Water-Data Report 2008

05085000 FOREST RIVER AT MINTO, ND

Lower Red Basin
Forest Subbasin

LOCATION.--Lat 48°16′10″, long 97°22′10″ referenced to North American Datum of 1927, in SE ¼ NW ¼ SE ¼ sec.31, T.156 N., R.52 W., Walsh County, ND, Hydrologic Unit 09020308, on right bank 30 ft upstream from dam in Minto, 150 ft upstream from Burlington Northern Railway bridge, and 900 ft east of U.S. Highway 81.

DRAINAGE AREA.--740 mi^2 of which 120 mi^2 probably is noncontributing.

SURFACE-WATER RECORDS

PERIOD OF RECORD.--DAILY DISCHARGE--April 1944 to current year.

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

REVISED RECORDS.--WSP 1438: 1948-50. WSP 1728: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 806.95 ft above National Geodetic Vertical Datum of 1929. Prior to July 15, 1954, nonrecording gage at site 400 ft upstream at same datum.

REMARKS.--Records fair except for estimated daily discharges, which are poor. Occasionally during high stages, particularly when the channel is filled with snow, overflow occurs 0.5 mi below the municipality of Forest River and bypasses the gage 3 mi south of Minto and flows into Lake Ardoch. Bypass flow is not included in computation of discharge record for station at Minto.

05085000 FOREST RIVER AT MINTO, ND—Continued

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2007 TO SEPTEMBER 2008
DAILY MEAN VALUES
[e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	14	19	e16	e14	e6.2	4.0	e65	50	19	33	16	9.2
2	15	19	e16	e13	e6.1	4.2	e110	45	19	31	15	9.3
3	14	19	e16	e13	6.0	e4.2	e175	44	19	28	16	9.2
4	15	e18	e16	e13	5.9	e4.1	e210	43	18	26	17	9.4
5	16	e18	e16	e13	5.9	e4.1	e240	37	19	25	17	10
6	17	e17	e16	e13	5.7	e4.0	e280	34	22	22	16	10
7	21	13	e16	e13	5.4	e3.9	e290	36	25	21	16	10
8	26	18	e15	e11	5.2	3.9	e275	33	31	19	15	9.0
9	27	25	e15	11	e5.3	3.8	e260	33	38	21	14	7.8
10	27	20	e15	11	e5.1	3.8	e240	35	40	25	13	7.3
11	26	e19	e15	9.7	e4.9	3.8	e230	30	40	32	28	7.9
12	25	18	e15	9.8	e4.8	4.0	e215	32	45	31	41	6.5
13	25	18	e15	10	e4.9	4.0	e205	43	50	27	33	5.8
14	23	e18	e15	e10	e4.9	4.3	e190	43	61	24	28	6.4
15	23	18	e15	e9.6	e5.0	4.4	174	40	72	24	26	6.8
16	21	17	e14	e9.4	e4.7	4.3	161	43	72	23	27	6.5
17	22	e17	e14	e9.4	e4.7	4.5	152	41	65	22	26	4.9
18	24	16	e14	e9.3	e4.8	5.6	148	39	62	20	26	4.7
19	25	e17	e14	e8.9	e4.8	5.7	132	37	56	19	27	5.5
20	25	e17	e14	e8.5	e4.6	e7.0	119	32	53	19	24	4.0
21	25	e16	e15	e8.3	e4.5	e9.0	113	28	43	18	22	4.2
22	25	e17	e14	e8.2	e4.3	e13	109	27	39	16	23	5.2
23	24	e16	e14	e8.1	e4.2	e17	93	27	35	16	21	6.8
24	23	e16	e13	e8.0	3.9	e19	93	22	35	15	20	10
25	22	e15	e13	e7.7	3.9	e20	90	23	36	15	18	14
26	e21	e15	e13	e7.4	3.8	e21	83	23	34	14	15	15
27	e21	e15	e14	e7.3	4.0	e23	67	24	30	15	16	15
28	e20	e15	e14	e7.1	4.0	e26	61	23	28	15	14	16
29	20	e15	e13	e6.9	3.9	e30	57	22	32	16	14	16
30	20	e16	e13	e6.8	---	e36	52	21	35	18	12	24
31	19	---	e14	e6.5	---	e45	---	20	---	17	9.7	---
Total	671	517	452	301.9	141.4	346.6	4,689	1,030	1,173	667	625.7	276.4
Mean	21.6	17.2	14.6	9.74	4.88	11.2	156	33.2	39.1	21.5	20.2	9.21
Max	27	25	16	14	6.2	45	290	50	72	33	41	24
Min	14	13	13	6.5	3.8	3.8	52	20	18	14	9.7	4.0
Ac-ft	1,330	1,030	897	599	280	687	9,300	2,040	2,330	1,320	1,240	548

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1944 - 2008, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	11.0	10.6	6.59	3.96	3.94	78.3	305	98.4	54.9	37.2	17.9	10.5
Max	59.1	32.4	20.9	15.8	50.2	559	1,573	1,515	267	348	328	69.0
(WY)	(1983)	(2001)	(1998)	(1998)	(1998)	(2004)	(1950)	(1950)	(1964)	(1997)	(1993)	(1993)
Min	0.00	0.97	0.29	0.00	0.00	0.00	17.8	10.6	4.21	1.87	0.00	0.00
(WY)	(1991)	(1991)	(1990)	(1977)	(1961)	(1962)	(2000)	(1946)	(1991)	(1980)	(1946)	(1961)

05085000 FOREST RIVER AT MINTO, ND—Continued

SUMMARY STATISTICS

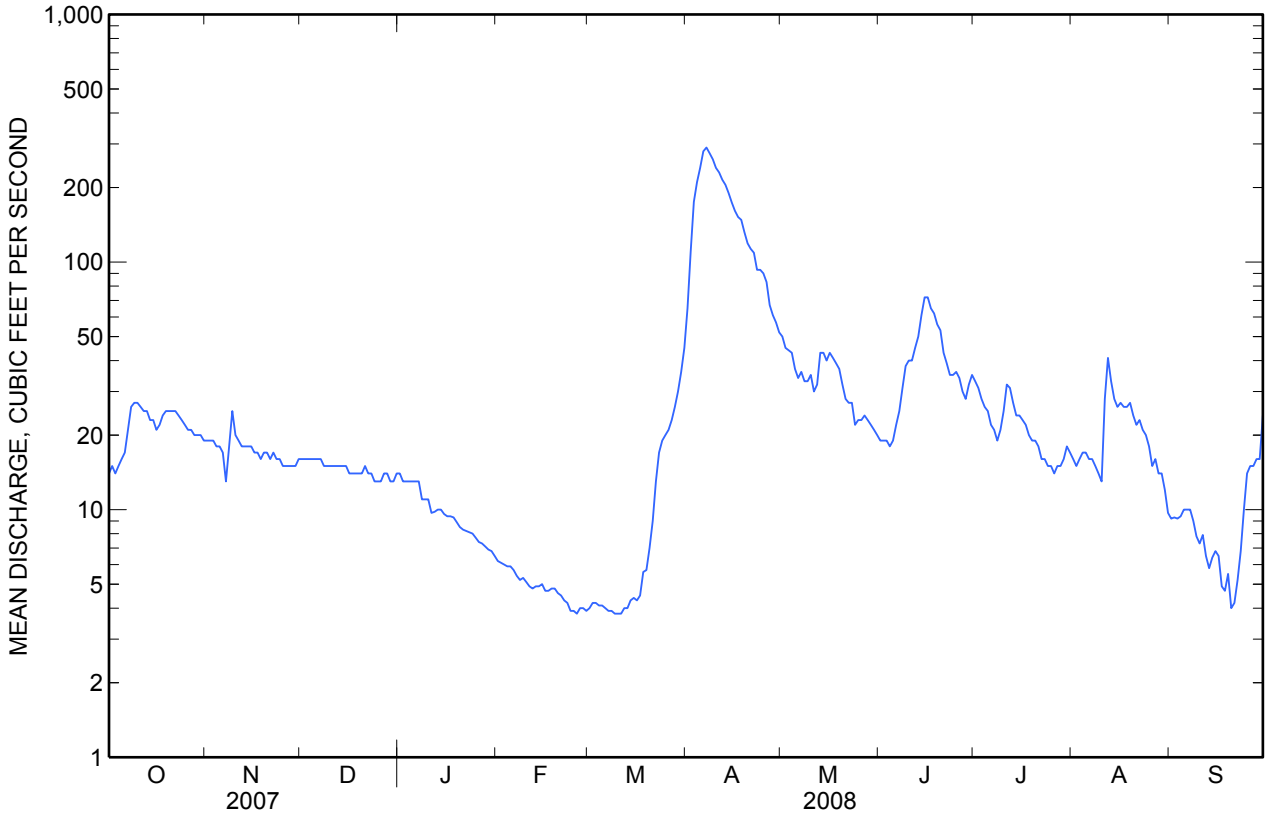
	Calendar Year 2007		Water Year 2008		Water Years 1944 - 2008	
Annual total	28,911.3		10,891.0			
Annual mean	79.2		29.8		53.6	
Highest annual mean					268	1950
Lowest annual mean					4.36	1990
Highest daily mean	1,370	Mar 26	290	Apr 7	11,600	Apr 19, 1950
Lowest daily mean	1.2	Feb 5	3.8	Feb 26	0.00	Sep 5, 1945
Annual seven-day minimum	1.3	Feb 3	3.9	Mar 6	0.00	Sep 5, 1945
Maximum peak flow			[a]310	Apr 7	[b]16,600	Apr 18, 1950
Maximum peak stage			[c]2.69	Apr 7	[d]11.80	Apr 18, 1950
Annual runoff (ac-ft)	57,350		21,600		38,810	
10 percent exceeds	238		52		85	
50 percent exceeds	22		17		9.8	
90 percent exceeds	4.9		4.9		0.60	

[a] Estimated.

[b] From rating curve extended above 7,200 ft³/s on basis of contracted opening measurement of peak flow.

[c] Backwater from ice.

[d] From floodmark.

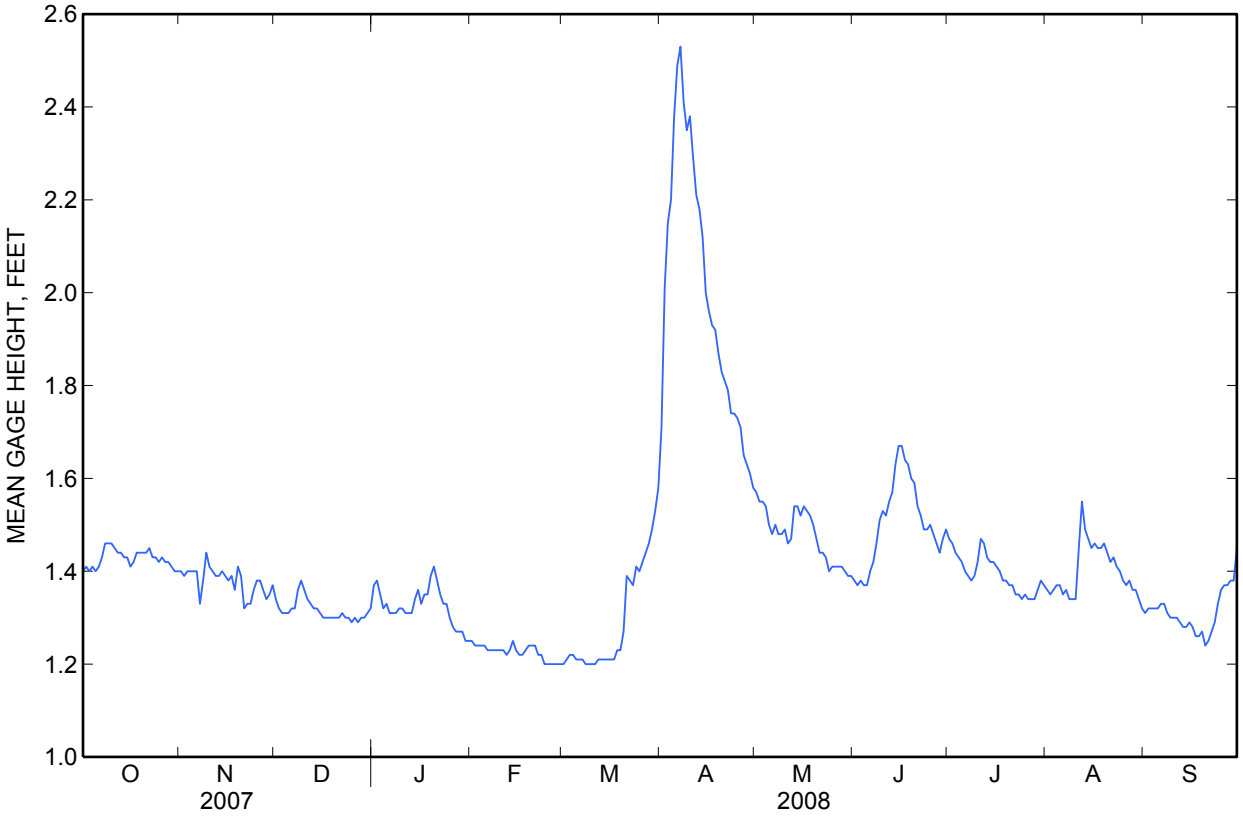


05085000 FOREST RIVER AT MINTO, ND—Continued

GAGE HEIGHT, FEET
WATER YEAR OCTOBER 2007 TO SEPTEMBER 2008
DAILY MEAN VALUES

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	1.40	1.40	1.34	1.37	1.25	1.20	1.71	1.57	1.38	1.47	1.36	1.31
2	1.41	1.39	1.32	1.38	1.24	1.21	2.01	1.55	1.37	1.46	1.35	1.32
3	1.40	1.40	1.31	1.35	1.24	1.22	2.15	1.55	1.38	1.44	1.36	1.32
4	1.41	1.40	1.31	1.32	1.24	1.22	2.20	1.54	1.37	1.43	1.37	1.32
5	1.40	1.40	1.31	1.33	1.24	1.21	2.38	1.50	1.37	1.42	1.37	1.32
6	1.41	1.40	1.32	1.31	1.23	1.21	2.49	1.48	1.40	1.40	1.35	1.33
7	1.43	1.33	1.32	1.31	1.23	1.21	2.53	1.50	1.42	1.39	1.36	1.33
8	1.46	1.38	1.36	1.31	1.23	1.20	2.41	1.48	1.46	1.38	1.34	1.31
9	1.46	1.44	1.38	1.32	1.23	1.20	2.35	1.48	1.51	1.39	1.34	1.30
10	1.46	1.41	1.36	1.32	1.23	1.20	2.38	1.49	1.53	1.42	1.34	1.30
11	1.45	1.40	1.34	1.31	1.23	1.20	2.29	1.46	1.52	1.47	1.45	1.30
12	1.44	1.39	1.33	1.31	1.22	1.21	2.21	1.47	1.55	1.46	1.55	1.29
13	1.44	1.39	1.32	1.31	1.23	1.21	2.18	1.54	1.57	1.43	1.49	1.28
14	1.43	1.40	1.32	1.34	1.25	1.21	2.12	1.54	1.63	1.42	1.47	1.28
15	1.43	1.39	1.31	1.36	1.23	1.21	2.00	1.52	1.67	1.42	1.45	1.29
16	1.41	1.38	1.30	1.33	1.22	1.21	1.96	1.54	1.67	1.41	1.46	1.28
17	1.42	1.39	1.30	1.35	1.22	1.21	1.93	1.53	1.64	1.40	1.45	1.26
18	1.44	1.36	1.30	1.35	1.23	1.23	1.92	1.52	1.63	1.38	1.45	1.26
19	1.44	1.41	1.30	1.39	1.24	1.23	1.87	1.50	1.60	1.38	1.46	1.27
20	1.44	1.39	1.30	1.41	1.24	1.27	1.83	1.47	1.59	1.37	1.44	1.24
21	1.44	1.32	1.30	1.38	1.24	1.39	1.81	1.44	1.54	1.37	1.42	1.25
22	1.45	1.33	1.31	1.35	1.22	1.38	1.79	1.44	1.52	1.35	1.43	1.27
23	1.43	1.33	1.30	1.33	1.22	1.37	1.74	1.43	1.49	1.35	1.41	1.29
24	1.43	1.36	1.30	1.33	1.20	1.41	1.74	1.40	1.49	1.34	1.40	1.33
25	1.42	1.38	1.29	1.30	1.20	1.40	1.73	1.41	1.50	1.35	1.38	1.36
26	1.43	1.38	1.30	1.28	1.20	1.42	1.71	1.41	1.48	1.34	1.37	1.37
27	1.42	1.36	1.29	1.27	1.20	1.44	1.65	1.41	1.46	1.34	1.38	1.37
28	1.42	1.34	1.30	1.27	1.20	1.46	1.63	1.41	1.44	1.34	1.36	1.38
29	1.41	1.35	1.30	1.27	1.20	1.49	1.61	1.40	1.47	1.36	1.36	1.38
30	1.40	1.37	1.31	1.25	---	1.53	1.58	1.39	1.49	1.38	1.34	1.45
31	1.40	---	1.32	1.25	---	1.58	---	1.39	---	1.37	1.32	---
Mean	1.43	1.38	1.32	1.32	1.23	1.29	2.00	1.48	1.50	1.39	1.40	1.31
Max	1.46	1.44	1.38	1.41	1.25	1.58	2.53	1.57	1.67	1.47	1.55	1.45
Min	1.40	1.32	1.29	1.25	1.20	1.20	1.58	1.39	1.37	1.34	1.32	1.24

05085000 FOREST RIVER AT MINTO, ND—Continued



05085000 FOREST RIVER AT MINTO, ND—Continued

WATER-QUALITY RECORDS

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

WATER-QUALITY DATA
WATER YEAR OCTOBER 2007 TO SEPTEMBER 2008

Part 1 of 5

[Remark codes: <, less than. Null value qualifier codes: c, sample lost in lab; x, result failed quality assurance review.]

Date	Time	Instantaneous discharge, ft3/s (00061)	Turbidity, IR LED light, det ang 90 deg, FNU (63680)	Barometric pressure, mm Hg (00025)	Dissolved oxygen, mg/L (00300)	Dissolved oxygen, percent of saturation (00301)	pH, water, unfltrd field, std units (00400)	pH, water, unfltrd lab, std units (00403)	Specif. conductance, wat unf lab, µS/cm 25 degC (90095)	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)
Oct													
16...	1035	21	7.2	735	9.4	85	8.1	8.2	855	843	6.0	9.2	370
Jan													
07...	1505	13	--	729	8.2	59	7.5	7.7	997	941	.5	.1	410
Apr													
28...	1125	66	--	741	13.0	103	8.5	8.0	1,050	1,030	3.0	4.4	460
May													
13...	1505	44	--	733	10.2	92	8.6	--x	1,060	1,040	7.0	8.8	440
Jun													
04...	1415	20	--	728	5.8	61	8.2	7.7	1,000	992	20.0	15.6	410
Jul													
15...	1235	26	--	738	6.5	75	8.3	8.2	1,240	1,180	26.5	20.3	540
Aug													
05...	1425	20	--	747	6.0	70	8.3	8.2	885	888	26.0	21.9	370
Sep													
03...	1020	8.7	--	750	5.7	62	8.2	8.2	961	964	13.0	18.1	390

05085000 FOREST RIVER AT MINTO, ND—Continued

WATER-QUALITY DATA
WATER YEAR OCTOBER 2007 TO SEPTEMBER 2008
Part 2 of 5
[Remark codes: <, less than. Null value qualifier codes: c, sample lost in lab; x, result failed quality assurance review.]

Date	Calcium water, fltrd, mg/L (00915)	Magnes-ium, water, fltrd, mg/L (00925)	Potas-sium, water, fltrd, mg/L (00935)	Sodium adsorp-tion ratio (00931)	Sodium frac-tion of cations percent (00932)	Sodium, water, fltrd, mg/L (00930)	ANC, wat unf fixed end pt, lab, mg/L as CaCO3 (90410)	Chlor-ide, water, fltrd, mg/L (00940)	Fluor-ide, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L as SiO2 (00955)	Sulfate water, fltrd, mg/L (00945)	Residue water, fltrd, sum of consti-tuents mg/L (70301)	Residue water, dis-solved, tons/d (70302)
Oct													
16...	83.7	38.2	5.60	.8	18	36.2	236	18.4	.18	9.70	195	530	30.1
Jan													
07...	99.9	39.5	5.04	.8	16	37.3	280	22.0	.21	20.3	222	618	21.4
Apr													
28...	106	47.6	7.62	1.4	24	67.6	255	29.4	.20	15.1	274	651	125
May													
13...	96.7	47.5	6.90	1.3	24	63.4	244	38.0	.18	9.55	276	657	81.4
Jun													
04...	91.4	44.7	7.16	1.2	22	55.4	252	28.5	.20	8.83	250	620	34.5
Jul													
15...	118	58.6	7.71	1.3	22	69.8	238	30.6	.20	21.3	383	769	58.6
Aug													
05...	81.3	40.3	6.72	1.0	20	43.5	222	22.8	.29	21.8	230	549	31.4
Sep													
03...	85.6	43.3	7.24	1.1	22	50.3	237	24.1	.19	18.1	250	596	14.5

05085000 FOREST RIVER AT MINTO, ND—Continued

WATER-QUALITY DATA
WATER YEAR OCTOBER 2007 TO SEPTEMBER 2008
Part 3 of 5
[Remark codes: <, less than. Null value qualifier codes: c, sample lost in lab; x, result failed quality assurance review.]

Date	Residue total non-filter-able, mg/L (00530)	Ammonia + org-N, water, fltrd, mg/L as N (00623)	Ammonia + org-N, water, unfltrd mg/L as N (00625)	Ammonia water, fltrd, mg/L as N (00608)	Ammonia water, unfltrd mg/L as N (00610)	Nitrate + nitrite water fltrd, mg/L as N (00631)	Nitrate + nitrite water unfltrd mg/L as N (00630)	Organic nitro-gen, water, fltrd, mg/L (00607)	Organic nitro-gen, water, unfltrd mg/L (00605)	Total nitro-gen, wat flt by anal ysis, mg/L (62854)	Total nitro-gen, wat unf by anal ysis, mg/L (62855)	Total nitro-gen, water, fltrd, mg/L (00602)	Phos-phorus, water, fltrd, mg/L as P (00666)
Oct													
16...	12	.41	.42	.033	.04	.489	.480	.38	.39	.90	.91	.90	.045
Jan													
07...	<5	.45	.50	.235	.24	2.16	2.16	.21	.26	2.61	2.66	2.6	.093
Apr													
28...	26	.50	.54	<.030	<.03	.261	.250	--	--	.76	.79	.76	.063
May													
13...	13	.51	.55	.030	<.03	.097	.100	.48	.52	.60	.65	.60	.043
Jun													
04...	32	.55	.59	.133	.16	.072	.110	.42	.43	.62	.70	.62	.071
Jul													
15...	28	.77	.72	.090	.09	.636	.630	.68	.63	1.41	1.35	1.4	.115
Aug													
05...	16	.54	.53	.136	.05	.206	.190	.40	.48	.74	.72	.74	.116
Sep													
03...	11	--	.64	--c	.12	--c	.110	--	.51	--c	.75	--	--c

05085000 FOREST RIVER AT MINTO, ND—Continued

WATER-QUALITY DATA
WATER YEAR OCTOBER 2007 TO SEPTEMBER 2008
Part 4 of 5
[Remark codes: <, less than. Null value qualifier codes: c, sample lost in lab; x, result failed quality assurance review.]

Date	Phos-phorus, water, unfltrd mg/L as P (00665)	Organic carbon, water, fltrd, mg/L (00681)	Organic carbon, water, unfltrd mg/L (00680)	E coli, m-TEC MF, water, col/ 100 mL (31633)	Fecal coli-form, M-FC 0.7u MF col/ 100 mL (31625)	Fecal strep-tococci KF MF, col/ 100 mL (31673)	Alum-inum, water, fltrd, µg/L (01106)	Anti-mony, water, fltrd, µg/L (01095)	Arsenic water, fltrd, µg/L (01000)	Barium, water, fltrd, µg/L (01005)	Beryll-ium, water, fltrd, µg/L (01010)	Boron, water, fltrd, µg/L (01020)	Cadmium water, fltrd, µg/L (01025)
Oct													
16...	.058	4.1	4.2	20	20	110	<50	<1.00	2.6	39	<1.00	85	<1.00
Jan													
07...	.100	3.2	3.2	10	10	<10	<50	<1.00	1.8	40	<1.00	54	<1.00
Apr													
28...	.100	6.2	6.3	<10	<10	--	<50	<1.00	2.5	38	<1.00	85	<1.00
May													
13...	.074	5.6	5.5	<10	10	--	<50	<1.00	2.3	45	<1.00	110	<1.00
Jun													
04...	.195	5.4	4.9	10	10	--	<50	<1.00	2.3	56	<1.00	103	<1.00
Jul													
15...	.139	7.5	7.2	60	60	--	<50	<1.00	5.2	89	<1.00	93	<1.00
Aug													
05...	.135	5.1	4.9	20	20	--	<50	<1.00	6.5	37	<1.00	92	<1.00
Sep													
03...	.125	5.9	5.5	30	30	--	60	<1.00	5.1	40	<1.00	102	<1.00

05085000 FOREST RIVER AT MINTO, ND—Continued

WATER-QUALITY DATA
WATER YEAR OCTOBER 2007 TO SEPTEMBER 2008
Part 5 of 5
[Remark codes: <, less than. Null value qualifier codes: c, sample lost in lab; x, result failed quality assurance review.]

Date	Chromium, water, fltrd, µg/L (01030)	Copper, water, fltrd, µg/L (01040)	Iron, water, fltrd, µg/L (01046)	Lead, water, fltrd, µg/L (01049)	Manganese, water, fltrd, µg/L (01056)	Nickel, water, fltrd, µg/L (01065)	Selenium, water, fltrd, µg/L (01145)	Silver, water, fltrd, µg/L (01075)	Thallium, water, fltrd, µg/L (01057)	Zinc, water, fltrd, µg/L (01090)	Suspnd. sediment, sieve diametr percent <62.5um (70331)	Suspended sediment concentration mg/L (80154)	Suspended sediment discharge, tons/d (80155)
Oct													
16...	<1.0	1.4	<50	<1.00	52.0	3.7	1.6	<1.0	<1.00	3.0	92	16	.91
Jan													
07...	7.0	1.1	<50	<1.00	105	3.0	2.1	<1.0	<1.00	6.1	97	4	.14
Apr													
28...	<1.0	1.1	<50	<1.00	94.0	4.4	1.8	<1.0	<1.00	2.0	98	22	3.9
May													
13...	<1.0	1.4	<50	<1.00	104	4.4	1.8	<1.0	<1.00	2.4	82	15	1.8
Jun													
04...	<1.0	1.7	<50	<1.00	559	5.5	2.2	<1.0	<1.00	5.0	91	14	.76
Jul													
15...	<1.0	2.0	<50	<1.00	126	5.5	2.8	<1.0	<1.00	2.6	--	7	.49
Aug													
05...	<1.0	<1.0	<50	<1.00	143	5.3	1.6	<1.0	<1.00	3.0	92	17	.92
Sep													
03...	<1.0	<1.0	<50	<1.00	262	6.3	1.9	<1.0	<1.00	4.3	76	18	.42