WATER RESOURCES OF THE MENOMINEE INDIAN RESERVATION OF WISCONSIN

By James T. Krohelski, Phil A. Kammerer, Jr., and Terrence D. Conlon

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CONVERSION FACTORS, VERTICAL DATUM, WATER-QUALITY UNITS, AND SYMBOLS AND ABBREVIATIONS USED IN APPENDIXES

Multiply	*By*	*To obtain*
acre	0.004047	square kilometer
inch (in.)	25.4	millimeter
foot (ft)	0.3048	meter
mile (mi)	1.609	kilometer
square mile (mi^2)	2.590	square kilometer
foot per day (ft/d)	731.52	centimeter per second
foot per mile (ft/mi)	0.1896	meter per kilometer

Temperature, in degrees Fahrenheit (°F) can be converted to degrees Celsius (°C) by use of the following equation:

$$°C = 5/9 (°F - 32).$$

Sea level: In this report, "sea level" refers to the National Geodetic Vertical Datum of 1929 (NGVD of 1929)--a geodetic datum derived from a general adjustment of the first-order level nets of both the United States and Canada, formerly called Sea Level Datum of 1929.

Abbreviated water-quality units used in this report: Chemical concentrations and water temperature are given in metric units. Chemical concentration is given in milligrams per liter (mg/L) or micrograms per liter (µg/L). Milligrams per liter is a unit expressing the concentration of chemical constituents in solution as weight (milligrams) of solute per unit volume (liter) of water. One thousand micrograms per liter is equivalent to one milligram per liter. For concentrations less than 7,000 mg/L, the numerical value is the same as for concentrations in parts per million.

Specific electrical conductance of water is expressed in microsiemens per centimeter at 25 degrees Celsius (µS/cm). This unit is equivalent to micromhos per centimeter at 25 degrees Celsius (µmho/cm), formerly used by the U.S. Geological Survey.

Abbreviations used in appendixes:

Milligrams per liter (mg/L)
Micrograms per liter (µg/L)
Micrograms per gram (µg/g)
Microsiemens per centimeter (µS/cm)
Degrees Celsius (°C)
Elevation
Total
pH
Calcium carbonate ($CaCO_3$)
Calcium (Ca)
Magnesium (Mg)
Sodium (Na)
Potassium (K)
Chloride (Cl)
Sulfate (SO_4)
Fluoride (F)
Silica (SiO_2)
Nitrogen (N)
Nitrite (NO_2)
Nitrate (NO_3)
Phosphorus (P)
Ammonia (NH_4)
Arsenic (As)
Aluminum (Al)
Barium (Ba)
Berylium (Be)
Cadmium (Cd)
Chromium (Cr)
Cobalt (Co)
Copper (Cu)
Iron (Fe)
Lead (Pb)
Manganese (Mn)
Mercury (Hg)
Nickel (Ni)
Selenium (Se)
Strontium (Sr)
Silver (Ag)
Zinc (Zn)

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ABSTRACT

Water resources of the Menominee Indian Reservation, Wisconsin, were investigated during the period October 1981 through September 1987. The report presents baseline data and some interpretation of ground- and surface-water hydrology and quality of the Reservation.

The area stratigraphy consists of basal Precambrian crystalline bedrock and overlying till and sand and gravel deposits. In the Reservation, the glacial deposits range in thickness from zero to 180 feet. The bedrock aquifer is composed of fractured and weathered Precambrian bedrock within about 20 feet of the upper bedrock surface. The sand and gravel aquifer is composed of saturated, permeable sand and gravel that occurs as layers, lenses, terrace deposits, and valley fillings. The glacial material has a saturated thickness ranging from approximately 150 feet to zero feet in areas where the Precambrian bedrock crops out. Water-table conditions commonly occur in both aquifers. Horizontal hydraulic conductivity of the sand and gravel and bedrock aquifers is estimated to be 5 and 0.3 feet per day, respectively.

The Wolf River and its tributaries drain the Reservation except for the eastern quarter, which is drained by the South Branch of the Oconto River. The average discharge of the Wolf River, monitored continuously during 1907-85 at Keshena Falls near Keshena, was 762 ft^3/s (cubic feet per second). Maximum instantaneous discharge was 5,200 ft^3/s recorded on March 15, 1973, and the minimum was 91 ft^3/s recorded on December 22, 1939. Low flow and flood-frequency characteristics for the Wolf River were estimated using mean-daily discharge for the period of record at Keshena Falls.

Ground water from the sand and gravel and bedrock aquifers is a calcium magnesium bicarbonate type. The composition of waters from the two aquifers is similar because water recharging the bedrock aquifer is from the overlying sand and gravel aquifer. Iron or manganese concentrations exceeding secondary maximum contaminant levels were found in water samples from approximately one-quarter to one-half of the wells sampled.

Approximately three-quarters of the ground water sampled during the study is moderately hard to very hard, with a median hardness equal to 171 mg/L (milligrams per liter) (as calcium carbonate) for the sand and gravel aquifer and 165 mg/L (as calcium carbonate) for the bedrock aquifer. Alkalinity of the ground water ranged from 26 to 211 mg/L, with a median value of 182 mg/L (as calcium carbonate) for the sand and gravel aquifer and ranged from 72 to 250 mg/L, with a median value of 170 mg/L (as calcium carbonate) for the bedrock aquifer.

Water samples collected from Reservation streams and lakes were similar to ground water (calcium magnesium bicarbonate type), reflecting the strong surface-water/ground-water interaction in the study area. The chemical composition of water from lakes having inlets or outlets indicate that they are not influenced by precipitation as much as lakes that do not have inlets or outlets.

INTRODUCTION

The Menominee Indian Tribe of Wisconsin is concerned about the potential effects of proposed large-scale underground zinc-copper mining near the Menominee Reservation on the Reservation water resources. To address these concerns, the U.S. Geological Survey (USGS), in cooperation with the Menominee Tribe, conducted a hydrologic study of the Reservation. The objectives of the study were to characterize the ground- and surface-water hydrology and quality within the Menominee Indian Reservation.

Purpose and Scope

This report summarizes selected groundwater and surface-water data collected from October 1981-September 1987 on (and adjacent to) the Menominee Indian Reservation. This

report is not intended to be a comprehensive description of water resources of the Reservation, but rather it presents baseline water data for use by tribal planners and others in future site-specific investigations and studies concerned with long-term water-quality trends in the Reservation area.

Some data have been analyzed and interpreted; other data are presented in tabular form with minimal discussion. Data from test holes, seismic-refraction survey lines, and sampled and measured wells were used to compile water-table, saturated thickness, and bedrock-altitude maps. Results of displacement-recovery (slug) tests in 11 observation wells were analyzed to estimate the hydraulic properties of the sand and gravel aquifer. Streamflow data were used to determine flow duration and flood and low-flow frequencies of the Wolf River at Keshena Falls near Keshena. Water samples from 78 wells, 13 streams, and 15 lakes were analyzed to describe the chemical characteristics of water throughout the Reservation.

Physical Setting

The Menominee Indian Reservation is located in northeastern Wisconsin (pl. 1). Reservation boundaries coincide with those of Menominee County, encompassing an area of 346 mi^2. Ninety-three percent of the Reservation is classified as forested (Hansen and Hole, 1967). Lumbering is the major industry on the Reservation and this resource is closely managed by the tribe.

The towns of Keshena and Neopit are the major population centers on the Reservation. The population on the Menominee Reservation is 2,672 (Wisconsin Legislative Reference Bureau, 1987).

The Wolf River flows from north to south through the Reservation, and its tributaries drain most of the Reservation. The eastern quarter of the Reservation is drained by the South Branch of the Oconto River, which flows eastward into Oconto County. Within Reservation boundaries are 44 lakes, which range in size from Legend Lake (1,304 acres) to Red Springs Lake (1 acre). Most lakes are small; only 12 are larger than 50 acres (Wisconsin Department of Natural Resources, 1981). Land surface altitude ranges from about 1,400 ft above sea level in the northwest to about 800 ft in the southeast. Local topographic relief is about 20 to 50 ft.

The Reservation is underlain by the southern extension of the Canadian Shield. Most of the Reservation is underlain by Precambrian crystalline granitic and syenitic rock of the Wolf River Batholith, which is known locally as Wolf River granite. In the extreme southeastern portion of the Reservation, the bedrock is composed of quartz monzonite (Mudrey and others, 1982). The bedrock surface slopes irregularly to the southeast at about 26 ft/mi (pl. 2).

Till (overlying 26.1 percent of the county) and outwash (overlying 72.1 percent of the county) are the predominant glacial deposits overlying the bedrock. The distribution of glacial deposits, soils, and vegetation was mapped by Hanson and Hole (1967). Maximum thickness of the glacial deposits is about 180 ft in the southeastern part of the Reservation. Bedrock is exposed in places in the central and eastern parts of the Reservation.

Site-Identification Systems

Each stream station, lake site, and ground-water site mentioned in this report is assigned a unique identification number. The systems used by the USGS to assign identification numbers for stream sites and for lake and ground-water well sites differ, but both systems are based on geographic location.

An eight-digit "downstream-order number" is used for sites on streams. The first two digits denote the main drainage basin ("04" is assigned to the Lake Michigan Basin); the last six digits, which increase in downstream order, are unique to a specific site.

Lake and ground-water sites are identified by a unique 15-digit number that is a concatenation of the site's latitude and longitude and a two-digit sequence number. The sequence number is used to distinguish between sites with the same latitude-longitude designation. Each ground-water site is also identified by a local number based on the cadastral-survey system of the U.S. Government. The number consists of an abbreviation of the county name; the township, range and section; and a four-digit number assigned to the well. For example, site ME-29/13E/13-0017 is in

Menominee County (ME), township 29 north, range 13 east, section 13; its sequence number is 17. On plate 1 only the sequence number is used to identify ground-water sites.

Acknowledgments

The authors acknowledge the guidance and cooperation of the U.S. Bureau of Indian Affairs in the conduct of this study. Particular gratitude is expressed towards the Menominee Tribal Planning Department and the Conservation Department for their assistance and support.

WATER RESOURCES

The results and interpretation of data collected to describe the ground- and surface-water resources of the Menominee Indian Reservation are discussed below. Results of all analyses and measurements are listed in appendixes 1 and 2.

Ground Water

Ground water is the source of all domestic water used on the Menominee Reservation. A bedrock aquifer is formed on the weathered top 20 feet of the Precambrian granite. An aquifer of saturated, permeable sand and gravel in layers, lenses, terrace deposits, and valley fillings overlies the granite (in places). Both aquifers lack laterally extensive low-permeability clay and silt layers. As a result, the aquifers are unconfined (under water-table conditions) throughout the Reservation area.

The ground-water hydrology of the Reservation was investigated by several means. Water levels were measured, geologic data from 102 boreholes were analyzed (appendix 1), and 17 seismic-refraction surveys (pl. 1) were used to define the water-table altitude and the saturated thickness of the sand and gravel aquifer. In addition, displacement-recovery tests were conducted to estimate the horizontal hydraulic conductivity of the sand and gravel aquifer (appendix 2).

Water-Table Configuration and Saturated Thickness

The configuration of the water table in the study area is shown on plate 3. Generally, the configuration of the water table is similar to surface topography but somewhat subdued. The water table most closely resembles surface topography in areas of low permeability (areas mantled by till) because infiltrating recharge cannot dissipate as quickly as in areas of high permeability (areas mantled by sand and gravel). Within the areas of low permeability, closely spaced contours indicate a steep horizontal gradient of the water table (pl. 3). In contrast, widely spaced contours in areas of higher permeability indicate a slight horizontal gradient of the water table.

The water table is at or near the surface in the vicinity of some lakes and wetlands. In other parts of the study area, depth to the water table can be as great as 80 ft. Generally, ground water flows from topographic high areas to topographic low areas, where it discharges to streams, lakes, and wetlands. Generalized horizontal ground-water flow in the study area is shown on plate 3.

Saturated thickness of the glacial deposits is shown on plate 4. Saturated thickness was calculated by subtracting bedrock-surface altitudes from associated water-table altitudes. Although saturated thickness ranges from zero (at bedrock outcrops) to approximately 150 ft, a 50-foot thickness is common in most parts of the Reservation. Generally, areas of thick saturated permeable materials would be the most favorable location for water-supply wells.

Aquifer Properties and Ground-Water Flow

Aquifers transmit water from recharge areas to discharge areas. The factors that affect the quantity of ground water transmitted are expressed in Darcy's Law:

$$Q = K \times A \times dh/dl, \quad (1)$$

where

- Q is the quantity of ground water per unit time,
- K is the hydraulic conductivity of the aquifer,
- A is the cross-sectional area (perpendicular to flow), and
- dh/dl is the hydraulic gradient.

Hydraulic conductivity indicates the ability of an aquifer to transmit water. In this report, hydraulic conductivity is expressed in terms of

foot per day (ft/d)[1]. Displacement-recovery tests, or "slug" tests, were used during this study to calculate horizontal hydraulic conductivity. In a test, a known quantity of water (or "slug") in a well is displaced, and subsequent recovery of the water level as a function of time is monitored (Bouwer and Rice, 1976). The local horizontal hydraulic conductivity in the immediate vicinity of the well can be calculated from the rate of water-level recovery.

The hydraulic conductivity values from 11 slug tests of wells finished in materials that varied in grain size from silt to coarse sand in the Reservation range from 0.1 to 55 ft/d (appendix 2). This variation is likely a result of the inhomogeneity of the sand and gravel aquifer at the local scale of the displacement-recovery tests. These hydraulic conductivities, however, are within the ranges for silty sand, till, and clean fine sand given by Freeze and Cherry (1979, p. 29). The geometric mean of hydraulic conductivities for six wells screened in fine to medium sand is 5 ft/d.

The hydraulic conductivity of the crystalline Precambrian bedrock largely depends on the presence or absence of fractures within the bedrock. A value of 0.3 ft/d is estimated on the basis of the fracture width and spacing measured from bedrock outcrops on the Stockbridge-Munsee Reservation which is located adjacent to the southern boundary of the Menominee Reservation. This estimate was made using a form of the cubic law (U.S. Environmental Protection Agency, 1989, p. 17).

Horizontal hydraulic gradients define the slope of the water table. Specifically, the slope is the change in water level divided by the horizontal distance. The water-table map (pl. 3) indicates that horizontal hydraulic gradients of a till unit and the sand and gravel aquifer in the study area are typically 0.01 ft/ft and 0.005 ft/ft, respectively.

The rate of contaminant movement in aquifers is commonly approximated by calculating ground-water velocity, even though estimates of ground-water velocity do not account for many contaminant-transport processes such as adsorption, decay, or dispersion (Freeze and Cherry, 1979, p. 75). Ground-water velocities are estimated by use of the following modified form of Darcy's Law:

$$v = K/n \times dh/dl, \quad (2)$$

where

- v is the ground-water velocity,
- K is the hydraulic conductivity of the aquifer,
- n is the porosity of the aquifer, and
- dh/dl is the hydraulic gradient.

The porosity of an aquifer is defined as the volume of void space in the aquifer divided by the total volume of the aquifer. Porosities commonly range from 40 to 70 percent, 25 to 50 percent, and 25 to 40 percent for clay, sand, and gravel, respectively (Freeze and Cherry, 1979, p. 37). If ground water is to move freely through an aquifer, however, the aquifer must be somewhat permeable. For example, porosities of clay deposits are generally high, but permeabilities generally are low. Thus, the water within clay deposits is not easily obtainable.

For the sand and gravel aquifer, using a hydraulic conductivity of 55 ft/d (the highest estimated value from the "slug" tests), an average porosity of 25 percent, and an average horizontal hydraulic gradient of 0.005 ft/ft, the resultant estimated ground-water velocity from equation 2 is 1 ft/d. Using a horizontal hydraulic conductivity of 0.1 ft/d (the lowest estimated value from the "slug" tests), an average porosity of 25 percent and an average horizontal hydraulic gradient of 0.01 ft/ft, the estimated ground-water velocity is 0.04 ft/d. It should be noted that stresses imposed upon the ground-water system, such as pumping, can affect one or more of the variables used in these calculations, and can result in different ground-water velocity estimations than are reported here.

Surface Water

On a regional scale, the Menominee Reservation is part of the Lake Michigan surface-water drainage basin. The intermediate river basins in the vicinity include the Fox-Wolf and the Menominee-Oconto-Peshtigo river basins. Within these basins, the Wolf and the South Branch of the

[1]Foot per day is a mathematical reduction of cubic foot per day per square foot [$(ft^3/d)ft^2$].

Oconto, are the two primary local surface-water drainage basins in the Reservation (pl. 1).

Streams

Streamflow was measured continuously from 1907 through 1985 on the Wolf River at Keshena Falls near Keshena (pl. 1, State No. 04077000). The drainage area of flow measured at this gage is 788 mi^2. The average discharge was 762 ft^3/s for the period of record. Maximum instantaneous discharge was 5,200 ft^3/s recorded on March 15, 1973, and the minimum was 91 ft^3/s recorded on December 22, 1939. The average discharge is equivalent to a runoff rate of 13.1 in./yr over the entire drainage area. This gage was moved to near the city of Shawano, downstream from the Reservation, in 1986 (Holmstrom and others, 1986).

A flow-duration table (table 1) indicates the percentage of time that a specified discharge is equaled or exceeded during the period of record. For example, streamflow in the Wolf River at Keshena Falls near Keshena equaled or exceeded 1,018 ft^3/s 20 percent of the time over the 79 years of record.

Low-flow and flood-frequency characteristics were estimated using mean-daily discharge for the period of record at the Wolf River at Keshena Falls near the Keshena gage. The recurrence intervals were determined using a log-Pearson Type III distribution. The low-flow frequency analysis was determined with minimum annual discharges, whereas the flood-frequency analysis was determined by annual maximum discharges for the various recurrence intervals. For example, table 2 indicates that the average time interval between floods having a discharge of at least 3,550 ft^3/s is 10 years and that the average time interval between a low-flow period of at least 7 consecutive days having a maximum discharge of 310 ft^3/s is 10 years. The flow-duration table (table 1) indicates the percentage of time that the 10-year flood and the 10-year, 7-day low-flow period are exceeded is less than 5 percent and greater than 95 percent, respectively.

Ground water sustains streamflow during low-rainfall periods in the Reservation. The contribution of ground water to streamflow was estimated for the Wolf River at Keshena Falls near Keshena during water year 1985 (October 1984 through September 1985) by separating streamflow empirically into its base-flow component (the contribution from ground water) and its surface runoff component (fig. 1). During this period, about 87 percent of the discharge to the Wolf River within the basin was contributed from ground water.

Base flow is also commonly expressed by the value $Q_{7,2}$ or $Q_{7,10}$. For example, as described in table 2, the $Q_{7,2}$ for the Wolf River at Keshena Falls near Keshena is 393 ft^3/s, which is the base-flow discharge that will occur on the average once every 2 years for a 7-day period.

Base flow for ungaged streams can be estimated using equations and methods developed by Holmstrom (1980). For example, the South Branch of the Oconto River near Breed, one of the stream-water quality sites (04070720), has a drainage area of 143 mi^2 and is estimated to have a $Q_{7,2}$ of 76 ft^3/s and a $Q_{7,10}$ of 58 ft^3/s (Holmstrom, 1980).

Lakes

Lakes in Wisconsin can be divided into three hydrologic types: 1) lakes with at least one inlet and outlet; 2) lakes with only an outlet; and 3) lakes without inlets or outlets (Novitzki and Devaul, 1978). The 15 lakes investigated in the study vicinity are classified in appendix 9.

Lake types may also have various degrees of hydraulic connection to the surrounding groundwater system. However, it is difficult to assess the degree of interaction through investigation of the physical system. The degree of interconnection is often reflected in the ground-water and lake-water chemistries. Results of water-quality sampling for all three lake types and the groundwater system, and a discussion of lake groundwater interaction, are presented in the following section of this report.

Water Quality

The results of analyses of water samples collected from ground-water and surface-water systems in the study area are discussed below. All water samples were collected in accordance with USGS standard practice (U.S. Department of the Interior, 1977) and were analyzed at the USGS National Water-Quality Laboratory in Denver, Colo. Specific conductance, temperature, and pH were measured in the field at the time of

Table 1. Duration of daily flow, Wolf River at Keshena Falls near Keshena

Discharge, in cubic feet per second, that was exceeded for indicated percent of time						
Percent	5	10	20	30	40	50
Discharge	1,670	1,334	1,018	833	721	643
Percent	60	70	80	90	95	
Discharge	578	522	470	415	379	

Table 2. Flood and low-flow frequency, Wolf River at Keshena Falls near Keshena

Flood Frequency

Peak discharge, in cubic feet per second for indicated recurrence interval, in years						
Recurrence interval	2	5	10	5	50	100
Discharge	2,410	3,080	3,550	4,160	4,648	5,150

Low-Flow Frequency

Consecutive-day period	Discharge, in cubic feet per second for indicated recurrence interval, in years			
	2	5	10	20
7	393	336	310	290
14	407	349	323	302
30	426	367	340	320
60	452	392	365	345
90	483	418	389	366

sample collection. Results of all analyses are listed in appendixes 3-9.

Ground Water

Water samples for chemical analysis were collected from wells in the sand and gravel and bedrock aquifers to characterize the ambient quality of ground water on the Menominee Indian Reservation. The number of analyses differs by constituent, but the data summaries shown in table 3 are based on up to 58 analyses of water from the sand and gravel aquifer and up to 17 analyses of water from the bedrock aquifer (appendixes 3-6).

The principal dissolved constituents in water from both aquifers are calcium, magnesium, and bicarbonate. The composition of the dissolved solids in the water is shown in figure 2. The similarity in composition of water from the two aquifers is reasonable because water in the bedrock aquifer is generally from local recharge from the overlying sand and gravel aquifer.

Ground-water quality for the sand and gravel aquifer on the Reservation is similar to ground water from this aquifer throughout north-central Wisconsin. Median concentrations of dissolved solids, chloride, and sulfate reported by Kammerer (1984, p. 31) for the larger area may be

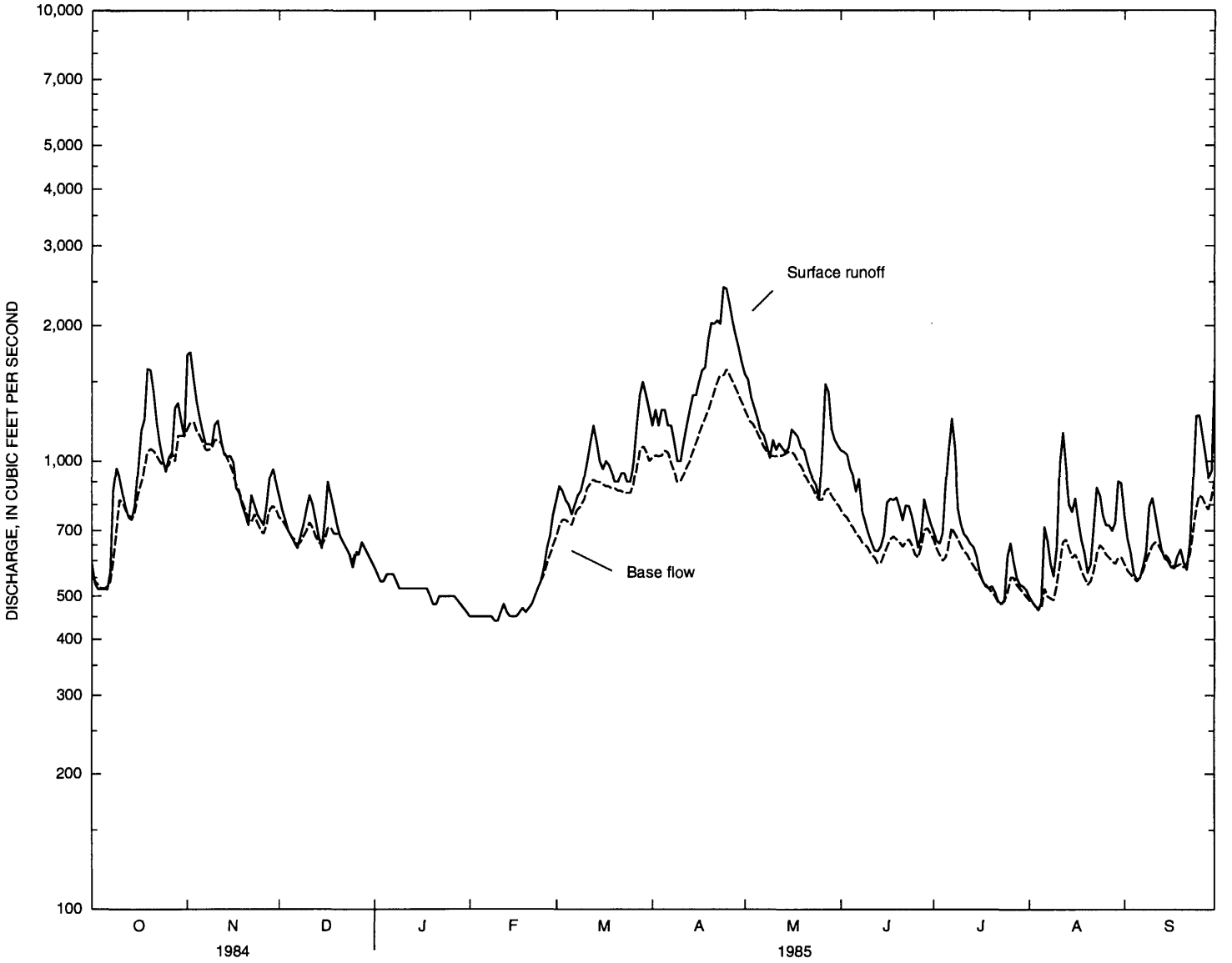

Figure 1. Hydrograph of base flow and surface-water runoff, Wolf River at Keshena Falls near Keshena, water year 1985.

Table 3. Summary of ground-water-quality data for the Menominee Indian Reservation, 1982-87

[Percent of wells where indicated value is equaled or exceeded (all units are in milligrams per liter unless otherwise indicated).]

		Percentile					
	No. of wells	Minimum	90	75	50 (median)	25	10	Maximum
Sand and gravel aquifer								
Specific conductance (µs/cm)	60	67	131	281	353	425	494	700
pH (standard units)	58	6.8	7.4	7.6	7.8	8.0	8.2	9.3
Hardness (as $CaCO_3$)	50	10	57	120	171	209	255	320
Calcium	50	2.3	13	25	38	44	55	76
Magnesium	50	1.1	5.5	12	18	24	28	36
Sodium	30	1.0	1.3	1.9	2.3	3.1	8.6	14
Potassium	30	.4	.5	.9	1.2	1.5	2.1	7.9
Alkalinity (as $CaCO_3$)	55	26	52	127	179	211	236	311
Sulfate	55	.2	4.9	7.6	13	16	19	37
Chloride	55	.2	.2	.7	1.5	5.4	17	69
Dissolved solids (at 180°C)	55	40	87	143	206	237	283	447
Precambrian aquifer								
Specific conductance (µs/cm)	17	165	169	312	365	412	487	515
pH (standard units)	17	6.6	7.3	7.6	8.0	8.0	8.4	8.6
Hardness (as $CaCO_3$)	13	60	68	114	165	201	240	240
Calcium	13	14	16	22	35	44	49	51
Magnesium	13	6.0	7.2	12	19	26	32	32
Sodium	4	2.3	2.3	2.4	4.1	11	13	13
Potassium	4	.7	.7	.8	1.2	2.4	2.7	2.7
Alkalinity (as $CaCO_3$)	17	72	74	134	175	213	243	250
Sulfate	17	6.7	8.5	10	12	17	20	24
Chloride	17	.2	.2	.2	1.1	2.0	17.4	29
Dissolved solids (at 180°C)	17	95	113	159	206	233	285	299

compared to the median concentrations for the Reservation shown in table 3. An exception to the similarity is in dissolved-solids concentration. The principal dissolved constituents (calcium, magnesium, and bicarbonate) in water on the Reservation are the same as those reported by Kammerer (1984, p. 28-29) for the larger area, but dissolved-solids concentrations on the Reservation are higher. The median value shown in table 3 is 206 mg/L compared to 146 mg/L reported by Kammerer. This difference is due to differences in the mineral composition of the aquifer between the Reservation and the larger area. The glacial deposits that comprise the sand and gravel aquifer on the Reservation contain more calcareous minerals than those in the larger area, causing higher dissolved-solids concentrations. Median chloride and sulfate concentrations of 2.2 and 7.2 mg/L, respectively, reported by Kammerer are similar to the median concentrations of 1.5 and 13 mg/L, respectively, shown in table 3 for the Reservation.

Since the principal use of ground water on the Menominee Reservation is for domestic sup-

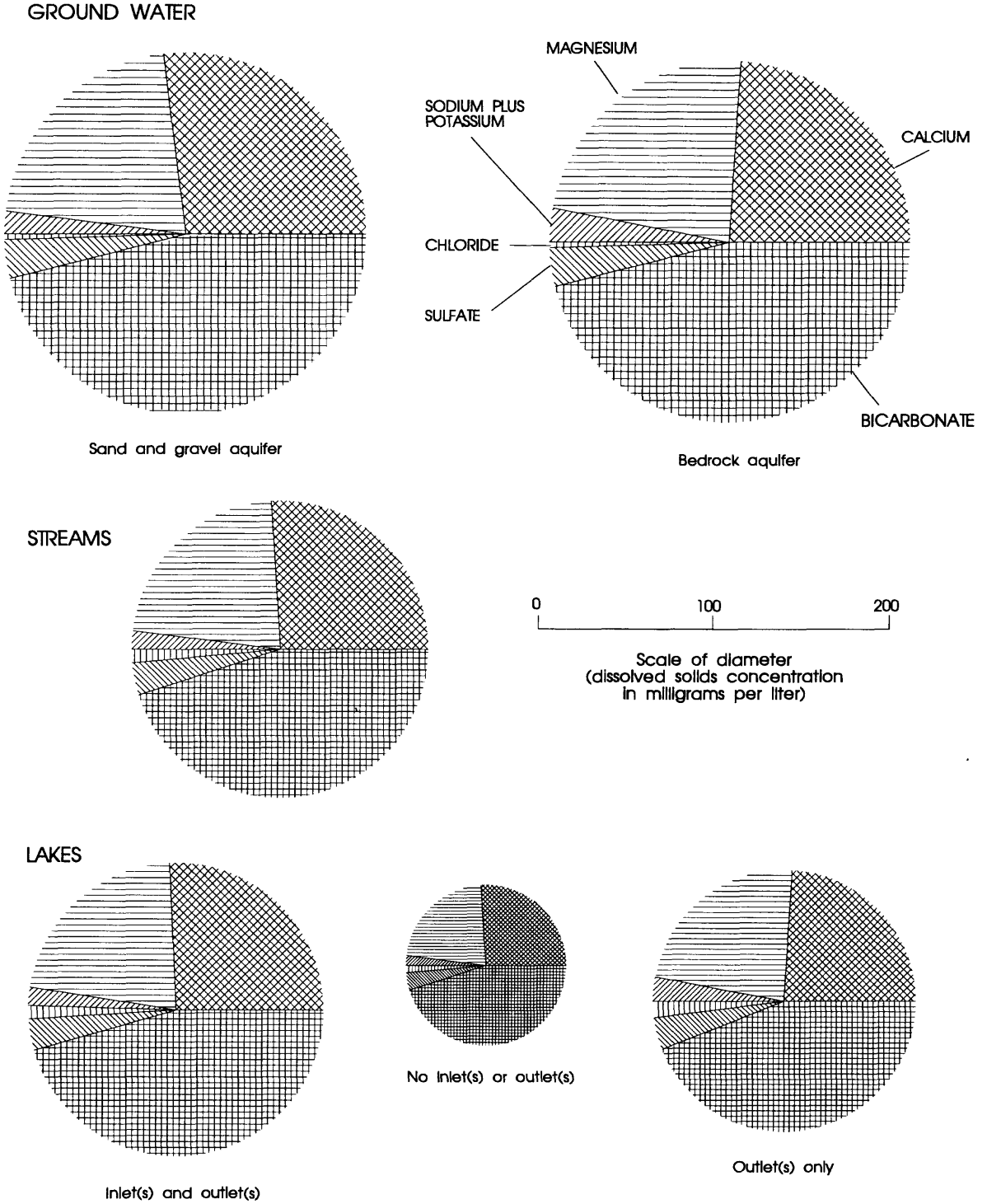

Figure 2. Diagrams showing the composition of dissolved solids in water at the Menominee Indian Reservation.

ply, water samples were analyzed for constituents for which maximum permissible concentrations are specified by U.S. Environmental Protection Agency (USEPA) maximum contaminant levels (MCL's) and secondary maximum contaminant levels (SMCL's) (table 4). Values exceeding MCL's would likely be due to local ground-water contamination or to more extensive natural sources. Reconnaissance data of the type reported here is only an indication of the presence or absence of large-scale contamination or high concentrations from natural sources. The data probably does not adequately represent instances of local contamination.

Results of the reconnaissance indicate that there is no widespread problem with respect to high concentrations of health-related inorganic constituents in ground water on the Reservation (appendixes 3 to 6). The MCL for cadmium was slightly exceeded in water from one well (MN-28/15E/30-0021).

The principal ground-water-quality problems on the Reservations that affect use of ground water for domestic water supplies are iron and manganese concentrations that exceed SMCL's (table 4 and appendixes 4 and 6) and excessive hardness (appendixes 3 and 5).

Iron or manganese concentrations exceeding drinking-water standards may cause objectionable tastes, staining of laundry and plumbing fixtures, and clogging of well screens and distribution systems. Concentrations exceeding the standards are common in Wisconsin's ground water, including that of the Reservation. Iron and manganese concentrations were measured in water from 45 wells on the Reservation. Concentrations exceeding SMCL's were found in one-quarter to one-half of the water samples. The measured concentrations were subject to large local differences, but the incidence of concentrations exceeding drinking-water standards agrees with that reported by Kammerer (1984, p. 33) for ground water in north-central Wisconsin. The proportion of samples with excessive iron or manganese concentrations was similar for water from the sand and gravel aquifer and the bedrock aquifer.

Hard water can form insoluble residues when it is heated or comes in contact with soap. The relative hardness of water supplies may be compared using the following classification scheme (Durfor and Becker, 1964, p. 27).

Hardness range (mg/L as calcium carbonate)	Hardness description
0-60	Soft
61-120	Moderately hard
121-180	Hard
Greater than 180	Very hard

Applying this classification to hardness values for the Reservation summarized in table 3 indicates that water from approximately three-quarters of the wells sampled can be classified as hard to very hard.

Measurements of other constituents and properties with SMCL's (table 4) indicate a low incidence of values exceeding the standards. Dissolved solids, sulfate, and chloride concentrations summarized in table 3 are all less than the respective secondary standards of 500, 250, and 250 mg/L.

Streams

Samples of water for chemical analysis were collected from 14 streams on the Reservation during periods of low flow from 1982-87. The stream sites where samples were collected for chemical analysis are listed in appendixes 7 and 8, and their locations are shown on plate 1. These analyses were used to compute a median composition of stream water at low flow which is represented in the diagram in figure 2. The chemical composition of the dissolved solids in the stream at low flow is similar to that of ground water. Water in these streams during low-flow periods is derived largely from ground-water discharge; hence the similarity in their compositions.

Lakes

Water samples collected from the surface of 15 lakes on the Reservation during the summer of 1984 were analyzed to characterize the composition of the dissolved solids (appendix 1). The samples were collected from 9 lakes without inlets or outlets, 1 lake with an outlet only, and 5 lakes with inlet(s) and outlet(s). The median chemical composition of the dissolved solids in water from lakes in each classification is similar,

Table 4. Summary of selected U.S. Environmental Protection Agency drinking-water regulations

[From U.S. Environmental Protection Agency, 1990. All units are milligrams per liter unless otherwise specified. Dash indicates not applicable.]

Constituent or property	Maximum Contaminant Level	Secondary Maximum Contaminant Level
Arsenic	0.050	--
Barium	1.0	--
Cadmium	.010	--
Chromium	.050	--
Lead	.050	--
Mercury	.002	--
Selenium	.010	--
Silver	.050	--
Fluoride	4.0	--
Nitrate (as nitrogen)	10	--
Chloride	--	250
Copper	--	1
Iron	--	.3
Manganese	--	.05
pH (standard units)	--	6.5-8.5
Sulfate	--	250
Total dissolved solids	--	500
Zinc		5

but the median dissolved-solids concentration reflects the lake type. The median composition and dissolved-solids concentration of water from lakes of each hydrologic type are shown on figure 2. The composition (relative proportion of principal inorganic constituents) of water from each lake type is similar to ground water and streams at low flow, indicating that ground water is the primary source of the dissolved constituents in the lakes.

Differences in the dissolved-solids concentrations among the lake types reflects the relative importance of precipitation as a source of the water in each type of lake. The dissolved-solids concentration in precipitation is low, so precipitation falling on the lake surface or entering the lake as surface runoff dilutes the water in the lake (decreases the dissolved-solids concentration). The diagrams in figure 2 show that dissolved-solids concentrations in lakes with inlet(s) and outlet(s) and the lake with an outlet only, are slightly less than those in ground water or streams at low flow, indicating the relative importance of ground water as a source of water to these lake types. Dissolved-solids concentration in water from lakes with no inlets or outlets is considerably lower (fig. 2), indicating that precipitation is a larger source of water in this type of lake when compared to the other types.

SUMMARY

A hydrologic study was conducted on the Menominee Indian Reservation in northeastern Wisconsin by the U.S. Geological Survey, in cooperation with the Menominee Indian Tribe of Wisconsin. This area consists of unconsolidated glacial material overlying Precambrian crystalline bedrock. The unconsolidated sediments range from 180 ft in thickness to zero feet in areas where bedrock crops out at the surface.

Most water used for domestic purposes in the Reservation is obtained from underlying aquifers. Glacial sand and gravel deposits and shallow fractured Precambrian bedrock form the aquifers. These aquifers are generally unconfined. The glacial deposits have a saturated thickness ranging from approximately 150 ft (in areas where the glacial deposits are relatively thick) to zero feet (in areas where the bedrock crops out). Fifty feet of saturated thickness is common on the Reservation. Horizontal hydraulic conductivity of the glacial deposits was analyzed using displacement-recovery ("slug")

tests in several wells. The horizontal conductivity was estimated to range from 0.1 to 55 ft/d with a geometric-mean horizontal hydraulic conductivity of 5 ft/d for wells finished in fine to medium sand. The horizontal hydraulic conductivity of the bedrock aquifer was estimated to be about 0.3 ft/d.

The horizontal hydraulic gradient, or slope, of the water table typically ranged from 0.005 ft/ft in the sand and gravel aquifer to 0.01 ft/ft in the till unit. Estimates of ground-water velocities within the glacial deposits range from about 1 ft/d to about 0.04 ft/d.

Reservation lands lie within two surface-water basins: the Wolf and the South Branch of the Oconto. Flow duration and low-flow and flood-frequency characteristics for the Wolf River were estimated using mean-daily discharges for a stream gage located at Keshena Falls near Keshena during the period 1907-85. Analysis shows that ground-water flow accounts for about 87 percent of the discharge to Wolf River within the basin.

The ground water from the sand and gravel and bedrock aquifers is a calcium magnesium bicarbonate type. This is similar to ground water throughout a large part of north-central Wisconsin. Three-quarters of the ground-water samples analyzed during the study indicated hard to very hard water with a median hardness equal to 171 and 165 mg/L as calcium carbonate for the sand and gravel and bedrock aquifers, respectively.

Sampled ground water did not exceed USEPA MCL's, with the exception of cadmium in one well. SMCL's were exceeded for iron and manganese in one-quarter to one-half of the wells. Although elevated concentrations of iron and manganese do not pose health risks, they can result in objectional taste and staining of laundry and plumbing fixtures.

Water samples collected from Reservation streams and lakes were similar to ground water (calcium magnesium bicarbonate type), reflecting the strong surface-water/ground-water interaction in the study area. The chemical composition of water from lakes having inlets or outlets indicate that they are less affected by precipitation than are lakes that do not have inlets or outlets.

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APPENDIXES 1-9

Appendix 1. Water-level and well-construction data for domestic and observation wells in the sand and gravel and bedrock aquifers, Menominee Indian Reservation

[Data on depth of well and screen or opening length are from well construction reports. Wells are domestic unless otherwise indicated. Well location shown on Plate 1. --, no data available]

Local well number	Water-level measurement date	Land-surface altitude (feet above sea level)	Water-level altitude (feet above sea level)	Depth of well (feet)	Screen or opening length (feet)	Aquifer type
ME-30/16E/23-0015	03-25-76	915	909	47	--	bedrock
[1]ME-29/13E/13-0017	11-04-81	1160	1150	34	3	sand & gravel
[1]ME-29/16E/17-0018	11-05-81	960	921	94	3	sand & gravel
ME-28/16E/02-0019	11-05-81	880	866	88	3	sand & gravel
[1]ME-28/16E/02-0020	11-09-82	880	870	38	3	sand & gravel
[1]ME-28/15E/30-0021	11-05-81	920	915	53	3	sand & gravel
[1]ME-28/15E/30-0022	11-05-81	920	914	17	3	sand & gravel
[1]ME-28/16E/34-0023	11-05-81	850	841	62	3	sand & gravel
[1]ME-30/13E/03-0024	11-04-81	1310	1297	66	3	sand & gravel
[1]ME-30/13E/26-0025	11-04-81	1250	1214	97	3	sand & gravel
[1]ME-30/14E/18-0027	09-02-81	1260	1248	64	3	sand & gravel
[1]ME-30/13E/30-0026	11-04-81	1270	1267	36	3	sand & gravel
[1]ME-30/14E/35-0028	11-04-81	1130	1116	38	3	sand & gravel
[1]ME-29/14E/02-0029	11-04-81	1110	1106	39	3	sand & gravel
[1]ME-30/15E/14-0030	09-02-81	1075	1062	75	3	sand & gravel
[1]ME-29/15E/11-0031	11-04-81	1020	940	163	3	sand & gravel
[1]ME-30/16E/07-0032	05-12-82	1080	dry	73	3	sand & gravel
ME-29/16E/19-0033	07-30-81	940	913	90	3	sand & gravel
ME-28/15E/14-0034	04-26-77	870	856	54	3	sand & gravel
ME-29/16E/23-0035	07-29-81	890	873	62	4	sand & gravel
ME-29/16E/14-0036	07-30-81	890	865	68	3	sand & gravel
ME-28/15E/36-0037	07-29-81	880	847	130	3	sand & gravel
ME-28/15E/22-0040	07-30-81	860	857	109	50	bedrock
ME-28/15E/07-0042	01-21-76	1020	952	158	3	sand & gravel
ME-30/16E/23-0043	07-30-81	910	884	72	4	sand & gravel
ME-30/16E/36-0044	07-30-81	920	885	85	3	sand & gravel
ME-30/16E/25-0045	07-30-81	900	877	89	22	bedrock
ME-29/14E/20-0046	--	1060	--	41	3	sand & gravel
ME-29/13E/24-0047	11-28-73	1050	1033	43	--	sand & gravel
ME-29/13E/02-0048	06-05-61	1220	1183	89	--	sand & gravel
ME-28/15E/22-0049	07-07-72	860	822	100	38	bedrock
ME-28/15E/22-0050	06-01-66	840	828	263	237	bedrock
ME-28/15E/03-0052	11-16-78	930	905	153	82	bedrock
ME-29/14E/19-0055	--	1070	1067	55	55	bedrock
ME-29/16E/18-0056	07-28-76	955	917	94	4	sand & gravel

Appendix 1. Water-level and well-construction data for domestic and observation wells in the sand and gravel and bedrock aquifers, Menominee Indian Reservation--Continued

Local well number	Water-level measurement date	Land-surface altitude (feet above sea level)	Water-level altitude (feet above sea level)	Depth of well (feet)	Screen or opening length (feet)	Aquifer type
ME-30/16E/23-0057	09-26-76	880	870	144	120	bedrock
ME-29/16E/18-0058	12-18-78	920	890	139	4	bedrock
ME-29/15E/25-0060	11-12-76	900	892	36	7	sand & gravel
ME-29/14E/35-0061	08-19-76	980	960	33	3	sand & gravel
ME-28/16E/21-0062	08-02-80	860	830	68	5	sand & gravel
ME-28/16E/21-0063	06-27-85	855	844	379	211	bedrock
ME-28/16E/19-0064	06-08-82	880	849	205	105	bedrock
ME-28/16E/17-0065	02-10-74	860	862	127	36	bedrock
ME-28/16E/18-0066	12-15-75	880	870	155	48	bedrock
ME-28/16E/17-0067	03-28-72	855	845	163	77	bedrock
ME-28/16E/17-0070	06-21-79	850	840	120	1	bedrock
ME-28/16E/16-0073	06-07-82	860	853	177	32	bedrock
ME-29/13E/02-0079	09-15-76	1220	1184	82	3	sand & gravel
ME-28/15E/14-0080	10-01-76	875	857	114	48	bedrock
ME-28/15E/07-0081	12-26-76	1035	973	89	3	sand & gravel
ME-28-15E/07-0082	05-23-85	1035	974	82	6	sand & gravel
ME-29/16E/19-0083	08-01-77	895	881	66	50	bedrock
ME-29/16E/19-0085	05-09-77	890	878	66	48	bedrock
ME-28/15E/24-0086	09-13-76	895	868	67	4	sand & gravel
ME-28/15E/25-0089	09-16-80	875	835	101	4	sand & gravel
ME-28/15E/36-0097	09-12-80	880	843	94	4	sand & gravel
ME-29/13E/02-0099	06-21-80	1215	1180	205	150	bedrock
ME-28/15E/23-0102	07-17-80	860	850	36	4	sand & gravel
ME-29/14E/19-0103	07-04-80	1065	1047	103	59	bedrock
ME-29/16E/13-0108	11-16-77	895	869	70	3	sand & gravel
ME-29/15E/34-0109	05-23-77	950	908	89	7	sand & gravel
ME-29/15E/12-0110	05-19-77	910	887	69	4	sand & gravel
ME-28/16E/30-0112	06-21-79	900	846	130	3	sand & gravel
ME-28/16E/25-0114	05-08-73	850	842	41	4	sand & gravel
ME-28/16E/17-0118	03-25-71	860	842	118	--	sand & gravel
ME-28/16E/15-0119	11-10-78	850	847	43	3	sand & gravel
ME-28/15E/22-0122	06-07-82	860	852	100	42	bedrock
ME-28/16E/21-0125	09-16-75	860	837	58	3	sand & gravel
ME-28/15E/23-0127	12-15-75	860	855	26	4	sand & gravel
ME-28/15E/16-0128	11-10-76	880	901	25	3	sand & gravel
ME-28/15E/13-0130	11-20-77	885	868	117	3	sand & gravel
ME-28/15E/11-0131	08-18-77	885	851	102	5	sand & gravel

Appendix 1. Water-level and well-construction data for domestic and observation wells in the sand and gravel and bedrock aquifers, Menominee Indian Reservation--Continued

Local well number	Water-level measurement date	Land-surface altitude (feet above sea level)	Water-level altitude (feet above sea level)	Depth of well (feet)	Screen or opening length (feet)	Aquifer type
ME-28/15E/25-0134	12-15-75	865	840	51	4	sand & gravel
ME-28/15E/25-0135	09-13-76	865	838	78	3	sand & gravel
ME-28/16E/30-0136	08-27-76	855	836	71	3	sand & gravel
ME-29/16E/19-0138	05-23-85	895	885	76	50	bedrock
[1]ME-29/14E/34-0139	08-20-86	1000	990	37	5	sand & gravel
[1]ME-30/13E/17-0140	08-19-86	1325	1313	74	5	sand & gravel
[1]ME-29/13E/05-0141	08-20-86	1240	1229	64	5	sand & gravel
[1]ME-29/13E/28-0142	08-20-86	1175	1162	27	5	sand & gravel
[1]ME-30/15E/09-0143	08-20-86	1155	1146	24	5	sand & gravel
[1]ME-30/15E/17-0144	08-20-86	1115	1105	42	5	sand & gravel
[1]ME-28/15E/05-0145	08-19-86	965	949	69	5	sand & gravel
[1]ME-30/14E/13-0146	08-21-86	1060	1057	26	5	sand & gravel
ME-28/15E/26-0147	--	830	--	--	--	sand & gravel
ME-28/15E/26-0148	--	830	--	--	--	sand & gravel
ME-28/15E/26-0149	--	845	--	--	--	sand & gravel
ME-29/16E/16-0151	05-24-84	885	874	61	3	sand & gravel
ME-30/16E/23-0152	08-27-82	910	884	7	3	sand & gravel
ME-28/16E/25-0153	12-08-81	870	848	64	4	sand & gravel
ME-28/16E/25-0154	--	865	840	4	4	sand & gravel
ME-28/16E/19-0155	05-17-83	855	832	65	5	sand & gravel
ME-28/16E/21-0156	--	850	--	--	4	sand & gravel
ME-29/14E/16-0157	08-16-83	1095	1082	125	92	bedrock
ME-29/14E/16-0158	08-17-83	1100	1088	85	45	bedrock
ME-28/15E/22-0160	08-22-81	865	854	65	23	bedrock
ME-28/15E/17-0161	04-28-84	925	912	45	3	sand & gravel

[1]U.S. Geological Survey observation well constructed for this study.

Appendix 2. Horizontal hydraulic conductivity, well-construction data, and brief description of geologic materials at selected observation wells on the Menominee Indian Reservation

Local well number	Horizontal hydraulic conductivity (feet per day)	Depth of observation well (feet)	Screen length (feet)	Lithology from test boring (feet below land surface)
ME-29/13E/13-0017	0.4	28	3.0	0 - 3 silt 3 - 28 sand and silt
ME-29/16E/17-0018	.2	55	3.0	0 - 48 sand and silt 48 - 58 silt
ME-28/16E/02-0020	55	38	3.0	0 - 38 fine sand
ME-28/15E/30-0021	.9	48	3.0	0 - 13 sand 28 - 38 sand and silt 38 - 43 gravel and silt 43 - 48 silt
ME-28/15E/30-0022	.3	17	3.0	0 - 13 sand 13 - 17 fine sand
ME-28/16E/34-0023	32	53	3.0	0 - 3 silt and sand 3 - 53 fine sand
ME-30/13E/03-0024	.1	59	3.0	0 - 3 silt 3 - 38 fine sand 38 - 48 sand and silt 48 - 59 silt and clay
ME-30/13E/26-0025	.4	61	1.3	0 - 43 silt and gravel 3 - 18 sand and gravel 18 - 23 sand and silt 23 - 33 sand, silt, and gravel 33 - 53 fine sand 53 - 58 fine sand and gravel 58 - 61 fine sand
ME-30/14E/18-0027	23	52	3.0	0 - 13 sand and gravel 13 - 53 medium sand
ME-30/14E/35-0028	.2	24	3.0	0 - 8 silt and gravel 8 - 24 sand, silt, and gravel > 24 bedrock
ME-29/14E/02-0029	2	35	3.0	0 - 8 silt and gravel 8 - 13 fine sand and silt 13 - 18 fine sand, silt, and gravel 18 - 28 fine to coarse sand and silt 28 - 35 fine to coarse sand > 35 bedrock

Appendix 3. Physical and chemical characteristics of water from wells completed in the sand and gravel aquifer on the Menominee Indian Reservation

[NGVD, National Geodetic Vertical Datum of 1929; µS/cm, microsiemens per centimeter at 25 degrees Celsius; °C, degrees Celsius; mg/L, milligrams per liter; --, no data available; <, less than. The five digit number ending each column heading is the parameter code used in the U.S. Geological Survey's Water Data Storage and Retrieval System.]

Local identifier	Station number	Date	Time	Depth below land surface (water level) (feet) (72019)	Depth of well,total (feet) (72008)	Depth to bottom of sample interval (feet) (72016)	Depth to top of sample interval (feet) (72015)	Elevation of land surface datum (feet above NGVD) (72000)
ME-28/16E/30-0038	445253088363801	05-11-82	1600	--	54.00	54	51	860
ME-28/15E/05-0145	445553088422101	08-19-86	1130	--	53.00	53	48	965
ME-29/16E/19-0033	445910088361501	05-10-82	1400	--	63.00	63	60	940
ME-29/13E/05-0141	450113088570501	08-20-86	1400	--	53.00	53	48	1240
ME-30/15E/17-0144	450440088421501	08-20-86	0930	--	32.00	32	27	1115
ME-28/15E/36-0037	445123088373801	05-11-82	1415	--	97.00	97	94	880
		06-04-85	0830	30.00	97.00	97	94	880
		06-05-85	0830	30.00	97.00	97	94	880
ME-28/15E/36-0097	445125088374001	06-04-85	1000	34.00	57.00	57	53	880
ME-28/16E/34-0023	445203088324601	08-27-84	1600	--	53.00	53	50	850
ME-28/16E/25-0154	445210088292201	08-22-85	1115	--	64.00	64	60	865
ME-28/15E/30-0021	445216088435302	08-27-84	1430	--	48.00	48	45	920
ME-28/16E/25-0114	445223088301201	06-27-85	0955	--	41.00	41	37	850
ME-28/16E/25-0153	445246088292201	08-22-85	1010	--	64.00	64	60	870
ME-28/15E/26-0149	445246088390501	04-22-87	1430	--	--	--	--	845
ME-28/16E/30-0136	445248088363701	08-09-83	0915	--	52.00	52	49	857
ME-28/15E/25-0089	445252088364701	06-04-85	1400	--	61.00	61	47	875
ME-28/15E/26-0148	445253088381201	04-22-87	1340	--	--	--	--	830
ME-28/15E/26-0147	445254088381301	04-22-87	1300	--	--	--	--	830
ME-28/15E/25-0135	445301088370801	06-04-85	1130	--	51.00	51	48	865
ME-28/15E/25-0134	445306088371101	06-04-85	1555	--	51.00	51	47	865
ME-28/16E/19-0155	445317088362501	08-22-85	1225	--	42.00	42	37	855
ME-28/16E/21-0156	445323088335901	08-22-85	1335	--	63.00	63	59	850
ME-28/16E/21-0062	445341088334501	06-28-85	1140	--	68.00	68	63	860
ME-28/15E/24-0086	445342088371801	05-23-85	0900	21.40	40.00	40	36	895
ME-28/15E/23-0102	445342088385701	08-09-83	1700	--	26.00	26	22	860
ME-28/15E/23-0127	445344088385601	06-03-85	1545	--	21.00	21	17	860
ME-28/16E/21-0125	445355088340901	06-28-85	0940	--	58.00	58	55	860
ME-28/15E/13-0130	445359088364401	06-04-85	1300	--	100.00	100	97	885
ME-28/15E/16-0128	445417088413301	08-09-83	1400	--	46.00	46	43	880
		06-25-85	1540	23.50	46.00	46	43	880
		06-25-85	1635	23.50	46.00	46	43	880
ME-28/15E/17-0161	445425088415701	08-23-85	1010	--	32.00	32	29	925

Appendix 3. Physical and chemical characteristics of water from wells completed in the sand and gravel aquifer on the Menominee Indian Reservation--Continued

Local identifier	Station number	Date	Time	Depth below land surface (water level) (feet) (72019)	Depth of well,total (feet) (72008)	Depth to bottom of sample interval (feet) (72016)	Depth to top of sample interval (feet) (72015)	Elevation of land surface datum (feet above NGVD) (72000)
ME-28/15E/14-0034	445439088385801	05-11-82	0930	--	40.00	40	37	875
		05-22-85	1100	12.30	40.00	40	37	875
ME-28/15E/07-0042	445501088433301	05-10-82	1830	--	90.00	90	87	1020
ME-28/15E/07-0042	445501088433301	06-26-85	1620	--	90.00	90	87	1020
ME-28/15E/07-0082	445511088432901	05-23-85	1330	60.70	82.00	82	76	1035
ME-28/15E/07-0081	445518088433001	05-23-85	1435	--	89.00	89	86	1035
ME-28/15E/11-0131	445519088385301	06-03-85	1300	--	68.00	68	63	885
ME-28/16E/02-0019	445553088311601	08-28-84	1700	--	74.50	74.5	71.5	880
ME-29/14E/35-0061	445640088460801	06-27-85	1530	--	33.00	33	30	980
ME-29/15E/34-0109	445656088395201	08-09-83	1500	--	47.00	47	40	950
ME-29/15E/25-0060	445750088374501	06-06-85	1630	--	28.00	28	21	900
ME-29/13E/24-0047	445904088513601	05-10-82	1600	--	43.00	--	--	1050
		06-26-85	1720	--	43.00	--	--	1050
ME-29/16E/23-0035	445910088304201	05-11-82	1200	--	45.00	45	41	890
		06-26-85	1130	--	45.00	45	41	890
ME-29/14E/20-0046	445910088492601	05-10-82	1500	--	41.00	41	38	1060
ME-29/16E/13-0108	445916088301001	08-10-83	1030	--	44.00	44	41	895
ME-29/16E/16-0151	445937088325801	08-21-85	1415	--	50.00	50	47	885
ME-29/16E/14-0036	445938088303901	06-06-85	1155	--	43.00	43	40	890
ME-29/16E/17-0018	445939088342601	08-28-84	0945	--	55.20	55.2	52.2	960
ME-29/13E/13-0017	445941088520601	08-29-84	1600	--	24.00	24	21	1160
ME-29/16E/18-0056	445947088355101	06-06-85	1330	--	56.00	56	52	955
ME-29/15E/12-0110	450015088365001	08-09-83	1100	--	46.00	46	42	910
		08-30-84	0900	--	46.00	46	42	910
ME-29/13E/02-0048	450054088535501	05-10-82	1700	--	52.00	--	--	1220
ME-29/13E/02-0079	450100088534501	06-27-85	1730	--	46.00	46	43	1210
ME-29/14E/02-0029	450136088460401	08-29-84	1400	--	35.00	35	31	1110
ME-30/14E/35-0028	450152088460701	08-29-84	1200	--	24.00	24	21	1130
ME-30/16E/36-0044	450207088302101	06-06-85	1030	--	50.00	50	47	920
ME-30/13E/30-0026	450243088581601	08-28-84	1400	--	33.00	33	30	1270
ME-30/13E/26-0025	450303088533501	08-28-84	0800	--	61.20	61	58	1250
ME-30/16E/23-0152	450334088305401	08-21-85	1545	--	44.00	44	41	910
ME-30/16E/23-0043	450335088311901	05-11-82	1045	--	46.00	46	42	910
		06-26-85	0850	27.20	46.00	46	42	910
ME-30/15E/14-0030	450448088384901	08-28-84	1300	--	62.50	62.5	59.5	1075
ME-30/14E/18-0027	450458088504201	08-30-84	1100	--	51.50	51.5	48.5	1260
ME-30/13E/03-0024	450624088543001	08-30-84	1400	--	53.50	53.5	50.5	1310
ME-29/14E/34-0139	445637088472501	08-20-86	1500	--	27.00	27	22	1000
ME-30/14E/13-0146	450500088444501	08-21-86	0900	--	23.00	23	18	1055

Appendix 3. Physical and chemical characteristics of water from wells completed in the sand and gravel aquifer on the Menominee Indian Reservation--Continued

Local identifier	Date	Specific conductance (µS/cm) (00095)	pH (standard units) (00400)	Temperature, water (°C) (00010)	Color (Platinum-cobalt units) (00800)	Hardness, total (mg/L as $CaCO_3$) (00900)	Calcium, total recoverable (mg/L as Ca) (00916)	Calcium, dissolved (mg/L as Ca) (00915)	Magnesium, total recoverable (mg/L as mg) (00927)
ME-28/16E/30-0038	05-11-82	430	7.8	9.0	--	200	--	48	--
ME-28/15E/05-0145	08-19-86	700	8.0	11.5	--	--	--	--	--
ME-29/16E/19-0033	05-10-82	260	7.9	8.5	--	120	--	25	--
ME-29/13E/05-0141	08-20-86	490	--	10.0	--	--	--	--	--
ME-30/15E/17-0144	08-20-86	330	>8.0	10.0	--	--	--	--	--
ME-28/15E/36-0037	05-11-82	310	8.1	9.5	--	140	--	29	--
	06-04-85	313	8.3	9.5	--	--	--	--	--
	06-05-85	313	8.3	9.5	5	--	28	--	--
ME-28/15E/36-0097	06-04-85	345	7.8	9.5	5	--	--	--	--
ME-28/16E/34-0023	08-27-84	165	8.0	10.5	--	73	--	19	--
ME-28/16E/25-0154	08-22-85	67	9.3	10.5	10	30	--	7.2	--
ME-28/15E/30-0021	08-27-84	290	7.7	15.5	--	160	--	33	--
ME-28/16E/25-0114	06-27-85	140	7.6	13.0	<1	--	13	--	6.6
ME-28/16E/25-0153	08-22-85	77	9.2	10.0	10	34	--	8.4	--
ME-28/15E/26-0149	04-22-87	--	7.8	9.0	--	--	--	47	--
ME-28/16E/30-0136	08-09-83	300	7.8	15.5	--	200	--	44	--
ME-28/15E/25-0089	06-04-85	445	7.8	9.0	<1	--	50	--	25
ME-28/15E/26-0148	04-22-87	532	7.4	10.0	--	--	--	68	--
ME-28/15E/26-0147	04-22-87	332	7.8	9.5	--	--	--	46	--
ME-28/15E/25-0135	06-04-85	405	7.7	9.5	10	--	--	--	--
ME-28/15E/25-0134	06-04-85	385	7.7	12.0	15	180	42	44	16
ME-28/16E/19-0155	08-22-85	325	7.9	11.0	10	160	--	36	--
ME-28/16E/21-0156	08-22-85	164	8.2	11.0	5	77	--	19	--
ME-28/16E/21-0062	06-28-85	280	8.0	10.0	10	--	28	--	12
ME-28/15E/24-0086	05-23-85	495	7.6	8.0	<1	260	--	55	--
ME-28/15E/23-0102	08-09-83	310	7.8	13.0	--	200	--	42	--
ME-28/15E/23-0127	06-03-85	425	7.8	6.5	--	--	--	--	--
ME-28/16E/21-0125	06-28-85	690	7.7	9.5	5	--	76	--	29
ME-28/15E/13-0130	06-04-85	475	8.0	9.0	5	--	47	--	25
ME-28/15E/16-0128	08-09-83	290	7.8	12.0	--	210	--	43	--
	06-25-85	425	7.5	10.0	5	--	43	--	--
	06-25-85	425	7.5	8.0	--	--	--	--	--
ME-28/15E/17-0161	08-23-85	435	7.7	12.5	5	180	--	38	--
ME-28/15E/14-0034	05-11-82	430	8.1	10.0	--	200	--	40	--
	05-22-85	405	8.0	11.0	10	220	--	43	--
ME-28/15E/07-0042	05-10-82	360	7.7	9.0	--	180	--	38	--
ME-28/15E/07-0042	06-26-85	355	7.8	9.0	5	--	34	--	19
ME-28/15E/07-0082	05-23-85	325	7.5	9.0	5	170	--	35	--

Appendix 3. Physical and chemical characteristics of water from wells completed in the sand and gravel aquifer on the Menominee Indian Reservation--Continued

Local identifier	Date	Specific conductance (µS/cm) (00095)	pH (standard units) (00400)	Temperature, water (°C) (00010)	Color (Platinum-cobalt units) (00800)	Hardness, total (mg/L as $CaCO_3$) (00900)	Calcium, total recoverable (mg/L as Ca) (00916)	Calcium, dissolved (mg/L as Ca) (00915)	Magnesium, total recoverable (mg/L as mg) (00927)
ME-28/15E/07-0081	05-23-85	360	7.6	8.5	<1	190	--	41	--
ME-28/15E/11-0131	06-03-85	500	7.9	8.0	5	--	--	--	--
ME-28/16E/02-0019	08-28-84	125	7.2	13.5	--	58	--	14	--
ME-29/14E/35-0061	06-27-85	365	7.5	8.0	5	--	26	--	14
ME-29/15E/34-0109	08-09-83	485	7.3	13.0	--	320	--	69	--
ME-29/15E/25-0060	06-06-85	320	8.0	11.0	5	--	33	--	20
ME-29/13E/24-0047	05-10-82	520	7.8	9.0	--	240	--	53	--
	06-26-85	500	7.7	8.0	5	--	50	--	28
ME-29/16E/23-0035	05-11-82	410	8.0	10.0	--	210	--	43	--
	06-26-85	420	7.8	9.5	10	--	42	--	24
ME-29/14E/20-0046	05-10-82	380	7.6	9.5	--	200	--	42	--
ME-29/16E/13-0108	08-10-83	385	7.9	15.0	--	260	--	55	--
ME-29/16E/16-0151	08-21-85	285	8.2	9.5	10	160	--	39	--
ME-29/16E/14-0036	06-06-85	490	7.8	8.0	5	--	52	--	26
ME-29/16E/17-0018	08-28-84	305	7.6	11.0	--	170	--	41	--
ME-29/13E/13-0017	08-29-84	325	7.7	11.5	--	160	--	36	--
ME-29/16E/18-0056	06-06-85	275	8.0	9.0	5	--	25	--	14
ME-29/15E/12-0110	08-09-83	125	6.4	14.0	--	73	--	16	--
	08-30-84	130	7.1	13.0	--	59	--	13	--
ME-29/13E/02-0048	05-10-82	360	7.8	9.5	--	160	--	35	--
ME-29/13E/02-0079	06-27-85	260	7.8	9.5	10	--	24	--	12
ME-29/14E/02-0029	08-29-84	270	7.6	13.0	--	130	--	34	--
ME-30/14E/35-0028	08-29-84	470	7.9	13.5	--	200	--	44	--
ME-30/16E/36-0044	06-06-85	370	8.0	9.0	10	--	--	--	--
ME-30/13E/30-0026	08-28-84	350	7.4	12.0	--	180	--	42	--
ME-30/13E/26-0025	08-28-84	115	9.3	10.0	--	54	--	12	--
ME-30/16E/23-0152	08-21-85	395	7.8	9.0	20	10	--	2.3	--
ME-30/16E/23-0043	05-11-82	400	8.0	10.0	--	210	--	46	--
	06-26-85	490	7.7	10.0	5	--	50	--	--
ME-30/15E/14-0030	08-28-84	205	7.5	11.0	--	130	--	37	--
ME-30/14E/18-0027	08-30-84	130	7.3	12.0	--	57	--	14	--
ME-30/13E/03-0024	08-30-84	285	7.5	10.5	--	170	--	42	--
ME-29/14E/34-0139	08-20-86	425	--	10.0	--	--	--	--	--
ME-30/14E/13-0146	08-21-86	310	--	9.0	--	--	--	--	--

Appendix 3. Physical and chemical characteristics of water from wells completed in the sand and gravel aquifer on the Menominee Indian Reservation--Continued

Local Identifier	Date	Magnesium, dissolved (mg/L as Mg) (00925)	Sodium, dissolved (mg/L as Na) (00930)	Potassium, dissolved (mg/L as K) (00935)	Alkalinity, field (mg/L as $CaCO_3$) (00410)	Alkalinity, lab (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)
ME-28/16E/30-0038	05-11-82	20	2.9	0.70	--	220	<1.0	1.8	--
ME-28/15E/05-0145	08-19-86	--	--	--	--	--	--	--	--
ME-29/16E/19-0033	05-10-82	15	3.5	1.3	--	128	8.0	0.60	--
ME-29/13E/05-0141	08-20-86	--	--	--	--	--	--	--	--
ME-30/15E/17-0144	08-20-86	--	--	--	--	--	--	--	--
ME-28/15E/36-0037	05-11-82	16	8.9	1.1	--	150	6.0	1.1	--
	06-04-85	--	--	--	154	--	--	--	--
	06-05-85	--	--	--	154	--	5.9	<.20	0.50
ME-28/15E/36-0097	06-04-85	--	--	--	162	--	6.8	2.9	<.10
ME-28/16E/34-0023	08-27-84	6.3	4.4	.70	--	83	3.6	<.20	.20
ME-28/16E/25-0154	08-22-85	2.8	--	--	28	--	7.0	.50	<.10
ME-28/15E/30-0021	08-27-84	18	2.8	1.5	--	151	10	3.4	.20
ME-28/16E/25-0114	06-27-85	--	--	--	67	--	5.4	1.1	<.10
ME-28/16E/25-0153	08-22-85	3.1	--	--	26	--	7.6	.50	<.10
ME-28/15E/26-0149	04-22-87	24	2.0	.90	--	205	13	1.1	.30
ME-28/16E/30-0136	08-09-83	21	2.1	.90	--	199	15	1.4	<.10
ME-28/15E/25-0089	06-04-85	--	--	--	236	--	18	<.20	<.10
ME-28/15E/26-0148	04-22-87	28	14	1.5	--	263	14	25	.10
ME-28/15E/26-0147	04-22-87	22	2.6	2.3	--	194	18	3.0	.10
ME-28/15E/25-0135	06-04-85	--	--	--	204	--	5.7	<.20	.10
ME-28/15E/25-0134	06-04-85	16	--	--	187	--	.40	2.2	<.10
ME-28/16E/19-0155	08-22-85	17	--	--	148	--	9.9	2.6	.20
ME-28/16E/21-0156	08-22-85	7.2	--	--	52	--	20	.50	<.10
ME-28/16E/21-0062	06-28-85	--	--	--	129	--	12	1.7	.10
ME-28/15E/24-0086	05-23-85	29	--	--	237	--	18	.90	.30
ME-28/15E/23-0102	08-09-83	23	2.2	.90	--	204	14	1.3	.30
ME-28/15E/23-0127	06-03-85	--	--	--	192	--	14	7.9	.30
ME-28/16E/21-0125	06-28-85	--	--	--	215	--	18	69	.10
ME-28/15E/13-0130	06-04-85	--	--	--	224	--	18	<.20	.60
ME-28/15E/16-0128	08-09-83	26	2.3	1.0	--	218	17	1.4	.30
	06-25-85	--	--	--	217	--	14	1.2	.40
	06-25-85	--	--	--	217	--	--	--	--
ME-28/15E/17-0161	08-23-85	21	--	--	201	--	17	9.5	<.10
ME-28/15E/14-0034	05-11-82	25	4.1	2.0	--	210	9.0	.70	--
	05-22-85	27	--	--	213	--	12	.60	.70
ME-28/15E/07-0042	05-10-82	20	1.3	.40	--	176	12	.80	--

Appendix 3. Physical and chemical characteristics of water from wells completed in the sand and gravel aquifer on the Menominee Indian Reservation--Continued

Local Identifier	Date	Magnesium, dissolved (mg/L as Mg) (00925)	Sodium, dissolved (mg/L as Na) (00930)	Potassium, dissolved (mg/L as K) (00935)	Alkalinity, field (mg/L as $CaCO_3$) (00410)	Alkalinity, lab (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)
ME-28/15E/07-0042	06-26-85	--	--	--	173	--	14	0.90	0.10
ME-28/15E/07-0082	05-23-85	19	--	--	154	--	7.5	.60	.40
ME-28/15E/07-0081	05-23-85	22	--	--	221	--	18	4.4	<.10
ME-28/15E/11-0131	06-03-85	--	--	--	247	--	20	<.20	.10
ME-28/16E/02-0019	08-28-84	5.5	1.0	0.50	--	51	15	1.0	<.10
ME-29/14E/35-0061	06-27-85	--	--	--	127	--	15	31	.20
ME-29/15E/34-0109	08-09-83	36	13	7.9	--	311	24	27	<.10
ME-29/15E/25-0060	06-06-85	--	--	--	154	--	16	<.20	<.10
ME-29/13E/24-0047	05-10-82	27	2.7	1.1	--	233	20	2.9	--
	06-26-85	--	--	--	235	--	20	2.3	.40
ME-29/16E/23-0035	05-11-82	24	2.0	.40	--	200	11	1.7	--
	06-26-85	--	--	--	214	--	14	1.1	<.10
ME-29/14E/20-0046	05-10-82	22	2.0	.60	--	190	14	.90	--
ME-29/16E/13-0108	08-10-83	30	2.9	.50	--	262	13	6.4	<.10
ME-29/16E/16-0151	08-21-85	14	--	--	122	--	37	54	.20
ME-29/16E/14-0036	06-06-85	--	--	--	223	--	8.3	4.5	<.10
ME-29/16E/17-0018	08-28-84	17	6.1	1.3	--	132	7.1	11	.10
ME-29/13E/13-0017	08-29-84	16	2.5	2.1	--	145	8.5	11	.20
ME-29/16E/18-0056	06-06-85	--	--	--	109	--	15	3.4	<.10
ME-29/15E/12-0110	08-09-83	8.0	1.4	.90	--	64	17	1.2	.20
	08-30-84	6.5	1.1	.70	--	55	8.6	1.1	.20
ME-29/13E/02-0048	05-10-82	17	2.6	1.0	--	146	13	5.4	--
ME-29/13E/02-0079	06-27-85	--	--	--	134	--	13	5.6	<.10
ME-29/14E/02-0029	08-29-84	11	1.7	1.4	--	127	8.0	1.5	.20
ME-30/14E/35-0028	08-29-84	22	1.9	2.1	--	207	7.1	1.1	.20
ME-30/16E/36-0044	06-06-85	--	--	--	179	--	15	<.20	<.10
ME-30/13E/30-0026	08-28-84	18	2.9	1.5	--	178	2.3	3.8	.20
ME-30/13E/26-0025	08-28-84	5.9	2.1	1.6	--	49	10	.50	.10
ME-30/16E/23-0152	08-21-85	1.1	--	--	195	2	7.3	5.6	<.10
ME-30/16E/23-0043	05-11-82	23	1.7	.90	--	210	9.0	4.9	--
	06-26-85	--	--	--	233	--	11	12	<.10
ME-30/15E/14-0030	08-28-84	9.6	2.3	1.2	--	97	4.1	2.2	.20
ME-30/14E/18-0027	08-30-84	5.3	1.4	1.3	--	51	8.5	1.2	.10
ME-30/13E/03-0024	08-30-84	16	1.8	1.5	--	182	<0.20	3.1	.20
ME-29/14E/34-0139	08-20-86	--	--	--	--	--	--	--	--
ME-30/14E/13-0146	08-21-86	--	--	--	--	--	--	--	--

Appendix 3. Physical and chemical characteristics of water from wells completed in the sand and gravel aquifer on the Menominee Indian Reservation--Continued

Local Identifier	Date	Silica, dissolved (mg/L as SiO_2) (00955)	Solids, residue at 180°C, dissolved (mg/L) (70300)	Residue total at 105°C, suspended (mg/L) (00530)	Nitrogen, nitrite dissolved (mg/L as N) (00613)	Nitrogen, $NO_2 + NO_3$ dissolved (mg/L as N) (00631)	Carbon, organic dissolved (mg/L as C) (00681)	Cyanide, dissolved (mg/L as Cn) (00723)	Methylene blue, active substance (mg/L) (38260)
ME-28/16E/30-0038	05-11-82	16	238	--	--	<0.100	--	--	--
ME-28/15E/05-0145	08-19-86	--	--	--	--	--	--	--	--
ME-29/16E/19-0033	05-10-82	17	138	--	--	<.100	--	--	--
ME-29/13E/05-0141	08-20-86	--	--	--	--	--	--	--	--
ME-30/15E/17-0144	08-20-86	--	--	--	--	--	--	--	--
ME-28/15E/36-0037	05-11-82	16	183	--	--	<.100	--	--	--
	06-04-85	--	--	--	<0.010	<.100	1.7	--	--
	06-05-85	--	179	--	--	--	--	<0.01	0.01
ME-28/15E/36-0097	06-04-85	--	190	--	<.010	.840	2.2	<.01	.01
ME-28/16E/34-0023	08-27-84	14	113	4	--	--	--	<.01	--
ME-28/16E/25-0154	08-22-85	--	40	--	<.010	<.100	--	<.01	.01
ME-28/15E/30-0021	08-27-84	13	197	26	--	--	--	<.01	--
ME-28/16E/25-0114	06-27-85	--	73	--	<.010	<.100	2.2	<.01	.02
ME-28/16E/25-0153	08-22-85	--	46	--	<.010	.100	--	<.01	<.01
ME-28/15E/26-0149	04-22-87	16	215	--	--	--	--	--	--
ME-28/16E/30-0136	08-09-83	16	214	--	--	--	--	--	--
ME-28/15E/25-0089	06-04-85	--	260	--	<.010	<.100	2.1	<.01	.01
ME-28/15E/26-0148	04-22-87	13	313	--	--	--	--	--	--
ME-28/15E/26-0147	04-22-87	11	217	--	--	--	--	--	--
ME-28/15E/25-0135	06-04-85	--	227	--	<.010	.230	2.2	<.01	.01
ME-28/15E/25-0134	06-04-85	--	206	--	<.010	<.100	3.6	<.01	.01
ME-28/16E/19-0155	08-22-85	--	169	--	<.010	<.100	--	<.01	.01
ME-28/16E/21-0156	08-22-85	--	92	--	<.010	<.100	--	<.01	.01
ME-28/16E/21-0062	06-28-85	--	142	--	<.010	<.100	0.8	<.01	.02
ME-28/15E/24-0086	05-23-85	--	250	--	<.010	<.100	1.9	<.01	.01
ME-28/15E/23-0102	08-09-83	15	219	--	--	--	--	--	--
ME-28/15E/23-0127	06-03-85	--	240	--	<.010	<.100	1.8	<.01	.02
ME-28/16E/21-0125	06-28-85	--	447	--	<.010	7.10	1.1	<.01	.07
ME-28/15E/13-0130	06-04-85	--	252	--	<.010	<.100	2.3	<.01	.01
ME-28/15E/16-0128	08-09-83	14	235	--	--	--	--	--	--
	06-25-85	--	230	--	--	--	--	<.01	.03
	06-25-85	--	--	--	.010	<.100	1.7	--	--
ME-28/15E/17-0161	08-23-85	--	233	--	<.010	.120	--	<.01	.02
ME-28/15E/14-0034	05-11-82	23	245	--	--	<.100	--	--	--
	05-22-85	--	221	--	<.010	<.100	1.5	<.01	<.01
ME-28/15E/07-0042	05-10-82	12	184	--	--	.210	--	--	--

Appendix 3. Physical and chemical characteristics of water from wells completed in the sand and gravel aquifer on the Menominee Indian Reservation--Continued

Local Identifier	Date	Silica, dissolved (mg/L as SiO_2) (00955)	Solids, residue at 180°C, dissolved (mg/L) (70300)	Residue total at 105°C, suspended (mg/L) (00530)	Nitrogen, nitrite dissolved (mg/L as N) (00613)	Nitrogen, $NO_2 + NO_3$ dissolved (mg/L as N) (00631)	Carbon, organic dissolved (mg/L as C) (00681)	Cyanide, dissolved (mg/L as Cn) (00723)	Methylene blue, active substance (mg/L) (38260)
ME-28/15E/07-0042	06-26-85	--	201	--	--	--	--	<0.01	0.02
ME-28/15E/07-0082	05-23-85	--	163	--	--	--	--	<.01	.01
ME-28/15E/07-0081	05-23-85	--	190	--	<0.010	<0.100	1.6	<.01	<.01
ME-28/15E/11-0131	06-03-85	--	275	--	<.010	<.100	2.4	<.01	.02
ME-28/16E/02-0019	08-28-84	9.6	90	146	--	--	--	<.01	--
ME-29/14E/35-0061	06-27-85	--	205	--	<.010	<.100	2.2	<.01	.03
ME-29/15E/34-0109	08-09-83	15	427	--	--	--	--	--	--
ME-29/15E/25-0060	06-06-85	--	174	--	<.010	<.100	1.4	<.01	.01
ME-29/13E/24-0047	05-10-82	15	254	--	--	2.80	--	--	--
	06-26-85	--	297	--	<.010	3.00	4.0	<.01	.04
ME-29/16E/23-0035	05-11-82	15	235	--	--	.200	--	--	--
	06-26-85	--	237	--	.010	<.100	4.7	<.01	.02
ME-29/14E/20-0046	05-10-82	14	206	--	--	.100	--	--	--
ME-29/16E/13-0108	08-10-83	16	327	--	--	--	--	--	--
ME-29/16E/16-0151	08-21-85	--	295	--	<.010	<.100	--	<.01	--
ME-29/16E/14-0036	06-06-85	--	267	--	<.010	3.70	--	<.01	.03
ME-29/16E/17-0018	08-28-84	12	192	332	--	--	--	<.01	--
ME-29/13E/13-0017	08-29-84	12	197	42	--	--	--	<.01	--
ME-29/16E/18-0056	06-06-85	--	151	--	<.010	.480	1.8	<.01	.02
ME-29/15E/12-0110	08-09-83	13	110	--	--	--	--	--	--
	08-30-84	12	110	7	--	--	--	<.01	--
ME-29/13E/02-0048	05-10-82	13	167	--	--	1.50	--	--	--
ME-29/13E/02-0079	06-27-85	--	151	--	<.010	.260	1.8	<.01	.02
ME-29/14E/02-0029	08-29-84	9.3	143	41	--	--	--	<.01	--
ME-30/14E/35-0028	08-29-84	13	237	2720	--	--	--	.01	--
ME-30/16E/36-0044	06-06-85	--	209	--	<.010	<.100	0.6	<.01	.01
ME-30/13E/30-0026	08-28-84	12	226	33	--	--	--	<.01	--
ME-30/13E/26-0025	08-28-84	0.70	90	416	--	--	--	<.01	--
ME-30/16E/23-0152	08-21-85	--	47	--	<.010	.120	--	<.01	--
ME-30/16E/23-0043	05-11-82	10	252	--	--	.430	--	--	--
	06-26-85	--	292	--	<.010	1.20	1.5	<.01	.03
ME-30/15E/14-0030	08-28-84	10	137	135	--	--	--	<.01	--
ME-30/14E/18-0027	08-30-84	2	83	18	--	--	--	<.01	--
ME-30/13E/03-0024	08-30-84	13	214	44	--	--	--	<.01	--
ME-29/14E/34-0139	08-20-86	--	--	--	--	--	--	--	--
ME-30/14E/13-0146	08-21-86	--	--	--	--	--	--	--	--

Appendix 3. Physical and chemical characteristics of water from wells completed in the sand and gravel aquifer on the Menominee Indian Reservation--Continued

Local identifier	Station number	Date	Time	Depth of well, total (feet) (72008)	Elevation of land surface datum (feet above NGVD) (72000)	Specific conductance (µS/cm) (00095)	pH (standard units) (00400)	Temperature, water (°C) (00010)
ME-30/13E/17-0140	450513088574701	08-19-86	1430	62.00	1325	410	>8.0	13.5

Appendix 4. Trace-constituent analyses of water from wells completed in the sand and gravel aquifer on the Menominee Indian Reservation

[µg/L, micrograms per liter; --, no data available; <, less than. The five digit number ending each column heading is the parameter code used in the U.S. Geological Survey's Water Data Storage and Retrieval System.]

Local identifier	Station number	Date	Time	Antimony, dissolved (µg/L as Sb) (01095)	Arsenic, dissolved (µg/L as As) (01000)	Barium, total recoverable (µg/L as Ba) (01007)	Barium, dissolved (µg/L as Ba) (01005)	Beryllium, dissolved (µg/L as Be) (01010)
ME-28/16E/30-0038	445253088363801	05-11-82	1600	--	1	--	51	--
ME-29/16E/19-0033	445910088361501	05-10-82	1400	--	8	--	34	--
ME-28/15E/36-0037	445123088373801	05-11-82	1415	--	4	--	34	--
		06-05-85	0830	--	--	--	--	--
ME-28/15E/36-0097	445125088374001	06-04-85	1000	--	--	<100	--	--
ME-28/16E/34-0023	445203088324601	08-27-84	1600	<1	7	--	23	<0
ME-28/16E/25-0154	445210088292201	08-22-85	1115	--	<1	--	4	--
ME-28/15E/30-0021	445216088435302	08-27-84	1430	<1	3	--	32	<0
ME-28/16E/25-0114	445223088301201	06-27-85	0955	--	--	<100	--	--
ME-28/16E/25-0153	445246088292201	08-22-85	1010	--	<1	--	5	--
ME-28/16E/30-0136	445248088363701	08-09-83	0915	--	--	--	--	--
ME-28/15E/25-0089	445252088364701	06-04-85	1400	--	--	100	--	--
ME-28/15E/25-0135	445301088370801	06-04-85	1130	--	--	100	--	--
ME-28/15E/25-0134	445306088371101	06-04-85	1555	--	--	100	28	--
ME-28/16E/19-0155	445317088362501	08-22-85	1225	--	<1	--	11	--
ME-29/15E/25-0060	445750088374501	06-06-85	1630	--	--	100	--	--
ME-28/16E/21-0156	445323088335901	08-22-85	1335	--	<1	--	5	--
ME-28/16E/21-0062	445341088334501	06-28-85	1140	--	--	<100	--	--
ME-28/15E/24-0086	445342088371801	05-23-85	0900	--	--	--	22	--
ME-28/15E/23-0102	445342088385701	08-09-83	1700	--	--	--	--	--
ME-28/15E/23-0127	445344088385601	06-03-85	1545	--	--	100	--	--
ME-28/16E/21-0125	445355088340901	06-28-85	0940	--	--	<100	--	--
ME-28/15E/13-0130	445359088364401	06-04-85	1300	--	--	<100	--	--
ME-28/15E/16-0128	445417088413301	08-09-83	1400	--	--	--	--	--
		06-25-85	1540	--	--	--	--	--
ME-28/15E/17-0161	445425088415701	08-23-85	1010	--	<1	--	18	--
ME-28/15E/14-0034	445439088385801	05-11-82	0930	--	8	--	67	--
		05-22-85	1100	--	--	100	61	--
ME-28/15E/07-0042	445501088433301	05-10-82	1830	--	1	--	19	--

Appendix 4. Trace-constituent analyses of water from wells completed in the sand and gravel aquifer on the Menominee Indian Reservation--Continued

Local identifier	Date	Boron, dissolved (µg/L as B) (01020)	Cadmium, total recoverable (µg/L as Cd) (01027)	Cadmium, dissolved (µg/L as Cd) (01025)	Chromium, total recoverable (µg/L as Cr) (01034)	Chromium, dissolved (µg/L as Cr) (01030)	Copper, total recoverable (µg/L as Cu) (01042)	Copper, dissolved (µg/L as Cu) (01040)
ME-28/16E/30-0038	05-11-82	--	--	<1.0	--	10	--	<10
ME-29/16E/19-0033	05-10-82	--	--	<1.0	--	20	--	<10
ME-28/15E/36-0037	05-11-82	--	--	<1.0	--	10	--	<10
	06-05-85	--	--	--	--	--	--	--
ME-28/15E/36-0097	06-04-85	--	--	--	--	--	--	--
ME-28/16E/34-0023	08-27-84	20	--	<1.0	--	<10	--	2
ME-28/16E/25-0154	08-22-85	--	--	<1.0	--	<10	--	25
ME-28/15E/30-0021	08-27-84	<20	--	12	--	<10	--	11
ME-28/16E/25-0114	06-27-85	--	<1	--	10	--	230	--
ME-28/16E/25-0153	08-22-85	--	--	1.0	--	<10	--	5
ME-28/16E/30-0136	08-09-83	--	--	--	--	--	--	--
ME-28/15E/25-0089	06-04-85	--	--	--	--	--	--	--
ME-28/15E/25-0135	06-04-85	--	--	--	--	--	--	--
ME-28/15E/25-0134	06-04-85	--	<1	2.0	<10	10	1	5
ME-28/16E/19-0155	08-22-85	--	--	2.0	--	<10	--	6
ME-29/15E/25-0060	06-06-85	--	--	--	--	--	--	--
ME-28/16E/21-0156	08-22-85	--	--	<1.0	--	<10	--	14
ME-28/16E/21-0062	06-28-85	--	4	--	<10	--	43	--
ME-28/15E/24-0086	05-23-85	--	--	<1.0	--	--	--	--
ME-28/15E/23-0102	08-09-83	--	--	--	--	--	--	--
ME-28/15E/23-0127	06-03-85	--	--	--	--	--	--	--
ME-28/16E/21-0125	06-28-85	--	1	--	10	--	10	--
ME-28/15E/13-0130	06-04-85	--	--	--	--	--	--	--
ME-28/15E/16-0128	08-09-83	--	--	--	--	--	--	--
	06-25-85	--	--	--	--	--	--	--
ME-28/15E/17-0161	08-23-85	--	--	2.0	--	<10	--	110
ME-28/15E/14-0034	05-11-82	--	--	<1.0	--	10	--	<10
	05-22-85	--	--	<1.0	--	--	--	--
ME-28/15E/07-0042	05-10-82	--	--	<1.0	--	20	--	20

Appendix 4. Trace-constituent analyses of water from wells completed in the sand and gravel aquifer on the Menominee Indian Reservation--Continued

Local identifier	Date	Iron, total recoverable (µg/L as Fe) (01045)	Iron, suspended recoverable (µg/L as Fe) (01044)	Iron, dissolved (µg/L as Fe) (01046)	Lead, total recoverable (µg/L as Pb) (01051)	Lead, dissolved (µg/L as Pb) (01049)	Manganese, total recoverable (µg/L as Mn) (01055)	Manganese, dissolved (µg/L as Mn) (01056)
ME-28/16E/30-0038	05-11-82	2900	900	2000	--	<30	--	120
ME-29/16E/19-0033	05-10-82	110	80	34	--	<100	--	12
ME-28/15E/36-0037	05-11-82	1200	980	220	--	<100	--	24
	06-05-85	490	--	--	--	--	--	--
ME-28/15E/36-0097	06-04-85	1500	--	--	--	--	<10	--
ME-28/16E/34-0023	08-27-84	--	--	12	--	2	--	89
ME-28/16E/25-0154	08-22-85	--	--	44	--	1	--	8
ME-28/15E/30-0021	08-27-84	--	--	290	--	3	--	35
ME-28/16E/25-0114	06-27-85	1800	--	--	11	--	90	--
ME-28/16E/25-0153	08-22-85	--	--	23	--	7	--	2
ME-28/16E/30-0136	08-09-83	--	--	10	--	--	--	3
ME-28/15E/25-0089	06-04-85	1300	--	--	--	--	--	--
ME-28/15E/25-0135	06-04-85	180	--	--	--	--	10	--
ME-28/15E/25-0134	06-04-85	1600	--	1400	1	5	120	110
ME-28/16E/19-0155	08-22-85	--	--	150	--	10	--	67
ME-29/15E/25-0060	06-06-85	240	--	--	--	--	--	--
ME-28/16E/21-0156	08-22-85	--	--	50	--	10	--	42
ME-28/16E/21-0062	06-28-85	770	--	--	26	--	40	--
ME-28/15E/24-0086	05-23-85	50	--	<3	--	--	--	<1
ME-28/15E/23-0102	08-09-83	--	--	10	--	--	--	<1
ME-28/15E/23-0127	06-03-85	130	--	--	--	--	10	--
ME-28/16E/21-0125	06-28-85	240	--	--	4	--	30	--
ME-28/15E/13-0130	06-04-85	80	--	--	--	--	--	--
ME-28/15E/16-0128	08-09-83	--	--	15	--	--	--	2
	06-25-85	110	--	--	--	--	--	--
ME-28/15E/17-0161	08-23-85	--	--	7	--	17	--	16
ME-28/15E/14-0034	05-11-82	510	500	15	--	<100	--	25
	05-22-85	330	--	41	--	--	--	18
ME-28/15E/07-0042	05-10-82	120	--	<3	--	<100	--	1

Appendix 4. Trace-constituent analyses of water from wells completed in the sand and gravel aquifer on the Menominee Indian Reservation--Continued

Local identifier	Date	Mercury, dissolved (µg/L as Hg) (71890)	Nickel, dissolved (µg/L as Ni) (01065)	Selenium, dissolved (µg/L as Se) (01145)	Silver, dissolved (µg/L as Ag) (01075)	Strontium, dissolved (µg/L as Sr) (01080)	Zinc, total recoverable (µg/L as Zn) (01092)	Zinc, dissolved (µg/L as Zn) (01090)
ME-28/16E/30-0038	05-11-82	0.1	--	<1	<1.0	--	--	43
ME-29/16E/19-0033	05-10-82	<.1	--	<1	<1.0	--	--	7
ME-28/15E/36-0037	05-11-82	3.4	--	<1	<1.0	--	--	70
	06-05-85	<.1	--	--	--	--	--	--
ME-28/15E/36-0097	06-04-85	<.1	--	--	--	--	200	--
ME-28/16E/34-0023	08-27-84	<.1	5	<1	<1.0	--	--	14
ME-28/16E/25-0154	08-22-85	<.1	--	<1	--	--	--	12
ME-28/15E/30-0021	08-27-84	.1	9	<1	<1.0	--	--	120
ME-28/16E/25-0114	06-27-85	<.1	--	--	--	--	50	--
ME-28/16E/25-0153	08-22-85	<.1	--	<1	--	--	--	18
ME-28/16E/30-0136	08-09-83	--	--	--	--	41	--	--
ME-28/15E/25-0089	06-04-85	<.1	--	--	--	--	--	--
ME-28/15E/25-0135	06-04-85	<.1	--	--	--	--	50	--
ME-28/15E/25-0134	06-04-85	.1	--	--	--	--	250	--
ME-28/16E/19-0155	08-22-85	<.1	--	<1	--	--	--	32
ME-29/15E/25-0025	06-06-85	<.1	--	--	--	--	--	--
ME-28/16E/21-0156	08-22-85	--	--	<1	--	--	--	32
ME-28/16E/21-0062	06-28-85	<.1	--	--	--	--	90	--
ME-28/15E/24-0086	05-23-85	<.1	--	--	--	--	--	22
ME-28/15E/23-0102	08-09-83	--	--	--	--	51	--	--
ME-28/15E/23-0127	06-03-85	.5	--	--	--	--	60	--
ME-28/16E/21-0125	06-28-85	.2	--	--	--	--	330	--
ME-28/15E/13-0130	06-04-85	<.1	--	--	--	--	--	--
ME-28/15E/16-0128	08-09-83	--	--	--	--	44	--	--
	06-25-85	<.1	--	--	--	--	--	--
ME-28/15E/17-0161	08-23-85	--	--	<1	--	--	--	440
ME-28/15E/14-0034	05-11-82	<.1	--	<1	<1.0	--	--	6
	05-22-85	<.1	--	--	--	--	--	<3
ME-28/15E/07-0042	05-10-82	<.1	--	<1	<1.0	--	--	120

Appendix 4. Trace-constituent analyses of water from wells completed in the sand and gravel aquifer on the Menominee Indian Reservation--Continued

Local identifier	Station number	Date	Time	Antimony, dissolved (µg/L as Sb) (01095)	Arsenic, dissolved (µg/L as As) (01000)	Barium, total recoverable (µg/L as Ba) (01007)	Barium, dissolved (µg/L as Ba) (01005)	Beryllium, dissolved (µg/L as Be) (01010)
ME-28/15E/07-0042	445501088433301	06-26-85	1620	--	--	<100	--	--
ME-28/15E/07-0082	445511088432901	05-23-85	1330	--	--	--	19	--
ME-28/15E/07-0081	445518088433001	05-23-85	1435	--	--	--	11	--
ME-28/15E/11-0131	445519088385301	06-03-85	1300	--	--	<100	--	--
ME-28/16E/02-0019	445553088311601	08-28-84	1700	<1	1	--	24	<0
ME-29/14E/35-0061	445640088460801	06-27-85	1530	--	--	<100	--	--
ME-29/15E/34-0109	445656088395201	08-09-83	1500	--	--	--	--	--
ME-29/13E/24-0047	445904088513601	05-10-82	1600	--	1	--	27	--
		06-26-85	1720	--	--	<100	--	--
ME-29/16E/23-0035	445910088304201	05-11-82	1200	--	1	--	21	--
		06-26-85	1130	--	--	<100	--	--
ME-29/14E/20-0046	445910088492601	05-10-82	1500	--	1	--	15	--
ME-29/16E/13-0108	445916088301001	08-10-83	1030	--	--	--	--	--
ME-29/16E/16-Q151	445937088325801	08-21-85	1415	--	3	--	31	--
ME-29/16E/14-0036	445938088303901	06-06-85	1155	--	--	100	--	--
ME-29/16E/17-0018	445939088342601	08-28-84	945	3	2	--	36	<0
ME-29/13E/13-0017	445941088520601	08-29-84	1600	<1	5	--	31	<0
ME-29/16E/18-0056	445947088355101	06-06-85	1330	--	--	--	--	--
ME-29/15E/12-0110	450015088365001	08-09-83	1100	--	--	--	--	--
		08-30-84	900	<1	<1	--	29	<0
ME-29/13E/02-0048	450054088535501	05-10-82	1700	--	1	--	15	--
ME-29/13E/02-0079	450100088534501	06-27-85	1730	--	--	<100	--	--
ME-29/14E/02-0029	450136088460401	08-29-84	1400	<1	3	--	27	<0
ME-30/14E/35-0028	450152088460701	08-29-84	1200	<1	2	--	35	<0
ME-30/16E/36-0044	450207088302101	06-06-85	1030	--	--	100	--	--
ME-30/13E/30-0026	450243088581601	08-28-84	1400	<1	2	--	29	<0
ME-30/13E/26-0025	450303088533501	08-28-84	800	<1	<1	--	17	<0
ME-30/16E/23-0152	450334088305401	08-21-85	1545	--	<1	--	37	--
ME-30/16E/23-0043	450335088311901	05-11-82	1045	--	1	--	28	--
		06-26-85	850	--	--	--	--	--
ME-30/15E/14-0030	450448088384901	08-28-84	1300	<1	2	--	31	<0
ME-30/14E/18-0027	450458088504201	08-30-84	1100	<1	20	--	24	<0
ME-30/13E/03-0024	450624088543001	08-30-84	1400	<1	1	--	31	<0

Appendix 4. Trace-constituent analyses of water from wells completed in the sand and gravel aquifer on the Menominee Indian Reservation--Continued

Local identifier	Date	Boron, dissolved (µg/L as B) (01020)	Cadmium, total recoverable (µg/L as Cd) (01027)	Cadmium, dissolved (µg/L as Cd) (01025)	Chromium, total recoverable (µg/L as Cr) (01034)	Chromium, dissolved (µg/L as Cr) (01030)	Copper, total recoverable (µg/L as Cu) (01042)	Copper, dissolved (µg/L as Cu) (01040)	Iron, total recoverable (µg/L as Fe) (01045)
ME-28/15E/07-0042	06-26-85	--	2	--	10	--	65	--	230
ME-28/15E/07-0082	05-23-85	--	--	<1.0	--	--	--	--	70
ME-28/15E/07-0081	05-23-85	--	--	<1.0	--	--	--	--	90
ME-28/15E/11-0131	06-03-85	--	--	--	--	--	--	--	230
ME-28/16E/02-0019	08-28-84	20	--	<1.0	--	<10	--	1	--
ME-29/14E/35-0061	06-27-85	--	<1	--	10	--	54	--	260
ME-29/15E/34-0109	08-09-83	--	--	--	--	--	--	--	--
ME-29/13E/24-0047	05-10-82	--	--	<1.0	--	30	--	<10	80
	06-26-85	--	1	--	30	--	9	--	140
ME-29/16E/23-0035	05-11-82	--	--	<1.0	--	10	--	<10	80
	06-26-85	--	2	--	<10	--	8	--	150
ME-29/14E/20-0046	05-10-82	--	--	<1.0	--	20	--	<10	880
ME-29/16E/13-0108	08-10-83	--	--	--	--	--	--	--	--
ME-29/16E/16-0151	08-21-85	--	--	<1.0	--	10	--	4	--
ME-29/16E/14-0036	06-06-85	--	--	--	--	--	--	--	100
ME-29/16E/17-0018	08-28-84	<20	--	1.0	--	10	--	18	--
ME-29/13E/13-0017	08-29-84	<20	--	<1.0	--	<10	--	4	--
ME-29/16E/18-0056	06-06-85	--	--	--	--	--	--	--	330
ME-29/15E/12-0110	08-09-83	--	--	--	--	--	--	--	--
	08-30-84	<20	--	<1.0	--	10	--	44	--
ME-29/13E/02-0048	05-10-82	--	--	<1.0	--	30	--	110	40
ME-29/13E/02-0079	06-27-85	--	3	--	20	--	33	--	80
ME-29/14E/02-0029	08-29-84	20	--	<1.0	--	<10	--	2	--
ME-30/14E/35-0028	08-29-84	<20	--	<1.0	--	<10	--	2	--
ME-30/16E/36-0044	06-06-85	--	--	--	--	--	--	--	280
ME-30/13E/30-0026	08-28-84	<20	--	<1.0	--	<10	--	<1	--
ME-30/13E/26-0025	08-28-84	<20	--	<1.0	--	<10	--	6	--
ME-30/16E/23-0152	08-21-85	--	--	2.0	--	10	--	5	--
ME-30/16E/23-0043	05-11-82	--	--	<1.0	--	10	--	<10	90
	06-26-85	--	--	--	--	--	--	--	110
ME-30/15E/14-0030	08-28-84	30	--	<1.0	--	<10	--	2	--
ME-30/14E/18-0027	08-30-84	<20	--	<1.0	--	10	--	4	--
ME-30/13E/03-0024	08-30-84	<20	--	<1.0	--	<10	--	2	--

Appendix 4. Trace-constituent analyses of water from wells completed in the sand and gravel aquifer on the Menominee Indian Reservation--Continued

Local identifier	Date	Iron, suspended recoverable (µg/L as Fe) (01044)	Iron, dissolved (µg/L as Fe) (01046)	Lead, total recoverable (µg/L as Pb) (01051)	Lead, dissolved (µg/L as Pb) (01049)	Manganese, total recoverable (µg/L as Mn) (01055)	Manganese, dissolved (µg/L as Mn) (01056)	Mercury, dissolved (µg/L as Hg) (71890)
ME-28/15E/07-0042	06-26-85	--	--	24	--	20	--	<0.1
ME-28/15E/07-0082	05-23-85	--	4	--	--	--	<1	<.1
ME-28/15E/07-0081	05-23-85	--	<3	--	--	--	2	<.1
ME-28/15E/11-0131	06-03-85	--	--	--	--	20	--	<.1
ME-28/16E/02-0019	08-28-84	--	130	--	1	--	52	<.1
ME-29/14E/35-0061	06-27-85	--	--	11	--	30	--	<.1
ME-29/15E/34-0109	08-09-83	--	17	--	--	--	15	--
ME-29/13E/24-0047	05-10-82	--	<3	--	<30	--	<1	<.1
	06-26-85	--	--	10	--	20	--	<.1
ME-29/16E/23-0035	05-11-82	--	<3	--	<100	--	1	1.5
	06-26-85	--	--	13	--	20	--	<.1
ME-29/14E/20-0046	05-10-82	860	16	--	<100	--	9	<.1
ME-29/16E/13-0108	08-10-83	--	5	--	--	--	1	--
ME-29/16E/16-0151	08-21-85	--	170	--	7	--	87	.4
ME-29/16E/14-0036	06-06-85	--	--	--	--	--	--	<.1
ME-29/16E/17-0018	08-28-84	--	140	--	11	--	60	.1
ME-29/13E/13-0017	08-29-84	--	49	--	14	--	99	<.1
ME-29/16E/18-0056	06-06-85	--	--	--	--	--	--	<.1
ME-29/15E/12-0110	08-09-83	--	2300	--	--	--	66	--
	08-30-84	--	4900	--	5	--	88	.1
ME-29/13E/02-0048	05-10-82	--	<3	--	<30	--	<1	<.1
ME-29/13E/02-0079	06-27-85	--	--	7	--	30	--	.2
ME-29/14E/02-0029	08-29-84	--	580	--	5	--	100	.1
ME-30/14E/35-0028	08-29-84	--	70	--	2	--	50	<.1
ME-30/16E/36-0044	06-06-85	--	--	--	--	10	--	<.1
ME-30/13E/30-0026	08-28-84	--	400	--	2	--	170	<.1
ME-30/13E/26-0025	08-28-84	--	14	--	18	--	14	<.1
ME-30/16E/23-0152	08-21-85	--	1800	--	9	--	26	.2
ME-30/16E/23-0043	05-11-82	--	<3	--	<100	--	4	3.3
	06-26-85	--	--	--	--	--	--	<.1
ME-30/15E/14-0030	08-28-84	--	170	--	3	--	87	.3
ME-30/14E/18-0027	08-30-84	--	15	--	4	--	8	<.1
ME-30/13E/03-0024	08-30-84	--	160	--	4	--	59	<.1

Appendix 4. Trace-constituent analyses of water from wells completed in the sand and gravel aquifer on the Menominee Indian Reservation--Continued

Local identifier	Date	Nickel, total recoverable (µg/L as Ni) (01067)	Nickel, dissolved (µg/L as Ni) (01065)	Selenium, dissolved (µg/L as Se) (01145)	Silver, dissolved (µg/L as Ag) (01075)	Strontium, dissolved (µg/L as Sr) (01080)	Zinc, total recoverable (µg/L as Zn) (01092)	Zinc, dissolved (µg/L as Zn) (01090)
ME-28/15E/07-0042	06-26-85	--	--	--	--	--	70	--
ME-28/15E/07-0082	05-23-85	--	--	--	--	--	--	9
ME-28/15E/07-0081	05-23-85	--	--	--	--	--	<10	30
ME-28/15E/11-0131	06-03-85	--	--	--	--	--	100	--
ME-28/16E/02-0019	08-28-84	--	8	<1	<1.0	--	--	14
ME-29/14E/35-0061	06-27-85	--	--	--	--	--	30	--
ME-29/15E/34-0109	08-09-83	--	--	--	--	100	--	--
ME-29/13E/24-0047	05-10-82	--	--	<1	<1.0	--	--	50
	06-26-85	--	--	--	--	--	30	--
ME-29/16E/23-0035	05-11-82	--	--	<1	<1.0	--	--	34
	06-26-85	--	--	--	--	--	50	--
ME-29/14E/20-0046	05-10-82	--	--	<1	<1.0	--	--	120
ME-29/16E/13-0108	08-10-83	--	--	--	--	41	--	--
ME-29/16E/16-0151	08-21-85	--	--	<1	--	--	--	11
ME-29/16E/14-0036	06-06-85	--	--	--	--	--	--	--
ME-29/16E/17-0018	08-28-84	8	7	<1	<1.0	--	--	450
ME-29/13E/13-0017	08-29-84	1	6	<1	<1.0	--	--	280
ME-29/16E/18-0056	06-06-85	--	--	--	--	--	--	--
ME-29/15E/12-0110	08-09-83	--	--	--	--	38	--	--
	08-30-84	--	2	<1	<1.0	--	--	370
ME-29/13E/02-0048	05-10-82	--	--	<1	<1.0	--	--	32
ME-29/13E/02-0079	06-27-85	--	--	--	--	--	100	--
ME-29/14E/02-0029	08-29-84	--	13	<1	1.0	--	--	54
ME-30/14E/35-0028	08-29-84	1	4	<1	<1.0	--	--	19
ME-30/16E/36-0044	06-06-85	--	--	--	--	--	50	--
ME-30/13E/30-0026	08-28-84	--	5	<1	<1.0	--	--	25
ME-30/13E/26-0025	08-28-84	--	3	<1	<1.0	--	--	210
ME-30/16E/23-0152	08-21-85	--	--	<1	--	--	--	30
ME-30/16E/23-0043	05-11-82	--	--	<1	<1.0	--	--	99
	06-26-85	--	--	--	--	--	--	--
ME-30/15E/14-0030	08-28-84	--	5	<1	<1.0	--	--	79
ME-30/14E/18-0027	08-30-84	--	3	<1	<1.0	--	--	360
ME-30/13E/03-0024	08-30-84	--	2	<1	<1.0	--	--	190

Appendix 5. Physical and chemical characteristics of water from wells completed in the bedrock aquifer on the Menominee Indian Reservation

[NGVD, National Geodetic Vertical Datum of 1929; µS/cm, microsiemens per centimeter at 25 degrees Celsius; °C, degrees Celsius; mg/L, milligrams per liter; --, no data available; <, less than. The five digit number ending each column heading is the parameter code used in the U.S. Geological Survey's Water Data Storage and Retrieval System.]

Local identifier	Station number	Date	Time	Depth below land surface (water level) (feet) (72019)	Depth of well, total (feet) (72008)	Depth to bottom of sample interval (feet) (72016)	Depth to top of sample interval (feet) (72015)	Elevation of land surface datum (Feet above NGVD) (72000)
ME-28/15E/22-0040	445339088392901	05-11-82	1500	--	109	109	59	860
ME-28/15E/22-0049	445323088393501	06-04-85	0845	--	100	100	62	860
ME-28/15E/22-0122	445325088391001	06-07-85	1015	--	100	100	58	860
ME-28/16E/19-0064	445331088353101	06-05-85	1000	--	205	205	100	880
ME-28/15E/22-0050	445334088391501	06-03-85	1445	--	263	--	--	840
ME-28/15E/22-0160	445345088401301	08-23-85	0910	--	65	65	42	865
ME-28/16E/21-0063	445346088332201	06-27-85	1130	10.80	368	368	157	855
ME-28/16E/18-0066	445410088361601	06-05-85	1345	--	155	155	107	880
ME-28/15E/14-0080	445445088385501	08-09-83	1630	--	96	96	48	875
		05-22-85	1400	11.80	96	96	48	875
		05-22-85	1500	11.80	96	96	48	875
ME-28/15E/03-0052	445628088395801	06-07-85	0945	--	128	128	46	930
ME-29/16E/19-0085	445837088363801	06-06-85	1430	--	66	66	18	890
ME-29/16E/19-0083	445843088363601	05-23-85	1100	--	66	66	16	905
ME-29/14E/19-0103	445854088505101	08-10-83	1230	--	85	85	26	1065
		08-22-85	1650	--	85	85	26	1065
ME-29/14E/16-0157	445945088490301	08-22-85	1510	--	125	125	33	1095
ME-29/14E/16-0158	445946088490001	08-22-85	1555	--	85	85	40	1100
ME-29/13E/02-0099	450115088532501	06-28-85	0845	--	205	205	55	1215
ME-30/16E/25-0045	450324088294201	05-11-82	1115	--	66	66	44	900
		06-26-85	0950	20.00	66	66	44	900

Appendix 5. Physical and chemical characteristics of water from wells completed in the bedrock aquifer on the Menominee Indian Reservation--Continued

Local identifier	Date	Specific conductance (µS/cm) (00095)	pH (standard units) (00400)	Temperature, water (°C) (00010)	Color (Platinum-cobalt units) (00080)	Hardness, total (mg/L as $CaCO_3$) (00900)	Calcium, total recoverable (mg/L as Ca) (00916)	Calcium, dissolved (mg/L as Ca) (00915)	Magnesium, total recoverable (mg/L as Mg) (00927)
ME-28/15E/22-0040	05-11-82	480	7.9	9.0	--	240	--	51	--
ME-28/15E/22-0049	06-04-85	400	7.7	11.5	30	--	45	--	22
ME-28/15E/22-0122	06-07-85	370	8.0	10.5	5	--	38	--	20
ME-28/16E/19-0064	06-05-85	385	8.6	9.0	10	--	--	--	--
ME-28/15E/22-0050	06-03-85	515	8.0	10.0	5	--	35	--	19
ME-28/15E/22-0160	08-23-85	480	8.0	9.0	<1	240	--	44	--
ME-28/16E/21-0063	06-27-85	165	8.2	10.5	5	--	14	--	6
ME-28/16E/18-0066	06-05-85	420	8.0	10.0	15	--	--	--	--
ME-28/15E/14-0080	08-09-83	305	8.2	13.5	--	190	--	25	--
	05-22-85	385	7.9	10.0	10	210	--	27	--
	05-22-85	385	7.9	10.0	--	--	--	--	--
ME-28/15E/03-0052	06-07-85	345	8.0	9.0	10	--	--	--	--
ME-29/16E/19-0085	06-06-85	365	7.6	10.0	5	--	--	--	--
ME-29/16E/19-0083	05-23-85	170	6.6	8.5	20	82	--	18	--
ME-29/14E/19-0103	08-10-83	275	7.4	15.5	--	150	--	33	--
	08-22-85	375	7.6	9.0	5	150	--	34	--
ME-29/14E/16-0157	08-22-85	330	7.8	11.0	5	160	--	36	--
ME-29/14E/16-0158	08-22-85	300	7.5	10.5	10	140	--	33	--
ME-29/13E/02-0099	06-28-85	203	8.4	9.5	<1	--	19	--	10
ME-30/16E/25-0045	05-11-82	400	7.8	10.5	--	200	--	44	--
	06-26-85	410	8.1	9.5	5	--	--	--	--

Appendix 5. Physical and chemical characteristics of water from wells completed in the bedrock aquifer on the Menominee Indian Reservation--Continued

Local identifier	Date	Magnesium, dissolved (mg/L as Mg) (00925)	Sodium, dissolved (mg/L as Na) (00930)	Potassium, dissolved (mg/L as K) (00935)	Alkalinity, field (mg/L as $CaCO_3$) (00410)	Alkalinity, lab (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)
ME-28/15E/22-0040	05-11-82	28	2.6	1.3	--	250	15	1.3	--
ME-28/15E/22-0049	06-04-85	--	--	--	215	--	6.7	<0.20	0.20
ME-28/15E/22-0122	06-07-85	--	--	--	170	--	19	2.1	.70
ME-28/16E/19-0064	06-05-85	--	--	--	183	--	12	5.5	1.6
ME-28/15E/22-0050	06-03-85	--	--	--	201	--	24	29	2.4
ME-28/15E/22-0160	08-23-85	31	--	--	241	--	13	<.20	.80
ME-28/16E/21-0063	06-27-85	--	--	--	74	--	10	1.1	.90
ME-28/16E/18-0066	06-05-85	--	--	--	211	--	10	<.20	1.2
ME-28/15E/14-0080	08-09-83	30	5.6	2.7	--	204	9.2	1.0	.60
	05-22-85	34	--	--	236	--	8.8	.80	.70
	05-22-85	--	--	--	236	--	--	--	--
ME-28/15E/03-0052	06-07-85	--	--	--	175	--	18	<.20	.30
ME-29/16E/19-0085	06-06-85	--	--	--	123	--	17	<.20	.10
ME-29/16E/19-0083	05-23-85	9	--	--	72	--	10	.70	.10
ME-29/14E/19-0103	08-10-83	17	13	1.2	--	150	17	16	.10
	08-22-85	17	--	--	141	--	18	13	.20
ME-29/14E/16-0157	08-22-85	16	--	--	146	--	12	1.9	<.10
ME-29/14E/16-0158	08-22-85	15	--	--	144	--	11	1.8	.30
ME-29/13E/02-0099	06-28-85	--	--	--	92	--	16	.90	.20
ME-30/16E/25-0045	05-11-82	23	2.3	0.70	--	200	10	1.0	--
	06-26-85	--	--	--	215	--	13	1.3	.20

Appendix 5. Physical and chemical characteristics of water from wells completed in the bedrock aquifer on the Menominee Indian Reservation--Continued

Local identifier	Date	Silica, dissolved (mg/L as SiO_2) (00955)	Solids, residue at 180°C dissolved (mg/L) (70300)	Nitrogen, nitrite dissolved (mg/L as N) (00613)	Nitrogen, $NO_2 + NO_3$ dissolved (mg/L as N) (00631)	Carbon, organic dissolved (mg/L as C) (00681)	Cyanide, dissolved (mg/L as Cn) (00723)	Methylene blue, active substance (mg/L) (38260)
ME-28/15E/22-0040	05-11-82	15	282	--	0.14	--	--	--
ME-28/15E/22-0049	06-04-85	--	233	<0.01	<.10	5.7	<0.01	0.02
ME-28/15E/22-0122	06-07-85	--	226	<.01	<.10	1.8	<.01	.02
ME-28/16E/19-0064	06-05-85	--	218	<.01	<.10	1.3	<.01	.01
ME-28/15E/22-0050	06-03-85	--	299	<.01	.16	1.5	<.01	.02
ME-28/15E/22-0160	08-23-85	--	243	<.01	<.10	--	<.01	.01
ME-28/16E/21-0063	06-27-85	--	95	<.01	<.10	2.5	<.01	.02
ME-28/16E/18-0066	06-05-85	--	233	.03	<.10	1.8	<.01	.01
ME-28/15E/14-0080	08-09-83	24	205	--	--	--	--	--
	05-22-85	--	207	--	--	--	<.01	<.01
	05-22-85	--	--	<.01	<.10	1.5	--	--
ME-28/15E/03-0052	06-07-85	--	195	<.01	<.10	1.7	<.01	.01
ME-29/16E/19-0085	06-06-85	--	156	<.01	<.10	1.9	<.01	.02
ME-29/16E/19-0083	05-23-85	--	117	<.01	<.10	2.8	<.01	.03
ME-29/14E/19-0103	08-10-83	12	209	--	--	--	--	--
	08-22-85	--	184	<.01	<.10	--	<.01	.02
ME-29/14E/16-0157	08-22-85	--	166	<.01	<.10	--	<.01	.02
ME-29/14E/16-0158	08-22-85	--	162	<.01	<.10	--	<.01	.02
ME-29/13E/02-0099	06-28-85	--	128	<.01	.29	3.3	<.01	.02
ME-30/16E/25-0045	05-11-82	15	234	--	.18	--	--	--
	06-26-85	--	233	.01	<.10	1.8	<.01	.02

Appendix 6. Trace-constituent analyses of water from wells completed in the bedrock aquifer on the Menominee Indian Reservation

[µg/L, micrograms per liter; --, no data available; <, less than. The five digit number ending each column heading is the parameter code used by the U.S. Geological Survey's Water Data Storage and Retrieval System.]

Local identifier	Station number	Date	Time	Arsenic, dissolved (µg/L as As) (01000)	Barium, total recoverable (µg/L as Ba) (01007)	Barium, dissolved (µg/L as Ba) (01005)	Cadmium, total recoverable (µg/L as Cd) (01027)	Cadmium, dissolved (µg/L as Cd) (01025)
ME-28/15E/22-0040	445339088392901	05-11-82	1500	1	--	32	--	<1.0
ME-28/15E/22-0049	445323088393501	06-04-85	0845	--	<100	--	--	--
ME-28/15E/22-0122	445325088391001	06-07-85	1015	--	100	--	--	--
ME-28/16E/19-0064	445331088353101	06-05-85	1000	--	100	--	--	--
ME-28/15E/22-0160	445345088401301	08-23-85	0910	7	--	53	--	<1.0
ME-28/16E/21-0063	445346088332201	06-27-85	1130	--	<100	--	3	--
ME-28/16E/18-0066	445410088361601	06-05-85	1345	--	100	--	--	--
ME-28/15E/14-0080	445445088385501	08-09-83	1630	--	--	--	--	--
		05-22-85	1400	--	--	46	--	<1.0
ME-28/15E/03-0052	445628088395801	06-07-85	0945	--	100	--	--	--
ME-28/15E/22-0050	445334088391501	06-03-85	1445	--	<100	--	--	<1.0
ME-29/16E/19-0085	445837088363801	06-06-85	1430	--	--	--	--	--
ME-29/16E/19-0083	445843088363601	05-23-85	1100	--	<100	13	--	<1.0
ME-29/14E/19-0103	445854088505101	08-10-83	1230	--	--	--	--	--
		08-22-85	1650	<1	--	14	--	1.0
ME-29/14E/16-0157	445945088490301	08-22-85	1510	<1	--	13	--	<1.0
ME-29/14E/16-0158	445946088490001	08-22-85	1555	1	--	27	--	1.0
ME-29/13E/02-0099	450115088532501	06-28-85	0845	--	<100	--	2	--
ME-30/16E/25-0045	450324088294201	05-11-82	1115	1	--	39	--	<1.0
		06-26-85	0950	--	--	--	--	--

Appendix 6. Trace-constituent analyses of water from wells completed in the bedrock aquifer on the Menominee Indian Reservation--Continued

Local identifier	Date	Chromium, total recoverable (µg/L as Cr) (01034)	Chromium, dissolved (µg/L as Cr) (01030)	Copper, total recoverable (µg/L as Cu) (01042)	Copper, dissolved (µg/L as Cu) (01040)	Iron, total recoverable (µg/L as Fe) (01045)	Iron, dissolved (µg/L as Fe) (01046)	Lead, total recoverable (µg/L as Pb) (01051)	Lead, dissolved (µg/L as Pb) (01049)
ME-28/15E/22-0040	05-11-82	--	10	--	<10	200	<3	--	<100
ME-28/15E/22-0049	06-04-85	--	--	--	--	2500	--	--	--
ME-28/15E/22-0122	06-07-85	--	--	--	--	460	--	--	--
ME-28/16E/19-0064	06-05-85	--	--	--	--	2900	--	--	--
ME-28/15E/22-0160	08-23-85	--	<10	--	<1	--	290	--	5
ME-28/16E/21-0063	06-27-85	<10	--	6	--	280	--	4	--
ME-28/16E/18-0066	06-05-85	--	--	--	--	3900	--	--	--
ME-28/15E/14-0080	08-09-83	--	--	--	--	--	140	--	--
	05-22-85	--	--	--	--	210	17	--	--
ME-28/15E/03-0052	06-07-85	--	--	--	--	140	--	--	--
ME-28/15E/22-0050	06-03-85	--	--	--	--	100	--	--	--
ME-29/16E/19-0085	06-06-85	--	--	--	--	350	--	--	--
ME-29/16E/19-0083	05-23-85	--	--	--	--	620	230	--	--
ME-29/14E/19-0103	08-10-83	--	--	--	--	--	30	--	--
	08-22-85	--	10	--	7	--	8	--	13
ME-29/14E/16-0157	08-22-85	--	10	--	3	--	22	--	8
ME-29/14E/16-0158	08-22-85	--	<10	--	1	--	1100	--	20
ME-29/13E/02-0099	06-28-85	10	--	18	--	200	--	16	--
ME-30/16E/25-0045	05-11-82	--	10	--	<10	190	<3	--	<100
	06-26-85	--	--	--	--	460	--	--	--

Appendix 6. Trace-constituent analyses of water from wells completed in the bedrock aquifer on the Menominee Indian Reservation--Continued

Local identifier	Date	Manganese, total recoverable (µg/L as Mn) (01055)	Manganese, dissolved (µg/L as Mn) (01056)	Mercury, dissolved (µg/L as Hg) (71890)	Selenium, dissolved (µg/L as Se) (01145)	Silver, dissolved (µg/L as Ag) (01075)	Strontium, dissolved (µg/L as Sr) (01080)	Zinc, total recoverable (µg/L as Zn) (01092)	Zinc, dissolved (µg/L as Zn) (01090)
ME-28/15E/22-0040	05-11-82	--	5	0.2	<1	<1.0	--	--	160
ME-28/15E/22-0049	06-04-85	--	--	<.1	--	--	--	--	--
ME-28/15E/22-0122	06-07-85	--	--	<.1	--	--	--	--	--
ME-28/16E/19-0064	06-05-85	80	--	<.1	--	--	--	<10	--
ME-28/15E/22-0160	08-23-85	--	26	--	<1	--	--	--	15
ME-28/16E/21-0063	06-27-85	50	--	<.1	--	--	--	170	--
ME-28/16E/18-0066	06-05-85	90	--	<.1	--	--	--	100	--
ME-28/15E/14-0080	08-09-83	--	8	--	--	--	420	--	--
	05-22-85	--	8	<.1	--	--	--	--	<3
ME-28/15E/03-0052	06-07-85	20	--	<.1	--	--	--	200	--
ME-28/15E/22-0050	06-03-85	--	--	<.1	--	--	--	--	--
ME-29/16E/19-0085	06-06-85	20	--	<.1	--	--	--	130	--
ME-29/16E/19-0083	05-23-85	--	11	<.1	--	--	--	--	920
ME-29/14E/19-0103	08-10-83	--	1	--	--	--	73	--	--
	08-22-85	--	3	--	<1	--	--	--	90
ME-29/14E/16-0157	08-22-85	--	580	<.1	<1	--	--	--	170
ME-29/14E/16-0158	08-22-85	--	240	--	<1	--	--	--	96
ME-29/13E/02-0099	06-28-85	30	--	<.1	--	--	--	150	--
ME-30/16E/25-0045	05-11-82	--	2	.1	<1	<1.0	--	--	69
	06-26-85	--	--	<.1	--	--	--	--	--

Appendix 7. Physical and chemical characteristics of water from streams on the Menominee Indian Reservation

[µS/cm, microsiemens per centimeter at 25 degrees Celsius; mg/L, milligrams per liter; °C, degrees Celsius; µg/L, micrograms per liter; --, no data available; <, less than. The five digit number ending each column heading is the parameter code used in the U.S. Geological Survey's Water Data Storage and Retrieval System.]

Station name	Downstream order number	Date	Time	Discharge, inst. cubic feet per second (00061)	Specific conductance (µS/cm) (00095)	pH (standard units) (00400)	Temperature, water (°C) (00010)	Oxygen demand, chemical (high level) (mg/L) (00340)
South Branch Oconto River nr Breed, WI	04070720	05-19-83	1000	174	190	8.0	10.5	--
South Branch Oconto River nr Breed, WI	04070720	07-24-84	1530	--	250	8.4	22.0	--
South Branch Oconto River nr Breed, WI	04070720	06-19-85	1700	--	255	7.8	14.5	20
Pecore Creek nr Keshena, WI	04070771	06-19-85	1215	--	270	7.7	15.5	47
Linzy Creek nr Keshena, WI	04070945	06-19-85	0730	--	180	7.5	16.0	50
Elton Creek nr Langlade, WI	04075300	06-18-85	1215	--	335	7.9	12.5	18
Elton Creek nr Langlade, WI	04075300	05-28-86	1500	--	330	8.5	19.0	<10
Evergreen River at Cth WW nr Langlade, WI	04075350	05-18-83	0920	--	255	8.0	9.0	--
Evergreen River at Cth WW nr Langlade, WI	04075350	07-25-84	1430	--	290	8.3	19.0	17
Evergreen River at Cth WW nr Langlade, WI	04075350	06-18-85	1000	--	325	8.0	12.5	10
Evergreen River at Cth WW nr Langlade, WI	04075350	05-29-86	1135	--	335	8.6	15.5	<10
West Branch Wolf River 2 mi. north of Neopit, WI	04075803	09-01-82	1500	36	320	8.4	15.0	--
West Branch Wolf River 2 mi. north of Neopit, WI	04075803	05-18-83	1100	72	260	8.2	10.5	--
West Branch Wolf River 2 mi. north of Neopit, WI	04075803	07-23-84	1440	--	290	8.2	22.0	--
West Branch Wolf River 2 mi. north of Neopit, WI	04075803	06-18-85	1630	--	330	7.9	13.0	23
West Branch Wolf River 2 mi. north of Neopit, WI	04075803	05-28-86	1340	--	303	8.4	19.0	22
Little West Branch Wolf River nr Neopit, WI	04075850	09-01-82	1630	27	340	8.5	14.5	--
Little West Branch Wolf River nr Neopit, WI	04075850	05-18-83	0920	97	--	--	--	--
Little West Branch Wolf River nr Neopit, WI	04075850	05-18-83	1230	97	265	8.3	9.5	--
Little West Branch Wolf River nr Neopit, WI	04075850	07-23-84	1600	--	330	8.4	20.0	--
Little West Branch Wolf River nr Neopit, WI	04075850	06-20-85	1500	--	350	8.0	14.0	17
West Branch Wolf River at Neopit, WI	04076080	05-29-86	0930	--	350	8.5	20.0	11
Little West Branch Creek at Cth M nr Neopit, WI	04076400	09-01-82	1230	8.2	240	7.9	14.5	--
Little West Branch Creek at Cth M nr Neopit, WI	04076400	05-18-83	1025	10	150	7.5	9.0	--
Little West Branch Creek at Cth M nr Neopit, WI	04076400	07-25-84	1130	--	210	7.9	20.5	--
West Branch Wolf River 3 mi. north of Keshena, WI	04076500	09-01-82	1100	173	290	8.3	15.0	--
West Branch Wolf River 3 mi. north of Keshena, WI	04076500	05-17-83	1600	214	210	8.2	13.5	--
West Branch Wolf River 3 mi. north of Keshena, WI	04076500	07-26-84	1030	--	210	8.3	26.0	--
West Branch Wolf River 3 mi. north of Keshena, WI	04076500	06-17-85	1800	--	290	8.7	14.0	27
Wolf River at Keshena Falls nr Keshena, WI	04707000	11-09-81	1200	487	280	--	4.0	--
Wolf River at Keshena Falls nr Keshena, WI	04077000	06-17-82	1235	622	140	--	18.0	--
Wolf River at Keshena Falls nr Keshena, WI	04077000	12-22-83	1230	568	--	--	0.0	--
Wolf River at Keshena Falls nr Keshena, WI	04077000	04-18-84	1105	1280	120	--	7.5	--
Red River nr Neopit, WI	04775900	06-18-85	1745	--	360	8.1	14.0	17
Miller Creek nr Neopit, WI	04077670	06-20-85	1100	--	340	8.0	13.5	37

Appendix 7. Physical and chemical characteristics of water from streams on the Menominee Indian Reservation--Continued

Station name	Hardness, total (mg/L as $CaCO_3$) (00900)	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)	Alkalinity lab (mg/L as $CaCO_3$) (90410)	Sulfate, dissolved (mg/L as SO_4) (00945)
South Branch Oconto River nr Breed, WI	120	27	12	1.6	1.1	116	10
South Branch Oconto River nr Breed, WI	140	31	14	1.9	1.3	131	7.8
South Branch Oconto River nr Breed, WI	--	--	--	--	--	120	--
Pecore Creek nr Keshena, WI	--	--	--	--	--	125	--
Linzy Creek nr Keshena, WI	--	--	--	--	--	83	--
Elton Creek nr Langlade, WI	--	--	--	--	--	161	--
Elton Creek nr Langlade, WI	170	38	18	2.2	1.7	169	9.8
Evergreen River at Cth WW nr Langlade, WI	150	34	16	2.0	1.4	153	10
Evergreen River at Cth WW nr Langlade, WI	180	39	19	2.3	1.5	163	15
Evergreen River at Cth WW nr Langlade, WI	--	--	--	--	--	153	--
Evergreen River at Cth WW nr Langlade, WI	170	38	18	2.2	1.5	164	9.9
West Branch Wolf River 2 mi. north of Neopit, WI	160	36	18	1.9	1.0	152	9.0
West Branch Wolf River 2 mi. north of Neopit, WI	150	33	16	1.7	1.2	147	10
West Branch Wolf River 2 mi. north of Neopit, WI	160	34	18	1.9	1.5	153	16
West Branch Wolf River 2 mi. north of Neopit, WI	--	--	--	--	--	152	--
West Branch Wolf River 2 mi. north of Neopit, WI	160	35	18	2.0	1.3	160	9.7
Little West Branch Wolf River nr Neopit, WI	180	40	20	2.4	0.90	172	9.0
Little West Branch Wolf River nr Neopit, WI	--	--	--	--	--	--	--
Little West Branch Wolf River nr Neopit, WI	170	37	18	2.3	1.2	167	11
Little West Branch Wolf River nr Neopit, WI	180	40	20	2.3	1.2	175	9.8
Little West Branch Wolf River nr Neopit, WI	--	--	--	--	--	165	--
West Branch Wolf River at Neopit, WI	170	37	19	3.5	1.2	164	9.7
Little West Branch Creek at Cth M nr Neopit, WI	120	28	13	1.7	.70	118	7.0
Little West Branch Creek at Cth M nr Neopit, WI	85	19	9	1.2	.80	81	10
Little West Branch Creek at Cth M nr Neopit, WI	130	30	14	1.7	1.1	122	14
West Branch Wolf River 3 mi. north of Keshena, WI	160	35	18	2.1	1.2	154	8.0
West Branch Wolf River 3 mi. north of Keshena, WI	130	28	14	1.8	1.0	125	10
West Branch Wolf River 3 mi. north of Keshena, WI	120	27	13	2.3	1.0	114	13
West Branch Wolf River 3 mi. north of Keshena, WI	--	--	--	--	--	145	--
Wolf River at Keshena Falls nr Keshena, WI	--	--	--	--	--	--	--
Wolf River at Keshena Falls nr Keshena, WI	--	--	--	--	--	--	--
Wolf River at Keshena Falls nr Keshena, WI	--	--	--	--	--	--	--
Wolf River at Keshena Falls nr Keshena, WI	--	--	--	--	--	--	--
Red River nr Neopit, WI	--	--	--	--	--	167	--
Miller Creek nr Neopit, WI	--	--	--	--	--	105	--

Appendix 7. Physical and chemical characteristics of water from streams on the Menominee Indian Reservation--Continued

Station name	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, dissolved (tons per acre-feet) (70303)	Solids, dissolved (tons per day) (70302)	Residue total at 105°C, suspended (mg/L) (00530)
South Branch Oconto River nr Breed, WI	2.2	0.40	8.1	150	0.20	70.4	--
South Branch Oconto River nr Breed, WI	2.3	.50	11	163	.22	--	2
South Branch Oconto River nr Breed, WI	3.1	--	--	173	--	--	--
Pecore Creek nr Keshena, WI	2.3	--	--	180	--	--	--
Linzy Creek nr Keshena, WI	2.4	--	--	141	--	--	--
Elton Creek nr Langlade, WI	3.1	--	--	185	--	--	--
Elton Creek nr Langlade, WI	2.3	.50	8.8	187	.25	--	--
Evergreen River at Cth WW nr Langlade, WI	2.8	.40	8.6	198	.27	--	--
Evergreen River at Cth WW nr Langlade, WI	3.0	.40	12	196	.27	--	2
Evergreen River at Cth WW nr Langlade, WI	3.6	--	--	190	--	--	--
Evergreen River at Cth WW nr Langlade, WI	2.8	<.10	8.5	180	.24	--	--
West Branch Wolf River 2 mi. north of Neopit, WI	2.0	.30	9.6	197	.27	19.4	--
West Branch Wolf River 2 mi. north of Neopit, WI	2.1	.20	7.6	185	.25	35.9	--
West Branch Wolf River 2 mi. north of Neopit, WI	2.3	.30	9.1	189	.26	--	6
West Branch Wolf River 2 mi. north of Neopit, WI	2.1	--	--	173	--	--	--
West Branch Wolf River 2 mi. north of Neopit, WI	1.6	.30	8.5	183	.25	--	--
Little West Branch Wolf River nr Neopit, WI	3.7	.20	12	196	.27	14.3	--
Little West Branch Wolf River nr Neopit, WI	--	--	--	--	--	--	--
Little West Branch Wolf River nr Neopit, WI	4.6	.20	7.9	207	.28	54.2	--
Little West Branch Wolf River nr Neopit, WI	4.5	.20	11	220	.30	--	8
Little West Branch Wolf River nr Neopit, WI	4.3	--	--	216	--	--	--
West Branch Wolf River at Neopit, WI	5.7	.30	6.9	186	.25	--	--
Little West Branch Creek at Cth M nr Neopit, WI	1.2	.20	11	153	.21	3.39	--
Little West Branch Creek at Cth M nr Neopit, WI	1.2	.20	6.0	117	.16	3.27	--
Little West Branch Creek at Cth M nr Neopit, WI	1.8	.20	11	181	.25	--	2
West Branch Wolf River 3 mi. north of Keshena, WI	2.1	.30	8.1	171	.23	79.9	--
West Branch Wolf River 3 mi. north of Keshena, WI	3.0	.20	5.8	168	.23	97.1	--
West Branch Wolf River 3 mi. north of Keshena, WI	2.9	.20	7.2	146	.20	--	4
West Branch Wolf River 3 mi north of Keshena, WI	3.4	--	--	183	--	--	--
Wolf River at Keshena Falls nr Keshena, WI	--	--	--	--	--	--	--
Wolf River at Keshena Falls nr Keshena, WI	--	--	--	--	--	--	--
Wolf River at Keshena Falls nr Keshena, WI	--	--	--	--	--	--	--
Wolf River at Keshena Falls nr Keshena, WI	--	--	--	--	--	--	--
Red River nr Neopit, WI	4.6	--	--	210	--	--	--
Miller Creek nr Neopit, WI	1.6	--	--	146	--	--	--

Appendix 7. Physical and chemical characteristics of water from streams on the Menominee Indian Reservation--Continued

Station name	Nitrogen, nitrite total (mg/L as N) (00615)	Nitrogen, $NO_2 + NO_3$ total (mg/L as N) (00630)	Nitrogen, ammonia total (mg/L as N) (00610)	Nitrogen, ammonia + organic total (mg/L as N) (00625)	Carbon, organic dissolved (mg/L as C) (00681)	Carbon, organic suspended total (mg/L as C) (00689)	Cyanide, total (mg/L as Cn) (00720)
South Branch Oconto River nr Breed, WI	--	--	--	--	--	--	--
South Branch Oconto River nr Breed, WI	--	--	--	--	--	--	--
South Branch Oconto River nr Breed, WI	<0.01	<0.10	0.04	0.50	5.8	0.2	<0.01
Pecore Creek nr Keshena, WI	<.01	<.10	.09	1.0	16	.4	<.01
Linzy Creek nr Keshena, WI	<.01	<.10	.08	.60	17	.4	<.01
Elton Creek nr Langlade, WI	<.01	.30	.02	.70	3.1	.2	<.01
Elton Creek nr Langlade, WI	--	--	.01	--	--	--	<.01
Evergreen River At Cth WW nr Langlade, WI	--	--	--	--	--	--	--
Evergreen River At Cth WW nr Langlade, WI	--	--	--	--	--	--	<.01
Evergreen River At Cth WW nr Langlade, WI	<.01	.40	.02	.70	3.1	.5	<.01
Evergreen River At Cth WW nr Langlade, WI	--	--	.01	--	--	--	<.01
West Branch Wolf River 2 mi. north of Neopit, WI	--	--	--	--	--	--	--
West Branch Wolf River 2 mi. north of Neopit, WI	--	--	--	--	--	--	--
West Branch Wolf River 2 mi. north of Neopit, WI	--	--	--	--	--	--	--
West Branch Wolf River 2 mi. north of Neopit, WI	<.01	.20	<.01	.40	5.2	.2	<.01
West Branch Wolf River 2 mi. north of Neopit, WI	--	--	.02	--	--	--	<.01
Little West Branch Wolf River nr Neopit, WI	--	--	--	--	--	--	--
Little West Branch Wolf River nr Neopit, WI	--	--	--	--	--	--	--
Little West Branch Wolf River nr Neopit, WI	--	--	--	--	--	--	--
Little West Branch Wolf River nr Neopit, WI	--	--	--	--	--	--	--
Little West Branch Wolf River nr Neopit, WI	<.01	.80	<.01	.40	4.6	.3	<.01
West Branch Wolf River at Neopit, WI	--	--	.02	--	--	--	<.01
Little West Branch Creek at Cth M nr Neopit, WI	--	--	--	--	--	--	--
Little West Branch Creek at Cth M nr Neopit, WI	--	--	--	--	--	--	--
Little West Branch Creek at Cth M nr Neopit, WI	--	--	--	--	--	--	--
West Branch Wolf River 3 mi. north of Keshena, WI	--	--	--	--	--	--	--
West Branch Wolf River 3 mi. north of Keshena, WI	--	--	--	--	--	--	--
West Branch Wolf River 3 mi. north of Keshena, WI	--	--	--	--	--	--	--
West Branch Wolf River 3 mi. north of Keshena, WI	<.01	.10	<.01	.40	6.0	.3	<.01
Wolf River at Keshena Falls nr Keshena, WI	--	--	--	--	--	--	--
Wolf River at Keshena Falls nr Keshena, WI	--	--	--	--	--	--	--
Wolf River at Keshena Falls nr Keshena, WI	--	--	--	--	--	--	--
Wolf River at Keshena Falls nr Keshena, WI	--	--	--	--	--	--	--
Red River nr Neopit, WI	.01	.60	<.01	1.0	3.9	.3	<.01
Miller Creek nr Neopit, Wi	<.01	<.10	<.01	.50	11	.1	<.01

Appendix 8. Trace-constituent analyses of water from streams on the Menominee Indian Reservation

[µg/L, micrograms per liter; --, no data available; <, less than. The five digit number ending each column heading is the parameter code used in the U.S. Geological Survey's Water Data Storage and Retrieval System.]

Station name	Downstream order number	Date	Time	Aluminum, total recoverable (µg/L as Al) (01105)	Arsenic, total (µg/L as As) (01002)	Barium, total recoverable (µg/L as Ba) (01007)	Barium, dissolved (µg/L as Ba) (01005)	Beryllium, total recoverable (µg/L as Be) (01012)
South Branch Oconto River nr Breed, WI	04070720	07-24-84	1530	--	--	--	33	--
South Branch Oconto River nr Breed, WI	04070720	06-19-85	1700	--	1	--	--	<10
Pecore Creek nr Keshena, WI	04070771	06-19-85	1215	--	1	--	--	<10
Linzy Creek nr Keshena, WI	04070945	06-19-85	0730	--	1	--	--	<10
Elton Creek nr Langlade, WI	04075300	06-18-85	1215	--	1	--	--	<10
Elton Creek nr Langlade, WI	04075300	05-28-86	1500	--	<1	<100	--	--
Evergreen River at Cth WW nr Langlade, WI	04075350	05-18-83	0920	--	--	--	--	--
Evergreen River at Cth WW nr Langlade, WI	04075350	07-25-84	1430	70	1	--	19	--
Evergreen River at Cth WW nr Langlade, WI	04075350	06-18-85	1000	--	<1	--	--	<10
Evergreen River at Cth WW nr Langlade, WI	04075350	05-29-86	1135	--	<1	<100	--	--
West Branch Wolf River 2 mi. north of Neopit, WI	04075803	09-01-82	1500	--	2	--	--	--
West Branch Wolf River 2 mi. north of Neopit, WI	04075803	07-23-84	1440	--	--	--	17	--
West Branch Wolf River 2 mi. north of Neopit, WI	04075803	06-18-85	1630	--	<1	--	--	<10
West Branch Wolf River 2 mi. north of Neopit, WI	04075803	05-28-86	1340	--	<1	<100	--	--
Little West Branch Wolf River nr Neopit, WI	04075850	09-01-82	1630	--	2	--	--	--
Little West Branch Wolf River nr Neopit, WI	04075850	07-23-84	1600	--	--	--	36	--
Little West Branch Wolf River nr Neopit, WI	04075850	06-20-85	1500	--	<1	--	--	<10
West Branch Wolf River at Neopit, WI	04076080	05-29-86	0930	--	<1	<100	--	--
Little West Branch Creek at Cth M nr Neopit, WI	04075850	09-01-82	1230	--	2	--	--	--
Little West Branch Creek at Cth M nr Neopit, WI	04075850	07-25-84	1130	--	--	--	16	--
West Branch Wolf River 3 mi. north of Keshena, WI	04076500	09-01-82	1100	--	2	--	--	--
West Branch Wolf River 3 mi. north of Keshena, WI	04076500	07-26-84	1030	--	--	--	14	--
West Branch Wolf River 3 mi. north of Keshena, WI	04076500	06-17-85	1800	--	<1	--	--	<10
Red River nr Neopit, WI	04775900	06-18-85	1745	--	1	--	--	<10
Miller Creek nr Neopit, WI	04077670	06-20-85	1100	--	<1	--	--	<10

Appendix 8. Trace-constituent analyses of water from streams on the Menominee Indian Reservation--Continued

Station name	Beryllium, dissolved (µg/L as Be) (01010)	Cadmium, total recoverable (µg/L as Cd) (01027)	Chromium, total recoverable (µg/L as Cr) (01034)	Copper, total recoverable (µg/L as Cu) (01042)	Iron, total recoverable (µg/L as Fe) (01045)	Iron, dissolved (µg/L as Fe) (01046)
South Branch Oconto River nr Breed, WI	1	--	--	--	--	51
South Branch Oconto River nr Breed, WI	--	<1	20	2	180	--
Pecore Creek nr Keshena, WI	--	<1	10	7	250	--
Linzy Creek nr Keshena, WI	--	<1	10	7	1700	--
Elton Creek nr Langlade, WI	--	<1	10	3	100	--
Elton Creek nr Langlade, WI	--	<1	24	3	30	--
Evergreen River at Cth WW nr Langlade, WI	--	--	--	--	--	--
Evergreen River at Cth WW nr Langlade, WI	<0	5	<1	3	150	8
Evergreen River at Cth WW nr Langlade, WI	--	<1	10	3	120	--
Evergreen River at Cth WW nr Langlade, WI	--	<1	7	11	70	--
West Branch Wolf River 2 mi. north of Neopit, WI	--	<10	10	10	--	--
West Branch Wolf River 2 mi. north of Neopit, WI	<0	--	--	--	--	17
West Branch Wolf River 2 mi. north of Neopit, WI	--	<1	10	4	150	--
West Branch Wolf River 2 mi. north of Neopit, WI	--	<1	6	4	100	--
Little West Branch Wolf River nr Neopit, WI	--	<10	10	10	--	--
Little West Branch Wolf River nr Neopit, WI	0.5	--	--	--	--	22
Little West Branch Wolf River nr Neopit, WI	--	<1	30	2	700	--
West Branch Wolf River at Neopit, WI	--	<1	4	2	70	--
Little West Branch Creek at Cth M nr Neopit, WI	--	<10	10	10	--	--
Little West Branch Creek at Cth M nr Neopit, WI	<0	--	--	--	--	210
West Branch Wolf River 3 mi. north of Keshena, WI	--	<10	10	10	--	--
West Branch Wolf River 3 mi. north of Keshena, WI	<0	--	--	--	--	42
West Branch Wolf River 3 mi. north of Keshena, WI	--	<1	10	3	370	--
Red River nr Neopit, WI	--	<1	10	3	230	--
Miller Creek nr Neopit, WI	--	<1	10	1	560	--

Appendix 8. Trace-constituent analyses of water from streams on the Menominee Indian Reservation--Continued

Station name	Lead, total recoverable (µg/L as Pb) (01051)	Manganese, total recoverable (µg/L as Mn) (01055)	Manganese, dissolved (µg/L as Mn) (01056)	Mercury, total recoverable (µg/L as Hg) (71900)	Nickel, total recoverable (µg/L as Ni) (01067)	Nickel, dissolved (µg/L as Ni) (01065)
South Branch Oconto River nr Breed, WI	--	--	8	--	--	1
South Branch Oconto River nr Breed, WI	<1	--	--	<0.10	<1	--
Pecore Creek nr Keshena, WI	3	--	--	<.10	18	--
Linzy Creek nr Keshena, WI	7	--	--	<.10	21	--
Elton Creek nr Langlade, WI	<1	--	--	<.10	<1	--
Elton Creek nr Langlade, WI	1	10	--	<.10	8	--
Evergreen River at Cth WW nr Langlade, WI	--	--	--	--	--	--
Evergreen River at Cth WW nr Langlade, WI	<1	30	<1	<.10	3	1
Evergreen River at Cth WW nr Langlade, WI	<1	--	--	<.10	<1	--
Evergreen River at Cth WW nr Langlade, WI	5	20	--	<.10	<1	--
West Branch Wolf River 2 mi. north of Neopit, WI	<100	--	--	<.10	--	--
West Branch Wolf River 2 mi. north of Neopit, WI	--	--	8	--	--	1
West Branch Wolf River 2 mi. north of Neopit, WI	<1	--	--	<.10	1	--
West Branch Wolf River 2 mi. north of Neopit, WI	1	30	--	<.10	3	--
Little West Branch Wolf River nr Neopit, WI	<100	--	--	<.10	--	--
Little West Branch Wolf River nr Neopit, WI	--	--	3	--	--	2
Little West Branch Wolf River nr Neopit, WI	2	--	--	<.10	3	--
West Branch Wolf River at Neopit, WI	1	40	--	<.10	4	--
Little West Branch Creek at Cth M nr Neopit, WI	<100	--	--	<.10	--	--
Little West Branch Creek at Cth M nr Neopit, WI	--	--	16	--	--	1
West Branch Wolf River 3 mi. north of Keshena, WI	<100	--	--	<.10	--	--
West Branch Wolf River 3 mi. north of Keshena, WI	--	--	11	--	--	<1
West Branch Wolf River 3 mi. north of Keshena, WI	<1	--	--	<.10	<1	--
Red River nr Neopit, WI	<1	--	--	<.10	2	--
Miller Creek nr Neopit, WI	<1	--	--	<.10	<1	--

Appendix 8. Trace-constituent analyses of water from streams on the Menominee Indian Reservation--Continued

Station name	Selenium, total (µg/L as Se) (01147)	Silver, total recoverable (µg/L as Ag) (01077)	Silver, dissolved (µg/L as Ag) (01075)	Zinc, total recoverable (µg/L as Zn) (01092)	Phenols, total (µg/L) (32730)	1,1-dichloroethane, total (µg/L) (34496)
South Branch Oconto River nr Breed, WI	--	--	<1.0	--	--	--
South Branch Oconto River nr Breed, WI	<1	--	--	10	--	--
Pecore Creek nr Keshena, WI	<1	--	--	20	--	--
Linzy Creek nr Keshena, WI	<1	--	--	20	--	--
Elton Creek nr Langlade, WI	<1	--	--	30	--	--
Elton Creek nr Langlade, WI	<1	<1	--	<10	--	--
Evergreen River at Cth WW nr Langlade, WI	--	--	--	--	--	40
Evergreen River at Cth WW nr Langlade, WI	<1	<1	<1.0	20	1	--
Evergreen River at Cth WW nr Langlade, WI	<1	--	--	30	--	--
Evergreen River at Cth WW nr Langlade, WI	<1	<1	--	<10	--	--
West Branch Wolf River 2 mi. north of Neopit, WI	<1	--	--	580	--	--
West Branch Wolf River 2 mi. north of Neopit, WI	--	--	<1.0	--	--	--
West Branch Wolf River 2 mi. north of Neopit, WI	<1	--	--	20	--	--
West Branch Wolf River 2 mi. north of Neopit, WI	<1	<1	--	20	--	--
Little West Branch Wolf River nr Neopit, WI	<1	--	--	940	--	--
Little West Branch Wolf River nr Neopit, WI	--	--	1.0	--	--	--
Little West Branch Wolf River nr Neopit, WI	<1	--	--	10	--	--
West Branch Wolf River at Neopit, WI	<1	<1	--	<10	--	--
Little West Branch Creek at Cth M nr Neopit, WI	<1	--	--	170	--	--
Little West Branch Creek at Cth M nr Neopit, WI	--	--	<1.0	--	--	--
West Branch Wolf River 3 mi. north of Keshena, WI	<1	--	--	20	--	--
West Branch Wolf River 3 mi. north of Keshena, WI	--	--	<1.0	--	--	--
West Branch Wolf River 3 mi. north of Keshena, WI	<1	--	--	30	--	--
Red River nr Neopit, WI	<1	--	--	10	--	--
Miller Creek nr Neopit, WI	<1	--	--	20	--	--

Appendix 9. Physical and chemical characteristics of water from lakes on the Menominee Indian Reservation

[µS/cm, microsiemens per centimeter at 25 degrees Celsius; °C, degrees Celsius; mg/L, milligrams per liter; µG/L, micrograms per liter; --, no data available; <, less than. The five digit number ending each column heading is the parameter code used in the U.S. Geological Survey's Water Data Storage and Retrieval System.]

Station name	Station number	Date	Time	Lake type	Specific conductance lab, (µS/cm) (90095)	pH, lab (standard units) (00403)
Legend Lake site no. 1 nr Keshena, WI	445318088373301	07-18-84	0900	inlet/outlet	208	8.8
Legend Lake site no. 2 nr Keshena, WI	445324088370001	07-18-84	0930	inlet/outlet	211	8.7
Legend Lake site no. 3 nr Keshena, WI	445423088352001	07-18-84	1015	inlet/outlet	210	8.4
Legend Lake site no. 4 nr Keshena, WI	445410088334001	07-18-84	1100	inlet/outlet	207	8.3
Legend Lake site no. 5 nr Keshena, WI	445345088313001	07-18-84	1400	inlet/outlet	201	8.0
Legend Lake site no. 5, bottom nr Keshena, WI	445345088313002	07-18-84	1400	inlet/outlet	216	7.6
Moshawquit Lake nr Keshena, WI	445355088301501	07-18-84	1555	inlet/outlet	192	8.1
Bass Lake (SE) nr Keshena, WI	445216088300001	07-18-84	1645	no inlet/outlet	77	7.7
Pine Lake nr Keshena, WI	445240088311001	07-18-84	1750	no inlet/outlet	102	7.7
Sand Lake nr Keshena, WI	445319088321601	07-18-84	1840	no inlet/outlet	126	7.8
Round Lake Bottom nr Keshena, WI	445330088335002	07-18-84	2010	no inlet/outlet	151	7.0
Round Lake nr Keshena, WI	445330088335001	07-18-84	2010	no inlet/outlet	129	8.0
Bass Lake (NW)nr Zoar. WI	450642088524501	07-19-84	1115	inlet/outlet	311	8.4
Bass Lake (NW) bottom nr Zoar, WI	450642088524502	07-19-84	1115	inlet/outlet	311	8.4
Bass Lake (SE) nr Zoar, WI	450607088520501	07-19-84	1240	no inlet/outlet	30	6.9
Hazel Lake nr Zoar, WI	450458088504001	07-19-84	1430	no inlet/outlet	94	7.7
Lake Noseum nr Zoar, WI	450244088552701	07-19-84	1615	no inlet/outlet	237	8.8
Neopit Pond at Neopit, WI	445857088501901	07-19-84	1725	inlet/outlet	294	8.3
La Motte Lake bottom nr Keshena, WI	445302088353102	07-20-84	0905	outlet Only	288	7.2
La Motte Lake nr Keshena, WI	445302088353101	07-20-84	0905	outlet Only	247	8.3
Lake Elma (bottom) nr Zoar, WI	450215088532502	07-29-84	1450	inlet/outlet	354	7.1
Lake Elma nr Zoar, WI	450215088532501	07-29-84	1450	inlet/outlet	250	7.7
St. Joseph Lake nr Keshena, WI	450145088304001	07-29-84	1815	no inlet/outlet	239	8.2
Fredenberg Lake nr Keshena, WI	450305088310501	07-29-84	1930	no inlet/outlet	71	7.2

Appendix 9. Physical and chemical characteristics of water from lakes on the Menominee Indian Reservation--Continued

Station name	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)	Alkalinity, lab (mg/L as $CaCO_3$) (90410)	Sulfate, dissolved (mg/L as SO_4) (00945)
Legend Lake site no. 1 nr Keshena, WI	18	17	1.8	0.10	109	11
Legend Lake site no. 2 nr Keshena, WI	18	18	1.8	.20	108	10
Legend Lake site no. 3 nr Keshena, WI	22	14	1.5	.20	111	8.5
Legend Lake site no. 4 nr Keshena, WI	24	14	1.5	.40	110	8.0
Legend Lake site no. 5 nr Keshena, WI	23	13	1.5	.50	105	7.0
Legend Lake site no. 5, bottom nr Keshena, WI	27	13	1.5	.70	113	7.1
Moshawquit Lake nr Keshena, WI	23	11	1.6	.40	99	5.8
Bass Lake (SE) nr Keshena, WI	8.7	3.6	1.2	.30	32	7.5
Pine Lake nr Keshena, WI	12	6.1	1.2	.30	50	9.1
Sand Lake nr Keshena, WI	15	6.9	1.4	.30	62	6.9
Round Lake bottom nr Keshena, WI	19	7.3	1.5	.50	70	10
Round Lake nr Keshena, WI	14	6.5	1.6	.40	57	10
Bass Lake 1-2 (NW) nr Zoar, WI	36	19	1.8	1.2	168	9.8
North Bass Lake bottom nr Zoar, WI	37	19	1.9	1.2	168	9.9
Bass Lake 1-12 (NW) nr Zoar, WI	3.8	1.2	0.30	.70	14	3.8
Hazel Lake nr Zoar, WI	11	5.0	1.2	.70	46	7.8
Lake Noseum nr Zoar, WI	28	16	1.4	.40	127	10
Neopit Pond at Neopit, WI	34	17	2.1	1.0	153	9.8
La Motte Lake bottom nr Keshena, WI	37	16	2.8	.90	151	12
La Motte Lake nr Keshena, WI	26	15	2.4	.60	129	11
Lake Elma (bottom) nr Zoar, WI	46	18	1.7	.90	189	9.0
Lake Elma nr Zoar, WI	30	15	1.5	.50	129	9.5
St. Joseph Lake nr Keshena, WI	27	15	2.0	.70	128	5.0
Fredenberg Lake nr Keshena, WI	7.5	4.0	.60	.50	3.0	3.0

Appendix 9. Physical and chemical characteristics of water from lakes on the Menominee Indian Reservation--Continued

Station name	Chloride, dissolved (mg/L as Cl) (00940)	Fluoride, dissolved (mg/L as F) (00950)	Silica, dissolved (mg/L as SiO_2) (00955)	Residue at 180°C dissolved (mg/L) (70300)	Nitrogen, nitrite total (mg/L as N) (00615)	Solids, nitrogen, $NO_2 + NO_3$ total (mg/L as N) (00630)
Legend Lake site no. 1 nr Keshena, WI	2.1	0.20	1.8	131	<0.01	<0.10
Legend Lake site no. 2 nr Keshena, WI	1.8	.20	1.9	132	<.01	<.10
Legend Lake site no. 3 nr Keshena, WI	1.4	.20	5.1	140	--	--
Legend Lake site no. 4 nr Keshena, WI	1.6	.20	3.0	131	.01	<.10
Legend Lake site no. 5 nr Keshena, WI	1.7	.20	1.5	127	<.01	<.10
Legend Lake site no. 5, bottom nr Keshena, WI	1.6	.20	3.5	133	<.01	<.10
Moshawquit Lake nr Keshena, WI	1.8	.20	3.3	141	<.01	<.10
Bass Lake (SE) nr Keshena, WI	1.6	<.10	0.37	58	<.01	<.10
Pine Lake nr Keshena, WI	1.6	<.10	4.5	83	.01	<.10
Sand Lake nr Keshena, WI	2.1	<.10	1.5	88	<.01	<.10
Round Lake bottom nr Keshena, WI	2.0	<.10	5.7	105	<.01	<.10
Round Lake nr Keshena, WI	2.1	<.10	2.0	90	<.01	<.10
Bass Lake 1-2 (NW) nr Zoar, WI	2.2	.30	6.0	190	<.01	<.10
North Bass Lake bottom nr Zoar, WI	2.3	.30	6.1	194	<.01	<.10
Bass Lake 1-12 (NW) nr Zoar, WI	0.80	<.10	.32	30	<.01	<.10
Hazel Lake nr Zoar, WI	1.0	<.10	.17	67	<.01	<.10
Lake Noseum nr Zoar, WI	1.4	.10	12	176	<.01	<.10
Neopit Pond at Neopit, WI	3.0	.30	8.2	194	<.01	.20
La Motte Lake bottom nr Keshena, WI	2.9	.20	15	191	<.01	.10
La Motte Lake nr Keshena, WI	2.6	.20	4.3	150	<.01	<.10
Lake Elma (bottom) nr Zoar, WI	1.3	.10	17	223	<.01	<.10
Lake Elma nr Zoar, WI	.90	.10	3.7	157	<.01	<.10
St. Joseph Lake nr Keshena, WI	1.8	<.10	15	167	<.01	<.10
Fredenberg Lake nr Keshena, WI	24	<.10	.35	56	<.01	<.10

Appendix 9. Physical and chemical characteristics of water from lakes on the Menominee Indian Reservation--Continued

Station name	Nitrogen, ammonia total (mg/L as N) (00610)	Nitrogen, ammonia + organic total (mg/L as N) (00625)	Phosphorus, total (mg/L as P) (00665)	Phosphorus, ortho total (mg/L as P) (70507)	Iron, dissolved (µg/L as Fe) (01046)	Manganese, dissolved (µg/L as Mn) (01056)
Legend Lake site no. 1 nr Keshena, WI	<0.01	0.60	<0.01	<0.01	4	3
Legend Lake site no. 2 nr Keshena, WI	.03	.20	<.01	< .01	<10	<10
Legend Lake site no. 3 nr Keshena, WI	--	--	--	--	25	5
Legend Lake site no. 4 nr Keshena, WI	<.01	.30	<.01	<.01	17	3
Legend Lake site no. 5 nr Keshena, WI	<.01	.30	<.01	<.01	7	3
Legend Lake site no. 5, bottom nr Keshena, WI	<.01	.20	<.01	<.01	4	3
Moshawquit Lake nr Keshena, WI	.04	.30	<.01	<.01	9	3
Bass Lake (SE) nr Keshena, WI	.05	.30	<.01	<.01	14	2
Pine Lake nr Keshena, WI	.05	.40	<.01	<.01	91	5
Sand Lake nr Keshena, WI	.01	.60	<.01	<.01	22	3
Round Lake bottom nr Keshena, WI	.63	1.3	.07	.08	1300	750
Round Lake nr Keshena, WI	.06	1.0	<.01	<.01	18	10
Bass Lake 1-2 (NW) nr Zoar, WI	<.01	.70	.01	<.01	7	2
North Bass Lake bottom nr Zoar, WI	.05	1.4	.02	.02	8	4
Bass Lake 1-12 (NW) nr Zoar, WI	.03	.90	.01	<.01	17	2
Hazel Lake nr Zoar, WI	.04	1.3	.01	<.01	12	3
Lake Noseum nr Zoar, WI	<.01	.80	<.01	<.01	22	4
Neopit Pond at Neopit, WI	.02	.60	.01	<.01	54	8
La Motte Lake bottom nr Keshena, WI	1.1	1.4	.18	.20	1600	1800
La Motte Lake nr Keshena, WI	.01	.60	<.01	.01	8	3
Lake Elma (boom) nr Zoar, WI	1.7	2.3	.10	.01	440	2300
Lake Elma nr Zoar, WI	<.01	.50	.05	<.01	11	11
St. Joseph Lake nr Keshena, WI	<.01	.80	.02	<.01	25	16
Fredenberg Lake nr Keshena, WI	<.01	1.0	.02	<.01	10	4

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