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Mercury, Methylmercury, and Other Water-Quality Data from Flood-Control Impoundments and Natural Waters of the Red River of the North Basin, Minnesota, 1997–99

Mark E. Brigham, Mark L. Olson, and John F. DeWild

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Prepared in cooperation with the Red River Watershed Management Board and the Minnesota Pollution Control Agency

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Conversion Factors and Water-Quality Units

Multiply	By	To obtain
meter (m)	3.281	feet
hectare (ha)	2.471	acre

Chemical concentrations are given in metric units. Chemical concentrations of substances in water are given in milligrams per liter (mg/L), nanograms per liter (ng/L), or micrograms per liter (µg/L). Milligrams per liter is a unit expressing the concentration of chemical constituents in solution as mass (milligrams) of solute per unit volume (liter) of water. Nanograms per liter is a unit expressing the concentration of chemical constituents in solution as mass (nanograms) of solute per unit volume (liter) of water. One million nanograms per liter is equivalent to one milligram per liter. Micrograms per liter is a unit expressing the concentration of chemical constituents in solution mass (micrograms) of solute per unit volume (liter) of water. One thousand micrograms per liter is equivalent to one milligram per liter.

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ABSTRACT

It is now well documented that impoundment of natural waters, with inundation of terrestrial area, results in enhanced conversion of inorganic mercury to methylmercury, a form that is toxic and bioaccumulates to a greater extent than inorganic mercury. Concentrations of mercury, methylmercury, and other water-quality constituents are reported from water sampled from flood-control impoundments and natural (unimpounded) waters of the Red River of the North Basin from 1997–99.

INTRODUCTION

Mercury occurs naturally in surface waters worldwide, although nearly always at minute concentrations. Aquatic organisms can accumulate much higher mercury concentrations than their surrounding water (Downs and others, 1998; Morel and others, 1998). Organisms higher in the food chain also tend to have higher mercury concentrations than their prey, a phenomenon known as biomagnification (Morel and others, 1998; Watras and others, 1998). Methylation of mercury is a natural process that converts inorganic mercury to methylmercury, a form that is more toxic and bioaccumulates to a greater extent than inorganic mercury. Gamefish in many waters of Minnesota have mercury levels that prompt advisories that suggest limiting consumption of certain sizes and species of fish (Minnesota Department of Health, 1998). Minnesota's tiered advisory recommends progressively lower fish consumption as mercury content increases. Larger fish in many waters exceed the U.S. Food and Drug Administration's 1 part per million standard for mercury in edible fish.

Human activities are known to influence the mercury cycle in several ways. Human activities release substantial amounts of mercury to the environment, largely through coal burning and waste incineration (Nriagu and Pacyna, 1988). Consequently, the amount of mercury deposited in Minnesota lakes that are distant from point sources has increased by a factor of about 3.7 since 1850 (Swain and others, 1992).

Surface water impoundment can directly and indirectly affect the aquatic mercury cycle. Methylation rates and net methylmercury production increase, resulting in increases in mercury concentrations in fish that live in such impoundments. This phenomenon has been observed in numerous reservoirs throughout the world (reviewed by Bodaly and others, 1997). There is some evidence that mercury levels in fish in newly created reservoirs rapidly increase, plateau, then decrease to approximately background levels over a period of one to several decades (Bodaly and others, 1997; Scruton and others, 1994).

Water management activities in the Red River of the North Basin have included construction of numerous small impoundments over the past few decades, and there is current interest to construct additional impoundments to minimize damages related to flooding. Most studies of the effect of impoundments on mercury cycling have been on large hydroelectric impoundments in boreal Canada. Increased methylation and(or) uptake of mercury by aquatic organisms could be important in smaller flood-control impoundments of northwestern Minnesota; however, little information exists on mercury levels and cycling in this region.

Through the Environmental Impact Statement process related to the cumulative effect of small impoundments in the Red River Basin, increased methylation of mercury was identified as a potential water-quality concern (U.S. Army Corps of Engineers and Minnesota Department of Natural Resources, 1996). There is interest in gaining a better scientific understanding of this issue to aid in resource-management decisions. Particularly, there is interest in learning whether constructed impoundments contribute more methylmercury to aquatic systems than exists in natural hydrologic systems.

OBJECTIVES AND SCOPE

To address the above concerns, the U.S. Geological Survey (USGS) studied mercury and methylmercury levels in impoundments and natural waters (lakes, streams, and outflows from wetlands) in northwestern Minnesota.

The first phase of this study focused on the Good Lake impoundment, a newly constructed (May 1995) permanent-pool impoundment in Clearwater and Beltrami Counties, Minnesota, and three nearby lakes. The second phase (roughly contemporaneous with the first) of this study involved reconnaissance sampling of older permanent-pool impoundments (those at least ten years old), natural lakes and outflows from wetlands, and temporary-pool impoundments (inflow and outflow). This report includes mercury and water-quality data from 1997–99, from all study sites.

ACKNOWLEDGEMENTS

This study was a cooperative effort of the USGS, the Red River Watershed Management Board, and the Minnesota Pollution Control Agency. Additional field support was provided by Joel Rohde, Rick Barrett, Pat Brun, and Pat Brown of the Red Lake Band of Chippewa Indians Department of Natural Resources; and Maggie Leach and Ryan Odenbach of the Red Lake Watershed District. The following also provided useful information on flood-control impoundments: Jerry Bennett (Wild Rice Watershed District); Bruce Albright (Buffalo-Red River Watershed District); Dan Wilkins (Sandhill River Watershed District); Lowell Enerson, Brad Johnson, and Loren Sanderson (Red Lake Watershed District); and Donald Ogaard (Red River Watershed Management Board).

APPROACH

There were two phases to this study. The first phase focused on the Good Lake impoundment (fig. 1). The principal inflow, mid-pool (at the approximate center of pre-impounded Good Lake), and outflow of the Good Lake impoundment were sampled approximately monthly. For comparison, three nearby lakes (Cahill, Curtis, and Miskogineu) (fig. 1) that are similar to the pre-impounded Good Lake were sampled approximately quarterly. At each sampling, unfiltered surface water was collected for analysis of total mercury, methylmercury, and organic carbon. In addition, field parameters (water temperature, specific conductance, dissolved oxygen, and pH) were measured. At selected samplings, samples for filtered-water analyses of mercury, methylmercury, organic carbon, and major ions were collected. Also, at selected sampling intervals, mercury and methylmercury samples were collected from deeper strata in the impoundment and lakes. Good Lake and reference lakes were about 1–m deep (mid-pool), although at high-flow, the Good Lake impoundment was about 2–m deep.

The Good Lake impoundment is located in the Red Lake Indian Reservation in Clearwater and Beltrami Counties, Minnesota. Construction of the impoundment was completed in May 1995. Prior to completion of the impoundment, smaller ditch and dike construction efforts near Good Lake date back to 1984 (Adolfs, 1991), although these had minimal effects on Good Lake. Prior to impoundment, Good Lake had a surface area of 34 ha (84 acres). The impoundment design is for a normal pool with a surface area of 728 ha (1,800 acres), and a maximum flood pool (includes normal pool) of 1,900 ha (4,700 acres). The National Aerial Photography Program photograph (NAPP 8845–45) from September 9, 1996 (cover photograph) indicates inundation of about 260 ha (640 acres). The Good Lake impoundment drains predominantly forest and wetlands (peatlands), with some cultivated cropland.

The second phase focused on sampling impounded and natural waters of a wider area in northwestern Minnesota (fig. 2, and table 1 at the back of the report). Lakes and permanent-pool impoundments were sampled five times, from late-summer 1997 to late-winter 1999. The permanent-pool impoundments were all constructed before 1988. Inflowing waters were occasionally sampled, particularly during runoff events. Similar constituents were measured as listed for the first phase. The watersheds of permanent-pool impoundments and lakes ranged from predominantly agricultural to predominantly forest and wetland (especially peatlands at sites 39–52). Permanent-pool impoundments were typically about 1–2 m deep at mid-pool during normal flow regimes. Lake depths ranged from about 1–4 m at mid-pool.

Temporary-pool impoundments (inundated only during large runoff events) were also sampled, either by wading near (upstream of) the outlet dam structure, or by sampling the water flowing out of the dam structure (either from the outflow, or from the spillway downstream of the dam). Stream inflows to temporary-pool impoundments were typically sampled on the same day of, or in some cases several days before, sampling of the outflowing water. Sample numbers varied among sites.

Impoundment sites for the second phase span a variety of conditions: engineering design, size of watershed and impounded area, depth, hydraulic detention time, biological community composition, age, and other variables. Many of these variables are known to be important in aquatic mercury cycling. For sites with large ranges in pool area between normal stage and flood stage, a range

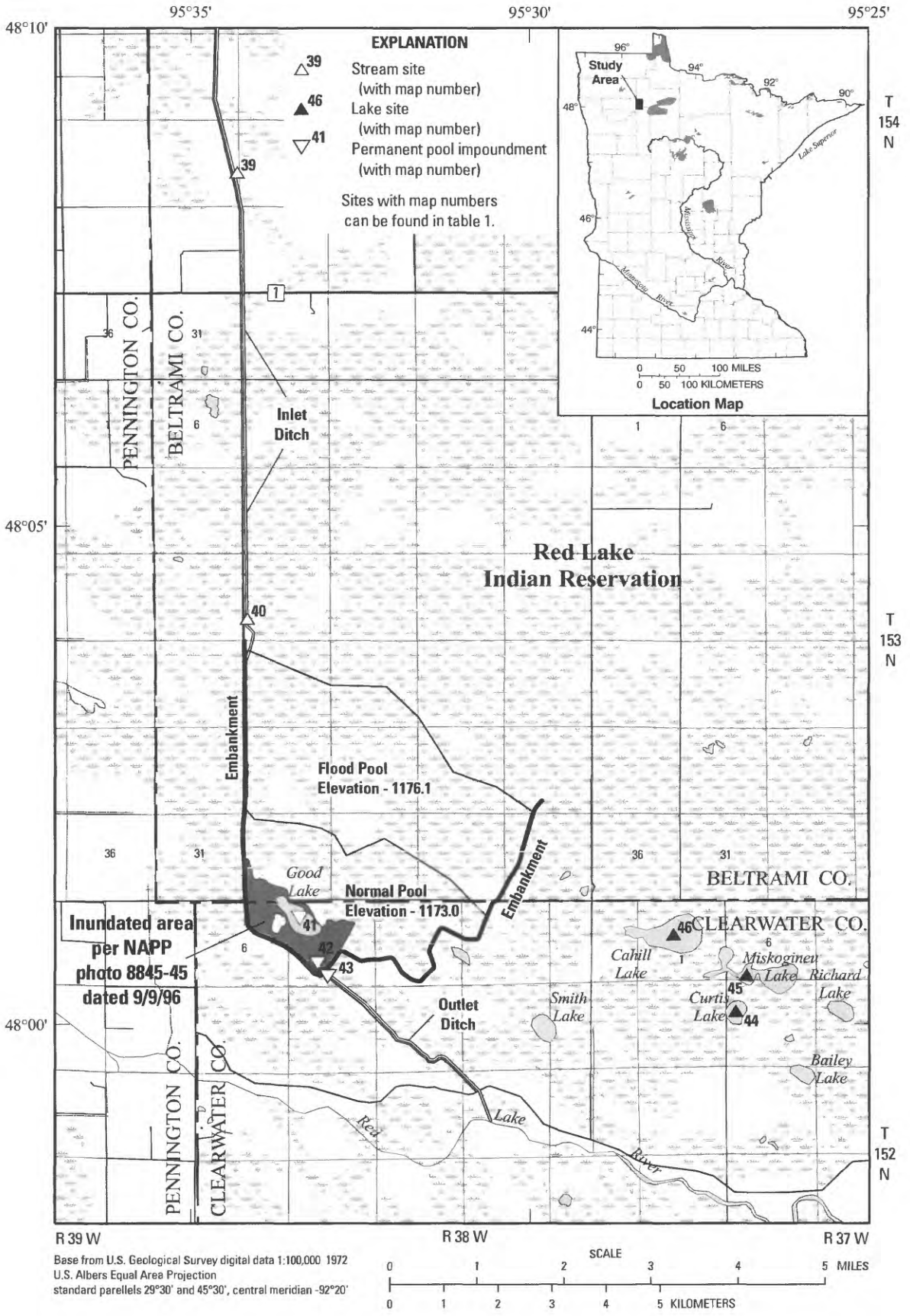

Figure 1. Location of Good Lake Impoundment study area within the Red Lake Indian Reservation.

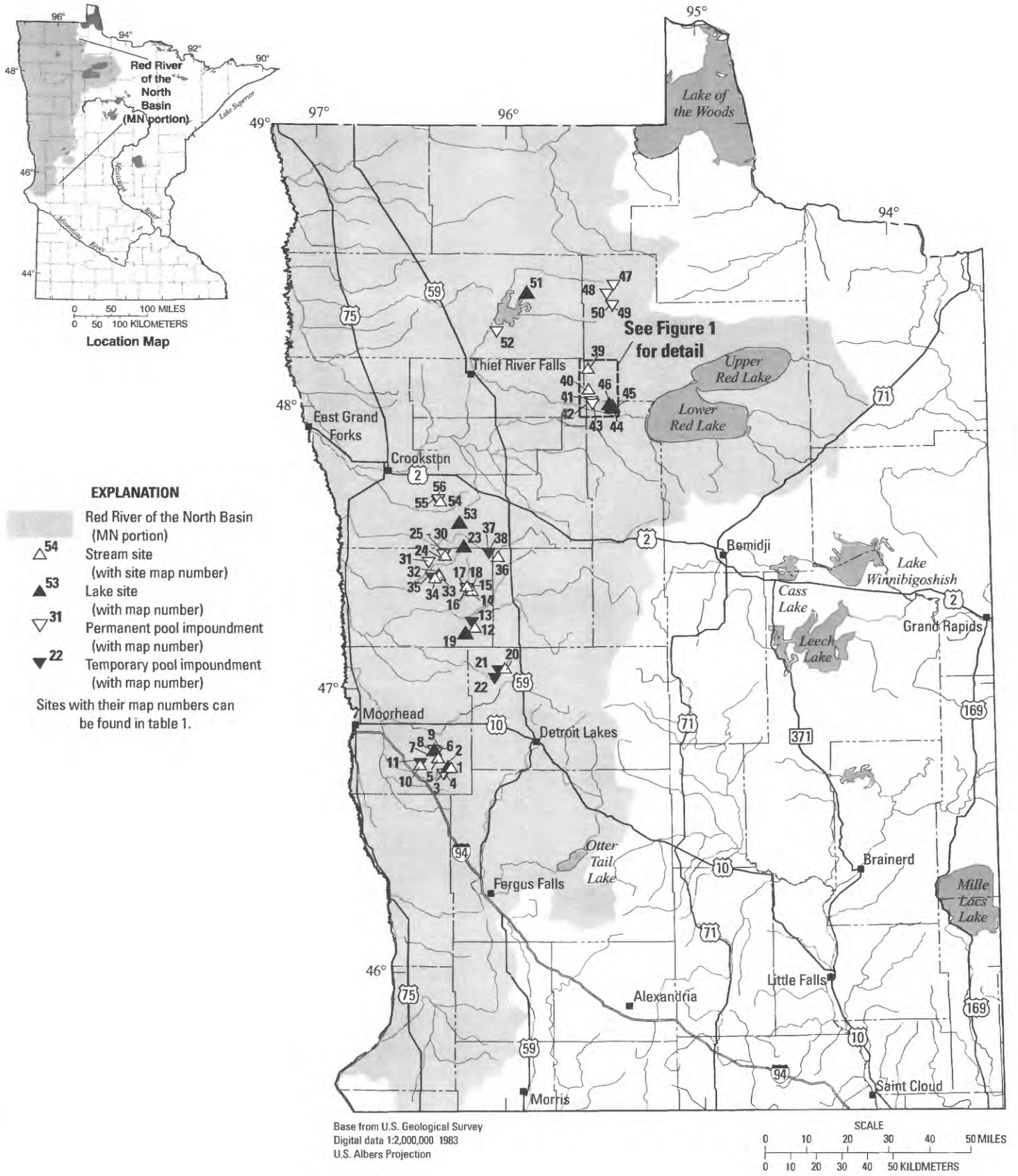

Figure 2. Location map, study area, and mercury sampling sites in the Minnesota portion of the Red River of the North Basin.

of areas is given. Also, Adolfs (1991) lists a range of drainage areas for the Good Lake impoundment, with the greater area contributing drainage during floods.

METHODS

Sampling of mercury and methylmercury followed the procedures outlined by Olson and DeWild (1999) and Olson and others (1997), except that Tyvek suits were not worn during sampling. Samples were typically collected by dipping sample bottles to a depth of approximately 0.1 m (open-water) to 0.5 m (through ice). Impoundment pools and lakes were sampled either by boating or wading upwind during open water. In stream channels or pipe-outflows from impoundments, samples were taken by dipping into the approximate centroid of flow. Through-ice samples were taken either by dipping or pumping through an auger-drilled hole (after precleaning the auger, and drilling several test holes to remove contamination). Pumped samples were collected with a peristaltic pump using silicon pumphead tubing and Teflon FEP pump lines weighted with a Teflon PTFE weight.

Care was taken to minimize contamination, as described by Olson and DeWild (1999). Briefly, mercury-sample bottles and pump tubing were pre-cleaned, and shipped double-bagged from the laboratory in sealable bags. Field personnel wore clean shoulder-length polyethylene gloves and hand-length nitrile gloves at each sampling. A gloved "dirty-hands" person touched outer surfaces of bags and other equipment; a gloved" clean-hands" person touched only inner bag, sample bottle, and pump lines. Samples were express-shipped to the USGS mercury research laboratory in Middleton, Wisconsin. Filtration (where applicable) was typically done at the laboratory using 0.4 micrometer capsule filters (Meissner Filtration Products, Inc.). Total mercury samples were preserved with 10 mL of 6 normal hydrochloric acid, either in the field or upon receipt at the laboratory.

Sample analysis follows modern, low-level detection procedures outlined by Olson and DeWild (1999). Total mercury is analyzed by Method 1631 (U.S. Environmental Protection Agency, 1999). Methylmercury is analyzed by proposed Method 1630 (U.S. Environmental Protection Agency, 1998).

The mercury laboratory also analyzed organic carbon with a carbon analyzer (model 1010, OI Analytical, College Station, Texas) using Standard Method 5310D (American Public Health Association and others, 1998).

Major ions were analyzed at the USGS National Water Quality Laboratory in Lakewood, Colo., by routine methods (Fishman, 1993; Fishman and Friedman, 1989). Quality-control data for major ions in streams in the Red River of the North Basin (Tornes and others, 1997) have indicated good reproducibility (pooled coefficients of variation less than 3 percent), and undetectable or low-level blank contamination, relative to ambient streamwater of the region.

Field parameters were typically measured with a Hydrolab Series 4 Sonde, calibrated prior to each day's field work for all parameters except turbidity. Turbidity was not consistently measured throughout the study. Hydrolab turbidity was calibrated approximately monthly; the measurements were inherently variable, particularly in shallow conditions or rapidly flowing water, and are considered estimates. Occasionally, an MG Scientific portable turbidimeter, calibrated daily, was used for turbidity measurements (denoted as "lab turbidity" in table 2).

RESULTS

Table 2, at the back of the report, lists data for field measurements, organic carbon, and mercury for all regular (not quality control) samples. Table 3, at the back of the report, lists data for major ions, which were sampled less frequently than other constituents.

QUALITY-CONTROL DATA

Potential contamination of mercury samples due to collection, sample handling, and analysis was assessed with field blank samples, using de-ionized water purified at the mercury laboratory, using a Millipore MilliQ system. Data for field-blank samples (table 4, at the back of the report) show low concentrations of analytes relative to nearly all ambient-water samples. Methylmercury in unfiltered and filtered field-blank water samples ranged from less than detection limits to a maximum of 0.061 ng/L. The maximum-concentration was a pump-blank sample following collection of a high-methylmercury sample. Total mercury in unfiltered and filtered field-blank samples ranged from 0.05–0.42 ng/L, with a mean of 0.15 ng/L. Organic carbon concentrations in blank samples were typically at least two orders of magnitude lower than in ambient waters for this study.

Reproducibility was assessed by analysis of replicate field samples. Data for field replicates are presented in table 5, at the back of the report.

Table 6, at the back of the report, provides a statistical summary of replicate data. For each set of replicates, a coefficient of variation (CV = (standard deviation divided by mean concentration) multiplied by 100 to express as a percentage) was calculated. Pooled CVs were then calculated for each analyte as the square root of the weighted mean (weighted to degrees of freedom of each repli-

cate set) of the squared CVs. CVs allow a comparison of reproducibility across a range of concentrations.

For methylmercury in unfiltered water, CVs range from 0.4 to 106 percent. The high CVs are at low concentrations. When concentrations (mean of replicate set) exceeded 0.2 ng/L, CVs were less than 11 percent. CVs for total mercury did not follow a pattern with increasing mercury concentration.

Organic carbon showed good reproducibility (CVs less than 7 percent) in both unfiltered and filtered samples, except in one replicate set, which had a CV of 34.7 percent.

Laboratory quality control data are summarized by Olson and DeWild (1999).

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SUPPLEMENTAL INFORMATION

Table 1. Sampling locations and watershed characteristics.

[mi^2, square miles; km^2, square kilometers; ac, acres; ha, hectares; trib., tributary; abv, above (upstream from); nr, near; MN, Minnesota; Cr, creek; blw, below (downstream of); WMA, Wildlife Management Area; Co., county; Rd, road; imp., impoundment; pp-imp, permanent-pool impoundment; tp-imp, temporary-pool impoundment; ag, agricultural land; JCT, Junction; NWR, National Wildlife Refuge; out, outlflow; Ref., reference; R, river; no., number; Ind., Indian; Res., reservation; Lk, Lake; nw, northwest; --, not available]

Map number (figure 2)	Site number	Latitude	Longitude	Site name	Watershed area (mi^2/km^2)	Surface area ac/ha)	Type	Observations	Ref.
1	05061320	46°43'37"	096°16'46"	Unnamed trib. to Stony Cr abv Big Slough nr Rollag, MN	11.2/29.0[c]	--	stream	drains cattail marsh	
2	05061330	46°43'47"	096°17'45"	Unnamed pond, trib. to Big Slough nr Rollag, MN	1.02/2.64[c]	27.0/10.9[d]	lake	ag; intense algae in summer	
3	05061340	46°41'54"	096°18'51"	Stony Cr (Big Slough) abv outlet nr Barnesville, MN	26.1[a]/67.6	1150[a]/465	pp-imp	ag	1
4	05061350	46°41'55"	096°19'08"	Stony Cr blw Big Slough outlet nr Barnesville, MN	26.1[a]/67.6	1150[a]/465	pp-out		1
5	05061380	46°45'39"	096°20'44"	Hay Cr abv Bjornson WMA nr Rollag, MN	46.7/121[c]	--	stream	ag/wetland	
6	05061382	46°46'32"	096°21'19"	South pool outlet of Bjornson WMA nr Rollag, MN	48.7/126[c]	272[a]/110	pp-out	ag/wetland	2
7	05061385	46°47'23"	096°21'57"	Rushfieldt Lk nr Downer, MN	0.81/2.10[c]	39.7/16.1[d]	lake	ag	
8	05061387	46°46'53"	096°22'08"	North pool, Bjornson WMA nr Rollag, MN	41.4[a]/107.2	361[a]/146	pp-imp	ag/wetland	2
9	05061388	46°46'52"	096°22'08"	North pool outlet of Bjornson WMA nr Rollag, MN	41.4[a]/107.2	361[a]/146	pp-out	ag/wetland	2
				(watershed area for North Pool, determined by method c)	52.0/134[c]	--			
10	05061400	46°44'37"	096°25'12"	Spring Cr abv Downer, MN	5.81[b]/15.0	--	stream	ag	
11	05061415	46°44'10"	096°26'17"	Spring Cr at Henry Dam spillway abv Downer, MN	9.3/24.0[c]	53[a]/21	tp-imp	ag	3
12	05062477	47°13'25"	096°09'35"	Moccasin Cr abv imp. nr Fossum, MN	64.0/166[c]	--	stream	ag	
13	05062480	47°14'07"	096°10'28"	Moccasin Cr imp. abv outlet nr Fossum, MN	64.9[a]/168	113[a]/45	tp-imp	ag	4
14	05062550	47°21'13"	096°10'26"	Mashaug Cr abv Dam nr Gary, MN	11.0/28.4[c]	--	stream	ag	
15	05062560	47°20'48"	096°11'40"	Mashaug Cr blw dam nr Gary, MN	14.1[a]/36.5	47[a]/19	tp-imp	ag	5
16	05062570	47°22'08"	096°12'00"	Garden Slough at Co. Rd 19 near Gary, MN	8.7/22.5[c]	--	stream	ag	
17	05062580	47°21'18"	096°11'59"	Garden Slough imp. nr Gary, MN	12.2[a]/31.6	14[a]/5.7	pp-imp	ag	6
18	05062590	47°21'13"	096°11'59"	Garden Slough imp. outlet nr Gary, MN	12.2[a]/31.6	--	pp-out	ag	6
19	471213096122301	47°12'13"	096°12'23"	Home Lk, northeast end, nr Fossum, MN	1.5/3.9[c]	67.2/27.2[d]	lake	mixed ag/forest	
20	05063220	47°04'45"	096°00'19"	South Branch Wild Rice River nr Ogema, MN	30.9[b]/80.0	--	stream	ag	
21	05063230	47°03'54"	096°02'14"	South Branch Wild Rice River (Upper Becker imp.) nr Ogema, MN	39.0[a]/101	100–300[a]/ 40–121	tp-imp	ag	7
22	05063245	47°02'16"	096°03'27"	South Branch Wild Rice R (Lower Becker imp.) nr Ogema, MN	43.0[a]/111	15–40[a]/6.1–16	tp-imp	ag	7
23	473034096130501	47°30'34"	096°13'05"	Raff Lk nr Fertile, MN	0.73/1.9[c]	66.9/27.1[d]	lake	ag	
24	05067315	47°28'40"	096°18'48"	Co. Ditch 45 abv Sande imp. nr Flaming, MN	4.3/11.1[c]	--	stream	ag	
25	05067317	47°28'28"	096°19'04"	Pool B2 Sande imp. abv outlet nr Flaming MN	6.0[a]/15.5	14.5[a]/5.9	pp-imp	ag	8
26	05067320	47°28'23"	096°19'07"	Pool B2 outlet, Sande imp. nr Co. Ditch 45 nr Flaming, MN	6.0[a]/15.5	14.5[a]/5.9	pp-imp	ag	8
27	05067327	47°28'22"	096°19'14"	Pool B3 Sande imp. abv outlet nr Flaming, MN	6.0[a]/15.5	20.4[a]/8.3	pp-imp	ag	8
28	05067330	47°28'24"	096°19'16"	Pool B3 outlet, Sande imp. nr Co. Ditch 45 nr Flaming, MN	6.0[a]/15.5	20.4[a]/8.3	pp-imp	ag	8
29	05067333	47°28'24"	096°19'21"	Pool A4 Sande imp. abv outlet nr Flaming, MN	6.0[a]/15.5	15.0[a]/6.1	pp-imp	ag	8
30	05067335	47°28'22"	096°19'22"	Pool A4 outlet, Sande imp. nr Co. Ditch 45 nr Flaming, MN	6.0[a]/15.5	15.0[a]/6.1	pp-imp	ag	8
				(watershed area for Sande imp., determined by method c)	4.7/12.1[c]	--			
31	05067395	47°26'47"	096°23'57"	Lockhart Swamp imp. Agassiz No.2 WMA Nr Flaming MN	35.7[a]/92.5	850[a]/344	pp-imp	ag; large wetland	9
32	05067420	47°24'46"	096°20'45"	Unnamed stream at Co. Rd 131 nr Gary, MN	6.0/15.5[c]	--	stream	ag	
33	05067425	47°24'24"	096°20'38"	Unnamed stream at Co. Rd 156, nr Flaming, MN	3.9/10.0[c]	--	stream	ag	
34	05067430	47°23'53"	096°21'55"	Unnamed stream by Co. Rd 30 nr Flaming, MN	11.4/29.7[c]	--	stream	ag	
35	05067435	47°23'33"	096°22'43"	Green Meadow dam outlet nr Flaming, MN	20.6[a]/53.3	180[e]/73	tp-imp	ag	10
				(watershed area of Green Meadow outlet, determined by method c)	26.3/68.1[c]	--			
36	05067850	47°28'25"	096°02'27"	Sand Hill River at Co. Rd. 7 nr Rindal, MN	121/314[c]	--	stream	mixed ag/wetland/ forest	

Table 1. Sampling locations and watershed characteristics.(Continued)

[mi^2, square miles; km^2, square kilometers; ac, acres; ha, hectares; trib., tributary; abv, above (upstream from); nr, near; MN, Minnesota; Cr, creek; blw, below (downstream of); WMA, Wildlife Management Area; Co., county; Rd, road; imp., impoundment; pp-imp, permanent-pool impoundment; tp-imp, temporary-pool impoundment; ag, agricultural land; JCT, Junction; NWR, National Wildlife Refuge; out, outlflow; Ref., reference; R, river; no., number; Ind., Indian; Res., reservation; Lk, Lake; nw, northwest; --, not available]

Map number (figure 2)	Site number	Latitude	Longitude	Site name	Watershed area (mi^2/km^2)	Surface area ac/ha)	Type	Observations	Ref.
37	05067878	47°28'44"	096°05'17"	Sand Hill River abv dam nr Rindal, MN	146[a]/378	--	tp-imp	mixed ag/wetland/ forest	11
38	05067880	47°28'45"	096°05'18"	Sand Hill River blw dam nr Rindal, MN (watershed area of Sand Hill River below dam, determined by method c)	146[a]/378 136/353[c]	--	tp-imp	mixed ag/wetland/ forest	11
39	05074750	48°08'24"	095°34'22"	Unnamed ditch to Good Lake nr Erie, MN	8.6/22.2[c]	--	stream	wetland/forest	
40	05074760	48°04'04"	095°34'13"	Unnamed ditch abv Good Lake, nr Erie, MN	16.7/43.3[c]	--	stream	mixed wetland/ forest/ag	
41	05074765	48°01'02"	095°33'25"	Good Lake imp., mid-pool, nr Erie, MN	35–73[a]/91–189	1800[a]/728	pp-imp	mixed wetland/ forest/ag	12
42	05074770	48°00'30"	095°33'04"	Good Lake abv outlet nr Erie, MN	35–73[a]/91–189	1800[a]/728	pp-imp	mixed wetland/ forest/ag	12
43	05074780	48°00'29"	095°33'03"	Good Lake outlet nr Erie, MN (watershed area for Good Lake, determined by method c)	35–73[a]/91–189 33.1/85.8[c]	1800[a]/728 --	pp-out	mixed wetland/ forest/ag	12
44	480005095265901	48°00'05"	095°26'59"	Curtis Lake, Clearwater Co., Red Lake Ind. Res.	0.36/0.93[c]	36.1/14.6[d]	lake	wetland/forest	
45	480028095264801	48°00'28"	095°26'48"	Miskogineu Lake, Clearwater Co., Red Lake Ind. Res.	0.90/2.35[c]	135/54.6[d]	lake	wetland/forest	
46	480052095275001	48°00'52"	095°27'50"	Cahill Lake, Clearwater Co., Red Lake Ind. Res.	0.88/2.28[c]	159/64.5[d]	lake	wetland/forest	
47	05075380	48°25'37"	095°26'15"	Moose River imp., North Pool, nr Grygla, MN	41.8[a]/108	1250–3050[a]/ 506–1230	pp-imp	mixed wetland/ forest/ag	13
48	05075680	48°23'42"	095°28'20"	Moose River imp., nw corner of South Pool, nr Grygla, MN	83.3[a]/216	2250–7300[a]/ 910–2950	pp-imp	mixed wetland/ forest/ag	13
49	05075685	48°21'16"	095°26'36"	Moose River imp., South Pool, abv outlet, nr Grygla, MN	83.3[a]/216	2250–7300[a]/ 910–2950	pp-imp	mixed wetland/ forest/ag	13
50	05075686	48°21'14"	095°26'36"	Moose River imp., South Pool spillway, nr Grygla, MN	83.3[a]/216	2250–7300[a]/ 910–2950	pp-imp	mixed wetland/ forest/ag	13
51	482430095532701	48°24'30"	095°53'27"	Webster Lake at Agassiz NWR nr Gatzke MN	0.12/0.31[c]	12.2/4.9[d]	lake	wetland/forest	
52	05075950	48°15'50"	096°02'58"	Farmes Pool abv outlet, nr Holt, MN	23[a]/60	2100[a]/850	pp-imp	mixed wetland/ forest	14
53	473533096142001	47°35'33"	096°14'20"	Kittleson Lake nr Fertile, MN	21.1/54.7[c]	269/109[d]	lake	ag	
54	05079695	47°40'02"	096°20'23"	County Ditch 140 abv Burnham Cr imp. nr Tilden Jct	8.2/21.3[c]	--	stream	mixed ag/grassland	
55	05079698	47°39'44"	096°21'06"	Burnham Cr imp., mid-pool, nr Tilden Jct, MN	8.1[a]/21	211.7[a]/85.7	pp-imp	mixed ag/grassland	15
56	05079700	47°40'02"	096°20'57"	Burnham Cr imp. abv outlet nr Tilden Jct, MN	8.1[a]/21	211.7[a]/85.7	pp-imp	mixed ag/grassland	15

[a]From engineer's report or watershed district report describing site.

[b]From USGS database.

[c]Determined from U.S. Geological Survey topographic maps and digital watershed boundaries.

[d]Determined from digital data (U.S. Fish and Wildlife Service, 1981-present).

[e]Estimated from U.S. Geological Survey topographic maps and watershed district maps, assuming innudation to approximately 990 feet. A small (8 acre, 3.2 ha) permanent pool exists at this site.

References: 1. Woodbury and Muscha, 1985; 2. Woodbury and Muscha, 1988; 3. Woodbury and Muscha, 1981a; 4. Woodbury and Muscha, 1981b; 5. Woodbury and Muscha, 1979; 6. Mark Christianson, Norman County (Minnesota) Soil and Water Conservation District, written commun., August 1997; 7. Woodbury and Muscha, 1978; 8. Muscha, 1988; 9. Woodbury and Muscha, 1981; 10. Jerry Bennett, Wild Rice-Marsh River Watershed District (Minnesota), written commun., July, 1999; 11. Red River Watershed Management Board, 1995; 12. Adolfs, 1991; 13–15. Loren Sanderson, Red Lake Watershed District (Minnesota), written commun., August 1997.

Table 2. Field measurements, organic carbon, and mercury in streams, impoundments, and lakes in the Red River of the North Basin.

[m, meters; µS/cm, microsiemens per centimeter; ° C, degrees centigrade; E, estimated; --, not measured; mg/L, milligrams per liter; ng/L, nanograms per liter; NTU, nephelometric turbidity units; lab, laboratory; >, greater than; <, less than; imp., impoundment; trib., tributary; WMA, Wildlife Management Area. Sampling method codes (82398): 70, grab sample (dip); 50, point sample. Sampler type code (84164): 3070, grab sample; 4080, peristaltic pump]

Map number (figure 2)	Site name	Date	Time	Sampling depth (m) (00098)	Sampling method (codes) (82398)	Sampler type (codes) (84164)	Specific conductance (µS/cm) (00095)	pH water whole field (standard units) (00400)	pH water whole lab (standard units) (00403)	Temperature (°C) (00010)	Carbon, organic total (mg/L as C) (00680)	Carbon, organic dissolved (mg/L as C) (00681)	Methylmercury, water, unfiltered (ng/L as Hg) (50284)	Methylmercury, water, filtered (ng/L as Hg) (50285)	Mercury water, unfiltered (ng/L) (50286)	Mercury water, filtered (ng/L) (50287)	Oxygen, dissolved (mg/L) (00300)	Oxygen, dissolved (percent saturation) (00301)	Turbitity (NTU) (00076)	Turbitity lab (NTU) (82079)
1	Unnamed trib. to Stony Creek, above Big Slough imp. near Rollag, MN	09–02–97	1415	E0.10	70	3070	663	7.9	--	16.3	20	--	0.99	--	4.57	--	4.1	43	--	--
		07–06–98	1400	E.10	70	3070	426	7.4	--	19.5	11	--	1.09	--	3.92	--	1.3	14	E6.8	--
		07–07–98	1320	E.10	70	3070	442	7.4	--	20.2	10	--	.84	0.48	3.95	2.33	2.9	34	E5.0	--
2	Unnamed pond, trib. to Big Slough imp., near Rollag, MN	08–27–97	1000	E.10	70	3070	754	8.7	--	23.7	21	--	.50	--	2.77	--	9.2	113	--	--
		03–09–98	1715	E.50	70	3070	580	8.4	--	1.0	16	--	.40	--	3.58	--	4.7	35	--	--
		07–06–98	1430	E.10	70	3070	658	8.9	7.1	23.7	27	--	3.67	.32	8.49	1.71	8.0	97	E66	--
		08–31–98	1445	E.10	70	3070	515	9.5	--	22.9	24	--	.37	.048	5.48	.93	8.8	108	>1000	--
		02–08–99	1345	.75	50	4080	1540	7.5	--	.5	33	--	1.87	--	4.28	--	.2	1	E5.2	--
3	Stony Creek imp. (Big Slough) above outlet near Barnesville, MN	09–02–97	1200	E.10	70	3070	402	8.8	--	19.2	19	--	.31	--	1.72	--	7.8	85	--	--
		03–09–98	1530	E.50	70	3070	502	7.7	--	.9	6.5	--	.42	.26	3.00	2.11	7.6	55	--	--
		07–06–98	1230	E.10	70	3070	440	7.9	7.9	22.5	15	--	.70	--	2.95	--	7.7	92	E4.5	--
		08–31–98	1330	E.10	70	3070	334	9.4	--	25.1	17	--	.13	--	1.54	--	12.9	161	--	--
		02–08–99	1245	.62	50	4080	2430	7.0	--	.5	20	--	.11	--	11.6	--	.2	2	--	--
4	Stony Creek below Big Slough outlet near Barnesville, MN	03–09–98	1500	E.10	70	3070	--	--	--	--	12	12	.96	.77	2.66	1.80	--	--	--	--
5	Hay Creek above Bjornson WMA near Rollag, MN	03–05–98	1635	E.10	70	3070	794	8.2	--	.1	12	--	.21	--	1.51	--	10.5	74	--	--
		07–01–98	0830	E.10	70	3070	596	7.4	--	19.7	15	--	.62	--	2.82	--	2.8	32	E1.7	--
		07–07–98	1130	E.10	70	3070	414	7.6	--	19.8	12	--	1.23	1.54	5.35	3.41	3.4	39	E22	--

Table 2. Field measurements, organic carbon, and mercury in streams, impoundments, and lakes in the Red River of the North Basin. (Continued)

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Map number (figure 2)	Site name	Date	Time	Sampling depth (m) (00098)	Sampling method (codes) (82398)	Sampler type (codes) (84164)	Specific conductance (µS/cm) (00095)	pH water whole field (standard units) (00400)	pH water whole lab (standard units) (00403)	Temperature (°C) (00010)	Carbon, organic total (mg/L as C) (00680)	Carbon, organic dissolved (mg/L as C) (00681)	Methylmercury, water, unfiltered (ng/L as Hg) (50284)	Methylmercury, water, filtered (ng/L as Hg) (50285)	Mercury water, unfiltered (ng/L) (50286)	Mercury water, filtered (ng/L) (50287)	Oxygen, dissolved (mg/L) (00300)	Oxygen, dissolved (percent saturation) (00301)	Turbitity (NTU) (00076)	Turbitity lab (NTU) (82079)
6	South pool outlet of Bjornson WMA near Rollag, MN	09–02–97	1700	E0.10	70	3070	644	7.7	--	18.8	21	--	1.57	--	4.09	--	2.3	25	--	--
		03–05–98	1715	E.10	70	3070	757	7.8	--	.1	12	--	.18	--	2.06	--	8.0	57	--	--
		07–01–98	0900	E.10	70	3070	580	7.4	--	21.7	15	--	.31	--	2.26	--	1.2	14	E0.50	--
		08–31–98	1530	E.10	70	3070	613	8.1	--	24.7	18	--	1.30	--	3.28	--	4.9	61	--	--
		02–08–99	1630	E.05	70	3070	1330	7.6	--	.8	18	--	1.65	--	2.54	--	.3	3	E1.5	--
7	Rushfieldt Lake near Downer, MN	09–02–97	1615	E.10	70	3070	996	8.7	--	21.4	27	--	.33	--	2.24	--	9.8	113	--	--
		09–02–97	1620	E2.0	70	3070	997	8.8	--	21.0	--	--	--	--	--	--	10.6	125	--	--
		03–09–98	1815	E.50	70	3070	835	8.4	--	2.5	18	--	.63	--	3.16	--	12.4	92	--	--
		07–01–98	1400	E.10	70	3070	821	8.8	8.3	26.4	21	--	.15	--	2.79	--	10.9	141	E12	--
		08–31–98	1645	E.10	70	3070	696	9.8	--	27.4	24	--	.072	--	1.73	--	14.0	180	--	--
		02–08–99	1530	.57	50	4080	1240	8.8	--	.5	29	--	.35	--	1.49	--	6.2	47	E2.0	--
		02–08–99	1535	1.8	50	4080	--	--	--	3.6	--	--	--	--	--	--	<.7	--	--	--
8	North pool, Bjornson WMA near Rollag, MN	09–02–97	1520	E.10	70	3070	649	7.5	--	18.9	--	--	--	--	--	--	2.0	23	--	--
		09–02–97	1525	E1.0	70	3070	643	7.8	--	18.7	--	--	--	--	--	--	1.5	17	--	--
		03–05–98	1610	E.10	70	3070	695	7.7	--	.1	--	--	--	--	--	--	8.0	66	--	--
		07–01–98	0945	E.10	70	3070	607	7.2	7.9	21.5	17	--	1.25	--	3.25	--	.1	1	E2.5	
		08–31–98	1600	E.10	70	3070	655	7.7	--	21.1	21	--	.54	--	1.78	--	2.1	26	E2.5	--
		02–08–99	1450	.60	70	3070	1290	7.3	--	.1	--	--	--	--	--	--	.3	2	E.20	--
9	North pool outlet of Bjornson WMA near Rollag, MN	09–02–97	1515	E.10	--	3070	646	7.5	--	18.4	24	--	.68	--	2.45	--	5.9	64	--	--
		03–05–98	1605	E.10	70	3070	--	--	--	--	12	--	.077	--	1.53	--	--	--	--	--
		07–01–98	1230	E.10	70	3070	556	7.3	--	21.8	15	--	.64	--	3.09	--	3.5	41	E5.9	--
		02–08–99	1445	E.10	70	3070	1360	7.3	--	.0	18	--	.11	--	1.62	--	5.6	40	--	--

Table 2. Field measurements, organic carbon, and mercury in streams, impoundments, and lakes in the Red River of the North Basin. (Continued)

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Map number (figure 2)	Site name	Date	Time	Sampling depth (m) (00098)	Sampling method (codes) (82398)	Sampler type (codes) (84164)	Specific conductance (µS/cm) (00095)	pH water whole field (standard units) (00400)	pH water whole lab (standard units) (00403)	Temperature (°C) (00010)	Carbon, organic total (mg/L as C) (00680)	Carbon, organic dissolved (mg/L as C) (00681)	Methylmercury, water, unfiltered (ng/L as Hg) (50284)	Methylmercury, water, filtered (ng/L as Hg) (50285)	Mercury water, unfiltered (ng/L) (50286)	Mercury water, filtered (ng/L) (50287)	Oxygen, dissolved (mg/L) (00300)	Oxygen, dissolved (percent saturation) (00301)	Turbitity (NTU) (00076)	Turbitity lab (NTU) (82079)
10	Spring Creek above Downer, MN	05–21–98	1330	E0.10	70	3070	791	8.1	--	22.4	22	--	1.96	2.23	8.69	7.75	9.4	110	E7.5	--
		06–29–98	1245	E.10	70	3070	--	--	--	--	18	--	2.96	2.06	7.82	6.60	--	--	--	--
		07–01–98	1710	E.10	70	3070	563	7.9	--	24.8	17	--	3.18	.34	16.2	6.02	5.4	68	E280	--
		07–07–98	1200	E.10	70	3070	331	7.8	--	21.9	9.9	--	2.44	1.60	8.75	4.80	6.2	73	E70	--
11	Spring Creek at Henry Dam spillway above Downer, MN	05–21–98	1240	E.10	70	3070	720	7.8	--	22.1	20	--	1.83	2.06	8.32	5.39	5.8	68	E18	--
		06–29–98	1345	E.10	70	3070	--	--	--	--	15	--	1.92	1.26	7.87	4.56	--	--	--	--
		07–01–98	1620	E.10	70	3070	551	7.8	--	23.5	17	--	1.82	--	8.98	--	6.0	73	E13	--
		07–01–98	1630	E.10	70	3070	--	--	--	--	--	--	--	--	--	--	5.3	67	--	--
		07–07–98	1240	E.10	70	3070	316	7.8	--	20.1	11	--	1.81	1.16	9.02	3.72	5.1	59	E130	
		07–09–98	1025	E.10	70	3070	465	7.7	--	26.7	--	--	--	--	--	--	4.1	53	E10	--
		07–09–98	1030	E.10	70	3070	451	7.7	--	24.0	--	--	4.62	3.63	7.75	7.75	5.6	68	--	--
12	Moccasin Creek above imp. near Fossum, MN	05–20–98	1510	E.10	70	3070	729	7.9	--	21.1	17	--	.24	.24	3.38	2.32	7.5	88	E19	--
		06–29–98	1915	E.10	70	3070	343	7.8	--	21.7	8.9	--	.80	.72	3.93	2.98	6.3	75	E22	--
13	Moccasin Creek imp. above outlet near Fossum, MN	05–20–98	1420	E.10	70	3070	688	8.1	--	22.2	18	--	.41	.11	4.46	2.51	9.2	109	E9.0	--
		06–29–98	1830	E.10	70	3070	381	7.8	--	22.2	10	--	.92	.79	4.29	2.37	5.3	61	E17	--
14	Mashaug Creek above dam near Gary, MN	05–14–98	1255	E.10	70	3070	733	8.1	--	16.6	17	--	.20	.17	3.99	4.41	7.7	84	E6.2	--
		05–20–98	1000	E.10	70	3070	527	7.9	--	16.6	13	--	.30	.19	3.18	2.09	7.8	83	E8.9	--
		06–24–98	1545	E.10	70	3070	492	7.9	--	22.1	13	--	.46	.35	3.95	2.11	7.7	92	E7.6	7.7

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Map number (figure 2)	Site name	Date	Time	Sampling depth (m) (00098)	Sampling method (codes) (82398)	Sampler type (codes) (84164)	Specific conductance (µS/cm) (00095)	pH water whole field (standard units) (00400)	pH water whole lab (standard units) (00403)	Temperature (°C) (00010)	Carbon, organic total (mg/L as C) (00680)	Carbon, organic dissolved (mg/L as C) (00681)	Methylmercury, water, unfiltered (ng/L as Hg) (50284)	Methylmercury, water, filtered (ng/L as Hg) (50285)	Mercury water, unfiltered (ng/L) (50286)	Mercury water, filtered (ng/L) (50287)	Oxygen, dissolved (mg/L) (00300)	Oxygen, dissolved (percent saturation) (00301)	Turbitity (NTU) (00076)	Turbitity lab (NTU) (82079)
15	Mashaug Creek below dam near Gary, MN	05–14–98	1220	E0.10	70	3070	671	7.7	--	14.1	16	--	0.21	0.15	4.08	3.37	8.4	86	E10	--
		05–20–98	0915	E.10	70	3070	541	7.6	--	18.4	12	--	.33	.20	4.26	2.75	5.8	65	E22	--
		06–24–98	1615	E.10	70	3070	499	7.7	--	19.9	12	--	1.25	.47	5.46	2.88	6.6	75	E40	22
16	Garden Slough at County Road 19 near Gary, MN	05–14–98	1335	E.10	70	3070	596	8.0	--	15.2	16	--	.48	.45	5.01	4.18	6.9	72	E7.5	--
		06–25–98	1100	E.10	70	3070	418	7.5	--	19.4	14	--	1.04	.54	6.26	3.18	5.5	63	E40	37
17	Garden Slough imp. near Gary, MN	08–26–97	1730	E.10	70	3070	454	8.3	--	24.9	16	--	.43	--	2.77	--	10.8	135	--	--
		09–01–98	1045	E.10	70	3070	434	8.0	--	22.0	15	--	.68	--	5.34	--	6.5	77	--	--
		02–09–99	1145	.64	50	4080	950	7.4	--	.5	16	--	.21	--	1.09	--	.2	2	E.10	--
		02–09–99	1215	4.0	70	3070	1100	7.3	--	4.9	--	--	--	--	--	--	.1	1	E6.5	--
		02–09–99	1220	3.0	50	4080	1030	7.5	--	3.6	17	--	.43	--	1.38	--	--	--	--	--
18	Garden Slough imp. outlet near Gary, MN	03–04–98	1100	E.10	70	3070	489	7.7	--	.3	11	--	.20	--	3.01	--	11.3	83	--	--
		05–14–98	1400	E.10	70	3070	551	8.2	--	13.4	14	--	.29	.23	4.59	3.16	8.8	88	E18	--
		06–30–98	1045	E.10	70	3070	369	7.9	--	21.1	11	--	1.05	.74	4.04	2.88	8.2	96	E7.0	--
19	Home Lake, NE end, near Fossum, MN	09–03–97	1100	E.10	70	3070	333	8.1	--	20.0	11	--	.084	--	.86	--	8.2	92	--	--
		09–03–97	1130	E2.5	70	3070	333	8.1	--	19.6	--	--	--	--	--	--	7.4	83	--	--
		03–05–98	0830	E.50	50	4080	431	8.0	--	3.7	13	--	.41	--	1.76	--	.6	4	--	--
		07–07–98	1515	E.10	70	3070	268	8.3	7.8	24.4	10	--	.12	--	1.04	--	8.7	108	E2.4	--
		09–01–98	0930	E.10	70	3070	321	8.1	--	22.4	13	--	.19	--	1.60	--	7.9	94	--	--
		02–09–99	1010	.90	50	4080	536	7.4	--	1.3	14	--	.30	--	.89	--	.2	2	E1.0	--
		02–09–99	1015	2.0	50	4080	580	7.2	--	3.8	--	--	--	--	--	--	.1	1	E8.9	--

Table 2. Field measurements, organic carbon, and mercury in streams, impoundments, and lakes in the Red River of the North Basin. (Continued)

[m, meters; µS/cm, microsiemens per centimeter; ° C, degrees centigrade; E, estimated; --, not measured; mg/L, milligrams per liter; ng/L, nanograms per liter; NTU, nephelometric turbidity units; lab, laboratory; >, greater than; <, less than; imp., impoundment; trib., tributary; WMA, Wildlife Management Area. Sampling method codes (82398): 70, grab sample (dip); 50, point sample. Sampler type code (84164): 3070, grab sample; 4080, peristaltic pump]

Map number (figure 2)	Site name	Date	Time	Sampling depth (m) (00098)	Sampling method (codes) (82398)	Sampler type (codes) (84164)	Specific conductance (µS/cm) (00095)	pH water whole field (standard units) (00400)	pH water whole lab (standard units) (00403)	Temperature (°C) (00010)	Carbon, organic total (mg/L as C) (00680)	Carbon, organic dissolved (mg/L as C) (00681)	Methylmercury, water, unfiltered (ng/L as Hg) (50284)	Methylmercury, water, filtered (ng/L as Hg) (50285)	Mercury water, unfiltered (ng/L) (50286)	Mercury water, filtered (ng/L) (50287)	Oxygen, dissolved (mg/L) (00300)	Oxygen, dissolved (percent saturation) (00301)	Turbitity (NTU) (00076)	Turbitity lab (NTU) (82079)
20	South Branch Wild Rice River near Ogema, MN	05–20–98	1620	E0.10	70	3070	709	7.9	--	21.0	20	--	0.66	<0.034	5.05	2.60	7.0	82	E14	--
		06–29–98	1730	E.10	70	3070	460	7.6	--	21.5	13	--	.68	.75	3.95	2.81	2.7	31	E6.3	--
		07–06–98	1730	E.10	70	3070	610	7.8	--	20.9	18	--	1.79	1.01	4.35	2.69	5.2	60	E8.0	--
		07–07–98	1015	E.10	70	3070	485	7.5	--	19.4	16	--	1.43	1.04	7.19	2.86	3.4	38	E75	--
21	South Branch Wild Rice R. (Upper Becker imp.) near Ogema, MN	06–29–98	1645	E.10	70	3070	360	7.8	--	21.6	10	--	.77	.62	5.45	3.39	5.1	60	E20	--
		07–06–98	1630	E.10	70	3070	610	7.4	--	20.9	19	--	1.46	--	4.11	--	1.4	16	E2.2	--
22	South Branch Wild Rice R. (Lower Becker imp.) near Ogema, MN	05–20–98	1650	E.10	70	3070	719	7.9	--	23.8	20	--	.64	.58	3.59	3.13	6.9	86	E23	--
		06–29–98	1615	E.10	70	3070	341	7.6	--	21.5	10	--	.86	.70	4.16	3.10	2.9	34	E20	--
		07–06–98	1630	E.10	70	3070	599	7.5	--	22.2	19	--	3.28	--	8.39	--	1.4	17	E1.2	--
23	Raff Lake near Fertile, MN	08–26–97	1900	E.20	70	3070	422	8.1	--	23.6	14	--	.014	--	1.39	--	8.8	103	--	--
		03–04–98	1415	E.50	50	4080	494	7.4	--	3.3	16	--	.17	--	1.19	--	1.0	9	--	--
		06–23–98	1445	E.10	70	3070	422	8.4	8.0	20.6	13	--	.071	--	.85	--	9.1	104	E.00	3.3
		09–01–98	1245	E.10	70	3070	416	8.4	--	22.7	14	--	.057	--	1.01	--	8.4	100	--	--
		02–09–99	1525	.95	50	4080	537	7.8	--	1.4	15	--	.041	--	.37	--	.6	4	E.10	--
		02–09–99	1535	3.5	50	4080	604	7.6	--	4.4	15	--	.58	--	1.08	--	.1	1	--	--
24	County Ditch 45 above Sande imp. near Flaming, MN	03–05–98	1030	E.10	70	3070	561	8.3	--	-.1	12	--	.13	--	1.36	--	11.2	78	--	--
		06–24–98	0945	E.10	70	3070	318	7.7	--	17.1	9.9	--	.82	.25	15.5	2.29	4.7	51	E160	97

Table 2. Field measurements, organic carbon, and mercury in streams, impoundments, and lakes in the Red River of the North Basin. (Continued)

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Map number (figure 2)	Site name	Date	Time	Sampling depth (m) (00098)	Sampling method (codes) (82398)	Sampler type (codes) (84164)	Specific conductance (µS/cm) (00095)	pH water whole field (standard units) (00400)	pH water whole lab (standard units) (00403)	Temperature (°C) (00010)	Carbon, organic total (mg/L as C) (00680)	Carbon, organic dissolved (mg/L as C) (00681)	Methylmercury, water, unfiltered (ng/L as Hg) (50284)	Methylmercury, water, filtered (ng/L as Hg) (50285)	Mercury water, unfiltered (ng/L) (50286)	Mercury water, filtered (ng/L) (50287)	Oxygen, dissolved (mg/L) (00300)	Oxygen, dissolved (percent saturation) (00301)	Turbitity (NTU) (00076)	Turbitity lab (NTU) (82079)
25	Pool B2 Sande Imp. above outlet, near Flaming, MN	09–03–97	1600	E0.10	70	3070	454	8.4	--	19.2	19	--	0.20	--	2.53	--	9.2	103	--	--
		06–24–98	1010	--	30	--	416	8.2	8.1	20.0	--	--	--	--	--	--	7.9	91	--	--
		02–24–99	1345	.40	50	4080	1410	7.1	--	.8	38	--	4.28	--	7.88	--	.3	3	--	--
26	Pool B2 outlet, Sande imp. near Co. Ditch 45 near Flaming, MN	03–05–98	1150	E.10	70	3070	463	8.4	--	1.4	12	--	.31	--	2.47	--	10.7	79	--	--
		06–24–98	1010	E.10	70	3070	416	8.2	--	20.0	15	--	.45	0.24	2.43	2.06	7.9	91	--	1.6
		09–02–98	1530	E.10	70	3070	337	8.6	--	21.6	18	--	.17	--	2.75	--	9.2	109	--	--
27	Pool B3 Sande imp. above outlet, near Flaming, MN	09–03–97	1630	E.10	70	3070	389	8.6	--	20.4	18	--	.26	--	1.27	--	11.5	132	--	--
		02–24–99	1300	.50	50	4080	1200	7.3	--	.9	34	--	1.95	--	2.94	--	.2	2	--	--
		02–24–99	1310	.65	50	4080	1210	7.3	--	1.9	33	--	1.43	--	2.60	--	.3	2	--	--
28	Pool B3 outlet, Sande imp. near Co. Ditch 45 near Flaming, MN	03–05–98	1135	E.10	70	3070	461	8.5	--	1.1	12	--	.37	--	2.38	--	11.3	82	--	--
		06–24–98	1030	E.10	70	3070	360	8.6	--	21.0	15	--	.18	.13	2.22	.88	9.2	107	E0.00	2.9
		09–02–98	1600	E.10	70	3070	268	9.2	--	21.4	18	--	.22	--	2.81	--	10.7	125	--	--
29	Pool A4 Sande imp. above outlet, near Flaming, MN	09–03–97	1530	E.10	70	3070	319	8.8	--	19.6	18	--	.18	--	3.32	--	9.7	107	--	--
		09–02–98	1630	E.10	70	3070	253	9.2	--	21.8	17	--	.18	--	3.37	--	10.8	128	--	--
		02–24–99	1210	.40	50	4080	1360	7.0	--	1.5	32	--	8.36	--	13.7	--	1.4	11	--	--

Table 2. Field measurements, organic carbon, and mercury in streams, impoundments, and lakes in the Red River of the North Basin. (Continued)

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Map number (figure 2)	Site name	Date	Time	Sampling depth (m) (00098)	Sampling method (codes) (82398)	Sampler type (codes) (84164)	Specific conductance (µS/cm) (00095)	pH water whole field (standard units) (00400)	pH water whole lab (standard units) (00403)	Temperature (°C) (00010)	Carbon, organic total (mg/L as C) (00680)	Carbon, organic dissolved (mg/L as C) (00681)	Methylmercury, water, unfiltered (ng/L as Hg) (50284)	Methylmercury, water, filtered (ng/L as Hg) (50285)	Mercury water, unfiltered (ng/L) (50286)	Mercury water, filtered (ng/L) (50287)	Oxygen, dissolved (mg/L) (00300)	Oxygen, dissolved (percent saturation) (00301)	Turbitity (NTU) (00076)	Turbitity lab (NTU) (82079)
30	Pool A4 outlet, Sande imp. near Co. Ditch 45 near Flaming, MN	03–05–98	1110	E0.10	70	3070	463	8.6	--	1.1	12	--	0.32	--	2.45	--	12.0	86	--	--
		06–24–98	1415	E.10	70	3070	341	8.6	--	20.9	14	--	.41	0.34	1.95	1.90	10.5	123	E0.00	1.5
31	Lockhart Swamp imp. Agassiz No. 2 WMA, near Flaming, MN	09–03–97	1330	E.10	70	3070	487	8.3	--	19.0	16	--	.66	--	2.28	--	9.8	108	--	--
		03–04–98	1215	E.10	70	3070	469	7.7	--	1.2	11	10	.21	.18	2.42	1.99	8.7	65	--	--
		06–23–98	1045	E.15	70	3070	456	8.4	8.1	20.2	15	--	.46	--	1.73	--	10.7	122	<.60	1.2
		09–01–98	1145	E.10	70	3070	431	8.4	--	21.9	18	--	.57	--	2.78	--	8.5	100	--	--
		02–09–99	1345	.58	50	4080	1230	7.3	--	.2	14	--	5.50	--	9.00	--	.3	2	E11	--
		02–09–99	1350	1.2	70	3070	1310	7.3	--	2.4	--	--	--	--	--	--	.2	1	--	--
32	Unnamed stream at Co. Rd. 131 near Gary, MN	05–21–98	0850	E.10	70	3070	550	8.0	--	16.5	14	--	.57	.50	3.21	2.34	9.0	94	E5.6	--
33	Unnamed stream at Co. Rd. 156 near Flaming, MN	05–21–98	0925	E.10	70	3070	474	7.9	--	17.9	16	--	1.22	.94	4.68	3.59	8.2	89	E5.0	--
34	Unnamed stream by Co. Rd. 30 near Flaming, MN	05–26–98	1600	E.10	70	3070	732	7.8	--	23.7	15	--	.73	.46	3.74	2.14	6.7	82	--	--
		06–25–98	1200	E.10	70	3070	514	7.9	--	20.8	15	--	.28	.33	5.08	3.00	7.4	87	--	28

Table 2. Field measurements, organic carbon, and mercury in streams, impoundments, and lakes in the Red River of the North Basin. (Continued)

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Map number (figure 2)	Site name	Date	Time	Sampling depth (m) (00098)	Sampling method (codes) (82398)	Sampler type (codes) (84164)	Specific conductance (µS/cm) (00095)	pH water whole field (standard units) (00400)	pH water whole lab (standard units) (00403)	Temperature (°C) (00010)	Carbon, organic total (mg/L as C) (00680)	Carbon, organic dissolved (mg/L as C) (00681)	Methylmercury, water, unfiltered (ng/L as Hg) (50284)	Methylmercury, water, filtered (ng/L as Hg) (50285)	Mercury water, unfiltered (ng/L) (50286)	Mercury water, filtered (ng/L) (50287)	Oxygen, dissolved (mg/L) (00300)	Oxygen, dissolved (percent saturation) (00301)	Turbitity (NTU) (00076)	Turbitity lab (NTU) (82079)
35	Green Meadow Dam outlet NE near Flaming, MN	05–21–98	1010	E0.10	70	3070	369	7.8	--	20.7	13	--	0.95	0.69	5.07	3.39	7.1	81	E7.5	--
		05–26–98	1515	E.10	70	3070	431	7.7	--	20.2	15	--	4.30	1.79	7.75	4.22	3.7	42	E11	--
		06–30–98	0945	E.10	70	3070	458	7.9	--	21.3	15	--	1.77	1.41	5.66	4.37	6.1	72	E15	--
36	Sand Hill River at Co. Rd. 7 near Rindal, MN	05–20–98	1200	E.10	70	3070	549	7.7	--	19.2	18	--	.38	.33	2.86	3.06	5.3	60	E6.5	--
		06–24–98	1730	E.10	70	3070	508	8.0	--	22.8	16	--	.54	.37	2.27	2.20	10.0	120	E.00	1.9
		06–30–98	1230	E.10	70	3070	478	7.7	--	21.4	16	--	1.02	--	3.82	--	5.1	61	E4.6	--
37	Sand Hill River above dam near Rindal, MN	05–20–98	1245	E.10	70	3070	498	7.5	--	20.4	17	--	.67	.51	3.52	2.84	2.7	31	E7.5	--
		06–24–98	1700	E.10	70	3070	463	7.5	--	21.6	14	--	.68	.70	3.17	2.70	4.7	55	E.00	1.0
		06–30–98	1200	E.10	70	3070	445	7.4	--	21.2	15	--	1.72	--	4.32	--	2.7	31	E2.5	--
38	Sand Hill River below dam near Rindal, MN	05–20–98	1250	E.10	70	3070	--	--	--	20.4	--	--	--	--	--	--	3.3	37	--	--
39	Unnamed ditch to Good Lake near Erie, MN	10–28–97	1130	E.10	70	3070	290	7.8	--	4.8	--	--	.15	--	1.73	--	15.3	--	--	--

Table 2. Field measurements, organic carbon, and mercury in streams, impoundments, and lakes in the Red River of the North Basin. (Continued)

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Map number (figure 2)	Site name	Date	Time	Sampling depth (m) (00098)	Sampling method (codes) (82398)	Sampler type (codes) (84164)	Specific conductance (µS/cm) (00095)	pH water whole field (standard units) (00400)	pH water whole lab (standard units) (00403)	Temperature (°C) (00010)	Carbon, organic total (mg/L as C) (00680)	Carbon, organic dissolved (mg/L as C) (00681)	Methylmercury, water, unfiltered (ng/L as Hg) (50284)	Methylmercury, water, filtered (ng/L as Hg) (50285)	Mercury water, unfiltered (ng/L) (50286)	Mercury water, filtered (ng/L) (50287)	Oxygen, dissolved (mg/L) (00300)	Oxygen, dissolved (percent saturation) (00301)	Turbitity (NTU) (00076)	Turbitity lab (NTU) (82079)
40	Unnamed ditch above Good Lake, near Lake Erie, MN	04–22–97	1230	E0.10	70	3070	197	7.4	--	12.5	15	--	0.17	0.23	3.48	2.54	7.0	--	--	--
		04–29–97	1220	E.10	70	3070	216	7.2	--	9.7	17	--	.47	--	4.19	--	7.6	--	--	--
		05–07–97	1200	E.10	70	3070	239	7.6	--	10.2	18	--	.17	--	2.71	--	8.3	--	--	--
		05–20–97	1050	E.10	70	3070	245	7.1	--	8.5	19	--	.29	--	2.48	--	--	--	--	--
		06–10–97	1200	E.10	70	3070	302	7.4	--	23.9	23	--	.78	--	3.58	--	8.2	--	--	--
		07–14–97	1550	E.10	70	3070	269	7.6	7.4	23.6	--	--	.92	--	3.09	--	5.2	--	--	--
		08–20–97	0940	E.10	70	3070	454	--	7.1	13.0	26	--	.075	--	2.87	--	10.1	--	--	--
		10–06–97	1630	E.10	70	3070	420	7.3	--	16.5	23	--	.22	--	1.98	--	8.5	--	--	--
		10–28–97	1035	E.10	70	3070	359	7.4	--	2.2	17	--	.15	--	2.67	--	12.8	--	--	--
		12–16–97	1430	E.10	70	3070	674	7.4	--	1.0	18	--	.28	--	2.05	--	1.3	10	--	--
		01–14–98	1300	E.10	70	3070	511	7.5	--	.9	22	--	.56	--	3.21	--	7.2	--	--	--
		02–17–98	1630	E.10	70	3070	1040	7.2	--	.9	18	--	1.37	--	2.72	--	.7	5	--	--
		03–18–98	1515	E.10	70	3070	610	6.9	--	1.5	17	--	.15	.28	2.47	1.81	12.1	90	--	--
		04–21–98	1240	E.10	70	3070	210	7.1	--	8.4	13	--	.10	.21	1.88	1.62	9.5	85	E2.5	--
		05–19–98	1145	E.10	70	3070	174	7.4	--	17.9	21	--	1.07	1.09	5.03	4.48	4.6	50	--	--
		06–04–98	1200	E.10	70	3070	276	--	--	12.5	--	--	.60	--	2.88	--	8.3	--	--	--
		06–15–98	1600	E.10	70	3070	302	7.2	--	18.8	23	--	.50	.39	2.40	1.39	6.2	--	--	--
		07–08–98	1500	E.10	70	3070	--	--	--	--	22	--	1.27	--	4.28	--	--	--	--	--
		07–20–98	1350	E.10	70	3070	229	7.4	--	22.5	20	--	1.51	.85	4.34	3.98	5.7	--	--	--
		08–18–98	1330	E.10	70	3070	376	7.7	--	19.5	23	22	.57	.50	2.14	1.85	7.8	--	--	1.8
		09–03–98	1330	E.10	70	3070	285	7.6	--	16.5	21	--	.40	--	1.80	--	10.5	113	--	--
		09–22–98	1645	E.10	70	3070	411	8.1	--	14.7	29	19	.19	.18	1.39	1.13	9.4	95	--	2.5
		10–14–98	1050	E.10	70	3070	357	7.6	--	7.5	18	--	.15	--	1.08	--	11.4	--	--	2.3
		01–21–99	1115	E.10	70	3070	472	6.8	--	.2	14	--	.29	--	2.18	--	.2	1	E.00	1.8
		02–22–99	1540	E.05	70	3070	678	7.2	--	.2	26	--	12.3	--	13.7	--	.2	1	E1.7	--
		03–26–99	1445	E.10	70	3070	--	--	--	--	--	--	1.03	--	2.76	--	--	--	--	--

Table 2. Field measurements, organic carbon, and mercury in streams, impoundments, and lakes in the Red River of the North Basin. (Continued)

[m, meters; µS/cm, microsiemens per centimeter; ° C, degrees centigrade; E, estimated; --, not measured; mg/L, milligrams per liter; ng/L, nanograms per liter; NTU, nephelometric turbidity units; lab, laboratory; >, greater than; <, less than; imp., impoundment; trib., tributary; WMA, Wildlife Management Area. Sampling method codes (82398): 70, grab sample (dip); 50, point sample. Sampler type code (84164): 3070, grab sample; 4080, peristaltic pump]

Map number (figure 2)	Site name	Date	Time	Sampling depth (m) (00098)	Sampling method (codes) (82398)	Sampler type (codes) (84164)	Specific conductance (µS/cm) (00095)	pH water whole field (standard units) (00400)	pH water whole lab (standard units) (00403)	Temperature (°C) (00010)	Carbon, organic total (mg/L as C) (00680)	Carbon, organic dissolved (mg/L as C) (00681)	Methylmercury, water, unfiltered (ng/L as Hg) (50284)	Methylmercury, water, filtered (ng/L as Hg) (50285)	Mercury water, unfiltered (ng/L) (50286)	Mercury water, filtered (ng/L) (50287)	Oxygen, dissolved (mg/L) (00300)	Oxygen, dissolved (percent saturation) (00301)	Turbitity (NTU) (00076)	Turbitity lab (NTU) (82079)
		05–07–97	1000	E0.10	70	3070	236	7.6	--	11.8	18	--	0.26	--	2.45	--	--	--	--	--
		05–20–97	1005	E.10	70	3070	237	7.1	--	9.5	18	--	.26	--	3.03	--	--	--	--	--
		06–10–97	1400	E.10	70	3070	262	7.4	--	23.3	20	20	.71	0.58	2.78	4.43	--	--	--	--
		06–10–97	1530	--	--	--	--	--	7.4	--	--	--	--	--	--	--	--	--	--	--
		07–14–97	1330	E.10	70	3070	269	7.6	7.4	23.6	23	22	.65	.47	2.77	4.84	5.2	64	--	--
		08–20–97	1040	E.10	70	3070	310	--	7.2	12.3	26	--	.10	--	1.62	--	12.3	--	--	--
		10–06–97	1400	E.50	70	3070	344	7.7	7.8	15.6	26	--	.056	.038	1.28	2.22	7.2	--	--	--
		12–16–97	1300	E.30	70	3070	396	8.3	8.1	2.9	29	27	.27	.046	2.30	1.41	11.9	92	--	--
		01–14–98	1130	E.40	70	3070	--	--	--	--	33	--	1.00	--	3.73	--	--	--	--	--
		02–17–98	1500	E.40	70	3070	467	7.7	--	2.2	28	--	.63	--	3.04	--	.6	4	--	--
		02–17–98	1530	E.70	50	4080	467	7.7	--	2.2	36	--	2.82	--	4.70	--	.6	4	--	--
		03–18–98	1330	.36	50	4080	340	7.7	7.6	2.4	20	20	.37	.14	2.51	2.51	13.0	100	--	--
	Good Lake	04–21–98	1145	.41	70	3070	268	7.7	--	12.2	16	--	.13	.13	1.28	1.01	9.0	87	--	--
41	imp. mid-pool,	05–19–98	1015	E.10	70	3070	208	8.0	--	19.3	18	17	.25	.21	2.28	1.85	7.9	88	--	--
	near Erie, MN	06–04–98	1000	E.10	70	3070	261	7.8	--	12.8	--	--	.45	--	2.50	--	9.2	--	--	--
		06–15–98	1330	E.10	70	3070	259	7.6	7.8	20.5	23	--	.43	.26	2.21	2.10	7.4	--	--	--
		07–08–98	1340	E.10	70	3070	--	--	--	--	22	--	.27	--	2.63	--	--	--	--	--
		07–20–98	1210	E.10	70	3070	296	7.6	--	25.1	23	--	.27	.23	1.68	1.55	6.9	--	--	--
		08–18–98	1100	E.10	70	3070	303	7.7	--	21.2	23	22	.11	.097	1.01	.85	6.6	--	--	2.3
		09–03–98	1215	E.10	70	3070	273	7.8	--	19.3	22	--	.091	--	0.93	--	7.5	85	--	--
		09–22–98	1400	E.10	70	3070	297	8.3	--	14.3	23	22	.067	0.037	1.15	0.86	9.7	97	--	3.4
		10–14–98	1245	E.10	70	3070	--	--	--	--	21	--	.089	--	1.36	--	--	--	--	--
		01–20–99	1425	.59	70	3070	447	7.4	--	1.1	27	--	.27	--	.95	--	3.1	23	E0.00	1.8
		01–20–99	1426	.90	50	--	447	7.3	--	2.7	--	--	--	--	--	--	1.1	9	--	--
		02–22–99	1410	.50	--	--	526	7.4	--	.3	29	--	2.67	--	3.35	--	.2	2	--	--
		02–22–99	1420	.90	--	--	518	7.3	--	1.9	30	--	3.72	--	4.71	--	.1	1	--	--
		02–22–99	1430	1.1	--	--	514	7.3	--	2.9	31	--	3.69	--	5.02	--	.1	1	--	--

Table 2. Field measurements, organic carbon, and mercury in streams, impoundments, and lakes in the Red River of the North Basin. (Continued)

[m, meters; µS/cm, microsiemens per centimeter; ° C, degrees centigrade; E, estimated; --, not measured; mg/L, milligrams per liter; ng/L, nanograms per liter; NTU, nephelometric turbidity units; lab, laboratory; >, greater than; <, less than; imp., impoundment; trib., tributary; WMA, Wildlife Management Area. Sampling method codes (82398): 70, grab sample (dip); 50, point sample. Sampler type code (84164): 3070, grab sample; 4080, peristaltic pump]

Map number (figure 2)	Site name	Date	Time	Sampling depth (m) (00098)	Sampling method (codes) (82398)	Sampler type (codes) (84164)	Specific conductance (µS/cm) (00095)	pH water whole field (standard units) (00400)	pH water whole lab (standard units) (00403)	Temperature (°C) (00010)	Carbon, organic total (mg/L as C) (00680)	Carbon, organic dissolved (mg/L as C) (00681)	Methylmercury, water, unfiltered (ng/L as Hg) (50284)	Methylmercury, water, filtered (ng/L as Hg) (50285)	Mercury water, unfiltered (ng/L) (50286)	Mercury water, filtered (ng/L) (50287)	Oxygen, dissolved (mg/L) (00300)	Oxygen, dissolved (percent saturation) (00301)	Turbitity (NTU) (00076)	Turbitity lab (NTU) (82079)
42	Good Lake imp. above outlet, near Erie, MN	05–19–98	1055	E0.10	70	3070	227	8.0	--	19.7	18	--	0.38	0.23	2.18	1.62	7.3	82	--	--
		06–15–98	1530	E.10	70	3070	274	7.2	--	20.7	25	--	.55	.34	2.14	1.42	4.9	--	--	--
		08–18–98	1240	E.10	70	3070	304	7.7	--	21.1	--	--	--	--	--	--	5.9	--	--	--
		02–22–99	1635	E.05	70	3070	569	7.3	--	.2	30	--	6.56	--	6.97	--	.3	2	--	--
43	Good Lake imp. outlet near Erie, MN	04–22–97	1130	E.10	70	3070	207	7.6	--	9.2	11	--	0.17	--	2.33	--	8.3	--	--	--
		04–29–97	1145	E.10	70	3070	221	7.4	--	11.1	14	--	.70	--	3.70	--	9.2	--	--	--
		05–07–97	1100	E.10	70	3070	231	7.6	--	11.9	16	--	.34	--	2.99	--	9.4	--	--	--
		05–20–97	0903	E.10	70	3070	245	7.2	--	8.8	18	--	.34	--	3.33	--	--	--	--	--
		06–10–97	1207	E.10	70	3070	270	7.4	--	22.0	20	--	1.00	--	3.45	--	6.3	--	--	--
		07–14–97	1530	E.10	70	3070	280	7.6	--	23.8	--	--	.96	--	3.25	--	5.3	--	--	--
		08–20–97	1140	E.10	70	3070	303	--	7.4	14.0	28	--	.18	--	1.28	--	10.3	--	--	--
		10–06–97	1530	E.10	70	3070	340	8.0	--	17.8	--	--	.27	--	2.58	--	8.4	--	--	--
		10–28–97	1010	E.10	70	3070	346	8.1	--	3.1	24	--	.16	--	3.73	--	13.6	--	--	--
		12–16–97	1345	E.10	70	3070	450	8.2	--	1.1	27	--	.66	--	2.64	--	8.3	61	--	--
		02–17–98	1330	E.10	70	3070	726	7.2	--	.8	36	--	3.76	--	5.98	--	.9	6	--	--
		03–18–98	1430	E.10	70	3070	365	7.2	--	1.8	22	--	.39	.36	2.37	2.35	11.6	87	--	--
		04–21–98	1310	E.10	70	3070	298	7.8	--	14.2	17	--	.12	.17	1.27	1.05	9.1	92	--	--
		06–04–98	1130	E.10	70	3070	249	--	--	13.4	--	--	.40	--	2.07	--	8.7	--	--	--
		07–08–98	1400	E.10	70	3070	--	--	--	--	22	--	.41	--	2.20	--	--	--	--	--
		07–20–98	1305	E.10	70	3070	291	7.5	--	24.4	24	--	.33	.25	2.27	1.81	6.4	--	--	--
		08–18–98	1230	E.10	70	3070	304	7.8	--	21.0	24	24	.25	.24	1.17	1.15	7.7	--	--	2.2
		09–03–98	1245	E.10	70	3070	270	7.8	--	19.0	24	--	.21	--	1.08	--	7.9	90	--	--
		09–22–98	1250	E.10	70	3070	536	7.7	--	13.8	19	28	.20	.18	1.00	1.28	6.3	63	--	2.3
		10–14–98	1130	E.10	70	3070	--	--	--	--	25	--	.15	--	.74	--	--	--	--	2.0
		01–20–99	1500	E.10	70	3070	525	7.1	--	.8	30	--	3.00	--	4.09	--	8.4	62	E3.0	5.8
		02–22–99	1645	E.05	70	3070	562	7.5	--	.5	31	--	4.94	--	6.68	--	6.9	50	--	--
		03–26–99	1400	E.10	70	3070	--	--	--	--	--	--	2.46	--	3.58	--	--	--	--	--

Table 2. Field measurements, organic carbon, and mercury in streams, impoundments, and lakes in the Red River of the North Basin. (Continued)

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Map number (figure 2)	Site name	Date	Time	Sampling depth (m) (00098)	Sampling method (codes) (82398)	Sampler type (codes) (84164)	Specific conductance (µS/cm) (00095)	pH water whole field (standard units) (00400)	pH water whole lab (standard units) (00403)	Temperature (°C) (00010)	Carbon, organic total (mg/L as C) (00680)	Carbon, organic dissolved (mg/L as C) (00681)	Methylmercury, water, unfiltered (ng/L as Hg) (50284)	Methylmercury, water, filtered (ng/L as Hg) (50285)	Mercury water, unfiltered (ng/L) (50286)	Mercury water, filtered (ng/L) (50287)	Oxygen, dissolved (mg/L) (00300)	Oxygen, dissolved (percent saturation) (00301)	Turbitity (NTU) (00076)	Turbitity lab (NTU) (82079)
44	Curtis Lake, Clearwater Co. Red Lake Ind. Res.	06–11–97	1345	E0.10	70	3070	--	--	7.2	--	47	44	0.084	--	4.37	--	--	--	--	--
		07–15–97	1400	E.10	70	3070	93	8.1	--	27.1	45	41	.073	0.033	3.08	2.14	8.0	--	--	--
		07–15–97	1410	--	70	--	93	8.1	7.0	27.1	--	--	--	--	--	--	8.0	104	--	--
		10–07–97	1040	E.10	70	3070	114	7.2	7.3	13.8	39	38	.046	<.034	1.33	2.35	9.6	--	--	--
		12–17–97	1145	E.35	70	3070	145	8.2	7.8	1.8	49	47	<.047	<.044	2.17	2.12	1.1	8	--	--
		03–18–98	1200	.31	70	3070	131	6.6	6.8	.7	54	50	.23	.12	3.13	2.99	1.0	8	--	--
		06–16–98	1330	E.10	70	3070	107	8.0	7.5	22.2	45	--	.11	.043	2.32	2.05	7.9	94	--	--
		09–23–98	1310	E.10	70	3070	139	8.0	--	12.6	45	42	.041	.043	1.33	1.04	10.1	99	--	--
		01–20–99	1245	.58	70	3070	220	7.6	--	.8	60	--	.20	--	1.82	--	.9	7	E0.45	1.7
		01–20–99	1246	.85	70	--	220	7.4	--	3.1	--	--	--	--	--	--	.3	2	E.00	--
		02–23–99	1220	.50	50	4080	246	6.9	--	.2	72	--	.42	--	2.56	--	.2	2	--	--
		02–23–99	1230	.90	50	4080	250	6.8	--	2.1	58	--	.51	--	3.92	--	.1	1	--	--
		02–23–99	1240	.75	50	4080	247	6.8	--	1.6	57	--	.59	--	3.00	--	.1	1	--	--

Table 2. Field measurements, organic carbon, and mercury in streams, impoundments, and lakes in the Red River of the North Basin. (Continued)

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Map number (figure 2)	Site name	Date	Time	Sampling depth (m) (00098)	Sampling method (codes) (82398)	Sampler type (codes) (84164)	Specific conductance (µS/cm) (00095)	pH water whole field (standard units) (00400)	pH water whole lab (standard units) (00403)	Temperature (°C) (00010)	Carbon, organic total (mg/L as C) (00680)	Carbon, organic dissolved (mg/L as C) (00681)	Methylmercury, water, unfiltered (ng/L as Hg) (50284)	Methylmercury, water, filtered (ng/L as Hg) (50285)	Mercury water, unfiltered (ng/L) (50286)	Mercury water, filtered (ng/L) (50287)	Oxygen, dissolved (mg/L) (00300)	Oxygen, dissolved (percent saturation) (00301)	Turbitity (NTU) (00076)	Turbitity lab (NTU) (82079)
45	Miskogineu Lake, Clearwater Co., Red Lake Ind. Res.	06–12–97	1000	E0.10	70	3070	160	8.5	--	210.0	21	22	0.16	0.15	3.08	3.04	10.8	--	--	--
		06–12–97	1030	--	--	--	--	--	7.9	--	--	--	--	--	--	--	--	--	--	--
		07–15–97	1215	E.10	70	3070	154	8.5	--	25.5	22	21	.18	.21	2.11	1.90	8.4	--	--	--
		07–15–97	1220	--	70	--	154	8.5	7.6	25.5	--	--	--	--	--	--	8.4	107	--	--
		10–07–97	1130	E.10	70	3070	190	7.9	7.9	13.8	22	21	.057	.052	2.05	1.17	10.1	--	--	--
		12–17–97	1015	E.35	70	3070	235	8.3	8.1	2.1	26	26	<.044	<.048	1.57	.91	4.5	34	--	--
		03–18–98	1100	E.35	50	4080	334	7.1	7.0	4.5	21	20	.085	.12	3.67	2.65	9.4	76	--	--
		06–16–98	1200	E.10	70	3070	165	8.6	7.7	21.1	22	--	.059	.050	1.68	2.19	7.4	88	--	--
		09–23–98	1110	E.10	70	3070	190	8.6	--	12.9	24	23	.036	.042	.96	.69	10.4	102	--	--
		01–20–99	1200	.57	70	3070	328	7.6	--	.1	34	--	.11	--	1.31	--	2.5	18	E.00	2.1
		01–20–99	1201	.95	70	--	340	7.7	--	2.3	--	--	--	--	--	--	1.5	12	--	--
		02–23–99	1320	.50	50	4080	374	7.3	--	.7	41	--	.13	--	1.26	--	.4	3	--	--
		02–23–99	1330	.60	50	4080	378	7.2	--	1.0	40	--	.23	--	1.52	--	.3	3	--	--
		02–23–99	1340	.75	50	4080	379	7.2	--	1.3	34	--	.23	--	1.82	--	.4	3	--	--
46	Cahill Lake, Clearwater Co. Red Lake Ind. Res.	06–11–97	1130	E.10	70	3070	--	--	7.8	--	21	20	.36	.30	2.19	3.76	--	--	--	--
		07–15–97	1040	E.10	70	3070	208	8.1	7.6	24.1	22	21	.23	.18	2.65	1.92	7.6	93	--	--
		10–07–97	1245	E.10	70	3070	202	8.8	8.7	13.6	22	--	.053	.054	1.40	1.10	10.9	--	--	--
		12–17–97	1110	E.35	70	3070	262	8.9	8.3	2.4	25	24	<.047	<.046	1.65	1.07	12.5	96	--	--
		03–18–98	1000	.34	50	4080	228	6.9	7.3	.9	23	23	.34	.24	4.79	3.62	8.8	64	--	--
		06–16–98	1035	E.10	70	3070	168	9.0	8.3	20.0	22	--	.069	.11	2.46	2.11	8.2	95	--	--
		09–23–98	1210	E.10	70	3070	208	8.8	--	12.6	22	21	.028	.024	.86	.81	12.0	117	--	--
		01–20–99	1115	.84	70	3070	310	7.6	--	-.1	--	31	.084	--	1.97	--	1.3	9	E7.6	1.8
		02–23–99	1030	.45	50	4080	442	7.1	--	.5	37	--	1.04	--	2.52	--	.3	2	--	--
		02–23–99	1040	.90	50	4080	447	7.1	--	2.1	32	--	1.20	--	2.76	--	.2	1	--	--
		02–23–99	1050	.80	70	3070	442	7.1	--	1.6	36	--	.96	--	2.58	--	.2	1	--	--

Table 2. Field measurements, organic carbon, and mercury in streams, impoundments, and lakes in the Red River of the North Basin. (Continued)

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Map number (figure 2)	Site name	Date	Time	Sampling depth (m) (00098)	Sampling method (codes) (82398)	Sampler type (codes) (84164)	Specific conductance (µS/cm) (00095)	pH water whole field (standard units) (00400)	pH water whole lab (standard units) (00403)	Temperature (°C) (00010)	Carbon, organic total (mg/L as C) (00680)	Carbon, organic dissolved (mg/L as C) (00681)	Methylmercury, water, unfiltered (ng/L as Hg) (50284)	Methylmercury, water, filtered (ng/L as Hg) (50285)	Mercury water, unfiltered (ng/L) (50286)	Mercury water, filtered (ng/L) (50287)	Oxygen, dissolved (mg/L) (00300)	Oxygen, dissolved (percent saturation) (00301)	Turbitity (NTU) (00076)	Turbitity lab (NTU) (82079)
47	Moose River imp., north pool, near Grygla, MN	08–27–97	1710	E0.10	70	3070	279	8.3	--	23.0	22	--	0.10	--	1.50	--	7.8	95	--	--
		09–04–97	1645	E.10	70	3070	266	8.1	--	19.4	20	--	.11	--	.75	--	7.9	89	--	--
		03–10–98	1810	.31	70	3070	252	7.4	--	1.0	15	--	.11	--	2.96	--	8.0	57	--	--
		07–08–98	1300	E.10	70	3070	273	7.7	7.9	22.5	21	--	.12	--	1.36	--	6.9	83	E2.5	--
		02–10–99	1510	.70	50	4080	376	7.5	--	1.3	22	--	.94	--	1.83	--	.1	1	--	--
48	Moose River imp., NW corner of south pool, near Grygla, MN	09–04–97	1600	E.10	70	3070	342	8.1	--	21.7	27	--	.43	--	1.42	--	8.6	106	--	--
		03–10–98	1845	E.50	70	3070	231	7.7	--	1.2	19	--	.25	--	4.40	--	16.5	120	--	--
		07–08–98	1045	E.10	70	3070	286	7.5	7.6	22.4	--	--	.43	--	2.73	--	6.3	75	E2.4	--
		09–02–98	0845	E.10	70	3070	324	7.4	--	18.4	29	--	.25	--	1.58	--	3.8	42	--	--
		02–10–99	1350	.60	50	4080	498	7.3	--	.9	30	--	1.32	--	2.20	--	.1	1	E.10	--
		02–10–99	1400	1.6	50	4080	581	7.1	--	3.6	30	--	1.43	--	2.69	--	.1	1	E1.4	--
49	Moose River imp., south pool above outlet, near Grygla, MN	08–27–97	1850	E.10	70	3070	285	7.8	--	25.2	--	--	--	--	--	--	7.7	97	--	--
		08–27–97	1855	E1.0	70	3070	280	7.6	--	20.9	--	--	--	--	--	--	3.4	40	--	--
		03–10–98	1730	E.10	70	3070	243	7.3	--	.4	20	--	.19	--	2.34	--	2.8	19	--	--
		07–08–98	0855	E.10	70	3070	235	7.2	--	20.6	--	--	.19	--	1.92	--	4.5	52	E.70	--
50	Moose River imp. south pool spillway, near Grygla, MN	08–27–97	1830	E.10	70	3070	281	7.7	--	22.1	24	--	.071	--	1.46	--	5.8	64	--	--

Table 2. Field measurements, organic carbon, and mercury in streams, impoundments, and lakes in the Red River of the North Basin. (Continued)

[m, meters; µS/cm, microsiemens per centimeter; ° C, degrees centigrade; E, estimated; --, not measured; mg/L, milligrams per liter; ng/L, nanograms per liter; NTU, nephelometric turbidity units; lab, laboratory; >, greater than; <, less than; imp., impoundment; trib., tributary; WMA, Wildlife Management Area. Sampling method codes (82398): 70, grab sample (dip); 50, point sample. Sampler type code (84164): 3070, grab sample; 4080, peristaltic pump]

Map number (figure 2)	Site name	Date	Time	Sampling depth (m) (00098)	Sampling method (codes) (82398)	Sampler type (codes) (84164)	Specific conductance (µS/cm) (00095)	pH water whole field (standard units) (00400)	pH water whole lab (standard units) (00403)	Temperature (°C) (00010)	Carbon, organic total (mg/L as C) (00680)	Carbon, organic dissolved (mg/L as C) (00681)	Methylmercury, water, unfiltered (ng/L as Hg) (50284)	Methylmercury, water, filtered (ng/L as Hg) (50285)	Mercury water, unfiltered (ng/L) (50286)	Mercury water, filtered (ng/L) (50287)	Oxygen, dissolved (mg/L) (00300)	Oxygen, dissolved (percent saturation) (00301)	Turbitity (NTU) (00076)	Turbitity lab (NTU) (82079)
51	Webster Lake at Agassiz NWR near Gatzke, MN	09–04–97	1400	E0.10	70	3070	1080	8.0	--	20.3	26	--	0.041	--	1.10	--	7.8	90	--	--
		03–10–98	1550	E.50	70	3070	848	8.6	--	.3	28	29	.46	0.28	5.48	2.26	3.2	22	--	--
		07–08–98	1815	--	70	3070	812	9.7	9.3	30.4	--	--	--	--	--	--	13.8	190	2.4	--
		07–08–98	1900	E.10	70	3070	812	9.7	--	30.4	--	--	.080	.39	1.71	1.84	13.8	190	E2.4	--
		09–02–98	1125	E.10	70	3070	988	7.5	--	17.2	27	--	.28	--	1.49	--	4.7	52	--	--
		02–10–99	1145	.45	50	4080	1860	7.1	--	.5	61	--	.060	--	3.79	--	.2	2	--	--
52	Farmes Pool above outlet, near Holt, MN	09–04–97	1015	E.10	70	3070	639	8.2	7.9	14.9	30	30	.60	.14	3.51	1.67	7.5	77	--	--
		03–10–98	1330	E.30	70	3070	552	7.8	--	.9	15	--	.27	--	5.20	--	9.1	64	--	--
53	Kittleson Lake near Fertile, MN	09–03–97	1830	E.10	70	3070	361	8.5	--	19.3	16	--	.042	--	2.51	--	9.1	101	--	--
		03–05–98	1410	E.10	70	3070	414	8.1	--	1.8	9.5	--	.34	--	2.82	--	8.1	61	--	--
		06–22–98	1630	E.10	70	3070	--	--	7.8	--	13	--	.18	--	1.09	--	--	--	--	2.4
		06–23–98	1645	E.10	70	3070	328	8.5	--	21.0	--	--	--	--	--	--	9.8	113	E0.00	--
		09–01–98	1445	E.10	70	3070	331	8.5	--	22.5	15	--	.12	--	1.45	--	8.9	107	--	--
		02–09–99	1640	.69	50	4080	589	7.6	--	.7	21	--	.76	--	1.25	--	.2	1	E.10	--
54	County Ditch 140 above Burnham Creek imp. near Tilden Junction, MN	06–25–98	1000	E0.10	70	3070	391	7.7	--	19.3	13	--	0.67	0.41	15.4	3.76	7.2	82	E260	140

Table 2. Field measurements, organic carbon, and mercury in streams, impoundments, and lakes in the Red River of the North Basin. (Continued)

[m, meters; µS/cm, microsiemens per centimeter; ° C, degrees centigrade; E, estimated; --, not measured; mg/L, milligrams per liter; ng/L, nanograms per liter; NTU, nephelometric turbidity units; lab, laboratory; >, greater than; <, less than; imp., impoundment; trib., tributary; WMA, Wildlife Management Area. Sampling method codes (82398): 70, grab sample (dip); 50, point sample. Sampler type code (84164): 3070, grab sample; 4080, peristaltic pump]

Map number (figure 2)	Site name	Date	Time	Sampling depth (m) (00098)	Sampling method (codes) (82398)	Sampler type (codes) (84164)	Specific conductance (µS/cm) (00095)	pH water whole field (standard units) (00400)	pH water whole lab (standard units) (00403)	Temperature (°C) (00010)	Carbon, organic total (mg/L as C) (00680)	Carbon, organic dissolved (mg/L as C) (00681)	Methylmercury, water, unfiltered (ng/L as Hg) (50284)	Methylmercury, water, filtered (ng/L as Hg) (50285)	Mercury water, unfiltered (ng/L) (50286)	Mercury water, filtered (ng/L) (50287)	Oxygen, dissolved (mg/L) (00300)	Oxygen, dissolved (percent saturation) (00301)	Turbitity (NTU) (00076)	Turbitity lab (NTU) (82079)
55	Burnham Creek imp., mid-pool, near Tilden Junction, MN	06–30–98	1445	E0.10	70	3070	449	8.3	8.0	23.1	13	--	0.88	0.56	2.57	2.50	9.0	109	E13	--
		09–01–98	1530	E.10	70	3070	495	8.5	--	22.0	15	--	.73	--	2.40	--	8.2	98	--	--
		02–11–99	0950	.75	70	3070	815	7.6	--	.6	16	--	.23	--	.99	--	3.6	26	E.00	--
		02–11–99	0955	1.3	70	3070	825	7.5	--	1.7	--	--	--	--	--	--	3.3	25	E8.1	--
		02–24–99	1520	1.0	50	4080	945	7.6	--	3.3	21	--	2.97	--	5.33	--	.2	2	--	--
		02–24–99	1525	.60	50	4080	934	7.6	--	1.3	19	--	2.00	--	3.64	--	.5	4	E1.9	--
56	Burnham Creek imp. above outlet, near Tilden Junction, MN	09–03–97	1730	E.10	70	3070	503	8.5	8.4	19.5	14	--	.49	--	2.97	--	9.7	108	--	--
		03–05–98	1315	E.10	70	3070	506	8.3	--	1.0	12	--	.22	--	3.18	--	9.4	68	--	--

Table 3. Major ion, alkalinity, and silica data for impoundments and lakes in the Red River of the North Basin .

[m, meters; mg/L, milligrams per liter; ANC, acid-neutralizing capacity, unfiltered water, titrated in laboratory to ph=4.5; µg/L, micrograms per liter; °C, degrees centigrade; <, less than]

Site number (figure 2)	Site name	Date	Time	Sampling depth (m) (00098)	Calcium dissolved (mg/L as Ca) (00915)	Magnesium, dissolved (mg/L as Mg) (00925)	Sodium, dissolved (mg/L as Na) (00930)	Potassium, dissolved (mg/L as K) (00935)	ANC (mg/L as $CaCO_3$) (90410)	Sulfate dissolved (mg/L as SO_4) (00945)	Chloride, dissolved (mg/L as Cl) (00940)	Fluoride, dissolved (mg/L as F) (00950)	Silica, dissolved (mg/L as SiO_2) (00955)	Solids, residue at 180°C dissolved (mg/L) (70300)	Solids, sum of constituents, dissolved (mg/L) (70301)	Iron, dissolved (µg/L as Fe) (01046)	Manganese, dissolved (µg/L as Mn) (01056)
2	Unnamed pond, trib. to Big Slough near Rollag, MN	07–06–98	1430	E0.10	47	49	9.6	25	197	130	17	0.19	18	453	409	<10	277
3	Stony Creek imp.(Big Slough) above outlet near Barnesville, MN	07–06–98	1230	E.10	54	25	4.3	1.7	229	20	.56	.22	25	307	269	<10	<4.0
7	Rushfieldt Lake near Downer, MN	07–01–98	1400	E.10	23	91	20	25	396	62	25	.15	11	533	493	<10	<4.0
8	North Pool, Bjornson WMA near Rollag, MN	07–01–98	0945	E.10	59	37	8.1	4.6	254	50	5.2	.23	22	375	338	59	8.8
19	Home Lake, northeast end, near Fossum, MN	07–07–98	1515	E.10	27	19	2.8	2.3	150	1.0	.72	.14	5.3	162	148	<10	<4.0
23	Raff Lake near Fertile MN	06–23–98	1445	E.10	38	34	3.4	6.4	244	1.5	4.8	.16	3.6	266	239	<10	<4.0
25	Pool B2 Sande imp.above outlet near Flaming, MN	06–24–98	1010	--	59	24	3.6	1.8	238	10	4.1	.20	16	306	261	32	<4.0
31	Lockhart Swamp imp Agassiz no. 2 WMA near Flaming, MN	06–23–98	1045	E.15	57	28	6.5	3.3	231	23	8.9	.24	6.7	308	272	12	<4.0

Table 3. Major ion, alkalinity, and silica data for impoundments and lakes in the Red River of the North Basin (Continued).

[m, meters; mg/L, milligrams per liter; ANC, acid-neutralizing capacity, unfiltered water, titrated in laboratory to ph=4.5; µg/L, micrograms per liter; °C, degrees centigrade; <, less than]

Site number (figure 2)	Site name	Date	Time	Sampling depth (m) (00098)	Calcium dissolved (mg/L as Ca) (00915)	Magnesium, dissolved (mg/L as Mg) (00925)	Sodium, dissolved (mg/L as Na) (00930)	Potassium, dissolved (mg/L as K) (00935)	ANC (mg/L as $CaCO_3$) (90410)	Sulfate dissolved (mg/L as SO_4) (00945)	Chloride, dissolved (mg/L as Cl) (00940)	Fluoride, dissolved (mg/L as F) (00950)	Silica, dissolved (mg/L as SiO_2) (00955)	Solids, residue at 180°C dissolved (mg/L) (70300)	Solids, sum of constituents, dissolved (mg/L) (70301)	Iron, dissolved (µg/L as Fe) (01046)	Manganese, dissolved (µg/L as Mn) (01056)
41	Good Lake imp., mid-pool, near Erie, MN	06–10–97	1530	--	32	10	1.9	3.0	105	17	0.51	<0.10	6.3	179	134	54	150
		07–14–97	1330	E0.10	37	11	2.0	3.5	128	8.9	.48	.11	8.5	194	148	11	<3.0
		10–06–97	1400	E.50	49	15	2.5	4.3	171	13	.59	.12	5.0	250	192	8.2	1.4
		12–16–97	1300	E.30	62	19	3.4	4.7	204	30	1.4	<.10	1.6	304	244	15	205
		03–18–98	1330	.36	47	15	2.8	5.1	145	40	1.5	<.10	6.7	255	205	110	750
		06–15–98	1330	E.10	37	11	2.0	2.5	122	13	.58	<.10	3.9	196	143	13	<4.0
44	Curtis Lake, Clearwater County, Red Lake Indian Reservation	06–11–97	1345	E.10	12	5.0	1.3	2.1	44	.43	.46	<.10	.54	110	49	150	8.7
		07–15–97	1410	--	14	5.6	1.2	1.3	46	.49	.21	<.10	.73	129	51	60	2.1
		10–07–97	1040	E.10	17	7.3	1.7	1.5	59	.52	.56	.11	.25	142	64	45	3.1
		12–17–97	1145	E.35	21	9.0	2.1	2.1	79	.76	.76	<.10	.31	175	83	77	150
		03–18–98	1200	.31	21	7.7	1.9	1.9	75	.74	.78	<.10	4.7	180	87	1200	926
		06–16–98	1330	E.10	16	6.2	1.5	.82	56	.75	.35	<.10	.74	178	60	120	4.5
45	Miskogineu Lake, Clearwater County, Red Lake Indian Reservation	06–12–97	1030	--	14	7.9	2.6	1.4	73	2.8	<.10	<.10	3.0	122	--	20	1.5
		07–15–97	1220	--	18	8.8	2.1	1.5	83	1.9	<.10	<.10	2.6	126	--	4.7	<1.0
		10–07–97	1130	E.10	22	12	2.7	2.1	102	.88	<.10	.10	7.3	150	--	4.9	3.1
		12–17–97	1015	E.35	30	15	3.6	2.7	138	1.8	.33	<.10	5.2	192	142	51	4.9
		03–18–98	1100	E.35	26	11	2.7	5.1	115	2.3	1.0	<.10	7.7	167	125	110	511
		06–16–98	1200	E.10	19	8.7	2.3	2.2	87	.37	.22	<.10	2.7	135	87	<10	<4.0
46	Cahill Lake, Clearwater County Red Lake Indian Reservation	06–11–97	1130	E.10	27	10	2.3	1.4	104	3.7	<.10	<.10	5.6	155	--	14	<1.0
		07–15–97	1040	E.10	27	10	2.2	1.5	110	3.0	.23	<.10	5.3	160	116	6.4	<1.0
		10–07–97	1245	E.10	27	12	2.5	1.3	112	1.7	<.10	<.10	13	166	--	4.8	2.9
		12–17–97	1110	E.35	38	16	3.5	1.9	158	3.2	.40	<.10	12	217	170	<10	<4.0
		03–18–98	1000	.34	29	12	2.5	5.7	126	3.2	.92	<.10	12	187	141	110	263
		06–16–98	1035	E.10	22	9.3	2.5	2.1	93	1.4	.14	<.10	3.0	141	96	<10	7.4

Table 3. Major ion, alkalinity, and silica data for impoundments and lakes in the Red River of the North Basin (Continued).

[m, meters; mg/L, milligrams per liter; ANC, acid-neutralizing capacity, unfiltered water, titrated in laboratory to ph=4.5; µg/L, micrograms per liter; °C, degrees centigrade; <, less than]

Site number (figure 2)	Site name	Date	Time	Sampling depth (m) (00098)	Calcium dissolved (mg/L as Ca) (00915)	Magnesium, dissolved (mg/L as Mg) (00925)	Sodium, dissolved (mg/L as Na) (00930)	Potassium, dissolved (mg/L as K) (00935)	ANC (mg/L as $CaCO_3$) (90410)	Sulfate dissolved (mg/L as SO_4) (00945)	Chloride, dissolved (mg/L as Cl) (00940)	Fluoride, dissolved (mg/L as F) (00950)	Silica, dissolved (mg/L as SiO_2) (00955)	Solids, residue at 180°C dissolved (mg/L) (70300)	Solids, sum of constituents, dissolved (mg/L) (70301)	Iron, dissolved (µg/L as Fe) (01046)	Manganese, dissolved (µg/L as Mn) (01056)
47	Moose River imp., north pool, near Grygla, MN	07–08–98	1300	E0.10	40	10	1.2	0.42	134	0.35	<0.10	<0.10	9.3	180	--	11	<4.0
48	Moose River imp., NW corner of south pool, near Grygla, MN	07–08–98	1045	E.10	43	12	1.1	.23	150	1.7	<.10	<.10	10	218	--	55	<4.0
51	Webster Lake at Agassiz NWR near Gatzke, MN	07–08–98	1815	--	93	50	8.1	5.0	108	330	1.0	<.10	1.5	657	557	<10	36
53	Kittleson Lake near Fertile, MN	06–22–98	1630	E.10	31	25	3.4	4.0	183	4.0	4.4	.16	2.4	214	185	20	<4.0
55	Burnham Creek imp., mid-pool, near Tilden jct., MN	06–30–98	1445	E.10	44	28	6.9	4.6	171	56	9.1	.17	12	301	263	<10	<4.0

Table 4. Blank-sample data for organic carbon and mercury.

[mg/L, milligrams per liter; ng/L, nanograms per liter; <, less than. Sampler type code (84164): 8000, none (in this report, denotes pouring from source bottle into sample bottle); 4080, peristaltic pump (in this report, pump blanks were taken after sampling ambient water, then rinsing pump lines wtih 4 percent hydrochloric acid.]

Map number (figure 2)	Station number	Date	Time	Sampler type (84164)	Carbon, organic total (mg/L as C) (00680)	Carbon, organic dissolved (mg/L as C) (00681)	Methylmercury, water, unfiltered (ng/L as Hg) (50284)	Methylmercury, water, filtered (ng/L as Hg) (50285)	Mercury water, unfiltered (ng/L) (50286)	Mercury water, filtered (ng/L) (50287)
3	Stony Cr. imp. (Big Slough) abv outlet nr Barnsville, MN	09–02–97	1210	8000	--	--	<0.034	--	0.116	--
29	Pool A4 Sande imp. abv outlet nr Flaming, MN	09–02–98	1645	8000	0.1	--	.018	--	.09	--
		2–24–99	1225	4080	.1	--	.061	--	.1	--
40	Unnamed ditch abv Good Lake nr Erie, MN	07–14–97	1555	8000	--	0.11	<.059	<0.009	.24	0.27
41	Good Lake imp., midpool, nr Erie, MN	10–06–97	1405	8000	--	--	<.037	<.033	.1	--
43	Good Lake outlet near Erie, MN	04–22–97	1150	8000	--	--	<.022	--	.42	--
45	Miskogineu Lake, Clearwater Co. Red Lake Ind. Res.	06–17–98	0900	8000	.1	--	<.013	<.008	.05	.05
47	Moose River imp., north pool, nr Grygla, MN	08–27–97	1330	8000	.08	--	<.043	--	.182	--
		09–04–97	1700	8000.	.18	--	<.043	--	.14	--
48	Moose River imp., NW corner of south pool, nr Grygla, MN	02–10–99	1410	4080	--	--	<.011	--	.08	--
Maximum values:					0.18	0.11	0.061	<0.033	0.42	0.27
Mean values:					0.11	--	--	--	0.15	0.16

Table 5. Replicate sample data for organic carbon and mercury .

[m, meters; mg/L, milligrams per liter; ng/L, nanograms per liter; R, surface-water quality control sample; E, estimate. Sampling method codes (82398): 70, grab sample (dip); 50, point sample. Sampler type code (84164): 3070, grab sample, 4080, peristaltic pump. Data for these constiuents are not rounded to significant figures.]

Map number (figure 2)	Site name	Date	Time	Medium code	Sampling depth (m) (00098)	Sampling method, codes (82398)	Sampler type (code) (84164)	Carbon, organic total (mg/L as C) (00680)	Carbon, organic dissolved (mg/L as C) (00681)	Methyl-mercury, water, unfiltered (ng/L as Hg) (50284)	Methyl-mercury, water, filtered (ng/L as Hg) (50285)	Mercury water, unfiltered (ng/L) (50286)	Mercury water, filtered (ng/L) (502887)
3	Stony Cr. imp. (Big Slough) abv outlet nr Barnesville, MN	03–09–98	1530	9	E0.5	70	3070	6.5	--	0.418	0.261	3.0	2.11
		03–09–98	1535	R	E.5	70	3070	6.9	--	.440	.196	2.54	1.53
4	Stony Cr. blw Big Slough outlet nr Barnesville, MN	03–09–98	1500	9	E.1	70	3070	12.4	11.5	.963	.767	2.66	1.8
		03–09–98	1505	R	E.1	70	3070	12.3	11.8	.834	.700	3.05	1.71
17	Garden Slough imp. nr Gary, MN	02–09–99	1145	9	.64	50	4080	16.1	--	.210	--	1.09	--
		02–09–99	1155	R	.64	50	4080	16.2	--	.242	--	1.08	--
40	Unnamed ditch abv Good Lake nr Erie, MN	10–06–97	1630	9	E.1	70	3070	23.1	--	.215	--	1.98	--
		10–06–97	1635	R	E.1	70	3070	23.4	--	.156	--	2.22	--
		10–06–97	1640	R	E.1	70	3070	23.3	--	.193	--	2.12	--
		06–10–97	1400	9	E.1	70	3070	19.7	20.1	.706	.58	2.78	4.43
		06–10–97	1401	R	E.1	70	3070	19.7	--	.765	--	4.36	--
		06–10–97	1402	R	E.1	70	3070	19.4	--	.718	--	2.94	--
		07–14–97	1330	9	E.1	70	3070	22.8	21.8	.647	.469	2.77	4.84
		07–14–97	1335	R	E.1	70	3070	22.8	22.4	.643	.501	2.99	2.59
		02–17–98	1500	9	E.4	70	3070	27.6	--	.629	--	3.04	--
		02–17–98	1515	R	E.4	70	3070	16.7	--	.609	--	3.22	--
		02–17–98	1530	9	E.7	50	4080	36.1	--	2.816	--	4.70	--
41	Good Lake imp., mid-pool, near Erie, MN	02–17–98	1545	R	E.7	50	4080	36.1	--	2.775	--	4.86	--
		06–15–98	1330	9	E.1	70	3070	22.7	--	.428	.265	2.21	2.10
		06–15–98	1335	R	E.1	70	3070	22.7	--	.395	.319	1.99	1.96
		06–15–98	1340	R	E.1	70	3070	22.7	--	.350	.172	2.06	1.31
		09–03–98	1215	9	E.1	70	3070	21.8	--	.091	--	.930	--
		09–03–98	1220	R	E.1	70	3070	21.8	--	.121	--	.930	--
		09–03–98	1225	R	E.1	70	3070	21.8	--	.079	--	1.08	--
		09–22–98	1400	9	E.1	70	3070	22.6	21.5	.067	.037	1.15	.860
		09–22–98	1405	R	E.1	70	3070	22.9	22.	.077	.03	1.18	.800
		09–22–98	1410	R	E.1	70	3070	23.	23.1	.057	.036	1.47	.810

Table 5. Replicate sample data for organic carbon and mercury (Continued).

[m, meters; mg/L, milligrams per liter; ng/L, nanograms per liter; R, surface-water quality control sample; E, estimate. Sampling method codes (82398): 70, grab sample (dip); 50, point sample. Sampler type code (84164): 3070, grab sample, 4080, peristaltic pump. Data for these constiuents are not rounded to significant figures.]

Map number (figure 2)	Site name	Date	Time	Medium code	Sampling depth (m) (00098)	Sampling method, codes (82398)	Sampler type (code) (84164)	Carbon, organic total (mg/L as C) (00680)	Carbon, organic dissolved (mg/L as C) (00681)	Methyl-mercury, water, unfiltered (ng/L as Hg) (50284)	Methyl-mercury, water, filtered (ng/L as Hg) (50285)	Mercury water, unfiltered (ng/L) (50286)	Mercury water, filtered (ng/L) (502887)
43	Good Lake outlet nr Erie, MN	04–22–97	1130	9	E0.1	70	3070	11.3	--	0.169	--	2.33	--
		04–22–97	1135	R	E.1	70	3070	11.5	--	.110	--	2.14	--
		04–22–97	1140	R	E.1	70	3070	11.5	--	.154	--	3.08	--
		04–22–97	1145	R	E.1	70	3070	11.7	--	<.022	--	3.32	--
47	Moose River imp., north pool, nr Grygla, MN	08–27–97	1710	9	E.1	70	3070	21.7	--	.102	--	1.505	--
		08–27–97	1720	R	E.1	70	3070	19.1	--	.142	--	2.16	--
		08–27–97	1730	R	E.1	70	3070	19.8	--	.138	--	1.281	--
48	Moose River imp., NW corner of south pool, nr Grygla, MN	09–02–98	0845	9	E.1	70	3070	29.4	--	.251	--	1.58	--
		09–02–98	0850	R	E.1	70	3070	29.4	--	.241	--	1.63	--
		09–02–98	0855	R	E.1	70	3070	29.1	--	.255	--	1.52	--
19	Garden Slough imp. outlet nr Gary, MN	09–03–97	1100	9	E.1	70	3070	11.1	--	.084	--	.862	--
		09–03–97	1110	R	E.1	70	3070	11.3	--	.035	--	.926	--
		09–03–97	1120	R	E.1	70	3070	11.4	--	.091	--	1.073	--

Table 6. Summary of replicate sample data.

[N sets, number of sets of replicate samples; N samples, total number of samples]

Analyte	N sets	N samples	Coefficient of Variation		
			Minimum	Maximum	Pooled
Organic carbon, total (00680)	16	40	0.0	34.7	7.4
Organic carbon, dissolved (00681)	3	7	1.8	3.6	2.9
Methylmercury, water, unfiltered (ng/L as Hg) (50284)	16	40	0.4	106.0	28.1
Methylmercury, water, filtered (ng/L as Hg) (50285)	5	12	4.6	29.5	18.7
Mercury water, unfiltered (ng/L) (50286)	16	40	0.6	27.7	13.1
Mercury waer, filtered (ng/L) (50287)	5	12	3.6	42.8	22.3

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