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

SY-2022 Monthly Report

Lake Thunderbird TMDL Monitoring Plan Implementation:

May 2022 Monitoring Report

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

Sampling for May 2022 consisted of three sampling events. The first collection occurred during high flow conditions on the third, where water samples were collected via autosampler at two locations. Mesonet data shows no precipitation on the third, 2.34 inches of precipitation in the 72 hours prior to sampling, and 2.02 inches of precipitation in the 72 hours after the sampling event. The second collection occurred during base flow conditions on the seventeenth. Water samples were collected at nine locations and discharge was measured at seven locations. Samples were not collected at JB-1 due to construction activity. Mesonet shows no precipitation on the seventeenth, in the 72 hours prior to sampling, or in the 72 hours after the sampling event. The third collection also occurred during high flow conditions on the twenty-fourth. Water samples were collected at eight locations, one of which was via autosampler, as well as all seven stormwater outfalls. Discharge measurements were also collected at four locations. Mesonet shows 1.44 inches of precipitation on the twenty-fourth, 0.75 inches of precipitation in the 72 hours prior to sampling, and 0.84 inches of precipitation in the 72 hours after sampling. The total rainfall amount in Norman for the month of May was 7.39 inches. All water level gauges were operational for the month, except for JB-1 due to road construction. The gauge at LT-1 was removed in 2018 as a result of equipment malfunction. The equipment has not been replaced due to intermittent streamflow and dry conditions. Furthermore, this station is being reviewed for a possible location change.

RESULTS

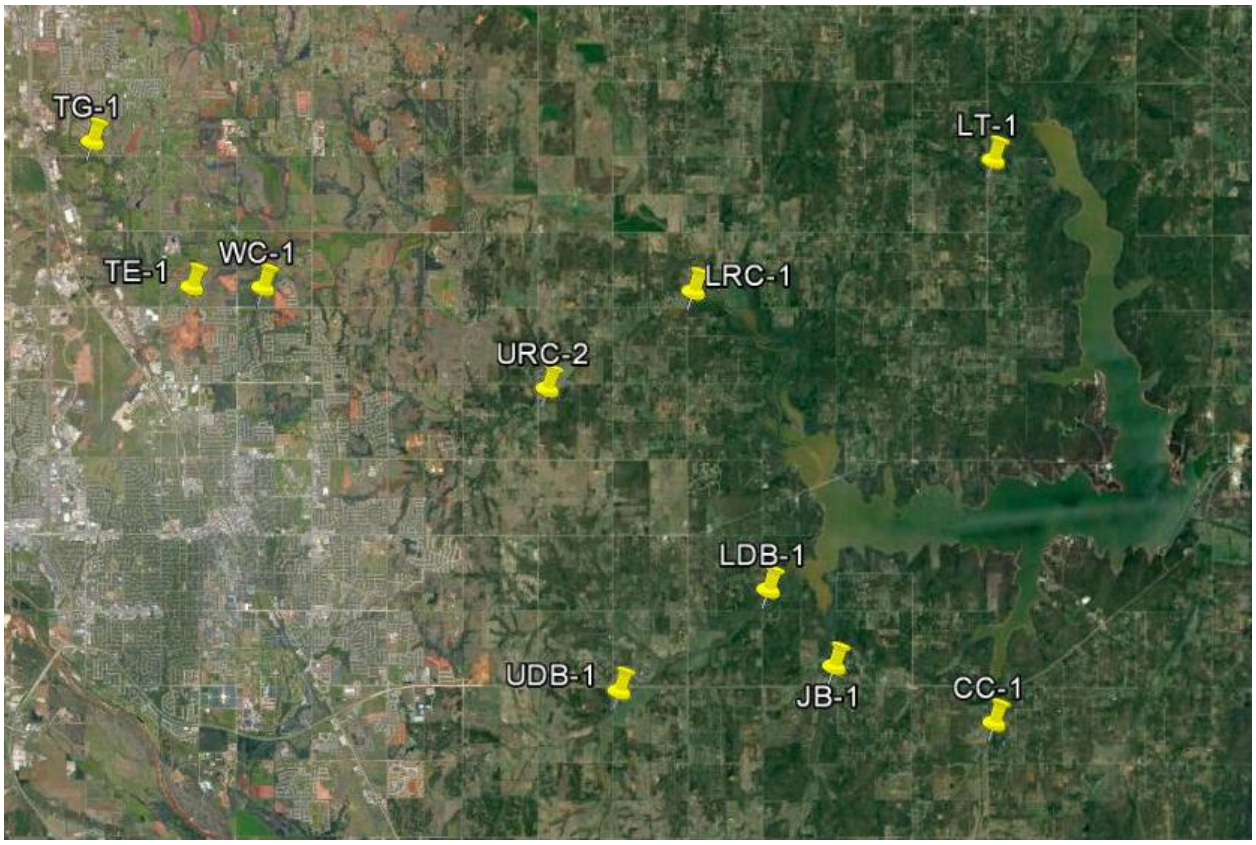


Figure 1 Monitoring Station Map

Monitoring Location ID	Monitoring Location Name	Date	Time	Field Crew	Water Temperature (°C)	Dissolved Oxygen (DO) (mg/L)	pH	Specific Conductance (mS/cm)	Turbidity (NTU)	Notes
CC-1	Clear Creek	5/17/2022	11:58	SD	22.15	8.09	7.86	689	6	Used RP3, RP4 also over water; DCP not connecting- changed power cords; low/normal conditions
JB-1	Jim Blue Creek	5/17/2022	13:05	SD	N/A	N/A	N/A	N/A	N/A	Construction ongoing; did not sample. Pool conditions on downstream
LDB-1	Lower Dave Blue Creek	5/17/2022	13:30	SD	25.00	4.43	7.88	857	64	One autosampler bottle triggered from 5/5, spilled sample
LRC-1	Lower Rock Creek	5/17/2022	15:30	SD	26.36	8.38	7.94	757	8	Solar panel gone, autosampler batteries gone, wires cut, DCP has no power, orifice buried; replaced panel on 5/18
LT-1	Lake Laterals	5/17/2022	14:52	SD	28.50	5.96	7.74	712	28	No visual flow; lots of filamentous, very shallow on upstream
TE-1	Little River Tributary	5/18/2022	11:03	SD	24.45	5.48	7.70	1050	26	Orifice was pulled out of water after tapedown, secured back in water- changed DCP/offset
TG-1	Little River	5/18/2022	9:40	SD	22.98	6.30	7.82	1169	3	Low/normal conditions
UDB-1	Upper Dave Blue Creek	5/17/2022	10:19	SD	21.25	6.61	7.87	937	8	Tree under bridge; normal/low flow conditions
URC-2	Upper Rock Creek	5/17/2022	16:12	SD	26.20	5.85	7.65	859	12	Orifice of autosampler came loose- resecured
WC-1	Woodcrest Creek	5/18/2022	12:30	SD	24.39	6.97	7.64	1105	15	Autosampler orifice probably clogged

Table 1 Field Data Form

Monitoring Location ID	Monitoring Location Name	Nitrate and Nitrite (mg/L)	Kjeldahl Nitrogen (mg/L)	Phosphorus (mg/L)	Total Suspended Solids (mg/L)
CC-1	Clear Creek	0.15	0.29	0.053	<5.0
JB-1	Jim Blue Creek	N/A	N/A	N/A	N/A
LDB-1	Lower Dave Blue Creek	0.09	0.87	0.110	49.0
LRC-1	Lower Rock Creek	<0.05	0.33	0.045	<5.0
LT-1	Lake Laterals	<0.05	1.68	0.230	22.0
TE-1	Little River Tributary	<0.05	0.49	0.046	19.0
TG-1	Little River	<0.05	0.39	0.032	<5.0
UDB-1	Upper Dave Blue Creek	0.11	0.29	0.043	<5.0
URC-2	Upper Rock Creek	<0.05	0.54	0.073	10.0
WC-1	Woodcrest Creek	0.07	0.39	0.089	9.0

Table 2 Laboratory Analysis Summary

Monitoring Location Name	Nitrate and Nitrite (mg/L)	Kjeldahl Nitrogen (mg/L)	Phosphorus (mg/L)	Total Suspended Solids (mg/L)
Field Blank	<0.05	<0.10	<0.010	<5.0
Duplicate	0.16	0.26	0.054	<5.0
Duplicate RPD	6.45%	10.91%	1.87%	0%

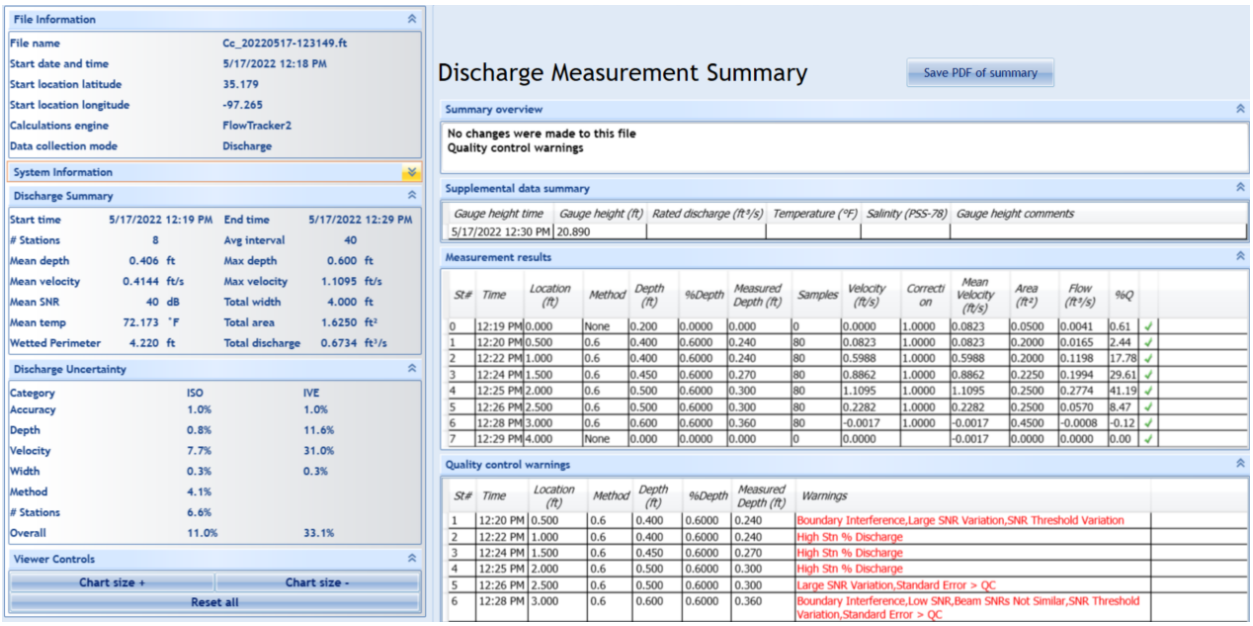
Table 3 QA/QC Data

Quality assurance/quality control (QA/QC) of the data includes a field blank and duplicate sample from each collection event and is qualified by the OWRB. Relative Percent Difference (RPD) of the duplicate sample can be categorized into four levels, where Level 1 likely has no QA issues and Level 4 has major QA issues and should be used with caution.

Monitoring Location ID	Monitoring Location Name	Discharge (cfs)	Stream Stage (ft)
CC-1	Clear Creek	0.67	20.89
JB-1	Jim Blue Creek	N/A	N/A
LDB-1	Lower Dave Blue Creek	49.63	17.28
LRC-1	Lower Rock Creek	0.75	4.29
LT-1	Lake Laterals	0.01	4.19
TE-1	Little River Tributary	0.03	10.99
TG-1	Little River	0.83	9.09
UDB-1	Upper Dave Blue Creek	-0.11	17.54
URC-2	Upper Rock Creek	0.08	10.95
WC-1	Woodcrest Creek	0.09	7.61

Table 4 Station Discharge Summary

All rated stream discharges are provisional and subject to change.



File Information

File name	Cc_20220517-123149.ft
Start date and time	5/17/2022 12:18 PM
Start location latitude	35.179
Start location longitude	-97.265
Calculations engine	FlowTracker2
Data collection mode	Discharge

System Information

Discharge Summary

Start time	5/17/2022 12:19 PM	End time	5/17/2022 12:29 PM
# Stations	8	Avg interval	40
Mean depth	0.406 ft	Max depth	0.600 ft
Mean velocity	0.4144 ft/s	Max velocity	1.1095 ft/s
Mean SNR	40 dB	Total width	4.000 ft
Mean temp	72.173 °F	Total area	1.6250 ft²
Wetted Perimeter	4.220 ft	Total discharge	0.6734 ft³/s

Discharge Uncertainty

Category	ISO	IVE
Accuracy	1.0%	1.0%
Depth	0.8%	11.6%
Velocity	7.7%	31.0%
Width	0.3%	0.3%
Method	4.1%	
# Stations	6.6%	
Overall	11.0%	33.1%

Viewer Controls

Chart size + | Chart size - | Reset all

Discharge Measurement Summary

Save PDF of summary

Summary overview

No changes were made to this file
Quality control warnings

Supplemental data summary

Gauge height time	Gauge height (ft)	Rated discharge (ft³/s)	Temperature (°F)	Salinity (PSS-78)	Gauge height comments
5/17/2022 12:30 PM	20.890				

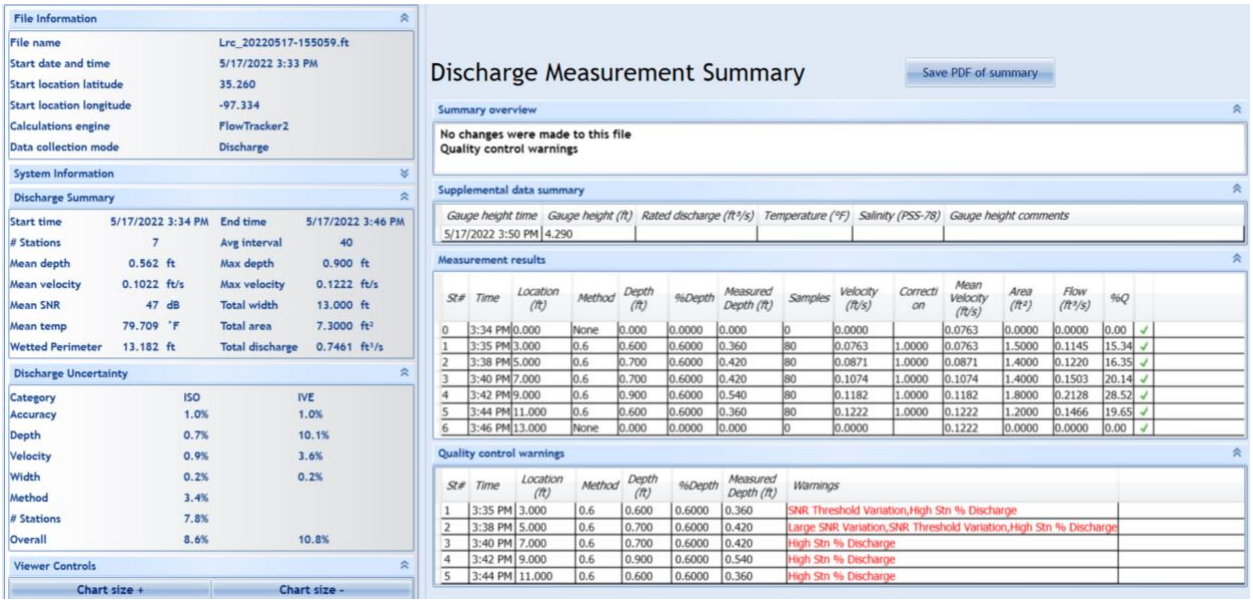
Measurement results

St#	Time	Location (ft)	Method	Depth (ft)	%Depth	Measured Depth (ft)	Samples	Velocity (ft/s)	Correction	Mean Velocity (ft/s)	Area (ft²)	Flow (ft³/s)	%Q	
0	12:19 PM	0.000	None	0.200	0.0000	0.000	0	0.0000	1.0000	0.0823	0.0500	0.0041	0.61	✓
1	12:20 PM	0.500	0.6	0.400	0.6000	0.240	80	0.0823	1.0000	0.0823	0.2000	0.0165	2.44	✓
2	12:22 PM	1.000	0.6	0.400	0.6000	0.240	80	0.5988	1.0000	0.5988	0.2000	0.1198	17.78	✓
3	12:24 PM	1.500	0.6	0.450	0.6000	0.270	80	0.8862	1.0000	0.8862	0.2250	0.1994	29.61	✓
4	12:25 PM	2.000	0.6	0.500	0.6000	0.300	80	1.1095	1.0000	1.1095	0.2500	0.2774	41.19	✓
5	12:26 PM	2.500	0.6	0.500	0.6000	0.300	80	0.2282	1.0000	0.2282	0.2500	0.0570	8.47	✓
6	12:28 PM	3.000	0.6	0.600	0.6000	0.360	80	-0.0017	1.0000	-0.0017	0.4500	-0.0008	-0.12	✓
7	12:29 PM	4.000	None	0.000	0.0000	0.000	0	0.0000		-0.0017	0.0000	0.0000	0.00	✓

Quality control warnings

St#	Time	Location (ft)	Method	Depth (ft)	%Depth	Measured Depth (ft)	Warnings
1	12:20 PM	0.500	0.6	0.400	0.6000	0.240	Boundary Interference,Large SNR Variation,SNR Threshold Variation
2	12:22 PM	1.000	0.6	0.400	0.6000	0.240	High Stn % Discharge
3	12:24 PM	1.500	0.6	0.450	0.6000	0.270	High Stn % Discharge
4	12:25 PM	2.000	0.6	0.500	0.6000	0.300	High Stn % Discharge
5	12:26 PM	2.500	0.6	0.500	0.6000	0.300	Large SNR Variation,Standard Error > QC
6	12:28 PM	3.000	0.6	0.600	0.6000	0.360	Boundary Interference,Low SNR,Beam SNRs Not Similar,SNR Threshold Variation,Standard Error > QC

Figure 2 Discharge Measurement Summary CC-1



File Information

File name	Lrc_20220517-155059.ft
Start date and time	5/17/2022 3:33 PM
Start location latitude	35.260
Start location longitude	-97.334
Calculations engine	FlowTracker2
Data collection mode	Discharge

System Information

Discharge Summary

Start time	5/17/2022 3:34 PM	End time	5/17/2022 3:46 PM
# Stations	7	Avg interval	40
Mean depth	0.562 ft	Max depth	0.900 ft
Mean velocity	0.1022 ft/s	Max velocity	0.1222 ft/s
Mean SNR	47 dB	Total width	13.000 ft
Mean temp	79.709 °F	Total area	7.3000 ft²
Wetted Perimeter	13.182 ft	Total discharge	0.7461 ft³/s

Discharge Uncertainty

Category	ISO	IVE
Accuracy	1.0%	1.0%
Depth	0.7%	10.1%
Velocity	0.9%	3.6%
Width	0.2%	0.2%
Method	3.4%	
# Stations	7.8%	
Overall	8.6%	10.8%

Viewer Controls

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Discharge Measurement Summary

Save PDF of summary

Summary overview

No changes were made to this file
Quality control warnings

Supplemental data summary

Gauge height time	Gauge height (ft)	Rated discharge (ft³/s)	Temperature (°F)	Salinity (PSS-78)	Gauge height comments
5/17/2022 3:50 PM	4.290				

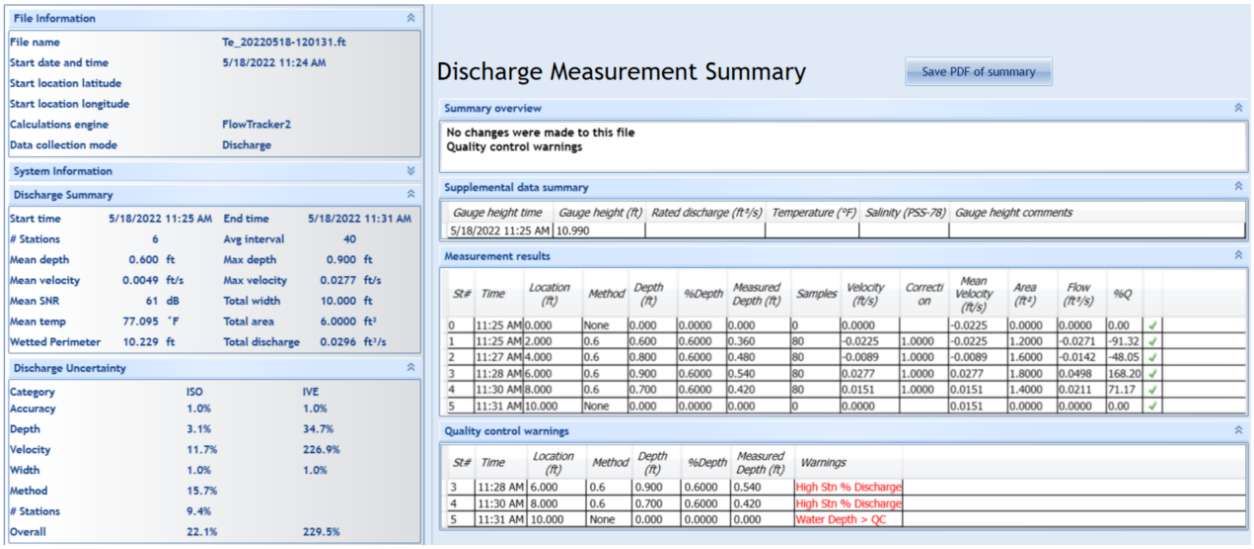
Measurement results

St#	Time	Location (ft)	Method	Depth (ft)	%Depth	Measured Depth (ft)	Samples	Velocity (ft/s)	Correction	Mean Velocity (ft/s)	Area (ft²)	Flow (ft³/s)	%Q	
0	3:34 PM	0.000	None	0.000	0.0000	0.000	0	0.0000		0.0763	0.0000	0.0000	0.00	✓
1	3:35 PM	3.000	0.6	0.600	0.6000	0.360	80	0.0763	1.0000	0.0763	1.5000	0.1145	15.34	✓
2	3:38 PM	5.000	0.6	0.700	0.6000	0.420	80	0.0871	1.0000	0.0871	1.4000	0.1220	16.35	✓
3	3:40 PM	7.000	0.6	0.700	0.6000	0.420	80	0.1074	1.0000	0.1074	1.4000	0.1503	20.14	✓
4	3:42 PM	9.000	0.6	0.900	0.6000	0.540	80	0.1182	1.0000	0.1182	1.8000	0.2128	28.52	✓
5	3:44 PM	11.000	0.6	0.600	0.6000	0.360	80	0.1222	1.0000	0.1222	1.2000	0.1466	19.65	✓
6	3:46 PM	13.000	None	0.000	0.0000	0.000	0	0.0000		0.1222	0.0000	0.0000	0.00	✓

Quality control warnings

St#	Time	Location (ft)	Method	Depth (ft)	%Depth	Measured Depth (ft)	Warnings
1	3:35 PM	3.000	0.6	0.600	0.6000	0.360	SNR Threshold Variation,High Stn % Discharge
2	3:38 PM	5.000	0.6	0.700	0.6000	0.420	Large SNR Variation,SNR Threshold Variation,High Stn % Discharge
3	3:40 PM	7.000	0.6	0.700	0.6000	0.420	High Stn % Discharge
4	3:42 PM	9.000	0.6	0.900	0.6000	0.540	High Stn % Discharge
5	3:44 PM	11.000	0.6	0.600	0.6000	0.360	High Stn % Discharge

Figure 3 Discharge Measurement Summary LRC-1



Discharge Measurement Summary

Save PDF of summary

File Information

File name	Te_20220518-120131.ft
Start date and time	5/18/2022 11:24 AM
Start location latitude	
Start location longitude	
Calculations engine	FlowTracker2
Data collection mode	Discharge

System Information

Discharge Summary

Start time	5/18/2022 11:25 AM	End time	5/18/2022 11:31 AM
# Stations	6	Avg interval	40
Mean depth	0.600 ft	Max depth	0.900 ft
Mean velocity	0.0049 ft/s	Max velocity	0.0277 ft/s
Mean SNR	61 dB	Total width	10.000 ft
Mean temp	77.095 °F	Total area	6.0000 ft²
Wetted Perimeter	10.229 ft	Total discharge	0.0296 ft³/s

Discharge Uncertainty

Category	ISO	IVE
Accuracy	1.0%	1.0%
Depth	3.1%	34.7%
Velocity	11.7%	226.9%
Width	1.0%	1.0%
Method	15.7%	
# Stations	9.4%	
Overall	22.1%	229.5%

Summary overview

No changes were made to this file
Quality control warnings

Supplemental data summary

Gauge height time	Gauge height (ft)	Rated discharge (ft³/s)	Temperature (°F)	Salinity (PSS-78)	Gauge height comments
5/18/2022 11:25 AM	10.990				

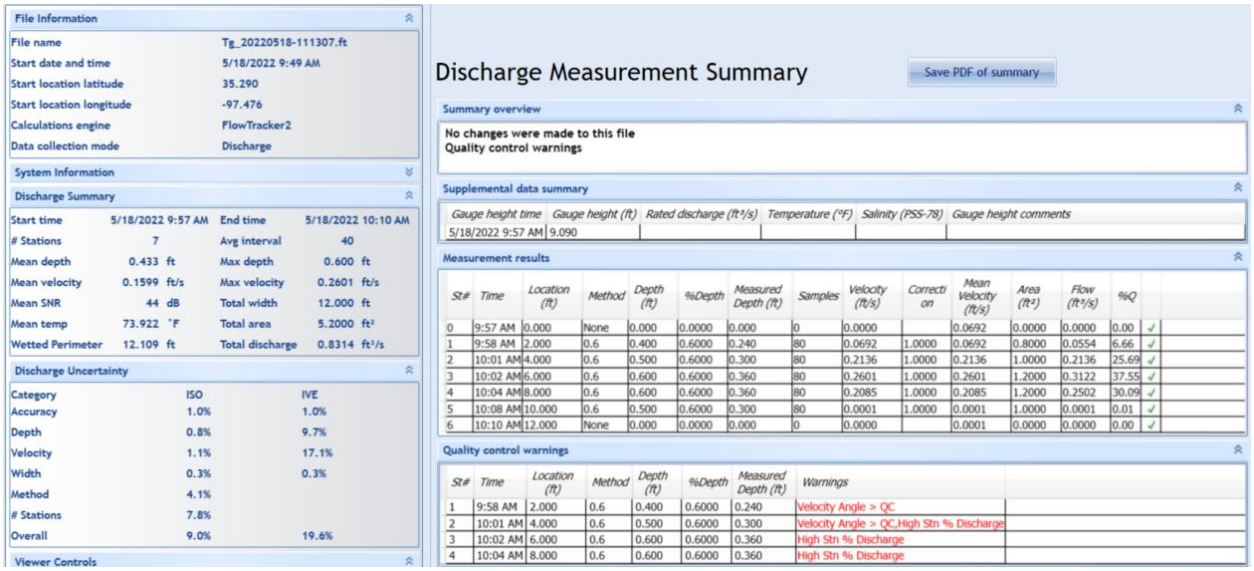
Measurement results

St#	Time	Location (ft)	Method	Depth (ft)	%Depth	Measured Depth (ft)	Samples	Velocity (ft/s)	Correction	Mean Velocity (ft/s)	Area (ft²)	Flow (ft³/s)	%Q	
0	11:25 AM	0.000	None	0.000	0.0000	0.000	0	0.0000		-0.0225	0.0000	0.0000	0.00	✓
1	11:25 AM	2.000	0.6	0.600	0.6000	0.360	80	-0.0225	1.0000	-0.0225	1.2000	-0.0271	-91.32	✓
2	11:27 AM	4.000	0.6	0.800	0.6000	0.480	80	-0.0089	1.0000	-0.0089	1.6000	-0.0142	-48.05	✓
3	11:28 AM	6.000	0.6	0.900	0.6000	0.540	80	0.0277	1.0000	0.0277	1.8000	0.0498	168.20	✓
4	11:30 AM	8.000	0.6	0.700	0.6000	0.420	80	0.0151	1.0000	0.0151	1.4000	0.0211	71.17	✓
5	11:31 AM	10.000	None	0.000	0.0000	0.000	0	0.0000		0.0151	0.0000	0.0000	0.00	✓

Quality control warnings

St#	Time	Location (ft)	Method	Depth (ft)	%Depth	Measured Depth (ft)	Warnings
3	11:28 AM	6.000	0.6	0.900	0.6000	0.540	High Stn % Discharge
4	11:30 AM	8.000	0.6	0.700	0.6000	0.420	High Stn % Discharge
5	11:31 AM	10.000	None	0.000	0.0000	0.000	Water Depth > QC

Figure 4 Discharge Measurement Summary TE-1



Discharge Measurement Summary

Save PDF of summary

File Information

File name	Tg_20220518-111307.ft
Start date and time	5/18/2022 9:49 AM
Start location latitude	35.290
Start location longitude	-97.476
Calculations engine	FlowTracker2
Data collection mode	Discharge

System Information

Discharge Summary

Start time	5/18/2022 9:57 AM	End time	5/18/2022 10:10 AM
# Stations	7	Avg interval	40
Mean depth	0.433 ft	Max depth	0.600 ft
Mean velocity	0.1599 ft/s	Max velocity	0.2601 ft/s
Mean SNR	44 dB	Total width	12.000 ft
Mean temp	73.922 °F	Total area	5.2000 ft²
Wetted Perimeter	12.109 ft	Total discharge	0.8314 ft³/s

Discharge Uncertainty

Category	ISO	IVE
Accuracy	1.0%	1.0%
Depth	0.8%	9.7%
Velocity	1.1%	17.1%
Width	0.3%	0.3%
Method	4.1%	
# Stations	7.8%	
Overall	9.0%	19.6%

Viewer Controls

Summary overview

No changes were made to this file
Quality control warnings

Supplemental data summary

Gauge height time	Gauge height (ft)	Rated discharge (ft³/s)	Temperature (°F)	Salinity (PSS-78)	Gauge height comments
5/18/2022 9:57 AM	9.090				

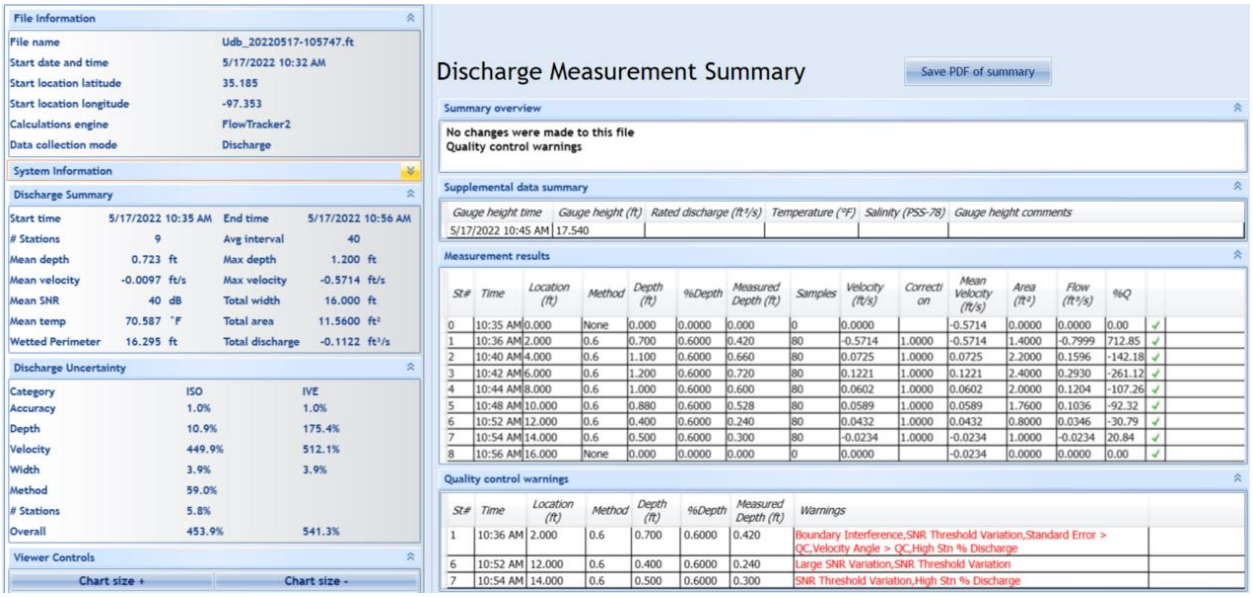
Measurement results

St#	Time	Location (ft)	Method	Depth (ft)	%Depth	Measured Depth (ft)	Samples	Velocity (ft/s)	Correction	Mean Velocity (ft/s)	Area (ft²)	Flow (ft³/s)	%Q	
0	9:57 AM	0.000	None	0.000	0.0000	0.000	0	0.0000		0.0692	0.0000	0.0000	0.00	✓
1	9:58 AM	2.000	0.6	0.400	0.6000	0.240	80	0.0692	1.0000	0.0692	0.8000	0.0554	6.66	✓
2	10:01 AM	4.000	0.6	0.500	0.6000	0.300	80	0.2136	1.0000	0.2136	1.0000	0.2136	25.69	✓
3	10:02 AM	6.000	0.6	0.600	0.6000	0.360	80	0.2601	1.0000	0.2601	1.2000	0.3122	37.55	✓
4	10:04 AM	8.000	0.6	0.600	0.6000	0.360	80	0.2085	1.0000	0.2085	1.2000	0.2502	30.09	✓
5	10:08 AM	10.000	0.6	0.500	0.6000	0.300	80	0.0001	1.0000	0.0001	1.0000	0.0001	0.01	✓
6	10:10 AM	12.000	None	0.000	0.0000	0.000	0	0.0000		0.0001	0.0000	0.0000	0.00	✓

Quality control warnings

St#	Time	Location (ft)	Method	Depth (ft)	%Depth	Measured Depth (ft)	Warnings
1	9:58 AM	2.000	0.6	0.400	0.6000	0.240	Velocity Angle > QC
2	10:01 AM	4.000	0.6	0.500	0.6000	0.300	Velocity Angle > QC,High Stn % Discharge
3	10:02 AM	6.000	0.6	0.600	0.6000	0.360	High Stn % Discharge
4	10:04 AM	8.000	0.6	0.600	0.6000	0.360	High Stn % Discharge

Figure 5 Discharge Measurement Summary TG-1



File Information

File name	Udb_20220517-105747.ft
Start date and time	5/17/2022 10:32 AM
Start location latitude	35.185
Start location longitude	-97.353
Calculations engine	FlowTracker2
Data collection mode	Discharge

System Information

Discharge Summary

Start time	5/17/2022 10:35 AM	End time	5/17/2022 10:56 AM
# Stations	9	Avg interval	40
Mean depth	0.723 ft	Max depth	1.200 ft
Mean velocity	-0.0097 ft/s	Max velocity	-0.5714 ft/s
Mean SNR	40 dB	Total width	16.000 ft
Mean temp	70.587 °F	Total area	11.5600 ft²
Wetted Perimeter	16.295 ft	Total discharge	-0.1122 ft³/s

Discharge Uncertainty

Category	ISO	IVE
Accuracy	1.0%	1.0%
Depth	10.9%	175.4%
Velocity	449.9%	512.1%
Width	3.9%	3.9%
Method	59.0%	
# Stations	5.8%	
Overall	453.9%	541.3%

Viewer Controls

Chart size + | Chart size -

Discharge Measurement Summary

Save PDF of summary

Summary overview

No changes were made to this file
Quality control warnings

Supplemental data summary

Gauge height time	Gauge height (ft)	Rated discharge (ft³/s)	Temperature (°F)	Salinity (PSS-78)	Gauge height comments
5/17/2022 10:45 AM	17.540				

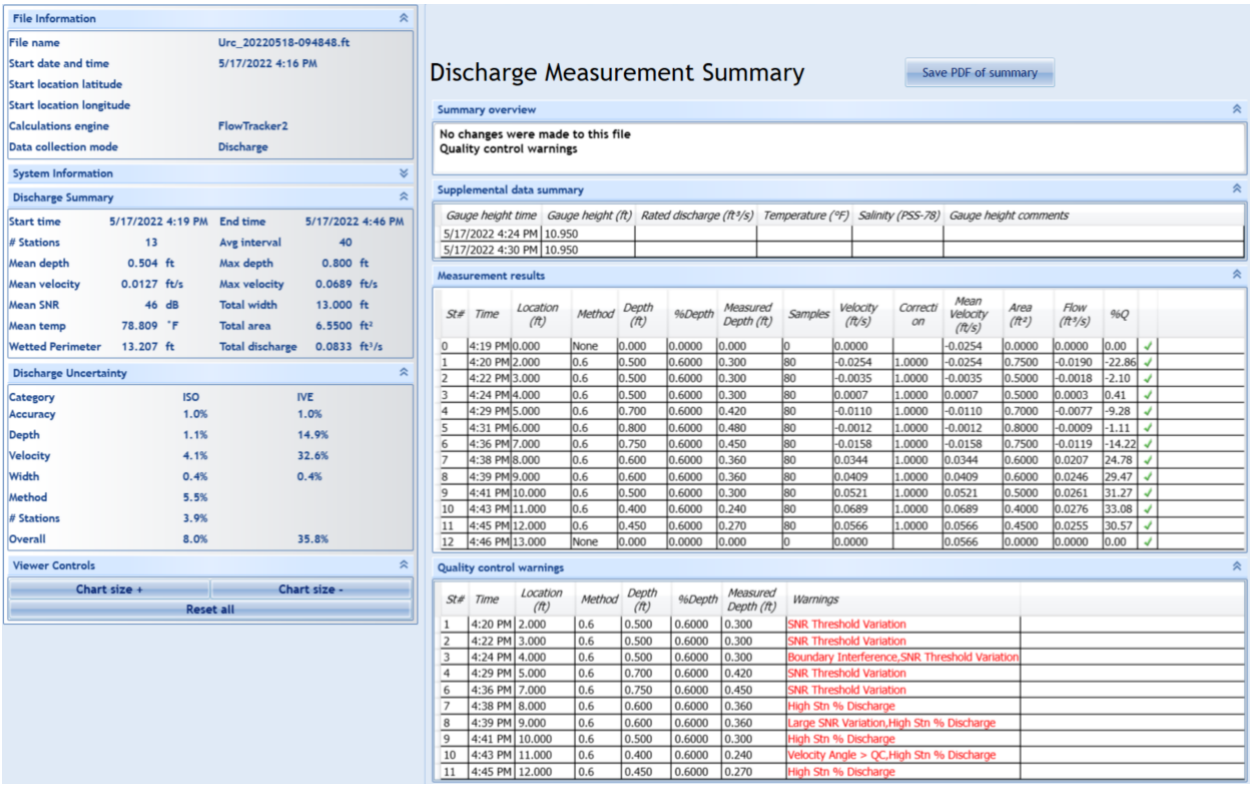
Measurement results

St#	Time	Location (ft)	Method	Depth (ft)	%Depth	Measured Depth (ft)	Samples	Velocity (ft/s)	Correction	Mean Velocity (ft/s)	Area (ft²)	Flow (ft³/s)	%Q	
0	10:35 AM	0.000	None	0.000	0.0000	0.000	0	0.0000		-0.5714	0.0000	0.0000	0.00	✓
1	10:36 AM	2.000	0.6	0.700	0.6000	0.420	80	-0.5714	1.0000	-0.5714	1.4000	-0.7999	712.85	✓
2	10:40 AM	4.000	0.6	1.100	0.6000	0.660	80	0.0725	1.0000	0.0725	2.2000	0.1596	-142.18	✓
3	10:42 AM	6.000	0.6	1.200	0.6000	0.720	80	0.1221	1.0000	0.1221	2.4000	0.2930	-261.12	✓
4	10:44 AM	8.000	0.6	1.000	0.6000	0.600	80	0.0602	1.0000	0.0602	2.0000	0.1204	-107.26	✓
5	10:48 AM	10.000	0.6	0.880	0.6000	0.528	80	0.0589	1.0000	0.0589	1.7600	0.1036	-92.32	✓
6	10:52 AM	12.000	0.6	0.400	0.6000	0.240	80	0.0432	1.0000	0.0432	0.8000	0.0346	-30.79	✓
7	10:54 AM	14.000	0.6	0.500	0.6000	0.300	80	-0.0234	1.0000	-0.0234	1.0000	-0.0234	20.84	✓
8	10:56 AM	16.000	None	0.000	0.0000	0.000	0	0.0000		-0.0234	0.0000	0.0000	0.00	✓

Quality control warnings

St#	Time	Location (ft)	Method	Depth (ft)	%Depth	Measured Depth (ft)	Warnings
1	10:36 AM	2.000	0.6	0.700	0.6000	0.420	Boundary Interference,SNR Threshold Variation,Standard Error > QC,Velocity Angle > QC,High Stn % Discharge
6	10:52 AM	12.000	0.6	0.400	0.6000	0.240	Large SNR Variation,SNR Threshold Variation
7	10:54 AM	14.000	0.6	0.500	0.6000	0.300	SNR Threshold Variation,High Stn % Discharge

Figure 6 Discharge Measurement Summary UDB-1



File Information

File name	Urc_20220518-094848.ft
Start date and time	5/17/2022 4:16 PM
Start location latitude	
Start location longitude	
Calculations engine	FlowTracker2
Data collection mode	Discharge

System Information

Discharge Summary

Start time	5/17/2022 4:19 PM	End time	5/17/2022 4:46 PM
# Stations	13	Avg interval	40
Mean depth	0.504 ft	Max depth	0.800 ft
Mean velocity	0.0127 ft/s	Max velocity	0.0689 ft/s
Mean SNR	46 dB	Total width	13.000 ft
Mean temp	78.809 °F	Total area	6.5500 ft²
Wetted Perimeter	13.207 ft	Total discharge	0.0833 ft³/s

Discharge Uncertainty

Category	ISO	IVE
Accuracy	1.0%	1.0%
Depth	1.1%	14.9%
Velocity	4.1%	32.6%
Width	0.4%	0.4%
Method	5.5%	
# Stations	3.9%	
Overall	8.0%	35.8%

Viewer Controls

Chart size + | Chart size -

Reset all

Discharge Measurement Summary

Save PDF of summary

Summary overview

No changes were made to this file
Quality control warnings

Supplemental data summary

Gauge height time	Gauge height (ft)	Rated discharge (ft³/s)	Temperature (°F)	Salinity (PSS-78)	Gauge height comments
5/17/2022 4:24 PM	10.950				
5/17/2022 4:30 PM	10.950				

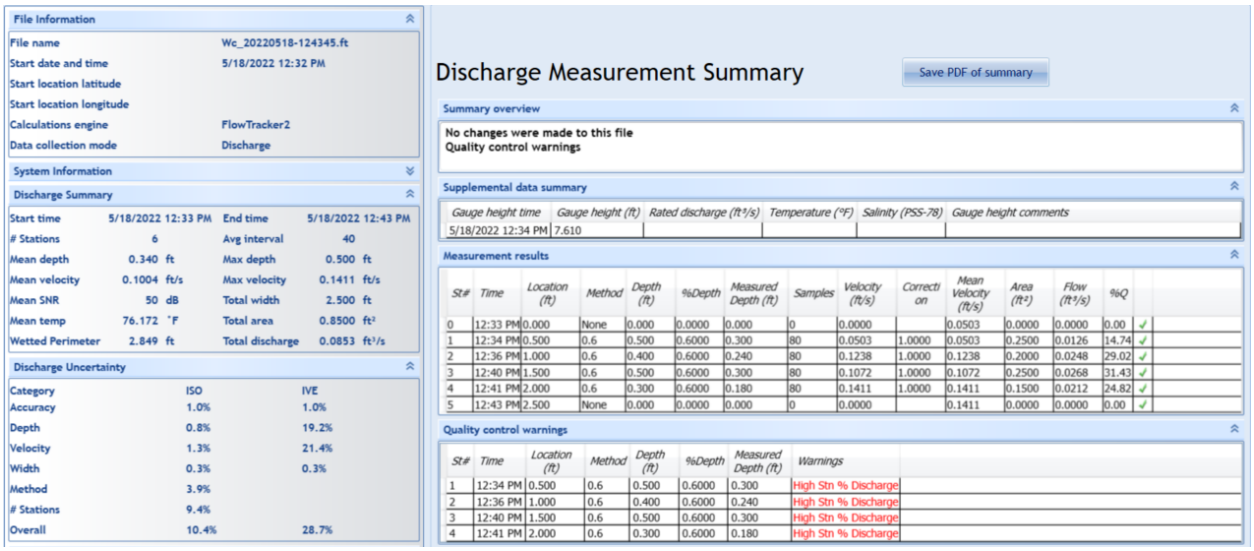
Measurement results

St#	Time	Location (ft)	Method	Depth (ft)	%Depth	Measured Depth (ft)	Samples	Velocity (ft/s)	Correction	Mean Velocity (ft/s)	Area (ft²)	Flow (ft³/s)	%Q	
0	4:19 PM	0.000	None	0.000	0.0000	0.000	0	0.0000		-0.0254	0.0000	0.0000	0.00	✓
1	4:20 PM	2.000	0.6	0.500	0.6000	0.300	80	-0.0254	1.0000	-0.0254	0.7500	-0.0190	-22.86	✓
2	4:22 PM	3.000	0.6	0.500	0.6000	0.300	80	-0.0035	1.0000	-0.0035	0.5000	-0.0018	-2.10	✓
3	4:24 PM	4.000	0.6	0.500	0.6000	0.300	80	0.0007	1.0000	0.0007	0.5000	0.0003	0.41	✓
4	4:29 PM	5.000	0.6	0.700	0.6000	0.420	80	-0.0110	1.0000	-0.0110	0.7000	-0.0077	-9.28	✓
5	4:31 PM	6.000	0.6	0.800	0.6000	0.480	80	-0.0012	1.0000	-0.0012	0.8000	-0.0009	-1.11	✓
6	4:36 PM	7.000	0.6	0.750	0.6000	0.450	80	-0.0158	1.0000	-0.0158	0.7500	-0.0119	-14.22	✓
7	4:38 PM	8.000	0.6	0.600	0.6000	0.360	80	0.0344	1.0000	0.0344	0.6000	0.0207	24.78	✓
8	4:39 PM	9.000	0.6	0.600	0.6000	0.360	80	0.0409	1.0000	0.0409	0.6000	0.0246	29.47	✓
9	4:41 PM	10.000	0.6	0.500	0.6000	0.300	80	0.0521	1.0000	0.0521	0.5000	0.0261	31.27	✓
10	4:43 PM	11.000	0.6	0.400	0.6000	0.240	80	0.0689	1.0000	0.0689	0.4000	0.0276	33.08	✓
11	4:45 PM	12.000	0.6	0.450	0.6000	0.270	80	0.0566	1.0000	0.0566	0.4500	0.0255	30.57	✓
12	4:46 PM	13.000	None	0.000	0.0000	0.000	0	0.0000		0.0566	0.0000	0.0000	0.00	✓

Quality control warnings

St#	Time	Location (ft)	Method	Depth (ft)	%Depth	Measured Depth (ft)	Warnings
1	4:20 PM	2.000	0.6	0.500	0.6000	0.300	SNR Threshold Variation
2	4:22 PM	3.000	0.6	0.500	0.6000	0.300	SNR Threshold Variation
3	4:24 PM	4.000	0.6	0.500	0.6000	0.300	Boundary Interference,SNR Threshold Variation
4	4:29 PM	5.000	0.6	0.700	0.6000	0.420	SNR Threshold Variation
6	4:36 PM	7.000	0.6	0.750	0.6000	0.450	SNR Threshold Variation
7	4:38 PM	8.000	0.6	0.600	0.6000	0.360	High Stn % Discharge
8	4:39 PM	9.000	0.6	0.600	0.6000	0.360	Large SNR Variation,High Stn % Discharge
9	4:41 PM	10.000	0.6	0.500	0.6000	0.300	High Stn % Discharge
10	4:43 PM	11.000	0.6	0.400	0.6000	0.240	Velocity Angle > QC,High Stn % Discharge
11	4:45 PM	12.000	0.6	0.450	0.6000	0.270	High Stn % Discharge

Figure 7 Discharge Measurement Summary URC-2



File Information

File name	Wc_20220518-124345.ft
Start date and time	5/18/2022 12:32 PM
Start location latitude	
Start location longitude	
Calculations engine	FlowTracker2
Data collection mode	Discharge

System Information

Discharge Summary

Start time	5/18/2022 12:33 PM	End time	5/18/2022 12:43 PM
# Stations	6	Avg interval	40
Mean depth	0.340 ft	Max depth	0.500 ft
Mean velocity	0.1004 ft/s	Max velocity	0.1411 ft/s
Mean SNR	50 dB	Total width	2.500 ft
Mean temp	76.172 °F	Total area	0.8500 ft²
Wetted Perimeter	2.849 ft	Total discharge	0.0853 ft³/s

Discharge Uncertainty

Category	ISO	IVE
Accuracy	1.0%	1.0%
Depth	0.8%	19.2%
Velocity	1.3%	21.4%
Width	0.3%	0.3%
Method	3.9%	
# Stations	9.4%	
Overall	10.4%	28.7%

Discharge Measurement Summary

Save PDF of summary

Summary overview

No changes were made to this file
Quality control warnings

Supplemental data summary

Gauge height time	Gauge height (ft)	Rated discharge (ft³/s)	Temperature (°F)	Salinity (PSS-78)	Gauge height comments
5/18/2022 12:34 PM	7.610				

Measurement results

St#	Time	Location (ft)	Method	Depth (ft)	%Depth	Measured Depth (ft)	Samples	Velocity (ft/s)	Correction	Mean Velocity (ft/s)	Area (ft²)	Flow (ft³/s)	%Q	
0	12:33 PM	0.000	None	0.000	0.0000	0.000	0	0.0000		0.0503	0.0000	0.0000	0.00	✓
1	12:34 PM	0.500	0.6	0.500	0.6000	0.300	80	0.0503	1.0000	0.0503	0.2500	0.0126	14.74	✓
2	12:36 PM	1.000	0.6	0.400	0.6000	0.240	80	0.1238	1.0000	0.1238	0.2000	0.0248	29.02	✓
3	12:40 PM	1.500	0.6	0.500	0.6000	0.300	80	0.1072	1.0000	0.1072	0.2500	0.0268	31.43	✓
4	12:41 PM	2.000	0.6	0.300	0.6000	0.180	80	0.1411	1.0000	0.1411	0.1500	0.0212	24.82	✓
5	12:43 PM	2.500	None	0.000	0.0000	0.000	0	0.0000		0.1411	0.0000	0.0000	0.00	✓

Quality control warnings

St#	Time	Location (ft)	Method	Depth (ft)	%Depth	Measured Depth (ft)	Warnings
1	12:34 PM	0.500	0.6	0.500	0.6000	0.300	High Stn % Discharge
2	12:36 PM	1.000	0.6	0.400	0.6000	0.240	High Stn % Discharge
3	12:40 PM	1.500	0.6	0.500	0.6000	0.300	High Stn % Discharge
4	12:41 PM	2.000	0.6	0.300	0.6000	0.180	High Stn % Discharge

Figure 8 Discharge Measurement Summary WC-1

Monitoring Location ID	Monitoring Location Name	Date	Time	Field Crew	Water Temperature (°C)	Dissolved Oxygen (DO) (mg/L)	pH	Specific Conductance (mS/cm)	Turbidity (NTU)	Notes
URC-2	Upper Rock Creek	5/3/2022	12:12	NH	*	*	7.93	255	1000	Autosampler collected T1 on 5/2 @ 20:15 at 16.4, peak at 20:30 at 16.45
TE-1	Little River Tributary	5/3/2022	13:43	NH	*	*	7.70	259	901	Autosampler collected T1 on 5/2 @ 18:45 at 15.54, peak at 15.74 at 19:15

Table 5 First Stormwater Field Data Form Where the Asterisk Denotes a Sample from an Autosampler

Monitoring Location ID	Monitoring Location Name	Nitrate and Nitrite (mg/L)	Kjeldahl Nitrogen (mg/L)	Phosphorus (mg/L)	Total Suspended Solids (mg/L)
URC-2	Upper Rock Creek	0.27	17.3	3.95	7560
TE-1	Little River Tributary	<0.05	3.72	0.656	647

Table 6 First Stormwater Laboratory Analysis Summary

Monitoring Location ID	Monitoring Location Name	Discharge (cfs)	Stream Stage (ft)
URC-2	Upper Rock Creek	131.00	16.40
TE-1	Little River Tributary	267.20	15.54

Table 7 First Stormwater Station Discharge Summary

All rated stream discharges are provisional and subject to change.

Monitoring Location ID	Monitoring Location Name	Date	Time	Field Crew	Water Temperature (°C)	Dissolved Oxygen (DO) (mg/L)	pH	Specific Conductance (mS/cm)	Turbidity (NTU)	Notes
CC-1	Clear Creek	5/24/2022	10:17	NH	16.0	7.31	7.48	557	75	Used RP3, RP4 also over water; took two flow measurements; DCP not working but stage rising while at site (21.08, 21.12, 21.17)
UDB-1	Upper Dave Blue Creek	5/24/2022	11:47	NH	17.2	8.38	7.54	195	1000	Took flow, stage rising while at site, 18.98 after flow; some med debris present; DCP 18.1 at arrival- may have been clogged
LDB-1	Lower Dave Blue Creek	5/24/2022	12:50	NH	16.0	7.72	7.75	568	228	17.38 after flow
URC-2	Upper Rock Creek	5/24/2022	13:29	NH	17.7	8.29	7.63	234	411	13.56 after flow
TG-1	Little River	5/24/2022	5:30	LP	*	*	*	*	529	Autosampler collected T1 at 17.84, peak at 20.24 at 6:45; flow taken
TG-1	Little River	5/24/2022	6:00	LP	*	*	*	*	641	Autosampler collected T2 at 19.43, peak at 20.24 at 6:45
TE-1	Little River Tributary	5/24/2022	10:17	LP	17.3	8.33	8.03	165	417	13.6 tapedown, flow taken
WC-1	Woodcrest Creek	5/24/2022	11:21	LP	17.6	8.69	7.73	199	161	13.18 tapedown, flow taken
LRC-1	Lower Rock Creek	5/24/2022	12:00	LP	N/A	N/A	N/A	N/A	585	14.77 tapedown, flow taken; no sonde data
SW-01	Stormwater Outfall 01	5/24/2022	10:13	CH	17.5	8.45	8.06	139	484	
SW-02	Stormwater Outfall 02	5/24/2022	10:45	CH	18.5	8.51	7.72	210	34	
SW-03	Stormwater Outfall 03	5/24/2022	11:08	CH	17.8	8.54	7.82	104	134	
SW-04	Stormwater Outfall 04	5/24/2022	11:32	CH	17.3	8.96	8.01	196	235	
SW-05	Stormwater Outfall 05	5/24/2022	12:02	CH	17.2	8.04	7.68	354	53	
SW-06	Stormwater Outfall 06	5/24/2022	13:25	CH	17.0	5.01	8.15	332	26	Pond was very full but had no flow in it
SW-07	Stormwater Outfall 07	5/24/2022	12:52	CH	19.4	6.40	8.06	294	29	

Table 8 Second Stormwater Field Data Form Where the Asterisk Denotes a Sample from an Autosampler

Monitoring Location ID	Monitoring Location Name	Nitrate and Nitrite (mg/L)	Kjeldahl Nitrogen (mg/L)	Phosphorus (mg/L)	Total Suspended Solids (mg/L)
CC-1	Clear Creek	0.17	0.57	0.100	40.0
LDB-1	Lower Dave Blue Creek	0.29	0.95	0.225	144
UDB-1	Upper Dave Blue Creek	0.39	1.72	0.739	640
URC-2	Upper Rock Creek	0.33	1.73	0.392	312
LRC-1	Lower Rock Creek	0.37	1.76	0.401	488
TE-1	Little River Tributary	0.42	1.11	0.353	252
TG-1	Little River	0.36	1.65	0.680	647
TG-1	Little River	0.34	1.64	0.651	957
WC-1	Woodcrest Creek	0.43	1.27	0.398	178
SW-01	Stormwater Outfall 01	0.30	1.11	0.323	359
SW-02	Stormwater Outfall 02	0.28	1.16	0.238	52.0
SW-03	Stormwater Outfall 03	0.36	1.30	0.564	158
SW-04	Stormwater Outfall 04	0.35	1.12	0.281	122
SW-05	Stormwater Outfall 05	0.57	1.14	0.238	40.0
SW-06	Stormwater Outfall 06	0.14	0.89	0.089	20.0
SW-07	Stormwater Outfall 07	0.16	0.81	0.091	21.0

Table 9 Second Stormwater Laboratory Analysis Summary

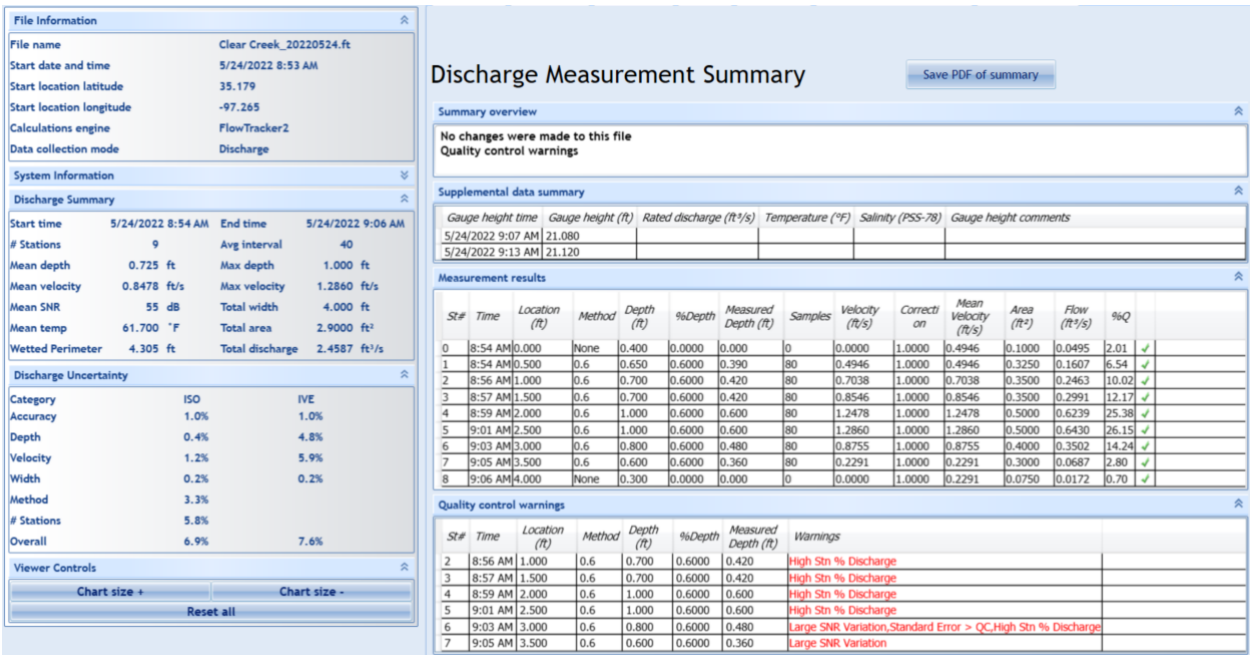
Monitoring Location Name	Nitrate and Nitrite (mg/L)	Kjeldahl Nitrogen (mg/L)	Phosphorus (mg/L)	Total Suspended Solids (mg/L)
Field Blank	<0.05	<0.10	<0.010	<5.0
Duplicate	0.17	0.55	0.099	37.0
Duplicate RPD	0%	3.57%	1.01%	7.79%

Table 10 Second Stormwater QA/QC Data

Monitoring Location ID	Monitoring Location Name	Discharge (cfs)	Stream Stage (ft)
CC-1	Clear Creek	2.46	21.08
CC-1	Clear Creek	2.74	21.12
LDB-1	Lower Dave Blue Creek	83.96	17.42
UDB-1	Upper Dave Blue Creek	87.13	18.90
URC-2	Upper Rock Creek	54.38	13.72
LRC-1	Lower Rock Creek	355	14.77
TE-1	Little River Tributary	70	13.60
WC-1	Woodcrest Creek	375	13.18
TG-1	Little River	515	17.84
TG-1	Little River	725	19.43

Table 11 Second Stormwater Station Discharge Summary

All rated stream discharges are provisional and subject to change.



Discharge Measurement Summary

Save PDF of summary

File Information

File name	Clear Creek_20220524.ft
Start date and time	5/24/2022 8:53 AM
Start location latitude	35.179
Start location longitude	-97.265
Calculations engine	FlowTracker2
Data collection mode	Discharge

System Information

Discharge Summary

Start time	5/24/2022 8:54 AM	End time	5/24/2022 9:06 AM
# Stations	9	Avg interval	40
Mean depth	0.725 ft	Max depth	1.000 ft
Mean velocity	0.8478 ft/s	Max velocity	1.2860 ft/s
Mean SNR	55 dB	Total width	4.000 ft
Mean temp	61.700 °F	Total area	2.9000 ft²
Wetted Perimeter	4.305 ft	Total discharge	2.4587 ft³/s

Discharge Uncertainty

Category	ISO	IVE
Accuracy	1.0%	1.0%
Depth	0.4%	4.8%
Velocity	1.2%	5.9%
Width	0.2%	0.2%
Method	3.3%	
# Stations	5.8%	
Overall	6.9%	7.6%

Viewer Controls

Chart size + | Chart size - | Reset all

Summary overview

No changes were made to this file
Quality control warnings

Supplemental data summary

Gauge height time	Gauge height (ft)	Rated discharge (ft³/s)	Temperature (°F)	Salinity (PSS-78)	Gauge height comments
5/24/2022 9:07 AM	21.080				
5/24/2022 9:13 AM	21.120				

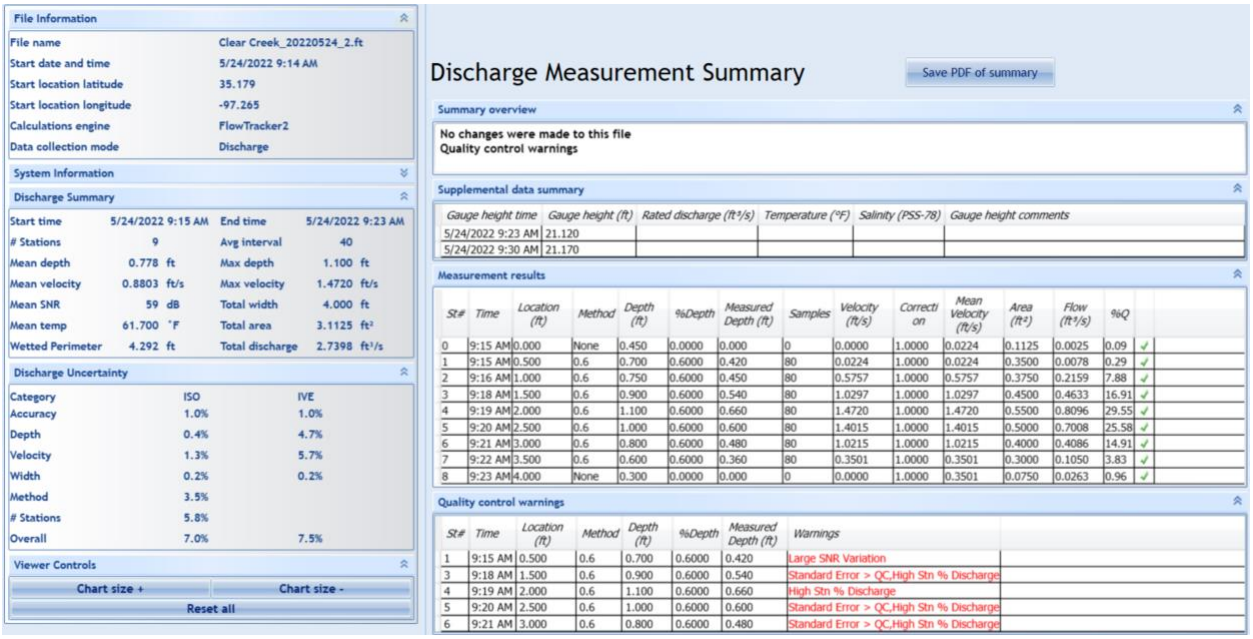
Measurement results

St#	Time	Location (ft)	Method	Depth (ft)	%Depth	Measured Depth (ft)	Samples	Velocity (ft/s)	Correction	Mean Velocity (ft/s)	Area (ft²)	Flow (ft³/s)	%Q	
0	8:54 AM	0.000	None	0.400	0.0000	0.000	0	0.0000	1.0000	0.4946	0.1000	0.0495	2.01	✓
1	8:54 AM	0.500	0.6	0.650	0.6000	0.390	80	0.4946	1.0000	0.4946	0.3250	0.1607	6.54	✓
2	8:56 AM	1.000	0.6	0.700	0.6000	0.420	80	0.7038	1.0000	0.7038	0.3500	0.2463	10.02	✓
3	8:57 AM	1.500	0.6	0.700	0.6000	0.420	80	0.8546	1.0000	0.8546	0.3500	0.2991	12.17	✓
4	8:59 AM	2.000	0.6	1.000	0.6000	0.600	80	1.2478	1.0000	1.2478	0.5000	0.6239	25.38	✓
5	9:01 AM	2.500	0.6	1.000	0.6000	0.600	80	1.2860	1.0000	1.2860	0.5000	0.6430	26.15	✓
6	9:03 AM	3.000	0.6	0.800	0.6000	0.480	80	0.8755	1.0000	0.8755	0.4000	0.3502	14.24	✓
7	9:05 AM	3.500	0.6	0.600	0.6000	0.360	80	0.2291	1.0000	0.2291	0.3000	0.0687	2.80	✓
8	9:06 AM	4.000	None	0.300	0.0000	0.000	0	0.0000	1.0000	0.2291	0.0750	0.0172	0.70	✓

Quality control warnings

St#	Time	Location (ft)	Method	Depth (ft)	%Depth	Measured Depth (ft)	Warnings
2	8:56 AM	1.000	0.6	0.700	0.6000	0.420	High Stn % Discharge
3	8:57 AM	1.500	0.6	0.700	0.6000	0.420	High Stn % Discharge
4	8:59 AM	2.000	0.6	1.000	0.6000	0.600	High Stn % Discharge
5	9:01 AM	2.500	0.6	1.000	0.6000	0.600	High Stn % Discharge
6	9:03 AM	3.000	0.6	0.800	0.6000	0.480	Large SNR Variation,Standard Error > QC,High Stn % Discharge
7	9:05 AM	3.500	0.6	0.600	0.6000	0.360	Large SNR Variation

Figure 9 Stormwater Discharge Measurement Summary CC-1 First Measurement



Discharge Measurement Summary

Save PDF of summary

File Information

File name	Clear Creek_20220524_2.ft
Start date and time	5/24/2022 9:14 AM
Start location latitude	35.179
Start location longitude	-97.265
Calculations engine	FlowTracker2
Data collection mode	Discharge

System Information

Discharge Summary

Start time	5/24/2022 9:15 AM	End time	5/24/2022 9:23 AM
# Stations	9	Avg interval	40
Mean depth	0.778 ft	Max depth	1.100 ft
Mean velocity	0.8803 ft/s	Max velocity	1.4720 ft/s
Mean SNR	59 dB	Total width	4.000 ft
Mean temp	61.700 °F	Total area	3.1125 ft²
Wetted Perimeter	4.292 ft	Total discharge	2.7398 ft³/s

Discharge Uncertainty

Category	ISO	IVE
Accuracy	1.0%	1.0%
Depth	0.4%	4.7%
Velocity	1.3%	5.7%
Width	0.2%	0.2%
Method	3.5%	
# Stations	5.8%	
Overall	7.0%	7.5%

Viewer Controls

Chart size + | Chart size - | Reset all

Summary overview

No changes were made to this file
Quality control warnings

Supplemental data summary

Gauge height time	Gauge height (ft)	Rated discharge (ft³/s)	Temperature (°F)	Salinity (PSS-78)	Gauge height comments
5/24/2022 9:23 AM	21.120				
5/24/2022 9:30 AM	21.170				

Measurement results

St#	Time	Location (ft)	Method	Depth (ft)	%Depth	Measured Depth (ft)	Samples	Velocity (ft/s)	Correction	Mean Velocity (ft/s)	Area (ft²)	Flow (ft³/s)	%Q	
0	9:15 AM	0.000	None	0.450	0.0000	0.000	0	0.0000	1.0000	0.0224	0.1125	0.0025	0.09	✓
1	9:15 AM	0.500	0.6	0.700	0.6000	0.420	80	0.0224	1.0000	0.0224	0.3500	0.0078	0.29	✓
2	9:16 AM	1.000	0.6	0.750	0.6000	0.450	80	0.5757	1.0000	0.5757	0.3750	0.2159	7.88	✓
3	9:18 AM	1.500	0.6	0.900	0.6000	0.540	80	1.0297	1.0000	1.0297	0.4500	0.4633	16.91	✓
4	9:19 AM	2.000	0.6	1.100	0.6000	0.660	80	1.4720	1.0000	1.4720	0.5500	0.8096	29.55	✓
5	9:20 AM	2.500	0.6	1.000	0.6000	0.600	80	1.4015	1.0000	1.4015	0.5000	0.7008	25.58	✓
6	9:21 AM	3.000	0.6	0.800	0.6000	0.480	80	1.0215	1.0000	1.0215	0.4000	0.4086	14.91	✓
7	9:22 AM	3.500	0.6	0.600	0.6000	0.360	80	0.3501	1.0000	0.3501	0.3000	0.1050	3.83	✓
8	9:23 AM	4.000	None	0.300	0.0000	0.000	0	0.0000	1.0000	0.3501	0.0750	0.0263	0.96	✓

Quality control warnings

St#	Time	Location (ft)	Method	Depth (ft)	%Depth	Measured Depth (ft)	Warnings
1	9:15 AM	0.500	0.6	0.700	0.6000	0.420	Large SNR Variation
3	9:18 AM	1.500	0.6	0.900	0.6000	0.540	Standard Error > QC,High Stn % Discharge
4	9:19 AM	2.000	0.6	1.100	0.6000	0.660	High Stn % Discharge
5	9:20 AM	2.500	0.6	1.000	0.6000	0.600	Standard Error > QC,High Stn % Discharge
6	9:21 AM	3.000	0.6	0.800	0.6000	0.480	Standard Error > QC,High Stn % Discharge

Figure 10 Stormwater Discharge Measurement Summary CC-1 Second Measurement

Station Number:
Station Name: LDB

Meas. No: 1
Date: 05/24/2022

Party: Scd ndh	Width: 43.8 ft	Processed by:
Boat/Motor:	Area: 140 ft²	Mean Velocity: 0.600 ft/s
Gage Height: 17.42 ft	G.H.Change: 0.000 ft	Discharge: 84.0 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 (0.00°)	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.: 3.27 ft/s	Type/Freq.: RiverRay / 0 kHz	
WT 3-Beam Solution: YES	Max. Depth: 5.49 ft	Serial #: 645654	Firmware: 44.16
BT Error Vel.: 3.28 ft/s	Mean Depth: 3.21 ft	Bin Size: 50 cm	Blank: 50 cm
WT Error Vel.: 32.81 ft/s	% Meas.: 49.03	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.: 61.4 °F	WV: 170	
Use Weighted Mean Depth: YES			

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

Project Name: LDB05242022_1.mmt
Software: 2.23.00.02

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	7	4	208	23.4	42.1	21.3	1.66	1.87	90.4	53	163	01:28	01:30	0.32	0.55	34	1
001	L	7	4	132	19.3	41.3	17.3	1.80	2.15	81.9	41	134	01:30	01:32	0.44	0.61	13	0
002	R	7	4	153	20.0	41.2	17.4	3.39	2.05	84.0	45	148	01:32	01:33	0.40	0.57	25	0
003	L	7	4	174	18.1	38.3	15.7	3.11	1.55	76.8	42	133	01:34	01:35	0.35	0.58	24	0
004	R	7	4	162	19.8	39.7	18.9	1.94	1.48	81.8	43	132	01:35	01:37	0.38	0.62	20	0
005	L	7	4	157	21.0	42.9	19.2	1.45	2.26	86.9	42	134	01:37	01:39	0.38	0.65	18	0
006	R	7	4	135	20.6	41.6	19.4	1.48	1.45	84.5	43	138	01:39	01:40	0.43	0.61	15	0
007	L	7	4	151	20.2	42.1	18.2	3.04	1.91	85.4	43	139	01:40	01:42	0.39	0.61	18	0
Mean		7	4	159	20.3	41.2	18.4	2.23	1.84	84.0	44	140	Total	00:14	0.38	0.60	21	0
SDev		0	0	24	1.55	1.48	1.68	0.804	0.313	4.01	3.8	10.7			0.04	0.03		
SD/M		0.0%	0.0%	15.1%	7.6%	3.6%	9.1%	36.0%	17.0%	4.8%	8.7%	7.6%			9.8%	5.3%		

Figure 11 Stormwater Discharge Measurement Summary LDB-1

Station Number:
Station Name: Udb

Meas. No: 1
Date: 05/24/2022

Party: Scd ndh	Width: 25.7 ft	Processed by:
Boat/Motor:	Area: 37.0 ft²	Mean Velocity: 2.39 ft/s
Gage Height: 18.90 ft	G.H.Change: 0.000 ft	Discharge: 87.1 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 (0.00°)	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.: 6.44 ft/s	Type/Freq.: RiverRay / 0 kHz	
WT 3-Beam Solution: YES	Max. Depth: 1.88 ft	Serial #: 645654	Firmware: 44.16
BT Error Vel.: 3.28 ft/s	Mean Depth: 1.44 ft	Bin Size: 50 cm	Blank: 50 cm
WT Error Vel.: 32.81 ft/s	% Meas.: 16.53	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.: 62.7 °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: UDB05242022_1.mmt
Software: 2.23.00.02

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
001	L	4	5	184	47.7	14.9	14.5	5.83	9.75	92.7	31	44	00:23	00:24	0.38	2.10	71	0
002	R	2	5	148	55.0	17.2	17.9	3.00	8.40	102	27	40	00:25	00:26	0.43	2.53	71	0
004	R	2	5	115	34.3	10.8	12.2	4.03	8.37	69.6	26	40	00:28	00:29	0.36	1.74	57	0
005	L	2	3	138	61.6	19.2	18.5	4.31	6.00	110	27	41	00:29	00:30	0.35	2.70	50	0
006	R	2	3	151	48.1	15.0	14.3	3.85	4.63	85.9	27	40	00:31	00:33	0.28	2.16	71	0
008	R	3	3	172	33.8	10.6	10.8	6.64	5.44	67.3	20	28	00:36	00:37	0.25	2.42	78	0
009	L	3	5	171	41.6	13.0	12.6	6.71	9.15	83.1	21	27	00:37	00:39	0.26	3.07	52	0
Mean		3	4	154	46.0	14.4	14.4	4.91	7.39	87.1	26	37	Total	00:16	0.33	2.39	64	0
SDev		1	1	24	10.3	3.20	2.90	1.47	2.00	15.6	4.0	6.7			0.07	0.43		
SD/M		30.6%	25.8%	15.3%	22.4%	22.2%	20.1%	30.0%	27.1%	17.9%	15.7%	18.2%			20.8%	18.2%		

Figure 12 Stormwater Discharge Measurement Summary UDB-1

Station Number: Meas. No: 1

Station Name: URC Date: 05/24/2022

Party: scd ndh	Width: 19.4 ft	Processed by:
Boat/Motor:	Area: 52.5 ft²	Mean Velocity: 1.06 ft/s
Gage Height: 13.72 ft	G.H.Change: 0.000 ft	Discharge: 54.4 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 (0.00°)	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.: 2.84 ft/s	Type/Freq.: RiverRay / 0 kHz	
WT 3-Beam Solution: YES	Max. Depth: 3.99 ft	Serial #: 645654	Firmware: 44.16
BT Error Vel.: 3.28 ft/s	Mean Depth: 2.76 ft	Bin Size: 50 cm	Blank: 50 cm
WT Error Vel.: 32.81 ft/s	% Meas.: 39.86	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.: 63.4 °F	WV: 170	
Use Weighted Mean Depth: YES			

Performed Diag. Test: NO Project Name: urc 05242022 (redo)_1

Performed Moving Bed Test: NO Software: 2.23.00.02

Performed Compass Calibration: NO Evaluation: NO

Meas. Location:

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
001	R	2	2	72	17.7	23.2	13.0	2.47	1.80	58.2	14	42	02:50	02:50	0.48	1.39	53	0
002	L	2	2	77	16.4	21.2	12.3	1.62	2.08	53.6	23	60	02:50	02:51	0.89	0.90	55	0
003	R	2	2	75	14.8	20.2	10.4	2.75	2.33	50.5	14	43	02:51	02:52	0.34	1.18	52	0
005	R	2	2	84	14.9	20.4	11.6	2.75	1.94	51.7	16	47	02:53	02:54	0.45	1.09	60	0
006	L	2	2	96	20.0	24.7	15.5	1.73	2.37	64.2	25	69	02:54	02:55	0.52	0.94	59	0
008	L	2	2	89	14.3	20.3	9.64	1.13	2.68	48.1	24	55	02:56	02:57	0.56	0.87	56	0
Mean		2	2	83	16.3	21.7	12.1	2.08	2.20	54.4	19	53	Total	00:07	0.50	1.06	56	0
SDev		0	0	10	2.17	1.84	2.09	0.678	0.322	5.90	5.2	10.5			0.12	0.20		
SD/M		0.0%	0.0%	12.6%	13.3%	8.5%	17.3%	32.6%	14.6%	10.8%	26.8%	20.0%			23.5%	18.8%		

Figure 13 Stormwater Discharge Measurement Summary URC-2

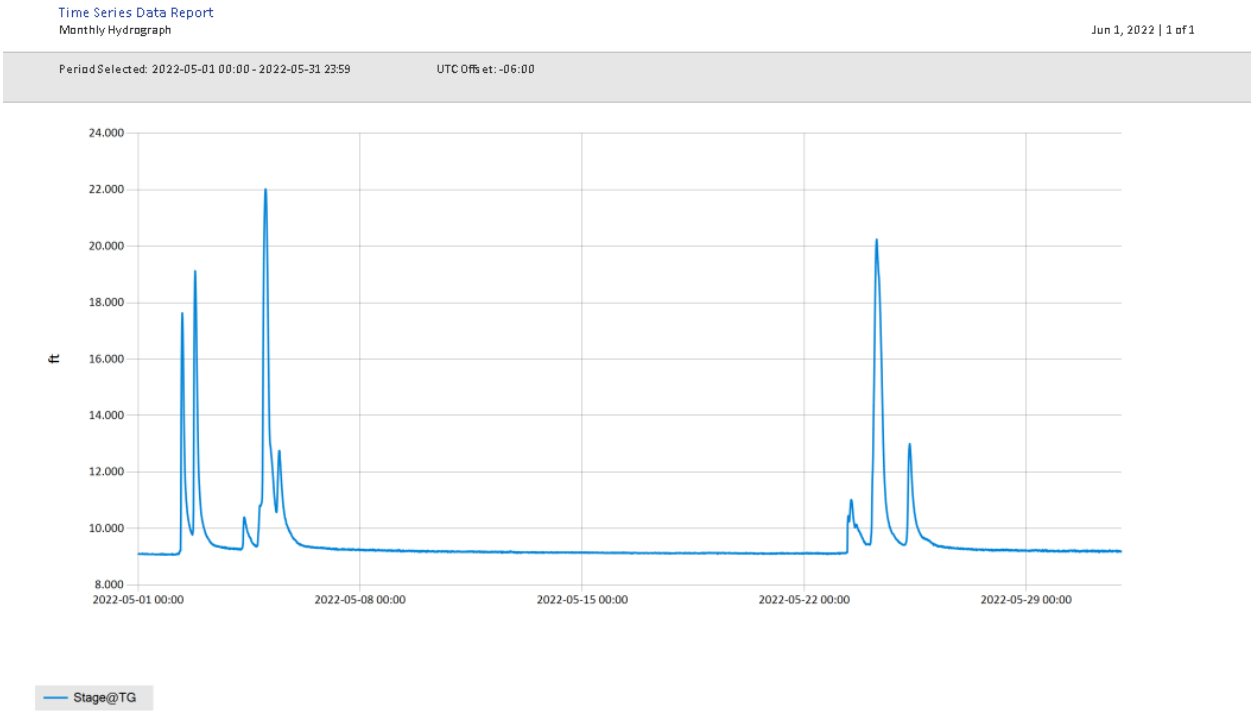


Figure 14 Monthly Hydrograph TG-1

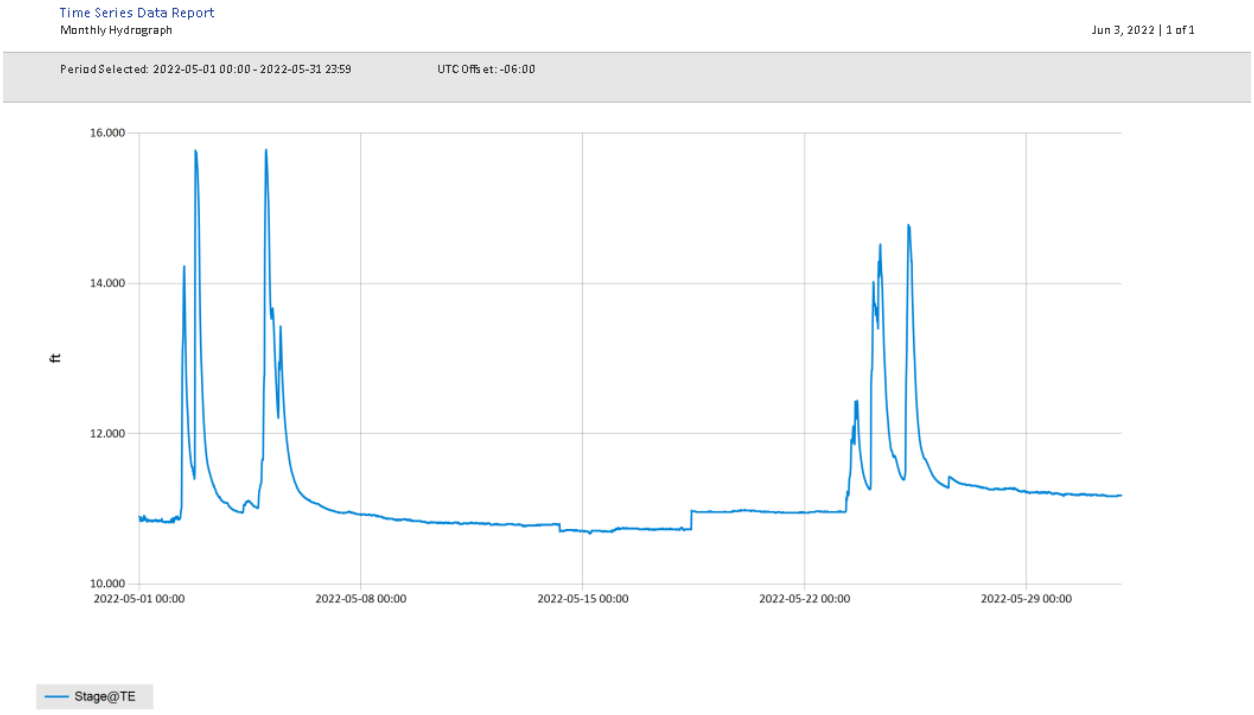


Figure 15 Monthly Hydrograph TE-1

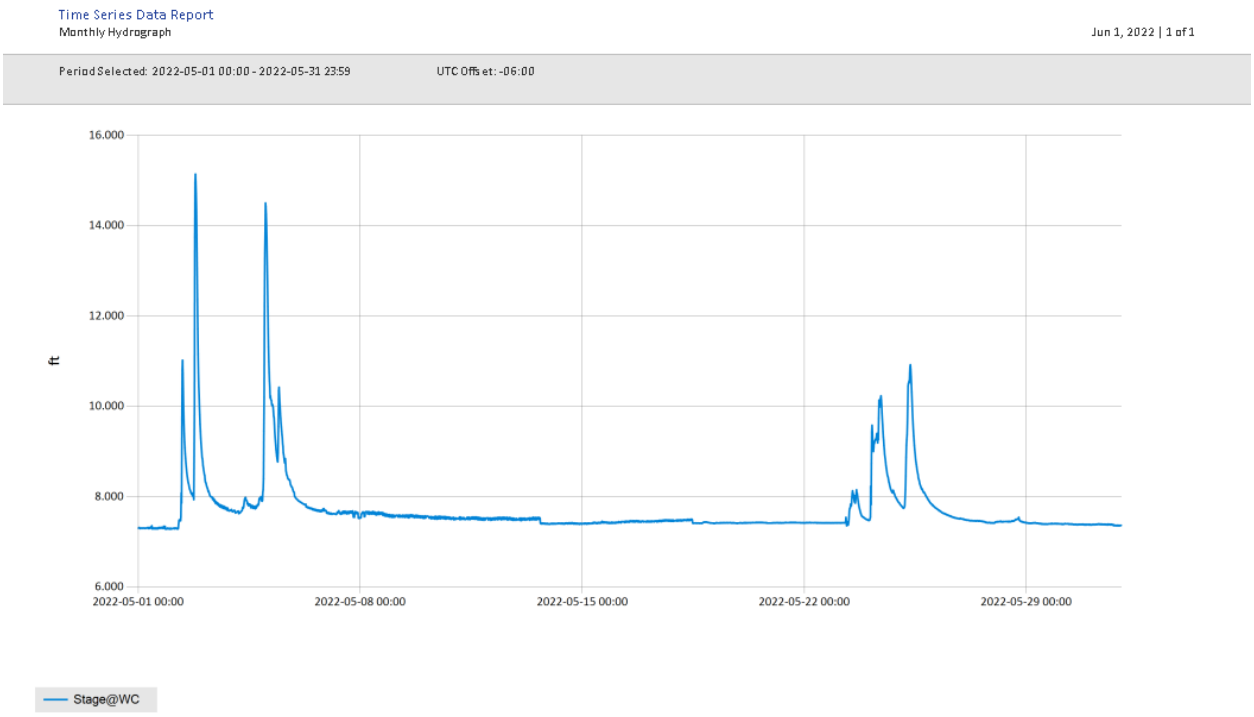


Figure 16 Monthly Hydrograph WC-1

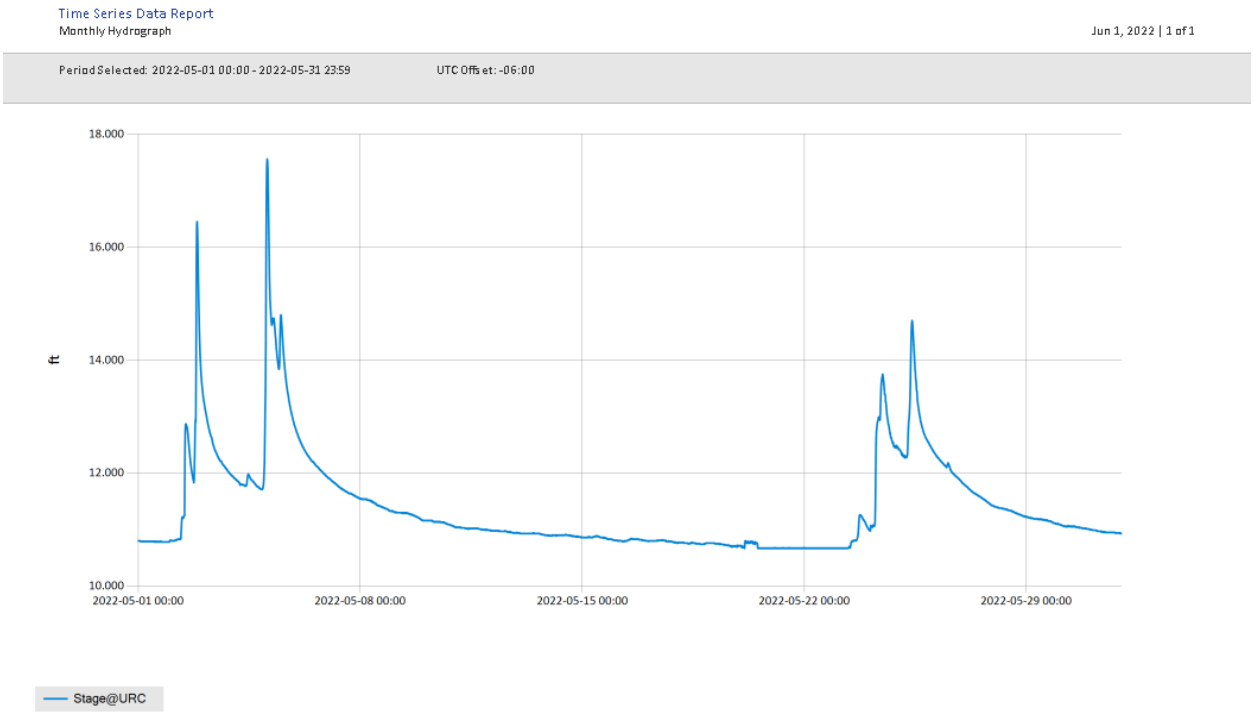


Figure 17 Monthly Hydrograph URC-2

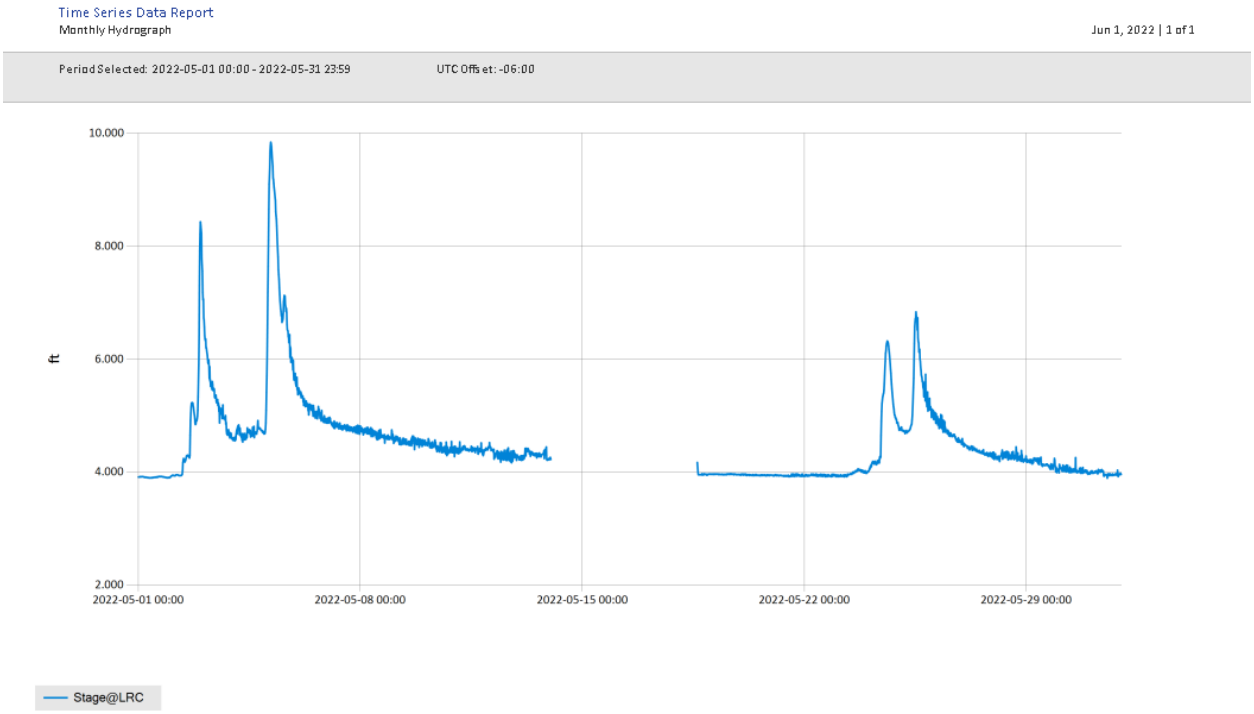


Figure 18 Monthly Hydrograph LRC-1

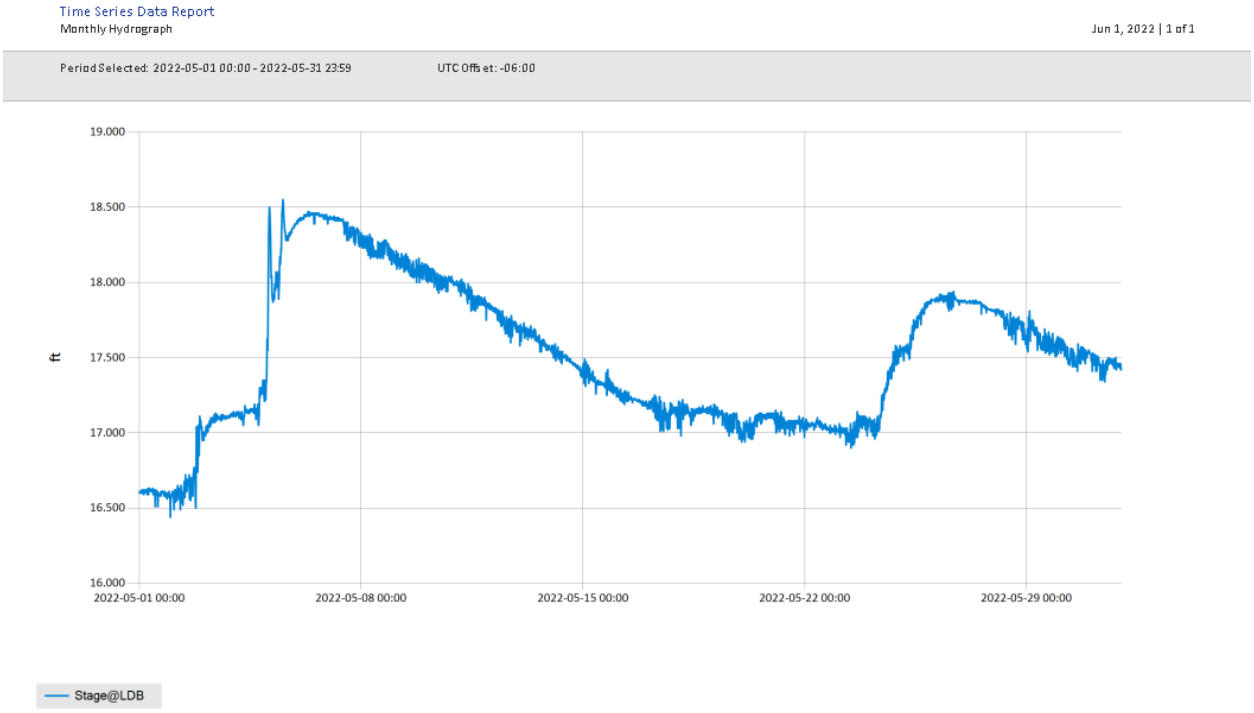


Figure 19 Monthly Hydrograph LDB-1

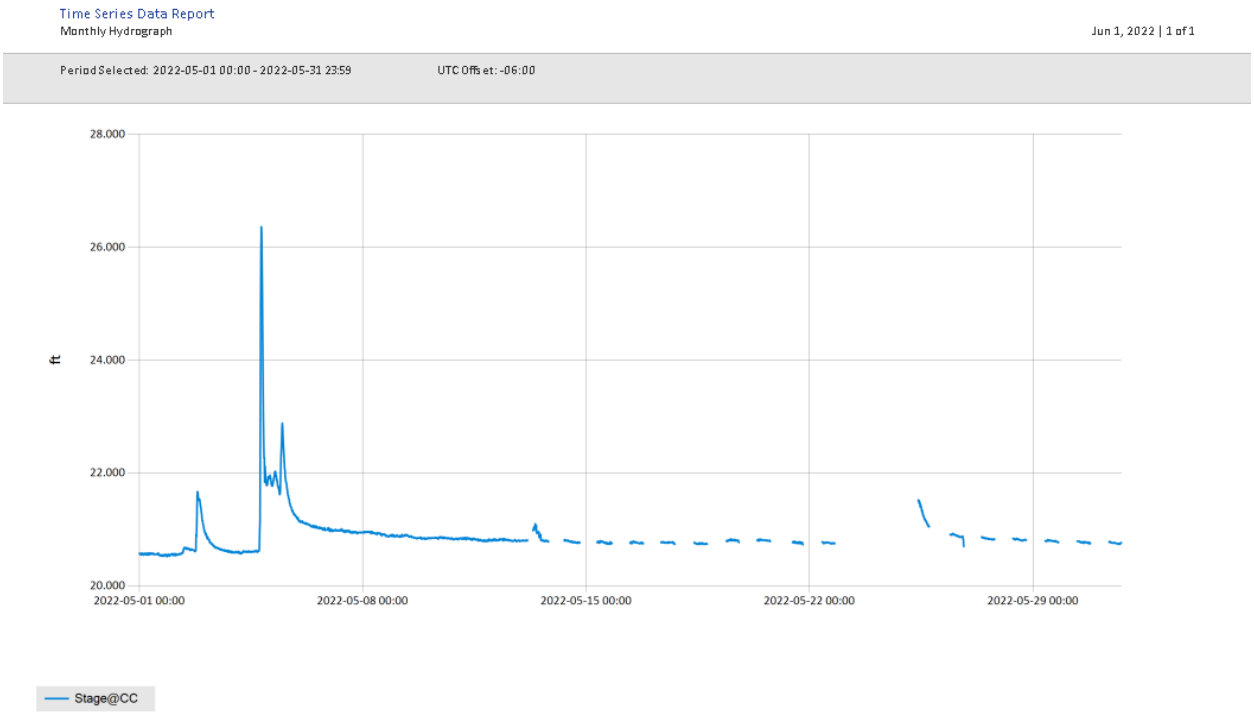


Figure 20 Monthly Hydrograph CC-1

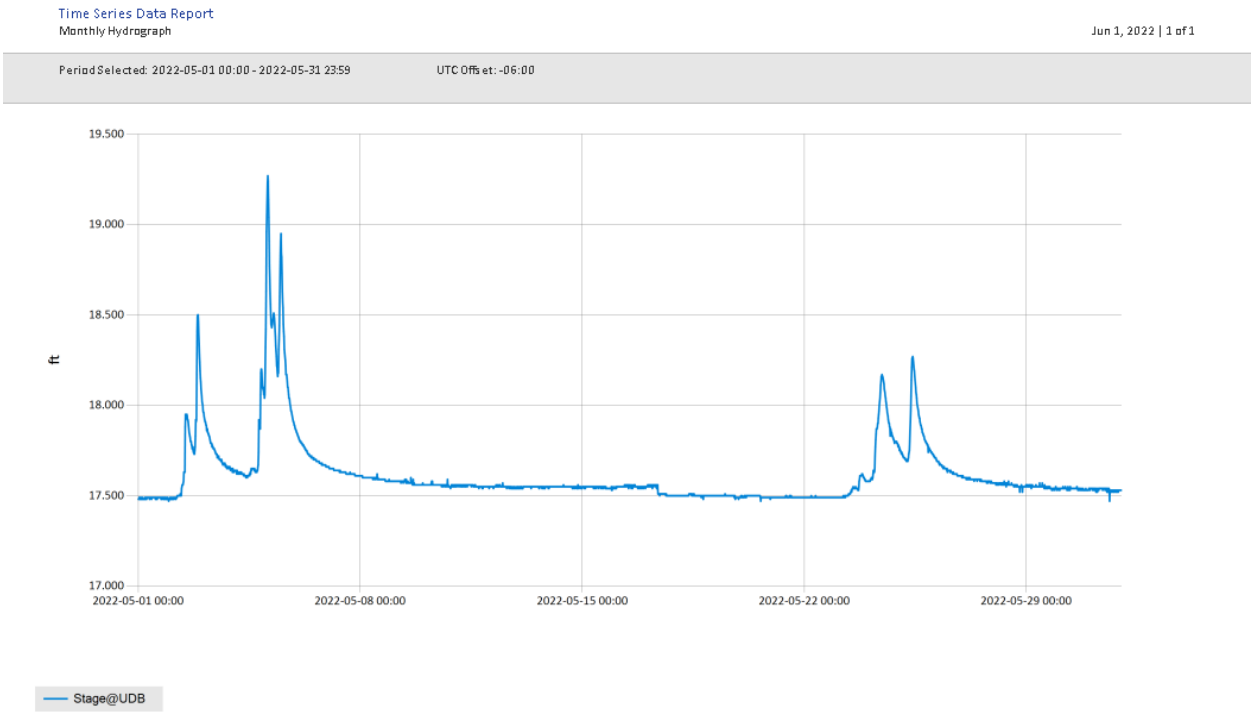


Figure 21 Monthly Hydrograph UDB-1

MESONET CLIMATOLOGICAL DATA SUMMARY — May 2022 — 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	78	48	65.0	46.7	2	0	93	34	55	0.00	28.73	29.98	ESE	7.7	25.7	20.63	63.2	67.8	74	61
2	80	49	64.0	59.8	0	0	99	66	87	2.34	28.52	29.76	SE	12.1	47.2	9.36	63.6	66.5	71	64
3	60	46	52.4	44.6	12	0	86	61	75	0.00	28.75	29.99	NNW	10.6	27.8	17.87	60.4	61.9	67	58
4	69	52	59.9	58.1	5	0	98	76	94	1.41	28.65	29.89	E	7.7	39.0	6.86	61.2	62.1	65	59
5	64	50	59.3	55.4	8	0	98	60	88	0.61	28.61	29.85	NW	10.3	29.8	9.20	61.7	62.9	65	61
6	76	47	61.9	51.1	3	0	94	42	70	0.00	28.64	29.89	NW	5.6	14.1	27.56	62.0	64.6	74	56
7	82	56	71.0	62.4	0	4	92	63	75	0.00	28.51	29.75	SE	11.8	30.0	25.23	65.4	67.8	74	61
8	91	73	81.3	70.2	0	17	90	51	70	0.00	28.32	29.55	SSE	15.0	33.7	26.51	69.7	72.8	78	69
9	90	74	81.7	71.0	0	17	81	55	70	0.00	28.42	29.66	S	14.0	30.9	26.19	72.0	74.3	79	70
10	88	75	81.1	72.0	0	17	84	64	74	0.00	28.68	29.93	S	12.6	29.4	22.42	73.3	75.8	81	72
11	88	67	77.9	66.8	0	13	87	45	70	0.00	28.78	30.03	SSE	10.4	32.4	24.41	73.4	77.3	85	71
12	90	70	79.1	64.9	0	15	91	38	64	0.00	28.67	29.92	S	11.0	28.6	28.08	73.5	79.2	87	72
13	85	70	76.8	67.0	0	13	87	58	72	0.00	28.62	29.87	ESE	8.9	21.4	22.82	73.9	79.8	86	74
14	89	64	78.7	64.6	0	12	95	42	64	0.00	28.68	29.92	SSE	5.5	24.3	26.57	74.3	81.1	90	73
15	93	67	79.3	65.0	0	15	83	34	64	0.00	28.65	29.89	S	9.8	32.4	27.13	75.0	82.5	91	76
16	82*	60*	72.5*	60.6*	0*	6*	92*	49*	68*	0.00*	28.75*	29.99*	ESE*	7.0*	17.0*	NA	74.7*	81.5*	89*	73*
17	89	69	78.1	63.5	0	14	86	30	63	0.00	28.62	29.86	SSE	11.3	31.9	22.34	74.2	80.2	86	75
18	89	73	80.5	66.8	0	16	83	46	64	0.00	28.56	29.80	E	8.6	27.3	25.78	75.0	82.4	90	76
19	90	67	80.3	65.3	0	14	84	47	61	0.00	28.37	29.60	S	11.3	32.3	26.87	75.6	83.0	90	76
20	85	70	78.0	62.6	0	13	79	45	60	0.00	28.32	29.56	S	12.4	31.7	22.49	75.3	82.5	88	78
21	70	55	60.8	48.1	3	0	88	50	64	0.00	28.75	30.00	NNE	17.3	34.7	9.62	70.9	75.1	81	71
22	68	49	58.0	40.0	7	0	72	37	52	0.00	29.01	30.27	NNE	11.0	26.5	24.58	67.8	71.1	77	66
23	59	53	55.5	52.7	9	0	98	71	91	0.75	28.83	30.08	E	7.4	22.7	2.32	65.9	66.1	70	63
24	64	59	61.5	60.0	4	0	98	88	95	1.44	28.55	29.79	SE	8.0	26.2	3.30	64.9	64.3	66	63
25	59	53	55.3	52.5	9	0	97	82	91	0.84	28.54	29.78	W	10.0	23.7	6.40	63.8	62.9	64	61
26	76	52	63.6	49.8	1	0	91	35	64	0.00	28.67	29.91	NW	12.3	30.9	28.06	64.2	65.1	72	59
27	84	50	70.2	52.5	0	2	96	33	58	0.00	28.74	29.99	SSE	4.6	17.5	29.66	65.7	67.7	76	58
28	87	66	77.5	61.3	0	11	71	46	58	0.00	28.51	29.75	SSE	13.2	35.2	24.88	68.6	69.7	75	64
29	87	74	81.1	65.3	0	16	69	50	59	0.00	28.36	29.59	S	14.3	34.4	27.45	71.1	73.3	79	68
30	86	71	78.9	66.2	0	14	79	55	65	0.00	28.43	29.67	SSE	14.1	35.7	23.21	72.1	76.1	83	70
31	86	74	79.8	69.1	0	15	81	58	70	0.00	28.59	29.83	S	10.9	31.2	15.77	72.7	77.9	82	74
	80*	61*	71.0*	59.9*	<- Monthly Averages ->						28.61*	29.85*	S *	10.5*	47.2*	20.45*	69.2*	72.8*	79*	67*

Temperature - Highest: 93*
Lowest: 46*

Degree Days - Total HDD: 62*
Total CDD: 241*

Rainfall: Monthly Total: 7.39* in.
Greatest 24 Hr: 2.34* in.

Humidity - Highest: 99*
Lowest: 30*

Number of Days With:

Tmax ≥ 90:	5*	Rainfall ≥ 0.01 inch:	6*
Tmax ≤ 32:	0*	Rainfall ≥ 0.10 inch:	6*
Tmin ≤ 32:	0*	Avg Wind Speed ≥ 10 mph:	20*
Tmin ≤ 0:	0*	Max Wind Speed ≥ 30 mph:	16*

* Denotes incomplete record

Figure 22 May Mesonet Data