



**Prepared in cooperation with the City of Columbia, Missouri,  
and the Missouri Department of Conservation**

# **Water-Quality Data, 1999–2005, and Ground-Water Level Data, 2004–2005, for McBaine Bottoms, Including the Eagle Bluffs Conservation Area, Columbia, Missouri**

Data Series 212

**U.S. Department of the Interior  
U.S. Geological Survey**

# **Water-Quality Data, 1999–2005, and Ground-Water Level Data, 2004–2005, for McBaine Bottoms, Including the Eagle Bluffs Conservation Area, Columbia, Missouri**

By Brenda J. Smith and Joseph M. Richards

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Data Series 212

**U.S. Department of the Interior  
U.S. Geological Survey**

**U.S. Department of the Interior  
DIRK KEMPTHORNE, SECRETARY**

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## Conversion Factors and Datum

Multiply	By	To obtain
<b>Length</b>		
inch (in.)	2.54	centimeter (cm)
inch (in.)	25.4	millimeter (mm)
foot (ft)	0.3048	meter (m)
mile (mi)	1.609	kilometer (km)
<b>Area</b>		
acre	4,047	square meter ( $m^2$ )
acre	0.4047	hectare (ha)
acre	0.4047	square hectometer ( $hm^2$ )
acre	0.004047	square kilometer ( $km^2$ )
square mile ( $mi^2$ )	259.0	hectare (ha)
square mile ( $mi^2$ )	2.590	square kilometer ( $km^2$ )
<b>Flow rate</b>		
gallon per minute (gal/min)	0.06308	liter per second (L/s)
gallon per day (gal/d)	0.003785	cubic meter per day ( $m^3/d$ )
million gallons per day (Mgal/d)	0.04381	cubic meter per second ( $m^3/s$ )

Horizontal coordinate information is referenced to the North American Datum of 1983 (NAD 83).

Vertical coordinate information is referenced to the National Geodetic Vertical Datum of 1929 (NGVD 29).

Temperature in degrees Celsius ( $^{\circ}C$ ) can be converted to degrees Fahrenheit ( $^{\circ}F$ ) as follows:

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

Altitude, as used in this report, refers to distance above the vertical datum.

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

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

# Water-Quality Data, 1999–2005, and Ground-Water Level Data, 2004–2005, for McBaine Bottoms, Including the Eagle Bluffs Conservation Area, Columbia, Missouri

By Brenda J. Smith and Joseph M. Richards

## Abstract

The U.S. Geological Survey, in cooperation with the city of Columbia, Missouri, and the Missouri Department of Conservation, collected ground-water quality data from June 1999 through August 2005, surface-water quality data from August 1999 through August 2003, and water-level data from February 2004 through August 2005 in McBaine Bottoms, southwest of Columbia. McBaine Bottoms, adjacent to the Missouri River, is the location of the municipal-supply well field for the city of Columbia, the city of Columbia wastewater-treatment wetlands, and the Missouri Department of Conservation Eagle Bluffs Conservation Area.

This report presents water-quality data, which include water-quality analyses of samples collected from 36 water-quality sampling sites (31 were wells and 5 were surface-water sites), and ground-water level data, which include water-level measurements from more than 80 wells. Water samples were analyzed for physical properties, inorganic chemical constituents, nutrients, and dissolved iron. Selected samples were analyzed for trace elements, wastewater organic compounds, and pesticides.

In samples from monitoring wells, chloride concentrations ranged from 2.41 to 259 mg/L (milligrams per liter), sodium concentrations ranged from 1.08 to 175 mg/L, and sulfate concentrations ranged from less than 0.2 to 271 mg/L (all concentrations were dissolved). Dissolved nitrite plus nitrate as nitrogen concentrations ranged from less than 0.05 to 0.46 mg/L. Total phosphorous concentrations ranged from less than 0.04 to 1.68 mg/L, dissolved phosphorous concentrations ranged from less than 0.04 to 1.50 mg/L, and dissolved orthophosphorous concentrations ranged from less than 0.01 to 1.83 mg/L. Dissolved iron concentrations ranged from less than 6 to 42,900 µg/L (micrograms per liter). Dissolved arsenic concentrations in samples from two monitoring wells ranged from 11 to 37 µg/L.

In samples from surface-water sampling sites, chloride concentrations ranged from 8.67 to 289 mg/L, sodium concentrations ranged from 6.18 to 219 mg/L, and sulfate concentrations ranged from 33.4 to 119 mg/L. All of the minimum concentrations were detected in samples from Perche Creek. Dissolved nitrite plus nitrate as nitrogen concentrations ranged from less than 0.05 to 1.53 mg/L. Total phosphorous concentra-

tions ranged from 0.07 to 3.06 mg/L, dissolved phosphorous concentrations ranged from less than 0.05 to 2.88 mg/L, and dissolved orthophosphorous concentrations ranged from less than 0.01 to 2.86 mg/L. Most of the maximum concentrations were detected in samples from the city outflow.

More than 35 wastewater organic compounds and pesticides were detected in samples from the city outflow. However, most concentrations were estimated or their presence verified, but not quantified.

Water levels in monitoring wells ranged from 548.54 to 576.55 ft (feet) above the National Geodetic Vertical Datum of 1929 (NGVD 29). The difference in water levels from February 2004 to August 2005 ranged from 0.13 ft to 10.97 ft.

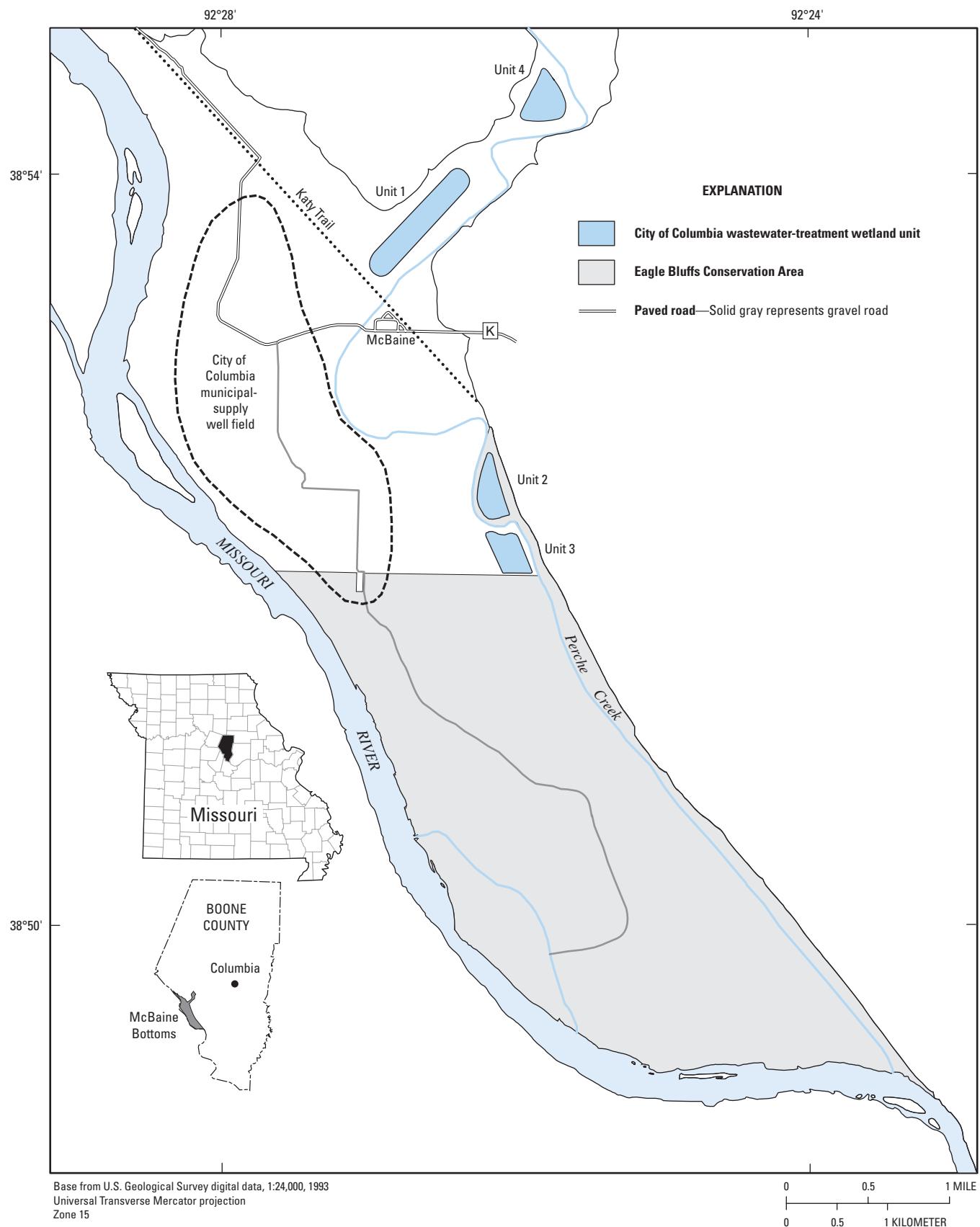
## Introduction

When expansion of the Columbia, Missouri, wastewater-treatment facility became necessary, the construction of a wastewater-treatment wetland, hereafter referred to as the treatment wetland, was constructed in McBaine Bottoms (fig. 1) as an alternative to expanding the existing activated sludge facilities. The Missouri Department of Conservation uses the treated effluent from the treatment wetland as a water source for the 1,300-acre managed wetland on the 4,200-acre Eagle Bluffs Conservation Area (fig. 1). The city of Columbia municipal-supply well field, also in McBaine Bottoms, is north of the Eagle Bluffs Conservation Area and west of the treatment wetland.

The treatment wetland consists of four units with a total surface area of about 130 acres. Wastewater entering the treatment wetland consists of blended primary and secondary treated effluent from the wastewater-treatment facility. The design capacity of the treatment wetland is 20 Mg/d (million gallons per day), with an average treated effluent of about 16 Mg/d (City of Columbia, 2005). When the treatment wetland began treating wastewater, the city of Columbia stopped using Perche Creek as the receiving water for the treated effluent (Richards, 2002).

Before the operations began at the treatment wetland, monitoring wells were drilled from 1991 through 1993 by the city of Columbia and the U.S. Geological Survey, and samples

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**Figure 1.** Location of McBaine Bottoms, Columbia, Missouri.

were collected from the wells for water-quality analyses (Richards, 1995, 1999). The Eagle Bluffs Conservation Area began accepting treated effluent in 1994, and full wetland management began in late 1995. After effluent discharge began in 1994, samples from a shallow monitoring well, (MW1-2A, fig. 2) about 30 ft (feet) deep near treatment wetland unit 1 (fig. 1), began showing gradual but marked concentration increases in various water-quality constituents. Soon after, samples from other monitoring wells on the Eagle Bluffs Conservation Area began showing similar changes. The water-quality constituents showing the most substantial changes were dissolved sodium, potassium, calcium, sulfate, and chloride (Richards, 1999, 2002).

In 2000, the U.S. Geological Survey installed 55 shallow monitoring wells throughout McBaine Bottoms. These wells were installed to determine the ground-water flow and ground- and surface-water interaction at McBaine Bottoms (Smith, 2003). Shortly after the wells were installed, one was destroyed.

The city of Columbia [population of 84,531 (U.S. Census Bureau, 2000)] uses the Missouri River alluvial aquifer in McBaine Bottoms for its municipal water supply and currently (2006) pumps water from seven well pairs. Each well pair consists of two, 4-ft diameter wells about 100 ft deep with pumps rated at about 2,000 gallons per minute.

The purpose of this report is to present the water-quality data from samples collected from June 1999 through August 2005 from 36 water-quality sampling sites [data collected before June 1999 are given in Richards (1995, 1999, and 2002)] and to present ground-water level data for wells from 2004 through 2005 [data collected before 2004 are given in Smith (2003)]. Physical properties, inorganic constituent concentrations (including iron), and nutrient concentrations were determined at all sampling sites. Densities of an indicator bacteria (fecal coliform) were determined for samples collected from 1999 through 2002. Concentrations of trace elements, wastewater organic compounds, and pesticides were measured for selected samples collected from 1999 through 2003.

## Study Area

McBaine Bottoms is part of the Missouri River alluvial valley about 7 mi (miles) southwest of Columbia, Missouri. It is an 8.7-mi<sup>2</sup> (square mile) area bounded to the south and west by the Missouri River and to the north and east by the Missouri River bluffs. Perche Creek flows southward along the Missouri River bluffs and discharges to the Missouri River in the southeast part of the study area (fig. 1). Before the treatment wetland was fully operational, the city of Columbia used Perche Creek as the discharge point for treated sewage effluent (Richards, 2002). McBaine Bottoms, including parts of the Eagle Bluffs Conservation Area, is agricultural land primarily used for the cultivation of row crops, such as corn and soybeans. McBaine Bottoms receives an average of 38 in. (inches) of precipitation annually (Missouri Department of Natural Resources, 1986).

Land-surface altitudes range from 580 ft above the National Geodetic Vertical Datum of 1929 (NGVD 29) in the northwestern part of the study area to 550 ft in the extreme southeastern part of McBaine Bottoms. The altitude of a bluff west of McBaine Bottoms that overlooks the Missouri River and the Missouri River alluvial plain is as much as 800 ft above the NGVD 29 (Smith, 2003).

The alluvium underlying McBaine Bottoms is composed of silt, clay, coarse-grained sand, and gravel. The maximum thickness of the alluvium is about 95 ft; the average saturated thickness is about 60 ft (Emmett and Jeffrey, 1969). The sand and gravel in the lower part of the alluvium form the alluvial aquifer (Richards, 1999).

## Water-Quality Data

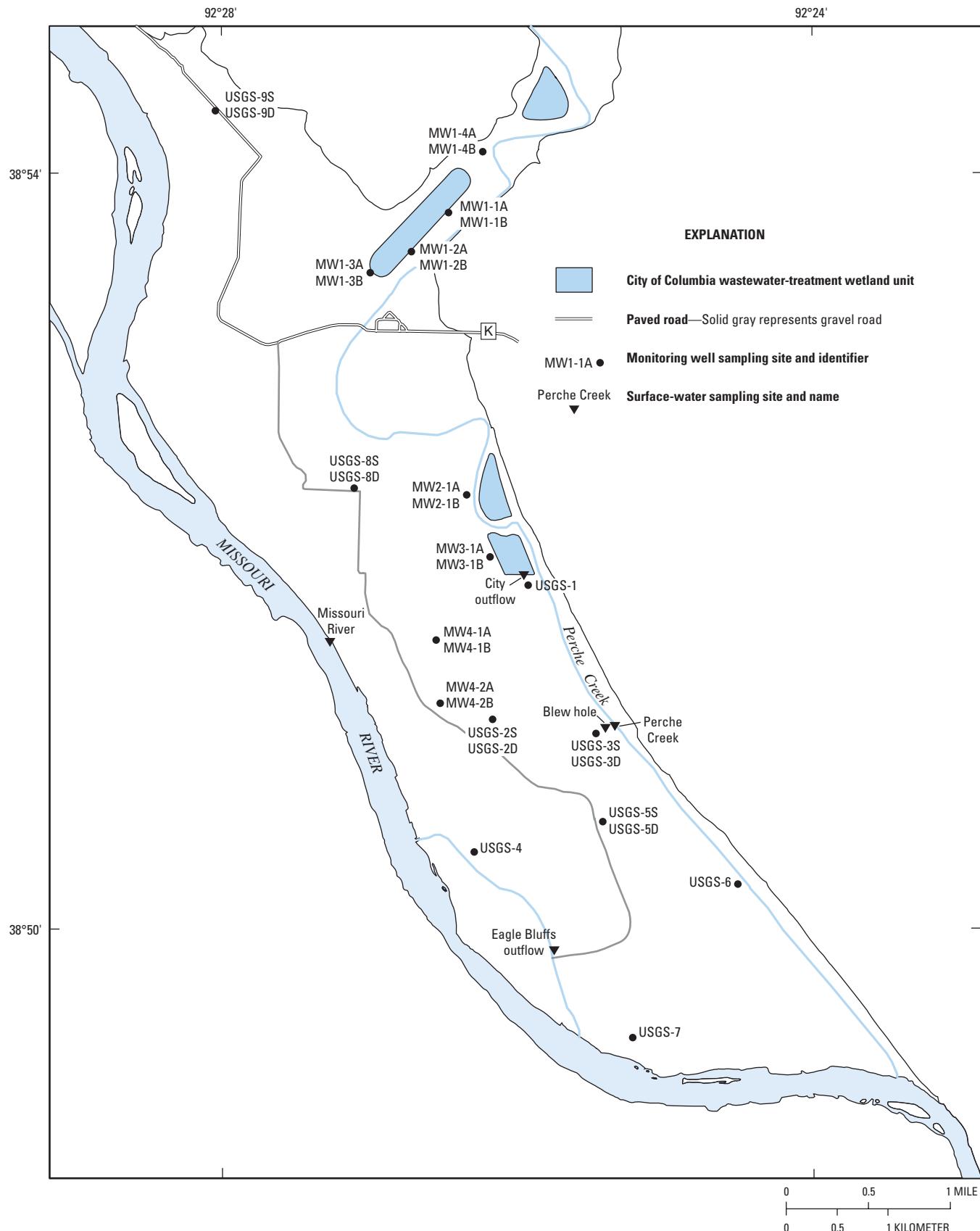
Water samples were collected from 31 wells (fig. 2) from June 1999 through August 2005 and from 5 surface-water sampling sites from August 1999 through August 2003. The samples were analyzed for constituents at the U.S. Geological Survey (USGS) National Water Quality Laboratory (NWQL). Quality-assurance/quality-control (QA/QC) samples were collected and analyzed to evaluate the bias and variability associated with environmental data and interpretation of analytical results.

## Sampling Methods

Samples were collected and processed as described in Richards (1995, 1999). The water level, specific conductance, pH, temperature, dissolved oxygen, and bacteria densities were determined onsite at the time of sampling, after physical properties had stabilized (usually after pumping about two well volumes); inorganic constituent, nutrient, and organic constituent concentrations were determined by the NWQL (table 1, at the back of this report). Samples were analyzed for dissolved constituents, unless otherwise noted in the tables. Samples were analyzed according to methods described by Wershaw and others (1983), Fishman and Friedman (1989), Patton and Truitt (1992), and Fishman (1993).

The water levels listed in table 1 were measured immediately before the water in the well was pumped. Specific conductance, pH, temperature, and dissolved oxygen were determined onsite using procedures described by Wilde and Radtke (1998). Specific conductance values were measured using a portable conductivity meter with temperature compensation designed to express readings in microsiemens per centimeter at 25 °C (degrees Celsius). The pH value was measured at the time of sample collection with an electronic meter calibrated with buffers bracketing the expected pH values of the samples. The water temperature was determined with the same meter that determined the pH value. Dissolved oxygen concentrations were determined using a low-range colorimetric method or a portable temperature compensated meter.

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**Figure 2.** Location of water-quality sampling sites.

The components of analytical variability (uncertainty) in water-quality results can be estimated when QA/QC samples of the correct types and quantities are incorporated into measurement procedures. The USGS NWQL incorporates numerous QA/QC samples in the laboratory to ensure that the measurement system is functioning properly. In addition to the laboratory QA/QC procedures, replicate and blank samples were collected onsite at McBaine Bottoms. Replicate samples are collected and analyzed to determine the precision of sampling, processing, and onsite analysis. Generally replicate samples were collected immediately after a regular sample using the same equipment and sampling techniques. Blank samples were used to determine that equipment cleaning, sample collection, and processing procedures provided an inconsequential source of bias to the regular samples. For the blank samples, highly purified water was passed through the same equipment used to collect and process the water-quality samples and then stored and shipped using the same methods that were used for the water-quality samples. Regular, replicate, and blank samples were analyzed at the USGS NWQL using identical analytical techniques. A relative percent difference less than 20 percent between the regular sample and the replicate usually indicates that the sampling process is representative. Replicate samples analyses are listed in the table adjacent to the regular sample. Generally the relative percent difference was less than 20 percent between the regular samples and the replicate samples collected at McBaine Bottoms. Most compounds were not detected in any blank samples; if detected, the concentrations were near the reporting limit for the compound (data on file at the U.S. Geological Survey, Rolla, Missouri).

## Ground-Water Quality

Water-quality samples were collected from 31 wells (fig. 2). Twenty-six of the monitoring wells that were sampled were in well pairs; the well pairs are identified with the suffix A, B, S, or D. For each well pair, the shallow well (identified by A or S) is about 30 ft deep and the deep well (identified by B or D) is about 60 ft deep. Wells USGS-1 and USGS-6 are about 30 ft deep, USGS-4 and USGS-7 are about 60 ft deep, and the city of Columbia public-supply well 5 is 104 ft deep. Samples were collected at monitoring wells designated by the prefix MW1- through MW4- from June 1999 through August 2005; samples were collected at monitoring wells designated by the prefix USGS- from August 1999 through April 2003; and samples were collected at public-supply well 5 during 2003.

Constituent concentrations that have shown the most substantial changes since the operation of the wetland were dissolved sodium, potassium, calcium, sulfate, and chloride (Richards, 1999, 2002). The following concentrations were determined in samples collected from June 1999 through August 2005: calcium concentrations ranged from 77.1 to 226 mg/L (milligrams per liter), chloride concentrations ranged from 2.41 to 259 mg/L, potassium concentrations ranged from 1.59 to 8.60 mg/L, sodium concentrations ranged from 1.08 to

175 mg/L, and sulfate concentrations ranged from less than 0.2 to 271 mg/L (all concentrations were dissolved). The Missouri secondary maximum contaminant level for drinking water for chloride and sulfate is 250 mg/L (Missouri Department of Natural Resources, 2005).

Nutrients (nitrogen and phosphorous species) are of particular interest in a wetland environment, especially one in which the source of water is treated sewage effluent. The concentration of dissolved ammonia as nitrogen ranged from less than 0.02 to 4.05 mg/L (milligrams per liter). Dissolved nitrite plus nitrate as nitrogen concentrations ranged from less than 0.05 to 0.46 mg/L. Total phosphorous concentrations ranged from less than 0.04 to 1.68 mg/L, dissolved phosphorous concentrations ranged from less than 0.04 to 1.50 mg/L, and dissolved orthophosphorous concentrations ranged from less than 0.01 to 1.83 mg/L.

Fecal coliform densities were determined for sampling sites from 1999 through 2002 (data on file at the U.S. Geological Survey, Rolla, Missouri). Densities in samples from monitoring wells were less than 5 col/100 mL (colonies per 100 milliliters). However, during sampling on August 23 through 25, 2000, densities in samples from seven monitoring wells ranged from an estimated 7 to an estimated 150 col/100 mL. These wells included monitoring wells MW3-1A, MW4-1A, MW4-2A, USGS-4, USGS-5S, USGS-6, and USGS-7 (fig. 2).

Dissolved trace-element concentrations were determined in selected samples from monitoring wells collected in June and September 1999 (table 2, at the back of this report), except for iron. Iron concentrations were determined for all samples collected from 1999 to 2005 (table 1) and ranged from less than 6 to 42,900 µg/L (micrograms per liter). Arsenic concentrations were less than 10 µg/L in all samples except for those from monitoring wells MW1-3A and MW1-4B. In samples from these wells, the concentrations ranged from 11 to 37 µg/L. Concentrations of beryllium, cadmium, chromium, copper, lead, molybdenum, and silver were less than the reporting limit. Detected concentrations for mercury, nickel, selenium, vanadium, and zinc were at the reporting limit or were estimated less than the reporting limit (table 2).

In June 1999, water-quality samples were collected at five monitoring wells (MW1-3B, MW1-4A, MW2-1A, MW4-1A, and USGS-9S) for the determination of organic compounds and pesticides. The samples were analyzed for concentrations of selected organic compounds and pesticides (table 3, at the back of this report). No constituent concentrations were detected in these samples. Concentrations of wastewater organic compounds and pesticides were determined in samples from selected monitoring wells from 1999 through 2003. A list of wastewater organic compounds (table 4, at the back of this report) and pesticides (table 5, at the back of this report) that were analyzed and their minimum reporting limits are given. The concentrations of wastewater organic compounds and pesticides are listed in table 6, at the back of the report. Six wastewater organic compounds and pesticides were detected in samples from monitoring wells MW3-1A and USGS-3S, and seven in samples from monitoring well MW1-3A. Detected concen-

## **6 Water-Quality Data, 1999–2005, and Ground-Water Level Data, 2004–2005, for McBaine Bottoms, Columbia, Missouri**

trations were estimated or their presence verified, but not quantified. The exceptions were atrazine concentrations of 0.007 µg/L detected in a water sample from monitoring well MW4-1A and 0.008 µg/L detected in a sample from monitoring well MW1-3B and 10 phenol concentrations that ranged from 0.5 to 1.8 µg/L. The phenol concentrations were detected in samples from monitoring wells MW1-1A, MW1-3A, MW1-4A, MW3-1A, MW4-1A, MW4-2A, USGS-3S, and USGS-9D.

### **Surface-Water Quality**

The five surface-water sites (fig. 2) include a scour hole caused by levee failures during past flooding that has formed along the levee surrounding the study area (blew hole), the outflow from the treatment wetlands (city outflow), the outflow from the Eagle Bluffs Conservation Area (Eagle Bluffs outflow), a site on Perche Creek near the blew hole (Perche Creek), and a site on the Missouri River near the Eagle Bluffs Conservation Area (Missouri River). Samples were collected at these sites from August 1999 through August 2003, except for the Missouri River site where samples were collected during 2003.

Calcium concentrations ranged from 31.6 to 104 mg/L, chloride concentrations ranged from 8.67 to 289 mg/L, potassium concentrations ranged from 3.91 to 41.5 mg/L, sodium concentrations ranged from 6.18 to 219 mg/L, and sulfate concentrations ranged from 33.4 to 119 mg/L (table 1; all concentrations were dissolved). All of the minimum concentrations were detected in samples from Perche Creek.

Nutrient concentrations were measured in samples collected from the surface-water sites (table 1). The concentration of dissolved ammonia as nitrogen ranged from less than 0.02 to an estimated concentration of 14.6 mg/L. Dissolved nitrite plus nitrate as nitrogen concentrations ranged from less than 0.05 to 1.53 mg/L. Total phosphorous concentrations ranged from 0.07 to 3.06 mg/L, dissolved phosphorous concentrations ranged from less than 0.05 to 2.88 mg/L, and dissolved orthophosphorous concentrations ranged from less than 0.01 to 2.86 mg/L. Most of the maximum concentration were detected in samples from the city outflow.

Densities of fecal coliform bacteria in samples from the surface-water sites were larger than those in samples from monitoring wells. The densities ranged from less than 1 col/100 mL to an estimated 57,000 col/100 mL at the city outflow (data on file at the U.S. Geological Survey, Rolla, Missouri).

More than 35 wastewater organic compounds and pesticides were detected in samples from the city outflow (table 5). However, most concentrations were estimated or their presence verified, but not quantified. Atrazine concentrations in samples from three of the surface-water sampling sites (blew hole, city outflow, and Perche Creek) ranged from 0.008 to 0.192 µg/L Diazinon concentrations in samples from three of the surface-water sampling sites (city outflow, Eagle Bluffs outflow, and Perche Creek) ranged from 0.012 to an estimated 0.100 µg/L.

### **Ground-Water Level Data**

Ground-water levels were measured in more than 80 wells in McBaine Bottoms (fig. 3). They included the 30 wells that were sampled for water-quality analyses, the wells that were installed in 2000, and additional wells that included 2 wells installed by the city of Columbia and 2 wells installed by the U.S. Geological Survey. Initially, 55 wells were installed in 2000, but shortly thereafter, monitoring well MW-149 was destroyed. The altitude of monitoring well measuring points (usually the top of the riser pipe) was surveyed so that water levels could be accurately referenced to a common datum (NGVD 29). An electric tape was lowered into the well, and the depth to the ground water from the measuring point was read to the nearest 0.01 ft. Water-level measurements were made in February and August 2004 and March and August 2005 (table 7, at the back of this report). Water-level measurements at all sites were made during the same day so the Missouri River stage fluctuations or temporal ground-water fluctuations would have a minimal effect on the measurements.

Water levels ranged from 548.54 ft above NGVD 29 in monitoring well MW-147 to 576.55 ft above NGVD 29 in monitoring well MW-142. The difference in water levels from February 2004 to August 2005 ranged from 0.13 ft at MW-150 to 10.97 ft at MW-152.

### **Summary**

The U.S. Geological Survey, in cooperation with the city of Columbia, Missouri, and the Missouri Department of Conservation, collected ground-water quality data from June 1999 through August 2005, surface-water quality data from August 1999 through August 2003, and water-level data from February and August 2004 and March and August 2005 in McBaine Bottoms, southwest of Columbia. McBaine Bottoms, adjacent to the Missouri River, is the location of the municipal-supply well field for the city of Columbia, the city of Columbia wastewater-treatment wetlands, and the Missouri Department of Conservation Eagle Bluffs Conservation Area.

This report presents water-quality data, which include water-quality analyses of samples collected from 36 water-quality sampling sites (31 were wells and 5 were surface-water sites), and ground-water level data, which include water-level measurements from more than 80 wells. Water samples were analyzed for physical properties, inorganic chemical constituents, nutrients, and dissolved iron. Selected samples were analyzed for trace elements, wastewater organic compounds, and pesticides.

In samples from monitoring wells, calcium concentrations ranged from 77.1 to 226 mg/L (milligrams per liter), chloride concentrations ranged from 2.41 to 259 mg/L, potassium concentrations ranged from 1.59 to 8.60 mg/L, sodium concentrations ranged from 1.08 to 175 mg/L, and sulfate concentrations ranged from less than 0.2 to 271 mg/L (all concentrations were

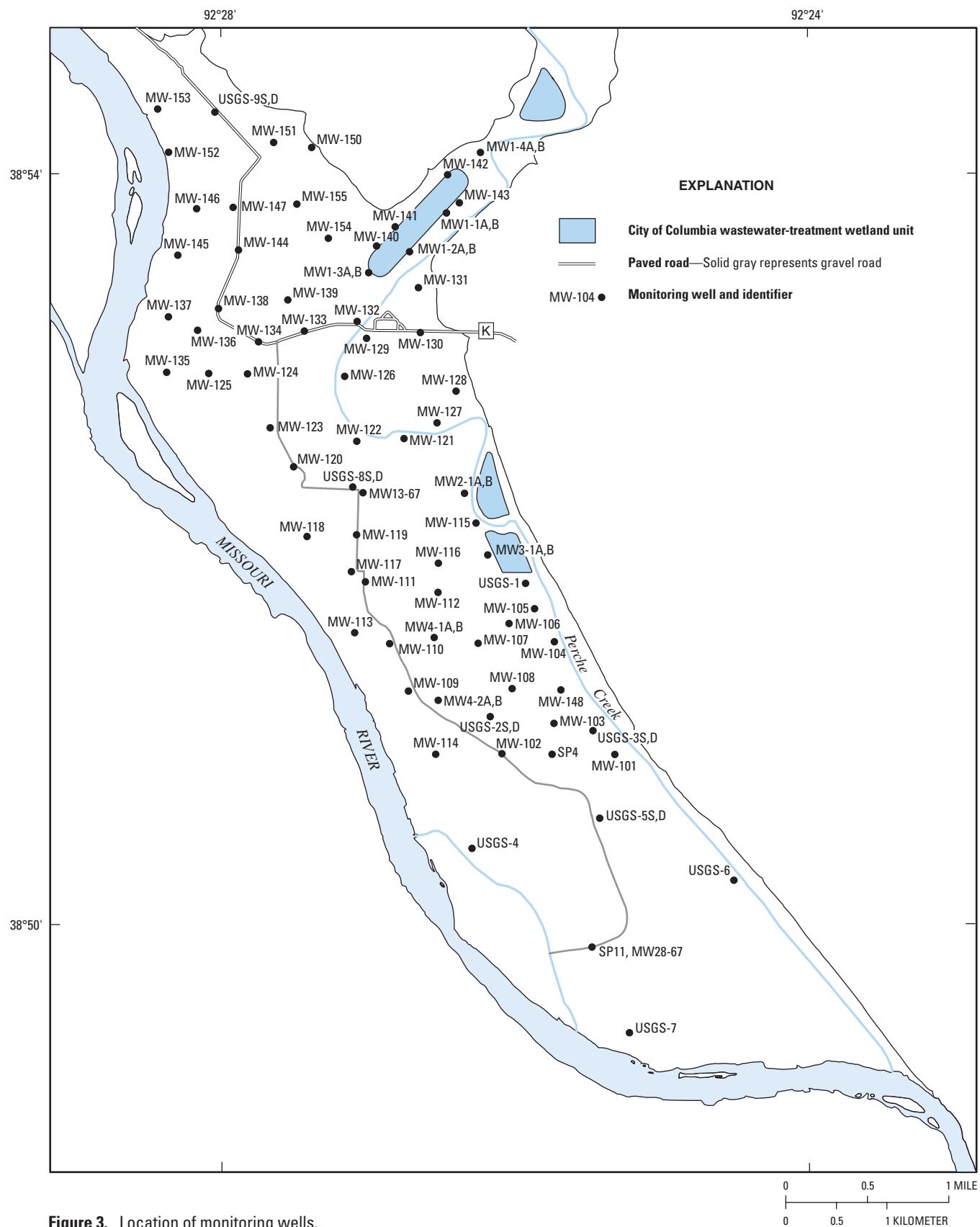


Figure 3. Location of monitoring wells.

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dissolved). Dissolved nitrite plus nitrate as nitrogen concentrations ranged from less than 0.05 to 0.46 mg/L. Total phosphorous concentrations ranged from less than 0.04 to 1.68 mg/L, dissolved phosphorous concentrations ranged from less than 0.04 to 1.50 mg/L, and dissolved orthophosphorous concentrations ranged from less than 0.01 to 1.83 mg/L. Dissolved iron concentrations ranged from less than 6 to 42,900 µg/L (micrograms per liter). Dissolved arsenic concentrations in samples from two monitoring wells ranged from 11 to 37 µg/L.

In samples from surface-water sampling sites, calcium concentrations ranged from 31.6 to 104 mg/L, chloride concentrations ranged from 8.67 to 289 mg/L, potassium concentrations ranged from 3.91 to 41.5 mg/L, sodium concentrations ranged from 6.18 to 219 mg/L, and sulfate concentrations ranged from 33.4 to 119 mg/L (all concentrations were dissolved). All of the minimum concentrations were detected in samples from Perche Creek. Dissolved nitrite plus nitrate as nitrogen concentrations ranged from less than 0.05 to 1.53 mg/L. Total phosphorous concentrations ranged from 0.07 to 3.06 mg/L, dissolved phosphorous concentrations ranged from less than 0.05 to 2.88 mg/L, and dissolved orthophosphorous concentrations ranged from less than 0.01 to 2.86 mg/L. Most of the maximum concentration were detected in samples from the city outflow.

More than 35 wastewater organic compounds and pesticides were detected in samples from the city outflow. However, most concentrations were estimated or their presence verified, but not quantified.

Water levels in monitoring wells ranged from 548.54 ft to 576.55 ft above the National Geodetic Vertical Datum of 1929 (NGVD 29). The difference in water levels from February 2004 to August 2005 ranged from 0.13 ft to 10.97 ft.

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## **Tables**

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**Table 1.** Values of physical properties and concentrations of inorganic constituents and nutrients in samples from wells and surface-water sites, 1999–2005.

[ $\mu\text{S}/\text{cm}$ , microsiemens per centimeter at 25 degrees Celsius; pH, in standard units;  $^{\circ}\text{C}$ , degrees Celsius; constituent concentrations are dissolved, unless otherwise noted; mg/L, milligrams per liter; CaCO<sub>3</sub>, calcium carbonate; ANC, total acid neutralizing capacity, incremental titration; N, nitrogen;  $\mu\text{g}/\text{L}$ , micrograms per liter; NGVD 29, National Geodetic Vertical Datum of 1929; --, no data; <, less than; E, estimated; \*, replicate sample; >, greater than]

Date	Time	Waterlevel (feet below measuring point)	Specific conductance ( $\mu\text{S}/\text{cm}$ )	pH	Temperature ( $^{\circ}\text{C}$ )	Dissolved oxygen (mg/L)	Hardness (mg/L as CaCO <sub>3</sub> )	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Alkalinity, fixed endpoint (mg/L)	ANC (mg/L)
MW1-1A (measuring point altitude 578.50 feet above NGVD 29)													
06-03-99	1040	7.51	883	6.7	15.2	<0.1	380	119	21.0	24.2	2.72	--	303
09-02-99	1000	--	928	6.6	15.2	<.1	440	138	23.2	24.5	3.00	--	314
03-07-00	1240	10.29	923	6.6	16.4	<.1	400	124	22.0	22.5	2.90	303	306
08-24-00	1450	10.07	899	6.5	16.6	<.1	380	119	21.1	24.7	2.80	281	287
02-21-01	1020	10.07	852	6.5	15.4	<.1	400	124	21.6	25.0	2.56	277	276
08-28-01	1320	9.45	970	6.6	15.9	<.1	420	132	23.0	25.2	2.96	296	292
02-28-02	1010	9.75	893	6.7	14.3	<.1	380	120	20.4	25.1	2.72	269	269
08-20-02	1420	9.92	1,020	6.8	16.4	<.1	430	133	22.6	27.3	2.97	287	275
04-03-03	1100	9.67	1,060	6.6	15.6	<.1	--	--	--	--	--	--	--
08-28-03	1020	11.34	1,020	6.7	15.9	<.1	--	--	--	--	--	--	--
02-26-04	1320	9.44	1,040	6.7	14.9	<.1	--	155	26.9	27.9	3.28	316	308
08-25-04	1140	9.52	1,110	6.8	15.9	--	530	167	28.2	28.6	3.14	315	309
03-02-05	1210	8.29	1,170	6.6	15.0	--	620	192	32.8	28.4	3.41	341	341
08-03-05	1200	10.12	1,100	6.6	15.7	--	472	149	24.2	26.6	2.85	350	352
MW1-1B (measuring point altitude 578.34 feet above NGVD 29)													
06-03-99	1000	10.44	1,340	6.8	15.1	<.1	660	201	38.0	21.9	6.74	--	439
09-02-99	1050	--	1,290	6.8	15.5	<.1	690	214	38.0	21.6	7.04	--	444
03-07-00	1330	17.32	1,270	6.9	16.1	<.1	590	179	34.3	20.2	5.88	436	441
08-24-00	1540	16.71	1,270	6.7	16.9	<.1	610	186	34.8	19.7	7.14	439	450
02-21-01	1100	15.70	1,180	6.7	14.0	<.1	630	193	36.1	20.4	6.39	436	435
08-28-01	1550	15.49	1,310	6.9	16.1	<.1	640	195	36.3	20.1	6.83	439	437
02-28-02	1100	16.67	1,260	7.0	14.3	<.1	590	183	33.4	19.2	6.43	438	438
08-20-02	1330	16.07	1,350	7.0	16.0	<.1	650	200	35.9	20.9	6.47	439	407
02-26-04	1400	16.20	1,230	6.9	14.8	--	650	199	36.6	20.8	6.86	427	403
08-25-04	1230	16.15	1,300	7.0	16.8	--	680	209	37.2	22.0	6.68	438	421
03-02-05	1300	14.43	1,290	6.9	14.6	--	730	226	39.5	21.2	7.00	436	479
08-03-05	1230	16.98	1,170	6.8	15.1	--	647	203	34.4	19.8	6.84	472	476

**Table 1.** Values of physical properties and concentrations of inorganic constituents and nutrients in samples from wells and surface-water sites, 1999–2005.—Continued

[ $\mu\text{S}/\text{cm}$ , microsiemens per centimeter at 25 degrees Celsius; pH, in standard units;  $^{\circ}\text{C}$ , degrees Celsius; constituent concentrations are dissolved, unless otherwise noted; mg/L, milligrams per liter; CaCO<sub>3</sub>, calcium carbonate; ANC, total acid neutralizing capacity, incremental titration; N, nitrogen;  $\mu\text{g}/\text{L}$ , micrograms per liter; NGVD 29, National Geodetic Vertical Datum of 1929; --, no data; <, less than; E, estimated; \*, replicate sample; >, greater than]

Date	Time	Sulfate (mg/L)	Chloride (mg/L)	Fluoride (mg/L)	Residue, sum of constituents (mg/L)	Nitrite as N (mg/L)	Nitrite plus nitrate as N (mg/L)	Ammonia as N (mg/L)	Ammonia plus organic N, total (mg/L)	Phosphorous, total (mg/L)	Phosphorous, dissolved (mg/L)	Ortho- phosphorous (mg/L)	Iron ( $\mu\text{g}/\text{L}$ )
MW1-1A													
06-03-99	1040	133	11.1	0.2	566	0.036	<0.05	1.29	1.3	1.47	1.50	1.16	25,500
09-02-99	1000	158	11.0	.2	622	.025	<.05	1.29	1.2	1.28	1.15	.84	26,900
03-07-00	1240	168	12.2	.1	560	.022	<.05	1.15	1.4	1.68	<.05	.83	22,200
08-24-00	1450	159	13.4	.2	535	.024	<.05	1.09	1.2	1.49	1.41	.94	22,300
02-21-01	1020	179	12.4	.2	556	E.004	<.05	1.12	1.2	1.40	.62	.21	22,900
08-28-01	1320	140	40.8	.2	564	E.018	<.05	E1.23	1.3	1.46	1.45	E.39	23,600
02-28-02	1010	172	19.3	.2	547	.027	<.05	1.23	1.3	1.47	1.23	.73	21,900
08-20-02	1420	157	34.8	.2	576	.028	<.05	1.23	1.4	1.45	1.35	.40	22,700
04-03-03	1100	--	13.6	--	--	--	--	--	--	--	--	--	--
08-28-03	1020	--	22.2	--	--	--	--	--	--	--	--	--	--
02-26-04	1320	200	25.4	.2	641	.109	<.60	1.20	1.5	1.51	1.41	.81	7,830
08-25-04	1140	214	27.2	.2	687	<.008	<.06	1.26	1.5	1.44	.29	<.02	28,400
03-02-05	1210	224	26.6	.2	744	<.008	<.06	1.30	1.4	1.55	1.34	<.02	32,500
08-03-05	1200	184	49.1	.2	675	<.008	<.06	1.20	1.4	1.44	.70	<.02	25,160
MW1-1B													
06-03-99	1000	268	12.4	.2	904	.077	<.05	2.99	2.5	1.30	1.27	1.24	36,000
09-02-99	1050	271	14.4	.2	928	.065	<.05	2.50	2.3	1.20	1.10	1.40	37,800
03-07-00	1330	257	12.3	.2	809	.018	<.05	2.28	2.6	1.41	<.05	.90	32,600
08-24-00	1540	241	12.8	.2	801	<.010	<.05	2.20	2.4	1.34	1.09	<.01	33,100
02-21-01	1100	251	11.5	.3	817	<.006	<.05	2.18	2.4	1.30	.10	.02	34,300
08-28-01	1550	244	11.4	.2	811	E.009	<.05	E2.36	2.4	1.37	1.29	E.10	34,100
02-28-02	1100	256	12.9	.2	811	.090	<.05	2.22	2.4	1.35	1.23	.56	32,500
08-20-02	1330	245	11.5	.2	825	.085	<.05	2.40	2.5	1.38	1.49	1.34	33,900
02-26-04	1400	241	12.6	.2	816	.095	<.60	2.14	2.5	1.41	.99	1.13	36,500
08-25-04	1230	242	12.1	.2	833	<.008	<.06	4.05	2.4	1.38	.92	<.02	35,700
03-02-05	1300	247	12.5	.2	879	<.008	<.06	3.64	2.4	1.36	1.11	<.02	33,260
08-03-05	1230	247	12.7	.2	842	E.004	<.06	2.18	2.4	1.34	.26	<.02	30,760

**Table 1.** Values of physical properties and concentrations of inorganic constituents and nutrients in samples from wells and surface-water sites, 1999–2005.—Continued

[ $\mu\text{S}/\text{cm}$ , microsiemens per centimeter at 25 degrees Celsius; pH, in standard units;  $^{\circ}\text{C}$ , degrees Celsius; constituent concentrations are dissolved, unless otherwise noted; mg/L, milligrams per liter;  $\text{CaCO}_3$ , calcium carbonate; ANC, total acid neutralizing capacity, incremental titration; N, nitrogen;  $\mu\text{g}/\text{L}$ , micrograms per liter; NGVD 29, National Geodetic Vertical Datum of 1929; --, no data; <, less than; E, estimated; \*, replicate sample; >, greater than]

Date	Time	Water level (feet below measuring point)	Specific conductance ( $\mu\text{S}/\text{cm}$ )	pH	Temperature ( $^{\circ}\text{C}$ )	Dissolved oxygen (mg/L)	Hardness (mg/L as $\text{CaCO}_3$ )	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Alkalinity, fixed endpoint (mg/L)	ANC (mg/L)
MW1-2A (measuring point altitude 573.38 feet above NGVD 29)													
06-03-99	0900	8.36	1,390	7.2	14.5	<0.1	360	100	27.6	139	5.45	--	344
09-02-99	0810	--	1,410	7.1	15.2	<.1	400	112	28.9	148	5.92	--	370
03-07-00	1100	18.02	1,440	7.0	16.1	<.1	390	108	30.4	140	5.69	364	365
08-24-00	1320	18.62	1,380	7.0	15.6	<.1	390	108	30.2	125	5.46	356	359
02-21-01	1310	19.38	--	7.0	13.6	<.1	410	113	31.3	131	4.95	364	364
08-28-01	1440	14.43	1,430	7.1	16.2	<.1	400	111	30.7	137	5.76	360	343
02-28-02	1310	18.51	1,700	7.2	14.7	<.1	480	132	35.7	158	6.07	481	481
08-20-02	1520	16.70	1,770	7.2	16.8	<.1	480	135	35.3	175	6.16	414	382
04-03-03	1000	20.82	1,560	7.1	15.4	<.1	--	--	--	--	--	--	--
08-28-03	1100	20.21	1,420	7.1	15.9	<.1	--	--	--	--	--	--	--
02-26-04	1500	20.66	1,190	7.1	14.9	<.1	470	131	35.3	85.1	5.49	333	181
08-25-04	1015	17.61	992	7.3	15.5	--	450	125	33.5	46.5	4.86	414	230
03-02-05	1000	17.63	919	7.0	14.1	--	490	137	35.7	27.7	4.20	430	422
08-03-05	1100	18.71	989	7.0	15.0	--	464	129	34.7	31.3	4.39	391	393
MW1-2B (measuring point altitude 573.45 feet above NGVD 29)													
06-03-99	0820	8.42	1,370	7.1	15.0	<.1	540	154	38.1	60.4	5.87	--	399
09-02-99	0900	--	1,400	7.1	15.2	<.1	550	157	37.5	85.6	6.17	--	388
03-07-00	1130	18.10	1,370	7.1	15.9	<.1	450	127	31.7	90.8	5.99	379	380
08-24-00	1400	18.70	1,330	7.1	15.8	<.1	470	135	33.0	73.8	6.41	399	400
02-21-01	1350	19.46	--	7.1	14.1	<.1	470	136	32.6	109	5.97	380	379
08-28-01	1530	14.48	1,410	7.2	15.9	<.1	510	145	36.3	86.6	6.25	418	385
02-28-02	1400	18.98	1,470	7.3	14.5	<.1	450	128	31.6	115	6.18	426	425
08-20-02	1610	16.76	1,580	7.3	16.6	<.1	510	144	35.6	117	6.38	432	361
02-26-04	1540	20.72	1,290	7.3	14.7	--	480	137	32.6	99.5	6.55	325	387
08-25-04	1050	17.67	992	7.4	16.2	--	420	119	29.0	50.7	5.67	421	321
03-02-05	1100	17.68	1,180	7.1	14.5	--	500	142	35.6	66.3	6.13	433	438
08-03-05	1115	18.75	1,400	7.2	14.9	--	559	158	40.0	79.6	6.38	448	450

**Table 1.** Values of physical properties and concentrations of inorganic constituents and nutrients in samples from wells and surface-water sites, 1999–2005.—Continued

[ $\mu\text{S}/\text{cm}$ , microsiemens per centimeter at 25 degrees Celsius; pH, in standard units;  $^{\circ}\text{C}$ , degrees Celsius; constituent concentrations are dissolved, unless otherwise noted; mg/L, milligrams per liter; CaCO<sub>3</sub>, calcium carbonate; ANC, total acid neutralizing capacity, incremental titration; N, nitrogen;  $\mu\text{g}/\text{L}$ , micrograms per liter; NGVD 29, National Geodetic Vertical Datum of 1929; --, no data; <, less than; E, estimated; \*, replicate sample; >, greater than]

Date	Time	Sulfate (mg/L)	Chloride (mg/L)	Fluoride (mg/L)	Residue, sum of constituents (mg/L)	Nitrite as N (mg/L)	Nitrite plus nitrate as N (mg/L)	Ammonia as N (mg/L)	Ammonia plus organic N, total (mg/L)	Phosphorous, total (mg/L)	Phosphorous, dissolved (mg/L)	Ortho- phosphorous (mg/L)	Iron ( $\mu\text{g}/\text{L}$ )
MW1-2A													
06-03-99	0900	58.3	208	0.4	773	<0.010	<0.05	0.15	0.29	0.14	<0.05	0.12	2,610
09-02-99	0810	54.1	214	.4	815	<.010	<.05	.11	.25	.14	.11	.18	3,220
03-07-00	1100	69.0	232	.3	806	<.010	<.05	.11	.26	.11	.09	.07	2,470
08-24-00	1320	71.4	203	.3	759	<.010	<.05	.10	.23	.11	.10	.10	1,970
02-21-01	1310	66.7	204	.4	772	<.006	<.05	.08	.20	.12	.06	.04	1,500
08-28-01	1440	62.0	207	.3	773	<.006	<.05	E.09	.21	.14	.08	E.11	2,990
02-28-02	1310	62.4	259	.4	946	E.004	<.05	.11	.27	.14	.12	.12	3,580
08-20-02	1520	84.4	242	.3	930	<.008	<.05	.12	.28	.15	.10	.13	3,640
04-03-03	1000	--	221	--	--	--	--	--	--	--	--	--	--
08-28-03	1100	--	198	--	--	--	--	--	--	--	--	--	--
02-26-04	1500	48.3	137	.3	647	E.050	<.60	.85	.23	.11	.10	<.36	2,650
08-25-04	1015	38.1	59.4	.3	559	<.008	E.03	.09	.16	.13	.09	.08	2,560
03-02-05	1000	32.4	36.2	.3	528	<.008	<.06	.06	.13	.06	E.04	E.13	1,490
08-03-05	1100	35.9	78.2	.3	552	<.008	<.06	.08	.15	.10	.04	.02	2,700
MW1-2B													
06-03-99	0820	50.6	175	.2	770	.017	<.05	.73	.48	.21	.32	.27	10,200
09-02-99	0900	64.7	198	.2	829	.013	<.05	.62	.87	.30	.28	.35	9,810
03-07-00	1130	57.3	194	.2	745	<.010	<.05	.57	.77	.29	<.05	.23	8,650
08-24-00	1400	37.0	173	.2	708	.014	<.05	.55	.68	.31	.31	.26	9,190
02-21-01	1350	59.9	215	.3	796	<.006	<.05	.59	.78	.33	.36	.09	9,220
08-28-01	1530	36.5	186	.2	756	E.005	<.05	E.73	.89	.34	.29	E.27	8,800
02-28-02	1400	45.4	216	.3	808	.015	<.05	.70	1.1	.33	.25	.30	8,440
08-20-02	1610	44.9	208	.2	826	E.007	<.05	.69	.87	.34	.33	.38	8,930
02-26-04	1540	30.7	166	.2	677	<.080	<.60	.51	.72	.33	.28	E.29	9,410
08-25-04	1050	1.70	72.2	.2	539	<.008	<.06	.52	.63	.35	.25	<.02	7,380
03-02-05	1100	13.7	123	.2	659	<.008	<.06	.51	.68	.30	.16	<.02	8,830
08-03-05	1115	31.2	188	.2	782	<.008	<.06	.66	.86	.34	.07	<.02	8,320

**Table 1.** Values of physical properties and concentrations of inorganic constituents and nutrients in samples from wells and surface-water sites, 1999–2005.—Continued

[ $\mu\text{S}/\text{cm}$ , microsiemens per centimeter at 25 degrees Celsius; pH, in standard units;  $^{\circ}\text{C}$ , degrees Celsius; constituent concentrations are dissolved, unless otherwise noted; mg/L, milligrams per liter;  $\text{CaCO}_3$ , calcium carbonate; ANC, total acid neutralizing capacity, incremental titration; N, nitrogen;  $\mu\text{g}/\text{L}$ , micrograms per liter; NGVD 29, National Geodetic Vertical Datum of 1929; --, no data; <, less than; E, estimated; \*, replicate sample; >, greater than]

Date	Time	Water level (feet below measuring point)	Specific conductance ( $\mu\text{S}/\text{cm}$ )	pH	Temperature ( $^{\circ}\text{C}$ )	Dissolved oxygen (mg/L)	Hardness (mg/L as $\text{CaCO}_3$ )	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Alkalinity, fixed endpoint (mg/L)	ANC (mg/L)
MW1-3A (measuring point altitude 575.05 feet above NGVD 29)													
06-03-99	1250	10.42	783	7.1	15.3	<0.1	400	104	32.6	5.54	4.90	--	340
09-01-99	1440	--	971	7.2	15.2	<.1	480	126	41.0	6.18	4.60	--	335
03-07-00	1440	20.26	1,040	7.2	16.8	<.1	490	129	41.8	6.07	5.18	336	337
08-22-00	1230	21.34	1,120	7.1	16.9	<.1	550	142	47.0	6.82	4.76	349	354
02-20-01	1640	21.75	1,120	7.0	14.6	<.1	580	153	48.8	8.76	4.88	360	359
08-28-01	1610	16.39	1,300	7.1	15.8	<.1	640	169	52.3	1.08	4.71	340	289
02-28-02	1520	20.84	1,170	7.2	15.0	<.1	540	144	45.0	13.2	5.55	364	363
08-20-02	0930	19.37	1,300	7.2	15.8	<.1	590	158	47.8	18.0	4.96	361	293
04-02-03	1630	23.50	1,140	7.2	16.3	<.1	--	--	--	--	--	--	--
08-28-03	1140	22.51	1,230	7.1	16.4	<.1	--	--	--	--	--	--	--
02-27-04	1000	23.17	1,220	7.1	15.0	--	600	159	49.6	33.1	6.21	246	211
08-25-04	1430	19.60	1,380	7.2	16.8	--	630	167	51.3	42.3	5.79	388	239
03-07-05	1100	19.81	1,320	7.0	14.8	--	590	154	50.3	48.3	6.27	384	446
08-03-05	1525	20.67	1,255	7.1	15.0	--	576	154	46.3	48.4	5.77	385	390
MW1-3B (measuring point altitude 574.97 feet above NGVD 29)													
06-03-99	1350	10.45	915	7.1	15.2	<.1	450	128	31.8	5.98	3.61	--	337
09-01-99	1550	--	1,030	7.1	15.2	<.1	520	146	37.5	6.89	4.01	--	362
03-07-00	1410	20.30	1,090	7.1	15.8	<.1	510	145	36.8	8.66	4.19	367	367
08-22-00	1310	21.39	1,150	7.0	16.7	<.1	540	152	39.1	12.6	4.34	372	378
02-20-01	1600	21.78	1,040	7.0	14.2	<.1	530	152	37.5	11.8	3.88	358	359
08-28-01	1645	16.44	1,210	7.1	15.8	<.1	580	165	40.3	13.8	4.53	375	293
02-28-02	1440	20.89	1,210	7.2	14.5	<.1	540	155	38.0	15.1	4.57	374	374
08-20-02	0830	19.40	1,330	7.2	15.8	<.1	590	170	40.1	18.8	4.59	384	301
02-27-04	0920	23.21	1,260	7.1	14.8	<.1	620	177	42.7	31.2	4.97	273	173
08-25-04	1345	19.64	1,340	7.3	15.8	--	630	180	42.7	35.8	4.75	379	157
03-07-05	1140	19.85	1,320	7.1	14.7	--	610	175	41.4	39.4	4.89	389	450
*	1150	19.85	1,320	7.1	14.7	--	600	173	40.9	38.8	4.95	389	450
08-03-05	1520	20.71	1,295	7.2	15.0	--	605	174	41.4	39.2	4.79	408	416

**Table 1.** Values of physical properties and concentrations of inorganic constituents and nutrients in samples from wells and surface-water sites, 1999–2005.—Continued

[ $\mu\text{S}/\text{cm}$ , microsiemens per centimeter at 25 degrees Celsius; pH, in standard units;  $^{\circ}\text{C}$ , degrees Celsius; constituent concentrations are dissolved, unless otherwise noted; mg/L, milligrams per liter; CaCO<sub>3</sub>, calcium carbonate; ANC, total acid neutralizing capacity, incremental titration; N, nitrogen;  $\mu\text{g}/\text{L}$ , micrograms per liter; NGVD 29, National Geodetic Vertical Datum of 1929; --, no data; <, less than; E, estimated; \*, replicate sample; >, greater than]

Date	Time	Sulfate (mg/L)	Chloride (mg/L)	Fluoride (mg/L)	Residue, sum of constituents (mg/L)	Nitrite as N (mg/L)	Nitrite plus nitrate as N (mg/L)	Ammonia as N (mg/L)	Ammonia plus organic N, total (mg/L)	Phosphorous, total (mg/L)	Phosphorous, dissolved (mg/L)	Ortho- phosphorous (mg/L)	Iron ( $\mu\text{g}/\text{L}$ )
MW1-3A													
06-03-99	1250	35.5	34.7	0.3	475	0.012	<0.05	0.66	0.70	0.64	0.28	0.36	7,100
09-01-99	1440	51.1	92.6	.3	574	<.010	<.05	.43	.43	.44	.35	.54	7,190
03-07-00	1440	57.0	114	.3	563	<.010	<.05	.47	.53	.37	<.05	.23	7,080
08-22-00	1230	53.3	131	.3	602	.018	<.05	.43	.54	.30	.18	.12	6,920
02-20-01	1640	63.9	147	.3	647	<.006	<.05	.38	.44	.21	.12	.05	4,250
08-28-01	1610	69.7	166	.3	683	<.006	<.05	E.29	.39	.21	.14	E.03	5,980
02-28-02	1520	64.1	143	.3	642	.016	<.05	.49	.57	.28	.24	.24	6,850
08-20-02	0930	64.6	147	.3	663	E.004	<.05	.38	.47	.23	.17	.13	6,420
04-02-03	1630	--	128	--	--	--	--	--	--	--	--	--	--
08-28-03	1140	--	167	--	--	--	--	--	--	--	--	--	--
02-27-04	1000	67.4	161	.3	624	<.080	<.60	<.40	.30	.04	<.04	<.36	--
08-25-04	1430	75.2	174	.3	753	<.008	<.06	.52	.63	.16	.12	<.02	4,010
03-07-05	1100	74.1	165	.4	773	<.008	<.06	.48	.63	.16	.10	.07	5,870
08-03-05	1525	72.1	156	.3	724	<.008	<.06	.48	.57	.16	.05	.03	6,000
MW1-3B													
06-03-99	1350	32.3	73.7	.3	521	<.010	<.05	0.41	0.40	0.32	0.39	0.29	6,150
09-01-99	1550	39.1	107	.3	601	<.010	<.05	.33	.34	.27	.23	.32	6,970
03-07-00	1410	41.5	120	.3	585	<.010	<.05	.34	.42	.28	<.05	.22	6,680
08-22-00	1310	37.3	131	.3	608	<.010	<.05	.35	.47	.31	.14	.06	7,170
02-20-01	1600	43.4	123	.4	595	<.006	<.05	.34	.41	.30	.17	.07	7,230
08-28-01	1645	48.5	140	.3	644	E.009	<.05	E.39	.48	.31	.26	E.22	7,490
02-28-02	1440	46.4	148	.4	640	.013	<.05	.38	.51	.29	.26	.15	7,060
08-20-02	0830	44.8	161	.3	678	.011	<.05	.41	.51	.29	.30	.29	7,500
02-27-04	0920	44.6	175	.4	648	E.045	<.60	E.36	.56	.31	.22	E.27	8,450
08-25-04	1345	48.0	175	.3	723	<.008	<.06	.43	.54	.29	.22	<.02	8,130
03-07-05	1140	45.9	174	.4	759	<.008	<.06	.41	.53	.29	.23	<.02	7,930
*	1150	46.1	173	.4	755	<.008	<.06	.41	.52	.28	.21	<.02	7,720
08-03-05	1520	43.7	175	.4	736	<.008	<.06	.41	.56	.30	.14	.06	7,160

**Table 1.** Values of physical properties and concentrations of inorganic constituents and nutrients in samples from wells and surface-water sites, 1999–2005.—Continued

[ $\mu\text{S}/\text{cm}$ , microsiemens per centimeter at 25 degrees Celsius; pH, in standard units;  $^{\circ}\text{C}$ , degrees Celsius; constituent concentrations are dissolved, unless otherwise noted; mg/L, milligrams per liter;  $\text{CaCO}_3$ , calcium carbonate; ANC, total acid neutralizing capacity, incremental titration; N, nitrogen;  $\mu\text{g}/\text{L}$ , micrograms per liter; NGVD 29, National Geodetic Vertical Datum of 1929; --, no data; <, less than; E, estimated; \*, replicate sample; >, greater than]

Date	Time	Water level (feet below measuring point)	Specific conductance ( $\mu\text{S}/\text{cm}$ )	pH	Temperature ( $^{\circ}\text{C}$ )	Dissolved oxygen (mg/L)	Hardness (mg/L as $\text{CaCO}_3$ )	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Alkalinity, fixed endpoint (mg/L)	ANC (mg/L)
MW1-4A (measuring point altitude 583.46 feet above NGVD 29)													
06-01-99	1530	11.16	855	6.8	15.2	<0.1	420	120	27.9	18.3	1.84	--	405
*	1535	11.16	855	6.8	15.2	<.1	440	129	29.0	18.7	1.75	--	405
09-02-99	1410	--	838	7.0	14.9	<.1	470	137	30.0	19.4	1.80	--	412
*	1415	--	838	7.0	14.9	<.1	470	138	30.1	19.1	1.84	--	413
03-02-00	0820	12.49	775	6.6	13.8	<.1	390	112	26.1	17.7	1.70	397	399
*	0825	12.49	775	6.6	13.8	<.1	390	112	26.0	17.6	1.74	397	399
08-22-00	1420	12.83	758	6.9	16.9	<.1	370	107	25.1	17.8	1.60	367	385
*	1425	12.83	758	6.9	16.9	<.1	370	108	24.7	16.7	1.78	381	376
02-21-01	0820	11.52	756	6.9	13.5	<.1	400	116	26.2	18.2	1.60	371	370
*	0825	11.52	756	6.9	13.5	<.1	--	117	26.5	18.4	1.59	370	370
08-28-01	1140	11.83	807	7.0	16.1	<.1	420	121	27.5	19.1	1.74	373	366
*	1145	11.83	807	7.0	16.1	<.1	--	120	27.4	19.6	1.69	365	342
02-28-02	0920	11.72	718	7.0	14.3	<.1	360	106	23.1	17.1	1.62	369	366
*	0925	11.72	718	7.0	14.3	<.1	--	--	--	--	--	--	--
08-20-02	1130	11.91	729	7.1	16.6	<.1	350	102	22.4	17.9	1.70	341	301
*	1135	11.91	729	7.1	16.6	<.1	--	--	--	--	--	--	--
04-02-03	1530	11.35	731	7.0	15.5	<.1	--	--	--	--	--	--	--
08-28-03	0920	13.22	745	7.0	15.7	<.1	--	--	--	--	--	--	--
02-26-04	1030	11.28	787	7.0	14.4	--	420	124	27.4	19.8	1.90	276	179
*	1035	11.28	787	7.0	14.4	--	--	118	26.9	19.4	1.7	293	232
08-24-04	1130	12.14	827	7.2	15.2	--	460	135	29.4	20.3	1.88	383	220
03-02-05	1345	10.57	810	6.8	15.1	--	450	132	29.1	17.9	1.81	394	387
08-03-05	1400	12.62	810	7.0	14.6	--	424	125	27.0	17.7	1.60	378	383
MW1-4B (measuring point altitude 583.53 feet above NGVD 29)													
06-01-99	1430	15.92	712	6.8	15.9	<.1	330	94.1	22.1	17.0	2.92	--	362
09-02-99	1320	--	610	7.2	15.6	<.1	290	85.2	18.3	14.9	4.18	--	340
03-02-00	0910	23.46	569	6.8	14.5	<.1	260	77.1	16.7	13.9	3.99	328	331
08-22-00	0510	23.29	595	7.1	18.1	<.1	270	79.3	16.7	12.5	4.16	329	329
02-21-01	0930	21.26	566	7.2	13.4	<.1	270	80.5	17.2	14.1	3.70	326	325
08-28-01	1220	21.69	620	7.2	15.0	<.1	290	84.2	18.5	15.0	3.76	331	331

**Table 1.** Values of physical properties and concentrations of inorganic constituents and nutrients in samples from wells and surface-water sites, 1999–2005.—Continued

[ $\mu\text{S}/\text{cm}$ , microsiemens per centimeter at 25 degrees Celsius; pH, in standard units;  $^{\circ}\text{C}$ , degrees Celsius; constituent concentrations are dissolved, unless otherwise noted; mg/L, milligrams per liter;  $\text{CaCO}_3$ , calcium carbonate; ANC, total acid neutralizing capacity, incremental titration; N, nitrogen;  $\mu\text{g}/\text{L}$ , micrograms per liter; NGVD 29, National Geodetic Vertical Datum of 1929; --, no data; <, less than; E, estimated; \*, replicate sample; >, greater than]

Date	Time	Sulfate (mg/L)	Chloride (mg/L)	Fluoride (mg/L)	Residue, sum of constituents (mg/L)	Nitrite as N (mg/L)	Nitrite plus nitrate as N (mg/L)	Ammonia as N (mg/L)	Ammonia plus organic N, total (mg/L)	Phosphorous, total (mg/L)	Phosphorous, dissolved (mg/L)	Ortho- phosphorous (mg/L)	Iron ( $\mu\text{g}/\text{L}$ )
MW1-4A													
06-01-99	1530	72.8	7.92	0.4	510	<0.010	<0.05	0.17	0.18	0.10	E0.03	0.09	103
*	1535	72.9	7.13	.4	520	<.010	<.05	.16	.18	.10	.06	.09	114
09-02-99	1410	73.4	8.92	.4	538	<.010	<.05	.10	.15	.09	.07	.07	142
*	1415	73.8	8.80	.4	540	<.010	<.05	.12	.16	.09	.08	.09	165
03-02-00	0820	68.5	6.21	.4	471	<.010	<.05	.10	.16	.08	.07	.06	76
*	0825	68.2	5.42	.4	469	<.010	<.05	.10	.18	.07	.08	.07	74
08-22-00	1420	53.4	6.56	.4	432	<.010	<.05	.09	.17	.09	.09	.07	82
*	1425	53.1	6.57	.3	440	<.010	<.05	.09	.16	.10	.09	.07	56
02-21-01	0820	55.8	16.6	.4	458	<.006	<.05	.09	.15	.09	.09	.08	94
*	0825	55.7	16.6	.4	--	<.006	<.05	.08	.13	.10	.08	.08	25
08-28-01	1140	53.8	15.3	.4	463	<.006	<.05	E.11	.16	.10	.06	E.05	181
*	1145	51.7	15.2	.4	--	<.006	<.05	E.09	.13	.08	.07	E.06	81
02-28-02	0920	39.8	8.14	.4	418	<.008	<.05	.08	.15	.10	.08	.07	86
*	0925	--	--	--	--	--	<.05	<.21	.14	.09	.09	.08	--
08-20-02	1130	32.2	7.11	.4	388	<.008	<.05	.09	.13	.10	.08	.07	74
*	1135	--	--	--	--	--	--	--	--	--	--	--	--
04-02-03	1530	--	5.95	--	--	--	--	--	--	--	--	--	--
08-28-03	0920	--	11.4	--	--	--	--	--	--	--	--	--	--
02-26-04	1030	47.7	13.9	.4	401	E.004	<.06	.08	.15	.09	.08	E.09	44
*	1035	50.1	14.1	.4	--	E.004	<.06	.08	.15	.09	.08	<.18	58
08-24-04	1130	53.9	14.6	.4	486	<.008	<.06	.09	.17	.12	.06	.05	115
03-02-05	1345	54.4	8.8	.4	477	<.008	<.06	.09	.16	.09	.06	.05	118
08-03-05	1400	56.5	7.01	.4	466	<.008	<.06	.09	.15	.10	.08	.04	162
MW1-4B													
06-01-99	1430	28.2	4.95	.3	424	<.010	<.05	2.33	2.1	.67	<.05	.39	3,840
09-02-99	1320	.3	3.65	.2	384	<.010	<.05	4.03	3.4	1.20	.72	1.83	6,890
03-02-00	0910	<.3	2.60	.2	--	<.010	<.05	3.63	4.0	1.33	.39	1.25	6,840
08-22-00	0510	<.3	3.03	.2	--	<.010	<.05	3.50	4.1	1.33	1.45	1.12	7,060
02-21-01	0930	E.1	2.54	.2	--	<.006	<.05	3.50	3.8	1.23	.98	.63	7,260
08-28-01	1220	.6	3.17	.2	330	<.006	<.05	E3.52	3.7	1.28	.90	E.71	6,420

**Table 1.** Values of physical properties and concentrations of inorganic constituents and nutrients in samples from wells and surface-water sites, 1999–2005.—Continued

[ $\mu\text{S}/\text{cm}$ , microsiemens per centimeter at 25 degrees Celsius; pH, in standard units;  $^{\circ}\text{C}$ , degrees Celsius; constituent concentrations are dissolved, unless otherwise noted; mg/L, milligrams per liter;  $\text{CaCO}_3$ , calcium carbonate; ANC, total acid neutralizing capacity, incremental titration; N, nitrogen;  $\mu\text{g}/\text{L}$ , micrograms per liter; NGVD 29, National Geodetic Vertical Datum of 1929; --, no data; <, less than; E, estimated; \*, replicate sample; >, greater than]

Date	Time	Water level (feet below measuring point)	Specific conductance ( $\mu\text{S}/\text{cm}$ )	pH	Temperature ( $^{\circ}\text{C}$ )	Dissolved oxygen (mg/L)	Hardness (mg/L as $\text{CaCO}_3$ )	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Alkalinity, fixed endpoint (mg/L)	ANC (mg/L)
MW1-4B (measuring point altitude 583.53 feet above NGVD 29)—Continued													
02-28-02	0830	22.77	596	7.1	14.1	<0.1	270	81.2	17.0	13.4	3.73	327	326
08-20-02	1030	21.98	644	7.2	16.6	<.1	280	83.6	17.5	14.0	3.79	334	326
02-26-04	1120	21.87	580	7.2	14.4	<.1	290	87.4	18.1	14.9	3.98	329	311
08-24-04	1230	22.25	610	7.3	16.3	--	300	89.5	18.3	15.0	4.04	329	303
03-02-05	1415	20.10	699	7.1	14.9	--	390	112	26.0	17.8	2.17	356	369
08-03-05	1410	23.11	587	7.1	14.8	--	296	88.6	18.1	15.1	3.46	331	340
MW2-1A (measuring point altitude 576.89 feet above NGVD 29)													
06-02-99	1300	12.64	821	6.9	15.1	<.1	440	130	28.4	5.71	3.15	--	454
08-27-99	0810	18.88	744	6.7	14.7	<.1	430	125	28.2	4.56	2.36	--	412
02-29-00	1520	23.38	664	6.9	15.8	<.1	380	111	25.6	4.26	2.34	411	411
08-29-00	1320	22.28	787	6.9	16.2	<.1	440	129	29.2	5.69	2.88	446	449
03-01-01	0930	21.19	770	7.0	14.6	<.1	410	120	25.5	5.97	3.29	443	453
08-23-01	0830	21.52	797	6.9	14.3	<.1	440	128	28.7	5.15	2.86	365	349
02-27-02	0910	24.17	740	7.0	15.0	<.1	400	117	25.5	4.43	2.72	417	418
08-22-02	0900	23.14	757	7.0	15.7	<.1	400	120	25.7	4.95	2.55	371	279
02-26-04	0920	24.83	767	7.0	15.1	--	460	135	28.8	5.38	3.05	287	216
08-25-04	1535	22.45	798	7.0	16.3	--	460	136	29.2	5.29	3.11	370	274
03-04-05	1245	22.39	702	6.9	15.5	--	400	117	25.2	4.78	2.65	388	373
08-04-05	1050	23.58	702	6.9	14.4	--	383	113	24.4	4.51	2.43	384	385
MW2-1B (measuring point altitude 576.67 feet above NGVD 29)													
06-02-99	1400	12.42	885	7.0	14.9	<.1	450	129	29.7	10.6	5.15	--	466
08-27-99	0900	18.69	830	6.8	14.6	<.1	450	131	29.8	9.96	4.96	--	456
02-29-00	1600	23.19	732	6.9	15.1	<.1	390	113	26.7	8.76	5.16	451	456
08-29-00	1400	22.09	827	7.0	15.7	.1	500	140	35.9	9.82	4.85	463	490
03-01-01	1010	21.00	871	7.0	13.6	<.1	430	125	28.4	9.38	5.17	501	501
08-23-01	0930	21.31	915	7.0	15.6	<.1	460	133	31.4	10.9	5.31	392	406
02-27-02	0830	23.98	878	7.0	13.9	<.1	430	125	29.1	10.3	5.34	494	493
02-26-04	0840	23.30	899	7.0	14.5	<.1	490	142	32.1	11.2	5.18	370	357
08-25-04	1615	20.89	938	7.1	16.1	--	510	150	32.7	12.2	5.74	516	299
03-04-05	1315	20.87	926	7.0	15.0	--	520	153	34.4	12.8	6.23	512	594
08-04-05	1045	22.06	871	6.9	14.5	--	467	137	30.4	11.4	5.46	524	528

**Table 1.** Values of physical properties and concentrations of inorganic constituents and nutrients in samples from wells and surface-water sites, 1999–2005.—Continued

[ $\mu\text{S}/\text{cm}$ , microsiemens per centimeter at 25 degrees Celsius; pH, in standard units;  $^{\circ}\text{C}$ , degrees Celsius; constituent concentrations are dissolved, unless otherwise noted; mg/L, milligrams per liter; CaCO<sub>3</sub>, calcium carbonate; ANC, total acid neutralizing capacity, incremental titration; N, nitrogen;  $\mu\text{g}/\text{L}$ , micrograms per liter; NGVD 29, National Geodetic Vertical Datum of 1929; --, no data; <, less than; E, estimated; \*, replicate sample; >, greater than]

Date	Time	Sulfate (mg/L)	Chloride (mg/L)	Fluoride (mg/L)	Residue, sum of constituents (mg/L)	Nitrite as N (mg/L)	Nitrite plus nitrate as N (mg/L)	Ammonia as N (mg/L)	Ammonia plus organic N, total (mg/L)	Phosphorous, total (mg/L)	Phosphorous, dissolved (mg/L)	Ortho- phosphorous (mg/L)	Iron ( $\mu\text{g}/\text{L}$ )
MW1-4B—Continued													
02-28-02	0830	0.2	3.65	0.2	330	<0.008	<0.05	3.60	4.0	1.31	1.25	0.76	7,280
08-20-02	1030	.1	3.30	.2	339	<.008	<.05	3.55	4.1	1.50	1.49	1.50	7,180
02-26-04	1120	<.2	3.39	.2	--	E.004	<.06	.34	4.3	1.36	1.27	1.18	7,780
08-24-04	1230	.4	2.41	.2	339	<.008	<.06	3.62	4.0	1.41	1.27	E.01	7,780
03-02-05	1415	31.1	5.14	.3	410	E.004	E.06	.91	1.1	.38	.09	.05	548
08-03-05	1410	.9	2.62	.2	345	E.005	<.06	3.13	3.6	1.35	.82	.83	5,390
MW2-1A													
06-02-99	1300	9.3	6.88	.3	484	<.010	<.05	.09	.12	E.03	<.05	.02	314
08-27-99	0810	15.3	6.79	.3	460	<.010	.13	<.02	.10	<.05	<.05	<.01	87
02-29-00	1520	14.3	6.33	.3	411	<.010	.11	<.02	E.09	<.05	<.05	<.01	223
08-29-00	1320	11.2	6.53	.3	453	<.010	<.05	.02	E.06	<.05	<.05	<.01	147
03-01-01	0930	7.8	7.44	.4	437	<.006	<.05	.06	.10	<.06	<.06	<.02	281
08-23-01	0830	9.8	6.80	.3	400	<.006	E.04	E.03	.08	<.06	<.06	E.02	150
02-27-02	0910	12.1	6.72	.4	419	<.008	E.04	E.03	.13	<.06	<.06	<.02	188
08-22-02	0900	9.6	5.37	.3	391	<.008	.05	E.03	E.10	<.06	<.06	<.02	503
02-26-04	0920	14.5	5.70	.4	365	E.004	E.03	<.04	E.09	E.02	<.04	<.18	21
08-25-04	1535	13.7	3.98	.3	414	<.008	E.04	<.04	E.09	<.04	E.02	E.01	6
03-04-05	1245	9.5	2.87	.4	386	<.008	<.06	<.04	E.06	<.04	<.04	<.02	<30
08-04-05	1050	9.2	2.27	.3	387	<.008	E.04	<.04	.11	<.04	<.04	<.02	<6
MW2-1B													
06-02-99	1400	11.0	8.81	.2	527	.037	<.05	.59	.55	.64	.47	.44	13,000
08-27-99	0900	9.3	7.37	.2	521	.010	<.05	.47	.64	.69	.47	.30	13,500
02-29-00	1600	4.0	6.19	.2	447	<.010	<.05	.43	.53	.60	.24	.02	11,800
08-29-00	1400	.6	5.35	.2	492	.017	<.05	.44	.56	.64	<.05	.33	15,000
03-01-01	1010	.4	6.50	.3	489	<.006	<.05	.45	.56	.55	.56	.02	12,800
08-23-01	0930	.4	5.94	.2	436	E.004	<.05	.48	.64	.65	.52	E.51	13,600
02-27-02	0830	1.1	6.78	.3	487	.026	<.05	.48	.62	.66	.33	<.09	12,800
02-26-04	0840	<.2	6.21	.3	--	E.048	<.60	.41	.60	.64	.59	.64	13,600
08-25-04	1615	<.2	5.38	.3	--	<.008	<.06	.53	.61	.63	.54	<.02	4,700
03-04-05	1315	<.2	5.40	.3	--	<.008	<.06	.48	.62	.64	.22	<.02	13,910
08-04-05	1045	<.2	5.54	.3	--	<.008	<.06	.47	.61	.64	.20	<.02	11,750

**Table 1.** Values of physical properties and concentrations of inorganic constituents and nutrients in samples from wells and surface-water sites, 1999–2005.—Continued

[ $\mu\text{S}/\text{cm}$ , microsiemens per centimeter at 25 degrees Celsius; pH, in standard units;  $^{\circ}\text{C}$ , degrees Celsius; constituent concentrations are dissolved, unless otherwise noted; mg/L, milligrams per liter;  $\text{CaCO}_3$ , calcium carbonate; ANC, total acid neutralizing capacity, incremental titration; N, nitrogen;  $\mu\text{g}/\text{L}$ , micrograms per liter; NGVD 29, National Geodetic Vertical Datum of 1929; --, no data; <, less than; E, estimated; \*, replicate sample; >, greater than]

Date	Time	Water level (feet below measuring point)	Specific conductance ( $\mu\text{S}/\text{cm}$ )	pH	Temperature ( $^{\circ}\text{C}$ )	Dissolved oxygen (mg/L)	Hardness (mg/L as $\text{CaCO}_3$ )	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Alkalinity, fixed endpoint (mg/L)	ANC (mg/L)
MW3-1A (measuring point altitude 572.53 feet above NGVD 29)													
06-02-99	1440	7.34	873	7.0	15.6	<0.1	440	137	23.6	6.56	5.03	--	439
09-01-99	0900	--	835	7.0	15.0	<.1	460	145	24.7	6.63	4.54	--	437
03-08-00	0930	17.32	778	6.7	16.3	<.1	410	128	21.7	6.41	4.45	386	386
08-24-00	1040	16.33	747	7.0	16.2	<.1	390	122	20.6	7.41	4.51	349	357
02-22-01	1600	17.84	--	7.1	14.8	<.1	410	129	21.7	7.92	4.91	380	382
08-23-01	1100	15.81	791	7.2	15.5	<.1	410	129	21.7	8.96	4.55	313	310
02-27-02	1040	18.65	743	7.1	14.6	<.1	390	122	19.8	8.31	4.27	373	378
08-22-02	1340	17.74	774	7.1	17.1	<.1	390	124	20.1	8.63	4.04	349	291
04-01-03	1650	19.74	831	7.0	15.2	<.1	--	--	--	--	--	--	--
08-27-03	1430	19.61	1,000	6.9	15.9	<.1	--	--	--	--	--	--	--
02-25-04	1540	19.52	1,010	7.0	13.8	--	520	157	31.0	8.85	6.14	246	250
08-26-04	1340	16.35	844	6.8	17.0	--	480	152	23.4	9.34	4.62	375	285
03-04-05	1405	16.38	914	6.9	15.1	--	510	164	25.1	9.49	5.04	464	530
08-04-05	1210	18.02	957	6.9	14.4	--	530	169	26.3	8.99	4.74	472	476
MW3-1B (measuring point altitude 572.51 feet above NGVD 29)													
06-02-99	1530	7.31	847	7.1	15.4	<.1	440	129	28.3	7.62	4.18	--	435
09-01-99	0810	--	807	7.0	14.7	<.1	430	126	27.3	7.36	4.27	--	432
03-08-00	1030	17.32	775	6.8	15.7	<.1	390	115	25.6	6.93	4.19	420	422
08-24-00	1130	16.31	802	7.0	16.0	<.1	410	120	26.0	7.06	4.64	295	429
02-22-01	1640	17.88	--	7.1	14.0	<.1	460	137	29.5	7.41	4.42	486	485
08-23-01	1140	15.85	915	7.2	15.9	<.1	470	140	29.8	7.93	4.74	373	357
02-27-02	1000	18.68	903	7.1	13.7	<.1	460	137	28.1	7.60	4.57	489	492
08-22-02	1430	17.78	967	7.1	17.0	<.1	490	147	29.3	8.23	4.35	435	343
02-25-04	1620	19.55	826	7.0	14.4	<.1	460	147	23.4	8.63	4.71	269	138
08-26-04	1415	16.37	1,020	6.9	16.1	--	550	168	31.1	9.51	5.10	472	407
*	1420	16.37	--	6.9	--	--	161	31.5	9.56	5.09	472	380	
03-04-05	1435	16.44	1,120	7.0	14.7	--	570	173	33.7	10.9	5.23	389	474
08-04-05	1215	18.06	1,060	6.9	14.3	--	553	168	32.5	11.0	5.23	405	408

**Table 1.** Values of physical properties and concentrations of inorganic constituents and nutrients in samples from wells and surface-water sites, 1999–2005.—Continued

[ $\mu\text{S}/\text{cm}$ , microsiemens per centimeter at 25 degrees Celsius; pH, in standard units;  $^{\circ}\text{C}$ , degrees Celsius; constituent concentrations are dissolved, unless otherwise noted; mg/L, milligrams per liter; CaCO<sub>3</sub>, calcium carbonate; ANC, total acid neutralizing capacity, incremental titration; N, nitrogen;  $\mu\text{g}/\text{L}$ , micrograms per liter; NGVD 29, National Geodetic Vertical Datum of 1929; --, no data; <, less than; E, estimated; \*, replicate sample; >, greater than]

Date	Time	Sulfate (mg/L)	Chloride (mg/L)	Fluoride (mg/L)	Residue, sum of constituents (mg/L)	Nitrite as N (mg/L)	Nitrite plus nitrate as N (mg/L)	Ammonia as N (mg/L)	Ammonia plus organic N, total (mg/L)	Phosphorous, total (mg/L)	Phosphorous, dissolved (mg/L)	Ortho- phosphorous (mg/L)	Iron ( $\mu\text{g}/\text{L}$ )
MW3-1A													
06-02-99	1440	40.8	11.8	0.3	512	<0.010	<0.05	0.06	0.13	E0.04	<0.05	0.03	<10
09-01-99	0900	43.1	9.30	.3	522	<.010	<.05	<.02	E.07	<.05	<.05	.02	<10
03-08-00	0930	60.1	11.6	.3	464	<.010	<.05	.03	.14	<.05	E.03	.02	<10
08-24-00	1040	59.4	12.2	.3	435	<.010	<.05	<.02	.10	<.05	<.05	.02	<10
02-22-01	1600	61.0	9.27	.3	462	<.006	<.05	<.04	.09	E.03	E.04	.02	E6
08-23-01	1100	54.0	8.30	.3	415	<.006	<.05	E.02	.12	<.06	<.06	E.02	E8
02-27-02	1040	46.4	7.44	.3	432	<.008	<.05	E.02	.11	E.05	<.06	<.02	<10
08-22-02	1340	44.9	7.91	.3	420	<.008	<.05	<.04	E.09	<.06	<.06	.02	12
04-01-03	1650	--	7.91	--	--	--	--	--	--	--	--	--	--
08-27-03	1430	--	25.6	--	--	--	--	--	--	--	--	--	--
02-25-04	1540	28.8	46.2	.2	436	--	--	--	--	--	--	--	--
08-26-04	1340	35.6	7.01	.3	457	<.008	<.06	E.02	.14	.05	E.04	.02	10
03-04-05	1405	52.0	7.79	.3	582	<.008	<.06	<.04	E.09	.04	E.03	.02	41
08-04-05	1210	55.4	11.2	.3	562	<.008	<.06	<.04	E.09	E.03	E.03	<.02	7
MW3-1B													
06-02-99	1530	23.1	5.64	.2	511	.040	<.05	.55	.47	.48	.50	.38	12,900
09-01-99	0810	20.8	5.93	.2	503	.010	<.05	.38	.41	.47	.38	.56	13,000
03-08-00	1030	26.2	5.08	.2	449	.010	<.05	.37	.50	.47	E.03	.33	11,700
08-24-00	1130	21.6	4.84	.2	375	.020	<.05	.35	.42	.48	.48	.43	12,100
02-22-01	1640	21.6	5.25	.3	511	<.006	<.05	.35	.48	.48	.57	.04	13,900
08-23-01	1140	22.0	5.70	.2	448	E.023	E.03	E.40	.49	.48	.39	E.38	14,000
02-27-02	1000	20.7	5.01	.3	512	.020	<.05	.41	.48	.49	.42	.43	14,000
08-22-02	1430	21.0	6.73	.2	495	.020	<.05	.41	.48	.51	.52	.53	14,500
02-25-04	1620	37.9	7.73	.3	391	--	--	--	--	--	--	--	--
08-26-04	1415	29.4	33.9	.2	577	<.008	<.06	.41	.52	.51	.14	<.02	15,800
*	1420	29.3	33.9	.2	--	<.008	<.06	.40	.53	.49	.21	<.02	15,700
03-04-05	1435	52.6	99.4	.3	677	<.008	<.06	.38	.54	.37	.22	<.02	17,190
08-04-05	1215	54.7	98.7	.2	631	<.008	<.06	.37	.53	.44	E.02	<.02	15,470

**Table 1.** Values of physical properties and concentrations of inorganic constituents and nutrients in samples from wells and surface-water sites, 1999–2005.—Continued

[ $\mu\text{S}/\text{cm}$ , microsiemens per centimeter at 25 degrees Celsius; pH, in standard units;  $^{\circ}\text{C}$ , degrees Celsius; constituent concentrations are dissolved, unless otherwise noted; mg/L, milligrams per liter;  $\text{CaCO}_3$ , calcium carbonate; ANC, total acid neutralizing capacity, incremental titration; N, nitrogen;  $\mu\text{g}/\text{L}$ , micrograms per liter; NGVD 29, National Geodetic Vertical Datum of 1929; --, no data; <, less than; E, estimated; \*, replicate sample; >, greater than]

Date	Time	Water level (feet below measuring point)	Specific conductance ( $\mu\text{S}/\text{cm}$ )	pH	Temperature ( $^{\circ}\text{C}$ )	Dissolved oxygen (mg/L)	Hardness (mg/L as $\text{CaCO}_3$ )	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Alkalinity, fixed endpoint (mg/L)	ANC (mg/L)
MW4-1A (measuring point altitude 572.66 feet above NGVD 29)													
06-02-99	0810	6.07	958	6.9	14.0	<0.1	470	127	36.7	9.18	5.55	--	413
08-31-99	1300	--	889	7.1	14.1	<.1	490	137	36.4	7.50	5.17	--	437
03-01-00	1530	15.49	899	6.9	13.8	<.1	450	121	35.0	14.6	5.80	434	439
08-25-00	1030	15.29	901	7.0	15.1	<.1	410	114	31.3	17.8	5.60	362	369
02-23-01	0800	16.53	--	7.0	13.0	<.1	460	129	34.2	14.9	5.46	453	454
08-22-01	0840	14.36	965	6.9	15.1	<.1	500	138	36.9	15.9	5.41	412	359
02-26-02	1420	17.01	959	7.0	13.2	<.1	470	133	32.6	15.9	5.64	474	478
08-21-02	1130	17.20	996	7.1	16.0	<.1	530	151	36.2	15.5	5.32	496	448
04-02-03	0950	18.41	969	7.1	14.7	<.1	--	--	--	--	--	--	--
08-27-03	1230	18.66	1,030	7.1	15.6	<.1	--	--	--	--	--	--	--
02-25-04	1440	18.47	1,060	7.0	13.5	<.1	510	147	35.0	20.2	6.16	396	250
08-26-04	1210	15.09	1,080	6.9	16.3	--	550	163	35.4	19.3	6.17	478	466
03-04-05	0945	14.48	1,070	7.0	14.3	--	550	164	34.9	19.4	6.13	492	515
08-04-05	1340	16.99	1,020	7.4	20.1	--	534	158	34.0	14.2	5.61	538	546
MW4-1B (measuring point altitude 572.48 feet above NGVD 29)													
06-02-99	0915	5.91	798	7.1	14.4	0.4	390	106	29.1	10.8	3.94	--	269
08-31-99	1350	--	759	7.1	14.3	<.1	380	107	27.6	14.6	4.05	--	255
03-01-00	1610	15.36	776	7.0	13.2	<.1	350	96.6	27.1	15.9	4.39	307	311
08-25-00	1120	15.13	873	7.0	14.9	<.1	400	110	30.4	12.2	4.67	--	377
02-23-01	0810	16.47	--	7.1	12.8	<.1	420	116	30.9	13.7	4.28	376	373
08-22-01	0920	14.29	876	7.0	14.9	<.1	420	115	31.4	14.2	4.50	365	366
02-26-02	1510	16.86	993	7.1	13.0	<.1	450	127	32.9	15.5	4.90	372	373
08-21-02	1230	16.99	1,110	7.1	16.0	<.1	510	144	36.6	24.3	5.01	356	286
02-25-04	1400	18.33	1,270	7.0	13.4	<.1	500	141	34.8	66.5	5.82	247	214
08-26-04	1255	14.86	1,380	7.0	16.0	--	460	132	31.8	90.6	6.04	332	282
03-04-05	1020	14.49	1,320	7.1	14.3	--	480	137	34.3	90.3	6.32	360	394
08-04-05	1330	16.95	1,250	7.1	14.2	--	423	122	28.6	95.0	5.57	386	386

**Table 1.** Values of physical properties and concentrations of inorganic constituents and nutrients in samples from wells and surface-water sites, 1999–2005.—Continued

[ $\mu\text{S}/\text{cm}$ , microsiemens per centimeter at 25 degrees Celsius; pH, in standard units;  $^{\circ}\text{C}$ , degrees Celsius; constituent concentrations are dissolved, unless otherwise noted; mg/L, milligrams per liter; CaCO<sub>3</sub>, calcium carbonate; ANC, total acid neutralizing capacity, incremental titration; N, nitrogen;  $\mu\text{g}/\text{L}$ , micrograms per liter; NGVD 29, National Geodetic Vertical Datum of 1929; --, no data; <, less than; E, estimated; \*, replicate sample; >, greater than]

Date	Time	Sulfate (mg/L)	Chloride (mg/L)	Fluoride (mg/L)	Residue, sum of constituents (mg/L)	Nitrite as N (mg/L)	Nitrite plus nitrate as N (mg/L)	Ammonia as N (mg/L)	Ammonia plus organic N, total (mg/L)	Phosphorous, total (mg/L)	Phosphorous, dissolved (mg/L)	Ortho- phosphorous (mg/L)	Iron ( $\mu\text{g}/\text{L}$ )
MW4-1A													
06-02-99	0810	88.8	14.1	0.2	577	0.022	<0.05	0.97	0.96	0.47	0.08	0.34	13,200
08-31-99	1300	60.9	10.7	.2	568	.020	.23	.74	.84	.30	.29	.30	11,400
03-01-00	1530	74.0	12.6	.2	539	.015	<.05	.81	.99	.52	<.05	.47	12,800
08-25-00	1030	94.7	18.7	.2	514	.011	<.05	.80	.92	.49	.25	.38	12,300
02-23-01	0800	61.9	9.64	.2	543	E.004	<.05	.87	1.0	.52	.51	.08	14,900
08-22-01	0840	61.9	11.6	.2	533	.008	E.02	.89	.95	.45	.53	E.44	15,300
02-26-02	1420	60.1	11.8	.2	563	.023	<.05	.93	1.0	.50	.56	.48	16,200
08-21-02	1130	58.0	11.3	.2	594	.017	<.05	.91	1.1	.52	.56	.50	16,500
04-02-03	0950	--	12.3	--	--	--	--	--	--	--	--	--	--
08-27-03	1230	--	17.0	--	--	--	--	--	--	--	--	--	--
02-25-04	1440	80.8	23.7	.2	571	E.052	<.60	.77	1.1	.62	.58	.45	17,800
08-26-04	1210	77.9	19.3	.2	627	<.008	<.06	.88	1.0	.59	.09	<.02	18,000
03-04-05	0945	67.7	20.8	.2	643	<.008	<.06	.78	.96	.60	.36	<.02	19,610
08-04-05	1340	58.5	14.5	.2	630	<.008	<.06	.78	.98	.52	.34	<.02	16,450
MW4-1B													
06-02-99	0915	122	18.4	.2	503	0.034	<.05	.98	.95	.80	<.05	.61	13,000
08-31-99	1350	121	19.8	.2	508	.057	<.05	.84	.83	.79	.80	.96	18,000
03-01-00	1610	97.8	15.4	.2	461	.027	<.05	.85	1.0	.83	<.05	.58	16,500
08-25-00	1120	69.4	21.0	.2	494	.019	<.05	.89	.99	.83	.33	.51	17,800
02-23-01	0810	76.5	17.9	.2	505	E.003	<.05	.87	.99	.84	1.03	.08	18,700
08-22-01	0920	83.1	24.6	.2	513	E.041	E.04	E.95	1.0	.82	E.88	E.68	20,200
02-26-02	1510	72.5	63.3	.2	563	.044	<.05	1.07	1.1	.81	.76	.49	20,300
08-21-02	1230	71.2	105	.2	624	.066	<.05	1.11	1.2	.79	.84	.85	20,600
02-25-04	1400	61.1	163	.2	644	.083	<.60	.88	1.2	.81	.71	.68	19,700
08-26-04	1255	68.3	188	.2	735	<.008	<.06	1.11	1.2	.74	.25	<.02	17,700
03-04-05	1020	66.1	166	.2	760	<.008	<.06	1.06	1.3	.84	.47	<.02	21,970
08-04-05	1330	77.9	163	.2	743	<.008	<.06	1.03	1.2	.89	.25	<.02	17,620

**Table 1.** Values of physical properties and concentrations of inorganic constituents and nutrients in samples from wells and surface-water sites, 1999–2005.—Continued

[ $\mu\text{S}/\text{cm}$ , microsiemens per centimeter at 25 degrees Celsius; pH, in standard units;  $^{\circ}\text{C}$ , degrees Celsius; constituent concentrations are dissolved, unless otherwise noted; mg/L, milligrams per liter;  $\text{CaCO}_3$ , calcium carbonate; ANC, total acid neutralizing capacity, incremental titration; N, nitrogen;  $\mu\text{g}/\text{L}$ , micrograms per liter; NGVD 29, National Geodetic Vertical Datum of 1929; --, no data; <, less than; E, estimated; \*, replicate sample; >, greater than]

Date	Time	Water level (feet below measuring point)	Specific conductance ( $\mu\text{S}/\text{cm}$ )	pH	Temperature ( $^{\circ}\text{C}$ )	Dissolved oxygen (mg/L)	Hardness (mg/L as $\text{CaCO}_3$ )	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Alkalinity, fixed endpoint (mg/L)	ANC (mg/L)
MW4-2A (measuring point altitude 572.12 feet above NGVD 29)													
06-02-99	1100	5.40	963	7.0	14.8	<0.1	460	137	29.0	10.5	6.52	--	465
08-31-99	1500	--	968	7.0	14.4	<.1	520	156	31.3	9.94	5.80	--	491
03-01-00	1340	12.80	1,060	6.9	14.5	<.1	480	142	30.4	31.1	7.36	461	467
08-25-00	0840	13.21	1,200	7.0	16.3	.4	470	138	30.1	51.4	7.97	404	412
02-23-01	0950	14.32	--	7.1	14.1	<.1	440	130	27.3	36.6	6.76	437	436
08-22-01	1020	12.72	1,140	7.0	16.0	<.1	450	132	28.7	61.7	6.73	433	354
02-26-02	1300	14.89	1,180	7.0	15.3	<.1	400	119	24.6	87.4	7.86	379	388
08-21-02	1400	15.14	1,240	7.1	16.8	<.1	440	132	26.3	96.5	7.15	408	358
04-02-03	0850	16.55	1,140	7.1	16.7	<.1	--	--	--	--	--	--	--
08-27-03	1130	17.17	1,120	7.0	17.2	<.1	--	--	--	--	--	--	--
02-25-04	1110	16.68	1,190	7.0	15.7	<.1	380	115	23.7	101	7.50	310	276
08-26-04	1045	13.03	1,260	7.2	17.9	.6	460	138	27.2	91.7	8.07	355	408
03-04-05	1115	12.40	1,220	6.9	16.9	.2	450	135	26.9	90.7	8.60	389	514
08-04-05	1445	15.62	1,120	7.7	22.7	.5	450	136	27.9	71.6	6.83	430	434
MW4-2B (measuring point altitude 572.14 feet above NGVD 29)													
06-02-99	1020	5.39	1,060	6.9	14.7	<.1	490	145	31.4	13.1	5.61	--	409
08-31-99	1600	--	1,050	6.9	14.6	<.1	500	147	31.9	15.9	5.79	--	376
03-01-00	1430	12.82	1,010	6.9	14.1	<.1	440	130	28.9	24.3	5.96	350	354
08-25-00	0930	13.32	1,110	7.0	16.0	<.1	400	117	26.5	49.8	6.65	317	324
02-23-01	1030	14.36	--	7.1	14.2	<.1	410	121	26.3	88.4	6.52	252	253
08-22-01	1100	12.72	1,320	7.1	16.4	<.1	350	101	23.2	123	6.37	289	287
02-26-02	1330	14.89	1,260	7.1	14.6	<.1	340	101	21.6	117	6.79	283	282
08-21-02	1510	15.15	1,200	7.1	18.7	<.1	330	96.7	20.4	122	6.62	247	329
02-25-04	1200	16.67	1,360	7.0	15.3	--	400	119	23.9	124	7.28	202	152
08-26-04	1120	13.06	1,330	7.3	18.1	--	340	102	19.7	141	7.35	297	291
03-04-05	1155	12.43	1,390	7.1	16.1	--	330	100	19.4	153	7.42	249	263
08-04-05	1440	15.66	1,370	7.2	17.1	--	296	91.2	16.5	162	7.54	319	320
*	1445	15.66	1,370	7.2	17.1	--	294	90.7	16.4	161	7.33	319	320

**Table 1.** Values of physical properties and concentrations of inorganic constituents and nutrients in samples from wells and surface-water sites, 1999–2005.—Continued

[ $\mu\text{S}/\text{cm}$ , microsiemens per centimeter at 25 degrees Celsius; pH, in standard units;  $^{\circ}\text{C}$ , degrees Celsius; constituent concentrations are dissolved, unless otherwise noted; mg/L, milligrams per liter; CaCO<sub>3</sub>, calcium carbonate; ANC, total acid neutralizing capacity, incremental titration; N, nitrogen;  $\mu\text{g}/\text{L}$ , micrograms per liter; NGVD 29, National Geodetic Vertical Datum of 1929; --, no data; <, less than; E, estimated; \*, replicate sample; >, greater than]

Date	Time	Sulfate (mg/L)	Chloride (mg/L)	Fluoride (mg/L)	Residue, sum of constituents (mg/L)	Nitrite as N (mg/L)	Nitrite plus nitrate as N (mg/L)	Ammonia as N (mg/L)	Ammonia plus organic N, total (mg/L)	Phosphorous, total (mg/L)	Phosphorous, dissolved (mg/L)	Ortho- phosphorous (mg/L)	Iron ( $\mu\text{g}/\text{L}$ )
MW4-2A													
06-02-99	1100	37.8	19.9	0.2	560	0.023	<0.05	0.68	0.64	0.19	<0.05	0.13	10,300
08-31-99	1500	30.8	26.3	.1	598	.049	.46	.49	.55	.10	.11	.14	8,760
03-01-00	1340	49.3	71.9	<.1	623	.019	<.05	.59	.75	.22	<.05	.05	13,400
08-25-00	0840	48.8	121	.1	652	.019	<.05	.86	.98	.19	.16	.18	10,600
02-23-01	0950	37.1	61.1	.2	573	.007	<.05	.70	.80	.26	.24	.13	10,700
08-22-01	1020	45.6	106	.2	651	.011	<.05	E.72	.89	.30	.14	.16	10,200
02-26-02	1300	59.6	143	.2	683	.027	<.05	1.25	1.30	.37	.38	.30	10,900
08-21-02	1400	62.8	142	.3	724	E.007	<.05	1.30	1.40	.40	.47	.12	10,200
04-02-03	0850	--	118	--	--	--	--	--	--	--	--	--	--
08-27-03	1130	--	111	--	--	--	--	--	--	--	--	--	--
02-25-04	1110	59.0	126	.3	625	E.004	<.06	.08	1.00	.28	.25	E.25	6,370
08-26-04	1045	57.1	116	.3	661	<.008	<.06	1.11	1.30	.38	.10	<.02	8,440
03-04-05	1115	45.2	139	.3	766	<.008	<.06	1.07	1.28	.42	.27	<.02	9,700
08-04-05	1445	39.9	100	.3	648	<.008	.30	.65	.95	.18	.09	.04	4,540
MW4-2B													
06-02-99	1020	35.9	71.6	.1	611	.016	<.05	.66	.64	.71	.16	.14	19,600
08-31-99	1600	37.8	98.4	.1	631	.039	<.05	.57	.62	.65	.28	.60	22,200
03-01-00	1430	52.9	100	.1	571	.024	<.05	.57	.71	.64	<.05	.41	16,000
08-25-00	0930	71.9	107	.2	590	.019	<.05	.65	.76	.69	.30	.66	17,200
02-23-01	1030	92.0	218	.2	721	.023	<.05	.70	.86	.67	.64	.41	15,500
08-22-01	1100	77.7	204	.2	724	E.037	E.03	E.78	.93	.71	E.68	E.49	14,500
02-26-02	1330	94.5	183	.2	709	.039	<.05	.77	.94	.72	.58	.56	12,900
08-21-02	1510	80.7	123	.2	674	.027	<.05	.77	.92	.78	.84	.83	13,300
02-25-04	1200	80.0	215	.3	736	E.065	<.60	.58	.98	.64	.62	.48	42,900
08-26-04	1120	86.7	181	.4	721	<.008	<.06	.74	.89	.66	.13	<.02	3,730
03-04-05	1155	81.3	234	.4	766	<.008	<.06	.65	.89	.59	.06	<.02	11,150
08-04-05	1440	75.0	232	.5	788	<.008	<.06	.66	.94	.67	.28	<.02	10,250
*	1455	74.4	230	.5	783	<.008	<.06	.65	.94	.66	.22	<.02	10,120

**Table 1.** Values of physical properties and concentrations of inorganic constituents and nutrients in samples from wells and surface-water sites, 1999–2005.—Continued

[ $\mu\text{S}/\text{cm}$ , microsiemens per centimeter at 25 degrees Celsius; pH, in standard units;  $^{\circ}\text{C}$ , degrees Celsius; constituent concentrations are dissolved, unless otherwise noted; mg/L, milligrams per liter;  $\text{CaCO}_3$ , calcium carbonate; ANC, total acid neutralizing capacity, incremental titration; N, nitrogen;  $\mu\text{g}/\text{L}$ , micrograms per liter; NGVD 29, National Geodetic Vertical Datum of 1929; --, no data; <, less than; E, estimated; \*, replicate sample; >, greater than]

Date	Time	Water level (feet below measuring point)	Specific conductance ( $\mu\text{S}/\text{cm}$ )	pH	Temperature ( $^{\circ}\text{C}$ )	Dissolved oxygen (mg/L)	Hardness (mg/L as $\text{CaCO}_3$ )	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Alkalinity, fixed endpoint (mg/L)	ANC (mg/L)
USGS-1 (measuring point altitude 570.65 feet above NGVD 29)													
08-27-99	1010	10.99	736	7.2	14.1	<0.1	--	114	20.9	10.2	4.74	345	336
02-29-00	1420	14.27	703	7.0	14.9	<.1	--	122	21.8	6.95	4.97	378	379
08-23-00	1250	13.86	811	7.2	16.2	<.1	--	125	21.9	6.03	5.26	291	374
03-01-01	1130	11.22	827	7.1	14.5	<.1	--	128	21.8	7.09	5.11	367	373
08-22-01	1310	13.25	740	7.2	15.9	<.1	--	122	21.0	7.74	4.77	272	296
02-25-02	1530	15.90	884	7.1	14.3	<.1	--	135	23.3	8.78	5.04	347	337
08-22-02	1030	15.09	871	7.0	17.8	<.1	--	131	22.1	9.94	4.67	328	376
USGS-2S (measuring point altitude 572.68 feet above NGVD 29)													
08-26-99	1600	11.56	940	6.7	13.4	<.1	--	139	25.1	12.3	5.50	440	434
02-29-00	0800	10.98	968	6.7	13.0	<.1	--	112	20.3	51.9	6.55	305	317
08-23-00	0850	13.63	1,010	7.1	14.0	<.1	--	123	22.1	45.8	6.34	372	373
02-28-01	1120	8.50	1,040	7.2	14.2	<.1	--	110	19.7	66.0	6.31	273	286
08-21-01	1230	11.54	1,010	7.0	15.5	<.1	--	137	25.2	31.2	5.73	385	370
02-26-02	0840	14.11	1,070	7.0	13.5	<.1	--	130	22.6	49.8	5.98	339	344
USGS-2D (measuring point altitude 572.56 feet above NGVD 29)													
08-26-99	1510	11.42	1,030	6.7	13.4	<.1	--	102	24.6	44.5	5.95	250	244
02-29-00	0850	10.86	1,020	6.7	12.5	<.1	--	97.9	23.3	85.3	6.41	298	302
08-23-00	0930	13.5	1,140	7.1	14.8	<.1	--	93.2	23.0	87.1	6.74	305	305
02-28-01	1100	8.67	1,200	7.3	13.3	<.1	--	107	24.5	86.3	6.53	283	285
08-21-01	1320	11.43	1,180	7.0	15.9	<.1	--	97.6	23.5	93.9	6.09	243	272
02-26-02	0910	13.97	1,210	7.1	13.6	<.1	--	86.9	19.4	119	6.51	245	245

**Table 1.** Values of physical properties and concentrations of inorganic constituents and nutrients in samples from wells and surface-water sites, 1999–2005.—Continued

[ $\mu\text{S}/\text{cm}$ , microsiemens per centimeter at 25 degrees Celsius; pH, in standard units;  $^{\circ}\text{C}$ , degrees Celsius; constituent concentrations are dissolved, unless otherwise noted; mg/L, milligrams per liter; CaCO<sub>3</sub>, calcium carbonate; ANC, total acid neutralizing capacity, incremental titration; N, nitrogen;  $\mu\text{g}/\text{L}$ , micrograms per liter; NGVD 29, National Geodetic Vertical Datum of 1929; --, no data; <, less than; E, estimated; \*, replicate sample; >, greater than]

Date	Time	Sulfate (mg/L)	Chloride (mg/L)	Fluoride (mg/L)	Residue, sum of constituents (mg/L)	Nitrite as N (mg/L)	Nitrite plus nitrate as N (mg/L)	Ammonia as N (mg/L)	Ammonia plus organic N, total (mg/L)	Phosphorous, total (mg/L)	Phosphorous, dissolved (mg/L)	Ortho- phosphorous (mg/L)	Iron ( $\mu\text{g}/\text{L}$ )
USGS-1													
08-27-99	1010	71.6	11.1	0.2	--	<0.010	0.14	0.16	0.26	0.16	0.14	0.08	3,930
02-29-00	1420	48.9	14.4	.2	--	<.010	<.05	.15	.25	.12	<.05	.05	4,330
08-23-00	1250	50.0	21.9	.2	--	<.010	.07	.13	.22	.10	E.04	.03	2,900
03-01-01	1130	53.6	35.0	.3	--	<.006	<.05	.21	.24	E.04	.13	E.01	4,110
08-22-01	1310	56.2	19.0	.2	--	<.030	.28	.91	.26	.13	.13	<.09	4,080
02-25-02	1530	53.7	58.5	.3	--	E.007	.05	.17	.23	.13	.11	.10	4,500
08-22-02	1030	43.1	40.6	.3	--	E.004	.30	.16	.27	.12	.12	.11	3,960
USGS-2S													
08-26-99	1600	48.9	26.2	.1	--	.011	<.05	.65	.78	.85	.53	.64	21,700
02-29-00	0800	91.0	92.2	.1	--	.029	<.05	.66	.79	.67	<.05	.32	17,800
08-23-00	0850	70.6	51.9	.1	--	<.010	<.05	.60	.78	.69	.67	<.01	18,800
02-28-01	1120	133	94.2	.2	--	E.004	<.05	.70	1.0	.60	.64	<.02	16,500
08-21-01	1230	69.9	36.2	.2	--	.021	E.03	.64	.70	.64	.34	E.36	21,200
02-26-02	0840	99.4	87.2	.2	--	.044	<.05	.80	.87	.67	.57	.27	19,500
USGS-2D													
08-26-99	1510	76.3	130	.1	--	<.010	<.05	1.20	1.5	1.13	.49	.18	23,000
02-29-00	0850	105	119	.1	--	.049	<.05	1.21	1.4	1.00	<.05	.80	21,400
08-23-00	0930	83.3	115	.1	--	<.010	<.05	1.14	1.4	1.02	.74	<.01	19,700
02-28-01	1100	129	137	.2	--	<.006	<.05	1.17	1.4	.77	.80	<.02	22,100
08-21-01	1320	126	125	.2	--	.094	E.12	6.34	1.5	.88	.30	E.17	20,200
02-26-02	0910	110	170	.3	--	.058	<.05	1.28	1.4	.83	.60	.82	16,600

**Table 1.** Values of physical properties and concentrations of inorganic constituents and nutrients in samples from wells and surface-water sites, 1999–2005.—Continued

[ $\mu\text{S}/\text{cm}$ , microsiemens per centimeter at 25 degrees Celsius; pH, in standard units;  $^{\circ}\text{C}$ , degrees Celsius; constituent concentrations are dissolved, unless otherwise noted; mg/L, milligrams per liter;  $\text{CaCO}_3$ , calcium carbonate; ANC, total acid neutralizing capacity, incremental titration; N, nitrogen;  $\mu\text{g}/\text{L}$ , micrograms per liter; NGVD 29, National Geodetic Vertical Datum of 1929; --, no data; <, less than; E, estimated; \*, replicate sample; >, greater than]

Date	Time	Water level (feet below measuring point)	Specific conductance ( $\mu\text{S}/\text{cm}$ )	pH	Temperature ( $^{\circ}\text{C}$ )	Dissolved oxygen (mg/L)	Hardness (mg/L as $\text{CaCO}_3$ )	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Alkalinity, fixed endpoint (mg/L)	ANC (mg/L)
USGS-3S (measuring point altitude 570.28 feet above NGVD 29)													
08-26-99	1210	10.38	1,350	7.0	15.1	<0.1	--	119	19.1	119	6.14	279	272
02-29-00	1000	9.46	1,420	6.8	14.0	<.1	--	132	24.5	146	6.24	329	333
08-23-00	1030	12.25	1,440	7.2	15.0	<.1	--	121	23.6	143	6.72	317	321
02-27-01	1350	3.97	1,130	7.2	11.9	<.1	--	107	20.4	115	4.88	320	320
08-21-01	1430	10.55	1,060	7.2	14.3	<.1	--	82.3	15.5	106	4.46	241	240
02-26-02	1050	12.24	1,070	7.3	12.4	<.1	--	85.3	15.0	117	5.23	263	261
08-22-02	1200	13.03	1,180	7.3	15.3	<.1	--	93.7	15.4	123	5.14	282	256
04-01-03	1320	14.23	1,050	7.2	12.5	<.1	--	--	--	--	--	--	--
USGS-3D (measuring point altitude 570.25 feet above NGVD 29)													
08-26-99	1050	10.59	963	6.9	15.1	<.1	--	129	31.5	19.5	4.92	489	476
02-29-00	1040	9.65	890	6.9	13.6	<.1	--	103	24.9	51.2	4.63	301	293
08-23-00	1110	12.42	1,000	7.2	14.3	<.1	--	121	29.8	27.5	5.05	316	315
02-27-01	1300	4.16	1,050	7.3	12.6	<.1	--	93.9	21.2	100	5.28	380	379
08-21-01	1510	10.77	1,130	7.2	13.3	<.1	--	145	34.1	32.2	5.22	334	364
02-26-02	1020	12.49	1,050	7.3	11.6	<.1	--	103	22.8	75.4	5.21	304	305
USGS-4 (measuring point altitude 575.51 feet above NGVD 29)													
08-25-99	1630	15.40	1,060	6.6	14.2	<.1	--	164	37.2	13.6	6.12	581	570
03-01-00	1000	16.75	885	6.9	13.6	<.1	--	121	29.8	11.8	5.63	432	436
08-23-00	1510	17.67	652	6.9	15.8	<.1	--	126	30.3	12.4	5.94	401	413
02-22-01	1440	16.91	955	7.0	13.6	<.1	--	128	29.6	16.0	5.19	322	338
08-22-01	1420	16.83	963	7.1	15.4	<.1	--	136	31.2	15.0	5.63	327	376
02-25-02	1430	18.97	1,020	6.9	13.8	<.1	--	134	30.0	21.4	5.76	374	380

**Table 1.** Values of physical properties and concentrations of inorganic constituents and nutrients in samples from wells and surface-water sites, 1999–2005.—Continued

[ $\mu\text{S}/\text{cm}$ , microsiemens per centimeter at 25 degrees Celsius; pH, in standard units;  $^{\circ}\text{C}$ , degrees Celsius; constituent concentrations are dissolved, unless otherwise noted; mg/L, milligrams per liter; CaCO<sub>3</sub>, calcium carbonate; ANC, total acid neutralizing capacity, incremental titration; N, nitrogen;  $\mu\text{g}/\text{L}$ , micrograms per liter; NGVD 29, National Geodetic Vertical Datum of 1929; --, no data; <, less than; E, estimated; \*, replicate sample; >, greater than]

Date	Time	Sulfate (mg/L)	Chloride (mg/L)	Fluoride (mg/L)	Residue, sum of constituents (mg/L)	Nitrite as N (mg/L)	Nitrite plus nitrate as N (mg/L)	Ammonia as N (mg/L)	Ammonia plus organic N, total (mg/L)	Phosphorous, total (mg/L)	Phosphorous, dissolved (mg/L)	Ortho- phosphorous (mg/L)	Iron ( $\mu\text{g}/\text{L}$ )
USGS-3S													
08-26-99	1210	106	221	0.3	--	<0.010	<0.05	0.17	0.01	0.41	0.22	0.07	8,820
02-29-00	1000	128	247	.3	--	.021	<.05	.26	.62	.35	<.05	.16	11,200
08-23-00	1030	109	214	.3	--	.012	<.05	.14	.37	.19	.11	.17	7,640
02-27-01	1350	130	136	.3	--	E.003	<.05	.17	.36	.25	.15	<.02	8,270
08-21-01	1430	80.1	139	.3	--	E.004	<.05	E.19	.36	.28	.14	E.10	6,590
02-26-02	1050	136	113	.4	--	.012	<.05	.20	.41	.29	.20	.27	5,370
08-22-02	1200	129	114	.4	--	.009	<.05	.24	.40	.20	.20	.20	5,510
04-01-03	1320	--	90.5	--	--	--	--	--	--	--	--	--	--
USGS-3D													
08-26-99	1050	30.5	18.8	.2	--	--	--	--	--	--	--	--	20,300
02-29-00	1040	90.2	84.1	.2	--	.018	<.05	.60	.79	.59	<.05	.43	15,300
08-23-00	1110	82.9	71.5	.2	--	<.010	<.05	.59	.79	.61	.52	<.01	18,000
02-27-01	1300	70.5	102	.3	--	<.006	<.05	.73	.96	.60	.45	E.02	12,700
08-21-01	1510	85.5	94.5	.2	--	.017	E.02	.76	.91	.52	E.61	E.09	19,300
02-26-02	1020	100	104	.3	--	.037	<.05	.84	.96	.52	.41	<.09	13,200
USGS-4													
08-25-99	1630	24.4	9.3	.2	--	<.010	<.05	.43	.61	.46	.36	.30	13,800
03-01-00	1000	40.9	26.5	.1	--	.018	<.05	.37	.47	.41	.14	.23	10,800
08-23-00	1510	40.5	40.1	.2	--	.01	<.05	.31	.43	.41	.19	.07	11,300
02-22-01	1440	77.7	73.1	.2	--	<.006	<.05	.34	.45	.39	.17	.04	11,400
08-22-01	1420	72.9	59.1	E.2	--	<.010	<.09	.67	.44	.39	E.43	E.07	12,400
02-25-02	1430	77.6	67.5	.2	--	.032	<.05	.31	.44	.42	.36	.32	12,200

**Table 1.** Values of physical properties and concentrations of inorganic constituents and nutrients in samples from wells and surface-water sites, 1999–2005.—Continued

[ $\mu\text{S}/\text{cm}$ , microsiemens per centimeter at 25 degrees Celsius; pH, in standard units;  $^{\circ}\text{C}$ , degrees Celsius; constituent concentrations are dissolved, unless otherwise noted; mg/L, milligrams per liter;  $\text{CaCO}_3$ , calcium carbonate; ANC, total acid neutralizing capacity, incremental titration; N, nitrogen;  $\mu\text{g}/\text{L}$ , micrograms per liter; NGVD 29, National Geodetic Vertical Datum of 1929; --, no data; <, less than; E, estimated; \*, replicate sample; >, greater than]

Date	Time	Water level (feet below measuring point)	Specific conductance ( $\mu\text{S}/\text{cm}$ )	pH	Temperature ( $^{\circ}\text{C}$ )	Dissolved oxygen (mg/L)	Hardness (mg/L as $\text{CaCO}_3$ )	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Alkalinity, fixed endpoint (mg/L)	ANC (mg/L)
USGS-5S (measuring point altitude 571.98 feet above NGVD 29)													
08-31-99	1010	--	898	7.0	14.4	<0.1	--	137	29.5	11.8	5.00	430	437
03-01-00	1130	9.06	1,020	6.9	13.0	<.1	--	--	--	--	--	--	--
08-24-00	0850	12.78	883	7.0	15.3	<.1	--	131	26.2	12.0	4.79	406	412
02-22-01	0900	6.81	977	6.9	13.4	<.1	--	147	28.7	12.9	4.72	382	382
08-22-01	1530	10.10	966	7.1	15.2	<.1	--	150	29.2	11.9	4.82	317	306
02-27-02	1240	12.31	982	7.0	13.5	<.1	--	154	27.9	11.6	4.78	400	399
08-19-02	1420	12.62	953	7.0	15.1	<.1	--	146	26.4	13.0	4.69	347	252
04-01-03	1540	13.61	955	6.9	13.9	<.1	--	--	--	--	--	--	--
USGS-5D (measuring point altitude 571.94 feet above NGVD 29)													
08-31-99	0920	--	1,100	7.1	14.4	<.1	--	141	28.2	34.3	5.83	319	320
03-01-00	1200	9.02	941	6.8	13.3	<.1	--	--	--	--	--	--	--
08-24-00	0940	12.74	1,040	7.1	15.1	<.1	--	113	24.6	55.0	5.24	289	291
02-22-01	0940	6.78	1,170	7.1	13.6	<.1	--	108	22.6	87.3	5.20	234	234
08-22-01	1610	10.06	1,130	7.3	15.0	<.1	--	99.0	21.7	94.7	4.83	263	260
02-27-02	1330	12.28	985	7.3	13.1	<.1	--	78.2	15.8	98.4	4.98	275	274
08-19-02	1500	12.56	1,190	7.1	15.5	<.1	--	112	21.6	89.7	5.93	267	225
USGS-6 (measuring point altitude 570.71 feet above NGVD 29)													
08-31-99	0810	--	1,250	7.0	13.6	<.1	--	122	27.3	87.7	6.02	303	303
03-02-00	1030	13.61	1,240	6.5	14.4	<.1	--	117	25.8	97.8	7.00	339	344
08-23-00	1610	14.11	1,360	7.0	14.8	<.1	--	123	27.3	90.3	7.00	312	325
02-22-01	1040	11.10	1,270	6.9	14.8	<.1	--	115	25.2	103	6.32	335	334
08-24-01	0900	14.46	1,340	7.0	14.1	<.1	--	114	25.6	108	6.09	287	281
02-25-02	1620	15.46	1,270	6.9	14.7	<.1	--	116	24.8	103	6.25	364	367
08-19-02	1300	14.25	1,340	7.0	14.6	<.1	--	117	25.2	109	5.99	323	277
04-01-03	1440	16.08	1,190	7.0	14.9	<.1	--	--	--	--	--	--	--

**Table 1.** Values of physical properties and concentrations of inorganic constituents and nutrients in samples from wells and surface-water sites, 1999–2005.—Continued

[ $\mu\text{S}/\text{cm}$ , microsiemens per centimeter at 25 degrees Celsius; pH, in standard units;  $^{\circ}\text{C}$ , degrees Celsius; constituent concentrations are dissolved, unless otherwise noted; mg/L, milligrams per liter; CaCO<sub>3</sub>, calcium carbonate; ANC, total acid neutralizing capacity, incremental titration; N, nitrogen;  $\mu\text{g}/\text{L}$ , micrograms per liter; NGVD 29, National Geodetic Vertical Datum of 1929; --, no data; <, less than; E, estimated; \*, replicate sample; >, greater than]

**Table 1.** Values of physical properties and concentrations of inorganic constituents and nutrients in samples from wells and surface-water sites, 1999–2005.—Continued

[ $\mu\text{S}/\text{cm}$ , microsiemens per centimeter at 25 degrees Celsius; pH, in standard units;  $^{\circ}\text{C}$ , degrees Celsius; constituent concentrations are dissolved, unless otherwise noted; mg/L, milligrams per liter;  $\text{CaCO}_3$ , calcium carbonate; ANC, total acid neutralizing capacity, incremental titration; N, nitrogen;  $\mu\text{g}/\text{L}$ , micrograms per liter; NGVD 29, National Geodetic Vertical Datum of 1929; --, no data; <, less than; E, estimated; \*, replicate sample; >, greater than]

Date	Time	Water level (feet below measuring point)	Specific conductance ( $\mu\text{S}/\text{cm}$ )	pH	Temperature ( $^{\circ}\text{C}$ )	Dissolved oxygen (mg/L)	Hardness (mg/L as $\text{CaCO}_3$ )	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Alkalinity, fixed endpoint (mg/L)	ANC (mg/L)
USGS-7 (measuring point altitude 571.28 feet above NGVD 29)													
08-25-99	1510	13.33	1,130	6.7	9.7	<0.1	--	85.0	19.2	111	5.03	211	204
*	1515	13.33	1,130	6.7	9.7	<.1	--	84.4	19.3	111	4.96	210	205
03-1-00	0850	15.92	1,000	7.1	9.5	<.1	--	67.5	15.9	120	4.38	213	215
*	0855	15.92	1,000	7.1	9.5	<.1	--	67.3	15.9	119	4.41	212	214
08-23-00	1400	16.03	925	7.4	13.6	<.1	--	63.9	14.2	100	4.91	181	181
*	1405	16.03	925	7.4	13.6	<.1	--	62.1	14.2	101	4.97	178	180
02-22-01	1050	15.28	1,010	7.3	11.0	<.1	--	69.2	14.3	109	4.41	200	202
*	1055	15.28	1,010	7.3	11.0	<.1	--	69.2	14.4	109	4.43	201	201
08-21-01	1630	15.91	998	7.3	14.3	<.1	--	73.0	15.2	111	5.10	205	202
*	1635	15.91	998	7.3	14.3	<.1	--	69.3	15.2	108	5.05	206	202
02-25-02	1320	17.38	1,010	7.4	10.8	<.1	--	78.0	15.3	104	5.15	227	224
*	1325	17.38	1,010	7.4	10.8	<.1	--	77.3	15.3	104	5.02	224	226
USGS-8S (measuring point altitude 574.68 feet above NGVD 29)													
06-04-99	0830	9.69	780	6.9	14.9	0.2	--	117	23.2	5.07	8.05	--	384
09-01-99	1000	--	788	7.0	14.7	<.1	--	126	25.3	5.19	8.52	411	410
03-08-00	0810	24.42	714	6.9	15.3	<.1	--	113	21.3	4.87	5.70	365	363
08-29-00	1230	20.72	749	7.0	16.7	0.2	--	124	23.1	5.38	5.65	370	369
02-21-01	1440	22.91	791	6.9	13.9	0.2	--	126	24.2	4.95	5.71	383	382
08-23-01	1330	20.68	821	7.1	15.6	0.4	--	135	26.0	5.26	6.63	343	344
02-27-02	1430	22.57	751	7.2	14.2	<.1	--	121	22.5	4.62	5.69	362	376
08-19-02	1610	23.15	836	7.0	16.2	0.9	--	139	24.4	5.21	6.40	407	354
USGS-8D (measuring point altitude 574.51 feet above NGVD 29)													
06-04-99	0920	9.85	815	7.0	16	<.1	--	119	26.4	9.77	6.75	--	424
09-01-99	1050	--	804	7.1	14.8	<.1	--	119	25.9	12.1	6.78	425	423
03-08-00	0840	24.88	765	7.0	15.3	<.1	--	111	24.2	11.1	7.24	398	400
08-29-00	1150	20.57	770	7.1	16.2	<.1	--	116	25.5	14.8	6.98	401	402
02-21-01	1530	22.98	796	7.0	13.8	<.1	--	117	25.3	13.2	6.81	398	397
08-23-01	1420	21.35	814	7.3	15.7	<.1	--	117	25.1	14.6	7.45	350	319
02-27-02	1510	22.40	749	7.2	13.7	<.1	--	109	22.7	14.3	6.53	379	364
08-19-02	1650	23.51	782	7.1	16.6	<.1	--	115	23.8	14.0	6.94	365	315

**Table 1.** Values of physical properties and concentrations of inorganic constituents and nutrients in samples from wells and surface-water sites, 1999–2005.—Continued

[ $\mu\text{S}/\text{cm}$ , microsiemens per centimeter at 25 degrees Celsius; pH, in standard units;  $^{\circ}\text{C}$ , degrees Celsius; constituent concentrations are dissolved, unless otherwise noted; mg/L, milligrams per liter; CaCO<sub>3</sub>, calcium carbonate; ANC, total acid neutralizing capacity, incremental titration; N, nitrogen;  $\mu\text{g}/\text{L}$ , micrograms per liter; NGVD 29, National Geodetic Vertical Datum of 1929; --, no data; <, less than; E, estimated; \*, replicate sample; >, greater than]

Date	Time	Sulfate (mg/L)	Chloride (mg/L)	Fluoride (mg/L)	Residue, sum of constituents (mg/L)	Nitrite as N (mg/L)	Nitrite plus nitrate as N (mg/L)	Ammonia as N (mg/L)	Ammonia plus organic N, total (mg/L)	Phosphorous, total (mg/L)	Phosphorous, dissolved (mg/L)	Ortho- phosphorous (mg/L)	Iron ( $\mu\text{g}/\text{L}$ )
USGS-7													
08-25-99	1510	116	157	0.3	--	<0.010	<0.05	0.77	1.1	0.37	0.37	0.23	6,120
*	1515	115	155	.3	--	--	--	--	--	--	--	--	6,130
03-01-00	0850	180	89.9	.3	--	<.010	<.05	.53	.77	.28	<.05	.04	4,970
*	0855	181	90.3	.3	--	<.010	<.05	.52	.74	.30	<.05	.08	4,950
08-23-00	1400	161	85.3	.4	--	<.010	<.05	.49	.70	.29	.16	.23	4,460
*	1405	151	77.0	.4	--	<.010	<.05	.48	.72	.29	.21	.25	4,430
02-22-01	1050	156	99.5	.6	--	E.003	<.05	.37	.55	.24	.14	<.02	4,680
*	1055	156	98.9	.6	--	E.004	<.05	.37	.56	.24	.16	<.02	4,690
08-21-01	1630	156	99.8	.5	--	<.006	<.05	E.46	.72	.17	.11	E.12	2,650
*	1635	156	101	.5	--	<.006	<.05	E.44	.66	.18	.12	E.11	2,570
02-25-02	1320	154	91.6	.5	--	.008	<.05	.31	.43	.23	.19	.23	5,090
*	1325	154	91.7	.5	--	.009	<.05	.35	.48	.26	.22	.26	5,080
USGS-8S													
06-04-99	0830	37.8	6.36	.3	--	.049	2.33	.06	.12	<.05	<.05	.02	<10
09-01-99	1000	34.7	7.22	.3	--	.018	.78	<.02	E.09	E.04	<.05	<.01	<10
03-08-00	0810	42.4	6.20	.2	--	.064	3.30	.02	.15	<.05	<.05	<.01	16
08-29-00	1230	56.5	4.56	.2	--	.052	1.79	<.02	E.07	<.05	<.05	<.01	<10
02-21-01	1440	42.9	4.03	.3	--	.053	2.47	<.04	.09	<.06	<.06	<.02	<10
08-23-01	1330	43.2	4.79	.3	--	.021	.98	E.02	.10	<.06	<.06	E.03	<10
02-27-02	1430	40.5	4.26	.3	--	.066	4.93	<.04	.13	E.03	<.06	<.09	<10
08-19-02	1610	30.9	3.71	.3	--	.033	1.99	<.04	E.10	<.06	<.06	E.01	<10
USGS-8D													
06-04-99	0920	35.6	5.30	.2	--	.021	<.05	.20	.24	.41	.39	.37	4,920
09-01-99	1050	19.2	10.1	.3	--	.01	<.05	.12	.19	.36	.31	.42	7,930
03-08-00	0840	36.9	7.23	.3	--	<.010	<.05	.11	.22	.30	E.05	.06	7,170
08-29-00	1150	32.8	8.46	.3	--	.014	<.05	.14	.27	.46	E.04	.28	8,470
02-21-01	1530	34.6	7.26	.3	--	E.003	<.05	.10	.20	.39	.21	E.01	8,080
08-23-01	1420	24.8	9.73	.3	--	.008	E.03	.12	.23	.38	E.34	E.06	7,850
02-27-02	1510	36.7	9.91	.3	--	.017	<.05	.18	.25	.44	.39	.41	8,340
08-19-02	1650	31.9	7.92	.3	--	.012	<.05	.15	.23	.41	.43	.45	7,660

**Table 1.** Values of physical properties and concentrations of inorganic constituents and nutrients in samples from wells and surface-water sites, 1999–2005.—Continued

[ $\mu\text{S}/\text{cm}$ , microsiemens per centimeter at 25 degrees Celsius; pH, in standard units;  $^{\circ}\text{C}$ , degrees Celsius; constituent concentrations are dissolved, unless otherwise noted; mg/L, milligrams per liter;  $\text{CaCO}_3$ , calcium carbonate; ANC, total acid neutralizing capacity, incremental titration; N, nitrogen;  $\mu\text{g}/\text{L}$ , micrograms per liter; NGVD 29, National Geodetic Vertical Datum of 1929; --, no data; <, less than; E, estimated; \*, replicate sample; >, greater than]

Date	Time	Water level (feet below measuring point)	Specific conductance ( $\mu\text{S}/\text{cm}$ )	pH	Temperature ( $^{\circ}\text{C}$ )	Dissolved oxygen (mg/L)	Hardness (mg/L as $\text{CaCO}_3$ )	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Alkalinity, fixed endpoint (mg/L)	ANC (mg/L)
USGS-9S (measuring point altitude 582.05 feet above NGVD 29)													
06-03-99	1510	11.67	676	7.1	14.6	0.4	--	98.7	21.9	8.54	2.38	--	325
09-01-99	1340	--	658	7.2	14.1	>1.0	--	103	22.7	7.08	1.97	317	319
03-03-00	0810	24.89	665	7.1	14.7	.8	--	98.0	22.6	5.78	2.23	305	307
08-22-00	1620	23.49	652	7.0	15.2	>1.0	--	99.2	21.7	8.02	2.43	314	313
02-20-01	1330	25.25	650	7.0	14.2	.5	--	109	22.7	7.14	2.20	--	330
08-23-01	1540	20.42	675	7.3	15.1	>1.0	--	105	22.8	7.40	2.06	307	262
03-06-02	0900	26.09	787	7.0	14.7	>1.0	--	113	25.0	5.72	2.34	313	309
08-21-02	0950	24.49	744	7.2	15.6	>1.0	--	117	25.0	6.21	2.27	304	241
USGS-9D (measuring point altitude 582.16 feet above NGVD 29)													
06-03-99	1610	11.74	621	7.1	15.2	<.1	--	87.5	17.7	9.01	2.08	--	278
*	1615	11.74	621	7.1	15.2	<.1	--	89.0	17.8	8.95	2.10	--	278
09-01-99	1250	--	624	7.1	14.4	<.1	--	90.9	18.6	8.89	1.92	283	284
*	1255	--	624	7.1	14.4	<.1	--	92.2	18.4	8.99	1.09	283	284
03-03-00	0850	24.95	592	7.2	14.3	<.1	--	--	--	--	--	--	--
*	0855	24.95	592	7.2	14.3	<.1	--	--	--	--	--	--	--
08-22-00	1710	23.57	627	7.1	15.8	<.1	--	90.1	17.8	8.60	2.19	281	281
*	1715	23.57	627	7.1	15.8	<.1	--	91.4	18.0	8.62	2.17	280	275
02-20-01	1450	25.33	573	7.0	13.9	<.1	--	89.0	17.2	8.98	1.85	272	272
*	1455	25.33	573	7.0	13.9	<.1	--	89.5	17.3	9.02	1.87	272	272
08-23-01	1630	20.54	681	7.1	15.0	<.1	--	100	19.8	10	2.03	306	266
*	1635	20.54	681	7.1	15.0	<.1	--	100	19.9	9.88	2.20	260	261
03-06-02	1000	26.19	635	7.1	14.0	<.1	--	93.2	18.2	9.48	2.10	290	291
*	1005	26.19	635	7.1	14.0	<.1	--	--	--	--	--	--	--
08-21-02	0850	24.58	670	7.1	15.6	<.1	--	103	19.5	9.93	2.28	301	259
*	0855	24.58	670	7.1	15.6	<.1	--	103	19.7	10	2.12	304	247
04-01-03	1100	28.30	608	7.0	14.5	<.1	--	--	--	--	--	--	--
*	1105	28.30	608	7.0	14.5	<.1	--	--	--	--	--	--	--

**Table 1.** Values of physical properties and concentrations of inorganic constituents and nutrients in samples from wells and surface-water sites, 1999–2005.—Continued

[ $\mu\text{S}/\text{cm}$ , microsiemens per centimeter at 25 degrees Celsius; pH, in standard units;  $^{\circ}\text{C}$ , degrees Celsius; constituent concentrations are dissolved, unless otherwise noted; mg/L, milligrams per liter; CaCO<sub>3</sub>, calcium carbonate; ANC, total acid neutralizing capacity, incremental titration; N, nitrogen;  $\mu\text{g}/\text{L}$ , micrograms per liter; NGVD 29, National Geodetic Vertical Datum of 1929; --, no data; <, less than; E, estimated; \*, replicate sample; >, greater than]

**Table 1.** Values of physical properties and concentrations of inorganic constituents and nutrients in samples from wells and surface-water sites, 1999–2005.—Continued

[ $\mu\text{S}/\text{cm}$ , microsiemens per centimeter at 25 degrees Celsius; pH, in standard units;  $^{\circ}\text{C}$ , degrees Celsius; constituent concentrations are dissolved, unless otherwise noted; mg/L, milligrams per liter;  $\text{CaCO}_3$ , calcium carbonate; ANC, total acid neutralizing capacity, incremental titration; N, nitrogen;  $\mu\text{g}/\text{L}$ , micrograms per liter; NGVD 29, National Geodetic Vertical Datum of 1929; --, no data; <, less than; E, estimated; \*, replicate sample; >, greater than]

Date	Time	Water level (feet below measuring point)	Specific conductance ( $\mu\text{S}/\text{cm}$ )	pH	Temperature ( $^{\circ}\text{C}$ )	Dissolved oxygen (mg/L)	Hardness (mg/L as $\text{CaCO}_3$ )	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Alkalinity, fixed endpoint (mg/L)	ANC (mg/L)
City of Columbia public-supply well 5													
04-03-03	0840	--	979	6.8	16.6	--	--	--	--	--	--	--	--
08-28-03	1220	--	848	7.0	--	--	--	--	--	--	--	--	--
Blew hole													
08-26-99	1340	--	881	7.7	26.8	6.7	--	83.8	18.7	58.0	6.29	232	226
02-29-00	1110	--	1,030	6.8	10.8	11.1	--	104	22.0	91.2	5.85	255	265
08-30-00	0800	--	566	7.3	30.0	3.3	--	52.3	12.8	46.2	6.03	134	134
02-27-01	1440	--	234	7.2	5.3	10.2	--	33.7	6.0	14.3	4.44	82	81
08-29-01	0830	--	1,020	7.4	26.6	3.8	--	73.8	17.8	106	7.42	239	236
03-05-02	1330	--	1,070	8.2	5.5	15.3	--	74.1	19.5	97.4	6.00	231	234
City outflow													
08-31-99	1050	--	1,540	7.5	21.1	3.5	--	45.7	23.3	207	41.5	257	216
03-02-00	1140	--	1,470	7.3	10.8	5.9	--	53.2	20.0	198	36.6	241	211
08-29-00	1430	--	1,400	7.4	28.8	2.7	--	60.3	20.1	160	24.3	245	194
02-28-01	1440	--	1,210	7.7	7.6	5.7	--	60.2	15.8	125	23.1	241	172
08-24-01	1030	--	1,600	7.4	24.5	2.4	--	43.9	21.4	196	--	209	157
03-05-02	1510	--	1,590	8.0	11.5	12.0	--	48.4	18.0	195	23.2	229	178
04-02-03	1400	--	1,500	7.8	21.8	8.8	--	--	--	--	--	--	--
04-09-03	1630	--	1,440	7.6	15.7	--	--	--	--	--	--	--	--
08-27-03	1450	--	1,780	7.3	27.3	2.5	--	--	--	--	--	--	--
Eagle Bluffs outflow													
08-30-99	1540	--	1,490	8.8	25.9	1.1	--	48.6	23.6	208	38.2	244	230
03-02-00	1100	--	1,220	8.8	10.0	7.8	--	44.7	17.7	164	32.5	202	179
08-29-00	1530	--	1,400	7.5	31.7	.7	--	63.3	19.7	171	29.1	240	203
02-28-01	1300	--	1,180	8.2	4.1	13.4	--	44.7	14.8	135	28.1	215	145
08-24-01	0940	--	1,600	9.0	27.0	2.7	--	50.9	22.5	219	34.5	226	215
03-05-02	1430	--	1,640	8.1	5.5	16.0	--	47.0	21.0	205	34.9	246	220

**Table 1.** Values of physical properties and concentrations of inorganic constituents and nutrients in samples from wells and surface-water sites, 1999–2005.—Continued

[ $\mu\text{S}/\text{cm}$ , microsiemens per centimeter at 25 degrees Celsius; pH, in standard units;  $^{\circ}\text{C}$ , degrees Celsius; constituent concentrations are dissolved, unless otherwise noted; mg/L, milligrams per liter; CaCO<sub>3</sub>, calcium carbonate; ANC, total acid neutralizing capacity, incremental titration; N, nitrogen;  $\mu\text{g}/\text{L}$ , micrograms per liter; NGVD 29, National Geodetic Vertical Datum of 1929; --, no data; <, less than; E, estimated; \*, replicate sample; >, greater than]

Date	Time	Sulfate (mg/L)	Chloride (mg/L)	Fluoride (mg/L)	Residue, sum of constituents (mg/L)	Nitrite as N (mg/L)	Nitrite plus nitrate as N (mg/L)	Ammonia as N (mg/L)	Ammonia plus organic N, total (mg/L)	Phosphorous, total (mg/L)	Phosphorous, dissolved (mg/L)	Ortho- phosphorous (mg/L)	Iron ( $\mu\text{g}/\text{L}$ )
City of Columbia public-supply well 5													
04-03-03	0840	--	64.5	--	--	--	--	--	--	--	--	--	--
08-28-03	1220	--	50.3	--	--	--	--	--	--	--	--	--	--
Blew hole													
08-26-99	1340	81.9	105	0.3	--	<0.010	<0.05	0.07	1.0	0.18	E.04	<0.01	10
02-29-00	1110	82.7	170	.2	--	<.010	<.05	<.02	1.0	.17	<.05	<.01	13
08-30-00	0800	42.8	78.6	.3	--	<.010	<.05	.06	1.4	.23	E.05	<.01	28
02-27-01	1440	27.6	23.6	E.1	--	.013	.59	.09	1.4	.29	.07	.06	41
08-29-01	830	67.4	131	.3	--	<.006	<.05	<.04	1.1	.17	E.03	E.01	30
03-05-02	1330	84.6	137	.3	--	<.008	<.05	<.04	.88	.09	<.06	<.02	E6
City outflow													
08-31-99	1050	98.3	280	1.1	--	.017	<.05	5.91	5.2	2.83	2.88	2.86	126
03-02-00	1140	108	280	1.0	--	.243	.93	4.85	5.4	2.13	1.95	1.67	89
08-29-00	1430	107	211	1.1	--	<.010	<.05	7.94	8.7	1.81	1.78	1.50	174
02-28-01	1440	93.8	188	.8	--	.038	.12	9.63	13	1.81	1.42	1.26	140
08-24-01	1030	101	241	.9	--	.008	E.03	E14.6	18	3.06	2.86	E2.40	177
03-05-02	1510	91.5	278	.9	--	.059	.28	14.3	15	2.55	2.17	2.34	64
04-02-03	1400	--	285	--	--	--	--	--	--	--	--	--	--
04-09-03	1630	--	--	--	--	--	--	--	--	--	--	--	--
08-27-03	1450	--	289	--	--	--	--	--	--	--	--	--	--
Eagle Bluffs outflow													
08-30-99	1540	108	271	1.2	--	.661	1.16	1.33	5.2	1.75	1.26	1.10	E8
03-02-00	1100	91.0	218	.9	--	.230	1.24	3.35	5.8	2.06	1.67	1.43	32
08-29-00	1530	113	223	1.1	--	.153	.29	5.78	6.8	2.04	1.93	1.78	20
02-28-01	1300	80.8	203	.8	--	.086	1.18	9.93	14	2.38	1.94	1.63	79
08-24-01	0940	119	278	1.0	--	E.144	E.18	E.55	3.4	.86	.46	E.34	E10
03-05-02	1430	102	282	1.0	--	.116	1.53	7.31	9.4	2.02	1.89	1.91	31

**Table 1.** Values of physical properties and concentrations of inorganic constituents and nutrients in samples from wells and surface-water sites, 1999–2005.—Continued

[ $\mu\text{S}/\text{cm}$ , microsiemens per centimeter at 25 degrees Celsius; pH, in standard units;  $^{\circ}\text{C}$ , degrees Celsius; constituent concentrations are dissolved, unless otherwise noted; mg/L, milligrams per liter;  $\text{CaCO}_3$ , calcium carbonate; ANC, total acid neutralizing capacity, incremental titration; N, nitrogen;  $\mu\text{g}/\text{L}$ , micrograms per liter; NGVD 29, National Geodetic Vertical Datum of 1929; --, no data; <, less than; E, estimated; \*, replicate sample; >, greater than]

Date	Time	Water level (feet below measuring point)	Specific conductance ( $\mu\text{S}/\text{cm}$ )	pH	Temperature ( $^{\circ}\text{C}$ )	Dissolved oxygen (mg/L)	Hardness (mg/L as $\text{CaCO}_3$ )	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Alkalinity, fixed endpoint (mg/L)	ANC (mg/L)
Perche Creek													
08-26-99	830	--	653	7.3	24.6	4.8	--	91.6	16.1	17.7	3.91	292	281
03-02-00	1410	--	491	7.0	10.9	6.9	--	64.2	12.8	18.2	5.24	131	131
08-30-00	0930	--	378	7.4	28.9	5.3	--	57.2	9.49	11.4	4.86	138	137
02-27-01	1450	--	234	7.4	4.8	10.8	--	31.6	5.24	6.18	4.09	71	71
08-29-01	1000	--	304	7.0	25.3	4.1	--	40.9	6.19	8.64	5.37	101	99
03-05-02	1200	--	700	7.2	2.4	14.0	--	79.9	13.4	39.9	4.32	170	168
Missouri River													
04-02-03	1040	--	617	8.0	12.5	11.2	--	--	--	--	--	--	--
08-27-03	1540	--	798	8.1	30.1	5.9	--	--	--	--	--	--	--

**Table 1.** Values of physical properties and concentrations of inorganic constituents and nutrients in samples from wells and surface-water sites, 1999–2005.—Continued

[ $\mu\text{S}/\text{cm}$ , microsiemens per centimeter at 25 degrees Celsius; pH, in standard units;  $^{\circ}\text{C}$ , degrees Celsius; constituent concentrations are dissolved, unless otherwise noted; mg/L, milligrams per liter; CaCO<sub>3</sub>, calcium carbonate; ANC, total acid neutralizing capacity, incremental titration; N, nitrogen;  $\mu\text{g}/\text{L}$ , micrograms per liter; NGVD 29, National Geodetic Vertical Datum of 1929; --, no data; <, less than; E, estimated; \*, replicate sample; >, greater than]

**Table 2.** Concentrations of trace elements, organic carbon, bromide, and silica in samples from selected monitoring wells, 1999.

[µg/L, micrograms per liter; constituent concentrations are dissolved, unless otherwise noted; <, less than; --, no data; E, estimated; mg/L, milligrams per liter; COD, chemical oxygen demand; \*, replicate sample]

Date	Time	Aluminum (µg/L)	Arsenic (µg/L)	Barium (µg/L)	Beryllium (µg/L)	Boron (µg/L)	Cadmium (µg/L)	Chromium (µg/L)	Cobalt (µg/L)	Copper (µg/L)	Lead (µg/L)	Lithium (µg/L)	Manganese (µg/L)	Mercury (µg/L)
MW1-1A														
06-03-99	1040	<10	6	42.4	<1.6	55	<8	<14	--	<10	<1	20	3,280	<0.1
09-02-99	1000	<20	6	46.2	<1.6	46	<8	<14	--	<10	<1	26	3,660	<.1
MW1-1B														
06-03-99	1000	<10	1	417	<1.6	90	<8	<14	--	<10	<1	20	2,250	<.1
09-02-99	1050	<20	2	418	<1.6	72	<8	<14	--	<10	<1	24	2,340	<.1
MW1-2A														
06-03-99	0900	<10	2	432	<1.6	190	<8	<14	<7	<10	<1	13	411	.1
09-02-99	0810	<20	2	486	<1.6	218	<8	<14	E7	<10	<1	17	432	<.1
MW1-2B														
06-03-99	0820	<10	<1	1,330	<1.6	83	<8	<14	--	<10	<1	25	422	<.1
09-02-99	0900	<20	<1	1,360	<1.6	87	<8	<14	--	<10	<1	27	408	<.1
MW1-3A														
06-03-99	1250	<10	14	418	<1.6	59	<8	<14	--	<10	<1	19	431	<.1
09-01-99	1440	<20	11	512	<1.6	46	<8	<14	--	<10	<1	23	668	<.1
MW1-3B														
06-03-99	1350	<10	<1	773	<1.6	53	<8	<14	--	<10	<1	15	294	<.1
09-01-99	1550	<20	<1	881	<1.6	46	<8	<14	--	<10	<1	19	347	<.1
MW1-4A														
06-01-99	1530	<10	<1	176	<1.6	53	<8	<14	<7	<10	<1	45	508	<.1
*	1535	<10	<1	180	<1.6	49	<8	<14	<7	<10	<1	47	540	<.1
09-02-99	1410	<20	1	187	<1.6	55	<8	<14	<13	<10	<1	53	581	<.1
*	1415	<20	1	189	<1.6	52	<8	<14	<13	<10	<1	53	601	--
MW1-4B														
06-01-99	1430	<10	17	239	<1.6	89	<8	<14	8	<10	<1	28	155	<.1
09-02-99	1320	<20	37	264	<1.6	116	<8	<14	--	<10	<1	23	265	<.1
MW2-1A														
06-02-99	1300	<10	<1	539	<1.6	66	<8	<14	<7	<10	<1	30	72.6	<.1
08-27-99	0810	<20	2	508	<1.6	63	<8	<14	8	<10	<1	3	29.4	<.1

**Table 2.** Concentrations of trace elements, organic carbon, bromide, and silica in samples from selected monitoring wells, 1999.—Continued

[µg/L, micrograms per liter; constituent concentrations are dissolved, unless otherwise noted; <, less than; --, no data; E, estimated; mg/L, milligrams per liter; COD, chemical oxygen demand; \*, replicate sample]

Date	Time	Molybdenum (µg/L)	Nickel (µg/L)	Selenium (µg/L)	Silver (µg/L)	Strontium (µg/L)	Vanadium (µg/L)	Zinc (µg/L)	Organic carbon, (mg/L)	Organic carbon, total (mg/L)	COD, high level (mg/L)	Bromide (mg/L)	Silica (mg/L)
MW1-1A													
06-03-99	1040	<50	<40	<1	<4	449	<10	<20	2.6	3.3	30	0.06	37.9
09-02-99	1000	<30	<40	1	<7	494	<10	<20	3.5	4.2	<10	.07	39.9
MW1-1B													
06-03-99	1000	<50	<40	<1	<4	931	<10	<20	2.2	3.1	20	.09	45.0
09-02-99	1050	<30	<40	<1	<7	926	<10	<20	3.5	7.4	<10	.08	47.3
MW1-2A													
06-03-99	0900	<50	<40	<1	<4	177	<10	<20	2.7	3.6	30	.33	23.1
09-02-99	0810	<30	<40	<1	<7	190	<10	<20	3.2	3.9	<10	.26	24.3
MW1-2B													
06-03-99	0820	<50	<40	<1	<4	345	<10	<20	2.4	2.4	30	.28	32.6
09-02-99	0900	<30	<40	<1	<7	338	<10	<20	3.2	4.2	<10	.49	33.7
MW1-3A													
06-03-99	1250	<50	<40	<1	<4	477	<10	<20	1.3	2.8	20	.04	43.4
09-01-99	1440	<30	<40	<1	<7	492	<10	<20	1.8	2.3	<10	.07	39.9
MW1-3B													
06-03-99	1350	<50	<40	<1	<4	349	<10	<20	1.4	1.3	20	.09	33.8
09-01-99	1550	<30	<40	<1	<7	386	<10	<20	1.8	2.1	<10	.11	33.5
MW1-4A													
06-01-99	1530	<50	<40	<1	<4	565	<10	<20	1.4	1.7	20	.07	16.0
*	1535	<50	<40	<1	<4	590	<10	<20	1.3	1.2	20	.07	16.7
09-02-99	1410	<30	<40	1	<7	607	<10	<20	1.9	2.0	<10	.08	17.9
*	1415	<30	<40	<1	<7	612	<10	<20	2.0	2.0	<10	.08	18.0
MW1-4B													
06-01-99	1430	<50	<40	1	<4	485	<10	E8	2.0	3.3	20	.04	28.2
09-02-99	1320	<30	<40	<1	<7	437	E5	<20	3.2	4.4	<10	<.01	34.2
MW2-1A													
06-02-99	1300	<50	<40	<1	<4	512	<10	<20	1.5	2.8	10	.03	25.8
08-27-99	0810	<30	<40	<1	<7	418	<10	<20	--	--	--	.03	28.2

**Table 2.** Concentrations of trace elements, organic carbon, bromide, and silica in samples from selected monitoring wells, 1999.—Continued

[ $\mu\text{g/L}$ , micrograms per liter; constituent concentrations are dissolved, unless otherwise noted; <, less than; --, no data; E, estimated; mg/L, milligrams per liter; COD, chemical oxygen demand; \*, replicate sample]

Date	Time	Aluminum ( $\mu\text{g/L}$ )	Arsenic ( $\mu\text{g/L}$ )	Barium ( $\mu\text{g/L}$ )	Beryllium ( $\mu\text{g/L}$ )	Boron ( $\mu\text{g/L}$ )	Cadmium ( $\mu\text{g/L}$ )	Chromium ( $\mu\text{g/L}$ )	Cobalt ( $\mu\text{g/L}$ )	Copper ( $\mu\text{g/L}$ )	Lead ( $\mu\text{g/L}$ )	Lithium ( $\mu\text{g/L}$ )	Manganese ( $\mu\text{g/L}$ )	Mercury ( $\mu\text{g/L}$ )
MW2-1B														
06-02-99	1400	<10	<1	1,330	<1.6	85	<8	<14	--	<10	<1	40	321	<0.1
08-27-99	0900	<20	<1	1,340	<1.6	85	<8	<14	--	<10	<1	25	343	<.1
MW3-1A														
06-02-99	1440	<10	<1	226	<1.6	55	<8	<14	<7	<10	<1	26	278	<.1
09-01-99	0900	<20	2	234	<1.6	57	<8	<14	<13	<10	<1	28	291	<.1
MW3-1B														
06-02-99	1530	<10	<1	731	<1.6	82	<8	<14	--	<10	<1	43	585	<.1
09-01-99	0810	<20	<1	733	<1.6	82	<8	<14	--	<30	<1	43	567	<.1
MW4-1A														
06-02-99	0810	M	5	441	<1.6	87	<8	<14	--	<10	<1	41	1,240	<.1
08-31-99	1300	<20	6	440	<1.6	92	<8	<14	--	<10	<1	44	1,240	<.1
MW4-1B														
06-02-99	0915	<10	1	1,130	<1.6	83	<8	<14	--	<10	<1	35	352	<.1
08-31-99	1350	<20	2	1,020	<1.6	82	<8	<14	--	<10	<1	37	543	<.1
MW4-2A														
06-02-99	1100	<10	4	327	<1.6	77	<8	<14	--	<10	<1	36	1,710	<.1
08-31-99	1500	<20	5	338	<1.6	87	<8	<14	--	<10	<1	38	1,860	<.1
MW4-2B														
06-02-99	1020	<10	<1	1,080	<1.6	99	<8	<14	--	<10	<1	43	1,030	<.1
08-31-99	1600	<20	<1	1,090	<1.6	106	<8	<14	--	<30	<1	47	1,170	<.1
USGS-8S														
06-04-99	0830	<10	<1	193	<1.6	54	<8	<14	<7	<10	<1	23	178	<.1
USGS-8D														
06-04-99	0830	<10	<1	538	<1.6	67	<8	<14	10	<10	<1	34	440	<.1
USGS-9S														
06-03-99	1510	<10	6	428	<1.6	46	<8	<14	<7	<10	<1	E4	19.5	<.1
USGS-9D														
06-03-99	1610	<10	<1	555	<1.6	30	<8	<14	--	<10	<1	7	316	<.1
*	1615	<10	<1	552	<1.6	27	<8	<14	--	<10	<1	8	319	<.1

**Table 2.** Concentrations of trace elements, organic carbon, bromide, and silica in samples from selected monitoring wells, 1999.—Continued

[µg/L, micrograms per liter; constituent concentrations are dissolved, unless otherwise noted; <, less than; --, no data; E, estimated; mg/L, milligrams per liter; COD, chemical oxygen demand; \*, replicate sample]

Date	Time	Molybdenum (µg/L)	Nickel (µg/L)	Selenium (µg/L)	Silver (µg/L)	Strontium (µg/L)	Vanadium (µg/L)	Zinc (µg/L)	Organic carbon (mg/L)	Organic carbon, total (mg/L)	COD, high level (mg/L)	Bromide (mg/L)	Silica (mg/L)
MW2-1B													
06-02-99	1400	<50	<40	<1	<4	715	<10	<20	2.3	2.3	20	0.03	35.3
08-27-99	0900	<30	<40	<1	<7	723	<10	<20	2.9	3.0	<10	.02	37.2
MW3-1A													
06-02-99	1440	<50	<40	<1	<4	796	<10	<20	1.8	1.3	10	.06	22.4
09-01-99	0900	<30	E20	1	<7	848	<10	<20	2.5	2.5	<10	.07	24.7
MW3-1B													
06-02-99	1530	<50	<40	<1	<4	876	<10	<20	1.8	7.3	20	.01	34.8
09-01-99	0810	<30	<40	<1	<7	880	<10	<20	2.4	2.7	<10	<.01	35.3
MW4-1A													
06-02-99	0810	<50	<40	<1	<4	1,060	<10	<20	2.0	8.0	20	.09	29.0
08-31-99	1300	<30	<40	<1	<7	1,130	<10	<20	3.1	4.8	<10	.04	30.7
MW4-1B													
06-02-99	0915	<50	<40	<1	<4	792	<10	<20	2.2	2.8	20	.10	33.2
08-31-99	1350	<30	<40	<1	<7	819	<10	<20	2.6	3.4	<10	.10	35.6
MW4-2A													
06-02-99	1100	<50	<40	<1	<4	924	<10	<20	2.4	1.8	20	.05	26.0
08-31-99	1500	<30	E20	<1	<7	1,030	<10	<20	3.0	3.3	<10	.04	28.2
USGS-8S													
06-04-99	0830	<50	<40	<1	<4	746	<10	<20	1.3	1.4	20	.01	23.1
USGS-8D													
06-04-99	0830	<50	<40	<1	<4	716	<10	<20	1.6	2.5	20	.03	27.1
USGS-9S													
06-03-99	1510	<50	<40	1	<4	272	<10	<20	1.1	1.4	10	.02	20.9
USGS-9D													
06-03-99	1610	<50	<40	<1	<4	196	<10	<20	1.1	2.7	10	.17	29.5
*	1615	<50	<40	<1	<4	196	<10	<20	1.0	1.5	20	.06	29.6

**Table 3.** Organic compounds and pesticides analyzed and minimum reporting limits for samples from selected monitoring wells, June 1999.

[--, not detected; µg/L, micrograms per liter; CFC, 1,1,2-trichloro-1,2,2-trifluoroethane; p,p'-DDD, 1,1'-(2,2-dichloroethylidene)bis(4-chlorobenzene); p,p'-DDE, 1,1'-(dichloroethylidene)bis(4-chlorobenzene); p,p'-DDT, 1,1'-(2,2,2-dichloroethylidene)bis(4-chlorobenzene); PCBs, polychlorinated biphenyls; PCNs, polychlorinated naphthalenes]

Constituent	Minimum reporting limit (µg/L)	Detected in water sample	Constituent	Minimum reporting limit (µg/L)	Detected in water sample
Organic compounds					
1,1-Dichloroethane	3	--	4-Isopropyl toluene	3	--
1,1-Dichloroethene	3	--	4-Nitrophenol	30	--
1,1-Dichloropropene	3	--	9H-Fluorene	5	--
1,1,1-Trichloroethane	3	--	Acenaphthene	5	--
1,1,1,2-Tetrachloroethane	3	--	Acenaphthylene	5	--
1,1,2-Trichloroethane	3	--	Acrylonitrile	2.5	--
1,1,2,2-Tetrachloroethane	3	--	Anthracene	5	--
1,2-Dibromoethane	3	--	Benzene	3	--
1,2-Dichlorobenzene	3	--	Benzidine	40	--
1,2-Dichloroethane	3	--	Benzo[a]anthracene	10	--
1,2-Dichloropropane	3	--	Benzo[a]pyrene	10	--
1,2-Diphenylhydrazine	5	--	Benzo[b]fluoranthene	10	--
1,2,3-Trichlorobenzene	3	--	Benzo[g,h,i]perylene	10	--
1,2,3-Trichloropropane	3	--	Benzo[k]fluoranthene	10	--
1,2,4-Trichlorobenzene	3	--	Benzyl-n-butyl phthalate	5	--
1,2,4-Trimethylbenzene	3	--	Bis(2-chloroethoxy) methane	5	--
1,3-Dichlorobenzene	3	--	Bis(2-chloroethyl) ether	5	--
1,3-Dichloropropane	3	--	Bis(2-chloroisopropyl) ether	5	--
1,3,5-Trimethylbenzene	3	--	Bis(2-ethylhexyl) phthalate	5	--
1,4-Dichlorobenzene	3	--	Bromobenzene	3	--
2-Chloronaphthalene	5	--	Bromochloromethane	3	--
2-Chlorophenol	5	--	Bromodichloromethane	3	--
2-Chlorotoluene	3	--	Bromomethane	3	--
2-Methyl-4,6-dinitrophenol	30	--	CFC-113	3	--
2-Nitrophenol	5	--	Chrysene	10	--
2,2-Dichloropropane	3	--	Chlorobenzene	3	--
2,4-Dichlorophenol	5	--	Chloroethane	3	--
2,4-Dimethylphenol	5	--	Chloromethane	3	--
2,4-Dinitrophenol	20	--	cis-1,2-Dichloroethene	3	--
2,4-Dinitrotoluene	5	--	cis-1,3-Dichloropropene	3	--
2,4,6-Trichlorophenol	20	--	Dibenzo[a,h]anthracene	10	--
2,6-Dinitrotoluene	5	--	Dibromochloromethane	3	--
3,3'-Dichlorobenzidine	20	--	Dibromochloropropane	3	--
4-Bromophenyl phenyl ether	5	--	Dibromomethane	3	--
4-Chloro-3-methylphenol	30	--	Dichlorodifluoromethane	3	--
4-Chlorophenyl phenyl ether	5	--	Dichloromethane	3	--
4-Chlorotoluene	3	--	Diethyl phthalate	5	--

**Table 3.** Organic compounds and pesticides analyzed and minimum reporting limits for samples from selected monitoring wells, June 1999.—Continued

[--, not detected; µg/L, micrograms per liter; CFC, 1,1,2-trichloro-1,2,2-trifluoroethane; p,p'-DDD, 1,1'-(2,2-dichloroethylidene)bis(4-chlorobenzene); p,p'-DDE, 1,1'-(dichloroethylidene)bis(4-chlorobenzene); p,p'-DDT, 1,1'-(2,2,2-dichloroethylidene)bis(4-chlorobenzene); PCBs, polychlorinated biphenyls; PCNs, polychlorinated naphthalenes]

Constituent	Minimum reporting limit (µg/L)	Detected in water sample	Constituent	Minimum reporting limit (µg/L)	Detected in water sample
Organic compounds—Continued					
Dimethyl phthalate	5	--	N-Nitrosodiphenylamine	5	--
Di-n-butyl phthalate	5	--	Pentachlorophenol	30	--
Di-n-octyl phthalate	10	--	Pentanthrene	5	--
Ethylbenzene	3	--	Phenol	5	--
Fluoranthene	5	--	Pyrene	5	--
Hexachlorobenzene	5	--	sec-Butylbenzene	3	--
Hexachlorobutadiene	3	--	Styrene	3	--
Hexachlorocyclopentadiene	20	--	tert-Butylbenzene	3	--
Hexachloroethane	5	--	Tetrachloroethene	3	--
Indeno[1,2,3-cd]pyrene	10	--	Tetrachloromethane	3	--
Isophorone	5	--	Toluene	3	--
Isopropylbenzene	3	--	trans-1,2-Dichloroethene	3	--
Methyl-t-butyl ether	3	--	trans-1,3-Dichloropropene	3	--
Naphthalene	3	--	Tribromomethane	3	--
Nitrobenzene	5	--	Trichloroethene	3	--
n-Butylbenzene	3	--	Trichlorofluoromethane	3	--
n-Propylbenzene	3	--	Trichloromethane	3	--
N-Nitrosodimethylamine	5	--	Vinyl chloride	1	--
N-Nitrosodi-n-propylamine	5	--	Xylenes (total)	3	--
Pesticides					
Aldrin	.01	--	p,p'-DDD	.01	--
alpha-Endosulfan	.01	--	p,p'-DDE	.01	--
Chlordane	.1	--	p,p'-DDT	.01	--
Dieldrin	.010	--	p,p'-Ethyl-DDD	.1	--
Endrin	.01	--	p,p'-Methoxychlor	.01	--
Heptachlor	.01	--	PCBs	.1	--
Heptachlor epoxide	.01	--	PCNs	.1	--
Lindane	.01	--	Toxaphene	1	--
Mirex	.01	--			

**Table 4.** Wastewater organic compounds analyzed and minimum reporting limits for samples from selected monitoring wells and surface-water sites, 1999–2003.

[--, not detected; µg/L, micrograms per liter; AHTN, acetyl hexamethyl tetrahydronaphthalene; DEET, N,N-diethyl-meta-toluamide; HHCB, hexahydrohexamethylcyclopentabenzopyran; compounds detected are indicated with an X in the table]

Constituent	Minimum reporting limit (µg/L)	Detected in ground or surface water (table 6)	Constituent	Minimum reporting limit (µg/L)	Detected in ground or surface water (table 6)
1,4-Dichlorobenzene	0.5	X	Dichlorvos	1	--
1-Methylnaphthalene	.5	--	Diethoxynonylphenol	5	X
2,6-Dimethylnaphthalene	.5	--	Diethoxyoctylphenol	1	X
2-Methylnaphthalene	.5	--	d-Limonene	.5	--
3-beta-Coprostanol	2	X	Ethoxyoctylphenol	.5	X
3-Methyl-1H-indole	1	X	HHCB	.5	X
3-tert-Butyl-4-hydroxyanisole (BHA)	5	--	Indole	.5	X
4-Cumylphenol	1	--	Isoborneol	.5	--
4-Octylphenol	1	--	Isophorone	.5	X
4-Nonylphenol	5	X	Isopropylbenzene	.5	--
4-tert-Octylphenol	1	X	Isoquinoline	.5	--
5-Methyl-1H-benzotriazole	2	X	Menthol	.5	X
9,10-Anthraquinone	.5	--	Metalaxyl	.5	--
Acetophenone	.5	X	Methyl salicylate	.5	X
AHTN	.5	X	Metolachlor	.5	--
Anthracene	.5	--	Naphthalene	.5	--
Benzo[a]pyrene	.5	--	p-Cresol	1	X
Benzophenone	.5	X	Pentachlorophenol	2	--
beta-Sitosterol	2	X	Phenanthrene	.5	--
beta-Stigmastanol	2	X	Phenol	.5	X
Bisphenol A	1	X	Prometon	.5	X
Bromacil	.5	--	Pyrene	.5	--
Caffeine	.5	X	Tetrachloroethene	.5	--
Camphor	.5	X	Tribromomethane	.5	X
Carbaryl	1	X	Tributyl phosphate	.5	X
Carbazole	.5	--	Triclosan	1	X
Chlorpyrifos	.5	--	Triethyl citrate	.5	X
Cholesterol	2	X	Triphenyl phosphate	.5	X
Cotinine	1	X	Tris(2-butoxyethyl) phosphate	.5	X
DEET	.5	X	Tris(2-chloroethyl) phosphate	.5	X
Diazinon	.5	X	Tris(dichloroisopropyl) phosphate	.5	X

**Table 5.** Pesticides analyzed and minimum reporting limits for samples from selected monitoring wells and surface-water sites, 1999–2003.

[--, not detected; µg/L, micrograms per liter; CIAT, 2-chloro-4-isopropylamino-6-amino-s-triazine; HCH, hexachlorocyclohexane; DCPA, dimethyl tetrachloroterephthalate; EPTC, s-ethyl dipropylthiocarbamate; DDE, dichlorodiphenyl dichloroethylene; compounds detected are indicated with an X in the table]

Constituent	Minimum reporting limit (µg/L)	Detected in ground or surface water (table 6)	Constituent	Minimum reporting limit (µg/L)	Detected in ground or surface water (table 6)
2,6-Diethylaniline	0.006	--	Malathion	0.027	--
CIAT	.014	X	Methyl parathion	.015	--
Acetochlor	.006	--	Metolachlor	.006	X
Alachlor	.005	--	Metribuzin	.028	X
alpha-HCH	.005	--	Molinate	.003	--
Atrazine	.007	X	Napropamide	.007	--
Azinphos-methyl	.05	--	p,p'-DDE	.003	--
Benfluralin	.01	--	Parathion	.01	--
Butylate	.004	--	Pebulate	.004	--
Carbaryl	.041	X	Pendimethalin	.022	--
Carbofuran	.02	--	Phorate	.055	--
Chlorpyrifos	.005	--	Prometon	.010	X
cis-Permethrin	.006	--	Propyzamide	.004	--
Cyanazine	.018	--	Propachlor	.010	--
DCPA	.003	--	Propanil	.011	--
Dieldrin	.009	--	Propargite	.023	--
Disulfoton	.021	--	Simazine	.005	--
EPTC	.004	--	Tebuthiuron	.016	--
Ethalfluralin	.009	--	Terbacil	.034	--
Ethoprop	.012	--	Terbufos	.017	--
Fonofos	.0053	--	Thiobencarb	.010	--
Lindane	.004	--	Triallate	.006	--
Linuron	.035	--	Trifluralin	.009	--

**Table 6.** Concentrations of wastewater organic compounds and pesticides in samples from selected monitoring wells and surface-water sampling sites, 1999–2003.

[µg/L, micrograms per liter; constituent concentrations are dissolved, unless otherwise noted; CIAT, 2-chloro-4-isopropylamino-6-amino-s-triazine; AHTN, acetyl hexamethyl tetrahydronaphthalene; --, concentration less than reporting limit; nd, not determined; E, estimated; M, presence verified, but not quantified; \*, replicate sample; DEET, n,n-diethyl-meta-toluamide]

Date	Time	1,4-Dichloro-benzene (µg/L)	3-beta-Coprostanol (µg/L)	3-Methyl-1H-indole (µg/L)	4-Nonyl-phenol (µg/L)	4-tert-Octyl-phenol (µg/L)	5-Methyl-1H-benzotriazole (µg/L)	CIAT (µg/L)	Aceto-phenone (µg/L)	AHTN (µg/L)	Atrazine (µg/L)	Benzophenone (µg/L)	beta-Sitosterol (µg/L)	beta-Stigmastanol (µg/L)	Bisphenol A (µg/L)
MW1-1A															
04-03-03	1040	--	--	--	--	--	--	nd	--	--	nd	E0.1	--	--	--
08-28-03	1000	--	--	--	--	--	--	nd	--	--	nd	--	--	--	--
MW1-2A															
04-03-03	1000	--	--	--	--	--	--	nd	--	--	nd	E.2	--	--	--
08-28-03	1100	--	--	--	--	--	--	nd	--	--	nd	--	--	--	M
MW1-3A															
04-03-03	1630	--	--	--	--	--	--	nd	E.2	--	nd	E.1	--	--	--
08-28-03	1140	--	--	M	--	--	--	nd	--	--	nd	--	--	--	--
MW1-3B															
06-03-99	1350	--	nd	nd	nd	nd	nd	--	nd	nd	0.008	nd	nd	nd	nd
MW1-4A															
04-03-03	1530	--	--	--	--	--	--	--	--	--	--	--	--	--	--
08-28-03	0920	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW3-1A															
04-01-03	1650	--	--	--	E1	--	--	nd	E.2	--	nd	E.2	--	--	--
08-27-03	1430	--	--	--	--	--	--	nd	--	--	nd	--	--	--	--
MW4-1A															
04-02-03	0950	--	--	--	--	--	--	--	E.2	--	.007	E.2	--	--	--
08-27-03	1230	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW4-2A															
04-02-03	0850	--	--	--	--	--	--	nd	--	--	nd	M	--	--	--
08-27-03	1130	--	--	--	--	--	--	nd	--	--	nd	--	--	--	--
USGS-1															
03-01-01	1130	nd	nd	nd	nd	nd	nd	E0.002	nd	nd	E.002	nd	nd	nd	nd
USGS-3S															
04-01-03	1320	--	--	--	--	--	--	nd	E.2	--	nd	E.1	--	--	M
USGS-9S															
02-20-01	1330	nd	nd	nd	nd	nd	nd	E.004	nd	nd	--	nd	nd	nd	nd

**Table 6.** Concentrations of wastewater organic compounds and pesticides in samples from selected monitoring wells and surface-water sampling sites, 1999–2003.—Continued

[µg/L, micrograms per liter; constituent concentrations are dissolved, unless otherwise noted; CIAT, 2-chloro-4-isopropylamino-6-amino-s-triazine; AHTN, acetyl hexamethyl tetrahydronaphthalene; --, concentration less than reporting limit; nd, not determined; E, estimated; M, presence verified, but not quantified; \*, replicate sample; DEET, n,n-diethyl-meta-toluamide]

Date	Caffeine (µg/L)	Camphor (µg/L)	Carbaryl (µg/L)	Cholesterol (µg/L)	Cotinine (µg/L)	DEET (µg/L)	Diazinon (µg/L)	Diethoxy- nonylphenol (µg/L)	Diethoxy- octylphenol (µg/L)	Ethoxy- octylphenol (µg/L)	HHCB (µg/L)	Indole (µg/L)	Isophorone (µg/L)	Menthol (µg/L)
MW1-1A														
04-03-02	--	--	--	--	--	E0.1	--	--	--	--	--	--	--	--
08-28-02	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW1-2A														
04-03-02	--	--	--	--	--	E.2	--	--	--	--	--	--	--	--
08-28-02	--	--	--	--	--	E.1	--	--	--	--	--	--	--	--
MW1-3A														
04-03-02	--	--	--	--	--	E.1	--	--	--	--	--	--	--	--
08-28-02	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW1-3B														
06-03-99	nd	nd	--	nd	nd	nd	--	nd	nd	nd	nd	nd	--	nd
MW1-4A														
04-03-02	--	--	--	--	--	--	--	--	--	--	--	--	--	--
08-28-02	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW3-1A														
04-01-02	--	--	--	--	--	E.1	--	--	--	--	--	--	--	--
08-27-02	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW4-1A														
04-02-03	--	--	--	--	--	E.2	--	--	--	--	--	--	--	--
08-27-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW4-2A														
04-02-03	--	--	--	--	--	E.1	--	--	--	--	--	--	--	--
08-27-03	--	--	--	--	--	M	--	--	--	--	--	--	--	--
USGS-1														
03-01-01	nd	nd	--	nd	nd	nd	--	nd	nd	nd	nd	nd	nd	nd
USGS-3S														
04-01-03	--	--	--	--	--	E.1	--	--	--	--	--	--	--	--
USGS-9S														
02-20-01	nd	nd	--	nd	nd	nd	--	nd	nd	nd	nd	nd	--	nd

**Table 6.** Concentrations of wastewater organic compounds and pesticides in samples from selected monitoring wells and surface-water sampling sites, 1999–2003.—Continued

[µg/L, micrograms per liter; constituent concentrations are dissolved, unless otherwise noted; CIAT, 2-chloro-4-isopropylamino-6-amino-s-triazine; AHTN, acetyl hexamethyl tetrahydronaphthalene; --, concentration less than reporting limit; nd, not determined; E, estimated; M, presence verified, but not quantified; \*, replicate sample; DEET, n,n-diethyl-meta-toluamide]

Date	Methyl salicylate (µg/L)	Metolachlor (µg/L)	Metribuzin (µg/L)	p-Cresol (µg/L)	Phenol (µg/L)	Prometon (µg/L)	Simazine (µg/L)	Tribromo-methane (µg/L)	Tributyl phosphate (µg/L)	Triclosan (µg/L)	Triethyl citrate (µg/L)	Triphenyl phosphate (µg/L)	Tris (2-butoxy-ethyl) phosphate (µg/L)	Tris (2-chloro-ethyl) phosphate (µg/L)	Tris (dichloro-i-Pr) phosphate (µg/L)
MW1-1A															
04-03-02	--	--	nd	--	1.0	--	nd	--	--	--	--	--	--	--	--
08-28-02	--	--	nd	--	1.0	--	nd	--	--	--	--	--	--	--	--
MW1-2A															
06-03-99	M	--	nd	--	E.3	--	nd	--	--	--	--	--	--	--	--
09-02-99	--	--	nd	--	--	--	nd	--	--	--	--	--	--	--	--
MW1-3A															
04-03-02	M	--	nd	--	E.3	--	nd	--	--	--	--	--	--	--	--
08-28-02	--	--	nd	M	.8	--	nd	--	--	--	--	--	--	--	--
MW1-3B															
06-03-99	nd	--	--	nd	--	--	--	nd	nd	nd	nd	nd	nd	nd	nd
MW1-4A															
04-03-02	--	--	--	--	1.8	--	--	--	--	--	--	--	--	--	--
08-28-02	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW3-1A															
04-01-02	E0.1	--	nd	--	1.2	--	nd	--	--	--	--	--	--	--	--
08-27-02	--	--	nd	--	E.3	--	nd	--	--	--	--	--	--	--	--
MW4-1A															
04-02-03	E.1	--	--	--	E.3	--	--	--	--	--	--	--	--	--	--
08-27-03	--	--	--	--	.6	--	--	--	--	--	--	--	--	--	--
MW4-2A															
04-02-03	E.1	--	nd	--	1.8	--	nd	--	--	--	--	--	--	--	--
08-27-03	--	--	nd	--	.6	--	nd	--	--	--	--	--	--	--	--
USGS-1															
03-01-01	nd	--	--	nd	nd	--	--	nd	nd	nd	nd	nd	nd	nd	nd
USGS-3S															
04-01-03	E.2	--	nd	--	.5	--	nd	--	--	--	--	--	--	--	--
USGS-9S															
02-20-01	nd	--	--	nd	--	--	--	nd	nd	nd	nd	nd	nd	nd	nd

**Table 6.** Concentrations of wastewater organic compounds and pesticides in samples from selected monitoring wells and surface-water sampling sites, 1999–2003.—Continued

[µg/L, micrograms per liter; constituent concentrations are dissolved, unless otherwise noted; CIAT, 2-chloro-4-isopropylamino-6-amino-s-triazine; AHTN, acetyl hexamethyl tetrahydronaphthalene; --, concentration less than reporting limit; nd, not determined; E, estimated; M, presence verified, but not quantified; \*, replicate sample; DEET, n,n-diethyl-meta-toluamide]

Date	Time	1,4-Dichloro-benzene (µg/L)	3-beta-Coprostanol (µg/L)	3-Methyl-1H-indole (µg/L)	4-Nonyl-phenol (µg/L)	4-tert-Octyl-phenol (µg/L)	5-Methyl-1H-benzotriazole (µg/L)	CIAT (µg/L)	Aceto-phenone (µg/L)	AHTN (µg/L)	Atrazine (µg/L)	Benzophenone (µg/L)	beta-Sitosterol (µg/L)	beta-Stigmasterol (µg/L)	Bisphenol A (µg/L)
USGS-9D															
04-01-03	1100	--	--	--	--	--	--	nd	--	--	nd	E0.1	--	--	--
*	1105	--	--	--	--	--	--	nd	--	--	nd	M	--	--	--
City of Columbia public-supply well 5															
04-03-03	0840	--	--	--	--	--	--	nd	--	--	--	E.1	--	--	--
08-28-03	1220	--	--	--	--	--	--	nd	--	--	--	M	--	--	--
Blew hole															
08-26-99	1340	nd	nd	nd	nd	nd	nd	E0.043	nd	nd	0.192	nd	nd	nd	nd
08-30-00	0800	nd	nd	nd	nd	nd	nd	E.059	nd	nd	.073	nd	nd	nd	nd
02-27-01	1440	nd	nd	nd	nd	nd	nd	E.007	nd	nd	.013	nd	nd	nd	nd
City outflow															
08-31-99	1050	nd	nd	nd	nd	nd	nd	--	nd	nd	--	nd	nd	nd	nd
08-29-00	1430	nd	nd	nd	nd	nd	nd	--	nd	nd	--	nd	nd	nd	nd
02-28-01	1440	nd	nd	nd	nd	nd	nd	--	nd	nd	--	nd	nd	nd	nd
04-02-03	1400	M	E1	--	E4	M	E2	nd	E0.3	0.6	nd	.6	--	--	1
04-09-03	1630	E0.1	E2	M	E3	M	E1	nd	E.2	.8	nd	.5	E3	E2	M
Eagle Bluffs outflow															
08-30-99	1540	nd	nd	nd	nd	nd	nd	--	nd	nd	--	nd	nd	nd	nd
08-29-00	1530	nd	nd	nd	nd	nd	nd	--	nd	nd	--	nd	nd	nd	nd
02-28-01	1300	nd	nd	nd	nd	nd	nd	--	nd	nd	--	nd	nd	nd	nd
Perche Creek															
08-26-99	0830	nd	nd	nd	nd	nd	nd	E.029	nd	nd	.154	nd	nd	nd	nd
08-30-00	0930	nd	nd	nd	nd	nd	nd	E.011	nd	nd	.112	nd	nd	nd	nd
02-27-01	1450	nd	nd	nd	nd	nd	nd	E.010	nd	nd	.017	nd	nd	nd	nd
Missouri River															
04-02-03	1040	--	--	--	--	--	--	nd	--	M	nd	M	--	--	--
08-27-03	1540	--	--	--	--	--	--	nd	E.1	--	nd	M	--	--	--

**Table 6.** Concentrations of wastewater organic compounds and pesticides in samples from selected monitoring wells and surface-water sampling sites, 1999–2003.—Continued

[ $\mu\text{g/L}$ , micrograms per liter; constituent concentrations are dissolved, unless otherwise noted; CIAT, 2-chloro-4-isopropylamino-6-amino-s-triazine; AHTN, acetyl hexamethyl tetrahydronaphthalene, --, concentration less than reporting limit; nd, not determined; E, estimated; M, presence verified, but not quantified; \*, replicate sample; DEET, n,n-diethyl-meta-toluamide]

Date	Caffeine ( $\mu\text{g/L}$ )	Camphor ( $\mu\text{g/L}$ )	Carbaryl ( $\mu\text{g/L}$ )	Cholesterol ( $\mu\text{g/L}$ )	Cotinine ( $\mu\text{g/L}$ )	DEET ( $\mu\text{g/L}$ )	Diazinon ( $\mu\text{g/L}$ )	Diethoxy-nonyl-phenol ( $\mu\text{g/L}$ )	Diethoxy-octyl-phenol ( $\mu\text{g/L}$ )	Ethoxy-octyl-phenol ( $\mu\text{g/L}$ )	HHCB ( $\mu\text{g/L}$ )	Indole ( $\mu\text{g/L}$ )	Isophorone ( $\mu\text{g/L}$ )	Menthol ( $\mu\text{g/L}$ )
USGS-9D														
04-01-03	--	--	--	--	--	E0.1	--	--	--	--	--	--	--	--
*	--	--	--	--	--	M	--	--	--	--	--	--	--	--
City of Columbia public-supply well 5														
04-03-03	--	--	--	--	--	M	--	--	--	--	--	--	--	--
08-28-03	--	--	--	--	--	M	--	--	--	--	--	--	--	--
Blew hole														
08-26-99	nd	nd	nd	nd	nd	nd	--	nd	nd	nd	nd	nd	nd	nd
08-30-00	nd	nd	nd	nd	nd	nd	--	nd	nd	nd	nd	nd	nd	nd
02-27-01	nd	nd	nd	nd	nd	nd	--	nd	nd	nd	nd	nd	nd	nd
City outflow														
08-31-99	nd	nd	E0.053	nd	nd	nd	0.042	nd	nd	nd	nd	nd	nd	nd
08-29-00	nd	nd	E.015	nd	nd	nd	.058	nd	nd	nd	nd	nd	nd	nd
02-28-01	nd	nd	--	nd	nd	nd	.028	nd	nd	nd	nd	nd	nd	nd
04-02-03	E.3	--	nd	E2	E0.240	.8	--	E4	M	M	E0.1	--	E0.1	--
04-09-03	2.6	M	nd	E3	E.420	.5	E.100	E9	M	E2	E.2	E0.1	--	0.9
Eagle Bluffs outflow														
08-30-99	nd	nd	--	nd	nd	nd	.028	nd	nd	nd	nd	nd	nd	nd
08-29-00	nd	nd	E.008	nd	nd	nd	.047	nd	nd	nd	nd	nd	nd	nd
02-28-01	nd	nd	--	nd	nd	nd	.019	nd	nd	nd	nd	nd	nd	nd
Perche Creek														
08-26-99	nd	nd	--	nd	nd	nd	--	nd	nd	nd	nd	nd	nd	nd
08-30-00	nd	nd	--	nd	nd	nd	.012	nd	nd	nd	nd	nd	nd	nd
02-27-01	nd	nd	--	nd	nd	nd	--	nd	nd	nd	nd	nd	nd	nd
Missouri River														
04-02-03	E.1	--	--	--	--	M	--	--	--	--	--	--	--	--
08-27-03	E.1	--	--	--	--	E.1	--	--	--	--	--	--	--	--

**Table 6.** Concentrations of wastewater organic compounds and pesticides in samples from selected monitoring wells and surface-water sampling sites, 1999–2003.—Continued

[ $\mu$ g/L, micrograms per liter; constituent concentrations are dissolved, unless otherwise noted; CIAT, 2-chloro-4-isopropylamino-6-amino-s-triazine; AHTN, acetyl hexamethyl tetrahydronaphthalene; --, concentration less than reporting limit; nd, not determined; E, estimated; M, presence verified, but not quantified; \*, replicate sample; DEET, n,n-diethyl-meta-toluamide]

**Table 7.** Altitude of water levels in monitoring wells, 2004–2005.

[Altitudes are in feet above National Geodetic Vertical Datum of 1929 (NGVD 29); ft, feet; --, no data]

<b>Site (fig. 3)</b>	<b>Date</b>	<b>Altitude (ft)</b>	<b>Site (fig. 3)</b>	<b>Date</b>	<b>Altitude (ft)</b>
MW-101	02-24-2004	567.35	MW-111	02-24-2004	551.84
	08-31-2004	559.56		08-31-2004	557.65
	03-08-2005	560.81		03-08-2005	553.87
	08-02-2005	557.11		08-02-2005	552.77
MW-102	02-24-2004	558.24	MW-112	02-24-2004	553.33
	08-31-2004	561.16		08-31-2004	558.12
	03-08-2005	563.20		03-08-2005	556.45
	08-02-2005	557.96		08-02-2005	555.08
MW-103	02-24-2004	556.57	MW-113	02-24-2004	553.40
	08-31-2004	560.41		08-31-2004	562.17
	03-08-2005	561.28		03-08-2005	554.60
	08-02-2005	556.98		08-02-2005	554.51
MW-104	02-24-2004	554.65	MW-114	02-24-2004	556.31
	08-31-2004	562.07		08-31-2004	562.81
	03-08-2005	557.27		03-08-2005	559.63
	08-02-2005	555.70		08-02-2005	556.71
MW-105	02-24-2004	554.33	MW-115	02-24-2004	552.04
	08-31-2004	559.34		08-31-2004	557.78
	03-08-2005	556.84		03-08-2005	553.61
	08-02-2005	555.62		08-02-2005	553.47
MW-106	02-24-2004	554.72	MW-116	02-24-2004	552.75
	08-31-2004	559.66		08-31-2004	557.29
	03-08-2005	558.18		03-08-2005	555.72
	08-02-2005	556.21		08-02-2005	554.50
MW-107	02-24-2004	554.83	MW-117	02-24-2004	551.88
	08-31-2004	560.02		08-31-2004	557.73
	03-08-2005	558.45		03-08-2005	553.70
	08-02-2005	556.43		08-02-2005	552.72
MW-108	02-24-2004	556.01	MW-118	02-24-2004	551.89
	08-31-2004	560.70		08-31-2004	559.37
	03-08-2005	560.50		03-08-2005	554.58
	08-02-2005	557.26		08-02-2005	553.95
MW-109	02-24-2004	554.62	MW-117	02-24-2004	551.88
	08-31-2004	562.44		08-31-2004	557.73
	03-08-2005	557.14		03-08-2005	553.70
	08-02-2005	555.69		08-02-2005	552.72
MW-110	02-24-2004	553.70	MW-118	02-24-2004	551.89
	08-31-2004	561.10		08-31-2004	559.37
	03-08-2005	555.94		03-08-2005	554.58
	08-02-2005	555.11		08-02-2005	553.95

**Table 7.** Altitude of water levels in monitoring wells, 2004–2005.—Continued

[Altitudes are in feet above National Geodetic Vertical Datum of 1929 (NGVD 29); ft, feet; --, no data]

<b>Site (fig. 3)</b>	<b>Date</b>	<b>Altitude (ft)</b>	<b>Site (fig. 3)</b>	<b>Date</b>	<b>Altitude (ft)</b>
MW-119	02-24-2004	551.21	MW-129	02-24-2004	551.19
	08-31-2004	556.42		08-31-2004	555.34
	03-08-2005	554.44		03-08-2005	554.47
	08-02-2005	553.00		08-02-2005	553.52
MW-120	02-24-2004	548.90	MW-130	02-24-2004	552.78
	08-31-2004	554.17		08-31-2004	556.17
	03-08-2005	554.50		03-08-2005	555.69
	08-02-2005	551.78		08-02-2005	554.33
MW-121	02-24-2004	550.83	MW-131	02-24-2004	553.71
	08-31-2004	555.40		08-31-2004	--
	03-08-2005	553.94		03-08-2005	556.02
	08-02-2005	552.77		08-02-2005	555.74
MW-122	02-24-2004	549.57	MW-132	02-24-2004	551.15
	08-31-2004	553.99		08-31-2004	555.42
	03-08-2005	554.05		03-08-2005	554.48
	08-02-2005	551.95		08-02-2005	553.66
MW-123	02-24-2004	548.68	MW-133	02-24-2004	549.86
	08-31-2004	553.67		08-31-2004	553.74
	03-08-2005	553.74		03-08-2005	553.39
	08-02-2005	551.13		08-02-2005	552.71
MW-124	02-24-2004	548.81	MW-134	02-24-2004	549.20
	08-31-2004	553.95		08-31-2004	554.11
	03-08-2005	552.96		03-08-2005	553.47
	08-02-2005	551.77		08-02-2005	552.37
MW-125	02-24-2004	549.00	MW-135	02-24-2004	551.57
	08-31-2004	555.69		08-31-2004	561.54
	03-08-2005	552.99		03-08-2005	554.89
	08-02-2005	551.79		08-02-2005	554.63
MW-126	02-24-2004	549.91	MW-136	02-24-2004	550.02
	08-31-2004	554.18		08-31-2004	557.68
	03-08-2005	553.55		03-08-2005	554.62
	08-02-2005	552.53		08-02-2005	553.09
MW-127	02-24-2004	551.87	MW-137	02-24-2004	552.39
	08-31-2004	555.58		08-31-2004	562.25
	03-08-2005	554.31		03-08-2005	555.32
	08-02-2005	553.26		08-02-2005	555.03
MW-128	02-24-2004	552.30	MW-138	02-24-2004	549.15
	08-31-2004	556.28		08-31-2004	556.39
	03-08-2005	554.89		03-08-2005	553.64
	08-02-2005	--		08-02-2005	551.56

**Table 7.** Altitude of water levels in monitoring wells, 2004–2005.—Continued

[Altitudes are in feet above National Geodetic Vertical Datum of 1929 (NGVD 29); ft, feet; --, no data]

<b>Site (fig. 3)</b>	<b>Date</b>	<b>Altitude (ft)</b>	<b>Site (fig. 3)</b>	<b>Date</b>	<b>Altitude (ft)</b>
MW-139	02-24-2004	550.04	MW-150	02-24-2004	566.71
	08-31-2004	554.53		08-31-2004	566.69
	03-08-2005	553.96		03-08-2005	566.58
	08-02-2005	553.27		08-02-2005	--
MW-140	02-24-2004	560.95	MW-151	02-24-2004	552.64
	08-31-2004	562.56		08-31-2004	557.86
	03-08-2005	559.09		03-08-2005	556.22
	08-02-2005	557.68		08-02-2005	557.27
MW-141	02-24-2004	552.53	MW-152	02-24-2004	555.90
	08-31-2004	556.17		08-31-2004	566.87
	03-08-2005	555.68		03-08-2005	557.10
	08-02-2005	554.76		08-02-2005	558.35
MW-142	02-24-2004	576.20	MW-153	02-24-2004	555.82
	08-31-2004	575.45		08-31-2004	565.96
	03-08-2005	576.55		03-08-2005	557.99
	08-02-2005	574.36		08-02-2005	559.02
MW-143	02-24-2004	568.29	MW-154	02-24-2004	551.24
	08-31-2004	568.38		08-31-2004	555.39
	03-08-2005	569.10		03-08-2005	554.76
	08-02-2005	567.16		08-02-2005	554.26
MW-144	02-24-2004	550.25	MW-155	02-24-2004	551.49
	08-31-2004	555.90		08-31-2004	555.60
	03-08-2005	554.10		03-08-2005	556.43
	08-02-2005	553.65		08-02-2005	554.74
MW-145	02-24-2004	553.33	MW1-1A	02-24-2004	569.01
	08-31-2004	562.62		08-31-2004	569.21
	03-08-2005	555.94		03-08-2005	570.06
	08-02-2005	556.11		08-02-2005	568.37
MW-146	02-24-2004	552.64	MW1-1B	02-24-2004	562.15
	08-31-2004	560.90		08-31-2004	563.30
	03-08-2005	555.51		03-08-2005	563.55
	08-02-2005	555.85		08-02-2005	561.37
MW-147	02-24-2004	548.54	MW1-2A	02-24-2004	552.68
	08-31-2004	554.50		08-31-2004	556.48
	03-08-2005	552.81		03-08-2005	555.61
	08-02-2005	--		08-02-2005	554.72
MW-148	02-24-2004	555.12	MW1-2B	02-24-2004	552.68
	08-31-2004	561.02		08-31-2004	556.47
	03-08-2005	558.42		03-08-2005	555.61
	08-02-2005	556.08		08-02-2005	554.74

**Table 7.** Altitude of water levels in monitoring wells, 2004–2005.—Continued

[Altitudes are in feet above National Geodetic Vertical Datum of 1929 (NGVD 29); ft, feet; --, no data]

<b>Site (fig. 3)</b>	<b>Date</b>	<b>Altitude (ft)</b>	<b>Site (fig. 3)</b>	<b>Date</b>	<b>Altitude (ft)</b>
MW1-3A	02-24-2004	551.95	MW4-2A	02-24-2004	555.48
	08-31-2004	555.82		08-31-2004	562.15
	03-08-2005	555.15		03-08-2005	558.89
	08-02-2005	554.38		08-02-2005	556.73
MW1-3B	02-24-2004	551.81	MW4-2B	02-24-2004	555.50
	08-31-2004	555.72		08-31-2004	562.17
	03-08-2005	555.04		03-08-2005	558.86
	08-02-2005	554.26		08-02-2005	556.71
MW1-4A	02-24-2004	572.11	USGS-1	02-24-2004	553.61
	08-31-2004	571.66		08-31-2004	559.05
	03-08-2005	572.62		03-08-2005	556.04
	08-02-2005	570.86		08-02-2005	555.22
MW1-4B	02-24-2004	561.68	USGS-2S	02-24-2004	556.74
	08-31-2004	562.85		08-31-2004	561.34
	03-08-2005	562.91		03-08-2005	561.47
	08-02-2005	560.44		08-02-2005	557.53
MW2-1A	02-24-2004	552.13	USGS-2D	02-24-2004	556.76
	08-31-2004	556.85		08-31-2004	561.38
	03-08-2005	554.13		03-08-2005	561.37
	08-02-2005	553.51		08-02-2005	557.53
MW2-1B	02-24-2004	--	USGS-3S	02-24-2004	556.08
	08-31-2004	--		08-31-2004	560.62
	03-08-2005	--		03-08-2005	559.25
	08-02-2005	--		08-02-2005	556.29
MW3-1A	02-24-2004	553.02	USGS-3D	02-24-2004	555.85
	08-31-2004	557.93		08-31-2004	560.40
	03-08-2005	555.56		03-08-2005	558.99
	08-02-2005	554.71		08-02-2005	556.07
MW3-1B	02-24-2004	552.96	USGS-4	02-24-2004	555.66
	08-31-2004	557.90		08-31-2004	561.88
	03-08-2005	555.48		03-08-2005	559.56
	08-02-2005	554.64		08-02-2005	556.58
MW4-1A	02-24-2004	554.19	USGS-5S	02-24-2004	559.26
	08-31-2004	559.79		08-31-2004	560.07
	03-08-2005	557.44		03-08-2005	563.89
	08-02-2005	555.86		08-02-2005	558.48
MW4-1B	02-24-2004	554.16	USGS-5D	02-24-2004	559.24
	08-31-2004	559.96		08-31-2004	560.09
	03-08-2005	557.26		03-08-2005	563.89
	08-02-2005	555.74		08-02-2005	558.53

**Table 7.** Altitude of water levels in monitoring wells, 2004–2005.—Continued

[Altitudes are in feet above National Geodetic Vertical Datum of 1929 (NGVD 29); ft, feet; --, no data]

<b>Site (fig. 3)</b>	<b>Date</b>	<b>Altitude (ft)</b>	<b>Site (fig. 3)</b>	<b>Date</b>	<b>Altitude (ft)</b>
USGS-6	02-24-2004	554.65	USGS-9D	02-24-2004	--
	08-31-2004	560.70		08-31-2004	--
	03-08-2005	556.07		03-08-2005	--
	08-02-2005	555.18		08-02-2005	--
USGS-7	02-24-2004	553.22	SP11	02-24-2004	559.33
	08-31-2004	561.70		08-31-2004	560.05
	03-08-2005	555.24		03-08-2005	563.81
	08-02-2005	554.80		08-02-2005	560.76
USGS-8S	02-24-2004	549.80	SP4	02-24-2004	563.77
	08-31-2004	553.29		08-31-2004	--
	03-08-2005	554.57		03-08-2005	563.75
	08-02-2005	551.36		08-02-2005	563.22
USGS-8D	02-24-2004	549.60	MW13-67	02-24-2004	549.49
	08-31-2004	552.59		08-31-2004	551.72
	03-08-2005	554.48		03-08-2005	554.42
	08-02-2005	550.56		08-02-2005	549.74
USGS-9S	02-24-2004	554.03	MW28-67	02-24-2004	557.60
	08-31-2004	560.40		08-31-2004	560.76
	03-08-2005	558.21		03-08-2005	561.65
	08-02-2005	559.07		08-02-2005	558.15

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