Water-Data Report 2013

05082625 TURTLE RIVER AT TURTLE RIVER STATE PARK NEAR ARVILLA, ND

Lower Red Basin
Turtle Subbasin

LOCATION.--Lat 47°55′55″, long 97°30′51″ referenced to North American Datum of 1927, in NE ¼ NW ¼ NW ¼ sec.1, T.151 N., R.54 W., Grand Forks County, ND, Hydrologic Unit 09020307, on right bank 75 ft upstream from U.S. Highway 2, 0.25 mi upstream from Turtle River State Park, 1 mi northwest of Arvilla, and 65 mi above mouth.

DRAINAGE AREA.--311 mi^2.

SURFACE-WATER RECORDS

PERIOD OF RECORD.--DAILY DISCHARGE--October 1992 to current year.

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

GAGE.--Water-stage recorder. Datum of gage is 980 ft above National Geodetic Vertical Datum of 1929, from topographic map.

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

REGULATION.--Some regulation by Larimore Dam located 4 mi upstream on the south branch of the Turtle River.

Suggested citation: U.S. Geological Survey, 2014, Water-resources data for the United States, Water Year 2013: U.S. Geological Survey Water-Data Report WDR-US-2013, site 05082625, accessed at http://wdr.water.usgs.gov/wy2013/pdfs/05082625.2013.pdf

05082625 TURTLE RIVER AT TURTLE RIVER STATE PARK NEAR ARVILLA, ND—Continued

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2012 TO SEPTEMBER 2013
DAILY MEAN VALUES
[e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	6.1	12	e10	e9.4	e4.5	e7.4	e5.2	1,130	289	93	22	11
2	5.8	12	e10	e9.3	e4.5	e7.6	e5.0	918	416	74	20	11
3	6.2	12	e10	e9.2	e4.5	e7.8	e5.5	685	351	61	19	11
4	7.5	13	e10	e9.0	e4.5	e7.8	e7.5	555	350	52	18	10
5	8.3	12	e10	e8.9	e4.5	e7.8	e8.2	463	483	46	18	11
6	8.5	12	e10	e8.8	e4.3	e7.8	e9.0	373	715	41	17	11
7	8.3	13	e10	e8.7	e4.1	e7.7	e9.4	309	702	37	17	11
8	8.0	12	e10	e8.6	e4.0	e7.6	e9.8	279	519	33	16	10
9	7.7	12	e10	e8.4	e4.0	e7.4	e10	254	421	32	16	12
10	7.8	12	e9.9	e8.2	e4.0	e7.2	e10	230	357	31	16	13
11	7.9	e11	e9.9	e7.8	e4.0	e7.1	e10	208	320	29	16	12
12	7.6	e11	e9.9	e7.6	e4.0	e7.0	e11	184	289	28	15	11
13	7.3	e11	e9.9	e7.4	e4.0	e6.9	e12	162	262	29	15	11
14	7.1	e11	e9.9	e7.2	e4.0	e6.8	e13	142	226	29	14	11
15	7.0	e11	e9.9	e7.1	e3.9	e6.7	e15	126	190	27	14	11
16	7.2	e11	e9.9	e7.0	e3.9	e6.6	e17	110	156	26	14	11
17	7.8	12	e9.9	e6.9	e3.8	e6.6	e20	100	e127	24	13	11
18	11	13	e9.9	e6.6	e3.8	e6.5	e23	90	e108	23	13	11
19	14	12	e9.9	e6.3	e3.7	e6.4	e26	104	90	22	13	11
20	14	12	e9.9	e6.0	e3.6	e6.4	e30	193	64	21	13	12
21	14	12	e9.9	e5.6	e3.8	e6.4	e34	515	61	21	12	12
22	13	e11	e9.7	e5.4	e4.2	e6.2	e40	1,050	59	26	12	11
23	14	e11	e9.7	e5.4	e4.6	e6.1	e46	712	56	25	12	11
24	14	e11	e9.6	e5.3	e5.2	e6.0	e54	523	57	32	11	10
25	14	e11	e9.6	e5.2	e5.9	e6.0	e64	420	52	39	11	10
26	14	e10	e9.6	e5.1	e6.4	e6.0	e100	331	147	35	12	10
27	13	e10	e9.6	e5.0	e7.0	e5.9	e250	273	296	31	12	11
28	13	e10	e9.5	e4.8	e7.2	e5.8	e1,400	239	337	28	12	13
29	12	e10	e9.5	e4.6	---	e5.7	1,910	207	196	26	13	14
30	12	e10	e9.4	e4.5	---	e5.6	1,240	187	125	25	12	13
31	12	---	e9.4	e4.5	---	e5.4	---	236	---	24	12	---
Total	310.1	343	304.4	213.8	125.9	208.2	5,394.6	11,308	7,821	1,070	450	338
Mean	10.0	11.4	9.82	6.90	4.50	6.72	180	365	261	34.5	14.5	11.3
Max	14	13	10	9.4	7.2	7.8	1,910	1,130	715	93	22	14
Min	5.8	10	9.4	4.5	3.6	5.4	5.0	90	52	21	11	10
Ac-ft	615	680	604	424	250	413	10,700	22,430	15,510	2,120	893	670

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1993 - 2013, BY WATER YEAR (WY)

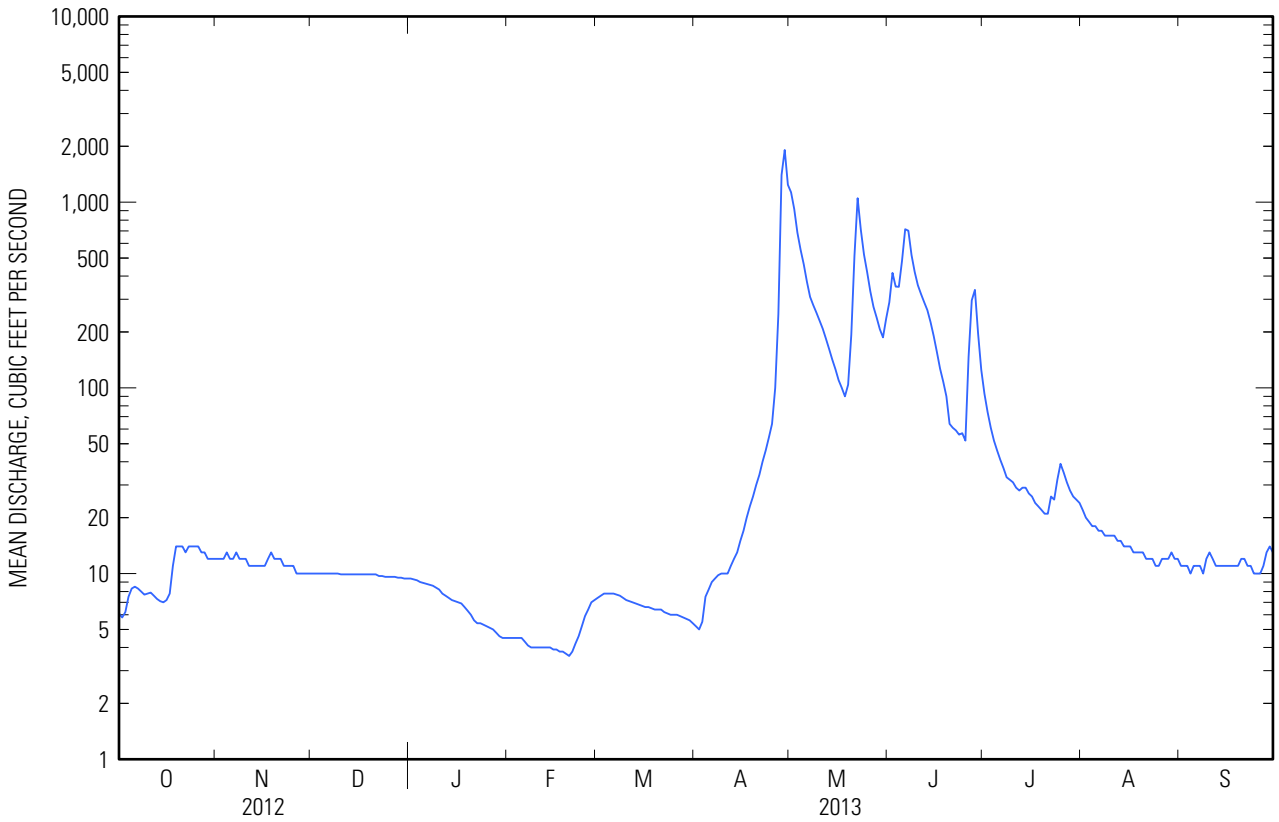
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	15.8	18.2	11.0	9.21	10.3	96.9	169	68.9	109	44.2	19.8	16.5
Max	70.0	58.3	18.2	15.7	32.3	356	525	365	923	168	84.4	74.7
(WY)	(1995)	(2001)	(2001)	(2010)	(1998)	(2010)	(1997)	(2013)	(2000)	(1997)	(1993)	(1993)
Min	5.47	7.48	5.59	3.97	2.49	6.72	18.3	12.5	12.5	5.82	4.84	2.80
(WY)	(1993)	(2007)	(1993)	(1993)	(2007)	(2013)	(2000)	(1993)	(2012)	(2006)	(2006)	(1998)

05082625 TURTLE RIVER AT TURTLE RIVER STATE PARK NEAR ARVILLA, ND—Continued

SUMMARY STATISTICS

	Calendar Year 2012		Water Year 2013		Water Years 1993 - 2013	
Annual total	5,357.3		27,887.0			
Annual mean	14.6		76.4		49.0	
Highest annual mean					94.7	2000
Lowest annual mean					14.8	2003
Highest daily mean	115	Mar 15	1,910	Apr 29	5,000	Jun 13, 2000
Lowest daily mean	5.2	Sep 13	3.6	Feb 20	2.1	Sep 8, 2003
Annual seven-day minimum	5.4	Sep 11	3.8	Feb 15	2.2	Feb 1, 2007
Maximum peak flow			2,780	Apr 28	12,400	Jun 13, 2000
Maximum peak stage			10.65	Apr 28	[a]18.74	Jun 13, 2000
Annual runoff (ac-ft)	10,630		55,310		35,500	
10 percent exceeds	29		237		98	
50 percent exceeds	10		11		14	
90 percent exceeds	6.1		5.4		6.8	

[a] From floodmark.

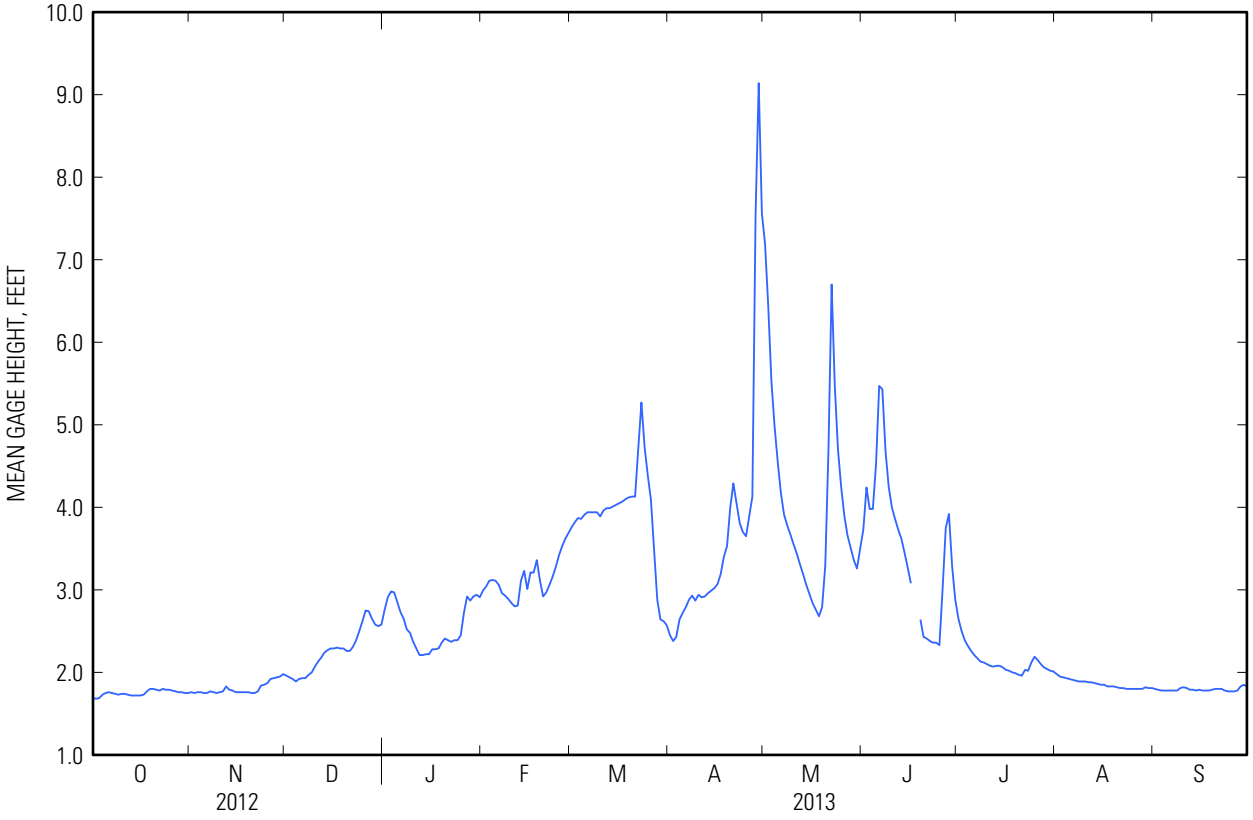


05082625 TURTLE RIVER AT TURTLE RIVER STATE PARK NEAR ARVILLA, ND—Continued

GAGE HEIGHT, FEET
WATER YEAR OCTOBER 2012 TO SEPTEMBER 2013
DAILY MEAN VALUES

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	1.69	1.76	1.96	2.76	2.99	3.76	2.45	7.19	3.73	2.65	1.98	1.80
2	1.68	1.75	1.94	2.91	3.04	3.82	2.38	6.44	4.24	2.50	1.95	1.79
3	1.69	1.76	1.92	2.98	3.11	3.87	2.43	5.53	3.98	2.39	1.94	1.78
4	1.73	1.76	1.89	2.97	3.12	3.86	2.64	4.98	3.98	2.32	1.93	1.78
5	1.75	1.75	1.92	2.85	3.11	3.91	2.72	4.55	4.52	2.26	1.92	1.78
6	1.76	1.75	1.93	2.73	3.06	3.94	2.79	4.17	5.47	2.21	1.91	1.78
7	1.75	1.77	1.93	2.65	2.96	3.94	2.88	3.91	5.43	2.17	1.90	1.78
8	1.74	1.76	1.97	2.52	2.93	3.94	2.93	3.78	4.68	2.13	1.89	1.78
9	1.73	1.75	2.00	2.48	2.89	3.94	2.87	3.67	4.25	2.12	1.89	1.81
10	1.74	1.76	2.07	2.37	2.84	3.89	2.94	3.55	4.00	2.10	1.89	1.82
11	1.74	1.77	2.13	2.29	2.80	3.96	2.91	3.44	3.86	2.08	1.88	1.81
12	1.73	1.83	2.18	2.21	2.81	3.99	2.92	3.31	3.73	2.07	1.88	1.79
13	1.72	1.79	2.24	2.21	3.11	3.99	2.96	3.19	3.62	2.08	1.87	1.79
14	1.72	1.78	2.27	2.22	3.23	4.01	2.99	3.06	3.45	2.08	1.86	1.78
15	1.72	1.76	2.29	2.22	3.01	4.03	3.02	2.95	3.27	2.06	1.85	1.79
16	1.72	1.76	2.29	2.28	3.21	4.05	3.07	2.84	3.08	2.03	1.85	1.78
17	1.73	1.76	2.30	2.28	3.21	4.07	3.19	2.76	---	2.02	1.83	1.78
18	1.77	1.76	2.29	2.29	3.36	4.10	3.40	2.68	---	2.00	1.83	1.78
19	1.80	1.76	2.29	2.36	3.11	4.12	3.53	2.79	2.64	1.99	1.83	1.79
20	1.80	1.75	2.26	2.41	2.92	4.13	3.99	3.30	2.43	1.97	1.82	1.80
21	1.79	1.75	2.26	2.39	2.97	4.13	4.29	4.70	2.41	1.96	1.81	1.80
22	1.78	1.77	2.31	2.37	3.06	4.71	4.05	6.70	2.38	2.03	1.81	1.80
23	1.80	1.84	2.39	2.39	3.16	5.27	3.81	5.47	2.36	2.02	1.80	1.78
24	1.79	1.85	2.50	2.39	3.28	4.73	3.70	4.70	2.36	2.12	1.80	1.77
25	1.79	1.87	2.62	2.45	3.42	4.39	3.65	4.25	2.33	2.19	1.80	1.77
26	1.78	1.92	2.75	2.72	3.53	4.09	3.89	3.90	3.01	2.15	1.80	1.77
27	1.77	1.93	2.74	2.92	3.62	3.48	4.13	3.66	3.75	2.10	1.80	1.78
28	1.76	1.94	2.65	2.87	3.69	2.88	7.53	3.51	3.92	2.06	1.80	1.83
29	1.76	1.95	2.58	2.92	---	2.64	9.14	3.36	3.29	2.04	1.82	1.85
30	1.75	1.98	2.56	2.94	---	2.62	7.56	3.26	2.88	2.02	1.81	1.83
31	1.75	---	2.58	2.91	---	2.57	---	3.50	---	2.01	1.81	---
Mean	1.75	1.80	2.26	2.56	3.13	3.90	3.69	4.04	---	2.13	1.86	1.79
Max	1.80	1.98	2.75	2.98	3.69	5.27	9.14	7.19	---	2.65	1.98	1.85
Min	1.68	1.75	1.89	2.21	2.80	2.57	2.38	2.68	---	1.96	1.80	1.77

05082625 TURTLE RIVER AT TURTLE RIVER STATE PARK NEAR ARVILLA, ND—Continued



05082625 TURTLE RIVER AT TURTLE RIVER STATE PARK NEAR ARVILLA, ND—Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water year 1993 to current year.

WATER-QUALITY DATA
WATER YEAR OCTOBER 2012 TO SEPTEMBER 2013

Part 1 of 6

[%, percent; ANC, acid neutralizing capacity; $CaCO_3$, calcium carbonate; FNU, Formazin nephelometric units; LED, light-emitting diode; N, nitrogen; P, phosphorus; SiO_2, silicon dioxide; ft³/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; nm, nanometers; °C, degrees Celsius; µS/cm, microsiemens per centimeter; µg/L, micrograms per liter; <, less than; E, estimated]

Date	Sample start time	Barometric pressure, mm Hg (00025)	Discharge, ft³/s (00060)	Discharge, instantaneous, ft³/s (00061)	Dissolved oxygen, water, unfiltered, mg/L (00300)	Dissolved oxygen, water, unfiltered, % saturation (00301)	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)
10-25-2012	**0840**	--	--	14	11.5	--	8.4	8.2	797	776
02-04-2013	**1000**	--	E 4.5	--	9.0	--	7.3	7.8	932	917
05-02-2013	**1530**	745	--	863	11.3	90	7.7	7.8	481	457
05-09-2013	**1600**	--	--	250	9.9	--	7.8	7.9	605	580
06-20-2013	**1320**	--	--	63	11.0	--	8.3	8.1	1,220	--
07-30-2013	**1520**	739	--	25	10.2	118	8.3	8.2	1,160	1,140

WATER-QUALITY DATA
WATER YEAR OCTOBER 2012 TO SEPTEMBER 2013

Part 2 of 6

[%, percent; ANC, acid neutralizing capacity; $CaCO_3$, calcium carbonate; FNU, Formazin nephelometric units; LED, light-emitting diode; N, nitrogen; P, phosphorus; SiO_2, silicon dioxide; ft³/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; nm, nanometers; °C, degrees Celsius; µS/cm, microsiemens per centimeter; µg/L, micrograms per liter; <, less than; E, estimated]

Date	Sample start time	Temperature, water, °C (00010)	Turbidity, water, unfiltered, monochrome near infrared LED light, 780-900 nm, detection angle 90 +/- 2.5 degrees, FNU (63680)	Dissolved solids, water, filtered, sum of constituents, mg/L (70301)	Dissolved solids, water, tons per day (70302)	Hardness, water, mg/L as $CaCO_3$ (00900)	Calcium, water, filtered, mg/L (00915)	Magnesium, water, filtered, mg/L (00925)	Potassium, water, filtered, mg/L (00935)
10-25-2012	**0840**	4.8	--	--	--	--	--	--	--
02-04-2013	**1000**	-.1	--	631	--	508	135	41.4	5.00
05-02-2013	**1530**	4.9	--	313	729	178	44.9	16.0	7.28
05-09-2013	**1600**	12.5	--	394	266	223	56.0	20.2	6.78
06-20-2013	**1320**	19.4	--	864	146	529	124	53.2	6.91
07-30-2013	**1520**	21.1	4.1	812	54.8	492	116	49.2	5.46

05082625 TURTLE RIVER AT TURTLE RIVER STATE PARK NEAR ARVILLA, ND—Continued

WATER-QUALITY DATA
WATER YEAR OCTOBER 2012 TO SEPTEMBER 2013
Part 3 of 6

[%, percent; ANC, acid neutralizing capacity; $CaCO_3$, calcium carbonate; FNU, Formazin nephelometric units; LED, light-emitting diode; N, nitrogen; P, phosphorus; SiO_2, silicon dioxide; ft³/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; nm, nanometers; °C, degrees Celsius; µS/cm, microsiemens per centimeter; µg/L, micrograms per liter; <, less than; E, estimated]

Date	Sample start time	Sodium adsorption ratio, water, number (00931)	Sodium fraction of cations, water, percent in equiva-lents of major cations (00932)	Sodium, water, filtered, mg/L (00930)	ANC, water, unfiltered, fixed endpoint (pH 4.5) titration, laboratory, mg/L as $CaCO_3$ (90410)	Chloride, water, filtered, mg/L (00940)	Fluoride, water, filtered, mg/L (00950)	Silica, water, filtered, mg/L as SiO_2 (00955)	Sulfate, water, filtered, mg/L (00945)	Ammonia, water, filtered, mg/L as N (00608)
10-25-2012	**0840**	--	--	--	225	23.2	--	--	178	< .030
02-04-2013	**1000**	.63	12	32.7	299	26.8	.32	26.9	181	.136
05-02-2013	**1530**	1.08	28	33.2	102	10.2	--	17.7	116	.105
05-09-2013	**1600**	1.15	27	39.3	142	11.6	--	21.5	151	.060
06-20-2013	**1320**	1.81	28	95.6	298	27.2	--	26.6	349	< .030
07-30-2013	**1520**	1.58	26	80.4	263	28.7	--	21.0	352	< .030

WATER-QUALITY DATA
WATER YEAR OCTOBER 2012 TO SEPTEMBER 2013
Part 4 of 6

[%, percent; ANC, acid neutralizing capacity; $CaCO_3$, calcium carbonate; FNU, Formazin nephelometric units; LED, light-emitting diode; N, nitrogen; P, phosphorus; SiO_2, silicon dioxide; ft³/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; nm, nanometers; °C, degrees Celsius; µS/cm, microsiemens per centimeter; µg/L, micrograms per liter; <, less than; E, estimated]

Date	Sample start time	Ammonia, water, unfiltered, mg/L as N (00610)	Nitrate plus nitrite, water, filtered, mg/L as N (00631)	Nitrate plus nitrite, water, unfiltered, mg/L as N (00630)	Organic nitrogen, water, filtered, mg/L (00607)	Organic nitrogen, water, unfiltered, mg/L (00605)	Phos-phorus, water, filtered, mg/L as P (00666)	Phosphorus, water, unfiltered, mg/L as P (00665)	Total nitrogen, water, filtered, analytically determined, mg/L (62854)
10-25-2012	**0840**	< .03	< .030	< .030	< .28	< .30	0.029	0.035	0.28
02-04-2013	**1000**	.13	.470	.470	.34	.30	.063	.074	.95
05-02-2013	**1530**	.14	1.24	1.20	.89	.65	.417	.571	2.23
05-09-2013	**1600**	.06	.488	.480	.70	.65	.310	.371	1.25
06-20-2013	**1320**	< .03	.498	.500	< .77	< .79	.224	.242	1.27
07-30-2013	**1520**	< .03	.252	.250	< .73	< .76	.133	.152	.99

05082625 TURTLE RIVER AT TURTLE RIVER STATE PARK NEAR ARVILLA, ND—Continued

WATER-QUALITY DATA
WATER YEAR OCTOBER 2012 TO SEPTEMBER 2013
Part 5 of 6

[%, percent; ANC, acid neutralizing capacity; $CaCO_3$, calcium carbonate; FNU, Formazin nephelometric units; LED, light-emitting diode; N, nitrogen; P, phosphorus; SiO_2, silicon dioxide; ft^3/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; nm, nanometers; °C, degrees Celsius; µS/cm, microsiemens per centimeter; µg/L, micrograms per liter; <, less than; E, estimated]

Date	Sample start time	Total nitrogen, water, unfiltered, analytically determined, mg/L (62855)	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)	Copper, water, filtered, µg/L (01040)	Iron, water, filtered, µg/L (01046)	Lead, water, filtered, µg/L (01049)
10-25-2012	**0840**	0.30	< 50	59.0	< 5.00	< 5.00	< 5.0	< 5.0	180	< 5.00
02-04-2013	**1000**	.91	< 50	77.9	< 5.00	< 5.00	< 5.0	< 5.0	< 50.0	< 5.00
05-02-2013	**1530**	1.99	90	31.7	< 5.00	< 5.00	< 5.0	< 5.0	105	< 5.00
05-09-2013	**1600**	1.19	< 50	39.1	< 5.00	< 5.00	< 5.0	< 5.0	< 50.0	< 5.00
06-20-2013	**1320**	1.29	< 50	47.9	< 5.00	< 5.00	< 5.0	< 5.0	< 50.0	< 5.00
07-30-2013	**1520**	1.01	< 50	54.6	< 5.00	< 5.00	< 5.0	< 5.0	< 50.0	< 5.00

WATER-QUALITY DATA
WATER YEAR OCTOBER 2012 TO SEPTEMBER 2013
Part 6 of 6

[%, percent; ANC, acid neutralizing capacity; $CaCO_3$, calcium carbonate; FNU, Formazin nephelometric units; LED, light-emitting diode; N, nitrogen; P, phosphorus; SiO_2, silicon dioxide; ft^3/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; nm, nanometers; °C, degrees Celsius; µS/cm, microsiemens per centimeter; µg/L, micrograms per liter; <, less than; E, estimated]

Date	Sample start time	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)	Arsenic, water, filtered, µg/L (01000)	Boron, water, filtered, µg/L (01020)	Selenium, water, filtered, µg/L (01145)
10-25-2012	**0840**	63.0	6.7	< 5.00	< 5.00	< 5.0	< 5.00	< 5.0	< 50	< 5.0
02-04-2013	**1000**	172	< 5.0	< 5.00	< 5.00	< 5.0	< 5.00	< 5.0	106	< 5.0
05-02-2013	**1530**	158	< 5.0	< 5.00	< 5.00	< 5.0	< 5.00	< 5.0	60	< 5.0
05-09-2013	**1600**	158	< 5.0	< 5.00	< 5.00	< 5.0	< 5.00	< 5.0	61	< 5.0
06-20-2013	**1320**	248	5.8	< 5.00	< 5.00	< 5.0	< 5.00	< 5.0	165	< 5.0
07-30-2013	**1520**	125	7.1	< 5.00	< 5.00	< 5.0	< 5.00	< 5.0	155	< 5.0