

Water-Data Report 2006

06326500 POWDER RIVER NEAR LOCATE, MT

Powder Basin
Lower Powder Subbasin

LOCATION.--Lat 46°25'48", long 105°18'34" referenced to North American Datum of 1927, in SW ¼ SW ¼ SE ¼ sec.23, T.8 N., R.51 E., Custer County, Hydrologic Unit 10090209, on left bank at downstream side of bridge on U.S. Highway 12, 0.1 mi west of Locate, and 25 mi east of Miles City, and at river mile 29.4.

DRAINAGE AREA.--13,068 mi².

SURFACE-WATER RECORDS

PERIOD OF RECORD.--March 1938 to current year.

REVISED RECORDS. --Water Supply Paper (WSP) 926: 1939. WSP 1309: 1938-39, maximum discharge. WSP 1729: Drainage area. Water Data Report MT-04-1: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 2,384.79 ft, referenced to National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to July 11, 1947, nonrecording gage at bridge 1.5 mi upstream, and July 11, 1947 to Sept. 30, 1965, water-stage recorder at site near upstream bridge at different elevation. Oct. 1, 1965 to Oct. 4, 1966, nonrecording gage, and Oct. 5, 1966 to Mar. 21, 1978, water-stage recorder at present site and elevation. Mar. 22, 1978 to Apr. 23, 1981, water-stage recorder 1.5 mi upstream at different elevation, Apr. 24 to Aug. 20, 1981, water-stage recorder at present site and elevation, and Aug. 21, 1981 to Sept. 30, 1981, water-stage recorder 1.5 mi upstream at different elevation. Oct. 1, 1981 to Apr. 5, 1995 water-stage recorder at site 1.5 miles downstream at different elevation. Apr. 7, 1995 to present, water-stage recorders located on each bank and used depending on control conditions.

REMARKS.--Records are fair except those for estimated daily discharges, which are poor. Some regulation occurs by three reservoirs in Wyoming with combined usable capacity of 36,800 acre-ft. Diversions for irrigation include about 101,800 acres upstream from station. U.S. Army Corps of Engineers satellite telemeter is located at the station.

06326500 POWDER RIVER NEAR LOCATE, 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	36	180	e70	e210	e180	e190	324	581	493	34	2.3	e0.00
2	36	185	e60	e210	e180	e500	332	552	443	33	3.5	e0.00
3	42	181	e70	e210	e180	e1,000	345	510	401	28	3.4	e0.00
4	53	179	e90	e210	e180	e1,000	421	486	326	30	3.0	e0.05
5	152	182	e90	e190	e180	1,040	405	486	292	29	2.5	e0.20
6	178	184	e90	e190	e180	1,440	595	389	239	24	1.8	e0.05
7	293	187	e80	e190	e170	1,020	957	329	194	21	1.3	e0.00
8	424	193	e90	e190	e180	880	865	319	190	18	1.7	e0.00
9	657	188	e110	e200	e180	792	1,060	358	241	16	5.9	e0.00
10	857	185	e120	e200	e180	702	712	474	171	15	2.0	e0.00
11	560	189	e120	e200	e170	640	579	493	151	13	1.3	0.44
12	358	211	e120	e200	e160	553	499	391	170	12	2.4	0.96
13	268	209	e110	e200	e180	472	476	387	130	11	2.9	0.28
14	234	210	e120	e200	e160	470	488	366	186	9.9	2.3	0.00
15	260	188	e120	e200	e160	433	426	323	223	9.8	2.2	0.00
16	254	193	e110	e210	e150	395	420	308	230	8.4	2.4	0.36
17	242	206	e100	e210	e140	382	430	280	156	6.8	2.5	17
18	237	232	e80	e210	e150	377	951	284	120	6.2	5.3	50
19	247	259	e90	e210	e160	342	2,510	240	102	5.4	6.8	74
20	242	225	e100	e210	e170	313	3,120	208	90	5.1	3.4	50
21	220	202	e120	e210	e170	292	2,610	191	81	5.4	2.4	36
22	197	220	e130	e210	e170	303	2,250	177	77	5.1	2.1	82
23	179	230	e130	e200	e170	325	1,900	510	74	4.7	1.7	240
24	177	230	e130	e180	e170	341	1,430	2,280	68	4.4	1.0	119
25	176	230	e130	e180	e160	325	1,130	1,110	61	4.0	0.48	80
26	183	e210	e140	e180	e170	311	866	671	48	3.7	0.54	52
27	185	e200	e170	e180	e170	293	747	545	48	3.4	0.39	37
28	176	e150	e210	e190	e170	302	704	435	43	3.0	0.22	37
29	172	e80	e210	e180	---	301	657	669	39	2.6	0.04	44
30	177	e70	e210	e180	---	315	614	712	34	2.6	0.02	38
31	179	---	e210	e180	---	318	---	588	---	2.2	0.17	---
Total	7,651	5,788	3,730	6,120	4,740	16,367	28,823	15,652	5,121	376.7	67.96	958.34
Mean	247	193	120	197	169	528	961	505	171	12.2	2.19	31.9
Max	857	259	210	210	180	1,440	3,120	2,280	493	34	6.8	240
Min	36	70	60	180	140	190	324	177	34	2.2	0.02	0.00
Ac-ft	15,180	11,480	7,400	12,140	9,400	32,460	57,170	31,050	10,160	747	135	1,900

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1939 - 2006, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	246	216	148	143	418	1,191	728	1,123	1,556	546	205	163
Max	921	790	417	476	3,850	4,627	3,062	5,970	8,045	2,015	1,096	898
(WY)	(1941)	(1999)	(1942)	(1981)	(1943)	(1972)	(1965)	(1978)	(1944)	(1993)	(1941)	(1941)
Min	1.77	12.5	12.5	4.53	2.82	80.2	109	51.2	25.9	9.34	1.30	0.19
(WY)	(1961)	(1961)	(1961)	(1950)	(1950)	(1950)	(1961)	(2004)	(2004)	(2004)	(1988)	(1960)

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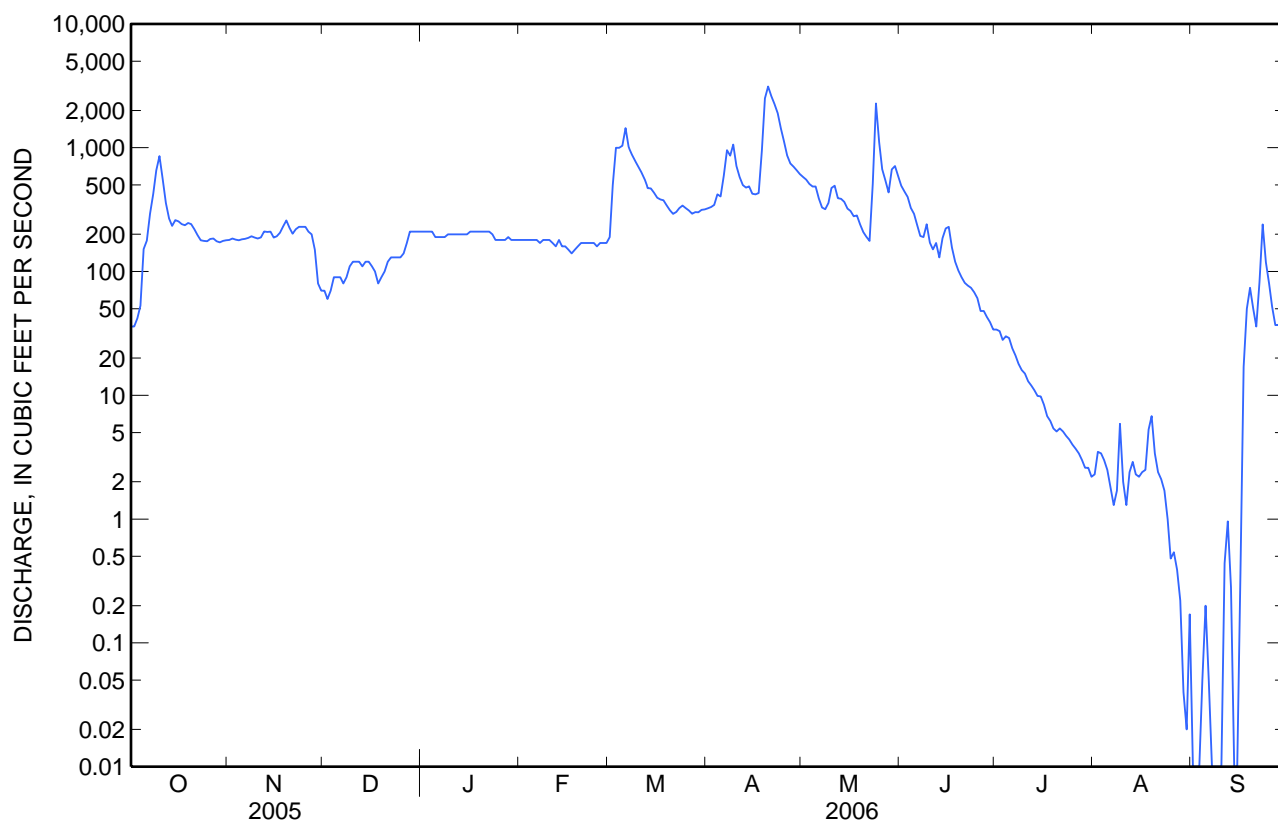
SUMMARY STATISTICS

	Calendar Year 2005		Water Year 2006		Water Years 1939 - 2006	
Annual total	149,843		95,395.00			
Annual mean	411		261		557	
Highest annual mean					1,622	1944
Lowest annual mean					79.1	2004
Highest daily mean	3,390	Jun 28	3,120	Apr 20	26,000	Feb 19, 1943
Lowest daily mean	29	Aug 12	0.00	Sep 1	0.00	Jan 16, 1950
Annual seven-day minimum	36	Sep 22	0.04	Aug 29	0.00	Jan 16, 1950
Maximum peak flow			4,240	Apr 19	^b 31,000	Feb 19, 1943
Maximum peak stage			5.29	Apr 19	^c 12.20	Mar 16, 1978
Instantaneous low flow			^a 0.00	Many days	^a 0.00	Many days
Annual runoff (ac-ft)	297,200		189,200		403,200	
10 percent exceeds	1,240		580		1,300	
50 percent exceeds	196		180		228	
90 percent exceeds	53		2.4		38	

^a On many days in 1950, 1960-61, 1998, and 2006.

^b Gage height, 11.23 ft, observed.

^c Backwater from ice.



06326500 POWDER RIVER NEAR LOCATE, MT—Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1948-63, 1975 to September 1994, January 1999 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: January 1951 to September 1962, October 1974 to September 1981, July 1988 to January 1990.

WATER TEMPERATURE: March 1951 to July 1963, October 1974 to September 1979.

SUSPENDED-SEDIMENT DISCHARGE: October 1974 to September 1984.

REMARKS.--Several unpublished observations of specific conductance and water temperature were made during the year.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum daily, 4,000 microsiemens per centimeter ($\mu\text{S}/\text{cm}$) at 25.0°C, Apr. 1, 1977; minimum daily, 523 $\mu\text{S}/\text{cm}$ at 25.0°C, Mar. 11, 12, 1989.

WATER TEMPERATURE: Maximum, 30°C, July 26, 1959; minimum 0.0°C many days during winter periods.

SEDIMENT CONCENTRATION: Maximum daily mean, 60,000 mg/L, Aug. 6, 1953; minimum daily mean, 17 mg/L, Dec. 3, 1974.

SEDIMENT LOAD: Maximum daily, 1,020,000 tons, May 26, 1952; minimum daily, less than 1 ton on several days during September 1950.

WATER-QUALITY DATA
WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006

Part 1 of 4

[Remark codes: E, estimated.]

Date	Time	Instan- taneous dis- charge, cfs (00061)	Baro- metric pres- sure, mm Hg (00025)	Dis- solved oxygen, mg/L (00300)	Dis- solved oxygen, percent of sat- uration (00301)	pH, water, unfltrd field, std units (00400)	Specif. conduc- tance, wat unf uS/cm 25 degC (00095)	Temper- ature, air, deg C (00020)	Temper- ature, water, deg C (00010)	Hard- ness, water, mg/L as CaCO3 (00900)	Calcium water, fltrd, mg/L (00915)	Magnes- ium, water, fltrd, mg/L (00925)	Potas- sium, water, fltrd, mg/L (00935)
Oct													
06...	0800	167	702	13.7	102	7.6	1,510	-4.0	0.0	290	66.8	30.3	6.05
Nov													
03...	0800	182	692	11.4	99	8.3	1,990	4.0	5.0	530	112	61.5	8.38
Dec													
12...	1045	E120	700	11.7	88	8.3	2,890	2.5	0.0	780	172	84.7	9.91
Jan													
10...	0900	E200	695	11.2	85	8.1	1,880	1.5	0.0	520	121	54.1	8.13
30...	1500	E180	687	13.1	100	8.3	1,820	9.5	0.0	480	110	49.0	6.74
Mar													
06...	1545	1,340	695	13.7	109	8.3	1,860	13.5	2.0	480	110	49.6	7.94
Apr													
05...	0830	401	690	10.0	96	8.4	1,930	15.5	9.0	480	109	49.9	7.82
May													
03...	0815	546	702	10.4	96	8.6	1,590	7.0	8.0	410	92.0	44.1	6.60
Jun													
07...	0815	199	700	8.3	98	8.7	1,720	20.0	19.0	430	102	43.0	8.29
Jul													
12...	0815	13	--*	--*	--*	8.3	2,910	E25.0	22.5	570	115	68.2	12.3
Aug													
09...	0715	11	695	7.2	84	8.0	1,980	25.0	18.0	190	47.2	16.4	8.59
Sep													
05...	1130	E.20	705	10.4	133	8.3	3,290	25.0	23.0	530	102	66.3	11.4

* Meter problems.

06326500 POWDER RIVER NEAR LOCATE, MT—Continued

WATER-QUALITY DATA
WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006

Part 2 of 4

[Remark codes: <, less than; E, estimated.]

Date	Sodium adsorp- tion ratio (00931)	Sodium, water, fltrd, mg/L (00930)	ANC, wat unf fixed end pt, lab, mg/L as CaCO3 (90410)	Alka- linity, wat flt fxd end lab, mg/L as CaCO3 (29801)	Chlor- ide, water, fltrd, mg/L (00940)	Fluor- ide, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L (00955)	Sulfate water, fltrd, mg/L (00945)	Residue water, sum of consti- tuents mg/L (70301)	Residue water, fltrd, tons/ acre-ft (70303)	Residue water, dis- solved, tons/d (70302)	Ammonia water, fltrd, mg/L as N (00608)	Nitrite + nitrate water fltrd, mg/L as N (00631)
Oct													
06...	5	212	230	167	36.9	.36	5.6	539	1,000	1.36	451	.024	.736
Nov													
03...	5	249	246	194	102	.44	6.5	681	1,340	1.82	657	<.010	<.016
Dec													
12...	5	343	360	343	139	.48	11.7	1,020	1,990	2.70	E644	.073	.296
Jan													
10...	4	208	309	295	80.6	.45	10.1	583	1,240	1.69	E672	.038	.372
30...	4	217	276	269	91.2	.44	8.3	578	1,220	1.66	E595	E.005	.243
Mar													
06...	4	226	557	257	103	.45	7.1	560	1,220	1.66	4,410	.061	.388
Apr													
05...	5	250	286	224	98.7	.55	8.2	670	1,330	1.81	1,440	<.010	.321
May													
03...	4	190	252	218	74.9	.50	8.9	529	1,080	1.47	1,590	E.005	.242
Jun													
07...	4	210	265	225	61.5	.54	10.3	612	1,180	1.61	636	E.007	.443
Jul													
12...	8	441	254	260	113	.43	14.7	1,160	2,080	2.83	73.1	E.006	<.016
Aug													
09...	9	294	738	170	31.6	.58	7.7	763	1,280	1.74	38.0	.072	2.36
Sep													
05...	9	472	315	318	119	.44	5.8	1,320	2,290	3.11	E1.24	E.008	E.010

06326500 POWDER RIVER NEAR LOCATE, MT—Continued

WATER-QUALITY DATA
WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006

Part 3 of 4

[Remark codes: <, less than; E, estimated.]

Date	Nitrite water, flt'd, mg/L as N (00613)	Total nitro- gen, water, unflt'd mg/L (62855)	Ortho- phos- phate, water, flt'd, mg/L as P (00671)	Phos- phorus, water, unflt'd mg/L (00665)	Arsenic water unflt'd ug/L (01002)	Barium, water, unflt'd recover- able, ug/L (01007)	Boron, water, unflt'd recover- able, ug/L (01022)	Cadmium water, unflt'd ug/L (01027)	Chrom- ium, water, unflt'd recover- able, ug/L (01034)	Copper, water, unflt'd recover- able, ug/L (01042)	Iron, water, unflt'd recover- able, ug/L (01045)	Lead, water, unflt'd recover- able, ug/L (01051)	Mangan- ese, water, unflt'd recover- able, ug/L (01055)
Oct 06...	.009	3.32	E.004	1.68	14.8	722	166	1.58	59.8	112	67,600	56.1	1,320
Nov 03...	<.002	.63	<.006	.203	2.7	117	182	.17	4.5	10.4	5,960	4.67	176
Dec 12...	E.001	.62	<.006	.040	1.5	77.3	208	<.08	.89	7.0	941	.82	25.3
Jan 10...	.003	.72	<.006	.048	1.1	55.1	155	E.03	1.4	5.6	1,280	1.22	29.4
30...	E.001	.56	<.006	.088	1.4	62.6	149	.08	2.4	6.6	2,470	2.37	55.3
Mar 06...	.003	4.18	E.003	.697	16.5	674	187	2.49	46.3	96.0	79,400	77.3	2,070
Apr 05...	E.001	1.43	E.003	.310	7.7	248	176	.57	21.1	37.4	25,900	23.1	465
May 03...	E.001	1.03	.007	.326	5.2	154	152	.29	7.5	14.6	12,200	10.3	307
Jun 07...	E.001	1.67	.017	.504	8.0	243	165	.41	13.5	25.5	22,300	20.6	503
Jul 12...	<.002	.27	.006	.008	1.2	72.8	297	<.08	.26	10.8	59	<.12	7.7
Aug 09...	.043	14.2	E.005	1.49	23.6	984	544	5.74	180	368	186,000	383	6,020
Sep 05...	<.002	.43	E.005	.023	1.5	64.5	398	E.05	1.2	7.2	1,690	.91	92.6

06326500 POWDER RIVER NEAR LOCATE, MT—Continued

WATER-QUALITY DATA
WATER YEAR OCTOBER 2005 TO SEPTEMBER 2006

Part 4 of 4

[Remark codes: <, less than; E, estimated.]

Date	Mercury water, unfltrd recover -able, ug/L (71900)	Nickel, water, unfltrd recover -able, ug/L (01067)	Selen- ium, water, unfltrd ug/L (01147)	Zinc, water, unfltrd recover -able, ug/L (01092)	Suspnd. sedi- ment, sieve diametr percent <.063mm (70331)	Sus- pended sedi- ment concen- tration mg/L (80154)	Sus- pended sedi- ment dis- charge, tons/d (80155)
Oct							
06...	--	122	1.6	395	99	6,230	2,810
Nov							
03...	--	10.4	1.2	27	95	411	202
Dec							
12...	--	6.36	1.4	7	91	240	E77.8
Jan							
10...	--	4.45	.84	7	81	210	E113
30...	--	6.11	.88	12	97	194	E94.3
Mar							
06...	--	96.8	2.8	280	86	6,220	22,500
Apr							
05...	--	36.2	2.4	99	93	1,490	1,610
May							
03...	--	14.5	1.6	45	87	732	1,080
Jun							
07...	.045	28.0	2.0	101	59	2,280	1,230
Jul							
12...	--	3.67	.52	5	87	16	.56
Aug							
09...	--	402	3.6	960	99	22,700	675
Sep							
05...	--	6.16	.28	6	69	132	E.07