Water-Data Report 2010

05092000 RED RIVER OF THE NORTH AT DRAYTON, ND

Lower Red Basin
Lower Red Subbasin

LOCATION.--Lat 48°34′20″, long 97°08′50″ referenced to North American Datum of 1927, in SE ¼ SE ¼ SE ¼ sec.24, T.159 N., R.51 W., Pembina County, ND, Hydrologic Unit 09020311, on downstream side of bridge on North Dakota State Highway 66, at the North Dakota-Minnesota border, 1.5 mi northeast of Drayton, and at mile 206.7.

DRAINAGE AREA.--34,800 mi^2, approximately, includes 3,800 mi^2 in closed basins.

SURFACE-WATER RECORDS

PERIOD OF RECORD.--DAILY DISCHARGE--April 1936 to June 1937, April 1941 to current year (fragmentary prior to April 1949).

PERIOD OF RECORD.--DAILY GAGE HEIGHT--October 2000 to current year.

REVISED RECORDS.--WSP 1388: 1949-50. WSP 1728: Drainage area.

GAGE.--Water-stage recorder and concrete control. Datum of gage is 755.00 ft above National Geodetic Vertical Datum of 1929 (Minnesota highway benchmark). Prior to November 30, 1954, nonrecording gage at site 1.5 mi upstream at datum 1.59 ft higher.

REMARKS.--Records good except for estimated daily discharges, which are poor.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of April 1897 reached a stage of about 41 ft at site and datum in use prior to November 30, 1954.

05092000 RED RIVER OF THE NORTH AT DRAYTON, ND—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	1,790	5,320	4,590	e2,220	e2,110	e2,610	59,100	10,100	27,300	15,900	7,160	4,040
2	1,780	5,540	4,510	e2,200	e2,140	e2,670	57,000	9,940	26,300	14,500	7,380	4,020
3	1,840	6,400	4,420	e2,180	e2,200	e2,710	55,700	10,000	24,600	12,700	7,040	4,050
4	1,940	7,650	3,630	e2,160	e2,270	e2,730	53,600	10,200	22,500	11,000	6,520	4,020
5	2,260	8,810	3,080	e2,140	e2,340	e2,740	51,500	10,700	20,000	9,390	6,070	3,950
6	2,880	9,700	2,560	e2,120	e2,390	e2,750	49,400	11,100	17,400	7,920	5,740	3,860
7	3,250	10,400	e2,240	e2,120	e2,430	e2,770	47,100	11,500	14,800	6,970	5,510	3,830
8	3,500	10,900	e2,160	e2,090	e2,440	e2,780	45,000	12,100	13,200	6,780	5,320	3,980
9	3,820	11,000	e2,070	e2,050	e2,440	e2,820	43,500	12,600	11,700	6,920	5,080	4,250
10	3,950	10,800	e2,000	e2,020	e2,430	e2,880	41,200	13,100	10,300	6,870	4,810	5,300
11	3,920	10,300	e2,000	e1,990	e2,430	e2,970	38,500	13,600	9,150	6,600	4,640	6,710
12	3,890	9,310	e2,130	e1,990	e2,430	e3,260	36,700	14,000	8,360	6,280	4,540	7,990
13	3,930	7,940	e2,310	e2,030	e2,420	e3,820	35,200	14,200	8,010	5,890	4,380	9,950
14	3,970	6,820	e2,480	e2,060	e2,420	e5,410	33,600	14,200	8,190	5,570	4,300	12,100
15	3,950	5,990	e2,620	e2,080	e2,420	e9,760	32,000	14,100	8,630	5,330	4,420	13,700
16	3,870	5,460	e2,680	e2,090	e2,410	e15,400	30,100	13,900	8,900	5,170	5,030	14,300
17	3,680	5,150	e2,710	e2,090	e2,400	e21,000	28,100	13,900	9,010	5,420	6,280	14,100
18	3,420	4,980	e2,730	e2,080	e2,400	e25,400	26,300	13,900	9,900	6,130	e7,800	13,400
19	3,280	4,880	e2,730	e2,060	e2,380	e28,900	24,800	13,900	9,770	6,730	e8,500	12,300
20	3,310	4,800	e2,690	e2,040	e2,370	e31,700	22,900	13,700	10,100	6,860	e8,000	11,000
21	3,550	4,720	e2,600	e2,030	e2,370	e35,400	20,800	13,200	11,500	6,580	e7,200	9,650
22	3,930	4,590	e2,470	e2,030	e2,370	41,800	18,600	12,400	13,200	6,260	6,420	8,550
23	4,160	4,480	e2,370	e2,040	e2,370	52,500	17,100	11,500	13,600	6,010	5,830	7,760
24	4,240	4,400	e2,330	e2,060	e2,370	60,300	15,700	10,800	13,200	5,770	5,430	7,780
25	4,260	4,370	e2,320	e2,100	e2,380	63,200	14,500	13,700	12,800	5,690	5,090	8,690
26	4,370	4,400	e2,330	e2,150	e2,400	64,200	13,500	16,300	13,000	5,700	4,790	10,900
27	4,780	4,500	e2,330	e2,210	e2,460	64,700	12,700	18,500	14,100	6,000	4,560	14,700
28	5,360	4,630	e2,320	e2,230	e2,530	65,200	11,600	21,000	15,300	6,170	4,390	18,100
29	5,720	4,690	e2,300	e2,220	---	64,600	10,700	23,200	16,000	6,000	4,260	20,700
30	5,730	4,660	e2,270	e2,140	---	62,900	10,300	26,100	16,300	5,880	4,170	22,400
31	5,520	---	e2,240	e2,100	---	61,000	---	27,400	---	6,390	4,120	---
Total	115,850	197,590	82,220	65,120	66,520	810,880	956,800	444,840	417,120	225,380	174,780	286,080
Mean	3,737	6,586	2,652	2,101	2,376	26,160	31,890	14,350	13,900	7,270	5,638	9,536
Max	5,730	11,000	4,590	2,230	2,530	65,200	59,100	27,400	27,300	15,900	8,500	22,400
Min	1,780	4,370	2,000	1,990	2,110	2,610	10,300	9,940	8,010	5,170	4,120	3,830
Ac-ft	229,800	391,900	163,100	129,200	131,900	1,608,000	1,898,000	882,300	827,400	447,000	346,700	567,400

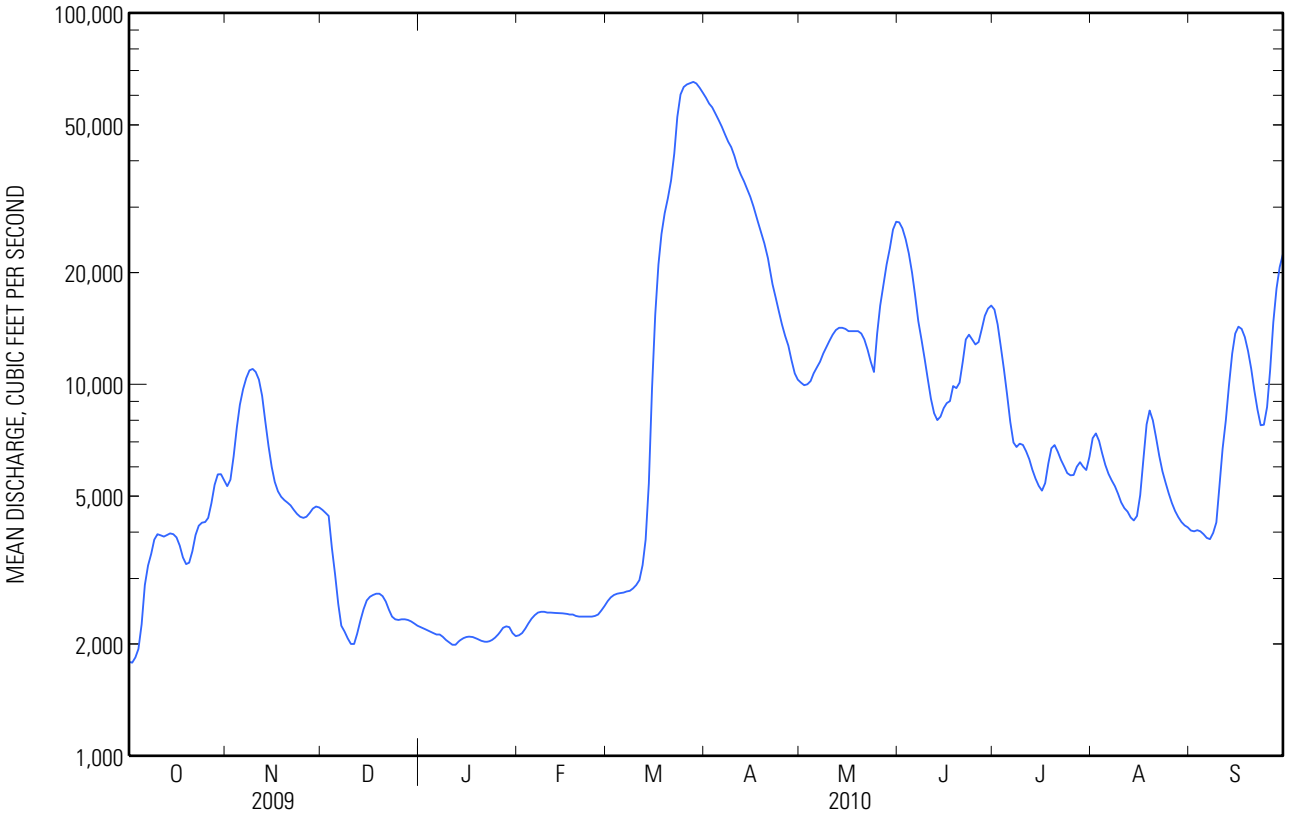
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1949 - 2010, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	2,149	2,233	1,520	1,252	1,213	3,904	16,860	9,895	6,913	5,798	2,742	2,331
Max	8,724	11,840	4,168	3,356	2,873	26,160	67,340	58,890	23,420	28,240	21,580	12,140
(WY)	(2009)	(2001)	(1999)	(2006)	(2006)	(2010)	(2009)	(1950)	(1962)	(1975)	(1993)	(1999)
Min	317	277	149	174	201	280	1,275	938	676	348	243	329
(WY)	(1991)	(1977)	(1977)	(1990)	(1977)	(1962)	(1981)	(1977)	(1977)	(1988)	(1977)	(1988)

05092000 RED RIVER OF THE NORTH AT DRAYTON, ND—Continued

SUMMARY STATISTICS

	Calendar Year 2009		Water Year 2010		Water Years 1949 - 2010	
Annual total	4,754,010		3,843,180			
Annual mean	13,020		10,530		4,757	
Highest annual mean					13,610	2009
Lowest annual mean					536	1977
Highest daily mean	85,500	Apr 5	65,200	Mar 28	124,000	Apr 24, 1997
Lowest daily mean	1,550	Jan 13	1,780	Oct 2	110	Dec 23, 1989
Annual seven-day minimum	1,590	Jan 12	2,030	Jan 9	118	Dec 28, 1989
Maximum peak flow			65,700	Mar 28	124,000	Apr 24, 1997
Maximum peak stage			42.18	Mar 28	45.55	Apr 24, 1997
Instantaneous low flow					7.7	Oct 16, 1936
Annual runoff (ac-ft)	9,430,000		7,623,000		3,447,000	
10 percent exceeds	40,700		25,000		11,300	
50 percent exceeds	3,970		5,690		2,030	
90 percent exceeds	1,870		2,170		530	

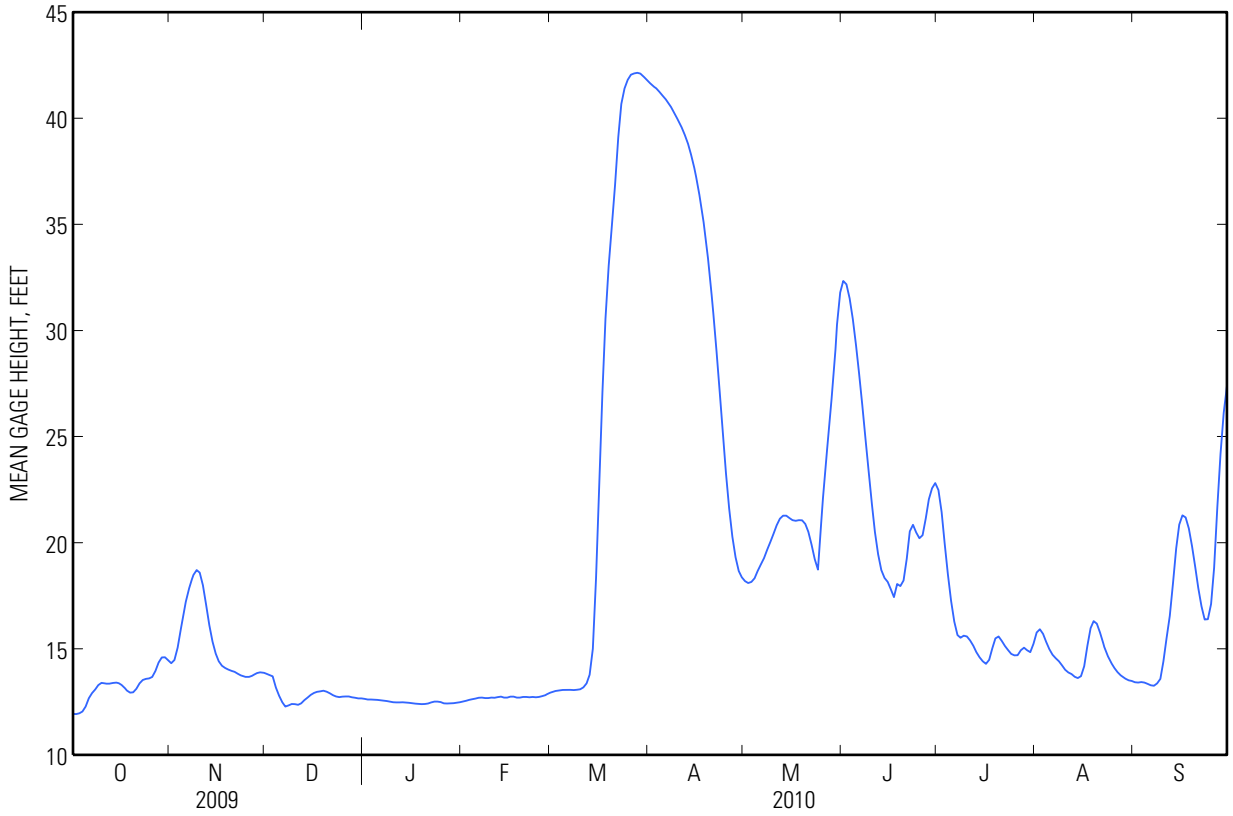


05092000 RED RIVER OF THE NORTH AT DRAYTON, ND—Continued

GAGE HEIGHT, FEET
WATER YEAR OCTOBER 2009 TO SEPTEMBER 2010
DAILY MEAN VALUES

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	11.93	14.32	13.82	12.64	12.50	12.96	41.66	18.19	32.33	22.48	15.77	13.42
2	11.92	14.47	13.76	12.61	12.56	13.00	41.51	18.10	32.17	21.44	15.92	13.41
3	11.96	15.05	13.70	12.60	12.59	13.03	41.41	18.15	31.51	19.96	15.70	13.43
4	12.04	15.92	13.17	12.61	12.62	13.05	41.24	18.32	30.53	18.51	15.33	13.41
5	12.28	16.76	12.79	12.59	12.65	13.06	41.06	18.66	29.29	17.26	14.98	13.35
6	12.67	17.46	12.48	12.57	12.69	13.07	40.88	18.97	27.97	16.28	14.72	13.28
7	12.91	18.03	12.28	12.55	12.70	13.05	40.67	19.27	26.49	15.65	14.55	13.26
8	13.08	18.48	12.33	12.55	12.68	13.05	40.44	19.67	24.90	15.52	14.41	13.37
9	13.29	18.71	12.40	12.50	12.68	13.07	40.16	20.04	23.35	15.62	14.22	13.58
10	13.39	18.59	12.39	12.48	12.70	13.09	39.87	20.41	21.83	15.58	14.01	14.40
11	13.37	17.99	12.36	12.47	12.69	13.18	39.57	20.82	20.50	15.39	13.88	15.51
12	13.34	17.07	12.43	12.47	12.72	13.37	39.21	21.13	19.45	15.14	13.81	16.55
13	13.38	16.11	12.58	12.48	12.74	13.78	38.79	21.27	18.71	14.84	13.68	18.09
14	13.40	15.34	12.70	12.48	12.70	15.00	38.28	21.27	18.34	14.60	13.62	19.73
15	13.39	14.77	12.83	12.44	12.70	18.32	37.66	21.16	18.15	14.41	13.71	20.85
16	13.33	14.41	12.92	12.43	12.74	22.71	36.89	21.06	17.81	14.29	14.18	21.29
17	13.20	14.20	12.97	12.41	12.74	27.09	36.01	21.03	17.43	14.48	15.14	21.19
18	13.03	14.09	12.99	12.41	12.70	30.55	35.00	21.06	18.05	15.03	15.97	20.67
19	12.93	14.02	13.02	12.39	12.70	33.04	33.82	21.05	17.95	15.49	16.30	19.83
20	12.95	13.96	12.98	12.40	12.73	34.94	32.42	20.88	18.22	15.58	16.18	18.85
21	13.11	13.91	12.90	12.42	12.73	36.87	30.81	20.51	19.24	15.37	15.76	17.86
22	13.37	13.82	12.81	12.47	12.71	39.11	29.02	19.91	20.53	15.13	15.26	17.00
23	13.53	13.74	12.75	12.51	12.73	40.67	27.10	19.22	20.84	14.93	14.80	16.38
24	13.58	13.69	12.72	12.51	12.71	41.40	25.14	18.73	20.48	14.76	14.49	16.39
25	13.60	13.67	12.74	12.49	12.73	41.81	23.28	20.91	20.21	14.69	14.23	17.11
26	13.67	13.69	12.75	12.43	12.77	42.05	21.61	22.83	20.35	14.70	13.99	18.81
27	13.95	13.76	12.75	12.41	12.81	42.11	20.28	24.47	21.15	14.93	13.82	21.66
28	14.35	13.85	12.71	12.43	12.88	42.14	19.31	26.36	22.04	15.05	13.69	24.18
29	14.59	13.89	12.69	12.44	---	42.10	18.66	27.99	22.56	14.93	13.59	26.12
30	14.60	13.87	12.66	12.46	---	41.96	18.37	30.27	22.81	14.84	13.51	27.37
31	14.46	---	12.66	12.47	---	41.81	---	31.79	---	15.23	13.48	---
Mean	13.25	15.25	12.81	12.49	12.70	25.95	33.67	21.40	22.51	15.87	14.60	17.68
Max	14.60	18.71	13.82	12.64	12.88	42.14	41.66	31.79	32.33	22.48	16.30	27.37
Min	11.92	13.67	12.28	12.39	12.50	12.96	18.37	18.10	17.43	14.29	13.48	13.26

05092000 RED RIVER OF THE NORTH AT DRAYTON, ND—Continued



05092000 RED RIVER OF THE NORTH AT DRAYTON, ND—Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water year 1972 to current year.

WATER-QUALITY DATA
WATER YEAR OCTOBER 2009 TO SEPTEMBER 2010

Part 1 of 5

[ANC, acid neutralizing capacity; CaCO3, calcium carbonate; N, nitrogen; SiO2, silicon dioxide; ft³/s, cubic feet per second; mg/L, milligrams per liter; °C, degrees Celsius; µS/cm, microsiemens per centimeter; µg/L, micrograms per liter; <, less than]

Date	Sample start time	Temperature, air, °C (00020)	Discharge, instantaneous, ft³/s (00061)	pH, water, unfiltered, field, standard units (00400)	pH, water, unfiltered, laboratory, standard units (00403)	Specific conductance, water, unfiltered, laboratory, µS/cm at 25 °C (90095)	Specific conductance, water, unfiltered, µS/cm at 25 °C (00095)	Temperature, water, °C (00010)	Dissolved solids, water, filtered, sum of constituents, milligrams per liter (70301)	Dissolved solids, water, tons per day (70302)
03-30-2010	**1230**	13.0	63,200	8.0	7.8	387	382	4.2	240	41,000
07-28-2010	**1510**	--	6,090	8.1	8.3	776	764	24.8	481	7,910

WATER-QUALITY DATA
WATER YEAR OCTOBER 2009 TO SEPTEMBER 2010

Part 2 of 5

[ANC, acid neutralizing capacity; CaCO3, calcium carbonate; N, nitrogen; SiO2, silicon dioxide; ft³/s, cubic feet per second; mg/L, milligrams per liter; °C, degrees Celsius; µS/cm, microsiemens per centimeter; µg/L, micrograms per liter; <, less than]

Date	Sample start time	Hardness, water, mg/L as CaCO3 (00900)	Calcium, water, filtered, mg/L (00915)	Magnesium, water, filtered, mg/L (00925)	Potassium, water, filtered, mg/L (00935)	Sodium adsorption ratio, water, number (00931)	Sodium fraction of cations, water, percent in equivalents of major cations (00932)	Sodium, water, filtered, mg/L (00930)	ANC, water, unfiltered, fixed endpoint (pH 4.5) titration, laboratory, mg/L as CaCO3 (90410)	Chloride, water, filtered, mg/L (00940)
03-30-2010	**1230**	165	39.4	16.2	6.95	.4	13	11.6	109	11.8
07-28-2010	**1510**	299	63.5	34.1	5.69	1.0	22	39.0	212	26.5

05092000 RED RIVER OF THE NORTH AT DRAYTON, ND—Continued

WATER-QUALITY DATA
WATER YEAR OCTOBER 2009 TO SEPTEMBER 2010

Part 3 of 5

[ANC, acid neutralizing capacity; CaCO3, calcium carbonate; N, nitrogen; SiO2, silicon dioxide; ft³/s, cubic feet per second; mg/L, milligrams per liter; °C, degrees Celsius; µS/cm, microsiemens per centimeter; µg/L, micrograms per liter; <, less than]

Date	Sample start time	Fluoride, water, filtered, mg/L (00950)	Silica, water, filtered, mg/L as SiO2 (00955)	Sulfate, water, filtered, mg/L (00945)	Nitrate plus nitrite, water, unfiltered, mg/L as N (00630)	Aluminum, water, filtered, µg/L (01106)	Barium, water, filtered, µg/L (01005)	Beryllium, water, filtered, µg/L (01010)	Cadmium, water, filtered, µg/L (01025)	Chromium, water, filtered, µg/L (01030)
03-30-2010	**1230**	.10	13.2	52.3	--	< 50	28	< 5.00	< 5.00	< 5.0
07-28-2010	**1510**	.16	16.0	158	.410	< 50	55	< 5.00	< 5.00	< 5.0

WATER-QUALITY DATA
WATER YEAR OCTOBER 2009 TO SEPTEMBER 2010

Part 4 of 5

[ANC, acid neutralizing capacity; CaCO3, calcium carbonate; N, nitrogen; SiO2, silicon dioxide; ft³/s, cubic feet per second; mg/L, milligrams per liter; °C, degrees Celsius; µS/cm, microsiemens per centimeter; µg/L, micrograms per liter; <, less than]

Date	Sample start time	Copper, water, filtered, µg/L (01040)	Iron, water, filtered, µg/L (01046)	Lead, water, filtered, µg/L (01049)	Manganese, water, filtered, µg/L (01056)	Nickel, water, filtered, µg/L (01065)	Silver, water, filtered, µg/L (01075)	Thallium, water, filtered, µg/L (01057)	Zinc, water, filtered, µg/L (01090)	Antimony, water, filtered, µg/L (01095)
03-30-2010	**1230**	< 5.0	< 50	< 5.00	< 10.0	< 5.0	< 5.0	< 5.00	5.9	< 5.00
07-28-2010	**1510**	< 5.0	< 50	< 5.00	< 10.0	< 5.0	< 5.0	< 5.00	< 5.0	< 5.00

WATER-QUALITY DATA
WATER YEAR OCTOBER 2009 TO SEPTEMBER 2010

Part 5 of 5

[ANC, acid neutralizing capacity; CaCO3, calcium carbonate; N, nitrogen; SiO2, silicon dioxide; ft³/s, cubic feet per second; mg/L, milligrams per liter; °C, degrees Celsius; µS/cm, microsiemens per centimeter; µg/L, micrograms per liter; <, less than]

Date	Sample start time	Arsenic, water, filtered, µg/L (01000)	Boron, water, filtered, µg/L (01020)	Selenium, water, filtered, µg/L (01145)
03-30-2010	**1230**	< 5.0	< 50	< 5.0
07-28-2010	**1510**	5.8	75	< 5.0