

Ozarks Environmental and Water Resources Institute (OEWRI)
Missouri State University (MSU)

Hydrological Monitoring of the Big Barren Creek Watershed, Mark Twain National Forest, Southeast Missouri Water Year 2017

SUMMARY REPORT

Prepared by:

Marc R. Owen, M.S., Assistant Director, OEWRI
Shoukat Ahmed, Graduate Assistant, OEWRI
Robert T. Pavlowsky, Ph.D., Director, OEWRI

Assisted in the field by:

Matt Thies, Nick Bradley, Joe Nash, Hannah Adams, Grace Roman, Katy Reminga,
Kayla Coonen, Triston Rice, Max Hillermann, and Tyler Pursley

Ozark Environmental and Water Resources Institute
Missouri State University
Temple Hall 343
901 South National Avenue
Springfield, MO 65897

Completed for:

Kelly Whitsett, Forest Hydrologist and Cave and Karst Program Manager
U.S. Forest Service
Mark Twain National Forest
401 Fairgrounds Road
Rolla, MO 65401

April 15, 2021



OEWRI EDR-20-002.2

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WATER YEAR 2017 SUMMARY

This report summarizes the 2017 Water Year (WY2017) discharge results for the 14 stations that were installed in the Big Barren Creek watershed in 2015 and 2016. The 2017 Water Year runs from October 1, 2016 to September 30, 2017. Big Barren Creek is a tributary of the Current River Basin (8-digit Hydrological Unit Code (HUC) #11010008) located in portions of Ripley, Oregon and Carter Counties in southeast Missouri (Figure 1). Gaging station locations were selected along both the main stem of Big Barren Creek and distributed along smaller tributaries throughout the watershed (Figure 2). Drainage areas for the tributary sites ranged from 1.59-7.82 km² and gage locations within the smaller tributary watersheds drain forest service lands that have either been entirely burned or unburned (Table 1). The drainage areas of the main stem sites have a mix of land uses from private lands, to burned and unburned public forest, ranging in drainage area from 8.82-183.1 km². The majority of the streams within the Big Barren Creek watershed are ephemeral due to the underlying karst landscape where sinkholes, losing streams, and caves are common (Weary et al., 2014). Perennial sections of these streams are located within, or just downstream, of the Big Barren Creek Natural Area and the Cowards Hollow Natural Area which appear to be associated with a series of northeast trending faults (Weary et al., 2014; Figure 2).

Stage data was recorded every 5-minutes using Hobo U20L-04 Water Level Loggers. The level loggers were installed inside a PVC pipe assembly and secured to 1-2 m staff gages that were installed at each site. An additional level logger was installed to measure barometric pressure used to compensate for barometric pressure changes. Raw data is downloaded periodically (\approx every 10 weeks) from the level loggers using the Hobo Waterproof Shuttle. Discharge rating curves were created at each site to estimate flows for each 5-minute stage reading over the monitoring period. Specific methods used to develop these rating curves can be seen in a separate report (Owen et al., 2020). For 13 of the 14 sites there were less than 2 days of missing data over the year. However, at Cowards Hollow there was over 36 days of missing data due to equipment problems.

Rainfall

There was a total of 127.1 cm of rainfall in WY2017, which is 7.8 cm higher than the average annual rainfall for the area between 1956-2014 (Pavlowsky et al., 2016). Of that total, 62.0 cm (49%) of the total annual rainfall came in the spring from April to June (Figure 3). Very high rainfall amounts occurred between April 28-30 that saw as much as 25 cm of rainfall in some areas of southern Missouri that produced extreme floods causing infrastructure damage and set peak discharge records at several USGS gaging stations in the Ozarks (Heimann et al., 2018). In the Big Barren Creek watershed, these storms produced over 14 cm of rainfall from April 28-

30, with nearly 12 cm falling on April 30th alone. This event caused extreme flooding, widespread stream erosion, and damaged many of the road crossings within the watershed (Owen et al, 2018). The second highest seasonal rainfall total occurred in the winter from January-March with 26.6 cm (20.9%) of the total annual rainfall. The lowest seasonal rainfall occurred in the fall from October-December with 16.8 cm (13.2%).

Discharge and Runoff

The range in discharge values for WY2017 were calculated for both perennial and ephemeral gaging stations in the Big Barren Creek watershed and annual average discharges are comparable to nearby USGS gaging stations. Average discharge for the perennial sites ranged from 0.047 m³/s at CH to 1.77 m³/s at LNA (Table 2). For ephemeral sites, average annual discharge ranged from 0.008 m³/s at TH to 1.76 m³/s at LBB. Station BH only recorded partial flows as it was recently discovered a portion of the flow in the channel jumps to the road ditch upstream of the gaging station. Therefore, data produced at this site is far lower than the other gaging stations. Annual peak discharge ranged from 16.9 m³/s at TH to 409.8 m³/s at LBB. Minimum discharge at the perennial sites ranged from 0.006 m³/s at CH to 0.115 m³/s at UNA. Average annual discharge for the sites from this study were plotted by drainage area and compared to nearby USGS gaging stations (Table 3). Ephemeral sites plot below the best-fit line of perennial USGS stations and perennial sites plot on or just below the USGS stations (Figure 4). Furthermore, the USGS station along a losing section of Logan Creek near Ellington plots along the best-fit line of the ephemeral sites in this study.

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TABLES

Table 1. WY2017 gaging station locations in the Big Barren Creek watershed.

Site Name	Site ID	Northing (m) NAD83, UTM15N	Easting (m) NAD83, UTM15N	Elevation (m)	Drainage Area (km ²)	Stream Type	Burn History	Missing Days
Tram Hollow	TH	4,080,612.536	660,800.255	257.10	1.59	Ephemeral	Unburned	1.7
Cowards Hollow	CH	4,077,436.497	671,184.193	201.49	2.19	Perennial	Burned	36.7
Upper Big Barren	UBB	4,082,297.631	660,727.701	253.46	2.51	Ephemeral	Burned	1.8
Barnes Hollow	BH	4,080,152.539	660,963.250	258.76	2.67	Ephemeral	Unburned	1.7
Upper Tributary	UT	4,081,698.540	660,910.259	247.92	4.19	Ephemeral	Burned	1.8
Wolf Pond	WP	4,084,372.539	665,468.255	232.65	5.13	Ephemeral	Burned	1.8
Polecat Hollow	PH	4,082,395.533	664,472.252	224.51	6.19	Ephemeral	Burned	1.7
South Prong Cedar	SPC	4,078,550.511	666,420.219	209.96	7.28	Ephemeral	Burned	1.7
Fools Catch	FC	4,081,865.521	669,811.222	196.79	7.82	Ephemeral	Unburned	1.7
Highway J	HYJ	4,081,730.799	661,557.484	245.46	8.82	Ephemeral	Mixed	1.7
Middle Big Barren	MBB	4,081,306.806	667,938.252	191.57	47.8	Ephemeral	Mixed	1.7
Upper Natural Area	UNA	4,080,307.787	672,375.327	163.74	103.6	Perennial	Mixed	1.7
Lower Natural Area	LNA	4,079,188.630	672,767.129	158.50	124.2	Perennial	Mixed	1.7
Lower Big Barren	LBB	4,074,388.720	681,374.962	121.83	186.1	Ephemeral	Mixed	1.7

Table 2. WY2017 Big Barren Creek watershed gaging station data summary.

Site Name	Drainage Area (km ²)	Rainfall* Vol. (m ³)	Runoff Vol. (m ³)	Rainfall As Runoff (%)	Runoff Depth (cm)	Avg. Q (m ³ /s)	Max Q (m ³ /s)	10% Q** (m ³ /s)	50% Q** (m ³ /s)	90% Q** (m ³ /s)	Min Q (m ³ /s)
Tram Hollow	1.59	1,995,470	257,029	12.9	16.4	0.008	16.9	0.000	0.000	0.000	0.000
Cowards Hollow	2.19	2,796,200	1,468,336	52.5	66.7	0.047	18.9	0.098	0.029	0.011	0.006
Upper Big Barren	2.51	3,190,210	521,051	16.3	20.8	0.017	27.0	0.001	0.000	0.000	0.000
Barnes Hollow***	2.67	3,393,570	81,187	2.4	3.0	0.003	6.23	0.000	0.000	0.000	0.000
Upper Tributary	4.19	5,325,490	861,033	16.2	20.6	0.027	42.6	0.000	0.000	0.000	0.000
Wolf Pond	5.13	6,520,230	393,325	6.0	7.7	0.013	32.7	0.000	0.000	0.000	0.000
Polecat Hollow	6.19	7,867,490	742,745	9.4	12.0	0.024	50.0	0.000	0.000	0.000	0.000
South Prong Cedar	7.28	9,252,880	1,602,811	17.3	22.0	0.051	36.4	0.039	0.000	0.000	0.000
Fools Catch	7.82	9,939,220	852,590	8.6	10.9	0.027	40.8	0.000	0.000	0.000	0.000
Highway J	8.82	11,210,220	977,415	8.7	11.1	0.031	77.5	0.000	0.000	0.000	0.000
Middle Big Barren	47.8	60,702,960	3,936,790	6.5	8.2	0.125	93.5	0.033	0.000	0.000	0.000
Upper Natural Area	103.6	131,675,600	26,718,751	20.3	25.8	0.847	209.1	0.672	0.182	0.140	0.115
Lower Natural Area	124.2	157,858,200	55,715,875	35.3	44.9	1.77	259.6	5.20	0.218	0.103	0.063
Lower Big Barren	186.1	232,720,100	55,641,630	23.9	30.4	1.76	409.8	2.32	0.000	0.000	0.000

*Total rainfall for WY2017 = 127.1 cm

** Exceedance value

*** Poor site conditions, only receives a portion of the total watershed runoff.

Table 3. Water Year 2017 Records for Nearby USGS Gaging Stations.

Station Name	Start Year	Years of Record	Drainage Area (km ²)	WY 2017 Avg. Annual Q (m ³ /s)	Flow Exceedance (%)			
					90% (m ³ /s)	50% (m ³ /s)	10% (m ³ /s)	0% (Max) (m ³ /s)
EAST FORK BLACK RIVER NEAR LESTERVILLE, MO	2003	15	135.2	2.73	0.11	0.35	3.79	464.4
CURRENT RIVER AT MONTAUK STATE PARK, MO	2007	11	152.3	4.72	2.21	2.83	6.38	311.5
E. FORK BLACK R. BELOW LOWER TAUM SAUK RESERVOIR	2008	10	226.1	3.82	0.22	0.58	5.56	739.2
LOGAN CREEK AT ELLINGTON, MO*	1994	24	360.0	3.41	0.09	0.16	1.29	801.5
JACKS FORK NEAR MOUNTAIN VIEW, MO	2001	17	479.2	7.50	0.80	1.31	8.88	945.9
BIG CREEK AT SAM A. BAKER STATE PARK	2005	13	489.5	9.90	1.08	2.21	15.4	1,192.3
LITTLE BLACK RIVER BELOW FAIRDEALING, MO	2007	11	502.5	7.86	1.34	2.44	14.6	645.7
SOUTH FORK SPRING RIVER AT SADDLE, AR	2010	8	686.4	9.22	1.39	3.34	16.8	631.5
CURRENT RIVER ABOVE AKERS, MO	2001	17	764.1	17.7	5.79	8.44	27.9	1,098.8
JACKS FORK AT ALLEY SPRING, MO	1993	25	771.8	13.0	2.06	2.86	17.4	2,667.7
JACKS FORK AT EMINENCE, MO	1921	97	1,030.8	20.4	5.39	7.11	29.5	3,001.9
BLACK RIVER NEAR ANNAPOLIS, MO	1939	79	1,253.6	23.1	5.14	6.91	35.5	2,016.4
BLACK RIVER BELOW ANNAPOLIS, MO	2006	12	1,276.9	26.2	5.78	7.96	39.5	2,016.4
ST. FRANCIS RIVER NEAR SACO, MO	2005	13	1,719.8	28.7	1.02	4.79	38.0	3,115.2
ELEVEN POINT RIVER NEAR BARDLEY, MO	1921	97	2,053.9	38.9	13.5	18.4	57.6	3,455.0
SPRING RIVER AT TOWN BRANCH BRIDGE AT HARDY, AR	1921	97	2,188.6	NA	3.26	8.10	61.7	3,568.3
ST. FRANCIS RIVER NEAR PATTERSON, MO	2008	10	2,476.0	44.2	9.54	17.6	106.5	373.8
BLACK RIVER AT LEEPER, MO	2008	10	2,556.3	42.0	11.9	20.2	108.2	1,370.7
BLACK RIVER ABOVE WILLIAMSVILLE, MO	2000	18	2,608.1	46.8	18.1	25.6	78.8	4,644.5
ELEVEN POINT RIVER NEAR RAVENDEN SPRINGS, AR	1939	79	2,926.7	51.6	16.9	26.6	114.8	841.1
SPRING RIVER AT IMBODEN, AR	1940	78	3,056.2	NA	3.87	20.9	133.9	682.5
BLACK RIVER AT POPLAR BLUFF, MO	1912	106	3,224.6	56.9	28.6	36.8	121.8	5,069.3
ST. FRANCIS RIVER AT WAPPAPELLO, MO	1938	79	3,395.5	55.3	16.5	31.2	143.9	693.8
CURRENT RIVER AT VAN BUREN, MO	1918	100	4,317.5	83.1	45.6	57.5	159.0	5,182.6
BLACK RIVER NEAR CORNING, AR	2003	15	4,532.5	70.3	0.11	0.35	3.79	464.4
CURRENT RIVER AT DONIPHAN, MO	2007	11	5,278.4	116.6	2.21	2.83	6.38	311.5

* Losing section of Logan Creek, ephemeral

FIGURES

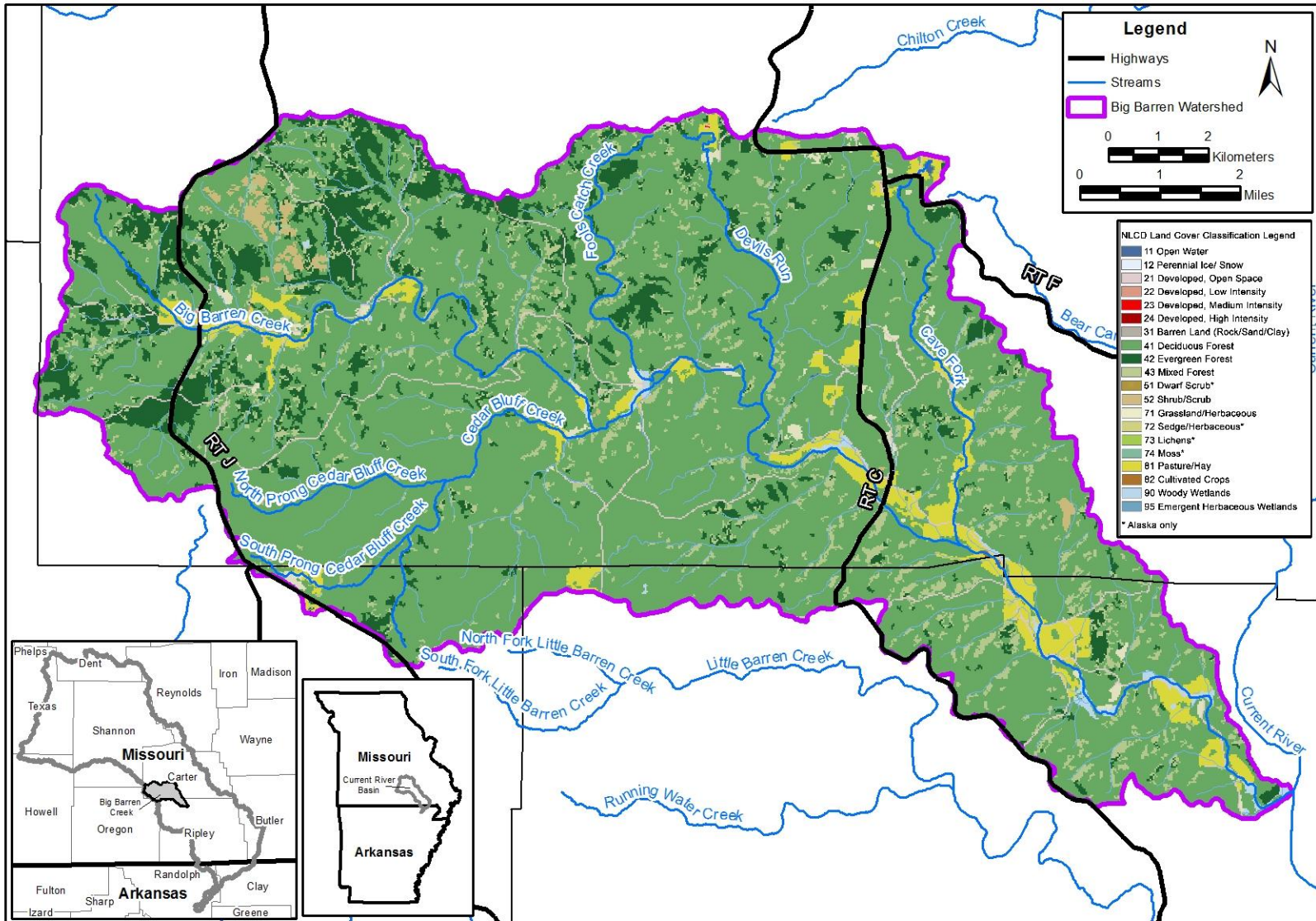


Figure 1. Location and land use of the Big Barren Creek watershed.

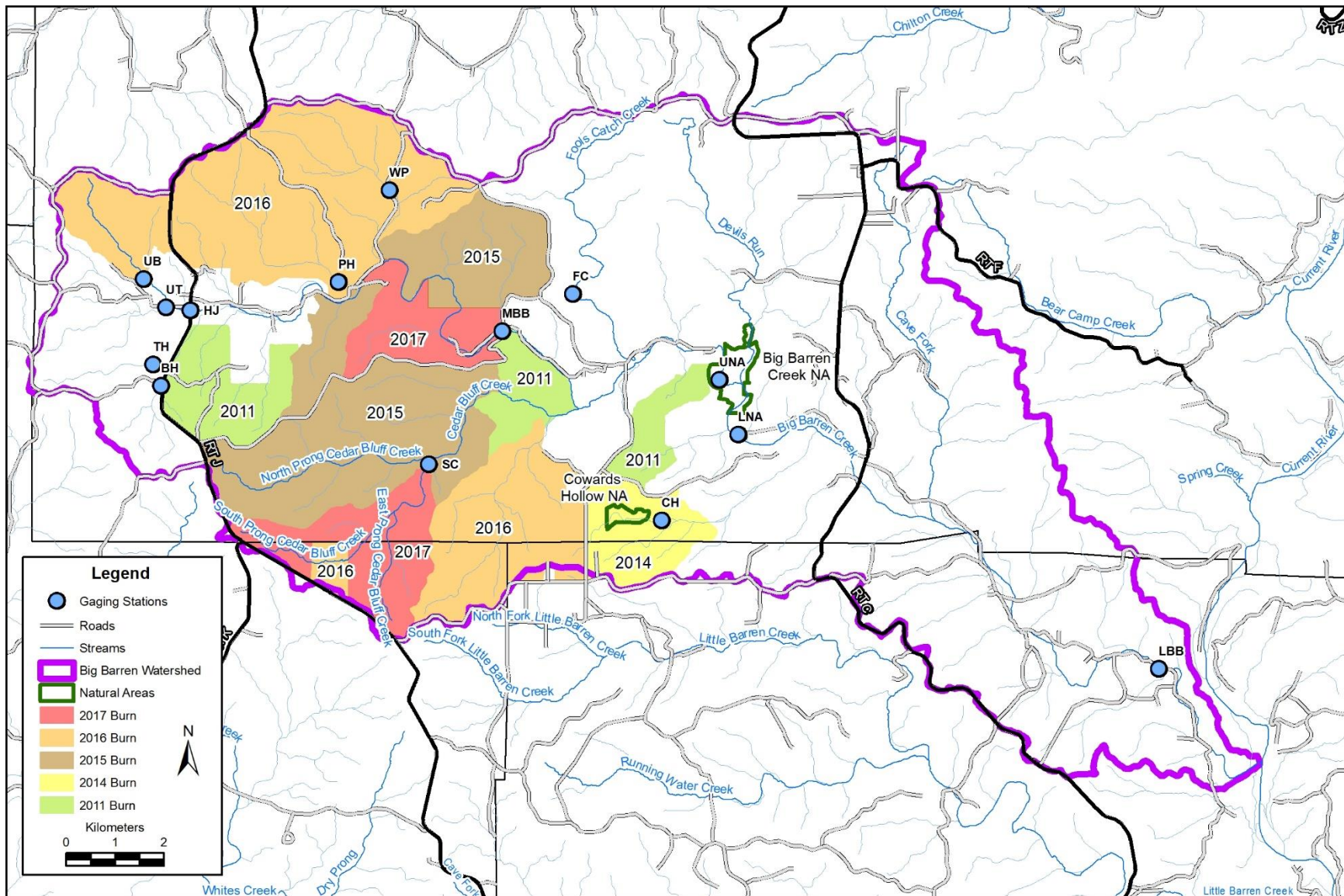


Figure 2. Hydrologic monitoring stations (WY2017) with burn history.

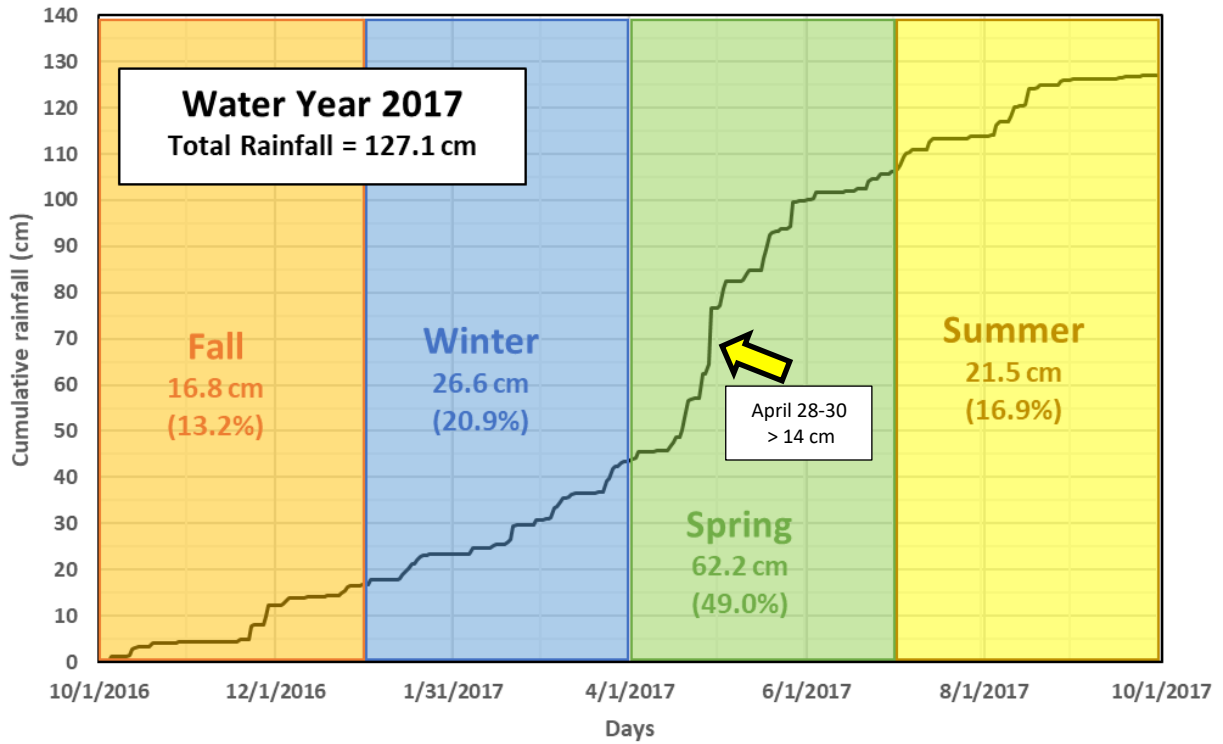


Figure 3. WY2017 cumulative rainfall by season.

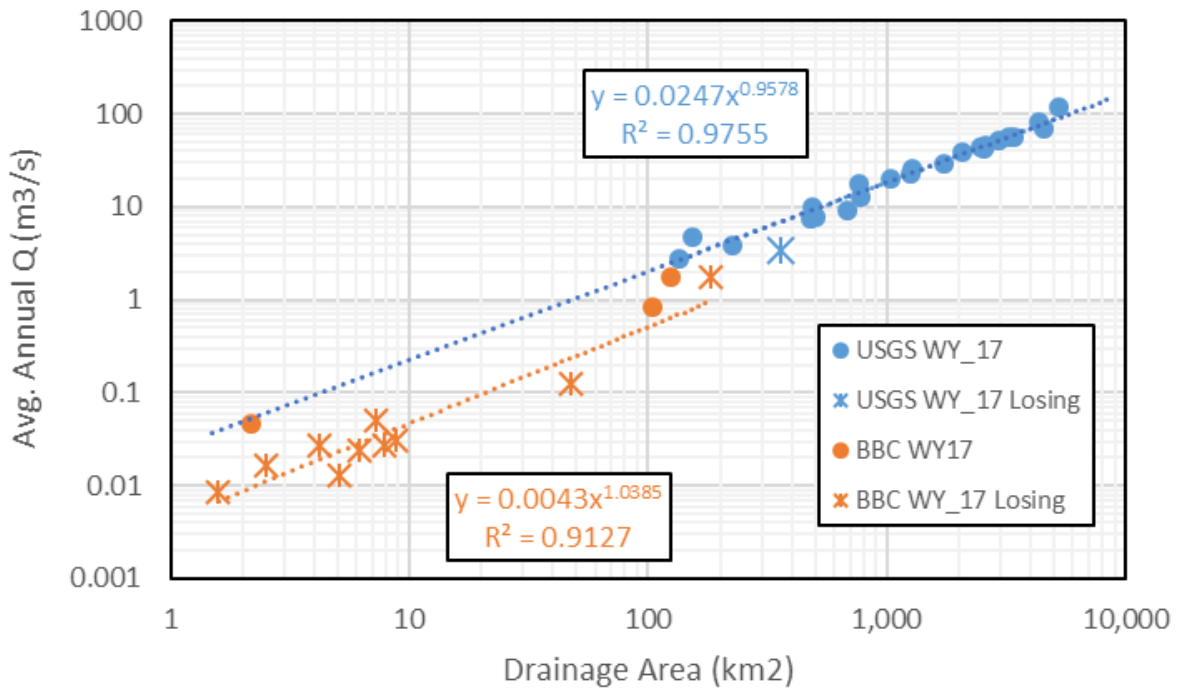


Figure 4. Average annual discharge for Big Barren Creek gages compared to nearby USGS gages (WY2017).

WY2017 GAGING STATION RESULTS

Tram Hollow (1.59 km²)

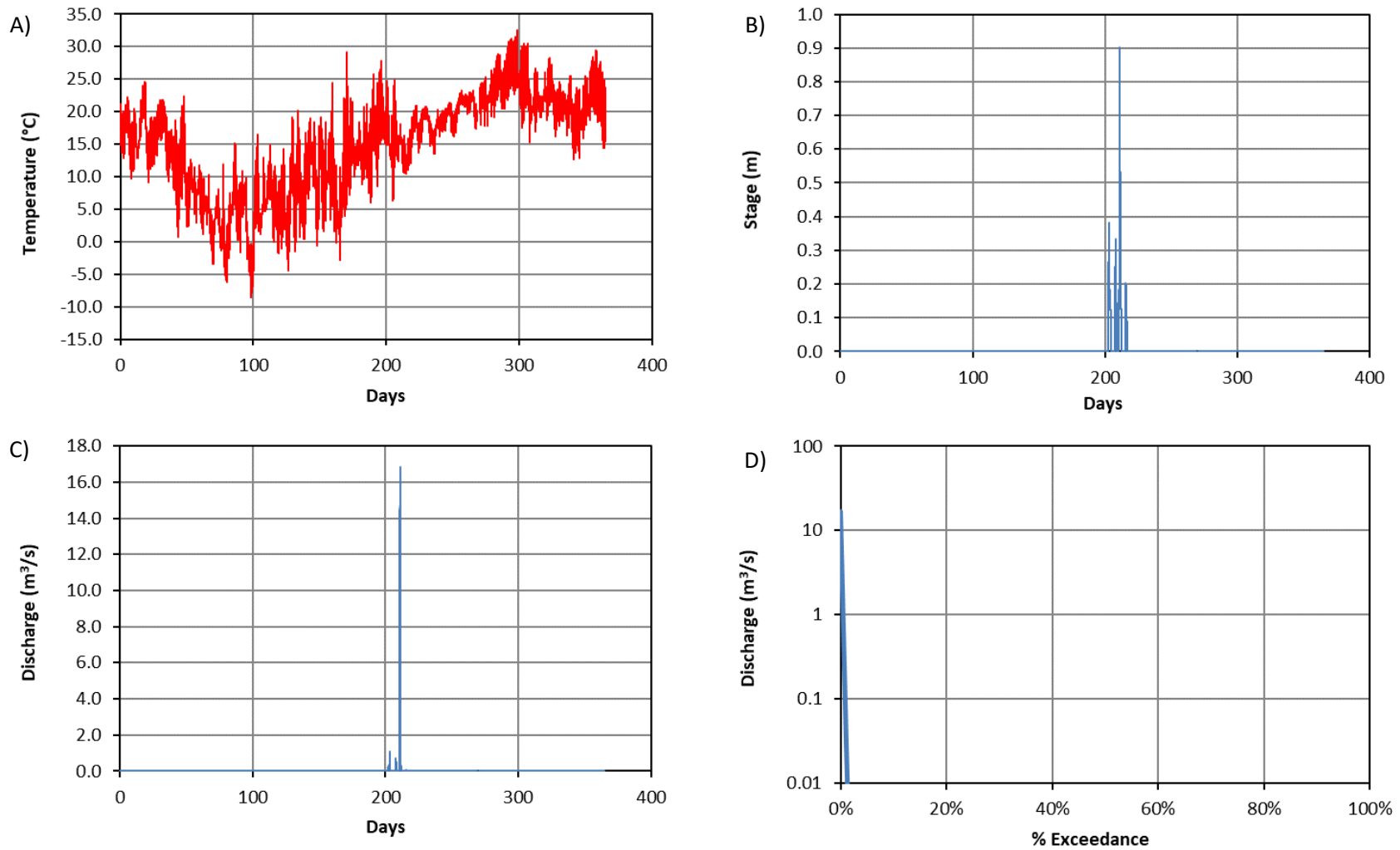


Figure 5. WY2017 A) temperature, B) stage, C) discharge, and D) flow duration curve collected from gaging station at Tram Hollow.

Table 4. Daily Mean Discharge (m³/s) for WY 2017 at Tram Hollow.

Day	Oct 2016	Nov 2016	Dec 2016	Jan 2017	Feb 2017	Mar 2017	Apr 2017	May 2017	Jun 2017	Jul 2017	Aug 2017	Sep 2017
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.18	0.00	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.00	M	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	M	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	M	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00		0.00	1.26	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00		0.00	1.13	0.00	0.00	0.00	0.00	0.00
31	0.00		0.00	0.00		0.00		0.00	0.00	0.00	0.00	
Total	0.00	0.00	0.00	0.00	0.00	0.00	2.94	0.02	0.00	0.00	0.00	0.00
Mean	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.00
Max	0.00	0.00	0.00	0.00	0.00	0.00	1.26	0.02	0.00	0.00	0.00	0.00
Min	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Cowards Hollow (2.19 km²)

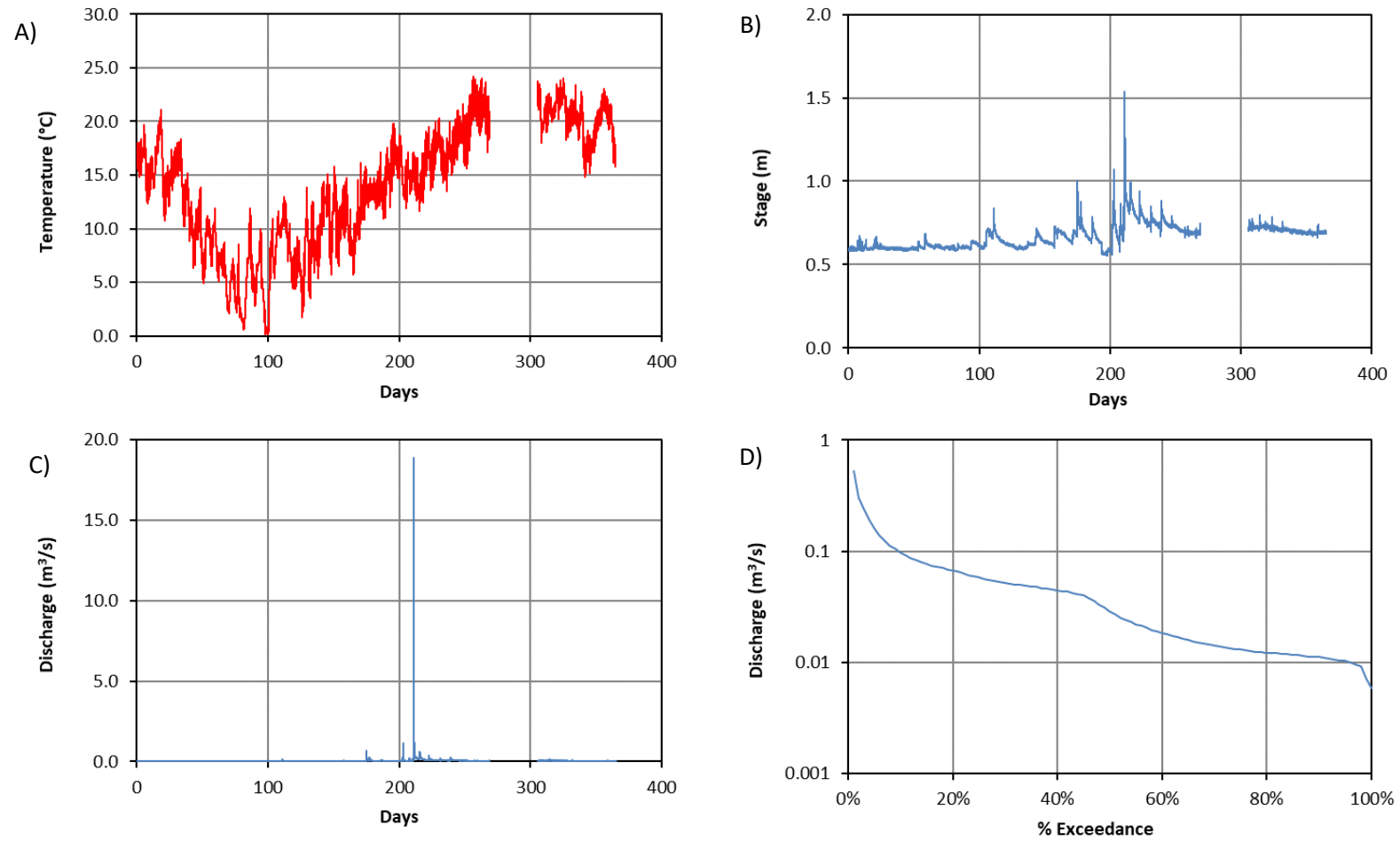


Figure 6. WY2017 A) temperature, B) stage, C) discharge, and D) flow duration curve collected from gaging station at Cowards Hollow.

Table 5. Daily Mean Discharge (m³/s) for WY 2017 at Cowards Hollow (CH)

Day	Oct 2016	Nov 2016	Dec 2016	Jan 2017	Feb 2017	Mar 2017	Apr 2017	May 2017	Jun 2017	Jul 2017	Aug 2017	Sep 2017
1	0.01	0.01	0.02	0.01	0.02	0.02	0.03	0.28	0.07	M	M	0.04
2	0.01	0.01	0.01	0.01	0.02	0.02	0.03	0.19	0.06	M	M	0.04
3	0.01	0.01	0.01	0.02	0.01	0.02	0.02	0.16	0.06	M	0.06	0.04
4	0.01	0.01	0.01	0.02	0.01	0.02	0.02	0.44	0.06	M	0.05	0.04
5	0.01	0.01	0.01	0.02	0.01	0.02	0.07	0.27	0.08	M	0.06	0.04
6	0.01	0.01	0.01	0.02	0.01	0.02	0.05	0.18	0.06	M	0.06	0.04
7	0.01	0.01	0.01	0.02	0.01	0.05	0.04	0.14	0.06	M	0.05	0.04
8	0.02	0.01	0.01	0.02	0.01	0.04	0.03	0.11	0.06	M	0.05	0.04
9	0.02	0.01	0.01	0.01	0.01	0.03	0.02	0.10	0.05	M	0.05	0.04
10	0.01	0.01	0.01	0.01	0.01	0.04	0.02	0.09	0.05	M	0.05	0.04
11	0.01	0.01	0.01	0.01	0.01	0.04	0.02	0.11	0.04	M	0.07	0.04
12	0.01	0.01	0.01	0.01	0.01	0.04	0.01	0.14	0.04	M	0.06	0.04
13	0.01	0.01	0.01	0.02	0.01	0.03	0.01	0.12	0.04	M	0.06	0.04
14	0.01	0.01	0.01	0.03	0.01	0.04	0.01	0.10	0.04	M	0.06	0.04
15	0.01	0.01	0.01	0.04	0.02	0.03	0.01	0.08	0.04	M	0.06	0.04
16	0.01	0.01	0.01	0.04	0.02	0.03	0.01	0.07	0.04	M	0.05	0.04
17	0.01	0.01	0.01	0.04	0.02	0.02	0.01	0.07	0.04	M	0.06	0.04
18	0.01	0.01	0.01	0.03	0.02	0.02	0.01	0.06	0.04	M	0.05	0.04
19	0.01	0.01	0.01	0.05	0.02	0.02	0.01	0.06	0.04	M	0.05	0.04
20	0.02	0.01	0.01	0.07	0.02	0.02	0.02	0.11	0.04	M	0.06	0.04
21	0.02	0.01	0.01	0.04	0.04	0.03	0.15	0.09	0.04	M	0.05	0.04
22	0.02	0.01	0.01	0.03	0.04	0.04	0.22	0.08	0.04	M	0.05	0.03
23	0.01	0.02	0.01	0.03	0.03	0.04	0.05	0.07	0.04	M	0.05	0.04
24	0.01	0.01	0.01	0.02	0.03	0.06	0.03	0.07	0.04	M	0.05	0.04
25	0.01	0.01	0.01	0.02	0.02	0.19	0.02	0.06	0.04	M	0.05	0.04
26	0.01	0.01	0.01	0.02	0.02	0.07	0.06	0.06	M	M	0.05	0.04
27	0.01	0.01	0.01	0.02	0.02	0.10	0.06	0.07	M	M	0.05	0.04
28	0.01	0.02	0.01	0.02	0.02	0.07	0.03	0.16	M	M	0.05	0.04
29	0.01	0.02	0.01	0.02		0.05	0.90	0.11	M	M	0.05	0.04
30	0.01	0.02	0.01	0.02		0.04	1.88	0.08	M	M	0.05	0.04
31	0.01		0.01	0.02		0.04		0.07		M	0.05	
Total	0.40	0.38	0.40	0.74	0.51	1.28	3.84	3.80	1.17	M	1.53	1.18
Mean	0.01	0.01	0.01	0.02	0.02	0.04	0.13	0.12	0.05	M	0.05	0.04
Max	0.02	0.02	0.02	0.07	0.04	0.19	1.88	0.44	0.08	M	0.07	0.04
Min	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.06	0.04	M	0.05	0.03

Upper Big Barren (2.51 km²)

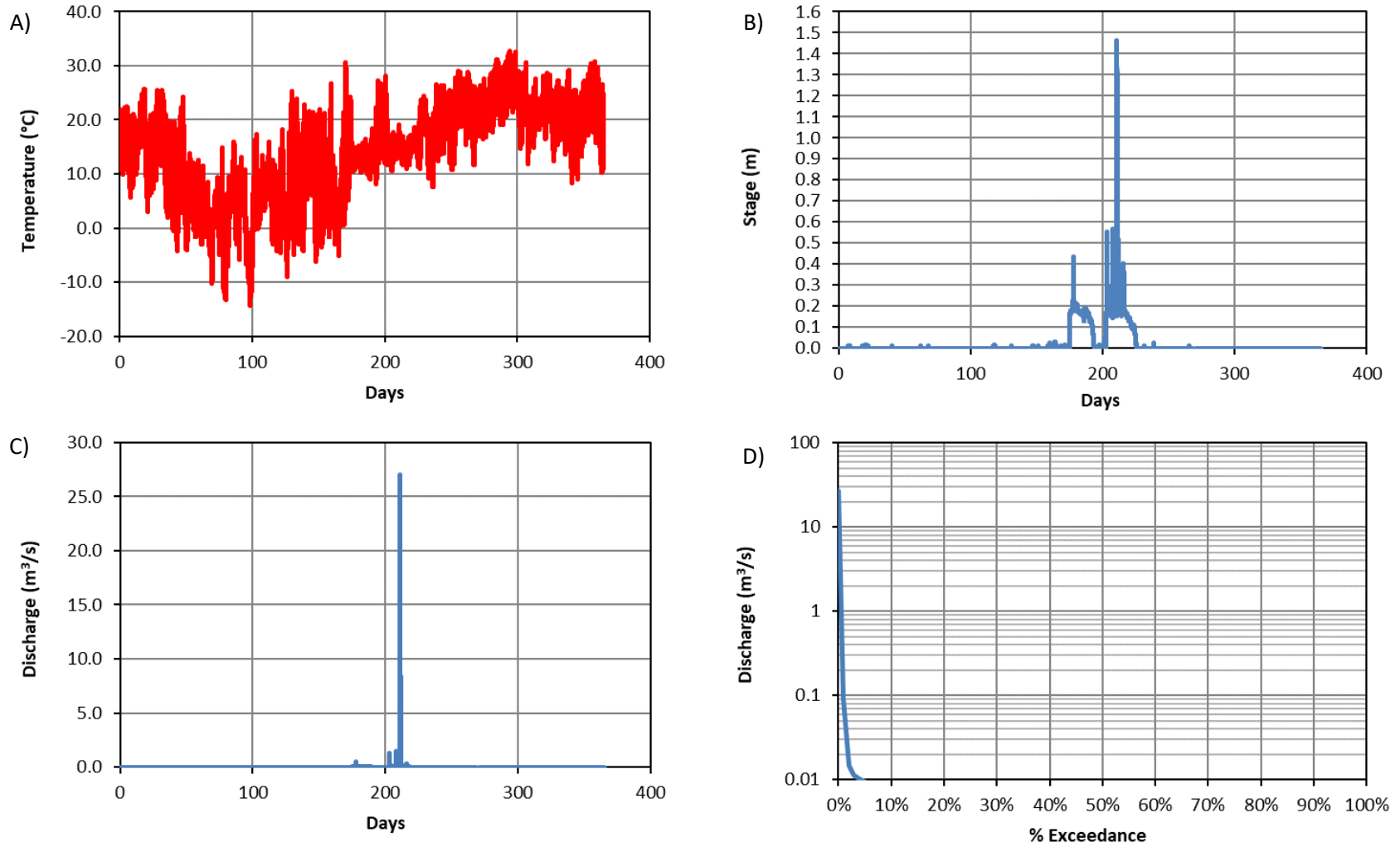


Figure 7. WY2017 A) temperature, B) stage, C) discharge, and D) flow duration curve collected from gaging station at Upper Big Barren.

Table 6. Daily Mean Discharge (m³/s) for WY 2017 at Upper Big Barren.

Day	Oct 2016	Nov 2016	Dec 2016	Jan 2017	Feb 2017	Mar 2017	Apr 2017	May 2017	Jun 2017	Jul 2017	Aug 2017	Sep 2017
1	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.10	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.31	0.00	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.01	0.23	0.00	M	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.13	0.19	0.00	M	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.03	0.01	0.00	M	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00		0.01	2.21	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00		0.02	2.54	0.00	0.00	0.00	0.00	0.00
31	0.00		0.00	0.00		0.01		0.00		0.00	0.00	
Total	0.00	0.00	0.00	0.00	0.00	0.21	5.59	0.20	0.00	0.00	0.00	0.00
Mean	0.00	0.00	0.00	0.00	0.00	0.01	0.19	0.01	0.00	0.00	0.00	0.00
Max	0.00	0.00	0.00	0.00	0.00	0.13	2.54	0.10	0.00	0.00	0.00	0.00
Min	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Barnes Hollow (2.67 km²)

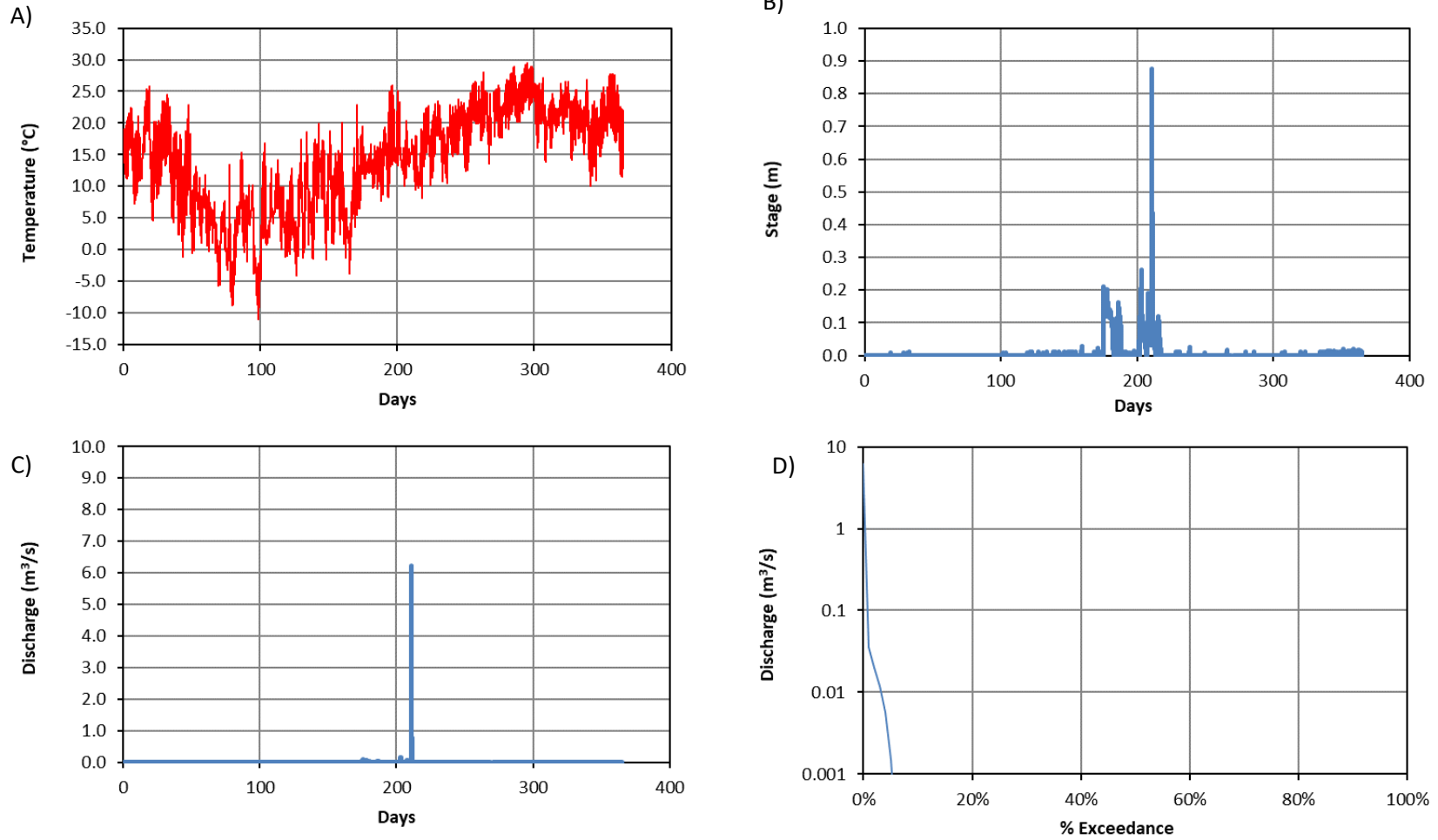


Figure 8. WY2017 A) temperature, B) stage, C) discharge, and D) flow duration curve collected from gaging station at Barnes Hollow.

Table 7. Daily Mean Discharge (m³/s) for WY 2017 at Barnes Hollow (BH)

Day	Oct 2016	Nov 2016	Dec 2016	Jan 2017	Feb 2017	Mar 2017	Apr 2017	May 2017	Jun 2017	Jul 2017	Aug 2017	Sep 2017
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.02	0.01	0.00	M	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.04	0.01	0.00	M	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	M	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00		0.02	0.37	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00		0.02	0.21	0.00	0.00	0.00	0.00	0.00
31	0.00		0.00	0.00		0.01		0.00		0.00	0.00	
Total	0.00	0.00	0.00	0.00	0.00	0.20	0.72	0.01	0.00	0.00	0.00	0.00
Mean	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.00	0.00	0.00	0.00	0.00
Max	0.00	0.00	0.00	0.00	0.00	0.05	0.37	0.01	0.00	0.00	0.00	0.00
Min	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Upper Tributary (4.19 km²)

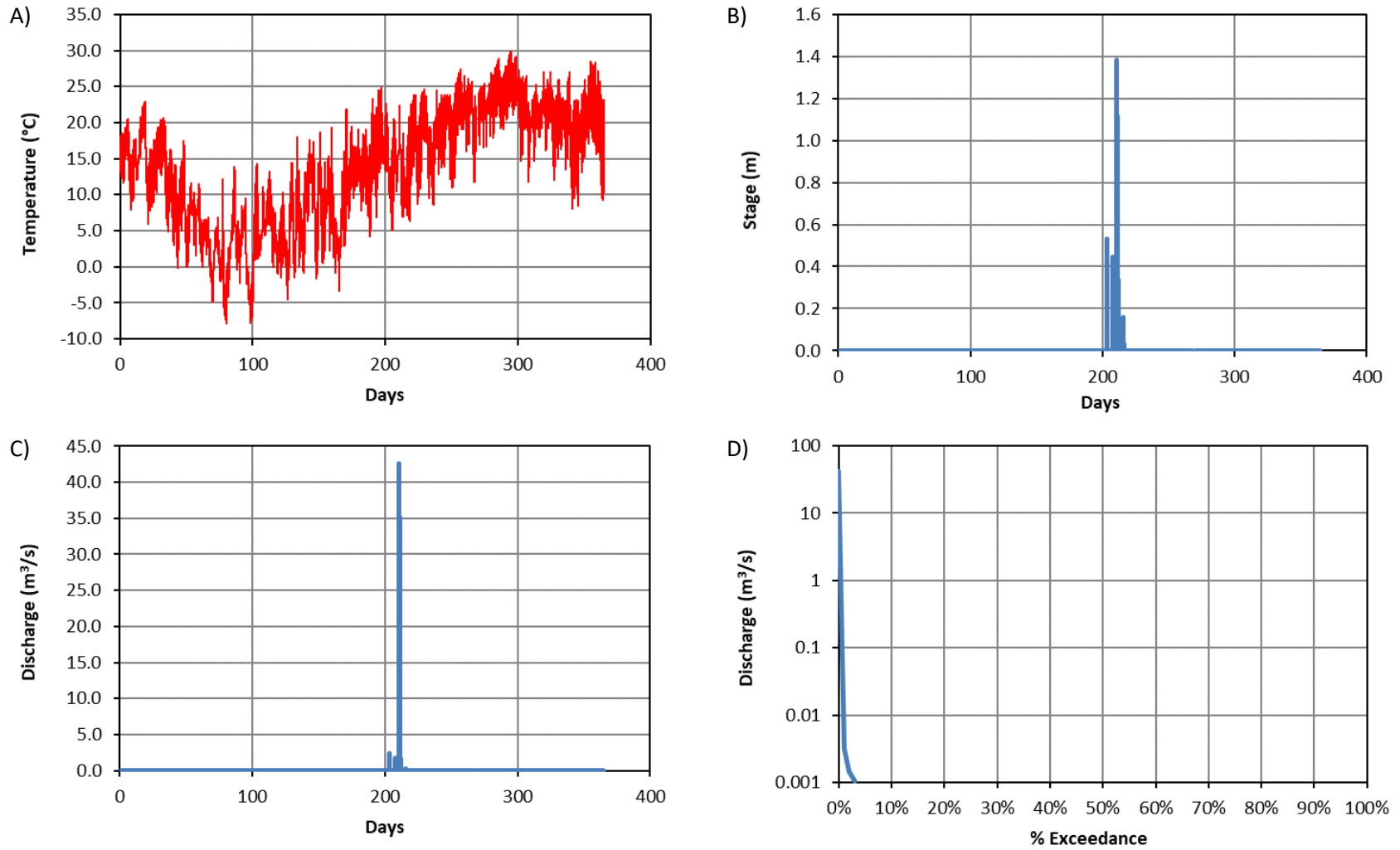


Figure 9. WY2017 A) temperature, B) stage, C) discharge, and D) flow duration curve collected from gaging station at the Upper Tributary.

Table 8. Daily Mean Discharge (m³/s) for WY 2017 at Upper Tributary.

Day	Oct 2016	Nov 2016	Dec 2016	Jan 2017	Feb 2017	Mar 2017	Apr 2017	May 2017	Jun 2017	Jul 2017	Aug 2017	Sep 2017
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.32	0.00	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.22	0.00	M	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.00	M	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	M	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00		0.00	3.82	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00		0.00	5.34	0.00	0.00	0.00	0.00	0.00
31	0.00		0.00	0.00		0.00		0.00		0.00	0.00	
Total	0.00	0.00	0.00	0.00	0.00	0.00	9.88	0.04	0.00	0.00	0.00	0.00
Mean	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.00	0.00	0.00	0.00	0.00
Max	0.00	0.00	0.00	0.00	0.00	0.00	5.34	0.04	0.00	0.00	0.00	0.00
Min	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Wolf Pond (5.13 km²)

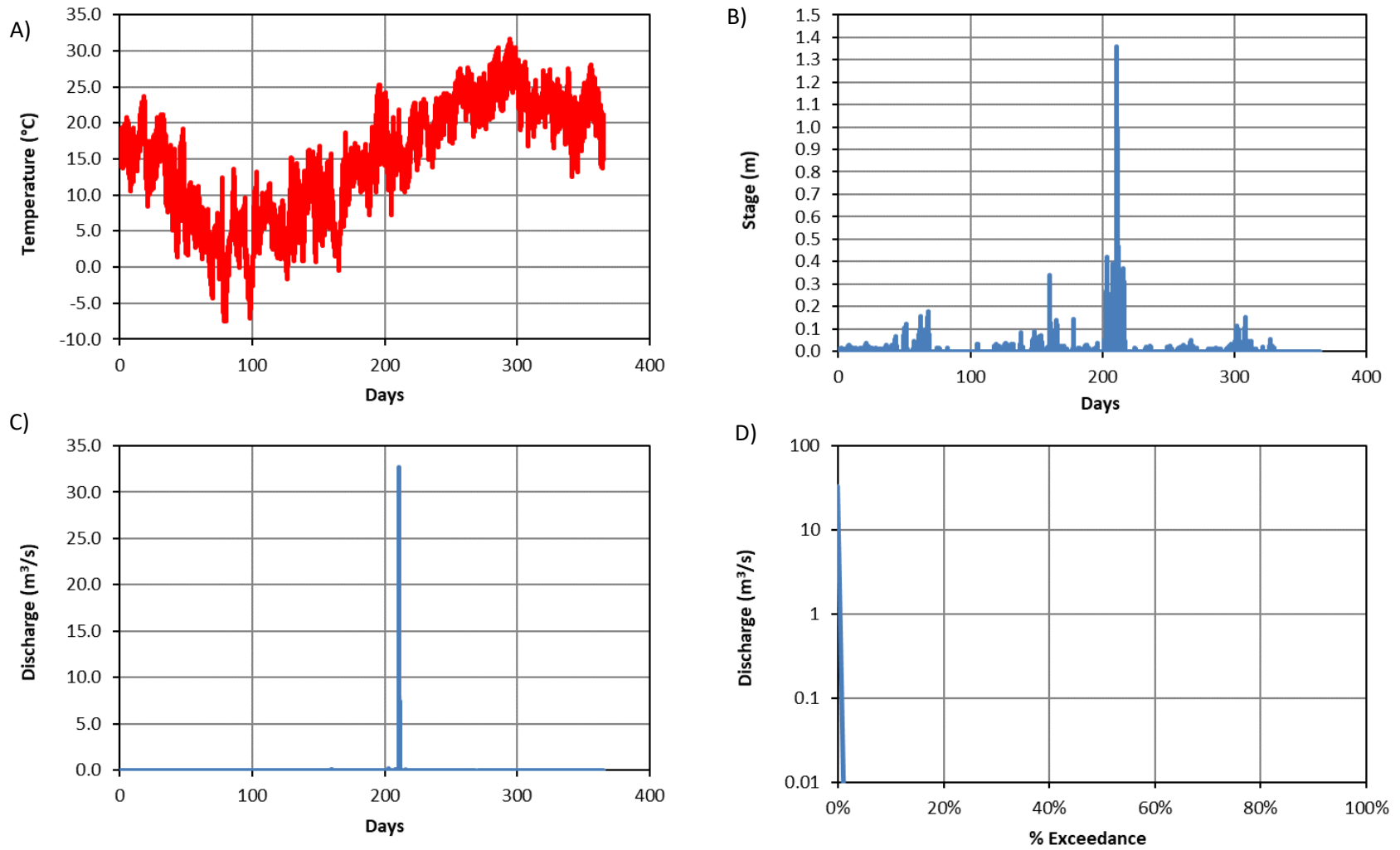


Figure 10. WY2017 A) temperature, B) stage, C) discharge, and D) flow duration curve collected from gaging station at the Wolf Pond Tributary.

Table 9. Daily Mean Discharge (m³/s) for WY 2017 at Wolf Pond Tributary.

Day	Oct 2016	Nov 2016	Dec 2016	Jan 2017	Feb 2017	Mar 2017	Apr 2017	May 2017	Jun 2017	Jul 2017	Aug 2017	Sep 2017
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	M	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	M	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	M	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00		0.00	1.95	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00		0.00	2.48	0.00	0.00	0.00	0.00	0.00
31	0.00		0.00	0.00		0.00		0.00		0.00	0.00	
Total	0.00	0.00	0.00	0.00	0.00	0.01	4.49	0.03	0.00	0.00	0.00	0.00
Mean	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.00	0.00	0.00	0.00	0.00
Max	0.00	0.00	0.00	0.00	0.00	0.01	2.48	0.02	0.00	0.00	0.00	0.00
Min	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Polecat Hollow (6.19 km²)

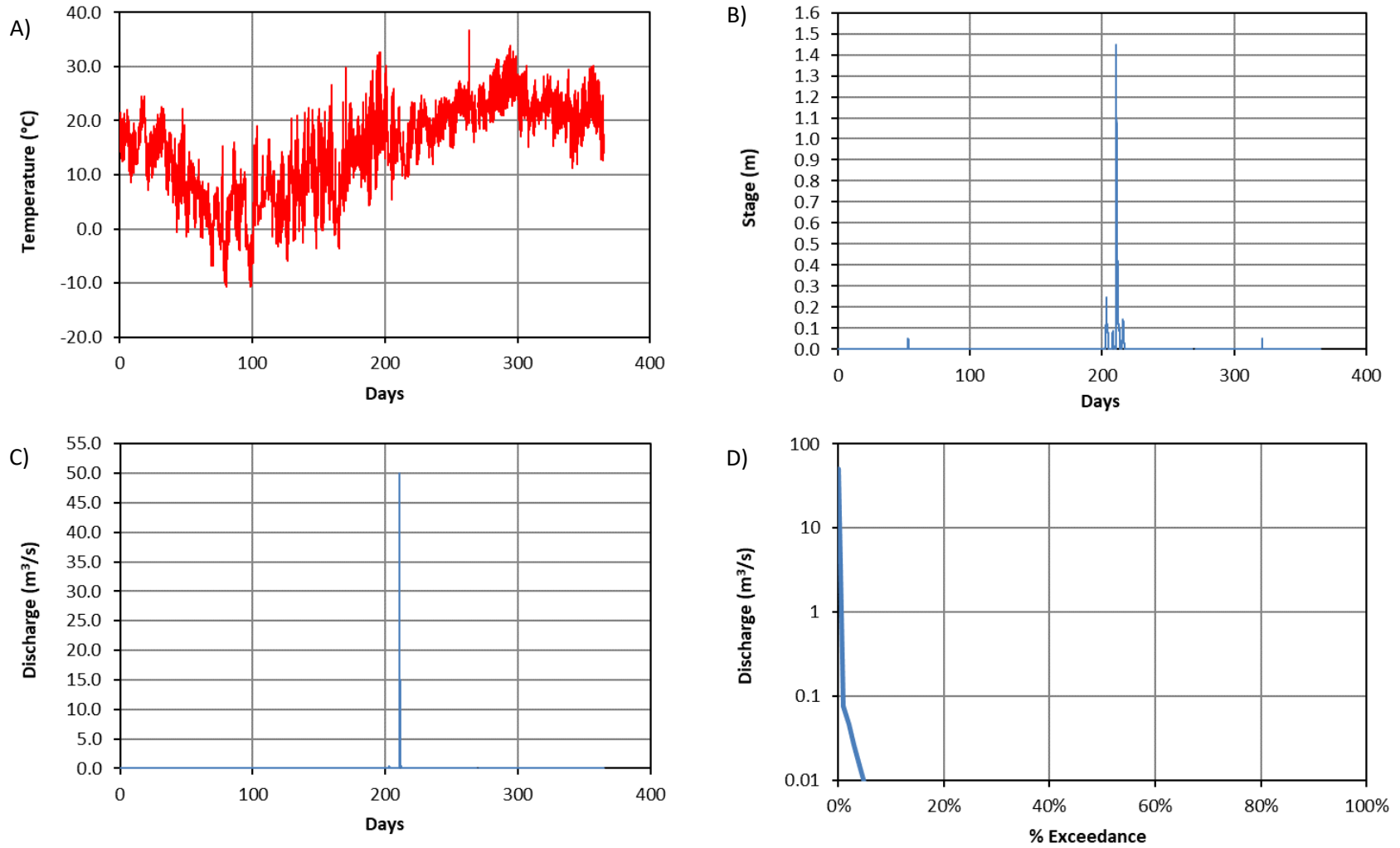


Figure 11. WY2017 A) temperature, B) stage, C) discharge, and D) flow duration curve collected from gaging station at Polecat Hollow.

Table 10. Daily Mean Discharge (m³/s) for WY 2017 at Polecat Hollow

Day	Oct 2016	Nov 2016	Dec 2016	Jan 2017	Feb 2017	Mar 2017	Apr 2017	May 2017	Jun 2017	Jul 2017	Aug 2017	Sep 2017
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	M	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	M	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	M	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00		0.00	3.47	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00		0.00	4.86	0.00	0.00	0.00	0.00	0.00
31	0.00		0.00	0.00		0.00		0.00		0.00	0.00	
Total	0.00	0.00	0.00	0.00	0.00	0.00	8.46	0.09	0.00	0.00	0.00	0.00
Mean	0.00	0.00	0.00	0.00	0.00	0.00	0.28	0.00	0.00	0.00	0.00	0.00
Max	0.00	0.00	0.00	0.00	0.00	0.00	4.86	0.04	0.00	0.00	0.00	0.00
Min	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

South Prong Cedar Bluff Creek (7.28 km²)

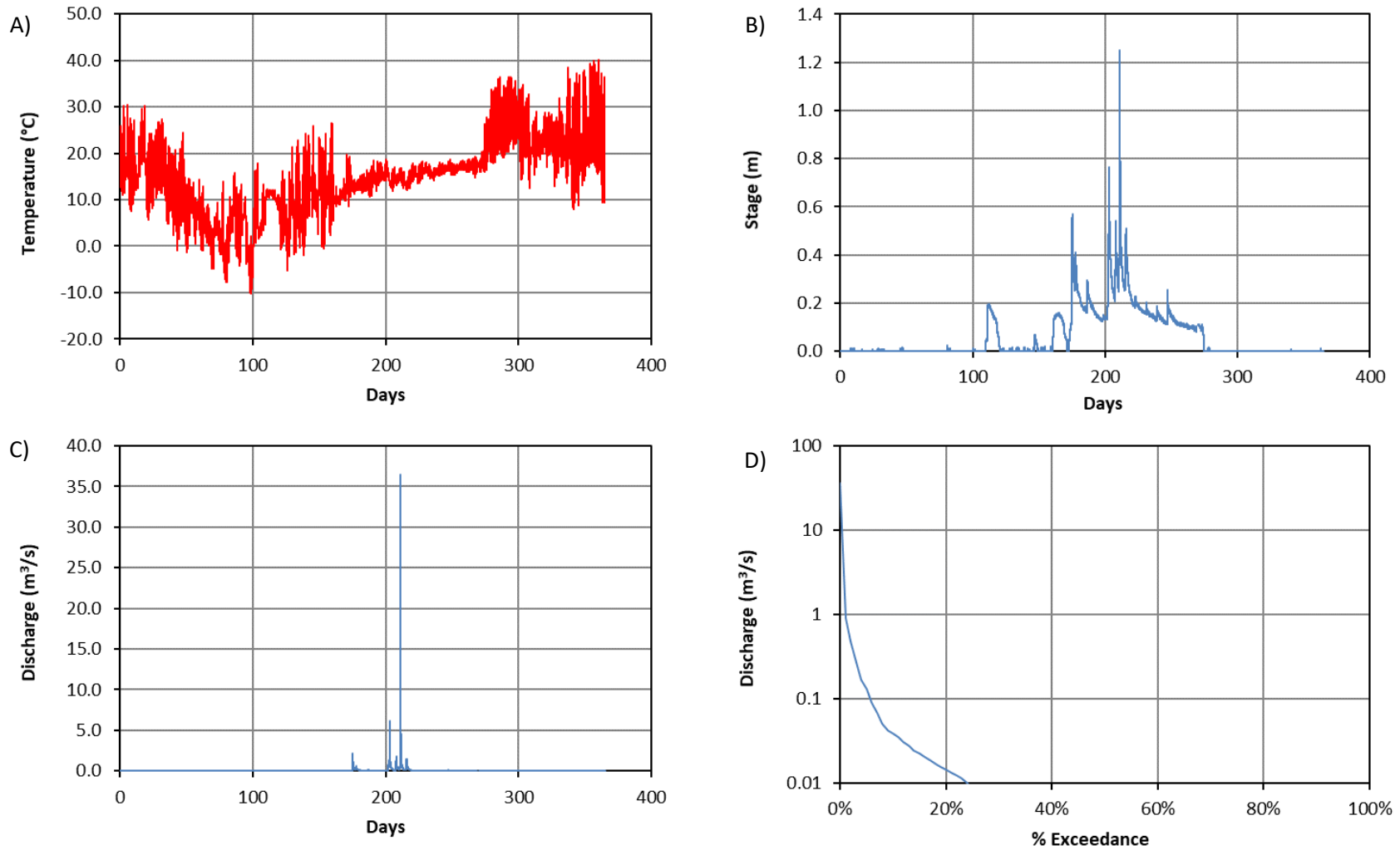


Figure 12. WY2017 A) temperature, B) stage, C) discharge, and D) flow duration curve collected from gaging station at South Prong Cedar Bluff Creek.

Table 11. Daily Mean Discharge (m³/s) for WY 2017 at South Prong Cedar Bluff Creek.

Day	Oct 2016	Nov 2016	Dec 2016	Jan 2017	Feb 2017	Mar 2017	Apr 2017	May 2017	Jun 2017	Jul 2017	Aug 2017	Sep 2017
1	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.52	0.01	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.22	0.01	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.13	0.01	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.77	0.01	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.53	0.04	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.21	0.03	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.11	0.02	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.07	0.02	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.05	0.01	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.04	0.01	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.04	0.01	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.05	0.01	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.04	0.01	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.02	0.01	0.04	0.01	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.02	0.01	0.03	0.01	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.02	0.01	0.03	0.01	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.03	0.01	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.02	0.01	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.01	0.00	0.00	0.00
20	0.00	0.00	0.00	0.04	0.00	0.00	0.05	0.03	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.04	0.00	0.00	0.99	0.02	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.03	0.00	0.00	1.95	0.02	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.02	0.00	0.00	0.34	0.02	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.02	0.00	0.01	0.15	0.02	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.01	0.00	0.96	0.09	0.02	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.01	0.00	0.22	0.37	0.01	M	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.33	0.72	0.01	M	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.21	0.19	0.03	M	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00		0.10	2.60	0.02	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00		0.08	4.64	0.02	0.00	0.00	0.00	0.00
31	0.00		0.00	0.00		0.05		0.01		0.00	0.00	
Total	0.00	0.00	0.00	0.18	0.00	2.10	12.74	3.18	0.26	0.00	0.00	0.00
Mean	0.00	0.00	0.00	0.01	0.00	0.07	0.42	0.10	0.01	0.00	0.00	0.00
Max	0.00	0.00	0.00	0.04	0.00	0.96	4.64	0.77	0.04	0.00	0.00	0.00
Min	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00

Fools Catch (7.82 km²)

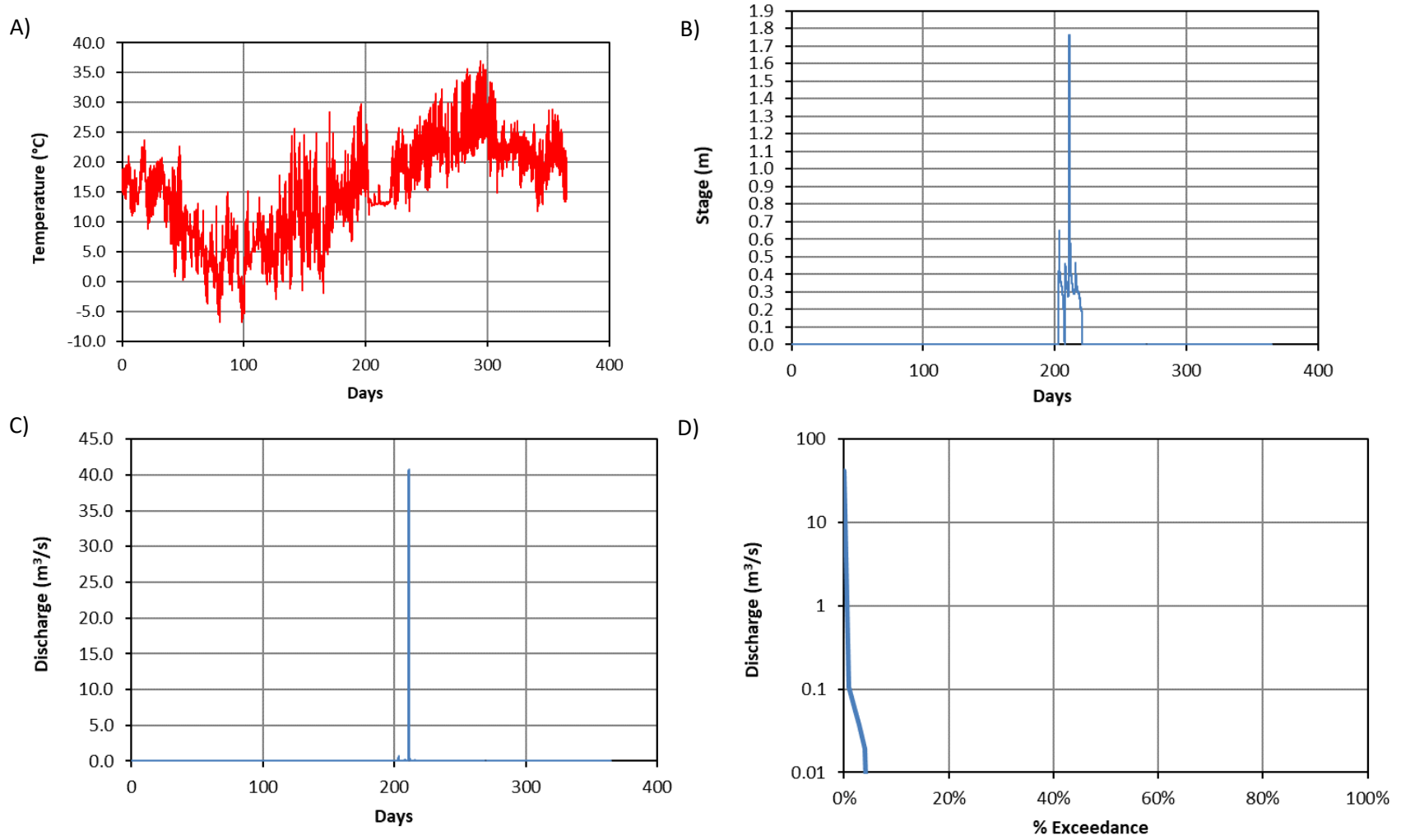


Figure 13. WY2017 A) temperature, B) stage, C) discharge, and D) flow duration curve collected from gaging station at Fools Catch.

Table 12. Daily Mean Discharge (m³/s) for WY 2017 at Fools Catch

Day	Oct 2016	Nov 2016	Dec 2016	Jan 2017	Feb 2017	Mar 2017	Apr 2017	May 2017	Jun 2017	Jul 2017	Aug 2017	Sep 2017
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.00	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	M	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00	M	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	M	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00		0.00	3.03	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00		0.00	5.81	0.00	0.00	0.00	0.00	0.00
31	0.00		0.00	0.00		0.00		0.00		0.00	0.00	
Total	0.00	0.00	0.00	0.00	0.00	0.00	9.37	0.45	0.00	0.00	0.00	0.00
Mean	0.00	0.00	0.00	0.00	0.00	0.00	0.31	0.01	0.00	0.00	0.00	0.00
Max	0.00	0.00	0.00	0.00	0.00	0.00	5.81	0.11	0.00	0.00	0.00	0.00
Min	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Highway J (8.82 km²)

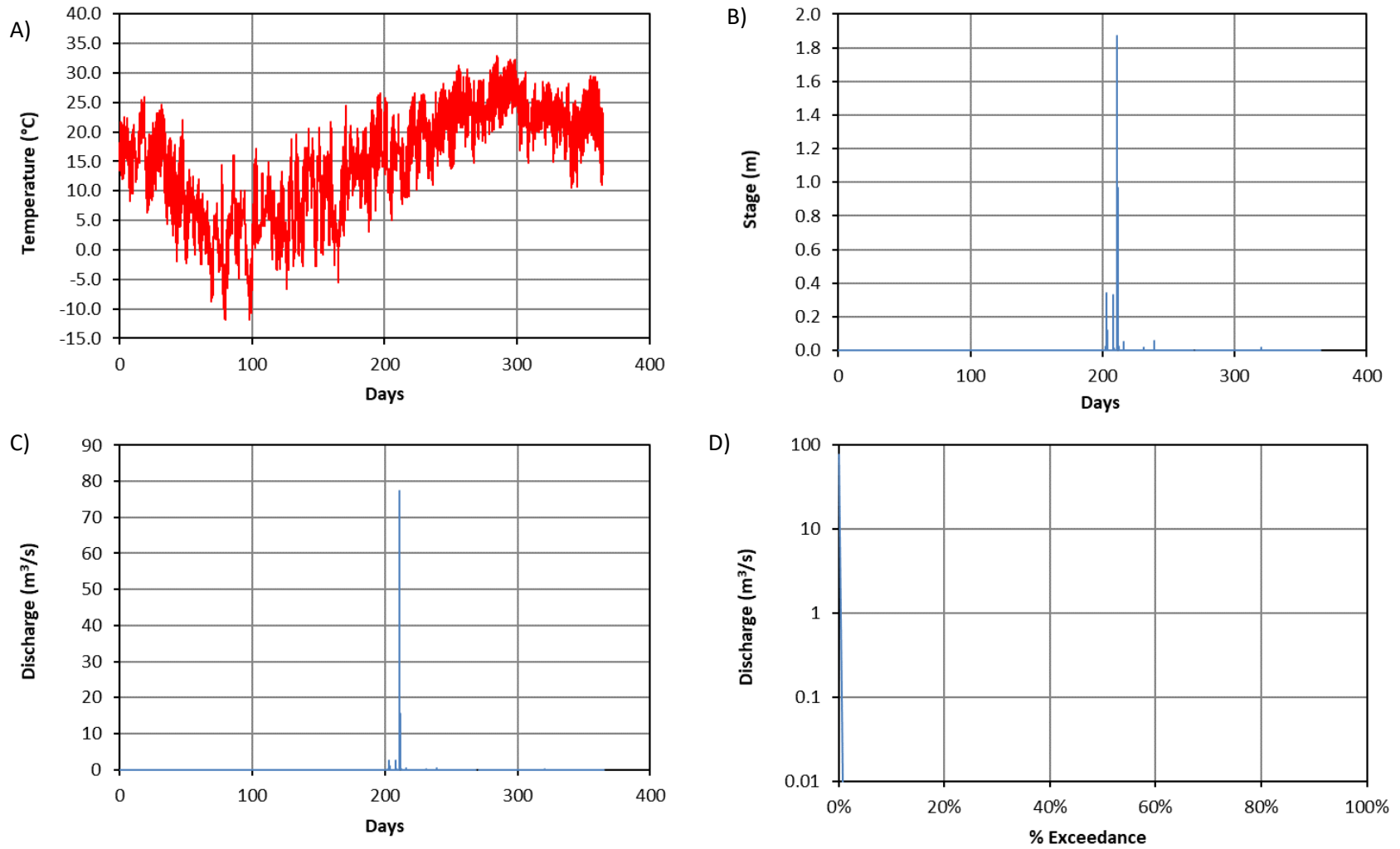


Figure 14. WY2017 A) temperature, B) stage, C) discharge, and D) flow duration curve collected from gaging station at Highway J.

Table 13. Daily Mean Discharge (m³/s) for WY 2017 at Highway J.

Day	Oct 2016	Nov 2016	Dec 2016	Jan 2017	Feb 2017	Mar 2017	Apr 2017	May 2017	Jun 2017	Jul 2017	Aug 2017	Sep 2017
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.47	0.00	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.27	0.00	M	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	0.53	0.00	M	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	M	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00		0.00	5.60	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00		0.00	4.36	0.00	0.00	0.00	0.00	0.00
31	0.00		0.00	0.00		0.00		0.00		0.00	0.00	
Total	0.00	0.00	0.00	0.00	0.00	0.00	11.23	0.08	0.00	0.00	0.00	0.00
Mean	0.00	0.00	0.00	0.00	0.00	0.00	0.37	0.00	0.00	0.00	0.00	0.00
Max	0.00	0.00	0.00	0.00	0.00	0.00	5.60	0.04	0.00	0.00	0.00	0.00
Min	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Middle Big Barren Creek (47.76 km²)

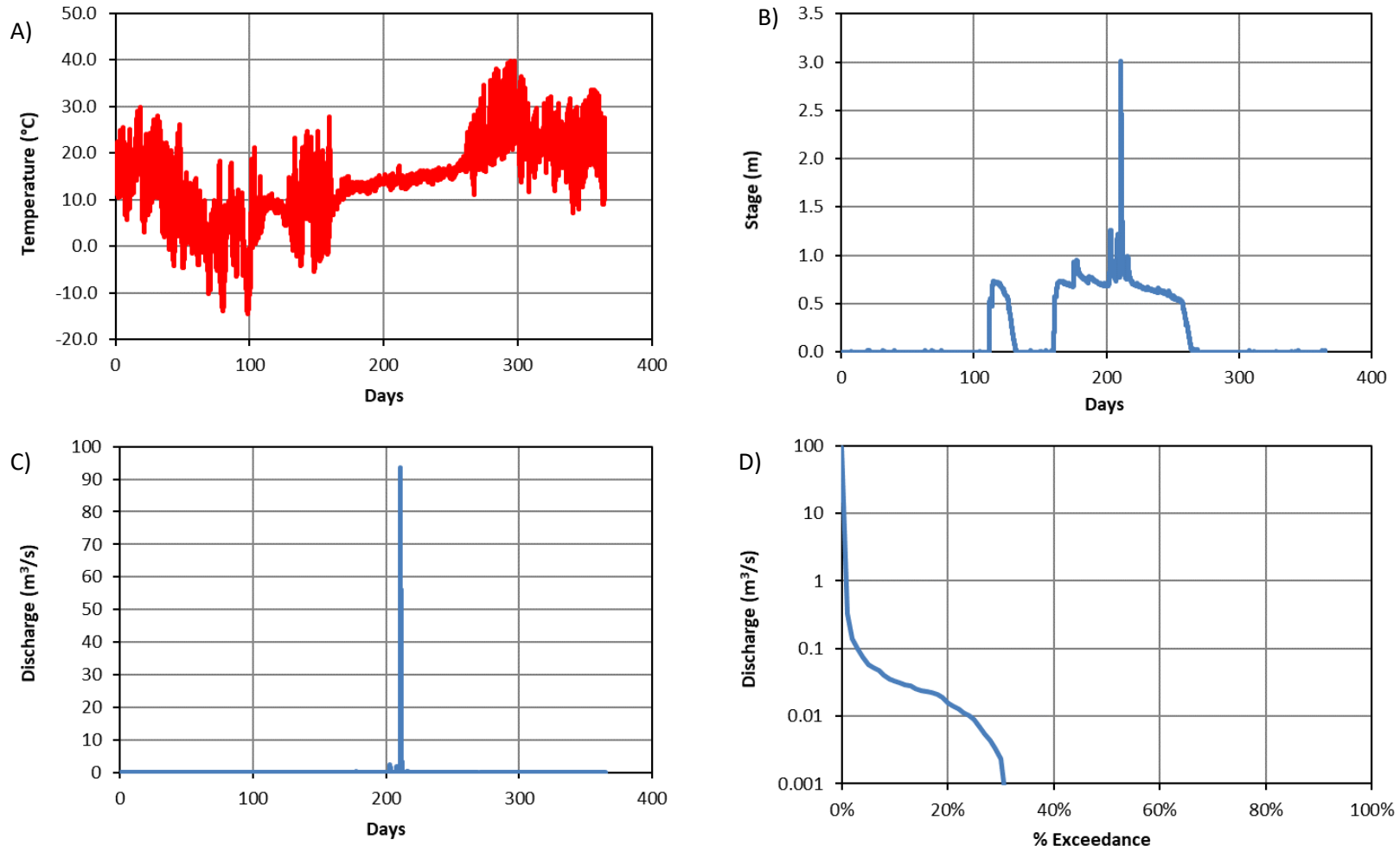


Figure 15. WY2017 A) temperature, B) stage, C) discharge, and D) flow duration curve collected from gaging station at Middle Big Barren.

Table 14. Daily Mean Discharge (m³/s) for WY 2017 at Middle Big Barren.

Day	Oct 2016	Nov 2016	Dec 2016	Jan 2017	Feb 2017	Mar 2017	Apr 2017	May 2017	Jun 2017	Jul 2017	Aug 2017	Sep 2017
1	0.00	0.00	0.00	0.00	0.01	0.00	0.05	0.65	0.01	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.01	0.00	0.04	0.10	0.01	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.05	0.01	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.20	0.01	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.17	0.01	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.06	0.01	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.04	0.01	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.03	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.03	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.02	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.02	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.02	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.02	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.02	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.03	0.02	0.02	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.03	0.02	0.02	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.03	0.02	0.02	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.03	0.02	0.01	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.03	0.02	0.01	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.01	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.02	0.15	0.01	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.02	0.91	0.01	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.03	0.00	0.02	0.13	0.01	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.03	0.00	0.02	0.07	0.01	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.03	0.00	0.11	0.05	0.01	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.03	0.00	0.10	0.11	0.01	M	0.00	0.00	0.00
27	0.00	0.00	0.00	0.03	0.00	0.15	0.53	0.01	M	0.00	0.00	0.00
28	0.00	0.00	0.00	0.02	0.00	0.14	0.08	0.01	M	0.00	0.00	0.00
29	0.00	0.00	0.00	0.02		0.08	9.43	0.01	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.02		0.06	30.18	0.01	0.00	0.00	0.00	0.00
31	0.00		0.00	0.01		0.05		0.01		0.00	0.00	
Total	0.00	0.00	0.00	0.22	0.02	1.04	42.33	1.66	0.08	0.00	0.00	0.00
Mean	0.00	0.00	0.00	0.01	0.00	0.03	1.41	0.05	0.00	0.00	0.00	0.00
Max	0.00	0.00	0.00	0.03	0.01	0.15	30.18	0.65	0.01	0.00	0.00	0.00
Min	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.01	0.00	0.00	0.00	0.00

Upper Natural Area (103.6 km²)

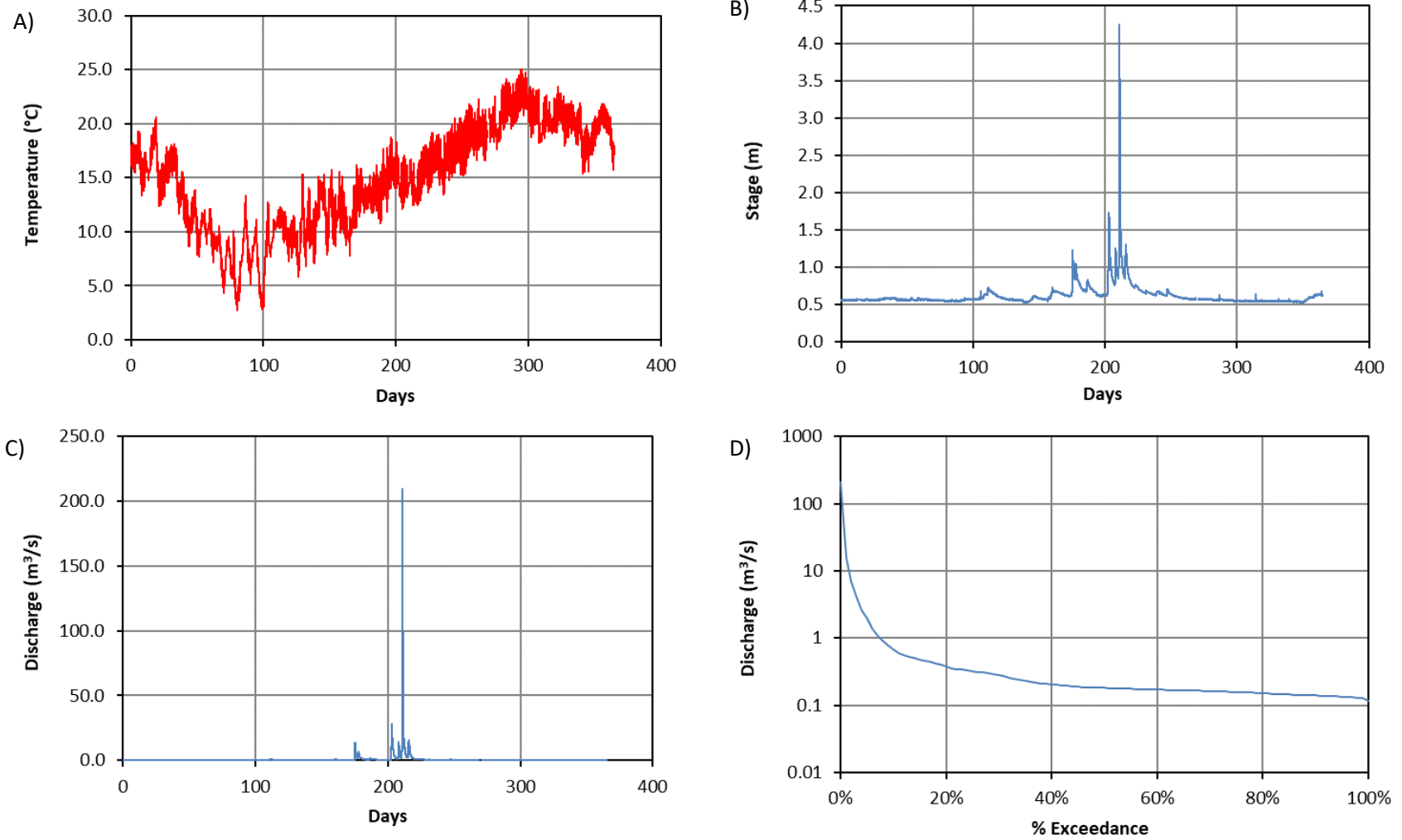


Figure 16. WY2017 A) temperature, B) stage, C) discharge, and D) flow duration curve collected from gaging station at Upper Natural Area.

Table 15. Daily Mean Discharge (m³/s) for WY 2017 at Upper Natural Area.

Day	Oct 2016	Nov 2016	Dec 2016	Jan 2017	Feb 2017	Mar 2017	Apr 2017	May 2017	Jun 2017	Jul 2017	Aug 2017	Sep 2017
1	0.16	0.19	0.17	0.16	0.20	0.20	0.69	12.05	0.37	0.18	0.14	0.14
2	0.16	0.20	0.17	0.18	0.19	0.19	0.60	4.70	0.33	0.18	0.14	0.14
3	0.16	0.21	0.17	0.18	0.18	0.18	0.58	2.44	0.31	0.18	0.15	0.14
4	0.16	0.21	0.17	0.19	0.17	0.18	0.53	9.32	0.30	0.18	0.14	0.14
5	0.16	0.20	0.17	0.18	0.17	0.18	1.21	9.23	0.57	0.18	0.14	0.14
6	0.16	0.20	0.17	0.18	0.17	0.17	1.26	3.58	0.45	0.17	0.14	0.14
7	0.16	0.20	0.16	0.17	0.18	0.22	0.89	1.99	0.38	0.17	0.14	0.13
8	0.16	0.20	0.17	0.17	0.18	0.25	0.71	1.39	0.34	0.18	0.14	0.13
9	0.16	0.22	0.16	0.18	0.17	0.40	0.61	1.07	0.31	0.17	0.14	0.13
10	0.16	0.21	0.16	0.18	0.17	0.62	0.53	0.88	0.28	0.17	0.14	0.13
11	0.16	0.20	0.16	0.18	0.16	0.52	0.47	0.84	0.27	0.17	0.16	0.13
12	0.17	0.18	0.16	0.18	0.16	0.49	0.41	0.98	0.25	0.16	0.14	0.13
13	0.17	0.18	0.16	0.19	0.16	0.49	0.33	0.85	0.24	0.16	0.14	0.13
14	0.17	0.17	0.16	0.23	0.16	0.47	0.31	0.70	0.23	0.19	0.14	0.13
15	0.17	0.17	0.15	0.22	0.15	0.43	0.29	0.60	0.23	0.18	0.14	0.13
16	0.17	0.17	0.15	0.22	0.13	0.40	0.29	0.54	0.22	0.17	0.14	0.13
17	0.16	0.17	0.15	0.33	0.13	0.38	0.31	0.49	0.21	0.17	0.14	0.15
18	0.16	0.18	0.15	0.35	0.13	0.36	0.31	0.45	0.21	0.17	0.14	0.17
19	0.17	0.17	0.14	0.36	0.13	0.32	0.30	0.42	0.20	0.16	0.14	0.19
20	0.18	0.16	0.14	0.70	0.13	0.31	0.34	0.49	0.20	0.16	0.14	0.22
21	0.17	0.16	0.15	0.59	0.16	0.30	6.35	0.47	0.19	0.16	0.14	0.23
22	0.17	0.17	0.15	0.52	0.18	0.29	16.71	0.43	0.19	0.15	0.14	0.24
23	0.17	0.20	0.15	0.47	0.25	0.30	5.66	0.40	0.19	0.15	0.14	0.24
24	0.17	0.17	0.15	0.41	0.27	0.33	2.37	0.38	0.19	0.15	0.14	0.27
25	0.17	0.17	0.14	0.36	0.25	9.41	1.42	0.35	0.18	0.15	0.14	0.32
26	0.17	0.16	0.15	0.32	0.23	3.25	2.94	0.33	M	0.15	0.14	0.33
27	0.17	0.16	0.15	0.29	0.22	3.93	9.76	0.34	M	0.15	0.14	0.34
28	0.17	0.19	0.15	0.26	0.20	3.53	3.08	0.48	M	0.15	0.15	0.34
29	0.17	0.18	0.15	0.24		1.74	29.68	0.50	0.19	0.15	0.14	0.33
30	0.18	0.18	0.15	0.23		1.26	77.36	0.45	0.19	0.14	0.14	0.32
31	0.18		0.16	0.22		0.89		0.41		0.14	0.14	
Total	5.17	5.53	4.83	8.65	4.98	32.00	166.31	57.55	7.22	5.11	4.40	5.82
Mean	0.17	0.18	0.16	0.28	0.18	1.03	5.54	1.86	0.27	0.16	0.14	0.19
Max	0.18	0.22	0.17	0.70	0.27	9.41	77.36	12.05	0.57	0.19	0.16	0.34
Min	0.16	0.16	0.14	0.16	0.13	0.17	0.29	0.33	0.18	0.14	0.14	0.13

Lower Natural Area (124.2 km²)

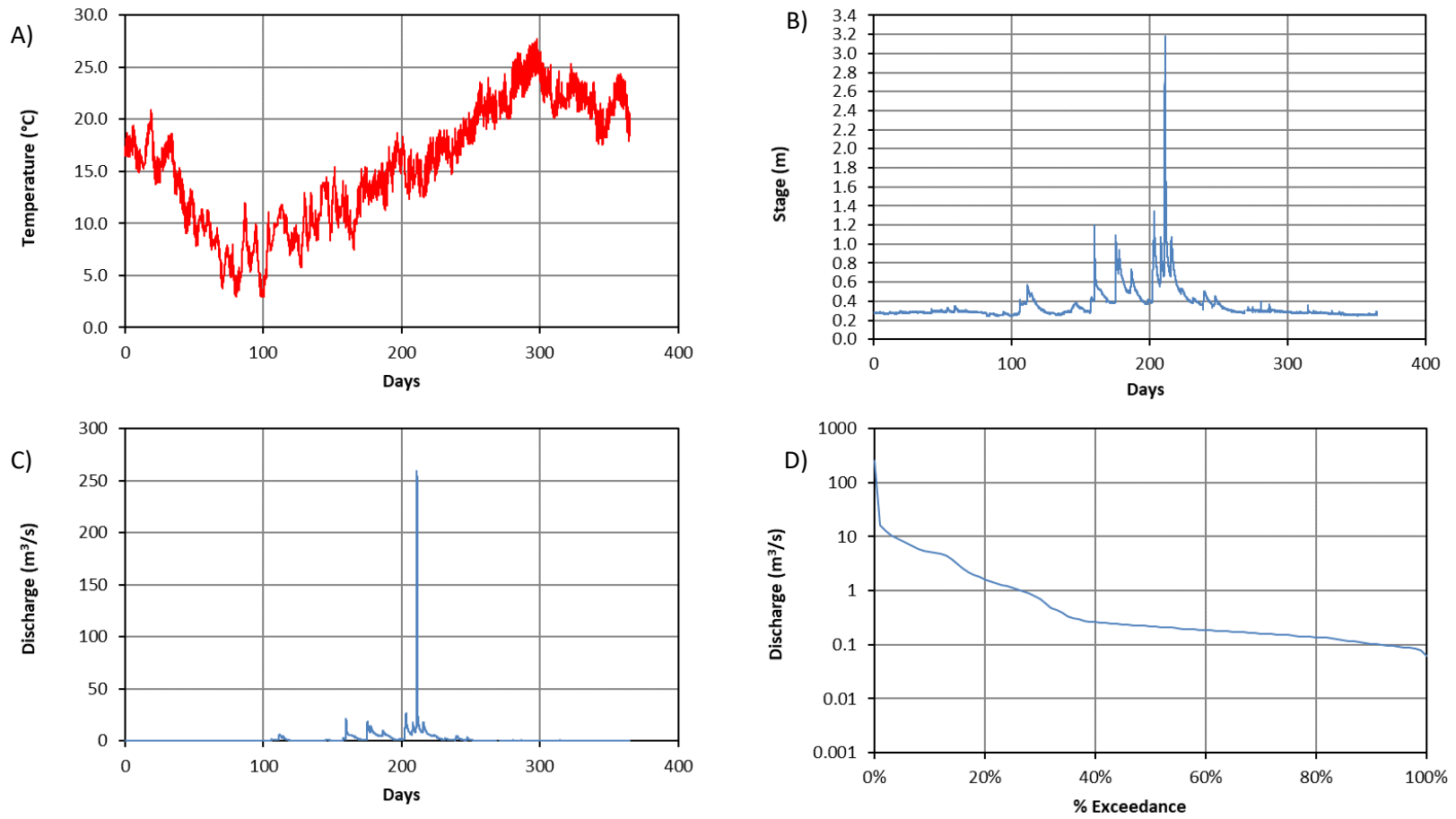


Figure 17. WY2017 A) temperature, B) stage, C) discharge, and D) flow duration curve collected from gaging station at Lower Natural Area.

Table 16. Daily Mean Discharge (m³/s) for WY 2017 at Lower Natural Area.

Day	Oct 2016	Nov 2016	Dec 2016	Jan 2017	Feb 2017	Mar 2017	Apr 2017	May 2017	Jun 2017	Jul 2017	Aug 2017	Sep 2017
1	0.16	0.19	0.25	0.09	0.23	0.40	5.43	14.95	1.35	0.29	0.15	0.12
2	0.16	0.18	0.23	0.12	0.18	0.28	4.99	10.62	1.02	0.26	0.15	0.12
3	0.15	0.18	0.22	0.17	0.16	0.24	4.90	8.52	0.80	0.27	0.16	0.12
4	0.15	0.19	0.24	0.14	0.15	0.24	4.83	13.49	0.75	0.25	0.15	0.11
5	0.17	0.18	0.22	0.12	0.14	0.23	7.98	13.28	2.44	0.27	0.16	0.12
6	0.15	0.17	0.26	0.10	0.14	0.22	7.53	9.63	1.74	0.25	0.17	0.11
7	0.15	0.17	0.23	0.08	0.15	1.24	6.13	7.60	1.13	0.26	0.16	0.11
8	0.13	0.17	0.21	0.07	0.14	2.08	5.35	6.35	0.88	0.30	0.15	0.10
9	0.13	0.16	0.20	0.08	0.11	3.23	4.88	5.57	0.70	0.24	0.14	0.10
10	0.13	0.15	0.19	0.10	0.11	10.43	4.23	5.04	0.54	0.24	0.14	0.10
11	0.13	0.20	0.19	0.10	0.11	6.14	3.25	4.84	0.46	0.24	0.28	0.09
12	0.14	0.25	0.20	0.11	0.11	5.46	2.29	5.19	0.40	0.23	0.19	0.09
13	0.15	0.23	0.19	0.12	0.10	5.37	1.62	4.77	0.35	0.23	0.17	0.10
14	0.14	0.23	0.19	0.45	0.13	5.09	1.35	3.67	0.32	0.42	0.17	0.09
15	0.14	0.24	0.17	1.05	0.16	4.58	1.11	2.70	0.29	0.35	0.19	0.09
16	0.14	0.25	0.17	0.83	0.20	3.66	0.96	2.10	0.26	0.29	0.17	0.09
17	0.14	0.24	0.18	1.08	0.20	2.86	1.33	1.75	0.25	0.27	0.17	0.10
18	0.16	0.28	0.16	1.14	0.22	2.27	1.73	1.44	0.24	0.26	0.16	0.10
19	0.17	0.24	0.14	1.14	0.21	1.71	1.52	1.21	0.22	0.25	0.16	0.10
20	0.21	0.20	0.14	5.07	0.20	1.40	1.59	1.88	0.19	0.24	0.17	0.09
21	0.18	0.21	0.13	4.75	0.33	1.30	12.33	1.93	0.18	0.23	0.16	0.09
22	0.17	0.22	0.07	3.83	0.59	1.15	19.29	1.55	0.19	0.21	0.15	0.09
23	0.17	0.40	0.09	3.93	0.86	1.16	11.57	1.31	0.20	0.21	0.15	0.09
24	0.17	0.28	0.13	2.41	1.05	1.22	8.49	1.13	0.18	0.21	0.15	0.10
25	0.17	0.22	0.11	1.62	0.76	13.56	6.83	0.94	0.17	0.20	0.14	0.11
26	0.17	0.19	0.12	1.07	0.56	10.93	7.95	0.85	M	0.19	0.14	0.10
27	0.19	0.19	0.10	0.73	0.48	10.63	14.46	0.83	M	0.18	0.13	0.10
28	0.18	0.43	0.09	0.53	0.43	11.12	9.36	4.10	M	0.18	0.16	0.10
29	0.19	0.44	0.09	0.40		8.38	29.45	4.04	0.32	0.18	0.15	0.10
30	0.19	0.30	0.08	0.34		7.30	84.12	2.65	0.28	0.17	0.13	0.11
31	0.19		0.09	0.29		6.31		1.83		0.16	0.12	
Total	4.94	7.00	5.06	32.05	8.19	130.17	276.86	145.78	15.84	7.51	4.95	3.04
Mean	0.16	0.23	0.16	1.03	0.29	4.20	9.23	4.70	0.59	0.24	0.16	0.10
Max	0.21	0.44	0.26	5.07	1.05	13.56	84.12	14.95	2.44	0.42	0.28	0.12
Min	0.13	0.15	0.07	0.07	0.10	0.22	0.96	0.83	0.17	0.16	0.12	0.09

Lower Big Barren Creek (183.1 km²)

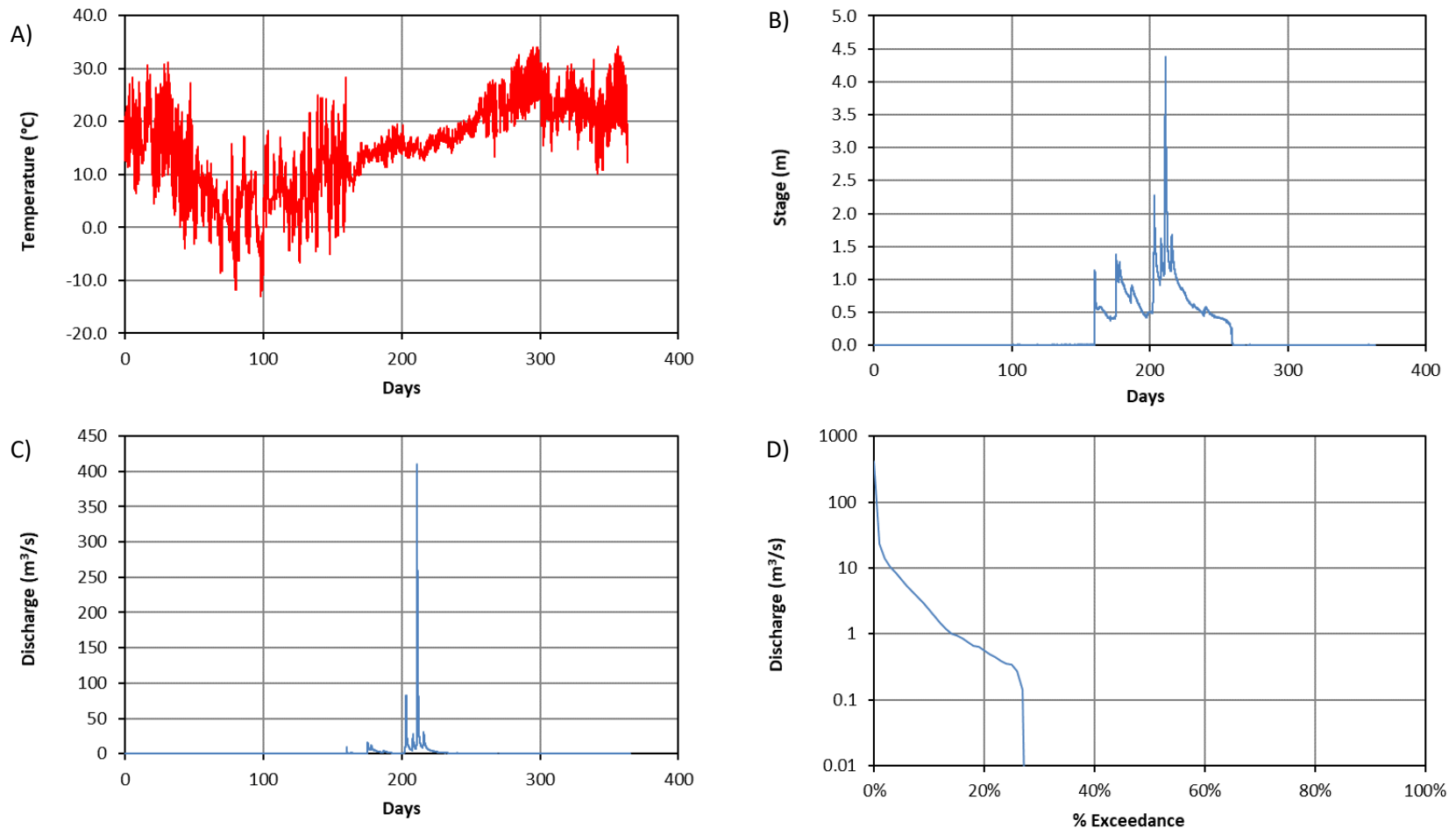


Figure 18. WY2017 A) temperature, B) stage, C) discharge, and D) flow duration curve collected from gaging station at Lower Big Barren.

Table 17. Daily Mean Discharge (m³/s) for WY 2017 at Lower Big Barren Creek.

Day	Oct 2016	Nov 2016	Dec 2016	Jan 2017	Feb 2017	Mar 2017	Apr 2017	May 2017	Jun 2017	Jul 2017	Aug 2017	Sep 2017
1	0.00	0.00	0.00	0.00	0.00	0.00	3.14	47.25	0.58	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	2.66	14.91	0.51	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	2.37	10.03	0.47	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	1.92	18.01	0.44	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	2.97	19.34	0.41	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	3.77	10.65	0.39	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	2.77	7.73	0.37	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	2.18	5.99	0.36	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	1.78	4.94	0.34	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	3.03	1.41	4.21	0.33	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.94	1.14	3.68	0.30	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.87	0.87	3.57	0.27	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	1.00	0.67	3.12	0.23	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.99	0.55	2.65	0.21	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.86	0.48	2.07	0.17	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.72	0.46	1.73	0.10	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.60	0.54	1.53	0.03	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.47	0.66	1.33	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.40	0.66	1.16	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.36	0.73	1.22	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.34	8.82	1.14	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.35	42.62	0.99	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.35	14.45	0.90	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.36	8.73	0.81	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	9.46	6.37	0.72	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	7.46	6.63	0.66	M	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	7.45	19.59	0.61	M	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	8.97	9.57	0.64	M	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00			5.82	20.19	0.97	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00			4.86	233.22	0.87	0.00	0.00	0.00
31	0.00		0.00	0.00			3.80	0.70			0.00	
Total	0.00	0.00	0.00	0.00	0.00	59.47	401.92	174.13	5.51	0.00	0.00	0.00
Mean	0.00	0.00	0.00	0.00	0.00	1.92	13.40	5.62	0.20	0.00	0.00	0.00
Max	0.00	0.00	0.00	0.00	0.00	9.46	233.22	47.25	0.58	0.00	0.00	0.00
Min	0.00	0.00	0.00	0.00	0.00	0.00	0.46	0.61	0.00	0.00	0.00	0.00