

Water-Data Report 2010

**06329500 YELLOWSTONE RIVER NEAR SIDNEY, MT**

Yellowstone Basin  
Lower Yellowstone Subbasin

LOCATION.--Lat 47°40'42", long 104°09'22" referenced to North American Datum of 1927, in SW ¼ NE ¼ SW ¼ sec.9, T.22 N., R.59 E., Richland County, MT, Hydrologic Unit 10100004, on left bank at Montana-Dakota Utilities Company powerplant, 0.2 mi downstream from bridge on State Highway 23, 2.5 mi south of Sidney, 3.0 mi downstream from Fox Creek, and at river mile 29.2.

DRAINAGE AREA.--69,083 mi<sup>2</sup> of which 691 mi<sup>2</sup> probably is noncontributing. Area at site 4.5 mi upstream, 68,812 mi<sup>2</sup>.

**SURFACE-WATER RECORDS**

PERIOD OF RECORD.--October 1910 to September 1931 (published as "at Intake"), October 1933 to current year. If monthly figures of diversions to Lower Yellowstone Canal at Intake are added to records at this site, records equivalent to those published as Yellowstone River at Glendive (1898-1910, 1931-34) can be obtained. Monthly discharge only for some periods, published in Water Supply Paper (WSP) 1309. Monthly figures of diversions into Lower Yellowstone Canal prior to 1951 published in WSP 1309, 1951-60 published in WSP 1729, 1961-65 published in WSP 1916, 1966-70 published in WSP 2116, and 1971 to current year are published in annual reports.

REVISED RECORDS.--Water Data Report MT-04-1: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 1,881.3 ft, referenced to National Geodetic Vertical Datum of 1929, levels by U.S. Army Corps of Engineers. Jan. 1, 1911, to Sept. 30, 1931, nonrecording gage at site 32 miles upstream at different elevation. Apr. 9, 1934, water-stage recorder at two sites within 500 ft of highway bridge 0.2 mi upstream and May 17, 1945, to Apr. 3, 1952, nonrecording gage on same bridge at elevation 1.36 ft higher. Apr. 4, 1952, to Nov. 19, 1967, water-stage recorder at site 4.5 mi upstream at different elevation.

REMARKS.--Records are good except for estimated daily discharges, which are poor. Flow is regulated to some extent by Bighorn Lake, usable capacity, 1,312,000 acre-ft, on the Bighorn River and on other tributary streams in Wyoming and Montana. Diversion for irrigation of about 1,250,000 acres occurs upstream from station. Lower Yellowstone Project Main Canal diverts from left bank in NW¼ sec.36, T.18 N., R.56 E., at Lower Yellowstone diversion dam at Intake about 36.6 mi upstream for irrigation of about 52,000 acres of which about one-third lies upstream from station. U.S. Army Corps of Engineers satellite telemeter is located at the station.

## 06329500 YELLOWSTONE RIVER NEAR SIDNEY, MT—Continued

**DISCHARGE, CUBIC FEET PER SECOND**  
**WATER YEAR OCTOBER 2009 TO SEPTEMBER 2010**  
**DAILY MEAN VALUES**

[e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	6,390	8,450	7,130	e5,100	e5,100	e5,300	6,270	9,710	29,200	41,300	10,100	5,950
2	6,520	8,310	7,110	e4,900	e5,100	e5,300	6,270	9,600	32,800	40,800	9,750	8,940
3	6,730	8,180	6,960	e5,100	e5,400	e5,300	6,540	10,500	30,600	40,600	9,270	9,940
4	7,010	8,120	6,710	e5,100	e5,400	e5,300	6,670	10,500	28,400	42,800	9,020	8,970
5	7,450	8,220	e6,100	e5,100	e5,400	e5,400	6,640	10,100	29,300	41,900	8,870	8,400
6	8,020	8,250	e4,800	e5,300	e5,400	e5,500	6,580	9,300	33,000	38,500	8,850	8,420
7	8,450	8,290	e3,700	e5,700	e5,400	e5,700	6,370	9,020	40,000	34,800	8,680	8,560
8	8,840	8,030	e3,700	e5,700	e5,400	e6,000	6,150	9,510	47,000	31,800	8,470	8,440
9	9,010	7,650	e2,400	e5,700	e5,400	e6,100	5,910	9,890	53,900	30,200	8,360	8,190
10	8,740	7,440	e1,600	e5,300	e5,400	e6,300	5,780	10,200	55,100	27,900	8,380	8,360
11	8,680	7,440	e1,400	e4,900	e5,400	e6,200	5,780	9,740	53,900	25,100	8,240	8,590
12	8,690	7,510	e1,100	e4,900	e5,400	e6,000	5,800	9,300	54,500	23,000	8,160	8,690
13	8,720	7,510	e1,300	e4,900	e5,400	e5,900	5,780	8,730	51,000	22,100	8,100	8,510
14	8,540	7,460	e1,100	e5,100	e5,300	e5,900	5,770	8,480	49,400	21,500	8,080	8,420
15	8,430	7,430	e1,900	e5,300	e5,300	e6,900	5,730	8,510	45,900	20,700	8,140	8,690
16	8,440	7,520	e3,200	e5,500	e5,300	e8,200	5,660	9,240	41,100	19,700	7,980	9,170
17	8,510	7,720	e3,900	e5,700	e5,200	e8,800	5,700	10,700	39,400	18,700	7,880	9,000
18	8,700	7,550	e3,900	e5,700	e5,100	e8,800	5,660	11,800	43,600	17,300	7,850	9,380
19	9,160	7,370	e4,100	e5,700	e5,000	e9,000	5,740	11,600	44,500	16,300	7,620	9,410
20	9,480	7,380	e5,500	e5,700	e5,200	e8,500	5,670	11,700	48,300	15,600	7,100	9,030
21	8,960	7,390	e6,100	e5,500	e5,400	e7,800	5,520	12,800	48,800	15,200	6,630	8,890
22	8,550	7,380	e6,200	e5,500	e5,400	e7,500	5,460	15,100	45,400	14,800	6,250	8,890
23	8,090	7,430	e6,200	e5,500	e5,300	e7,300	5,660	18,000	44,300	17,500	5,950	8,870
24	7,860	7,400	e6,200	e5,400	e5,200	e7,200	6,290	19,800	44,400	18,200	5,790	9,090
25	7,560	7,390	e6,200	e5,300	e5,100	e7,100	7,020	24,400	42,900	16,300	5,700	8,740
26	8,800	7,330	e6,200	e5,200	e5,000	e7,000	7,770	33,200	41,700	14,500	5,610	8,630
27	8,800	7,240	e6,200	e5,100	e5,100	e6,900	9,560	32,500	41,100	13,100	5,520	8,660
28	8,740	7,240	e5,700	e5,100	e5,200	e6,900	10,500	29,200	40,200	12,100	5,430	8,510
29	8,660	7,150	e5,300	e5,100	---	6,820	10,400	28,800	41,100	11,300	5,420	8,290
30	8,700	7,180	e5,300	e5,100	---	6,610	10,400	27,100	42,400	10,700	5,520	8,050
31	8,650	---	e5,300	e5,100	---	6,360	---	24,500	---	10,500	5,550	---
<b>Total</b>	257,880	228,960	142,510	164,300	147,700	207,890	199,050	463,530	1,283,200	724,800	232,270	259,680
<b>Mean</b>	8,319	7,632	4,597	5,300	5,275	6,706	6,635	14,950	42,770	23,380	7,493	8,656
<b>Max</b>	9,480	8,450	7,130	5,700	5,400	9,000	10,500	33,200	55,100	42,800	10,100	9,940
<b>Min</b>	6,390	7,150	1,100	4,900	5,000	5,300	5,460	8,480	28,400	10,500	5,420	5,950
<b>Ac-ft</b>	511,500	454,100	282,700	325,900	293,000	412,300	394,800	919,400	2,545,000	1,438,000	460,700	515,100

**STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1911 - 2010, BY WATER YEAR (WY)\***

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
<b>Mean</b>	8,152	7,249	5,888	5,667	6,711	10,570	10,060	18,050	38,080	22,430	8,425	6,989
<b>Max</b>	29,130	12,150	9,594	13,110	17,750	25,980	39,160	38,100	77,280	55,000	20,470	16,000
<b>(WY)</b>	(1924)	(1924)	(1976)	(1925)	(1971)	(1972)	(1924)	(1928)	(1918)	(1917)	(1912)	(1941)
<b>Min</b>	3,726	3,700	3,019	2,087	2,702	3,235	2,821	5,409	11,580	3,311	1,602	2,389
<b>(WY)</b>	(1922)	(1922)	(1961)	(1937)	(1936)	(2002)	(1961)	(1961)	(1919)	(1919)	(1961)	(1934)

\*During periods of operation 1911-31, 1934 to current year. Published as "at Intake" 1911-31.

## 06329500 YELLOWSTONE RIVER NEAR SIDNEY, MT—Continued

## SUMMARY STATISTICS

	Calendar Year 2009		Water Year 2010		Water Years 1911 - 2010*	
<b>Annual total</b>	4,619,560		4,311,770			
<b>Annual mean</b>	12,660		11,810		12,370	
<b>Highest annual mean</b>					21,250 1924	
<b>Lowest annual mean</b>					5,673 2004	
<b>Highest daily mean</b>	51,200	Jun 25	55,100	Jun 10	142,000 Jun 21, 1921	
<b>Lowest daily mean</b>	1,100	Dec 12	1,100	Dec 12	570 May 17, 1961	
<b>Annual seven-day minimum</b>	1,540	Dec 9	1,540	Dec 9	1,010 Aug 8, 1961	
<b>Maximum peak flow</b>			56,600	Jun 10	<sup>a</sup> 159,000 Jun 21, 1921	
<b>Maximum peak stage</b>			14.40	Jun 10	<sup>b</sup> 24.03 Mar 6, 1994	
<b>Instantaneous low flow</b>					<sup>c</sup> 470 May 17, 1961	
<b>Annual runoff (ac-ft)</b>	9,163,000		8,552,000		8,961,000	
<b>10 percent exceeds</b>	36,400		31,100		27,700	
<b>50 percent exceeds</b>	7,630		7,770		7,870	
<b>90 percent exceeds</b>	5,500		5,200		4,040	

	Water Years 1911 - 1965**		Water Years 1967 - 2010***	
<b>Annual mean</b>	12,890		11,830	
<b>Highest annual mean</b>	21,250 1924		19,150 1997	
<b>Lowest annual mean</b>	5,814 1934		5,673 2004	
<b>Highest daily mean</b>	142,000 Jun 21, 1921		104,000 May 23, 1978	
<b>Lowest daily mean</b>	570 May 17, 1961		800 Jan 2, 1989	
<b>Annual seven-day minimum</b>	1,010 Aug 8, 1961		1,060 Aug 23, 2001	
<b>Maximum peak flow</b>	<sup>a</sup> 159,000 Jun 21, 1921		<sup>d</sup> 111,000 May 23, 1978	
<b>Maximum peak stage</b>	<sup>b</sup> 21.85 Mar 22, 1947		<sup>b</sup> 24.03 Mar 6, 1994	
<b>Instantaneous low flow</b>	<sup>c</sup> 470 May 17, 1961			
<b>Annual runoff (ac-ft)</b>	9,341,000		8,557,000	
<b>10 percent exceeds</b>	29,900		25,500	
<b>50 percent exceeds</b>	7,690		8,200	
<b>90 percent exceeds</b>	3,820		4,480	

\*During periods of operation 1911-31, 1934 to current year. Published as "at Intake" 1911-31.

\*\*Prior to Bighorn Lake reaching operational level.

\*\*\*After Bighorn Lake reached operational level.

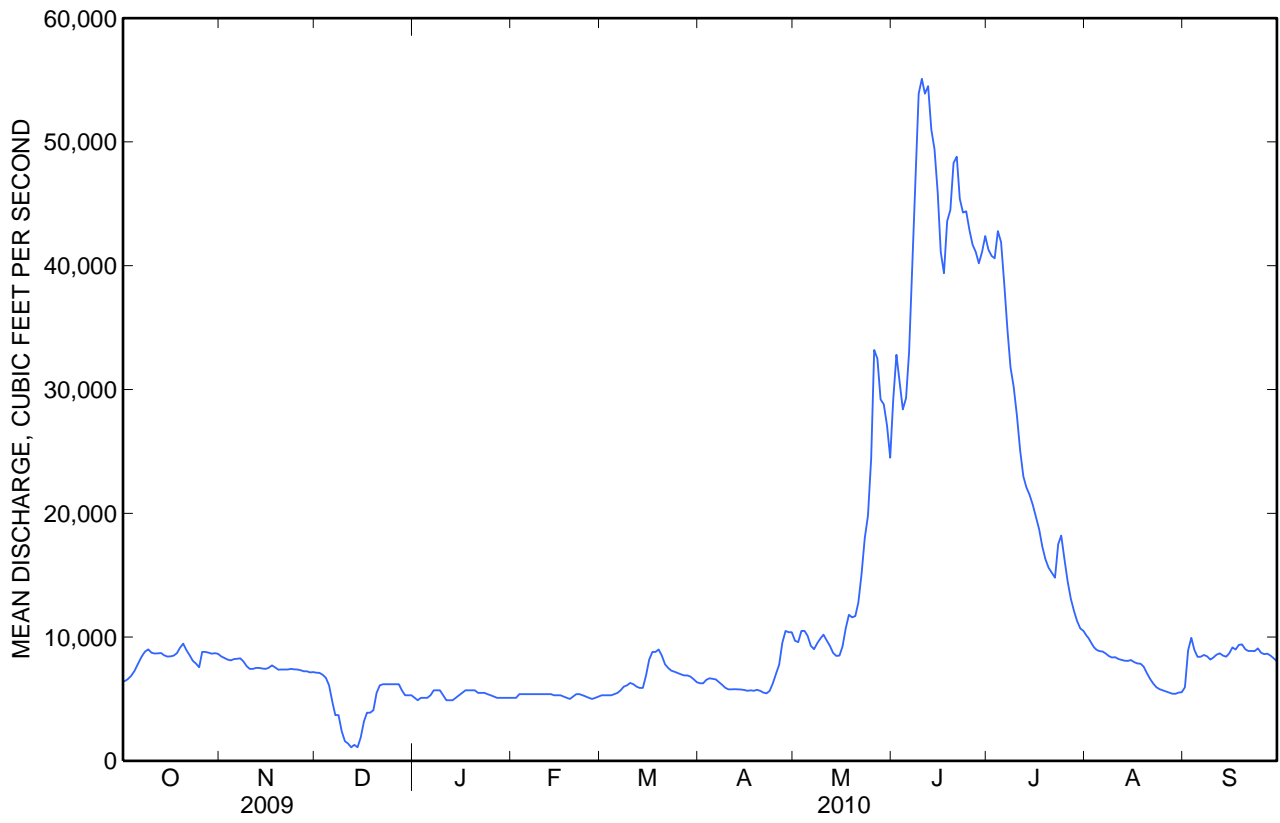
<sup>a</sup> Gage height, 12.60 ft, site and datum then in use.

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

<sup>c</sup> Gage height, 2.73 ft, site and datum then in use.

<sup>d</sup> Gage height, 20.02 ft.

06329500 YELLOWSTONE RIVER NEAR SIDNEY, MT—Continued



**06329500 YELLOWSTONE RIVER NEAR SIDNEY, MT—Continued**

**WATER-QUALITY RECORDS**

PERIOD OF RECORD.--Water years 1948 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: October 1964 to September 1981.

WATER TEMPERATURE: January 1951 to September 1985.

SUSPENDED-SEDIMENT DISCHARGE: October 1971 to September 1981, October 1982 to September 1991, seasonal records (March to November) from October 1991 to current year.

REMARKS.--Daily sediment records are rated good except for several periods of storm runoff, which are rated fair to poor. Daily sediment data collected seasonally (October 2009 to November 2009 and March 2010 to September 2010) during open water. Suspended and bed sediment samples plus the seasonal daily sediment record were obtained as part of the Corps of Engineers program.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum daily, 1,220 microsiemens per centimeter ( $\mu\text{S}/\text{cm}$ ) at 25.0°C, Apr. 6, 1979; minimum daily, 261  $\mu\text{S}/\text{cm}$  at 25.0°C, June 4, 1966.

WATER TEMPERATURE: Maximum, 29.0°C July 23, 1960; minimum, 0.0°C on many days during winter.

SEDIMENT CONCENTRATION: Maximum daily mean, 26,800 mg/L May 8, 1975; minimum daily mean, 8 mg/L Jan. 9, 1973.

SEDIMENT LOAD: Maximum daily, 3,030,000 tons May 8, 1975; minimum daily, 63 tons Jan. 2, 1989.

EXTREMES FOR CURRENT YEAR.--

SEDIMENT CONCENTRATION: During period of seasonal operation, maximum daily mean, 7,900 mg/L, May 26; minimum daily mean, 32 mg/L, Oct. 1.

SEDIMENT LOAD: During period of seasonal operation, maximum daily, 708,000 tons, May 26; minimum daily, 537 tons, Aug. 30.

## 06329500 YELLOWSTONE RIVER NEAR SIDNEY, MT—Continued

**SUSPENDED-SEDIMENT**  
**SEASON OCTOBER TO NOVEMBER 2009 AND MARCH TO SEPTEMBER 2010**

Day	Mean	Sediment	Mean	Sediment	Mean	Sediment	Mean	Sediment	Mean	Sediment	Mean	Sediment
	concentration (mg/L)	discharge (tons/day)	concentration (mg/L)	discharge (tons/day)	concentration (mg/L)	discharge (tons/day)	concentration (mg/L)	discharge (tons/day)	concentration (mg/L)	discharge (tons/day)	concentration (mg/L)	discharge (tons/day)
	October		November		December		January		February		March	
1	32	552	96	2,190								
2	33	581	95	2,130								
3	33	600	88	1,940								
4	35	662	79	1,730								
5	100	2,010	72	1,600								
6	620	13,400	68	1,510								
7	1,140	26,000	65	1,450								
8	1,190	28,400	59	1,280								
9	1,060	25,800	54	1,120								
10	800	18,900	49	984								
11	531	12,400	46	924								
12	321	7,530	44	892								
13	180	4,240	43	872								
14	172	3,970	42	846								
15	186	4,230	44	883								
16	199	4,530	48	975								
17	185	4,250	52	1,080								
18	172	4,040	52	1,060								
19	188	4,650	51	1,010								
20	213	5,450	50	996								
21	212	5,130	49	978								
22	184	4,250	48	956								
23	148	3,230	49	983							799	15,700
24	144	3,060	53	1,060							869	16,900
25	145	2,960	55	1,100							801	15,400
26	164	3,900	56	1,110							585	11,100
27	121	2,870	56	1,090							680	12,700
28	101	2,380	57	1,110							660	12,300
29	100	2,340	58	1,120							294	5,410
30	100	2,350	59	1,140							207	3,690
31	98	2,290	---	---							171	2,940
<b>Total</b>	---	206,955	---	36,119							---	---

## 06329500 YELLOWSTONE RIVER NEAR SIDNEY, MT—Continued

**SUSPENDED-SEDIMENT**  
**SEASON OCTOBER TO NOVEMBER 2009 AND MARCH TO SEPTEMBER 2010**

Day	Mean concentration (mg/L)	Sediment discharge (tons/day)	Mean concentration (mg/L)	Sediment discharge (tons/day)	Mean concentration (mg/L)	Sediment discharge (tons/day)	Mean concentration (mg/L)	Sediment discharge (tons/day)	Mean concentration (mg/L)	Sediment discharge (tons/day)	Mean concentration (mg/L)	Sediment discharge (tons/day)
	April		May		June		July		August		September	
1	154	2,610	825	21,600	2,020	159,000	735	82,000	136	3,710	54	868
2	133	2,250	838	21,700	1,970	174,000	850	93,600	124	3,260	1,050	25,300
3	141	2,490	1,260	35,700	1,370	113,000	690	75,600	115	2,880	1,240	33,300
4	222	4,000	1,740	49,300	1,020	78,200	820	94,800	100	2,440	970	23,500
5	338	6,060	1,550	42,300	950	75,200	860	97,300	93	2,230	720	16,300
6	310	5,510	1,110	27,900	1,300	116,000	820	85,200	89	2,130	460	10,500
7	232	3,990	700	17,000	2,030	219,000	820	77,000	85	1,990	235	5,430
8	225	3,740	700	18,000	1,880	239,000	825	70,800	80	1,830	227	5,170
9	195	3,110	803	21,400	1,750	255,000	835	68,100	73	1,650	230	5,090
10	145	2,260	903	24,900	1,220	181,000	890	67,000	65	1,470	268	6,050
11	108	1,690	810	21,300	780	114,000	980	66,400	60	1,330	320	7,420
12	96	1,500	512	12,900	1,030	152,000	1,100	68,300	62	1,370	363	8,520
13	82	1,280	320	7,540	805	111,000	1,180	70,400	68	1,490	347	7,970
14	84	1,310	205	4,690	960	128,000	1,060	61,500	75	1,640	275	6,250
15	89	1,380	165	3,790	730	90,500	379	21,200	83	1,820	240	5,630
16	84	1,280	210	5,240	860	95,400	332	17,700	92	1,980	248	6,140
17	82	1,260	245	7,080	1,180	126,000	400	20,200	94	2,000	261	6,340
18	88	1,340	440	14,000	3,900	459,000	455	21,300	83	1,760	850	21,500
19	80	1,240	760	23,800	1,400	168,000	488	21,500	68	1,400	1,090	27,700
20	63	964	1,120	35,400	1,130	147,000	488	20,600	57	1,090	600	14,600
21	66	984	1,460	50,500	1,240	163,000	464	19,000	48	859	300	7,200
22	55	811	1,680	68,500	1,620	199,000	470	18,800	42	709	251	6,020
23	53	810	1,680	81,600	1,420	170,000	3,350	158,000	43	691	300	7,180
24	66	1,120	1,800	96,200	1,100	132,000	3,200	157,000	49	766	390	9,570
25	107	2,030	4,200	277,000	865	100,000	1,900	83,600	53	816	330	7,790
26	217	4,550	7,900	708,000	900	101,000	950	37,200	53	803	219	5,100
27	387	9,990	5,700	500,000	1,080	120,000	607	21,500	48	715	131	3,060
28	388	11,000	4,070	321,000	900	97,700	480	15,700	41	601	96	2,210
29	394	11,100	4,590	357,000	820	91,000	350	10,700	37	541	95	2,130
30	670	18,800	3,710	271,000	800	91,600	230	6,640	36	537	95	2,060
31	---	---	2,320	153,000	---	---	158	4,480	40	599	---	---
<b>Total</b>	---	110,459	---	3,299,340	---	4,465,600	---	1,733,120	---	47,107	---	295,898