

Water-Data Report 2012

**06035000 WILLOW CREEK NEAR HARRISON, MT**

Missouri Headwaters Basin  
Jefferson Subbasin

LOCATION.--Lat 45°43'23", long 111°44'28" referenced to North American Datum of 1983, in SE ¼ SW ¼ NW ¼ sec.28, T.1 S., R.1 W., Madison County, MT, 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 mi<sup>2</sup>.

**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 for Mar. 13 to May 1, 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 Several unpublished observations of water temperature and specific conductance were made during the season.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 2011 TO SEPTEMBER 2012**  
**DAILY MEAN VALUES**  
[e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1						e25	45	36	18	14		
2						e25	38	33	29	15		
3						e25	34	30	49	14		
4						28	35	29	69	13		
5						29	32	29	84	11		
6						28	34	28	82	10		
7						e25	32	24	59	7.6		
8						e30	33	15	45	6.8		
9						30	37	14	45	5.3		
10						31	44	12	38	4.4		
11						31	50	9.1	30	3.7		
12						31	48	7.5	27	3.4		
13						31	40	7.2	27	2.8		
14						30	35	6.9	27	3.3		
15						34	34	8.3	26	4.3		
16						39	33	13	25	6.1		
17						44	33	18	30	9.3		
18						41	33	21	34	6.3		
19						39	32	13	35	4.3		
20						35	31	11	29	3.5		
21						49	33	9.9	24	3.2		
22						42	36	21	26	2.9		
23						38	39	20	30	3.0		
24						37	43	14	34	2.5		
25						36	48	22	38	2.1		
26						37	50	26	42	1.9		
27						38	58	31	34	2.1		
28						37	39	27	25	2.0		
29						37	36	20	20	1.7		
30						35	38	17	16	1.6		
31						40	---	15	---	1.5		
<b>Total</b>						1,057	1,153	587.9	1,097	172.6		
<b>Mean</b>						34.1	38.4	19.0	36.6	5.57		
<b>Max</b>						49	58	36	84	15		
<b>Min</b>						25	31	6.9	16	1.5		
<b>Ac-ft</b>						2,100	2,290	1,170	2,180	342		

**STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1938 - 2012, BY WATER YEAR (WY)\***

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
<b>Mean</b>	29.1	33.7	29.9	24.7	27.4	31.0	40.7	61.2	112	61.3	12.3	18.9
<b>Max</b>	80.1	56.5	47.4	43.6	60.9	44.7	72.5	167	300	278	61.0	62.4
<b>(WY)</b>	(1983)	(1947)	(1948)	(1976)	(1963)	(1974)	(1996)	(1984)	(1995)	(1975)	(1993)	(1965)
<b>Min</b>	2.01	9.40	11.5	10.0	12.0	18.0	11.1	11.1	10.1	1.52	1.12	2.01
<b>(WY)</b>	(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).

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SUMMARY STATISTICS

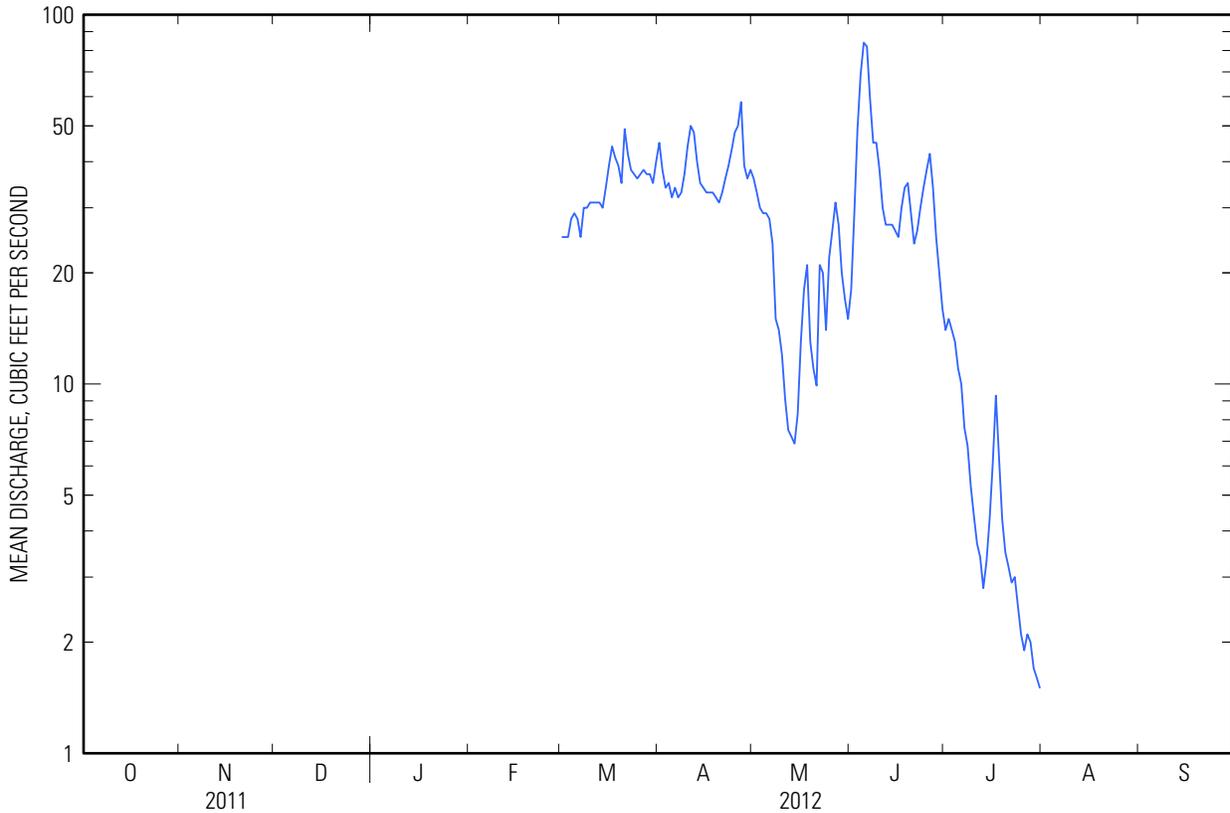
	2012 Season		Water Years 1938 - 1982		Seasons 1938 - 2012*	
<b>Annual mean</b>			40.7			
<b>Highest annual mean</b>			76.0	1975		
<b>Lowest annual mean</b>			19.2	1954		
<b>Highest daily mean</b>	84	Jun 5	591	Jun 27, 1944	423	Jun 6, 1995
<b>Lowest daily mean</b>	1.5	Jul 31	1.6	Sep 16, 1952	0.59	Jul 23, 1988
<b>Maximum peak flow</b>	92	Jun 6	813	Feb 3, 1963	448	Jun 6, 1995
<b>Maximum peak stage</b>	1.40	Jun 6	4.24	Feb 3, 1963	3.38	Jun 6, 1995
<b>Instantaneous low flow</b>	<sup>a</sup> 1.0	Jul 31	<sup>b</sup> 1.4	Sep 17, 1953	<sup>c</sup> 0.32	Jul 21, 1988
<b>Annual runoff (ac-ft)</b>			29,480			
<b>10 percent exceeds</b>			79			
<b>50 percent exceeds</b>			30			
<b>90 percent exceeds</b>			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).

<sup>a</sup>Gage height, 0.33 ft.

<sup>b</sup>Gage height, 0.39 ft.

<sup>c</sup>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.--Water temperature probe was installed Apr. 23, 2002.

REMARKS.--Daily water temperature record is rated excellent 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 and 14, 2002 and July 6 and 18, 2007; minimum, 0.0°C Oct. 24-27, 2002 and many days in March and April, most years.

## EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: During period of seasonal operation (March 1 - July 31), maximum, 27.9°C, July 29; minimum, 0.1°C, many days March through April.

**TEMPERATURE, WATER, DEGREES CELSIUS  
WATER YEAR OCTOBER 2011 TO SEPTEMBER 2012**

Day	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean
	March			April			May			June		
1	0.2	0.1	0.1	8.5	4.5	6.4	11.4	6.5	8.7	19.2	9.8	14.1
2	0.2	0.1	0.1	9.3	1.6	5.1	10.9	5.0	7.7	14.7	9.8	12.4
3	0.5	0.1	0.2	10.3	1.4	5.6	9.1	4.4	6.7	16.8	8.7	12.1
4	5.3	0.1	2.2	11.7	4.1	7.2	12.8	4.8	8.5	17.5	9.0	12.9
5	5.5	1.0	3.0	7.8	4.2	5.8	10.4	5.8	7.9	15.7	8.9	12.2
6	2.8	0.1	1.7	4.7	0.1	1.8	13.2	3.1	7.8	13.2	7.1	9.7
7	1.2	0.1	0.3	7.6	0.1	3.4	15.1	3.7	9.0	15.1	5.7	10.1
8	1.5	0.1	0.5	9.4	0.8	4.6	18.5	5.5	11.6	13.2	8.3	10.8
9	6.3	0.3	2.6	10.0	2.0	5.6	19.1	7.7	13.2	10.4	6.8	8.5
10	7.1	0.7	3.5	10.6	3.1	6.6	16.4	7.8	11.6	8.2	5.8	7.1
11	7.5	2.0	4.3	11.4	3.7	7.4	17.2	3.8	10.1	17.1	5.7	11.0
12	6.7	1.7	4.1	9.6	6.5	7.8	19.0	4.5	11.4	17.0	7.9	12.7
13	6.5	2.6	4.1	10.9	3.6	6.9	21.0	6.1	13.2	18.2	10.0	13.7
14	4.7	2.1	3.4	11.2	3.6	7.2	22.0	7.8	14.6	18.6	7.7	12.9
15	8.0	2.7	4.7	7.3	4.2	5.6	21.6	8.8	15.1	18.1	8.4	13.0
16	6.0	4.3	5.0	10.5	2.0	6.1	20.9	10.6	15.2	18.0	7.9	12.8
17	6.5	3.4	4.7	12.8	5.4	8.4	14.0	9.8	11.9	16.6	9.8	13.0
18	5.2	2.8	4.0	9.5	6.3	7.7	14.9	8.6	10.9	18.0	8.8	12.9
19	4.4	0.2	2.2	12.2	4.9	8.0	15.8	5.4	10.6	16.2	7.4	11.3
20	1.6	0.1	0.5	14.4	6.3	9.9	17.8	6.2	11.9	18.0	6.9	12.1
21	7.3	0.1	2.9	16.1	8.2	11.5	18.8	9.4	13.9	19.6	7.8	13.5
22	10.5	3.0	6.1	16.9	7.1	11.6	14.5	9.9	12.2	19.6	10.3	14.5
23	7.3	4.5	5.7	15.1	8.8	11.9	15.4	6.8	10.1	20.1	10.9	15.4
24	8.2	3.6	5.3	16.4	9.8	12.5	15.0	6.9	10.2	19.8	10.2	15.0
25	9.0	3.4	5.5	14.4	8.2	11.2	8.9	5.5	6.7	19.8	10.2	14.8
26	8.6	3.1	6.0	14.8	8.7	11.4	5.9	3.7	4.7	18.2	10.4	14.1
27	9.7	3.8	6.5	10.8	5.4	7.6	9.6	3.3	6.2	17.7	8.4	12.9
28	7.9	4.1	5.8	7.5	3.9	5.4	13.1	5.9	8.9	19.2	8.7	13.9
29	7.8	2.0	4.6	10.5	4.3	7.2	15.2	6.0	10.8	20.5	10.2	15.1
30	10.8	3.5	6.5	10.3	4.7	7.2	14.3	9.5	11.5	23.1	10.6	16.4
31	10.7	6.3	8.4	---	---	---	14.8	6.7	11.1	---	---	---
Month	10.8	0.1	3.7	16.9	0.1	7.5	22.0	3.1	10.4	23.1	5.7	12.7

## 06035000 WILLOW CREEK NEAR HARRISON, MT—Continued

**TEMPERATURE, WATER,  
DEGREES CELSIUS  
WATER YEAR OCTOBER 2011  
TO SEPTEMBER 2012**

<b>Day</b>	<b>Max</b>	<b>Min</b>	<b>Mean</b>
<b>July</b>			
<b>1</b>	22.7	11.6	16.5
<b>2</b>	23.7	11.5	17.3
<b>3</b>	21.6	12.6	17.2
<b>4</b>	23.0	10.8	16.7
<b>5</b>	16.5	12.0	13.8
<b>6</b>	23.1	11.1	16.7
<b>7</b>	23.2	12.8	17.7
<b>8</b>	26.0	12.6	18.9
<b>9</b>	27.0	12.9	19.8
<b>10</b>	27.1	14.9	20.4
<b>11</b>	23.7	13.9	18.8
<b>12</b>	27.0	12.1	19.4
<b>13</b>	23.2	14.7	18.9
<b>14</b>	24.6	16.1	19.2
<b>15</b>	23.7	15.5	19.1
<b>16</b>	22.0	13.5	17.9
<b>17</b>	24.8	13.2	18.1
<b>18</b>	23.9	12.5	18.1
<b>19</b>	24.4	12.4	18.6
<b>20</b>	25.1	15.4	19.4
<b>21</b>	27.1	13.6	20.1
<b>22</b>	26.4	14.3	20.0
<b>23</b>	24.6	15.1	18.7
<b>24</b>	26.1	13.4	19.3
<b>25</b>	26.1	11.8	18.8
<b>26</b>	26.6	12.9	19.3
<b>27</b>	23.6	14.8	18.1
<b>28</b>	26.2	12.4	18.6
<b>29</b>	27.9	13.9	20.3
<b>30</b>	26.5	13.4	19.7
<b>31</b>	27.1	13.3	19.8
<b>Month</b>	27.9	10.8	18.6