

Water-Data Report 2011

**06324500 POWDER RIVER AT MOORHEAD, MT**

Powder Basin  
Middle Powder Subbasin

LOCATION.--Lat 45°03'28", long 105°52'39" referenced to North American Datum of 1927, in SE ¼ NE ¼ NE ¼ sec.18, T.9 S., R.48 E., Powder River County, MT, Hydrologic Unit 10090207, on left bank 25 ft downstream from bridge on Powder River, 7.3 mi upstream from Buffalo Creek, and at river mile 183.7.

DRAINAGE AREA.--8,086 mi<sup>2</sup>. Sept. 13, 1956 to Aug. 27, 2001 published as 8,088 mi<sup>2</sup>.

**SURFACE-WATER RECORDS**

PERIOD OF RECORD.--May 1929 to September 1972, October 1974 to current year. Monthly discharge only for some periods, published in Water Supply Paper (WSP) 1309.

REVISED RECORDS.--WSP 1309: 1932, maximum discharge. WSP 1729: Drainage area. Water Data Report MT-04-01: 2003, drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 3,350.6 ft, referenced to the National Geodetic Vertical Datum of 1929. Prior to Aug. 28, 1931, nonrecording gage at site 0.8 mi downstream at different elevation. Aug. 28, 1931, to Mar. 21, 1956, water-stage recorder at site 0.1 mi upstream at different elevation. Mar. 22 to July 24, 1956, nonrecording gage at site 1.4 mi downstream at different elevation. July 25 to Sept. 12, 1956, nonrecording gage at different site and elevation. Sept. 13, 1956 to Aug. 27, 2001, water-stage recorder during period of gage operation 1.1 mi downstream at different elevation.

REMARKS.--Records are fair except estimated daily discharges, which are poor. Some regulation occurs by three reservoirs in Wyoming with a combined usable capacity of 36,800 acre-ft. Diversions for irrigation of about 66,300 acres occur upstream from station. U.S. Geological Survey satellite telemeter is located at the station.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Sept. 30, 1923, reached a stage of 19 ft, site and elevation used 1931-56, from information by local residents.

## 06324500 POWDER RIVER AT MOORHEAD, MT—Continued

**DISCHARGE, CUBIC FEET PER SECOND**  
**WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011**  
**DAILY MEAN VALUES**  
[e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	75	258	e200	e170	e180	e210	426	333	6,270	2,950	214	83
2	76	246	e210	e180	e190	e210	471	341	4,610	2,930	204	80
3	82	236	e220	e190	e220	e230	442	330	4,280	2,530	183	76
4	89	235	e210	e180	e240	e260	390	330	4,160	2,190	168	73
5	88	239	e210	e210	e250	e280	382	361	4,110	2,090	147	74
6	83	241	e210	e220	e240	e290	357	333	3,990	1,900	140	73
7	81	241	e220	e230	e210	e300	350	301	3,920	1,760	143	68
8	82	242	e220	e230	e200	e330	350	300	4,000	1,730	166	66
9	79	244	e230	e210	e200	e350	353	318	4,030	1,610	174	64
10	85	245	e220	e190	e220	e380	355	424	4,430	1,360	193	57
11	102	246	e200	e170	e250	e430	354	519	4,910	1,250	203	56
12	127	249	e210	e170	e260	e450	345	640	4,620	1,450	204	54
13	148	251	e220	e200	e270	e480	346	664	3,920	1,330	181	55
14	155	249	e230	e220	e270	e520	343	682	3,630	1,250	162	61
15	153	263	e230	e210	e280	e540	351	676	3,560	1,200	143	69
16	155	278	e220	e220	e280	e700	351	612	3,620	1,160	130	70
17	164	280	e210	e230	e260	e1,000	343	548	3,770	1,110	119	75
18	170	274	e200	e230	e240	e900	346	579	3,710	1,020	110	90
19	183	255	e200	e230	e210	e800	359	656	3,400	911	103	114
20	188	211	e210	e220	e200	676	380	780	3,260	902	92	116
21	186	e200	e210	e230	e200	609	363	1,290	3,000	859	86	121
22	187	e180	e220	e230	e210	557	347	3,000	2,830	778	83	136
23	192	e190	e220	e240	e210	516	344	3,040	2,960	672	80	140
24	195	e180	e220	e240	e190	470	343	2,610	2,910	574	68	141
25	196	e210	e220	e250	e180	428	330	3,550	3,050	516	61	136
26	199	e230	e230	e250	e200	429	319	5,210	3,040	457	59	130
27	201	e220	e230	e260	e210	404	330	5,210	3,000	368	64	134
28	207	e210	e220	e260	e220	409	354	4,170	2,920	317	73	129
29	220	e200	e230	e230	---	394	344	3,640	2,560	296	78	133
30	231	e200	e220	e200	---	374	334	3,920	2,590	256	209	128
31	242	---	e200	e180	---	378	---	4,730	---	229	120	---
<b>Total</b>	4,621	7,003	6,700	6,680	6,290	14,304	10,802	50,097	111,060	37,955	4,160	2,802
<b>Mean</b>	149	233	216	215	225	461	360	1,616	3,702	1,224	134	93.4
<b>Max</b>	242	280	230	260	280	1,000	471	5,210	6,270	2,950	214	141
<b>Min</b>	75	180	200	170	180	210	319	300	2,560	229	59	54
<b>Ac-ft</b>	9,170	13,890	13,290	13,250	12,480	28,370	21,430	99,370	220,300	75,280	8,250	5,560

**STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1930 - 2011, BY WATER YEAR (WY)\***

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
<b>Mean</b>	221	224	159	153	277	591	497	1,063	1,373	464	168	138
<b>Max</b>	897	660	326	445	1,200	2,290	1,314	5,553	4,131	2,500	1,219	686
<b>(WY)</b>	(1995)	(1999)	(1981)	(1981)	(1930)	(1947)	(1965)	(1978)	(1967)	(1937)	(1941)	(1982)
<b>Min</b>	16.1	80.0	56.2	27.2	20.9	185	117	82.6	31.1	10.0	0.60	1.28
<b>(WY)</b>	(1955)	(1936)	(1933)	(1950)	(1933)	(2002)	(1961)	(1934)	(2004)	(2006)	(1966)	(1960)

\*During periods of operation (1930-72, 1975 to current year).

06324500 POWDER RIVER AT MOORHEAD, MT—Continued

SUMMARY STATISTICS

	Calendar Year 2010		Water Year 2011		Water Years 1930 – 2011*	
<b>Annual total</b>	186,382		262,474			
<b>Annual mean</b>	511		719		444	
<b>Highest annual mean</b>					1,091	1978
<b>Lowest annual mean</b>					109	1961
<b>Highest daily mean</b>	3,440	May 31	6,270	Jun 1	27,500	May 20, 1978
<b>Lowest daily mean</b>	40	Aug 27	54	Sep 12	0.00	Many days
<b>Annual seven-day minimum</b>	45	Aug 24	59	Sep 8	0.00	Sep 4, 1960
<b>Maximum peak flow</b>			<sup>a</sup> 6,840	Jun 1	<sup>d</sup> 33,000	May 20, 1978
<b>Maximum peak stage</b>			<sup>b</sup> 8.30	Mar 16	<sup>e</sup> 17.70	Mar 21, 1956
<b>Instantaneous low flow</b>			<sup>c</sup> 53	Sep 12	0.00	Many days
<b>Annual runoff (ac-ft)</b>	369,700		520,600		321,600	
<b>10 percent exceeds</b>	1,550		2,920		1,020	
<b>50 percent exceeds</b>	235		240		215	
<b>90 percent exceeds</b>	73		90		47	

\*During periods of operation (1930-72, 1975 to current year).

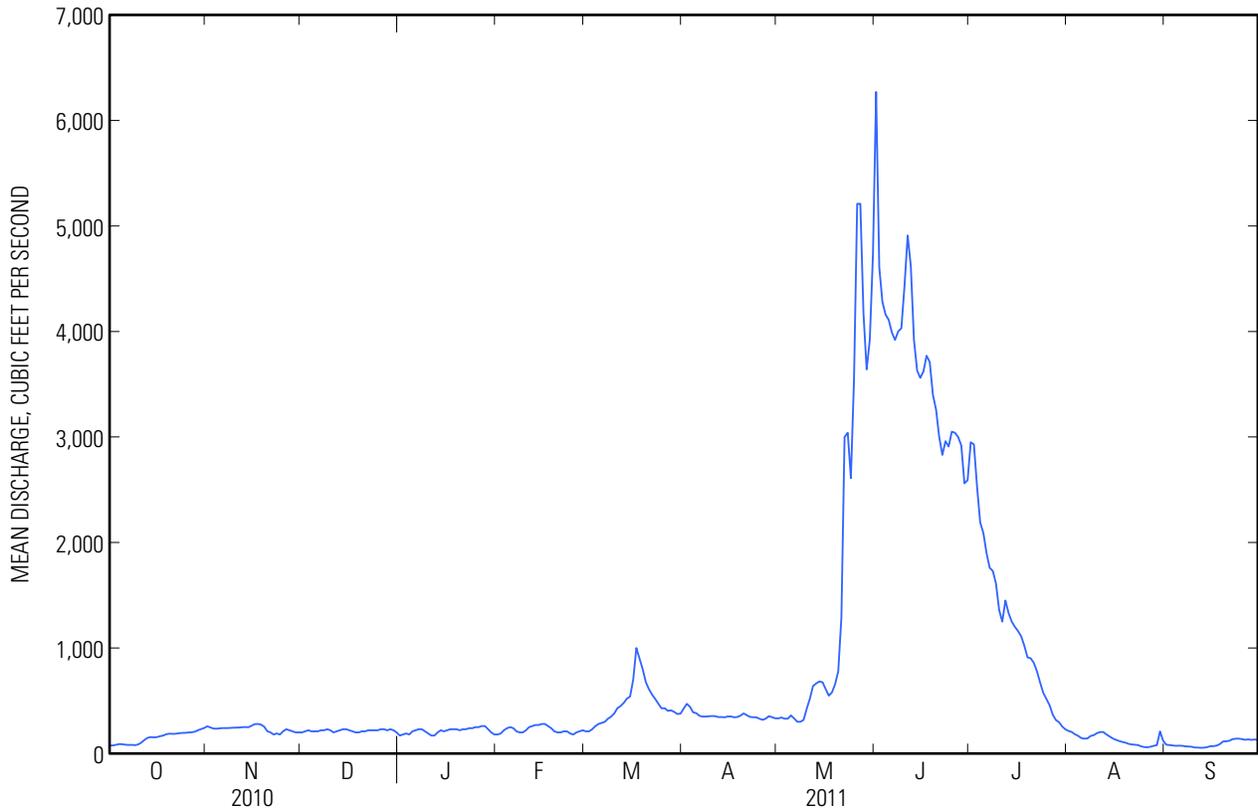
<sup>a</sup>Gage height, 7.81 ft.

<sup>b</sup>Backwater from ice.

<sup>c</sup>Gage height, 1.79 ft.

<sup>d</sup>Gage height, 15.24 ft.

<sup>e</sup>Ice jam, site and datum then in use.



**06324500 POWDER RIVER AT MOORHEAD, MT—Continued**

**WATER-QUALITY RECORDS**

PERIOD OF RECORD.--Water years 1951-53, 1956-67, 1969-72, 1975-77, 2001 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: July 1986 to November 1989 (observer samples), May 2001 to current year (seasonal records, continuous monitor).

WATER TEMPERATURE: February 1951 to September 1953, October 1955 to September 1957, October 1974 to September 1977, March 1978 to September 1981 (seasonal records only).

SUSPENDED-SEDIMENT DISCHARGE: October 1974 to September 1977, March 1978 to September 1996 (seasonal records only).

INSTRUMENTATION.--Specific conductance probe was installed May 20, 2001.

REMARKS.--Daily specific conductance records are provided for the months of the water year during which irrigation occurs (October 2010, April 1 to Sept. 30, 2011) plus observer readings for November to March. Daily specific conductance records are rated good to fair except May 20 and 29, which was rated fair and 10 days of record rated as poor due to siltation (April 1-6, May 21-22, May 30-31). There were 9 days of missing or partial record.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum, 6,240 microsiemens per centimeter ( $\mu\text{S}/\text{cm}$ ) at 25.0°C, Aug. 17, 2006; minimum, 314  $\mu\text{S}/\text{cm}$  at 25.0°C, June 21, 2008.

WATER TEMPERATURE: Maximum daily, 33.0°C, July 14, 1981; minimum daily 0.0°C on many days during winter.

SEDIMENT CONCENTRATION: Maximum daily mean, 53,500 mg/L, May 27, 1980; minimum daily mean, 3 mg/L, Sept. 16-18, 1996.

SEDIMENT LOAD: Maximum daily, 2,230,000 tons, May 20, 1978; minimum daily, 0.17 ton, Aug. 1, 1988 and Sept. 16, 1996.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum recorded, 2,520  $\mu\text{S}/\text{cm}$  at 25.0°C, Aug. 27; minimum recorded, 392  $\mu\text{S}/\text{cm}$  at 25.0°C, July 1.

## 06324500 POWDER RIVER AT MOORHEAD, MT—Continued

**SPECIFIC CONDUCTANCE, WATER, UNFILTERED, MICROSIEMENS PER CENTIMETER AT 25 DEGREES CELSIUS**  
**WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011**

[Remark codes: #, Value computed from partial day with greater than 50% of the day recorded; \*, Computed from available daily values. A specific conductance value greater or less than the reported maximum or minimum may have occurred during the missing period of record;

\*\* , Instantaneous value from observer sample.]

Day	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean
	October			November			December			January		
1	2,080	2,060	2,070	---	---	**1,800	---	---	**2,020	---	---	---
2	2,120	2,070	2,090	---	---	---	---	---	**1,910	---	---	**1,560
3	2,110	2,070	2,090	---	---	**1,850	---	---	---	---	---	---
4	2,140	2,040	2,090	---	---	---	---	---	---	---	---	**1,740
5	2,100	2,040	2,070	---	---	---	---	---	---	---	---	---
6	2,180	2,080	2,140	---	---	---	---	---	**2,000	---	---	**1,730
7	2,280	2,180	2,240	---	---	---	---	---	---	---	---	---
8	2,300	2,200	2,270	---	---	**1,760	---	---	---	---	---	---
9	2,260	2,190	2,230	---	---	---	---	---	---	---	---	---
10	2,270	2,230	2,250	---	---	---	---	---	**1,690	---	---	---
11	2,250	2,140	2,200	---	---	---	---	---	---	---	---	**1,750
12	2,150	2,060	2,120	---	---	---	---	---	---	---	---	---
13	2,090	1,970	2,000	---	---	**1,690	---	---	---	---	---	---
14	2,000	1,900	1,950	---	---	---	---	---	**1,890	---	---	---
15	1,900	1,840	1,860	---	---	---	---	---	**1,640	---	---	---
16	2,140	1,850	2,010	---	---	---	---	---	---	---	---	**1,780
17	2,110	1,980	2,060	---	---	**1,670	---	---	---	---	---	---
18	2,050	1,960	2,010	---	---	---	---	---	---	---	---	---
19	---	---	#2,030	---	---	---	---	---	---	---	---	**1,550
20	---	---	---	---	---	---	---	---	---	---	---	**1,630
21	---	---	---	---	---	**2,000	---	---	---	---	---	---
22	---	---	---	---	---	---	---	---	---	---	---	---
23	---	---	---	---	---	---	---	---	---	---	---	---
24	---	---	---	---	---	---	---	---	---	---	---	---
25	---	---	---	---	---	**2,010	---	---	---	---	---	**1,630
26	1,800	1,780	1,790	---	---	---	---	---	---	---	---	---
27	1,780	1,770	1,780	---	---	---	---	---	---	---	---	---
28	1,820	1,770	1,780	---	---	---	---	---	---	---	---	---
29	1,770	1,730	1,750	---	---	---	---	---	---	---	---	**1,580
30	1,780	1,740	1,760	---	---	---	---	---	---	---	---	---
31	1,790	1,770	1,780	---	---	---	---	---	---	---	---	---
Month	*2,300	*1,730	*2,020	---	---	---	---	---	---	---	---	---

## 06324500 POWDER RIVER AT MOORHEAD, MT—Continued

**SPECIFIC CONDUCTANCE, WATER, UNFILTERED, MICROSIEMENS PER CENTIMETER AT 25 DEGREES CELSIUS**  
**WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011**

[Remark codes: #, Value computed from partial day with greater than 50% of the day recorded; \*, Computed from available daily values. A specific conductance value greater or less than the reported maximum or minimum may have occurred during the missing period of record;

\*\*, Instantaneous value from observer sample.]

Day	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean
	February			March			April			May		
1	---	---	---	---	---	**1,840	1,780	1,620	1,720	1,850	1,820	1,830
2	---	---	**1,690	---	---	---	1,860	1,720	1,770	1,860	1,790	1,820
3	---	---	**1,610	---	---	**2,050	1,880	1,760	1,820	1,840	1,790	1,830
4	---	---	---	---	---	---	1,960	1,880	1,930	1,840	1,820	1,830
5	---	---	---	---	---	---	1,990	1,960	1,980	1,860	1,830	1,850
6	---	---	---	---	---	---	2,030	1,980	2,010	1,840	1,810	1,830
7	---	---	**1,900	---	---	**2,240	2,050	1,990	2,030	1,820	1,780	1,810
8	---	---	---	---	---	---	1,990	1,960	1,980	1,830	1,790	1,820
9	---	---	---	---	---	---	1,970	1,910	1,940	1,830	1,770	1,810
10	---	---	---	---	---	---	1,910	1,840	1,880	1,780	1,720	1,740
11	---	---	---	---	---	**1,540	1,860	1,830	1,840	1,890	1,750	1,820
12	---	---	**1,320	---	---	---	1,840	1,830	1,840	1,970	1,820	1,900
13	---	---	---	---	---	---	1,880	1,840	1,860	1,920	1,730	1,800
14	---	---	---	---	---	---	1,910	1,860	1,890	1,790	1,730	1,760
15	---	---	**1,310	---	---	**1,520	1,910	1,880	1,890	1,790	1,650	1,720
16	---	---	---	---	---	---	1,920	1,860	1,890	1,650	1,480	1,550
17	---	---	**1,430	---	---	---	1,860	1,840	1,850	1,500	1,440	1,470
18	---	---	---	---	---	---	1,870	1,860	1,870	1,480	1,190	1,370
19	---	---	---	---	---	**1,770	1,870	1,840	1,860	1,240	1,180	1,200
20	---	---	---	---	---	---	1,870	1,820	1,840	1,260	1,190	1,220
21	---	---	**1,530	---	---	---	1,830	1,790	1,810	1,440	1,220	1,260
22	---	---	---	---	---	---	1,810	1,760	1,790	1,450	1,180	1,370
23	---	---	---	---	---	**1,940	1,860	1,800	1,830	---	---	#1,060
24	---	---	---	---	---	**1,880	1,880	1,860	1,880	---	---	---
25	---	---	**1,650	---	---	---	1,910	1,870	1,890	1,050	808	969
26	---	---	---	---	---	---	1,900	1,830	1,870	909	716	805
27	---	---	---	---	---	**2,000	1,860	1,830	1,850	988	832	946
28	---	---	**1,720	---	---	---	1,870	1,820	1,840	876	784	834
29	---	---	---	---	---	---	1,820	1,740	1,770	793	747	772
30	---	---	---	---	---	---	1,820	1,740	1,770	818	729	762
31	---	---	---	---	---	**2,030	---	---	---	1,000	793	881
<b>Month</b>	---	---	---	---	---	---	2,050	1,620	1,870	*1,970	*716	*1,450

## 06324500 POWDER RIVER AT MOORHEAD, MT—Continued

**SPECIFIC CONDUCTANCE, WATER, UNFILTERED, MICROSIEMENS PER CENTIMETER AT 25 DEGREES CELSIUS**  
**WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011**

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\*\*, Instantaneous value from observer sample.]

Day	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean
	June			July			August			September		
1	1,200	939	1,090	439	392	412	1,700	1,620	1,660	1,940	1,430	1,700
2	1,260	1,190	1,230	415	397	407	1,720	1,680	1,710	2,200	1,940	2,080
3	1,260	1,020	1,130	461	410	437	1,800	1,720	1,760	2,320	2,200	2,250
4	1,020	867	920	472	461	469	1,850	1,800	1,820	2,320	2,260	2,290
5	868	767	814	491	468	481	1,960	1,850	1,900	2,280	2,230	2,250
6	767	645	700	523	478	498	2,030	1,960	1,990	2,310	2,270	2,290
7	645	595	610	542	523	537	2,120	2,030	2,080	2,320	2,270	2,300
8	597	553	574	535	524	528	2,090	1,840	1,910	2,320	2,270	2,300
9	569	505	542	571	527	546	1,860	1,800	1,830	2,340	2,250	2,310
10	534	442	496	658	571	634	1,830	1,660	1,760	2,320	2,290	2,300
11	548	414	484	693	651	671	1,660	1,600	1,630	2,440	2,320	2,380
12	788	521	693	728	565	678	1,610	1,550	1,580	2,450	2,420	2,430
13	735	610	668	952	709	875	1,620	1,600	1,620	2,470	2,400	2,430
14	625	526	576	912	809	859	1,660	1,620	1,620	2,470	2,370	2,410
15	597	508	546	818	797	807	1,780	1,660	1,720	2,380	2,320	2,350
16	538	498	525	815	770	790	1,910	1,540	1,800	2,400	2,340	2,370
17	529	486	517	846	778	797	1,970	1,910	1,940	2,390	2,310	2,350
18	512	423	477	887	846	871	2,030	1,940	1,990	2,340	2,240	2,310
19	497	435	480	872	805	846	2,110	2,030	2,080	2,240	1,970	2,090
20	509	487	502	805	772	786	2,170	2,110	2,130	2,030	1,980	2,010
21	526	482	500	811	771	789	2,280	2,170	2,220	2,100	2,020	2,070
22	570	525	545	842	806	819	2,340	2,240	2,280	2,070	2,040	2,050
23	570	519	545	924	841	873	2,340	2,290	2,320	2,060	2,000	2,020
24	580	511	534	1,010	924	960	2,330	2,300	2,310	2,060	2,000	2,050
25	582	489	534	1,080	1,010	1,040	2,370	2,320	2,340	2,000	1,920	1,940
26	545	457	499	1,150	1,080	1,100	2,470	2,370	2,440	1,940	1,900	1,910
27	481	436	458	1,280	1,150	1,220	2,520	2,460	2,480	1,940	1,880	1,910
28	451	430	441	1,370	1,280	1,330	2,510	2,400	2,480	1,920	1,880	1,890
29	475	446	463	1,460	1,370	1,430	2,400	2,240	2,340	1,930	1,880	1,900
30	478	433	456	1,550	1,450	1,490	2,240	1,170	1,900	1,890	1,820	1,850
31	---	---	---	1,620	1,550	1,580	1,430	1,130	1,310	---	---	---
<b>Month</b>	1,260	414	618	1,620	392	825	2,520	1,130	1,970	2,470	1,430	2,160