06307830 TONGUE RIVER BELOW BRANDENBERG BRIDGE, NEAR ASHLAND MT

Tongue Basin
Lower Tongue Subbasin

LOCATION.--Lat 45°50′23″, long 106°13′09″ referenced to North American Datum of 1927, in SE ¼ SW ¼ NE ¼ sec.14, T.1 N., R.44 E., Rosebud County, MT, Hydrologic Unit 10090102, on right bank downstream from county bridge, 22 mi north of Ashland, and at river mile 81.3.

DRAINAGE AREA.--3,948 mi^2. Area at site used prior to July 2000, 4,062 mi^2.

SURFACE-WATER RECORDS

PERIOD OF RECORD.--October 1973 to September 1984, July 2000 to September 2007, discontinued.

GAGE.--Water stage recorder. Elevation of gage is 2,760 ft, referenced to the National Geodetic Vertical Datum of 1929, from topographic map. October 1973 to September 1984, water-stage recorder at site 6.5 mi downstream at different elevation.

REMARKS.--Records are good except those for estimated daily discharges, which are poor. Flow is regulated by Tongue River Reservoir (station number 06307000) and many small reservoirs in Wyoming with a combined capacity of about 15,000 acre-ft. Diversions for irrigation for about 73,000 acres occur above station. U.S. Geological Survey satellite telemeter is located at the station.

06307830 TONGUE RIVER BELOW BRANDENBERG BRIDGE, NEAR ASHLAND MT—Continued

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2006 TO SEPTEMBER 2007
DAILY MEAN VALUES
[e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	58	e100	e120	e90	e80	e80	376	548	1,760	860	363	347
2	61	e90	e90	e100	e80	e80	446	549	1,710	762	364	352
3	63	119	e90	e100	e80	e70	501	567	1,880	704	360	346
4	65	134	e100	e100	e90	e80	499	644	2,040	602	357	341
5	65	134	e100	e100	e110	e80	504	676	1,980	558	360	338
6	70	132	e90	e100	e100	e200	505	943	2,010	529	366	346
7	74	136	e90	e100	e100	e200	503	955	2,820	485	365	350
8	74	139	e100	e100	e100	e200	503	1,080	2,710	459	372	354
9	75	139	e110	e100	e100	e200	522	1,190	2,570	428	361	351
10	82	140	e100	e100	e100	e200	541	1,180	3,080	402	365	365
11	90	142	e100	e100	e100	195	543	1,180	3,460	395	367	366
12	92	142	e110	e90	e100	193	542	1,200	3,240	376	368	341
13	91	139	e120	e90	e100	193	543	1,520	3,010	360	362	316
14	94	138	e110	e90	e90	173	543	1,630	2,910	336	363	308
15	106	138	e120	e90	e90	170	542	2,050	2,820	314	366	308
16	111	138	e110	e90	e90	181	545	2,450	2,660	301	358	308
17	116	138	e100	e90	e100	204	544	2,560	2,540	283	357	308
18	117	138	e90	e90	e100	213	544	2,350	2,470	298	358	320
19	118	138	e100	e90	e100	238	564	2,200	2,390	312	362	316
20	121	139	e100	e100	e100	250	567	2,180	2,300	323	342	296
21	121	139	e100	e100	e100	273	551	2,230	2,070	333	332	289
22	120	144	e100	e100	e100	277	552	2,340	1,760	343	336	268
23	121	146	e100	e110	e100	279	554	2,390	1,540	346	343	260
24	123	146	e100	e100	e100	282	555	2,360	1,470	342	349	253
25	121	e140	e100	e100	e90	282	553	2,200	1,310	353	342	233
26	124	e130	e100	e100	e80	281	552	1,970	1,280	369	359	225
27	125	e120	e110	e90	e80	281	552	1,820	1,210	361	351	218
28	126	e110	e100	e90	e80	304	552	1,730	1,020	353	342	215
29	124	e100	e90	e90	---	335	551	1,700	964	363	334	213
30	122	e110	e90	e80	---	354	549	1,680	919	369	334	218
31	e90	---	e80	e90	---	363	---	1,710	---	368	333	---
Total	3,060	3,938	3,120	2,960	2,640	6,711	15,898	49,782	63,903	12,987	10,991	9,069
Mean	98.7	131	101	95.5	94.3	216	530	1,606	2,130	419	355	302
Max	126	146	120	110	110	363	567	2,560	3,460	860	372	366
Min	58	90	80	80	80	70	376	548	919	283	332	213
Ac-ft	6,070	7,810	6,190	5,870	5,240	13,310	31,530	98,740	126,800	25,760	21,800	17,990

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1974 - 2007, BY WATER YEAR (WY)*

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	239	194	176	191	198	263	291	780	1,305	594	387	281
Max	511	388	389	334	406	705	594	2,502	3,452	2,261	915	436
(WY)	(1974)	(1974)	(1979)	(1975)	(1983)	(1975)	(1975)	(1978)	(1978)	(1975)	(1975)	(1979)
Min	98.7	84.3	95.5	75.8	90.4	81.3	94.9	111	184	183	125	72.1
(WY)	(2007)	(1976)	(2002)	(2005)	(2002)	(2002)	(2005)	(2002)	(2006)	(2002)	(2001)	(2006)

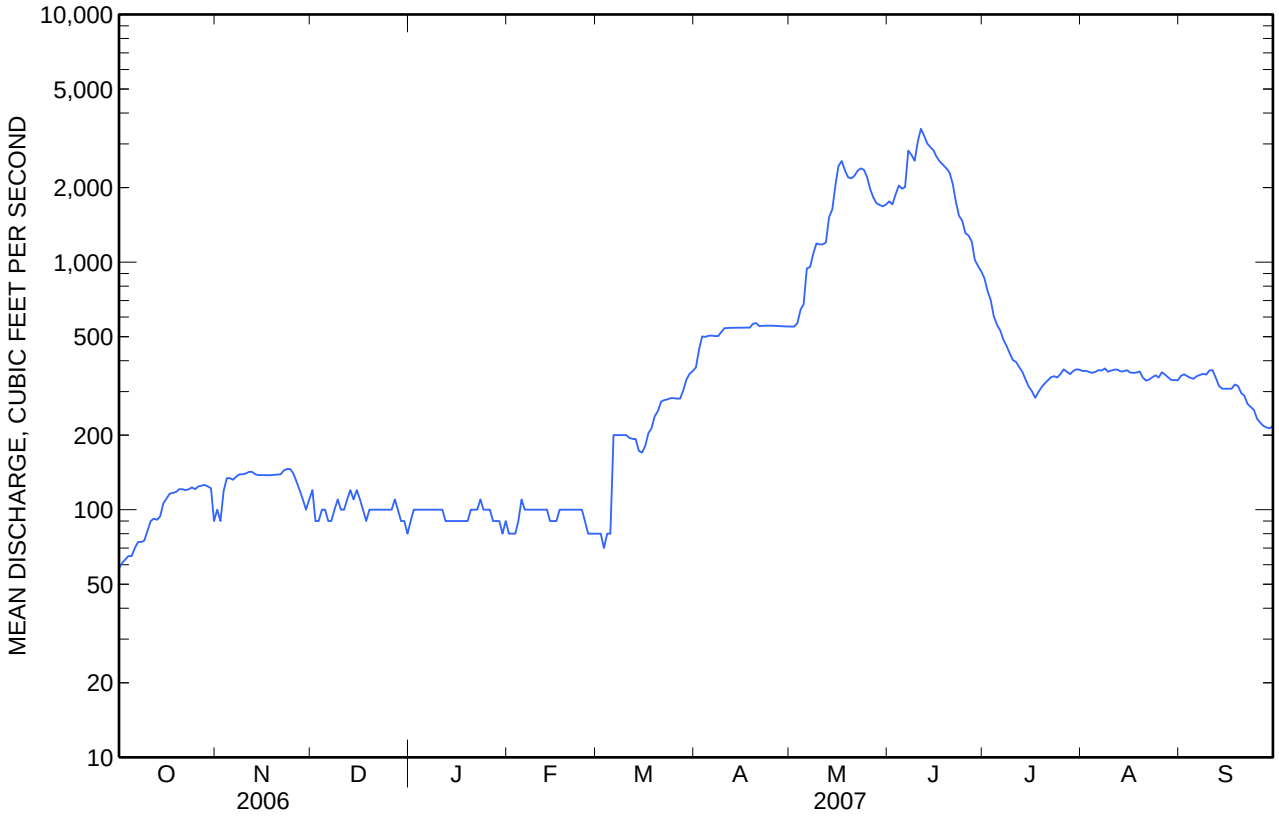
* During periods of operation (October 1973 to September 1984, July 2000 to September 2007).

06307830 TONGUE RIVER BELOW BRANDENBERG BRIDGE, NEAR ASHLAND MT—Continued

SUMMARY STATISTICS

	Calendar Year 2006		Water Year 2007		Water Years 1974 - 2007*	
Annual total	50,728		185,059			
Annual mean	139		507		410	
Highest annual mean					885	1975
Lowest annual mean					120	2002
Highest daily mean	333	Jun 8	3,460	Jun 11	7,600	May 22, 1978
Lowest daily mean	58	Sep 30	58	Oct 1	40	Jan 14, 2005
Annual seven-day minimum	60	Sep 27	65	Oct 1	53	Nov 25, 1975
Maximum peak flow			3,510	Jun 11	[a]8,280	May 22, 1978
Maximum peak stage			10.97	Jun 11	[b]11.49	Mar 15, 2003
Annual runoff (ac-ft)	100,600		367,100		296,900	
10 percent exceeds	215		1,710		858	
50 percent exceeds	125		279		243	
90 percent exceeds	79		90		100	

* During periods of operation (October 1973 to September 1984, July 2000 to September 2007).
[a] Gage height, 9.96 ft, site and datum then in use.
[b] Backwater from ice.



WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1974-81, June 2000 to October 2007, discontinued.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: August 2000 to October 2007, (seasonal operation dependent on ice conditions).
SUSPENDED-SEDIMENT DISCHARGE: October 1974 to September 1981.

INSTRUMENTATION.--Specific conductance probe installed Aug. 23, 2000.

REMARKS. --Seasonal specific conductance collected this year for the period March to October 2007. Data are included for October 2007 (water yar 2008) to provide information for the complete irrigation season. Specific conductance records are rated good to excellent, except those for Apr. 27 to May 7, which are rated poor due to fouling of the sensor. Missing specific conductance data for May 11 and July 2-11 are due to equipment problems. The Aug. 27 water-quality sample was collected in conjunction with aquatic ecology samples for an interagency task group studying the effects of coal-bed natural gas development. Additional information is available at http://wy.water.usgs.gov/projects/atg/index.htm. Several unpublished observations of specific conductance and water temperature were made during the year.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: Maximum, 1,140 microsiemens per centimeter (µS/cm), Jan. 2, 3, 2002; minimum, 158 µS/cm, June 8, 2006.
SEDIMENT CONCENTRATION: Maximum daily mean, 6,400 mg/L July 26, 1979; minimum daily mean, 1 mg/L Oct. 18, 24, 1976.
SEDIMENT LOAD: Maximum daily, 27,200 tons May 19, 1978; minimum daily, 0.47 ton Nov. 15-17, 1975.

EXTREMES FOR CURRENT YEAR.--
SPECIFIC CONDUCTANCE: During period of seasonal operation, maximum, 1,130 microsiemens per centimeter (µS/cm), May 8 and 9; minimum, 337 µS/cm, June 6.

06307830 TONGUE RIVER BELOW BRANDENBERG BRIDGE, NEAR ASHLAND MT—Continued

WATER-QUALITY DATA
WATER YEAR OCTOBER 2006 TO SEPTEMBER 2007
Part 1 of 6
[Remark codes: E, estimated.]

Date	Time	Instantaneous discharge, cfs (00061)	Barometric pressure, mm Hg (00025)	Dissolved oxygen, mg/L (00300)	Dissolved oxygen, percent of saturation (00301)	pH, water, unfltrd field, std units (00400)	Specific conductance, wat unf µS/cm 25 degC (00095)	Temperature, air, deg C (00020)	Temperature, water, deg C (00010)	Hardness, water, mg/L as CaCO3 (00900)	Calcium water, fltrd, mg/L (00915)	Magnesium, water, fltrd, mg/L (00925)	Potassium, water, fltrd, mg/L (00935)
Oct													
03...	1330	62	696	7.4	76	8.5	823	9.0	12.5	310	51.9	44.1	5.41
Nov													
15...	1345	142	689	16.5	132	8.3	730	10.0	2.0	290	55.5	36.5	3.94
Dec													
06...	1315	E90	698	12.9	97	8.1	860	0.5	0.0	330	62.0	43.3	4.67
Feb													
23...	1230	E100	678	11.8	91	8.1	692	5.0	0.0	250	46.8	32.5	7.31
Mar													
06...	1700	E200	693	14.5	109	8.5	751	17.0	0.0	270	50.6	34.8	3.65
28...	1030	293	689	9.1	90	8.5	770	0.5	10.5	310	59.4	38.8	4.14
Apr													
10...	1230	541	681	10.7	101	8.5	731	9.0	8.0	290	57.0	36.2	4.37
24...	1445	555	692	9.9	106	8.5	707	18.0	14.0	280	55.7	34.3	4.63
May													
07...	1300	920	690	10.2	101	8.3	733	22.0	10.5	280	53.4	34.6	5.53
22...	1600	2,360	686	8.9	98	8.3	491	10.0	15.0	210	41.8	24.8	3.52
Jun													
04...	1700	2,050	689	9.2	112	8.3	380	27.0	20.0	160	34.6	17.6	2.40
26...	0830	1,280	697	7.5	91	8.3	432	15.0	20.0	180	38.5	21.2	3.06
Jul													
11...	1500	401	693	7.7	101	8.5	580	28.0	24.5	230	49.6	26.8	3.56
19...	1645	311	685	7.8	114	8.5	596	35.5	29.0	220	45.9	26.3	3.56
Aug													
07...	1430	363	681	8.3	114	8.2	501	30.0	25.5	190	42.1	21.8	2.94
27...	0905	357	--	8.0	--	8.5	528	--	20.0	--	--	--	--
Sep													
18...	1130	317	691	8.7	100	8.4	612	16.5	17.0	240	49.6	28.9	3.46

06307830 TONGUE RIVER BELOW BRANDENBERG BRIDGE, NEAR ASHLAND MT—Continued

WATER-QUALITY DATA
WATER YEAR OCTOBER 2006 TO SEPTEMBER 2007
Part 2 of 6
[Remark codes: E, estimated.]

Date	Sodium adsorption ratio (00931)	Sodium, water, fltrd, mg/L (00930)	Alkalinity, wat flt fxd end lab, mg/L as CaCO3 (29801)	Chloride, water, fltrd, mg/L (00940)	Fluoride, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L (00955)	Sulfate water, fltrd, mg/L (00945)	Dissolved solids, sum of constituents mg/L (70301)	Dissolved solids, tons/acre-ft (70303)	Dissolved solids, tons/d (70302)	Suspnd. sediment, sieve diametr percent <.063mm (70331)	Suspended sediment concentration mg/L (80154)	Suspended sediment discharge, tons/d (80155)
Oct													
03...	1.7	70.0	240	5.44	.39	5.66	210	537	.73	89.9	77	27	4.5
Nov													
15...	1.4	53.1	234	4.68	.35	3.92	167	465	.63	178	84	29	11
Dec													
06...	1.5	61.2	272	5.47	.45	4.69	200	545	.74	E132	57	41	E10
Feb													
23...	1.5	54.0	200	4.98	.32	6.61	162	437	.59	E118	96	29	E7.8
Mar													
06...	1.4	53.0	224	5.02	.34	2.88	179	464	.63	E250	75	160	E86
28...	1.4	55.2	247	5.35	.37	1.41	176	488	.66	386	78	96	76
Apr													
10...	1.4	53.2	232	5.34	.34	3.33	165	464	.63	678	73	106	155
24...	1.2	46.9	222	5.41	.34	3.12	157	441	.60	661	--	--	--
May													
07...	1.5	57.9	191	4.73	.28	4.04	194	469	.64	1,160	--	--	--
22...	.8	25.8	152	2.96	.20	7.15	106	304	.41	1,930	75	211	1,340
Jun													
04...	.6	17.3	126	2.11	.17	5.01	67.1	222	.30	1,230	--	--	--
26...	.8	23.6	141	2.31	.24	7.26	83.6	264	.36	912	--	--	--
Jul													
11...	1.1	37.7	171	3.43	.25	7.25	131	362	.49	392	--	--	--
19...	1.1	37.8	175	3.38	.26	7.15	132	361	.49	303	--	--	--
Aug													
07...	.8	25.7	165	2.53	.24	5.70	95.6	296	.40	290	93	19	19
27...	--	--	--	--	--	--	--	--	--	--	--	--	--
Sep													
18...	1.1	38.2	193	3.70	.28	1.97	135	377	.51	322	--	--	--

06307830 TONGUE RIVER BELOW BRANDENBERG BRIDGE, NEAR ASHLAND MT—Continued

WATER-QUALITY DATA
WATER YEAR OCTOBER 2006 TO SEPTEMBER 2007
Part 3 of 6
[Remark codes: <, less than; E, estimated.]

Date	Time	Ammonia water, fltrd, mg/L as N (00608)	Nitrite + nitrate water fltrd, mg/L as N (00631)	Nitrite water, fltrd, mg/L as N (00613)	Total nitro-gen, water unfltrd, mg/L (62855)	Ortho-phos-phate, water, fltrd, mg/L as P (00671)	Total phos-phorus, water, unfltrd mg/L (00665)	Alum-inum, water, fltrd, µg/L (01106)	Alum-inum, water, unfltrd recover-able, µg/L (01105)	Arsenic water, fltrd, µg/L (01000)	Arsenic water, unfltrd µg/L (01002)	Barium, water, fltrd, µg/L (01005)	Barium, water, unfltrd recover-able, µg/L (01007)
Oct													
03...	1330	E.011	E.008	<.002	.22	<.006	E.008	2.6	44	.70	.90	53	56.0
Dec													
06...	1315	<.020	<.016	<.002	.35	<.006	.014	--	--	--	--	--	--
Feb													
23...	1230	<.020	.270	.013	1.10	E.004	.072	2.0	450	.69	1.1	48	54.2
Apr													
10...	1230	<.020	<.016	<.002	.62	<.006	.083	2.0	482	.90	1.5	57	72.9
May													
22...	1600	.028	.106	.003	.68	.007	.159	5.3	1,550	.87	2.4	46	81.1
Aug													
07...	1430	<.020	<.016	E.001	.33	E.005	.026	4.3	190	1.3	1.3	50	54.5

WATER-QUALITY DATA
WATER YEAR OCTOBER 2006 TO SEPTEMBER 2007
Part 4 of 6
[Remark codes: <, less than; E, estimated.]

Date	Beryll-ium, water, fltrd, µg/L (01010)	Beryll-ium, water, unfltrd recover-able, µg/L (01012)	Boron, water, fltrd, µg/L (01020)	Cadmium water, fltrd, µg/L (01025)	Cadmium water, unfltrd µg/L (01027)	Chrom-ium, water, fltrd, µg/L (01030)	Chrom-ium, water, unfltrd recover-able, µg/L (01034)	Copper, water, fltrd, µg/L (01040)	Copper, water, unfltrd recover-able, µg/L (01042)	Iron, water, fltrd, µg/L (01046)	Iron, water, unfltrd recover-able, µg/L (01045)	Lead, water, fltrd, µg/L (01049)	Lead, water, unfltrd recover-able, µg/L (01051)
Oct													
03...	<.06	<.06	117	<.04	<.02	--	.80	.61	1.5	17	120	.16	.19
Dec													
06...	--	--	--	--	--	--	--	--	--	--	--	--	--
Feb													
23...	<.06	E.04	70	<.04	.03	--	1	1.8	3.7	64	702	<.12	.67
Apr													
10...	<.06	E.05	--	--	--	--	--	--	--	11	940	--	--
May													
22...	<.06	.15	--	<.04	.06	.14	2.2	1.8	4.6	21	3,180	.20	2.65
Aug													
07...	<.06	<.06	--	--	--	--	--	--	--	E4	367	--	--

06307830 TONGUE RIVER BELOW BRANDENBERG BRIDGE, NEAR ASHLAND MT—Continued

WATER-QUALITY DATA
WATER YEAR OCTOBER 2006 TO SEPTEMBER 2007
Part 5 of 6
[Remark codes: E, estimated.]

Date	Lithium water, fltrd, µg/L (01130)	Manganese, water, fltrd, µg/L (01056)	Manganese, water, unfltrd recoverable, µg/L (01055)	Mercury water, unfltrd ng/L (50286)	Nickel, water, fltrd, µg/L (01065)	Nickel, water, unfltrd recoverable, µg/L (01067)	Selenium, water, fltrd, µg/L (01145)	Selenium, water, unfltrd µg/L (01147)	Strontium, water, fltrd, µg/L (01080)	Zinc, water, fltrd, µg/L (01090)	Zinc, water, unfltrd recoverable, µg/L (01092)
Oct											
03...	26.9	7.5	12.3	--	.89	1.60	.16	.22	618	E.39	E1
Dec											
06...	--	--	--	--	--	--	--	--	--	--	--
Feb											
23...	21.6	20.5	42.6	--	1.2	2.17	.29	.28	515	1.9	6
Apr											
10...	--	4.6	96.7	--	--	--	.38	.35	--	--	--
May											
22...	--	3.1	134	--	1.4	4.3	.61	.47	--	9.4	9.1
Aug											
07...	--	3.5	31.4	1.24	--	--	.29	.29	--	--	--

WATER-QUALITY DATA
WATER YEAR OCTOBER 2006 TO SEPTEMBER 2007
Part 6 of 6

Date	Time	Turbdty white light, det ang 90+/-30 corrctd NTRU (63676)	Biomass periphyton, ashfree drymass g/m2 (49954)	Periphyton biomass ash weight, g/m2 (00572)	Periphyton biomass dry weight, g/m2 (00573)	Biomass chlorophyll ratio, periphyton, number (70950)	Chlorophyll a periphyton, chromofluoro, mg/m2 (70957)	Pheophytin a, periphyton, mg/m2 (62359)
Aug								
27...	0905	11	6.2	270	280.2	1,100	5.5	1.7

06307830 TONGUE RIVER BELOW BRANDENBERG BRIDGE, NEAR ASHLAND MT—Continued

SPECIFIC CONDUCTANCE, WATER, UNFILTERED, MICROSIEMENS PER CENTIMETER AT 25 DEGREES CELSIUS
MARCH 2007 TO OCTOBER 2007

Day	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean
		March			April			May			June	
1				728	680	707	708	668	683	388	370	378
2				727	709	720	718	704	710	390	374	382
3				722	710	716	723	706	714	379	372	376
4				716	702	709	722	712	717	379	372	375
5				719	698	708	718	694	707	376	369	373
6				726	713	723	715	690	696	369	337	362
7				722	713	718	796	715	739	424	340	378
8				728	717	723	1,130	757	826	476	416	436
9				724	705	719	1,130	734	836	586	424	462
10				728	703	714	---	---	---	568	414	443
11				714	709	712	---	---	#758	416	404	409
12				715	703	707	763	706	737	405	400	402
13				717	707	712	712	670	690	409	402	407
14				714	706	711	705	689	701	406	401	404
15				718	705	710	689	655	669	415	401	408
16				788	705	743	657	626	641	420	415	418
17				806	772	782	648	637	645	418	409	414
18				807	752	772	637	603	622	410	401	405
19				752	725	737	615	596	607	401	397	399
20				729	720	723	603	530	568	401	398	400
21				729	720	724	554	517	539	424	401	408
22				720	711	715	517	492	503	434	420	429
23				727	719	721	492	463	475	447	428	438
24				719	694	708	467	420	444	444	426	432
25				699	687	694	468	446	457	449	427	439
26				699	676	691	469	450	459	441	420	429
27				694	580	657	464	434	450	430	420	424
28	---	---	#747	594	573	583	440	433	435	466	430	453
29	752	735	745	619	588	602	434	399	414	468	460	463
30	738	722	730	668	619	641	399	375	384	463	451	460
31	733	674	700	---	---	---	375	364	369	---	---	---
Month	---	---	---	807	573	707	*1,130	*364	*606	586	337	414

Value computed from partial day with greater than 50 percent of day recorded.

* Monthly mean computed from available daily means. A specific conductance greater than or less than the reported maximum or minimum may have occurred during the period of missing record.

06307830 TONGUE RIVER BELOW BRANDENBERG BRIDGE, NEAR ASHLAND MT—Continued

SPECIFIC CONDUCTANCE, WATER, UNFILTERED, MICROSIEMENS PER CENTIMETER AT 25 DEGREES CELSIUS
MARCH 2007 TO OCTOBER 2007

Day	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean
		July			August			September			October	
1	467	450	458	502	492	497	588	567	579	703	696	699
2	---	---	---	503	490	496	583	564	574	697	692	695
3	---	---	---	504	492	498	579	563	572	700	694	697
4	---	---	---	504	495	499	588	569	577	703	697	700
5	---	---	---	501	494	497	599	579	586	707	701	703
6	---	---	---	497	490	493	596	580	586	701	697	699
7	---	---	---	500	487	493	586	575	581	705	697	701
8	---	---	---	498	487	494	587	570	579	702	695	697
9	---	---	---	501	489	496	594	579	587	702	693	698
10	---	---	---	505	495	499	587	570	575	705	696	700
11	---	---	---	508	497	502	581	562	572	711	696	704
12	582	572	575	513	500	506	590	569	578	715	706	710
13	574	569	571	517	506	512	599	586	591	707	688	697
14	586	573	578	521	511	516	600	590	595	705	690	698
15	603	585	596	520	506	513	599	582	591	709	696	701
16	617	602	613	521	506	514	598	587	592	715	703	711
17	635	617	626	532	515	524	616	598	610	718	711	714
18	628	603	619	543	524	531	633	603	616	722	711	715
19	603	576	591	546	529	537	627	604	614	723	714	720
20	576	551	562	551	537	543	627	613	622	719	693	713
21	551	528	539	557	547	551	640	625	633	722	695	711
22	528	514	520	553	544	548	659	631	647	718	686	711
23	514	504	508	559	539	552	675	659	669	721	715	717
24	506	499	502	557	532	542	669	658	663	728	691	718
25	500	488	495	556	548	552	685	663	670	727	696	712
26	490	473	484	554	538	547	698	685	690	732	698	725
27	492	473	484	549	536	542	709	689	703	738	709	723
28	499	483	492	552	541	547	722	706	713	736	711	725
29	495	488	492	558	543	550	722	705	718	733	706	727
30	501	492	496	558	545	551	713	703	709	734	729	730
31	504	492	497	575	556	565	---	---	---	---	---	---
Month	*635	*450	*538	575	487	523	722	562	620	738	686	710

* Monthly mean computed from available daily means. A specific conductance greater than or less than the reported maximum or minimum may have occurred during the period of missing record.