# Hydrologic Data for the Fristoe Unit of the Mark Twain National Forest, Southern Missouri, 1988-93

*By* M.J. KLEESCHULTE *and* S.J. SUTLEY

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Rolla, Missouri
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# Quantity and Quality Of Base Flow and Stormwater Runoff in Independence, Missouri--October 1991 to February 1993

*By* Gregg K. Schalk


## Abstract

Samples were collected in October 1991 and January to February 1992 at 193 sampling sites to characterize base flow in Independence, Missouri. From all samples collected at the base-flow sampling sites, 5 samples exceeded a pH of 9.0, total chlorine was detected in 45 samples, total detergents were detected in 1 sample, and total copper and total phenols were not detected in any samples.

Samples were collected from July 1992 to February 1993 at five stormwater-runoff sampling sites draining single-family, multi-family, commercial, and light-industrial land uses. Fecal coliform ranged from 500 to 290,000 colonies per 100 milliliters and fecal streptococci ranged from 1,900 to 500,000 colonies per 100 milliliters in 35 first-flush samples collected from 15 storms at the 5 sampling sites. The fecal coliform to fecal streptococci ratio averaged 0.9 and ranged from 0.01 to 4.1.

At each stormwater-runoff sampling site, three flow-weighted composite samples were collected and analyzed for physical properties, common constituents, major nutrients, trace elements, pesticides, volatile organic compounds, and acidic, basic, and neutral semi-volatile organic compounds. Runoff loads were calculated for each constituent detected. The chemical oxygen demand ranged from 36 to 1,600 milligrams per liter. Biochemical oxygen demand ranged from 15 to greater than 650 milligrams per liter. Dissolved solids concentrations ranged from 34 milligrams per liter at a commercial site to 14,700 milligrams per liter at a light-industrial site that had large unsheltered piles of road salt. For all sites suspended solids concentrations ranged from 38 to 1,200 milligrams per liter.

Antimony, beryllium, selenium, and thallium were not detected, and silver was detected once. Mercury was detected with concentrations of 0.1, 0.2, and 0.3 microgram per liter. The following ranges of trace element concentrations (micrograms per liter) were detected: arsenic (1 to 10), cadmium (less than 1 to 40), chromium (less than 1 to 99), copper (8 to 130), lead (20 to 800), nickel (3 to 37), and zinc (110 to 6,200).

Pesticides detected include chlordane, *p,p'*-DDD, *p,p'*-DDT, diazinon, dieldrin, lindane, and Aroclor 1254. Thirteen of the 63 volatile organic compounds analyzed were detected 27 times with concentrations ranging from 0.2 to 5.1 micrograms per liter. Acidic, basic, and neutral semi-volatile organic compounds detected include di-2-ethylhexyl phthalate, fluoranthene, phenanthrene, and pyrene.


## INTRODUCTION

During 1990 the U.S. Environmental Protection Agency (USEPA) mandated that all cities with a population of 100,000 or greater be required to submit a stormwater discharge permit application under the National Pollution Discharge Elimination System (NPDES) program. The purpose of the permit is to establish an approach to

U.S. DEPARTMENT OF THE INTERIOR

BRUCE BABBITT, Secretary

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| Multiply | By | To obtain |
|---|---|---|
| inch | 25.4 | millimeter |
| foot | 0.3048 | meter |
| mile | 1.609 | kilometer |
| acre | 4,047 | square meter |
| gram | 0.03527 | ounce, avoirdupois |
| cubic foot per second | 0.02832 | cubic meter per second |
| square mile | 2.590 | square kilometer |

To convert degrees Celsius (°C) to degrees Fahrenheit (°F) use the following:

$$°F = 1.8\ °C + 32.$$

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

# Hydrologic Data for the Fristoe Unit of the Mark Twain National Forest, Southern Missouri, 1988-93

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## ABSTRACT

This report contains background hydrologic data collected during an investigation of the water resources in the Fristoe Unit of the Mark Twain National Forest of southern Missouri, from October 1988 through September 1993. Water-quality data was collected from 6 stream sites on the Current River, Eleven Point River, Spring Creek, and Hurricane Creek; 7 springs in these river basins; and 29 wells in and near the Fristoe Unit. The water-quality data were analyzed and compared using trilinear diagrams, stiff diagrams, boxplots, and summary statistics. The water in the streams, springs, and wells of this area is a calcium magnesium bicarbonate type. Water samples collected during high base-flow conditions have slightly smaller concentrations of the major cations and anions than water samples collected during low base-flow conditions. Streams generally have a slightly larger potassium concentration than the springs, and springs have a larger potassium concentration than water from wells. Streams also have larger concentrations of barium and total organic carbon than springs and wells. Water collected from wells has larger bicarbonate and zinc concentrations and a larger variability in sodium, chloride, and nitrate concentrations than stream and spring samples.

Streambed-material samples were collected at the stream and spring sampling sites to characterize the stream sediments. The results show the bulk mineralogy for streambed material to be primarily coarse-grain quartz. Quantitative elemental (chemistry) analysis on the less than 63 micrometer fraction of the bulk material also was performed.

The heavy minerals in the streambed-material samples were selectively concentrated. Semi-quantitative optical mineralogy and 37-element semi-quantitative emission spectrography analysis were performed on these minerals.

Water-level measurements were made in 57 wells in the study area in the spring and fall from 1990 to 1993 to determine the natural fluctuations in ground-water levels. Fluctuations ranged from less than 1.0 to 205.1 feet in these wells.

Mean daily water levels were tabulated for three wells in the area that were equipped with continuous water-level recorders. Water levels in the lower Eleven Point River well were monitored from October 1989 to September 1993 and depth to water ranged from 289.68 to 333.39 feet in this well. This well is a former exploration hole near the Preference Right Lease Application Area that is completed in the geologic formations from the Roubidoux Formation into the Derby-Doe Run Dolomites--the Ozark aquifer and St. Francois confining unit. Water levels in the Ozark Lead Well 1 were monitored from October 1988 through September 1992, and water levels in the Ozark Lead Well 2 were monitored from May 1989 through September 1992. Ozark Lead Well 1 is completed in the geologic formations from the Gasconade Dolomite to the Davis Formation, which includes part of the Ozark aquifer and the St. Francois confining unit. Depth to water ranged from 78.73 to 90.20 feet in this well.

Ozark Lead Well 2 is open from the Davis Formation into the Bonneterre Formation, which compose part of the St. Francois confining unit and the St. Francois aquifer. Depth to water ranged from 127.53 to 135.67 feet in this well.

The daily mean discharge for Greer Spring was tabulated from October 1989 through September 1993. The spring discharge ranged from 208 cubic feet per second in January 1990 to 751 cubic feet per second in April 1991.

## INTRODUCTION

Exploration for lead and zinc in the Mark Twain National Forest in southern Missouri has been ongoing since the 1960's. In the late 1970's and early 1980's, the search intensified, resulting in approximately 250 exploration holes being drilled. In 1983, as a result of this drilling, two Preference Right Lease Applications were submitted for approximately 3,743 acres of land in the Fristoe Unit of the Mark Twain National Forest south of Winona (fig. 1).

After the Preference Right Lease Applications were submitted, the U.S. Department of Agriculture, Forest Service (hereafter referred to as the Forest Service) and the U.S. Department of the Interior, Bureau of Land Management (hereafter referred to as the Bureau of Land Management) began an Environmental Assessment. During the preparation of the Environmental Assessment, the two agencies recognized the environmental sensitivity of the area, and in 1985 they decided that an Environmental Impact Statement was needed. A joint Forest Service-Bureau of Land Management interdisciplinary team was established and determined that the study area should be enlarged to include 119,000 acres of Mark Twain National Forest land that had reasonable potential for mineral-leasing proposals.

Following formal appeal of the Environmental Impact Statement the agencies decided that insufficient information existed to adequately analyze the potential environmental effects of mining in the area. Because mining could have a potentially adverse effect on the surface- and gound-water resources in the area and adequate surface- and gound-water data for the area were lacking, the extent of potential effects was unknown.

In 1990, a study was started by the U.S. Geological Survey (USGS) in cooperation with the Missouri Department of Conservation to collect "background" hydrologic information in and adjacent to the Fristoe Unit. Prior to this study, insufficient data existed to understand the natural flow rates of streams; the type and distribution of dissolved minerals, inorganic species, and trace elements in the undisturbed surface and ground water; and ground-water level fluctuations and ground-water flow in the aquifers.

This report describes the results of water-quality data collection and ground-water level measurements that were performed from 1990 to 1993. Also included are hydrologic data for three monitoring wells and discharge data for Greer Spring. The methodology used during the collection of these data also is described. The background data compiled as a result of this study document hydrologic conditions that existed during exploration drilling.

### Study area

The two adjacent Preference Right Lease Application Areas (hereafter referred to as the lease area) are located in the Fristoe Unit of the Mark Twain National Forest, north of the Eleven Point River in Oregon and Shannon Counties (fig. 1). Other parts of the Fristoe Unit have potential for preference right lease applications, with the exception of the Irish Wilderness. Because of this potential the study area for this project was expanded to include land bounded by State Highway 99 on the west, U.S. Highway 60 on the north, the Current River on the east, and U.S. Highway 160 on the south.

The study area lies in a region of well-developed karst terrain with numerous large springs. The two largest springs in Missouri, Big and Greer

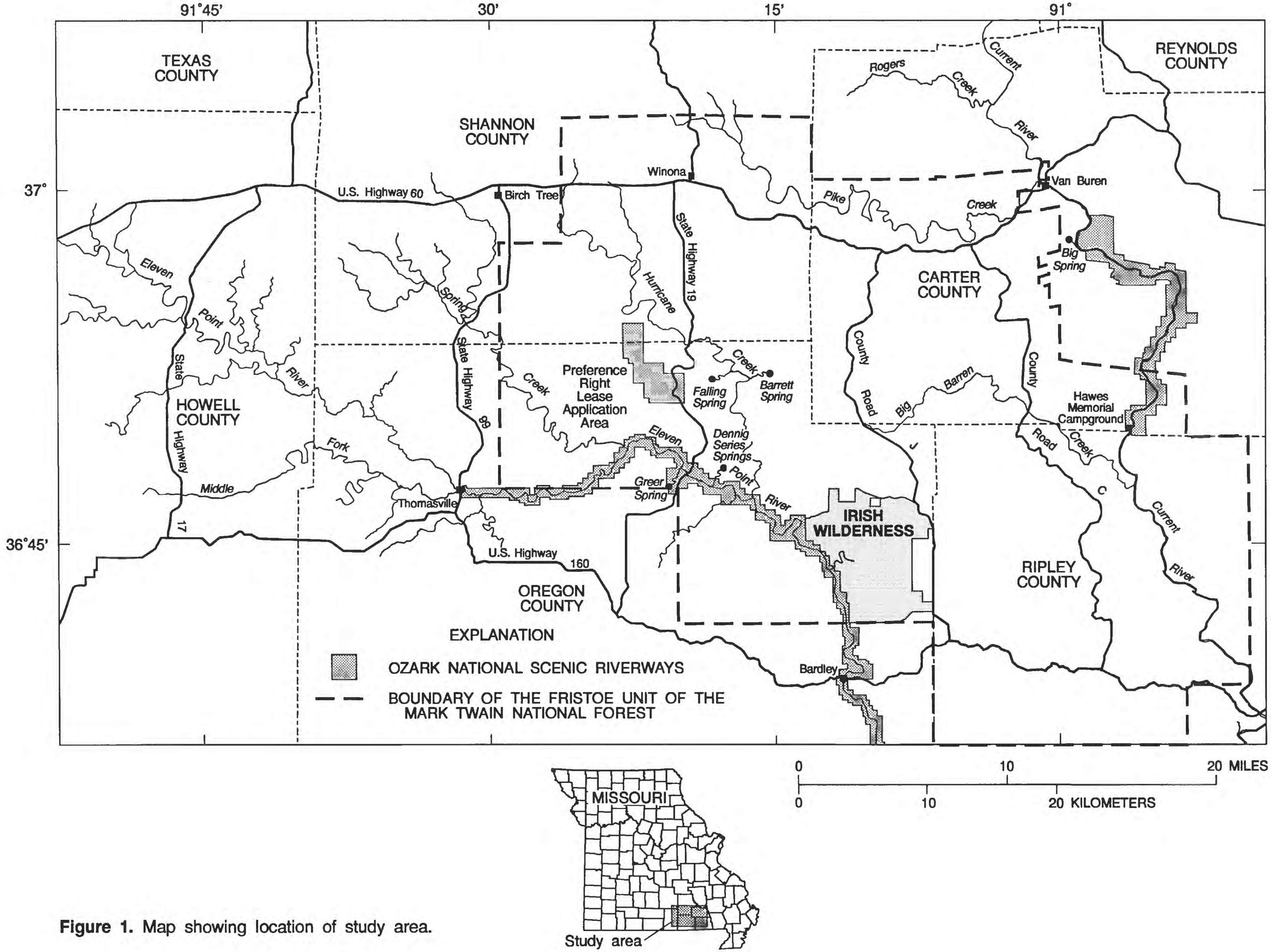



**Figure 1.** Map showing location of study area.

Springs, are in the study area, and the discharge from these springs helps sustain flow in area streams. Big Spring is in the Current River Basin and has an annual mean discharge of 443 $ft^3/s$ (cubic feet per second). Greer Spring is located in the Eleven Point River Basin and has an annual mean discharge of 340 $ft^3/s$ (Reed and others, 1994).

Rocks of Cambrian and Ordovician age are predominant at the land surface in the study area (Anderson, 1979) and include the rock sequence from the Jefferson City Dolomite to the Eminence Dolomite. These rocks form part of the Ozark aquifer, which is composed predominantly of dolomite (fig. 2). The Ozark aquifer includes the formations from the Jefferson City Dolomite to the base of the Potosi Dolomite (Imes, 1990a) and is the most widely used aquifer in the study area for domestic and public-water supplies. The St. Francois confining unit lies 1,100 to 1,300 ft (feet) beneath the surface of the Ozark aquifer in the lease area (U.S. Department of Agriculture, Forest Service, and U.S. Department of the Interior, Bureau of Land Management, 1991) and consists of the Derby-Doe Run Dolomites and the Davis Formation. Underlying the confining unit is the St. Francois aquifer, which consists of the Bonneterre Formation and the Lamotte Sandstone (Imes, 1990b)

### Well-Numbering System

In this report, location of wells and exploration holes follows the General Land Office coordinate system. According to this system (fig. 3), the first three sets of numbers of a well number designate township, range, and section. The letters that follow indicate quarter section, quarter-quarter section, and quarter-quarter-quarter section. The quarter sections are represented by letters a, b, c, and d, in counterclockwise order, starting in the northeastern quadrant. Two or more wells or test holes in the same division are numbered serially in the order they were inventoried.

### Acknowledgments

The authors acknowledge the cooperation of the many land owners in the study area for allowing access to their wells for sampling and measurement of water levels. These data could not have been obtained without their cooperation.

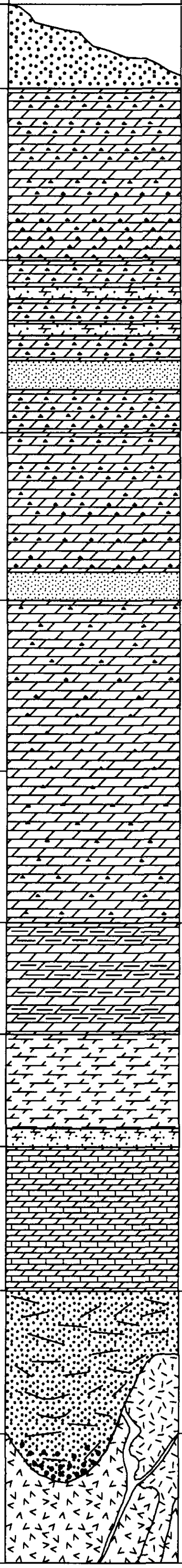
Support by the U.S. Department of Agriculture, Forest Service, and the U.S. Department of the Interior, Bureau of Land Management, also is acknowledged. These agencies provided significant input to the design, coordination, and management of this study.

## WATER QUALITY

Water samples were collected from streams, springs, and wells in the study area from September 1990 to August 1993. Sites were selected that had a high probability of being affected by hydrologic disturbances in the lease area based on both proximity to the lease area and dye-tracing tests performed in the Mark Twain National Forest (U.S. Department of Agriculture, Forest Service, and U.S. Department of the Interior, Bureau of Land Management, 1987). Stream- and spring-water samples were normally collected during low base-flow conditions that occurred in late summer and fall; however, one set of samples was collected during a high base-flow period in the spring of 1991. The ground-water samples were collected from wells during the same seasonal period as the stream and spring samples.

Water samples were collected at six sites from four area streams (fig. 4). Streams were selected that receive water from the lease area either directly by runoff or indirectly from springs that receive part of their recharge from the lease area. The Current and Eleven Point Rivers are the two principal streams in the study area and two sampling locations were selected in both streams. The upstream sampling locations in these streams were in reaches

| Erathem | System | Series | Geohydrologic unit | Geologic unit (thickness, in feet) | Lithologic description |
| --- | --- | --- | --- | --- | --- |
| | | | | Chert residuum | |
| PALEOZOIC | ORDOVICIAN | LOWER CANADIAN | OZARK AQUIFER | Jefferson City Dolomite (200-300 feet) | Dolomite, fine- to medium-grained, argillaceous, cherty; "cotton rock" variety locally abundant. |
| | | | | Roubidoux Formation (125-200 feet) | Dolomite, light gray to brown, fine-grained cherty.<br>Sandstone, quartzose. |
| | | | | Gasconade Dolomite (250-300 feet) | Dolomite, light gray to buff, fine- to coarse-grained, cherty; contains beds and lenses of *Cryptozoon*. |
| | | | | Gunter Sandstone Member (20-40 feet) | Dolomite, arenaceous, rounded-frosted quartz grains. |
| | CAMBRIAN | UPPER CAMBRIAN | | Eminence Dolomite (150-300 feet) | Dolomite, light gray, medium- to coarse-grained, medium to massively bedded, cherty. |
| | | | | Potosi Dolomite (250-300 feet) | Dolomite, brown to gray, fine- to medium-grained, massively bedded; contains abundant quartz druse and cherty digitate algal forms. |
| | | | ST. FRANCOIS CONFINING UNIT | Derby-Doe Run Dolomites (100-200 feet) | Dolomite, tan to buff, fine- to medium-grained, argillaceous, silty, oolitic. |
| | | | | Davis Formation (125-225 feet) | Shale, dolomitic, thin-bedded; contains edgewise conglomerate, *Eoorthis* zone 30 to 35 feet below top. "Marble boulder bed" 60 to 70 feet below top. Interbedded limestone in some areas. |
| | | | ST. FRANCOIS AQUIFER | Bonneterre Formation (200-450 feet) | Dolomite, light gray to dark brown fine- to medium-grained, glauconitic in places. Contains some dark green to black, thin shale beds. Lenses of gray to pink limestone are referred to as "Taum Sauk marble". |
| | | | | Lamotte Sandstone (0-500 feet) | Sandstone and conglomerate, quartzose, arkosic; contains interbedded red-brown shale. |
| PRECAMBRIAN ROCKS | | | | | Basic intrusives; Granite porphyry Intrusives; Extrusive felsite Flows and tuffs |



(Modified from U.S. Department of Agriculture, Forest Service, and U.S. Department of the Interior, Bureau of Land Management, 1991)

**Figure 2.** Generalized stratigraphic column.

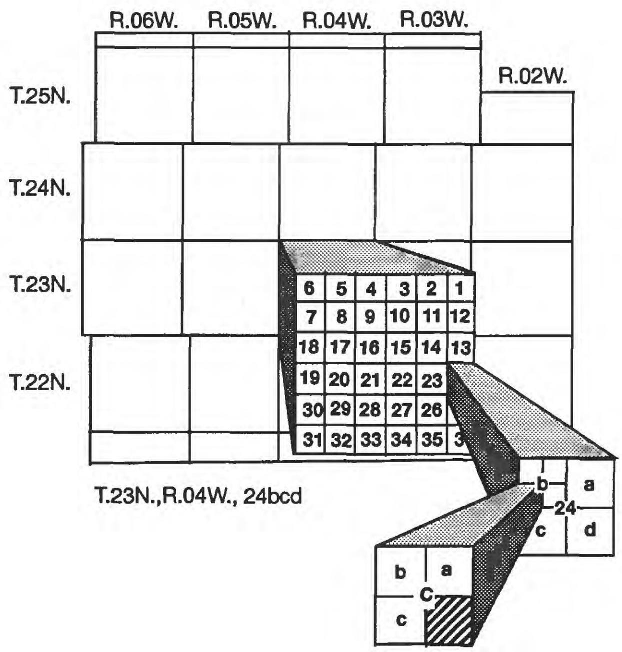



**Figure 3.** Well-numbering system.

where there are no hydrologic influences from the lease area and are therefore used as background water-quality sites. The downstream sampling locations in both basins were selected so that all cumulative effects from the lease area on these streams could be detected. Sampling sites also were located at the mouth of the Spring and Hurricane Creeks. Surface runoff from the lease area flows into these tributaries of the Eleven Point River.

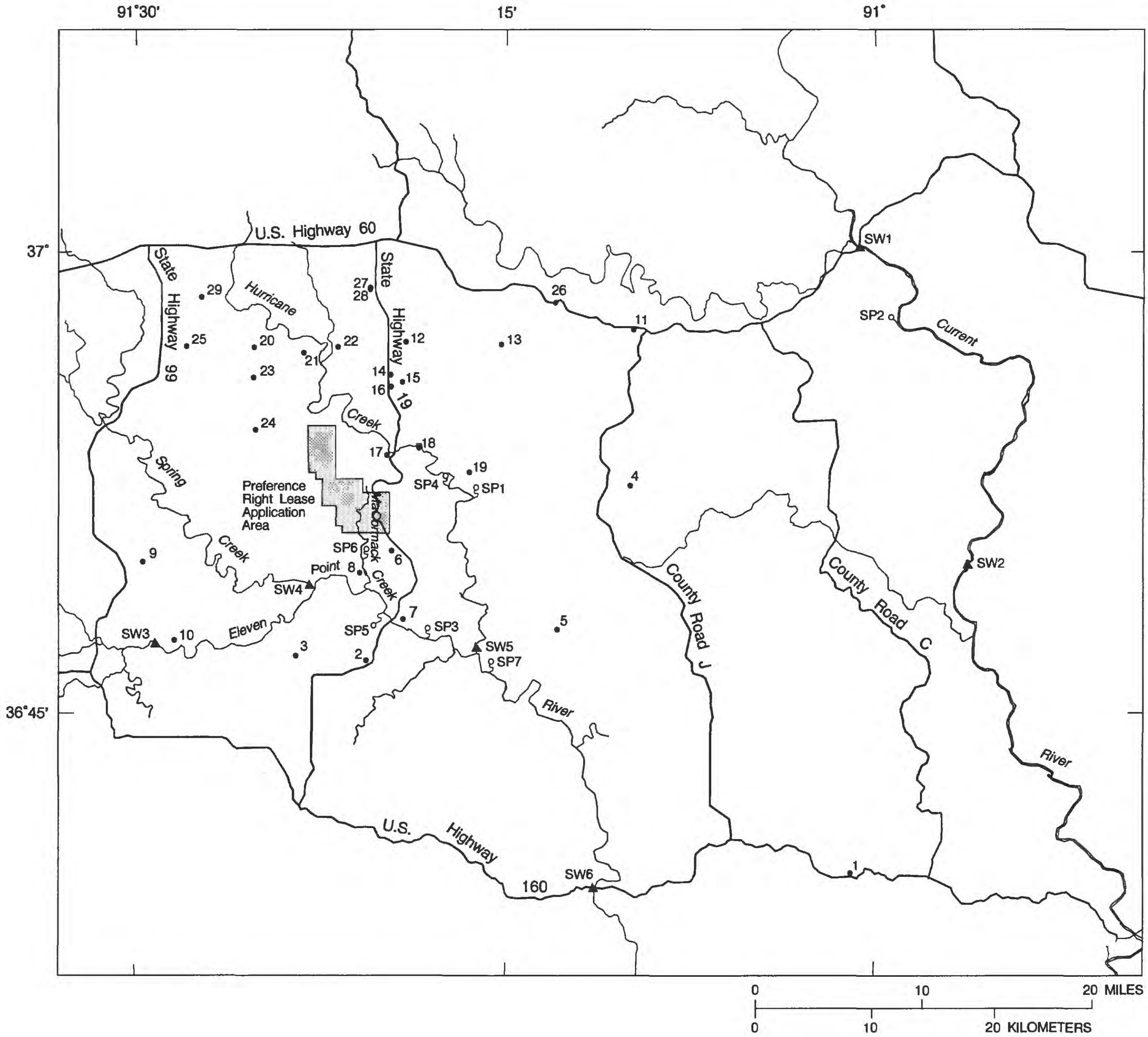
Springs are excellent sites for monitoring water quality in karst areas because springs typically are the lowest point in a ground-water basin, the point to which ground-water flow converges (Quinlan and Ewers, 1985). Unlike water samples from wells that represent the quality of the ground water in the vicinity of the well, the quality of water discharging from a spring orifice is representative of the recharge area for the spring. This recharge area can contain ground-water flow from several square miles to hundreds of square miles and this can be reflected by the volume of discharge from the spring. Seven spring sampling sites that are located in the Current River, Hurricane Creek, McCormack Creek, and Eleven Point River Basins were selected because they have the potential to receive recharge from the lease area (fig. 4).

Twenty-nine wells were sampled during this project (fig. 4). Wells were selected to give a wide distribution across the study area. There was, however, a denser spacing near the lease area. All the selected wells are completed in the Ozark aquifer.

## Sampling Methodology

The following criteria were used to locate the cross sections where stream and spring water-quality samples were collected. Sampling cross sections in the stream or spring branch were located where water was moving with sufficient velocity to allow mixing of the water. In addition, water samples from springs were collected as close to the orifice as possible, usually within a few feet. However, at Big Spring, Dennig Series Springs, and Greer Spring (fig. 1), this distance was increased to several hundred feet to accommodate a wading/sampling cross section.

Stream- and spring-water samples usually were collected using the equal width increment method. This method consists of dividing the stream into 10 to 15 sampling verticals of equal width. At each sampling vertical a water sample was collected




EXPLANATION

SW1 ▲ STREAM SAMPLING SITE AND NUMER

SP1 SPRING SAMPLING SITE AND NUMBER

.1 WELL AND NUMBER

**Figure 4.** Stream, spring, and well sampling sites.

using a hand-held, depth integrating, epoxy-coated sampler containing a glass bottle. The sampler was raised and lowered using the same transit rate at each vertical, and the amount of water collected in the sample bottle is a function of velocity and depth of water at the vertical. The water sample from each vertical was composited into a polyethylene churn splitter. Transit rates were determined using methods described by Edwards and Glysson (1988). Discharge measurements at these sites were made with a current meter using the general methods adopted by the USGS (Carter and Davidian, 1968).

The sampling procedure could not be followed at every site, and deviations from the equal width increment method occurred at the following sites. Water from Barrett Spring (fig. 1) was collected from a metal pipe that was the sole discharge source for the water from the spring. The water discharging from the pipe was allowed to flow directly into the churn splitter. The orifice of Falling Spring (fig. 1) is located in a bluff and water discharged from the spring drops about 15 ft into a pool. The water samples collected before August 1993 were collected by standing in the pool under the orifice and collecting a "grab" sample directly into the churn splitter. The August 1993 sample was collected at the orifice in the bluff using a hand sampler.

The water sample to be analyzed was extracted from water composited in the churn splitter using the techniques described in a report by the U.S. Geological Survey (1993). The chemical constituents to be analyzed in the "dissolved" phase were filtered onsite through a 0.45-micrometer cellulose-nitrate membrane filter supported between lucite plates, using a peristaltic pump as the pressure source. Constituents to be analyzed as total concentrations were collected as raw or unfiltered samples. After onsite rinsing of the sample bottle and filtration of the water, the samples were preserved. Samples for dissolved cations were placed in acid-washed polyethylene bottles and preserved with ultrapure nitric acid to a pH less than 2. Samples for dissolved anions were placed into polyethylene bottles. Dissolved nutrient samples (nitrogen and phosphorus species) were collected in amber polyethylene bottles and preserved by adding 1 mL (milliliter) of $10^{-4}$ molar mercuric chloride and chilling to 4 °C (degrees Celsius). Total organic carbon samples were collected in 250-mL amber glass bottles and preserved by chilling to 4 °C.

The ground-water samples were collected from private and public water-supply wells in a three-county area surrounding the lease area. The water sample was collected as close to the well head as possible. When specific conductance, pH, and temperature of the water being discharged stabilized, the sample was collected in a polyethylene churn splitter. The stabilization of these properties usually occurred after purging the water system for approximately 30 minutes.

Specific conductance, pH, water temperature, dissolved oxygen concentrations, and alkalinity were determined onsite at all sampling locations. Specific conductance values were measured using a portable conductivity meter with temperature compensation designed to express readings in microsiemens per centimeter at 25 °C. The pH was measured with a portable pH meter. Water temperature was measured with a mercury thermometer to the nearest 0.5 °C. Dissolved oxygen concentrations were determined at all wells by colorimetry to the nearest 0.05 mg/L (milligram per liter) using a diethylene glycol and rhodazine-D method developed by Chemetrics[1]. Dissolved oxygen was measured with a portable dissolved oxygen meter at the stream and spring sites. Alkalinity was determined by incremental titration past the inflection point with 0.1600 normal sulfuric acid.

All water-quality samples were analyzed by laboratories of the USGS. Samples were analyzed for inorganic substances according to methods described by Fishman and Friedman (1989) and organic substances according to methods described by Wershaw and others (1983). The suspended-sediment concentrations were determined in the USGS sediment laboratory in Rolla, Missouri.

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[1] Use of trade names in this report is for identification purposes only and does not constitute endorsement by the U.S. Geological Survey.

When chemical constituents were detected at concentrations that were less than limits deemed reliable for reporting as numerical values, they were considered less that the reporting limit. In the water-quality tables at the back of this report, this situation is indicated by a less than (<) symbol in front of the reporting limit value.

## Water-Quality Analysis Techniques

The composition of most natural waters can be diagrammatically represented in terms of major dissolved ionic constituents (Hem, 1985). The relation among these major constituents can be displayed by grouping ions with similar chemical properties on trilinear diagrams. Units on trilinear diagrams are generally expressed as percentages of the total milliequivalents per liter for each ion in a sample, and the assumption is made that the sum of these percentages is equal to 100.

Trilinear diagrams (figs. 5 and 6) approximate the composition of the water by grouping the water-quality constituents of a sample into three cationic and anionic groups. On trilinear diagrams there are three separate areas where each sample is plotted. The diamond shaped area is used to show the overall chemical character of the water. The position of each point in the diamond indicates the composition of the sample in terms of the cation-anion groups that correspond to the four vertices of the diamond. The triangle in the lower left is used to display the relations of the three groups of cations in the sample and the triangle in the lower right is used to display the relations of the three groups of anions (Hem, 1985).

Stiff diagrams are another method used to display the major chemical composition of water samples. This method uses a distinctive pattern or polygon to represent general water composition. The diagram uses four parallel horizontal axis extending on each side of a vertical axis that represents zero (fig. 7). The milliequivalent concentration of cations are plotted to the left of zero, and milliequivalent concentration of anions are plotted to the right of zero. All ions are plotted on the diagram using the same scale, and on all diagrams each ion is plotted in the same order (Hem, 1985).

A boxplot can be used to visually examine the distribution of values for an individual variable or for comparing two or more groups of data. Boxplots provide a visual summary of the 25th, 50th, and 75th percentiles and any extreme values in the distribution. An example of a boxplot is shown in figure 8. The boxplot consists of the median value (50th percentile) plotted as a horizontal line, and a box is drawn from the 25th percentile to the 75th percentile. The box length equals the interquartile range (IQR), and the box represents one-half of the data values. The IQR is insensitive to the presence of extreme values in the distribution. If the median value does not divide the box in two equal parts, it indicates there is asymmetry in the data distribution. Adjacent values are located outside the box and within 1.5 times the IQR. They are shown as whiskers connected to and drawn vertically outward from the 25th and 75th percentile lines. The individual data points represented by adjacent values are not plotted along the whisker lines. The length of the whisker connected to the 75th percentile represents the value of the largest adjacent point and the length of the whisker connected to the 25th percentile represents the smallest adjacent value. Values more extreme in either direction than the adjacent values are plotted individually. The values equal to 1.5 to 3.0 times the IQR are called "outside values" and are represented by an asterisk (*); those values greater than 3.0 times the IQR are called "far-out values" and are represented by a circle (D.R. Helsel, U.S. Geological Survey, written commun., 1989).

The summary statistics, including the maximum, minimum, mean, and the 95th, 75th, 50th (median), 25th, and 5th percentiles, were calculated for the water samples collected as a result of this project. The 95th percentile value for each chemical constituent represents the concentration which 95 percent of the measured concentrations are equal to or less than. Generally, the 95th percentile value represents a value that is about two standard deviations larger than the mean value for the chemical

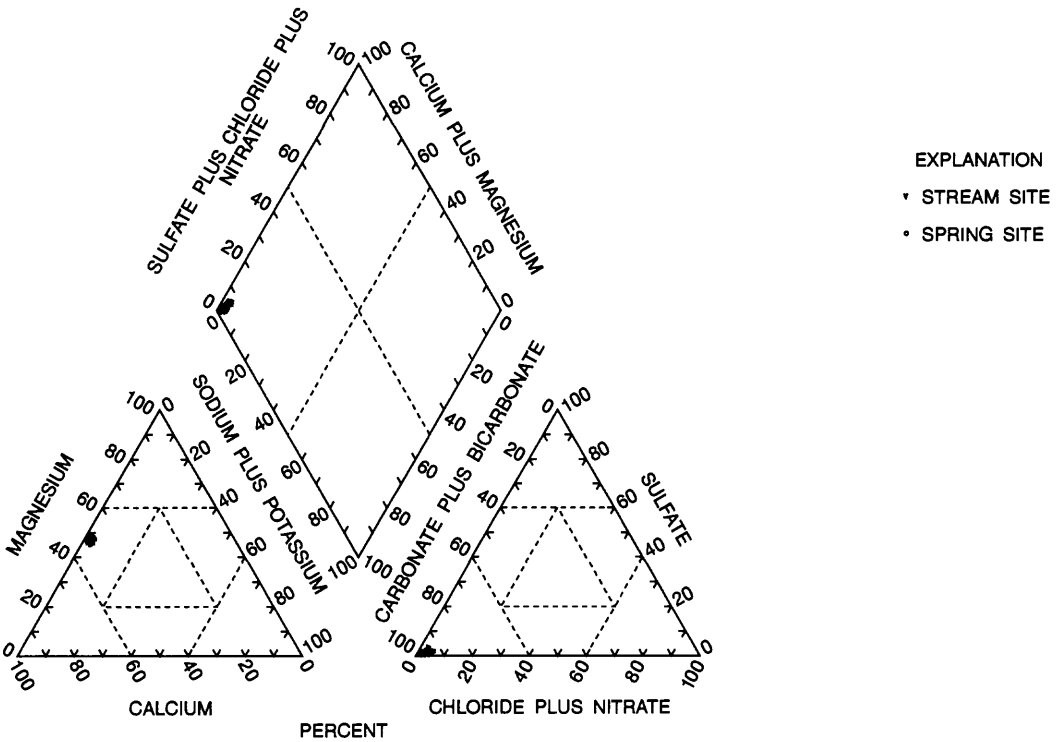



**Figure 5.** Trilinear diagram of major constituents in water samples from streams and springs.

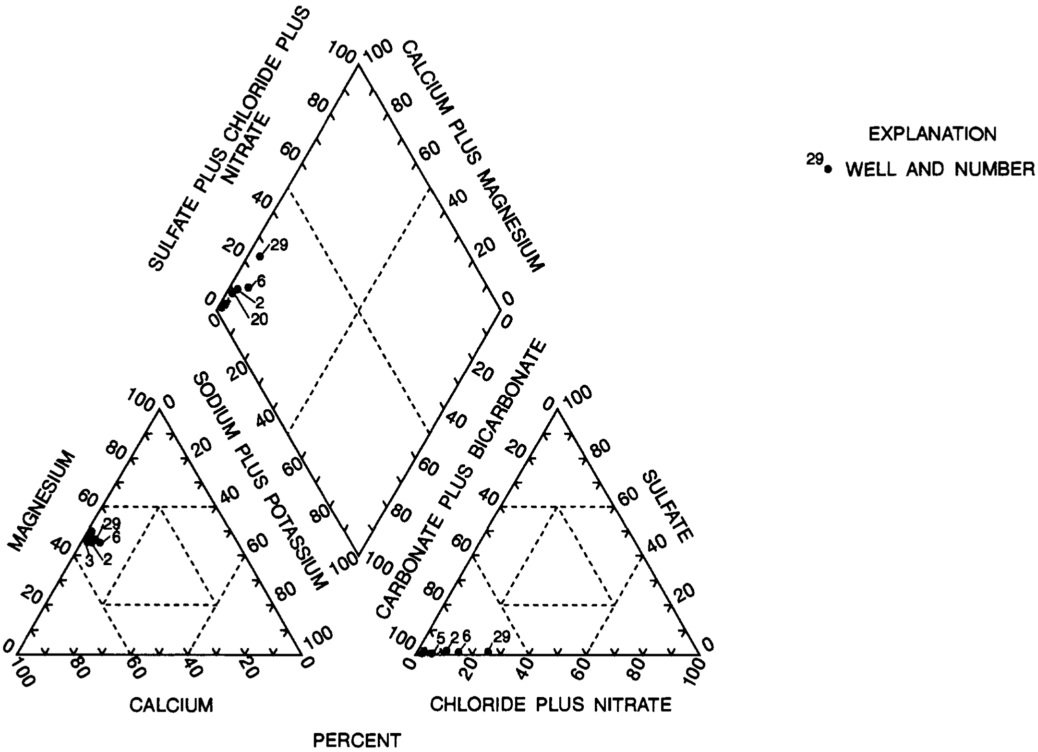



**Figure 6.** Trilinear diagram of major constituents in water samples from wells.

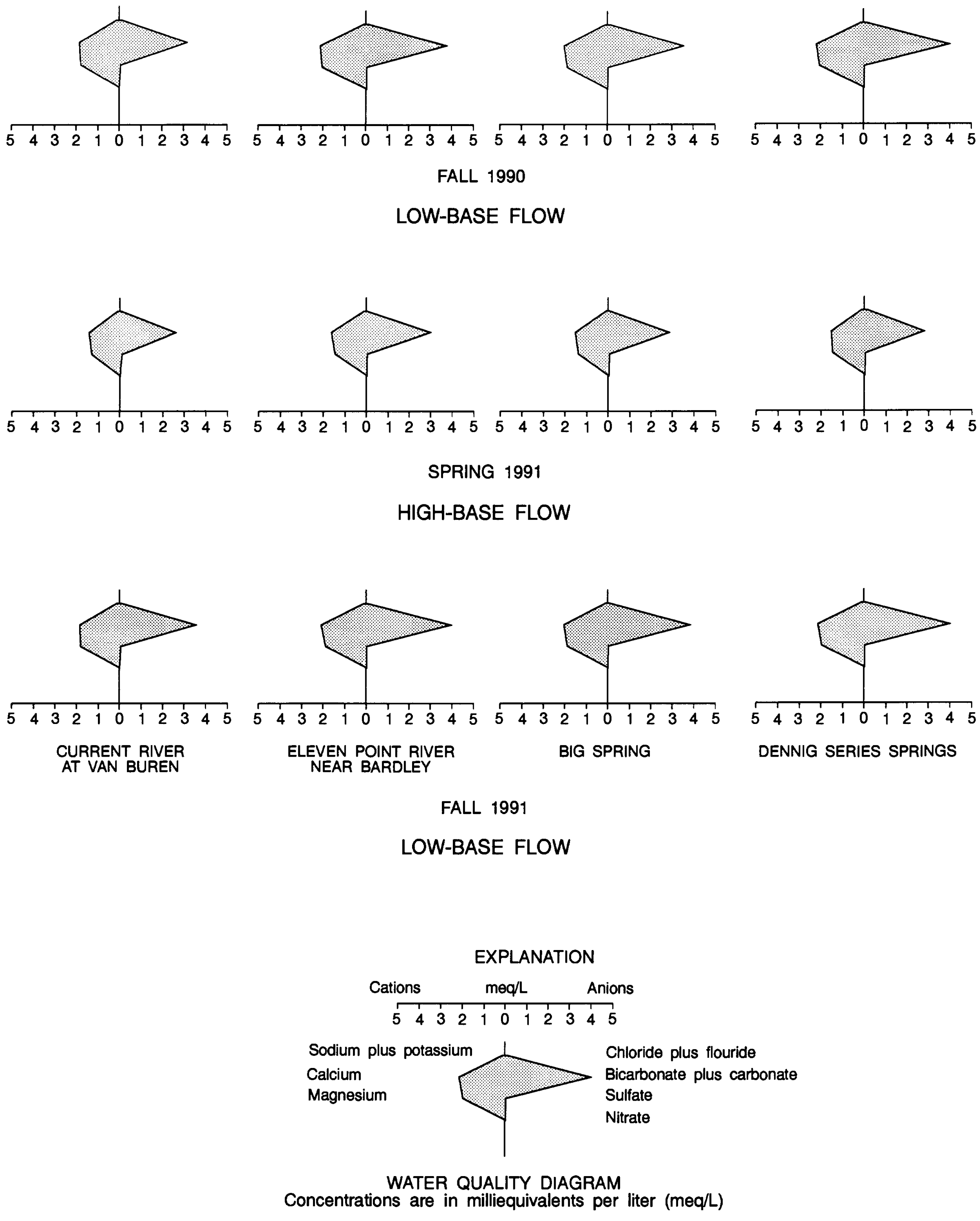



**Figure 7.** Representative stiff diagrams from low and high base-flow sampling.

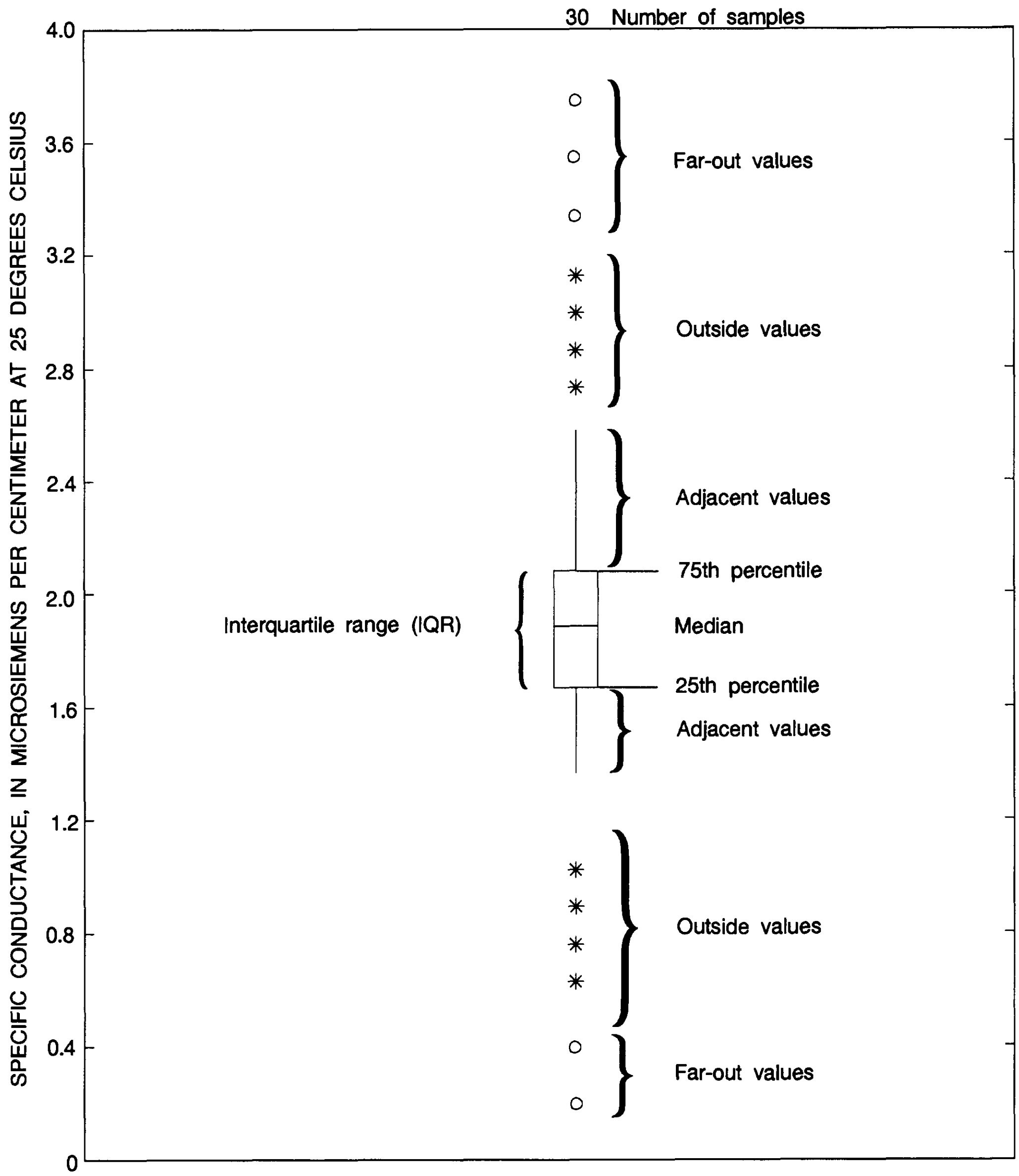



**Figure 8.** Example of a boxplot.

constituent. The mean and percentiles for multiple-censored data were estimated using a log-probability regression procedure described by Gilliom and Helsel (1986) and Helsel and Cohn (1988). A parameter is considered censored if greater than 5 percent of the total number of data values are less than the reporting limit. This method is used to estimate the values less than the reporting limit of a constituent; then these estimated values and the detected values are used together to estimate the mean and percentiles. When the data set consisted almost entirely of values less than the reporting limit, the percentiles were not calculated because the calculated percentile values were considered unreliable. In this situation only maximum, minimum, and 50th percentile (median) values were reported. When the entire data set consisted of values less than the reporting limit, only a less than the reporting limit value was listed in the maximum column.

## Water-Quality Data

The water-quality data that were collected as a result of this study are listed in table 1 (at the back of this report). The general water composition in the streams, springs, and wells of this area is a calcium-magnesium-bicarbonate type. This is graphically shown on the trilinear diagrams (figs. 5 and 6) and the stiff diagram (fig. 7). The analyses for the stream- and spring-water samples were combined on the trilinear diagram (fig. 5) because of the similarity in the cation-anion distribution. The data plot in a tight cluster near the 100 percent calcium plus magnesium and carbonate plus bicarbonate corner of the diamond field in the diagram. The data plot in a tight cluster in the lower left triangle that indicates approximately an equal distribution of calcium and magnesium. The data also plot in a tight cluster in the lower right triangle, which shows the anion distribution. The data plot near the vertex showing 100 percent bicarbonate plus carbonate distribution; however, the carbonate concentration (table 1) for all samples was zero.

Water analyses for well samples were plotted separately from stream and spring samples (fig. 6) because, even though the water from wells also plots predominantly as a calcium-magnesium-bicarbonate type, there is a slight difference when compared to the stream and spring samples. Several of the well-water samples show greater percentages of sulfate plus chloride plus nitrate than the stream and spring samples. The lower right anion triangle and the water-quality data (table 1) indicate this variation in distribution is caused by increased chloride and nitrate concentrations.

One water-quality data set was collected from the streams and springs in the study area during high base-flow conditions in May and June 1991. Four sample sets were collected during low base-flow conditions. The constituent concentrations of the high base-flow samples are slightly lower for several of the major cations and anions. This is graphically shown for selected streams and springs on the stiff diagram (fig. 7). The general pattern of all samples from the same site is similar; however, the width of the high base-flow samples on the horizontal axis are slightly less (fig. 7).

Boxplots for the major chemical constituents are shown in figure 9. The boxplots are grouped for streams, springs, and wells to analyze each group independently and to show any water-quality differences between the groups.

Boxplots of the major cations from the three groups (fig. 9) show the similarity of calcium, magnesium, and sodium concentrations between streams, springs, and wells. Sodium concentrations in water from wells, however, have a larger variability than concentrations in water from streams or springs. The potassium plot shows streams generally have a slightly larger concentration than the springs, and springs have a larger potassium concentration than the water from wells. Boxplots for the major anion concentrations are also similar for the three different groups; however, water from wells has larger bicarbonate concentrations and larger variations in chloride and nitrate concentrations than water from the streams and springs. Fluoride was not plotted with the other anions because most concentrations were less than the reporting limit.

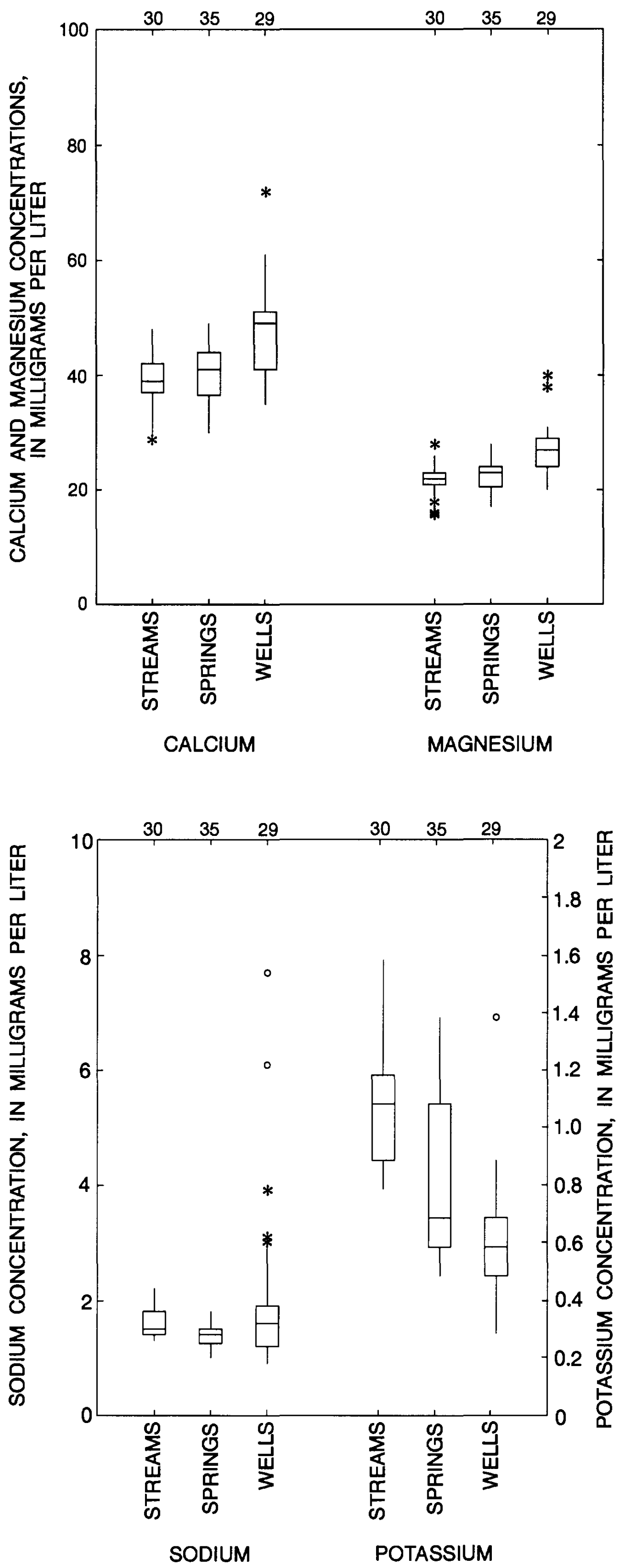
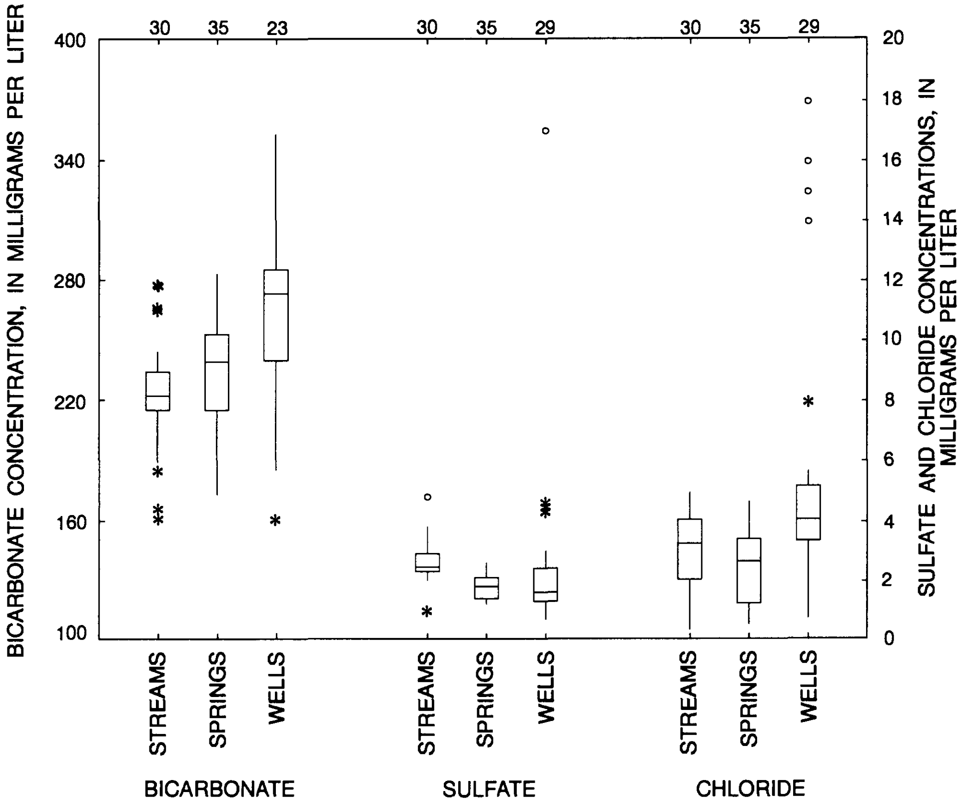



**Figure 9.** Boxplots of major chemical constituents in water from streams, springs, and wells.



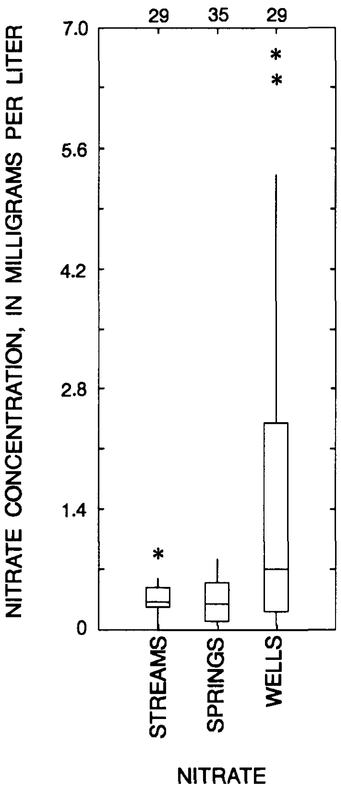




**Figure 9.** Boxplots of major chemical constituents in water from streams, springs, and wells–Continued.



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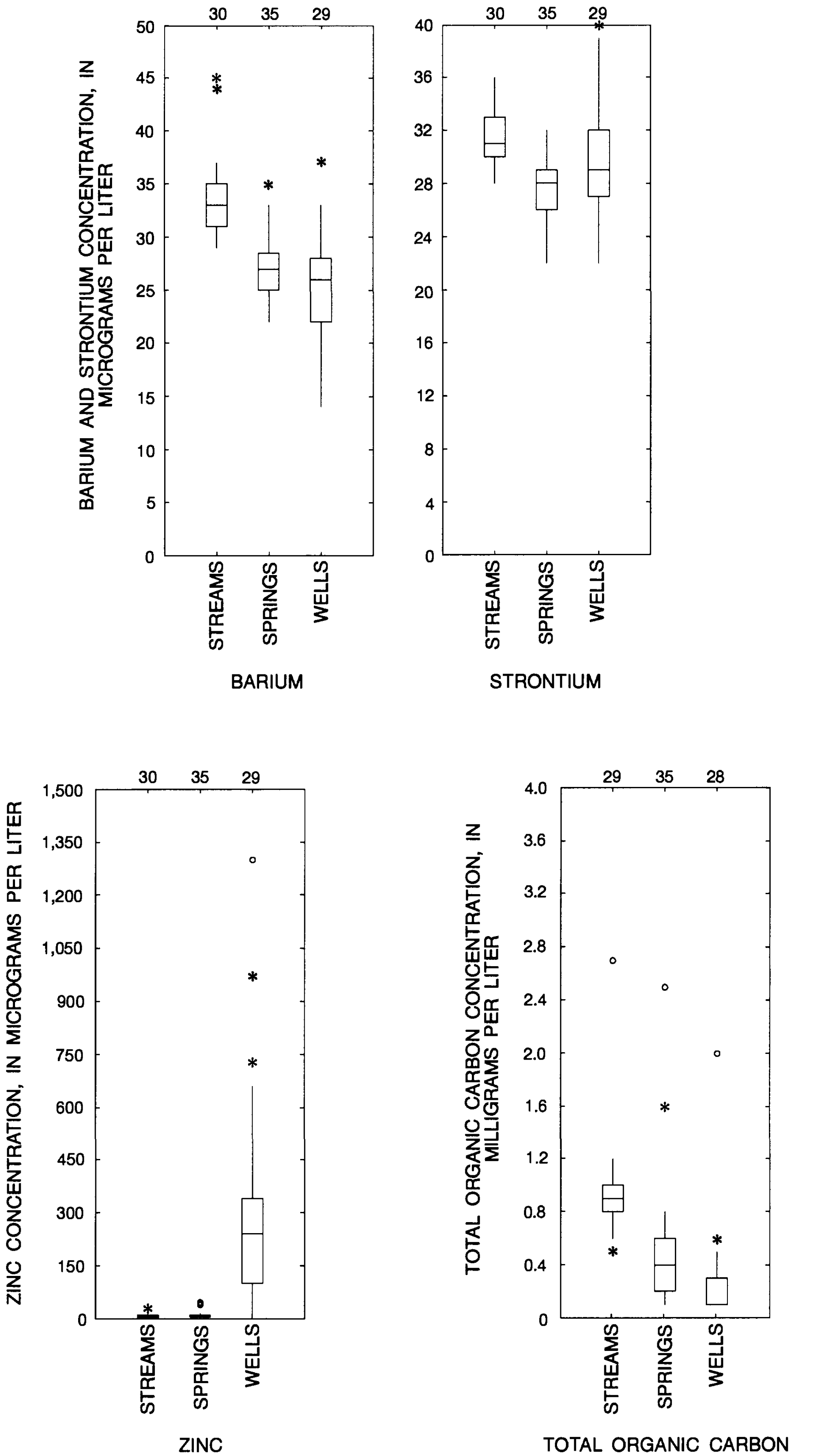


**Figure 9.** Boxplots of major chemical constituents in water from streams, springs, and wells–Continued.

Boxplots also were drawn for trace element concentrations of barium, strontium, and zinc and for total organic carbon concentrations. Barium concentrations were larger in streams than in springs and wells, and strontium concentrations were similar in all three groups. Zinc concentrations in well water generally were larger and more variable than zinc concentrations in streams and springs, which are similar. Total organic carbon concentrations are larger in streams than in springs, but concentrations are larger in springs than in well water. A total organic carbon concentration of 38 mg/L from one well sample was not plotted on figure 9 with the other total organic carbon values. If this far-out value was included, the scale would have to be expanded considerably, causing the size of the IQR boxes to be much smaller on the figure. This does not affect the values used to draw the IQR boxes. Other trace elements were not plotted because of the numerous concentrations less than the reporting limit.

Summary statistics for the water-quality data collected during this project were categorized by the three site types used for the boxplots. Categorizing the data by site type better defines the range of constituent concentrations from each group. This method was preferred over compiling the data from all three groups into one data set. This decision was based on the results of the boxplots that show there can be significant differences in the concentrations of some chemical constituents when comparing data from streams, springs, and wells. Chemical constituent concentrations in water can be affected by several factors, including the source of the water sampled and the geology and hydrology of an area. For instance, ground water that has been in contact with geologic formations for an extended period has had an opportunity to dissolve minerals present in the rock. Similarly, ground water that has traveled through conduits in the subsurface and that discharges from springs would not have long residence times in the subsurface. The opportunity for this water to dissolve minerals would be decreased (Hem, 1985). The calculated summary statistics are listed in table 2 (at the back of this report).

### Quality Assurance and Quality Control

Blank samples were collected at the same time as the environmental samples during this project beginning in September 1991. The water used for the first blank sample was deionized and had a specific conductance of 15 μS/cm (microsiemens per centimeter at 25 °C). Subsequent water used for blank samples was supplied by the USGS National Water Quality Laboratory and the quality of the blank sample water was such that it had no inorganic chemical constituent concentrations greater than the reporting level. These blank samples were subjected to all aspects of sample collection, processing, preservation, transportation, and laboratory handling as the environmental samples and are considered both a sampler and filter blank. The blank samples were analyzed for common anions and cations, nutrients, and trace elements--the same as the environmental samples. The analytes detected in the blank sample were introduced as a result of the field sampling process.

## STREAMBED MATERIAL

Streambed-material samples were collected at each of the spring and stream water-quality sites. Streambed material was collected because most mining-related constituents are considered insoluble and usually are not detected in the dissolved phase in surface water [two notable exceptions are sulfate and zinc (Hem, 1985)]. By sampling the streambed material, the insoluble chemical constituents that are present can be detected and analyzed.

Chemical analyses of streambed-material samples represent the chemistry of rock and soil material in the drainage basin upstream from each sample site. Such information is useful for identifying those basins that contain concentrations of elements that may be related to mineral occurrences and mining activity. Heavy mineral-concentrate samples provide information about the presence of heavy minerals (specific gravity greater than 2.85) in rock material found in the drainage basin upstream from each sample site. The selective concentration of heavy minerals, many of which may be ore related, permits determination of some elements that, because of their small concentrations, cannot otherwise be easily detected in streambed-material samples.

## Sampling Methodology

Streambed-material samples consisted of alluvium that was collected and composited from several localities at each stream and spring sampling site. The sampler consisted of a 2-in. (inches) cup made of polyvinyl chloride (PVC) attached to a stainless steel rod. The sampling cup was scraped across the top 2 in. of the streambed and the collected material was deposited into a polyethylene churn splitter. Each bulk sample was then sieved with a 2.0-mm (millimeter, 10-mesh) screen to remove coarse material. The less than 2-mm size material was saved for further laboratory preparation and analysis.

## Streambed-Material Analysis Techniques

The bulk streambed-material samples were oven dried at 105 °F (degrees Fahrenheit) at the USGS sediment laboratory in Rolla. After drying, the samples were sent to the USGS, Branch of Geochemistry Laboratory in Denver, Colorado, for analysis.

The bulk streambed material was split into two unequal fractions. Split 1 consisted of about 85 g (grams) of the bulk material and was saved for grain-size analysis, semi-quantitative mineralogy, and quantitative elemental (chemistry) analysis on the less than 63 micrometer fraction. Split 2, which consisted of most of the bulk sample, was used for the heavy mineral concentrate. Split 2 samples were wet panned until most of the quartz, feldspar, organic material, and clay-size material were removed. The samples were then sieved with a 0.5-mm (35-mesh) screen and floated through bromoform (specific gravity 2.85) to remove the remaining quartz, feldspar, and other light minerals. The heavy material was collected, air dried, and separated into three magnetic fractions using a modified Frantz Isodynamic Separator. The most magnetic fraction (C-1), primarily magnetite, was saved but not analyzed. The moderately to weakly magnetic fraction (C-2), largely ferromagnesian silicates and iron oxides also was saved but not analyzed. The nonmagnetic fraction (C-3), which may include nonmagnetic ore and ore-related minerals, was saved for subsequent analysis.

All samples were prepared as described above except the August 1993 samples, which were first wet sieved before drying, which caused virtually all clay-size material and some light minerals to be washed away. This process adversely affected the semi-quantitative mineralogy and quantitative elemental results for the bulk stream-sediment samples (split 1).

Phase analysis was performed using standard X-ray diffraction techniques on the bulk streambed material (split 1) sample to determine the minerals present. The semi-quantitative analysis that was performed on these minerals was accomplished using the Reference Intensity Ratio (RIR) method; therefore, the values given should not be used as absolute numbers but rather as relative concentrations from one sample site to another. Standard deviation is plus or minus 12 to 15 percent for concentrations greater than 30 percent and plus or minus 18 to 20 percent for concentrations less than 30 percent. The part of the bulk sample that was used for grain-size analysis that was less than 63 µm (micrometers) in size was recombined, mixed, and submitted for quantitative elemental (chemistry) analysis using multi-channel inductively-coupled plasma atomic emission spectroscopy (ICP-AES).

The non-magnetic fraction of the heavy mineral concentrate (C-3 fraction) of split 2 was analyzed by optical mineralogy to give semi-quantitative estimates of the mineral grains present and by 37-element semi-quantitative emission spectrography. Ideally a 5-mg (milligram) sample is used when analyzing the C-3 fraction by emission spectrography. Many of the C-3 samples were less than 5 mg because of small concentrations of heavy minerals in the original heavy mineral-concentrate sample;

however, the samples were analyzed and the results were adjusted relative to 5-mg standards. The elements analyzed and their lower limits of determination are listed in table 3 (at the back of this report).

Different analysis were used to analyze the streambed-material samples collected from September 1991 through August 1993. The first streambed material collected in September 1990 was analyzed only as a bulk material sample; no heavy mineral concentrate was analyzed. Beginning in May 1991, both bulk sample and heavy mineral-concentrate analyses were performed. The 37-element semi-quantitative emission spectrography analysis was performed on the bulk streambed-material sample, and the mineralogy of all three fractions (C-1, C-2, and C-3) of the heavy mineral concentrate was optically determined. Beginning in September 1991 after reviewing the heavy mineral-concentrate data, optical mineralogy was performed and the 37-element semi-quantitative emission spectrography was used only on the C-3 fraction of the heavy mineral concentrate.

### Streambed-Material Data

Data from the bulk streambed-material analysis from split 1 are listed in tables 4 to 7 (at the back of this report). The bulk sample grain-size distributions listed in table 4 indicate the sediments are primarily coarse-grained material. The semi-quantitative mineralogy listed in table 5 show the streambed material is primarily quartz with minor amounts of other minerals. The quantitative elemental (chemistry) analyses of the less than 63 micrometer fraction are listed in table 6. After sieving was completed on the May 1991 sample from the Current River at Hawes Memorial Campground (fig. 1), there was insufficient sample to perform this analysis. The results of the semi-quantitative emission spectrography analysis performed on the May 1991 bulk samples are listed in table 7. The data in table 7 show many of the mineralogic concentrations of the samples were less than the lower determination limit. The exceptions were calcium, iron, magnesium, and titanium expressed in percent by weight and barium, copper, manganese, lead, and zircon expressed in micrograms per gram.

The heavy mineral-concentrate data from split 2 are listed in tables 8 and 9 (at the back of this report). Results of optical mineralogy performed on the non-magnetic (C-3) minerals present in the heavy mineral concentrate of the streambed material (table 8) indicate zircon and dolomite are typically the two most abundant minerals present. Zircon typically was the dominant mineral detected in streambed material from the surface-water sites and dolomite was the dominant mineral detected at the spring sites. The lead detected at the various sites was metallic lead, which is anthropogenic lead--not minerals containing lead. This means the form in which the lead was detected was a result of the effect of humans and not naturally occurring lead minerals in the environment.

The results of emission spectrograph analysis of the C-3 fraction are found in table 9 (at the back of this report). The data indicate boron, barium, manganese, lead, tin, and zircon were typically detected in concentrations greater than 1,000 μg/g (micrograms per gram).

## WATER-LEVEL DATA

Depth-to-water measurements were made in 57 wells in a four-county area surrounding the lease area to determine both ground-water altitudes and the range of ground-water fluctuations from May 1990 through September 1993 (fig. 10). The wells were measured in the spring when ground-water altitudes are usually at their highest and in the fall when ground-water altitudes are usually their lowest. These spring and fall periods were chosen to give the largest range in natural ground-water fluctuations that can be expected for the area. Ground-water levels were measured from the top of the well casing using an electric tape to the nearest 0.1 ft. The distance the well casing extended above land surface was measured and subtracted from the depth-to-water measurement. The land-surface altitudes were obtained from USGS 7.5-minute topographic maps. The altitudes are accurate to

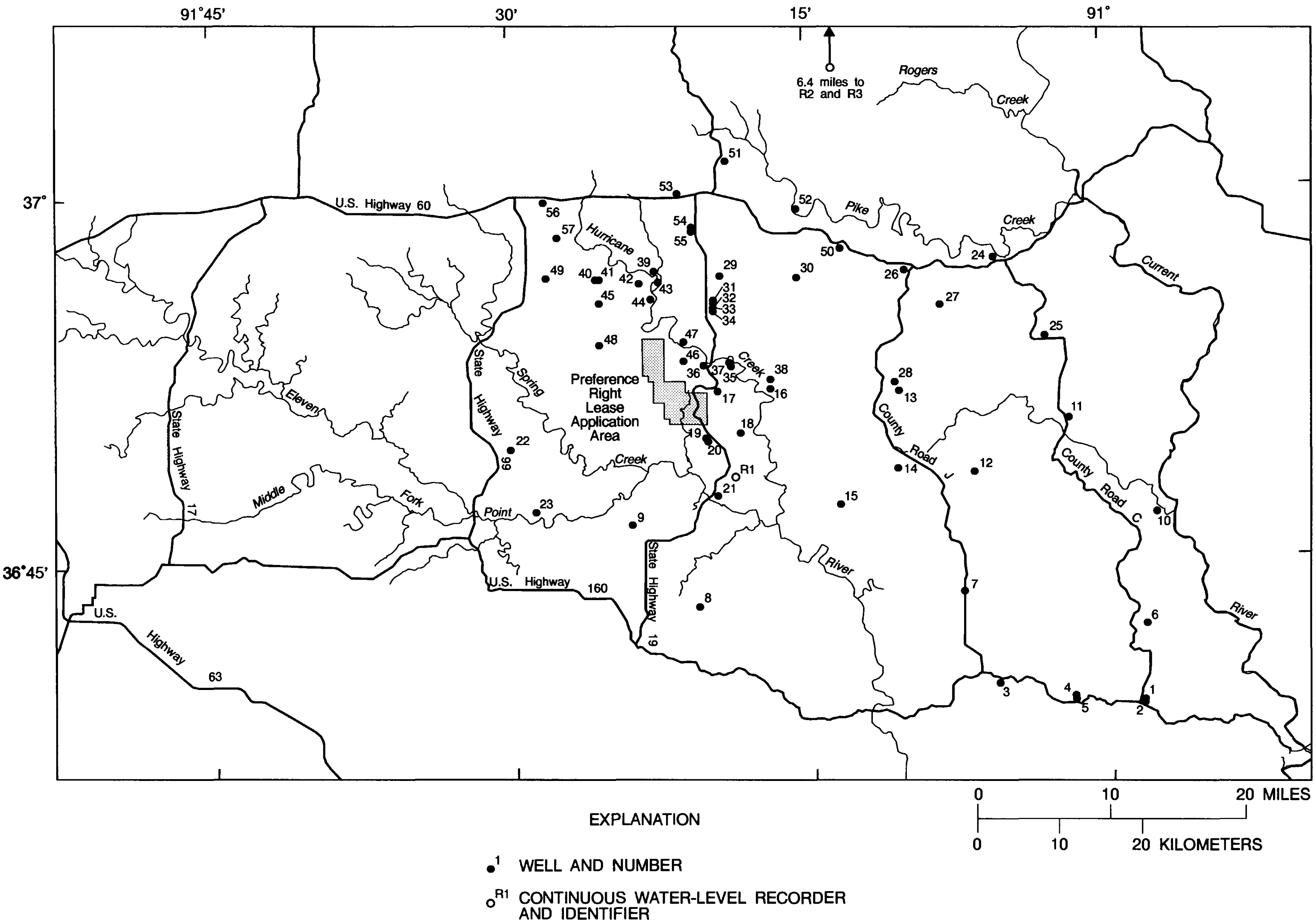


**Figure 10.** Locations of wells used as depth-to-water measurement sites and continuous water-level recorder sites.

one-half of the contour interval of the map. Because of the steep topography in southern Missouri, all of the topographic maps used had contour intervals of 20 ft. The depth-to-water measurements are listed in table 10 (at the back of this report) with the range of water-level fluctuations for each site.

Continuous water-level recorders were operated on three wells (fig. 10) during this project. Water levels in the lower Eleven Point River well (R1) were monitored from October 1989 to September 1993. This well is a former exploration hole near the lease area that is completed in the geologic formations from the Roubidoux Formation into the Derby-Doe Run Dolomites. These formations compose part of the Ozark aquifer and St. Francois confining unit. The other two wells are the Ozark Lead Wells 1 and 2, which are adjacent to each other 11 mi (miles) northeast of Eminence, Missouri. Water levels in the Ozark Lead well 1 were monitored from October 1988 through September 1992, and the well was completed in the geologic formations from the Gasconade Dolomite to the Davis Formation, which includes part of the Ozark aquifer and St. Francois confining unit. Water levels in the Ozark Lead well 2 were monitored from May 1989 to September 1992. This well is open from the Davis Formation into the Bonneterre Formation and includes part of the St. Francois confining unit and the St. Francois aquifer.

Water-level data from these three wells are shown in table 11 (at the back of this report) and hydrographs for these wells are presented in figure 11. Depth to water ranged from 289.68 to 333.39 ft in the lower Eleven Point River well, from 78.73 to 90.20 ft in Ozark Lead well 1, and from 127.53 to 135.67 ft in Ozark Lead well 2.

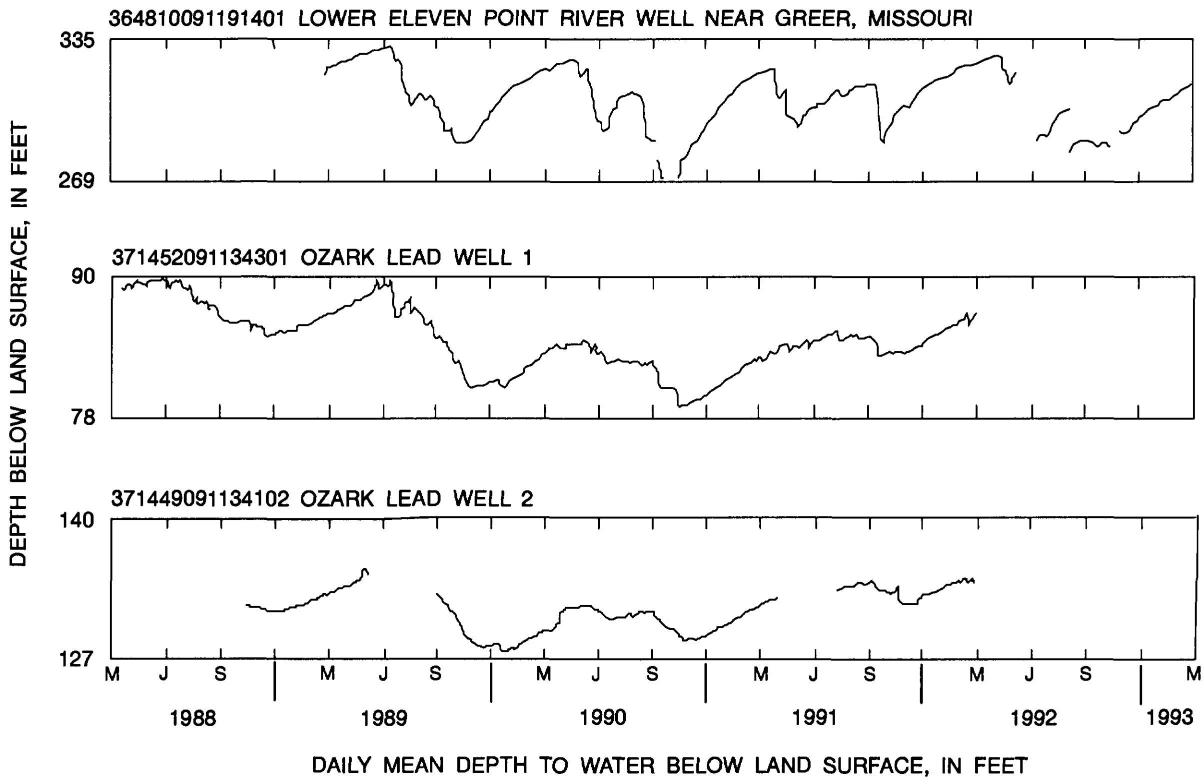


**Figure 11.** Hydrographs for three continuously monitored wells.



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## SPRING-DISCHARGE DATA

A continuous gaging station was operated at Greer Spring (fig. 1) during this project. The daily mean discharge is computed from rating tables that give the corresponding discharge for the measured gage height (stage). The rating table was prepared from stage-discharge-relation curves previously developed for Greer Spring. When the stage-discharge relation changes because of physical changes to the control, the discharge was computed by the shifting-control method. The daily mean discharge for October 1989 through September 1993 is listed in table 12 (at the back of this report). The discharge from Greer Spring ranged from 208 $ft^3/s$ in January 1990 to 751 $ft^3/s$ in April 1991.

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# TABLES

## ABBREVIATIONS AND SYMBOLS USED IN TABLE 1

| | |
|---|---|
| Q | Instantaneous discharge, in cubic feet per second |
| Cond | Specific conductance, in microsiemens per centimeter at 25 degrees Celsius |
| pH | In standard units |
| Temp | Water temperature, in degrees Celsius |
| DO | Dissolved oxygen, in milligrams per liter |
| Ca | Dissolved calcium, in milligrams per liter |
| Mg | Dissolved magnesium, in milligrams per liter |
| Na | Dissolved sodium, in milligrams per liter |
| K | Dissolved potassium, in milligrams per liter |
| $HCO_3$ | Bicarbonate, in milligrams per liter |
| $CO_3$ | Carbonate, in milligrams per liter |
| Alk | Alkalinity as calcium carbonate, in milligrams per liter |
| $SO_4$ | Dissolved sulfate, in milligrams per liter |
| Cl | Dissolved chloride, in milligrams per liter |
| F | Dissolved fluoride, in milligrams per liter |
| $SiO_2$ | Dissolved silica, in milligrams per liter |
| DS | Dissolved solids, residue at 180 degrees Celsius, in milligrams per liter |
| $NO_2$ | Dissolved nitrite as nitrogen, in milligrams per liter |
| $NO_2$+$NO_3$ | Dissolved nitrite plus nitrate as nitrogen, in milligrams per liter |
| $NH_3$ | Dissolved ammonia as nitrogen, in milligrams per liter |
| $NH_3$+ORG | Dissolved ammonia plus organic nitrogen as nitrogen, in milligrams per liter |
| P | Dissolved phosphorous, in milligrams per liter |
| P ortho | Dissolved orthophosphate as phosphorus, in milligrams per liter |
| Al | Dissolved aluminum, in micrograms per liter |
| As | Dissolved arsenic, in micrograms per liter |
| Ba | Dissolved barium, in micrograms per liter |
| Be | Dissolved beryllium, in micrograms per liter |
| Cd | Dissolved cadmium, in micrograms per liter |
| Cr | Dissolved chromium, in micrograms per liter |
| Co | Dissolved cobalt, in micrograms per liter |
| Cu | Dissolved copper, in micrograms per liter |
| Fe | Dissolved iron, in micrograms per liter |
| Pb | Dissolved lead, in micrograms per liter |
| Li | Dissolved lithium, in micrograms per liter |
| Mn | Dissolved manganese, in micrograms per liter |
| Hg | Dissolved mercury, in micrograms per liter |
| Mo | Dissolved molybdenum, in micrograms per liter |
| Ni | Dissolved nickel, in micrograms per liter |
| Se | Dissolved selenium, in micrograms per liter |
| Ag | Dissolved silver, in micrograms per liter |
| Sr | Dissolved strontium, in micrograms per liter |
| V | Dissolved vanadium, in micrograms per liter |
| Zn | Dissolved zinc, in micrograms per liter |
| TOC | Total organic carbon, in milligrams per liter |
| SS | Suspended sediment, in milligrams per liter |
| TD | Total depth of well, in feet |
| -- | No data |
| < | Less than |
| > | Greater than |
| ~ | Approximately |
| DDDMMSS | Latitude and longitude are in degrees, minutes, and seconds |

**Table 1.** Water-quality data for streams, springs, and wells

| Site number (fig. 4) | Site location | Date | Q | Cond | pH | Temp | DO | Ca | Mg | Na | K | $HCO_3$ | $CO_3$ | Alk |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SW1 | Current River at Van Buren | 09-12-90 | 1,010 | 317 | 7.9 | 21.5 | 8.0 | 38 | 22 | 2.1 | 0.9 | 197 | 0 | 161 |
| | | 05-28-91 | 2,350 | 253 | 8.2 | 23.5 | 9.6 | 29 | 16 | 1.8 | 1.0 | 161 | 0 | 132 |
| | | 09-10-91 | 993 | 334 | 8.1 | 24.5 | 9.0 | 37 | 22 | 2.2 | .9 | 219 | 0 | 179 |
| | | 08-24-92 | 900 | 311 | 7.5 | 24.0 | 9.5 | 36 | 21 | 1.8 | .9 | 210 | 0 | 172 |
| | | 08-10-93 | 1,490 | 319 | 8.0 | 23.0 | 9.2 | 36 | 20 | 2.0 | .9 | 219 | 0 | 180 |
| SW2 | Current River at Hawes Memorial Campground | 09-12-90 | 1,580 | 320 | 8.0 | 22.0 | 10.2 | 37 | 22 | 1.9 | .8 | 215 | 0 | 176 |
| | | 05-29-91 | 2,990 | 263 | 8.0 | 20.0 | 9.8 | 30 | 16 | 1.5 | .9 | 166 | 0 | 136 |
| | | 09-11-91 | 1,300 | 340 | 8.0 | 22.5 | 7.0 | 38 | 22 | 2.0 | .8 | 221 | 0 | 181 |
| | | 08-25-92 | 1,330 | 320 | 7.8 | 22.0 | 8.8 | 38 | 21 | 1.6 | .9 | 219 | 0 | 179 |
| | | 08-11-93 | 1,520 | 310 | 8.0 | 21.0 | 9.6 | 37 | 20 | 1.8 | .8 | 223 | 0 | 183 |
| SW3 | Eleven Point River at Thomasville | 09-11-90 | 8.70 | 339 | 7.3 | 22.5 | 8.0 | 42 | 23 | 1.4 | 1.4 | 218 | 0 | 179 |
| | | 05-30-91 | 75.4 | 298 | 7.8 | 19.5 | 9.5 | 35 | 19 | 1.3 | 1.2 | 192 | 0 | 158 |
| | | 09-11-91 | 10.4 | 350 | 7.9 | 25.0 | 8.0 | 41 | 22 | 1.4 | 1.6 | 234 | 0 | 192 |
| | | 08-25-92 | 4.09 | 327 | 7.6 | 24.5 | 8.2 | 38 | 21 | 1.4 | 1.6 | 219 | 0 | 180 |
| | | 08-23-93 | 7.60 | 355 | 7.7 | 25.5 | -- | 39 | 22 | 1.3 | 1.6 | 231 | 0 | 190 |
| SW4 | Spring Creek | 09-13-90 | 25.2 | 333 | 8.1 | 16.5 | 10.2 | 42 | 23 | 1.5 | 1.1 | 221 | 0 | 181 |
| | | 06-03-91 | 83.0 | 288 | 7.8 | 17.5 | 10.7 | 34 | 20 | 1.5 | 1.1 | 189 | 0 | 155 |
| | | 09-12-91 | 21.0 | 358 | 7.8 | 17.0 | 7.0 | 41 | 23 | 1.4 | 1.2 | 242 | 0 | 198 |
| | | 08-26-92 | 9.69 | 326 | 7.8 | 19.0 | 8.4 | 41 | 23 | 1.4 | 1.2 | 233 | 0 | 191 |
| | | 08-24-93 | 20.2 | 359 | 8.1 | 17.0 | -- | 40 | 22 | 1.3 | 1.2 | 224 | 0 | 184 |
| SW5 | Hurricane Creek | 09-19-90 | 3.09 | 382 | 7.9 | 19.0 | 8.4 | 48 | 28 | 1.6 | 1.0 | 265 | 0 | 217 |
| | | 06-04-91 | 26.4 | 326 | 7.7 | 17.5 | 9.5 | 40 | 22 | 1.4 | 1.0 | 226 | 0 | 185 |
| | | 09-12-91 | 3.50 | 390 | 8.0 | 22.0 | -- | 46 | 25 | 1.5 | 1.0 | 266 | 0 | 218 |
| | | 08-26-92 | 1.13 | 359 | 6.7 | 20.5 | 5.7 | 46 | 25 | 1.5 | 1.1 | 277 | 0 | 227 |
| | | 08-25-93 | 4.7 | 415 | 7.9 | 19.5 | -- | 46 | 26 | 1.3 | 1.0 | 277 | 0 | 227 |
| SW6 | Eleven Point River near Bardley | 09-20-90 | 486 | 341 | 8.0 | 18.0 | 9.1 | 43 | 25 | 1.6 | 1.2 | 231 | 0 | 189 |
| | | 05-30-91 | 1,200 | 287 | 7.8 | 17.5 | 10.0 | 33 | 18 | 1.6 | 1.2 | 185 | 0 | 152 |
| | | 09-13-91 | 485 | 357 | 8.0 | 19.0 | 9.0 | 42 | 23 | 1.5 | 1.2 | 244 | 0 | 200 |
| | | 08-26-92 | 440 | 325 | 7.6 | 21.0 | 9.9 | 40 | 22 | 1.4 | 1.3 | 226 | 0 | 185 |
| | | 08-25-93 | 530 | 358 | 8.0 | 20.5 | -- | 39 | 22 | 1.4 | 1.3 | 238 | 0 | 195 |
| | Blank sample | 09-11-91 | -- | 15 | 5.6 | -- | -- | .50 | 1.0 | .20 | <.10 | -- | -- | -- |
| | | 08-27-92 | -- | -- | -- | -- | -- | .04 | .04 | <.20 | <.10 | -- | -- | -- |
| | | 08-24-93 | -- | 2 | 8.0 | -- | -- | .13 | .03 | <.20 | <.10 | -- | -- | -- |
| | | 09-27-93 | -- | 2 | 8.2 | -- | -- | .03 | .01 | <.20 | <.10 | -- | -- | -- |

**Table 1.** Water-quality data for streams, springs, and wells–Continued

| Site number (fig. 4) | Site location | Date | $SO_4$ | Cl | F | $SiO_2$ | DS | $NO_2$ | $NO_2+NO_3$ | $NH_3$ | $NH_3$+ ORG | P | P ortho |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SW1 | Current River at Van Buren | 09-12-90 | 3.2 | 5.0 | <0.10 | 8.9 | 178 | <0.01 | 0.30 | <0.01 | <0.2 | <0.01 | <0.01 |
| | | 05-28-91 | 4.8 | 1.9 | <.10 | 7.8 | 138 | <.01 | .26 | <.01 | <.2 | .04 | .02 |
| | | 09-10-91 | 3.3 | 4.1 | <.10 | 8.6 | 177 | .04 | .31 | .02 | <.2 | <.01 | <.01 |
| | | 08-24-92 | 2.7 | 4.1 | .10 | 8.1 | 138 | <.01 | .31 | .01 | <.2 | .01 | .01 |
| | | 08-10-93 | 3.4 | 2.7 | <.10 | 8.3 | 174 | <.01 | .26 | .02 | <.2 | <.01 | .02 |
| SW2 | Current River at Hawes Memorial Campground | 09-12-90 | 2.9 | 4.8 | <.10 | 8.8 | 236 | <.01 | .20 | <.01 | .2 | <.01 | <.01 |
| | | 05-29-91 | 3.8 | 1.6 | .10 | 7.7 | 128 | <.01 | .24 | <.01 | .2 | <.01 | <.01 |
| | | 09-11-91 | 2.4 | 3.5 | <.10 | 8.6 | 180 | .04 | .29 | .01 | <.2 | <.01 | <.01 |
| | | 08-25-92 | 2.5 | 4.1 | <.10 | 8.1 | 156 | <.01 | .25 | <.01 | <.2 | <.01 | <.01 |
| | | 08-11-93 | 3.0 | 2.2 | <.10 | 8.2 | 171 | <.01 | .28 | .02 | <.2 | <.01 | <.01 |
| SW3 | Eleven Point River at Thomasville | 09-11-90 | 2.3 | 4.7 | .10 | 10 | 182 | <.01 | .40 | .02 | .3 | .01 | <.01 |
| | | 05-30-91 | 2.5 | 1.1 | .10 | 7.9 | 162 | <.01 | .46 | <.01 | 1.1 | <.01 | <.01 |
| | | 09-11-91 | 2.3 | 3.4 | <.10 | 9.6 | 185 | .04 | .45 | .03 | .2 | <.01 | <.01 |
| | | 08-25-92 | 2.4 | 4.3 | <.10 | 9.0 | 140 | <.01 | .47 | .02 | <.2 | <.01 | <.01 |
| | | 08-23-93 | 1.0 | .8 | <.10 | 9.9 | 189 | <.01 | .33 | .04 | <.2 | <.01 | .02 |
| SW4 | Spring Creek | 09-13-90 | 2.3 | 4.6 | <.10 | 9.4 | 187 | <.01 | .60 | .02 | .2 | <.01 | <.01 |
| | | 06-03-91 | 2.9 | 3.4 | <.10 | 8.7 | 159 | <.01 | .43 | .02 | .2 | <.01 | <.01 |
| | | 09-12-91 | 2.2 | 2.9 | <.10 | 8.8 | 190 | .04 | .56 | .02 | .4 | <.01 | <.01 |
| | | 08-26-92 | 2.1 | 2.8 | .10 | 8.5 | 186 | <.01 | .35 | .01 | <.2 | <.01 | <.01 |
| | | 08-24-93 | 2.4 | 3.2 | <.10 | 8.3 | 185 | <.01 | .54 | .03 | <.2 | <.01 | .02 |
| SW5 | Hurricane Creek | 09-19-90 | 2.5 | 4.3 | <.10 | 10 | 185 | <.01 | <.10 | <.01 | <.2 | <.01 | <.01 |
| | | 06-04-91 | 3.2 | 3.6 | <.10 | 8.2 | 183 | <.01 | .29 | .01 | <.2 | <.01 | <.01 |
| | | 09-12-91 | 2.6 | 3.2 | <.10 | 9.5 | 207 | -- | -- | -- | -- | -- | -- |
| | | 08-26-92 | 2.4 | 3.5 | .10 | 9.3 | 206 | <.01 | .25 | .01 | <.2 | <.01 | <.01 |
| | | 08-25-93 | 2.8 | 1.5 | <.10 | 9.5 | 214 | <.01 | .12 | .02 | <.2 | <.01 | .01 |
| SW6 | Eleven Point River near Bardley | 09-20-90 | 2.1 | 3.9 | <.10 | 9.6 | 172 | <.01 | .50 | <.01 | <.2 | <.01 | <.01 |
| | | 05-30-91 | 2.3 | .4 | <.10 | 7.8 | 173 | <.01 | .49 | <.01 | <.2 | <.01 | <.01 |
| | | 09-13-91 | 2.1 | 3.2 | <.10 | 9.0 | 182 | .04 | .56 | .02 | .2 | <.01 | <.01 |
| | | 08-26-92 | 2.0 | 1.0 | .10 | 8.6 | 162 | .02 | .89 | .02 | <.2 | <.01 | <.01 |
| | | 08-25-93 | 2.2 | 2.1 | <.10 | 8.7 | 188 | <.01 | .51 | .02 | <.2 | <.01 | .01 |
| | Blank sample | 09-11-91 | .20 | .2 | .30 | 10 | 8 | .04 | .06 | .05 | <.2 | <.01 | <.01 |
| | | 08-27-92 | <.10 | .5 | <.10 | .03 | <1 | <.01 | <.05 | <.01 | <.2 | <.01 | <.01 |
| | | 08-24-93 | .20 | .2 | <.10 | .12 | <1 | <.01 | <.05 | .02 | <.2 | <.01 | .01 |
| | | 09-27-93 | .20 | <.1 | .10 | .05 | <1 | <.01 | <.05 | .03 | <.2 | .02 | .02 |

**Table 1.** Water-quality data for streams, springs, and wells--Continued

| Site number (fig. 4) | Site location | Date | Al | As | Ba | Be | Cd | Cr | Co | Cu | Fe | Pb | Li |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SW1 | Current River at Van Buren | 09-12-90 | 10 | <1 | 36 | <0.5 | 1.0 | 1 | <3 | 1 | <3 | 1 | <4 |
| | | 05-28-91 | <10 | <1 | 30 | <.5 | <1.0 | <1 | <3 | 13 | 6 | <1 | <4 |
| | | 09-10-91 | 10 | <1 | 34 | <.5 | <1.0 | <1 | <3 | 2 | <3 | <1 | <4 |
| | | 08-24-92 | 10 | <1 | 33 | <10 | <1.0 | <1 | <3 | 1 | 8 | <1 | <4 |
| | | 08-10-93 | <10 | <1 | 34 | <.5 | <1.0 | <1 | <3 | <1 | <3 | <1 | <4 |
| SW2 | Current River at Hawes Memorial Campground | 09-12-90 | 10 | <1 | 32 | <.5 | 2.0 | <1 | <3 | 1 | <3 | 1 | <4 |
| | | 05-29-91 | <10 | <1 | 29 | <.5 | <1.0 | <1 | <3 | 1 | 4 | <1 | <4 |
| | | 09-11-91 | <10 | <1 | 33 | <.5 | <1.0 | <1 | <3 | <1 | <3 | <1 | <4 |
| | | 08-25-92 | 10 | <1 | 31 | <10 | <1.0 | <1 | <3 | <1 | 13 | <1 | <4 |
| | | 08-11-93 | <10 | <1 | 31 | <.5 | <1.0 | <1 | <3 | 1 | <3 | <1 | <4 |
| SW3 | Eleven Point River at Thomasville | 09-11-90 | 10 | <1 | 45 | <.5 | 1.0 | <1 | <3 | 1 | 7 | 3 | <4 |
| | | 05-30-91 | <10 | <1 | 34 | <.5 | <1.0 | <1 | <3 | <1 | 5 | <1 | <4 |
| | | 09-11-91 | <10 | <1 | 44 | <.5 | <1.0 | <1 | <3 | <1 | 15 | <1 | <4 |
| | | 08-25-92 | 10 | <1 | 44 | <10 | <1.0 | <1 | <3 | 1 | 4 | <1 | <4 |
| | | 08-23-93 | <10 | <1 | 44 | .5 | <1.0 | <1 | <3 | <1 | 5 | <1 | <4 |
| SW4 | Spring Creek | 09-13-90 | 10 | <1 | 33 | <.5 | 1.0 | <1 | <3 | 1 | 5 | 1 | <4 |
| | | 06-03-91 | <10 | <1 | 31 | <.5 | <1.0 | <1 | <3 | 2 | 11 | <1 | <4 |
| | | 09-12-91 | <10 | <1 | 32 | <.5 | <1.0 | <1 | <3 | <1 | 4 | <1 | <4 |
| | | 08-26-92 | 20 | <1 | 32 | <10 | <1.0 | <1 | <3 | <1 | 4 | <1 | <4 |
| | | 08-24-93 | <10 | <1 | 31 | .6 | <1.0 | <1 | <3 | <1 | 20 | <1 | 8 |
| SW5 | Hurricane Creek | 09-19-90 | <10 | <1 | 37 | .5 | <1.0 | <1 | <3 | <1 | 6 | <1 | <4 |
| | | 06-04-91 | <10 | <1 | 30 | <.5 | <1.0 | <1 | <3 | 1 | 6 | <1 | <4 |
| | | 09-12-91 | <10 | <1 | 35 | <.5 | <1.0 | <1 | <3 | <1 | 5 | <1 | <4 |
| | | 08-26-92 | <10 | <1 | 35 | <10 | <1.0 | <1 | <3 | <1 | 4 | <1 | <4 |
| | | 08-25-93 | <10 | <1 | 35 | .6 | <1.0 | <1 | <3 | <1 | 7 | <1 | <4 |
| SW6 | Eleven Point River near Bardley | 09-20-90 | <10 | <1 | 35 | .5 | <1.0 | <1 | <3 | <1 | 5 | <1 | <4 |
| | | 05-30-91 | <10 | <1 | 29 | <.5 | <1.0 | <1 | <3 | 1 | 6 | <1 | <4 |
| | | 09-13-91 | <10 | <1 | 32 | <.5 | <1.0 | <1 | <3 | <1 | 3 | <1 | <4 |
| | | 08-26-92 | <10 | <1 | 30 | <10 | <1.0 | <1 | <3 | <1 | 6 | <1 | <4 |
| | | 08-25-93 | <10 | <1 | 30 | .5 | <1.0 | <1 | <3 | <1 | <3 | <1 | <4 |
| | Blank sample | 09-11-91 | <10 | <1 | <2 | <.5 | <1.0 | <1 | <3 | <1 | 6 | <1 | <4 |
| | | 08-27-92 | <10 | <1 | <2 | <10 | <1.0 | <1 | <3 | <1 | <3 | <1 | <4 |
| | | 08-24-93 | <10 | <1 | <2 | <.5 | <1.0 | 1 | <3 | <1 | 10 | <1 | 8 |
| | | 09-27-93 | <10 | <1 | <2 | <.5 | 1.0 | <1 | <3 | <1 | <3 | <1 | <4 |

**Table 1.** Water-quality data for streams, springs, and wells–Continued

| Site number (fig. 4) | Site location | Date | Mn | Hg | Mo | Ni | Se | Ag | Sr | V | Zn | TOC | SS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SW1 | Current River at Van Buren | 09-12-90 | 3 | <0.1 | <10 | <1 | <1 | <1.0 | 34 | <6 | <3 | 0.8 | 2.7 |
| | | 05-28-91 | 5 | .2 | <10 | 2 | <1 | <1.0 | 28 | <6 | 8 | 1.2 | 8.2 |
| | | 09-10-91 | 5 | <.1 | <10 | <1 | <1 | <1.0 | 33 | <6 | 3 | .9 | 2.8 |
| | | 08-24-92 | 5 | .2 | <10 | <1 | <1 | <1.0 | 32 | <6 | <10 | 1.0 | 16.0 |
| | | 08-10-93 | 1 | <.1 | <10 | <1 | <1 | <1.0 | 33 | <6 | <3 | .9 | 4.1 |
| SW2 | Current River at Hawes Memorial Campground | 09-12-90 | 2 | <.1 | <10 | 1 | <1 | <1.0 | 31 | <6 | 4 | .7 | 4.5 |
| | | 05-29-91 | 3 | <.1 | <10 | 1 | <1 | <1.0 | 28 | <6 | 6 | 1.0 | 5.0 |
| | | 09-11-91 | 3 | <.1 | <10 | <1 | <1 | <1.0 | 32 | <6 | 4 | .9 | 4.1 |
| | | 08-25-92 | 3 | <.1 | <10 | <1 | <1 | <1.0 | 31 | <6 | <10 | .9 | 10.0 |
| | | 08-11-93 | <1 | .1 | <10 | <1 | <1 | <1.0 | 31 | <6 | 3 | .8 | 4.7 |
| SW3 | Eleven Point River at Thomasville | 09-11-90 | 25 | .4 | <10 | <1 | <1 | <1.0 | 36 | <6 | 6 | .7 | 6.7 |
| | | 05-30-91 | 13 | <.1 | <10 | <1 | <1 | <1.0 | 29 | <6 | <3 | 1.0 | 9.2 |
| | | 09-11-91 | 24 | <.1 | <10 | <1 | <1 | <1.0 | 34 | <6 | 15 | 1.1 | 10.8 |
| | | 08-25-92 | 19 | .1 | <10 | <1 | <1 | <1.0 | 35 | <6 | <10 | 2.7 | 14.3 |
| | | 08-23-93 | 28 | .1 | <10 | <1 | <1 | <1.0 | 34 | <6 | 8 | 1.2 | 44.2 |
| SW4 | Spring Creek | 09-13-90 | 3 | .7 | <10 | <1 | <1 | <1.0 | 31 | <6 | 3 | .9 | 3.3 |
| | | 06-03-91 | 6 | <.1 | <10 | <1 | <1 | <1.0 | 28 | <6 | 26 | .6 | 8.7 |
| | | 09-12-91 | 4 | <.1 | <10 | <1 | <1 | <1.0 | 30 | <6 | 6 | .6 | 3.6 |
| | | 08-26-92 | 5 | .1 | <10 | <1 | <1 | <1.0 | 31 | <6 | <10 | .7 | 17.0 |
| | | 08-24-93 | 6 | .2 | <10 | <1 | <1 | 2.0 | 30 | <6 | 9 | 1.2 | 6.1 |
| SW5 | Hurricane Creek | 09-19-90 | 5 | <.1 | <10 | <1 | <1 | <1.0 | 34 | <6 | <3 | .9 | 3.4 |
| | | 06-04-91 | 8 | <.1 | <10 | <1 | <1 | <1.0 | 28 | <6 | 8 | .5 | 8.6 |
| | | 09-12-91 | 4 | <.1 | <10 | <1 | <1 | <1.0 | 32 | <6 | <3 | -- | 5.1 |
| | | 08-26-92 | 2 | <.1 | <10 | <1 | <1 | <1.0 | 33 | <6 | <10 | .7 | 14.0 |
| | | 08-25-93 | 6 | .1 | <10 | <1 | <1 | 2.0 | 33 | <6 | 3 | .8 | 6.0 |
| SW6 | Eleven Point River near Bardley | 09-20-90 | 4 | <.1 | <10 | <1 | <1 | <1.0 | 34 | <6 | <3 | .9 | 5.6 |
| | | 05-30-91 | 7 | <.1 | <10 | 1 | <1 | <1.0 | 28 | <6 | 11 | 1.0 | 9.0 |
| | | 09-13-91 | 4 | <.1 | <10 | <1 | <1 | <1.0 | 30 | <6 | 3 | .9 | 6.7 |
| | | 08-26-92 | 4 | <.1 | <10 | <1 | <1 | <1.0 | 30 | <6 | <10 | .8 | 17.7 |
| | | 08-25-93 | 4 | .1 | <10 | <1 | <1 | <1.0 | 29 | <6 | 5 | .8 | 3.4 |
| | Blank sample | 09-11-91 | <1 | <.1 | <10 | <1 | <1 | <1.0 | <1 | <6 | 9 | 4.3 | -- |
| | | 08-27-92 | <1 | <.1 | <10 | <1 | <1 | <1.0 | <1 | <6 | <10 | .1 | -- |
| | | 08-24-93 | <1 | .1 | <10 | <1 | <1 | 3.0 | <1 | <6 | <3 | -- | -- |
| | | 09-27-93 | <1 | <.1 | <10 | <1 | <1 | 1.0 | <1 | <6 | 4 | -- | -- |

**Table 1.** Water-quality data for streams, springs, and wells--Continued

| Site number (fig. 4) | Site location | Date | Q | Cond | pH | Temp | DO | Ca | Mg | Na | K | $HCO_3$ | $CO_3$ | Alk |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SP1 | Barrett Spring | 09-13-90 | 0.02 | 286 | 7.4 | 14.5 | -- | 34 | 19 | 1.5 | 0.50 | 200 | 0 | 164 |
| | | 05-29-91 | .07 | 262 | 7.6 | 13.5 | 11.0 | 30 | 17 | 1.3 | .50 | 173 | 0 | 142 |
| | | 09-13-91 | .03 | 305 | 7.5 | 14.0 | 7.0 | 35 | 20 | 1.5 | .50 | 207 | 0 | 170 |
| | | 08-27-92 | .03 | 302 | 7.9 | 13.5 | 10.6 | 34 | 19 | 1.4 | .50 | 205 | 0 | 168 |
| | | 08-23-93 | .03 | 302 | 7.2 | 13.5 | -- | 33 | 19 | 1.4 | .50 | 199 | 0 | 163 |
| SP2 | Big Spring | 09-12-90 | 373 | 343 | 7.0 | 15.0 | 9.0 | 41 | 23 | 1.6 | .70 | 221 | 0 | 181 |
| | | 05-29-91 | 543 | 270 | 7.2 | 13.5 | 9.0 | 31 | 17 | 1.4 | .90 | 176 | 0 | 144 |
| | | 09-10-91 | 420 | 354 | 7.6 | 14.5 | 8.0 | 41 | 23 | 1.6 | .70 | 236 | 0 | 193 |
| | | 08-25-92 | 380 | 316 | 6.8 | 14.5 | 8.3 | 40 | 22 | 1.5 | .70 | 227 | 0 | 186 |
| | | 08-11-93 | 426 | 273 | 6.7 | 14.5 | 9.7 | 37 | 21 | 1.4 | .70 | 283 | 0 | 232 |
| SP3 | Dennig Series Springs | 09-18-90 | 11.5 | 352 | 7.8 | 16.5 | 9.6 | 44 | 25 | 1.6 | 1.1 | 246 | 0 | 201 |
| | | 06-03-91 | 22.5 | 265 | 7.4 | 14.5 | 8.7 | 31 | 18 | 1.8 | 1.4 | 173 | 0 | 142 |
| | | 09-12-91 | 19.2 | 373 | 7.8 | 16.0 | 7.0 | 43 | 24 | 1.5 | 1.1 | 246 | 0 | 201 |
| | | 08-27-92 | 8.03 | 345 | 7.2 | 15.0 | 9.2 | 40 | 22 | 1.5 | 1.2 | 233 | 0 | 191 |
| | | 08-24-93 | 10 | 372 | 7.8 | 16.0 | -- | 41 | 23 | 1.4 | 1.2 | 244 | 0 | 200 |
| SP4 | Falling Spring | 09-13-90 | .60 | 346 | 7.7 | 14.5 | -- | 44 | 24 | 1.3 | .50 | 246 | 0 | 202 |
| | | 05-29-91 | 1.0 | 310 | 7.4 | 16.0 | -- | 36 | 20 | 1.3 | .70 | 209 | 0 | 172 |
| | | 09-13-91 | 1.0 | 371 | 7.6 | 14.5 | -- | 45 | 24 | 1.3 | .50 | 258 | 0 | 212 |
| | | 08-27-92 | .70 | 378 | 7.0 | 14.0 | -- | 44 | 24 | 1.0 | .60 | 249 | 0 | 204 |
| | | 08-23-93 | .20 | 370 | 7.3 | 13.0 | -- | 41 | 23 | 1.1 | .60 | 245 | 0 | 200 |
| SP5 | Greer Spring | 09-14-90 | 370 | 340 | 7.5 | 14.5 | 9.3 | 40 | 22 | 1.6 | 1.2 | 227 | 0 | 186 |
| | | 06-04-91 | 497 | 282 | 7.3 | 14.0 | 9.7 | 32 | 17 | 1.4 | 1.3 | 180 | 0 | 147 |
| | | 09-13-91 | 270 | 357 | 7.8 | 14.5 | 9.0 | 42 | 23 | 1.6 | 1.3 | 239 | 0 | 196 |
| | | 08-27-92 | 266 | 330 | 7.8 | 14.5 | 9.3 | 39 | 22 | 1.5 | 1.4 | 225 | 0 | 184 |
| | | 08-24-93 | 300 | 351 | 7.6 | 14.0 | -- | 38 | 21 | 1.4 | 1.3 | 228 | 0 | 187 |
| SP6 | McCormack Spring | 09-18-90 | .38 | 391 | 7.3 | 14.0 | 10.7 | 49 | 28 | 1.1 | .60 | 276 | 0 | 226 |
| | | 06-05-91 | 1.74 | 385 | 7.4 | 13.0 | 9.6 | 48 | 27 | 1.2 | .60 | 277 | 0 | 227 |
| | | 09-11-91 | .51 | 420 | 7.5 | 14.0 | -- | 48 | 27 | 1.1 | .60 | 283 | 0 | 232 |
| | | 08-25-92 | .13 | 385 | 7.4 | 14.0 | 10.0 | 47 | 27 | 1.0 | .60 | 269 | 0 | 221 |
| | | 08-24-93 | .37 | 412 | 7.4 | 14.0 | -- | 46 | 26 | 1.0 | .60 | 278 | 0 | 228 |
| SP7 | Turner Spring | 09-19-90 | 4.18 | 359 | 7.6 | 14.0 | 10.8 | 46 | 26 | 1.4 | .80 | 258 | 0 | 211 |
| | | 06-04-91 | 11.2 | 333 | 7.5 | 13.5 | 10.7 | 41 | 23 | 1.5 | 1.0 | 232 | 0 | 190 |
| | | 09-12-91 | 4.34 | 376 | 7.6 | 14.0 | 7.0 | 44 | 24 | 1.3 | .80 | 253 | 0 | 207 |
| | | 08-26-92 | 4.67 | 346 | 7.2 | 13.5 | 9.8 | 43 | 23 | 1.2 | .90 | 244 | 0 | 200 |
| | | 08-25-93 | 6.08 | 376 | 7.6 | 14.5 | -- | 43 | 24 | 1.2 | .90 | 252 | 0 | 207 |

**Table 1.** Water-quality data for streams, springs, and wells–Continued

| Site number (fig. 4) | Site location | Date | $SO_4$ | Cl | F | $SiO_2$ | DS | $NO_2$ | $NO_2+NO_3$ | $NH_3$ | $NH_3$+ ORG | P | P ortho |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SP1 | Barrett Spring | 09-13-90 | 1.4 | 3.8 | <0.10 | 10 | 159 | <0.01 | <0.10 | <0.01 | 0.2 | <0.01 | <0.01 |
| | | 05-29-91 | 1.3 | 1.1 | <.10 | 10 | 142 | <.01 | <.05 | <.01 | <.2 | <.01 | <.01 |
| | | 09-13-91 | 1.4 | 2.4 | <.10 | 10 | 165 | .04 | .11 | .01 | <.2 | <.01 | <.01 |
| | | 08-27-92 | 1.3 | .6 | <.10 | 10 | 136 | <.01 | .07 | <.01 | <.2 | <.01 | <.01 |
| | | 08-23-93 | 1.6 | 1.3 | <.10 | 9.8 | 156 | <.01 | .07 | .01 | <.2 | <.01 | .01 |
| SP2 | Big Spring | 09-12-90 | 1.8 | 4.2 | .10 | 8.7 | 185 | <.01 | .30 | <.01 | .3 | <.01 | <.01 |
| | | 05-29-91 | 2.6 | 1.6 | <.10 | 8.3 | 148 | <.01 | .45 | <.01 | .3 | <.01 | <.01 |
| | | 09-10-91 | 1.9 | 3.0 | <.10 | 8.4 | 188 | .04 | .38 | .01 | <.2 | <.01 | <.01 |
| | | 08-25-92 | 1.7 | 3.5 | <.10 | 8.3 | 166 | <.01 | .40 | <.01 | <.2 | <.01 | <.01 |
| | | 08-11-93 | 2.2 | 3.3 | .10 | 8.1 | 176 | <.01 | .38 | .01 | <.2 | <.01 | <.01 |
| SP3 | Dennig Series Springs | 09-18-90 | 2.1 | 3.9 | <.10 | 9.8 | 185 | <.01 | .50 | <.01 | .2 | .01 | <.01 |
| | | 06-03-91 | 2.6 | 3.9 | <.10 | 9.9 | 147 | <.01 | .71 | .02 | <.2 | <.01 | <.01 |
| | | 09-12-91 | 2.1 | 3.1 | <.10 | 9.3 | 198 | .04 | .61 | .01 | <.2 | .01 | <.01 |
| | | 08-27-92 | 2.0 | 1.4 | <.10 | 9.3 | 180 | <.01 | .59 | .02 | <.2 | .01 | <.01 |
| | | 08-24-93 | 2.3 | 1.7 | <.10 | 9.0 | 192 | <.01 | .60 | .02 | <.2 | <.01 | .02 |
| SP4 | Falling Spring | 09-13-90 | 1.3 | 4.0 | .10 | 9.4 | 191 | <.01 | .10 | <.01 | .3 | <.01 | <.01 |
| | | 05-29-91 | 1.6 | 1.3 | <.10 | 8.9 | 165 | <.01 | .07 | .01 | .2 | <.01 | <.01 |
| | | 09-13-91 | 1.3 | 2.6 | <.10 | 9.3 | 200 | .04 | .16 | .01 | .2 | <.01 | <.01 |
| | | 08-27-92 | 1.2 | .7 | .10 | 9.0 | 178 | <.01 | .11 | <.01 | <.2 | <.01 | <.01 |
| | | 08-23-93 | 1.5 | 1.1 | <.10 | 8.9 | 197 | <.01 | .11 | .02 | <.2 | <.01 | .01 |
| SP5 | Greer Spring | 09-14-90 | 2.2 | 4.7 | <.10 | 9.4 | 178 | <.01 | .80 | <.01 | .2 | <.01 | <.01 |
| | | 06-04-91 | 2.6 | 3.5 | <.10 | 9.1 | 154 | <.01 | .82 | .01 | <.2 | <.01 | <.01 |
| | | 09-13-91 | 2.1 | 3.1 | <.10 | 9.6 | 191 | .04 | .80 | .01 | <.2 | .01 | <.01 |
| | | 08-27-92 | 2.1 | 1.3 | <.10 | 9.2 | 178 | <.01 | .76 | <.01 | <.2 | .03 | .01 |
| | | 08-24-93 | 2.4 | 3.3 | <.10 | 8.9 | 182 | <.01 | .82 | .02 | <.2 | <.01 | .02 |
| SP6 | McCormack Spring | 09-18-90 | 1.6 | 3.3 | <.10 | 9.3 | 219 | <.01 | <.10 | .01 | <.2 | <.01 | <.01 |
| | | 06-05-91 | 2.5 | 3.3 | <.10 | 8.8 | 231 | <.01 | .07 | <.01 | <.2 | <.01 | <.01 |
| | | 09-11-91 | 1.8 | 2.7 | <.10 | 9.0 | 196 | .04 | .12 | .01 | .9 | <.01 | <.01 |
| | | 08-25-92 | 1.6 | 3.5 | <.10 | 8.9 | 184 | <.01 | .07 | <.01 | <.2 | <.01 | <.01 |
| | | 08-24-93 | 1.9 | 1.1 | <.10 | 8.7 | 220 | <.01 | .09 | .02 | <.2 | <.01 | .03 |
| SP7 | Turner Spring | 09-19-90 | 1.3 | 3.4 | <.10 | 11 | 184 | <.01 | .30 | .01 | <.2 | <.01 | <.01 |
| | | 06-04-91 | 1.8 | 2.3 | <.10 | 10 | 189 | <.01 | .44 | .02 | <.2 | <.01 | <.01 |
| | | 09-12-91 | 1.4 | 2.7 | <.10 | 10 | 186 | .04 | .33 | .01 | <.2 | <.01 | <.01 |
| | | 08-26-92 | 1.3 | .6 | .10 | 9.9 | 174 | <.01 | .30 | <.01 | <.2 | <.01 | <.01 |
| | | 08-25-93 | 1.5 | 1.2 | <.10 | 9.8 | 199 | <.01 | .29 | .01 | <.2 | <.01 | .02 |

**Table 1.** Water-quality data for streams, springs, and wells–Continued

| Site number (fig. 4) | Site location | Date | Al | As | Ba | Be | Cd | Cr | Co | Cu | Fe | Pb | Li |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SP1 | Barrett Spring | 09-13-90 | <10 | <1 | 24 | <0.5 | 2.0 | <1 | <3 | <1 | <3 | <1 | <4 |
| | | 05-29-91 | <10 | <1 | 23 | <.5 | <1.0 | <1 | <3 | 1 | 6 | <1 | <4 |
| | | 09-13-91 | <10 | <1 | 26 | <.5 | <1.0 | <1 | <3 | <1 | <3 | <1 | <4 |
| | | 08-27-92 | <10 | <1 | 25 | <10 | <1.0 | <1 | <3 | <1 | <3 | <1 | <4 |
| | | 08-23-93 | <10 | <1 | 24 | .7 | <1.0 | <1 | <3 | <1 | <3 | <1 | <4 |
| SP2 | Big Spring | 09-12-90 | 10 | <1 | 28 | <.5 | <1.0 | <1 | <3 | <1 | 3 | <1 | <4 |
| | | 05-29-91 | <10 | <1 | 26 | <.5 | <1.0 | <1 | <3 | 1 | 4 | 1 | <4 |
| | | 09-10-91 | <10 | <1 | 28 | <.5 | <1.0 | <1 | <3 | <1 | <3 | <1 | <4 |
| | | 08-25-92 | 10 | <1 | 27 | <10 | <1.0 | <1 | <3 | <1 | <3 | <1 | <4 |
| | | 08-11-93 | <10 | <1 | 26 | <.5 | <1.0 | <1 | <3 | <1 | 4 | <1 | <4 |
| SP3 | Dennig Series Springs | 09-18-90 | <10 | <1 | 29 | <.5 | <1.0 | <1 | <3 | <1 | 4 | <1 | <4 |
| | | 06-03-91 | <10 | <1 | 33 | <.5 | <1.0 | <1 | <3 | 1 | 18 | <1 | <4 |
| | | 09-12-91 | <10 | <1 | 28 | <.5 | <1.0 | <1 | <3 | <1 | <3 | <1 | <4 |
| | | 08-27-92 | 10 | <1 | 28 | <10 | <1.0 | <1 | <3 | 2 | 10 | 2 | <4 |
| | | 08-24-93 | <10 | <1 | 27 | <.5 | <1.0 | <1 | <3 | <1 | 6 | <1 | 7 |
| SP4 | Falling Spring | 09-13-90 | 10 | <1 | 25 | <.5 | 1.0 | <1 | <3 | <1 | <3 | 1 | <4 |
| | | 05-29-91 | <10 | <1 | 22 | <.5 | 1.0 | <1 | <3 | 6 | 4 | <1 | <4 |
| | | 09-13-91 | <10 | <1 | 27 | <.5 | <1.0 | <1 | <3 | <1 | <3 | <1 | <4 |
| | | 08-27-92 | <10 | <1 | 25 | <10 | <1.0 | <1 | <3 | <1 | 6 | <1 | <4 |
| | | 08-23-93 | <10 | <1 | 25 | .5 | <1.0 | <1 | <3 | <1 | <3 | <1 | <4 |
| SP5 | Greer Spring | 09-14-90 | 10 | <1 | 35 | <.5 | <1.0 | <1 | <3 | 1 | 24 | 2 | <4 |
| | | 06-04-91 | <10 | <1 | 29 | <.5 | <1.0 | <1 | <3 | 1 | 5 | <1 | <4 |
| | | 09-13-91 | <10 | <1 | 32 | <.5 | <1.0 | <1 | <3 | <1 | <3 | <1 | <4 |
| | | 08-27-92 | <10 | <1 | 31 | <10 | <1.0 | <1 | <3 | <1 | <3 | <1 | <4 |
| | | 08-24-93 | <10 | <1 | 30 | <.5 | <1.0 | <1 | <3 | <1 | <3 | <1 | <4 |
| SP6 | McCormack Spring | 09-18-90 | <10 | <1 | 26 | <.5 | <1.0 | <1 | <3 | <1 | 7 | <1 | <4 |
| | | 06-05-91 | <10 | <1 | 24 | <.5 | <1.0 | <1 | <3 | 1 | 15 | <1 | <4 |
| | | 09-11-91 | <10 | <1 | 25 | <.5 | <1.0 | <1 | <3 | <1 | <3 | <1 | <4 |
| | | 08-25-92 | 20 | <1 | 25 | <10 | <1.0 | <1 | <3 | <1 | 13 | <1 | <4 |
| | | 08-24-93 | <10 | <1 | 24 | .5 | <1.0 | <1 | <3 | <1 | <3 | <1 | <4 |
| SP7 | Turner Spring | 09-19-90 | <10 | <1 | 29 | .5 | <1.0 | <1 | <3 | <1 | <3 | <1 | <4 |
| | | 06-04-91 | <10 | <1 | 29 | <.5 | <1.0 | <1 | <3 | 1 | 3 | <1 | <4 |
| | | 09-12-91 | <10 | <1 | 27 | <.5 | <1.0 | <1 | <3 | <1 | 3 | <1 | <4 |
| | | 08-26-92 | <10 | <1 | 27 | <10 | <1.0 | <1 | <3 | <1 | <3 | <1 | <4 |
| | | 08-25-93 | <10 | <1 | 26 | .7 | <1.0 | <1 | <3 | <1 | <3 | <1 | <4 |

**Table 1.** Water-quality data for streams, springs, and wells–Continued

| Site number (fig. 4) | Site location | Date | Mn | Hg | Mo | Ni | Se | Ag | Sr | V | Zn | TOC | SS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SP1 | Barrett Spring | 09-13-90 | <1 | <0.1 | <10 | <1 | <1 | <1.0 | 22 | <6 | 7 | 0.2 | 1.8 |
| | | 05-29-91 | <1 | <.1 | <10 | 2 | <1 | <1.0 | 23 | <6 | 11 | .2 | 2.3 |
| | | 09-13-91 | <1 | <.1 | <10 | <1 | <1 | <1.0 | 25 | <6 | 8 | .3 | 2.5 |
| | | 08-27-92 | <1 | <.1 | <10 | <1 | <1 | <1.0 | 24 | <6 | 10 | .6 | 11.0 |
| | | 08-23-93 | <1 | .2 | <10 | <1 | <1 | 2.0 | 23 | <6 | 9 | .4 | 3.6 |
| SP2 | Big Spring | 09-12-90 | <1 | <.1 | <10 | <1 | <1 | <1.0 | 28 | <6 | 10 | .2 | 3.5 |
| | | 05-29-91 | <1 | <.1 | <10 | 1 | <1 | <1.0 | 26 | <6 | 5 | .4 | 3.7 |
| | | 09-10-91 | <1 | <.1 | <10 | <1 | <1 | <1.0 | 29 | <6 | 5 | .5 | 7.2 |
| | | 08-25-92 | <1 | <.1 | <10 | <1 | <1 | <1.0 | 28 | <6 | <10 | .5 | 14.7 |
| | | 08-11-93 | <1 | <.1 | <10 | <1 | <1 | <1.0 | 28 | <6 | <3 | .6 | 6.9 |
| SP3 | Dennig Series Springs | 09-18-90 | 4 | .1 | <10 | 6 | <1 | <1.0 | 32 | <6 | 8 | .5 | 2.4 |
| | | 06-03-91 | 9 | <.1 | <10 | 1 | <1 | <1.0 | 26 | <6 | 39 | .6 | 6.9 |
| | | 09-12-91 | 4 | <.1 | <10 | <1 | <1 | <1.0 | 29 | <6 | 4 | .4 | 6.2 |
| | | 08-27-92 | 4 | <.1 | <10 | <1 | <1 | <1.0 | 29 | <6 | 10 | .7 | 19.0 |
| | | 08-24-93 | 4 | .1 | <10 | <1 | <1 | <1.0 | 29 | <6 | 4 | .5 | 2.4 |
| SP4 | Falling Spring | 09-13-90 | <1 | .2 | <10 | <1 | <1 | <1.0 | 26 | <6 | 14 | .2 | 1.6 |
| | | 05-29-91 | <1 | <.1 | <10 | 2 | <1 | <1.0 | 24 | <6 | 46 | .8 | 4.8 |
| | | 09-13-91 | <1 | <.1 | <10 | <1 | <1 | <1.0 | 29 | <6 | 13 | .3 | 8.9 |
| | | 08-27-92 | <1 | <.1 | <10 | <1 | <1 | <1.0 | 27 | <6 | 10 | .2 | 26.0 |
| | | 08-23-93 | <1 | .1 | <10 | <1 | <1 | 1.0 | 26 | <6 | 9 | .5 | 1.9 |
| SP5 | Greer Spring | 09-14-90 | <1 | <.1 | <10 | <1 | <1 | <1.0 | 31 | <6 | 44 | .7 | 2.9 |
| | | 06-04-91 | <1 | <.1 | <10 | <1 | <1 | <1.0 | 26 | <6 | 15 | .7 | 5.8 |
| | | 09-13-91 | <1 | <.1 | <10 | <1 | <1 | <1.0 | 31 | <6 | 6 | .5 | 10.7 |
| | | 08-27-92 | <1 | <.1 | <10 | <1 | <1 | <1.0 | 30 | <6 | 10 | .7 | 15.0 |
| | | 08-24-93 | <1 | .1 | <10 | <1 | <1 | <1.0 | 29 | <6 | 4 | .5 | 1.9 |
| SP6 | McCormack Spring | 09-18-90 | 3 | <.1 | <10 | <1 | <1 | <1.0 | 30 | <6 | <3 | 1.6 | 4.4 |
| | | 06-05-91 | 2 | <.1 | <10 | 1 | <1 | <1.0 | 29 | <6 | 11 | .4 | 23.3 |
| | | 09-11-91 | 1 | <.1 | <10 | <1 | <1 | <1.0 | 29 | <6 | 5 | .3 | 4.3 |
| | | 08-25-92 | <1 | <.1 | <10 | <1 | <1 | <1.0 | 30 | <6 | <10 | .2 | 9.0 |
| | | 08-24-93 | <1 | .1 | <10 | <1 | <1 | <1.0 | 29 | <6 | 8 | 2.5 | 15.3 |
| SP7 | Turner Spring | 09-19-90 | <1 | <.1 | <10 | 1 | <1 | <1.0 | 30 | <6 | 6 | .2 | 3.4 |
| | | 06-04-91 | <1 | <.1 | <10 | <1 | <1 | <1.0 | 28 | <6 | 9 | .3 | 7.7 |
| | | 09-12-91 | <1 | <.1 | <10 | <1 | <1 | <1.0 | 28 | <6 | 5 | .2 | 13.1 |
| | | 08-26-92 | <1 | .1 | <10 | <1 | <1 | <1.0 | 28 | <6 | <10 | .2 | 20.9 |
| | | 08-25-93 | <1 | .1 | <10 | <1 | <1 | 1.0 | 28 | <6 | 4 | .1 | 4.1 |

**Table 1.** Water-quality data for streams, springs, and wells–Continued

| Site number (fig. 4) | Site location | Latitude longitude (DDDMMSS) | Date | TD | Cond | pH | Temp | DO | Ca | Mg | Na | K | $HCO_3$ | $CO_3$ | Alk |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | T23N R01W 13bcb2 | 363909 0910146 | 08-14-92 | 228 | 647 | 7.6 | 16.5 | -- | 72 | 40 | 3.0 | 0.70 | -- | -- | -- |
| 2 | T24N R04W 01acb | 364618 0912058 | 09-27-93 | 382 | 538 | 7.7 | 15.0 | -- | 58 | 31 | 3.9 | 1.4 | 303 | 0 | 248 |
| 3 | T24N R04W 04ada | 364637 0912353 | 06-05-91 | 350 | 313 | 7.7 | 16.0 | >1.0 | 38 | 20 | 1.2 | .90 | 205 | 0 | 168 |
| 4 | T25N R02W 04aac | 365154 0911021 | 08-14-92 | 260 | 438 | 7.7 | 15.0 | -- | 50 | 28 | 2.9 | .50 | -- | -- | -- |
| 5 | T25N R02W 31cba | 365203 0911650 | 06-04-91 | 415 | 417 | 7.3 | 15.5 | >1.0 | 50 | 28 | 1.8 | .90 | 275 | 0 | 226 |
| 6 | T25N R03W 18cbb | 364958 0911958 | 06-05-91 | 350 | 476 | 7.5 | 15.0 | >1.0 | 53 | 30 | 7.7 | .80 | 279 | 0 | 228 |
| 7 | T25N R03W 31bad | 364744 0911933 | 09-19-91 | 330 | 434 | 7.5 | 20.5 | >1.0 | 51 | 31 | 1.6 | .70 | 299 | 0 | 245 |
| 8 | T25N R04W 24cbd | 364917 0912107 | 09-20-90 | 250 | 489 | 7.5 | 14.5 | -- | 61 | 38 | 1.2 | .60 | 353 | 0 | 289 |
| 9 | T25N R05W 21aab | 364943 0912959 | 06-04-91 | 265 | 322 | 7.4 | 17.5 | >1.0 | 39 | 21 | 1.1 | .80 | 226 | 0 | 185 |
| 10 | T25N R05W 34ddd | 364711 0912846 | 09-19-91 | -- | 359 | 7.6 | 15.5 | >1.0 | 42 | 24 | 1.7 | .50 | 236 | 0 | 194 |
| 11 | T26N R02W 04add | 365657 0911003 | 09-28-93 | 400 | 425 | 7.8 | 21.0 | -- | 47 | 26 | 1.1 | .60 | 269 | 0 | 220 |
| 12 | T26N R03W 06dcc | 365640 0911916 | 08-13-92 | -- | 328 | 7.6 | 15.0 | -- | 38 | 21 | 1.0 | .40 | -- | -- | -- |
| 13 | T26N R03W 11bbb | 365632 0911524 | 08-13-92 | 210 | 403 | 7.5 | 15.5 | -- | 42 | 24 | 6.1 | .40 | -- | -- | -- |
| 14 | T26N R03W 18bbc | 365537 0911957 | 09-19-90 | 1,245 | 400 | 7.5 | 16.5 | -- | 51 | 29 | 1.8 | .40 | 283 | 0 | 232 |
| 15 | T26N R03W 18bdc | 365522 0911939 | 09-27-93 | 275 | 366 | 7.5 | 15.0 | -- | 40 | 22 | .90 | .30 | 233 | 0 | 191 |
| 16 | T26N R03W 18cbb | 365514 0911956 | 09-20-91 | ~1,200 | 415 | 7.6 | 14.5 | >1.0 | 50 | 28 | 1.6 | .50 | 282 | 0 | 231 |
| 17 | T26N R03W 30ccc | 365310 0911953 | 06-05-91 | 400 | 444 | 7.5 | 16.0 | >1.0 | 54 | 30 | 1.5 | .70 | 315 | 0 | 258 |
| 18 | T26N R03W 30dda | 365320 0911851 | 09-19-90 | 210 | 415 | 7.5 | 16.0 | -- | 53 | 30 | .90 | .60 | 287 | 0 | 235 |
| 19 | T26N R03W 33dda | 365226 0911648 | 09-19-91 | 120 | 369 | 7.6 | 14.5 | >1.0 | 47 | 26 | 1.1 | .40 | 265 | 0 | 217 |
| 20 | T26N R04W 08bbb1 | 365635 0912523 | 09-18-91 | ~350 | 334 | 7.8 | 15.0 | >1.0 | 36 | 20 | 1.6 | .70 | 185 | 0 | 152 |
| 21 | T26N R04W 09ada | 365623 0912322 | 09-20-90 | 450 | 399 | 7.4 | 17.0 | -- | 49 | 27 | 1.2 | .40 | 273 | 0 | 224 |
| 22 | T26N R04W 11bbb | 365633 0912200 | 09-27-93 | 293 | 412 | 7.5 | 15.5 | -- | 46 | 26 | 1.2 | .30 | 265 | 0 | 217 |
| 23 | T26N R04W 17bbc | 365536 0912523 | 08-12-92 | 350 | 383 | 7.7 | 15.0 | -- | 41 | 24 | 1.7 | .70 | -- | -- | -- |
| 24 | T26N R04W 29bbb | 365355 0912523 | 06-05-91 | 350 | 348 | 7.6 | 15.5 | >1.0 | 42 | 24 | 1.5 | .70 | 243 | 0 | 199 |
| 25 | T26N R05W 02cdd | 365639 0912805 | 08-13-92 | -- | 368 | 7.7 | 16.0 | -- | 40 | 23 | 2.1 | .50 | -- | -- | -- |
| 26 | T27N R02W 31bcc | 365753 0911312 | 09-20-91 | 610 | 410 | 7.4 | 15.5 | >1.0 | 49 | 29 | 1.6 | .50 | 296 | 0 | 243 |
| 27 | T27N R04W 25cdc1 | 365826 0912040 | 09-20-90 | 1,000 | 402 | 7.5 | 17.0 | -- | 49 | 27 | 1.8 | .50 | 282 | 0 | 231 |
| 28 | T27N R04W 25cdc2 | 365828 0912040 | 09-20-90 | 570 | 398 | 7.5 | 17.0 | -- | 49 | 27 | 1.9 | .60 | 273 | 0 | 224 |
| 29 | T27N R05W 35aaa | 365816 0912727 | 09-27-93 | 435 | 352 | 7.4 | 14.0 | -- | 35 | 20 | 3.1 | .90 | 161 | 0 | 132 |

**Table 1.** Water-quality data for streams, springs, and wells–Continued

| Site number (fig. 4) | Site location | Latitude longitude (DDDMMSS) | Date | $SO_4$ | Cl | F | $SiO_2$ | DS | $NO_2$ | $NO_2$+$NO_3$ | $NH_3$ | $NH_3$+ ORG | P | P ortho |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | T23N R01W 13bcb2 | 363909 0910146 | 08-14-92 | 17 | 15 | <0.10 | 13 | 354 | 0.28 | 6.40 | 0.02 | <0.2 | <0.01 | <0.01 |
| 2 | T24N R04W 01acb | 364618 0912058 | 09-27-93 | 4.5 | 14 | .10 | 12 | 274 | <.01 | 2.40 | .02 | <.2 | .03 | .01 |
| 3 | T24N R04W 04ada | 364637 0912353 | 06-05-91 | 1.3 | 5.1 | <.10 | 10 | 174 | <.01 | 2.40 | .02 | <.2 | <.01 | <.01 |
| 4 | T25N R02W 04aac | 365154 0911021 | 08-14-92 | 1.7 | 8.0 | .10 | 9.1 | 245 | <.01 | 6.70 | <.01 | <.2 | <.01 | <.01 |
| 5 | T25N R02W 31cba | 365203 0911650 | 06-04-91 | 1.4 | 5.7 | .10 | 11 | 237 | <.01 | 3.40 | .02 | .3 | <.01 | <.01 |
| 6 | T25N R03W 18cbb | 364958 0911958 | 06-05-91 | 3.0 | 15 | .10 | 9.7 | 283 | <.01 | 5.10 | .01 | .6 | <.01 | <.01 |
| 7 | T25N R03W 31bad | 364744 0911933 | 09-19-91 | 4.6 | 3.1 | .10 | 8.5 | 235 | <.01 | <.05 | <.01 | .3 | <.01 | <.01 |
| 8 | T25N R04W 24cbd | 364917 0912107 | 09-20-90 | 1.9 | 4.1 | <.10 | 9.7 | 255 | <.01 | <.10 | .01 | .3 | .03 | .01 |
| 9 | T25N R05W 21aab | 364943 0912959 | 06-04-91 | 1.8 | 3.2 | <.10 | 9.0 | 204 | <.01 | .67 | .02 | <.2 | <.01 | <.01 |
| 10 | T25N R05W 34ddd | 364711 0912846 | 09-19-91 | 1.0 | 4.5 | .10 | 9.6 | 194 | <.01 | 1.40 | <.01 | <.2 | <.01 | <.01 |
| 11 | T26N R02W 04add | 365657 0911003 | 09-28-93 | 1.3 | 1.9 | .10 | 8.0 | 219 | <.01 | 1.60 | .02 | <.2 | .02 | <.01 |
| 12 | T26N R03W 06dcc | 365640 0911916 | 08-13-92 | .70 | .80 | <.10 | 7.7 | 176 | <.01 | .23 | <.01 | <.2 | <.01 | <.01 |
| 13 | T26N R03W 11bbb | 365632 0911524 | 08-13-92 | 2.4 | 16 | .10 | 9.4 | 200 | <.01 | .49 | <.01 | <.2 | <.01 | <.01 |
| 14 | T26N R03W 18bbc | 365537 0911957 | 09-19-90 | 1.1 | 4.1 | <.10 | 9.1 | 201 | <.01 | .20 | .06 | <.2 | <.01 | <.01 |
| 15 | T26N R03W 18bdc | 365522 0911939 | 09-27-93 | .90 | 1.0 | .10 | 9.0 | 181 | <.01 | .27 | .02 | <.2 | .02 | <.01 |
| 16 | T26N R03W 18cbb | 365514 0911956 | 09-20-91 | 2.9 | 3.4 | .10 | 8.8 | 224 | <.01 | .56 | <.01 | <.2 | <.01 | <.01 |
| 17 | T26N R03W 30ccc | 365310 0911953 | 06-05-91 | 1.5 | 4.4 | .10 | 8.1 | 253 | <.01 | .38 | .02 | <.2 | <.01 | <.01 |
| 18 | T26N R03W 30dda | 365320 0911851 | 09-19-90 | 1.3 | 3.5 | <.10 | 9.2 | 210 | <.01 | .70 | .01 | <.2 | .01 | <.01 |
| 19 | T26N R03W 33dda | 365226 0911648 | 09-19-91 | 1.1 | 2.9 | .10 | 9.0 | 207 | <.01 | .09 | <.01 | <.2 | <.01 | <.01 |
| 20 | T26N R04W 08bbb1 | 365635 0912523 | 09-18-91 | 1.6 | 5.2 | .10 | 8.5 | 169 | <.01 | 2.80 | <.01 | .6 | <.01 | <.01 |
| 21 | T26N R04W 09ada | 365623 0912322 | 09-20-90 | <1.0 | 3.8 | <.10 | 8.3 | 212 | <.01 | 1.10 | .02 | <.2 | .01 | <.01 |
| 22 | T26N R04W 11bbb | 365633 0912200 | 09-27-93 | 1.6 | 1.5 | .10 | 8.4 | 183 | <.01 | .21 | .02 | <.2 | .02 | <.01 |
| 23 | T26N R04W 17bbc | 365536 0912523 | 08-12-92 | 1.0 | 4.6 | <.10 | 8.4 | 195 | <.01 | 1.20 | <.01 | <.2 | <.01 | <.01 |
| 24 | T26N R04W 29bbb | 365355 0912523 | 06-05-91 | 2.2 | 3.6 | .10 | 8.5 | 212 | <.01 | .91 | .02 | <.2 | .01 | <.01 |
| 25 | T26N R05W 02cdd | 365639 0912805 | 08-13-92 | 1.3 | 4.7 | .20 | 9.0 | 195 | <.01 | 2.10 | <.01 | <.2 | <.01 | .01 |
| 26 | T27N R02W 31bcc | 365753 0911312 | 09-20-91 | 1.9 | 3.4 | .10 | 8.4 | 227 | <.01 | .06 | <.01 | <.2 | <.01 | <.01 |
| 27 | T27N R04W 25cdc1 | 365826 0912040 | 09-20-90 | 4.4 | 3.8 | <.10 | 8.3 | 220 | <.01 | <.10 | .01 | <.2 | <.01 | <.01 |
| 28 | T27N R04W 25cdc2 | 365828 0912040 | 09-20-90 | 2.6 | 4.0 | <.10 | 8.3 | 213 | <.01 | .20 | .02 | <.2 | <.01 | .01 |
| 29 | T27N R05W 35aaa | 365816 0912727 | 09-27-93 | 2.1 | 18 | .10 | 9.0 | 188 | <.01 | 5.30 | .02 | <.2 | .03 | .01 |

**Table 1.** Water-quality data for streams, springs, and wells–Continued

| Site number (fig. 4) | Site location | Latitude longitude (DDDMMSS) | Date | Al | As | Ba | Be | Cd | Cr | Co | Cu | Fe | Pb | Li |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | T23N R01W 13bcb2 | 363909 0910146 | 08-14-92 | <10 | 1 | 37 | <10 | <1.0 | <1 | <3 | 1 | 18 | <1 | <4 |
| 2 | T24N R04W 01acb | 364618 0912058 | 09-27-93 | <10 | <1 | 33 | <.5 | <1.0 | <1 | <3 | 1 | <3 | <1 | <4 |
| 3 | T24N R04W 04ada | 364637 0912353 | 06-05-91 | <10 | <1 | 28 | <.5 | <1.0 | 2 | <3 | 3 | 16 | 3 | <4 |
| 4 | T25N R02W 04aac | 365154 0911021 | 08-14-92 | <10 | <1 | 27 | <10 | <1.0 | <1 | <3 | 9 | 14 | <1 | <4 |
| 5 | T25N R02W 31cba | 365203 0911650 | 06-04-91 | <10 | <1 | 28 | <.5 | <1.0 | <1 | <3 | 3 | 5 | 1 | <4 |
| 6 | T25N R03W 18cbb | 364958 0911958 | 06-05-91 | <10 | <1 | 31 | <.5 | <1.0 | <1 | <3 | 3 | 8 | <1 | 4 |
| 7 | T25N R03W 31bad | 364744 0911933 | 09-19-91 | <10 | <1 | 14 | <.5 | 1.0 | <1 | <3 | <1 | <3 | <1 | <4 |
| 8 | T25N R04W 24cbd | 364917 0912107 | 09-20-90 | 20 | <1 | 26 | <.5 | <1.0 | <1 | <3 | 3 | 6 | <1 | <4 |
| 9 | T25N R05W 21aab | 364943 0912959 | 06-04-91 | <10 | <1 | 26 | <.5 | <1.0 | 2 | <3 | 1 | <3 | <1 | <4 |
| 10 | T25N R05W 34ddd | 364711 0912846 | 09-19-91 | <10 | <1 | 28 | <.5 | <1.0 | <1 | <3 | <1 | <3 | <1 | <4 |
| 11 | T26N R02W 04add | 365657 0911003 | 09-28-93 | 10 | <1 | 28 | <.5 | <1.0 | <1 | <3 | 2 | <3 | 1 | <4 |
| 12 | T26N R03W 06dcc | 365640 0911916 | 08-13-92 | <10 | <1 | 18 | <10 | <1.0 | <1 | <3 | 2 | 9 | 1 | <4 |
| 13 | T26N R03W 11bbb | 365632 0911524 | 08-13-92 | <10 | <1 | 19 | <10 | 2.0 | 2 | <3 | <1 | 13 | 1 | <4 |
| 14 | T26N R03W 18bbc | 365537 0911957 | 09-19-90 | 10 | <1 | 25 | <.5 | <1.0 | <1 | <3 | 1 | <3 | 1 | <4 |
| 15 | T26N R03W 18bdc | 365522 0911939 | 09-27-93 | <10 | <1 | 21 | <.5 | 1.0 | <1 | 3 | 1 | 6 | <1 | <4 |
| 16 | T26N R03W 18cbb | 365514 0911956 | 09-20-91 | <10 | <1 | 20 | <.5 | 1.0 | <1 | <3 | <1 | <3 | <1 | <4 |
| 17 | T26N R03W 30ccc | 365310 0911953 | 06-05-91 | <10 | <1 | 28 | <.5 | <1.0 | 1 | <3 | 2 | 6 | 1 | 6 |
| 18 | T26N R03W 30dda | 365320 0911851 | 09-19-90 | 20 | <1 | 31 | <.5 | <1.0 | <1 | <3 | 2 | 4 | 1 | <4 |
| 19 | T26N R03W 33dda | 365226 0911648 | 09-19-91 | <10 | <1 | 20 | <.5 | <1.0 | <1 | <3 | <1 | <3 | 2 | <4 |
| 20 | T26N R04W 08bbb1 | 365635 0912523 | 09-18-91 | <10 | <1 | 23 | <.5 | 1.0 | <1 | <3 | <1 | 3 | <1 | <4 |
| 21 | T26N R04W 09ada | 365623 0912322 | 09-20-90 | 10 | <1 | 25 | <.5 | <1.0 | 1 | <3 | 1 | 3 | 1 | <4 |
| 22 | T26N R04W 11bbb | 365633 0912200 | 09-27-93 | <10 | <1 | 23 | <.5 | 1.0 | <1 | 3 | 1 | 5 | <1 | <4 |
| 23 | T26N R04W 17bbc | 365536 0912523 | 08-12-92 | 20 | <1 | 30 | <10 | <1.0 | 1 | <3 | 1 | 16 | <1 | <4 |
| 24 | T26N R04W 29bbb | 365355 0912523 | 06-05-91 | <10 | <1 | 23 | <.5 | <1.0 | <1 | <3 | 3 | 6 | 2 | <4 |
| 25 | T26N R05W 02cdd | 365639 0912805 | 08-13-92 | <10 | <1 | 24 | <10 | <1.0 | <1 | <3 | <1 | 9 | 1 | <4 |
| 26 | T27N R02W 31bcc | 365753 0911312 | 09-20-91 | <10 | <1 | 21 | <.5 | <1.0 | <1 | <3 | 3 | <3 | 5 | <4 |
| 27 | T27N R04W 25cdc1 | 365826 0912040 | 09-20-90 | 10 | <1 | 28 | <.5 | 1.0 | <1 | <3 | 3 | 4 | 4 | <4 |
| 28 | T27N R04W 25cdc2 | 365828 0912040 | 09-20-90 | 20 | <1 | 29 | <.5 | 1.0 | <1 | <3 | 1 | 18 | 2 | <4 |
| 29 | T27N R05W 35aaa | 365816 0912727 | 09-27-93 | <10 | <1 | 22 | <.5 | 2.0 | <1 | 3 | <1 | 6 | <1 | <4 |

**Table 1.** Water-quality data for streams, springs, and wells–Continued

| Site number (fig. 4) | Site location | Latitude longitude (DDDMMSS) | Date | Mn | Hg | Mo | Ni | Se | Ag | Sr | V | Zn | TOC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | T23N R01W 13bcb2 | 363909 0910146 | 08-14-92 | 11 | <0.1 | <10 | 8 | 4 | <1.0 | 40 | <6 | 20 | 0.1 |
| 2 | T24N R04W 01acb | 364618 0912058 | 09-27-93 | <1 | .1 | <10 | <1 | <1 | 2.0 | 33 | <6 | 83 | .1 |
| 3 | T24N R04W 04ada | 364637 0912353 | 06-05-91 | <1 | <.1 | <10 | 2 | <1 | <1.0 | 28 | <6 | 380 | .3 |
| 4 | T25N R02W 04aac | 365154 0911021 | 08-14-92 | 3 | <.1 | <10 | <1 | <1 | <1.0 | 29 | <6 | 70 | .4 |
| 5 | T25N R02W 31cba | 365203 0911650 | 06-04-91 | 1 | <.1 | <10 | <1 | <1 | <1.0 | 31 | <6 | 520 | .1 |
| 6 | T25N R03W 18cbb | 364958 0911958 | 06-05-91 | <1 | <.1 | <10 | 1 | <1 | <1.0 | 37 | <6 | 100 | .2 |
| 7 | T25N R03W 31bad | 364744 0911933 | 09-19-91 | <1 | <.1 | <10 | <1 | <1 | <1.0 | 39 | <6 | 660 | <.1 |
| 8 | T25N R04W 24cbd | 364917 0912107 | 09-20-90 | 3 | <.1 | <10 | 1 | <1 | <1.0 | 38 | <6 | 540 | 2.0 |
| 9 | T25N R05W 21aab | 364943 0912959 | 06-04-91 | <1 | <.1 | <10 | <1 | <1 | <1.0 | 28 | <6 | 240 | 38 |
| 10 | T25N R05W 34ddd | 364711 0912846 | 09-19-91 | <1 | <.1 | <10 | <1 | <1 | <1.0 | 25 | <6 | 210 | .1 |
| 11 | T26N R02W 04add | 365657 0911003 | 09-28-93 | <1 | <.1 | <10 | <1 | <1 | 1.0 | 31 | <6 | 160 | <.1 |
| 12 | T26N R03W 06dcc | 365640 0911916 | 08-13-92 | 16 | <.1 | <10 | 2 | <1 | <1.0 | 22 | <6 | 140 | .2 |
| 13 | T26N R03W 11bbb | 365632 0911524 | 08-13-92 | 1 | <.1 | <10 | <1 | <1 | <1.0 | 23 | <6 | 210 | .6 |
| 14 | T26N R03W 18bbc | 365537 0911957 | 09-19-90 | <1 | <.1 | <10 | <1 | <1 | <1.0 | 30 | <6 | 12 | .4 |
| 15 | T26N R03W 18bdc | 365522 0911939 | 09-27-93 | <1 | <.1 | <10 | <1 | <1 | 2.0 | 25 | <6 | 310 | .1 |
| 16 | T26N R03W 18cbb | 365514 0911956 | 09-20-91 | <1 | <.1 | <10 | <1 | <1 | <1.0 | 33 | <6 | 10 | <.1 |
| 17 | T26N R03W 30ccc | 365310 0911953 | 06-05-91 | 2 | <.1 | <10 | <1 | <1 | <1.0 | 32 | <6 | 340 | <.1 |
| 18 | T26N R03W 30dda | 365320 0911851 | 09-19-90 | <1 | <.1 | <10 | 1 | <1 | <1.0 | 33 | <6 | 8 | .5 |
| 19 | T26N R03W 33dda | 365226 0911648 | 09-19-91 | <1 | <.1 | <10 | <1 | <1 | <1.0 | 27 | <6 | 190 | <.1 |
| 20 | T26N R04W 08bbb1 | 365635 0912523 | 09-18-91 | <1 | <.1 | <10 | <1 | <1 | <1.0 | 27 | <6 | 270 | .2 |
| 21 | T26N R04W 09ada | 365623 0912322 | 09-20-90 | <1 | .3 | <10 | <1 | <1 | <1.0 | 29 | <6 | 260 | .1 |
| 22 | T26N R04W 11bbb | 365633 0912200 | 09-27-93 | <1 | <.1 | <10 | <1 | <1 | 2.0 | 28 | <6 | 11 | .1 |
| 23 | T26N R04W 17bbc | 365536 0912523 | 08-12-92 | 7 | -- | <10 | <1 | <1 | <1.0 | 28 | <6 | 260 | .2 |
| 24 | T26N R04W 29bbb | 365355 0912523 | 06-05-91 | <1 | <.1 | <10 | <1 | <1 | <1.0 | 26 | <6 | 330 | .1 |
| 25 | T26N R05W 02cdd | 365639 0912805 | 08-13-92 | 1 | <.1 | <10 | <1 | <1 | <1.0 | 26 | <6 | 340 | <.1 |
| 26 | T27N R02W 31bcc | 365753 0911312 | 09-20-91 | <1 | <.1 | <10 | <1 | <1 | <1.0 | 30 | <6 | 1,300 | <.1 |
| 27 | T27N R04W 25cdc1 | 365826 0912040 | 09-20-90 | <1 | <.1 | <10 | <1 | <1 | <1.0 | 29 | <6 | 970 | .2 |
| 28 | T27N R04W 25cdc2 | 365828 0912040 | 09-20-90 | 2 | .4 | <10 | <1 | <1 | <1.0 | 29 | <6 | 730 | .3 |
| 29 | T27N R05W 35aaa | 365816 0912727 | 09-27-93 | 2 | .1 | <10 | <1 | <1 | 2.0 | 24 | <6 | 100 | .3 |

**Table 2.** Statistical summary of water-quality data for streams, springs, and wells, September 1990 through August 1993

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

| Type of site | Property or constituent | Descriptive statistics: Number of samples | Maximum | Minimum | Mean | Percentage of samples in which values were less than or equal to those shown: 95 | 75 | 50 (Median) | 25 | 5 |
|---|---|---|---|---|---|---|---|---|---|---|
| Streams | Specific conductance, | 30 | 415.0 | 253.0 | 332.0 | 401.2 | 357.2 | 330.0 | 315.5 | 258.5 |
| Springs | microsiemens per centimeter at 25 | 35 | 420.0 | 262.0 | 341.9 | 413.6 | 373.0 | 346.0 | 305.0 | 264.4 |
| Wells | degrees Celsius | 29 | 647.0 | 313.0 | 407.0 | 592.5 | 429.5 | 402.0 | 362.5 | 317.5 |
| Streams | pH, | 30 | 8.2 | 6.7 | [a]7.8 | 8.1 | 8.0 | 7.9 | 7.8 | 7.0 |
| Springs | standard units | 35 | 7.9 | 6.7 | [a]7.4 | 7.8 | 7.6 | 7.5 | 7.3 | 6.8 |
| Wells | | 29 | 7.8 | 7.3 | [a]7.6 | 7.8 | 7.6 | 7.5 | 7.5 | 7.4 |
| Streams | Water temperature, | 30 | 25.5 | 16.5 | 20.8 | 25.2 | 22.6 | 20.8 | 18.8 | 16.8 |
| Springs | degrees Celsius | 35 | 16.5 | 13.0 | 14.3 | 16.1 | 14.5 | 14.0 | 14.0 | 13.0 |
| Wells | | 29 | 21.0 | 14.0 | 15.9 | 20.8 | 16.5 | 15.5 | 15.0 | 14.2 |
| Streams | Oxygen, | 25 | 10.7 | 5.7 | 8.9 | 10.6 | 9.7 | 9.1 | 8.1 | 6.1 |
| Springs | dissolved | 23 | 11.0 | 7.0 | 9.3 | 11.0 | 10.0 | 9.3 | 8.7 | 7.0 |
| Wells | (mg/L) | 12 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Streams | Calcium, | 30 | 48.0 | 29.0 | 39.1 | 46.9 | 42.0 | 39.0 | 36.8 | 29.6 |
| Springs | dissolved | 35 | 49.0 | 30.0 | 40.3 | 48.2 | 44.0 | 41.0 | 36.0 | 30.8 |
| Wells | (mg/L as Ca) | 29 | 72.0 | 35.0 | 47.3 | 66.5 | 51.0 | 49.0 | 40.5 | 35.5 |
| Streams | Magnesium, | 30 | 28.0 | 16.0 | 21.9 | 26.9 | 23.0 | 22.0 | 20.8 | 16.0 |
| Springs | dissolved | 35 | 28.0 | 17.0 | 22.5 | 27.2 | 24.0 | 23.0 | 20.0 | 17.0 |
| Wells | (mg/L as Mg) | 29 | 40.0 | 20.0 | 26.7 | 39.0 | 29.5 | 27.0 | 23.5 | 20.0 |
| Streams | Sodium, | 30 | 2.2 | 1.3 | 1.6 | 2.1 | 1.8 | 1.5 | 1.4 | 1.3 |
| Springs | dissolved | 35 | 1.8 | 1.0 | 1.4 | 1.6 | 1.5 | 1.4 | 1.2 | 1.0 |
| Wells | (mg/L as Na) | 29 | 7.7 | .9 | 2.1 | 6.9 | 2.0 | 1.6 | 1.2 | .9 |
| Streams | Potassium, | 30 | 1.6 | .8 | 1.1 | 1.6 | 1.2 | 1.1 | .9 | .8 |
| Springs | dissolved | 35 | 1.4 | .5 | .8 | 1.4 | 1.1 | .7 | .6 | .5 |
| Wells | (mg/L as K) | 29 | 1.4 | .3 | .6 | 1.2 | .7 | .6 | .5 | .3 |
| Streams | Bicarbonate, | 30 | 277.0 | 161.0 | 222.9 | 277.0 | 235.0 | 222.0 | 213.8 | 163.8 |
| Springs | (mg/L as $HCO_3$) | 35 | 283.0 | 173.0 | 234.2 | 283.0 | 253.0 | 239.0 | 209.0 | 173.0 |
| Wells | | 23 | 353.0 | 161.0 | 264.7 | 345.4 | 287.0 | 273.0 | 236.0 | 165.8 |

**Table 2.** Statistical summary of water-quality data for streams, springs, and wells, September 1990 through August 1993–Continued

| Type of site | Property or constituent | Descriptive statistics: Number of samples | Maximum | Minimum | Mean | Percentage of samples in which values were less than or equal to those shown: 95 | 75 | 50 (Median) | 25 | 5 |
|---|---|---|---|---|---|---|---|---|---|---|
| Streams | Carbonate, | 30 | 0.0 | -- | -- | -- | -- | -- | -- | -- |
| Springs | (mg/L as $CO_3$) | 35 | .0 | -- | -- | -- | -- | -- | -- | -- |
| Wells | | 23 | .0 | -- | -- | -- | -- | -- | -- | -- |
| Streams | Alkalinity, | 30 | 227.0 | 132.0 | 182.7 | 227.0 | 192.8 | 182.0 | 175.0 | 134.2 |
| Springs | (mg/L as $CaCO_3$) | 35 | 232.0 | 142.0 | 191.9 | 232.0 | 207.0 | 196.0 | 172.0 | 142.0 |
| Wells | | 23 | 289.0 | 132.0 | 216.9 | 282.8 | 235.0 | 224.0 | 194.0 | 136.0 |
| Streams | Sulfate, | 30 | 4.8 | 1.0 | 2.6 | 4.2 | 2.9 | 2.4 | 2.3 | 1.6 |
| Springs | dissolved | 35 | 2.6 | 1.2 | 1.8 | 2.6 | 2.1 | 1.8 | 1.4 | 1.3 |
| Wells | (mg/L as $SO_4$) | 29 | 17.0 | .7 | 2.5 | 10.8 | 2.5 | 1.6 | 1.2 | .8 |
| Streams | Chloride, | 30 | 5.0 | .4 | 3.1 | 4.9 | 4.1 | 3.3 | 2.0 | .6 |
| Springs | dissolved | 35 | 4.7 | .6 | 2.5 | 4.3 | 3.5 | 2.7 | 1.3 | .6 |
| Wells | (mg/L as Cl) | 29 | 18.0 | .8 | 5.8 | 17.0 | 5.4 | 4.1 | 3.3 | .9 |
| Streams | Fluoride, | 30 | .1 | <.1 | [b].10 | [b].10 | [b].10 | [b].10 | [b].10 | [b].10 |
| Springs | dissolved | 35 | .1 | <.1 | .10 | [b].10 | [b].10 | [b].10 | [b].10 | [b].10 |
| Wells | (mg/L as F) | 29 | .2 | <.1 | [b].10 | [b].15 | [b].10 | [b].10 | [b].09 | [b].07 |
| Streams | Silica, | 30 | 10.0 | 7.7 | 8.8 | 10.0 | 9.4 | 8.7 | 8.2 | 7.8 |
| Springs | dissolved | 35 | 11.0 | 8.1 | 9.3 | 10.2 | 9.9 | 9.3 | 8.9 | 8.3 |
| Wells | (mg/L as $SiO_2$) | 29 | 13.0 | 7.7 | 9.1 | 12.5 | 9.5 | 9.0 | 8.4 | 7.8 |
| Streams | Dissolved solids, residue | 30 | 236.0 | 128.0 | 177.1 | 223.9 | 187.2 | 181.0 | 162.0 | 133.5 |
| Springs | at 180 degrees Celsius | 35 | 231.0 | 136.0 | 180.5 | 222.2 | 192.0 | 184.0 | 165.0 | 140.8 |
| Wells | (mg/L) | 29 | 354.0 | 169.0 | 218.6 | 318.5 | 236.0 | 212.0 | 194.5 | 171.5 |
| Streams | Nitrite, | 29 | .04 | <.01 | [b].02 | [b].04 | [b].02 | [b].02 | [b].02 | [b].01 |
| Springs | dissolved | 35 | .04 | <.01 | .04 | [b].04 | [b].04 | [b].04 | [b].04 | [b].04 |
| Wells | (mg/L as N) | 29 | .28 | <.01 | -- | -- | -- | <.01 | -- | -- |
| Streams | Nitrite plus nitrate, | 29 | .89 | <.1 | .38 | .74 | .50 | .33 | .26 | .11 |
| Springs | dissolved | 35 | .82 | <.1 | .34 | [b].82 | [b].59 | [b].30 | [b].09 | [b].05 |
| Wells | (mg/L as N) | 29 | 6.70 | <.1 | [b]1.62 | [b]6.55 | [b]2.40 | [b].70 | [b].20 | [b].04 |

**Table 2.** Statistical summary of water-quality data for streams, springs, and wells, September 1990 through August 1993—Continued

| Type of site | Property or constituent | Descriptive statistics: Number of samples | Maximum | Minimum | Mean | Percentage of samples in which values were less than or equal to those shown: 95 | 75 | 50 (Median) | 25 | 5 |
|---|---|---|---|---|---|---|---|---|---|---|
| Streams | Nitrogen, ammonia, | 29 | 0.04 | <0.01 | [b]0.02 | [b]0.04 | [b]0.02 | [b]0.02 | [b]0.01 | [b]0.01 |
| Springs | dissolved | 35 | .02 | <.01 | .01 | [b].02 | [b].01 | [b].01 | [b].007 | [b].004 |
| Wells | (mg/L as N) | 29 | .06 | <.01 | [b].02 | [b].04 | [b].02 | [b].01 | [b].01 | [b].01 |
| Streams | Nitrogen, ammonia plus organic, | 29 | 1.1 | <.2 | [b].14 | [b].75 | [b].20 | [b].07 | [b].03 | [b].01 |
| Springs | dissolved | 35 | .9 | <.2 | .12 | [b].42 | [b].20 | [b].07 | [b].04 | [b].01 |
| Wells | (mg/L as N) | 29 | .6 | <.2 | [b].14 | [b].60 | [b].18 | [b].09 | [b].05 | [b].02 |
| Streams | Phosphorus, | 29 | .04 | <.01 | -- | -- | -- | <.01 | -- | -- |
| Springs | dissolved | 35 | .03 | <.01 | .004 | [b].014 | [b].004 | [b].002 | [b].001 | [b].000 |
| Wells | (mg/L as P) | 29 | .03 | <.01 | [b].009 | [b].030 | [b].010 | [b].006 | [b].003 | [b].001 |
| Streams | Orthophosphate, dissolved | 29 | .02 | <.01 | [b].007 | [b].020 | [b].009 | [b].006 | [b].003 | [b].002 |
| Springs | (mg/L as P) | 35 | .03 | <.01 | .006 | [b].022 | [b].007 | [b].003 | [b].002 | [b].001 |
| Wells | | 29 | .01 | <.01 | [b].010 | [b].010 | [b].010 | [b].010 | [b].010 | [b].010 |
| Streams | Aluminum, | 30 | 20.0 | <10 | [b]7.6 | [b]14.5 | [b]10.0 | [b]7.0 | [b]5.4 | [b]3.7 |
| Springs | dissolved | 35 | 20.0 | <10 | 5.4 | [b]12.0 | [b]6.8 | [b]4.4 | [b]2.9 | [b]1.5 |
| Wells | (µg/L as Al) | 29 | 20.0 | <10 | 7.5 | [b]20.0 | [b]10.0 | [b]5.7 | [b]3.4 | [b]1.6 |
| Streams | Arsenic, | 30 | <1 | -- | -- | -- | -- | -- | -- | -- |
| Springs | dissolved | 35 | <1 | -- | -- | -- | -- | -- | -- | -- |
| Wells | (µg/L as As) | 29 | 1 | <1 | -- | -- | -- | <1 | -- | -- |
| Streams | Barium, | 30 | 45.0 | 29.0 | 34.0 | 44.4 | 35.0 | 33.0 | 31.0 | 29.0 |
| Springs | dissolved | 35 | 35.0 | 22.0 | 27.0 | 33.4 | 29.0 | 27.0 | 25.0 | 22.8 |
| Wells | (µg/L as Ba) | 29 | 37.0 | 14.0 | 25.4 | 35.0 | 28.0 | 26.0 | 21.5 | 16.0 |
| Streams | Beryllium, | 30 | .6 | <.5 | [b].4 | [b].6 | [b].5 | [b].4 | [b].4 | [b].3 |
| Springs | dissolved | 35 | .7 | <.5 | .3 | [b].7 | [b].4 | [b].3 | [b].2 | [b].1 |
| Wells | (µg/L as Be) | 29 | <10 | -- | -- | -- | -- | -- | -- | -- |
| Streams | Cadmium, | 30 | 2.0 | <1 | -- | -- | -- | <1.0 | -- | -- |
| Springs | dissolved | 35 | 2.0 | <1 | -- | -- | -- | <1.0 | -- | -- |
| Wells | (µg/L as Cd) | 29 | 2.0 | <1 | [b].7 | [b]2.0 | [b]1.0 | [b].6 | [b].4 | [b].2 |

**Table 2.** Statistical summary of water-quality data for streams, springs, and wells, September 1990 through August 1993–Continued

| Type of site | Property or constituent | Descriptive statistics: Number of samples | Maximum | Minimum | Mean | Percentage of samples in which values were less than or equal to those shown: 95 | 75 | 50 (Median) | 25 | 5 |
|---|---|---|---|---|---|---|---|---|---|---|
| Streams | Chromium, | 30 | 1.0 | <1 | -- | -- | -- | <1 | -- | -- |
| Springs | dissolved | 35 | <1 | -- | -- | -- | -- | -- | -- | -- |
| Wells | (µg/L as Cr) | 29 | 2.0 | <1 | [b]0.6 | [b]2.0 | [b]0.8 | [b].4 | [b]0.2 | [b]0.1 |
| Streams | Cobalt, | 30 | <3 | -- | -- | -- | -- | -- | -- | -- |
| Springs | dissolved | 35 | <3 | -- | -- | -- | -- | -- | -- | -- |
| Wells | (µg/L as Co) | 29 | 3 | <3 | -- | -- | -- | <3 | -- | -- |
| Streams | Copper, | 30 | 13.0 | <1 | [b]1.1 | [b]7.0 | [b]1.0 | [b].5 | [b].2 | [b].1 |
| Springs | dissolved | 35 | 6.0 | <1 | .6 | [b]2.8 | [b]1.0 | [b].3 | [b].1 | [b].04 |
| Wells | (µg/L as Cu) | 29 | 9.0 | <1 | 1.8 | [b]6.0 | [b]3.0 | [b]1.0 | [b].7 | [b].3 |
| Streams | Iron, | 30 | 20.0 | <3 | [b]5.8 | [b]17.2 | [b]6.2 | [b]5.0 | [b]2.9 | [b]1.5 |
| Springs | dissolved | 35 | 24.0 | <3 | 4.4 | [b]19.2 | [b]6.0 | [b]2.3 | [b]1.0 | [b].3 |
| Wells | (µg/L as Fe) | 29 | 18.0 | <3 | 6.6 | [b]18.0 | [b]9.0 | [b]5.0 | [b]2.5 | [b]1.1 |
| Streams | Lead, | 30 | 3 | <1 | -- | -- | -- | <1 | -- | -- |
| Springs | dissolved | 35 | 2 | <1 | -- | -- | -- | <1 | -- | -- |
| Wells | (µg/L as Pb) | 29 | 5 | <1 | 1.1 | [b]4.5 | [b]1.0 | [b]1.0 | [b].4 | [b].1 |
| Streams | Lithium, | 30 | 8 | <4 | -- | -- | -- | <4 | -- | -- |
| Springs | dissolved | 35 | 7 | <4 | -- | -- | -- | <4 | -- | -- |
| Wells | (µg/L as Li) | 29 | 6 | <4 | -- | -- | -- | <4 | -- | -- |
| Streams | Manganese, | 30 | 28.0 | <1 | 7.1 | 26.4 | 6.2 | 4.5 | 3.0 | 1.0 |
| Springs | dissolved | 35 | 9.0 | <1 | 1.2 | [b]5.0 | [b]1.2 | [b].5 | [b].2 | [b].05 |
| Wells | (µg/L as Mn) | 29 | 16.0 | <1 | 1.8 | [b]13.5 | [b]2.0 | [b].4 | [b].1 | [b].01 |
| Streams | Mercury, | 30 | .7 | <.1 | [b].09 | [b].54 | [b].10 | [b].04 | [b].02 | [b].004 |
| Springs | dissolved | 35 | .2 | <.1 | .06 | [b].20 | [b].10 | [b].05 | [b].04 | [b].02 |
| Wells | (µg/L as Hg) | 28 | .4 | <.1 | -- | -- | -- | <.1 | -- | -- |
| Streams | Molybdenum | 30 | <10 | -- | -- | -- | -- | -- | -- | -- |
| Springs | dissolved | 35 | <10 | -- | -- | -- | -- | -- | -- | -- |
| Wells | (µg/L as Mo) | 29 | <10 | -- | -- | -- | -- | -- | -- | -- |

**Table 2.** Statistical summary of water-quality data for streams, springs, and wells, September 1990 through August 1993–Continued

| Type of site | Property or constituent | Descriptive statistics: Number of samples | Maximum | Minimum | Mean | Percentage of samples in which values were less than or equal to those shown: 95 | 75 | 50 (Median) | 25 | 5 |
|---|---|---|---|---|---|---|---|---|---|---|
| Streams | Nickel, | 30 | 2 | <1 | -- | -- | -- | <1 | -- | -- |
| Springs | dissolved | 35 | 6 | <1 | 0.52 | [b]2.80 | [b]0.47 | [b].15 | [b]0.05 | [b]0.009 |
| Wells | (µg/L as Ni) | 29 | 8 | <1 | .61 | [b]5.00 | [b].43 | [b].10 | [b].02 | [b].003 |
| Streams | Selenium, | 30 | <1 | -- | -- | -- | -- | -- | -- | -- |
| Springs | dissolved | 35 | <1 | -- | -- | -- | -- | -- | -- | -- |
| Wells | (µg/L as Se) | 29 | 4 | <1 | -- | -- | -- | <1 | -- | -- |
| Streams | Silver, | 30 | 2 | <1 | -- | -- | -- | <1 | -- | -- |
| Springs | dissolved | 35 | 2 | <1 | -- | -- | -- | <1 | -- | -- |
| Wells | (µg/L as Ag) | 29 | 2 | <1 | .90 | [b]2.00 | [b]1.06 | [b].77 | [b].52 | [b].30 |
| Streams | Strontium, | 30 | 36.0 | 28.0 | 31.4 | 35.4 | 33.2 | 31.0 | 29.8 | 28.0 |
| Springs | dissolved | 35 | 32.0 | 22.0 | 27.7 | 31.2 | 29.0 | 28.0 | 26.0 | 22.8 |
| Wells | (µg/L as Sr) | 29 | 40.0 | 22.0 | 29.7 | 39.5 | 32.5 | 29.0 | 26.5 | 22.5 |
| Streams | Vanadium, | 30 | <6 | -- | -- | -- | -- | -- | -- | -- |
| Springs | dissolved | 35 | <6 | -- | -- | -- | -- | -- | -- | -- |
| Wells | (µg/L as V) | 29 | <6 | -- | -- | -- | -- | -- | -- | -- |
| Streams | Zinc, | 30 | 26.0 | <3 | [b]5.5 | [b]20.0 | [b]7.6 | [b]4.0 | [b]2.3 | [b]1.1 |
| Springs | dissolved | 35 | 46.0 | <3 | 10.6 | [b]44.4 | [b]10.0 | [b]8.0 | [b]5.0 | [b]2.2 |
| Wells | (µg/L as Zn) | 29 | 1,300.0 | 8 | 302.6 | 1,135.0 | 360.0 | 240.0 | 91.5 | 9.0 |
| Streams | Carbon, total organic | 29 | 2.7 | .5 | .93 | 1.95 | 1.00 | .90 | .75 | .55 |
| Springs | (mg/L as C) | 35 | 2.5 | .1 | .51 | 1.78 | .60 | .40 | .20 | .18 |
| Wells | | 29 | 38.0 | <.1 | [b]1.54 | [b]20.00 | [b].30 | [b].10 | [b].07 | [b].01 |

[a] Mean pH will not satisfactorily summarize the typical hydrogen ion concentration if pH is not normally distributed.

[b] Values of data less than the detection limit. Value is estimated by using a log-probability regression to predict the values of data less than the detecion limit as described by Gilliom and Helsel (1986) and Helsel and Cohn (1988).

**Table 3.** Limits of determination for the spectrographic analysis of heavy mineral concentrates based on a 5-milligram sample

| Elements | Lower determination limit | Upper determination limit |
|---|---|---|
| | **Percent by weight** | |
| Calcium | 0.1 | 50 |
| Iron | .1 | 50 |
| Magnesium | .05 | 20 |
| Phosphorous | .5 | 20 |
| Sodium | .5 | 10 |
| Titanium | .005 | 2 |
| | **Milligrams per kilogram** | |
| Antimony | 200 | 20,000 |
| Arsenic | 500 | 20,000 |
| Barium | 50 | 10,000 |
| Beryllium | 2 | 2,000 |
| Bismuth | 20 | 2,000 |
| Boron | 20 | 5,000 |
| Cadmium | 50 | 1,000 |
| Chromium | 20 | 10,000 |
| Cobalt | 10 | 5,000 |
| Copper | 10 | 50,000 |
| Gallium | 10 | 1,000 |
| Germanium | 20 | 200 |
| Gold | 20 | 1,000 |
| Lanthanum | 50 | 2,000 |
| Lead | 20 | 50,000 |
| Manganese | 20 | 10,000 |
| Molybdenum | 10 | 5,000 |
| Nickel | 10 | 10,000 |
| Niobium | 50 | 5,000 |
| Palladium | 5 | 1,000 |
| Platinum | 20 | 1,000 |
| Scandium | 10 | 200 |
| Silver | 1 | 10,000 |
| Strontium | 200 | 10,000 |
| Thorium | 200 | 5,000 |
| Tin | 20 | 2,000 |
| Tungsten | 100 | 20,000 |
| Vanadium | 20 | 20,000 |
| Yttrium | 20 | 5,000 |
| Zinc | 500 | 20,000 |
| Zirconium | 20 | 2,000 |

**Table 4.** Bulk sample grain-size distribution for streambed-material samples

[All weights are in grams]

| Site number (fig. 4) | Site location | Date | Total weight | Coarse | | Silt | | Clay | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Weight | Percent | Weight | Percent | Weight | Percent |
| SW1 | Current River at Van Buren | 05-91 | 25.16 | 25.00 | 99.30 | 0.04 | 0.20 | 0.12 | 0.50 |
| | | 09-91 | 35.70 | 35.50 | 99.44 | .03 | .08 | .17 | .48 |
| | | 08-92 | 63.50 | 62.30 | 98.11 | .70 | 1.10 | .50 | .79 |
| | | 08-93 | 69.70 | 68.30 | 98.00 | .90 | 1.30 | .50 | .70 |
| SW2 | Current River at Hawes Memorial Campground | 05-91 | 25.29 | 25.21 | 99.70 | .03 | .10 | .05 | .20 |
| | | 09-91 | 35.50 | 33.80 | 95.21 | .60 | 1.69 | 1.10 | 3.10 |
| | | 08-92 | 76.90 | 75.80 | 98.57 | .80 | 1.04 | .30 | .39 |
| | | 08-93 | 66.60 | 65.20 | 97.90 | .80 | 1.20 | .60 | .90 |
| SW3 | Eleven Point River at Thomasville | 05-91 | 25.10 | 24.71 | 98.42 | .02 | .08 | .37 | 1.50 |
| | | 09-91 | 35.70 | 34.50 | 96.64 | .80 | 2.24 | .40 | 1.12 |
| | | 08-92 | 64.10 | 62.50 | 97.50 | 1.20 | 1.87 | .40 | .62 |
| | | 08-93 | 54.80 | 53.00 | 96.70 | 1.40 | 2.60 | .40 | .70 |
| SW4 | Spring Creek | 05-91 | 25.53 | 25.30 | 99.10 | .08 | .30 | .15 | .60 |
| | | 09-91 | 35.60 | 34.60 | 97.19 | .60 | 1.69 | .40 | 1.12 |
| | | 08-92 | 57.60 | 56.00 | 97.22 | 1.10 | 1.91 | .50 | .87 |
| | | 08-93 | 65.90 | 64.80 | 98.30 | .90 | 1.40 | .20 | .30 |
| SW5 | Hurricane Creek | 05-91 | 25.12 | 23.75 | 94.50 | 1.22 | 4.90 | .15 | .60 |
| | | 09-91 | 35.10 | 33.70 | 96.01 | .90 | 2.56 | .50 | 1.42 |
| | | 08-92 | 73.40 | 72.60 | 98.91 | .50 | .68 | .30 | .41 |
| | | 08-93 | 51.20 | 40.80 | 79.70 | 10.10 | 19.70 | .30 | .60 |
| SW6 | Eleven Point River near Bardley | 05-91 | 25.73 | 25.52 | 99.20 | .15 | .60 | .06 | .20 |
| | | 09-91 | 34.80 | 34.10 | 97.99 | .40 | 1.15 | .30 | .86 |
| | | 08-92 | 73.80 | 73.00 | 98.92 | .50 | .68 | .30 | .41 |
| | | 08-93 | 62.20 | 61.90 | 99.50 | .20 | .30 | .10 | .20 |

**Table 4.** Bulk sample grain-size distribution for streambed-material samples–Continued

| Site number (fig. 4) | Site location | Date | Total weight | Coarse | | Silt | | Clay | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Weight | Percent | Weight | Percent | Weight | Percent |
| SP1 | Barrett Spring | 05-91 | 25.48 | 24.79 | 97.30 | 0.55 | 2.20 | 0.14 | 0.50 |
| | | 09-91 | 35.30 | 33.70 | 95.47 | .70 | 1.98 | .90 | 2.55 |
| | | 08-92 | 61.60 | 60.60 | 98.38 | .60 | .97 | .40 | .65 |
| | | 08-93 | 67.00 | 57.90 | 86.40 | 6.50 | 9.70 | 2.60 | 3.90 |
| SP2 | Big Spring | 05-91 | 25.66 | 25.36 | 98.80 | .18 | .70 | .12 | .50 |
| | | 09-91 | 36.30 | 36.10 | 99.45 | .14 | .39 | .06 | .17 |
| | | 08-92 | 77.20 | 76.30 | 98.83 | .50 | .65 | .40 | .52 |
| | | 08-93 | 69.70 | 68.30 | 98.00 | .90 | 1.30 | .50 | .70 |
| SP3 | Dennig Series Springs | 05-91 | 25.18 | 23.44 | 93.10 | 1.51 | 6.00 | .23 | .90 |
| | | 09-91 | 35.20 | 31.00 | 88.07 | 3.00 | 8.52 | 1.20 | 3.41 |
| | | 08-92 | 66.10 | 62.80 | 95.01 | 2.60 | 3.93 | .70 | 1.06 |
| | | 08-93 | 57.10 | 52.30 | 91.60 | 4.00 | 7.00 | .80 | 1.40 |
| SP4 | Falling Spring | 05-91 | 25.45 | 25.22 | 99.10 | .14 | .55 | .09 | .35 |
| | | 09-91 | 35.30 | 34.10 | 96.60 | .50 | 1.42 | .70 | 1.98 |
| | | 08-92 | 59.60 | 58.50 | 98.15 | .50 | .84 | .60 | 1.01 |
| | | 08-93 | 79.60 | 78.40 | 98.50 | .60 | .80 | .60 | .80 |
| SP5 | Greer Spring | 05-91 | 25.38 | 24.22 | 95.40 | .85 | 3.40 | .31 | 1.20 |
| | | 09-91 | 35.20 | 34.10 | 96.88 | .50 | 1.42 | .60 | 1.70 |
| | | 08-92 | 69.80 | 67.20 | 96.28 | 1.50 | 2.15 | 1.10 | 1.58 |
| | | 08-93 | 76.20 | 73.70 | 96.70 | 2.00 | 2.60 | .50 | .70 |
| SP6 | McCormack Spring | 05-91 | 25.15 | 24.44 | 97.20 | .53 | 2.10 | .18 | .70 |
| | | 09-91 | 35.20 | 34.20 | 97.16 | .50 | 1.42 | .50 | 1.42 |
| | | 08-92 | 62.70 | 61.20 | 97.61 | 1.00 | 1.59 | .50 | .80 |
| | | 08-93 | 55.30 | 54.20 | 98.00 | .50 | .90 | .60 | 1.10 |
| SP7 | Turner Spring | 05-91 | 25.32 | 25.10 | 99.20 | .11 | .40 | .11 | .40 |
| | | 09-91 | 35.40 | 35.00 | 98.87 | .30 | .85 | .10 | .28 |
| | | 08-92 | 72.90 | 71.70 | 98.35 | .70 | .96 | .50 | .69 |
| | | 08-93 | 51.30 | 50.70 | 98.80 | .40 | .80 | .20 | .40 |

**Table 5.** Semi-quantitative bulk mineralogy for streambed-material samples

[Data in percent by weight; percent by weight should not be used as absolute number but rather as relative from one sample site to another; values are plus or minus 12 to 15 percent of the reported value for percent by weight greater than 30 and plus or minus 18 to 20 percent of the reported value for percent by weight less than 30 percent; Qtz, quartz; Kaol, kaolinite; Dolo, dolomite; Calc, calcite; Mica, mica, probably muscovite; Kfld, potassium feldspar; Pfld, plagioclase feldspar; Mont, expandable smectite, probably montmorillonite; Pyrx, pyroxene; Amor, amorphous material, including organic compounds and amorphous silicates and oxides; --, not detected; TRACE, less than 1 percent]

| Site number (fig. 4) | Site location | Date | Qtz | Kaol | Dolo | Calc | Mica | Kfld | Pfld | Mont | Pyrx | Amor |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SW1 | Current River at Van Buren | 05-91 | 90 | -- | TRACE | -- | -- | -- | -- | -- | -- | 5-10 |
| | | 09-91 | 72 | 2 | -- | 6 | 1 | 2 | -- | -- | -- | 10-15 |
| | | 08-92 | 70 | 3 | TRACE | 1 | TRACE | 4 | TRACE | -- | -- | 15-20 |
| | | 08-93 | 97 | -- | 3 | -- | -- | -- | -- | -- | -- | -- |
| SW2 | Current River at Hawes Memorial Campground | 05-91 | 85 | -- | -- | TRACE | -- | -- | -- | -- | -- | 5-10 |
| | | 09-91 | 3 | 4 | 1 | 2 | 1 | 2 | TRACE | -- | -- | 10-15 |
| | | 08-92 | 68 | 4 | 1 | 6 | -- | 2 | 1 | -- | -- | 15-20 |
| | | 08-93 | 100 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| SW3 | Eleven Point River at Thomasville | 05-91 | 85 | -- | -- | -- | -- | -- | -- | -- | -- | 10-15 |
| | | 09-91 | 81 | 2 | 1 | -- | 1 | 3 | 1 | -- | 1 | 5-10 |
| | | 08-92 | 80 | 2 | TRACE | -- | 1 | 3 | 2 | -- | 1 | 10-15 |
| | | 08-93 | 100 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| SW4 | Spring Creek | 05-91 | 85 | -- | -- | TRACE | -- | -- | -- | -- | -- | 10-15 |
| | | 09-91 | 78 | 5 | -- | 1 | 1 | 3 | 1 | -- | -- | 5-10 |
| | | 08-92 | 78 | 2 | 1 | -- | TRACE | 3 | 2 | -- | 1 | 10-15 |
| | | 08-93 | 100 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| SW5 | Hurricane Creek | 05-91 | 75 | -- | -- | -- | -- | -- | -- | -- | -- | 20-25 |
| | | 09-91 | 79 | 2 | -- | -- | 1 | 3 | 2 | 2 | 1 | 5-10 |
| | | 08-92 | 70 | 2 | 1 | -- | 1 | 3 | TRACE | -- | TRACE | 15-20 |
| | | 08-93 | 100 | -- | -- | -- | -- | -- | -- | -- | -- | -- |

**Table 5.** Semi-quantitative bulk mineralogy for streambed-material samples–Continued

| Site number (fig. 4) | Site location | Date | Qtz | Kaol | Dolo | Calc | Mica | Kfld | Pfld | Mont | Pyrx | Amor |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SW6 | Eleven Point River near Bardley | 05-91 | 80 | -- | -- | TRACE | -- | -- | -- | -- | -- | 10-15 |
| | | 09-91 | 72 | 5 | 1 | 3 | 3 | 4 | 3 | -- | -- | 5-10 |
| | | 08-92 | 80 | 2 | TRACE | -- | 1 | 3 | 2 | -- | 1 | 10-15 |
| | | 08-93 | 100 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| SP1 | Barrett Spring | 05-91 | 70 | -- | 15 | 2 | -- | -- | -- | -- | -- | 10-15 |
| | | 09-91 | 60 | 6 | 16 | 2 | 2 | 2 | -- | -- | -- | 10-15 |
| | | 08-92 | 55 | 5 | 22 | 3 | TRACE | 2 | -- | -- | -- | 10-15 |
| | | 08-93 | 80 | -- | 18 | 2 | -- | -- | -- | -- | -- | -- |
| SP2 | Big Spring | 05-91 | 85 | -- | 3 | -- | -- | -- | -- | -- | -- | 10-15 |
| | | 09-91 | 70 | 5 | 8 | -- | 2 | 2 | -- | -- | -- | 10-15 |
| | | 08-92 | 70 | 4 | 6 | -- | TRACE | 2 | TRACE | -- | 1 | 15-20 |
| | | 08-93 | 96 | -- | 4 | -- | -- | -- | -- | -- | -- | -- |
| SP3 | Dennig Series Springs | 05-91 | 80 | -- | 3 | -- | -- | -- | -- | -- | -- | 10-15 |
| | | 09-91 | 79 | 4 | 1 | -- | 1 | 4 | 2 | -- | 1 | 5-10 |
| | | 08-92 | 80 | 2 | 1 | -- | 1 | 4 | 3 | -- | 2 | 5-10 |
| | | 08-93 | 100 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| SP4 | Falling Spring | 05-91 | 80 | -- | 5 | -- | -- | -- | -- | -- | -- | 10-15 |
| | | 09-91 | 65 | 10 | 6 | 3 | 6 | -- | -- | -- | -- | 5-10 |
| | | 08-92 | 55 | 10 | 14 | 3 | TRACE | 2 | -- | -- | -- | 10-15 |
| | | 08-93 | 90 | -- | 10 | -- | -- | -- | -- | -- | -- | -- |

**Table 5.** Semi-quantitative bulk mineralogy for streambed-material samples--Continued

| Site number (fig. 4) | Site location | Date | Qtz | Kaol | Dolo | Calc | Mica | Kfld | Pfld | Mont | Pyrx | Amor |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SP5 | Greer Spring | 05-91 | 75 | -- | 5 | -- | -- | -- | -- | -- | -- | 10-15 |
| | | [a]09-91 | 65 | 4 | 6 | TRACE | -- | TRACE | -- | 3 | -- | 10-15 |
| | | 08-92 | 64 | 6 | 9 | -- | -- | 2 | TRACE | 2 | TRACE | 10-15 |
| | | 08-93 | 85 | 15 | -- | -- | -- | -- | -- | -- | -- | -- |
| SP6 | McCormack Spring | 05-91 | 85 | -- | 2 | -- | -- | -- | -- | -- | -- | 10-15 |
| | | 09-91 | 70 | 6 | 4 | -- | 2 | 2 | -- | -- | -- | 10-15 |
| | | 08-92 | 67 | 6 | 6 | -- | 1 | 2 | -- | -- | TRACE | 15-20 |
| | | 08-93 | 95 | -- | 5 | -- | -- | -- | -- | -- | -- | -- |
| SP7 | Turner Spring | 05-91 | 75 | -- | 10 | -- | -- | -- | -- | -- | -- | 10-15 |
| | | 09-91 | 55 | 12 | 18 | 1 | 4 | 2 | -- | -- | -- | 5-10 |
| | | 08-92 | 50 | 6 | 9 | -- | -- | 2 | TRACE | 2 | TRACE | 10-15 |
| | | 08-93 | 84 | -- | 16 | -- | -- | -- | -- | -- | -- | -- |

[a] Sample also has 3 percent hematite.

## ABBREVIATIONS AND SYMBOLS USED IN TABLES 6 and 7

| | |
|---|---|
| Al | Aluminum, percent by weight |
| Ca | Calcium, percent by weight |
| Fe | Iron, percent by weight |
| Mg | Magnesium, percent by weight |
| P | Phosphorous, percent by weight |
| K | Potassium, percent by weight |
| Na | Sodium, percent by weight |
| Ti | Titanium, percent by weight |
| Sb | Antimony, in micrograms per gram |
| As | Arsenic, in micrograms per gram |
| Ba | Barium, in micrograms per gram |
| Be | Beryllium, in micrograms per gram |
| Bi | Bismuth, in micrograms per gram |
| B | Boron, in micrograms per gram |
| Cd | Cadmium, in micrograms per gram |
| Ce | Cerium, in micrograms per gram |
| Cr | Chromium, in micrograms per gram |
| Co | Cobalt, in micrograms per gram |
| Cu | Copper, in micrograms per gram |
| Eu | Europium, in micrograms per gram |
| Ga | Gallium, in micrograms per gram |
| Ge | Germanium, in micrograms per gram |
| Au | Gold, in micrograms per gram |
| Ho | Holmium, in micrograms per gram |
| La | Lanthanum, in micrograms per gram |
| Pb | Lead, in micrograms per gram |
| Li | Lithium, in micrograms per gram |
| Mn | Manganese, in micrograms per gram |
| Mo | Molybdenum, in micrograms per gram |
| Nd | Neodybium, in micrograms per gram |
| Ni | Nickel, in micrograms per gram |
| Nb | Niobium, in micrograms per gram |
| Sc | Scandium, in micrograms per gram |
| Ag | Silver, in micrograms per gram |
| Sr | Strontium, in micrograms per gram |
| Ta | Tantalum, in micrograms per gram |
| Th | Thorium, in micrograms per gram |
| Sn | Tin, in micrograms per gram |
| W | Tungsten, in micrograms per gram |
| U | Uranium, in micrograms per gram |
| V | Vanadium, in micrograms per gram |
| Yb | Ytterbium, in micrograms per gram |
| Y | Yttrium, in micrograms per gram |
| Zn | Zinc, in micrograms per gram |
| Zr | Zirconium, in micrograms per gram |
| -- | No data |
| < | Less than |

**Table 6.** Quantitative elemental analysis of less than 63-micrometer fraction of streambed-material samples

| Site number (fig. 4) | Site location | Date | Al | Ca | Fe | Mg | P | K | Na | Ti | As | Ba |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SW1 | Current River at Van Buren | 09-90 | 2.2 | 1.6 | 0.84 | 0.25 | 0.03 | 0.86 | 0.24 | 0.16 | <10 | 300 |
| | | 05-91 | 3.3 | .59 | 1.7 | .37 | .05 | .78 | .15 | .20 | <10 | 300 |
| | | 09-91 | 4.2 | 2.8 | 2.4 | .60 | .10 | .87 | .15 | .21 | <10 | 370 |
| | | 08-92 | 3.9 | .97 | 1.9 | .43 | .06 | .94 | .19 | .22 | <10 | 350 |
| | | 08-93 | 4.3 | 1.5 | 1.9 | .45 | .07 | 1.0 | .21 | .24 | <10 | 360 |
| SW2 | Current River at Hawes Memorial Campground | 09-90 | 3.8 | .37 | 2.2 | .26 | .03 | 1.1 | .32 | .21 | 20 | 350 |
| | | 05-91 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | 09-91 | 4.0 | 1.1 | 1.7 | .45 | .06 | .87 | .19 | .19 | <10 | 350 |
| | | 08-92 | 3.9 | 2.8 | 1.6 | .48 | .06 | .96 | .22 | .21 | <10 | 370 |
| | | 08-93 | 4.8 | 1.5 | 2.2 | .50 | .08 | .98 | .18 | .24 | <10 | 360 |
| SW3 | Eleven Point River at Thomasville | 09-90 | 2.3 | 2.0 | .99 | 1.0 | .03 | .70 | .12 | .12 | <10 | 200 |
| | | 05-91 | 3.5 | .34 | 2.0 | .27 | .06 | .95 | .22 | .30 | <10 | 390 |
| | | 09-91 | 3.7 | .47 | 1.7 | .32 | .07 | .97 | .22 | .28 | <10 | 410 |
| | | 08-92 | 3.7 | .47 | 1.9 | .33 | .07 | .96 | .20 | .27 | <10 | 380 |
| | | 08-93 | 3.7 | .35 | 1.8 | .28 | .06 | 1.0 | .23 | .29 | <10 | 400 |
| SW4 | Spring Creek | 09-90 | 2.4 | .43 | .97 | .20 | .03 | .79 | .20 | .19 | <10 | 280 |
| | | 05-91 | 4.0 | .56 | 2.2 | .39 | .07 | .88 | .17 | .28 | <10 | 340 |
| | | 09-91 | 3.8 | .80 | 1.8 | .38 | .07 | .93 | .19 | .24 | 10 | 360 |
| | | 08-92 | 3.8 | .51 | 1.8 | .34 | .06 | .95 | .18 | .26 | <10 | 320 |
| | | 08-93 | 4.2 | .62 | 2.0 | .37 | .07 | .98 | .19 | .27 | <10 | 360 |
| SW5 | Hurricane Creek | 09-90 | 2.5 | 2.0 | 1.1 | .93 | .04 | .87 | .17 | .20 | <10 | 310 |
| | | 05-91 | 3.3 | .38 | 1.4 | .24 | .05 | .95 | .23 | .28 | <10 | 380 |
| | | 09-91 | 3.9 | .72 | 1.9 | .36 | .08 | .91 | .19 | .27 | 10 | 400 |
| | | 08-92 | 5.1 | .83 | 2.9 | .53 | .10 | .86 | .13 | .26 | 15 | 340 |
| | | 08-93 | 4.0 | .37 | 1.8 | .29 | .06 | 1.1 | .24 | .32 | <10 | 450 |
| SW6 | Eleven Point River near Bardley | 09-90 | 1.9 | 2.5 | .75 | .24 | .04 | .76 | .18 | .16 | <10 | 280 |
| | | 05-91 | 2.2 | .56 | 1.1 | .28 | .04 | .72 | .15 | .19 | <10 | 250 |
| | | 09-91 | 4.1 | 1.1 | 2.4 | .46 | .08 | .91 | .17 | .24 | 10 | 370 |
| | | 08-92 | 3.7 | 1.0 | 1.9 | .43 | .07 | .92 | .18 | .24 | <10 | 330 |
| | | 08-93 | 4.1 | 1.1 | 2.0 | .43 | .08 | .94 | .17 | .24 | <10 | 330 |

**Table 6.** Quantitative elemental analysis of less than 63-micrometer fraction of streambed-material samples–Continued

| Site number (fig. 4) | Site location | Date | Be | Bi | Cd | Ce | Cr | Co | Cu | Eu | Ga | Au |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SW1 | Current River at Van Buren | 09-90 | <1 | <10 | <2 | 42 | 38 | 8 | 63 | <2 | 5 | <8 |
| | | 05-91 | 1 | <10 | 2 | 53 | 69 | 24 | 190 | <2 | 9 | <8 |
| | | 09-91 | 2 | <10 | <2 | 70 | 61 | 31 | 33 | <2 | 14 | <8 |
| | | 08-92 | 2 | <10 | <2 | 55 | 47 | 21 | 34 | <2 | 11 | <8 |
| | | 08-93 | 2 | <10 | <2 | 57 | 49 | 17 | 26 | <2 | 9 | <8 |
| SW2 | Current River at Hawes Memorial Campground | 09-90 | 1 | <10 | <2 | 60 | 48 | 18 | 38 | <2 | 7 | <8 |
| | | 05-91 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | 09-91 | 2 | <10 | <2 | 63 | 47 | 21 | 95 | <2 | 10 | <8 |
| | | 08-92 | 2 | <10 | <2 | 58 | 46 | 20 | 41 | <2 | 13 | <8 |
| | | 08-93 | 2 | <10 | <2 | 60 | 58 | 23 | 30 | <2 | 10 | <8 |
| SW3 | Eleven Point River at Thomasville | 09-90 | <1 | <10 | <2 | 34 | 49 | 5 | 62 | <2 | 5 | <8 |
| | | 05-91 | 1 | <10 | <2 | 75 | 69 | 20 | 120 | <2 | 9 | <8 |
| | | 09-91 | 1 | <10 | <2 | 59 | 40 | 17 | 24 | <2 | 9 | <8 |
| | | 08-92 | 1 | <10 | <2 | 54 | 49 | 17 | 28 | <2 | 11 | <8 |
| | | 08-93 | 1 | <10 | <2 | 60 | 45 | 16 | 17 | <2 | 8 | <8 |
| SW4 | Spring Creek | 09-90 | <1 | <10 | <2 | 47 | 38 | 8 | 34 | <2 | 5 | <8 |
| | | 05-91 | 2 | <10 | <2 | 68 | 82 | 16 | 150 | <2 | 11 | <8 |
| | | 09-91 | 2 | <10 | <2 | 63 | 45 | 15 | 17 | <2 | 10 | <8 |
| | | 08-92 | 2 | <10 | <2 | 55 | 50 | 11 | 49 | <2 | 9 | <8 |
| | | 08-93 | 2 | <10 | <2 | 59 | 50 | 15 | 22 | <2 | 9 | <8 |
| SW5 | Hurricane Creek | 09-90 | 1 | <10 | <2 | 44 | 25 | 12 | 16 | <2 | 7 | <8 |
| | | 05-91 | 1 | <10 | <2 | 73 | 46 | 13 | 39 | <2 | 8 | <8 |
| | | 09-91 | 2 | <10 | <2 | 69 | 44 | 19 | 24 | <2 | 11 | <8 |
| | | 08-92 | 2 | <10 | <2 | 71 | 68 | 24 | 65 | <2 | 14 | <8 |
| | | 08-93 | 2 | <10 | <2 | 71 | 43 | 15 | 18 | <2 | 8 | <8 |
| SW6 | Eleven Point River near Bardley | 09-90 | <1 | <10 | <2 | 37 | 23 | 8 | 14 | <2 | 6 | <8 |
| | | 05-91 | <1 | <10 | <2 | 39 | 43 | 9 | 130 | <2 | 6 | <8 |
| | | 09-91 | 2 | <10 | <2 | 69 | 54 | 20 | 22 | <2 | 12 | <8 |
| | | 08-92 | 2 | <10 | <2 | 57 | 53 | 19 | 30 | <2 | 11 | <8 |
| | | 08-93 | 2 | <10 | <2 | 56 | 52 | 17 | 25 | <2 | 8 | <8 |

**Table 6.** Quantitative elemental analysis of less than 63-micrometer fraction of streambed-material samples--Continued

| Site number (fig. 4) | Site location | Date | Ho | La | Pb | Li | Mn | Mo | Nd | Ni | Nb | Sc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SW1 | Current River at Van Buren | 09-90 | <4 | 24 | 24 | 14 | 900 | <2 | 21 | 16 | <4 | 3 |
| | | 05-91 | <4 | 32 | 110 | 21 | 1,700 | 4 | 26 | 39 | 4 | 5 |
| | | 09-91 | <4 | 36 | 45 | 28 | 5,500 | <2 | 34 | 44 | 5 | 7 |
| | | 08-92 | <4 | 32 | 71 | 25 | 1,600 | <2 | 29 | 28 | 7 | 6 |
| | | 08-93 | <4 | 32 | 25 | 26 | 1,300 | <2 | 28 | 28 | 10 | 7 |
| SW2 | Current River at Hawes Memorial Campground | 09-90 | <4 | 30 | 35 | 22 | 830 | <2 | 27 | 21 | <4 | 5 |
| | | 05-91 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | 09-91 | <4 | 35 | 22 | 25 | 1,600 | <2 | 34 | 35 | 5 | 7 |
| | | 08-92 | <4 | 33 | 51 | 25 | 2,400 | <2 | 31 | 31 | 6 | 6 |
| | | 08-93 | <4 | 34 | 27 | 30 | 1,400 | <2 | 32 | 39 | 10 | 8 |
| SW3 | Eleven Point River at Thomasville | 09-90 | <4 | 22 | 34 | 16 | 450 | <2 | 21 | 25 | <4 | 3 |
| | | 05-91 | <4 | 39 | 45 | 22 | 1,800 | 3 | 30 | 29 | 5 | 5 |
| | | 09-91 | <4 | 32 | 36 | 23 | 1,500 | <2 | 25 | 24 | 6 | 6 |
| | | 08-92 | <4 | 30 | 86 | 24 | 1,200 | <2 | 25 | 24 | 6 | 6 |
| | | 08-93 | <4 | 31 | 36 | 23 | 1,100 | <2 | 25 | 23 | 10 | 6 |
| SW4 | Spring Creek | 09-90 | <4 | 27 | 34 | 16 | 600 | <2 | 24 | 20 | <4 | 3 |
| | | 05-91 | <4 | 39 | 42 | 26 | 1,600 | 4 | 33 | 38 | 5 | 7 |
| | | 09-91 | <4 | 36 | 32 | 24 | 1,300 | <2 | 31 | 25 | 6 | 6 |
| | | 08-92 | <4 | 32 | 98 | 25 | 310 | <2 | 28 | 24 | 6 | 6 |
| | | 08-93 | <4 | 34 | 33 | 26 | 880 | <2 | 28 | 27 | 10 | 7 |
| SW5 | Hurricane Creek | 09-90 | <4 | 26 | 22 | 17 | 2,500 | <2 | 24 | 19 | <4 | 4 |
| | | 05-91 | <4 | 42 | 29 | 21 | 1,200 | <2 | 32 | 22 | <4 | 5 |
| | | 09-91 | <4 | 41 | 32 | 26 | 2,800 | <2 | 33 | 29 | 7 | 7 |
| | | 08-92 | <4 | 40 | 150 | 34 | 1,400 | <2 | 35 | 38 | 8 | 8 |
| | | 08-93 | <4 | 40 | 31 | 25 | 1,500 | <2 | 33 | 22 | 11 | 6 |
| SW6 | Eleven Point River near Bardley | 09-90 | <4 | 21 | 15 | 13 | 3,800 | <2 | 19 | 17 | <4 | 3 |
| | | 05-91 | <4 | 23 | 33 | 15 | 770 | <2 | 20 | 21 | <4 | 4 |
| | | 09-91 | <4 | 40 | 41 | 26 | 2,600 | <2 | 35 | 30 | 5 | 7 |
| | | 08-92 | <4 | 34 | 87 | 24 | 1,600 | <2 | 30 | 32 | 6 | 6 |
| | | 08-93 | <4 | 32 | 35 | 26 | 1,000 | <2 | 27 | 31 | 10 | 7 |

**Table 6.** Quantitative elemental analysis of less than 63-micrometer fraction of streambed-material samples--Continued

| Site number (fig. 4) | Site location | Date | Ag | Sr | Ta | Th | Sn | U | V | Yb | Y | Zn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SW1 | Current River at Van Buren | 09-90 | <2 | 48 | <40 | 6 | 130 | <100 | 26 | 1 | 12 | 34 |
| | | 05-91 | <2 | 35 | <40 | 7 | 81 | <100 | 48 | 2 | 18 | 300 |
| | | 09-91 | <2 | 44 | <40 | 7 | 6 | <100 | 62 | 2 | 25 | 120 |
| | | 08-92 | <2 | 42 | <40 | 8 | <5 | <100 | 54 | 2 | 23 | 82 |
| | | 08-93 | <2 | 49 | <40 | 9 | 46 | <100 | 59 | 2 | 21 | 79 |
| SW2 | Current River at Hawes Memorial Campground | 09-90 | <2 | 52 | <40 | 9 | <10 | <100 | 56 | 2 | 16 | 47 |
| | | 05-91 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | 09-91 | <2 | 43 | <40 | 8 | <5 | <100 | 53 | 2 | 24 | 96 |
| | | 08-92 | <2 | 51 | <40 | 7 | <5 | <100 | 50 | 2 | 23 | 83 |
| | | 08-93 | <2 | 45 | <40 | 9 | 9 | <100 | 66 | 2 | 25 | 89 |
| SW3 | Eleven Point River at Thomasville | 09-90 | <2 | 40 | <40 | 4 | 1,400 | <100 | 28 | 1 | 14 | 64 |
| | | 05-91 | <2 | 46 | <40 | 10 | 30 | <100 | 52 | 2 | 19 | 100 |
| | | 09-91 | <2 | 48 | <40 | 8 | <5 | <100 | 52 | 2 | 18 | 140 |
| | | 08-92 | <2 | 46 | <40 | 9 | <5 | <100 | 53 | 2 | 19 | 84 |
| | | 08-93 | <2 | 48 | <40 | 9 | 13 | <100 | 54 | 2 | 18 | 73 |
| SW4 | Spring Creek | 09-90 | <2 | 40 | <40 | 7 | 190 | <100 | 31 | 2 | 14 | 60 |
| | | 05-91 | <2 | 41 | <40 | 10 | 67 | <100 | 57 | 2 | 23 | 140 |
| | | 09-91 | <2 | 44 | <40 | 7 | <5 | <100 | 51 | 2 | 21 | 84 |
| | | 08-92 | <2 | 45 | <40 | 9 | <5 | <100 | 51 | 2 | 22 | 94 |
| | | 08-93 | <2 | 46 | <40 | 7 | 20 | <100 | 58 | 2 | 21 | 95 |
| SW5 | Hurricane Creek | 09-90 | <2 | 42 | <40 | 8 | <5 | <100 | 32 | 1 | 14 | 69 |
| | | 05-91 | <2 | 46 | <40 | 8 | <5 | <100 | 43 | 2 | 21 | 87 |
| | | 09-91 | <2 | 43 | <40 | 8 | <5 | <100 | 55 | 2 | 24 | 120 |
| | | 08-92 | <2 | 36 | <40 | 11 | <5 | <100 | 74 | 2 | 27 | 180 |
| | | 08-93 | <2 | 49 | <40 | 9 | <5 | <100 | 57 | 2 | 25 | 94 |
| SW6 | Eleven Point River near Bardley | 09-90 | <2 | 41 | <40 | 7 | <5 | <100 | 22 | 1 | 11 | 49 |
| | | 05-91 | <2 | 34 | <40 | 6 | 21 | <100 | 29 | 1 | 14 | 97 |
| | | 09-91 | <2 | 43 | <40 | 9 | <5 | <100 | 57 | 2 | 24 | 99 |
| | | 08-92 | <2 | 42 | <40 | 9 | <5 | <100 | 51 | 2 | 22 | 110 |
| | | 08-93 | <2 | 43 | <40 | 7 | 10 | <100 | 56 | 2 | 21 | 110 |

**Table 6.** Quantitative elemental analysis of less than 63-micrometer fraction of streambed-material samples–Continued

| Site number (fig. 4) | Site location | Date | Al | Ca | Fe | Mg | P | K | Na | Ti | As | Ba |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SP1 | Barrett Spring | 09-90 | 2.2 | 5.7 | 1.1 | 3.0 | 0.03 | 0.67 | 0.09 | 0.10 | 10 | 160 |
| | | 05-91 | 3.6 | 5.5 | 1.9 | 3.0 | .04 | .79 | .12 | .18 | 10 | 220 |
| | | 09-91 | 5.0 | 3.8 | 2.8 | 2.2 | .07 | .98 | .08 | .21 | 26 | 210 |
| | | 08-92 | 4.5 | 4.7 | 2.6 | 2.2 | .07 | .90 | .08 | .18 | 19 | 210 |
| | | 08-93 | 7.0 | 7.5 | 3.5 | 1.6 | .06 | .89 | .05 | .23 | 22 | 200 |
| SP2 | Big Spring | 09-90 | 3.0 | .68 | 1.3 | .22 | .04 | .97 | .26 | .24 | <10 | 380 |
| | | 05-91 | 3.0 | 1.9 | 1.5 | 1.2 | .04 | .83 | .15 | .18 | <10 | 250 |
| | | 09-91 | 4.9 | 1.4 | 2.5 | .96 | .09 | .92 | .12 | .22 | 10 | 290 |
| | | 08-92 | 4.8 | 1.3 | 2.2 | .87 | .08 | .98 | .16 | .23 | <10 | 290 |
| | | 08-93 | 4.5 | 1.0 | 2.1 | .75 | .07 | .99 | .18 | .23 | <10 | 290 |
| SP3 | Dennig Series Springs | 09-90 | 2.3 | .30 | .85 | .19 | .03 | .96 | .24 | .20 | <10 | 300 |
| | | 05-91 | 3.0 | .38 | 1.1 | .29 | .03 | 1.0 | .23 | .24 | <10 | 320 |
| | | 09-91 | 3.8 | .50 | 1.6 | .38 | .05 | 1.1 | .22 | .24 | <10 | 330 |
| | | 08-92 | 3.6 | .46 | 1.5 | .32 | .06 | 1.0 | .20 | .25 | <10 | 300 |
| | | 08-93 | 4.0 | .43 | 1.7 | .32 | .06 | 1.1 | .22 | .27 | <10 | 420 |
| SP4 | Falling Spring | 09-90 | 4.7 | 5.6 | 2.0 | 2.4 | .05 | 1.1 | .12 | .16 | 20 | 240 |
| | | 05-91 | 5.9 | 3.3 | 2.9 | 2.1 | .06 | 1.3 | .13 | .25 | 25 | 340 |
| | | 09-91 | 6.5 | 1.7 | 3.6 | 1.3 | .07 | 1.7 | .05 | .28 | 42 | 230 |
| | | 08-92 | 6.9 | 3.4 | 3.5 | 1.6 | .07 | 1.4 | .07 | .26 | 31 | 250 |
| | | 08-93 | 7.6 | 2.2 | 4.0 | 1.7 | .09 | 1.4 | .05 | .29 | 35 | 250 |
| SP5 | Greer Spring | 09-90 | 4.6 | 2.6 | 2.4 | 1.5 | .04 | .93 | .19 | .19 | 20 | 270 |
| | | 05-91 | 7.3 | .84 | 3.8 | .86 | .05 | 1.1 | .17 | .34 | 23 | 310 |
| | | 09-91 | 6.9 | 1.6 | 4.7 | 1.2 | .09 | 1.0 | .10 | .29 | 41 | 340 |
| | | 08-92 | 7.4 | 1.2 | 4.3 | 1.0 | .08 | 1.1 | .14 | .32 | 27 | 340 |
| | | 08-93 | 4.9 | 1.1 | 2.4 | .74 | .09 | 1.1 | .18 | .28 | 13 | 360 |
| SP6 | McCormack Spring | 09-90 | 3.5 | 1.3 | 1.4 | .76 | .05 | .93 | .16 | .18 | 10 | 250 |
| | | 05-91 | 3.6 | .72 | 1.3 | .47 | .04 | .84 | .16 | .22 | <10 | 240 |
| | | 09-91 | 5.4 | 1.2 | 2.1 | .84 | .09 | .97 | .13 | .22 | 20 | 230 |
| | | 08-92 | 5.5 | 1.3 | 2.1 | .89 | .08 | .98 | .11 | .24 | 11 | 210 |
| | | 08-93 | 4.8 | 1.7 | 1.9 | 1.0 | .09 | .99 | .15 | .23 | 10 | 230 |
| SP7 | Turner Spring | 09-90 | 1.8 | 7.6 | 1.1 | 4.2 | .03 | .97 | .07 | .07 | 10 | 210 |
| | | 05-91 | 3.6 | 6.2 | 2.1 | 3.7 | .04 | 1.1 | .10 | .14 | 20 | 280 |
| | | 09-91 | 5.3 | 3.7 | 3.2 | 2.4 | .09 | 1.4 | .05 | .20 | 47 | 300 |
| | | 08-92 | 4.5 | 4.1 | 2.6 | 2.5 | .07 | 1.2 | .08 | .17 | 31 | 310 |
| | | 08-93 | 4.7 | 4.6 | 2.8 | 2.8 | .08 | 1.1 | .08 | .17 | 26 | 270 |

**Table 6.** Quantitative elemental analysis of less than 63-micrometer fraction of streambed-material samples–Continued

| Site number (fig. 4) | Site location | Date | Be | Bi | Cd | Ce | Cr | Co | Cu | Eu | Ga | Au |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SP1 | Barrett Spring | 09-90 | 1 | <10 | <2 | 36 | 23 | 9 | 38 | <2 | 4 | <8 |
| | | 05-91 | 2 | <10 | 2 | 57 | 41 | 16 | 67 | <2 | 9 | <8 |
| | | 09-91 | 4 | <10 | 4 | 110 | 50 | 33 | 50 | <2 | 12 | <8 |
| | | 08-92 | 3 | <10 | 4 | 78 | 47 | 30 | 76 | <2 | 12 | <8 |
| | | 08-93 | 4 | <10 | 3 | 78 | 56 | 22 | 32 | <2 | 14 | <8 |
| SP2 | Big Spring | 09-90 | 1 | <10 | <2 | 66 | 49 | 14 | 29 | <2 | 7 | <8 |
| | | 05-91 | 1 | <10 | <2 | 48 | 45 | 13 | 82 | <2 | 8 | <8 |
| | | 09-91 | 3 | <10 | <2 | 73 | 64 | 23 | 34 | <2 | 13 | <8 |
| | | 08-92 | 2 | <10 | <2 | 62 | 56 | 19 | 59 | <2 | 12 | <8 |
| | | 08-93 | 2 | <10 | <2 | 59 | 53 | 15 | 28 | <2 | 9 | <8 |
| SP3 | Dennig Series Springs | 09-90 | <1 | <10 | <2 | 29 | 25 | 4 | 12 | <2 | 5 | <8 |
| | | 05-91 | 1 | <10 | <2 | 50 | 40 | 7 | 33 | <2 | 6 | <8 |
| | | 09-91 | 2 | <10 | <2 | 67 | 44 | 9 | 17 | <2 | 8 | <8 |
| | | 08-92 | 2 | <10 | <2 | 59 | 46 | 9 | 33 | <2 | 9 | <8 |
| | | 08-93 | 2 | <10 | <2 | 59 | 51 | 10 | 18 | <2 | 7 | <8 |
| SP4 | Falling Spring | 09-90 | 3 | <10 | 5 | 100 | 47 | 31 | 45 | 2 | 9 | <8 |
| | | 05-91 | 3 | <10 | 5 | 120 | 72 | 38 | 150 | <2 | 14 | <8 |
| | | 09-91 | 4 | <10 | 8 | 170 | 79 | 53 | 48 | 2 | 17 | <8 |
| | | 08-92 | 4 | <10 | 6 | 120 | 74 | 41 | 52 | 2 | 19 | <8 |
| | | 08-93 | 4 | <10 | 5 | 140 | 78 | 38 | 46 | 3 | 16 | <8 |
| SP5 | Greer Spring | 09-90 | 2 | <10 | <2 | 66 | 66 | 17 | 100 | <2 | 9 | <8 |
| | | 05-91 | 2 | <10 | <2 | 70 | 66 | 15 | 58 | <2 | 18 | <8 |
| | | 09-91 | 3 | <10 | <2 | 96 | 91 | 29 | 150 | <2 | 18 | <8 |
| | | 08-92 | 3 | <10 | <2 | 94 | 83 | 31 | 68 | <2 | 19 | <8 |
| | | 08-93 | 2 | <10 | <2 | 73 | 60 | 18 | 32 | <2 | 10 | <8 |
| SP6 | McCormack Spring | 09-90 | 1 | <10 | <2 | 40 | 36 | 5 | 19 | <2 | 7 | <8 |
| | | 05-91 | 1 | <10 | <2 | 53 | 46 | 6 | 57 | <2 | 8 | <8 |
| | | 09-91 | 3 | <10 | <2 | 71 | 55 | 9 | 27 | 2 | 12 | <8 |
| | | 08-92 | 3 | <10 | <2 | 67 | 60 | 10 | 31 | 2 | 13 | <8 |
| | | 08-93 | 2 | <10 | <2 | 57 | 51 | 8 | 26 | <2 | 9 | <8 |
| SP7 | Turner Spring | 09-90 | 1 | <10 | <2 | 25 | 19 | 13 | 23 | <2 | 4 | <8 |
| | | 05-91 | 2 | <10 | <2 | 72 | 57 | 43 | 220 | <2 | 9 | <8 |
| | | 09-91 | 4 | <10 | 3 | 120 | 63 | 78 | 71 | 3 | 14 | <8 |
| | | 08-92 | 3 | <10 | 3 | 84 | 47 | 63 | 80 | 2 | 13 | <8 |
| | | 08-93 | 3 | <10 | 3 | 82 | 51 | 58 | 69 | 2 | 10 | <8 |

**Table 6.** Quantitative elemental analysis of less than 63-micrometer fraction of streambed-material samples–Continued

| Site number (fig. 4) | Site location | Date | Ho | La | Pb | Li | Mn | Mo | Nd | Ni | Nb | Sc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SP1 | Barrett Spring | 09-90 | <4 | 23 | 81 | 17 | 340 | <2 | 27 | 23 | <4 | 3 |
| | | 05-91 | <4 | 36 | 170 | 29 | 620 | <2 | 38 | 38 | <4 | 7 |
| | | 09-91 | <4 | 55 | 230 | 40 | 940 | <2 | 62 | 65 | 5 | 10 |
| | | 08-92 | <4 | 43 | 420 | 39 | 940 | <2 | 50 | 57 | 6 | 9 |
| | | 08-93 | <4 | 47 | 67 | 55 | 940 | <2 | 47 | 64 | 11 | 12 |
| SP2 | Big Spring | 09-90 | <4 | 35 | 32 | 20 | 2,300 | <2 | 29 | 20 | <4 | 4 |
| | | 05-91 | <4 | 30 | 27 | 20 | 790 | <2 | 29 | 27 | <4 | 5 |
| | | 09-91 | <4 | 45 | 39 | 32 | 1,400 | <2 | 51 | 42 | 6 | 10 |
| | | 08-92 | <4 | 39 | 64 | 32 | 750 | <2 | 42 | 38 | 8 | 9 |
| | | 08-93 | <4 | 36 | 27 | 29 | 600 | <2 | 36 | 34 | 10 | 8 |
| SP3 | Dennig Series Springs | 09-90 | <4 | 19 | 20 | 15 | 200 | <2 | 17 | 10 | <4 | 3 |
| | | 05-91 | <4 | 32 | 21 | 18 | 200 | <2 | 26 | 18 | <4 | 5 |
| | | 09-91 | <4 | 43 | 27 | 24 | 270 | <2 | 37 | 23 | 6 | 6 |
| | | 08-92 | <4 | 38 | 62 | 23 | 230 | <2 | 33 | 23 | 7 | 5 |
| | | 08-93 | <4 | 36 | 30 | 24 | 230 | <2 | 32 | 23 | 11 | 6 |
| SP4 | Falling Spring | 09-90 | <4 | 49 | 160 | 37 | 1,000 | <2 | 55 | 55 | <4 | 8 |
| | | 05-91 | <4 | 53 | 170 | 51 | 1,000 | 5 | 52 | 76 | 7 | 11 |
| | | 09-91 | <4 | 65 | 200 | 54 | 1,800 | 2 | 72 | 82 | 6 | 12 |
| | | 08-92 | <4 | 59 | 240 | 59 | 1,200 | <2 | 63 | 80 | 9 | 13 |
| | | 08-93 | <4 | 71 | 180 | 62 | 1,700 | 2 | 76 | 82 | 14 | 15 |
| SP5 | Greer Spring | 09-90 | <4 | 30 | 120 | 31 | 1,000 | <2 | 29 | 45 | <4 | 6 |
| | | 05-91 | <4 | 35 | 53 | 48 | 730 | 3 | 29 | 39 | 10 | 11 |
| | | 09-91 | <4 | 49 | 160 | 46 | 3,200 | 3 | 48 | 73 | 6 | 11 |
| | | 08-92 | <4 | 39 | 120 | 51 | 1,600 | <2 | 36 | 49 | 10 | 11 |
| | | 08-93 | <4 | 40 | 51 | 33 | 550 | <2 | 35 | 35 | 11 | 8 |
| SP6 | McCormack Spring | 09-90 | <4 | 37 | 36 | 23 | 150 | <2 | 38 | 20 | 5 | 7 |
| | | 05-91 | <4 | 40 | 41 | 23 | 130 | <2 | 38 | 24 | <4 | 7 |
| | | 09-91 | <4 | 62 | 53 | 35 | 140 | <2 | 65 | 33 | 6 | 12 |
| | | 08-92 | <4 | 59 | 79 | 37 | 120 | <2 | 63 | 34 | 8 | 12 |
| | | 08-93 | <4 | 48 | 47 | 32 | 110 | <2 | 53 | 31 | 10 | 10 |
| SP7 | Turner Spring | 09-90 | <4 | 17 | 24 | 14 | 550 | <2 | 22 | 29 | <4 | 3 |
| | | 05-91 | <4 | 40 | 73 | 27 | 1,800 | 4 | 46 | 82 | <4 | 7 |
| | | 09-91 | <4 | 62 | 85 | 42 | 2,400 | 2 | 82 | 110 | 4 | 12 |
| | | 08-92 | <4 | 44 | 83 | 36 | 1,900 | <2 | 59 | 100 | 5 | 10 |
| | | 08-93 | <4 | 46 | 53 | 32 | 1,800 | <2 | 61 | 84 | 7 | 11 |

**Table 6.** Quantitative elemental analysis of less than 63-micrometer fraction of streambed-material samples–Continued

| Site number (fig. 4) | Site location | Date | Ag | Sr | Ta | Th | Sn | U | V | Yb | Y | Zn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SP1 | Barrett Spring | 09-90 | <2 | 44 | <40 | 6 | 90 | <100 | 24 | 1 | 13 | 210 |
| | | 05-91 | <2 | 46 | <40 | 6 | 21 | <100 | 44 | 2 | 23 | 330 |
| | | 09-91 | <2 | 37 | <40 | 9 | 13 | <100 | 69 | 3 | 32 | 580 |
| | | 08-92 | <2 | 38 | <40 | 9 | 31 | <100 | 61 | 3 | 29 | 510 |
| | | 08-93 | <2 | 38 | <40 | 10 | <5 | <100 | 80 | 3 | 31 | 600 |
| SP2 | Big Spring | 09-90 | <2 | 49 | <40 | 9 | 30 | <100 | 41 | 2 | 16 | 56 |
| | | 05-91 | <2 | 39 | <40 | 6 | 17 | <100 | 40 | 2 | 20 | 110 |
| | | 09-91 | <2 | 35 | <40 | 10 | <5 | <100 | 71 | 3 | 37 | 140 |
| | | 08-92 | <2 | 41 | <40 | 9 | <5 | <100 | 64 | 3 | 34 | 120 |
| | | 08-93 | <2 | 42 | <40 | 7 | 12 | <100 | 62 | 3 | 28 | 97 |
| SP3 | Dennig Series Springs | 09-90 | <2 | 42 | <40 | 6 | <5 | <100 | 26 | 1 | 12 | 45 |
| | | 05-91 | <2 | 45 | <40 | 6 | <5 | <100 | 36 | 2 | 17 | 66 |
| | | 09-91 | <2 | 45 | <40 | 9 | <5 | <100 | 49 | 2 | 25 | 88 |
| | | 08-92 | <2 | 43 | <40 | 9 | 5 | <100 | 45 | 2 | 23 | 85 |
| | | 08-93 | <2 | 47 | <40 | 9 | <5 | <100 | 52 | 2 | 23 | 96 |
| SP4 | Falling Spring | 09-90 | <2 | 54 | <40 | 7 | 320 | <100 | 63 | 3 | 29 | 620 |
| | | 05-91 | <2 | 44 | <40 | 9 | 45 | <100 | 85 | 3 | 29 | 710 |
| | | 09-91 | <2 | 28 | <40 | 14 | <5 | <100 | 130 | 4 | 36 | 970 |
| | | 08-92 | <2 | 34 | <40 | 11 | <5 | <100 | 110 | 4 | 37 | 980 |
| | | 08-93 | <2 | 31 | <40 | 13 | <5 | <100 | 120 | 4 | 43 | 1,000 |
| SP5 | Greer Spring | 09-90 | <2 | 47 | <40 | 7 | 70 | <100 | 73 | 2 | 18 | 110 |
| | | 05-91 | <2 | 41 | <40 | 13 | <5 | <100 | 120 | 2 | 18 | 100 |
| | | 09-91 | <2 | 37 | <40 | 13 | <5 | <100 | 120 | 2 | 35 | 150 |
| | | 08-92 | <2 | 40 | <40 | 12 | 6 | <100 | 130 | 2 | 25 | 140 |
| | | 08-93 | <2 | 46 | <40 | 8 | 44 | <100 | 79 | 2 | 27 | 96 |
| SP6 | McCormack Spring | 09-90 | <2 | 36 | <40 | 6 | <5 | <100 | 40 | 2 | 22 | 93 |
| | | 05-91 | <2 | 35 | <40 | 7 | 13 | <100 | 42 | 2 | 23 | 120 |
| | | 09-91 | <2 | 33 | <40 | 9 | <5 | <100 | 68 | 3 | 38 | 160 |
| | | 08-92 | <2 | 32 | <40 | 9 | <5 | <100 | 69 | 4 | 38 | 180 |
| | | 08-93 | <2 | 38 | <40 | 9 | 12 | <100 | 60 | 3 | 30 | 150 |
| SP7 | Turner Spring | 09-90 | <2 | 56 | <40 | <4 | <5 | <100 | 22 | 1 | 12 | 90 |
| | | 05-91 | <2 | 53 | <40 | 6 | 52 | <100 | 49 | 3 | 25 | 260 |
| | | 09-91 | <2 | 33 | <40 | 10 | <5 | <100 | 90 | 5 | 44 | 350 |
| | | 08-92 | <2 | 40 | <40 | 7 | <5 | <100 | 66 | 4 | 36 | 290 |
| | | 08-93 | <2 | 43 | <40 | 7 | 7 | <100 | 68 | 4 | 37 | 290 |

**Table 7.** Bulk-sample mineralogic concentrations by emission spectrography for streambed-material samples collected May 28 through June 4, 1991

| Site number (fig. 4) | Site location | Ca | Fe | Mg | P | Na | Ti | Sb | As | Ba | Be | Bi | B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SW1 | Current River at Van Buren | <0.05 | 0.05 | 0.02 | <0.2 | <0.2 | 0.02 | <100 | <200 | 20 | <1 | <10 | <10 |
| SW2 | Current River at Hawes Memorial Campground | <.05 | .15 | <.02 | <.2 | <.2 | .02 | <100 | <200 | 20 | <1 | <10 | <10 |
| SW3 | Eleven Point River at Thomasville | <.05 | .05 | .03 | <.2 | <.2 | .05 | <100 | <200 | 30 | <1 | <10 | <10 |
| SW4 | Spring Creek | .05 | .05 | .02 | <.2 | <.2 | .05 | <100 | <200 | 50 | <1 | <10 | <10 |
| SW5 | Hurricane Creek | <.05 | .2 | .02 | <.2 | <.2 | .1 | <100 | <200 | 70 | <1 | <10 | <10 |
| SW6 | Eleven Point River near Bardley | <.05 | .05 | .02 | <.2 | <.2 | .02 | <100 | <200 | <20 | <1 | <10 | <10 |
| SP1 | Barrett Spring | 1.5 | .1 | 1.0 | <.2 | <.2 | .03 | <100 | <200 | 50 | <1 | <10 | <10 |
| SP2 | Big Spring | .2 | .1 | .2 | <.2 | <.2 | .05 | <100 | <200 | 30 | <1 | <10 | <10 |
| SP3 | Dennig Series Springs | .05 | .15 | .03 | <.2 | <.2 | .07 | <100 | <200 | 50 | <1 | <10 | <10 |
| SP4 | Falling Spring | .5 | .1 | .5 | <.2 | <.2 | .03 | <100 | <200 | 50 | <1 | <10 | <10 |
| SP5 | Greer Spring | .2 | .2 | .3 | <.2 | <.2 | .07 | <100 | <200 | 30 | <1 | <10 | <10 |
| SP6 | McCormack Spring | .05 | .03 | .1 | <.2 | <.2 | .05 | <100 | <200 | 30 | <1 | <10 | <10 |
| SP7 | Turner Spring | 1.0 | .07 | 1.0 | <.2 | <.2 | .02 | <100 | <200 | 30 | <1 | <10 | <10 |

**Table 7.** Bulk-sample mineralogic concentrations by emission spectrography for streambed-material samples collected May 28 through June 4, 1991–Continued

| Site number (fig. 4) | Site location | Cd | Cr | Co | Cu | Ga | Ge | Au | La | Pb | Mn | Mo | Ni |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SW1 | Current River at Van Buren | <20 | <10 | <10 | <5 | <5 | <10 | <10 | <50 | 20 | 20 | <5 | <5 |
| SW2 | Current River at Hawes Memorial Campground | <20 | 15 | <10 | <5 | <5 | <10 | <10 | <50 | 30 | 20 | <5 | <5 |
| SW3 | Eleven Point River at Thomasville | <20 | 10 | <10 | <5 | <5 | <10 | <10 | <50 | 30 | 30 | <5 | <5 |
| SW4 | Spring Creek | <20 | 10 | <10 | <5 | <5 | <10 | <10 | <50 | 50 | 20 | <5 | <5 |
| SW5 | Hurricane Creek | <20 | <10 | <10 | 5 | <5 | <10 | <10 | <50 | 20 | 100 | <5 | <5 |
| SW6 | Eleven Point River near Bardley | <20 | 10 | <10 | <5 | <5 | <10 | <10 | <50 | 20 | 10 | <5 | <5 |
| SP1 | Barrett Spring | <20 | 15 | <10 | 10 | <5 | <10 | <10 | <50 | 20 | 50 | <5 | 7 |
| SP2 | Big Spring | <20 | 10 | <10 | <5 | <5 | <10 | <10 | <50 | 30 | 30 | <5 | <5 |
| SP3 | Dennig Series Springs | <20 | 10 | <10 | 5 | <5 | <10 | <10 | <50 | 30 | 15 | <5 | <5 |
| SP4 | Falling Spring | <20 | 10 | <10 | 5 | <5 | <10 | <10 | <50 | 20 | 50 | <5 | <5 |
| SP5 | Greer Spring | <20 | 10 | <10 | 5 | <5 | <10 | <10 | <50 | 20 | 30 | <5 | 5 |
| SP6 | McCormack Spring | <20 | 10 | <10 | <5 | <5 | <10 | <10 | <50 | 30 | <10 | <5 | <5 |
| SP7 | Turner Spring | <20 | 15 | <10 | 7 | <5 | <10 | <10 | <50 | 50 | 100 | <5 | 5 |

**Table 7.** Bulk-sample mineralogic concentrations by emission spectrography for streambed-material samples collected May 28 through June 4, 1991–Continued

| Site number (fig. 4) | Site location | Nb | Sc | Ag | Sr | Th | Sn | W | V | Y | Zn | Zr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SW1 | Current River at Van Buren | <20 | <5 | <0.5 | <100 | <100 | <10 | <20 | <10 | <10 | <200 | 30 |
| SW2 | Current River at Hawes Memorial Campground | <20 | <5 | <.5 | <100 | <100 | <10 | <20 | <10 | <10 | <200 | 15 |
| SW3 | Eleven Point River at Thomasville | <20 | <5 | <.5 | <100 | <100 | <10 | <20 | <10 | <10 | <200 | 30 |
| SW4 | Spring Creek | <20 | <5 | <.5 | <100 | <100 | <10 | <20 | <10 | <10 | <200 | 50 |
| SW5 | Hurricane Creek | <20 | <5 | <.5 | <100 | <100 | <10 | <20 | <10 | <10 | <200 | 70 |
| SW6 | Eleven Point River near Bardley | <20 | <5 | <.5 | <100 | <100 | <10 | <20 | <10 | <10 | <200 | 20 |
| SP1 | Barrett Spring | <20 | <5 | <.5 | <100 | <100 | <10 | <20 | <10 | <10 | <200 | 30 |
| SP2 | Big Spring | <20 | <5 | <.5 | <100 | <100 | <10 | <20 | <10 | <10 | <200 | 30 |
| SP3 | Dennig Series Springs | <20 | <5 | <.5 | <100 | <100 | <10 | <20 | <10 | <10 | <200 | 50 |
| SP4 | Falling Spring | <20 | <5 | <.5 | <100 | <100 | <10 | <20 | <10 | <10 | <200 | 20 |
| SP5 | Greer Spring | <20 | <5 | <.5 | <100 | <100 | <10 | <20 | <10 | <10 | <200 | 30 |
| SP6 | McCormack Spring | <20 | <5 | <.5 | <100 | <100 | <10 | <20 | <10 | <10 | <200 | 50 |
| SP7 | Turner Spring | <20 | <5 | <.5 | <100 | <100 | <10 | <20 | <10 | <10 | <200 | 20 |

**Table 8.** Optical mineralogy of heavy mineral concentrate from streambed-material samples

[Mineralogy of all three fractions of the heavy mineral concentrate were determined for the May 1991 sample; samples collected after May 1991 had only the C-3 fraction analyzed; C-1, highly magnetic; C-2, moderately to weakly magnetic; C-3, non-magnetic; highly oxidized material described as amorphous iron oxide by laboratory technician; --, no data; **, sample not large enough to separate magnetically so results are for the total concentrate in approximate descending order of concentration; number in parenthesis is percentage of constituent determined]

| Site number (fig. 4) | Date | Sample size | Sample description |
|---|---|---|---|
| SW1 | | | **Current River at Van Buren** |
| | 05-91 | -- | C-1 magnetite, highly oxidized magnetic material. |
| | | | C-2 hematite, highly oxidized material, garnet, tourmaline. |
| | | | C-3 dolomite, zircon, apatite, rutile, tourmaline. |
| | 09-91 | 1 to 2 milligrams | Small grains: zircon (40), residual para-magnetic oxidized material (25), calcite (10), dolomite (5), apatite (5), barite (5), rutile (5), rock fragments (5), probably few grains cassiterite. |
| | 08-92 | 9 milligrams | Zircon (50), rutile (15), dolomite (10), tourmaline (10), apatite (5), calcite (5), barite (2), lead contamination (2). |
| | 08-93 | -- | Well rounded apatite (50), reddish-brown rock fragments (20), rounded tourmaline (10), rounded sphene and rutile (10), angular carbonate (10), traces of pyrite, metal shanks, and blue-gray slaggy material. |
| SW2 | | | **Current River at Hawes Memorial Campground** |
| | 05-91 | -- | **Hematite, oxidized material, apatite, tourmaline, calcite, zircon, rutile, garnet. |
| | 09-91 | 1 to 2 milligrams | Small grains: dolomite (40), zircon (15), rock fragments (10), calcite (5), barite (5), tourmaline (5), rutile (5), few grains of lead contamination. |
| | 08-92 | 4 milligrams | Dolomite (30), zircon (30), limonitic rock fragments (20), apatite (10), barite (5), calcite (2), rutile (2). |
| | 08-93 | -- | Ferruginous rock fragments (70), rounded black tourmaline (10), rounded apatite (10), rutile, rounded zircon, sphene, and angular carbonate (10). |
| SW3 | | | **Eleven Point River at Thomasville** |
| | 05-91 | -- | C-1 magnetite, highly oxidized magnetic material. |
| | | | C-2 highly oxidized material, hematite, garnet. |
| | | | C-3 zircon, apatite, rutile, tourmaline, few oxidized grains. |
| | 09-91 | 1 to 2 milligrams | Small grains: zircon (50), dolomite (10), rock fragments (10), rutile (5), barite (5), anatase (5), apatite (5), tourmaline (5), probably few grains of cassiterite. |
| | 08-92 | 7 milligrams | Small grains: zircon (50), apatite (10), rutile (10), dolomite (10), oxidized rock fragments (10), anatase (5), tourmaline (2), lead contamination (2), probably few grains of cassiterite. |
| | 08-93 | -- | Ferruginous rock fragments (90), rounded tourmaline, apatite, zircon, and pyrite (10). |
| SW4 | | | **Spring Creek** |
| | 05-91 | -- | **Highly oxidized material, hematite, garnet, calcite, zircon, tourmaline, rutile, apatite. |
| | 09-91 | 1 to 2 milligrams | Small grains: zircon (60), calcite (10), dolomite (5), barite (5), anatase (5), rutile (5), rock fragments (5), apatite (2), a few tourmaline grains. |
| | 08-92 | 5 milligrams | Zircon (60), rutile (20), apatite (10), anatase (5), dolomite (1 to 2), calcite (1 to 2). |
| | 08-93 | -- | Rounded black tourmaline (40), rounded apatite (40), zircon (10), rutile, anatase, and rock fragments (10), trace pyrite. |

**Table 8.** Optical mineralogy of heavy mineral concentrate from streambed-material samples--Continued

| Site number (fig. 4) | Date | Sample size | Sample description |
|---|---|---|---|
| SW5 | | | **Hurricane Creek** |
| | 05-91 | -- | **Highly oxidized material, hematite, garnet, apatite, tourmaline, zircon. |
| | 09-91 | 1 to 2 milligrams | Small grains: zircon (45), dolomite (25), rock fragments (13), anatase (5), calcite (5), barite (3), apatite (2), tourmaline (2). |
| | 08-92 | 7 milligrams | Dolomite (40), zircon (20), limonitic rock fragments (20), rutile (10), apatite (5), lead contamination (2), pyrite (1). |
| | 08-93 | -- | Ferruginous rock fragments (40), rounded black tourmaline (30), apatite (20), zircon, rutile, anatase, and angular carbonate (10). |
| SW6 | | | **Eleven Point River near Bardley** |
| | 05-91 | -- | **Garnet, highly oxidized material, hematite, calcite, tourmaline, apatite, zircon, rutile. |
| | 09-91 | 1 to 2 milligrams | Small grains: zircon (45), calcite (20), dolomite (15), lead contamination (5), rutile (5), rock fragments (3), apatite (2), anatase (2), barite (2). |
| | 08-92 | 6 milligrams | Zircon (45), limonitic rock fragments (10), apatite (10), tourmaline (10), dolomite (10), anatase (5), barite (5), calcite (2). |
| | 08-93 | -- | Ferruginous rock fragments (60), angular carbonate (30), rounded tourmaline, apatite, and zircon (10), and trace epidote. |
| SP1 | | | **Barrett Spring** |
| | 05-91 | -- | **Dolomite, calcite, oxidized material, garnet, tourmaline, apatite, zircon, lead contamination, rutile. |
| | 09-91 | 40 to 50 milligrams | Lead fragment contamination (40), dolomite (35), zircon (10), calcite (5), pyrite (2), rutile (2), a few grains of cassiterite. |
| | 08-92 | 60 milligrams | Mostly dolomite (60), much man-made contamination including lead (15 to 20), zircon (10), limonitic rock fragments (10), rutile (2), apatite (2). |
| | 08-93 | -- | Rounded black tourmaline (30), ferruginous rock fragments (30), angular carbonate (30), rutile, anatase, and zircon (10), and contaminated with slaggy glassy material. |
| SP2 | | | **Big Spring** |
| | 05-91 | -- | **Hematite, highly oxidized material, dolomite, tourmaline, garnet, apatite, zircon, rutile. |
| | 09-91 | 10 to 15 milligrams | Small grains: dolomite (50), zircon (20), residual para-magnetic oxidized material (15), barite (5), apatite (2), rutile (2), anatase (2). |
| | 08-92 | 20 milligrams | Dolomite (55), zircon (20), tourmaline (10), limonitic rock fragments (10), apatite (2), rutile (2), barite (1). |
| | 08-93 | -- | Angular carbonate (40), rounded apatite (20), red-brown iron oxide fragments and rock fragments (20), rounded to angular zircon (10), rounded tourmaline (10), traces of sphene and rutile. |
| SP3 | | | **Dennig Series Springs** |
| | 05-91 | -- | **Dolomite, garnet, tourmaline, oxidized material, apatite, rutile, zircon, anatase. |
| | 09-91 | 1 to 2 milligrams | Small grains: dolomite (70), zircon (15), barite (5), anatase (5), tourmaline (5), probably few grains cassiterite. |
| | 08-92 | 20 milligrams | Zircon (50), rutile (20), tourmaline (10), anatase (10), apatite (5). |
| | 08-93 | -- | Black rounded tourmaline (40), angular carbonate (40), apatite, rutile, and anatase (10), ferruginous rock fragments (10), and glassy slag contamination. |

**Table 8.** Optical mineralogy of heavy mineral concentrate from streambed-material samples–Continued

| Site number (fig. 4) | Date | Sample size | Sample description |
|---|---|---|---|
| SP4 | | | **Falling Spring** |
| | 05-91 | -- | C-1 magnetite, highly oxidized magnetic material. |
| | | | C-2 highly oxidized material, hematite, tourmaline, garnet. |
| | | | C-3 predominantly dolomite, zircon, apatite, rutile, lead contamination. |
| | 09-91 | 5 to 6 milligrams | Tiny grains: residual para-magnetic oxidized material (40), dolomite (20), zircon (13), calcite (10), barite (5), lead fragment contamination (5), rock fragments (5), rutile (2), probably few grains cassiterite. |
| | 08-92 | 140 milligrams | Dolomite (70), lead contamination (10), oxidized pyrite (5), zircon (5), tourmaline (5), apatite (1). |
| | 08-93 | -- | Limonite/goethite pseudomorphs after magnetite (70), angular carbonate (20), rounded tourmaline, zircon, rock fragments, apatite, and lead fragment contamination (10). |
| SP5 | | | **Greer Spring** |
| | 05-91 | -- | C-1 magnetite, highly magnetic oxidized material. |
| | | | C-2 highly oxidized material, hematite, garnet, some dolomite. |
| | | | C-3 predominantly dolomite, lead contamination, zircon, apatite, rutile. |
| | 09-91 | 50 to 60 milligrams | Mostly small grains: dolomite (50), zircon (20), calcite (10), lead fragments (10), rock fragments (5), anatase (2), and probably a few grains of cassiterite. |
| | 08-92 | 125 milligrams | Dolomite (65), calcite (10), limonitic rock fragments (10), zircon (10), man-made contamination including lead (5), apatite (2), and possibly a few grains of cassiterite. |
| | 08-93 | -- | Angular carbonate (40), ferruginous rock fragments (40), rounded black tourmaline (10), rounded white apatite, rutile, and zircon (10), traces of contamination (yellow beads of welding material). |
| SP6 | | | **McCormack Spring** |
| | 05-91 | -- | **Dolomite, apatite, zircon, oxidized material, tourmaline, garnet, 1 grain pyrite, anatase, rutile. |
| | 09-91 | 1 to 2 milligrams | Small grains: dolomite (50), zircon (25), barite (5), rutile (5), rock fragments (5), tourmaline (5), pyrite (2), few grains of cassiterite. |
| | 08-92 | 12 milligrams | Mostly tiny grains: dolomite (60), zircon (20), tourmaline (10), apatite (3), rutile (3), anatase (2). |
| | 08-93 | -- | Angular carbonate (80), rounded apatite and black tourmaline (10), rock fragments (10), traces of anatase, biotite, and metal fragments. |
| SP7 | | | **Turner Spring** |
| | 05-91 | -- | C-1 magnetite, highly magnetic oxidized material. |
| | | | C-2 hematite, highly oxidized material, garnet. |
| | | | C-3 mostly dolomite, zircon, anatase, rutile, tourmaline, apatite. |
| | 09-91 | 30 to 40 milligrams | Small grains: dolomite (70), zircon (15), barite (5), rock fragments (5), tourmaline (2), rutile (2), apatite (1). |
| | 08-92 | 130 milligrams | Dolomite (75), limonitic material (15), zircon (5), tourmaline (3), apatite (1), rutile (1). |
| | 08-93 | -- | Angular carbonate (80), ferruginous rock fragments (10), rutile, zircon, apatite, and rounded tourmaline (10). |

## ABBREVIATIONS AND SYMBOLS USED IN TABLE 9

| | |
|---|---|
| Ca | Calcium, percent by weight |
| Fe | Iron, percent by weight |
| Mg | Magnesium, percent by weight |
| P | Phosphorous, percent by weight |
| Na | Sodium, percent by weight |
| Ti | Titanium, percent by weight |
| Sb | Antimony, in micrograms per gram |
| As | Arsenic, in micrograms per gram |
| Ba | Barium, in micrograms per gram |
| Be | Beryllium, in micrograms per gram |
| Bi | Bismuth, in micrograms per gram |
| B | Boron, in micrograms per gram |
| Cd | Cadmium, in micrograms per gram |
| Cr | Chromium, in micrograms per gram |
| Co | Cobalt, in micrograms per gram |
| Cu | Copper, in micrograms per gram |
| Ga | Gallium, in micrograms per gram |
| Ge | Germanium, in micrograms per gram |
| Au | Gold, in micrograms per gram |
| La | Lanthanum, in micrograms per gram |
| Pb | Lead, in micrograms per gram |
| Mn | Manganese, in micrograms per gram |
| Mo | Molybdenum, in micrograms per gram |
| Ni | Nickel, in micrograms per gram |
| Nb | Niobium, in micrograms per gram |
| Pd | Palladium, in micrograms per gram |
| Pt | Platinum, in micrograms per gram |
| Sc | Scandium, in micrograms per gram |
| Ag | Silver, in micrograms per gram |
| Sr | Strontium, in micrograms per gram |
| Th | Thorium, in micrograms per gram |
| Sn | Tin, in micrograms per gram |
| W | Tungsten, in micrograms per gram |
| V | Vanadium, in micrograms per gram |
| Y | Yttrium, in micrograms per gram |
| Zn | Zinc, in micrograms per gram |
| Zr | Zirconium, in micrograms per gram |
| < | less than |
| > | greater than |

**Table 9.** Semi-quantitative emission spectrography analysis for heavy mineral concentrate of non-magnetic ore and non-ore minerals (C-3 fraction) of streambed material

| Site number (fig. 4) | Site location | Date | Ca | Fe | Mg | P | Na | Ti | Sb | As | Ba | Be |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SW1 | Current River at Van Buren | 09-91 | 0.2 | 2 | 0.3 | 0.5 | <0.5 | 2 | 200 | <500 | 2,000 | <2 |
| | | 08-92 | 1 | 1 | 3 | <.5 | <.5 | >2 | 200 | <500 | 200 | <2 |
| | | 08-93 | 1 | 10 | 3 | <.5 | <.5 | >2 | <200 | <500 | 500 | <2 |
| SW2 | Current River at Hawes Memorial Campground | 09-91 | 5 | 1 | 3 | <.5 | <.5 | 1.5 | 300 | 500 | 200 | <2 |
| | | 08-92 | 1 | 1 | 2 | <.5 | <.5 | 2 | <200 | <500 | 150 | <2 |
| | | 08-93 | <.1 | 10 | .5 | <.5 | <.5 | 2 | <200 | <500 | 300 | <2 |
| SW3 | Eleven Point River at Thomasville | 09-91 | 2 | .7 | 2 | <.5 | <.5 | 1.5 | <200 | <500 | 50 | <2 |
| | | 08-92 | .2 | 1 | .2 | <.5 | <.5 | 2 | <200 | <500 | 70 | <2 |
| | | 08-93 | .5 | 30 | 1 | <.5 | <.5 | .7 | <200 | <500 | 200 | <2 |
| SW4 | Spring Creek | 09-91 | .1 | .5 | .2 | <.5 | <.5 | 2 | <200 | <500 | 70 | <2 |
| | | 08-92 | .3 | 1 | .5 | .7 | <.5 | 2 | <200 | <500 | 50 | <2 |
| | | 08-93 | .1 | 15 | 3 | <.5 | <.5 | 1.5 | <200 | <500 | 150 | <2 |
| SW5 | Hurricane Creek | 09-91 | 3 | .5 | 2 | <.5 | <.5 | .7 | <200 | <500 | 1,000 | <2 |
| | | 08-92 | 2 | 7 | 5 | .5 | <.5 | 1 | 200 | <500 | 500 | <2 |
| | | 08-93 | .3 | 30 | 3 | .5 | <.5 | 1 | <200 | <500 | 500 | <2 |
| SW6 | Eleven Point River near Bardley | 09-91 | 3 | .2 | 2 | <.5 | <.5 | 1 | 200 | <500 | <50 | <2 |
| | | 08-92 | 1 | 1.5 | 1.5 | .5 | <.5 | 2 | <200 | <500 | 70 | <2 |
| | | 08-93 | 5 | 20 | 7 | <.5 | <.5 | 1.5 | <200 | <500 | 500 | <2 |

**Table 9.** Semi-quantitative emission spectrography analysis for heavy mineral concentrate of non-magnetic ore and non-ore minerals (C-3 fraction) of streambed material–Continued

| Site number (fig. 4) | Site location | Date | Bi | B | Cd | Cr | Co | Cu | Ga | Ge | Au | La |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SW1 | Current River at Van Buren | 09-91 | <20 | 500 | <50 | 200 | <20 | 300 | <10 | <20 | <20 | 300 |
| | | 08-92 | <20 | 1,000 | <50 | 200 | <20 | 1,000 | 10 | <20 | <20 | 300 |
| | | 08-93 | <20 | 2,000 | <50 | 150 | 30 | 200 | <10 | <20 | <20 | 200 |
| SW2 | Current River at Hawes Memorial | 09-91 | <20 | 200 | <50 | 20 | <20 | <10 | <10 | <20 | <20 | 500 |
| | Campground | 08-92 | <20 | 300 | <50 | 20 | <20 | 10 | <10 | <20 | <20 | <100 |
| | | 08-93 | <20 | 2,000 | <50 | 100 | 30 | 300 | 10 | <20 | <20 | 300 |
| SW3 | Eleven Point River at Thomasville | 09-91 | <20 | 700 | <50 | 20 | <20 | <10 | <10 | <20 | <20 | <100 |
| | | 08-92 | <20 | 1,500 | <50 | 100 | <20 | <10 | <10 | <20 | <20 | <100 |
| | | 08-93 | <20 | 2,000 | <50 | 150 | 50 | 500 | <10 | <20 | <20 | <100 |
| SW4 | Spring Creek | 09-91 | <20 | 1,000 | <50 | 20 | <20 | 70 | <10 | <20 | <20 | 100 |
| | | 08-92 | <20 | 2,000 | <50 | 200 | <20 | <10 | <10 | <20 | <20 | 200 |
| | | 08-93 | <20 | >5,000 | <50 | 200 | 20 | 50 | 10 | <20 | <20 | <100 |
| SW5 | Hurricane Creek | 09-91 | <20 | 300 | <50 | <20 | <20 | <10 | <10 | <20 | <20 | 500 |
| | | 08-92 | 20 | 1,000 | <50 | 300 | 20 | 20 | <10 | <20 | <20 | 100 |
| | | 08-93 | <20 | 2,000 | <50 | 300 | 70 | 150 | 20 | <20 | <20 | <100 |
| SW6 | Eleven Point River near Bardley | 09-91 | <20 | 150 | <50 | <20 | <20 | <10 | <10 | <20 | <20 | <100 |
| | | 08-92 | <20 | 1,500 | <50 | 100 | <20 | 300 | <10 | <20 | <20 | <100 |
| | | 08-93 | <20 | 3,000 | <50 | 150 | 30 | 70 | 15 | <20 | <20 | 150 |

**Table 9.** Semi-quantitative emission spectrography analysis for heavy mineral concentrate of non-magnetic ore and non-ore minerals (C-3 fraction) of streambed material--Continued

| Site number (fig. 4) | Site location | Date | Pb | Mn | Mo | Ni | Nb | Pd | Pt | Sc | Ag | Sr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SW1 | Current River at Van Buren | 09-91 | 2,000 | 1,000 | <10 | 15 | <50 | <5 | <20 | 15 | 5 | 500 |
| | | 08-92 | 500 | 2,000 | <10 | <10 | <50 | <5 | <20 | 50 | 1 | <200 |
| | | 08-93 | 100 | 2,000 | <10 | 50 | <50 | <5 | <20 | 20 | <1 | <200 |
| SW2 | Current River at Hawes Memorial Campground | 09-91 | 3,000 | 200 | <10 | <10 | 50 | <5 | <20 | 15 | <1 | <200 |
| | | 08-92 | 20 | 100 | <10 | <10 | 70 | <5 | <20 | 30 | <1 | <200 |
| | | 08-93 | 150 | 2,000 | <10 | 50 | 50 | <5 | <20 | 15 | <1 | <200 |
| SW3 | Eleven Point River at Thomasville | 09-91 | 300 | 100 | <10 | <10 | <50 | <5 | <20 | 30 | <1 | <200 |
| | | 08-92 | 1,000 | 200 | <10 | 10 | <50 | <5 | <20 | 50 | <1 | <200 |
| | | 08-93 | 500 | 3,000 | 10 | 200 | <50 | <5 | <20 | <10 | <1 | <200 |
| SW4 | Spring Creek | 09-91 | 70 | 100 | <10 | <10 | <50 | <5 | <20 | 70 | <1 | <200 |
| | | 08-92 | 300 | 150 | <10 | 10 | <50 | <5 | <20 | 50 | <1 | 300 |
| | | 08-93 | 100 | 2,000 | <10 | 100 | <50 | <5 | <20 | 15 | <1 | <200 |
| SW5 | Hurricane Creek | 09-91 | <20 | 1,000 | <10 | <10 | <50 | <5 | <20 | 10 | <1 | 500 |
| | | 08-92 | 5,000 | 2,000 | <10 | 70 | <50 | <5 | <20 | 15 | <1 | 500 |
| | | 08-93 | 150 | 5,000 | <10 | 100 | <50 | <5 | <20 | 15 | <1 | <200 |
| SW6 | Eleven Point River near Bardley | 09-91 | 10,000 | 150 | <10 | <10 | <50 | <5 | <20 | 30 | <1 | <200 |
| | | 08-92 | 300 | 1,000 | <10 | <10 | <50 | <5 | <20 | 100 | <1 | <200 |
| | | 08-93 | 1,000 | 1,500 | 10 | 150 | <50 | <5 | <20 | 10 | <1 | <200 |

**Table 9.** Semi-quantitative emission spectrography analysis for heavy mineral concentrate of non-magnetic ore and non-ore minerals (C-3 fraction) of streambed material–Continued

| Site number (fig. 4) | Site location | Date | Th | Sn | W | V | Y | Zn | Zr |
|---|---|---|---|---|---|---|---|---|---|
| SW1 | Current River at Van Buren | 09-91 | <200 | 500 | <50 | 50 | 150 | 500 | >2,000 |
| | | 08-92 | <200 | 150 | <50 | 70 | 500 | 700 | >2,000 |
| | | 08-93 | <200 | 200 | <50 | 70 | 200 | <500 | >2,000 |
| SW2 | Current River at Hawes Memorial | 09-91 | <200 | 200 | <50 | 50 | 100 | <500 | >2,000 |
| | Campground | 08-92 | <200 | 50 | <50 | 70 | 200 | <500 | >2,000 |
| | | 08-93 | <200 | <20 | <50 | 100 | 200 | <500 | >2,000 |
| SW3 | Eleven Point River at Thomasville | 09-91 | <200 | 500 | <50 | 70 | 200 | <500 | >2,000 |
| | | 08-92 | <200 | 1,500 | <50 | 70 | 200 | 500 | >2,000 |
| | | 08-93 | <200 | 2,000 | <50 | 150 | 150 | 500 | >2,000 |
| SW4 | Spring Creek | 09-91 | <200 | 200 | <50 | 50 | 300 | <500 | >2,000 |
| | | 08-92 | <200 | 20 | <50 | 70 | 500 | 700 | >2,000 |
| | | 08-93 | <200 | 50 | <50 | 100 | 500 | <500 | >2,000 |
| SW5 | Hurricane Creek | 09-91 | <200 | <20 | <50 | 30 | 70 | <500 | >2,000 |
| | | 08-92 | <200 | 1,000 | <50 | 100 | 150 | <500 | >2,000 |
| | | 08-93 | <200 | <20 | <50 | 100 | 300 | 500 | >2,000 |
| SW6 | Eleven Point River near Bardley | 09-91 | <200 | 70 | <50 | 20 | 100 | <500 | >2,000 |
| | | 08-92 | <200 | <20 | <50 | 50 | 500 | 2,000 | >2,000 |
| | | 08-93 | <200 | <20 | <50 | 100 | 300 | <500 | >2,000 |

**Table 9.** Semi-quantitative emission spectrography analysis for heavy mineral concentrate of non-magnetic ore and non-ore minerals (C-3 fraction) of streambed material–Continued

| Site number (fig. 4) | Site location | Date | Ca | Fe | Mg | P | Na | Ti | Sb | As | Ba | Be |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SP1 | Barrett Spring | 09-91 | 5 | 2 | 7 | <.5 | <.5 | .7 | 5,000 | 500 | 500 | <2 |
| | | 08-92 | 15 | 2 | 7 | <.5 | <.5 | .5 | 2,000 | 500 | 70 | <2 |
| | | 08-93 | 10 | 20 | 5 | <.5 | <.5 | 1 | <200 | <500 | 1,000 | <2 |
| SP2 | Big Spring | 09-91 | 3 | 1.5 | 3 | <0.5 | <0.5 | 2 | <200 | 500 | 1,000 | <2 |
| | | 08-92 | 10 | 1 | 7 | <.5 | <.5 | 1.5 | 200 | <500 | 150 | <2 |
| | | 08-93 | 10 | 15 | 5 | <.5 | <.5 | 2 | <200 | 500 | 500 | <2 |
| SP3 | Dennig Series Springs | 09-91 | 5 | .3 | 5 | <.5 | <.5 | .7 | <200 | <500 | 50 | <2 |
| | | 08-92 | .3 | .3 | 2 | .5 | <.5 | >2 | <200 | <500 | 150 | <2 |
| | | 08-93 | 15 | 5 | 10 | .5 | <.5 | 2 | <200 | <500 | 50 | <2 |
| SP4 | Falling Spring | 09-91 | 1.5 | 10 | 3 | <.5 | <.5 | 1.5 | 700 | <500 | 100 | <2 |
| | | 08-92 | 20 | 1.5 | 15 | <.5 | <.5 | .2 | 500 | <500 | 150 | <2 |
| | | 08-93 | 1 | 20 | 2 | <.5 | <.5 | .7 | <200 | <500 | 1,500 | <2 |
| SP5 | Greer Spring | 09-91 | 15 | .7 | 10 | <.5 | <.5 | .1 | 1,000 | <500 | 500 | <2 |
| | | 08-92 | 20 | 1.5 | 10 | <.5 | <.5 | .5 | 500 | <500 | 70 | <2 |
| | | 08-93 | 10 | 20 | 5 | <.5 | <.5 | .7 | <200 | <500 | 200 | <2 |
| SP6 | McCormack Spring | 09-91 | 3 | 3 | 3 | <.5 | <.5 | 1 | 500 | <500 | 50 | <2 |
| | | 08-92 | 10 | .15 | 10 | <.5 | <.5 | .5 | <200 | <500 | 100 | <2 |
| | | 08-93 | 20 | 10 | 10 | <.5 | <.5 | 1.5 | <200 | <500 | 200 | <2 |
| SP7 | Turner Spring | 09-91 | 10 | 1 | 10 | <.5 | <.5 | .5 | <200 | <500 | 1,000 | <2 |
| | | 08-92 | 20 | 2 | 10 | <.5 | <.5 | .3 | <200 | <500 | 70 | <2 |
| | | 08-93 | 30 | 15 | 15 | <.5 | <.5 | 1 | <200 | <500 | 200 | <2 |

**Table 9.** Semi-quantitative emission spectrography analysis for heavy mineral concentrate of non-magnetic ore and non-ore minerals (C-3 fraction) of streambed material–Continued

| Site number (fig. 4) | Site location | Date | Bi | B | Cd | Cr | Co | Cu | Ga | Ge | Au | La |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SP1 | Barrett Spring | 09-91 | 50 | 70 | <50 | 20 | <20 | 1,000 | <10 | <20 | <20 | <100 |
| | | 08-92 | 100 | 300 | <50 | 100 | <20 | 200 | <10 | <20 | <20 | 100 |
| | | 08-93 | <20 | 2,000 | <50 | 150 | 100 | 200 | <10 | <20 | <20 | 100 |
| SP2 | Big Spring | 09-91 | <20 | 500 | <50 | 100 | <20 | <10 | <10 | <20 | <20 | 300 |
| | | 08-92 | <20 | 700 | <50 | 100 | <20 | 100 | <10 | <20 | <20 | 150 |
| | | 08-93 | <20 | 2,000 | <50 | 150 | 50 | 200 | <10 | <20 | <20 | 200 |
| SP3 | Dennig Series Springs | 09-91 | <20 | 300 | <50 | 20 | <20 | <10 | <10 | <20 | <20 | <100 |
| | | 08-92 | <20 | 2,000 | <50 | 200 | <20 | 70 | 10 | <20 | <20 | <100 |
| | | 08-93 | <20 | 5,000 | <50 | 300 | <20 | 20 | 10 | <20 | <20 | <100 |
| SP4 | Falling Spring | 09-91 | 20 | 700 | <50 | 100 | 50 | 150 | <10 | <20 | <20 | 200 |
| | | 08-92 | <20 | 300 | <50 | 50 | 20 | 150 | <10 | <20 | <20 | <100 |
| | | 08-93 | <20 | 1,500 | <50 | 100 | 100 | 200 | <10 | <20 | <20 | <100 |
| SP5 | Greer Spring | 09-91 | 50 | 100 | <50 | 30 | <20 | 200 | <10 | <20 | <20 | <100 |
| | | 08-92 | 20 | 200 | <50 | 100 | 20 | 1,000 | <10 | <20 | <20 | <100 |
| | | 08-93 | <20 | 2,000 | <50 | 200 | 50 | 200 | 20 | <20 | <20 | <100 |
| SP6 | McCormack Spring | 09-91 | <20 | 200 | <50 | 100 | <20 | 300 | <10 | <20 | <20 | <100 |
| | | 08-92 | <20 | 1,000 | <50 | <20 | <20 | 20 | 50 | <20 | <20 | <100 |
| | | 08-93 | <20 | 2,000 | <50 | 500 | 50 | 1,500 | <10 | <20 | <20 | 100 |
| SP7 | Turner Spring | 09-91 | <20 | 100 | <50 | 50 | <20 | 20 | <10 | <20 | <20 | <100 |
| | | 08-92 | <20 | 200 | <50 | 70 | <20 | 50 | <10 | <20 | <20 | <100 |
| | | 08-93 | <20 | 1,000 | <50 | 100 | 70 | 200 | 10 | <20 | <20 | <100 |

**Table 9.** Semi-quantitative emission spectrography analysis for heavy mineral concentrate of non-magnetic ore and non-ore minerals (C-3 fraction) of streambed material–Continued

| Site number (fig. 4) | Site location | Date | Pb | Mn | Mo | Ni | Nb | Pd | Pt | Sc | Ag | Sr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SP1 | Barrett Spring | 09-91 | >50,000 | 150 | <10 | 20 | <50 | <5 | <20 | 20 | 20 | <200 |
| | | 08-92 | >50,000 | 700 | <10 | 50 | <50 | <5 | <20 | 10 | 20 | <200 |
| | | 08-93 | 500 | 10,000 | 15 | 200 | <50 | <5 | <20 | 10 | 1 | <200 |
| SP2 | Big Spring | 09-91 | 500 | 300 | <10 | <10 | <50 | <5 | <20 | 20 | <1 | 300 |
| | | 08-92 | 3,000 | 1,000 | <10 | 15 | <50 | <5 | <20 | 20 | <1 | <200 |
| | | 08-93 | 200 | 1,000 | <10 | 50 | <50 | <5 | <20 | 15 | 3 | 200 |
| SP3 | Dennig Series Springs | 09-91 | 100 | 150 | <10 | <10 | <50 | <5 | <20 | 20 | <1 | <200 |
| | | 08-92 | 200 | 200 | <10 | 10 | <50 | <5 | <20 | 50 | <1 | <200 |
| | | 08-93 | 1,500 | 300 | <10 | 30 | <50 | <5 | <20 | 50 | <1 | <200 |
| SP4 | Falling Spring | 09-91 | >50,000 | 500 | 15 | 100 | <50 | <5 | <20 | 20 | 2 | <200 |
| | | 08-92 | 15,000 | 1,000 | 10 | 50 | <50 | <5 | <20 | 10 | 1 | 200 |
| | | 08-93 | 5,000 | 5,000 | 20 | 200 | <50 | <5 | <20 | 10 | <1 | <200 |
| SP5 | Greer Spring | 09-91 | 30,000 | 500 | <10 | <10 | <50 | <5 | <20 | 10 | 3 | <200 |
| | | 08-92 | 10,000 | 3,000 | <10 | 10 | <50 | <5 | <20 | <10 | 300 | 200 |
| | | 08-93 | 700 | 2,000 | 15 | 200 | <50 | <5 | <20 | 10 | <1 | <200 |
| SP6 | McCormack Spring | 09-91 | 150 | 100 | <10 | <10 | <50 | <5 | <20 | 15 | <1 | <200 |
| | | 08-92 | 30 | 300 | <10 | 10 | <50 | <5 | <20 | <10 | <1 | <200 |
| | | 08-93 | 10,000 | 700 | <10 | 50 | <50 | <5 | <20 | 10 | <1 | 200 |
| SP7 | Turner Spring | 09-91 | 500 | 500 | <10 | 50 | <50 | <5 | <20 | <10 | <1 | 200 |
| | | 08-92 | 500 | 2,000 | 10 | 70 | <50 | <5 | <20 | <10 | <1 | 200 |
| | | 08-93 | 700 | 1,500 | 15 | 150 | <50 | <5 | <20 | 10 | 1 | 200 |

**Table 9.** Semi-quantitative emission spectrography analysis for heavy mineral concentrate of non-magnetic ore and non-ore minerals (C-3 fraction) of streambed material–Continued

| Site number (fig. 4) | Site location | Date | Th | Sn | W | V | Y | Zn | Zr |
|---|---|---|---|---|---|---|---|---|---|
| SP1 | Barrett Spring | 09-91 | <200 | >2,000 | <50 | 50 | 100 | <500 | >2,000 |
| | | 08-92 | <200 | >2,000 | <50 | 50 | 100 | 500 | >2,000 |
| | | 08-93 | <200 | <20 | <50 | 100 | 200 | 1,000 | >2,000 |
| SP2 | Big Spring | 09-91 | <200 | <20 | <50 | 50 | 150 | 500 | >2,000 |
| | | 08-92 | <200 | 2,000 | <50 | 70 | 500 | 700 | >2,000 |
| | | 08-93 | <200 | 20 | <50 | 70 | 200 | <500 | >2,000 |
| SP3 | Dennig Series Springs | 09-91 | <200 | 700 | <50 | 50 | 100 | <500 | >2,000 |
| | | 08-92 | <200 | <20 | <50 | 70 | 200 | <500 | >2,000 |
| | | 08-93 | <200 | <20 | <50 | 100 | 200 | <500 | >2,000 |
| SP4 | Falling Spring | 09-91 | <200 | 700 | <50 | 70 | 200 | <500 | >2,000 |
| | | 08-92 | <200 | 20 | <50 | 70 | 200 | 500 | >2,000 |
| | | 08-93 | <200 | <20 | <50 | 150 | 150 | 500 | >2,000 |
| SP5 | Greer Spring | 09-91 | <200 | 700 | <50 | 50 | 300 | <500 | >2,000 |
| | | 08-92 | <200 | 1,000 | <50 | 70 | 500 | 700 | >2,000 |
| | | 08-93 | <200 | <20 | <50 | 100 | 500 | <500 | >2,000 |
| SP6 | McCormack Spring | 09-91 | <200 | >2,000 | <50 | 30 | 70 | <500 | >2,000 |
| | | 08-92 | <200 | <20 | <50 | 100 | 150 | <500 | >2,000 |
| | | 08-93 | <200 | >2,000 | <50 | 100 | 300 | 500 | >2,000 |
| SP7 | Turner Spring | 09-91 | <200 | 20 | <50 | 20 | 100 | <500 | >2,000 |
| | | 08-92 | <200 | <20 | <50 | 50 | 500 | 2,000 | >2,000 |
| | | 08-93 | <200 | <20 | <50 | 100 | 300 | <500 | >2,000 |

**Table 10.** Construction and water-level data for wells, spring 1990 through fall 1993

[Latitude and longitude are in degrees, minutes, and seconds (DDDMMSS); --, no data; ~, approximately]

| Site number (fig. 10) | Local well number | Latitude longitude (DDDMMSS) | Altitude of land surface (feet) | Depth of well (feet) | Bottom of casing (feet) | Water level (feet) | | | | | | | Total water level fluctuations (feet) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Spring 1990 | Spring 1991 | Fall 1991 | Spring 1992 | Fall 1992 | Spring 1993 | Fall 1993 | |
| 1 | T23N R01E 16bcd1 | 363857 0905818 | 680 | 170 | -- | 22.8 | -- | -- | -- | -- | -- | -- | -- |
| 2 | T23N R01E 16bcd2 | 363857 0905818 | 685 | 300 | -- | -- | 42.8 | 57.1 | 50.9 | 60.3 | 56.6 | 54.1 | 17.5 |
| 3 | T23N R01W 08abd | 364008 0910534 | 755 | 358 | -- | 114.8 | 116.9 | 137.6 | 124.4 | 135.3 | 121.1 | -- | 22.8 |
| 4 | T23N R01W 13bcb1 | 363909 0910146 | 780 | 85 | -- | 31.2 | 29.0 | 47.9 | 39.5 | -- | -- | -- | 18.9 |
| 5 | T23N R01W 13bcb2 | 363909 0910146 | 780 | 228 | 148 | -- | -- | -- | -- | 53.0 | 44.7 | 46.1 | 8.3 |
| 6 | T24N R01E 28cab | 364218 0905806 | 455 | 190 | 160 | .2 | .0 | -- | -- | -- | -- | -- | .2 |
| 7 | T24N R02W 24aad | 364342 0910716 | 805 | 240 | 160 | 119.8 | 118.5 | 127.0 | 120.0 | 128.8 | 119.3 | 125.9 | 10.3 |
| 8 | T24N R03W 19ccb | 364315 0912034 | 960 | 220 | -- | 83.3 | 75.8 | 116.1 | 95.1 | 125.9 | 86.6 | 116.0 | 50.1 |
| 9 | T24N R04W 04ada | 364637 0912353 | 830 | 350 | -- | 127.6 | 147.4 | 142.3 | 146.1 | 155.2 | 137.0 | 150.0 | 27.6 |
| 10 | T25N R01E 33adb | 364658 0905722 | 405 | 86 | -- | 26.8 | 27.7 | 31.5 | 29.6 | 30.4 | 28.9 | 27.7 | 4.7 |
| 11 | T25N R01W 11acc | 365042 0910157 | 550 | 65 | -- | 19.6 | 26.9 | 34.8 | 36.7 | 33.4 | 35.4 | 33.9 | 17.1 |
| 12 | T25N R01W 19cdc | 364834 0910640 | 820 | 185 | -- | 8.5 | 9.4 | 13.6 | 12.5 | -- | 11.4 | 12.6 | 4.1 |
| 13 | T25N R02W 04aac | 365154 0911021 | 825 | 260 | -- | 70.3 | -- | -- | 91.5 | 117.8 | 87.6 | 106.7 | 47.5 |
| 14 | T25N R02W 21ddb | 364845 0911029 | 923 | 300 | -- | 157.5 | 141.8 | 151.4 | 145.5 | 153.4 | 142.4 | 151.6 | 15.7 |
| 15 | T25N R02W 31cba | 364719 0911323 | 840 | 415 | -- | 240.5 | 238.4 | 245.9 | 242.6 | 253.9 | 236.8 | 243.8 | 17.1 |
| 16 | T25N R03W 04aad | 365203 0911650 | 662 | 196 | -- | 30.9 | 23.9 | 55.3 | -- | 59.3 | 47.8 | 51.6 | 35.4 |
| 17 | T25N R03W 06bda | 365159 0911929 | 945 | 450 | -- | 213.5 | 211.3 | 210.8 | -- | -- | -- | -- | 2.7 |
| 18 | T25N R03W 17abc | 365017 0911822 | 640 | 10 | -- | 5.0 | 4.8 | -- | -- | -- | -- | -- | .2 |
| 19 | T25N R03W 18bcd | 365006 0911950 | 890 | 1,900 | -- | 226 | 226.1 | -- | 277.9 | -- | -- | -- | 51.9 |
| 20 | T25N R03W 18cbb | 364958 0911958 | 905 | 350 | -- | 218 | 210.7 | 221.4 | 217.5 | -- | 214.1 | -- | 10.7 |

**Table 10.** Construction and water-level data for wells, spring 1990 through fall 1993–Continued

| Site number (fig. 10) | Local well number | Latitude longitude (DDDMMSS) | Altitude of land surface (feet) | Depth of well (feet) | Bottom of casing (feet) | Water level (feet) | | | | | | | Total water level fluctuations (feet) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Spring 1990 | Spring 1991 | Fall 1991 | Spring 1992 | Fall 1992 | Spring 1993 | Fall 1993 | |
| 21 | T25N R03W 31bad | 364744 0911933 | 620 | 330 | -- | 60.3 | 58.4 | 73.1 | 70.8 | 75.7 | 66.4 | 68.3 | 17.3 |
| 22 | T25N R05W 21aab | 364943 0912959 | 935 | 265 | -- | 182.9 | 185.3 | 183.2 | 186.4 | 184.4 | 183.5 | 185.3 | 3.5 |
| 23 | T25N R05W 34ddd | 364711 0912846 | 710 | -- | -- | 59.3 | 61.1 | 71.5 | 67.0 | 73.2 | 66.7 | 67.2 | 13.9 |
| 24 | T26N R01W 05bdb | 365704 0910526 | 545 | 125 | -- | 25.1 | 25.8 | 66.5 | 43.6 | 63.6 | 45.1 | 48.1 | 41.4 |
| 25 | T26N R01W 22dcc | 365354 0910259 | 880 | 220 | -- | 59.9 | 54.8 | 64.4 | 60.6 | 67.4 | 54.6 | 63.3 | 12.8 |
| 26 | T26N R02W 04add | 365657 0911003 | 710 | 400 | 264 | 155.1 | 141.4 | 209.0 | 177.5 | 214.0 | 177.7 | 209.6 | 72.6 |
| 27 | T26N R02W 14abd | 365521 0910813 | 722 | -- | -- | 220.5 | 223.0 | 235.0 | 231.9 | 234.1 | 220.9 | 237.0 | 16.5 |
| 28 | T26N R02W 33dca | 365214 0911034 | 825 | -- | -- | 50.0 | 45.7 | 106.5 | -- | 124.1 | 57.9 | 107.3 | 78.4 |
| 29 | T26N R03W 06dcc | 365640 0911916 | 905 | -- | -- | 30 | 24.9 | 61.2 | 45.1 | 69.8 | 35.9 | 49.2 | 44.9 |
| 30 | T26N R03W 11bbb | 365632 0911524 | 925 | 210 | 190 | 166 | 157.5 | 159.6 | 158.4 | 162.3 | 156.1 | 158.5 | 9.9 |
| 31 | T26N R03W 18bbc | 365537 0911957 | 950 | 1,245 | 245 | 163 | 207.3 | -- | -- | -- | -- | -- | -- |
| 32 | T26N R03W 18bca | 365531 0911937 | 950 | ~1,200 | ~150 | 223 | 211.3 | 323.7 | 278.4 | 337.8 | 275.0 | -- | 126.5 |
| 33 | T26N R03W 18bcd | 365522 0911939 | 940 | ~1,200 | ~150 | -- | 244.5 | 369.4 | 320.8 | 386.4 | 290 | -- | 141.9 |
| 34 | T26N R03W 18cbb | 365514 0911956 | 945 | ~1,200 | ~150 | -- | 232.5 | 243.2 | 239.7 | 371.7 | 241.4 | 289.7 | 139.2 |
| 35 | T26N R03W 29ccc | 365312 0911845 | 705 | ~1,200 | -- | 52 | 64.6 | -- | 141.6 | -- | -- | -- | 77.0 |
| 36 | T26N R03W 30ccc | 365310 0911953 | 722 | 400 | -- | 13.0 | 15.8 | 47.6 | 40.4 | 50.0 | 38.8 | 30.0 | 37.0 |
| 37 | T26N R03W 30dda | 365320 0911851 | 705 | 210 | -- | 61 | 64.6 | 136.4 | 100.2 | 129.4 | 116.7 | 96.8 | 75.4 |
| 38 | T26N R03W 33dda | 365226 0911648 | 670 | 120 | -- | 18 | 16.8 | 48.1 | 36.4 | 54.4 | 31.6 | 36.1 | 37.6 |
| 39 | T26N R04W 03dcb | 365649 0912235 | 910 | ~1,200 | -- | 126 | 108.0 | -- | -- | 313.1 | 207.2 | 160.5 | 205.1 |
| 40 | T26N R04W 08bbb1 | 365635 0912523 | 990 | ~350 | -- | 198 | 184.5 | 212.4 | 205.0 | 229.3 | 201.5 | 214.0 | 44.8 |

**Table 10.** Construction and water-level data for wells, spring 1990 through fall 1993--Continued

| Site number (fig. 10) | Local well number | Latitude longitude (DDDMMSS) | Altitude of land surface (feet) | Depth of well (feet) | Bottom of casing (feet) | Water level (feet) | | | | | | | Total water level fluctuations (feet) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Spring 1990 | Spring 1991 | Fall 1991 | Spring 1992 | Fall 1992 | Spring 1993 | Fall 1993 | |
| 41 | T26N R04W 08bbb2 | 365635 0912521 | 987 | ~2,400 | -- | 219.6 | 206.5 | 340.2 | 265.8 | 369.0 | 290.6 | 250.1 | 162.5 |
| 42 | T26N R04W 09ada | 365623 0912322 | 980 | 450 | 155 | 229 | 195.0 | 246.3 | 231.4 | 259.9 | 243.0 | 245.8 | 64.9 |
| 43 | T26N R04W 10aba | 365635 0912232 | 885 | 310 | -- | -- | 97.3 | -- | -- | -- | -- | -- | -- |
| 44 | T26N R04W 15bda | 365528 0912246 | 835 | ~1,200 | ~150 | 90 | -- | -- | -- | -- | -- | -- | -- |
| 45 | T26N R04W 17bbc | 365536 0912523 | 950 | 350 | -- | 130.0 | 123.0 | 142.1 | 138.5 | 152.5 | 136.2 | 143.8 | 29.5 |
| 46 | T26N R04W 25ddc | 365313 0912111 | 735 | ~100 | -- | -- | -- | -- | 16.7 | -- | -- | -- | -- |
| 47 | T26N R04W 26aaa | 365357 0912112 | 810 | ~1,200 | ~150 | 121 | -- | -- | 162.5 | -- | -- | -- | 41.5 |
| 48 | T26N R04W 29bbb | 365355 0912523 | 1,005 | 350 | -- | 232 | 228.9 | 233.1 | 177.4 | 233.0 | 230.6 | 233.9 | 56.5 |
| 49 | T26N R05W 02cdd | 365639 0912805 | 1,025 | -- | -- | -- | 208.7 | 226.8 | 224.1 | 234.7 | 222.4 | 230.3 | 26.0 |
| 50 | T27N R02W 31bcc | 365753 0911312 | 970 | 610 | 202 | 437.3 | 345.5 | 429.2 | -- | 348.0 | -- | -- | 91.5 |
| 51 | T27N R03W 07dbd | 370118 0911854 | 1,115 | ~283 | -- | 163.8 | 160.5 | 161.3 | 162.2 | -- | -- | -- | 3.3 |
| 52 | T27N R03W 23ccc | 365918 0911521 | 840 | 360 | 300 | 189 | 174.1 | 212.6 | 182.3 | 196.4 | 113.7 | 199.8 | 98.9 |
| 53 | T27N R04W 23abd | 365959 0912121 | 1,060 | -- | -- | 229.6 | 223.1 | -- | -- | 233.6 | 229.4 | -- | 10.5 |
| 54 | T27N R04W 25cdc1 | 365826 0912040 | 1,060 | 1,000 | 200 | 162 | 242.8 | 267.5 | 262.6 | 274.2 | 256.8 | 267.8 | 112.2 |
| 55 | T27N R04W 25cdc2 | 365828 0912040 | 1,060 | 570 | 340 | 249 | 249.7 | 266.9 | 261.6 | 272.6 | 259.8 | 267.1 | 23.6 |
| 56 | T27N R05W 23bac | 365955 0912808 | 1,105 | -- | -- | 311.0 | -- | -- | -- | 312.4 | -- | -- | 1.4 |
| 57 | T27N R05W 35aaa | 365816 0912727 | 1,025 | 435 | -- | 209.3 | 194.2 | 203.0 | 353.0 | 217.4 | 221.8 | 209.5 | 158.8 |

**Table 11.** Continuous water-level data for three monitoring wells

[--, no data]

| Site number (fig. 10) | Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | **Lower Eleven Point River well near Greer, Mo., Oregon County[a] Daily mean depth to water in feet below land surface, October 1989 to September 1990** | | | | | | | |
| R1 | 1 | 323.46 | 328.66 | 330.71 | 332.64 | 329.31 | 315.20 | 315.82 | 306.04 | 301.34 | 309.69 | 317.43 | 321.99 |
| | 2 | 326.04 | 328.75 | 330.76 | 332.62 | 328.87 | 315.45 | 315.09 | 306.13 | 301.34 | 309.90 | 317.60 | 322.18 |
| | 3 | 326.32 | 328.80 | 330.94 | 332.50 | 327.39 | 315.94 | 314.32 | 305.83 | 301.53 | 310.17 | 317.72 | 322.32 |
| | 4 | 326.41 | 328.67 | 330.56 | 332.56 | 325.81 | 316.39 | 313.52 | 304.94 | 301.76 | 310.49 | 317.82 | 322.49 |
| | 5 | 326.31 | 328.64 | 330.54 | 332.70 | 324.20 | 316.80 | 313.16 | 304.06 | 301.90 | 310.80 | 318.10 | 322.53 |
| | 6 | 326.43 | 328.87 | 330.76 | 332.77 | 322.67 | 317.31 | 313.10 | 303.10 | 302.11 | 311.09 | 318.38 | 322.51 |
| | 7 | 326.67 | 328.76 | 331.13 | 332.68 | 321.83 | 317.81 | 313.19 | 302.27 | 302.44 | 311.37 | 318.56 | 322.57 |
| | 8 | 326.70 | 328.83 | 331.15 | 332.60 | 321.15 | 318.07 | 313.30 | 301.66 | 302.76 | 311.70 | 318.65 | 322.75 |
| | 9 | 326.74 | 329.04 | 331.03 | 332.68 | 320.84 | 318.21 | 313.41 | 301.22 | 303.17 | 312.02 | 318.78 | 322.89 |
| | 10 | 326.81 | 329.22 | 330.95 | 332.91 | 320.50 | 317.97 | 313.46 | 301.35 | 303.58 | 312.29 | 318.89 | 323.05 |
| | 11 | 326.90 | 329.28 | 331.26 | 332.89 | 319.73 | 317.58 | 313.18 | 301.52 | 303.90 | 312.53 | 319.03 | 323.22 |
| | 12 | 327.02 | 329.42 | 331.32 | 333.19 | 318.93 | 317.35 | 312.10 | 301.51 | 304.13 | 312.85 | 319.15 | 323.33 |
| | 13 | 327.16 | 329.39 | 331.29 | 333.27 | 318.20 | 317.05 | 310.73 | 301.83 | 304.41 | 313.16 | 319.34 | 323.38 |
| | 14 | 327.16 | 329.31 | 331.41 | 333.04 | 317.91 | 316.57 | 309.58 | 301.70 | 304.76 | 313.35 | 319.53 | 323.40 |
| | 15 | 327.17 | 329.38 | 331.54 | 333.17 | 317.56 | 316.43 | 308.73 | 301.33 | 305.04 | 313.66 | 319.66 | 323.50 |
| | 16 | 327.22 | 329.73 | 331.75 | 333.25 | 317.33 | 316.28 | 308.14 | 301.07 | 305.39 | 314.08 | 319.73 | 323.62 |
| | 17 | 327.53 | 329.76 | 331.70 | 333.13 | 316.57 | 315.96 | 307.94 | 301.26 | 305.77 | 314.36 | 319.80 | 323.95 |
| | 18 | 327.76 | 329.97 | 331.71 | 333.39 | 315.30 | 315.72 | 307.44 | 301.27 | 306.13 | 314.58 | 319.95 | 323.96 |
| | 19 | 327.73 | 329.97 | 331.81 | 333.15 | 314.45 | 315.61 | 306.71 | 301.09 | 306.33 | 314.74 | 320.08 | 323.99 |
| | 20 | 327.68 | 329.87 | 331.89 | 332.48 | 313.90 | 315.43 | 306.26 | 301.15 | 306.57 | 314.91 | 320.23 | 324.15 |

**Table 11.** Continuous water-level data for three monitoring wells--Continued

| Site number (fig. 10) | Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | **Lower Eleven Point River well near Greer, Mo., Oregon County** | | | | | | | | |
| | | | | | **Daily mean depth to water in feet below land surface, October 1989 to September 1990--Continued** | | | | | | | | |
| R1 | 21 | 327.68 | 329.94 | 332.15 | 331.56 | 313.28 | 315.13 | 305.96 | 301.39 | 306.98 | 315.06 | 320.42 | 324.14 |
| | 22 | 327.86 | 329.90 | 332.37 | 330.29 | 312.78 | 315.09 | 305.59 | 301.65 | 307.17 | 315.26 | 320.56 | 324.32 |
| | 23 | 328.00 | 330.04 | 332.32 | 329.02 | 313.15 | 315.50 | 305.23 | 301.62 | 307.49 | 315.58 | 320.66 | 324.54 |
| | 24 | 328.11 | 330.16 | 332.01 | 328.30 | 313.56 | 315.68 | 305.05 | 301.58 | 307.85 | 315.82 | 320.84 | 324.57 |
| | 25 | 328.19 | 330.04 | 331.84 | 328.06 | 314.02 | 315.94 | 305.08 | 301.51 | 308.16 | 316.07 | 321.01 | 324.45 |
| | 26 | 328.23 | 330.21 | 332.00 | 328.04 | 314.07 | 316.18 | 305.05 | 301.58 | 308.37 | 316.29 | 321.18 | 324.59 |
| | 27 | 328.30 | 330.12 | 332.05 | 328.05 | 314.38 | 316.36 | 305.07 | 301.57 | 308.64 | 316.45 | 321.27 | 324.77 |
| | 28 | 328.33 | 330.63 | 332.19 | 328.41 | 314.86 | 316.40 | 305.21 | 301.53 | 308.92 | 316.58 | 321.32 | 324.91 |
| | 29 | 328.34 | 330.82 | 332.10 | 328.42 | -- | 316.52 | 305.40 | 301.46 | 309.21 | 316.73 | 321.40 | 325.04 |
| | 30 | 328.32 | 330.69 | 332.18 | 328.73 | -- | 316.65 | 305.75 | 301.38 | 309.51 | 316.96 | 321.62 | 325.17 |
| | 31 | 328.51 | -- | 332.29 | 329.25 | -- | 316.54 | -- | 301.34 | -- | 317.22 | 321.79 | -- |
| | MEAN | 327.26 | 329.56 | 331.54 | 331.48 | 318.66 | 316.42 | 309.42 | 302.16 | 305.22 | 313.73 | 319.69 | 323.61 |
| | MAXIMUM | 328.51 | 330.82 | 332.37 | 333.39 | 329.31 | 318.21 | 315.82 | 306.13 | 309.51 | 317.22 | 321.79 | 325.17 |
| | MINIMUM | 323.46 | 328.64 | 330.54 | 328.04 | 312.78 | 315.09 | 305.05 | 301.07 | 301.34 | 309.69 | 317.43 | 321.99 |

WATER YEAR 1990 MEAN 319.09 MINIMUM 301.07 MAXIMUM 333.39

**Table 11.** Continuous water-level data for three monitoring wells–Continued

| Site number (fig. 10) | Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | **Lower Eleven Point River well near Greer, Mo. Daily mean depth to water in feet below land surface, October 1990 to September 1991** | | | | | | | |
| R1 | 1 | 325.14 | 327.25 | 324.99 | 312.26 | 312.36 | 317.65 | 301.85 | -- | 296.72 | 305.31 | 314.12 | 320.13 |
| | 2 | 325.08 | 327.36 | 324.20 | 311.06 | 312.85 | 317.70 | 301.86 | -- | 297.07 | 305.66 | 314.26 | 320.27 |
| | 3 | 324.99 | 327.45 | 323.82 | 310.30 | 313.25 | 317.83 | 302.15 | -- | 297.39 | 306.01 | 314.47 | 320.37 |
| | 4 | 325.33 | 327.33 | 323.93 | 309.65 | 313.69 | 317.70 | 302.31 | -- | 297.72 | 306.34 | 314.71 | 320.39 |
| | 5 | 325.44 | 327.37 | 323.50 | 309.16 | 314.09 | 317.27 | 302.32 | -- | 298.15 | 306.69 | 314.92 | 320.42 |
| | 6 | 325.45 | 327.58 | 323.30 | 309.22 | 314.56 | 317.12 | 301.95 | -- | 298.61 | 307.05 | 315.19 | 320.63 |
| | 7 | 325.55 | 327.71 | 323.41 | 309.09 | 315.10 | 317.42 | 301.49 | -- | 298.95 | 307.39 | 315.42 | 320.73 |
| | 8 | 325.60 | 327.60 | 323.58 | 308.57 | 315.38 | 317.38 | 301.11 | -- | 299.20 | 307.65 | 315.47 | 320.75 |
| | 9 | 325.50 | 327.46 | 323.87 | 308.24 | 315.54 | 317.41 | 301.06 | -- | 299.55 | 307.87 | 315.60 | 320.89 |
| | 10 | 325.27 | 327.67 | 324.11 | 307.68 | 315.83 | 317.35 | 301.21 | -- | 299.75 | 308.12 | 315.94 | 321.04 |
| | 11 | 324.94 | 327.87 | 324.29 | 307.23 | 316.11 | 316.95 | 301.23 | -- | 300.00 | 308.40 | 316.26 | 321.15 |
| | 12 | 324.65 | 328.02 | 324.53 | 306.86 | 316.12 | 316.54 | 301.06 | -- | 300.25 | 308.73 | 316.47 | 321.26 |
| | 13 | 324.51 | 328.06 | 325.12 | 306.13 | 315.90 | 316.62 | -- | -- | 300.57 | 309.06 | 316.59 | 321.37 |
| | 14 | 324.54 | 328.14 | 325.36 | 305.48 | 316.28 | 316.88 | -- | -- | 300.83 | 309.49 | 316.73 | 321.45 |
| | 15 | 324.93 | 328.22 | 325.61 | 304.92 | 316.70 | 317.04 | -- | -- | 301.07 | 309.89 | 316.94 | 321.62 |
| | 16 | 325.03 | 328.31 | 326.01 | 304.90 | 316.59 | 316.98 | 295.55 | -- | 301.40 | 310.18 | 317.14 | 321.82 |
| | 17 | 325.10 | 328.43 | 325.86 | 305.09 | 316.27 | 316.64 | 293.69 | -- | 301.67 | 310.37 | 317.23 | 321.96 |
| | 18 | 325.53 | 328.31 | 325.70 | 305.27 | 316.26 | 316.65 | 291.99 | 289.68 | 301.94 | 310.59 | 317.48 | 322.09 |
| | 19 | 325.67 | 328.38 | 325.14 | 305.27 | 316.62 | 316.40 | 290.75 | 290.10 | 302.23 | 310.91 | 317.70 | 322.41 |
| | 20 | 325.70 | 328.51 | 323.82 | 305.71 | 316.86 | 315.94 | 289.78 | 290.26 | 302.43 | 311.30 | 317.97 | 322.50 |

**Table 11.** Continuous water-level data for three monitoring wells--Continued

| Site number (fig. 10) | Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Lower Eleven Point River well near Greer, Mo. Daily mean depth to water in feet below land surface, October 1990 to September 1991--Continued** | | | | | | |
| R1 | 21 | 325.93 | 328.53 | 322.47 | 306.40 | 316.89 | 315.52 | -- | 290.35 | 302.60 | 311.63 | 318.18 | 322.46 |
| | 22 | 326.10 | 328.54 | 321.12 | 306.73 | 317.05 | 314.80 | -- | 290.45 | 302.84 | 311.89 | 318.48 | 322.52 |
| | 23 | 326.23 | 328.44 | 319.50 | 307.20 | 317.21 | 313.30 | -- | 292.31 | 303.20 | 312.11 | 318.83 | 322.72 |
| | 24 | 326.42 | 328.21 | 317.99 | 307.91 | 317.41 | 310.88 | -- | 295.16 | 303.51 | 312.31 | 319.07 | 322.64 |
| | 25 | 326.53 | 328.22 | 316.68 | 308.48 | 317.69 | 308.19 | -- | 295.25 | 303.77 | 312.62 | 319.20 | 322.66 |
| | 26 | 326.59 | 328.16 | 315.88 | 308.92 | 317.83 | 305.82 | -- | 295.36 | 304.04 | 312.97 | 319.27 | 322.90 |
| | 27 | 326.82 | 328.16 | 315.16 | 309.16 | 317.99 | 304.00 | -- | 295.49 | 304.32 | 313.24 | 319.39 | 323.11 |
| | 28 | 327.08 | 328.22 | 314.82 | 309.79 | 318.02 | 303.04 | -- | 295.66 | 304.57 | 313.38 | 319.58 | 323.28 |
| | 29 | 327.11 | 327.43 | 314.75 | 310.28 | -- | 302.21 | -- | 295.77 | 304.81 | 313.57 | 319.70 | 323.47 |
| | 30 | 327.15 | 326.03 | 314.61 | 310.99 | -- | 302.12 | -- | 295.96 | 305.05 | 313.83 | 319.75 | 323.52 |
| | 31 | 327.22 | -- | 313.77 | 311.83 | -- | 301.90 | -- | 296.32 | -- | 314.01 | 319.88 | -- |
| | MEAN | 325.71 | 327.90 | 321.84 | 308.06 | 315.94 | 313.65 | 298.90 | 293.44 | 301.14 | 309.95 | 317.16 | 321.75 |
| | MAXIMUM | 327.22 | 328.54 | 326.01 | 312.26 | 318.02 | 317.83 | 302.32 | 296.32 | 305.05 | 314.01 | 319.88 | 323.52 |
| | MINIMUM | 324.51 | 326.03 | 313.77 | 304.90 | 312.36 | 301.90 | 289.78 | 289.68 | 296.72 | 305.31 | 314.12 | 320.13 |

WATER YEAR 1991 MEAN 314.47 MINIMUM 289.68 MAXIMUM 328.54

**Table 11.** Continuous water-level data for three monitoring wells--Continued

| Site number (fig. 10) | Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Lower Eleven Point River well near Greer, Mo. Daily mean depth to water in feet below land surface, October 1991 to September 1992** | | | | | | |
| R1 | 1 | 323.48 | 321.60 | 309.92 | 312.57 | 316.72 | 317.43 | 320.15 | 301.59 | 312.81 | 317.76 | 321.68 | 325.06 |
| | 2 | 323.46 | 320.17 | 309.19 | 312.56 | 316.95 | 317.62 | 320.27 | 301.95 | 312.94 | 317.96 | 321.73 | 325.05 |
| | 3 | 323.55 | 318.54 | 308.51 | 312.77 | 317.11 | 317.78 | 320.16 | 302.45 | 312.96 | 318.37 | 321.81 | 325.25 |
| | 4 | 323.58 | 317.05 | 307.76 | 313.07 | 317.27 | 317.91 | 320.26 | 302.75 | 312.99 | 318.60 | 322.00 | 325.42 |
| | 5 | 324.00 | 315.83 | 306.69 | 313.26 | 317.41 | 318.02 | 320.70 | 303.25 | 312.81 | 318.60 | 322.13 | 325.46 |
| | 6 | 324.25 | 315.20 | 305.95 | 313.54 | 317.51 | 318.18 | 320.74 | 303.95 | 312.53 | 318.81 | 322.24 | 325.57 |
| | 7 | 324.27 | 315.17 | 305.42 | 313.82 | 317.77 | 318.51 | 320.83 | 304.40 | 312.59 | 319.04 | 322.28 | 325.67 |
| | 8 | 324.23 | 315.35 | 305.32 | 313.96 | 318.20 | 318.73 | 320.96 | 304.68 | 312.56 | 319.23 | 322.45 | 325.79 |
| | 9 | 324.33 | 315.45 | 305.60 | 314.22 | 318.54 | 318.62 | 321.02 | 305.14 | 312.57 | 319.42 | 322.64 | 325.75 |
| | 10 | 324.36 | 315.71 | 305.97 | 314.27 | 318.65 | 319.00 | 320.96 | 305.77 | 312.71 | 319.56 | 322.72 | 326.00 |
| | 11 | 324.26 | 316.27 | 306.37 | 314.07 | 318.85 | 319.22 | 320.81 | 306.20 | 312.95 | 319.72 | 322.83 | 326.18 |
| | 12 | 324.44 | 316.82 | 306.63 | 313.77 | 318.85 | 319.24 | 320.85 | 306.55 | 313.18 | 319.82 | 322.84 | 326.23 |
| | 13 | 324.64 | 317.25 | 307.28 | 313.53 | 318.92 | 319.40 | 320.49 | 307.20 | 313.35 | 319.99 | 322.79 | 326.24 |
| | 14 | 324.62 | 317.74 | 308.17 | 313.82 | 318.81 | 319.51 | 320.11 | 307.57 | 313.60 | 320.07 | 322.89 | 326.31 |
| | 15 | 324.79 | 318.34 | 308.69 | 314.02 | 318.68 | 319.83 | 319.87 | 308.10 | 313.89 | 320.22 | 322.98 | 326.48 |
| | 16 | 325.00 | 318.90 | 309.04 | 313.89 | 318.42 | 319.90 | 319.75 | 308.63 | 314.18 | 320.37 | 323.06 | 326.53 |
| | 17 | 325.04 | 319.17 | 309.54 | 313.83 | 317.49 | 319.85 | 319.73 | 309.14 | 314.42 | 320.63 | 323.15 | 326.50 |
| | 18 | 325.19 | 319.16 | 310.31 | 314.03 | 316.93 | 319.65 | 319.56 | 309.57 | 314.77 | 320.84 | 323.31 | 326.51 |
| | 19 | 325.44 | 318.58 | 310.89 | 314.05 | 316.77 | 320.06 | 319.29 | 309.88 | 315.04 | 320.89 | 323.42 | 326.71 |
| | 20 | 325.42 | 317.27 | 311.27 | 314.02 | 316.51 | 320.18 | 317.92 | 310.19 | 315.31 | 320.93 | 323.55 | 326.53 |

**Table 11.** Continuous water-level data for three monitoring wells--Continued

| Site number (fig. 10) | Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Lower Eleven Point River well near Greer, Mo. Daily mean depth to water in feet below land surface, October 1991 to September 1992--Continued** | | | | | | |
| R1 | 21 | 325.36 | 315.28 | 311.72 | 314.07 | 316.27 | 319.83 | 315.26 | 310.50 | 315.78 | 321.01 | 323.79 | 326.40 |
| | 22 | 325.43 | 313.12 | 311.69 | 313.97 | 316.09 | 319.63 | 312.05 | 310.77 | 315.99 | 321.04 | 323.93 | 326.46 |
| | 23 | 325.52 | 311.50 | 311.70 | 314.21 | 315.97 | 319.68 | 308.67 | 310.96 | 316.03 | 321.10 | 324.04 | 326.46 |
| | 24 | 325.61 | 310.31 | 312.03 | 314.73 | 316.20 | 319.60 | 306.01 | 311.18 | 316.21 | 321.20 | 324.21 | 326.30 |
| | 25 | 325.72 | 309.61 | 312.01 | 314.91 | 316.36 | 319.44 | 304.13 | 311.27 | 316.48 | 321.22 | 324.35 | 326.20 |
| | 26 | 325.77 | 309.11 | 311.95 | 315.33 | 316.50 | 319.44 | 302.93 | 311.45 | 316.82 | 321.15 | 324.41 | 326.20 |
| | 27 | 325.88 | 309.00 | 311.97 | 315.50 | 316.64 | 319.72 | 302.15 | 311.72 | 317.13 | 321.16 | 324.42 | 326.40 |
| | 28 | 325.83 | 309.14 | 311.83 | 315.81 | 316.77 | 319.71 | 301.65 | 311.92 | 317.28 | 321.19 | 324.60 | 326.56 |
| | 29 | 325.74 | 309.34 | 311.93 | 316.03 | 317.23 | 319.56 | 301.34 | 312.06 | 317.42 | 321.13 | 324.72 | 326.77 |
| | 30 | 324.90 | 309.87 | 312.22 | 316.06 | -- | 319.85 | 301.38 | 312.41 | 317.54 | 321.14 | 324.85 | 326.81 |
| | 31 | 323.23 | -- | 312.47 | 316.37 | -- | 319.98 | -- | 312.68 | -- | 321.44 | 325.00 | -- |
| | MEAN | 324.75 | 315.19 | 309.36 | 314.20 | 317.39 | 319.20 | 315.33 | 307.93 | 314.49 | 320.12 | 323.25 | 326.13 |
| | MAXIMUM | 325.88 | 321.60 | 312.47 | 316.37 | 318.92 | 320.18 | 321.02 | 312.68 | 317.54 | 321.44 | 325.00 | 326.81 |
| | MINIMUM | 323.23 | 309.00 | 305.32 | 312.56 | 315.97 | 317.43 | 301.34 | 301.59 | 312.53 | 317.76 | 321.68 | 325.05 |

WATER YEAR 1992 MEAN 317.27 MINIMUM 301.34 MAXIMUM 326.81

**Table 11.** Continuous water-level data for three monitoring wells–Continued

| Site number (fig. 10) | Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Lower Eleven Point River well near Greer, Mo. Daily mean depth to water in feet below land surface, October 1992 to September 1993** | | | | | | | | | | | | | |
| R1 | 1 | 326.86 | 329.11 | 320.35 | -- | 304.30 | 311.38 | 301.18 | 301.05 | -- | 308.63 | 313.93 | 317.79 |
| | 2 | 326.87 | 329.19 | 320.88 | -- | 304.69 | 311.38 | 301.46 | 301.23 | -- | 308.81 | 314.14 | 317.83 |
| | 3 | 326.94 | 329.40 | 321.31 | -- | 305.16 | 311.38 | 301.49 | 301.42 | -- | 308.98 | 314.42 | 317.98 |
| | 4 | 327.07 | 329.62 | 321.81 | -- | 305.73 | -- | 301.47 | 301.50 | 305.43 | 309.18 | 314.69 | 318.12 |
| | 5 | 327.36 | 329.67 | 322.48 | -- | 306.06 | -- | 301.44 | 301.41 | 305.48 | 309.40 | 314.74 | 318.15 |
| | 6 | 327.51 | 329.84 | 322.64 | -- | 306.48 | -- | 301.44 | 301.06 | 304.99 | 309.74 | 314.80 | 318.29 |
| | 7 | 327.45 | 329.82 | 322.84 | -- | 306.84 | -- | 301.44 | 300.58 | 304.45 | 309.99 | 315.04 | 318.43 |
| | 8 | 327.41 | 329.79 | 323.17 | -- | 307.32 | -- | 301.44 | 300.28 | 304.18 | 310.20 | 315.30 | 318.38 |
| | 9 | 327.61 | 329.82 | -- | -- | 307.82 | -- | 301.44 | 300.19 | 304.28 | 310.48 | 315.43 | 318.40 |
| | 10 | 327.75 | 329.85 | -- | -- | 308.13 | -- | 301.44 | 300.15 | 304.48 | 310.75 | 315.45 | 318.72 |
| | 11 | 327.95 | 329.75 | -- | -- | 308.30 | 298.16 | 301.44 | 300.13 | 304.70 | 310.89 | 315.57 | 318.86 |
| | 12 | 327.94 | 329.40 | -- | -- | 308.79 | 298.16 | 301.44 | 299.93 | 304.88 | 311.05 | 315.61 | 318.78 |
| | 13 | 328.00 | 328.92 | -- | -- | 309.23 | 298.16 | 301.44 | 299.71 | 305.10 | 311.27 | 315.71 | 318.91 |
| | 14 | 328.09 | 327.73 | -- | 301.48 | 309.61 | 298.31 | 301.44 | 299.71 | 305.34 | 311.55 | 315.76 | 319.02 |
| | 15 | 328.22 | 326.76 | -- | 301.56 | 309.78 | 298.61 | 301.44 | 299.66 | 305.63 | 311.71 | 315.66 | 319.41 |
| | 16 | 328.44 | 325.79 | -- | 301.76 | 310.05 | 298.88 | 301.44 | -- | 305.84 | 311.83 | 315.60 | 319.48 |
| | 17 | 328.59 | 325.23 | -- | 302.26 | 310.65 | 299.48 | 301.44 | -- | 306.08 | 312.01 | 315.60 | 319.56 |
| | 18 | 328.65 | 325.03 | -- | 302.74 | 310.97 | 299.79 | 301.36 | -- | 306.37 | 312.19 | 315.67 | 319.57 |
| | 19 | 328.72 | 324.94 | -- | 303.09 | 310.97 | 299.92 | 300.67 | -- | 306.57 | 312.41 | 315.79 | 319.56 |
| | 20 | 328.64 | 324.81 | -- | 303.23 | 310.97 | 300.20 | 300.36 | -- | 306.85 | 312.57 | 315.87 | 319.58 |

**Table 11.** Continuous water-level data for three monitoring wells--Continued

| Site number (fig. 10) | Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | **Lower Eleven Point River well near Greer, Mo.** | | | | | | | |
| | | | | | | **Daily mean depth to water in feet below land surface, October 1992 to September 1993--Continued** | | | | | | | |
| R1 | 21 | 328.87 | 325.02 | -- | 303.40 | 311.00 | 300.44 | 300.39 | -- | 307.06 | 312.65 | 316.10 | 319.85 |
| | 22 | 329.04 | 324.55 | -- | 303.24 | 311.31 | 300.46 | 300.17 | -- | 307.19 | 312.71 | 316.19 | 319.89 |
| | 23 | 329.00 | 324.08 | -- | 302.81 | 311.36 | 300.56 | 299.77 | -- | 307.30 | 312.75 | 316.32 | 319.92 |
| | 24 | 328.87 | 322.87 | -- | 302.93 | 311.36 | 300.67 | 299.49 | -- | 307.51 | 312.82 | 316.52 | 319.97 |
| | 25 | 328.89 | 321.74 | -- | 302.85 | 311.36 | 300.77 | 299.71 | -- | 307.74 | 312.95 | 316.80 | 319.87 |
| | 26 | 328.89 | 321.10 | -- | 302.70 | 311.36 | 300.82 | 300.05 | -- | 307.92 | 313.08 | 317.00 | 319.87 |
| | 27 | 329.03 | 320.50 | -- | 302.74 | 311.37 | 300.84 | 300.10 | -- | 307.97 | 313.17 | 317.07 | 319.87 |
| | 28 | 329.13 | 320.11 | -- | 302.90 | 311.38 | 300.89 | 300.26 | -- | 308.17 | 313.38 | 317.16 | 319.87 |
| | 29 | 329.19 | 320.09 | -- | 303.48 | -- | 300.93 | 300.45 | -- | 308.33 | 313.63 | 317.27 | 319.87 |
| | 30 | 329.21 | 320.19 | -- | 303.74 | -- | 300.94 | 300.77 | -- | 308.48 | 313.76 | 317.42 | 319.87 |
| | 31 | 329.33 | -- | -- | 303.81 | -- | 300.98 | -- | -- | -- | 313.89 | 317.61 | -- |
| | MEAN | 328.24 | 326.16 | 321.93 | 302.82 | 309.01 | 301.34 | 300.93 | 300.53 | 306.23 | 311.56 | 315.81 | 319.12 |
| | MAXIMUM | 329.33 | 329.85 | 323.17 | 303.81 | 311.38 | 311.38 | 301.49 | 301.50 | 308.48 | 313.89 | 317.61 | 319.97 |
| | MINIMUM | 326.86 | 320.09 | 320.35 | 301.48 | 304.30 | 298.16 | 299.49 | 299.66 | 304.18 | 308.63 | 313.93 | 317.79 |

WATER YEAR 1993 MEAN 312.53 MINIMUM 298.16 MAXIMUM 329.85

**Table 11.** Continuous water-level data for three monitoring wells–Continued

| Site number (fig. 10) | Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | **Ozark Lead Well 1 near Eminence, Mo., Shannon County[b]** **Daily mean depth to water in feet below land surface, October 1988 to September 1989** | | | | | | | |
| R2 | 1 | -- | 89.29 | 89.75 | 89.70 | 88.99 | 88.16 | 86.67 | 86.40 | 85.97 | 85.17 | 85.54 | 85.98 |
| | 2 | -- | 89.24 | 89.88 | 89.68 | 89.22 | 87.90 | 86.55 | 86.43 | 85.96 | 85.06 | 85.56 | 86.19 |
| | 3 | -- | 89.07 | 89.76 | 89.57 | 88.90 | 87.60 | 86.44 | 86.45 | 85.77 | 85.13 | 85.50 | 86.27 |
| | 4 | -- | 88.92 | 89.98 | 89.70 | 88.88 | 87.81 | 86.17 | 86.20 | 85.80 | 85.21 | 85.44 | 86.23 |
| | 5 | -- | 89.06 | 89.82 | 89.28 | 88.85 | 87.93 | 86.29 | 86.16 | 85.75 | 85.26 | 85.46 | 86.28 |
| | 6 | -- | 89.30 | 89.61 | 88.92 | 89.02 | 87.93 | 86.30 | 86.40 | 85.81 | 85.34 | 85.50 | 86.25 |
| | 7 | -- | 89.46 | 89.61 | 88.87 | 89.11 | 88.14 | 86.30 | 86.43 | 85.76 | 85.39 | 85.67 | 86.22 |
| | 8 | -- | 89.72 | 89.95 | 89.54 | 89.34 | 88.22 | 86.18 | 86.25 | 85.73 | 85.36 | 85.73 | 86.18 |
| | 9 | -- | 89.56 | 89.95 | 89.69 | 89.43 | 88.20 | 86.57 | 86.20 | 85.86 | 85.33 | 85.79 | 86.15 |
| | 10 | -- | 89.69 | 89.80 | 89.63 | 89.09 | 87.93 | 86.73 | 86.48 | 86.06 | 85.37 | 85.86 | 86.32 |
| | 11 | -- | 89.87 | 89.94 | 89.51 | 88.91 | 87.46 | 86.62 | 86.50 | 85.96 | 85.41 | 85.88 | 86.40 |
| | 12 | -- | 89.50 | 89.92 | 89.62 | 88.97 | 87.35 | 86.45 | 86.38 | 85.77 | 85.38 | 85.85 | 86.48 |
| | 13 | -- | 89.67 | 89.73 | 89.94 | 88.41 | 87.14 | 86.46 | 86.26 | 85.61 | 85.31 | 85.82 | 86.44 |
| | 14 | -- | 89.68 | 89.66 | 89.59 | 88.01 | 86.92 | 86.30 | 86.31 | 85.12 | 85.36 | 85.80 | 86.39 |
| | 15 | -- | 89.46 | 90.20 | 89.64 | 88.01 | 87.47 | 86.21 | 86.42 | 85.23 | 85.42 | 85.76 | 86.41 |
| | 16 | -- | 89.54 | 90.16 | 89.79 | 88.22 | 87.67 | 86.13 | 86.45 | 85.44 | 85.44 | 85.78 | 86.44 |
| | 17 | -- | 89.87 | 90.05 | 89.68 | 88.13 | 87.44 | 86.15 | 86.46 | 85.52 | 85.44 | 85.90 | 86.54 |
| | 18 | -- | 89.79 | 89.97 | 89.66 | 88.02 | 87.74 | 86.21 | 86.33 | 85.39 | 85.34 | 86.00 | 86.57 |
| | 19 | 89.19 | 89.50 | 89.79 | 89.72 | 87.85 | 87.75 | 86.35 | 86.27 | 84.87 | 85.27 | 85.89 | 86.59 |
| | 20 | 89.11 | 89.36 | 89.84 | 89.94 | 87.60 | 87.41 | 86.31 | 86.47 | 84.85 | 85.27 | 85.81 | 86.61 |

**Table 11.** Continuous water-level data for three monitoring wells–Continued

| Site number (fig. 10) | Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Ozark Lead Well 1 near Eminence, Mo. Shannon County** | | | | | | |
| | | | | | | | **Daily mean depth to water in feet below land surface, October 1988 to September 1989--Continued** | | | | | | |
| R2 | 21 | 89.04 | 89.65 | 90.19 | 89.99 | 87.75 | 87.72 | 86.20 | 86.54 | 84.99 | 85.32 | 85.86 | 86.58 |
| | 22 | 89.06 | 89.65 | 90.03 | 89.80 | 88.15 | 87.74 | 86.11 | 85.60 | 85.12 | 85.51 | 85.88 | 86.44 |
| | 23 | 88.87 | 89.56 | 89.94 | 89.72 | 88.39 | 87.60 | 86.03 | 85.30 | 85.22 | 85.50 | 85.89 | 86.79 |
| | 24 | 89.07 | 89.44 | 89.80 | 89.73 | 88.30 | 87.52 | 86.09 | 85.26 | 85.29 | 85.49 | 85.92 | 86.84 |
| | 25 | 89.17 | 89.37 | 90.20 | 89.77 | 87.95 | 87.52 | 86.14 | 85.38 | 85.26 | 85.55 | 85.95 | 86.73 |
| | 26 | 89.28 | 89.07 | 90.08 | 89.63 | 87.79 | 87.51 | 86.15 | 85.77 | 85.20 | 85.57 | 85.98 | 86.85 |
| | 27 | 89.18 | 89.15 | 89.82 | 89.41 | 87.72 | 87.53 | 86.13 | 86.12 | 85.16 | 85.50 | 86.03 | 86.98 |
| | 28 | 89.48 | 89.46 | 89.85 | 89.28 | 87.93 | 87.47 | 86.05 | 86.08 | 85.17 | 85.42 | 86.00 | 86.89 |
| | 29 | 89.59 | 89.46 | 89.82 | 89.26 | -- | 87.30 | 86.17 | 85.91 | 85.26 | 85.38 | 86.01 | 86.83 |
| | 30 | 89.56 | 89.60 | 89.62 | 89.17 | -- | 86.83 | 86.44 | 85.84 | 85.26 | 85.38 | 86.05 | 86.72 |
| | 31 | 89.42 | -- | 89.61 | 88.99 | -- | 86.73 | -- | 85.91 | -- | 85.44 | 85.99 | -- |
| | MEAN | 89.23 | 89.47 | 89.88 | 89.56 | 88.46 | 87.60 | 86.30 | 86.16 | 85.47 | 85.37 | 85.81 | 86.49 |
| | MAXIMUM | 89.59 | 89.87 | 90.20 | 89.99 | 89.43 | 88.22 | 86.73 | 86.54 | 86.06 | 85.57 | 86.05 | 86.98 |
| | MINIMUM | 88.87 | 88.92 | 89.61 | 88.87 | 87.60 | 86.73 | 86.03 | 85.26 | 84.85 | 85.06 | 85.44 | 85.98 |

WATER YEAR 1989 MEAN 87.39 MINIMUM 84.85 MAXIMUM 90.20

**Table 11.** Continuous water-level data for three monitoring wells–Continued

| Site number (fig. 10) | Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Ozark Lead Well 1 near Eminence, Mo. Daily mean depth to water in feet below land surface, October 1989 to September 1990** | | | | | | | | | | | | | |
| R2 | 1 | 86.59 | 87.67 | 88.44 | 89.51 | 86.81 | 87.22 | 84.70 | 83.63 | 80.67 | 80.88 | 80.87 | 82.15 |
| | 2 | 86.81 | 87.73 | 88.47 | 89.49 | 87.48 | 86.93 | 84.86 | 83.33 | 80.56 | 80.86 | 80.90 | 82.23 |
| | 3 | 87.05 | 87.73 | 88.66 | 89.31 | 87.52 | 86.93 | 84.95 | 82.81 | 80.62 | 80.84 | 80.90 | 82.28 |
| | 4 | 87.06 | 87.53 | 88.24 | 89.35 | 87.21 | 86.97 | 84.79 | 82.57 | 80.72 | 80.92 | 80.85 | 82.37 |
| | 5 | 86.88 | 87.42 | 88.11 | 89.47 | 87.08 | 86.97 | 84.87 | 82.64 | 80.65 | 80.97 | 80.98 | 82.33 |
| | 6 | 86.91 | 87.60 | 88.27 | 89.49 | 87.26 | 87.08 | 85.07 | 82.79 | 80.58 | 81.01 | 81.15 | 82.22 |
| | 7 | 87.11 | 87.47 | 88.68 | 89.38 | 87.13 | 87.16 | 85.26 | 82.86 | 80.63 | 81.02 | 81.18 | 82.20 |
| | 8 | 87.06 | 87.45 | 88.70 | 89.22 | 87.27 | 86.94 | 85.24 | 82.85 | 80.65 | 81.06 | 81.13 | 82.29 |
| | 9 | 87.02 | 87.62 | 88.52 | 89.25 | 87.58 | 86.87 | 85.10 | 82.71 | 80.74 | 81.11 | 81.16 | 82.37 |
| | 10 | 87.02 | 87.80 | 88.39 | 89.45 | 87.94 | 86.78 | 84.62 | 82.83 | 80.84 | 81.10 | 81.15 | 82.43 |
| | 11 | 87.06 | 87.83 | 88.68 | 89.42 | 87.90 | 86.67 | 84.48 | 82.96 | 80.86 | 81.05 | 81.20 | 82.55 |
| | 12 | 87.13 | 87.96 | 88.75 | 89.71 | 87.70 | 86.48 | 84.50 | 82.53 | 80.71 | 81.09 | 81.19 | 82.59 |
| | 13 | 87.21 | 87.86 | 88.65 | 89.80 | 87.79 | 86.17 | 84.49 | 82.13 | 80.65 | 81.15 | 81.25 | 82.61 |
| | 14 | 87.15 | 87.72 | 88.90 | 89.53 | 87.58 | 85.87 | 84.43 | 82.11 | 80.67 | 81.08 | 81.36 | 82.58 |
| | 15 | 87.08 | 87.71 | 89.16 | 89.61 | 88.40 | 85.77 | 84.42 | 82.02 | 80.64 | 81.11 | 81.39 | 82.63 |
| | 16 | 87.04 | 88.04 | 89.33 | 89.66 | 88.33 | 85.78 | 84.35 | 81.74 | 80.61 | 81.28 | 81.39 | 82.67 |
| | 17 | 87.29 | 88.05 | 89.24 | 89.36 | 87.93 | 85.89 | 84.53 | 81.38 | 80.65 | 81.37 | 81.39 | 82.94 |
| | 18 | 87.44 | 88.25 | 89.22 | 89.30 | 87.94 | 86.16 | 84.71 | 81.46 | 80.74 | 81.24 | 81.44 | 82.91 |
| | 19 | 87.41 | 88.21 | 89.27 | 88.95 | 87.77 | 86.44 | 84.51 | 81.25 | 80.65 | 81.10 | 81.40 | 82.88 |
| | 20 | 87.28 | 88.04 | 89.32 | 87.55 | 87.60 | 86.46 | 84.37 | 81.23 | 80.55 | 80.97 | 81.45 | 82.98 |

**Table 11.** Continuous water-level data for three monitoring wells–Continued

| Site number (fig. 10) | Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Ozark Lead Well 1 near Eminence, Mo.<br>Daily mean depth to water in feet below land surface, October 1989 to September 1990--Continued** | | | | | | |
| R2 | 21 | 87.23 | 88.09 | 89.59 | 87.29 | 87.27 | 86.14 | 84.22 | 81.28 | 80.70 | 80.84 | 81.56 | 82.91 |
| | 22 | 87.35 | 88.02 | 89.80 | 87.05 | 86.69 | 86.01 | 84.01 | 81.18 | 80.60 | 80.71 | 81.60 | 83.05 |
| | 23 | 87.45 | 88.29 | 89.72 | 87.14 | 86.93 | 86.36 | 83.85 | 81.05 | 80.64 | 80.57 | 81.62 | 83.23 |
| | 24 | 87.54 | 88.17 | 89.32 | 87.05 | 87.22 | 86.31 | 83.84 | 81.08 | 80.74 | 80.44 | 81.69 | 83.25 |
| | 25 | 87.58 | 87.98 | 89.05 | 86.81 | 87.63 | 86.32 | 83.96 | 81.02 | 80.82 | 80.53 | 81.76 | 83.07 |
| | 26 | 87.56 | 88.10 | 89.14 | 86.60 | 87.36 | 86.22 | 83.90 | 80.60 | 80.79 | 80.59 | 81.82 | 83.11 |
| | 27 | 87.58 | 87.92 | 89.13 | 86.58 | 87.30 | 86.01 | 83.73 | 80.31 | 80.78 | 80.59 | 81.87 | 83.22 |
| | 28 | 87.55 | 88.36 | 89.25 | 86.35 | 87.38 | 85.70 | 83.50 | 80.25 | 80.83 | 80.58 | 81.80 | 83.32 |
| | 29 | 87.50 | 88.26 | 89.12 | 86.59 | -- | 85.51 | 83.39 | 80.44 | 80.85 | 80.56 | 81.79 | 83.41 |
| | 30 | 87.41 | 88.43 | 89.11 | 86.58 | -- | 85.17 | 83.57 | 80.63 | 80.89 | 80.64 | 81.91 | 83.52 |
| | 31 | 87.56 | -- | 89.16 | 86.36 | -- | 84.81 | -- | 80.70 | -- | 80.77 | 82.03 | -- |
| | MEAN | 87.22 | 87.91 | 88.95 | 88.43 | 87.50 | 86.33 | 84.41 | 81.82 | 80.70 | 80.90 | 81.39 | 82.74 |
| | MAXIMUM | 87.58 | 88.43 | 89.80 | 89.80 | 88.40 | 87.22 | 85.26 | 83.63 | 80.89 | 81.37 | 82.03 | 83.52 |
| | MINIMUM | 86.59 | 87.42 | 88.11 | 86.35 | 86.69 | 84.81 | 83.39 | 80.25 | 80.55 | 80.44 | 80.85 | 82.15 |

WATER YEAR 1990 MEAN 84.85 MINIMUM 80.25 MAXIMUM 89.80

**Table 11.** Continuous water-level data for three monitoring wells--Continued

| Site number (fig. 10) | Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | **Ozark Lead Well 1 near Eminence, Mo. Daily mean depth to water in feet below land surface, October 1990 to September 1991** | | | | | | | |
| R2 | 1 | 83.57 | 83.91 | 84.41 | 83.49 | 83.26 | 83.18 | 82.96 | 80.55 | 79.10 | 79.76 | 80.92 | 82.06 |
| | 2 | 83.51 | 83.95 | 84.28 | 83.63 | 83.22 | 83.17 | 82.92 | 80.62 | 79.11 | 79.81 | 80.91 | 82.13 |
| | 3 | 83.39 | 83.97 | 84.10 | 83.90 | 83.11 | 82.96 | 82.85 | 80.40 | 79.11 | 79.84 | 80.95 | 82.17 |
| | 4 | 83.61 | 83.80 | 84.55 | 83.87 | 83.01 | 82.95 | 82.51 | 80.41 | 79.11 | 79.86 | 81.04 | 82.14 |
| | 5 | 83.72 | 83.77 | 84.45 | 83.61 | 82.94 | 83.18 | 82.32 | 80.38 | 79.29 | 79.90 | 81.07 | 82.15 |
| | 6 | 83.65 | 84.01 | 84.37 | 83.72 | 82.95 | 83.19 | 82.25 | 80.55 | 79.47 | 79.96 | 81.15 | 82.31 |
| | 7 | 83.67 | 84.21 | 84.49 | 83.56 | 83.13 | 82.70 | 82.18 | 80.60 | 79.51 | 80.03 | 81.24 | 82.35 |
| | 8 | 83.75 | 84.15 | 84.54 | 83.32 | 83.09 | 82.57 | 82.10 | 80.57 | 79.47 | 80.08 | 81.15 | 82.30 |
| | 9 | 83.78 | 83.99 | 84.60 | 83.45 | 82.94 | 82.44 | 82.19 | 80.48 | 79.50 | 80.05 | 81.11 | 82.33 |
| | 10 | 83.83 | 84.13 | 84.58 | 83.20 | 82.97 | 82.42 | 82.37 | 80.28 | 79.48 | 80.07 | 81.25 | 82.39 |
| | 11 | 83.89 | 84.29 | 84.45 | 82.57 | 83.03 | 82.76 | 82.33 | 80.16 | 79.39 | 80.11 | 81.39 | 82.40 |
| | 12 | 83.87 | 84.40 | 84.36 | 82.54 | 82.83 | 83.13 | 82.04 | 80.04 | 79.34 | 80.19 | 81.43 | 82.42 |
| | 13 | 83.85 | 84.38 | 84.64 | 82.53 | 82.38 | 83.03 | 81.60 | 79.97 | 79.37 | 80.24 | 81.37 | 82.44 |
| | 14 | 83.81 | 84.39 | 84.65 | 82.57 | 82.62 | 82.67 | 80.73 | 79.89 | 79.36 | 80.37 | 81.34 | 82.44 |
| | 15 | 84.10 | 84.39 | 84.56 | 82.56 | 82.82 | 82.39 | 80.98 | 79.85 | 79.35 | 80.46 | 81.39 | 82.52 |
| | 16 | 84.10 | 84.42 | 84.76 | 82.51 | 82.85 | 82.36 | 80.99 | 79.46 | 79.42 | 80.49 | 81.42 | 82.63 |
| | 17 | 84.02 | 84.49 | 84.43 | 82.62 | 83.15 | 82.74 | 80.98 | 79.38 | 79.47 | 80.45 | 81.36 | 82.69 |
| | 18 | 84.23 | 84.32 | 84.06 | 82.72 | 83.23 | 82.97 | 80.64 | 78.73 | 79.53 | 80.38 | 81.45 | 82.73 |
| | 19 | 84.26 | 84.28 | 84.06 | 82.51 | 82.87 | 82.97 | 80.40 | 78.90 | 79.59 | 80.42 | 81.52 | 82.96 |
| | 20 | 84.25 | 84.35 | 84.18 | 82.54 | 82.67 | 82.89 | 80.55 | 78.99 | 79.59 | 80.53 | 81.61 | 82.99 |

**Table 11.** Continuous water-level data for three monitoring wells--Continued

| Site number (fig. 10) | Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | **Ozark Lead Well 1 near Eminence, Mo. Daily mean depth to water in feet below land surface, October 1990 to September 1991--Continued** | | | | | | | | |
| R2 | 21 | 84.27 | 84.32 | 83.79 | 82.88 | 82.73 | 82.84 | 80.53 | 79.08 | 79.51 | 80.62 | 81.65 | 82.87 |
| | 22 | 84.27 | 84.34 | 83.55 | 82.77 | 82.71 | 82.55 | 80.43 | 78.92 | 79.52 | 80.63 | 81.68 | 82.84 |
| | 23 | 84.29 | 84.33 | 83.74 | 82.69 | 82.72 | 82.34 | 80.45 | 78.96 | 79.65 | 80.63 | 81.74 | 82.93 |
| | 24 | 84.29 | 84.26 | 84.12 | 82.90 | 82.72 | 82.55 | 80.74 | 79.03 | 79.73 | 80.64 | 81.88 | 82.81 |
| | 25 | 84.14 | 84.35 | 84.21 | 83.00 | 82.61 | 82.63 | 80.67 | 79.17 | 79.74 | 80.67 | 81.89 | 82.75 |
| | 26 | 84.16 | 84.29 | 84.40 | 82.91 | 82.69 | 82.48 | 80.52 | 79.13 | 79.78 | 80.81 | 81.86 | 82.89 |
| | 27 | 84.13 | 84.15 | 84.24 | 82.60 | 82.74 | 82.34 | 80.44 | 79.06 | 79.85 | 80.86 | 81.87 | 83.03 |
| | 28 | 83.97 | 84.21 | 84.08 | 82.68 | 82.87 | 82.60 | 80.42 | 79.06 | 79.84 | 80.81 | 81.95 | 83.13 |
| | 29 | 84.01 | 84.62 | 83.69 | 82.69 | -- | 82.59 | 80.32 | 79.04 | 79.84 | 80.77 | 81.96 | 83.15 |
| | 30 | 84.06 | 84.51 | 83.22 | 82.88 | -- | 82.94 | 80.49 | 78.94 | 79.79 | 80.87 | 81.91 | 83.13 |
| | 31 | 83.98 | -- | 83.48 | 83.23 | -- | 82.97 | -- | 79.04 | -- | 80.91 | 81.93 | -- |
| | MEAN | 83.95 | 84.23 | 84.23 | 82.99 | 82.89 | 82.76 | 81.36 | 79.67 | 79.49 | 80.36 | 81.46 | 82.60 |
| | MAXIMUM | 84.29 | 84.62 | 84.76 | 83.90 | 83.26 | 83.19 | 82.96 | 80.62 | 79.85 | 80.91 | 81.96 | 83.15 |
| | MINIMUM | 83.39 | 83.77 | 83.22 | 82.51 | 82.38 | 82.34 | 80.32 | 78.73 | 79.10 | 79.76 | 80.91 | 82.06 |

WATER YEAR 1991 MEAN 82.16 MINIMUM 78.73 MAXIMUM 84.76

**Table 11.** Continuous water-level data for three monitoring wells–Continued

| Site number (fig. 10) | Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | **Ozark Lead Well 1 near Eminence, Mo. Daily mean depth to water in feet below land surface, October 1991 to September 1992** | | | | | | | |
| R2 | 1 | 83.09 | 83.40 | 84.40 | 84.60 | 85.21 | 85.03 | 84.98 | 83.44 | 83.70 | 84.23 | 85.28 | 86.35 |
| | 2 | 83.16 | 83.78 | 83.94 | 84.37 | 85.22 | 85.02 | 85.00 | 83.48 | 83.60 | 84.25 | 85.20 | 86.00 |
| | 3 | 83.12 | 84.01 | 83.83 | 84.40 | 85.21 | 85.00 | 84.80 | 83.66 | 83.40 | 84.50 | 85.18 | 86.16 |
| | 4 | 83.18 | 84.01 | 84.15 | 84.51 | 85.20 | 84.95 | 84.80 | 83.55 | 83.37 | 84.55 | 85.30 | 86.28 |
| | 5 | 82.92 | 83.77 | 84.08 | 84.50 | 85.17 | 84.90 | 85.15 | 83.62 | 83.43 | 84.42 | 85.33 | 86.25 |
| | 6 | 82.70 | 83.78 | 84.07 | 84.55 | 85.07 | 84.83 | 85.17 | 83.83 | 83.47 | 84.45 | 85.40 | 86.29 |
| | 7 | 82.73 | 84.05 | 83.95 | 84.60 | 85.12 | 85.00 | 85.07 | 83.85 | 83.67 | 84.50 | 85.35 | 86.32 |
| | 8 | 82.84 | 84.34 | 83.97 | 84.50 | 85.41 | 85.05 | 85.08 | 83.62 | 83.75 | 84.56 | 85.38 | 86.33 |
| | 9 | 82.82 | 84.35 | 84.24 | 84.60 | 85.63 | 84.85 | 85.05 | 83.55 | 83.72 | 84.62 | 85.45 | 86.26 |
| | 10 | 82.85 | 84.20 | 84.36 | 84.76 | 85.57 | 84.95 | 84.44 | 83.63 | 83.70 | 84.64 | 85.43 | 86.37 |
| | 11 | 82.95 | 84.30 | 84.37 | 84.67 | 85.63 | 85.05 | 84.28 | 83.59 | 83.72 | 84.67 | 85.43 | 86.62 |
| | 12 | 83.10 | 84.35 | 84.12 | 84.46 | 85.47 | 85.00 | 84.77 | 83.57 | 83.75 | 84.60 | 85.55 | 87.07 |
| | 13 | 83.23 | 84.28 | 84.23 | 84.37 | 85.24 | 85.15 | 84.83 | 83.64 | 83.72 | 84.60 | 85.69 | 86.53 |
| | 14 | 83.16 | 84.20 | 84.68 | 84.56 | 84.87 | 85.10 | 84.67 | 83.60 | 83.70 | 84.60 | 85.67 | 86.53 |
| | 15 | 83.27 | 84.34 | 84.72 | 84.86 | 84.53 | 85.33 | 84.57 | 83.62 | 83.72 | 84.67 | 85.73 | 86.61 |
| | 16 | 83.40 | 84.45 | 84.63 | 84.85 | 84.75 | 85.28 | 84.55 | 83.74 | 83.78 | 84.70 | 85.71 | 86.59 |
| | 17 | 83.37 | 84.31 | 84.63 | 84.80 | 84.50 | 85.08 | 84.50 | 83.82 | 83.78 | 84.82 | 85.71 | 86.50 |
| | 18 | 83.45 | 83.94 | 84.92 | 85.08 | 84.45 | 84.60 | 83.97 | 83.88 | 83.82 | 84.94 | 85.75 | 86.96 |
| | 19 | 83.68 | 83.96 | 84.98 | 85.00 | 84.63 | 84.64 | 83.21 | 83.85 | 83.87 | 84.94 | 85.74 | 86.61 |
| | 20 | 83.63 | 83.55 | 84.80 | 84.83 | 84.84 | 84.83 | 83.42 | 83.83 | 83.90 | 84.94 | 85.76 | 86.19 |

**Table 11.** Continuous water-level data for three monitoring wells--Continued

| Site number (fig. 10) | Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | **Ozark Lead Well 1 near Eminence, Mo. Daily mean depth to water in feet below land surface, October 1991 to September 1992--Continued** | | | | | | | |
| R2 | 21 | 83.44 | 83.60 | 84.65 | 84.80 | 84.80 | 84.71 | 83.12 | 83.80 | 84.07 | 84.94 | 85.82 | 85.77 |
| | 22 | 83.45 | 83.72 | 84.12 | 84.57 | 84.73 | 84.70 | 83.20 | 83.60 | 84.03 | 84.95 | 85.84 | 86.07 |
| | 23 | 83.50 | 83.94 | 83.90 | 84.58 | 84.58 | 84.93 | 83.37 | 83.12 | 83.82 | 85.00 | 85.85 | 86.43 |
| | 24 | 83.51 | 84.14 | 84.31 | 85.04 | 84.73 | 84.97 | 83.50 | -- | 83.80 | 85.10 | 85.95 | 86.43 |
| | 25 | 83.54 | 84.40 | 84.37 | 85.00 | 84.80 | 84.90 | 83.60 | -- | 83.85 | 85.10 | 85.99 | 86.37 |
| | 26 | 83.55 | 84.32 | 84.40 | 85.25 | 84.75 | 84.87 | 83.67 | -- | 84.00 | 84.98 | 85.97 | 86.34 |
| | 27 | 83.67 | 84.26 | 84.53 | 85.18 | 84.74 | 85.10 | 83.74 | -- | 84.10 | 84.86 | 85.90 | 86.51 |
| | 28 | 83.62 | 84.23 | 84.35 | 85.24 | 84.68 | 85.05 | 83.68 | -- | 84.25 | 85.00 | 86.00 | 86.60 |
| | 29 | 83.66 | 84.11 | 84.36 | 85.23 | 85.04 | 84.77 | 83.50 | 83.70 | 84.22 | 85.00 | 86.03 | 86.77 |
| | 30 | 83.77 | 84.29 | 84.54 | 84.96 | -- | 84.93 | 83.43 | 83.60 | 84.22 | 84.98 | 86.01 | 86.71 |
| | 31 | 83.57 | -- | 84.68 | 85.06 | -- | 84.97 | -- | 83.72 | -- | 85.17 | 86.17 | -- |
| | MEAN | 83.29 | 84.08 | 84.36 | 84.77 | 84.99 | 84.95 | 84.24 | 83.65 | 83.80 | 84.75 | 85.66 | 86.43 |
| | MAXIMUM | 83.77 | 84.45 | 84.98 | 85.25 | 85.63 | 85.33 | 85.17 | 83.88 | 84.25 | 85.17 | 86.17 | 87.07 |
| | MINIMUM | 82.70 | 83.40 | 83.83 | 84.37 | 84.45 | 84.60 | 83.12 | 83.12 | 83.37 | 84.23 | 85.18 | 85.77 |

WATER YEAR 1992 MEAN 84.59 MINIMUM 82.70 MAXIMUM 87.07

**Table 11.** Continuous water-level data for three monitoring wells–Continued

| Site number (fig. 10) | Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Ozark Lead Well 2 near Eminence, Mo., Shannon County[c]** **Daily mean depth to water in feet below land surface, October 1988 to September 1989** | | | | | | |
| R3 | 1 | -- | -- | -- | -- | -- | -- | -- | -- | 131.85 | 131.36 | 131.71 | 132.15 |
| | 2 | -- | -- | -- | -- | -- | -- | -- | -- | 131.82 | 131.28 | 131.73 | 132.31 |
| | 3 | -- | -- | -- | -- | -- | -- | -- | -- | 131.69 | 131.31 | 131.67 | 132.37 |
| | 4 | -- | -- | -- | -- | -- | -- | -- | -- | 131.71 | 131.37 | 131.64 | 132.37 |
| | 5 | -- | -- | -- | -- | -- | -- | -- | -- | 131.65 | 131.39 | 131.65 | 132.41 |
| | 6 | -- | -- | -- | -- | -- | -- | -- | -- | 131.68 | 131.46 | 131.69 | 132.42 |
| | 7 | -- | -- | -- | -- | -- | -- | -- | -- | 131.65 | 131.49 | 131.82 | 132.40 |
| | 8 | -- | -- | -- | -- | -- | -- | -- | -- | 131.63 | 131.47 | 131.86 | 132.38 |
| | 9 | -- | -- | -- | -- | -- | -- | -- | -- | 131.73 | 131.46 | 131.93 | 132.36 |
| | 10 | -- | -- | -- | -- | -- | -- | -- | -- | 131.87 | 131.49 | 131.99 | 132.49 |
| | 11 | -- | -- | -- | -- | -- | -- | -- | -- | 131.80 | 131.52 | 132.00 | 132.56 |
| | 12 | -- | -- | -- | -- | -- | -- | -- | -- | 131.67 | 131.49 | 132.01 | 132.61 |
| | 13 | -- | -- | -- | -- | -- | -- | -- | -- | 131.64 | 131.43 | 131.98 | 132.60 |
| | 14 | -- | -- | -- | -- | -- | -- | -- | -- | 131.63 | 131.48 | 131.98 | 132.54 |
| | 15 | -- | -- | -- | -- | -- | -- | -- | 132.02 | 131.63 | 131.52 | 131.94 | 132.56 |
| | 16 | -- | -- | -- | -- | -- | -- | -- | 132.03 | 131.65 | 131.54 | 131.94 | 132.61 |
| | 17 | -- | -- | -- | -- | -- | -- | -- | 132.06 | 131.65 | 131.54 | 132.03 | 132.66 |
| | 18 | -- | -- | -- | -- | -- | -- | -- | 131.95 | 131.58 | 131.46 | 132.09 | 132.71 |
| | 19 | -- | -- | -- | -- | -- | -- | -- | 131.92 | 131.53 | 131.40 | 132.01 | 132.73 |
| | 20 | -- | -- | -- | -- | -- | -- | -- | 132.07 | 131.48 | 131.40 | 131.95 | 132.75 |

**Table 11.** Continuous water-level data for three monitoring wells--Continued

| Site number (fig. 10) | Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Ozark Lead Well 2 near Eminence, Mo., Shannon County Daily mean depth to water in feet below land surface, October 1988 to September 1989--Continued** | | | | | | |
| R3 | 21 | -- | -- | -- | -- | -- | -- | -- | 132.12 | 131.42 | 131.44 | 131.99 | 132.73 |
| | 22 | -- | -- | -- | -- | -- | -- | -- | 131.93 | 131.43 | 131.60 | 132.02 | 132.64 |
| | 23 | -- | -- | -- | -- | -- | -- | -- | 131.85 | 131.46 | 131.65 | 132.02 | 132.95 |
| | 24 | -- | -- | -- | -- | -- | -- | -- | 131.69 | 131.46 | 131.67 | 132.02 | 132.96 |
| | 25 | -- | -- | -- | -- | -- | -- | -- | 131.58 | 131.43 | 131.70 | 132.06 | 132.88 |
| | 26 | -- | -- | -- | -- | -- | -- | -- | 131.79 | 131.38 | 131.72 | 132.09 | 132.99 |
| | 27 | -- | -- | -- | -- | -- | -- | -- | 131.98 | 131.37 | 131.68 | 132.13 | 133.09 |
| | 28 | -- | -- | -- | -- | -- | -- | -- | 131.91 | 131.41 | 131.62 | 132.13 | 133.02 |
| | 29 | -- | -- | -- | -- | -- | -- | -- | 131.78 | 131.48 | 131.59 | 132.17 | 132.98 |
| | 30 | -- | -- | -- | -- | -- | -- | -- | 131.73 | 131.45 | 131.59 | 132.19 | 132.91 |
| | 31 | -- | -- | -- | -- | -- | -- | -- | 131.78 | -- | 131.65 | 132.16 | -- |
| | MEAN | -- | -- | -- | -- | -- | -- | -- | 131.89 | 131.59 | 131.51 | 131.95 | 132.64 |
| | MAXIMUM | -- | -- | -- | -- | -- | -- | -- | 132.12 | 131.87 | 131.72 | 132.19 | 133.09 |
| | MINIMUM | -- | -- | -- | -- | -- | -- | -- | 131.58 | 131.37 | 131.28 | 131.64 | 132.15 |

WATER YEAR 1989 MEAN 131.92 MINIMUM 131.28 MAXIMUM 133.09

**Table 11.** Continuous water-level data for three monitoring wells--Continued

| Site number (fig. 10) | Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Ozark Lead Well 2 near Eminence, Mo. Daily mean depth to water in feet below land surface, October 1989 to September 1990** | | | | | | | | | | | | | |
| R3 | 1 | 132.84 | 133.83 | 135.34 | -- | -- | -- | -- | 131.64 | 128.67 | 128.17 | 127.77 | 128.65 |
| | 2 | 133.00 | 133.89 | 135.27 | -- | -- | -- | -- | 131.56 | 128.51 | 128.15 | 127.78 | 128.70 |
| | 3 | 133.17 | 133.86 | 135.23 | -- | -- | -- | -- | 131.34 | 128.53 | 128.14 | 127.76 | 128.73 |
| | 4 | 133.17 | 133.72 | 135.58 | -- | -- | -- | -- | 131.12 | 128.57 | 128.18 | 127.74 | 128.82 |
| | 5 | 133.03 | 133.67 | 135.67 | -- | -- | -- | -- | 131.12 | 128.47 | 128.22 | 127.80 | 128.78 |
| | 6 | 133.10 | 133.77 | 135.48 | -- | -- | -- | 133.00 | 131.05 | 128.38 | 128.25 | 127.98 | 128.69 |
| | 7 | 133.23 | 133.66 | 135.14 | -- | -- | -- | 133.05 | 130.95 | 128.41 | 128.24 | 127.98 | 128.66 |
| | 8 | 133.20 | 133.70 | 134.97 | -- | -- | -- | 133.03 | 130.87 | 128.37 | 128.24 | 127.97 | 128.72 |
| | 9 | 133.16 | 133.79 | -- | -- | -- | -- | 132.88 | 130.66 | 128.44 | 128.28 | 127.98 | 128.77 |
| | 10 | 133.19 | 133.94 | -- | -- | -- | -- | 132.70 | 130.78 | 128.50 | 128.28 | 127.97 | 128.84 |
| | 11 | 133.20 | 133.98 | -- | -- | -- | -- | 132.82 | 130.78 | 128.47 | 128.23 | 127.98 | 128.92 |
| | 12 | 133.29 | 134.06 | -- | -- | -- | -- | 132.77 | 130.54 | 128.35 | 128.26 | 127.97 | 128.95 |
| | 13 | 133.32 | 133.99 | -- | -- | -- | -- | 132.61 | 130.56 | 128.26 | 128.28 | 127.95 | 128.95 |
| | 14 | 133.28 | 133.87 | -- | -- | -- | -- | 132.47 | 130.50 | 128.26 | 128.23 | 127.93 | 128.90 |
| | 15 | 133.22 | 133.90 | -- | -- | -- | -- | 132.39 | 130.29 | 128.21 | 128.25 | 127.97 | 128.92 |
| | 16 | 133.20 | 134.15 | -- | -- | -- | -- | 132.28 | 130.10 | 128.18 | 128.44 | 128.00 | 128.94 |
| | 17 | 133.42 | 134.12 | -- | -- | -- | -- | 132.40 | 130.16 | 128.20 | 128.44 | 128.04 | 129.13 |
| | 18 | 133.58 | 134.33 | -- | -- | -- | -- | 132.48 | 130.05 | 128.24 | 128.45 | 128.09 | 129.10 |
| | 19 | 133.52 | 134.26 | -- | -- | -- | -- | 132.33 | 129.73 | 128.15 | 128.42 | 128.13 | 129.09 |
| | 20 | 133.45 | 134.18 | -- | -- | -- | -- | 132.21 | 129.60 | 128.05 | 128.36 | 128.19 | 129.16 |

**Table 11.** Continuous water-level data for three monitoring wells--Continued

| Site number (fig. 10) | Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | |
| **Ozark Lead Well 2 near Eminence, Mo. Daily mean depth to water in feet below land surface, October 1989 to September 1990--Continued** | | | | | | | | | | | | | |
| R3 | 21 | 133.43 | 134.19 | -- | -- | -- | -- | 132.14 | 129.54 | 128.16 | 128.33 | 128.22 | 129.08 |
| | 22 | 133.54 | 134.22 | -- | -- | -- | -- | 132.04 | 129.46 | 128.07 | 128.26 | 128.27 | 129.17 |
| | 23 | 133.63 | 134.38 | -- | -- | -- | -- | 131.90 | 129.42 | 128.09 | 127.88 | 128.27 | 129.32 |
| | 24 | 133.70 | 134.27 | -- | -- | -- | -- | 131.85 | 129.30 | 128.15 | 127.53 | 128.32 | 129.33 |
| | 25 | 133.73 | 134.15 | -- | -- | -- | -- | 131.88 | 129.18 | 128.20 | 127.58 | 128.37 | 129.20 |
| | 26 | 133.72 | 134.21 | -- | -- | -- | -- | 131.79 | 129.09 | 128.14 | 127.63 | 128.43 | 129.25 |
| | 27 | 133.75 | 134.13 | -- | -- | -- | -- | 131.60 | 128.93 | 128.15 | 127.61 | 128.45 | 129.36 |
| | 28 | 133.74 | 134.58 | -- | -- | -- | -- | 131.46 | 128.83 | 128.17 | 127.60 | 128.42 | 129.42 |
| | 29 | 133.67 | 135.23 | -- | -- | -- | -- | 131.45 | 128.85 | 128.19 | 127.60 | 128.40 | 129.46 |
| | 30 | 133.64 | 135.34 | -- | -- | -- | -- | 131.59 | 128.81 | 128.23 | 127.63 | 128.48 | 129.57 |
| | 31 | 133.78 | -- | -- | -- | -- | -- | -- | 128.74 | -- | 127.73 | 128.53 | -- |
| | MEAN | 133.38 | 134.11 | 135.33 | -- | -- | -- | 132.28 | 130.11 | 128.29 | 128.09 | 128.10 | 129.02 |
| | MAXIMUM | 133.78 | 135.34 | 135.67 | -- | -- | -- | 133.05 | 131.64 | 128.67 | 128.45 | 128.53 | 129.57 |
| | MINIMUM | 132.84 | 133.66 | 134.97 | -- | -- | -- | 131.45 | 128.74 | 128.05 | 127.53 | 127.74 | 128.65 |

WATER YEAR 1990 MEAN 130.54 MINIMUM 127.53 MAXIMUM 135.67

**Table 11.** Continuous water-level data for three monitoring wells--Continued

| Site number (fig. 10) | Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | **Ozark Lead Well 2 near Eminence, Mo. Daily mean depth to water in feet below land surface, October 1990 to September 1991** | | | | | | | |
| R3 | 1 | 129.58 | 131.37 | 131.92 | 131.71 | 130.94 | 130.78 | 131.46 | 129.99 | 128.72 | 128.99 | 129.87 | 130.89 |
| | 2 | 129.57 | 131.37 | 131.94 | 131.55 | 130.91 | 131.01 | 131.40 | 130.00 | 128.72 | 129.00 | 129.85 | 130.95 |
| | 3 | 129.46 | 131.37 | 131.65 | 131.63 | 130.83 | 131.13 | 131.37 | 129.79 | 128.69 | 129.01 | 129.89 | 130.98 |
| | 4 | 129.62 | 131.24 | 131.75 | 131.68 | 130.78 | 131.11 | 131.36 | 129.80 | 128.71 | 129.04 | 129.93 | 130.97 |
| | 5 | 129.67 | 131.20 | 132.00 | 131.48 | 130.72 | 130.86 | 131.34 | 129.78 | 128.81 | 129.08 | 130.04 | 130.99 |
| | 6 | 129.62 | 131.42 | 131.80 | 131.43 | 130.76 | 131.08 | 131.24 | 129.89 | 128.93 | 129.13 | 130.10 | 131.12 |
| | 7 | 129.62 | 131.58 | 131.83 | 131.49 | 130.87 | 131.32 | 131.11 | 129.93 | 128.93 | 129.18 | 130.15 | 131.14 |
| | 8 | 129.66 | 131.55 | 131.89 | 131.42 | 130.82 | 131.38 | 131.02 | 129.87 | 128.91 | 129.22 | 130.08 | 131.09 |
| | 9 | 129.68 | 131.41 | 131.94 | 131.36 | 130.71 | 131.53 | 131.11 | 129.80 | 128.92 | 129.21 | 130.08 | 131.13 |
| | 11 | 129.73 | 131.64 | 131.95 | 131.11 | 130.93 | 131.24 | 131.21 | 129.75 | 128.81 | 129.25 | 130.25 | 131.17 |
| | 12 | 129.70 | 131.73 | 131.85 | 131.03 | 130.87 | 131.01 | 131.09 | 129.63 | 128.78 | 129.29 | 130.29 | 131.19 |
| | 13 | 129.66 | 131.76 | 131.79 | 131.09 | 130.55 | 131.19 | 130.94 | 129.55 | 128.79 | 129.33 | 130.24 | 131.21 |
| | 14 | 129.65 | 131.76 | 132.00 | 130.94 | 130.76 | 131.45 | 130.77 | 129.47 | 128.77 | 129.44 | 130.24 | 131.21 |
| | 15 | 129.76 | 131.79 | 131.98 | 130.86 | 131.11 | 131.61 | 130.77 | 129.45 | 128.75 | 129.51 | 130.29 | 131.28 |
| | 16 | 129.75 | 131.77 | 131.89 | 130.67 | 131.04 | 131.57 | 130.72 | 129.38 | 128.81 | 129.54 | 130.31 | 131.38 |
| | 17 | 129.73 | 131.91 | 132.08 | 130.83 | 130.85 | 131.37 | 130.58 | 129.38 | 128.83 | 129.50 | 130.27 | 131.41 |
| | 18 | 129.71 | 131.78 | 131.83 | 130.90 | 130.88 | 131.47 | 130.36 | 129.35 | 128.87 | 129.46 | 130.36 | 131.47 |
| | 19 | 129.73 | 131.73 | 131.70 | 130.89 | 131.15 | 131.43 | 130.36 | 129.30 | 128.91 | 129.49 | 130.42 | 131.66 |
| | 20 | 129.70 | 131.79 | 131.90 | 130.64 | 131.22 | 131.29 | 130.44 | 129.21 | 128.89 | 129.58 | 130.49 | 131.67 |

**Table 11.** Continuous water-level data for three monitoring wells--Continued

| Site number (fig. 10) | Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Ozark Lead Well 2 near Eminence, Mo. Daily mean depth to water in feet below land surface, October 1990 to September 1991--Continued** | | | | | | | | | | | |
| R3 | 21 | 129.64 | 131.76 | 131.89 | 130.68 | 131.18 | 131.26 | 130.26 | 129.14 | 128.84 | 129.64 | 130.53 | 131.57 |
| | 22 | 129.70 | 131.76 | 131.78 | 130.87 | 131.26 | 131.16 | 130.08 | 129.10 | 128.83 | 129.66 | 130.56 | 131.54 |
| | 23 | 130.00 | 131.77 | 131.80 | 130.74 | 131.19 | 131.32 | 130.06 | 129.02 | 128.94 | 129.65 | 130.61 | 131.62 |
| | 24 | 130.17 | 131.73 | 131.78 | 130.84 | 131.28 | 131.39 | 130.20 | 128.95 | 128.98 | 129.66 | 130.72 | 131.51 |
| | 25 | 130.26 | 131.73 | 131.88 | 130.82 | 131.31 | 131.28 | 130.10 | 128.82 | 128.99 | 129.69 | 130.73 | 131.46 |
| | 26 | 130.27 | 131.78 | 131.88 | 130.72 | 131.25 | 131.10 | 129.96 | 128.83 | 129.01 | 129.79 | 130.72 | 131.58 |
| | 27 | 130.25 | 131.70 | 131.98 | 130.54 | 131.20 | 131.05 | 129.89 | 128.88 | 129.04 | 129.83 | 130.73 | 131.69 |
| | 28 | 130.42 | 131.68 | 131.81 | 130.60 | 131.09 | 131.16 | 129.85 | 128.91 | 129.05 | 129.80 | 130.78 | 131.77 |
| | 29 | 130.39 | 132.02 | 131.66 | 130.58 | -- | 131.22 | 129.79 | 128.78 | 129.05 | 129.79 | 130.80 | 131.87 |
| | 30 | 130.36 | 132.12 | 131.54 | 130.76 | -- | 131.47 | 129.94 | 128.69 | 129.01 | 129.86 | 130.77 | 131.84 |
| | 31 | 130.96 | -- | 131.60 | 130.96 | -- | 131.44 | -- | 128.70 | -- | 129.89 | 130.78 | -- |
| | MEAN | 129.86 | 131.66 | 131.85 | 131.04 | 130.97 | 131.26 | 130.67 | 129.38 | 128.87 | 129.44 | 130.36 | 131.35 |
| | MAXIMUM | 130.96 | 132.12 | 132.08 | 131.71 | 131.31 | 131.61 | 131.46 | 130.00 | 129.05 | 129.89 | 130.80 | 131.87 |
| | MINIMUM | 129.46 | 131.20 | 131.54 | 130.54 | 130.55 | 130.78 | 129.79 | 128.69 | 128.69 | 128.99 | 129.85 | 130.89 |

WATER YEAR 1991 MEAN 130.56 MINIMUM 128.69 MAXIMUM 132.12

**Table 11.** Continuous water-level data for three monitoring wells–Continued

| Site number (fig. 10) | Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | **Ozark Lead well 2 near Eminence, Mo. Daily mean depth to water in feet below land surface, October 1991 to September 1992** | | | | | | | |
| R3 | 1 | 131.90 | 132.50 | -- | -- | -- | 133.70 | 134.02 | 133.15 | 132.27 | 132.67 | 133.50 | 134.18 |
| | 2 | 131.82 | 132.70 | -- | -- | -- | 133.79 | 134.10 | 133.18 | 132.13 | 132.72 | 133.43 | 134.05 |
| | 3 | 131.85 | -- | -- | -- | -- | 133.79 | 133.94 | 133.30 | 131.99 | 132.82 | 133.42 | 134.22 |
| | 4 | 131.83 | -- | -- | -- | -- | 133.77 | 133.94 | 133.19 | 131.90 | 132.92 | 133.53 | 134.28 |
| | 5 | 132.10 | -- | -- | -- | -- | 133.73 | 134.20 | 133.20 | 131.95 | 132.82 | 133.55 | 134.28 |
| | 6 | 132.25 | -- | -- | -- | -- | 133.70 | 134.18 | 133.39 | 131.95 | 132.82 | 133.60 | 134.30 |
| | 7 | 132.22 | -- | -- | -- | -- | 133.80 | 134.17 | 133.37 | 132.08 | 132.90 | 133.55 | 134.32 |
| | 8 | 132.15 | -- | -- | -- | -- | 133.84 | 134.19 | 133.13 | 132.16 | 132.93 | 133.55 | 134.35 |
| | 9 | 132.16 | -- | -- | -- | -- | 133.68 | 134.18 | 133.14 | 132.13 | 132.98 | 133.62 | 134.20 |
| | 10 | 132.12 | -- | -- | -- | -- | 133.86 | 134.19 | 133.19 | 132.12 | 132.90 | 133.62 | 134.40 |
| | 11 | 132.03 | -- | -- | -- | -- | 133.82 | 134.06 | 133.16 | 132.10 | 133.02 | 133.65 | 134.48 |
| | 12 | 132.17 | -- | -- | -- | -- | 133.84 | 134.26 | 133.04 | 132.15 | 133.04 | 133.72 | 134.50 |
| | 13 | 132.23 | -- | -- | -- | 133.50 | 133.96 | 134.24 | 133.14 | 132.13 | 133.00 | 133.77 | 134.50 |
| | 14 | 132.18 | -- | -- | -- | 133.35 | 133.96 | 134.11 | 133.09 | 132.13 | 133.03 | 133.75 | 134.50 |
| | 15 | 132.23 | -- | -- | -- | 133.34 | 134.09 | 134.05 | 133.14 | 132.13 | 133.03 | 133.80 | 134.50 |
| | 16 | 132.37 | -- | -- | -- | 133.58 | 134.06 | 134.01 | 133.21 | 132.18 | 133.10 | 133.82 | 134.50 |
| | 17 | 132.33 | -- | -- | -- | 133.39 | 133.92 | 134.01 | 133.26 | 132.14 | 133.16 | 133.83 | 134.45 |
| | 18 | 132.48 | -- | -- | -- | 133.37 | 133.67 | 133.86 | 133.30 | 132.18 | 133.27 | 133.87 | 134.45 |
| | 19 | 132.62 | -- | -- | -- | 133.59 | 133.90 | 133.68 | 133.28 | 132.20 | 133.23 | 133.90 | 134.05 |
| | 20 | 132.59 | -- | -- | -- | 133.67 | 134.06 | 133.43 | 133.25 | 132.20 | 133.25 | 133.90 | 134.30 |

**Table 11.** Continuous water-level data for three monitoring wells--Continued

| Site number (fig. 10) | Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | **Ozark Lead well 2 near Eminence, Mo.** | | | | | | | |
| | | | | | | **Daily mean depth to water in feet below land surface, October 1991 to September 1992--Continued** | | | | | | | |
| R3 | 21 | 132.50 | -- | -- | -- | 133.66 | 133.92 | 133.40 | 133.23 | 132.34 | 133.23 | 133.97 | 134.20 |
| | 22 | 132.52 | -- | -- | -- | 133.62 | 133.88 | 133.49 | 133.20 | 132.28 | 133.23 | 133.97 | 134.40 |
| | 23 | 132.53 | -- | -- | -- | 133.50 | 134.00 | 133.42 | 133.09 | 132.15 | 133.28 | 133.97 | 134.50 |
| | 24 | 132.51 | -- | -- | -- | 133.60 | 134.01 | 133.39 | 133.02 | 132.14 | 133.28 | 134.02 | 134.40 |
| | 25 | 132.54 | -- | -- | -- | 133.65 | 133.95 | 133.40 | 132.93 | 132.14 | 133.35 | 134.08 | 134.35 |
| | 26 | 132.55 | -- | -- | -- | 133.63 | 133.93 | 133.45 | 133.92 | 132.28 | 133.28 | 134.02 | 134.35 |
| | 27 | 132.59 | -- | -- | -- | 133.60 | 134.12 | 133.48 | 132.95 | 132.33 | 133.25 | 134.04 | 134.48 |
| | 28 | 132.55 | -- | -- | -- | 133.57 | 134.08 | 133.42 | 132.92 | 132.42 | 133.33 | 134.13 | 134.60 |
| | 29 | 132.62 | -- | -- | -- | 133.79 | 133.91 | 133.25 | 132.65 | 132.60 | 133.30 | 134.13 | 134.10 |
| | 30 | 132.68 | -- | -- | -- | -- | 134.03 | 133.17 | 132.23 | 132.64 | 133.28 | 134.18 | 134.10 |
| | 31 | 132.43 | -- | -- | -- | -- | 133.98 | -- | 132.32 | -- | 133.37 | 134.18 | -- |
| | MEAN | 132.31 | 132.60 | -- | -- | 133.55 | 133.90 | 133.82 | 133.12 | 132.18 | 133.09 | 133.81 | 134.34 |
| | MAXIMUM | 132.68 | 132.70 | -- | -- | 133.79 | 134.12 | 134.26 | 133.92 | 132.64 | 133.37 | 134.18 | 134.60 |
| | MINIMUM | 131.82 | 132.50 | -- | -- | 133.34 | 133.67 | 133.17 | 132.23 | 131.90 | 132.67 | 133.42 | 134.05 |

WATER YEAR 1992 MEAN 133.33 MINIMUM 131.82 MAXIMUM 134.60

[a] Location: Latitude 36° 48' 10" Longitude 091° 19' 14" T.25 N., R.03 W., sec 30dac; formations open to well: Roubidoux Formation through Derby-Doe Run Dolomites: well depth: 1,650 feet; casing 210 feet of 6 1/4 inch; datum: 883 feet above sea level.

[b] Location: Latitude 37° 14' 52" Longitude 091°13' 43" T.30 N., R.03 W., sec 36cbd; formations open to well: Gasconade Dolomite to Davis Formation; well plugged in Davis Formation; well depth: total depth unknown; 190 feet of 6 1/4-inch casing; datum: 840 feet above sea level.

[c] Location: Latitude 37° 14' 49" Longitude 091° 13' 41" T.30 N., R.03 W., sec 36cbd; formations open to well: Davis Formation to Bonneterre Formation at 1,095 feet; casing set and grouted in Davis Formation; well depth: total depth unknown; 958 feet of 6 1/4-inch casing; datum: 872 feet above sea level.

**Table 12.** Daily mean discharge for Greer Spring, October 1989 through September 1993

[Mean values, in cubic feet per second; --, no data available]

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | October 1989 through September 1990 | | | | | | | |
| 1 | 295 | 253 | 240 | 231 | 300 | 371 | 546 | 572 | 570 | 413 | 359 | 352 |
| 2 | 295 | 251 | 241 | 231 | 400 | 370 | 545 | 571 | 567 | 409 | 354 | 353 |
| 3 | 289 | 249 | 241 | 232 | 450 | 369 | 538 | 664 | 562 | 406 | 356 | 352 |
| 4 | 287 | 249 | 240 | 231 | 440 | 368 | 534 | 708 | 555 | 401 | 357 | 353 |
| 5 | 288 | 248 | 240 | 230 | 430 | 362 | 526 | 693 | 551 | 398 | 355 | 351 |
| 6 | 288 | 247 | 244 | 228 | 420 | 359 | 517 | 679 | 546 | 397 | 356 | 351 |
| 7 | 285 | 245 | 239 | 226 | 410 | 355 | 505 | 670 | 537 | 399 | 353 | 352 |
| 8 | 281 | 247 | 239 | 224 | 400 | 368 | 495 | 657 | 533 | 398 | 353 | 353 |
| 9 | 279 | 247 | 239 | 222 | 420 | 388 | 483 | 652 | 530 | 397 | 353 | 359 |
| 10 | 282 | 244 | 241 | 221 | 450 | 392 | 553 | 648 | 524 | 392 | 355 | 358 |
| 11 | 283 | 244 | 241 | 217 | 440 | 391 | 615 | 635 | 521 | 386 | 355 | 357 |
| 12 | 282 | 244 | 240 | 214 | 430 | 398 | 603 | 634 | 517 | 384 | 357 | 356 |
| 13 | 277 | 244 | 237 | 209 | 425 | 435 | 587 | 665 | 515 | 384 | 354 | 357 |
| 14 | 272 | 244 | 235 | 209 | 420 | 456 | 588 | 644 | 508 | 381 | 351 | 352 |
| 15 | 271 | 245 | 235 | 208 | 420 | 528 | 575 | 639 | 502 | 379 | 352 | 346 |
| 16 | 270 | 243 | 236 | 208 | 500 | 572 | 567 | 635 | 498 | 376 | 355 | 345 |
| 17 | 267 | 243 | 235 | 222 | 490 | 580 | 651 | 629 | 490 | 376 | 354 | 342 |
| 18 | 265 | 242 | 233 | 239 | 470 | 579 | 660 | 625 | 489 | 374 | 350 | 340 |
| 19 | 262 | 240 | 231 | 280 | 450 | 566 | 650 | 616 | 483 | 368 | 353 | 340 |
| 20 | 259 | 241 | 234 | 350 | 430 | 561 | 639 | 607 | 475 | 369 | 355 | 338 |

**Table 12.** Daily mean discharge for Greer Spring, October 1989 through September 1993--Continued

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **October 1989 through September 1990--Continued** | | | | | | | | | | | | |
| 21 | 258 | 240 | 233 | 340 | 420 | 551 | 651 | 604 | 470 | 371 | 350 | 340 |
| 22 | 256 | 240 | 233 | 330 | 414 | 543 | 647 | 605 | 464 | 370 | 351 | 341 |
| 23 | 253 | 239 | 233 | 320 | 418 | 534 | 638 | 600 | 459 | 368 | 354 | 337 |
| 24 | 253 | 236 | 234 | 315 | 410 | 526 | 631 | 590 | 455 | 365 | 353 | 335 |
| 25 | 252 | 237 | 233 | 305 | 400 | 513 | 620 | 584 | 447 | 362 | 353 | 337 |
| 26 | 252 | 237 | 230 | 300 | 390 | 497 | 607 | 578 | 443 | 361 | 353 | 336 |
| 27 | 254 | 236 | 230 | 290 | 382 | 489 | 605 | 578 | 436 | 361 | 353 | 335 |
| 28 | 254 | 234 | 228 | 280 | 379 | 482 | 600 | 593 | 429 | 360 | 354 | 331 |
| 29 | 254 | 232 | 228 | 270 | -- | 472 | 597 | 590 | 421 | 360 | 351 | 331 |
| 30 | 256 | 237 | 230 | 260 | -- | 483 | 589 | 583 | 414 | 359 | 352 | 329 |
| 31 | 255 | -- | 232 | 260 | -- | 532 | -- | 577 | -- | 359 | 350 | -- |
| Mean | 270 | 243 | 236 | 255 | 422 | 464 | 585 | 623 | 497 | 380 | 354 | 345 |
| Maximum | 295 | 253 | 244 | 350 | 500 | 580 | 660 | 708 | 570 | 413 | 359 | 359 |
| Minimum | 252 | 232 | 228 | 208 | 300 | 355 | 483 | 571 | 414 | 359 | 350 | 329 |

**Table 12.** Daily mean discharge for Greer Spring, October 1989 through September 1993–Continued

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | October 1990 through September 1991 | | | | | | |
| 1 | 329 | 304 | 358 | 541 | 423 | 366 | 355 | 654 | 450 | 370 | 325 | 295 |
| 2 | 328 | 302 | 345 | 519 | 420 | 371 | 349 | 637 | 461 | 364 | 327 | 296 |
| 3 | 326 | 300 | 359 | 498 | 415 | 366 | 360 | 628 | 477 | 360 | 331 | 297 |
| 4 | 326 | 304 | 366 | 484 | 413 | 364 | 411 | 622 | 474 | 360 | 331 | 300 |
| 5 | 323 | 302 | 358 | 474 | 417 | 364 | 435 | 610 | 475 | 356 | 328 | 304 |
| 6 | 322 | 300 | 347 | 473 | 417 | 369 | 437 | 606 | 471 | 358 | 317 | 304 |
| 7 | 331 | 297 | 344 | 506 | 412 | 365 | 445 | 601 | 460 | 353 | 310 | 300 |
| 8 | 353 | 297 | 334 | 509 | 404 | 361 | 440 | 589 | 455 | 347 | 310 | 297 |
| 9 | 353 | 297 | 326 | 507 | 401 | 355 | 441 | 582 | 451 | 347 | 315 | 296 |
| 10 | 360 | 293 | 323 | 507 | 398 | 358 | 436 | 573 | 444 | 341 | 313 | 293 |
| 11 | 354 | 292 | 317 | 568 | 393 | 354 | 437 | 564 | 441 | 345 | 311 | 292 |
| 12 | 347 | 291 | 316 | 590 | 393 | 353 | 489 | 551 | 437 | 342 | 315 | 292 |
| 13 | 341 | 288 | 314 | 579 | 393 | 356 | 599 | 554 | 436 | 342 | 314 | 289 |
| 14 | 337 | 286 | 308 | 571 | 397 | 348 | 751 | 550 | 434 | 340 | 314 | 288 |
| 15 | 335 | 288 | 309 | 558 | 396 | 344 | 687 | 540 | 429 | 337 | 316 | 288 |
| 16 | 333 | 289 | 302 | 546 | 385 | 343 | 656 | 542 | 425 | 338 | 319 | 285 |
| 17 | 332 | 288 | 305 | 540 | 388 | 345 | 647 | 543 | 420 | 339 | 317 | 285 |
| 18 | 330 | 288 | 346 | 527 | 385 | 370 | 668 | 566 | 416 | 337 | 312 | 285 |
| 19 | 327 | 286 | 387 | 514 | 382 | 372 | 705 | 577 | 411 | 336 | 304 | 284 |
| 20 | 324 | 285 | 377 | 507 | 376 | 372 | 679 | 572 | 408 | 334 | 305 | 281 |

**Table 12.** Daily mean discharge for Greer Spring, October 1989 through September 1993--Continued

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | **October 1990 through September 1991--Continued** | | | | | | | |
| 21 | 324 | 287 | 409 | 496 | 372 | 374 | 669 | 571 | 405 | 332 | 300 | 284 |
| 22 | 321 | 287 | 471 | 484 | 370 | 448 | 665 | 559 | 402 | 333 | 299 | 285 |
| 23 | 317 | 291 | 468 | 480 | 371 | 498 | 655 | 535 | 400 | 333 | 297 | 285 |
| 24 | 316 | 288 | 458 | 470 | 369 | 456 | 642 | 509 | 390 | 329 | 296 | 285 |
| 25 | 314 | 288 | 442 | 463 | 366 | 446 | 630 | 498 | 389 | 329 | 296 | 284 |
| 26 | 308 | 288 | 423 | 461 | 371 | 429 | 621 | 486 | 381 | 325 | 296 | 281 |
| 27 | 307 | 308 | 413 | 450 | 364 | 416 | 619 | 478 | 380 | 330 | 296 | 280 |
| 28 | 305 | 399 | 408 | 445 | 364 | 407 | 618 | 471 | 375 | 325 | 296 | 277 |
| 29 | 305 | 393 | 430 | 439 | -- | 394 | 721 | 467 | 378 | 326 | 296 | 277 |
| 30 | 301 | 373 | 537 | 437 | -- | 383 | 675 | 465 | 376 | 325 | 296 | 277 |
| 31 | 304 | -- | 547 | 433 | -- | 369 | -- | 458 | -- | 322 | 293 | -- |
| Mean | 327 | 303 | 379 | 502 | 391 | 381 | 565 | 553 | 425 | 340 | 310 | 289 |
| Maximum | 360 | 399 | 547 | 590 | 423 | 498 | 751 | 654 | 477 | 370 | 331 | 304 |
| Minimum | 301 | 285 | 302 | 433 | 364 | 343 | 349 | 458 | 375 | 322 | 293 | 277 |

**Table 12.** Daily mean discharge for Greer Spring, October 1989 through September 1993--Continued

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | October 1991 through September 1992 | | | | | | |
| 1 | 269 | 494 | 386 | 363 | 312 | 304 | 288 | 438 | 316 | 300 | 288 | 262 |
| 2 | 269 | 504 | 414 | 363 | 308 | 300 | 288 | 423 | 316 | 300 | 288 | 262 |
| 3 | 269 | 493 | 443 | 359 | 304 | 300 | 285 | 419 | 316 | 300 | 288 | 258 |
| 4 | 269 | 478 | 443 | 359 | 304 | 300 | 288 | 409 | 316 | 296 | 288 | 254 |
| 5 | 269 | 463 | 438 | 355 | 300 | 296 | 285 | 400 | 316 | 296 | 288 | 254 |
| 6 | 269 | 443 | 428 | 355 | 300 | 296 | 285 | 395 | 312 | 296 | 288 | 254 |
| 7 | 269 | 428 | 419 | 350 | 300 | 292 | 281 | 390 | 312 | 296 | 285 | 251 |
| 8 | 269 | 414 | 414 | 350 | 296 | 292 | 281 | 386 | 312 | 296 | 285 | 251 |
| 9 | 269 | 404 | 404 | 346 | 292 | 292 | 285 | 381 | 308 | 296 | 285 | 251 |
| 10 | 269 | 395 | 400 | 346 | 292 | 292 | 304 | 377 | 308 | 296 | 285 | 251 |
| 11 | 269 | 386 | 390 | 346 | 292 | 292 | 312 | 372 | 325 | 296 | 325 | 251 |
| 12 | 266 | 372 | 386 | 346 | 288 | 292 | 308 | 368 | 333 | 296 | 325 | 251 |
| 13 | 266 | 363 | 381 | 346 | 288 | 288 | 300 | 363 | 337 | 292 | 312 | 251 |
| 14 | 266 | 359 | 377 | 346 | 300 | 288 | 296 | 359 | 337 | 292 | 304 | 251 |
| 15 | 266 | 355 | 372 | 346 | 333 | 285 | 296 | 355 | 337 | 292 | 296 | 251 |
| 16 | 266 | 350 | 368 | 341 | 333 | 281 | 296 | 355 | 333 | 296 | 288 | 251 |
| 17 | 266 | 350 | 363 | 341 | 333 | 281 | 292 | 350 | 329 | 296 | 285 | 251 |
| 18 | 266 | 386 | 359 | 337 | 333 | 285 | 296 | 346 | 325 | 292 | 281 | 251 |
| 19 | 262 | 400 | 359 | 337 | 328 | 304 | 316 | 341 | 325 | 292 | 281 | 251 |
| 20 | 262 | 453 | 355 | 333 | 325 | 308 | 672 | 333 | 321 | 296 | 277 | 251 |

**Table 12.** Daily mean discharge for Greer Spring, October 1989 through September 1993–Continued

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **October 1991 through September 1992--Continued** | | | | | | | | | | | | |
| 21 | 262 | 448 | 363 | 329 | 325 | 308 | 594 | 333 | 316 | 296 | 273 | 262 |
| 22 | 262 | 443 | 381 | 329 | 321 | 308 | 560 | 329 | 316 | 296 | 273 | 269 |
| 23 | 258 | 433 | 390 | 329 | 321 | 304 | 542 | 329 | 316 | 296 | 273 | 262 |
| 24 | 258 | 423 | 390 | 325 | 321 | 300 | 531 | 329 | 316 | 296 | 269 | 262 |
| 25 | 262 | 409 | 390 | 325 | 316 | 296 | 520 | 325 | 312 | 296 | 269 | 258 |
| 26 | 262 | 395 | 386 | 325 | 312 | 296 | 510 | 325 | 308 | 296 | 269 | 254 |
| 27 | 262 | 386 | 386 | 321 | 312 | 296 | 483 | 321 | 308 | 296 | 269 | 254 |
| 28 | 269 | 381 | 381 | 316 | 312 | 292 | 468 | 321 | 304 | 292 | 269 | 251 |
| 29 | 368 | 377 | 381 | 316 | 308 | 292 | 458 | 321 | 304 | 292 | 266 | 251 |
| 30 | 438 | 377 | 377 | 312 | -- | 292 | 448 | 321 | 304 | 292 | 266 | 247 |
| 31 | 433 | -- | 372 | 312 | -- | 292 | -- | 321 | -- | 292 | 262 | -- |
| Mean | 280 | 412 | 390 | 339 | 311 | 295 | 379 | 359 | 318 | 295 | 284 | 254 |
| Maximum | 438 | 504 | 443 | 363 | 333 | 308 | 672 | 438 | 337 | 300 | 325 | 269 |
| Minimum | 258 | 350 | 355 | 312 | 288 | 281 | 281 | 321 | 304 | 292 | 262 | 247 |

**Table 12.** Daily mean discharge for Greer Spring, October 1989 through September 1993–Continued

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | October 1992 through September 1993 | | | | | | | |
| 1 | 247 | 233 | 355 | 444 | 453 | 434 | 465 | 459 | 400 | 390 | 336 | 312 |
| 2 | 247 | 239 | 350 | 442 | 448 | 482 | 462 | 459 | 400 | 386 | 333 | 314 |
| 3 | 247 | 237 | 342 | 484 | 443 | 550 | 457 | 468 | 404 | 385 | 333 | 324 |
| 4 | 247 | 236 | 337 | 697 | 438 | 569 | 454 | 476 | 439 | 381 | 332 | 331 |
| 5 | 244 | 236 | 332 | 749 | 433 | 559 | 453 | 473 | 477 | 377 | 329 | 329 |
| 6 | 244 | 233 | 325 | 709 | 426 | 537 | 453 | 469 | 477 | 373 | 329 | 324 |
| 7 | 244 | 230 | 321 | 693 | 415 | 523 | 457 | 467 | 469 | 372 | 329 | 318 |
| 8 | 244 | 229 | 316 | 675 | 413 | 504 | 458 | 463 | 462 | 368 | 329 | 316 |
| 9 | 246 | 229 | 313 | 661 | 409 | 488 | 459 | 458 | 454 | 367 | 329 | 312 |
| 10 | 258 | 230 | 312 | 644 | 404 | 473 | 462 | 454 | 452 | 364 | 329 | 309 |
| 11 | 251 | 245 | 308 | 631 | 402 | 459 | 459 | 457 | 448 | 363 | 329 | 308 |
| 12 | 244 | 308 | 304 | 624 | 409 | 450 | 457 | 458 | 443 | 363 | 340 | 305 |
| 13 | 240 | 348 | 300 | 611 | 407 | 447 | 449 | 457 | 438 | 360 | 355 | 306 |
| 14 | 237 | 341 | 313 | 592 | 404 | 438 | 451 | 453 | 433 | 359 | 354 | 315 |
| 15 | 236 | 329 | 449 | 587 | 404 | 429 | 474 | 448 | 428 | 359 | 347 | 320 |
| 16 | 236 | 317 | 598 | 576 | 401 | 426 | 497 | 443 | 423 | 359 | 345 | 320 |
| 17 | 233 | 309 | 616 | 559 | 400 | 432 | 499 | 437 | 419 | 358 | 341 | 316 |
| 18 | 233 | 304 | 626 | 540 | 400 | 429 | 495 | 429 | 418 | 355 | 338 | 313 |
| 19 | 233 | 297 | 617 | 506 | 400 | 428 | 494 | 428 | 414 | 355 | 336 | 312 |
| 20 | 232 | 299 | 601 | 518 | 400 | 429 | 497 | 427 | 410 | 354 | 333 | 312 |

**Table 12.** Daily mean discharge for Greer Spring, October 1989 through September 1993--Continued

| Day | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | October 1992 through September 1993--Continued | | | | | | | |
| 21 | 230 | 346 | 587 | 547 | 402 | 436 | 489 | 424 | 409 | 351 | 329 | 312 |
| 22 | 229 | 397 | 572 | 542 | 420 | 439 | 479 | 423 | 405 | 350 | 328 | 309 |
| 23 | 229 | 428 | 557 | 530 | 427 | 442 | 473 | 423 | 404 | 350 | 325 | 312 |
| 24 | 229 | 423 | 533 | 520 | 429 | 442 | 472 | 419 | 400 | 350 | 324 | 356 |
| 25 | 226 | 413 | 516 | 510 | 429 | 442 | 470 | 414 | 399 | 350 | 321 | 548 |
| 26 | 229 | 400 | 504 | 500 | 432 | 443 | 477 | 410 | 396 | 346 | 320 | 601 |
| 27 | 229 | 390 | 489 | 493 | 431 | 442 | 477 | 409 | 395 | 346 | 317 | 606 |
| 28 | 229 | 381 | 477 | 484 | 424 | 437 | 469 | 409 | 395 | 345 | 316 | 599 |
| 29 | 229 | 372 | 464 | 477 | -- | 430 | 464 | 404 | 395 | 342 | 316 | 589 |
| 30 | 229 | 363 | 458 | 467 | -- | 435 | 462 | 400 | 391 | 341 | 313 | 582 |
| 31 | 230 | -- | 452 | 458 | -- | 449 | -- | 400 | -- | 338 | 312 | -- |
| Mean | 237 | 311 | 440 | 564 | 418 | 462 | 469 | 439 | 423 | 360 | 331 | 371 |
| Maximum | 258 | 428 | 626 | 749 | 453 | 569 | 499 | 476 | 477 | 390 | 355 | 606 |
| Minimum | 226 | 229 | 300 | 442 | 400 | 426 | 449 | 400 | 391 | 338 | 312 | 305 |