

Water-Data Report 2006

06035000 WILLOW CREEK NEAR HARRISON, MT

Missouri Headwaters Basin
Jefferson Subbasin

LOCATION.--Lat 45°43'23", long 111°44'25" referenced to North American Datum of 1927, in SE ¼ SW ¼ NW ¼ sec.28, T.1 S., R.1 W., Madison County, Hydrologic Unit 10020005, on right bank 2.2 mi upstream from Willow Creek Dam, 2.5 mi northeast of Harrison, and at river mile 13.6.

DRAINAGE AREA.--83.8 mi².

SURFACE-WATER RECORDS

PERIOD OF RECORD.--April 1938 to September 1982, October 1982 to October 2002, March 2004 to current year (seasonal records only). Monthly discharge only for some periods, published in Water Supply Paper (WSP) 1309.

REVISED RECORDS.-- WSP 1559: Drainage area.

GAGE.--Water-stage recorder and concrete control. Elevation of gage is 4,750 ft, referenced to the National Geodetic Vertical Datum of 1929. Prior to Oct. 8, 1946, water-stage recorder at elevation 0.22 ft higher, with different concrete control.

REMARKS.--Seasonal records are good except those for Mar. 1 to May 10, which are fair, and those for estimated daily discharges, which are poor. Diversions for irrigation include about 12,500 acres of which 3,500 acres are in Norwegian Creek drainage. U.S. Geological Survey satellite telemeter is located at the station. Several unpublished observations of water temperature and specific conductance were made during the season.

06035000 WILLOW CREEK NEAR HARRISON, MT—Continued

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006
DAILY MEAN VALUES

[e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1						e33	28	50	27	74		
2						e30	28	45	24	72		
3						e28	27	42	27	73		
4						26	29	39	37	80		
5						25	38	39	54	70		
6						24	104	40	70	59		
7						24	55	37	102	54		
8						e24	51	37	174	44		
9						e25	49	32	208	35		
10						e27	50	24	274	30		
11						e27	47	15	217	25		
12						e27	42	14	165	20		
13						e26	46	13	155	23		
14						e28	51	14	154	17		
15						e27	51	16	164	18		
16						e26	56	15	120	16		
17						e25	54	16	104	12		
18						e26	47	19	98	9.5		
19						25	43	30	91	7.4		
20						e24	40	37	81	6.6		
21						e23	41	44	72	7.0		
22						22	43	50	69	7.0		
23						20	47	61	58	6.4		
24						23	47	51	53	6.4		
25						25	47	46	51	7.7		
26						31	45	55	50	7.6		
27						24	41	71	52	6.4		
28						22	40	63	59	5.3		
29						26	40	46	63	4.6		
30						29	45	35	82	4.2		
31						28	---	30	---	3.7		
Total						800	1,372	1,126	2,955	811.8		
Mean						25.8	45.7	36.3	98.5	26.2		
Max						33	104	71	274	80		
Min						20	27	13	24	3.7		
Ac-ft						1,590	2,720	2,230	5,860	1,610		

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1938 – 1982 AND SEASONS 1983 – 2006*

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	29.1	33.7	29.9	24.7	27.4	31.2	40.9	61.9	111	59.5	12.3	18.9
Max	80.1	56.5	47.4	43.6	60.9	44.7	72.5	167	300	278	61.0	62.4
(WY)	(1983)	(1947)	(1948)	(1976)	(1963)	(1974)	(1996)	(1984)	(1995)	(1975)	(1993)	(1965)
Min	2.01	9.40	11.5	10.0	12.0	18.0	11.1	11.1	10.1	1.52	1.12	2.01
(WY)	(1989)	(1955)	(1955)	(1940)	(1940)	(1940)	(1961)	(2002)	(1966)	(1988)	(1988)	(1956)

* During periods of operation (water years April 1938 to September 1982; seasonal records only October 1982 to October 2002, March 2004 to current year).

06035000 WILLOW CREEK NEAR HARRISON, MT—Continued

SUMMARY STATISTICS

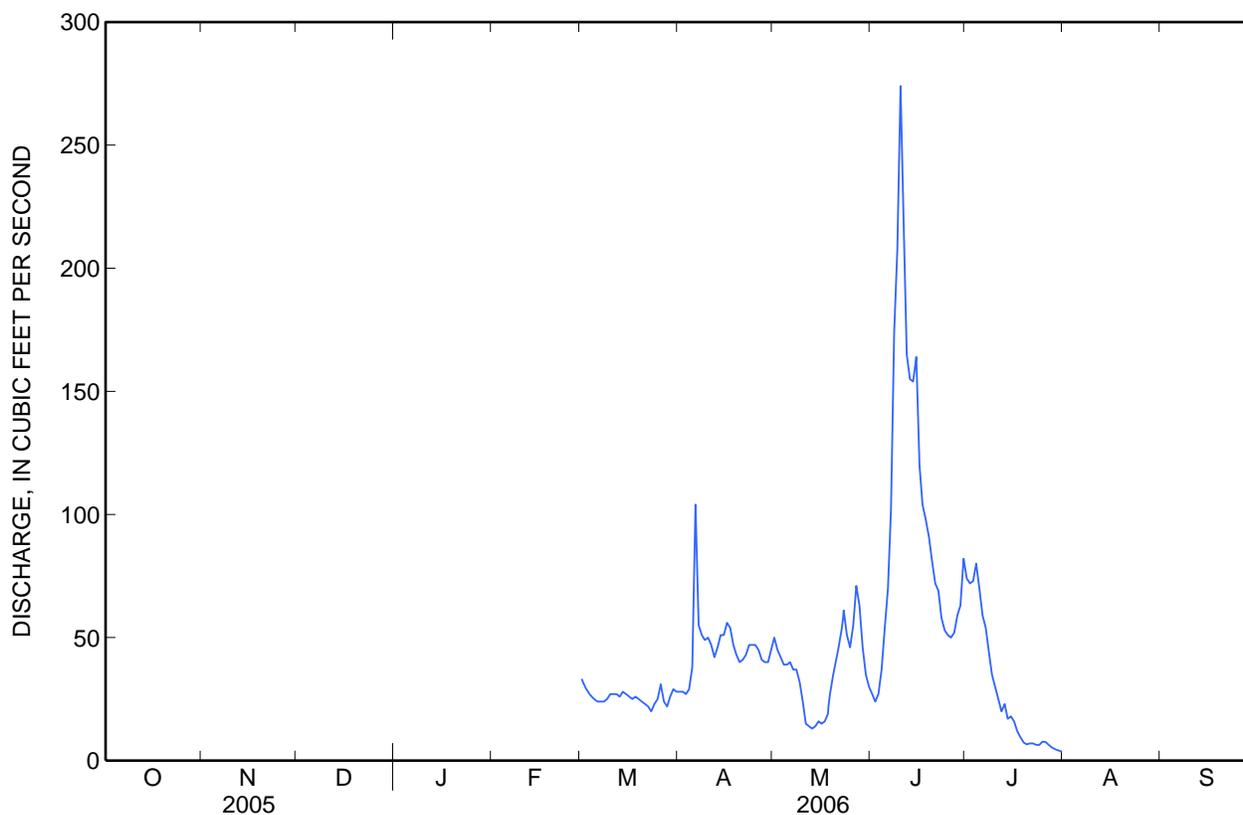
	2006 Season		Water Years 1938 - 1982*		Seasons 1983 - 2006	
Annual mean			40.7			
Highest annual mean			76.0	1975		
Lowest annual mean			19.2	1954		
Highest daily mean	274	Jun 10	591	Jun 27, 1944	423	Jun 6, 1955
Lowest daily mean	3.7	Jul 31	1.6	Sep 16, 1952	0.59	Jul 23, 1988
Maximum peak flow	298	Jun 10	813	Feb 3, 1963	448	Jun 6, 1995
Maximum peak stage	2.62	Jun 10	4.24	Feb 3, 1963	3.38	Jun 6, 1995
Instantaneous low flow	^a 3.0	Jul 31	^b 1.4	Sep 17, 1956	^c 0.32	Jul 21, 1988
Annual runoff (ac-ft)			29,480			
10 percent exceeds			79			
50 percent exceeds			30			
90 percent exceeds			6.9			

* During periods of operation (water years April 1938 to September 1982; seasonal records only October 1982 to October 2002, March 2004 to current year).

^a Gage height, 0.39 ft.

^b Gage height, 0.39 ft.

^c Gage height, 0.26 ft.



06035000 WILLOW CREEK NEAR HARRISON, MT—Continued**WATER-QUALITY RECORDS**

PERIOD OF DAILY RECORD.--

WATER TEMPERATURE (seasonal records): April 2002 to September 2002, March 2004 to current year.

INSTRUMENTATION.--Temperature probe installed Apr. 23, 2002.

REMARKS.--Daily water temperature records are rated good for the season. Several unpublished observations of water temperature and specific conductance were made during the year.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURE (seasonal records): Maximum, 29.5°C, July 13,14, 2002; minimum, 0.0°C Oct. 24-27, 2002 and many days in March most years.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: During period of seasonal operation, maximum, 28.5°C, July 22 and 23; minimum, 0.0°C, many days in March.

**TEMPERATURE, WATER, DEGREES CELSIUS
SEASON MARCH 2006 TO JULY 2006**

Day	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean
	March			April			May		
1	0.0	0.0	0.0	8.5	2.5	5.5	13.5	5.5	9.5
2	0.5	0.0	0.0	9.0	2.0	4.5	11.0	5.0	8.0
3	0.5	0.0	0.0	8.5	3.0	5.5	8.5	4.0	6.0
4	1.5	0.0	0.5	9.5	5.0	7.0	12.0	3.0	7.0
5	2.5	0.0	0.5	9.5	5.5	7.0	14.5	4.0	9.0
6	3.0	0.0	1.5	5.5	3.0	4.0	14.0	6.0	10.0
7	5.5	1.0	2.5	8.0	3.0	5.0	10.5	7.5	9.0
8	5.5	0.0	2.0	10.0	3.0	6.0	12.5	6.0	9.0
9	2.5	0.0	1.0	11.0	4.0	7.0	13.0	3.5	7.5
10	0.5	0.0	0.0	10.0	5.0	7.0	15.0	4.0	9.5
11	0.5	0.0	0.0	11.0	3.5	7.0	15.5	6.0	10.5
12	1.0	0.0	0.0	12.5	4.0	8.0	17.0	8.0	12.0
13	0.5	0.0	0.0	11.0	6.0	8.5	19.5	7.0	12.5
14	0.5	0.0	0.0	11.0	5.0	8.0	20.5	7.5	13.5
15	1.5	0.0	0.5	11.5	6.0	8.5	20.5	9.0	14.5
16	3.0	0.0	1.0	8.5	6.0	7.0	20.5	9.5	15.0
17	3.5	0.0	1.5	6.0	4.0	5.0	21.5	10.5	15.5
18	1.5	0.0	1.0	9.0	1.5	5.0	21.0	10.5	15.5
19	2.0	0.0	0.5	11.0	2.0	6.0	18.5	11.5	15.0
20	4.0	0.0	1.5	13.0	3.5	8.0	15.0	10.5	13.0
21	5.5	0.0	2.0	14.0	5.0	9.5	16.0	8.0	12.0
22	7.5	1.0	3.5	14.0	6.0	10.0	14.0	8.5	11.5
23	7.5	0.5	3.5	9.5	3.0	5.5	13.5	8.5	10.5
24	7.5	1.5	4.0	5.0	2.0	3.0	15.5	7.0	11.0
25	9.5	2.5	5.5	11.0	2.0	6.0	16.5	8.5	12.5
26	7.5	2.0	4.5	13.5	5.0	9.0	12.0	8.0	9.5
27	8.0	0.0	3.5	12.5	7.0	9.0	8.5	7.5	8.0
28	7.0	1.0	4.0	14.5	4.5	9.0	10.5	6.5	8.0
29	7.0	4.0	5.5	16.0	6.5	11.0	12.5	6.5	9.0
30	8.5	3.5	5.5	15.5	9.5	12.0	16.5	6.0	11.0
31	9.0	3.0	5.5	---	---	---	18.0	7.0	12.0
Month	9.5	0.0	2.0	16.0	1.5	7.0	21.5	3.0	11.0

06035000 WILLOW CREEK NEAR HARRISON, MT—Continued

TEMPERATURE, WATER, DEGREES CELSIUS
SEASON MARCH 2006 TO JULY 2006

Day	Max	Min	Mean	Max	Min	Mean
	June			July		
1	19.5	9.0	13.5	19.0	12.0	15.0
2	19.0	10.0	14.5	18.0	12.0	15.0
3	21.0	12.0	16.0	19.5	13.0	16.0
4	17.5	11.0	14.0	19.5	12.0	15.5
5	18.0	9.0	13.5	16.0	13.0	14.5
6	17.5	9.5	13.5	19.0	12.0	15.5
7	15.5	10.0	12.5	20.5	13.0	16.5
8	12.5	10.0	11.0	21.5	12.0	16.5
9	11.5	8.0	9.5	19.5	12.5	16.0
10	12.0	8.5	10.0	19.5	12.0	16.0
11	12.0	8.0	10.0	22.0	12.5	17.0
12	15.0	8.0	11.5	20.5	13.5	16.5
13	16.5	10.0	13.5	22.5	11.5	17.0
14	13.5	10.0	11.0	24.5	12.5	18.0
15	13.0	7.5	10.5	24.5	13.5	18.5
16	15.5	8.5	11.5	25.5	14.0	19.5
17	15.5	9.5	12.5	26.5	14.5	20.5
18	15.5	8.0	11.5	26.5	14.5	20.5
19	14.0	9.5	12.0	27.0	13.5	20.0
20	16.0	9.0	12.5	27.0	15.0	20.5
21	16.5	9.0	12.5	27.5	14.0	20.5
22	17.5	9.0	13.0	28.5	14.5	21.5
23	18.5	10.0	14.0	28.5	16.5	22.0
24	19.0	10.0	14.0	24.0	17.5	20.5
25	19.5	10.5	15.0	26.0	14.5	19.5
26	20.0	11.5	15.5	27.0	14.5	20.5
27	19.5	11.5	15.0	28.0	14.5	21.0
28	19.0	11.5	15.0	27.5	15.0	21.0
29	18.0	12.5	15.0	27.5	15.5	21.0
30	18.0	12.0	15.0	26.0	15.5	20.5
31	---	---	---	24.0	12.5	18.0
Month	21.0	7.5	13.0	28.5	11.5	18.5