

Prepared in cooperation with the Bureau of Reclamation

Water-Quality Data for Water- and Wastewater-Treatment Plants Along the Red River of the North, North Dakota and Minnesota, January through October 2006

Data Series 328

Water-Quality Data for Water- and Wastewater-Treatment Plants Along the Red River of the North, North Dakota and Minnesota, January through October 2006

By William C. Damschen, John A. Hansel, and Rochelle A. Nustad

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Conversion Factors

Multiply	By	To obtain
	Length	
mile (mi)	1.609	kilometer (km)
	Flow rate	
cubic foot per second (ft ³ /s)	0.02832	cubic meter per second (m ³ /s)

Temperature in degrees Celsius (°C) may be converted to degrees Fahrenheit (°F) as follows:

$$^{\circ}\text{F}=(1.8\times^{\circ}\text{C})+32$$

Specific conductance is given in microsiemens per centimeter at 25 degrees Celsius ($\mu\text{S}/\text{cm}$ at 25°C).

Concentrations of chemical constituents in water are given either in milligrams per liter (mg/L) or micrograms per liter ($\mu\text{g}/\text{L}$).

Water-Quality Data for Water- and Wastewater-Treatment Plants Along the Red River of the North, North Dakota and Minnesota, January through October 2006

By William C. Damschen, John A. Hansel, and Rochelle A. Nustad

Abstract

From January through October 2006, six sets of water-quality samples were collected at 28 sites, which included inflow and outflow from seven major municipal water-treatment plants (14 sites) and influent and effluent samples from seven major municipal wastewater treatment plants (14 sites) along the Red River of the North in North Dakota and Minnesota. Samples were collected in cooperation with the Bureau of Reclamation for use in the development of return-flow boundary conditions in a 2006 water-quality model for the Red River of the North. All samples were analyzed for nutrients and major ions. For one set of effluent samples from each of the wastewater-treatment plants, water was analyzed for *Escherichia coli*, fecal coliform, 20-day biochemical oxygen demand, 20-day nitrogenous biochemical oxygen demand, total organic carbon, and dissolved organic carbon. In general, results from the field equipment blank and replicate samples indicate that the overall process of sample collection, processing, and analysis did not introduce substantial contamination and that consistent results were obtained.

Introduction

The Bureau of Reclamation (Reclamation) is preparing an Environmental Impact Statement (EIS) for the Red River Valley Water Supply Project (Red River Valley Supply Project, 2007). To provide information for the EIS, two water-quality modeling studies were conducted by the U.S. Geological Survey (USGS) in cooperation with Reclamation. In 2005, a steady state water-quality model was developed and applied for part of the Red River Basin (Bales and Nustad, 2005). This steady state water-quality model simulated the transport of total dissolved solids, sulfate, and chloride as conservative constituents in the Red River of the North (hereinafter referred to as the Red River) under the low-flow conditions that occurred during September 2003. For September 2003, the mean streamflow at the Red River of the North at Fargo gaging station was 106 ft³/s (Robinson and others, 2004). In

2006, Reclamation needed more detailed information on additional constituents during extremely low flow conditions. As a result, a second study was conducted to develop and apply a dynamic water-quality model to simulate the transport of total dissolved solids, sulfate, chloride, sodium, and total phosphorus during extremely low flow conditions such as those that occurred from September 1976 through August 1977 (Nustad and Bales, 2006). During this 12-month period, monthly mean streamflows at the Red River of the North at Fargo gaging station ranged from 3.77 ft³/s (October 1976) to 194 ft³/s (April 1977; U.S. Geological Survey, 1978). As part of the 2006 dynamic model, water-quality data from existing municipal water- and wastewater-treatment plants were used to develop water-quality boundary conditions for return flows from the major municipalities that were included in the model (Nustad and Bales, 2006). In support of this model, the USGS, in cooperation with Reclamation, collected water-quality samples from January through October, 2006 at major municipal water- and wastewater-treatment plants along the Red River. Municipalities included in the sampling effort were Wahpeton, Fargo, West Fargo, and Grand Forks, North Dakota; and Breckenridge, Moorhead, and East Grand Forks, Minnesota (fig. 1). This report describes the data-collection methods and presents the data from the collection effort.

The collection of samples from the water-treatment plants was possible through the cooperation of Jeff Muehler and staff, Breckenridge Public Utilities; Gary Hultberg and staff, East Grand Forks Water Treatment Plant; Dean Sletten and staff, Fargo Water Treatment Plant; Hazel Sletten and staff, Grand Forks Water Treatment Plant; Troy Hall and staff, Moorhead Water Treatment Plant; Leo Murr and staff, Wahpeton Water Treatment Plant; and Tom Moores, city of West Fargo Public Works. The collection of samples from the wastewater-treatment plants was possible through the cooperation of Jeff Muehler and staff, Breckenridge Public Utilities; Mark Kotebra and staff, city of East Grand Forks Public Works; Mark Blonigen and staff, Fargo Wastewater Treatment Plant; Don Tucker and staff, Grand Forks Wastewater Treatment Plant; Andy Bradshaw and staff, Moorhead Wastewater Treatment Facility; Don Wald, Wahpeton Water and Sewer; and Terry Rust, city of West Fargo Public Works.

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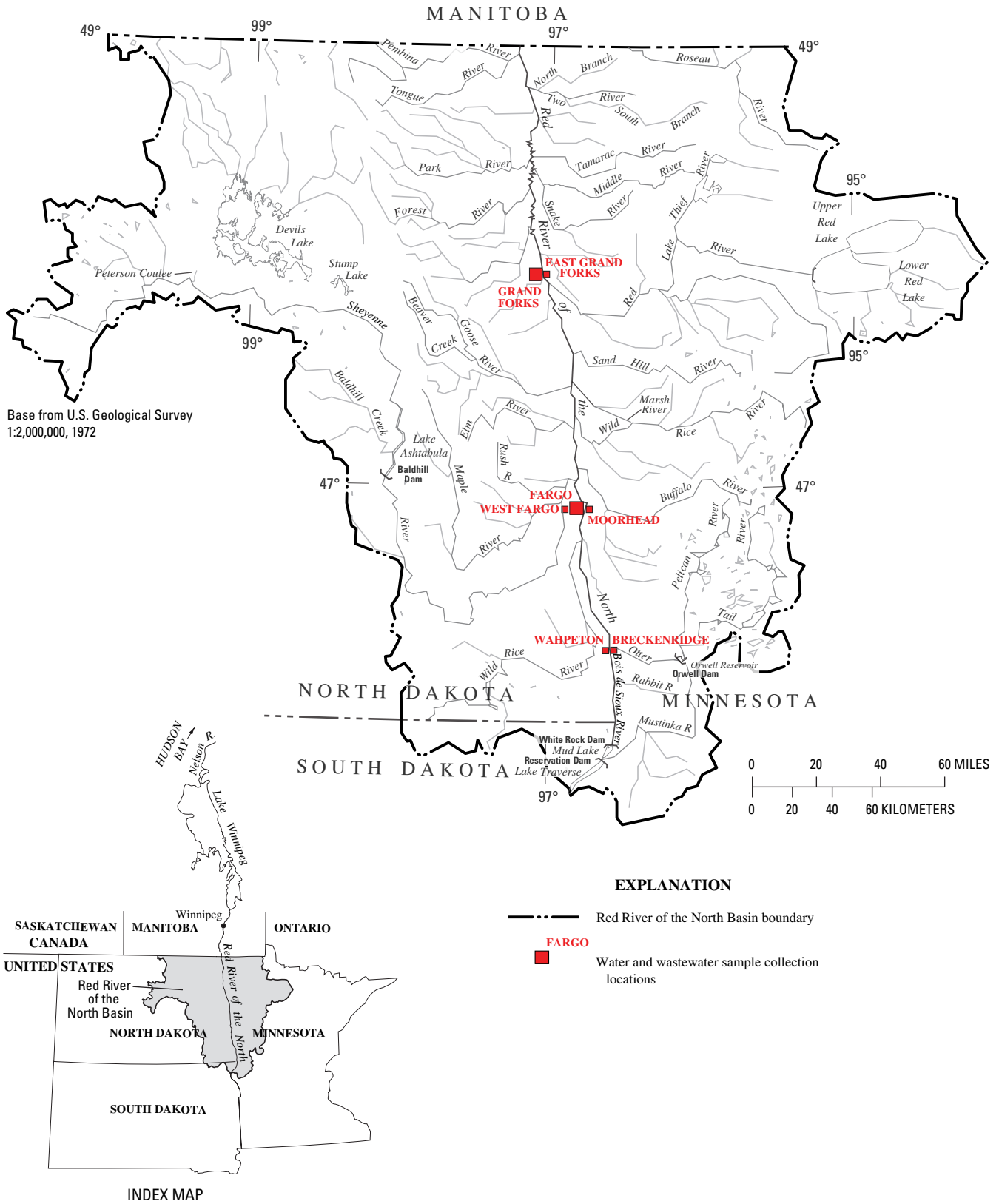


Figure 1. Locations of sampling sites in the Red River of the North Basin, North Dakota and Minnesota.

Data Collection

During January through October 2006, six sets of water-quality samples were collected at 28 sites, which included inflow and outflow samples from seven municipal water-treatment plants (14 sites) and influent and effluent samples from seven municipal wastewater-treatment plants (14 sites) along the Red River (table 1). Inflow samples for water-treatment plants are representative of the municipality's source water before treatment, and were typically collected from a tap (table 1). Outflow samples for water-treatment plants were collected at the last location in the plant before treated water is released into the water-distribution system and were also typically collected from a tap (table 1). Influent samples for wastewater-treatment plants were collected either at a lift station before water enters the plant or inside the plant from samples collected by plant staff (table 1). Effluent samples for wastewater-treatment plants were collected at the last location in the plant before water is discharged to the Red River (table 1). Water-quality samples were collected according to protocols described by the U.S. Geological Survey (U.S. Geological Survey, variously dated).

All samples were analyzed for unfiltered and filtered nutrients (tables 2–8). Also, all samples were analyzed for major ions, but samples collected on or before June 13, 2006, were analyzed for unfiltered major ions and samples collected after June 13 were analyzed for filtered major ions. For one set of effluent samples from each of the wastewater-treatment plants, water was analyzed for *Escherichia coli*, fecal coliform, 20-day biochemical oxygen demand, 20-day nitrogenous biochemical oxygen demand, total organic carbon, and dissolved organic carbon. All constituents were analyzed by the North Dakota Department of Health Laboratory using U.S. Environmental Protection Agency standard analytical methods (James Quarnstrom, North Dakota Department of Health Laboratory, written commun., 2007).

Quality-assurance/quality-control (QA/QC) samples were collected and analyzed to assess the accuracy and precision of the collected data. One field-equipment blank sample and 15 replicate samples were collected from January through October 2006 and analyzed along with the water-quality (environmental) samples (tables 9 and 10). The blank sample and replicates samples combined represent about 10 percent of the environmental samples that were collected.

Blank samples provide information on potential effects on analytical results from contamination during collection, processing, and laboratory analysis. The blank sample for this study was a field-equipment blank, which consists of an aliquot of deionized water processed through the sampling

equipment that is used to collect environmental samples. The blank is then subjected to the same processing as the environmental samples. Concentrations of most constituents in the field-equipment blank were less than or approximately equal to the respective analytical reporting level (table 9). Acid neutralizing capacity, bicarbonate, dissolved solids, and filtered iron were detected at concentrations close to the reporting level and much less than the minimum concentrations in the environmental samples. The contamination for these constituents probably did not affect study results. Filtered fluoride was detected in the blank sample at a concentration within the range of environmental sample concentrations. Because there is only a single blank sample it cannot be determined if the fluoride contamination was systemic. Also, because fluoride was not simulated in the water-quality modeling study, this contamination did not substantially affect development of return-flow boundary conditions. In general, results from the field equipment blank indicate that the overall process of sample collection, processing, and analysis did not introduce substantial contamination.

Replicate samples provide information on the precision or reproducibility of analytical results. For this study, replicate samples were obtained in the field by repeating the collection process to obtain two independent composite samples. The precision of analytical results for the constituents was determined by calculating the relative standard deviation of the differences in concentrations between replicate analyses for several sets of samples (Dodge and others, 2007, p. 9). A relative standard deviation of 20 percent or less has been considered as an acceptable level of precision (Dodge and others, 2007; Sando and others, 2007). Most constituents had relative standard deviations less than 20 percent, and many had relative standard deviations of 10 percent or less. Filtered iron; filtered and unfiltered nitrite plus nitrate; and total suspended solids had relative standard deviations greater than 20 percent. Because these constituents were not simulated in the water-quality modeling study, they did not affect study results. Generally, results for replicate samples indicate that the overall process of sample collection, processing, and analysis produced consistent results.

Water-Quality Data

Tables 2–10 provide water-quality data for water- and wastewater-treatment plants along the Red River of the North in North Dakota and Minnesota during January through October 2006. Environmental sample data and QA/QC data are electronically stored and on file at the USGS North Dakota Water Science Center, Bismarck, North Dakota.

Table 1. Locations of sampling sites in the Red River of the North Basin, North Dakota and Minnesota.-

Site number	Site name	Source water for water-treatment plant or type of treatment and frequency of discharge from the wastewater-treatment plant	Description of sample collection location
461604096351900	Water-treatment plant inflow at Breckenridge, Minnesota	Ground water	Source water tap inside wastewater-treatment plant
461605096352000	Water-treatment plant outflow at Breckenridge, Minnesota		Sample water tap before treated water is released into the water distribution system
461557096353500	Wastewater-treatment plant influent at Breckenridge, Minnesota		Second Street lift station
461834096333400	Wastewater-treatment plant effluent at Breckenridge, Minnesota	Secondary treatment, intermittent discharge	Final pond of lagoon system on 2/7/2006 and 3/1/2006 when wastewater was not being discharged from the lagoon system; Discharge pipe for remaining samples when wastewater was being discharged from lagoon system
461921096363800	Water-treatment plant inflow at Wahpeton, North Dakota		Source water tap inside wastewater-treatment plant
461922096363900	Water-treatment plant outflow at Wahpeton, North Dakota	Ground water	Sample water tap before water goes into the water distribution system
461749096363800	Wastewater-treatment plant influent at Wahpeton		Cell #1, primary influent pond
462009096371600	Wastewater-treatment plant effluent at Wahpeton	Secondary treatment, intermittent discharge	Final pond of lagoon system on 2/7/2006 and 3/1/2006 when wastewater was not being discharged from the lagoon system; Discharge pipe for remaining samples when wastewater was being discharged from lagoon system
465134096471100	Water-treatment plant inflow at Fargo, North Dakota	Red River of the North/Sheyenne River	Source water tap inside wastewater-treatment plant
465135096471200	Water-treatment plant outflow at Fargo, North Dakota		Sample water tap before water goes into the water distribution system
465520096471500	Wastewater-treatment plant influent at Fargo, North Dakota	Tertiary treatment, continuous discharge	Twenty-four hour composite sample
465529096471400	Wastewater-treatment plant effluent at Fargo, North Dakota		Twenty-four hour composite sample
465308096545800	Water-treatment plant inflow at West Fargo, North Dakota		Hose connected to source water tap in well house
465309096545700	Water-treatment plant outflow at West Fargo, North Dakota	Ground water	Hose connected to sample water tap in well house before water is released into the water distribution system

Table 1. Locations of sampling sites in the Red River of the North Basin, North Dakota and Minnesota.—Continued

Site number	Site name	Source water for water-treatment plant or type of treatment and frequency of discharge from the wastewater-treatment plant	Description of sample collection location
465337096553300	Wastewater-treatment plant influent at West Fargo, North Dakota		Lift station
465355096553600	Wastewater-treatment plant effluent at West Fargo, North Dakota	Secondary treatment, intermittent discharge	Final pond of lagoon system on 1/25/2006 and 2/28/2006 when wastewater was not being discharged from the lagoon system; Discharge pipe for remaining samples when wastewater was being discharged from lagoon system
465242096443800	Water-treatment plant inflow at Moorhead, Minnesota		Source water tap inside wastewater-treatment plant
465241096443700	Water-treatment plant outflow at Moorhead, Minnesota	Red River of the North/Ground water	Sample water tap before water goes into the water distribution system
465340096441500	Wastewater-treatment plant influent at Moorhead, Minnesota		Twenty-four hour composite sample
465339096441600	Wastewater-treatment plant effluent at Moorhead, Minnesota	Tertiary treatment, continuous discharge	Twenty-four hour composite sample
475517097011600	Water-treatment plant inflow at Grand Forks, North Dakota		Source water tap inside wastewater-treatment plant
475516097012400	Water-treatment plant outflow at Grand Forks, North Dakota	Red Lake River/Red River of the North	Sample water tap before water into the water distribution system
475708097083800	Wastewater-treatment plant influent at Grand Forks, North Dakota		Primary influent pond; Twenty-four hour composite sample on 2/27/2006 and 7/20/2006
475704097075500	Wastewater-treatment plant effluent at Grand Forks, North Dakota	Secondary treatment, intermittent discharge	Final pond of lagoon system on 1/24/2006 and 2/27/2006 when wastewater was not being discharged from the lagoon system; Discharge pipe for remaining samples when wastewater was being discharged from lagoon system
475525097003500	Water-treatment plant inflow at East Grand Forks, Minnesota		Source water tap inside wastewater-treatment plant
475526097003400	Water-treatment plant outflow at East Grand Forks, Minnesota	Red Lake River	Sample water tap before water goes into the water distribution system
475608097015300	Wastewater-treatment plant influent at East Grand Forks, Minnesota		Lift station
475828097031500	Wastewater-treatment plant effluent at East Grand Forks, Minnesota	Secondary treatment, intermittent discharge	Final pond of lagoon system on 1/24/2006 and 2/27/2006 when wastewater was not being discharged from the lagoon system; Discharge pipe for remaining samples when wastewater was being discharged from lagoon system

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Table 2. Analytical results for water-quality samples collected from the Breckenridge, Minnesota, water- and wastewater-treatment plants.

[NTRU, nephelometric turbidity ratio unit; $\mu\text{S}/\text{cm}$, microsiemens per centimeter; $^{\circ}\text{C}$, degrees Celsius; mg/L , milligrams per liter; CaCO_3 , calcium carbonate; --, no data; ANC, acid neutralizing capacity; <, less than; BOD, biochemical oxygen demand; mL , milliliters; $\mu\text{g}/\text{L}$, micrograms per liter; NBOD, nitrogenous biochemical oxygen demand; >, greater than]

Location and USGS station number	Sample date	Sample time	Turbidity (NTRU)	pH, field (standard unit)	Specific conductance, field ($\mu\text{S}/\text{cm}$ at 25°C)	Water temperature ($^{\circ}\text{C}$)	Hardness (mg/L as CaCO_3)	Noncarbonate hardness (mg/L as CaCO_3)
Water-treatment plant inflow								
461604096351900	02/07/06	0955	--	7.7	995	8.7	430	48
461604096351900	03/01/06	0805	--	7.6	982	7.9	440	60
461604096351900	05/09/06	0800	17	7.6	1,020	10.3	400	--
461604096351900	07/19/06	1220	22	7.5	1,000	13.1	420	30
461604096351900	08/28/06	0935	17	7.5	992	13.3	400	11
461604096351900	10/30/06	1315	18	7.6	992	9.5	410	14
Water-treatment plant outflow								
461605096352000	02/07/06	1000	--	9.2	525	8.2	130	43
461605096352000	03/01/06	0800	--	9.2	530	4.5	140	49
461605096352000	05/09/06	0810	1.8	9.6	564	10.7	140	--
461605096352000	07/19/06	1230	1.4	9.2	533	12.8	120	48
461605096352000	08/28/06	0930	1.3	9.4	544	13.4	120	38
461605096352000	10/30/06	1320	2.2	9.2	537	10.4	130	48
Wastewater-treatment plant influent								
461557096353500	02/07/06	1115	--	8.0	3,010	2.0	1,300	890
461557096353500	03/01/06	0830	--	8.1	2,610	8.9	970	610
461557096353500	05/09/06	0830	65	7.7	3,560	14.5	1,700	--
461557096353500	07/19/06	1140	110	7.7	2,360	20	850	520
461557096353500	08/28/06	1050	230	7.6	2,400	19.7	850	490
461557096353500	10/30/06	1330	120	8.0	2,240	15.3	840	500
Wastewater-treatment plant effluent								
461834096333400	02/07/06	1055	--	8.0	3,260	10.2	1,500	1,100
461834096333400	03/01/06	0845	--	8.4	3,580	1.0	1,800	1,400
461834096333400	05/09/06	0840	18	9.2	2,340	17.5	990	--
461834096333400	07/19/06	1200	60	8.6	3,160	24.5	1,500	1,100
461834096333400	08/28/06	1100	82	9.2	3,210	22.7	1,500	1,200
461834096333400	10/30/06	1345	36	8.9	2,820	6.2	1,300	930

Table 2. Analytical results for water-quality samples collected from the Breckenridge, Minnesota, water- and wastewater-treatment plants.—Continued

[NTRU, nephelometric turbidity ratio unit; $\mu\text{S}/\text{cm}$, microsiemens per centimeter; $^{\circ}\text{C}$, degrees Celsius; mg/L , milligrams per liter; CaCO_3 , calcium carbonate; --, no data; ANC, acid neutralizing capacity; <, less than; BOD, biochemical oxygen demand; mL, milliliters; $\mu\text{g}/\text{L}$, micrograms per liter; NBOD, nitrogenous biochemical oxygen demand; >, greater than]

Location and USGS station number	Sample date	Sample time	Calcium, filtered (mg/L)	Calcium, unfiltered recoverable (mg/L)	Magnesium, filtered (mg/L)	Magnesium, unfiltered recoverable (mg/L)	Potassium, filtered (mg/L)	Potassium, unfiltered recoverable (mg/L)
Water-treatment plant inflow								
461604096351900	02/07/06	0955	--	106	--	41.0	--	6.5
461604096351900	03/01/06	0805	--	108	--	41.5	--	6.7
461604096351900	05/09/06	0800	--	95.4	--	39.9	--	6.4
461604096351900	07/19/06	1220	100	--	40.3	--	7.09	--
461604096351900	08/28/06	0935	94.2	--	40.1	--	6.82	--
461604096351900	10/30/06	1315	100	--	38.6	--	6.00	--
Water-treatment plant outflow								
461605096352000	02/07/06	1000	--	30.7	--	13.1	--	6.5
461605096352000	03/01/06	0800	--	28.5	--	17.0	--	6.5
461605096352000	05/09/06	0810	--	26.1	--	19.5	--	7.4
461605096352000	07/19/06	1230	22.6	--	16.7	--	6.58	--
461605096352000	08/28/06	0930	27.7	--	12.1	--	6.84	--
461605096352000	10/30/06	1320	28.3	--	13.4	--	6.04	--
Wastewater-treatment plant influent								
461557096353500	02/07/06	1115	--	172	--	204	--	17.2
461557096353500	03/01/06	0830	--	131	--	156	--	16.9
461557096353500	05/09/06	0830	--	222	--	273	--	14.7
461557096353500	07/19/06	1140	117	--	136	--	17.4	--
461557096353500	08/28/06	1050	116	--	135	--	18.7	--
461557096353500	10/30/06	1330	120	--	130	--	17.8	--
Wastewater-treatment plant effluent								
461834096333400	02/07/06	1055	--	191	--	244	--	20.3
461834096333400	03/01/06	0845	--	236	--	291	--	23.6
461834096333400	05/09/06	0840	--	130	--	161	--	13.4
461834096333400	07/19/06	1200	192	--	246	--	21.8	--
461834096333400	08/28/06	1100	171	--	265	--	26.5	--
461834096333400	10/30/06	1345	158	--	210	--	18.0	--

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Table 2. Analytical results for water-quality samples collected from the Breckenridge, Minnesota, water- and wastewater-treatment plants.—Continued

[NTRU, nephelometric turbidity ratio unit; $\mu\text{S}/\text{cm}$, microsiemens per centimeter; $^{\circ}\text{C}$, degrees Celsius; mg/L , milligrams per liter; CaCO_3 , calcium carbonate; --, no data; ANC, acid neutralizing capacity; <, less than; BOD, biochemical oxygen demand; mL , milliliters; $\mu\text{g}/\text{L}$, micrograms per liter; NBOD, nitrogenous biochemical oxygen demand; >, greater than]

Location and USGS station number	Sample date	Sample time	Sodium adsorption ratio (number)	Sodium fraction of cations (percent in equivalents of major cations)	Sodium, filtered (mg/L)	Sodium, unfiltered recoverable (mg/L)	ANC, unfiltered (mg/L as CaCO_3)	Bicarbonate, unfiltered (mg/L)
Water-treatment plant inflow								
461604096351900	02/07/06	0955	1.1	21	--	53.6	385	469
461604096351900	03/01/06	0805	1.1	21	--	54.0	379	463
461604096351900	05/09/06	0800	1.1	21	--	49.5	395	482
461604096351900	07/19/06	1220	1.1	21	50.3	--	385	470
461604096351900	08/28/06	0935	1.2	24	57.3	--	389	474
461604096351900	10/30/06	1315	1.0	20	46.9	--	393	480
Water-treatment plant outflow								
461605096352000	02/07/06	1000	2.0	45	--	53.3	87	67
461605096352000	03/01/06	0800	1.9	43	--	52.6	92	76
461605096352000	05/09/06	0810	1.8	41	--	50.1	103	75
461605096352000	07/19/06	1230	1.9	46	50.3	--	78	64
461605096352000	08/28/06	0930	2.2	50	55.3	--	81	64
461605096352000	10/30/06	1320	1.8	45	46.9	--	79	73
Wastewater-treatment plant influent								
461557096353500	02/07/06	1115	2.8	28	--	230	386	471
461557096353500	03/01/06	0830	2.9	31	--	204	363	443
461557096353500	05/09/06	0830	2.4	22	--	221	442	540
461557096353500	07/19/06	1140	2.5	30	165	--	332	405
461557096353500	08/28/06	1050	3.0	34	197	--	353	430
461557096353500	10/30/06	1330	2.3	28	153	--	335	409
Wastewater-treatment plant effluent								
461834096333400	02/07/06	1055	2.9	27	--	254	364	444
461834096333400	03/01/06	0845	3.0	26	--	297	441	537
461834096333400	05/09/06	0840	2.3	26	--	164	274	225
461834096333400	07/19/06	1200	2.6	25	234	--	390	399
461834096333400	08/28/06	1100	3.5	31	311	--	361	238
461834096333400	10/30/06	1345	2.6	27	213	--	330	363

Table 2. Analytical results for water-quality samples collected from the Breckenridge, Minnesota, water- and wastewater-treatment plants.—Continued

[NTRU, nephelometric turbidity ratio unit; $\mu\text{S}/\text{cm}$, microsiemens per centimeter; $^{\circ}\text{C}$, degrees Celsius; mg/L , milligrams per liter; CaCO_3 , calcium carbonate; --, no data; ANC, acid neutralizing capacity; <, less than; BOD, biochemical oxygen demand; mL, milliliters; $\mu\text{g}/\text{L}$, micrograms per liter; NBOD, nitrogenous biochemical oxygen demand; >, greater than]

Location and USGS station number	Sample date	Sample time	Carbonate, unfiltered (mg/L)	Hydroxide, unfiltered (mg/L)	Chloride, filtered (mg/L)	Fluoride, filtered (mg/L)	Silica, filtered (mg/L)	Silica, unfiltered (mg/L)
Water-treatment plant inflow								
461604096351900	02/07/06	0955	<1	<1	10.3	0.41	--	27.5
461604096351900	03/01/06	0805	<1	<1	10.5	.38	--	29.6
461604096351900	05/09/06	0800	<1	<1	10.3	.40	--	31.1
461604096351900	07/19/06	1220	<1	<1	10.2	.35	31.4	--
461604096351900	08/28/06	0935	<1	<1	10.1	.35	29.2	--
461604096351900	10/30/06	1315	<1	<1	10.2	.42	28.1	--
Water-treatment plant outflow								
461605096352000	02/07/06	1000	20	<1	12.5	1.19	--	12.7
461605096352000	03/01/06	0800	18	<1	13.5	1.14	--	13.0
461605096352000	05/09/06	0810	25	<1	13.9	1.20	--	15.3
461605096352000	07/19/06	1230	15	<1	14.7	1.25	14.3	--
461605096352000	08/28/06	0930	17	<1	14.8	1.19	11.6	--
461605096352000	10/30/06	1320	11	<1	15.8	1.18	11.5	--
Wastewater-treatment plant influent								
461557096353500	02/07/06	1115	<1	<1	109	.90	--	21.6
461557096353500	03/01/06	0830	<1	<1	132	.91	--	17.2
461557096353500	05/09/06	0830	<1	<1	96.6	.81	--	23.8
461557096353500	07/19/06	1140	<1	<1	78.4	1.17	20.6	--
461557096353500	08/28/06	1050	<1	<1	82.9	5.78	19.1	--
461557096353500	10/30/06	1330	<1	<1	74.0	.96	18.6	--
Wastewater-treatment plant effluent								
461834096333400	02/07/06	1055	<1	<1	116	.83	--	11.7
461834096333400	03/01/06	0845	<1	<1	139	.92	--	15.6
461834096333400	05/09/06	0840	54	<1	79.4	.59	--	9.7
461834096333400	07/19/06	1200	38	<1	110	.71	44.3	--
461834096333400	08/28/06	1100	100	<1	115	.55	36.7	--
461834096333400	10/30/06	1345	20	<1	108	.72	14.4	--

10 Water-Quality Data for Water- and Wastewater-Treatment Plants Along the Red River of the North

Table 2. Analytical results for water-quality samples collected from the Breckenridge, Minnesota, water- and wastewater-treatment plants.—Continued

[NTRU, nephelometric turbidity ratio unit; $\mu\text{S}/\text{cm}$, microsiemens per centimeter; $^{\circ}\text{C}$, degrees Celsius; mg/L , milligrams per liter; CaCO_3 , calcium carbonate; --, no data; ANC, acid neutralizing capacity; <, less than; BOD, biochemical oxygen demand; mL, milliliters; $\mu\text{g}/\text{L}$, micrograms per liter; NBOD, nitrogenous biochemical oxygen demand; >, greater than]

Location and USGS station number	Sample date	Sample time	Sulfate, filtered (mg/L)	Dissolved solids (mg/L)	Total suspended solids (mg/L)	Ammonia plus organic nitrogen, filtered (mg/L as N)	Ammonia plus organic nitrogen, unfiltered (mg/L as N)	Ammonia, filtered (mg/L as N)
Water-treatment plant inflow								
461604096351900	02/07/06	0955	152	603	<5	1.5	1.3	1.35
461604096351900	03/01/06	0805	153	604	--	1.4	1.5	1.41
461604096351900	05/09/06	0800	152	593	<5	1.6	1.4	1.49
461604096351900	07/19/06	1220	153	620	<5	1.5	1.3	1.21
461604096351900	08/28/06	0935	151	626	<5	1.5	1.4	1.18
461604096351900	10/30/06	1315	156	620	<5	1.4	1.4	1.3
Water-treatment plant outflow								
461605096352000	02/07/06	1000	151	324	<5	.94	.88	.826
461605096352000	03/01/06	0800	152	329	--	1.1	.82	.746
461605096352000	05/09/06	0810	150	332	<5	.86	.79	.771
461605096352000	07/19/06	1230	152	329	<5	.71	.61	.539
461605096352000	08/28/06	0930	150	335	<5	.68	.67	.557
461605096352000	10/30/06	1320	154	334	<5	.47	.44	.437
Wastewater-treatment plant influent								
461557096353500	02/07/06	1115	1,280	2,250	118	36	39	24.1
461557096353500	03/01/06	0830	983	1,840	--	45	50	30.8
461557096353500	05/09/06	0830	1,730	2,830	132	32	34	17.2
461557096353500	07/19/06	1140	897	1,460	167	34	40	31.2
461557096353500	08/28/06	1050	870	1,490	317	33	43	2.65
461557096353500	10/30/06	1330	869	1,440	157	33	36	26.1
Wastewater-treatment plant effluent								
461834096333400	02/07/06	1055	1,510	2,560	9	3.9	4.2	1.34
461834096333400	03/01/06	0845	1,740	2,990	--	2.4	5.3	2.24
461834096333400	05/09/06	0840	982	1,700	22	2.8	3.6	.449
461834096333400	07/19/06	1200	1,500	1,920	48	3.7	3.7	.920
461834096333400	08/28/06	1100	1,560	1,980	72	2.2	2.1	.011
461834096333400	10/30/06	1345	1,290	1,750	48	4.5	4.8	1.95

Table 2. Analytical results for water-quality samples collected from the Breckenridge, Minnesota, water- and wastewater-treatment plants.—Continued

[NTRU, nephelometric turbidity ratio unit; $\mu\text{S}/\text{cm}$, microsiemens per centimeter; $^{\circ}\text{C}$, degrees Celsius; mg/L , milligrams per liter; CaCO_3 , calcium carbonate; --, no data; ANC, acid neutralizing capacity; <, less than; BOD, biochemical oxygen demand; mL , milliliters; $\mu\text{g}/\text{L}$, micrograms per liter; NBOD, nitrogenous biochemical oxygen demand; >, greater than]

Location and USGS station number	Sample date	Sample time	Ammonia, unfiltered (mg/L as N)	Nitrite plus nitrate, filtered (mg/L as N)	Nitrite plus nitrate, unfiltered (mg/L as N)	Total nitrogen, filtered (mg/L)	Total nitrogen, unfiltered (mg/L)	Phosphorus, filtered (mg/L)
Water-treatment plant inflow								
461604096351900	02/07/06	0955	1.25	<0.020	<0.020	1.48	1.35	0.017
461604096351900	03/01/06	0805	1.44	<.020	.02	1.47	1.49	.033
461604096351900	05/09/06	0800	1.39	.021	.02	1.66	1.45	.050
461604096351900	07/19/06	1220	1.21	<.020	<.020	1.50	1.36	<.004
461604096351900	08/28/06	0935	1.24	.022	.02	1.50	1.43	.020
461604096351900	10/30/06	1315	1.34	.030	.05	1.47	1.40	.004
Water-treatment plant outflow								
461605096352000	02/07/06	1000	.80	.549	.54	1.49	1.42	.302
461605096352000	03/01/06	0800	.79	.615	.60	1.69	1.42	.329
461605096352000	05/09/06	0810	.79	.570	.54	1.43	1.33	.332
461605096352000	07/19/06	1230	.55	.715	.72	1.43	1.33	.329
461605096352000	08/28/06	0930	.58	.762	.78	1.44	1.45	.311
461605096352000	10/30/06	1320	.49	.809	.78	1.28	1.22	.206
Wastewater-treatment plant influent								
461557096353500	02/07/06	1115	31.4	.590	.02	36.8	38.9	3.86
461557096353500	03/01/06	0830	28.6	.281	.24	45.3	50.0	5.01
461557096353500	05/09/06	0830	17.0	1.25	1.18	33.1	34.9	3.37
461557096353500	07/19/06	1140	31.7	.028	.03	34.4	39.7	3.93
461557096353500	08/28/06	1050	3.17	.020	.03	32.6	43.1	3.86
461557096353500	10/30/06	1330	26.0	.202	.19	32.9	36.2	3.02
Wastewater-treatment plant effluent								
461834096333400	02/07/06	1055	1.25	<.020	.02	3.91	4.20	2.57
461834096333400	03/01/06	0845	2.58	<.020	.02	2.42	5.32	1.93
461834096333400	05/09/06	0840	.473	.066	.07	2.90	3.68	.828
461834096333400	07/19/06	1200	.940	.162	.16	3.86	3.90	2.02
461834096333400	08/28/06	1100	<.01	.045	.04	2.27	2.18	.492
461834096333400	10/30/06	1345	1.86	.052	.05	4.54	4.88	.531

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Table 2. Analytical results for water-quality samples collected from the Breckenridge, Minnesota, water- and wastewater-treatment plants.—Continued

[NTRU, nephelometric turbidity ratio unit; µS/cm, microsiemens per centimeter; °C, degrees Celsius; mg/L, milligrams per liter; CaCO₃, calcium carbonate; --, no data; ANC, acid neutralizing capacity; <, less than; BOD, biochemical oxygen demand; mL, milliliters; µg/L, micrograms per liter; NBOD, nitrogenous biochemical oxygen demand; >, greater than]

Location and USGS station number	Sample date	Sample time	Phosphorus, unfiltered (mg/L)	Organic carbon, filtered (mg/L)	Organic carbon, unfiltered (mg/L)	BOD, 20-day (mg/L)	BOD, 5-day (mg/L)	<i>Escherichia coli</i> (colonies per 100 mL)
Water-treatment plant inflow								
461604096351900	02/07/06	0955	0.104	--	--	--	<40.0	<10
461604096351900	03/01/06	0805	.106	--	--	--	--	--
461604096351900	05/09/06	0800	.117	--	--	--	--	--
461604096351900	07/19/06	1220	.064	--	--	--	--	--
461604096351900	08/28/06	0935	.080	--	--	--	--	--
461604096351900	10/30/06	1315	.067	--	--	--	--	--
Water-treatment plant outflow								
461605096352000	02/07/06	1000	.301	--	--	--	<6.0	<10
461605096352000	03/01/06	0800	.305	--	--	--	--	--
461605096352000	05/09/06	0810	.344	--	--	--	--	--
461605096352000	07/19/06	1230	.323	--	--	--	--	--
461605096352000	08/28/06	0930	.315	--	--	--	--	--
461605096352000	10/30/06	1320	.201	--	--	--	--	--
Wastewater-treatment plant influent								
461557096353500	02/07/06	1115	4.89	--	--	--	74	<10
461557096353500	03/01/06	0830	9.52	--	--	--	--	--
461557096353500	05/09/06	0830	4.35	--	--	--	--	--
461557096353500	07/19/06	1140	5.64	--	--	--	--	--
461557096353500	08/28/06	1050	7.13	--	--	--	--	--
461557096353500	10/30/06	1330	4.40	--	--	--	--	--
Wastewater-treatment plant effluent								
461834096333400	02/07/06	1055	2.74	--	--	--	<40.0	<10
461834096333400	03/01/06	0845	4.08	--	--	--	--	--
461834096333400	05/09/06	0840	1.08	15.9	17.6	34	--	<10
461834096333400	07/19/06	1200	2.29	--	--	--	--	--
461834096333400	08/28/06	1100	.737	--	--	--	--	--
461834096333400	10/30/06	1345	.704	--	--	--	--	70

Table 2. Analytical results for water-quality samples collected from the Breckenridge, Minnesota, water- and wastewater-treatment plants.—Continued

[NTRU, nephelometric turbidity ratio unit; $\mu\text{S}/\text{cm}$, microsiemens per centimeter; $^{\circ}\text{C}$, degrees Celsius; mg/L , milligrams per liter; CaCO_3 , calcium carbonate; --, no data; ANC, acid neutralizing capacity; <, less than; BOD, biochemical oxygen demand; mL , milliliters; $\mu\text{g}/\text{L}$, micrograms per liter; NBOD, nitrogenous biochemical oxygen demand; >, greater than]

Location and USGS station number	Sample date	Sample time	Fecal coliform (colonies per 100 mL)	Iron, filtered ($\mu\text{g}/\text{L}$)	Iron, unfiltered recoverable ($\mu\text{g}/\text{L}$)	Manganese, filtered ($\mu\text{g}/\text{L}$)	Manganese, unfiltered recoverable ($\mu\text{g}/\text{L}$)	NBOD, 20-day (mg/L)
Water-treatment plant inflow								
461604096351900	02/07/06	0955	<10	--	2,510	--	160	--
461604096351900	03/01/06	0805	--	--	460	--	160	--
461604096351900	05/09/06	0800	--	--	1,740	--	150	--
461604096351900	07/19/06	1220	--	827	--	148	--	--
461604096351900	08/28/06	0935	--	785	--	145	--	--
461604096351900	10/30/06	1315	--	415	--	150	--	--
Water-treatment plant outflow								
461605096352000	02/07/06	1000	<10	--	<10	--	<10	--
461605096352000	03/01/06	0800	--	--	60	--	<10	--
461605096352000	05/09/06	0810	--	--	240	--	<10	--
461605096352000	07/19/06	1230	--	17	--	<10	--	--
461605096352000	08/28/06	0930	--	<10	--	<10	--	--
461605096352000	10/30/06	1320	--	13	--	<10	--	--
Wastewater-treatment plant influent								
461557096353500	02/07/06	1115	>1,600	--	360	--	940	--
461557096353500	03/01/06	0830	--	--	200	--	150	--
461557096353500	05/09/06	0830	--	--	1,960	--	200	--
461557096353500	07/19/06	1140	--	182	--	188	--	--
461557096353500	08/28/06	1050	--	86	--	192	--	--
461557096353500	10/30/06	1330	--	127	--	163	--	--
Wastewater-treatment plant effluent								
461834096333400	02/07/06	1055	<10	--	1,040	--	290	--
461834096333400	03/01/06	0845	--	--	200	--	1,240	--
461834096333400	05/09/06	0840	<10	--	480	--	250	10.2
461834096333400	07/19/06	1200	--	105	--	470	--	--
461834096333400	08/28/06	1100	--	55	--	20	--	--
461834096333400	10/30/06	1345	80	48	--	64	--	--

14 Water-Quality Data for Water- and Wastewater-Treatment Plants Along the Red River of the North

Table 3. Analytical results for water-quality samples collected from the Wahpeton, North Dakota, water- and wastewater-treatment plants.

[NTRU, nephelometric turbidity ratio unit; $\mu\text{S}/\text{cm}$, microsiemens per centimeter; $^{\circ}\text{C}$, degrees Celsius; mg/L , milligrams per liter; CaCO_3 , calcium carbonate; --, no data; ANC, acid neutralizing capacity; <, less than; BOD, biochemical oxygen demand; mL , milliliters; $\mu\text{g}/\text{L}$, micrograms per liter; NBOD, nitrogenous biochemical oxygen demand; >, greater than]

Location and USGS station number	Sample date	Sample time	Turbidity (NTRU)	pH, field (standard unit)	Specific conductance, field ($\mu\text{S}/\text{cm}$ at 25°C)	Water temperature ($^{\circ}\text{C}$)	Hardness (mg/L as CaCO_3)	Noncarbonate hardness (mg/L as CaCO_3)
Water-treatment plant inflow								
461921096363800	02/07/06	1305	--	8.7	1,030	8.8	420	25
461921096363800	03/01/06	1105	--	7.4	995	8.4	440	45
461921096363800	05/23/06	1105	18	7.5	1,020	12	440	--
461921096363800	06/13/06	0855	19	7.4	995	9.9	410	--
461921096363800	07/19/06	0825	25	7.5	1,020	22.5	410	27
461921096363800	08/28/06	1245	50	7.6	921	23.4	310	0
Water-treatment plant outflow								
461922096363900	02/07/06	1310	--	7.4	548	8.1	120	40
461922096363900	03/01/06	1055	--	9.1	557	9.0	150	47
461922096363900	05/23/06	1100	<1.0	8.9	587	12.1	160	--
461922096363900	06/13/06	0805	<1.0	9.1	600	12.3	160	--
461922096363900	07/19/06	0820	<1.0	8.7	588	12.3	120	30
461922096363900	08/28/06	1240	1.1	8.9	597	11.7	110	5
Wastewater-treatment plant influent								
461749096363800	02/07/06	1420	--	7.7	2,120	3.3	710	440
461749096363800	03/01/06	1210	--	7.2	2,000	4.1	650	380
461749096363800	05/23/06	1130	61	7.7	2,860	18.2	1,300	--
461749096363800	06/13/06	0925	120	7.7	2,430	19.3	930	--
461749096363800	07/19/06	0850	100	7.5	2,050	23.2	670	350
461749096363800	08/28/06	1400	58	8.6	2,270	24.1	590	350
Wastewater-treatment plant effluent								
462009096371600	02/07/06	1350	--	7.2	2,780	.8	980	540
462009096371600	03/01/06	1200	--	7.2	2,760	.8	1,000	560
462009096371600	05/23/06	1115	50	8.6	2,050	19.6	750	--
462009096371600	06/13/06	0820	24	8.6	2,040	20.0	690	--
462009096371600	07/19/06	0840	14	8.3	2,920	22.8	1,300	850
462009096371600	08/28/06	1350	30	8.5	2,750	23.1	1,100	680

Table 3. Analytical results for water-quality samples collected from the Wahpeton, North Dakota, water- and wastewater-treatment plants.—Continued

[NTRU, nephelometric turbidity ratio unit; $\mu\text{S}/\text{cm}$, microsiemens per centimeter; $^{\circ}\text{C}$, degrees Celsius; mg/L , milligrams per liter; CaCO_3 , calcium carbonate; --, no data; ANC, acid neutralizing capacity; <, less than; BOD, biochemical oxygen demand; mL , milliliters; $\mu\text{g}/\text{L}$, micrograms per liter; NBOD, nitrogenous biochemical oxygen demand; >, greater than]

Location and USGS station number	Sample date	Sample time	Calcium, filtered (mg/L)	Calcium, unfiltered recoverable (mg/L)	Magnesium, filtered (mg/L)	Magnesium, unfiltered recoverable (mg/L)	Potassium, filtered (mg/L)	Potassium, unfiltered recoverable (mg/L)
Water-treatment plant inflow								
461921096363800	02/07/06	1305	--	103	--	40	--	7.0
461921096363800	03/01/06	1105	--	107	--	40.8	--	7.0
461921096363800	05/23/06	1105	--	110	--	41.4	--	11.4
461921096363800	06/13/06	0855	--	99.5	--	38.2	--	8.0
461921096363800	07/19/06	0825	102	--	38.6	--	7.68	--
461921096363800	08/28/06	1245	70.6	--	33.3	--	7.03	--
Water-treatment plant outflow								
461922096363900	02/07/06	1310	--	18.5	--	17.7	--	7.4
461922096363900	03/01/06	1055	--	24.0	--	21.5	--	7.3
461922096363900	05/23/06	1100	--	32.5	--	18.4	--	12.0
461922096363900	06/13/06	0805	--	20.6	--	27	--	8.6
461922096363900	07/19/06	0820	13.4	--	20.3	--	8.39	--
461922096363900	08/28/06	1240	12.1	--	20.2	--	7.61	--
Wastewater-treatment plant influent								
461749096363800	02/07/06	1420	--	123	--	97.6	--	34.3
461749096363800	03/01/06	1210	--	109	--	91.9	--	35.9
461749096363800	05/23/06	1130	--	214	--	183	--	26.7
461749096363800	06/13/06	0925	--	158	--	130	--	27.1
461749096363800	07/19/06	0850	114	--	93.3	--	32.2	--
461749096363800	08/28/06	1400	79.1	--	94.7	--	27.1	--
Wastewater-treatment plant effluent								
462009096371600	02/07/06	1350	--	166	--	137	--	39.7
462009096371600	03/01/06	1200	--	170	--	139	--	41.9
462009096371600	05/23/06	1115	--	131	--	102	--	31.0
462009096371600	06/13/06	0820	--	117	--	97.1	--	32.4
462009096371600	07/19/06	0840	216	--	188	--	34.6	--
462009096371600	08/28/06	1350	170	--	167	--	37.4	--

16 Water-Quality Data for Water- and Wastewater-Treatment Plants Along the Red River of the North

Table 3. Analytical results for water-quality samples collected from the Wahpeton, North Dakota, water- and wastewater-treatment plants.—Continued

[NTRU, nephelometric turbidity ratio unit; $\mu\text{S}/\text{cm}$, microsiemens per centimeter; $^{\circ}\text{C}$, degrees Celsius; mg/L , milligrams per liter; CaCO_3 , calcium carbonate; --, no data; ANC, acid neutralizing capacity; <, less than; BOD, biochemical oxygen demand; mL, milliliters; $\mu\text{g}/\text{L}$, micrograms per liter; NBOD, nitrogenous biochemical oxygen demand; >, greater than]

Location and USGS station number	Sample date	Sample time	Sodium adsorption ratio (number)	Sodium fraction of cations (percent in equivalents of major cations)	Sodium, filtered (mg/L)	Sodium, unfiltered recoverable (mg/L)	ANC, unfiltered (mg/L as CaCO_3)	Bicarbonate, unfiltered (mg/L)
Water-treatment plant inflow								
461921096363800	02/07/06	1305	1.3	23	--	60.1	396	483
461921096363800	03/01/06	1105	1.2	22	--	56.8	389	475
461921096363800	05/23/06	1105	1.1	20	--	52.9	392	478
461921096363800	06/13/06	0855	1.1	21	--	50.0	383	467
461921096363800	07/19/06	0825	1.2	23	56.5	--	386	471
461921096363800	08/28/06	1245	1.4	28	57.5	--	399	487
Water-treatment plant outflow								
461922096363900	02/07/06	1310	2.3	50	--	58.7	79	81
461922096363900	03/01/06	1055	2.0	43	--	55.7	101	81
461922096363900	05/23/06	1100	1.9	40	--	53.9	107	114
461922096363900	06/13/06	0805	1.7	38	--	50.2	121	114
461922096363900	07/19/06	0820	2.6	54	64.3	--	87	95
461922096363900	08/28/06	1240	2.4	53	59.3	--	108	114
Wastewater-treatment plant influent								
461749096363800	02/07/06	1420	2.9	34	--	176	265	323
461749096363800	03/01/06	1210	2.8	34	--	164	276	337
461749096363800	05/23/06	1130	2.3	24	--	189	435	531
461749096363800	06/13/06	0925	2.2	26	--	157	505	617
461749096363800	07/19/06	0850	2.6	34	157	--	315	385
461749096363800	08/28/06	1400	4.3	47	241	--	234	286
Wastewater-treatment plant effluent								
462009096371600	02/07/06	1350	3.1	32	--	226	439	536
462009096371600	03/01/06	1200	3.1	32	--	227	435	531
462009096371600	05/23/06	1115	2.5	30	--	157	272	332
462009096371600	06/13/06	0820	2.5	31	--	150	284	333
462009096371600	07/19/06	0840	2.6	26	219	--	464	549
462009096371600	08/28/06	1350	3.2	32	245	--	432	448

Table 3. Analytical results for water-quality samples collected from the Wahpeton, North Dakota, water- and wastewater-treatment plants.—Continued

[NTRU, nephelometric turbidity ratio unit; $\mu\text{S}/\text{cm}$, microsiemens per centimeter; $^{\circ}\text{C}$, degrees Celsius; mg/L , milligrams per liter; CaCO_3 , calcium carbonate; --, no data; ANC, acid neutralizing capacity; <, less than; BOD, biochemical oxygen demand; mL, milliliters; $\mu\text{g}/\text{L}$, micrograms per liter; NBOD, nitrogenous biochemical oxygen demand; >, greater than]

Location and USGS station number	Sample date	Sample time	Carbonate, unfiltered (mg/L)	Hydroxide, unfiltered (mg/L)	Chloride, filtered (mg/L)	Fluoride, filtered (mg/L)	Silica, filtered (mg/L)	Silica, unfiltered (mg/L)
Water-treatment plant inflow								
461921096363800	02/07/06	1305	<1	<1	13.4	0.47	--	21.4
461921096363800	03/01/06	1105	<1	<1	11.2	.41	--	28.6
461921096363800	05/23/06	1105	<1	<1	11.1	.46	--	31.0
461921096363800	06/13/06	0855	<1	<1	11.1	.38	--	30.5
461921096363800	07/19/06	0825	<1	<1	11.5	.42	34.0	--
461921096363800	08/28/06	1245	<1	<1	12.3	.43	19.4	--
Water-treatment plant outflow								
461922096363900	02/07/06	1310	8	<1	16.2	1.31	--	15.6
461922096363900	03/01/06	1055	21	<1	14.3	1.29	--	20.1
461922096363900	05/23/06	1100	8	<1	14.8	1.43	--	20.5
461922096363900	06/13/06	0805	17	<1	13.7	1.34	--	25.3
461922096363900	07/19/06	0820	6	<1	16.8	1.30	19.4	--
461922096363900	08/28/06	1240	9	<1	17.1	1.21	20.0	--
Wastewater-treatment plant influent								
461749096363800	02/07/06	1420	<1	<1	127	1.05	--	19.6
461749096363800	03/01/06	1210	<1	<1	124	1.20	--	21.1
461749096363800	05/23/06	1130	<1	<1	107	.96	--	27.1
461749096363800	06/13/06	0925	<1	<1	98.9	1.07	--	27.3
461749096363800	07/19/06	0850	<1	<1	105	1.22	24.8	--
461749096363800	08/28/06	1400	<1	<1	121	.86	17.6	--
Wastewater-treatment plant effluent								
462009096371600	02/07/06	1350	<1	<1	147	1.32	--	25.2
462009096371600	03/01/06	1200	<1	<1	158	1.37	--	29.6
462009096371600	05/23/06	1115	<1	<1	111	.96	--	24.9
462009096371600	06/13/06	0820	7	<1	117	.86	--	31.0
462009096371600	07/19/06	0840	8	<1	122	.93	34.2	--
462009096371600	08/28/06	1350	39	<1	122	.94	32.5	--

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Table 3. Analytical results for water-quality samples collected from the Wahpeton, North Dakota, water- and wastewater-treatment plants.—Continued

[NTRU, nephelometric turbidity ratio unit; $\mu\text{S}/\text{cm}$, microsiemens per centimeter; $^{\circ}\text{C}$, degrees Celsius; mg/L , milligrams per liter; CaCO_3 , calcium carbonate; --, no data; ANC, acid neutralizing capacity; <, less than; BOD, biochemical oxygen demand; mL, milliliters; $\mu\text{g}/\text{L}$, micrograms per liter; NBOD, nitrogenous biochemical oxygen demand; >, greater than]

Location and USGS station number	Sample date	Sample time	Sulfate, filtered (mg/L)	Dissolved solids (mg/L)	Total suspended solids (mg/L)	Ammonia plus organic nitrogen, filtered (mg/L as N)	Ammonia plus organic nitrogen, unfiltered (mg/L as N)	Ammonia, filtered (mg/L as N)
Water-treatment plant inflow								
461921096363800	02/07/06	1305	164	628	<5	1.3	1.3	1.24
461921096363800	03/01/06	1105	161	620	--	1.4	1.3	1.31
461921096363800	05/23/06	1105	164	628	<5	1.4	1.4	1.26
461921096363800	06/13/06	0855	160	599	<5	1.6	1.5	1.23
461921096363800	07/19/06	0825	149	626	5	1.6	1.3	1.26
461921096363800	08/28/06	1245	96.7	578	12	1.4	1.3	1.24
Water-treatment plant outflow								
461922096363900	02/07/06	1310	162	330	<5	1.0	1.0	1.07
461922096363900	03/01/06	1055	160	345	--	1.2	1.1	1.07
461922096363900	05/23/06	1100	163	360	<5	1.1	.99	.989
461922096363900	06/13/06	0805	160	355	<5	1.1	1.0	1.01
461922096363900	07/19/06	0820	164	360	<5	1.1	1.0	1.04
461922096363900	08/28/06	1240	154	368	<5	1.1	1.1	1.05
Wastewater-treatment plant influent								
461749096363800	02/07/06	1420	735	1,450	74	23	31	17.1
461749096363800	03/01/06	1210	664	1,360	--	24	34	19.2
461749096363800	05/23/06	1130	1,130	2,110	77	16	28	14.1
461749096363800	06/13/06	0925	792	1,670	81	19	--	17.3
461749096363800	07/19/06	0850	670	1,260	84	18	31	14.1
461749096363800	08/28/06	1400	868	1,410	81	5.5	13	2.23
Wastewater-treatment plant effluent								
462009096371600	02/07/06	1350	948	1,930	11	32	34	27.7
462009096371600	03/01/06	1200	954	1,950	--	31	34	27.4
462009096371600	05/23/06	1115	707	1,410	64	12	17	8.65
462009096371600	06/13/06	0820	700	1,390	27	12	12	10.5
462009096371600	07/19/06	0840	1,200	1,820	16	7.7	7.6	4.76
462009096371600	08/28/06	1350	1,080	1,700	29	3.9	3.9	1.6

Table 3. Analytical results for water-quality samples collected from the Wahpeton, North Dakota, water- and wastewater-treatment plants.—Continued

[NTRU, nephelometric turbidity ratio unit; $\mu\text{S}/\text{cm}$, microsiemens per centimeter; $^{\circ}\text{C}$, degrees Celsius; mg/L , milligrams per liter; CaCO_3 , calcium carbonate; --, no data; ANC, acid neutralizing capacity; <, less than; BOD, biochemical oxygen demand; mL , milliliters; $\mu\text{g}/\text{L}$, micrograms per liter; NBOD, nitrogenous biochemical oxygen demand; >, greater than]

Location and USGS station number	Sample date	Sample time	Ammonia, unfiltered (mg/L as N)	Nitrite plus nitrate, filtered (mg/L as N)	Nitrite plus nitrate, unfiltered (mg/L as N)	Total nitrogen, filtered (mg/L)	Total nitrogen, unfiltered (mg/L)	Phosphorus, filtered (mg/L)
Water-treatment plant inflow								
461921096363800	02/07/06	1305	1.16	<0.020	<0.020	1.36	1.33	0.031
461921096363800	03/01/06	1105	1.38	<.020	.02	1.45	1.33	.076
461921096363800	05/23/06	1105	1.26	<.020	<.020	1.44	1.38	.027
461921096363800	06/13/06	0855	1.17	.022	.05	1.59	1.54	<.004
461921096363800	07/19/06	0825	1.19	<.020	.02	1.65	1.30	<.004
461921096363800	08/28/06	1245	1.32	<.020	<.020	1.45	1.36	.009
Water-treatment plant outflow								
461922096363900	02/07/06	1310	1.01	.105	.11	1.14	1.12	.342
461922096363900	03/01/06	1055	1.13	.100	.11	1.27	1.17	.293
461922096363900	05/23/06	1100	1.02	.120	.13	1.18	1.12	.149
461922096363900	06/13/06	0805	1.02	.138	.23	1.22	1.24	.180
461922096363900	07/19/06	0820	1.04	.134	.14	1.26	1.17	.242
461922096363900	08/28/06	1240	1.07	.080	.07	1.21	1.13	.130
Wastewater-treatment plant influent								
461749096363800	02/07/06	1420	18.5	.213	.02	22.9	31.0	2.51
461749096363800	03/01/06	1210	19.4	.318	.24	24.0	33.8	2.80
461749096363800	05/23/06	1130	14.5	.023	.04	16.5	28.4	2.22
461749096363800	06/13/06	0925	16.5	<.020	--	19.2	--	.624
461749096363800	07/19/06	0850	13.7	<.020	.10	17.8	31.3	.113
461749096363800	08/28/06	1400	2.28	.029	.04	5.5	12.7	.140
Wastewater-treatment plant effluent								
462009096371600	02/07/06	1350	27.8	.215	.02	32.5	34.2	3.79
462009096371600	03/01/06	1200	29.2	<.020	.03	31.2	33.9	4.42
462009096371600	05/23/06	1115	8.80	.128	.11	11.7	17.3	2.07
462009096371600	06/13/06	0820	10.5	.063	.06	11.9	12.1	1.96
462009096371600	07/19/06	0840	4.62	.740	.76	8.47	8.35	1.82
462009096371600	08/28/06	1350	1.59	1.65	1.69	5.51	5.62	2.07

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Table 3. Analytical results for water-quality samples collected from the Wahpeton, North Dakota, water- and wastewater-treatment plants.—Continued

[NTRU, nephelometric turbidity ratio unit; $\mu\text{S/cm}$, microsiemens per centimeter; $^{\circ}\text{C}$, degrees Celsius; mg/L, milligrams per liter; CaCO_3 , calcium carbonate; --, no data; ANC, acid neutralizing capacity; <, less than; BOD, biochemical oxygen demand; mL, milliliters; $\mu\text{g/L}$, micrograms per liter; NBOD, nitrogenous biochemical oxygen demand; >, greater than]

Location and USGS station number	Sample date	Sample time	Phosphorus, unfiltered (mg/L)	Organic carbon, filtered (mg/L)	Organic carbon, unfiltered (mg/L)	BOD, 20-day (mg/L)	BOD, 5-day (mg/L)	<i>Escherichia coli</i> (colonies per 100 mL)
Water-treatment plant inflow								
461921096363800	02/07/06	1305	0.083	--	--	--	<40.0	<10
461921096363800	03/01/06	1105	.093	--	--	--	--	--
461921096363800	05/23/06	1105	.093	--	--	--	--	--
461921096363800	06/13/06	0855	.062	--	--	--	--	--
461921096363800	07/19/06	0825	.080	--	--	--	--	--
461921096363800	08/28/06	1245	.117	--	--	--	--	--
Water-treatment plant outflow								
461922096363900	02/07/06	1310	.341	--	--	--	<6.0	<10
461922096363900	03/01/06	1055	.282	--	--	--	--	--
461922096363900	05/23/06	1100	.154	--	--	--	--	--
461922096363900	06/13/06	0805	.178	--	--	--	--	--
461922096363900	07/19/06	0820	.236	--	--	--	--	--
461922096363900	08/28/06	1240	.137	--	--	--	--	--
Wastewater-treatment plant influent								
461749096363800	02/07/06	1420	4.36	--	--	--	88	<10
461749096363800	03/01/06	1210	5.11	--	--	--	--	--
461749096363800	05/23/06	1130	4.64	--	--	--	--	--
461749096363800	06/13/06	0925	--	--	--	--	--	--
461749096363800	07/19/06	0850	4.79	--	--	--	--	--
461749096363800	08/28/06	1400	2.91	--	--	--	--	--
Wastewater-treatment plant effluent								
462009096371600	02/07/06	1350	4.14	--	--	--	22	<10
462009096371600	03/01/06	1200	4.92	--	--	--	--	--
462009096371600	05/23/06	1115	3.43	17.1	20.7	120	--	<10
462009096371600	06/13/06	0820	2.33	--	--	--	--	<10
462009096371600	07/19/06	0840	2.00	--	--	--	--	--
462009096371600	08/28/06	1350	2.60	--	--	--	--	--

Table 3. Analytical results for water-quality samples collected from the Wahpeton, North Dakota, water- and wastewater-treatment plants.—Continued

[NTRU, nephelometric turbidity ratio unit; $\mu\text{S}/\text{cm}$, microsiemens per centimeter; $^{\circ}\text{C}$, degrees Celsius; mg/L , milligrams per liter; CaCO_3 , calcium carbonate; --, no data; ANC, acid neutralizing capacity; <, less than; BOD, biochemical oxygen demand; mL , milliliters; $\mu\text{g}/\text{L}$, micrograms per liter; NBOD, nitrogenous biochemical oxygen demand; >, greater than]

Location and USGS station number	Sample date	Sample time	Fecal coliform (colonies per 100 mL)	Iron, filtered ($\mu\text{g}/\text{L}$)	Iron, unfiltered recoverable ($\mu\text{g}/\text{L}$)	Manganese, filtered ($\mu\text{g}/\text{L}$)	Manganese, unfiltered recoverable ($\mu\text{g}/\text{L}$)	NBOD, 20-day (mg/L)
Water-treatment plant inflow								
461921096363800	02/07/06	1305	<10	--	10	--	<10	--
461921096363800	03/01/06	1105	--	--	1,130	--	140	--
461921096363800	05/23/06	1105	--	--	1,660	--	130	--
461921096363800	06/13/06	0855	--	--	1,860	--	140	--
461921096363800	07/19/06	0825	--	42	--	140	--	--
461921096363800	08/28/06	1245	--	1,090	--	105	--	--
Water-treatment plant outflow								
461922096363900	02/07/06	1310	<10	--	1,610	--	130	--
461922096363900	03/01/06	1055	--	--	10	--	<10	--
461922096363900	05/23/06	1100	--	--	<10	--	<10	--
461922096363900	06/13/06	0805	--	--	60	--	<10	--
461922096363900	07/19/06	0820	--	22	--	<10	--	--
461922096363900	08/28/06	1240	--	<10	--	<10	--	--
Wastewater-treatment plant influent								
461749096363800	02/07/06	1420	>1,600	--	1,050	--	260	--
461749096363800	03/01/06	1210	--	--	410	--	200	--
461749096363800	05/23/06	1130	--	--	830	--	210	--
461749096363800	06/13/06	0925	--	--	1,290	--	210	--
461749096363800	07/19/06	0850	--	427	--	163	--	--
461749096363800	08/28/06	1400	--	23	--	286	--	--
Wastewater-treatment plant effluent								
462009096371600	02/07/06	1350	>1,600	--	1,030	--	670	--
462009096371600	03/01/06	1200	--	--	180	--	760	--
462009096371600	05/23/06	1115	<10	--	1,410	--	600	57.4
462009096371600	06/13/06	0820	<10	--	860	--	420	--
462009096371600	07/19/06	0840	--	64	--	381	--	--
462009096371600	08/28/06	1350	--	37	--	221	--	--

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Table 4. Analytical results for water-quality samples collected from the Fargo, North Dakota, water- and wastewater-treatment plants.

[NTRU, nephelometric turbidity ratio unit; $\mu\text{S}/\text{cm}$, microsiemens per centimeter; $^{\circ}\text{C}$, degrees Celsius; mg/L , milligrams per liter; CaCO_3 , calcium carbonate; --, no data; ANC, acid neutralizing capacity; <, less than; BOD, biochemical oxygen demand; mL , milliliters; $\mu\text{g}/\text{L}$, micrograms per liter; NBOD, nitrogenous biochemical oxygen demand; >, greater than]

Location and USGS station number	Sample date	Sample time	Turbidity (NTRU)	pH, field (standard unit)	Specific conductance, field ($\mu\text{S}/\text{cm}$ at 25°C)	Water temperature ($^{\circ}\text{C}$)	Hardness (mg/L as CaCO_3)	Noncarbonate hardness (mg/L as CaCO_3)
Water-treatment plant inflow								
465134096471100	01/25/06	1220	--	8.1	1,130	5.7	430	95
465134096471100	02/28/06	1040	--	7.6	828	6.0	370	120
465134096471100	05/09/06	1250	130	8.3	1,060	18.2	430	--
465134096471100	06/13/06	1155	89	8.3	994	21.7	400	--
465134096471100	07/18/06	1210	36	8.3	698	26.7	270	52
465134096471100	08/29/06	1020	40	8.4	860	21.6	370	110
Water-treatment plant outflow								
465135096471200	01/25/06	1225	--	8.9	896	4.1	130	10
465135096471200	02/28/06	1035	--	8.6	630	3.9	120	11
465135096471200	05/09/06	1255	2.8	9.1	933	16.8	130	--
465135096471200	06/13/06	1200	<1.0	9.1	846	20.9	130	--
465135096471200	07/18/06	1215	1.1	9.0	463	27.1	96	0
465135096471200	08/29/06	1015	1.4	9.0	794	22.5	190	32
Wastewater-treatment plant influent								
465520096471500	01/25/06	1340	--	7.6	1,970	14.8	390	89
465520096471500	02/28/06	1200	--	7.2	1,720	6.1	330	50
465520096471500	05/09/06	1320	130	7.4	2,080	13.6	660	--
465520096471500	06/13/06	1230	170	7.5	1,870	11.7	430	--
465520096471500	07/18/06	1235	150	7.3	1,380	9.9	310	42
465520096471500	08/29/06	1040	210	7.7	1,600	7.1	310	22
Wastewater-treatment plant effluent								
465529096471400	01/25/06	1335	--	7.9	1,680	13.9	360	220
465529096471400	02/28/06	1155	--	7.1	1,600	5.4	340	220
465529096471400	05/09/06	1310	19	7.7	1,970	13.6	550	--
465529096471400	06/13/06	1235	14	7.7	1,780	8.8	420	--
465529096471400	07/18/06	1240	7.6	7.4	1,260	9.2	300	190
465529096471400	08/29/06	1035	9.9	7.7	1,430	6.1	300	200

Table 4. Analytical results for water-quality samples collected from the Fargo, North Dakota, water- and wastewater-treatment plants.—Continued

[NTRU, nephelometric turbidity ratio unit; $\mu\text{S}/\text{cm}$, microsiemens per centimeter; $^{\circ}\text{C}$, degrees Celsius; mg/L , milligrams per liter; CaCO_3 , calcium carbonate; --, no data; ANC, acid neutralizing capacity; <, less than; BOD, biochemical oxygen demand; mL, milliliters; $\mu\text{g}/\text{L}$, micrograms per liter; NBOD, nitrogenous biochemical oxygen demand; >, greater than]

Location and USGS station number	Sample date	Sample time	Calcium, filtered (mg/L)	Calcium, unfiltered recoverable (mg/L)	Magnesium, filtered (mg/L)	Magnesium, unfiltered recoverable (mg/L)	Potassium, filtered (mg/L)	Potassium, unfiltered recoverable (mg/L)
Water-treatment plant inflow								
465134096471100	01/25/06	1220	--	86.4	--	51.7	--	9.2
465134096471100	02/28/06	1040	--	69.8	--	48.3	--	6.0
465134096471100	05/09/06	1250	--	90.8	--	49.4	--	9.9
465134096471100	06/13/06	1155	--	86.4	--	43.7	--	10.0
465134096471100	07/18/06	1210	50.2	--	34.7	--	12.9	--
465134096471100	08/29/06	1020	83.0	--	40.2	--	10.9	--
Water-treatment plant outflow								
465135096471200	01/25/06	1225	--	33.4	--	10.9	--	9.2
465135096471200	02/28/06	1035	--	25.1	--	13.0	--	6.1
465135096471200	05/09/06	1255	--	37.0	--	9.7	--	9.2
465135096471200	06/13/06	1200	--	36.3	--	8.7	--	9.3
465135096471200	07/18/06	1215	22.8	--	9.4	--	11.5	--
465135096471200	08/29/06	1015	67.0	--	5.9	--	10.7	--
Wastewater-treatment plant influent								
465520096471500	01/25/06	1340	--	73.6	--	50.7	--	21.9
465520096471500	02/28/06	1200	--	64.0	--	42.2	--	17.9
465520096471500	05/09/06	1320	--	112	--	92.2	--	20.8
465520096471500	06/13/06	1230	--	86.5	--	51.4	--	19.9
465520096471500	07/18/06	1235	65.8	--	35.2	--	16.7	--
465520096471500	08/29/06	1040	61.2	--	38.6	--	19.4	--
Wastewater-treatment plant effluent								
465529096471400	01/25/06	1335	--	64.9	--	47.6	--	21.1
465529096471400	02/28/06	1155	--	67.9	--	41.9	--	17.3
465529096471400	05/09/06	1310	--	89.5	--	78.4	--	15.4
465529096471400	06/13/06	1235	--	79.2	--	54.0	--	18.8
465529096471400	07/18/06	1240	58.8	--	37.5	--	15.8	--
465529096471400	08/29/06	1035	63.5	--	34.6	--	18.8	--

24 Water-Quality Data for Water- and Wastewater-Treatment Plants Along the Red River of the North

Table 4. Analytical results for water-quality samples collected from the Fargo, North Dakota, water- and wastewater-treatment plants.—Continued

[NTRU, nephelometric turbidity ratio unit; $\mu\text{S}/\text{cm}$, microsiemens per centimeter; $^{\circ}\text{C}$, degrees Celsius; mg/L , milligrams per liter; CaCO_3 , calcium carbonate; --, no data; ANC, acid neutralizing capacity; <, less than; BOD, biochemical oxygen demand; mL, milliliters; $\mu\text{g}/\text{L}$, micrograms per liter; NBOD, nitrogenous biochemical oxygen demand; >, greater than]

Location and USGS station number	Sample date	Sample time	Sodium adsorption ratio (number)	Sodium fraction of cations (percent in equivalents of major cations)	Sodium, filtered (mg/L)	Sodium, unfiltered recoverable (mg/L)	ANC, unfiltered (mg/L as CaCO_3)	Bicarbonate, unfiltered (mg/L)
Water-treatment plant inflow								
465134096471100	01/25/06	1220	2.0	32	--	97.5	332	406
465134096471100	02/28/06	1040	.8	18	--	37.3	254	310
465134096471100	05/09/06	1250	1.4	25	--	67.2	270	329
465134096471100	06/13/06	1155	1.1	21	--	51.3	266	325
465134096471100	07/18/06	1210	.8	20	31.9	--	217	255
465134096471100	08/29/06	1020	1.1	23	50.5	--	268	316
Water-treatment plant outflow								
465135096471200	01/25/06	1225	5.3	68	--	139	119	133
465135096471200	02/28/06	1035	3.3	59	--	82.3	107	125
465135096471200	05/09/06	1255	5.0	66	--	131	111	108
465135096471200	06/13/06	1200	4.1	62	--	105	111	104
465135096471200	07/18/06	1215	2.1	51	46.5	--	98	89
465135096471200	08/29/06	1015	2.5	48	80.5	--	160	146
Wastewater-treatment plant influent								
465520096471500	01/25/06	1340	5.2	55	--	235	304	370
465520096471500	02/28/06	1200	4.6	54	--	194	283	345
465520096471500	05/09/06	1320	3.6	40	--	210	342	417
465520096471500	06/13/06	1230	4.0	48	--	191	328	400
465520096471500	07/18/06	1235	3.4	49	136	--	266	325
465520096471500	08/29/06	1040	3.9	53	160	--	288	352
Wastewater-treatment plant effluent								
465529096471400	01/25/06	1335	5.3	56	--	229	142	174
465529096471400	02/28/06	1155	4.6	54	--	194	124	151
465529096471400	05/09/06	1310	3.5	42	--	187	201	245
465529096471400	06/13/06	1235	3.8	47	--	180	166	202
465529096471400	07/18/06	1240	3.2	48	129	--	113	138
465529096471400	08/29/06	1035	3.6	51	145	--	98	120

Table 4. Analytical results for water-quality samples collected from the Fargo, North Dakota, water- and wastewater-treatment plants.—Continued

[NTRU, nephelometric turbidity ratio unit; $\mu\text{S}/\text{cm}$, microsiemens per centimeter; $^{\circ}\text{C}$, degrees Celsius; mg/L , milligrams per liter; CaCO_3 , calcium carbonate; --, no data; ANC, acid neutralizing capacity; <, less than; BOD, biochemical oxygen demand; mL , milliliters; $\mu\text{g}/\text{L}$, micrograms per liter; NBOD, nitrogenous biochemical oxygen demand; >, greater than]

Location and USGS station number	Sample date	Sample time	Carbonate, unfiltered (mg/L)	Hydroxide, unfiltered (mg/L)	Chloride, filtered (mg/L)	Fluoride, filtered (mg/L)	Silica, filtered (mg/L)	Silica, unfiltered (mg/L)
Water-treatment plant inflow								
465134096471100	01/25/06	1220	<1	<1	23.2	0.29	--	24.4
465134096471100	02/28/06	1040	<1	<1	29.6	.16	--	18.9
465134096471100	05/09/06	1250	<1	<1	23.4	.20	--	39.0
465134096471100	06/13/06	1155	<1	<1	23.4	.21	--	35.3
465134096471100	07/18/06	1210	5	<1	32.5	.27	17.6	--
465134096471100	08/29/06	1020	5	<1	32.1	.24	18.2	--
Water-treatment plant outflow								
465135096471200	01/25/06	1225	6	<1	27.5	1.24	--	9.35
465135096471200	02/28/06	1035	2	<1	32.1	1.36	--	7.81
465135096471200	05/09/06	1255	14	<1	27.0	1.40	--	9.63
465135096471200	06/13/06	1200	16	<1	29.5	1.38	--	7.79
465135096471200	07/18/06	1215	15	<1	31.4	1.28	6.50	--
465135096471200	08/29/06	1015	24	<1	35.5	1.22	6.60	--
Wastewater-treatment plant influent								
465520096471500	01/25/06	1340	<1	<1	141	1.34	--	16.2
465520096471500	02/28/06	1200	<1	<1	142	1.45	--	12.6
465520096471500	05/09/06	1320	<1	<1	120	1.27	--	21.8
465520096471500	06/13/06	1230	<1	<1	123	1.61	--	18.7
465520096471500	07/18/06	1235	<1	<1	118	1.64	11.9	--
465520096471500	08/29/06	1040	<1	<1	134	1.65	13.9	--
Wastewater-treatment plant effluent								
465529096471400	01/25/06	1335	<1	<1	116	1.51	--	15.1
465529096471400	02/28/06	1155	<1	<1	135	1.44	--	13.1
465529096471400	05/09/06	1310	<1	<1	113	1.32	--	18.2
465529096471400	06/13/06	1235	<1	<1	122	1.34	--	15.7
465529096471400	07/18/06	1240	<1	<1	115	1.60	13.2	--
465529096471400	08/29/06	1035	<1	<1	125	1.50	13.4	--

26 Water-Quality Data for Water- and Wastewater-Treatment Plants Along the Red River of the North

Table 4. Analytical results for water-quality samples collected from the Fargo, North Dakota, water- and wastewater-treatment plants.—Continued

[NTRU, nephelometric turbidity ratio unit; $\mu\text{S}/\text{cm}$, microsiemens per centimeter; $^{\circ}\text{C}$, degrees Celsius; mg/L , milligrams per liter; CaCO_3 , calcium carbonate; --, no data; ANC, acid neutralizing capacity; <, less than; BOD, biochemical oxygen demand; mL, milliliters; $\mu\text{g}/\text{L}$, micrograms per liter; NBOD, nitrogenous biochemical oxygen demand; >, greater than]

Location and USGS station number	Sample date	Sample time	Sulfate, filtered (mg/L)	Dissolved solids (mg/L)	Total suspended solids (mg/L)	Ammonia plus organic nitrogen, filtered (mg/L as N)	Ammonia plus organic nitrogen, unfiltered (mg/L as N)	Ammonia, filtered (mg/L as N)
Water-treatment plant inflow								
465134096471100	01/25/06	1220	260	733	15	1.0	0.92	0.083
465134096471100	02/28/06	1040	139	486	--	.47	.53	.053
465134096471100	05/09/06	1250	283	691	161	.81	.69	.039
465134096471100	06/13/06	1155	242	621	73	.66	.55	<.010
465134096471100	07/18/06	1210	96.2	427	46	.85	.69	<.010
465134096471100	08/29/06	1020	205	588	48	.56	.56	<.010
Water-treatment plant outflow								
465135096471200	01/25/06	1225	266	562	<5	1.4	1.1	.695
465135096471200	02/28/06	1035	145	370	--	.84	.75	.505
465135096471200	05/09/06	1255	284	571	<5	.99	.93	.626
465135096471200	06/13/06	1200	246	505	<5	.95	.80	.647
465135096471200	07/18/06	1215	74.7	285	<5	1.1	1.0	.587
465135096471200	08/29/06	1015	182	487	<5	.92	.88	.620
Wastewater-treatment plant influent								
465520096471500	01/25/06	1340	459	1,170	238	37	43	29.9
465520096471500	02/28/06	1200	358	990	--	30	46	25.7
465520096471500	05/09/06	1320	607	1,370	244	22	29	20.6
465520096471500	06/13/06	1230	464	1,130	235	26	25	23.3
465520096471500	07/18/06	1235	256	856	290	26	27	22.1
465520096471500	08/29/06	1040	299	992	532	28	28	24.0
Wastewater-treatment plant effluent								
465529096471400	01/25/06	1335	445	1,100	10	1.1	1.6	<.010
465529096471400	02/28/06	1155	389	1,020	--	<.08	.20	.092
465529096471400	05/09/06	1310	582	1,280	14	.70	.90	.501
465529096471400	06/13/06	1235	483	1,150	15	<.08	<.08	.028
465529096471400	07/18/06	1240	256	787	7	.60	1.3	.029
465529096471400	08/29/06	1035	307	880	7	.30	.60	.034

Table 4. Analytical results for water-quality samples collected from the Fargo, North Dakota, water- and wastewater-treatment plants.—Continued

[NTRU, nephelometric turbidity ratio unit; $\mu\text{S}/\text{cm}$, microsiemens per centimeter; $^{\circ}\text{C}$, degrees Celsius; mg/L, milligrams per liter; CaCO_3 , calcium carbonate; --, no data; ANC, acid neutralizing capacity; <, less than; BOD, biochemical oxygen demand; mL, milliliters; $\mu\text{g}/\text{L}$, micrograms per liter; NBOD, nitrogenous biochemical oxygen demand; >, greater than]

Location and USGS station number	Sample date	Sample time	Ammonia, unfiltered (mg/L as N)	Nitrite plus nitrate, filtered (mg/L as N)	Nitrite plus nitrate, unfiltered (mg/L as N)	Total nitrogen, filtered (mg/L)	Total nitrogen, unfiltered (mg/L)	Phosphorus, filtered (mg/L)
Water-treatment plant inflow								
465134096471100	01/25/06	1220	0.08	0.551	0.59	1.57	1.51	0.250
465134096471100	02/28/06	1040	.06	.577	.37	1.05	.90	.192
465134096471100	05/09/06	1250	.02	.860	.81	1.67	1.50	.167
465134096471100	06/13/06	1155	<.01	.413	.40	1.07	.95	.126
465134096471100	07/18/06	1210	<.01	.242	.24	1.09	.93	.121
465134096471100	08/29/06	1020	<.01	.090	.08	.65	.64	.066
Water-treatment plant outflow								
465135096471200	01/25/06	1225	.60	.619	.70	2.03	1.79	.304
465135096471200	02/28/06	1035	.53	.436	.44	1.28	1.19	.449
465135096471200	05/09/06	1255	.63	1.04	1.04	2.03	1.97	.338
465135096471200	06/13/06	1200	.64	.531	.51	1.48	1.31	.360
465135096471200	07/18/06	1215	.61	.387	.40	1.54	1.40	.258
465135096471200	08/29/06	1015	.62	.238	.24	1.16	1.12	.270
Wastewater-treatment plant influent								
465520096471500	01/25/06	1340	29.9	.209	.18	37.4	43.2	4.09
465520096471500	02/28/06	1200	27.8	.118	.04	29.9	45.8	3.16
465520096471500	05/09/06	1320	18.8	<.020	.03	21.8	28.6	2.17
465520096471500	06/13/06	1230	23.8	.043	.03	26.0	24.9	2.64
465520096471500	07/18/06	1235	22.6	<.020	.10	26.0	27.2	2.85
465520096471500	08/29/06	1040	24.2	.105	.09	27.6	27.6	3.26
Wastewater-treatment plant effluent								
465529096471400	01/25/06	1335	.02	20.3	20.3	21.4	21.9	3.81
465529096471400	02/28/06	1155	.11	22.8	22.8	22.4	23.0	3.48
465529096471400	05/09/06	1310	.50	21.6	21.8	22.3	22.7	3.08
465529096471400	06/13/06	1235	.03	25.3	24.8	23.5	23.5	3.10
465529096471400	07/18/06	1240	.02	23.5	23.6	24.1	24.9	4.19
465529096471400	08/29/06	1035	.03	25.7	25.7	26.0	26.3	4.36

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Table 4. Analytical results for water-quality samples collected from the Fargo, North Dakota, water- and wastewater-treatment plants.—Continued

[NTRU, nephelometric turbidity ratio unit; $\mu\text{S}/\text{cm}$, microsiemens per centimeter; $^{\circ}\text{C}$, degrees Celsius; mg/L , milligrams per liter; CaCO_3 , calcium carbonate; --, no data; ANC, acid neutralizing capacity; <, less than; BOD, biochemical oxygen demand; mL, milliliters; $\mu\text{g}/\text{L}$, micrograms per liter; NBOD, nitrogenous biochemical oxygen demand; >, greater than]

Location and USGS station number	Sample date	Sample time	Phosphorus, unfiltered (mg/L)	Organic carbon, filtered (mg/L)	Organic carbon, unfiltered (mg/L)	BOD, 20-day (mg/L)	BOD, 5-day (mg/L)	<i>Escherichia coli</i> (colonies per 100 mL)
Water-treatment plant inflow								
465134096471100	01/25/06	1220	0.275	--	--	--	<30	10
465134096471100	02/28/06	1040	.210	--	--	--	--	--
465134096471100	05/09/06	1250	.311	--	--	--	--	--
465134096471100	06/13/06	1155	.213	--	--	--	--	--
465134096471100	07/18/06	1210	.159	--	--	--	--	--
465134096471100	08/29/06	1020	.119	--	--	--	--	--
Water-treatment plant outflow								
465135096471200	01/25/06	1225	.288	--	--	--	<6	<10
465135096471200	02/28/06	1035	.457	--	--	--	--	--
465135096471200	05/09/06	1255	.346	--	--	--	--	--
465135096471200	06/13/06	1200	.359	--	--	--	--	--
465135096471200	07/18/06	1215	.258	--	--	--	--	--
465135096471200	08/29/06	1015	.281	--	--	--	--	--
Wastewater-treatment plant influent								
465520096471500	01/25/06	1340	8.83	--	--	--	228	>1,600
465520096471500	02/28/06	1200	10.6	--	--	--	--	--
465520096471500	05/09/06	1320	6.06	--	--	--	--	--
465520096471500	06/13/06	1230	6.37	--	--	--	--	--
465520096471500	07/18/06	1235	6.59	--	--	--	--	--
465520096471500	08/29/06	1040	6.10	--	--	--	--	--
Wastewater-treatment plant effluent								
465529096471400	01/25/06	1335	4.41	--	--	--	<6	>1,600
465529096471400	02/28/06	1155	4.78	--	--	--	--	--
465529096471400	05/09/06	1310	3.68	9.8	10.2	20	--	>1,600
465529096471400	06/13/06	1235	3.52	--	--	--	--	40
465529096471400	07/18/06	1240	4.58	--	--	--	--	--
465529096471400	08/29/06	1035	4.68	--	--	--	--	--

Table 4. Analytical results for water-quality samples collected from the Fargo, North Dakota, water- and wastewater-treatment plants.—Continued

[NTRU, nephelometric turbidity ratio unit; $\mu\text{S}/\text{cm}$, microsiemens per centimeter; $^{\circ}\text{C}$, degrees Celsius; mg/L , milligrams per liter; CaCO_3 , calcium carbonate; --, no data; ANC, acid neutralizing capacity; <, less than; BOD, biochemical oxygen demand; mL, milliliters; $\mu\text{g}/\text{L}$, micrograms per liter; NBOD, nitrogenous biochemical oxygen demand; >, greater than]

Location and USGS station number	Sample date	Sample time	Fecal coliform (colonies per 100 mL)	Iron, filtered ($\mu\text{g}/\text{L}$)	Iron, unfiltered recoverable ($\mu\text{g}/\text{L}$)	Manganese, filtered ($\mu\text{g}/\text{L}$)	Manganese, unfiltered recoverable ($\mu\text{g}/\text{L}$)	NBOD, 20-day (mg/L)
Water-treatment plant inflow								
465134096471100	01/25/06	1220	10	--	650	--	140	--
465134096471100	02/28/06	1040	--	--	110	--	30	--
465134096471100	05/09/06	1250	--	--	4,370	--	780	--
465134096471100	06/13/06	1155	--	--	2,960	--	400	--
465134096471100	07/18/06	1210	--	24	--	<10	--	--
465134096471100	08/29/06	1020	--	28	--	<10	--	--
Water-treatment plant outflow								
465135096471200	01/25/06	1225	<10	--	<10	--	<10	--
465135096471200	02/28/06	1035	--	--	20	--	<10	--
465135096471200	05/09/06	1255	--	--	130	--	<10	--
465135096471200	06/13/06	1200	--	--	130	--	<10	--
465135096471200	07/18/06	1215	--	30	--	<10	--	--
465135096471200	08/29/06	1015	--	24	--	<10	--	--
Wastewater-treatment plant influent								
465520096471500	01/25/06	1340	>1,600	--	9,540	--	290	--
465520096471500	02/28/06	1200	--	--	830	--	250	--
465520096471500	05/09/06	1320	--	--	630	--	330	--
465520096471500	06/13/06	1230	--	--	10	--	450	--
465520096471500	07/18/06	1235	--	760	--	228	--	--
465520096471500	08/29/06	1040	--	407	--	220	--	--
Wastewater-treatment plant effluent								
465529096471400	01/25/06	1335	>1,600	--	1,130	--	50	--
465529096471400	02/28/06	1155	--	--	210	--	10	--
465529096471400	05/09/06	1310	>1,600	--	130	--	60	0
465529096471400	06/13/06	1235	40	--	130	--	60	--
465529096471400	07/18/06	1240	--	156	--	<10	--	--
465529096471400	08/29/06	1035	--	126	--	<10	--	--

30 Water-Quality Data for Water- and Wastewater-Treatment Plants Along the Red River of the North

Table 5. Analytical results for water-quality samples collected from the West Fargo, North Dakota, water- and wastewater-treatment plants.

[NTRU, nephelometric turbidity ratio unit; $\mu\text{S}/\text{cm}$, microsiemens per centimeter; $^{\circ}\text{C}$, degrees Celsius; mg/L , milligrams per liter; CaCO_3 , calcium carbonate; --, no data; ANC, acid neutralizing capacity; <, less than; BOD, biochemical oxygen demand; mL , milliliters; $\mu\text{g}/\text{L}$, micrograms per liter; NBOD, nitrogenous biochemical oxygen demand; >, greater than]

Location and USGS station number	Sample date	Sample time	Turbidity (NTRU)	pH, field (standard unit)	Specific conductance, field ($\mu\text{S}/\text{cm}$ at 25°C)	Water temperature ($^{\circ}\text{C}$)	Hardness (mg/L as CaCO_3)	Noncarbonate hardness (mg/L as CaCO_3)
Water-treatment plant inflow								
465308096545800	01/25/06	1020	--	7.8	1,880	8.2	200	0
465308096545800	02/28/06	0800	--	7.5	1,900	7.6	200	0
465308096545800	07/18/06	0955	2.8	7.7	1,880	10.0	200	0
465308096545800	08/02/06	1150	1.8	7.8	1,860	11.7	200	0
465308096545800	08/07/06	1305	2.4	7.9	1,880	12.5	180	0
465308096545800	08/29/06	0825	2.3	7.8	1,880	8.9	190	0
Water-treatment plant outflow								
465309096545700	01/25/06	1025	--	7.6	1,890	8.1	210	0
465309096545700	02/28/06	0755	--	7.2	1,900	7.6	200	0
465309096545700	07/18/06	1000	1.6	7.3	1,890	10	200	0
465309096545700	08/02/06	1155	2.0	7.4	1,870	11.4	200	0
465309096545700	08/07/06	1315	3.9	7.0	1,920	12.6	190	0
465309096545700	08/29/06	0820	1.1	7.4	1,860	8.7	200	0
Wastewater-treatment plant influent								
465337096553300	01/25/06	0930	--	7.8	3,230	11.7	530	0
465337096553300	02/28/06	0910	--	7.4	3,090	9.8	450	0
465337096553300	07/18/06	0935	73	7.3	3,120	17	530	0
465337096553300	08/02/06	1225	170	7.6	4,220	18.9	590	28
465337096553300	08/07/06	1335	150	7.8	3,810	18.5	480	0
465337096553300	08/29/06	0800	280	7.4	2,750	16.6	390	0
Wastewater-treatment plant effluent								
465355096553600	01/25/06	0950	--	8.7	3,380	.4	530	130
465355096553600	02/28/06	0915	--	8.2	3,850	1.0	660	120
465355096553600	07/18/06	0925	9.5	9.2	3,290	23.8	550	76
465355096553600	08/02/06	1220	12	8.4	3,020	24.3	520	0
465355096553600	08/07/06	1340	17	8.6	3,080	24.4	510	0
465355096553600	08/29/06	0755	23	9.2	1,820	18.6	590	75

Table 5. Analytical results for water-quality samples collected from the West Fargo, North Dakota, water- and wastewater-treatment plants.—Continued

[NTRU, nephelometric turbidity ratio unit; $\mu\text{S}/\text{cm}$, microsiemens per centimeter; $^{\circ}\text{C}$, degrees Celsius; mg/L , milligrams per liter; CaCO_3 , calcium carbonate; --, no data; ANC, acid neutralizing capacity; <, less than; BOD, biochemical oxygen demand; mL, milliliters; $\mu\text{g}/\text{L}$, micrograms per liter; NBOD, nitrogenous biochemical oxygen demand; >, greater than]

Location and USGS station number	Sample date	Sample time	Calcium, filtered (mg/L)	Calcium, unfiltered recoverable (mg/L)	Magnesium, filtered (mg/L)	Magnesium, unfiltered recoverable (mg/L)	Potassium, filtered (mg/L)	Potassium, unfiltered recoverable (mg/L)
Water-treatment plant inflow								
465308096545800	01/25/06	1020	--	51.2	--	17.6	--	7.2
465308096545800	02/28/06	0800	--	52.2	--	17.7	--	7.4
465308096545800	07/18/06	0955	50.6	--	17.7	--	6.64	--
465308096545800	08/02/06	1150	50.0	--	17.8	--	6.96	--
465308096545800	08/07/06	1305	45.7	--	17.0	--	7.36	--
465308096545800	08/29/06	0825	45.6	--	17.5	--	7.35	--
Water-treatment plant outflow								
465309096545700	01/25/06	1025	--	53.3	--	17.9	--	7.2
465309096545700	02/28/06	0755	--	50.8	--	17.1	--	7.1
465309096545700	07/18/06	1000	50.2	--	17.6	--	7.34	--
465309096545700	08/02/06	1155	49.7	--	17.6	--	7.27	--
465309096545700	08/07/06	1315	47.7	--	17.5	--	7.58	--
465309096545700	08/29/06	0820	53.8	--	17.2	--	6.73	--
Wastewater-treatment plant influent								
465337096553300	01/25/06	0930	--	102	--	66.3	--	19.2
465337096553300	02/28/06	0910	--	86.9	--	57.2	--	17.7
465337096553300	07/18/06	0935	98.5	--	68.4	--	16.4	--
465337096553300	08/02/06	1225	120	--	69.7	--	19.5	--
465337096553300	08/07/06	1335	94.1	--	58.2	--	23.4	--
465337096553300	08/29/06	0800	79.7	--	47.1	--	16.3	--
Wastewater-treatment plant effluent								
465355096553600	01/25/06	0950	--	78.1	--	82.0	--	18.3
465355096553600	02/28/06	0915	--	101	--	98.6	--	20.8
465355096553600	07/18/06	0925	85.4	--	82.6	--	20.6	--
465355096553600	08/02/06	1220	87.7	--	72.0	--	19.5	--
465355096553600	08/07/06	1340	86.5	--	72.2	--	21.6	--
465355096553600	08/29/06	0755	96.4	--	85.8	--	20.2	--

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Table 5. Analytical results for water-quality samples collected from the West Fargo, North Dakota, water- and wastewater-treatment plants.—Continued

[NTRU, nephelometric turbidity ratio unit; $\mu\text{S}/\text{cm}$, microsiemens per centimeter; $^{\circ}\text{C}$, degrees Celsius; mg/L , milligrams per liter; CaCO_3 , calcium carbonate; --, no data; ANC, acid neutralizing capacity; <, less than; BOD, biochemical oxygen demand; mL, milliliters; $\mu\text{g}/\text{L}$, micrograms per liter; NBOD, nitrogenous biochemical oxygen demand; >, greater than]

Location and USGS station number	Sample date	Sample time	Sodium adsorption ratio (number)	Sodium fraction of cations (percent in equivalents of major cations)	Sodium, filtered (mg/L)	Sodium, unfiltered recoverable (mg/L)	ANC, unfiltered (mg/L as CaCO_3)	Bicarbonate, unfiltered (mg/L)
Water-treatment plant inflow								
465308096545800	01/25/06	1020	10	78	--	333	405	494
465308096545800	02/28/06	0800	9.7	76	--	318	400	488
465308096545800	07/18/06	0955	9.7	77	314	--	397	485
465308096545800	08/02/06	1150	9.7	77	314	--	398	485
465308096545800	08/07/06	1305	12	81	364	--	397	485
465308096545800	08/29/06	0825	12	81	362	--	401	489
Water-treatment plant outflow								
465309096545700	01/25/06	1025	10	77	--	335	384	469
465309096545700	02/28/06	0755	9.6	76	--	311	388	473
465309096545700	07/18/06	1000	9.8	78	316	--	374	456
465309096545700	08/02/06	1155	9.7	78	313	--	372	453
465309096545700	08/07/06	1315	12	81	369	--	334	408
465309096545700	08/29/06	0820	9.1	76	300	--	386	471
Wastewater-treatment plant influent								
465337096553300	01/25/06	0930	9.1	65	--	482	560	684
465337096553300	02/28/06	0910	9.0	67	--	439	566	691
465337096553300	07/18/06	0935	8.0	64	425	--	565	690
465337096553300	08/02/06	1225	11	70	627	--	559	681
465337096553300	08/07/06	1335	12	73	592	--	580	708
465337096553300	08/29/06	0800	7.8	66	354	--	613	747
Wastewater-treatment plant effluent								
465355096553600	01/25/06	0950	10	68	--	554	407	452
465355096553600	02/28/06	0915	10	66	--	613	542	620
465355096553600	07/18/06	0925	9.7	67	525	--	479	356
465355096553600	08/02/06	1220	8.8	66	461	--	544	618
465355096553600	08/07/06	1340	9.7	68	505	--	590	669
465355096553600	08/29/06	0755	9.1	65	510	--	520	405

Table 5. Analytical results for water-quality samples collected from the West Fargo, North Dakota, water- and wastewater-treatment plants.—Continued

[NTRU, nephelometric turbidity ratio unit; $\mu\text{S}/\text{cm}$, microsiemens per centimeter; $^{\circ}\text{C}$, degrees Celsius; mg/L , milligrams per liter; CaCO_3 , calcium carbonate; --, no data; ANC, acid neutralizing capacity; <, less than; BOD, biochemical oxygen demand; mL , milliliters; $\mu\text{g}/\text{L}$, micrograms per liter; NBOD, nitrogenous biochemical oxygen demand; >, greater than]

Location and USGS station number	Sample date	Sample time	Carbonate, unfiltered (mg/L)	Hydroxide, unfiltered (mg/L)	Chloride, filtered (mg/L)	Fluoride, filtered (mg/L)	Silica, filtered (mg/L)	Silica, unfiltered (mg/L)
Water-treatment plant inflow								
465308096545800	01/25/06	1020	<1	<1	335	0.63	--	27.9
465308096545800	02/28/06	0800	<1	<1	341	.64	--	27.9
465308096545800	07/18/06	0955	<1	<1	331	.62	29.4	--
465308096545800	08/02/06	1150	<1	<1	328	.60	29.6	--
465308096545800	08/07/06	1305	<1	<1	343	.67	27.4	--
465308096545800	08/29/06	0825	<1	<1	329	.62	27.7	--
Water-treatment plant outflow								
465309096545700	01/25/06	1025	<1	<1	338	1.17	--	30.4
465309096545700	02/28/06	0755	<1	<1	344	1.24	--	27.4
465309096545700	07/18/06	1000	<1	<1	343	1.44	30.0	--
465309096545700	08/02/06	1155	<1	<1	343	1.39	29.8	--
465309096545700	08/07/06	1315	<1	<1	345	--	38.0	--
465309096545700	08/29/06	0820	<1	<1	340	1.43	28.0	--
Wastewater-treatment plant influent								
465337096553300	01/25/06	0930	<1	<1	478	1.09	--	28.2
465337096553300	02/28/06	0910	<1	<1	448	1.01	--	29.3
465337096553300	07/18/06	0935	<1	<1	452	1.08	32.6	--
465337096553300	08/02/06	1225	<1	<1	684	--	32.4	--
465337096553300	08/07/06	1335	<1	<1	702	--	28.4	--
465337096553300	08/29/06	0800	<1	<1	351	1.08	30.7	--
Wastewater-treatment plant effluent								
465355096553600	01/25/06	0950	22	<1	523	.95	--	21.5
465355096553600	02/28/06	0915	21	<1	610	1.02	--	28.7
465355096553600	07/18/06	0925	112	<1	491	.68	40.4	--
465355096553600	08/02/06	1220	22	<1	363	.60	39.5	--
465355096553600	08/07/06	1340	25	<1	462	--	37.5	--
465355096553600	08/29/06	0755	113	<1	531	.63	40.5	--

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Table 5. Analytical results for water-quality samples collected from the West Fargo, North Dakota, water- and wastewater-treatment plants.—Continued

[NTRU, nephelometric turbidity ratio unit; $\mu\text{S/cm}$, microsiemens per centimeter; $^{\circ}\text{C}$, degrees Celsius; mg/L , milligrams per liter; CaCO_3 , calcium carbonate; --, no data; ANC, acid neutralizing capacity; <, less than; BOD, biochemical oxygen demand; mL, milliliters; $\mu\text{g/L}$, micrograms per liter; NBOD, nitrogenous biochemical oxygen demand; >, greater than]

Location and USGS station number	Sample date	Sample time	Sulfate, filtered (mg/L)	Dissolved solids (mg/L)	Total suspended solids (mg/L)	Ammonia plus organic nitrogen, filtered (mg/L as N)	Ammonia plus organic nitrogen, unfiltered (mg/L as N)	Ammonia, filtered (mg/L as N)
Water-treatment plant inflow								
465308096545800	01/25/06	1020	49.1	1,040	<5	1.6	1.5	1.50
465308096545800	02/28/06	0800	51.0	1,030	--	1.5	1.2	1.32
465308096545800	07/18/06	0955	55.0	1,170	<5	1.6	1.5	1.23
465308096545800	08/02/06	1150	54.7	1,170	<5	1.7	1.6	1.43
465308096545800	08/07/06	1305	57.3	1,180	<5	1.8	1.6	1.27
465308096545800	08/29/06	0825	56.2	1,170	<5	1.6	1.5	1.31
Water-treatment plant outflow								
465309096545700	01/25/06	1025	49.1	1,030	<5	1.4	1.4	1.33
465309096545700	02/28/06	0755	51.0	1,020	--	1.4	1.2	1.21
465309096545700	07/18/06	1000	55.2	1,180	<5	.80	.76	.644
465309096545700	08/02/06	1155	54.8	1,170	<5	.78	.69	.703
465309096545700	08/07/06	1315	56.0	1,190	<5	.66	.58	.454
465309096545700	08/29/06	0820	56.1	1,170	<5	.74	.68	.611
Wastewater-treatment plant influent								
465337096553300	01/25/06	0930	406	1,890	81	36	41	37.4
465337096553300	02/28/06	0910	338	1,730	--	36	40	35.6
465337096553300	07/18/06	0935	364	1,940	109	32	33	28.3
465337096553300	08/02/06	1225	377	2,600	151	36	38	33.7
465337096553300	08/07/06	1335	338	2,320	182	42	44	39.1
465337096553300	08/29/06	0800	266	1,700	287	36	39	3.27
Wastewater-treatment plant effluent								
465355096553600	01/25/06	0950	618	2,120	<5	4.0	4.6	2.12
465355096553600	02/28/06	0915	667	2,440	--	6.2	6.4	3.57
465355096553600	07/18/06	0925	549	2,030	13	2.2	2.2	<.010
465355096553600	08/02/06	1220	298	1,870	11	3.9	6.1	3.41
465355096553600	08/07/06	1340	375	1,880	13	5.8	6.3	2.88
465355096553600	08/29/06	0755	581	2,460	25	1.9	2.4	<.010

Table 5. Analytical results for water-quality samples collected from the West Fargo, North Dakota, water- and wastewater-treatment plants.—Continued

[NTRU, nephelometric turbidity ratio unit; $\mu\text{S}/\text{cm}$, microsiemens per centimeter; $^{\circ}\text{C}$, degrees Celsius; mg/L , milligrams per liter; CaCO_3 , calcium carbonate; --, no data; ANC, acid neutralizing capacity; <, less than; BOD, biochemical oxygen demand; mL, milliliters; $\mu\text{g}/\text{L}$, micrograms per liter; NBOD, nitrogenous biochemical oxygen demand; >, greater than]

Location and USGS station number	Sample date	Sample time	Ammonia, unfiltered (mg/L as N)	Nitrite plus nitrate, filtered (mg/L as N)	Nitrite plus nitrate, unfiltered (mg/L as N)	Total nitrogen, filtered (mg/L)	Total nitrogen, unfiltered (mg/L)	Phosphorus, filtered (mg/L)
Water-treatment plant inflow								
465308096545800	01/25/06	1020	1.52	<0.020	0.02	1.63	1.48	0.070
465308096545800	02/28/06	0800	1.29	.023	.02	1.55	1.27	.060
465308096545800	07/18/06	0955	1.11	.080	.13	1.73	1.61	.034
465308096545800	08/02/06	1150	1.19	<.020	<.02	1.68	1.58	.038
465308096545800	08/07/06	1305	1.21	.021	.02	1.77	1.57	.040
465308096545800	08/29/06	0825	1.32	.022	.02	1.67	1.56	.036
Water-treatment plant outflow								
465309096545700	01/25/06	1025	1.33	.050	.050	1.49	1.44	.819
465309096545700	02/28/06	0755	1.18	.062	.08	1.46	1.29	.120
465309096545700	07/18/06	1000	.57	.114	.12	.92	.88	1.24
465309096545700	08/02/06	1155	.46	.026	.09	.80	.78	.032
465309096545700	08/07/06	1315	.47	.062	.10	.72	.68	20.2
465309096545700	08/29/06	0820	.60	.105	.10	.84	.78	1.29
Wastewater-treatment plant influent								
465337096553300	01/25/06	0930	38.4	.022	.03	36.4	40.6	5.98
465337096553300	02/28/06	0910	34.9	.035	.04	36.1	40.5	7.07
465337096553300	07/18/06	0935	27.3	<.020	.04	32.2	33.1	5.34
465337096553300	08/02/06	1225	21.8	<.020	.03	35.8	38.3	6.26
465337096553300	08/07/06	1335	39.5	.021	.03	41.7	44.5	5.76
465337096553300	08/29/06	0800	3.32	.020	.02	36.2	38.8	6.34
Wastewater-treatment plant effluent								
465355096553600	01/25/06	0950	2.14	<.020	.02	4.06	4.61	3.67
465355096553600	02/28/06	0915	3.49	.021	.03	6.26	6.40	5.32
465355096553600	07/18/06	0925	<.01	<.020	.02	2.18	2.18	.989
465355096553600	08/02/06	1220	2.99	.080	.10	4.02	6.16	2.45
465355096553600	08/07/06	1340	2.83	.097	.08	5.95	6.40	2.00
465355096553600	08/29/06	0755	<.01	<.020	<.02	1.96	2.40	1.43

Table 5. Analytical results for water-quality samples collected from the West Fargo, North Dakota, water- and wastewater-treatment plants.—Continued

[NTRU, nephelometric turbidity ratio unit; $\mu\text{S}/\text{cm}$, microsiemens per centimeter; $^{\circ}\text{C}$, degrees Celsius; mg/L , milligrams per liter; CaCO_3 , calcium carbonate; --, no data; ANC, acid neutralizing capacity; <, less than; BOD, biochemical oxygen demand; mL, milliliters; $\mu\text{g}/\text{L}$, micrograms per liter; NBOD, nitrogenous biochemical oxygen demand; >, greater than]

Location and USGS station number	Sample date	Sample time	Phosphorus, unfiltered (mg/L)	Organic carbon, filtered (mg/L)	Organic carbon, unfiltered (mg/L)	BOD, 20-day (mg/L)	BOD, 5-day (mg/L)	<i>Escherichia coli</i> (colonies per 100 mL)
Water-treatment plant inflow								
465308096545800	01/25/06	1020	0.112	--	--	--	<30	<10
465308096545800	02/28/06	0800	.106	--	--	--	--	--
465308096545800	07/18/06	0955	.074	--	--	--	--	--
465308096545800	08/02/06	1150	.076	--	--	--	--	--
465308096545800	08/07/06	1305	.084	--	--	--	--	--
465308096545800	08/29/06	0825	.076	--	--	--	--	--
Water-treatment plant outflow								
465309096545700	01/25/06	1025	.977	--	--	--	<6	10
465309096545700	02/28/06	0755	.251	--	--	--	--	--
465309096545700	07/18/06	1000	1.28	--	--	--	--	--
465309096545700	08/02/06	1155	.108	--	--	--	--	--
465309096545700	08/07/06	1315	20.2	--	--	--	--	--
465309096545700	08/29/06	0820	1.31	--	--	--	--	--
Wastewater-treatment plant influent								
465337096553300	01/25/06	0930	7.41	--	--	--	<100	>1,600
465337096553300	02/28/06	0910	8.81	--	--	--	--	--
465337096553300	07/18/06	0935	6.20	--	--	--	--	--
465337096553300	08/02/06	1225	7.90	--	--	--	--	--
465337096553300	08/07/06	1335	7.65	--	--	--	--	--
465337096553300	08/29/06	0800	8.28	--	--	--	--	--
Wastewater-treatment plant effluent								
465355096553600	01/25/06	0950	3.87	--	--	--	<6	<10
465355096553600	02/28/06	0915	5.37	--	--	--	--	--
465355096553600	07/18/06	0925	1.15	--	--	--	--	--
465355096553600	08/02/06	1220	2.91	15.9	21	50	--	40
465355096553600	08/07/06	1340	2.44	--	--	--	--	<10
465355096553600	08/29/06	0755	1.84	--	--	--	--	--

Table 5. Analytical results for water-quality samples collected from the West Fargo, North Dakota, water- and wastewater-treatment plants.—Continued

[NTRU, nephelometric turbidity ratio unit; $\mu\text{S}/\text{cm}$, microsiemens per centimeter; $^{\circ}\text{C}$, degrees Celsius; mg/L , milligrams per liter; CaCO_3 , calcium carbonate; --, no data; ANC, acid neutralizing capacity; <, less than; BOD, biochemical oxygen demand; mL , milliliters; $\mu\text{g}/\text{L}$, micrograms per liter; NBOD, nitrogenous biochemical oxygen demand; >, greater than]

Location and USGS station number	Sample date	Sample time	Fecal coliform (colonies per 100 mL)	Iron, filtered ($\mu\text{g}/\text{L}$)	Iron, unfiltered recoverable ($\mu\text{g}/\text{L}$)	Manganese, filtered ($\mu\text{g}/\text{L}$)	Manganese, unfiltered recoverable ($\mu\text{g}/\text{L}$)	NBOD, 20-day (mg/L)
Water-treatment plant inflow								
465308096545800	01/25/06	1020	<10	--	580	--	40	--
465308096545800	02/28/06	0800	--	--	60	--	40	--
465308096545800	07/18/06	0955	--	130	--	35	--	--
465308096545800	08/02/06	1150	--	46	--	33	--	--
465308096545800	08/07/06	1305	--	<10	--	33	--	--
465308096545800	08/29/06	0825	--	73	--	33	--	--
Water-treatment plant outflow								
465309096545700	01/25/06	1025	10	--	540	--	50	--
465309096545700	02/28/06	0755	--	--	50	--	20	--
465309096545700	07/18/06	1000	--	620	--	34	--	--
465309096545700	08/02/06	1155	--	48	--	24	--	--
465309096545700	08/07/06	1315	--	543	--	34	--	--
465309096545700	08/29/06	0820	--	565	--	33	--	--
Wastewater-treatment plant influent								
465337096553300	01/25/06	0930	>1,600	--	650	--	190	--
465337096553300	02/28/06	0910	--	--	190	--	150	--
465337096553300	07/18/06	0935	--	150	--	156	--	--
465337096553300	08/02/06	1225	--	144	--	193	--	--
465337096553300	08/07/06	1335	--	48	--	157	--	--
465337096553300	08/29/06	0800	--	119	--	143	--	--
Wastewater-treatment plant effluent								
465355096553600	01/25/06	0950	<10	--	120	--	650	--
465355096553600	02/28/06	0915	--	--	120	--	850	--
465355096553600	07/18/06	0925	--	46	--	18	--	--
465355096553600	08/02/06	1220	40	62	--	162	--	25.8
465355096553600	08/07/06	1340	20	<10	--	141	--	--
465355096553600	08/29/06	0755	--	59	--	<10	--	--

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Table 6. Analytical results for water-quality samples collected from the Moorhead, Minnesota, water- and wastewater-treatment plants.

[NTRU, nephelometric turbidity ratio unit; $\mu\text{S}/\text{cm}$, microsiemens per centimeter; $^{\circ}\text{C}$, degrees Celsius; mg/L , milligrams per liter; CaCO_3 , calcium carbonate; --, no data; ANC, acid neutralizing capacity; <, less than; BOD, biochemical oxygen demand; mL , milliliters; $\mu\text{g}/\text{L}$, micrograms per liter; NBOD, nitrogenous biochemical oxygen demand; >, greater than]

Location and USGS station number	Sample date	Sample time	Turbidity (NTRU)	pH, field (standard unit)	Specific conductance, field ($\mu\text{S}/\text{cm}$ at 25°C)	Water temperature ($^{\circ}\text{C}$)	Hardness (mg/L as CaCO_3)	Noncarbonate hardness (mg/L as CaCO_3)
Water-treatment plant inflow								
465242096443800	01/25/06	1515	--	7.9	921	11.0	440	180
465242096443800	02/28/06	1305	--	7.7	833	10.9	370	110
465242096443800	05/09/06	1540	25	7.9	1,050	13.8	280	--
465242096443800	06/13/06	1455	32	7.6	903	16.9	420	--
465242096443800	07/18/06	1410	11	7.3	966	15.9	460	140
465242096443800	08/29/06	1320	16	8.0	901	19.8	400	130
Water-treatment plant outflow								
465241096443700	01/25/06	1505	--	9.4	690	4.5	160	82
465241096443700	02/28/06	1300	--	8.8	556	4.2	100	52
465241096443700	05/09/06	1545	1.6	9.2	838	14.1	85	--
465241096443700	06/13/06	1500	<1.0	9.4	717	19.2	97	--
465241096443700	07/18/06	1415	<1.0	9.1	561	21.8	100	45
465241096443700	08/29/06	1315	<1.0	9.4	598	21.5	100	22
Wastewater-treatment plant influent								
465340096441500	01/25/06	1535	--	7.6	1,520	5.7	330	57
465340096441500	02/28/06	1335	--	7.1	1,500	6.7	310	55
465340096441500	05/09/06	1600	98	7.5	1,870	9.9	560	--
465340096441500	06/13/06	1520	120	7.4	1,690	11.1	440	--
465340096441500	07/18/06	1430	150	7.3	1,270	11.7	280	21
465340096441500	08/29/06	1335	220	7.5	1,320	10.3	240	0
Wastewater-treatment plant effluent								
465339096441600	01/25/06	1530	--	7.9	1,390	5.3	310	140
465339096441600	02/28/06	1330	--	7.4	1,480	6.7	330	160
465339096441600	05/09/06	1605	2.9	7.7	1,880	9.7	610	--
465339096441600	06/13/06	1515	2.0	7.7	1,680	12.3	440	--
465339096441600	07/18/06	1425	5.9	7.4	1,300	11.8	290	130
465339096441600	08/29/06	1330	4.5	7.6	1,190	10.3	250	120

Table 6. Analytical results for water-quality samples collected from the Moorhead, Minnesota, water- and wastewater-treatment plants.—Continued

[NTRU, nephelometric turbidity ratio unit; $\mu\text{S}/\text{cm}$, microsiemens per centimeter; $^{\circ}\text{C}$, degrees Celsius; mg/L , milligrams per liter; CaCO_3 , calcium carbonate; --, no data; ANC, acid neutralizing capacity; <, less than; BOD, biochemical oxygen demand; mL, milliliters; $\mu\text{g}/\text{L}$, micrograms per liter; NBOD, nitrogenous biochemical oxygen demand; >, greater than]

Location and USGS station number	Sample date	Sample time	Calcium, filtered (mg/L)	Calcium, unfiltered recoverable (mg/L)	Magnesium, filtered (mg/L)	Magnesium, unfiltered recoverable (mg/L)	Potassium, filtered (mg/L)	Potassium, unfiltered recoverable (mg/L)
Water-treatment plant inflow								
465242096443800	01/25/06	1515	--	80.0	--	57.4	--	6.9
465242096443800	02/28/06	1305	--	69.7	--	48.3	--	5.9
465242096443800	05/09/06	1540	--	58.4	--	32.4	--	5.6
465242096443800	06/13/06	1455	--	89.1	--	47.1	--	6.9
465242096443800	07/18/06	1410	105	--	46.7	--	6.76	--
465242096443800	08/29/06	1320	84.3	--	46.8	--	13.0	--
Water-treatment plant outflow								
465241096443700	01/25/06	1505	--	38.6	--	14.6	--	6.9
465241096443700	02/28/06	1300	--	24.4	--	10.0	--	6.2
465241096443700	05/09/06	1545	--	20.7	--	8.2	--	6.5
465241096443700	06/13/06	1500	--	25.9	--	7.9	--	7.1
465241096443700	07/18/06	1415	29.6	--	7.6	--	11.0	--
465241096443700	08/29/06	1315	26.9	--	8.7	--	12.9	--
Wastewater-treatment plant influent								
465340096441500	01/25/06	1535	--	55.7	--	46.4	--	38.5
465340096441500	02/28/06	1335	--	51.9	--	44.0	--	31.9
465340096441500	05/09/06	1600	--	83.4	--	86.0	--	18.9
465340096441500	06/13/06	1520	--	73.3	--	62.1	--	33.9
465340096441500	07/18/06	1430	50.8	--	35.9	--	31.9	--
465340096441500	08/29/06	1335	51.3	--	27.3	--	41.5	--
Wastewater-treatment plant effluent								
465339096441600	01/25/06	1530	--	53.3	--	43.9	--	33.2
465339096441600	02/28/06	1330	--	57.4	--	46.1	--	34.1
465339096441600	05/09/06	1605	--	88.5	--	94.0	--	27.2
465339096441600	06/13/06	1515	--	69.7	--	64.1	--	37.3
465339096441600	07/18/06	1425	52.7	--	39.0	--	34.7	--
465339096441600	08/29/06	1330	52.9	--	27.7	--	41.9	--

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Table 6. Analytical results for water-quality samples collected from the Moorhead, Minnesota, water- and wastewater-treatment plants.—Continued

[NTRU, nephelometric turbidity ratio unit; $\mu\text{S}/\text{cm}$, microsiemens per centimeter; $^{\circ}\text{C}$, degrees Celsius; mg/L , milligrams per liter; CaCO_3 , calcium carbonate; --, no data; ANC, acid neutralizing capacity; <, less than; BOD, biochemical oxygen demand; mL, milliliters; $\mu\text{g}/\text{L}$, micrograms per liter; NBOD, nitrogenous biochemical oxygen demand; >, greater than]

Location and USGS station number	Sample date	Sample time	Sodium adsorption ratio (number)	Sodium fraction of cations (percent in equivalents of major cations)	Sodium, filtered (mg/L)	Sodium, unfiltered recoverable (mg/L)	ANC, unfiltered (mg/L as CaCO_3)	Bicarbonate, unfiltered (mg/L)
Water-treatment plant inflow								
465242096443800	01/25/06	1515	0.8	16	--	37.9	253	309
465242096443800	02/28/06	1305	.9	18	--	39.2	261	318
465242096443800	05/09/06	1540	2.8	45	--	107	257	314
465242096443800	06/13/06	1455	.5	11	--	24.5	284	346
465242096443800	07/18/06	1410	.6	12	27.9	--	310	379
465242096443800	08/29/06	1320	.6	14	29.6	--	276	337
Water-treatment plant outflow								
465241096443700	01/25/06	1505	2.9	52	--	83.9	74	63
465241096443700	02/28/06	1300	2.9	57	--	67.1	48	59
465241096443700	05/09/06	1545	5.9	74	--	126	70	67
465241096443700	06/13/06	1500	3.9	64	--	88.4	66	49
465241096443700	07/18/06	1415	2.5	55	59.8	--	61	53
465241096443700	08/29/06	1315	2.7	57	62.2	--	80	56
Wastewater-treatment plant influent								
465340096441500	01/25/06	1535	3.7	47	--	156	272	332
465340096441500	02/28/06	1335	3.7	48	--	151	255	311
465340096441500	05/09/06	1600	2.8	36	--	155	337	411
465340096441500	06/13/06	1520	3.0	40	--	146	316	386
465340096441500	07/18/06	1430	2.9	46	109	--	252	308
465340096441500	08/29/06	1335	4.4	58	156	--	274	335
Wastewater-treatment plant effluent								
465339096441600	01/25/06	1530	3.7	48	--	149	174	212
465339096441600	02/28/06	1330	4.0	49	--	170	168	205
465339096441600	05/09/06	1605	2.6	33	--	149	274	334
465339096441600	06/13/06	1515	3.0	39	--	144	210	256
465339096441600	07/18/06	1425	2.9	46	115	--	160	196
465339096441600	08/29/06	1330	2.8	47	99.7	--	120	147

Table 6. Analytical results for water-quality samples collected from the Moorhead, Minnesota, water- and wastewater-treatment plants.—Continued

[NTRU, nephelometric turbidity ratio unit; $\mu\text{S}/\text{cm}$, microsiemens per centimeter; $^{\circ}\text{C}$, degrees Celsius; mg/L , milligrams per liter; CaCO_3 , calcium carbonate; --, no data; ANC, acid neutralizing capacity; <, less than; BOD, biochemical oxygen demand; mL , milliliters; $\mu\text{g}/\text{L}$, micrograms per liter; NBOD, nitrogenous biochemical oxygen demand; >, greater than]

Location and USGS station number	Sample date	Sample time	Carbonate, unfiltered (mg/L)	Hydroxide, unfiltered (mg/L)	Chloride, filtered (mg/L)	Fluoride, filtered (mg/L)	Silica, filtered (mg/L)	Silica, unfiltered (mg/L)
Water-treatment plant inflow								
465242096443800	01/25/06	1515	<1	<1	19.8	0.17	--	22.0
465242096443800	02/28/06	1305	<1	<1	30.2	.16	--	18.6
465242096443800	05/09/06	1540	<1	<1	44.0	.23	--	28.7
465242096443800	06/13/06	1455	<1	<1	9.4	.22	--	28.6
465242096443800	07/18/06	1410	<1	<1	14.3	.22	27.9	--
465242096443800	08/29/06	1320	<1	<1	24.0	.21	14.7	--
Water-treatment plant outflow								
465241096443700	01/25/06	1505	14	<1	25.3	.98	--	9.57
465241096443700	02/28/06	1300	<1	<1	32.0	1.09	--	4.46
465241096443700	05/09/06	1545	9	<1	25.5	1.17	--	10.0
465241096443700	06/13/06	1500	15	<1	15.8	1.24	--	6.72
465241096443700	07/18/06	1415	10	<1	27.8	1.17	7.17	--
465241096443700	08/29/06	1315	21	<1	28.6	1.08	6.66	--
Wastewater-treatment plant influent								
465340096441500	01/25/06	1535	<1	<1	91.0	.86	--	14.4
465340096441500	02/28/06	1335	<1	<1	116	.91	--	11.6
465340096441500	05/09/06	1600	<1	<1	84.4	.84	--	21.9
465340096441500	06/13/06	1520	<1	<1	97.6	1.07	--	21.0
465340096441500	07/18/06	1430	<1	<1	88.1	1.13	14.3	--
465340096441500	08/29/06	1335	<1	<1	108	1.04	13.5	--
Wastewater-treatment plant effluent								
465339096441600	01/25/06	1530	<1	<1	83.3	.90	--	14.4
465339096441600	02/28/06	1330	<1	<1	104	.96	--	13.4
465339096441600	05/09/06	1605	<1	<1	88.8	.86	--	17.3
465339096441600	06/13/06	1515	<1	<1	92.2	1.04	--	15.3
465339096441600	07/18/06	1425	<1	<1	80.6	1.09	8.19	--
465339096441600	08/29/06	1330	<1	<1	96.8	1.05	12.6	--

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Table 6. Analytical results for water-quality samples collected from the Moorhead, Minnesota, water- and wastewater-treatment plants.—Continued

[NTRU, nephelometric turbidity ratio unit; µS/cm, microsiemens per centimeter; °C, degrees Celsius; mg/L, milligrams per liter; CaCO₃, calcium carbonate; --, no data; ANC, acid neutralizing capacity; <, less than; BOD, biochemical oxygen demand; mL, milliliters; µg/L, micrograms per liter; NBOD, nitrogenous biochemical oxygen demand; >, greater than]

Location and USGS station number	Sample date	Sample time	Sulfate, filtered (mg/L)	Dissolved solids (mg/L)	Total suspended solids (mg/L)	Ammonia plus organic nitrogen, filtered (mg/L as N)	Ammonia plus organic nitrogen, unfiltered (mg/L as N)	Ammonia, filtered (mg/L as N)
Water-treatment plant inflow								
465242096443800	01/25/06	1515	220	578	<5	0.66	0.65	0.022
465242096443800	02/28/06	1305	141	495	--	.52	.54	.021
465242096443800	05/09/06	1540	222	627	30	1.0	1.0	.791
465242096443800	06/13/06	1455	202	552	31	.52	.36	.123
465242096443800	07/18/06	1410	204	603	6	.51	.45	.240
465242096443800	08/29/06	1320	179	557	14	.80	.67	.080
Water-treatment plant outflow								
465241096443700	01/25/06	1505	217	434	<5	.72	.68	.443
465241096443700	02/28/06	1300	157	330	--	.74	.69	.460
465241096443700	05/09/06	1545	269	501	<5	.65	.57	.411
465241096443700	06/13/06	1500	240	428	<5	.76	.51	.458
465241096443700	07/18/06	1415	151	346	<5	.69	.59	.342
465241096443700	08/29/06	1315	152	368	<5	.68	.68	.431
Wastewater-treatment plant influent								
465340096441500	01/25/06	1535	330	883	142	26	28	23.4
465340096441500	02/28/06	1335	309	859	--	25	31	22.2
465340096441500	05/09/06	1600	531	1,160	162	19	24	16.3
465340096441500	06/13/06	1520	417	1,020	130	21	23	19.0
465340096441500	07/18/06	1430	219	794	236	26	30	21.5
465340096441500	08/29/06	1335	217	831	269	28	33	24.4
Wastewater-treatment plant effluent								
465339096441600	01/25/06	1530	328	862	<5	9.6	10	7.21
465339096441600	02/28/06	1330	367	941	--	1.4	1.6	.490
465339096441600	05/09/06	1605	547	1,210	<5	5.4	5.6	4.02
465339096441600	06/13/06	1515	453	1,070	<5	7.1	8.2	7.17
465339096441600	07/18/06	1425	284	806	7	9.9	11	8.70
465339096441600	08/29/06	1330	205	738	7	5.5	6.2	3.90

Table 6. Analytical results for water-quality samples collected from the Moorhead, Minnesota, water- and wastewater-treatment plants.—Continued

[NTRU, nephelometric turbidity ratio unit; $\mu\text{S}/\text{cm}$, microsiemens per centimeter; $^{\circ}\text{C}$, degrees Celsius; mg/L, milligrams per liter; CaCO_3 , calcium carbonate; --, no data; ANC, acid neutralizing capacity; <, less than; BOD, biochemical oxygen demand; mL, milliliters; $\mu\text{g}/\text{L}$, micrograms per liter; NBOD, nitrogenous biochemical oxygen demand; >, greater than]

Location and USGS station number	Sample date	Sample time	Ammonia, unfiltered (mg/L as N)	Nitrite plus nitrate, filtered (mg/L as N)	Nitrite plus nitrate, unfiltered (mg/L as N)	Total nitrogen, filtered (mg/L)	Total nitrogen, unfiltered (mg/L)	Phosphorus, filtered (mg/L)
Water-treatment plant inflow								
465242096443800	01/25/06	1515	0.03	0.456	0.46	1.12	1.11	0.146
465242096443800	02/28/06	1305	.03	.429	.41	.95	.95	.196
465242096443800	05/09/06	1540	.77	.214	.18	1.21	1.18	.077
465242096443800	06/13/06	1455	.13	.252	.23	.77	.59	.045
465242096443800	07/18/06	1410	.25	.058	.05	.57	.50	.012
465242096443800	08/29/06	1320	.06	.083	.08	.89	.75	.051
Water-treatment plant outflow								
465241096443700	01/25/06	1505	.44	.393	.40	1.11	1.08	.106
465241096443700	02/28/06	1300	.45	.425	.41	1.17	1.10	.145
465241096443700	05/09/06	1545	.41	.560	.56	1.21	1.13	.206
465241096443700	06/13/06	1500	.45	.733	.71	1.49	1.22	.179
465241096443700	07/18/06	1415	.35	.558	.56	1.25	1.15	.227
465241096443700	08/29/06	1315	.44	.529	.53	1.21	1.21	.221
Wastewater-treatment plant influent								
465340096441500	01/25/06	1535	24.6	.024	.02	25.6	28.2	4.02
465340096441500	02/28/06	1335	19.7	.038	.03	25.4	31.3	3.95
465340096441500	05/09/06	1600	15.1	.021	.02	19.4	24.0	2.68
465340096441500	06/13/06	1520	19.1	.032	.03	20.9	23.1	3.06
465340096441500	07/18/06	1430	21.8	.065	.06	25.6	29.9	3.56
465340096441500	08/29/06	1335	24.5	.027	.04	28.5	32.6	4.56
Wastewater-treatment plant effluent								
465339096441600	01/25/06	1530	7.47	14.6	14.5	24.2	24.8	3.47
465339096441600	02/28/06	1330	.49	13.5	13.4	14.9	15.0	1.83
465339096441600	05/09/06	1605	4.10	12.2	12.1	17.6	17.7	2.32
465339096441600	06/13/06	1515	7.25	18.3	18.6	25.4	26.8	3.15
465339096441600	07/18/06	1425	8.68	17.7	17.5	27.6	28.1	3.51
465339096441600	08/29/06	1330	3.83	22.3	21.4	27.8	27.6	4.38

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Table 6. Analytical results for water-quality samples collected from the Moorhead, Minnesota, water- and wastewater-treatment plants.—Continued

[NTRU, nephelometric turbidity ratio unit; $\mu\text{S}/\text{cm}$, microsiemens per centimeter; $^{\circ}\text{C}$, degrees Celsius; mg/L , milligrams per liter; CaCO_3 , calcium carbonate; --, no data; ANC, acid neutralizing capacity; <, less than; BOD, biochemical oxygen demand; mL , milliliters; $\mu\text{g}/\text{L}$, micrograms per liter; NBOD, nitrogenous biochemical oxygen demand; >, greater than]

Location and USGS station number	Sample date	Sample time	Phosphorus, unfiltered (mg/L)	Organic carbon, filtered (mg/L)	Organic carbon, unfiltered (mg/L)	BOD, 20-day (mg/L)	BOD, 5-day (mg/L)	<i>Escherichia coli</i> (colonies per 100 mL)
Water-treatment plant inflow								
465242096443800	01/25/06	1515	0.165	--	--	--	<30	10
465242096443800	02/28/06	1305	.204	--	--	--	--	--
465242096443800	05/09/06	1540	.171	--	--	--	--	--
465242096443800	06/13/06	1455	.172	--	--	--	--	--
465242096443800	07/18/06	1410	.056	--	--	--	--	--
465242096443800	08/29/06	1320	.088	--	--	--	--	--
Water-treatment plant outflow								
465241096443700	01/25/06	1505	.112	--	--	--	<6	<10
465241096443700	02/28/06	1300	.145	--	--	--	--	--
465241096443700	05/09/06	1545	.210	--	--	--	--	--
465241096443700	06/13/06	1500	.177	--	--	--	--	--
465241096443700	07/18/06	1415	.231	--	--	--	--	--
465241096443700	08/29/06	1315	.226	--	--	--	--	--
Wastewater-treatment plant influent								
465340096441500	01/25/06	1535	5.38	--	--	--	159	>1,600
465340096441500	02/28/06	1335	5.91	--	--	--	--	--
465340096441500	05/09/06	1600	3.86	--	--	--	--	--
465340096441500	06/13/06	1520	4.28	--	--	--	--	--
465340096441500	07/18/06	1430	5.39	--	--	--	--	--
465340096441500	08/29/06	1335	6.56	--	--	--	--	--
Wastewater-treatment plant effluent								
465339096441600	01/25/06	1530	3.58	--	--	--	19	820
465339096441600	02/28/06	1330	1.88	--	--	--	--	--
465339096441600	05/09/06	1605	2.30	10.8	11.6	32	--	720
465339096441600	06/13/06	1515	3.49	--	--	--	--	<10
465339096441600	07/18/06	1425	3.62	--	--	--	--	--
465339096441600	08/29/06	1330	4.42	--	--	--	--	--

Table 6. Analytical results for water-quality samples collected from the Moorhead, Minnesota, water- and wastewater-treatment plants.—Continued

[NTRU, nephelometric turbidity ratio unit; $\mu\text{S}/\text{cm}$, microsiemens per centimeter; $^{\circ}\text{C}$, degrees Celsius; mg/L , milligrams per liter; CaCO_3 , calcium carbonate; --, no data; ANC, acid neutralizing capacity; <, less than; BOD, biochemical oxygen demand; mL, milliliters; $\mu\text{g}/\text{L}$, micrograms per liter; NBOD, nitrogenous biochemical oxygen demand; >, greater than]

Location and USGS station number	Sample date	Sample time	Fecal coliform (colonies per 100 mL)	Iron, filtered ($\mu\text{g}/\text{L}$)	Iron, unfiltered recoverable ($\mu\text{g}/\text{L}$)	Manganese, filtered ($\mu\text{g}/\text{L}$)	Manganese, unfiltered recoverable ($\mu\text{g}/\text{L}$)	NBOD, 20-day (mg/L)
Water-treatment plant inflow								
465242096443800	01/25/06	1515	10	--	280	--	30	--
465242096443800	02/28/06	1305	--	--	90	--	20	--
465242096443800	05/09/06	1540	--	--	2,070	--	100	--
465242096443800	06/13/06	1455	--	--	2,720	--	110	--
465242096443800	07/18/06	1410	--	602	--	158	--	--
465242096443800	08/29/06	1320	--	49	--	47	--	--
Water-treatment plant outflow								
465241096443700	01/25/06	1505	<10	--	<10	--	10	--
465241096443700	02/28/06	1300	--	--	20	--	<10	--
465241096443700	05/09/06	1545	--	--	360	--	10	--
465241096443700	06/13/06	1500	--	--	90	--	<10	--
465241096443700	07/18/06	1415	--	14	--	<10	--	--
465241096443700	08/29/06	1315	--	13	--	<10	--	--
Wastewater-treatment plant influent								
465340096441500	01/25/06	1535	>1,600	--	1,010	--	160	--
465340096441500	02/28/06	1335	--	--	270	--	140	--
465340096441500	05/09/06	1600	--	--	170	--	210	--
465340096441500	06/13/06	1520	--	--	210	--	240	--
465340096441500	07/18/06	1430	--	614	--	158	--	--
465340096441500	08/29/06	1335	--	189	--	142	--	--
Wastewater-treatment plant effluent								
465339096441600	01/25/06	1530	860	--	120	--	150	--
465339096441600	02/28/06	1330	--	--	160	--	110	--
465339096441600	05/09/06	1605	800	--	210	--	180	22.8
465339096441600	06/13/06	1515	<10	--	170	--	200	--
465339096441600	07/18/06	1425	--	112	--	93	--	--
465339096441600	08/29/06	1330	--	89	--	104	--	--

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Table 7. Analytical results for water-quality samples collected from the Grand Forks, North Dakota, water- and wastewater-treatment plants.

[NTRU, nephelometric turbidity ratio unit; $\mu\text{S}/\text{cm}$, microsiemens per centimeter; $^{\circ}\text{C}$, degrees Celsius; mg/L , milligrams per liter; CaCO_3 , calcium carbonate; --, no data; ANC, acid neutralizing capacity; <, less than; BOD, biochemical oxygen demand; mL , milliliters; $\mu\text{g}/\text{L}$, micrograms per liter; NBOD, nitrogenous biochemical oxygen demand; >, greater than]

Location and USGS station number	Sample date	Sample time	Turbidity (NTRU)	pH, field (standard unit)	Specific conductance, field ($\mu\text{S}/\text{cm}$ at 25°C)	Water temperature ($^{\circ}\text{C}$)	Hardness (mg/L as CaCO_3)	Noncarbonate hardness (mg/L as CaCO_3)
Water-treatment plant inflow								
475517097011600	01/24/06	0810	--	8.1	473	2.3	250	45
475517097011600	02/27/06	0820	--	7.9	478	1.1	240	27
475517097011600	05/08/06	0810	93	8.3	525	14.3	290	--
475517097011600	06/12/06	0745	66	8.5	498	19.9	250	--
475517097011600	07/17/06	0815	75	8.4	565	26.5	250	56
475517097011600	08/30/06	0745	59	8.5	526	21.8	230	43
Water-treatment plant outflow								
475516097012400	01/24/06	0820	--	9.1	323	3.9	140	47
475516097012400	02/27/06	0815	--	9.2	319	2.6	140	50
475516097012400	05/08/06	0815	<1.0	9.3	413	13.7	150	--
475516097012400	06/12/06	0755	1.7	9.3	334	20.1	130	--
475516097012400	07/17/06	0810	1.4	9.2	333	26.2	110	52
475516097012400	08/30/06	0750	1.2	9.2	334	22.2	110	44
Wastewater-treatment plant influent								
475708097083800	01/24/06	1435	--	8.8	1,180	15.0	310	0
475708097083800	02/27/06	1410	--	7.2	1,190	10.4	270	0
475708097083800	05/08/06	1520	210	7.5	2,210	17.5	790	--
475708097083800	06/12/06	1325	320	7.5	1,520	19.7	440	--
475708097083800	07/20/06	0900	340	7.4	1,390	9.4	380	14
475708097083800	08/30/06	1325	340	7.4	1,500	21.6	320	0
Wastewater-treatment plant effluent								
475704097075500	01/24/06	1445	--	7.7	2,190	8.2	650	240
475704097075500	02/27/06	1400	--	7.7	2,410	1.3	700	220
475704097075500	05/08/06	1535	5	8.8	1,780	18.8	520	--
475704097075500	06/12/06	1345	53	8.2	1,550	20.4	410	--
475704097075500	07/20/06	0920	15	8.1	1,800	21.1	490	77
475704097075500	08/30/06	1345	28	8.9	1,910	20.9	550	250

Table 7. Analytical results for water-quality samples collected from the Grand Forks, North Dakota, water- and wastewater-treatment plants.—Continued

[NTRU, nephelometric turbidity ratio unit; $\mu\text{S}/\text{cm}$, microsiemens per centimeter; $^{\circ}\text{C}$, degrees Celsius; mg/L , milligrams per liter; CaCO_3 , calcium carbonate; --, no data; ANC, acid neutralizing capacity; <, less than; BOD, biochemical oxygen demand; mL , milliliters; $\mu\text{g}/\text{L}$, micrograms per liter; NBOD, nitrogenous biochemical oxygen demand; >, greater than]

Location and USGS station number	Sample date	Sample time	Calcium, filtered (mg/L)	Calcium, unfiltered recoverable (mg/L)	Magnesium, filtered (mg/L)	Magnesium, unfiltered recoverable (mg/L)	Potassium, filtered (mg/L)	Potassium, unfiltered recoverable (mg/L)
Water-treatment plant inflow								
475517097011600	01/24/06	0810	--	58.9	--	24.6	--	3.2
475517097011600	02/27/06	0820	--	57.7	--	23.0	--	3.2
475517097011600	05/08/06	0810	--	68.4	--	29.4	--	4.7
475517097011600	06/12/06	0745	--	55.2	--	26.2	--	5.5
475517097011600	07/17/06	0815	52.6	--	28.2	--	3.94	--
475517097011600	08/30/06	0745	51.3	--	24.9	--	5.00	--
Water-treatment plant outflow								
475516097012400	01/24/06	0820	--	41.8	--	8.1	--	3.2
475516097012400	02/27/06	0815	--	40.0	--	8.9	--	3.2
475516097012400	05/08/06	0815	--	47.9	--	7.2	--	4.6
475516097012400	06/12/06	0755	--	34.6	--	9.8	--	5.2
475516097012400	07/17/06	0810	28.7	--	8.3	--	4.14	--
475516097012400	08/30/06	0750	28.3	--	8.8	--	4.89	--
Wastewater-treatment plant influent								
475708097083800	01/24/06	1435	--	68.8	--	33.2	--	29.4
475708097083800	02/27/06	1410	--	58.7	--	30.1	--	45.4
475708097083800	05/08/06	1520	--	138	--	108	--	68.8
475708097083800	06/12/06	1325	--	81.2	--	57.5	--	99.8
475708097083800	07/20/06	0900	69.1	--	49.2	--	15.1	--
475708097083800	08/30/06	1325	64.7	--	39.4	--	85.9	--
Wastewater-treatment plant effluent								
475704097075500	01/24/06	1445	--	110	--	90.2	--	107
475704097075500	02/27/06	1400	--	120	--	96.9	--	114
475704097075500	05/08/06	1535	--	84.7	--	73.6	--	90.5
475704097075500	06/12/06	1345	--	73.5	--	55.7	--	81.3
475704097075500	07/20/06	0920	83.9	--	67.9	--	97.2	--
475704097075500	08/30/06	1345	88.8	--	78.8	--	92.6	--

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Table 7. Analytical results for water-quality samples collected from the Grand Forks, North Dakota, water- and wastewater-treatment plants.—Continued

[NTRU, nephelometric turbidity ratio unit; $\mu\text{S/cm}$, microsiemens per centimeter; $^{\circ}\text{C}$, degrees Celsius; mg/L, milligrams per liter; CaCO_3 , calcium carbonate; --, no data; ANC, acid neutralizing capacity; <, less than; BOD, biochemical oxygen demand; mL, milliliters; $\mu\text{g/L}$, micrograms per liter; NBOD, nitrogenous biochemical oxygen demand; >, greater than]

Location and USGS station number	Sample date	Sample time	Sodium adsorption ratio (number)	Sodium fraction of cations (percent in equivalents of major cations)	Sodium, filtered (mg/L)	Sodium, unfiltered recoverable (mg/L)	ANC, unfiltered (mg/L as CaCO_3)	Bicarbonate, unfiltered (mg/L)
Water-treatment plant inflow								
475517097011600	01/24/06	0810	0.5	12	--	16.7	203	247
475517097011600	02/27/06	0820	.4	11	--	13.9	211	257
475517097011600	05/08/06	0810	.3	7	--	10.4	171	209
475517097011600	06/12/06	0745	.3	9	--	11.2	188	230
475517097011600	07/17/06	0815	.5	14	18.7	--	192	230
475517097011600	08/30/06	0745	.5	14	17.1	--	189	220
Water-treatment plant outflow								
475516097012400	01/24/06	0820	.4	14	--	11.1	91	84
475516097012400	02/27/06	0815	.5	16	--	12.8	87	78
475516097012400	05/08/06	0815	.7	23	--	20.9	76	73
475516097012400	06/12/06	0755	.5	17	--	12.6	70	58
475516097012400	07/17/06	0810	.8	27	18.5	--	56	46
475516097012400	08/30/06	0750	.8	27	18.2	--	62	55
Wastewater-treatment plant influent								
475708097083800	01/24/06	1435	2.8	41	--	112	347	413
475708097083800	02/27/06	1410	1.9	32	--	72.3	332	405
475708097083800	05/08/06	1520	1.8	22	--	116	409	499
475708097083800	06/12/06	1325	1.3	20	--	64.8	366	446
475708097083800	07/20/06	0900	2.0	34	87.6	--	360	440
475708097083800	08/30/06	1325	2.1	37	87.3	--	355	434
Wastewater-treatment plant effluent								
475704097075500	01/24/06	1445	2.6	29	--	151	410	500
475704097075500	02/27/06	1400	2.6	29	--	157	480	585
475704097075500	05/08/06	1535	2.4	30	--	124	308	308
475704097075500	06/12/06	1345	2.1	29	--	96.6	321	392
475704097075500	07/20/06	0920	2.4	35	120	--	411	502
475704097075500	08/30/06	1345	2.4	34	130	--	295	273

Table 7. Analytical results for water-quality samples collected from the Grand Forks, North Dakota, water- and wastewater-treatment plants.—Continued

[NTRU, nephelometric turbidity ratio unit; $\mu\text{S}/\text{cm}$, microsiemens per centimeter; $^{\circ}\text{C}$, degrees Celsius; mg/L , milligrams per liter; CaCO_3 , calcium carbonate; --, no data; ANC, acid neutralizing capacity; <, less than; BOD, biochemical oxygen demand; mL, milliliters; $\mu\text{g}/\text{L}$, micrograms per liter; NBOD, nitrogenous biochemical oxygen demand; >, greater than]

Location and USGS station number	Sample date	Sample time	Carbonate, unfiltered (mg/L)	Hydroxide, unfiltered (mg/L)	Chloride, filtered (mg/L)	Fluoride, filtered (mg/L)	Silica, filtered (mg/L)	Silica, unfiltered (mg/L)
Water-treatment plant inflow								
475517097011600	01/24/06	0810	<1	<1	6.17	0.12	--	10.3
475517097011600	02/27/06	0820	<1	<1	6.03	.12	--	8.65
475517097011600	05/08/06	0810	<1	<1	7.90	.12	--	22.6
475517097011600	06/12/06	0745	<1	<1	7.35	.12	--	21.5
475517097011600	07/17/06	0815	2	<1	13.4	.17	13.6	--
475517097011600	08/30/06	0745	5	<1	16.0	.17	11.3	--
Water-treatment plant outflow								
475516097012400	01/24/06	0820	13	<1	8.45	1.14	--	8.57
475516097012400	02/27/06	0815	14	<1	8.33	1.18	--	8.24
475516097012400	05/08/06	0815	10	<1	10.6	1.16	--	6.83
475516097012400	06/12/06	0755	13	<1	10.6	1.33	--	6.08
475516097012400	07/17/06	0810	10	<1	15.3	1.32	6.91	--
475516097012400	08/30/06	0750	11	<1	17.7	.95	6.11	--
Wastewater-treatment plant influent								
475708097083800	01/24/06	1435	5	<1	63.4	1.05	--	19.5
475708097083800	02/27/06	1410	<1	<1	82.1	.97	--	11.4
475708097083800	05/08/06	1520	<1	<1	159	.88	--	27.4
475708097083800	06/12/06	1325	<1	<1	86.4	.95	--	27.4
475708097083800	07/20/06	0900	<1	<1	113	1.16	12.5	--
475708097083800	08/30/06	1325	<1	<1	133	.89	10.8	--
Wastewater-treatment plant effluent								
475704097075500	01/24/06	1445	<1	<1	205	.41	--	15.9
475704097075500	02/27/06	1400	<1	<1	223	.64	--	15.4
475704097075500	05/08/06	1535	33	<1	191	.28	--	15.6
475704097075500	06/12/06	1345	<1	<1	156	.35	--	20.8
475704097075500	07/20/06	0920	<1	<1	175	.12	23.8	--
475704097075500	08/30/06	1345	43	<1	230	.06	17.7	--

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Table 7. Analytical results for water-quality samples collected from the Grand Forks, North Dakota, water- and wastewater-treatment plants.—Continued

[NTRU, nephelometric turbidity ratio unit; $\mu\text{S}/\text{cm}$, microsiemens per centimeter; $^{\circ}\text{C}$, degrees Celsius; mg/L , milligrams per liter; CaCO_3 , calcium carbonate; --, no data; ANC, acid neutralizing capacity; <, less than; BOD, biochemical oxygen demand; mL, milliliters; $\mu\text{g}/\text{L}$, micrograms per liter; NBOD, nitrogenous biochemical oxygen demand; >, greater than]

Location and USGS station number	Sample date	Sample time	Sulfate, filtered (mg/L)	Dissolved solids (mg/L)	Total suspended solids (mg/L)	Ammonia plus organic nitrogen, filtered (mg/L as N)	Ammonia plus organic nitrogen, unfiltered (mg/L as N)	Ammonia, filtered (mg/L as N)
Water-treatment plant inflow								
475517097011600	01/24/06	0810	38.3	272	10	0.69	0.64	0.085
475517097011600	02/27/06	0820	40.3	274	--	.80	.79	.069
475517097011600	05/08/06	0810	89.0	315	133	.81	.65	.087
475517097011600	06/12/06	0745	64.4	286	84	.71	.58	<.010
475517097011600	07/17/06	0815	83.8	346	107	.71	.48	<.010
475517097011600	08/30/06	0745	62.1	327	53	.67	.53	.016
Water-treatment plant outflow								
475516097012400	01/24/06	0820	54.3	183	<5	.70	.68	.398
475516097012400	02/27/06	0815	56.3	184	--	.90	.84	.478
475516097012400	05/08/06	0815	105	244	<5	.75	.74	.441
475516097012400	06/12/06	0755	76.8	193	<5	.77	.66	.297
475516097012400	07/17/06	0810	75.0	203	<5	.78	.69	.366
475516097012400	08/30/06	0750	64.8	206	<5	.91	.83	.470
Wastewater-treatment plant influent								
475708097083800	01/24/06	1435	116	638	563	26	46	22.5
475708097083800	02/27/06	1410	95	585	--	30	44	18.3
475708097083800	05/08/06	1520	558	1,400	513	26	48	24.1
475708097083800	06/12/06	1325	266	877	550	18	45	16.2
475708097083800	07/20/06	0900	138	862	399	32	36	29.0
475708097083800	08/30/06	1325	154	930	535	25	32	23.8
Wastewater-treatment plant effluent								
475704097075500	01/24/06	1445	443	1,350	9	17	18	16.5
475704097075500	02/27/06	1400	456	1,460	--	24	25	15.8
475704097075500	05/08/06	1535	325	1,080	22	9	10	7.96
475704097075500	06/12/06	1345	245	904	36	7.9	8.3	6.14
475704097075500	07/20/06	0920	267	1,120	18	12	12	10.5
475704097075500	08/30/06	1345	371	1,190	35	1.8	1.7	.020

Table 7. Analytical results for water-quality samples collected from the Grand Forks, North Dakota, water- and wastewater-treatment plants.—Continued

[NTRU, nephelometric turbidity ratio unit; $\mu\text{S}/\text{cm}$, microsiemens per centimeter; $^{\circ}\text{C}$, degrees Celsius; mg/L , milligrams per liter; CaCO_3 , calcium carbonate; --, no data; ANC, acid neutralizing capacity; <, less than; BOD, biochemical oxygen demand; mL , milliliters; $\mu\text{g}/\text{L}$, micrograms per liter; NBOD, nitrogenous biochemical oxygen demand; >, greater than]

Location and USGS station number	Sample date	Sample time	Ammonia, unfiltered (mg/L as N)	Nitrite plus nitrate, filtered (mg/L as N)	Nitrite plus nitrate, unfiltered (mg/L as N)	Total nitrogen, filtered (mg/L)	Total nitrogen, unfiltered (mg/L)	Phosphorus, filtered (mg/L)
Water-treatment plant inflow								
475517097011600	01/24/06	0810	0.11	0.181	0.18	0.88	0.82	0.049
475517097011600	02/27/06	0820	.07	.192	.19	.99	.98	.035
475517097011600	05/08/06	0810	.03	.152	.14	.96	.79	.033
475517097011600	06/12/06	0745	<.01	.135	.13	.85	.71	.027
475517097011600	07/17/06	0815	<.01	.271	.26	.98	.74	.102
475517097011600	08/30/06	0745	<.01	.370	.35	1.04	.88	.088
Water-treatment plant outflow								
475516097012400	01/24/06	0820	.43	.238	.23	.93	.91	.953
475516097012400	02/27/06	0815	.48	.252	.25	1.15	1.09	.915
475516097012400	05/08/06	0815	.46	.173	.17	.92	.91	1.14
475516097012400	06/12/06	0755	.30	.182	.17	.96	.83	1.16
475516097012400	07/17/06	0810	.36	.351	.35	1.13	1.04	1.44
475516097012400	08/30/06	0750	.46	.436	.42	1.35	1.25	1.39
Wastewater-treatment plant influent								
475708097083800	01/24/06	1435	22.5	1.31	1.32	26.8	46.8	3.88
475708097083800	02/27/06	1410	25.3	.030	.03	30.3	44.5	7.53
475708097083800	05/08/06	1520	24.2	<.020	.02	25.9	47.7	5.23
475708097083800	06/12/06	1325	16.5	<.020	<.02	17.6	45.1	10.6
475708097083800	07/20/06	0900	29.5	<.020	.02	31.5	36.3	5.02
475708097083800	08/30/06	1325	24	.289	.25	25.7	32.2	11.3
Wastewater-treatment plant effluent								
475704097075500	01/24/06	1445	16.5	.035	.04	17.2	17.8	5.74
475704097075500	02/27/06	1400	22.3	.036	.04	24.0	24.8	8.85
475704097075500	05/08/06	1535	7.9	.243	.23	9.25	10.2	2.92
475704097075500	06/12/06	1345	6.23	.099	.09	7.96	8.42	3.13
475704097075500	07/20/06	0920	10.7	.492	.52	12.8	13.0	2.67
475704097075500	08/30/06	1345	.02	.032	.03	1.87	1.76	.873

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Table 7. Analytical results for water-quality samples collected from the Grand Forks, North Dakota, water- and wastewater-treatment plants.—Continued

[NTRU, nephelometric turbidity ratio unit; $\mu\text{S}/\text{cm}$, microsiemens per centimeter; $^{\circ}\text{C}$, degrees Celsius; mg/L , milligrams per liter; CaCO_3 , calcium carbonate; --, no data; ANC, acid neutralizing capacity; <, less than; BOD, biochemical oxygen demand; mL , milliliters; $\mu\text{g}/\text{L}$, micrograms per liter; NBOD, nitrogenous biochemical oxygen demand; >, greater than]

Location and USGS station number	Sample date	Sample time	Phosphorus, unfiltered (mg/L)	Organic carbon, filtered (mg/L)	Organic carbon, unfiltered (mg/L)	BOD, 20-day (mg/L)	BOD, 5-day (mg/L)	<i>Escherichia coli</i> (colonies per 100 mL)
Water-treatment plant inflow								
475517097011600	01/24/06	0810	0.056	--	--	--	<30	<10
475517097011600	02/27/06	0820	.053	--	--	--	--	--
475517097011600	05/08/06	0810	.112	--	--	--	--	--
475517097011600	06/12/06	0745	.088	--	--	--	--	--
475517097011600	07/17/06	0815	.174	--	--	--	--	--
475517097011600	08/30/06	0745	.134	--	--	--	--	--
Water-treatment plant outflow								
475516097012400	01/24/06	0820	.971	--	--	--	<6	<10
475516097012400	02/27/06	0815	.928	--	--	--	--	--
475516097012400	05/08/06	0815	1.17	--	--	--	--	--
475516097012400	06/12/06	0755	1.17	--	--	--	--	--
475516097012400	07/17/06	0810	1.46	--	--	--	--	--
475516097012400	08/30/06	0750	1.37	--	--	--	--	--
Wastewater-treatment plant influent								
475708097083800	01/24/06	1435	10.7	--	--	--	297	>1,600
475708097083800	02/27/06	1410	12.7	--	--	--	--	--
475708097083800	05/08/06	1520	11.7	--	--	--	--	--
475708097083800	06/12/06	1325	18.1	--	--	--	--	--
475708097083800	07/20/06	0900	7.73	--	--	--	--	--
475708097083800	08/30/06	1325	13.8	--	--	--	--	--
Wastewater-treatment plant effluent								
475704097075500	01/24/06	1445	6.02	--	--	--	9	>1,600
475704097075500	02/27/06	1400	9.05	--	--	--	--	--
475704097075500	05/08/06	1535	3.30	15.2	15.8	50	--	<10
475704097075500	06/12/06	1345	4.98	--	--	--	--	<10
475704097075500	07/20/06	0920	3.04	--	--	--	--	--
475704097075500	08/30/06	1345	1.16	--	--	--	--	--

Table 7. Analytical results for water-quality samples collected from the Grand Forks, North Dakota, water- and wastewater-treatment plants.—Continued

[NTRU, nephelometric turbidity ratio unit; $\mu\text{S}/\text{cm}$, microsiemens per centimeter; $^{\circ}\text{C}$, degrees Celsius; mg/L , milligrams per liter; CaCO_3 , calcium carbonate; --, no data; ANC, acid neutralizing capacity; <, less than; BOD, biochemical oxygen demand; mL , milliliters; $\mu\text{g}/\text{L}$, micrograms per liter; NBOD, nitrogenous biochemical oxygen demand; >, greater than]

Location and USGS station number	Sample date	Sample time	Fecal coliform (colonies per 100 mL)	Iron, filtered ($\mu\text{g}/\text{L}$)	Iron, unfiltered recoverable ($\mu\text{g}/\text{L}$)	Manganese, filtered ($\mu\text{g}/\text{L}$)	Manganese, unfiltered recoverable ($\mu\text{g}/\text{L}$)	NBOD, 20-day (mg/L)
Water-treatment plant inflow								
475517097011600	01/24/06	0810	<10	--	340	--	40	--
475517097011600	02/27/06	0820	--	--	50	--	20	--
475517097011600	05/08/06	0810	--	--	330	--	190	--
475517097011600	06/12/06	0745	--	--	270	--	190	--
475517097011600	07/17/06	0815	--	<10	--	<10	--	--
475517097011600	08/30/06	0745	--	21	--	<10	--	--
Water-treatment plant outflow								
475516097012400	01/24/06	0820	<10	--	<10	--	<10	--
475516097012400	02/27/06	0815	--	--	40	--	<10	--
475516097012400	05/08/06	0815	--	--	130	--	<10	--
475516097012400	06/12/06	0755	--	--	100	--	<10	--
475516097012400	07/17/06	0810	--	25	--	<10	--	--
475516097012400	08/30/06	0750	--	22	--	<10	--	--
Wastewater-treatment plant influent								
475708097083800	01/24/06	1435	>1,600	--	2,420	--	200	--
475708097083800	02/27/06	1410	--	--	160	--	140	--
475708097083800	05/08/06	1520	--	--	3,850	--	300	--
475708097083800	06/12/06	1325	--	--	410	--	350	--
475708097083800	07/20/06	0900	--	99	--	100	--	--
475708097083800	08/30/06	1325	--	36	--	169	--	--
Wastewater-treatment plant effluent								
475704097075500	01/24/06	1445	>1,600	--	210	--	190	--
475704097075500	02/27/06	1400	--	--	150	--	240	--
475704097075500	05/08/06	1535	<10	--	200	--	40	46
475704097075500	06/12/06	1345	<10	--	1,330	--	180	--
475704097075500	07/20/06	0920	--	45	--	108	--	--
475704097075500	08/30/06	1345	--	45	--	24	--	--

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Table 8. Analytical results for water-quality samples collected from the East Grand Forks, Minnesota, water- and wastewater-treatment plants.

[NTRU, nephelometric turbidity ratio unit; $\mu\text{S}/\text{cm}$, microsiemens per centimeter; $^{\circ}\text{C}$, degrees Celsius; mg/L, milligrams per liter; CaCO_3 , calcium carbonate; --, no data; ANC, acid neutralizing capacity; <, less than; BOD, biochemical oxygen demand; mL, milliliters; $\mu\text{g}/\text{L}$, micrograms per liter; NBOD, nitrogenous biochemical oxygen demand; >, greater than]

Location and USGS station number	Sample date	Sample time	Turbidity (NTRU)	pH, field (standard unit)	Specific conductance, field ($\mu\text{S}/\text{cm}$ at 25°C)	Water temperature ($^{\circ}\text{C}$)	Hardness (mg/L as CaCO_3)	Noncarbonate hardness (mg/L as CaCO_3)
Water-treatment plant inflow								
475525097003500	01/24/06	1100	--	7.9	416	2.3	220	23
475525097003500	02/27/06	1025	--	8.1	398	1.8	210	18
475525097003500	05/08/06	0930	51	8.3	462	14.3	250	--
475525097003500	06/12/06	0930	42	8.4	388	19.8	190	--
475525097003500	07/17/06	1010	54	8.8	344	27.1	160	1
475525097003500	08/30/06	0905	55	8.3	365	22.0	180	17
Water-treatment plant outflow								
475526097003400	01/24/06	1110	--	9.2	282	8.0	110	29
475526097003400	02/27/06	1015	<1.0	9.6	274	6.5	110	26
475526097003400	05/08/06	0935	<1.0	9.5	394	17.0	110	--
475526097003400	06/12/06	0925	43	9.1	288	21.2	130	--
475526097003400	07/17/06	1015	1.3	9.5	272	26.5	110	20
475526097003400	08/30/06	0855	69	9	302	22.4	120	32
Wastewater-treatment plant influent								
475608097015300	01/24/06	1145	--	7.8	1,270	10.5	420	110
475608097015300	02/27/06	1245	--	8.2	955	8.9	250	29
475608097015300	05/08/06	1055	50	7.8	1,910	11.3	920	--
475608097015300	06/12/06	1040	190	7.9	1,710	14.1	720	--
475608097015300	07/17/06	1100	320	8.2	597	21.8	190	40
475608097015300	08/30/06	1030	160	7.6	1,150	18.5	340	36
Wastewater-treatment plant effluent								
475828097031500	01/24/06	1225	--	8.2	1,740	1.3	790	410
475828097031500	02/27/06	1300	--	7.9	1,880	2.4	850	370
475828097031500	05/08/06	1335	13	9.4	1,210	19.3	530	--
475828097031500	06/12/06	1020	20	8.1	1,280	19.1	490	--
475828097031500	07/17/06	1110	43	9.2	1,490	26.8	640	340
475828097031500	08/30/06	1045	50	9.8	1,370	20.2	560	390

Table 8. Analytical results for water-quality samples collected from the East Grand Forks, Minnesota, water- and wastewater-treatment plants.—Continued

[NTRU, nephelometric turbidity ratio unit; $\mu\text{S}/\text{cm}$, microsiemens per centimeter; $^{\circ}\text{C}$, degrees Celsius; mg/L , milligrams per liter; CaCO_3 , calcium carbonate; --, no data; ANC, acid neutralizing capacity; <, less than; BOD, biochemical oxygen demand; mL, milliliters; $\mu\text{g}/\text{L}$, micrograms per liter; NBOD, nitrogenous biochemical oxygen demand; >, greater than]

Location and USGS station number	Sample date	Sample time	Calcium, filtered (mg/L)	Calcium, unfiltered recoverable (mg/L)	Magnesium, filtered (mg/L)	Magnesium, unfiltered recoverable (mg/L)	Potassium, filtered (mg/L)	Potassium, unfiltered recoverable (mg/L)
Water-treatment plant inflow								
475525097003500	01/24/06	1100	--	55.0	--	20.2	--	2.8
475525097003500	02/27/06	1025	--	53.0	--	18.6	--	2.4
475525097003500	05/08/06	0930	--	63.0	--	23.5	--	3.6
475525097003500	06/12/06	0930	--	47.5	--	18.3	--	3.6
475525097003500	07/17/06	1010	40.5	--	15.3	--	2.27	--
475525097003500	08/30/06	0905	45.6	--	16.3	--	2.50	--
Water-treatment plant outflow								
475526097003400	01/24/06	1110	--	42.9	--	<1.00	--	2.9
475526097003400	02/27/06	1015	--	43.9	--	<1.00	--	2.7
475526097003400	05/08/06	0935	--	42.2	--	<1.00	--	4.0
475526097003400	06/12/06	0925	--	49.0	--	1.50	--	4.2
475526097003400	07/17/06	1015	41.8	--	<1.00	--	2.99	--
475526097003400	08/30/06	0855	44.7	--	<1.00	--	3.01	--
Wastewater-treatment plant influent								
475608097015300	01/24/06	1145	--	92.4	--	45.4	--	13.3
475608097015300	02/27/06	1245	--	63.7	--	22.5	--	10.6
475608097015300	05/08/06	1055	--	152	--	130	--	9.5
475608097015300	06/12/06	1040	--	130	--	96.5	--	14.4
475608097015300	07/17/06	1100	51.8	--	14.7	--	6.41	--
475608097015300	08/30/06	1030	76.9	--	36.8	--	10.8	--
Wastewater-treatment plant effluent								
475828097031500	01/24/06	1225	--	126	--	115	--	18.5
475828097031500	02/27/06	1300	--	143	--	119	--	18.8
475828097031500	05/08/06	1335	--	90.1	--	75.1	--	13.6
475828097031500	06/12/06	1020	--	78.5	--	71.5	--	14.7
475828097031500	07/17/06	1110	96.9	--	96.0	--	15.2	--
475828097031500	08/30/06	1045	71.9	--	91.2	--	14.5	--

Table 8. Analytical results for water-quality samples collected from the East Grand Forks, Minnesota, water- and wastewater-treatment plants.—Continued

[NTRU, nephelometric turbidity ratio unit; $\mu\text{S}/\text{cm}$, microsiemens per centimeter; $^{\circ}\text{C}$, degrees Celsius; mg/L, milligrams per liter; CaCO_3 , calcium carbonate; --, no data; ANC, acid neutralizing capacity; <, less than; BOD, biochemical oxygen demand; mL, milliliters; $\mu\text{g}/\text{L}$, micrograms per liter; NBOD, nitrogenous biochemical oxygen demand; >, greater than]

Location and USGS station number	Sample date	Sample time	Sodium adsorption ratio (number)	Sodium fraction of cations (percent in equivalents of major cations)	Sodium, filtered (mg/L)	Sodium, unfiltered recoverable (mg/L)	ANC, unfiltered (mg/L as CaCO_3)	Bicarbonate, unfiltered (mg/L)
Water-treatment plant inflow								
475525097003500	01/24/06	1100	0.2	5	--	5.5	197	240
475525097003500	02/27/06	1025	.2	6	--	6.3	189	231
475525097003500	05/08/06	0930	.2	5	--	6.8	168	205
475525097003500	06/12/06	0930	.1	5	--	4.9	179	218
475525097003500	07/17/06	1010	.2	6	4.8	--	162	198
475525097003500	08/30/06	0905	.1	5	4.6	--	163	199
Water-treatment plant outflow								
475526097003400	01/24/06	1110	.7	24	--	17.0	82	74
475526097003400	02/27/06	1015	.5	20	--	13.3	87	65
475526097003400	05/08/06	0935	1.6	41	--	37.3	82	68
475526097003400	06/12/06	0925	.6	20	--	15.5	78	86
475526097003400	07/17/06	1015	.5	18	10.9	--	87	71
475526097003400	08/30/06	0855	.6	20	13.8	--	84	82
Wastewater-treatment plant influent								
475608097015300	01/24/06	1145	1.6	27	--	74.7	303	370
475608097015300	02/27/06	1245	1.6	32	--	57.9	221	270
475608097015300	05/08/06	1055	1.1	16	--	79.7	409	499
475608097015300	06/12/06	1040	1.2	18	--	72.6	387	472
475608097015300	07/17/06	1100	.9	24	28.5	--	148	181
475608097015300	08/30/06	1030	2.0	35	85.1	--	307	374
Wastewater-treatment plant effluent								
475828097031500	01/24/06	1225	1.6	22	--	105	379	463
475828097031500	02/27/06	1300	1.6	20	--	104	476	580
475828097031500	05/08/06	1335	1.3	22	--	71.3	283	197
475828097031500	06/12/06	1020	1.3	21	--	64.2	248	302
475828097031500	07/17/06	1110	1.4	22	84.4	--	299	301
475828097031500	08/30/06	1045	1.6	25	86.7	--	168	76

Table 8. Analytical results for water-quality samples collected from the East Grand Forks, Minnesota, water- and wastewater-treatment plants.—Continued

[NTRU, nephelometric turbidity ratio unit; $\mu\text{S}/\text{cm}$, microsiemens per centimeter; $^{\circ}\text{C}$, degrees Celsius; mg/L, milligrams per liter; CaCO_3 , calcium carbonate; --, no data; ANC, acid neutralizing capacity; <, less than; BOD, biochemical oxygen demand; mL, milliliters; $\mu\text{g}/\text{L}$, micrograms per liter; NBOD, nitrogenous biochemical oxygen demand; >, greater than]

Location and USGS station number	Sample date	Sample time	Carbonate, unfiltered (mg/L)	Hydroxide, unfiltered (mg/L)	Chloride, filtered (mg/L)	Fluoride, filtered (mg/L)	Silica, filtered (mg/L)	Silica, unfiltered (mg/L)
Water-treatment plant inflow								
475525097003500	01/24/06	1100	<1	<1	4.50	0.12	--	9.20
475525097003500	02/27/06	1025	<1	<1	3.93	.10	--	7.23
475525097003500	05/08/06	0930	<1	<1	6.13	.11	--	17.2
475525097003500	06/12/06	0930	<1	<1	5.26	.10	--	13.1
475525097003500	07/17/06	1010	<1	<1	4.37	.12	8.26	--
475525097003500	08/30/06	0905	<1	<1	5.70	.11	9.16	--
Water-treatment plant outflow								
475526097003400	01/24/06	1110	13	<1	8.92	.87	--	7.32
475526097003400	02/27/06	1015	21	<1	8.14	.89	--	6.64
475526097003400	05/08/06	0935	16	<1	10.6	.94	--	7.41
475526097003400	06/12/06	0925	4	<1	10.3	.99	--	6.22
475526097003400	07/17/06	1015	18	<1	7.93	1.0	7.76	--
475526097003400	08/30/06	0855	10	<1	8.82	.90	7.33	--
Wastewater-treatment plant influent								
475608097015300	01/24/06	1145	<1	<1	65.2	.66	--	18.1
475608097015300	02/27/06	1245	<1	<1	69.5	.74	--	9.05
475608097015300	05/08/06	1055	<1	<1	55.5	.53	--	24.6
475608097015300	06/12/06	1040	<1	<1	80.9	.59	--	31.7
475608097015300	07/17/06	1100	<1	<1	28.0	.89	9.34	--
475608097015300	08/30/06	1030	<1	<1	58.9	.73	12.9	--
Wastewater-treatment plant effluent								
475828097031500	01/24/06	1225	<1	<1	86.7	.67	--	14.7
475828097031500	02/27/06	1300	<1	<1	93.4	.66	--	19.7
475828097031500	05/08/06	1335	73	<1	62.5	.50	--	10.5
475828097031500	06/12/06	1020	<1	<1	68.3	.53	--	24.8
475828097031500	07/17/06	1110	31	<1	82.0	.61	15.5	--
475828097031500	08/30/06	1045	64	<1	86.4	.43	5.90	--

Table 8. Analytical results for water-quality samples collected from the East Grand Forks, Minnesota, water- and wastewater-treatment plants.—Continued

[NTRU, nephelometric turbidity ratio unit; $\mu\text{S}/\text{cm}$, microsiemens per centimeter; $^{\circ}\text{C}$, degrees Celsius; mg/L, milligrams per liter; CaCO_3 , calcium carbonate; --, no data; ANC, acid neutralizing capacity; <, less than; BOD, biochemical oxygen demand; mL, milliliters; $\mu\text{g}/\text{L}$, micrograms per liter; NBOD, nitrogenous biochemical oxygen demand; >, greater than]

Location and USGS station number	Sample date	Sample time	Sulfate, filtered (mg/L)	Dissolved solids (mg/L)	Total suspended solids (mg/L)	Ammonia plus organic nitrogen, filtered (mg/L as N)	Ammonia plus organic nitrogen, unfiltered (mg/L as N)	Ammonia, filtered (mg/L as N)
Water-treatment plant inflow								
475525097003500	01/24/06	1100	21.1	230	9	0.77	0.60	0.088
475525097003500	02/27/06	1025	14.5	215	--	.77	.77	.070
475525097003500	05/08/06	0930	64.5	271	81	.73	.67	.014
475525097003500	06/12/06	0930	17.7	207	50	.69	.57	<.010
475525097003500	07/17/06	1010	10.2	210	71	.70	.46	<.010
475525097003500	08/30/06	0905	24.1	227	52	.68	.49	<.010
Water-treatment plant outflow								
475526097003400	01/24/06	1110	42.1	166	11	.72	.70	.520
475526097003400	02/27/06	1015	39.1	163	--	.68	.61	.334
475526097003400	05/08/06	0935	89.9	236	<5	.45	.42	.184
475526097003400	06/12/06	0925	46.5	175	45	.80	.85	.387
475526097003400	07/17/06	1015	37.1	169	<5	.65	.56	.278
475526097003400	08/30/06	0855	50.6	188	69	.72	.91	.358
Wastewater-treatment plant influent								
475608097015300	01/24/06	1145	242	718	148	37	40	28.8
475608097015300	02/27/06	1245	137	497	--	26	28	15.5
475608097015300	05/08/06	1055	601	1,280	125	20	24	13.6
475608097015300	06/12/06	1040	453	1,080	361	31	33	23.1
475608097015300	07/17/06	1100	112	371	2,100	8.9	8.9	7.57
475608097015300	08/30/06	1030	173	725	166	34	36	29.8
Wastewater-treatment plant effluent								
475828097031500	01/24/06	1225	478	1,160	27	4.7	4.6	3.19
475828097031500	02/27/06	1300	471	1,240	--	6.4	7.3	3.88
475828097031500	05/08/06	1335	330	814	21	1.2	1.8	.051
475828097031500	06/12/06	1020	350	798	38	4.3	4.5	2.48
475828097031500	07/17/06	1110	424	911	31	1.9	2.2	<.010
475828097031500	08/30/06	1045	472	856	24	2.2	1.9	<.010

Table 8. Analytical results for water-quality samples collected from the East Grand Forks, Minnesota, water- and wastewater-treatment plants.—Continued

[NTRU, nephelometric turbidity ratio unit; $\mu\text{S}/\text{cm}$, microsiemens per centimeter; $^{\circ}\text{C}$, degrees Celsius; mg/L, milligrams per liter; CaCO_3 , calcium carbonate; --, no data; ANC, acid neutralizing capacity; <, less than; BOD, biochemical oxygen demand; mL, milliliters; $\mu\text{g}/\text{L}$, micrograms per liter; NBOD, nitrogenous biochemical oxygen demand; >, greater than]

Location and USGS station number	Sample date	Sample time	Ammonia, unfiltered (mg/L as N)	Nitrite plus nitrate, filtered (mg/L as N)	Nitrite plus nitrate, unfiltered (mg/L as N)	Total nitrogen, filtered (mg/L)	Total nitrogen, unfiltered (mg/L)	Phosphorus, filtered (mg/L)
Water-treatment plant inflow								
475525097003500	01/24/06	1100	0.10	0.116	0.14	0.89	0.74	0.032
475525097003500	02/27/06	1025	.07	.117	.11	.88	.88	.014
475525097003500	05/08/06	0930	.02	.031	.03	.77	.70	.020
475525097003500	06/12/06	0930	<.01	<.020	<.020	.71	.59	<.004
475525097003500	07/17/06	1010	<.01	<.020	<.020	.72	.48	<.004
475525097003500	08/30/06	0905	<.01	.032	.03	.71	.53	.007
Water-treatment plant outflow								
475526097003400	01/24/06	1110	.59	.177	.17	.90	.87	1.90
475526097003400	02/27/06	1015	.35	.157	.16	.83	.77	1.50
475526097003400	05/08/06	0935	.17	.099	.10	.55	.52	1.35
475526097003400	06/12/06	0925	.40	.103	.10	.90	.95	1.36
475526097003400	07/17/06	1015	.29	.080	.08	.73	.64	1.21
475526097003400	08/30/06	0855	.37	.058	.04	.78	.95	1.44
Wastewater-treatment plant influent								
475608097015300	01/24/06	1145	29.2	.203	.23	36.9	40.3	5.87
475608097015300	02/27/06	1245	19.8	.302	.28	26.6	28.0	3.98
475608097015300	05/08/06	1055	12.9	1.39	1.39	21.8	25.7	3.19
475608097015300	06/12/06	1040	23.2	.277	.26	31.0	33.5	4.05
475608097015300	07/17/06	1100	7.70	.057	.05	8.94	9.00	1.96
475608097015300	08/30/06	1030	30.5	.039	.04	34.2	35.7	5.23
Wastewater-treatment plant effluent								
475828097031500	01/24/06	1225	3.40	.058	.06	4.74	4.68	3.64
475828097031500	02/27/06	1300	3.76	.022	.12	6.46	7.38	5.82
475828097031500	05/08/06	1335	.09	<.020	<.020	1.21	1.80	.828
475828097031500	06/12/06	1020	2.47	<.020	<.020	4.34	4.50	2.01
475828097031500	07/17/06	1110	<.01	.027	.03	1.89	2.23	1.96
475828097031500	08/30/06	1045	.03	.053	.44	2.29	2.32	.210

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Table 8. Analytical results for water-quality samples collected from the East Grand Forks, Minnesota, water- and wastewater-treatment plants.—Continued

[NTRU, nephelometric turbidity ratio unit; $\mu\text{S}/\text{cm}$, microsiemens per centimeter; $^{\circ}\text{C}$, degrees Celsius; mg/L, milligrams per liter; CaCO_3 , calcium carbonate; --, no data; ANC, acid neutralizing capacity; <, less than; BOD, biochemical oxygen demand; mL, milliliters; $\mu\text{g}/\text{L}$, micrograms per liter; NBOD, nitrogenous biochemical oxygen demand; >, greater than]

Location and USGS station number	Sample date	Sample time	Phosphorus, unfiltered (mg/L)	Organic carbon, filtered (mg/L)	Organic carbon, unfiltered (mg/L)	BOD, 20-day (mg/L)	BOD, 5-day (mg/L)	<i>Escherichia coli</i> (colonies per 100 mL)
Water-treatment plant inflow								
475525097003500	01/24/06	1100	0.037	--	--	--	<30	10
475525097003500	02/27/06	1025	.028	--	--	--	--	--
475525097003500	05/08/06	0930	.073	--	--	--	--	--
475525097003500	06/12/06	0930	.056	--	--	--	--	--
475525097003500	07/17/06	1010	.038	--	--	--	--	--
475525097003500	08/30/06	0905	.043	--	--	--	--	--
Water-treatment plant outflow								
475526097003400	01/24/06	1110	2.08	--	--	--	<6	<10
475526097003400	02/27/06	1015	1.52	--	--	--	--	--
475526097003400	05/08/06	0935	1.31	--	--	--	--	--
475526097003400	06/12/06	0925	2.38	--	--	--	--	--
475526097003400	07/17/06	1015	1.22	--	--	--	--	--
475526097003400	08/30/06	0855	3.43	--	--	--	--	--
Wastewater-treatment plant influent								
475608097015300	01/24/06	1145	8.03	--	--	--	169	>1,600
475608097015300	02/27/06	1245	6.19	--	--	--	--	--
475608097015300	05/08/06	1055	4.55	--	--	--	--	--
475608097015300	06/12/06	1040	5.95	--	--	--	--	--
475608097015300	07/17/06	1100	4.90	--	--	--	--	--
475608097015300	08/30/06	1030	6.72	--	--	--	--	--
Wastewater-treatment plant effluent								
475828097031500	01/24/06	1225	3.78	--	--	--	<6	<10
475828097031500	02/27/06	1300	6.00	--	--	--	--	--
475828097031500	05/08/06	1335	1.12	12.6	13.2	19	--	<10
475828097031500	06/12/06	1020	2.48	--	--	--	--	<10
475828097031500	07/17/06	1110	2.26	--	--	--	--	--
475828097031500	08/30/06	1045	.284	--	--	--	--	--

Table 8. Analytical results for water-quality samples collected from the East Grand Forks, Minnesota, water- and wastewater-treatment plants.—Continued

[NTRU, nephelometric turbidity ratio unit; $\mu\text{S}/\text{cm}$, microsiemens per centimeter; $^{\circ}\text{C}$, degrees Celsius; mg/L , milligrams per liter; CaCO_3 , calcium carbonate; --, no data; ANC, acid neutralizing capacity; <, less than; BOD, biochemical oxygen demand; mL , milliliters; $\mu\text{g}/\text{L}$, micrograms per liter; NBOD, nitrogenous biochemical oxygen demand; >, greater than]

Location and USGS station number	Sample date	Sample time	Fecal coliform (colonies per 100 mL)	Iron, filtered ($\mu\text{g}/\text{L}$)	Iron, unfiltered recoverable ($\mu\text{g}/\text{L}$)	Manganese, filtered ($\mu\text{g}/\text{L}$)	Manganese, unfiltered recoverable ($\mu\text{g}/\text{L}$)	NBOD, 20-day (mg/L)
Water-treatment plant inflow								
475525097003500	01/24/06	1100	10	--	330	--	30	--
475525097003500	02/27/06	1025	--	--	70	--	20	--
475525097003500	05/08/06	0930	--	--	240	--	140	--
475525097003500	06/12/06	0930	--	--	160	--	150	--
475525097003500	07/17/06	1010	--	41	--	<10	--	--
475525097003500	08/30/06	0905	--	15	--	<10	--	--
Water-treatment plant outflow								
475526097003400	01/24/06	1110	<10	--	50	--	<10	--
475526097003400	02/27/06	1015	--	--	40	--	<10	--
475526097003400	05/08/06	0935	--	--	170	--	<10	--
475526097003400	06/12/06	0925	--	--	260	--	10	--
475526097003400	07/17/06	1015	--	44	--	<10	--	--
475526097003400	08/30/06	0855	--	19	--	<10	--	--
Wastewater-treatment plant influent								
475608097015300	01/24/06	1145	>1,600	--	2,240	--	130	--
475608097015300	02/27/06	1245	--	--	120	--	240	--
475608097015300	05/08/06	1055	--	--	1,360	--	130	--
475608097015300	06/12/06	1040	--	--	3,160	--	230	--
475608097015300	07/17/06	1100	--	45	--	369	--	--
475608097015300	08/30/06	1030	--	105	--	59	--	--
Wastewater-treatment plant effluent								
475828097031500	01/24/06	1225	<10	--	470	--	560	--
475828097031500	02/27/06	1300	--	--	90	--	90	--
475828097031500	05/08/06	1335	<10	--	350	--	140	5.94
475828097031500	06/12/06	1020	<10	--	740	--	300	--
475828097031500	07/17/06	1110	--	103	--	81	--	--
475828097031500	08/30/06	1045	--	46	--	<10	--	--

Table 9. Analytical results for quality-assurance/quality-control field blank sample.[mg/L, milligrams per liter; ANC, acid neutralizing capacity; CaCO₃, calcium carbonate; <, less than; µg/L, micrograms per liter]

Sample date	Sample time	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)	Potassium, filtered (mg/L)	Sodium, filtered (mg/L)	ANC, unfiltered (mg/L as CaCO ₃)
7/17/2006	0805	<2.00	<1.00	<1.00	<3.00	6
Bicarbonate, unfiltered (mg/L)	Carbonate, unfiltered (mg/L)	Hydroxide, unfiltered (mg/L)	Chloride, filtered (mg/L)	Fluoride, filtered (mg/L)	Silica, filtered (mg/L)	Sulfate, filtered (mg/L)
7	<1	<1	<0.30	0.42	<2.00	<0.30
Dissolved solids (mg/L)	Total suspended solids (mg/L)	Ammonia plus organic nitrogen, filtered (mg/L as N)	Ammonia plus organic nitrogen, unfiltered (mg/L as N)	Ammonia, filtered (mg/L as N)	Ammonia, unfiltered (mg/L as N)	Nitrite plus nitrate, filtered (mg/L as N)
1	<5	<0.08	<0.08	<0.010	<0.01	<0.020
Total nitrogen, filtered (mg/L)	Total nitrogen, unfiltered (mg/L)	Phosphorus, filtered (mg/L)	Phosphorus, unfiltered (mg/L)	Iron, filtered (µg/L)	Manganese, filtered (µg/L)	
0.06	<0.01	<0.004	<0.004	12	<10	

Table 10. Analytical results and relative standard deviations for quality-assurance/quality-control replicate samples for select water- and wastewater-treatment plants within the Red River of the North Basin, North Dakota and Minnesota.

Site number	Site name	Sample date	Sample time	Calcium, filtered (mg/L)	Calcium, unfiltered recoverable (mg/L)	Magnesium, filtered (mg/L)	Magnesium, unfiltered recoverable (mg/L)	Potassium, filtered (mg/L)	Potassium, unfiltered recoverable (mg/L)	Sodium, filtered (mg/L)	Sodium, unfiltered recoverable (mg/L)
461604096351900	Water-treatment plant inflow at Breckenridge, Minnesota	05/09/06	0800	--	95.4	--	39.9	--	6.4	--	49.5
		05/09/06	0805	--	99.4	--	39.3	--	7.2	--	50.4
		07/19/06	1220	100	--	40.3	--	7.09	--	50.3	--
		07/19/06	1225	102	--	41.0	--	7.46	--	51.5	--
461605096352000	Water-treatment plant outflow at Breckenridge, Minnesota	07/19/06	1230	22.6	--	16.7	--	6.58	--	50.3	--
		07/19/06	1235	23.0	--	17.1	--	6.93	--	51.4	--
461834096333400	Wastewater-treatment plant effluent at Breckenridge, Minnesota	05/09/06	0840	--	130	--	161	--	13.4	--	164
		05/09/06	0845	--	130	--	161	--	13.4	--	164
461749096363800	Wastewater-treatment plant influent at Wahpeton, North Dakota	07/19/06	0850	114	--	93.3	--	32.2	--	157	--
		07/19/06	0855	117	--	95.5	--	32.9	--	160	--
462009096371600	Wastewater-treatment plant effluent at Wahpeton, North Dakota	06/13/06	0820	--	117	--	97.1	--	32.4	--	150
		06/13/06	0825	--	116	--	95.8	--	32.7	--	149
465308096545800	Water-treatment plant inflow at West Fargo, North Dakota	08/07/06	1305	45.7	--	17.0	--	7.36	--	364	--
		08/07/06	1310	46.5	--	16.7	--	6.85	--	345	--
465309096545700	Water-treatment plant outflow at West Fargo, North Dakota	08/07/06	1315	47.7	--	17.5	--	7.58	--	369	--
		08/07/06	1320	46.4	--	17.6	--	7.34	--	372	--
475517097011600	Water-treatment plant inflow at Grand Forks, North Dakota	01/24/06	0810	--	58.9	--	24.6	--	3.2	--	16.7
		01/24/06	0815	--	55.9	--	22.6	--	3.0	--	9.0
475516097012400	Water-treatment plant outflow at Grand Forks, North Dakota	01/24/06	0820	--	41.8	--	8.1	--	3.2	--	11.1
		01/24/06	0825	--	41.6	--	8.1	--	3.2	--	11.2
475525097003500	Water-treatment plant inflow at East Grand Forks, Minnesota	02/27/06	1025	--	53.0	--	18.6	--	2.4	--	6.3
		02/27/06	1030	--	52.8	--	18.3	--	2.4	--	5.6
		08/30/06	0905	45.6	--	16.3	--	2.50	--	4.6	--
		08/30/06	0910	45.8	--	16.3	--	2.53	--	4.6	--
475526097003400	Water-treatment plant outflow at East Grand Forks, Minnesota	02/27/06	1015	--	43.9	--	<1.0	--	2.7	--	13.3
		02/27/06	1020	--	44.1	--	<1.0	--	2.7	--	13.2
		08/30/06	0855	44.7	--	<1.0	--	3.01	--	13.8	--
		08/30/06	0900	45.1	--	<1.0	--	3.07	--	13.8	--
475828097031500	Wastewater-treatment plant effluent at East Grand Forks, Minnesota	08/30/06	1045	71.9	--	91.2	--	14.5	--	86.7	--
		08/30/06	1050	70.6	--	88.9	--	13.2	--	84.0	--
Number of replicate samples with complete analytical results for given parameter				8	7	8	7	8	7	8	7
Median relative standard deviation, in percent, for all replicate pairs				1.7	1.6	1.9	1.2	4.1	2.4	3.6	3.4

[mg/L, milligrams per liter; --, no data; <, less than; µg/L, micrograms per liter]

Table 10. Analytical results and relative standard deviations for quality-assurance/quality-control replicate samples for select water- and wastewater-treatment plants within the Red River of the North Basin, North Dakota and Minnesota.—Continued

Site number	Site name	Sample date	Sample time	Chloride, filtered (mg/L)	Fluoride, filtered (mg/L)	Silica, filtered (mg/L)	Silica, unfiltered (mg/L)	Sulfate, filtered (mg/L)	Dissolved solids (mg/L)	Total suspended solids (mg/L)	Ammonia plus organic nitrogen, filtered (mg/L as N)
461604096351900	Water-treatment plant inflow at Breckenridge, Minnesota	05/09/06	0800	10.3	0.40	--	31.1	152	593	<5	1.6
		05/09/06	0805	10.2	.39	--	30.7	152	600	<5	1.6
		07/19/06	1220	10.2	.35	31.4	--	153	620	<5	1.5
		07/19/06	1225	10.6	.35	31.7	--	153	620	<5	1.6
461605096352000	Water-treatment plant outflow at Breckenridge, Minnesota	07/19/06	1230	14.7	1.25	14.3	--	152	329	<5	.71
		07/19/06	1235	14.9	1.25	14.4	--	153	329	<5	.70
461834096333400	Wastewater-treatment plant effluent at Breckenridge, Minnesota	05/09/06	0840	79.4	.59	--	9.7	982	1,700	22	2.8
		05/09/06	0845	79.4	.59	--	9.7	982	1,700	22	2.8
461749096363800	Wastewater-treatment plant influent at Wahpeton, North Dakota	07/19/06	0850	105	1.22	24.8	--	670	1,260	84	18
		07/19/06	0855	108	1.27	25.5	--	685	1,260	102	18
462009096371600	Wastewater-treatment plant effluent at Wahpeton, North Dakota	06/13/06	0820	117	.86	--	31.0	700	1,390	27	12
		06/13/06	0825	115	.85	--	30.8	687	1,370	24	12
465308096545800	Water-treatment plant inflow at West Fargo, North Dakota	08/07/06	1305	343	.67	27.4	--	57.3	1,180	<5	1.8
		08/07/06	1310	349	.70	27.1	--	58.1	1,180	<5	1.7
465309096545700	Water-treatment plant outflow at West Fargo, North Dakota	08/07/06	1315	345	--	38.0	--	56.0	1,190	<5	.66
		08/07/06	1320	346	--	37.3	--	56.0	1,180	<5	.76
475517097011600	Water-treatment plant inflow at Grand Forks, North Dakota	01/24/06	0810	6.17	.12	--	10.3	38.3	272	10	.69
		01/24/06	0815	6.07	.11	--	10.1	37.9	259	11	.72
475516097012400	Water-treatment plant outflow at Grand Forks, North Dakota	01/24/06	0820	8.45	1.14	--	8.57	54.3	183	<5	.70
		01/24/06	0825	8.43	1.13	--	8.57	54.6	182	<5	.77
475525097003500	Water-treatment plant inflow at East Grand Forks, Minnesota	02/27/06	1025	3.93	.10	--	7.23	14.5	215	--	.77
		02/27/06	1030	3.84	.11	--	6.97	14.7	215	--	.76
		08/30/06	0905	5.70	.11	9.16	--	24.1	227	52	.68
		08/30/06	0910	5.60	.11	9.05	--	24.0	226	52	.66
475526097003400	Water-treatment plant outflow at East Grand Forks, Minnesota	02/27/06	1015	8.14	.89	6.64	6.64	39.1	163	--	.68
		02/27/06	1020	7.60	.88	6.68	6.68	39.4	161	--	.40
		08/30/06	0855	8.82	.90	7.33	--	50.6	188	69	.72
		08/30/06	0900	8.70	.89	7.41	--	50.1	187	2.5	.74
475828097031500	Wastewater-treatment plant effluent at East Grand Forks, Minnesota	08/30/06	1045	86.4	.43	5.90	--	472	856	24	2.2
		08/30/06	1050	85.8	.42	5.74	--	474	856	23	2.2
	Number of replicate samples with complete analytical results for given parameter			15	14	8	7	15	15	13	15
	Median relative standard deviation, in percent, for all replicate pairs			1.7	1.9	1.5	.9	1.5	.7	50.1	2.0

[mg/L, milligrams per liter; --, no data; <, less than; µg/L, micrograms per liter]

Table 10. Analytical results and relative standard deviations for quality-assurance/quality-control replicate samples for select water- and wastewater-treatment plants within the Red River of the North Basin, North Dakota and Minnesota.—Continued

Site number	Site name	Sample date	Sample time	Ammonia plus organic nitrogen, unfiltered (mg/L as N)	Ammonia, filtered (mg/L as N)	Ammonia, unfiltered (mg/L as N)	Nitrite plus nitrate, filtered (mg/L as N)	Nitrite plus nitrate, unfiltered (mg/L as N)	Total nitrogen, filtered (mg/L)	Total nitrogen, unfiltered (mg/L)	Phosphorus, filtered (mg/L)
461604096351900	Water-treatment plant inflow at Breckenridge, Minnesota	05/09/06	0800	1.4	1.49	1.39	0.021	0.02	1.66	1.45	0.050
		05/09/06	0805	1.4	1.47	1.5	<.020	.01	1.59	1.40	.039
		07/19/06	1220	1.3	1.21	1.21	<.020	.01	1.50	1.36	<.004
		07/19/06	1225	1.3	1.24	1.21	<.020	.02	1.57	1.34	<.004
461605096352000	Water-treatment plant outflow at Breckenridge, Minnesota	07/19/06	1230	.61	.539	.55	.715	.72	1.43	1.33	.329
		07/19/06	1235	.64	.531	.54	1.03	.70	1.73	1.34	.320
461834096333400	Wastewater-treatment plant effluent at Breckenridge, Minnesota	05/09/06	0840	3.6	.449	.47	.066	.07	2.90	3.68	.828
		05/09/06	0845	3.6	.449	.47	.066	.07	2.90	3.68	.828
461749096363800	Wastewater-treatment plant influent at Wahpeton, North Dakota	07/19/06	0850	31	14.1	13.7	<.020	.10	17.8	31.3	.113
		07/19/06	0855	33	14.3	14.4	<.020	.08	18.1	32.8	.092
462009096371600	Wastewater-treatment plant effluent at Wahpeton, North Dakota	06/13/06	0820	12	10.5	10.5	.063	.06	11.9	12.1	1.96
		06/13/06	0825	12	10.6	10.6	.062	.06	11.6	12.4	2.08
465308096545800	Water-treatment plant inflow at West Fargo, North Dakota	08/07/06	1305	1.6	1.27	1.21	.021	.02	1.77	1.57	.040
		08/07/06	1310	1.6	1.22	1.17	.024	.02	1.74	1.58	.033
465309096545700	Water-treatment plant outflow at West Fargo, North Dakota	08/07/06	1315	.58	.454	.47	.062	.10	.72	.68	20.2
		08/07/06	1320	.69	.509	.50	.057	.05	.81	.74	19.4
475517097011600	Water-treatment plant inflow at Grand Forks, North Dakota	01/24/06	0810	.64	.085	.11	.181	.18	.88	.82	.049
		01/24/06	0815	.64	.100	.11	.176	.18	.90	.82	.048
475516097012400	Water-treatment plant outflow at Grand Forks, North Dakota	01/24/06	0820	.68	.398	.43	.238	.23	.93	.91	.953
		01/24/06	0825	.71	.426	.52	.234	.24	1	.95	.963
475525097003500	Water-treatment plant inflow at East Grand Forks, Minnesota	02/27/06	1025	.77	.070	.07	.117	.11	.88	.88	.014
		02/27/06	1030	.76	.072	.07	.117	.11	.88	.87	.016
		08/30/06	0905	.49	<.010	<.01	.032	.03	.71	.53	.007
		08/30/06	0910	.50	<.010	<.01	.020	.01	.68	.52	.005
475526097003400	Water-treatment plant outflow at East Grand Forks, Minnesota	02/27/06	1015	.61	.334	.35	.157	.16	.83	.77	1.50
		02/27/06	1020	.34	.129	.13	.154	.16	.56	.50	1.51
		08/30/06	0855	.91	.358	.37	.058	.04	.78	.95	1.44
		08/30/06	0900	.67	.363	.36	.049	.04	.79	.71	1.47
475828097031500	Wastewater-treatment plant effluent at East Grand Forks, Minnesota	08/30/06	1045	1.9	.005	.03	.053	.44	2.29	2.32	.210
		08/30/06	1050	2.4	.012	.02	.040	.07	2.24	2.42	.204
Number of replicate samples with complete analytical results for given parameter				15	15	15	15	15	15	15	15
Median relative standard deviation, in percent, for all replicate pairs				9.7	2.8	6.6	44.8	49.6	2.3	7.0	8.1

[mg/L, milligrams per liter; --, no data; <, less than; µg/L, micrograms per liter]

Table 10. Analytical results and relative standard deviations for quality-assurance/quality-control replicate samples for select water- and wastewater-treatment plants within the Red River of the North Basin, North Dakota and Minnesota.—Continued

Site number	Site name	Sample date	Sample time	Phosphorus, unfiltered (mg/L)	Iron, filtered (µg/L)	Iron, unfiltered recoverable (µg/L)	Manganese, filtered (µg/L)	Manganese, unfiltered recoverable (µg/L)
461604096351900	Water-treatment plant inflow at Breckenridge, Minnesota	05/09/06	0800	0.117	--	1,740	--	150
		05/09/06	0805	.113	--	1,690	--	190
		07/19/06	1220	.064	827	--	148	--
		07/19/06	1225	.064	218	--	150	--
461605096352000	Water-treatment plant outflow at Breckenridge, Minnesota	07/19/06	1230	.323	17	--	<10	--
		07/19/06	1235	.328	28	--	<10	--
461834096333400	Wastewater-treatment plant effluent at Breckenridge, Minnesota	05/09/06	0840	1.08	--	480	--	250
		05/09/06	0845	1.08	--	169	--	200
461749096363800	Wastewater-treatment plant influent at Wahpeton, North Dakota	07/19/06	0850	4.79	427	--	163	--
		07/19/06	0855	5.10	402	--	167	--
462009096371600	Wastewater-treatment plant effluent at Wahpeton, North Dakota	06/13/06	0820	2.33	--	860	--	420
		06/13/06	0825	2.38	--	881	--	408
465308096545800	Water-treatment plant inflow at West Fargo, North Dakota	08/07/06	1305	.084	<10	--	33	--
		08/07/06	1310	.072	<10	--	34	--
465309096545700	Water-treatment plant outflow at West Fargo, North Dakota	08/07/06	1315	20.2	543	--	34	--
		08/07/06	1320	19.3	528	--	33	--
475517097011600	Water-treatment plant inflow at Grand Forks, North Dakota	01/24/06	0810	0.056	--	340	--	400
		01/24/06	0815	0.059	--	320	--	300
475516097012400	Water-treatment plant outflow at Grand Forks, North Dakota	01/24/06	0820	0.971	--	5	--	<10
		01/24/06	0825	0.969	--	20	--	<10
475525097003500	Water-treatment plant inflow at East Grand Forks, Minnesota	02/27/06	1025	.028	--	70	--	20
		02/27/06	1030	.026	--	70	--	20
		08/30/06	0905	.043	15	--	<10	--
		08/30/06	0910	.043	<10	--	<10	--
475526097003400	Water-treatment plant outflow at East Grand Forks, Minnesota	02/27/06	1015	1.52	--	40	--	<10
		02/27/06	1020	1.50	--	50	--	<10
		08/30/06	0855	3.43	19	--	<10	--
		08/30/06	0900	1.52	24	--	<10	--
475828097031500	Wastewater-treatment plant effluent at East Grand Forks, Minnesota	08/30/06	1045	.284	46	--	<10	--
		08/30/06	1050	.274	44	--	<10	--
Number of replicate samples with complete analytical results for given parameter				15	8	7	8	7
Median relative standard deviation, in percent, for all replicate pairs				17.2	77.4	16.5	2.3	17.6

[mg/L, milligrams per liter; --, no data; <, less than; µg/L, micrograms per liter]

References Cited

- Bales, J.D., and Nustad, R.A., 2005, Simulation of conservative-constituent transport in the Red River of the North Basin, North Dakota and Minnesota, 2003–04: U.S. Geological Survey Scientific Investigations Report 2005–5273, 81 p.
- Dodge K.A., Hornberger, M.I., and Dyke, J.L., 2007, Water-quality, bed-sediment, and biological data (October 2005 through September 2006) and statistical summaries of long-term data for streams in the Clark Fork Basin, Montana: U.S. Geological Survey Open-File Report 2007–1301, 124 p.
- Nustad, R.A., and Bales, J.D., 2006, Simulation of constituent transport in the Red River of the North Basin, North Dakota and Minnesota, during unsteady-flow conditions, 1977 and 2003–04, U.S. Geological Survey Water-Resources Investigations Report 2006–5296, 65 p.
- Red River Valley Water Supply Project, 2007, Current news and information—Red River Valley Water Supply Project Environmental Impact Statement: accessed September 10, 2007, at URL <http://www.rrvwsp.com/>
- Robinson, S.M., Lundgren, R.F., Sether, B.A., Norbeck, S.W., and Lambrecht, J.M., 2004, Water resources data—North Dakota, water year 2003, v. 1, Surface water; U.S. Geological Survey Water-Data Report ND–03–1, 583 p.
- Sando, S.K., Krabbenhoft, D.P., Johnson, K.M., Lundgren, R.F., and Emerson, D.G., 2007, Mercury and methylmercury in water and bottom sediments of wetlands at Lostwood National Wildlife Refuge, North Dakota, 2003–04: U.S. Geological Survey Scientific Investigations Report 2007–5219, 66 p.
- U.S. Geological Survey, 1978, Water resources data for North Dakota, water year 1977, Surface water; U.S. Geological Survey Water-Data Report ND–77–1, 512 p.
- U.S. Geological Survey, variously dated, National field manual for the collection of water-quality data: U.S. Geological Survey Techniques of Water-Resources Investigations, book 9, chaps. A1–A9.

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