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

SY2017 Monthly Report

Lake Thunderbird TMDL Monitoring Plan Implementation:

May 2017 Monitoring Report

Oklahoma Water Resources Board
Water Quality Programs Division
Monitoring and Assessment Section
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SUMMARY OF MAY WATER QUALITY SAMPLING

Sampling for May 2017 occurred over two days, where half the stations were collected on the twenty-ninth of April and the other half were collected on the second of May. The twenty-ninth was considered an above average flow collection. Discharge measurements were conducted at four locations, in addition to water collections being made at the seven storm outfalls. Mesonet data for Norman on the twenty-ninth of April shows 1.22 inches of rain, with 0.02 inches occurring in the 72 hours prior, and 0.09 inches occurring in the 72 hours after the sampling event. The remaining stations sampled on the second were considered base flow collections, and discharge measurements were conducted at all locations. Mesonet data on the second shows no precipitation, with 1.31 inches of precipitation in the 72 hours before collection, and no precipitation following the sampling event. The total rainfall in Norman for the month of May was 2.05 inches. All water level gages were operational for the month.

RESULTS

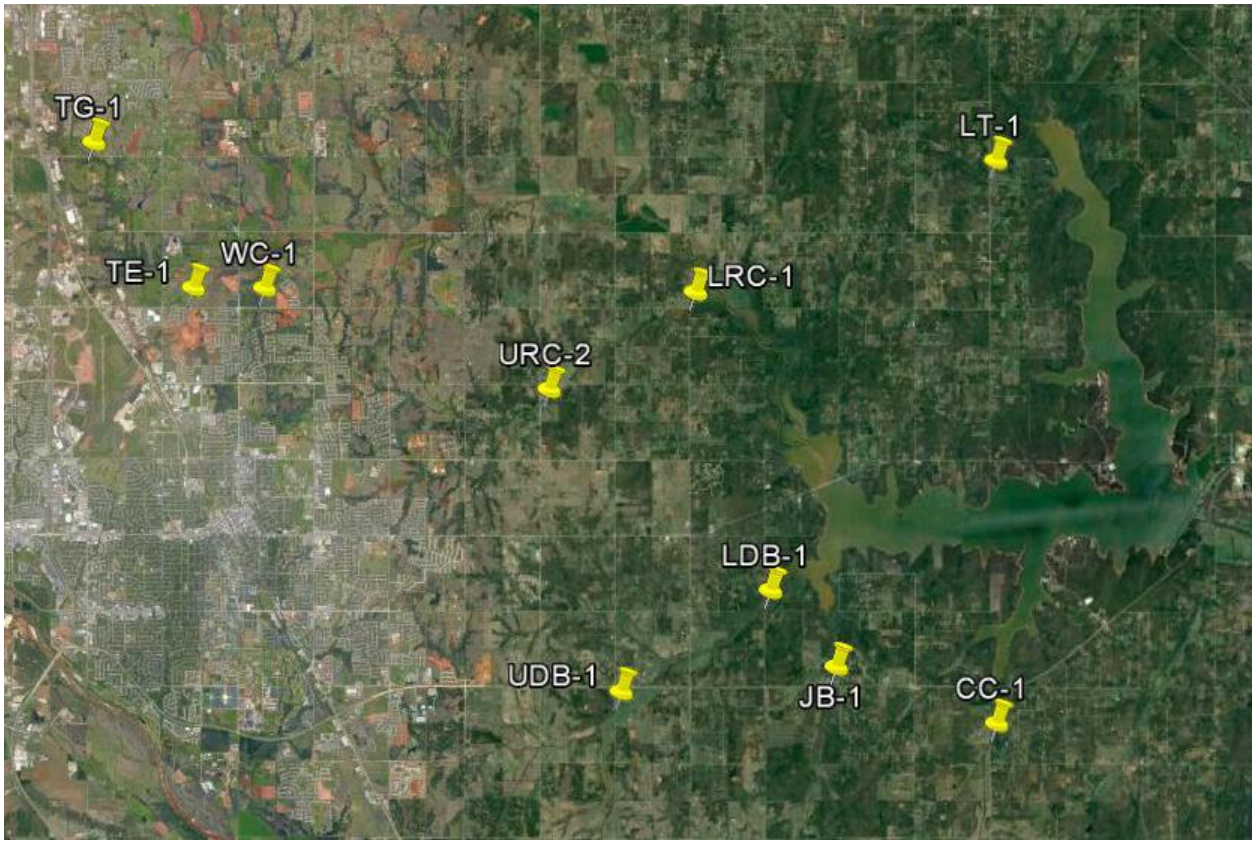

Figure 1 Monitoring Station Map

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
tg-1	5/2/2017	13:00	sd	N/A	N/A	N/A	N/A	N/A	field blank done at udb-1
cc-1	5/2/2017	11:10	sd	15.1	8.7	681.0	7.9	12.0	
sw-14	4/29/2017	9:15	sd	15.4	8.8	389.0	5.9	289.0	
sw-08	4/29/2017	9:30	sd	15.2	8.7	452.0	6.7	127.0	
sw-12	4/29/2017	9:55	sd	14.9	7.1	381.0	6.6	100.0	
lrc-1	4/29/2017	10:30	sd	16.4	7.3	445.0	7.0	191.0	bottles should have filled at 18.4 stage. Peak w as 18.6, stage w as 18.4 at approx 8:00 am
sw-13	4/29/2017	12:20	sd	15.3	8.6	232.0	7.4	60.0	
sw-10	4/29/2017	12:35	sd	17.2	8.6	271.0	7.7	74.0	
sw-11	4/29/2017	12:40	sd	16.4	8.4	247.0	7.6	110.0	
sw-09	4/29/2017	12:50	sd	16.0	7.5	323.0	7.6	44.0	
te-1	4/29/2017	9:25	jw	16.3	8.2	347.0	8.0	1000.0	
wc-1	4/29/2017	10:20	jw	15.9	8.6	243.0	7.9	97.0	
urc-2	4/29/2017	11:20	jw	15.8	8.0	329.0	7.9	157.0	stage of collection 13.25 at 10:10
tg-1	4/29/2017	9:45	as	16.0	9.0	182.0	7.6	177.0	
lt-1	5/2/2017	8:30	sd	13.5	4.7	419.0	7.5	7.0	
ldb-1	5/2/2017	9:35	sd	13.4	8.2	656.0	7.8	35.0	
jb-1	5/2/2017	12:25	sd	14.7	8.6	730.0	7.7	8.0	
udb-1	5/2/2017	13:15	sd	15.2	8.9	832.0	8.0	18.0	

Table 1 Field Data Form

Site Name	TKN (mg/L)	Nitrate/Nitrite (mg/L)	TP (mg/L)	TSS (mg/L)
TG-1	1.91	0.495	0.530	608
CC-1	0.402	0.191	0.042	7.10
JB-1	0.338	<0.050	0.041	5.10
UDB-1	0.229	0.096	0.042	14.7
LDB-1	0.468	0.262	0.054	30.3
LRC-1	1.42	0.281	0.391	188
URC-2	0.672	0.140	0.155	132
WC-1	1.34	0.664	0.236	61.5
TE-1	1.79	0.530	0.561	686
LT-1	0.151	<0.050	0.037	3.40
SW-08	0.700	1.91	0.307	166
SW-09	1.66	0.187	0.321	38.5
SW-10	0.190	<0.050	0.113	202
SW-11	1.44	0.614	0.208	124
SW-12	0.625	0.161	0.111	59.0
SW-13	0.349	0.068	0.072	102
SW-14	1.08	0.116	0.328	178

Table 2 Laboratory Analysis Summary

Site Name	TKN	Nitrate/Nitrite	TP	TSS
Field Blank	0.098 mg/L	<0.050 mg/L	<0.015 mg/L	<2.50 mg/L
Duplicate	0.338 mg/L	0.194 mg/L	0.042 mg/L	6.30 mg/L
Duplicate RPD	$17.30\%_{*1}$	1.56%	0%	$11.94\%_{*1}$

Table 3 QA/QC Data Where Subscript 1 Denotes a Level 2 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)	14.70	0.46	15.89	17.67	17.74	N/A	14.11	9.62	12.93	2.27
DISCHARGE (ft^3/s)	604	1.03	0.52	2.63	10.7	N/A	32.96	17.42	42.55	0.43

Table 4 Station Discharge Summary

Discharge Measurement Summary

Date Generated: Thu May 25 2017

File Information

File Name	WC10429.WAD
Start Date and Time	2017/04/29 07:48:41

Site Details

Site Name	WC1
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	ft^2
Discharge	cfs

Discharge Uncertainty

Category	ISO	Stats
Accuracy	1.0%	1.0%
Depth	0.3%	1.3%
Velocity	0.7%	2.1%
Width	0.1%	0.1%
Method	1.9%	-
# Stations	2.3%	-
Overall	**3.2%**	**2.7%**

Summary

Averaging Int.	40	# Stations	22
Start Edge	REW	Total Width	12.000
Mean SNR	42.1 dB	Total Area	7.000
Mean Temp	60.12 °F	Mean Depth	0.583
Disch. Equation	Mid-Section	Mean Velocity	2.4888
		Total Discharge	**17.4204**

Supplemental Data

#	Time	Location	Gauge Height	Rated Flow	Comments
1	Sat Apr 29 07:46:28 CDT 2017	0.000	9.615		

Measurement Results

St	Clock	Loc	Method	Depth	%Dep	MeasD	Vel	CorrFact	MeanV	Area	Flow	%Q
0	07:48	0.00	None	0.000	0.0	0.0	0.0000	1.00	0.0000	0.000	0.0000	0.0
1	07:48	1.00	0.6	0.800	0.6	0.320	2.2582	1.00	2.2582	0.800	1.8063	10.4
2	07:51	2.00	0.6	0.900	0.6	0.360	2.3005	1.00	2.3005	0.675	1.5527	8.9
3	07:55	2.50	0.6	1.000	0.6	0.400	2.5302	1.00	2.5302	0.500	1.2651	7.3
4	07:56	3.00	0.6	1.000	0.6	0.400	2.4977	1.00	2.4977	0.500	1.2489	7.2
5	07:57	3.50	0.6	0.900	0.6	0.360	3.2415	1.00	3.2415	0.450	1.4586	8.4
6	07:58	4.00	0.6	0.800	0.6	0.320	3.1919	1.00	3.1919	0.400	1.2766	7.3
7	07:59	4.50	0.6	0.800	0.6	0.320	3.1243	1.00	3.1243	0.400	1.2495	7.2
8	08:00	5.00	0.6	0.700	0.6	0.280	2.9413	1.00	2.9413	0.350	1.0296	5.9
9	08:01	5.50	0.6	0.600	0.6	0.240	2.5194	1.00	2.5194	0.300	0.7559	4.3
10	08:02	6.00	0.6	0.600	0.6	0.240	2.4396	1.00	2.4396	0.300	0.7320	4.2
11	08:03	6.50	0.6	0.600	0.6	0.240	1.8363	1.00	1.8363	0.300	0.5509	3.2
12	08:04	7.00	0.6	0.500	0.6	0.200	1.8091	1.00	1.8091	0.250	0.4523	2.6
13	08:05	7.50	0.6	0.500	0.6	0.200	2.3140	1.00	2.3140	0.250	0.5785	3.3
14	08:06	8.00	0.6	0.400	0.6	0.160	2.1535	1.00	2.1535	0.200	0.4306	2.5
15	08:07	8.50	0.6	0.400	0.6	0.160	2.2493	1.00	2.2493	0.200	0.4498	2.6
16	*08:08*	*9.00*	*0.6*	*0.500*	*0.6*	*0.200*	*2.2503*	*1.00*	*2.2503*	*0.250*	*0.5626*	*3.2*
17	08:09	9.50	0.6	0.500	0.6	0.200	2.5991	1.00	2.5991	0.250	0.6498	3.7
18	*08:10*	*10.00*	*0.6*	*0.400*	*0.6*	*0.160*	*2.2169*	*1.00*	*2.2169*	*0.200*	*0.4433*	*2.5*
19	08:11	10.50	0.6	0.400	0.6	0.160	2.5279	1.00	2.5279	0.200	0.5055	2.9
20	*08:12*	*11.00*	*0.6*	*0.300*	*0.6*	*0.120*	*1.8763*	*1.00*	*1.8763*	*0.225*	*0.4220*	*2.4*
21	08:12	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 2 Discharge Summary WC-1

Discharge Measurement Summary

Date Generated: Thu May 25 2017

File Information

File Name	TE10429.WAD
Start Date and Time	2017/04/29 06:44:38

Site Details

Site Name	TE1
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	ft^2
Discharge	cfs

Discharge Uncertainty

Category	ISO	Stats
Accuracy	1.0%	1.0%
Depth	0.2%	1.0%
Velocity	0.8%	1.9%
Width	0.1%	0.1%
Method	1.5%	-
# Stations	1.6%	-
Overall	**2.6%**	**2.4%**

Summary

Averaging Int.	40	# Stations	32
Start Edge	LEW	Total Width	33.000
Mean SNR	46.1 dB	Total Area	36.899
Mean Temp	60.95 °F	Mean Depth	1.118
Disch. Equation	Mid-Section	Mean Velocity	1.1530
		Total Discharge	**42.5453**

Supplemental Data

#	Time	Location	Gauge Height	Rated Flow	Comments
1	Sat Apr 29 07:27:36 CDT 2017	33.000	12.930		

Measurement Results

St	Clock	Loc	Method	Depth	%Dep	MeasD	Vel	CorrFact	MeanV	Area	Flow	%Q
0	06:44	0.00	None	0.000	0.0	0.0	0.0000	1.00	0.0000	0.000	0.0000	0.0
1	*06:44*	*2.00*	*0.6*	*1.000*	*0.6*	*0.400*	*-0.0863*	*1.00*	*-0.0863*	*1.500*	*-0.1294*	*-0.3*
2	*06:46*	*3.00*	*0.6*	*1.400*	*0.6*	*0.560*	*0.1959*	*1.00*	*0.1959*	*1.400*	*0.2742*	*0.6*
3	06:47	4.00	0.6	1.800	0.6	0.720	0.4662	1.00	0.4662	1.800	0.8391	2.0
4	06:48	5.00	0.6	1.800	0.6	0.720	0.7379	1.00	0.7379	1.800	1.3281	3.1
5	06:49	6.00	0.6	1.800	0.6	0.720	1.0318	1.00	1.0318	1.800	1.8571	4.4
6	06:50	7.00	0.6	1.700	0.6	0.680	1.3117	1.00	1.3117	1.700	2.2300	5.2
7	06:51	8.00	0.6	1.700	0.6	0.680	1.6621	1.00	1.6621	1.700	2.8257	6.6
8	06:52	9.00	0.6	1.400	0.6	0.560	1.5446	1.00	1.5446	1.400	2.1624	5.1
9	06:53	10.00	0.6	1.100	0.6	0.440	2.2024	1.00	2.2024	1.100	2.4228	5.7
10	*06:54*	*11.00*	*0.6*	*0.900*	*0.6*	*0.360*	*2.0003*	*1.00*	*2.0003*	*0.900*	*1.8002*	*4.2*
11	*06:55*	*12.00*	*0.6*	*0.900*	*0.6*	*0.360*	*2.0866*	*1.00*	*2.0866*	*0.900*	*1.8778*	*4.4*
12	*06:56*	*13.00*	*0.6*	*1.000*	*0.6*	*0.400*	*2.2234*	*1.00*	*2.2234*	*1.000*	*2.2234*	*5.2*
13	*06:57*	*14.00*	*0.6*	*1.000*	*0.6*	*0.400*	*2.2316*	*1.00*	*2.2316*	*1.000*	*2.2316*	*5.2*
14	*06:58*	*15.00*	*0.6*	*0.900*	*0.6*	*0.360*	*2.2487*	*1.00*	*2.2487*	*0.900*	*2.0237*	*4.8*
15	*06:59*	*16.00*	*0.6*	*0.900*	*0.6*	*0.360*	*2.0610*	*1.00*	*2.0610*	*0.900*	*1.8548*	*4.4*
16	*07:00*	*17.00*	*0.6*	*0.900*	*0.6*	*0.360*	*1.7900*	*1.00*	*1.7900*	*0.900*	*1.6109*	*3.8*
17	07:01	18.00	0.6	1.100	0.6	0.440	1.6631	1.00	1.6631	1.100	1.8295	4.3
18	07:02	19.00	0.6	1.300	0.6	0.520	1.5187	1.00	1.5187	1.300	1.9741	4.6
19	*07:03*	*20.00*	*0.6*	*1.300*	*0.6*	*0.520*	*1.2730*	*1.00*	*1.2730*	*1.300*	*1.6547*	*3.9*
20	07:04	21.00	0.6	1.300	0.6	0.520	0.9386	1.00	0.9386	1.300	1.2201	2.9
21	*07:05*	*22.00*	*0.6*	*1.300*	*0.6*	*0.520*	*1.0873*	*1.00*	*1.0873*	*1.300*	*1.4133*	*3.3*
22	07:06	23.00	0.6	1.300	0.6	0.520	0.8330	1.00	0.8330	1.300	1.0828	2.5
23	*07:07*	*24.00*	*0.6*	*1.200*	*0.6*	*0.480*	*0.8514*	*1.00*	*0.8514*	*1.200*	*1.0218*	*2.4*
24	*07:08*	*25.00*	*0.6*	*1.200*	*0.6*	*0.480*	*0.7234*	*1.00*	*0.7234*	*1.200*	*0.8682*	*2.0*
25	*07:09*	*26.00*	*0.6*	*1.100*	*0.6*	*0.440*	*0.6781*	*1.00*	*0.6781*	*1.100*	*0.7460*	*1.8*
26	*07:10*	*27.00*	*0.6*	*1.000*	*0.6*	*0.400*	*0.7759*	*1.00*	*0.7759*	*1.000*	*0.7759*	*1.8*
27	*07:12*	*28.00*	*0.6*	*0.900*	*0.6*	*0.360*	*0.7766*	*1.00*	*0.7766*	*0.900*	*0.6989*	*1.6*
28	*07:13*	*29.00*	*0.6*	*1.000*	*0.6*	*0.400*	*0.7221*	*1.00*	*0.7221*	*1.000*	*0.7221*	*1.7*
29	*07:14*	*30.00*	*0.6*	*1.000*	*0.6*	*0.400*	*0.5804*	*1.00*	*0.5804*	*1.000*	*0.5804*	*1.4*
30	*07:14*	*31.00*	*0.6*	*0.800*	*0.6*	*0.320*	*0.4377*	*1.00*	*0.4377*	*1.200*	*0.5251*	*1.2*
31	07:14	33.00	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 TE-1

Station Number:
Station Name: tg1

Meas. No: 0
Date: 04/29/2017

Party:	Width: 33.4 ft	Processed by:
Boat/Motor:	Area: 198 ft²	Mean Velocity: 3.06 ft/s
Gage Height: 14.70 ft	G.H.Change: 0.000 ft	Discharge: 604 ft³/s

Area Method: Avg. Course	ADCP Depth: 0.000 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.: 7.40 ft/s	Type/Freq.: RiverRay / 600 kHz	
WT 3-Beam Solution: YES	Max. Depth: 7.29 ft	Serial #: 645654	Firmware: 44.16
BT Error Vel.: 3.28 ft/s	Mean Depth: 5.90 ft	Bin Size: 10 cm	Blank: 16 cm
WT Error Vel.: 32.81 ft/s	% Meas.: 60.66	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.: 62.0 °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: station_0tg1.mmt
Software: 2.17

Tr.#		Edge Distance L	Edge Distance R	#Ens.	Discharge Top	Discharge Middle	Discharge Bottom	Discharge Left	Discharge Right	Discharge Total	Width	Area	Time Start	Time End	Mean Vel. Boat	Mean Vel. Water	% Bad Ens.	% Bad Bins
000	*L*	*1*	*2*	*92*	*62.5*	*371*	*110*	*9.36*	*9.11*	*562*	*34*	*202*	*19:03*	*19:05*	*0.48*	*2.79*	*36*	*1*
001	*R*	*3*	*2*	*49*	*54.7*	*297*	*120*	*19.0*	*15.5*	*506*	*28*	*165*	*19:05*	*19:05*	*0.79*	*3.06*	*8*	*1*
002	*L*	*3*	*2*	*51*	*59.1*	*314*	*118*	*21.4*	*13.0*	*526*	*35*	*200*	*19:05*	*19:06*	*0.90*	*2.64*	*12*	*1*
003	*R*	*3*	*2*	*56*	*55.6*	*314*	*102*	*18.5*	*18.6*	*509*	*27*	*156*	*19:06*	*19:07*	*0.60*	*3.25*	*36*	*2*
004	L	*3*	*2*	*42*	*60.2*	*373*	*103*	*28.2*	*13.5*	*577*	*28*	*170*	*19:07*	*19:08*	*0.75*	*3.40*	*36*	*3*
005	*R*	*3*	*2*	*59*	*74.3*	*346*	*185*	*21.4*	*17.5*	*644*	*36*	*203*	*19:08*	*19:08*	*0.91*	*3.17*	*37*	*2*
006	*L*	*3*	*2*	*56*	*69.1*	*376*	*175*	*27.5*	*12.3*	*660*	*33*	*201*	*19:08*	*19:09*	*0.73*	*3.29*	*41*	*1*
007	*R*	*3*	*2*	*51*	*47.8*	*254*	*99.6*	*23.0*	*11.9*	*436*	*28*	*155*	*19:09*	*19:10*	*0.77*	*2.81*	*24*	*1*
008	*L*	*3*	*2*	*56*	*112*	*653*	*210*	*25.2*	*14.8*	*1015*	*52*	*328*	*19:10*	*19:11*	*1.14*	*3.10*	*41*	*4*
Mean		3	2	56	66.2	366	136	21.5	14.0	604	33	198	**Total**	00:07	0.79	3.06	30	2
SDev		1	0	14	19.0	115	42.0	5.70	2.92	169	7.8	52.7			0.19	0.26		
SD/M		0.24	0.00	0.25	0.29	0.31	0.31	0.26	0.21	0.28	0.23	0.27			0.24	0.08		

Remarks:

Discharge for transects in *italics* have a total Q more than 5% from the mean

Figure 4 Discharge Summary TG-1

Discharge Measurement Summary

Date Generated: Thu May 25 2017

File Information

File Name	CC10502.WAD
Start Date and Time	2017/05/02 08:55:36

Site Details

Site Name	CC1
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	ft^2
Discharge	cfs

Discharge Uncertainty

Category	ISO	Stats
Accuracy	1.0%	1.0%
Depth	0.8%	2.3%
Velocity	2.3%	19.8%
Width	0.3%	0.3%
Method	3.9%	-
# Stations	2.5%	-
Overall	**5.4%**	**20.0%**

Summary

Averaging Int.	40	# Stations	20
Start Edge	LEW	Total Width	10.000
Mean SNR	40.5 dB	Total Area	5.401
Mean Temp	59.06 °F	Mean Depth	0.540
Disch. Equation	Mid-Section	Mean Velocity	0.1916
		Total Discharge	**1.0346**

Supplemental Data

#	Time	Location	Gauge Height	Rated Flow	Comments
1	Tue May 2 08:54:22 CDT 2017	0.000	0.460		

Measurement Results

St	Clock	Loc	Method	Depth	%Dep	MeasD	Vel	CorrFact	MeanV	Area	Flow	%Q
0	08:55	0.00	None	0.000	0.0	0.0	0.0000	1.00	0.0000	0.000	0.0000	0.0
1	08:55	1.00	0.6	0.600	0.6	0.240	-0.0007	1.00	-0.0007	0.450	-0.0003	0.0
2	08:57	1.50	0.6	0.600	0.6	0.240	0.0000	1.00	0.0000	0.300	0.0000	0.0
3	08:58	2.00	0.6	0.600	0.6	0.240	-0.0039	1.00	-0.0039	0.300	-0.0012	-0.1
4	*08:59*	*2.50*	*0.6*	*0.600*	*0.6*	*0.240*	*-0.0397*	*1.00*	*-0.0397*	*0.300*	*-0.0119*	*-1.2*
5	*09:00*	*3.00*	*0.6*	*0.600*	*0.6*	*0.240*	*-0.0581*	*1.00*	*-0.0581*	*0.300*	*-0.0174*	*-1.7*
6	*09:01*	*3.50*	*0.6*	*0.500*	*0.6*	*0.200*	*-0.0531*	*1.00*	*-0.0531*	*0.250*	*-0.0133*	*-1.3*
7	*09:02*	*4.00*	*0.6*	*0.500*	*0.6*	*0.200*	*-0.0610*	*1.00*	*-0.0610*	*0.250*	*-0.0153*	*-1.5*
8	*09:04*	*4.50*	*0.6*	*0.500*	*0.6*	*0.200*	*-0.0361*	*1.00*	*-0.0361*	*0.250*	*-0.0090*	*-0.9*
9	09:06	5.00	0.6	0.600	0.6	0.240	-0.0072	1.00	-0.0072	0.300	-0.0022	-0.2
10	09:07	5.50	0.6	0.600	0.6	0.240	0.0180	1.00	0.0180	0.300	0.0054	0.5
11	*09:08*	*6.00*	*0.6*	*0.600*	*0.6*	*0.240*	*0.0000*	*1.00*	*0.0000*	*0.300*	*0.0000*	*0.0*
12	*09:09*	*6.50*	*0.6*	*0.600*	*0.6*	*0.240*	*0.0502*	*1.00*	*0.0502*	*0.300*	*0.0151*	*1.5*
13	09:10	7.00	0.6	0.700	0.6	0.280	0.0833	1.00	0.0833	0.350	0.0292	2.8
14	09:11	7.50	0.6	0.700	0.6	0.280	0.5833	1.00	0.5833	0.350	0.2042	19.7
15	*09:13*	*8.00*	*0.6*	*0.700*	*0.6*	*0.280*	*0.6637*	*1.00*	*0.6637*	*0.350*	*0.2323*	*22.5*
16	09:14	8.50	0.6	0.600	0.6	0.240	1.3494	1.00	1.3494	0.300	0.4049	39.1
17	09:15	9.00	0.6	0.500	0.6	0.200	0.6673	1.00	0.6673	0.250	0.1668	16.1
18	09:16	9.50	0.6	0.400	0.6	0.160	0.2362	1.00	0.2362	0.200	0.0472	4.6
19	09:16	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 5 Discharge Summary CC-1

Discharge Measurement Summary

Date Generated: Thu May 25 2017

File Information

File Name	JB10502.WAD
Start Date and Time	2017/05/02 10:08:42

Site Details

Site Name	JB1
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	ft^2
Discharge	cfs

Discharge Uncertainty

Category	ISO	Stats
Accuracy	1.0%	1.0%
Depth	0.5%	2.6%
Velocity	1.2%	6.7%
Width	0.2%	0.2%
Method	2.5%	-
# Stations	3.3%	-
Overall	**4.5%**	**7.3%**

Summary

Averaging Int.	40	# Stations	15
Start Edge	LEW	Total Width	9.000
Mean SNR	26.3 dB	Total Area	3.650
Mean Temp	59.06 °F	Mean Depth	0.406
Disch. Equation	Mid-Section	Mean Velocity	0.1430
		Total Discharge	**0.5221**

Supplemental Data

#	Time	Location	Gauge Height	Rated Flow	Comments
1	Tue May 2 10:07:22 CDT 2017	0.000	15.885		

Measurement Results

St	Clock	Loc	Method	Depth	%Dep	MeasD	Vel	CorrFact	MeanV	Area	Flow	%Q
0	10:08	0.00	None	0.000	0.0	0.0	0.0000	1.00	0.0000	0.000	0.0000	0.0
1	*10:08*	*1.50*	*0.6*	*0.400*	*0.6*	*0.160*	*0.0203*	*1.00*	*0.0203*	*0.400*	*0.0081*	*1.6*
2	*10:10*	*2.00*	*0.6*	*0.500*	*0.6*	*0.200*	*0.0348*	*1.00*	*0.0348*	*0.250*	*0.0087*	*1.7*
3	*10:13*	*2.50*	*0.6*	*0.600*	*0.6*	*0.240*	*0.0545*	*1.00*	*0.0545*	*0.300*	*0.0163*	*3.1*
4	*10:14*	*3.00*	*0.6*	*0.600*	*0.6*	*0.240*	*0.0620*	*1.00*	*0.0620*	*0.300*	*0.0186*	*3.6*
5	*10:15*	*3.50*	*0.6*	*0.700*	*0.6*	*0.280*	*0.1526*	*1.00*	*0.1526*	*0.350*	*0.0534*	*10.2*
6	*10:16*	*4.00*	*0.6*	*0.600*	*0.6*	*0.240*	*0.1686*	*1.00*	*0.1686*	*0.300*	*0.0506*	*9.7*
7	10:17	4.50	0.6	0.600	0.6	0.240	0.1644	1.00	0.1644	0.300	0.0493	9.4
8	*10:18*	*5.00*	*0.6*	*0.600*	*0.6*	*0.240*	*0.2904*	*1.00*	*0.2904*	*0.300*	*0.0871*	*16.7*
9	*10:19*	*5.50*	*0.6*	*0.500*	*0.6*	*0.200*	*0.2749*	*1.00*	*0.2749*	*0.250*	*0.0687*	*13.2*
10	*10:20*	*6.00*	*0.6*	*0.500*	*0.6*	*0.200*	*0.3166*	*1.00*	*0.3166*	*0.250*	*0.0792*	*15.2*
11	*10:21*	*6.50*	*0.6*	*0.400*	*0.6*	*0.160*	*0.2290*	*1.00*	*0.2290*	*0.200*	*0.0458*	*8.8*
12	*10:22*	*7.00*	*0.6*	*0.300*	*0.6*	*0.120*	*0.1115*	*1.00*	*0.1115*	*0.150*	*0.0167*	*3.2*
13	*10:23*	*7.50*	*0.6*	*0.300*	*0.6*	*0.120*	*0.0650*	*1.00*	*0.0650*	*0.300*	*0.0195*	*3.7*
14	10:23	9.00	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 JB-1

Discharge Measurement Summary

Date Generated: Thu May 25 2017

File Information	
File Name	LT10502.WAD
Start Date and Time	2017/05/02 06:15:49

Site Details	
Site Name	LT1
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	ft^2
Discharge	cfs

Discharge Uncertainty

Category	ISO	Stats
Accuracy	1.0%	1.0%
Depth	0.1%	1.6%
Velocity	1.2%	6.0%
Width	0.1%	0.1%
Method	1.7%	-
# Stations	2.0%	-
Overall	**3.0%**	**6.3%**

Summary

Averaging Int.	40	# Stations	26
Start Edge	LEW	Total Width	14.000
Mean SNR	34.2 dB	Total Area	14.850
Mean Temp	56.07 °F	Mean Depth	1.061
Disch. Equation	Mid-Section	Mean Velocity	0.0286
		Total Discharge	**0.4251**

Supplemental Data

#	Time	Location	Gauge Height	Rated Flow	Comments
1	Tue May 2 06:28:55 CDT 2017	6.500	2.270		

Measurement Results

St	Clock	Loc	Method	Depth	%Dep	MeasD	Vel	CorrFact	MeanV	Area	Flow	%Q
0	06:15	0.00	None	0.000	0.0	0.0	0.0000	1.00	0.0000	0.000	0.0000	0.0
1	*06:15*	*1.00*	*0.6*	*0.500*	*0.6*	*0.200*	*0.0410*	*1.00*	*0.0410*	*0.500*	*0.0205*	*4.8*
2	*06:17*	*2.00*	*0.6*	*1.100*	*0.6*	*0.440*	*0.0197*	*1.00*	*0.0197*	*0.825*	*0.0162*	*3.8*
3	06:18	2.50	0.6	0.900	0.6	0.360	0.0167	1.00	0.0167	0.450	0.0075	1.8
4	*06:19*	*3.00*	*0.6*	*1.000*	*0.6*	*0.400*	*0.0016*	*1.00*	*0.0016*	*0.500*	*0.0008*	*0.2*
5	06:21	3.50	0.6	1.300	0.6	0.520	0.0095	1.00	0.0095	0.650	0.0062	1.5
6	06:23	4.00	0.6	1.300	0.6	0.520	0.0171	1.00	0.0171	0.650	0.0111	2.6
7	*06:24*	*4.50*	*0.6*	*1.400*	*0.6*	*0.560*	*0.0367*	*1.00*	*0.0367*	*0.700*	*0.0257*	*6.1*
8	*06:25*	*5.00*	*0.6*	*1.500*	*0.6*	*0.600*	*0.0194*	*1.00*	*0.0194*	*0.750*	*0.0145*	*3.4*
9	*06:26*	*5.50*	*0.6*	*1.500*	*0.6*	*0.600*	*0.0335*	*1.00*	*0.0335*	*0.750*	*0.0251*	*5.9*
10	*06:27*	*6.00*	*0.6*	*1.500*	*0.6*	*0.600*	*0.0440*	*1.00*	*0.0440*	*0.750*	*0.0330*	*7.8*
11	*06:29*	*6.50*	*0.6*	*1.400*	*0.6*	*0.560*	*0.0381*	*1.00*	*0.0381*	*0.700*	*0.0266*	*6.3*
12	*06:30*	*7.00*	*0.6*	*1.300*	*0.6*	*0.520*	*0.0492*	*1.00*	*0.0492*	*0.650*	*0.0320*	*7.5*
13	*06:31*	*7.50*	*0.6*	*1.300*	*0.6*	*0.520*	*0.0387*	*1.00*	*0.0387*	*0.650*	*0.0252*	*5.9*
14	*06:32*	*8.00*	*0.6*	*1.400*	*0.6*	*0.560*	*0.0440*	*1.00*	*0.0440*	*0.700*	*0.0308*	*7.2*
15	*06:33*	*8.50*	*0.6*	*1.400*	*0.6*	*0.560*	*0.0312*	*1.00*	*0.0312*	*0.700*	*0.0218*	*5.1*
16	06:34	9.00	0.6	1.300	0.6	0.520	0.0312	1.00	0.0312	0.650	0.0203	4.8
17	*06:35*	*9.50*	*0.6*	*1.200*	*0.6*	*0.480*	*0.0528*	*1.00*	*0.0528*	*0.600*	*0.0317*	*7.5*
18	*06:36*	*10.00*	*0.6*	*1.200*	*0.6*	*0.480*	*0.0407*	*1.00*	*0.0407*	*0.600*	*0.0244*	*5.7*
19	*06:37*	*10.50*	*0.6*	*1.200*	*0.6*	*0.480*	*0.0161*	*1.00*	*0.0161*	*0.600*	*0.0096*	*2.3*
20	06:38	11.00	0.6	1.200	0.6	0.480	0.0135	1.00	0.0135	0.600	0.0081	1.9
21	*06:40*	*11.50*	*0.6*	*1.000*	*0.6*	*0.400*	*0.0167*	*1.00*	*0.0167*	*0.500*	*0.0084*	*2.0*
22	*06:41*	*12.00*	*0.6*	*0.900*	*0.6*	*0.360*	*0.0318*	*1.00*	*0.0318*	*0.450*	*0.0143*	*3.4*
23	*06:42*	*12.50*	*0.6*	*0.800*	*0.6*	*0.320*	*0.0118*	*1.00*	*0.0118*	*0.400*	*0.0047*	*1.1*
24	*06:43*	*13.00*	*0.6*	*0.700*	*0.6*	*0.280*	*0.0125*	*1.00*	*0.0125*	*0.525*	*0.0065*	*1.5*
25	06:43	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 7 Discharge Summary LT-1

Station Number:
Station Name: udb-1

Meas. No: 1
Date: 05/02/2017

Party: jw sd	Width: 45.5 ft	Processed by:
Boat/Motor:	Area: 162 ft²	Mean Velocity: 0.068 ft/s
Gage Height: 17.74 ft	G.H.Change: 0.000 ft	Discharge: 10.7 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 (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.: 38.0 ft/s	Type/Freq.: RiverRay / 0 kHz	
WT 3-Beam Solution: YES	Max. Depth: 6.23 ft	Serial #: 645650	Firmware: 44.16
BT Error Vel.: 3.28 ft/s	Mean Depth: 3.56 ft	Bin Size: 50 cm	Blank: 50 cm
WT Error Vel.: 32.81 ft/s	% Meas.: 58.05	BT Mode: 0	BT Pings: 1
BT Up Vel.: 32.81 ft/s	Water Temp.: None	WT Mode: 1	WT Pings: 1
WT Up Vel.: 32.81 ft/s	ADCP Temp.: 57.8 °F	WV : 170	
Use Weighted Mean Depth: YES			

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

Project Name: udb_1.mmt
Software: 2.17

Tr.#		Edge Distance L	Edge Distance R	#Ens.	Discharge Top	Discharge Middle	Discharge Bottom	Discharge Left	Discharge Right	Discharge Total	Width	Area	Time Start	Time End	Mean Vel. Boat	Mean Vel. Water	% Bad Ens.	% Bad Bins
000	*L*	*6*	*4*	*239*	*0.424*	*-0.494*	*-0.212*	*-0.283*	*0.777*	*0.212*	*46*	*172*	*15:34*	*15:37*	*0.25*	*0.00*	*22*	*3*
001	*R*	*6*	*4*	*217*	*2.97*	*10.8*	*3.64*	*-1.73*	*1.17*	*16.8*	*41*	*153*	*15:38*	*15:40*	*0.28*	*0.11*	*26*	*1*
002	*L*	*6*	*4*	*271*	*3.78*	*7.98*	*3.32*	*1.77*	*-1.20*	*15.6*	*54*	*179*	*15:41*	*15:43*	*0.25*	*0.09*	*31*	*1*
003	*R*	*6*	*4*	*269*	*1.13*	*8.09*	*1.77*	*-1.87*	*-0.424*	*8.72*	*41*	*151*	*15:44*	*15:46*	*0.24*	*0.06*	*30*	*1*
004	*L*	*6*	*4*	*259*	*1.52*	*5.69*	*1.52*	*0.777*	*-1.06*	*8.48*	*50*	*166*	*15:46*	*15:49*	*0.23*	*0.05*	*30*	*2*
005	*R*	*6*	*4*	*250*	*4.10*	*5.26*	*2.79*	*1.20*	*1.09*	*14.4*	*42*	*149*	*15:50*	*15:53*	*0.24*	*0.10*	*26*	*2*
Mean		6	4	250	2.32	6.22	2.14	-0.024	0.059	10.7	46	162	**Total**	00:18	0.25	0.07	27	2
SDev		0	0	20	1.51	3.84	1.42	1.53	1.08	6.23	5.3	12.6			0.02	0.04		
SD/M		0.00	0.00	0.08	0.65	0.62	0.67	65.08	18.43	0.58	0.12	0.08			0.06	0.59		

Remarks:

Discharge for transects in *italics* have a total Q more than 5% from the mean

Figure 8 Discharge Summary LDB-1

Discharge Measurement Summary

Date Generated: Thu May 25 2017

File Information

File Name	UDB10502.WAD
Start Date and Time	2017/05/02 11:02:21

Site Details

Site Name	UDB1
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	ft^2
Discharge	cfs

Discharge Uncertainty

Category	ISO	Stats
Accuracy	1.0%	1.0%
Depth	0.3%	3.7%
Velocity	0.9%	3.3%
Width	0.1%	0.1%
Method	1.8%	-
# Stations	2.2%	-
Overall	**3.1%**	**5.1%**

Summary

Averaging Int.	40	# Stations	23
Start Edge	LEW	Total Width	12.500
Mean SNR	31.8 dB	Total Area	8.875
Mean Temp	59.52 °F	Mean Depth	0.710
Disch. Equation	Mid-Section	Mean Velocity	0.2959
		Total Discharge	**2.6256**

Supplemental Data

#	Time	Location	Gauge Height	Rated Flow	Comments
1	Tue May 2 11:00:36 CDT 2017	0.000	17.670		

Measurement Results

St	Clock	Loc	Method	Depth	%Dep	MeasD	Vel	CorrFact	MeanV	Area	Flow	%Q
0	11:02	0.00	None	0.000	0.0	0.0	0.0000	1.00	0.0000	0.000	0.0000	0.0
1	*11:02*	*1.00*	*0.6*	*0.800*	*0.6*	*0.320*	*0.1690*	*1.00*	*0.1690*	*0.600*	*0.1014*	*3.9*
2	*11:04*	*1.50*	*0.6*	*0.700*	*0.6*	*0.280*	*0.2434*	*1.00*	*0.2434*	*0.350*	*0.0852*	*3.2*
3	11:05	2.00	0.6	1.300	0.6	0.520	0.3435	1.00	0.3435	0.650	0.2233	8.5
4	11:07	2.50	0.6	1.100	0.6	0.440	0.3888	1.00	0.3888	0.550	0.2138	8.1
5	11:08	3.00	0.6	1.100	0.6	0.440	0.3766	1.00	0.3766	0.550	0.2072	7.9
6	11:09	3.50	0.6	0.900	0.6	0.360	0.3848	1.00	0.3848	0.450	0.1732	6.6
7	*11:10*	*4.00*	*0.6*	*0.600*	*0.6*	*0.240*	*0.3550*	*1.00*	*0.3550*	*0.300*	*0.1065*	*4.1*
8	11:12	4.50	0.6	0.700	0.6	0.280	0.4072	1.00	0.4072	0.350	0.1425	5.4
9	11:13	5.00	0.6	0.600	0.6	0.240	0.3976	1.00	0.3976	0.300	0.1193	4.5
10	11:13	5.50	0.6	0.700	0.6	0.280	0.3796	1.00	0.3796	0.350	0.1329	5.1
11	11:14	6.00	0.6	1.000	0.6	0.400	0.2464	1.00	0.2464	0.500	0.1232	4.7
12	11:15	6.50	0.6	0.900	0.6	0.360	0.2041	1.00	0.2041	0.450	0.0918	3.5
13	11:16	7.00	0.6	0.900	0.6	0.360	0.2349	1.00	0.2349	0.450	0.1057	4.0
14	11:17	7.50	0.6	0.800	0.6	0.320	0.3970	1.00	0.3970	0.400	0.1588	6.0
15	11:18	8.00	0.6	0.800	0.6	0.320	0.3255	1.00	0.3255	0.400	0.1302	5.0
16	*11:19*	*8.50*	*0.6*	*0.800*	*0.6*	*0.320*	*0.1417*	*1.00*	*0.1417*	*0.400*	*0.0567*	*2.2*
17	*11:20*	*9.00*	*0.6*	*0.900*	*0.6*	*0.360*	*0.1125*	*1.00*	*0.1125*	*0.450*	*0.0506*	*1.9*
18	*11:21*	*9.50*	*0.6*	*0.800*	*0.6*	*0.320*	*0.2762*	*1.00*	*0.2762*	*0.400*	*0.1105*	*4.2*
19	*11:22*	*10.00*	*0.6*	*0.700*	*0.6*	*0.280*	*0.3274*	*1.00*	*0.3274*	*0.525*	*0.1719*	*6.5*
20	11:23	11.00	0.6	0.300	0.6	0.120	0.2972	1.00	0.2972	0.225	0.0669	2.5
21	11:24	11.50	0.6	0.300	0.6	0.120	0.2408	1.00	0.2408	0.225	0.0542	2.1
22	11:24	12.50	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 9 Discharge Summary UDB-1

Discharge Measurement Summary

Date Generated: Thu May 25 2017

File Information

File Name	URC10429.WAD
Start Date and Time	2017/04/29 08:48:44

Site Details

Site Name	URC1
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	ft^2
Discharge	cfs

Discharge Uncertainty

Category	ISO	Stats
Accuracy	1.0%	1.0%
Depth	0.2%	2.8%
Velocity	0.4%	2.4%
Width	0.1%	0.1%
Method	2.1%	-
# Stations	3.1%	-
Overall	**3.9%**	**3.8%**

Summary

Averaging Int.	40	# Stations	16
Start Edge	LEW	Total Width	9.000
Mean SNR	47.8 dB	Total Area	12.200
Mean Temp	60.00 °F	Mean Depth	1.356
Disch. Equation	Mid-Section	Mean Velocity	2.7016
		Total Discharge	**32.9599**

Supplemental Data

#	Time	Location	Gauge Height	Rated Flow	Comments
1	Sat Apr 29 08:57:49 CDT 2017	5.000	14.105		

Measurement Results

St	Clock	Loc	Method	Depth	%Dep	MeasD	Vel	CorrFact	MeanV	Area	Flow	%Q
0	08:48	0.00	None	0.000	0.0	0.0	0.0000	1.00	0.0000	0.000	0.0000	0.0
1	*08:49*	*2.00*	*0.6*	*0.600*	*0.6*	*0.240*	*2.3533*	*1.00*	*2.3533*	*0.750*	*1.7652*	*5.4*
2	*08:50*	*2.50*	*0.6*	*0.700*	*0.6*	*0.280*	*2.4587*	*1.00*	*2.4587*	*0.350*	*0.8607*	*2.6*
3	*08:51*	*3.00*	*0.6*	*0.900*	*0.6*	*0.360*	*2.7579*	*1.00*	*2.7579*	*0.450*	*1.2410*	*3.8*
4	*08:52*	*3.50*	*0.6*	*1.000*	*0.6*	*0.400*	*2.5781*	*1.00*	*2.5781*	*0.500*	*1.2890*	*3.9*
5	*08:53*	*4.00*	*0.6*	*1.200*	*0.6*	*0.480*	*2.4793*	*1.00*	*2.4793*	*0.600*	*1.4878*	*4.5*
6	08:56	4.50	0.6	1.500	0.6	0.600	3.2116	1.00	3.2116	0.750	2.4087	7.3
7	08:57	5.00	0.6	1.800	0.6	0.720	3.0092	1.00	3.0092	0.900	2.7081	8.2
8	08:59	5.50	0.6	2.000	0.6	0.800	3.0164	1.00	3.0164	1.000	3.0164	9.2
9	09:00	6.00	0.6	2.300	0.6	0.920	2.9268	1.00	2.9268	1.150	3.3657	10.2
10	09:01	6.50	0.6	2.600	0.6	1.040	2.5512	1.00	2.5512	1.300	3.3166	10.1
11	09:02	7.00	0.6	2.400	0.6	0.960	2.9836	1.00	2.9836	1.200	3.5802	10.9
12	09:03	7.50	0.6	2.100	0.6	0.840	2.9026	1.00	2.9026	1.050	3.0478	9.2
13	09:04	8.00	0.6	2.500	0.6	1.000	2.2172	1.00	2.2172	1.250	2.7715	8.4
14	09:06	8.50	0.6	1.900	0.6	0.760	2.2119	1.00	2.2119	0.950	2.1013	6.4
15	09:06	9.00	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 10 Discharge Summary URC-2

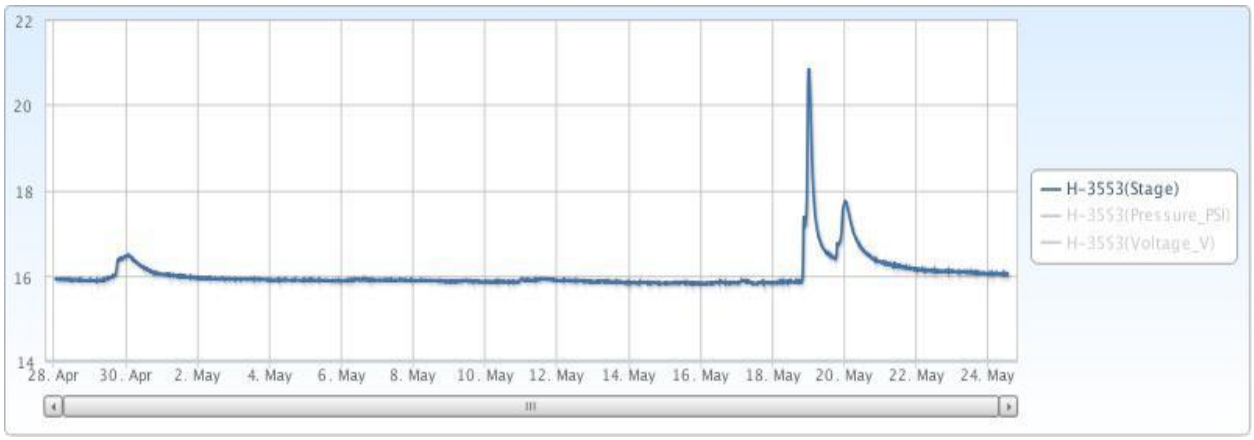

Figure 11 Monthly Hydrograph JB-1

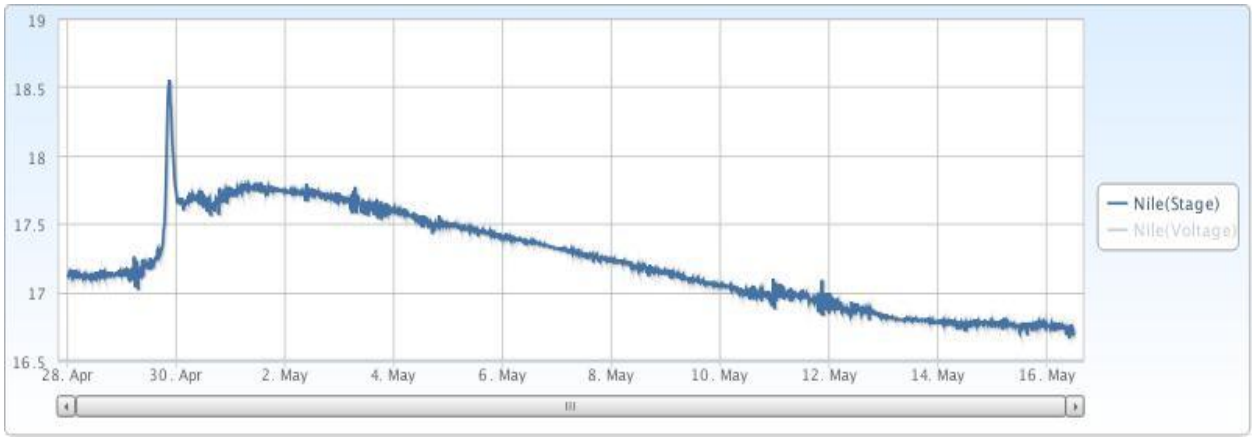

Figure 12 Monthly Hydrograph LDB-1

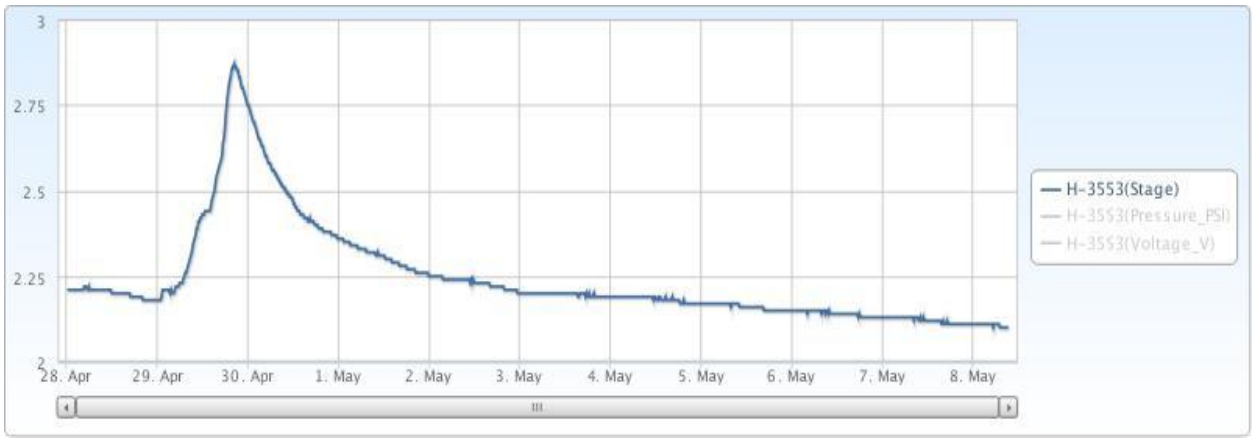

Figure 13 Monthly Hydrograph LT-1

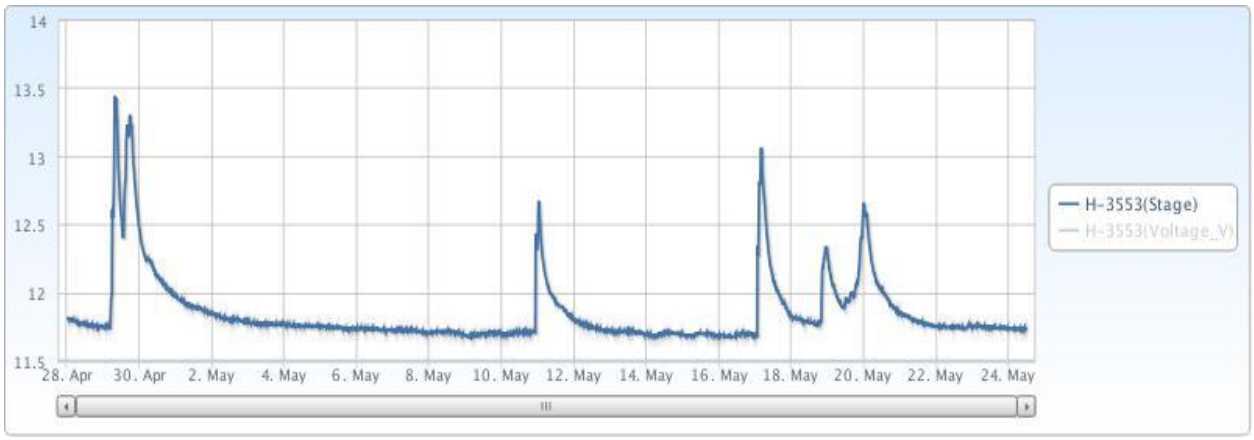

Figure 14 Monthly Hydrograph TE-1

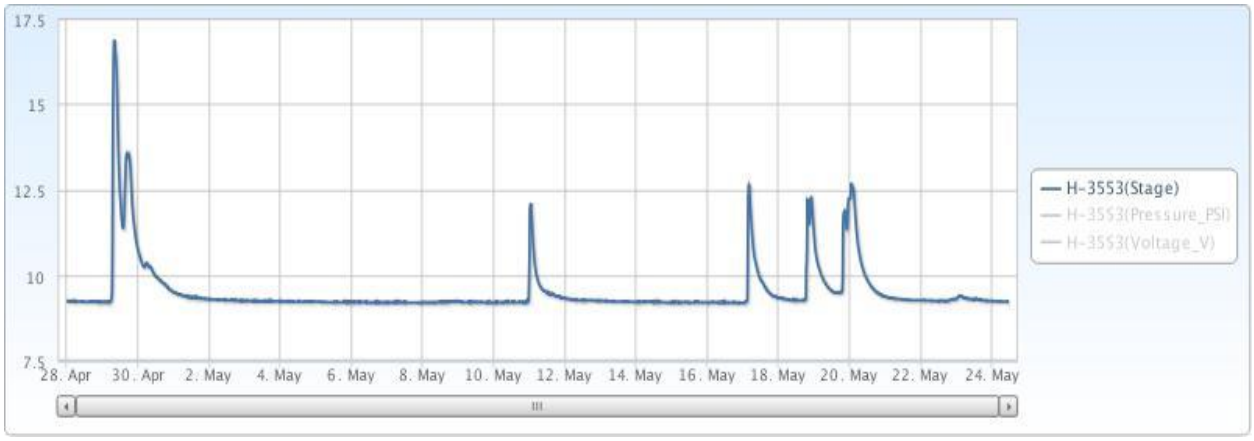

Figure 15 Monthly Hydrograph TG-1

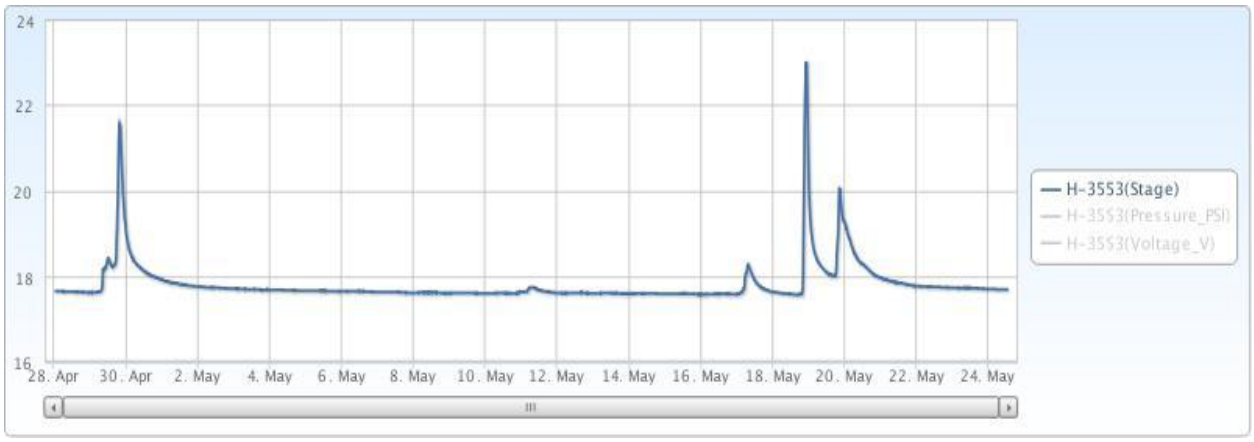

Figure 16 Monthly Hydrograph UDB-1

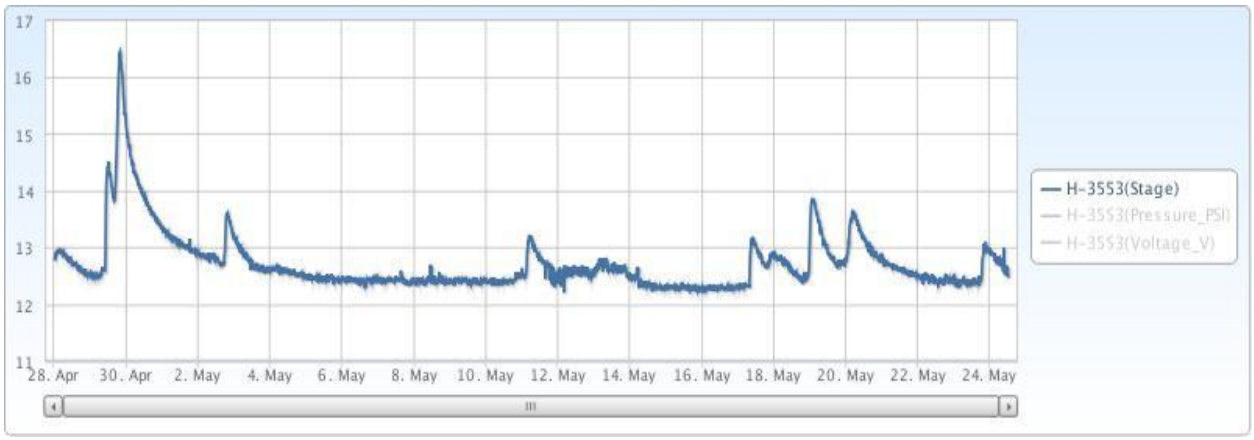

Figure 17 Monthly Hydrograph URC-2

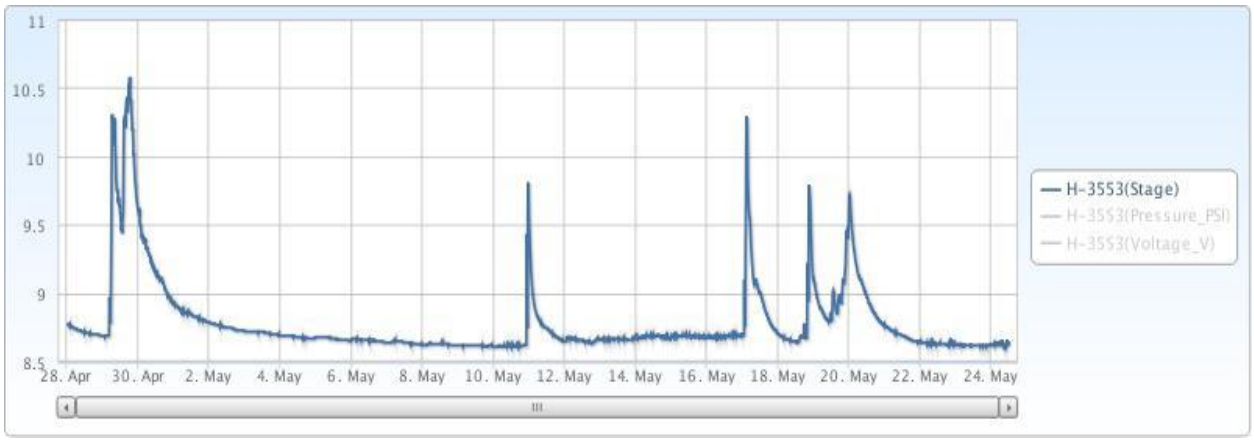

Figure 18 Monthly Hydrograph WC-1

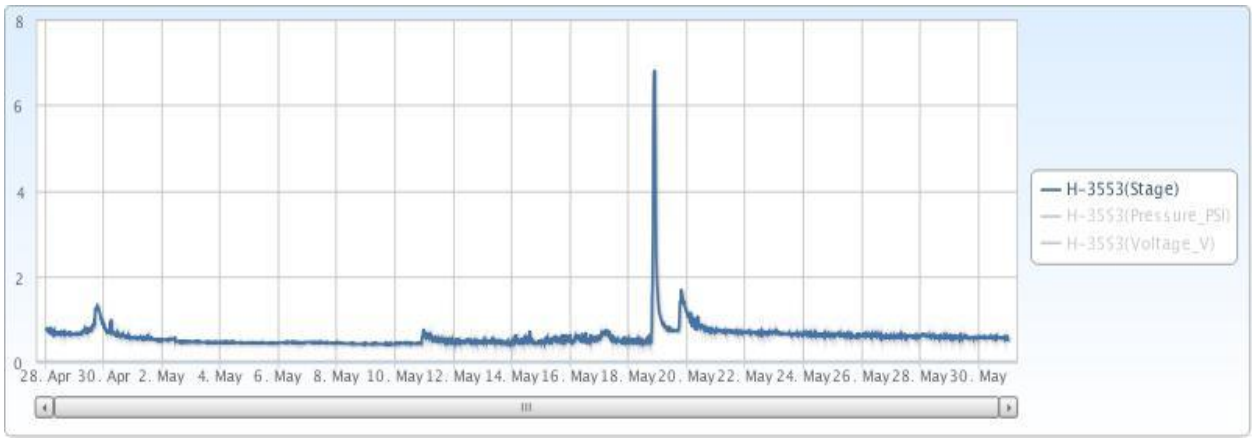

Figure 19 Monthly Hydrograph CC-1

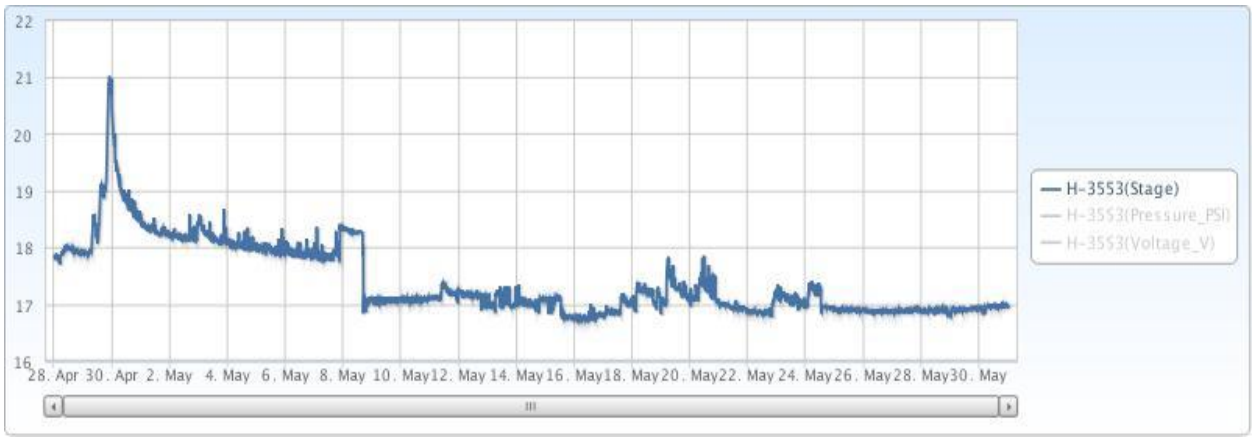

Figure 20 Monthly Hydrograph LRC-1

MESONET CLIMATOLOGICAL DATA SUMMARY — April 2017 — 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	76	46	58.1	49.6	4	0	100	30	78	0.62	28.69	29.94	ENE	8.7	27.9	12.44	58.0	57.0	61	52
2	62	54	56.4	56.0	7	0	100	83	98	0.36	28.56	29.81	NNW	6.6	39.5	4.58	58.6	58.4	60	57
3	75	51	61.7	51.4	2	0	100	40	73	0.00	28.41	29.65	W	7.3	20.0	24.90	60.6	62.6	70	57
4	76	47	59.1	51.2	3	0	93	48	76	0.00	28.43	29.66	WNW	12.7	28.8	18.28	61.4	62.7	68	59
5	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.00*	NA	NA	NW *	NA	42.2*	NA	NA	NA	NA	NA
6	70	38	55.8	32.6	11	0	87	21	47	0.00	28.94	30.20	ENE	4.8	15.9	25.94	58.2	55.7	64	47
7	76	44	61.8	39.5	5	0	67	31	45	0.00	28.87	30.12	SSE	9.8	26.2	25.27	59.5	57.0	64	50
8	82	58	69.7	53.6	0	5	73	44	57	0.00	28.56	29.80	S	15.4	36.3	24.98	61.6	61.8	70	55
9	83	63	71.8	60.6	0	8	88	48	69	0.00	28.49	29.73	S	14.8	35.6	17.43	63.8	66.5	72	62
10	73	53	65.0	40.9	2	0	86	21	45	0.00	28.78	30.03	N	12.3	30.7	26.16	64.2	67.8	74	62
11	74	45	59.6	37.8	6	0	79	22	48	0.00	28.95	30.21	NE	6.8	17.2	26.32	62.6	65.2	74	57
12	74	54	65.1	56.3	1	0	99	51	75	0.00	28.94	30.19	SSE	7.8	21.3	16.62	63.4	66.6	72	62
13	75	59	64.1	60.4	0	2	98	60	89	1.12	28.88	30.13	SSE	8.5	22.4	9.68	63.8	65.5	69	62
14	80	61	69.1	58.1	0	5	98	41	71	0.01	28.77	30.02	S	11.0	30.0	24.73	65.0	67.0	73	62
15	81	64	71.5	61.2	0	8	88	53	71	0.00	28.70	29.95	S	12.7	28.8	20.84	66.5	67.5	73	63
16	72	62	67.6	63.6	0	2	100	77	87	0.00	28.74	29.99	SE	8.2	22.2	5.91	66.4	66.2	68	65
17	70*	58*	64.4*	60.2*	1*	0*	100*	69*	87*	0.00*	28.79*	30.04*	SE *	7.8*	28.1*	NA	65.6*	65.0*	68*	63*
18	79	52	66.1	58.9	0	0	100	49	80	0.01	28.77	30.02	SSE	6.9	22.4	24.86	66.0	65.7	72	60
19	78	62	70.1	61.9	0	5	96	59	76	0.00	28.72	29.97	S	11.9	30.9	21.59	67.3	67.6	73	64
20	73	63	67.2	61.8	0	3	96	67	83	0.00	28.74	29.99	S	8.8	23.6	8.20	67.2	67.3	69	66
21	63	49	55.9	54.3	9	0	99	86	94	1.16	28.64	29.89	N	13.0	55.3	6.32	64.4	63.2	66	60
22	59	46	50.8	42.5	12	0	88	53	74	0.00	28.86	30.11	N	14.5	29.7	10.52	60.1	58.0	61	56
23	70	40	56.0	38.1	10	0	91	27	55	0.00	28.86	30.11	NW	5.9	18.3	28.74	60.2	59.3	68	51
24	75	46	62.6	44.7	4	0	77	38	53	0.00	28.52	29.76	SSE	11.3	33.8	26.77	61.7	59.4	66	52
25	83	58	70.2	57.4	0	6	97	47	66	0.59	28.19	29.42	S	11.7	28.6	22.72	64.2	63.6	70	58
26	58	41	50.3	43.8	15	0	99	53	79	0.02	28.42	29.65	N	13.4	34.7	11.06	62.1	60.1	65	56
27	69	38	55.9	45.4	11	0	98	46	71	0.00	28.45	29.69	SSE	8.4	30.7	18.15	59.5	57.4	64	51
28	78	57	67.8	58.5	0	3	94	48	73	0.00	28.37	29.61	ESE	7.7	18.9	22.76	63.2	63.8	71	56
29	70	47	53.5	52.5	7	0	100	84	96	1.22	28.40	29.63	NNW	12.4	36.1	1.58	62.6	61.0	66	57
30	53	42	46.3	39.6	17	0	98	58	78	0.09	28.41	29.64	SW	18.1	44.2	16.09	58.0	56.2	59	53
	73*	52*	61.8*	51.5*	<- Monthly Averages ->						28.65*	29.90*	S *	10.3*	55.3*	17.98*	62.6*	62.6*	68*	58*

Temperature - Highest: 83*
Lowest: 38*

Degree Days - Total HDD: 128*
Total CDD: 47*

Number of Days With:
Tmax ≥ 90: 0*
Tmax ≤ 32: 0*
Tmin ≤ 32: 0*
Tmin ≤ 0: 0*
Rainfall ≥ 0.01 inch: 10*
Rainfall ≥ 0.10 inch: 6*
Avg Wind Speed ≥ 10 mph: 14*
Max Wind Speed ≥ 30 mph: 13*

Rainfall: Monthly Total: 5.20* in.
Greatest 24 Hr: 1.22* in.

Humidity - Highest: 100*
Lowest: 21*

* Denotes incomplete record

Figure 21 April Mesonet Data

MESONET CLIMATOLOGICAL DATA SUMMARY — May 2017 — 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	73	38	57.0	37.8	10	0	88	27	53	0.00	28.66	29.91	WNW	10.3	30.8	29.20	57.5	57.7	67	49
2	81*	45*	66.8*	50.3*	2*	0*	87*	38*	57*	0.00*	28.66*	29.90*	E *	7.2*	21.9*	NA	61.8*	62.7*	70*	54*
3	66	52	57.4	49.2	6	0	89	58	75	0.00	28.68	29.92	N	14.3	34.3	10.31	62.6	60.3	64	56
4	71	44	57.4	43.6	8	0	97	29	64	0.00	28.83	30.08	NNW	12.2	33.2	26.18	61.0	57.6	63	52
5	75	44	60.8	43.7	6	0	92	30	58	0.00	28.79	30.04	NW	5.3	19.2	28.93	62.1	59.9	68	51
6	83	47	67.5	49.0	0	0	96	29	56	0.00	28.71	29.95	SSW	5.2	16.5	28.93	64.3	65.8	78	55
7	84	55	71.9	51.3	0	5	83	31	51	0.00	28.70	29.94	SSE	8.2	23.0	28.94	66.8	71.0	81	62
8	81	59	71.0	56.5	0	5	88	40	62	0.00	28.73	29.98	SSE	8.8	22.9	28.59	68.2	73.2	82	65
9	82	62	71.8	60.9	0	7	88	51	70	0.00	28.71	29.96	S	7.8	21.1	21.49	69.3	74.0	81	68
10	77	63	70.3	65.2	0	5	98	71	84	0.48	28.65	29.89	SSE	9.5	33.7	8.45	69.4	72.8	76	69
11	82	57	69.3	59.3	0	5	98	34	74	0.01	28.61	29.86	S	9.4	40.9	26.25	69.7	71.2	78	67
12	75	55	65.5	53.1	0	0	89	43	66	0.00	28.70	29.95	N	13.3	32.3	22.69	68.6	68.3	74	64
13	78	50	66.1	51.0	1	0	99	37	62	0.00	28.71	29.95	SE	5.1	19.4	29.15	68.2	70.6	81	60
14	85	59	73.0	57.9	0	7	78	45	60	0.00	28.64	29.89	SSE	9.7	22.1	28.90	70.1	74.6	84	65
15	88	67	76.9	62.6	0	13	88	41	63	0.00	28.61	29.85	SSE	10.9	25.0	28.07	72.2	78.3	87	71
16	78	68	72.9	62.9	0	8	82	64	71	0.03	28.49	29.73	SSE	13.7	42.8	14.25	71.4	75.7	79	72
17	83	62	72.0	52.6	0	8	99	26	56	0.68	28.40	29.64	S	13.3	36.0	29.61	70.7	71.5	75	68
18	86	63	73.5	64.7	0	10	94	51	75	0.29	28.47	29.71	S	13.1	56.5	19.20	71.3	70.8	77	66
19	76	61	66.2	62.0	0	3	99	53	87	0.47	28.54	29.78	SSE	9.6	41.7	3.75	69.3	67.0	68	66
20	72	52	62.1	50.4	3	0	94	38	68	0.03	28.73	29.98	NW	9.7	22.7	28.64	68.5	67.0	73	62
21	75	47	62.4	48.8	4	0	99	40	64	0.00	28.90	30.15	E	5.0	15.2	28.23	68.2	65.9	74	58
22	72	52	62.3	54.7	3	0	99	50	78	0.06	28.79	30.04	NNE	4.6	17.8	14.61	68.0	65.3	69	60
23	69	52	60.6	51.0	4	0	100	42	73	0.00	28.67	29.92	NNW	9.6	28.1	14.46	66.8	63.5	66	61
24	74	48	61.5	45.3	4	0	91	34	58	0.00	28.55	29.79	NW	9.9	27.9	30.34	66.3	64.5	74	56
25	87	55	72.3	54.5	0	6	76	39	55	0.00	28.37	29.61	SSE	12.0	30.2	28.75	68.3	70.4	80	61
26	88	73	80.2	65.4	0	15	85	39	62	0.00	28.46	29.70	S	7.9	22.2	28.31	71.5	78.0	87	70
27	93	72	81.7	70.7	0	17	95	43	71	0.00	28.52	29.76	SSW	10.6	32.1	24.97	73.9	80.7	88	74
28	82	61	72.6	57.2	0	7	89	32	61	0.00	28.74	29.99	N	9.7	37.6	28.02	74.0	80.3	87	74
29	87	55	73.8	52.5	0	6	92	24	52	0.00	28.79	30.04	S	4.8	16.3	30.15	72.9	79.4	89	70
30	86	57	73.4	56.5	0	7	88	31	57	0.00	28.82	30.08	S	5.7	16.4	25.28	73.1	79.2	87	72
31	86	64	76.1	59.5	0	10	82	38	58	0.00	28.79	30.04	S	6.4	19.9	26.93	74.2	80.4	88	73
	80*	56*	68.6*	54.8*	<- Monthly Averages ->						28.66*	29.90*	S *	9.1*	56.5*	24.05*	68.4*	70.2*	77*	64*

Temperature - Highest: 93*
Lowest: 38*

Degree Days - Total HDD: 51*
Total CDD: 143*

Number of Days With:
Tmax ≥ 90: 1* — Rainfall ≥ 0.01 inch: 8*
Tmax ≤ 32: 0* — Rainfall ≥ 0.10 inch: 4*
Tmin ≤ 32: 0* — Avg Wind Speed ≥ 10 mph: 10*
Tmin ≤ 0: 0* — Max Wind Speed ≥ 30 mph: 13*

Rainfall: Monthly Total: 2.05* in.
Greatest 24 Hr: 0.68* in.

Humidity - Highest: 100*
Lowest: 24*

* Denotes incomplete record

Figure 22 May Mesonet Data