

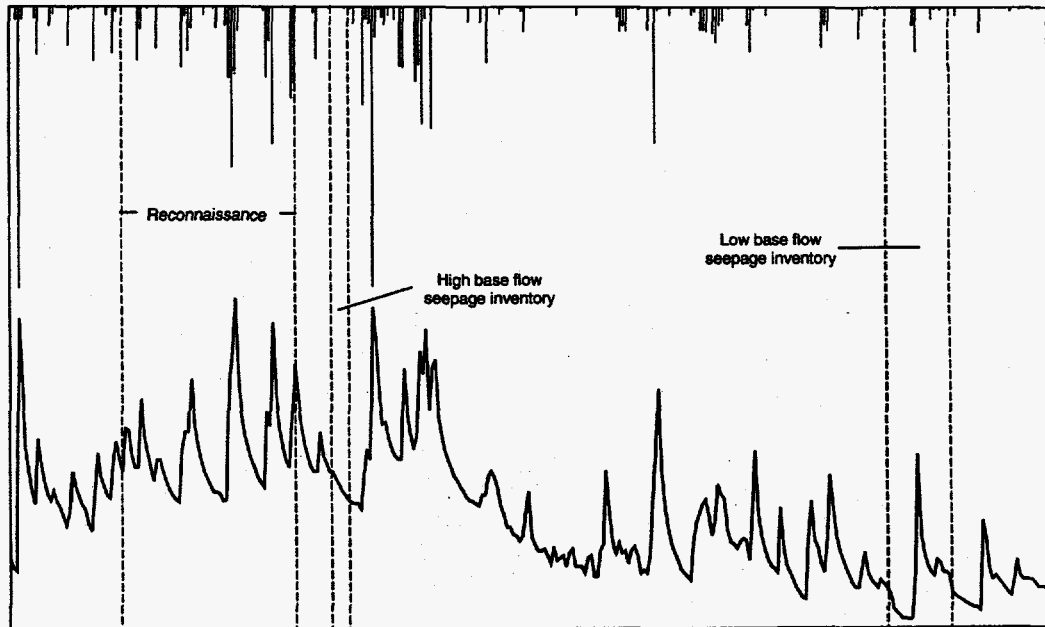
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**Open-File Report 95-459**

# Results of a Seepage Investigation at Bear Creek Valley, Oak Ridge, Tennessee, January through September 1994



Prepared by the  
**U.S. GEOLOGICAL SURVEY**

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By JOHN A. ROBINSON and GREGORY C. JOHNSON

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Nashville, Tennessee

1996



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## CONVERSION FACTORS AND VERTICAL DATUM

Multiply	By	To Obtain
cubic foot per second (ft <sup>3</sup> /s)	0.02832	cubic meter per second
foot (ft)	0.3048	meter
acre	0.4047	square hectare
square mile (mi <sup>2</sup> )	2.590	square kilometer
mile (mi)	1.609	kilometer
microsiemens per centimeter at 25 °C (μS/cm)	1	micromhos per centimeter at 25 °C

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

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

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

# Results of a Seepage Investigation at Bear Creek Valley, Oak Ridge, Tennessee, January through September 1994

By John A. Robinson and Gregory C. Johnson

## ABSTRACT

A seepage investigation was conducted of 4,600 acres of Bear Creek Valley southwest of the Y-12 Plant, Oak Ridge, Tennessee, for the period of January through September 1994. The data were collected to help the Y-12 Environmental Restoration Program develop a better understanding of ground-water and surface-water interactions, recharge and discharge relations, and ground-water flow patterns. The project was divided into three phases: a reconnaissance and mapping of seeps, springs, and stream-measurement sites; a high base flow seepage investigation; and a low base flow seepage investigation.

The reconnaissance was conducted from January 6 to March 1, 1994, to identify and map the locations of seeps, springs, and stream-measurement sites. A total of 701 sites were identified. They consisted of 382 stream-measurement sites, 265 seeps, 48 springs, and 6 wetlands. A global positioning system was used to locate 680 sites to within 3- to 5-meter accuracy.

The high base flow seepage investigation was conducted from March 14 through March 19, 1994. Measurements were made at 579 of the 701 sites identified in the reconnaissance that still had flowing water. Flow rates ranged from less than 0.005 to 6.89 cubic feet per second ( $\text{ft}^3/\text{s}$ ) for the streams, from less than 0.005 to 0.13  $\text{ft}^3/\text{s}$  for the seeps, and from less than 0.005 to 1  $\text{ft}^3/\text{s}$  for the springs. pH ranged from 5.0 to 8.4 for the streams, from 5.1 to 8.2 for the seeps, from 5.3 to 8.0 for the springs, and from 6.7 to 6.8 for the wetland sites. Specific conductance ranged from 16 to 1,670 microsiemens per centimeter ( $\mu\text{S}/\text{cm}$ )

for the streams, from 17 to 1,710  $\mu\text{S}/\text{cm}$  for the seeps, from 14 to 1,150  $\mu\text{S}/\text{cm}$  for the springs, and from 102 to 160  $\mu\text{S}/\text{cm}$  for the wetland sites. Temperature ranged from 4.5 to 16.0 °C for the streams, from 5.0 to 21.0 °C for the seeps, from 6.0 to 13.5 °C for the springs, and from 13.0 to 19.5 °C for the wetland sites. Dissolved oxygen ranged from 4.8 to 11.2 milligrams per liter (mg/L) for the streams, 1.2 to 11.3 mg/L for the seeps, and from 0.6 to 11.0 mg/L for the springs. Dissolved oxygen at a wetland site measured 3.8 mg/L.

The low base flow investigation was conducted from September 9 through September 29, 1994. The stream sites, seeps, and springs that had flow during the high base flow seepage investigation were revisited. One-hundred seventy-six of the stream sites visited still had flow. Discharge ranged from less than 0.005 to 0.76  $\text{ft}^3/\text{s}$ ; pH, from 4.8 to 8.3; specific conductance, from 47 to 2,030  $\mu\text{S}/\text{cm}$ ; temperature, from 13.5 to 22.5 °C; and dissolved oxygen, from 3.6 to 8.7 mg/L. Twenty-five of the seeps visited were flowing and had discharge ranging from less than 0.005 to 0.01  $\text{ft}^3/\text{s}$ ; pH, from 6.0 to 7.7; specific conductance, from 36 to 395  $\mu\text{S}/\text{cm}$ ; temperature, from 16.0 to 21.0 °C; and dissolved oxygen, from 2.2 to 9.0 mg/L. Thirty springs visited were flowing and had discharge ranging from less than 0.005 to 0.37  $\text{ft}^3/\text{s}$ ; pH, from 6.5 to 7.7; specific conductance, from 26 to 1,220  $\mu\text{S}/\text{cm}$ ; temperature, from 14.0 to 20.0 °C; and dissolved oxygen, from 1.0 to 9.2 mg/L. All of the wetland sites visited were dry.

## INTRODUCTION

The Oak Ridge Reservation (ORR) is located in East Tennessee in the western part of the Valley and Ridge Province. The 58,000-acre ORR is bounded on the northeast, southeast, and southwest by the Clinch River, and on the northwest by Blackoak Ridge (McMaster, 1967). The three major facilities within the ORR are Y-12, a research, development, and production center; X-10, the Oak Ridge National Laboratory (ORNL), a research and development center; and K-25, the Gaseous Diffusion Plant (ORGDP), a production center that was closed in 1986.

During 1994, the U.S. Geological Survey (USGS), in cooperation with the U.S. Department of Energy, conducted a seepage investigation of Bear Creek Valley, in which the Y-12 Plant is located. Information provided by this study will aid the Y-12 Environmental Restoration Program, Groundwater Operable Units Remedial Investigations Project develop a better understanding of ground-water and surface-water interactions on the ORR.

The study involved three phases of activity: (1) a reconnaissance to inventory and map seeps, springs, and stream-measurement sites; (2) the measurement of discharge and water-quality characteristics under high base flow conditions, and (3) the measurement of discharge and water-quality characteristics under low base flow conditions. This report describes the results of the investigation. It includes a map showing measurement site locations and tables that list the coordinates for each site and measurements of discharge, pH, specific conductance, temperature, and dissolved oxygen.

The study area is bounded by Pine Ridge on the northwest, Chestnut Ridge on the southeast, the Clinch River on the southwest, and the Y-12 Plant on the northeast (fig. 1). Bear Creek Valley southwest of the Y-12 Plant is drained by two streams: Bear Creek, which exits through a water gap in Pine Ridge, and Grassy Creek, which discharges to the Clinch River. The 4,600 acres within the study area were divided into 22 sub-areas for measurement purposes (table 1). Certain locations within these areas were excluded from the study because of safety or security concerns.

## SEEP AND SPRING INVENTORY

The reconnaissance was conducted from January 6 to March 1, 1994. For each of the 22 sampling

**Table 1.** Size of sampling areas in the Bear Creek Valley seepage investigation, Oak Ridge, Tennessee

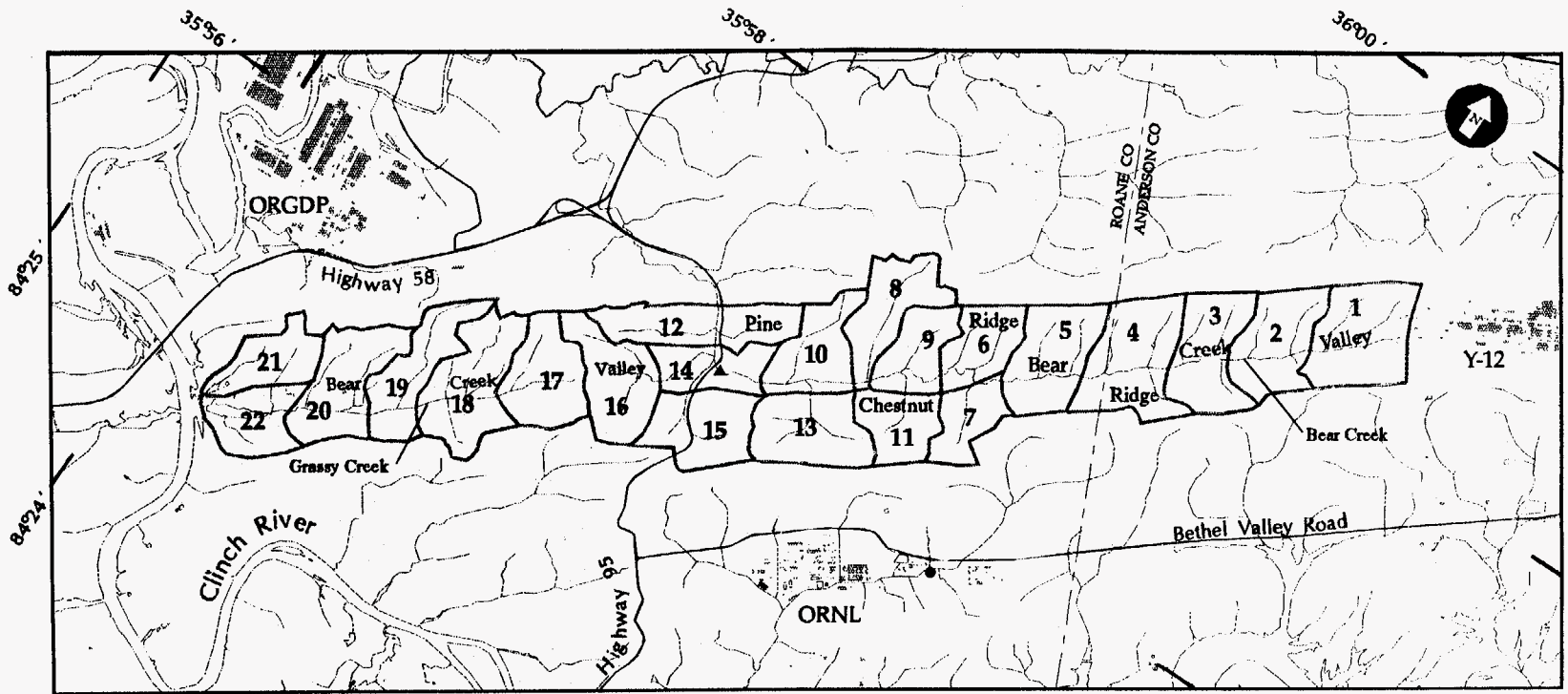
Sampling area	Area (acres)	Area (square miles)
1	303.3	0.47
2	227.5	0.36
3	239.6	0.37
4	355.8	0.56
5	171.0	0.27
6	157.0	0.25
7	191.7	0.30
8	157.1	0.25
9	124.8	0.19
10	181.2	0.28
11	154.2	0.24
12	230.9	0.36
13	233.6	0.36
14	169.5	0.26
15	224.2	0.35
16	218.4	0.34
17	216.8	0.34
18	237.3	0.37
19	239.8	0.37
20	281.6	0.21
21	133.1	0.21
22	154.2	0.24
Total	4,602.6	7.19

areas, all streams and tributaries were traversed to their source or to an area boundary. A total of 701 seeps, springs, and stream-measurement sites were staked and assigned unique identification numbers. The inventory consists of 265 seeps, 48 springs, 6 wetlands, and 382 stream-measurement sites (plate 1).

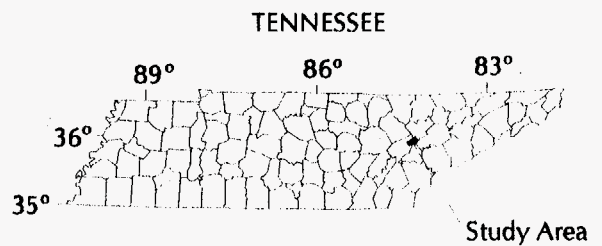
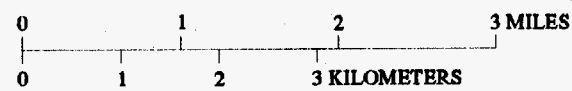
## Site-Numbering System

Each site was assigned a unique identification number. The identification number consists of four or five digits beginning with the sampling area number followed by an upstream order number that ranges from 001 to 999. This approach assigns the lowest number to the most downstream site in the basin and increasingly larger numbers to sites upstream. When a tributary is reached, site numbers increase along the tributary upstream to its source, and numbering resumes along the main channel.

The sites were classified as either a seep, spring, stream-measurement location, or wetland (tables 3 and 5, located at back of report). A seep was defined as a discharge of water at land surface without a distinguishable point outlet and generally at a low flow rate. A spring was defined as a discharge of water at a



Base from Tennessee Valley Authority  
S-16A Map of the Oak Ridge, Tennessee  
Area, December 1987



- EXPLANATION**
- AREA BOUNDARY
  - 17 AREA NUMBER
  - ▲ STAGE GAGE
  - RAIN GAGE
  - BUILDINGS

Figure 1. Study area in Bear Creek Valley, Oak Ridge, Tennessee.

defined outlet or where water was upwelling. The presence of watercress usually was an indicator of a spring. Stream-measurement sites were located about every 500 feet along each channel with flowing water and at the confluence of tributaries with flow. A wetland was defined as a bog-like area with no outlet.

### Site Coordinates

A global positioning system (GPS) was used to determine the coordinates of 680 sites to within 3- to 5-meter accuracy. The remaining sites were mapped by measuring their distances from the GPS points or other control points, plotting locations on field maps, and digitizing those points. Locations of the 701 sites inventoried are reported in state plane coordinates (table 2, located at back of report).

## RESULTS OF SEEPAGE INVESTIGATION

Two seepage investigations were conducted, one during high base flow and one during low base flow. A waiting period of 72 hours after rainfall events was used to minimize the possible influence of ephemeral streams and springs (Mulholland, 1991). Measurements in each sampling area were completed in 1 day to minimize variations in flow rates. During the high base flow seepage investigation, discharge and water-quality measurements were made at each site that had flowing water. For the low base flow seepage investigation, only the seeps and springs that had flow during the high base flow investigation were revisited.

### Field Methods

Four methods were used to measure discharge: (1) volumetric measurements, (2) current meter measurements, (3) surface velocity measurements, and (4) estimations.

Volumetric measurements are typically the most accurate method for quantifying discharge during low flow conditions. For this study, a volume of water was collected during a timed interval for four iterations, and the discharge was calculated as the average of the four measurements.

Pygmy-type current meters were used where practical. Using standard USGS current meter discharge measurement procedures, the accuracy of measurements range from about 5 percent error on some of

the larger streams to greater than 8 percent error on some sites with very low discharge.

The third type of discharge measurement involved the use of floats. The cross-sectional area of a stream was measured, and the average time for a float to travel a known distance for four iterations was determined. Discharge was then calculated and reported to 0.01 ft<sup>3</sup>/s.

The final, and least accurate, method was to estimate the discharge. This method was used in cases where the discharge was very small, and no other method was practical.

A notation was made to indicate sites where flow was visible, but less than the minimum reportable discharge. At sites where the flow was less than 0.005 ft<sup>3</sup>/s, the flow was reported as zero. For flows greater than 0.005 ft<sup>3</sup>/s, the discharge was rounded to the nearest hundredth of a cubic foot per second.

Field water-quality parameters consisted of specific conductance, temperature, pH, and dissolved oxygen. The dissolved oxygen, pH, and conductance meters used to collect these data were calibrated every morning before use, and again in the field if questionable values occurred. Calibration and use of the field meters were consistent with standard USGS procedures.

Discharge at the stream gaging station, at Bear Creek at Highway 95 near Oak Ridge, Tennessee (03538270), and rainfall at the gaging station, at Whiteoak Creek near Melton Valley Road (03536550), were used as indicators of the hydrologic conditions at the study area (fig. 2). During the reconnaissance, January 6 through March 1, 1994, mean daily discharge at Bear Creek ranged from 6.1 to 329 ft<sup>3</sup>/s. The mean daily discharge ranged from 5.8 ft<sup>3</sup>/s to 11.7 ft<sup>3</sup>/s during the high base flow seepage investigation and from 0.59 to 14 ft<sup>3</sup>/s for the low base flow seepage investigation.

### High Base Flow Seepage Investigation

The high base flow seepage investigation was conducted from March 14 through March 19, 1994. All 701 sites identified during the reconnaissance were revisited. Discharge and water-quality measurements were made at 579 of the 701 sites that still had flowing water (table 3, located at back of report). At 174 of the 579 sites with flowing water, the flow was reported as zero with a notation that flow was below the minimum reportable discharge (0.005 ft<sup>3</sup>/s). Flow rates ranged



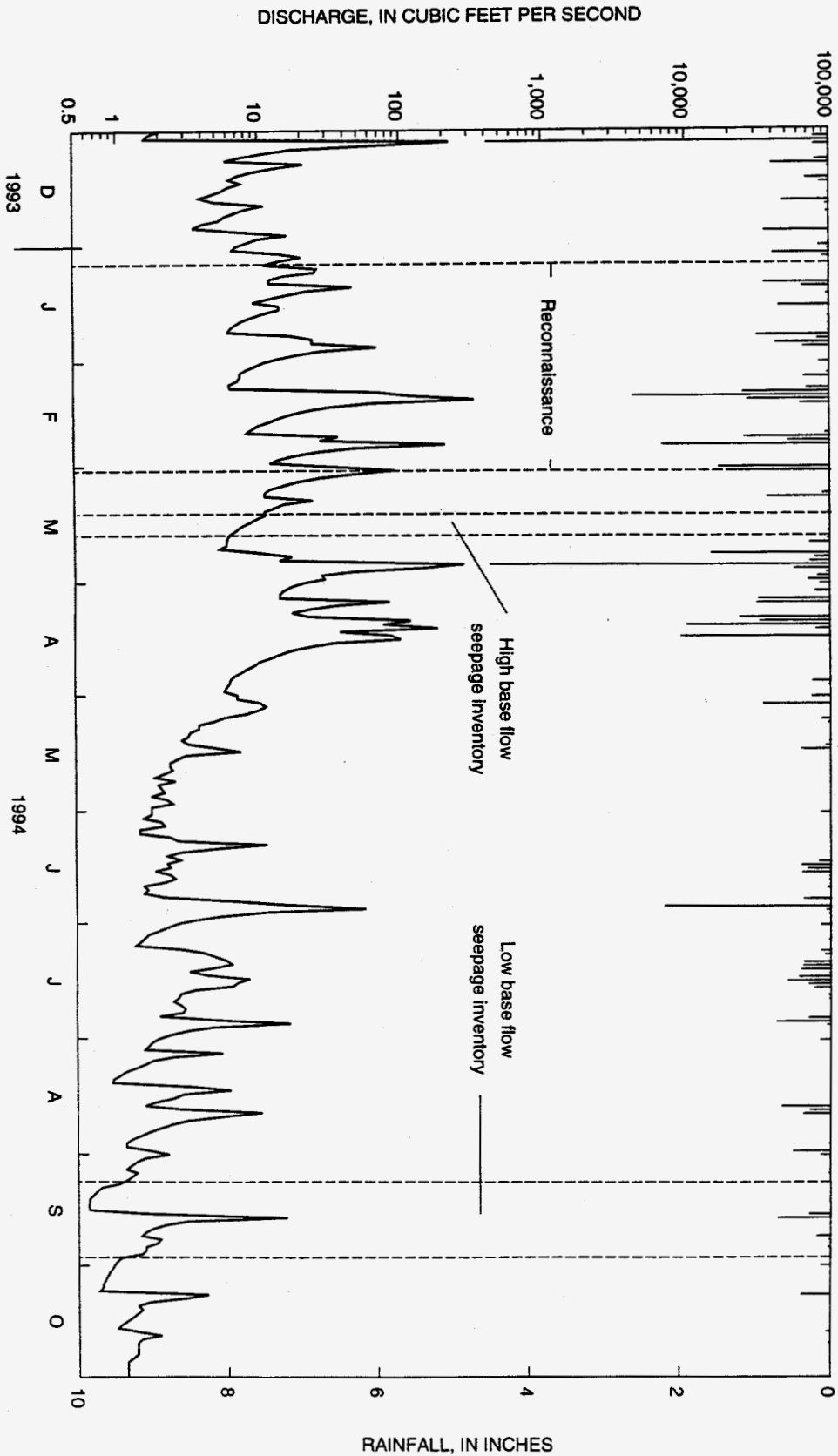


Figure 2. Mean daily discharge of Bear Creek near State Route 95, at Oak Ridge, Tennessee, and daily rainfall at Whiteoak Creek, at Oak Ridge, Tennessee, from December 1, 1993 through October 31, 1994.



from 0 to 6.89 ft<sup>3</sup>/s for the streams, from 0 to 0.13 ft<sup>3</sup>/s for the seeps, and from below the reporting limit to 1 ft<sup>3</sup>/s for the springs (table 4). pH values ranged from 5.0 to 8.4 for the streams, from 5.1 to 8.2 for the seeps, from 5.3 to 8.0 for the springs, and 6.7 to 6.8 for the wetlands. Specific conductance ranged from 16 to 1,670 microsiemens per centimeter (μS/cm) for the streams, from 17 to 1,710 μS/cm for the seeps, from 14 to 1,150 μS/cm for the springs, and from 102 to 160 μS/cm for the wetlands. Temperature ranged from 4.5 to 16.0 °C for the streams, 5.0 to 21.0 °C for the

seeps, 6.0 to 13.5 °C for the springs, and 13.0 to 19.5 °C for the wetlands. Dissolved oxygen ranged from 4.8 to 11.2 milligrams per liter (mg/L) for the streams, from 1.2 to 11.3 mg/L for the seeps, and from 0.6 to 11.0 mg/L for the springs. Dissolved oxygen at a wetland site measured 3.8 mg/L.

### Low Base Flow Seepage Investigation

Streams, seeps, and springs that were flowing during the high base flow seepage investigation were

**Table 4.** Statistical summary of discharge and water-quality data for the high base flow seepage investigation at Bear Creek Valley, Oak Ridge, Tennessee, March 14 through March 19, 1995

[ft<sup>3</sup>/s, cubic foot per second; μS/cm, microsiemens per centimeter at 25 degrees Celsius; °C, degrees Celsius; mg/L, milligrams per liter; --, no data]

Statistic	Flow (ft <sup>3</sup> /s)	pH	Specific conductance (μS/cm)	Temperature (°C)	Dissolved oxygen (mg/L)
<b>382 Stream-measurement sites</b>					
Number of measurements.	296	351	351	351	22
Minimum value	0	5.0	16	4.5	4.8
Maximum value	6.89	8.4	1,670	16	11.2
Mean	0.53	--	162	10.2	9.0
Standard deviation	1.3	--	209	2.3	1.7
Median	.06	7.3	90	10	9.2
<b>265 Seep sites</b>					
Number of measurements.	58	166	169	169	130
Minimum value	0	5.1	17	5	1.2
Maximum value	.13	8.2	1,710	21	11.3
Mean	.01	--	127	10.5	6.7
Standard deviation	.02	--	176	2.5	2.5
Median	.01	6.7	66	10	7.0
<b>48 Spring sites</b>					
Number of measurements.	35	47	47	47	47
Minimum value	0	5.3	14	6	.6
Maximum value	1	8.0	1,150	13.5	11.0
Mean	.12	--	214	11.5	8.3
Standard deviation	.21	--	255	1.5	2.4
Median	.03	7.1	118	12	9.0
<b>6 Wetland sites</b>					
Number of measurements.	0	2	2	2	1
Minimum value	--	6.7	102	13	3.8
Maximum value	--	6.8	160	19.5	3.8
Mean	--	--	131	16.3	3.8
Standard deviation	--	--	--	--	--
Median	--	--	--	--	--

revisited during September 9 through September 29, 1994, to make low base flow measurements (table 5, located at back of report). At 75 stream sites, 23 spring sites, and 22 seep sites, the flow rate was reported as zero with a notation that flow was below the minimum reportable discharge. Of the 382 stream sites visited, 176 had flow. Discharge ranged from 0 to 0.76 ft<sup>3</sup>/s; pH, from 4.8 to 8.3; specific conductance, from 47 to 2,030 μS/cm; temperature, from 13.5 to 22.5 °C; and dissolved oxygen, from 3.6 to 8.7 mg/L. Twenty-five of the 147 seeps visited were flowing and had discharge ranging from 0 to 0.01 ft<sup>3</sup>/s; pH, from 6.0 to 7.7; specific conductance, from 36 to 395 μS/cm; temperature, from 16.0 to 21.0 °C; and dissolved oxygen, from 2.2 to 9.0 mg/L. Thirty of the 48 springs visited were flowing and had discharge ranging from 0 to 0.37 ft<sup>3</sup>/s; pH, from 6.5 to 7.7; specific conductance, from 26 to 1,220 μS/cm; temperature, from 14.0 to 20.0 °C; and dissolved

oxygen, from 1.0 to 9.2 mg/L (table 6). All of the wetland sites visited were dry.

## SUMMARY

A seepage study was made of 4,600 acres in Bear Creek Valley near the Y-12 Plant on the Oak Ridge Reservation. The study was conducted in three phases: a reconnaissance and mapping of the sites, a high base flow seepage investigation, and a low base flow seepage investigation. The reconnaissance was conducted from January 6 to March 1, 1994, to identify and map seeps, springs, and stream-measurement sites. A total of 701 sites were identified, which consisted of 265 seeps, 48 springs, 6 wetlands, and 382 stream-measurement sites.

The high base flow seepage investigation was conducted from March 14 through March 19, 1994.

**Table 6.** Statistical summary of the discharge and water-quality data for the low base flow seepage investigation at Bear Creek Valley, Oak Ridge, Tennessee, September 9 through September 29, 1994

[ft<sup>3</sup>/s, cubic foot per second; μS/cm, microsiemens per centimeter at 25 degrees Celsius; °C, degrees Celsius; mg/L, milligrams per liter; --, no data]

Statistic	Flow (ft <sup>3</sup> /s)	pH	Specific conductance (μS/cm)	Temperature (°C)	Dissolved oxygen (mg/L)
<b>382 Stream-measurement sites</b>					
Number of measurements.	101	175	175	174	13
Minimum value	0	4.8	47	13.5	3.6
Maximum value	0.76	8.3	2,030	22.5	8.7
Mean	.1	--	381	18.4	6.9
Standard deviation	.16	--	350	1.6	1.7
Median	.02	7.7	275	18.5	7.8
<b>265 Seep sites</b>					
Number of measurements.	5	25	25	25	13
Minimum value	0	6.0	36	16	2.2
Maximum value	0.01	7.7	395	21	9.0
Mean	.01	--	172	18.5	6.7
Standard deviation	0	--	114	1	2.2
Median	--	7.2	132	18.5	7.7
<b>48 Spring sites</b>					
Number of measurements.	9	30	25	25	26
Minimum value	0	6.5	26	14	1.0
Maximum value	0.37	7.7	1,220	20	9.2
Mean	.1	--	294	16.5	7.0
Standard deviation	.12	--	270	2	1.9
Median	.02	7.1	272	17	7.7

Measurements were made at 579 of the 701 sites identified in the reconnaissance that still had flowing water. At 174 of the 579 sites, flow was insufficient to measure and was reported as zero with a notation that flow was below the minimum reportable discharge (0.005 ft<sup>3</sup>/s). Flow rates ranged from 0 to 6.89 ft<sup>3</sup>/s for the streams, from 0 to 0.13 ft<sup>3</sup>/s for the seeps, and from 0 to 1 ft<sup>3</sup>/s for the springs. pH values ranged from 5.0 to 8.4 for the streams, from 5.1 to 8.2 for the seeps, from 5.3 to 8.0 for the springs, and 6.7 to 6.8 for the wetlands. Specific conductance ranged from 16 to 1,670  $\mu$ S/cm for the streams, from 17 to 1,710  $\mu$ S/cm for the seeps, from 14 to 1,150  $\mu$ S/cm for the springs, and from 102 to 160  $\mu$ S/cm for the wetlands. Temperature ranged from 4.5 to 16.0 °C for the streams, 5.0 to 21.0 °C for the seeps, 6.0 to 13.5 °C for the springs, and 13.0 to 19.5 °C for the wetlands. Dissolved oxygen ranged from 4.8 to 11.2 milligrams per liter (mg/L) for the streams, 1.2 to 11.3 mg/L for the seeps, and from 0.6 to 11.0 mg/L for the springs. Dissolved oxygen at a wetland site measured 3.8 mg/L.

The low base flow investigation was conducted from September 9 through September 29, 1994. The streams, seeps, and springs that had flow during the high base flow seepage investigation were revisited. At 75 stream sites, 23 springs, and 22 seeps, the flow rate was reported as zero with a notation that flow was below the minimum reportable discharge. Of the 382 stream sites visited, 176 had flow. Discharge ranged

from below the reporting limit to 0.76 ft<sup>3</sup>/s; pH, from 4.8 to 8.3; specific conductance, from 47 to 2,030  $\mu$ S/cm; temperature, from 13.5 to 22.5 °C; and dissolved oxygen, from 3.6 to 8.7 mg/L. Twenty-five of the 147 seeps visited were flowing and had discharge ranging from 0 to 0.01 ft<sup>3</sup>/s; pH, from 6.0 to 7.7; specific conductance, from 36 to 395  $\mu$ S/cm; temperature, from 16.0 to 21.0 °C; and dissolved oxygen, from 2.2 to 9.0 mg/L. Thirty of the 48 springs visited were flowing and had discharge ranging from 0 to 0.37 ft<sup>3</sup>/s; pH, from 6.5 to 7.7; specific conductance, from 26 to 1,220  $\mu$ S/cm; temperature, from 14.0 to 20.0 °C; and dissolved oxygen, from 1.0 to 9.2 mg/L (table 6). All of the wetland sites visited were dry.

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- Mulholland, P.J., 1991, Effects of flowpath variation on the hydrogeochemical response of Walker Branch watershed to storms, *in* Sale, M.J., and Presley, P.M. compilers, Extended abstracts from Fourth Tennessee Water Resources Symposium, Knoxville, Tenn., 1991: Tennessee Section of the American Water Resources Association, p. 63-67.

**Table 2.** State plane coordinates for seeps, springs, wetlands, and stream-measurement sites at Bear Creek Valley, Oak Ridge, Tennessee

[N, north; W, west; GPS, global positioning system; DIG, digitized]

Site number	State plane coordinates						Method	Site number	State plane coordinates						Method
	Latitude (N) (degrees, minutes, seconds)			Longitude (W) (degrees, minutes, seconds)					Latitude (N) (degrees, minutes, seconds)			Longitude (W) (degrees, minutes, seconds)			
1005	35	58	17.292	-84	16	48.454	GPS	1515	35	58	33.366	-84	16	34.507	GPS
1010	35	58	17.566	-84	16	48.223	GPS	1520	35	58	34.982	-84	16	33.496	GPS
1015	35	58	20.687	-84	16	47.831	GPS	1525	35	58	38.096	-84	16	31.422	GPS
1020	35	58	22.904	-84	16	47.662	GPS	1530	35	58	39.580	-84	16	30.626	GPS
1025	35	58	25.129	-84	16	51.064	GPS	1535	35	58	36.620	-84	16	34.122	GPS
1030	35	58	24.197	-84	16	49.652	GPS	1540	35	58	37.859	-84	16	33.784	GPS
1035	35	58	27.358	-84	16	51.488	GPS	1545	35	58	38.294	-84	16	33.416	GPS
1040	35	58	27.394	-84	16	51.769	GPS	1550	35	58	42.791	-84	16	31.361	GPS
1045	35	58	27.293	-84	16	51.258	GPS	1555	35	58	43.432	-84	16	31.598	GPS
1050	35	58	25.277	-84	16	47.183	GPS	1560	35	58	44.929	-84	16	33.154	GPS
1055	35	58	26.530	-84	16	46.006	GPS	1565	35	58	44.609	-84	16	33.892	GPS
1060	35	58	27.444	-84	16	45.325	GPS	1570	35	58	45.577	-84	16	35.551	GPS
1065	35	58	28.402	-84	16	43.342	GPS	1573	35	58	48.947	-84	16	38.057	GPS
1070	35	58	28.592	-84	16	45.325	GPS	1575	35	58	49.811	-84	16	38.323	GPS
1075	35	58	29.060	-84	16	47.050	GPS	1576	35	58	43.288	-84	16	30.896	GPS
1080	35	58	29.629	-84	16	46.798	GPS	1577	35	58	44.814	-84	16	30.749	GPS
1085	35	58	30.850	-84	16	46.682	GPS	1579	35	58	47.338	-84	16	30.936	GPS
1090	35	58	32.628	-84	16	48.788	GPS	1582	35	58	52.871	-84	16	29.694	GPS
1095	35	58	32.999	-84	16	49.008	GPS	1585	35	58	55.052	-84	16	30.860	GPS
1100	35	58	34.136	-84	16	49.548	GPS	1600	35	58	28.870	-84	16	32.063	GPS
1105	35	58	35.260	-84	16	46.276	GPS	1610	35	58	32.250	-84	16	21.691	GPS
1110	35	58	36.358	-84	16	46.560	GPS	2005	35	57	58.986	-84	17	15.904	GPS
1115	35	58	37.553	-84	16	43.666	GPS	2006	35	58	2.582	-84	17	19.360	GPS
1120	35	58	36.044	-84	16	46.744	GPS	2010	35	58	3.090	-84	17	19.446	GPS
1125	35	58	36.408	-84	16	46.978	GPS	2015	35	58	0.340	-84	17	13.520	GPS
1130	35	58	39.475	-84	16	45.106	GPS	2020	35	58	0.973	-84	17	13.142	GPS
1135	35	58	44.090	-84	16	49.786	GPS	2025	35	58	6.017	-84	17	11.742	GPS
1140	35	58	40.051	-84	16	45.307	GPS	2027	35	58	8.540	-84	17	9.265	GPS
1145	35	58	42.064	-84	16	42.701	GPS	2030	35	58	7.115	-84	17	12.566	GPS
1148	35	58	45.210	-84	16	43.979	GPS	2035	35	58	7.266	-84	17	17.722	DIG
1150	35	58	47.514	-84	16	45.134	GPS	2040	35	58	8.843	-84	17	11.699	GPS
1155	35	58	42.276	-84	16	42.942	GPS	2050	35	58	9.005	-84	17	15.227	GPS
1480	35	58	17.083	-84	16	47.438	GPS	2055	35	58	10.535	-84	17	16.861	GPS
1485	35	58	19.038	-84	16	44.033	GPS	2065	35	58	9.991	-84	17	13.924	GPS
1490	35	58	22.102	-84	16	41.362	GPS	2067	35	58	13.620	-84	17	11.634	GPS
1495	35	58	22.976	-84	16	40.559	GPS	2068	35	58	13.156	-84	17	12.620	GPS
1500	35	58	26.130	-84	16	36.934	GPS	2070	35	58	17.612	-84	17	12.916	GPS
1502	35	58	25.028	-84	16	35.375	GPS	2080	35	58	21.583	-84	17	12.131	GPS
1505	35	58	29.208	-84	16	35.278	GPS	2083	35	58	21.058	-84	17	13.423	GPS
1510	35	58	29.060	-84	16	36.433	GPS	2085	35	58	25.993	-84	17	14.132	GPS

**Table 2. State plane coordinates for seeps, springs, wetlands, and stream-measurement sites at Bear Creek Valley, Oak Ridge, Tennessee—Continued**

Site number	State plane coordinates						Method	Site number	State plane coordinates						Method
	Latitude (N) (degrees, minutes, seconds)			Longitude (W) (degrees, minutes, seconds)					Latitude (N) (degrees, minutes, seconds)			Longitude (W) (degrees, minutes, seconds)			
2090	35	58	15.344	-84	17	12.689	GPS	2337	35	58	8.987	-84	16	53.346	GPS
2095	35	58	18.224	-84	17	8.822	GPS	2339	35	58	7.543	-84	16	52.741	GPS
2100	35	58	11.932	-84	17	16.919	GPS	2341	35	58	9.196	-84	16	52.626	GPS
2110	35	58	15.956	-84	17	19.482	GPS	2345	35	58	14.491	-84	16	53.058	GPS
2120	35	58	16.270	-84	17	19.313	GPS	3005	35	57	39.964	-84	17	43.339	GPS
2125	35	58	12.734	-84	17	15.389	GPS	3010	35	57	40.133	-84	17	42.652	GPS
2130	35	58	17.414	-84	17	15.576	GPS	3015	35	57	42.894	-84	17	37.720	GPS
2135	35	58	17.494	-84	17	15.864	GPS	3020	35	57	44.204	-84	17	34.987	GPS
2140	35	58	20.150	-84	17	15.929	GPS	3025	35	57	44.932	-84	17	34.192	GPS
2145	35	58	25.687	-84	17	16.217	GPS	3030	35	57	43.200	-84	17	27.434	GPS
2150	35	58	27.394	-84	17	17.070	GPS	3035	35	57	43.211	-84	17	26.905	GPS
2155	35	58	21.706	-84	17	18.589	GPS	3040	35	57	43.546	-84	17	38.623	GPS
2160	35	58	25.464	-84	17	19.280	GPS	3045	35	57	47.045	-84	17	34.872	GPS
2170	35	58	0.520	-84	17	7.462	GPS	3050	35	57	47.570	-84	17	35.304	GPS
2175	35	57	57.683	-84	17	3.768	GPS	3055	35	57	49.550	-84	17	37.900	GPS
2180	35	57	56.945	-84	17	2.040	GPS	3060	35	57	49.838	-84	17	37.558	GPS
2185	35	58	3.367	-84	17	6.457	GPS	3065	35	57	50.746	-84	17	38.404	GPS
2190	35	58	6.712	-84	17	1.417	GPS	3070	35	57	50.443	-84	17	37.590	GPS
2195	35	58	8.890	-84	16	58.231	GPS	3075	35	57	52.942	-84	17	38.540	GPS
2200	35	58	11.762	-84	16	58.710	GPS	3078	35	57	56.668	-84	17	34.289	GPS
2205	35	58	13.242	-84	16	58.750	GPS	3080	35	57	55.231	-84	17	38.422	GPS
2210	35	58	13.444	-84	17	0.211	GPS	3085	35	57	55.800	-84	17	37.316	GPS
2225	35	58	18.260	-84	17	2.508	GPS	3090	35	57	59.407	-84	17	38.555	GPS
2230	35	58	22.699	-84	17	4.650	GPS	3095	35	58	4.930	-84	17	41.611	GPS
2235	35	58	24.186	-84	17	7.184	GPS	3100	35	58	6.946	-84	17	45.175	GPS
2240	35	58	25.493	-84	17	7.649	GPS	3105	35	58	3.749	-84	17	42.464	GPS
2245	35	58	28.870	-84	17	10.342	GPS	3110	35	57	58.626	-84	17	37.892	GPS
2260	35	58	30.389	-84	17	10.860	GPS	3115	35	58	1.027	-84	17	37.504	GPS
2270	35	58	27.044	-84	17	8.113	GPS	3120	35	58	2.525	-84	17	38.170	GPS
2275	35	58	23.246	-84	17	2.450	GPS	3125	35	58	3.817	-84	17	38.494	GPS
2280	35	58	26.522	-84	17	4.603	GPS	3130	35	58	4.379	-84	17	36.431	GPS
2285	35	58	24.931	-84	17	1.313	GPS	3135	35	58	4.418	-84	17	35.808	GPS
2290	35	58	33.762	-84	16	58.940	GPS	3140	35	58	4.678	-84	17	38.231	GPS
2295	35	58	33.895	-84	16	58.735	GPS	3145	35	58	4.825	-84	17	38.386	DIG
2310	35	58	36.592	-84	17	0.211	GPS	3150	35	58	7.522	-84	17	38.386	GPS
2315	35	58	9.487	-84	16	56.536	GPS	3155	35	58	8.130	-84	17	38.983	GPS
2320	35	58	9.570	-84	16	56.381	GPS	3160	35	58	8.634	-84	17	39.552	GPS
2325	35	58	7.763	-84	16	54.952	GPS	3165	35	58	11.572	-84	17	41.215	GPS
2330	35	58	7.547	-84	16	53.638	GPS	3170	35	57	50.054	-84	17	30.721	GPS
2335	35	58	10.240	-84	16	55.096	GPS	3175	35	57	51.379	-84	17	29.530	GPS

**Table 2.** State plane coordinates for seeps, springs, wetlands, and stream-measurement sites at Bear Creek Valley, Oak Ridge, Tennessee—Continued

Site number	State plane coordinates						Method	Site number	State plane coordinates						Method
	Latitude (N) (degrees, minutes, seconds)			Longitude (W) (degrees, minutes, seconds)					Latitude (N) (degrees, minutes, seconds)			Longitude (W) (degrees, minutes, seconds)			
3180	35	57	51.883	-84	17	28.820	GPS	4060	35	57	41.854	-84	18	16.308	GPS
3185	35	57	53.446	-84	17	28.669	GPS	4065	35	57	44.273	-84	18	18.832	GPS
3190	35	57	55.541	-84	17	25.350	GPS	4070	35	57	43.430	-84	18	14.386	GPS
3195	35	57	59.479	-84	17	26.646	GPS	4075	35	57	48.992	-84	18	17.798	GPS
3198	35	58	4.696	-84	17	25.998	GPS	4080	35	57	37.908	-84	18	23.062	GPS
3200	35	58	3.904	-84	17	27.254	GPS	4085	35	57	38.009	-84	18	23.123	GPS
3202	35	58	5.621	-84	17	25.544	GPS	4090	35	57	43.747	-84	18	26.986	GPS
3205	35	58	7.201	-84	17	27.409	GPS	4095	35	57	42.494	-84	18	21.737	GPS
3210	35	58	8.148	-84	17	27.776	GPS	4100	35	57	45.248	-84	18	23.267	GPS
3215	35	58	10.589	-84	17	25.076	GPS	4105	35	57	20.218	-84	18	10.958	GPS
3225	35	58	13.105	-84	17	27.488	GPS	4110	35	57	23.029	-84	18	7.945	GPS
3230	35	58	15.946	-84	17	24.659	GPS	4115	35	57	26.143	-84	18	3.510	GPS
3235	35	58	19.430	-84	17	24.320	GPS	4120	35	57	32.699	-84	17	32.964	GPS
3240	35	58	8.681	-84	17	28.356	GPS	4125	35	57	33.343	-84	17	38.598	GPS
3245	35	58	10.877	-84	17	29.656	GPS	4400	35	57	27.997	-84	18	3.017	GPS
3250	35	58	10.848	-84	17	30.325	GPS	4405	35	57	28.228	-84	18	2.524	GPS
3255	35	58	11.453	-84	17	31.628	GPS	4410	35	57	28.598	-84	18	2.246	GPS
3260	35	58	16.514	-84	17	34.584	GPS	4415	35	57	30.442	-84	18	1.228	GPS
3265	35	58	17.605	-84	17	35.272	GPS	4420	35	57	30.510	-84	18	0.986	DIG
3270	35	58	13.123	-84	17	29.119	GPS	4425	35	57	29.747	-84	18	2.570	GPS
3275	35	58	16.734	-84	17	29.792	GPS	4430	35	57	32.357	-84	18	3.089	GPS
3280	35	58	18.203	-84	17	30.286	GPS	4435	35	57	35.161	-84	18	2.473	GPS
3285	35	57	55.102	-84	17	23.053	GPS	4440	35	57	39.751	-84	18	1.192	GPS
3290	35	57	51.678	-84	17	19.136	GPS	4445	35	57	42.178	-84	17	59.464	GPS
3295	35	57	49.234	-84	17	14.899	DIG	4450	35	57	41.515	-84	18	1.544	GPS
3300	35	57	48.816	-84	17	15.320	GPS	4455	35	57	43.391	-84	18	2.426	GPS
3305	35	57	47.909	-84	17	6.925	GPS	4472	35	57	58.878	-84	18	1.987	DIG
3310	35	57	57.614	-84	17	18.337	GPS	4473	35	57	59.267	-84	18	1.904	GPS
4005	35	57	21.524	-84	18	13.586	GPS	4475	35	57	35.244	-84	18	2.621	DIG
4010	35	57	28.919	-84	18	16.106	GPS	4480	35	57	40.349	-84	18	7.931	GPS
4015	35	57	29.776	-84	18	12.038	GPS	4485	35	57	44.734	-84	18	8.748	GPS
4017	35	57	31.450	-84	18	14.278	GPS	4490	35	57	48.125	-84	18	8.572	GPS
4020	35	57	29.480	-84	18	16.880	GPS	4495	35	57	48.269	-84	18	9.209	GPS
4025	35	57	31.288	-84	18	21.254	GPS	4500	35	57	49.050	-84	18	9.533	GPS
4030	35	57	30.298	-84	18	16.193	GPS	4505	35	57	49.000	-84	18	9.533	DIG
4035	35	57	32.209	-84	18	15.617	GPS	4510	35	57	51.203	-84	18	10.062	GPS
4040	35	57	35.716	-84	18	10.022	GPS	4515	35	57	52.556	-84	18	10.890	GPS
4045	35	57	38.390	-84	18	11.999	GPS	4520	35	57	52.556	-84	18	10.890	GPS
4050	35	57	37.739	-84	18	13.882	GPS	4525	35	57	33.772	-84	17	54.787	GPS
4055	35	57	40.576	-84	18	17.176	GPS	4530	35	57	36.778	-84	17	50.687	GPS

**Table 2. State plane coordinates for seeps, springs, wetlands, and stream-measurement sites at Bear Creek Valley, Oak Ridge, Tennessee—Continued**

Site number	State plane coordinates						Method	Site number	State plane coordinates						Method
	Latitude (N) (degrees, minutes, seconds)			Longitude (W) (degrees, minutes, seconds)					Latitude (N) (degrees, minutes, seconds)			Longitude (W) (degrees, minutes, seconds)			
4535	35	57	39.247	-84	17	48.599	GPS	6030	35	57	10.166	-84	19	2.176	GPS
4540	35	57	43.459	-84	17	50.136	GPS	6033	35	57	15.487	-84	18	59.508	DIG
4545	35	57	48.301	-84	17	51.882	GPS	6035	35	57	15.340	-84	18	59.674	GPS
4580	35	57	56.740	-84	17	52.091	GPS	6045	35	57	23.350	-84	19	8.695	GPS
4585	35	57	56.758	-84	17	52.699	GPS	6050	35	57	20.164	-84	19	0.613	GPS
4590	35	57	56.311	-84	17	50.798	GPS	6055	35	57	25.513	-84	18	57.535	GPS
4595	35	57	59.638	-84	17	50.852	GPS	6060	35	57	0.752	-84	18	58.295	GPS
4600	35	58	2.795	-84	17	47.818	GPS	6065	35	57	3.809	-84	18	51.710	GPS
4605	35	58	0.977	-84	17	51.094	GPS	6070	35	57	4.284	-84	18	50.576	GPS
4610	35	58	2.323	-84	17	51.119	GPS	6075	35	57	7.283	-84	18	47.880	GPS
4615	35	58	3.018	-84	17	51.817	GPS	6085	35	57	12.838	-84	18	50.728	GPS
4620	35	58	5.603	-84	17	51.702	GPS	6090	35	57	9.749	-84	18	45.997	GPS
4630	35	57	39.614	-84	17	46.982	GPS	6095	35	57	11.275	-84	18	43.038	GPS
5005	35	57	9.227	-84	18	33.152	GPS	6100	35	57	13.406	-84	18	47.117	GPS
5010	35	57	10.994	-84	18	29.516	GPS	6105	35	57	13.633	-84	18	47.232	DIG
5015	35	57	18.767	-84	18	33.066	GPS	6110	35	57	19.040	-84	18	47.765	GPS
5020	35	57	25.546	-84	18	39.791	GPS	6115	35	57	22.536	-84	18	48.949	GPS
5025	35	57	34.535	-84	18	41.022	GPS	6120	35	57	29.804	-84	18	50.987	GPS
5030	35	57	13.889	-84	18	25.909	GPS	7005	35	57	0.515	-84	18	47.117	GPS
5035	35	57	14.188	-84	18	25.726	GPS	7010	35	56	56.774	-84	18	47.416	GPS
5040	35	57	16.463	-84	18	25.837	GPS	7015	35	56	51.896	-84	18	44.687	GPS
5045	35	57	22.424	-84	18	30.809	GPS	7020	35	56	48.106	-84	18	45.022	GPS
5050	35	57	31.396	-84	18	32.429	GPS	7025	35	56	47.692	-84	18	41.548	GPS
5055	35	57	31.334	-84	18	32.396	GPS	7030	35	56	43.670	-84	18	40.716	GPS
5060	35	57	33.779	-84	18	35.406	GPS	7035	35	56	41.820	-84	18	40.280	GPS
5065	35	57	30.712	-84	18	35.302	GPS	7040	35	56	40.762	-84	18	33.980	GPS
5070	35	57	33.880	-84	18	31.784	GPS	7045	35	56	35.092	-84	18	36.576	GPS
5075	35	57	34.499	-84	18	31.946	GPS	7050	35	57	5.713	-84	18	39.614	GPS
5080	35	57	40.212	-84	18	32.609	GPS	7055	35	57	9.148	-84	18	40.381	GPS
5085	35	57	35.338	-84	18	30.737	GPS	7060	35	57	5.922	-84	18	38.333	GPS
5090	35	57	17.636	-84	18	21.578	GPS	8005	35	56	40.214	-84	19	26.954	GPS
5095	35	57	26.554	-84	18	22.406	GPS	8010	35	56	45.830	-84	19	30.137	GPS
5100	35	57	30.359	-84	18	25.880	GPS	8015	35	56	52.789	-84	19	29.863	GPS
5105	35	57	18.508	-84	18	17.514	GPS	8020	35	56	52.390	-84	19	33.672	GPS
6005	35	57	0.612	-84	18	59.234	GPS	8025	35	56	52.922	-84	19	34.374	GPS
6007	35	57	1.458	-84	18	59.922	GPS	8030	35	56	53.221	-84	19	40.109	GPS
6010	35	57	5.494	-84	18	58.658	GPS	8035	35	56	57.404	-84	19	42.550	GPS
6015	35	57	6.138	-84	19	1.168	GPS	8040	35	56	51.126	-84	19	43.741	GPS
6020	35	57	9.349	-84	19	4.739	GPS	8045	35	56	59.302	-84	19	33.985	GPS
6025	35	57	8.953	-84	18	59.792	GPS	8050	35	56	59.827	-84	19	33.557	GPS

**Table 2.** State plane coordinates for seeps, springs, wetlands, and stream-measurement sites at Bear Creek Valley, Oak Ridge, Tennessee—Continued

Site number	State plane coordinates						Method	Site number	State plane coordinates						Method
	Latitude (N) (degrees, minutes, seconds)			Longitude (W) (degrees, minutes, seconds)					Latitude (N) (degrees, minutes, seconds)			Longitude (W) (degrees, minutes, seconds)			
8055	35	57	2.768	-84	19	34.162	GPS	9060	35	57	3.823	-84	19	24.460	GPS
8060	35	57	3.647	-84	19	34.219	GPS	9065	35	57	5.249	-84	19	16.572	GPS
8062	35	57	8.060	-84	19	36.160	GPS	9068	35	57	12.704	-84	19	19.794	GPS
8063	35	57	8.532	-84	19	35.969	DIG	9070	35	57	12.420	-84	19	20.788	GPS
8065	35	57	12.118	-84	19	37.582	GPS	9075	35	57	6.253	-84	19	13.447	GPS
8070	35	57	12.683	-84	19	42.776	GPS	9080	35	57	8.737	-84	19	9.631	GPS
8075	35	57	11.135	-84	19	45.577	GPS	9085	35	57	11.020	-84	19	10.531	GPS
8080	35	57	12.218	-84	19	46.153	GPS	9090	35	56	52.145	-84	19	13.552	GPS
8085	35	57	16.441	-84	19	50.542	GPS	9092	35	56	51.709	-84	19	2.964	GPS
8090	35	57	12.406	-84	19	37.132	GPS	9093	35	56	53.718	-84	18	59.918	GPS
8092	35	57	13.194	-84	19	36.671	GPS	9095	35	56	53.052	-84	19	2.258	GPS
8095	35	57	15.030	-84	19	36.840	GPS	10005	35	56	44.268	-84	19	10.186	GPS
8100	35	57	15.768	-84	19	36.116	GPS	10070	35	56	37.680	-84	19	5.437	GPS
8103	35	57	15.581	-84	19	36.671	GPS	10080	35	56	35.527	-84	19	4.778	GPS
8105	35	57	16.556	-84	19	36.959	GPS	10090	35	56	36.535	-84	19	2.273	GPS
8110	35	57	19.598	-84	19	43.259	GPS	10095	35	56	37.039	-84	19	2.708	GPS
8115	35	57	20.405	-84	19	34.734	GPS	10100	35	56	40.268	-84	18	50.749	GPS
8120	35	57	21.740	-84	19	39.464	GPS	11005	35	56	24.011	-84	19	54.358	GPS
8125	35	57	20.318	-84	19	34.144	GPS	11010	35	56	31.222	-84	19	55.798	GPS
8130	35	57	22.234	-84	19	32.200	GPS	11015	35	56	36.499	-84	19	54.458	GPS
8135	35	57	22.831	-84	19	27.678	GPS	11020	35	56	32.831	-84	19	57.403	GPS
8140	35	57	20.070	-84	19	24.712	GPS	11025	35	56	41.726	-84	19	58.537	GPS
8145	35	57	20.959	-84	19	18.386	GPS	11030	35	56	49.510	-84	19	52.741	GPS
8150	35	57	21.701	-84	19	20.870	GPS	11035	35	56	55.831	-84	19	52.910	GPS
8200	35	56	39.959	-84	19	25.975	GPS	11040	35	56	41.201	-84	19	59.693	GPS
8205	35	57	13.475	-84	19	31.098	GPS	11045	35	56	49.495	-84	20	3.901	GPS
8210	35	57	18.263	-84	19	33.218	GPS	11050	35	56	28.144	-84	19	48.911	GPS
8220	35	57	17.140	-84	19	28.978	GPS	11055	35	56	28.342	-84	19	49.062	GPS
8225	35	57	14.580	-84	19	29.064	GPS	11060	35	56	32.183	-84	19	40.721	GPS
9005	35	56	46.334	-84	19	19.092	GPS	11065	35	56	35.182	-84	19	38.201	GPS
9010	35	56	49.085	-84	19	16.270	GPS	11070	35	56	40.078	-84	19	42.089	GPS
9015	35	56	51.644	-84	19	15.942	GPS	11075	35	56	40.452	-84	19	42.521	GPS
9020	35	56	52.084	-84	19	16.277	GPS	11080	35	56	40.290	-84	19	42.740	GPS
9025	35	56	54.164	-84	19	20.118	GPS	11085	35	56	40.754	-84	19	43.352	GPS
9030	35	56	59.006	-84	19	22.670	GPS	11090	35	56	40.830	-84	19	45.667	GPS
9035	35	57	0.184	-84	19	23.326	GPS	11095	35	56	47.432	-84	19	48.828	GPS
9040	35	56	52.847	-84	19	16.230	GPS	11099	35	56	36.370	-84	19	30.194	GPS
9045	35	56	59.708	-84	19	11.773	GPS	11100	35	56	37.705	-84	19	30.641	GPS
9050	35	57	1.508	-84	19	17.180	GPS	11105	35	56	39.437	-84	19	27.354	GPS
9055	35	57	4.889	-84	19	17.314	GPS	12010	35	56	22.837	-84	19	42.463	GPS



**Table 2. State plane coordinates for seeps, springs, wetlands, and stream-measurement sites at Bear Creek Valley, Oak Ridge, Tennessee—Continued**

Site number	State plane coordinates						Method	Site number	State plane coordinates						Method
	Latitude (N) (degrees, minutes, seconds)			Longitude (W) (degrees, minutes, seconds)					Latitude (N) (degrees, minutes, seconds)			Longitude (W) (degrees, minutes, seconds)			
12015	35	56	22.290	-84	19	42.251	GPS	13225	35	56	29.807	-84	20	23.244	GPS
12020	35	56	20.494	-84	19	40.148	GPS	13230	35	56	33.032	-84	20	19.604	GPS
12025	35	56	19.417	-84	19	37.862	GPS	13235	35	56	41.446	-84	20	20.555	GPS
12040	35	56	16.980	-84	19	26.796	GPS	13240	35	56	41.856	-84	20	20.152	GPS
12045	35	56	20.036	-84	19	16.352	GPS	13245	35	56	34.350	-84	20	16.933	GPS
12050	35	56	5.798	-84	19	43.507	GPS	13250	35	56	32.572	-84	20	16.933	DIG
13005	35	56	33.479	-84	20	38.530	GPS	13255	35	56	34.325	-84	20	15.504	GPS
13007	35	56	30.919	-84	20	36.344	GPS	13260	35	56	34.019	-84	20	15.187	DIG
13008	35	56	34.674	-84	20	34.397	GPS	13265	35	56	33.490	-84	20	15.266	GPS
13010	35	56	35.639	-84	20	32.374	GPS	13270	35	56	37.478	-84	20	11.900	GPS
13015	35	56	34.138	-84	20	30.905	GPS	13275	35	56	39.865	-84	20	10.226	GPS
13020	35	56	35.790	-84	20	27.208	GPS	13900	35	56	24.598	-84	20	33.162	GPS
13025	35	56	30.343	-84	20	35.873	GPS	14005	35	56	21.527	-84	20	31.078	GPS
13030	35	56	29.069	-84	20	34.264	GPS	14010	35	56	18.910	-84	20	28.694	GPS
13035	35	56	28.734	-84	20	29.936	GPS	14015	35	56	18.157	-84	20	28.100	GPS
13040	35	56	28.918	-84	20	36.301	GPS	14025	35	56	21.646	-84	20	24.061	GPS
13060	35	56	26.776	-84	20	34.476	GPS	14035	35	56	17.592	-84	20	28.374	GPS
13070	35	56	20.465	-84	20	38.947	GPS	14038	35	56	15.047	-84	20	33.763	GPS
13075	35	56	19.255	-84	20	43.699	GPS	14040	35	56	13.488	-84	20	34.890	GPS
13080	35	56	24.785	-84	20	52.544	GPS	14045	35	56	13.326	-84	20	35.369	GPS
13085	35	56	16.753	-84	20	49.549	GPS	14050	35	56	11.990	-84	20	38.969	GPS
13086	35	56	17.552	-84	20	50.485	GPS	14060	35	56	12.012	-84	20	44.149	GPS
13087	35	56	16.624	-84	20	49.456	DIG	14065	35	56	9.064	-84	20	36.834	GPS
13088	35	56	14.402	-84	20	50.240	GPS	14070	35	56	5.154	-84	20	38.767	GPS
13089	35	56	12.088	-84	20	49.164	GPS	14075	35	55	59.718	-84	20	44.974	GPS
13090	35	56	14.201	-84	20	55.154	GPS	14080	35	56	0.085	-84	20	46.622	GPS
13095	35	56	15.770	-84	20	56.634	GPS	14085	35	56	7.570	-84	20	51.083	GPS
13140	35	56	12.566	-84	20	57.109	GPS	14090	35	56	8.480	-84	20	51.256	GPS
13150	35	56	22.412	-84	21	3.690	GPS	14095	35	56	15.331	-84	20	27.344	GPS
13155	35	56	12.638	-84	20	58.960	GPS	14097	35	56	15.857	-84	20	26.851	GPS
13160	35	56	12.271	-84	20	59.129	GPS	14100	35	56	15.101	-84	20	24.904	GPS
13165	35	56	10.525	-84	20	59.305	GPS	14105	35	56	14.518	-84	20	23.197	GPS
13170	35	56	11.393	-84	21	0.842	GPS	14110	35	56	12.584	-84	20	23.424	GPS
13175	35	56	18.146	-84	21	5.911	GPS	14115	35	56	14.071	-84	20	16.588	GPS
13180	35	56	6.918	-84	21	7.877	GPS	14120	35	56	17.372	-84	20	16.660	GPS
13200	35	56	10.334	-84	21	16.520	GPS	14125	35	56	17.329	-84	20	13.376	GPS
13205	35	56	25.854	-84	20	33.248	GPS	14130	35	56	18.240	-84	20	10.918	GPS
13210	35	56	26.189	-84	20	26.171	GPS	14133	35	56	18.020	-84	20	5.690	GPS
13215	35	56	26.498	-84	20	22.355	GPS	14135	35	56	22.391	-84	19	57.929	GPS
13220	35	56	27.672	-84	20	23.780	GPS	14190	35	56	23.842	-84	20	17.866	GPS

**Table 2.** State plane coordinates for seeps, springs, wetlands, and stream-measurement sites at Bear Creek Valley, Oak Ridge, Tennessee—Continued

Site number	State plane coordinates						Method	Site number	State plane coordinates						Method
	Latitude (N) (degrees, minutes, seconds)			Longitude (W) (degrees, minutes, seconds)					Latitude (N) (degrees, minutes, seconds)			Longitude (W) (degrees, minutes, seconds)			
14195	35	56	26.585	-84	20	12.419	GPS	16105	35	55	54.041	-84	21	7.168	GPS
14200	35	56	28.680	-84	20	8.520	GPS	16110	35	55	59.074	-84	21	14.677	GPS
15005	35	56	2.126	-84	20	28.936	GPS	17005	35	55	26.742	-84	21	35.269	GPS
15010	35	55	57.580	-84	20	27.560	GPS	17010	35	55	28.337	-84	21	34.841	GPS
15015	35	55	55.178	-84	20	25.840	GPS	17015	35	55	35.353	-84	21	28.192	GPS
15020	35	55	54.354	-84	20	25.710	GPS	17020	35	55	38.978	-84	21	21.445	GPS
15025	35	55	52.932	-84	20	25.127	GPS	17030	35	55	43.046	-84	21	21.514	GPS
15030	35	55	49.051	-84	20	25.415	GPS	17035	35	55	47.348	-84	21	27.882	GPS
15035	35	55	54.566	-84	20	25.163	GPS	17040	35	55	44.944	-84	21	21.506	GPS
15040	35	55	53.710	-84	20	24.529	GPS	17045	35	55	46.888	-84	21	23.245	GPS
15045	35	55	52.756	-84	20	23.554	GPS	17050	35	55	44.818	-84	21	20.657	GPS
15055	35	55	49.732	-84	20	18.827	GPS	17055	35	55	52.450	-84	21	21.949	GPS
15056	35	55	49.829	-84	20	18.539	GPS	17065	35	55	45.570	-84	21	13.057	GPS
15065	35	55	44.652	-84	20	18.215	GPS	17070	35	55	34.277	-84	21	35.644	GPS
15070	35	55	42.503	-84	20	19.522	GPS	17075	35	55	35.738	-84	21	34.456	GPS
15075	35	55	51.042	-84	20	16.246	GPS	17082	35	55	38.896	-84	21	31.140	GPS
15080	35	55	52.068	-84	20	10.799	GPS	17083	35	55	39.227	-84	21	32.062	GPS
15081	35	55	52.057	-84	20	10.788	DIG	17085	35	55	37.067	-84	21	35.118	GPS
15085	35	55	56.942	-84	20	5.550	GPS	17090	35	55	40.062	-84	21	40.144	GPS
16005	35	56	3.253	-84	20	52.418	GPS	17095	35	55	36.836	-84	21	34.567	GPS
16010	35	55	59.239	-84	20	50.417	GPS	17100	35	55	38.784	-84	21	34.430	GPS
16015	35	56	1.349	-84	20	53.066	GPS	17105	35	55	46.085	-84	21	34.870	GPS
16020	35	56	1.856	-84	20	53.441	GPS	17110	35	55	46.906	-84	21	35.572	GPS
16025	35	56	3.840	-84	20	59.273	GPS	17115	35	55	47.719	-84	21	35.795	GPS
16030	35	56	5.784	-84	21	1.804	GPS	17120	35	55	48.907	-84	21	37.296	GPS
16035	35	56	3.289	-84	21	0.252	GPS	17125	35	55	49.775	-84	21	34.758	GPS
16040	35	56	1.082	-84	21	9.630	GPS	17130	35	55	56.525	-84	21	39.841	GPS
16045	35	56	1.277	-84	21	11.052	GPS	17135	35	55	51.139	-84	21	34.650	GPS
16050	35	56	0.510	-84	21	15.188	GPS	18005	35	55	13.498	-84	21	56.261	GPS
16055	35	56	6.745	-84	21	21.496	GPS	18010	35	55	21.011	-84	22	0.599	GPS
16060	35	55	58.973	-84	21	19.091	GPS	18015	35	55	22.969	-84	21	57.780	GPS
16065	35	55	59.362	-84	21	20.549	GPS	18020	35	55	21.792	-84	22	1.445	GPS
16067	35	55	58.066	-84	21	19.822	GPS	18025	35	55	26.267	-84	22	2.863	GPS
16070	35	55	57.256	-84	21	23.753	GPS	18060	35	55	13.649	-84	21	55.260	GPS
16075	35	55	54.876	-84	20	58.916	GPS	18065	35	55	7.910	-84	21	48.956	GPS
16080	35	55	52.910	-84	21	0.061	GPS	18070	35	55	7.655	-84	21	48.272	DIG
16085	35	55	55.506	-84	20	57.790	GPS	18075	35	55	7.518	-84	21	48.449	GPS
16090	35	55	56.597	-84	21	1.624	GPS	18080	35	55	7.655	-84	21	48.272	DIG
16095	35	55	57.716	-84	21	2.866	GPS	18085	35	55	7.208	-84	21	46.976	GPS
16100	35	55	55.132	-84	21	4.777	GPS	18090	35	55	7.493	-84	21	44.726	GPS

**Table 2. State plane coordinates for seeps, springs, wetlands, and stream-measurement sites at Bear Creek Valley, Oak Ridge, Tennessee—Continued**

Site number	State plane coordinates						Method	Site number	State plane coordinates						Method
	Latitude (N) (degrees, minutes, seconds)			Longitude (W) (degrees, minutes, seconds)					Latitude (N) (degrees, minutes, seconds)			Longitude (W) (degrees, minutes, seconds)			
18095	35	55	17.213	-84	21	48.974	GPS	19105	35	55	11.654	-84	22	13.066	GPS
18100	35	55	17.569	-84	21	49.662	DIG	19110	35	55	16.626	-84	22	7.331	GPS
18105	35	55	17.692	-84	21	49.554	GPS	19115	35	55	12.961	-84	22	13.624	GPS
18110	35	55	26.900	-84	21	44.766	GPS	19120	35	55	16.594	-84	22	17.396	GPS
18115	35	55	29.086	-84	21	44.543	GPS	19125	35	55	13.195	-84	22	12.252	GPS
18120	35	55	30.086	-84	21	42.476	GPS	19130	35	55	17.540	-84	22	6.305	GPS
18125	35	55	31.498	-84	21	40.889	GPS	19135	35	55	19.909	-84	22	10.553	GPS
18130	35	55	34.522	-84	21	43.002	GPS	19140	35	55	20.788	-84	22	11.543	GPS
18140	35	55	38.993	-84	21	44.006	GPS	19145	35	55	23.516	-84	22	11.431	GPS
18145	35	55	21.396	-84	21	50.382	GPS	19146	35	55	25.201	-84	22	11.053	GPS
18150	35	55	26.299	-84	21	53.460	GPS	19148	35	55	27.494	-84	22	10.942	GPS
18155	35	55	31.422	-84	21	53.075	GPS	19150	35	55	22.062	-84	22	8.231	GPS
18160	35	55	34.957	-84	21	53.618	GPS	19155	35	55	29.255	-84	22	6.762	GPS
18165	35	55	35.731	-84	21	54.029	GPS	19156	35	55	29.453	-84	22	6.758	DIG
18170	35	55	36.296	-84	21	54.479	GPS	19158	35	55	32.174	-84	22	7.500	GPS
18175	35	55	36.851	-84	21	57.640	GPS	19160	35	55	32.956	-84	22	3.446	GPS
18180	35	55	36.804	-84	21	55.530	GPS	19165	35	55	33.431	-84	22	3.601	GPS
18185	35	55	40.609	-84	21	50.353	GPS	19170	35	55	33.992	-84	22	2.827	GPS
18190	35	55	41.088	-84	21	51.484	GPS	19175	35	55	23.027	-84	22	14.614	GPS
18195	35	55	41.682	-84	21	51.646	GPS	19180	35	55	27.840	-84	22	15.305	GPS
18215	35	55	44.490	-84	21	52.189	GPS	19285	35	55	4.642	-84	22	6.168	GPS
18220	35	55	48.104	-84	21	55.876	GPS	19290	35	55	11.132	-84	22	0.167	GPS
18225	35	55	41.873	-84	21	49.482	GPS	19295	35	55	12.464	-84	22	1.096	GPS
18230	35	55	44.796	-84	21	45.605	GPS	19300	35	55	12.731	-84	21	57.496	GPS
18250	35	55	18.030	-84	21	48.690	GPS	20005	35	54	38.729	-84	22	51.521	GPS
18255	35	55	19.639	-84	21	44.611	GPS	20010	35	54	43.960	-84	22	45.656	GPS
18260	35	55	23.423	-84	21	39.107	GPS	20015	35	54	52.859	-84	22	48.400	GPS
19003	35	54	54.781	-84	22	19.549	GPS	20020	35	54	58.226	-84	22	54.808	GPS
19004	35	54	56.322	-84	22	18.386	GPS	20250	35	54	44.104	-84	22	44.904	GPS
19005	35	54	57.118	-84	22	21.464	GPS	20255	35	54	46.076	-84	22	37.772	GPS
19007	35	54	57.776	-84	22	15.730	GPS	20258	35	54	48.218	-84	22	33.409	GPS
19008	35	54	59.134	-84	22	14.905	GPS	20260	35	54	50.760	-84	22	30.763	GPS
19010	35	55	0.203	-84	22	12.713	GPS	20265	35	54	50.998	-84	22	30.029	GPS
19015	35	55	1.225	-84	22	12.040	GPS	20280	35	54	54.209	-84	22	46.038	GPS
19045	35	55	6.650	-84	22	12.536	GPS	20285	35	55	0.012	-84	22	38.597	GPS
19050	35	55	9.898	-84	22	17.170	GPS	20290	35	54	59.508	-84	22	46.902	GPS
19055	35	55	16.619	-84	22	21.630	GPS	20295	35	55	0.595	-84	22	46.564	GPS
19090	35	55	7.813	-84	22	10.196	GPS	20300	35	55	0.559	-84	22	44.594	DIG
19095	35	55	9.887	-84	22	13.156	GPS	20305	35	55	3.508	-84	22	45.293	GPS
19100	35	55	11.395	-84	22	13.166	GPS	20310	35	55	3.680	-84	22	45.170	DIG

**Table 2.** State plane coordinates for seeps, springs, wetlands, and stream-measurement sites at Bear Creek Valley, Oak Ridge, Tennessee—Continued

Site number	State plane coordinates						Method	Site number	State plane coordinates						Method
	Latitude (N) (degrees, minutes, seconds)			Longitude (W) (degrees, minutes, seconds)					Latitude (N) (degrees, minutes, seconds)			Longitude (W) (degrees, minutes, seconds)			
20315	35	55	11.770	-84	22	50.398	GPS	21035	35	54	43.384	-84	23	18.974	GPS
20320	35	55	4.523	-84	22	41.588	GPS	21040	35	54	44.399	-84	23	17.711	GPS
20325	35	55	7.705	-84	22	42.877	GPS	21045	35	54	45.295	-84	23	17.092	GPS
20335	35	55	13.562	-84	22	43.108	GPS	21050	35	54	51.930	-84	23	19.799	GPS
20340	35	54	53.320	-84	22	28.067	GPS	21055	35	54	50.011	-84	23	12.728	GPS
20342	35	54	56.016	-84	22	24.931	GPS	21057	35	54	55.123	-84	23	14.492	GPS
20343	35	55	6.506	-84	22	25.194	GPS	21058	35	54	56.434	-84	23	12.772	GPS
20350	35	54	58.637	-84	22	31.217	GPS	21060	35	54	55.944	-84	23	15.061	GPS
20355	35	54	59.130	-84	22	31.858	GPS	21065	35	54	51.070	-84	23	11.087	GPS
20360	35	55	9.520	-84	22	32.704	GPS	21100	35	54	45.180	-84	23	3.224	GPS
20365	35	55	10.513	-84	22	32.660	GPS	21102	35	54	47.516	-84	23	2.576	GPS
20370	35	55	10.967	-84	22	33.737	GPS	21103	35	54	50.501	-84	23	3.077	GPS
20375	35	55	13.570	-84	22	36.880	GPS	21105	35	54	53.010	-84	23	2.681	GPS
20380	35	55	11.842	-84	22	35.620	GPS	21110	35	54	54.349	-84	23	1.972	GPS
20385	35	55	12.619	-84	22	28.585	GPS	21115	35	54	55.976	-84	23	1.378	GPS
20390	35	55	13.998	-84	22	30.227	GPS	21119	35	55	2.183	-84	23	4.636	DIG
20395	35	55	15.708	-84	22	30.972	GPS	21120	35	55	2.186	-84	23	4.639	GPS
20400	35	55	19.772	-84	22	34.799	GPS	21125	35	55	5.192	-84	23	7.076	GPS
20405	35	55	15.348	-84	22	30.245	GPS	21130	35	55	8.270	-84	23	7.015	GPS
20410	35	55	18.397	-84	22	28.726	GPS	22005	35	54	26.399	-84	23	25.422	GPS
20415	35	55	22.447	-84	22	29.572	GPS	22006	35	54	28.292	-84	23	24.108	GPS
20420	35	55	18.257	-84	22	26.908	GPS	22010	35	54	23.616	-84	23	22.992	GPS
20425	35	55	20.784	-84	22	23.408	GPS	22034	35	54	30.348	-84	23	15.889	GPS
20430	35	54	53.885	-84	22	21.698	GPS	22040	35	54	32.108	-84	23	8.941	GPS
21005	35	54	34.225	-84	23	24.828	GPS	22041	35	54	35.132	-84	23	10.212	GPS
21010	35	54	40.349	-84	23	26.794	GPS	22042	35	54	40.201	-84	23	10.378	GPS
21015	35	54	34.690	-84	23	23.266	GPS	22044	35	54	40.972	-84	23	7.789	GPS
21020	35	54	42.491	-84	23	19.446	GPS	22045	35	54	35.471	-84	22	58.231	GPS
21025	35	54	42.721	-84	23	18.895	GPS	22050	35	54	36.223	-84	22	57.184	GPS
21030	35	54	49.907	-84	23	11.530	GPS	22055	35	54	38.110	-84	22	57.457	GPS
								22060	35	54	39.107	-84	22	59.916	GPS

**Table 3.** Discharge and water-quality data for the high base flow seepage investigation at Bear Creek Valley, Oak Ridge, Tennessee, March 14 through March 19, 1994

[Methods for measurement: D, no flowing water; E, estimation; F, float; L, less than minimum reportable flow, 0.005 cubic foot per second; P, pygmy meter measurement; R, rating from stream gage; V, volumetric measurement; ft<sup>3</sup>/s, cubic foot per second;  $\mu$ S/cm, microsiemens per centimeter;  $^{\circ}$ C, degree Celsius; mg/L, milligrams per liter; --, no data]

Site number	Type of site	Date sampled (month/day/year)	Method	Flow (ft <sup>3</sup> /s)	pH	Specific conductance ( $\mu$ S/cm)	Temperature ( $^{\circ}$ C)	Dissolved oxygen (mg/L)
1005	Stream	3/14/94	P	0.57	7.4	902	8.0	11
1010	Stream	3/14/94	P	.16	7.8	386	8.0	10.7
1015	Stream	3/14/94	P	.15	7.8	379	9.0	10.1
1020	Stream	3/14/94	F	.01	7.9	265	12.0	--
1025	Stream	3/14/94	V	.01	7.8	587	11.0	9.8
1030	Stream	3/14/94	F	.01	6.9	125	8.5	--
1035	Stream	3/14/94	D	0	--	--	--	--
1040	Seep	3/14/94	L	0	6.9	--	12.0	2.4
1045	Seep	3/14/94	V	.01	7.5	88	10.0	9.4
1050	Stream	3/14/94	P	.13	7.8	140	9.0	--
1055	Seep	3/14/94	D	0	--	--	--	--
1060	Stream	3/14/94	F	.02	5.9	42	8.5	--
1065	Seep	3/14/94	L	0	6	38	9.5	7.4
1070	Seep	3/14/94	L	0	6.7	40	8.5	10.8
1075	Stream	3/14/94	P	.15	6.6	68	9.5	--
1080	Seep	3/14/94	L	0	--	--	--	--
1085	Stream	3/14/94	F	.06	6.5	43	9.0	--
1090	Stream	3/14/94	L	0	6.2	55	9.5	--
1095	Seep	3/14/94	--	--	5.8	59	10.5	6.2
1100	Seep	3/14/94	P	.03	5.6	37	9.5	6.4
1105	Stream	3/14/94	P	.16	7.2	33	9.0	--
1110	Stream	3/14/94	E	.01	6.4	29	8.5	--
1115	Seep	3/14/94	L	0	6.1	37	8.0	2.7
1120	Stream	3/14/94	L	0	--	--	--	--
1125	Seep	3/14/94	L	0	--	--	--	--
1130	Stream	3/14/94	E	.04	7.2	32	10.0	--
1135	Seep	3/14/94	E	.01	6.7	38	11.0	9.7
1140	Stream	3/14/94	P	0.03	6.8	27	10.0	--
1145	Stream	3/14/94	P	.03	6.4	30	11.0	--
1148	Stream	3/14/94	E	.02	7	31	12.0	--
1150	Spring	3/14/94	E	.01	7.2	29	12.0	--
1155	Seep	3/14/94	E	.02	5.1	25	10.0	5
1480	Seep	3/14/94	L	0	7.4	457	10.0	8
1485	Stream	3/14/94	R	.44	7.5	239	10.0	11.2
1490	Seep	3/14/94	E	.01	7.2	646	7.0	3
1495	Stream	3/14/94	P	.31	7.5	278	10.0	10.9
1500	Stream	3/14/94	P	.3	8	1,350	10.0	--
1502	Spring	3/14/94	P	.07	7.6	954	13.0	.6
1505	Stream	3/14/94	E	.01	7.9	1,100	10.5	--
1510	Stream	3/14/94	P	.14	6.8	1,190	9.5	--
1515	Stream	3/14/94	P	.13	6.7	332	10.0	--
1520	Seep	3/14/94	L	0	7.7	1,710	10.0	--
1525	Spring	3/14/94	E	.01	7.6	1,026	12.0	2.5
1530	Seep	3/14/94	L	0	6.7	414	11.0	--
1535	Seep	3/14/94	L	0	8.2	707	21.0	--
1540	Stream	3/14/94	P	.1	8.1	162	14.0	--
1545	Seep	3/14/94	L	0	6.6	180	9.0	4.7
1550	Stream	3/14/94	P	.09	7	162	10.0	--
1555	Stream	3/14/94	P	.04	7.3	175	10.0	--
1560	Seep	3/14/94	L	0	6.8	50	11.0	8.4

**Table 3.** Discharge and water-quality data for the high base flow seepage investigation at Bear Creek Valley, Oak Ridge, Tennessee, March 14 through March 19, 1994—Continued

Site number	Type of site	Date sampled (month/day/year)	Method	Flow (ft <sup>3</sup> /s)	pH	Specific conductance (μS/cm)	Temperature (°C)	Dis-solved oxygen (mg/L)
1565	Spring	3/14/94	P	.01	6.7	50	10.0	6.7
1570	Stream	3/14/94	L	0	6.7	41	10.0	--
1573	Stream	3/14/94	L	0	6.5	33	14.0	--
1575	Seep	3/14/94	L	0	6.6	34	15.0	8.8
1576	Seep	3/14/94	L	0	7.2	135	14.0	6.2
1577	Seep	3/14/94	L	0	7.1	245	13.0	--
1579	Stream	3/14/94	P	.02	6.9	179	11.0	--
1582	Stream	3/14/94	P	.03	6.7	47	14.0	--
1585	Spring	3/14/94	L	0	6.9	60	13.0	8.9
1600	Stream	3/14/94	P	.22	7.4	1,670	9.5	--
1610	Seep	3/14/94	D	0	--	--	--	--
2005	Stream	3/15/94	D	0	--	--	--	--
2006	Seep	3/15/94	L	0	6.8	126	8.0	8.3
2010	Seep	3/15/94	L	0	6.6	217	8.0	5.5
2015	Stream	3/15/94	P	.64	8.1	524	10.0	--
2020	Stream	3/15/94	P	.1	7.7	149	9.0	--
2025	Stream	3/15/94	D	0	--	--	--	--
2027	Seep	3/15/94	D	0	--	--	--	--
2030	Stream	3/15/94	P	.1	7.4	126	8.5	--
2035	Stream	3/15/94	L	0	7.2	266	9.0	--
2040	Seep	3/15/94	L	0	--	545	13.0	--
2050	Stream	3/15/94	D	0	--	--	--	--
2055	Seep	3/15/94	D	0	--	--	--	--
2065	Stream	3/15/94	E	.01	7.6	167	11.0	--
2067	Seep	3/15/94	L	0	7.5	67	13.5	--
2068	Seep	3/15/94	P	.09	7.4	130	9.0	--
2070	Stream	3/15/94	D	0	--	--	--	--
2080	Seep	3/15/94	D	0	--	--	--	--
2083	Stream	3/15/94	D	0	--	--	--	--
2085	Seep	3/15/94	D	0	--	--	--	--
2090	Stream	3/15/94	D	0	--	--	--	--
2095	Seep	3/15/94	D	0	--	--	--	--
2100	Stream	3/15/94	F	.02	7.2	77	9.0	--
2110	Seep	3/15/94	D	0	--	--	--	--
2120	Seep	3/15/94	D	0	--	--	--	--
2125	Stream	3/15/94	E	.04	7.2	74	10.5	--
2130	Seep	3/15/94	E	.01	6.8	50	11.5	9.2
2135	Stream	3/15/94	P	.07	6.8	50	12.5	--
2140	Stream	3/15/94	E	.01	5.6	32	10.0	--
2145	Stream	3/15/94	D	0	--	--	--	--
2150	Spring	3/15/94	L	0	--	--	--	--
2155	Stream	3/15/94	P	.04	7	50	14.0	--
2160	Spring	3/15/94	E	.01	6.6	64	11.5	9.7
2170	Stream	3/15/94	L	0	8.2	162	12.5	--
2175	Stream	3/15/94	D	0	--	--	--	--
2180	Seep	3/15/94	D	0	--	--	--	--
2185	Stream	3/15/94	P	.7	8.3	590	12.0	--
2190	Stream	3/15/94	P	.9	8.2	605	12.5	--
2195	Stream	3/15/94	P	1.16	8.1	400	12.5	--
2200	Stream	3/15/94	D	0	8.2	760	9.0	--

**Table 3.** Discharge and water-quality data for the high base flow seepage investigation at Bear Creek Valley, Oak Ridge, Tennessee, March 14 through March 19, 1994—Continued

Site number	Type of site	Date sampled (month/day/year)	Method	Flow (ft <sup>3</sup> /s)	pH	Specific conductance (μS/cm)	Temperature (°C)	Dis-solved oxygen (mg/L)
2205	Wetland	3/15/94	D	0	--	--	--	--
2210	Stream	3/15/94	E	1.1	8.1	395	11.0	--
2225	Stream	3/15/94	P	.03	7	193	8.5	--
2230	Stream	3/15/94	P	.03	6.9	60	10.5	--
2235	Stream	3/15/94	V	.01	6	48	10.0	6.3
2240	Stream	3/15/94	P	.02	6.3	41	10.0	--
2245	Stream	3/15/94	P	.02	6.6	39	12.0	--
2260	Spring	3/15/94	L	0	6.6	62	12.0	8.8
2270	Seep	3/15/94	E	.01	5.4	41	10.5	5
2275	Stream	3/15/94	E	.01	6.4	67	10.5	--
2280	Seep	3/15/94	P	.01	5.9	53	9.5	7.9
2285	Stream	3/15/94	P	.04	6.8	62	13.5	--
2290	Stream	3/15/94	P	.05	6.8	56	12.5	--
2295	Stream	3/15/94	P	.04	7	56	14.5	--
2310	Seep	3/15/94	L	0	6.4	66	12.5	9.5
2315	Stream	3/15/94	P	1.08	8.3	631	12.0	--
2320	Stream	3/15/94	P	.17	7.9	236	14.5	--
2325	Spring	3/15/94	E	.05	7.2	166	12.5	11
2330	Spring	3/15/94	E	.12	7.1	248	13.0	10.9
2335	Stream	3/15/94	P	.22	8.1	266	13.0	--
2337	Stream	3/15/94	P	.06	7.9	256	12.0	--
2339	Spring	3/15/94	P	.03	7.1	260	13.0	9.3
2341	Spring	3/15/94	P	.23	7.2	268	13.5	9.5
2345	Stream	3/15/94	P	.44	7.5	835	8.5	--
3005	Stream	3/17/94	P	.76	--	517	10.0	--
3010	Stream	3/17/94	P	.36	7.7	590	11.5	--
3015	Stream	3/17/94	P	.44	7.2	596	11.5	--
3020	Wetland	3/17/94	D	0	--	--	--	--
3025	Spring	3/17/94	P	.37	7.5	607	12.5	4
3030	Spring	3/17/94	L	0	8	169	11.5	9.2
3035	Seep	3/17/94	E	.01	7.6	206	11.5	10.8
3040	Stream	3/17/94	P	.39	8	446	4.5	--
3045	Stream	3/17/94	P	.69	7.8	251	4.5	--
3050	Stream	3/17/94	P	.08	7.7	185	5.0	--
3055	Seep	3/17/94	P	0	6.4	155	6.5	1.6
3060	Stream	3/17/94	E	.01	7.1	190	7.5	--
3065	Seep	3/17/94	E	.01	7	167	9.0	5.6
3070	Stream	3/17/94	P	.09	7.6	182	6.0	--
3075	Seep	3/17/94	E	.01	7.1	252	12.5	3.1
3078	Seep	3/17/94	L	0	6.7	153	7.5	--
3080	Stream	3/17/94	P	.07	6.2	136	10.5	--
3085	Seep	3/17/94	E	--	6.7	128	7.5	5.8
3090	Stream	3/17/94	P	.01	7	380	10.5	--
3095	Stream	3/17/94	E	.01	7.6	109	14.5	--
3100	Spring	3/17/94	E	.01	6.4	62	13.5	7
3105	Spring	3/17/94	E	.01	6.4	1,150	11.0	1.9
3110	Stream	3/17/94	P	.02	7.1	67	10.5	--
3115	Seep	3/17/94	D	0	--	--	--	--
3120	Seep	3/17/94	E	.01	6	34	9.0	--
3125	Stream	3/17/94	P	.04	5.9	52	9.5	--



**Table 3.** Discharge and water-quality data for the high base flow seepage investigation at Bear Creek Valley, Oak Ridge, Tennessee, March 14 through March 19, 1994—Continued

Site number	Type of site	Date sampled (month/day/year)	Method	Flow (ft <sup>3</sup> /s)	pH	Specific conductance (μS/cm)	Temperature (°C)	Dissolved oxygen (mg/L)
3130	Seep	3/17/94	D	0	--	--	--	--
3135	Seep	3/17/94	D	0	--	--	--	--
3140	Seep	3/17/94	L	0	5.4	63	8.5	4
3145	Seep	3/17/94	E	.01	5.4	47	10.5	4.3
3150	Seep	3/17/94	E	.01	5.7	33	10.5	6.2
3155	Seep	3/17/94	D	0	--	--	--	--
3160	Stream	3/17/94	P	.02	6.6	45	11.0	--
3165	Spring	3/17/94	E	.02	6.2	49	11.0	9.7
3170	Stream	3/17/94	P	.64	7.8	499	6.0	--
3175	Seep	3/17/94	P	.13	7.2	515	11.0	7.8
3180	Spring	3/17/94	P	.13	7.1	513	11.0	6.3
3185	Stream	3/17/94	P	.5	8	495	6.5	--
3190	Stream	3/17/94	P	.14	7.4	116	7.0	--
3195	Stream	3/17/94	P	.1	7.3	101	10.5	--
3198	Wetland	3/17/94	L	0	6.7	160	19.5	--
3200	Stream	3/17/94	P	.12	7.2	87	12.5	--
3202	Stream	3/17/94	--	0	7	348	12.0	--
3205	Seep	3/17/94	L	0	7.3	243	12.5	--
3210	Stream	3/17/94	P	.03	7	45	10.5	--
3215	Seep	3/17/94	D	0	--	--	--	--
3225	Stream	3/17/94	L	0	5.6	33	9.0	--
3230	Seep	3/17/94	D	0	--	--	--	--
3235	Seep	3/17/94	D	0	--	--	--	--
3240	Stream	3/17/94	P	.03	7.2	51	9.5	--
3245	Seep	3/17/94	E	.01	5.7	31	9.0	5.5
3250	Stream	3/17/94	E	.01	5.7	35	10.0	--
3255	Seep	3/17/94	D	0	--	--	--	--
3260	Stream	3/17/94	E	.01	5.7	24	10.5	--
3265	Seep	3/17/94	L	0	--	--	--	--
3270	Stream	3/17/94	E	.03	7.2	48	9.5	--
3275	Stream	3/17/94	P	.03	7.3	54	11.0	--
3280	Spring	3/17/94	E	.03	7	66	11.5	10
3285	Stream	3/17/94	P	.4	8.3	574	8.5	--
3290	Stream	3/17/94	E	.01	8.2	150	12.5	--
3295	Seep	3/17/94	L	0	7.4	164	11.5	8.2
3300	Spring	3/17/94	L	0	7	146	12.0	8.5
3305	Seep	3/17/94	L	0	5.4	17	11.5	9.4
3310	Stream	3/17/94	P	.36	8.3	584	12.5	--
4005	Stream	3/18/94	P	.1	8.3	142	7.0	--
4010	Stream	3/18/94	L	0	6.4	52	8.5	--
4015	Seep	3/18/94	D	0	--	--	--	--
4020	Stream	3/18/94	D	0	--	--	--	--
4025	Seep	3/18/94	D	0	--	--	--	--
4030	Stream	3/18/94	P	.09	8	85	8.5	--
4035	Stream	3/18/94	P	.06	6.9	64	10.5	--
4040	Seep	3/18/94	D	0	--	--	--	--
4045	Seep	3/18/94	D	0	--	--	--	--
4050	Seep	3/18/94	D	0	--	--	--	--
4055	Stream	3/18/94	E	.01	5.8	27	11.5	--
4060	Seep	3/18/94	D	0	--	--	--	--



**Table 3.** Discharge and water-quality data for the high base flow seepage investigation at Bear Creek Valley, Oak Ridge, Tennessee, March 14 through March 19, 1994—Continued

Site number	Type of site	Date sampled (month/day/year)	Method	Flow (ft <sup>3</sup> /s)	pH	Specific conductance (μS/cm)	Temperature (°C)	Dissolved oxygen (mg/L)
4065	Seep	3/18/94	D	0	--	--	--	--
4070	Seep	3/18/94	D	0	--	--	--	--
4075	Spring	3/18/94	L	0	5.9	30	13.0	8.6
4080	Stream	3/18/94	P	.03	7	44	12.0	--
4085	Stream	3/18/94	L	0	5.8	32	12.5	--
4090	Seep	3/18/94	L	0	5.6	25	12.0	8.1
4095	Seep	3/18/94	L	0	5.5	37	12.5	4.8
4100	Stream	3/18/94	L	0	6.4	63	11.5	9.8
4105	Spring	3/18/94	E	.01	8	294	12.5	9.7
4110	Stream	3/18/94	P	2.01	8.4	428	9.0	--
4115	Spring	3/18/94	P	.44	7.4	351	12.0	5.8
4120	Seep	3/18/94	D	0	--	--	--	--
4125	Stream	3/18/94	D	0	--	--	--	--
4400	Stream	3/18/94	R	1.06	7.7	466	9.5	--
4405	Stream	3/18/94	P	.09	7.4	321	9.5	--
4410	Stream	3/18/94	P	.02	6.8	397	11.5	--
4415	Seep	3/18/94	L	0	7.1	255	17.0	6
4420	Spring	3/18/94	E	.01	7.8	420	13.0	5.9
4425	Seep	3/18/94	L	0	7.4	321	9.0	2.1
4430	Stream	3/18/94	P	.08	7.8	300	9.0	--
4435	Stream	3/18/94	P	.04	7.6	709	9.0	--
4440	Stream	3/18/94	E	.01	7.7	908	10.5	--
4445	Seep	3/18/94	D	0	--	--	--	--
4450	Stream	3/18/94	E	.01	7.8	388	5.0	--
4455	Stream	3/18/94	P	.03	8.2	1,350	8.5	--
4472	Seep	3/18/94	L	0	6.7	48	17.0	--
4473	Spring	3/18/94	E	.01	6.6	38	11.0	10.8
4475	Stream	3/18/94	--	--	7.9	170	7.5	--
4480	Stream	3/18/94	P	.04	7.6	109	8.0	--
4485	Stream	3/18/94	V	.04	7.6	115	8.5	--
4490	Stream	3/18/94	E	.01	7.6	323	8.0	--
4495	Seep	3/18/94	L	0	7	133	12.0	--
4500	Stream	3/18/94	P	.02	7.3	60	12.0	--
4505	Seep	3/18/94	L	0	6.3	32	16.0	7.7
4510	Seep	3/18/94	E	.01	6.7	78	10.0	1.4
4515	Spring	3/18/94	P	.01	6.9	31	12.0	9.5
4520	Stream	3/18/94	P	.89	8.1	507	14.5	--
4525	Stream	3/18/94	P	.8	8.1	508	14.5	--
4530	Stream	3/18/94	P	.93	7.9	513	14.0	--
4535	Stream	3/18/94	P	.06	8.4	304	11.5	--
4540	Stream	3/18/94	P	.07	8.3	307	12.5	--
4545	Stream	3/18/94	P	.1	8	312	13.0	--
4580	Stream	3/18/94	P	.07	7.2	190	16.0	--
4585	Stream	3/18/94	D	0	--	--	--	--
4590	Stream	3/18/94	D	0	--	--	--	--
4595	Stream	3/18/94	P	.06	6.8	464	13.0	--
4600	Stream	3/18/94	D	0	--	--	--	--
4605	Seep	3/18/94	D	0	--	--	--	--
4610	Stream	3/18/94	P	.02	7.6	156	14.5	--
4615	Seep	3/18/94	D	0	--	--	--	--

**Table 3.** Discharge and water-quality data for the high base flow seepage investigation at Bear Creek Valley, Oak Ridge, Tennessee, March 14 through March 19, 1994—Continued

Site number	Type of site	Date sampled (month/day/year)	Method	Flow (ft <sup>3</sup> /s)	pH	Specific conductance (μS/cm)	Temperature (°C)	Dis-solved oxygen (mg/L)
4620	Spring	3/18/94	F	.02	7.4	93	12.5	--
4630	Stream	3/18/94	P	.79	8.2	526	14.5	--
5005	Stream	3/14/94	P	3.28	8.4	348	12.5	--
5010	Stream	3/14/94	P	.03	8.1	125	12.0	9
5015	Stream	3/14/94	P	.04	8	87	12.0	9.5
5020	Stream	3/14/94	P	.03	6.7	41	10.0	7.1
5025	Seep	3/14/94	V	.01	--	49	12.0	--
5030	Stream	3/14/94	P	3.11	8.2	325	13.0	--
5035	Stream	3/14/94	P	.08	7.9	120	11.0	--
5040	Seep	3/14/94	L	0	7.4	366	11.0	4
5045	Stream	3/14/94	P	.06	7.9	69	11.0	8.2
5050	Stream	3/14/94	P	.06	7.5	43	10.5	8.5
5055	Stream	3/14/94	V	.01	7.1	25	11.5	7.6
5060	Seep	3/14/94	E	.01	6.1	29	10.5	9.4
5065	Seep	3/14/94	L	0	6	32	10.4	6.6
5070	Seep	3/14/94	L	0	6.4	39	13.0	2.5
5075	Stream	3/14/94	P	.04	6.8	45	12.5	8.7
5080	Seep	3/14/94	V	.01	6.7	66	11.5	8.9
5085	Seep	3/14/94	E	.01	6.1	32	10.0	3.2
5090	Stream	3/14/94	L	0	8	165	11.0	--
5095	Stream	3/14/94	V	.01	8.3	95	10.5	--
5100	Seep	3/14/94	V	.01	6.4	70	10.5	5.4
5105	Stream	3/14/94	P	3.83	8.1	363	13.5	--
6005	Stream	3/15/94	P	.1	7.4	115	13.0	--
6007	Stream	3/15/94	L	0	6.4	57	11.5	--
6010	Stream	3/15/94	E	.01	7.5	182	8.5	--
6015	Seep	3/14/94	E	.01	7.5	225	9.0	--
6020	Seep	3/14/94	L	0	6.9	95	10.0	--
6025	Stream	3/14/94	E	0.1	7	55	11.0	--
6030	Stream	3/14/94	P	.08	6.9	--	--	--
6033	Seep	3/14/94	E	.01	5.2	29	9.5	--
6035	Stream	3/14/94	V	.03	7.5	48	10.0	--
6045	Seep	3/14/94	F	.02	6.4	40	10.5	--
6050	Stream	3/14/94	P	.03	7.8	32	9.5	--
6055	Seep	3/14/94	P	.01	6.7	39	10.0	--
6060	Stream	3/14/94	P	3.33	8.3	340	14.0	--
6065	Stream	3/14/94	P	3.64	8.3	252	13.0	--
6070	Stream	3/14/94	P	.16	7.6	81	12.0	--
6075	Stream	3/14/94	L	0	6.4	51	8.0	--
6085	Seep	3/14/94	L	0	7.3	125	8.5	--
6090	Stream	3/14/94	L	0	6.9	26	8.0	--
6095	Seep	3/14/94	L	0	--	--	--	--
6100	Stream	3/15/94	P	.14	7.3	87	13.0	--
6105	Seep	3/15/94	L	0	--	--	--	--
6110	Seep	3/15/94	D	0	--	--	--	--
6115	Stream	3/15/94	P	.05	6.8	25	12.0	--
6120	Spring	3/15/94	V	.01	7.6	90	11.5	10.5
7005	Stream	3/14/94	P	3.04	8.4	348	13.0	--
7010	Stream	3/14/94	P	.08	8.1	95	13.0	--
7015	Stream	3/14/94	P	.33	7.4	95	12.0	--

**Table 3.** Discharge and water-quality data for the high base flow seepage investigation at Bear Creek Valley, Oak Ridge, Tennessee, March 14 through March 19, 1994—Continued

Site number	Type of site	Date sampled (month/day/year)	Method	Flow (ft <sup>3</sup> /s)	pH	Specific conductance (μS/cm)	Temperature (°C)	Dis-solved oxygen (mg/L)
7020	Spring	3/14/94	P	.05	7	165	12.5	8.7
7025	Stream	3/14/94	P	.16	7.4	60	14.0	--
7030	Stream	3/14/94	P	.13	6.7	39	12.5	--
7035	Stream	3/14/94	E	.04	5.3	16	11.0	--
7040	Wetland	3/14/94	D	0	--	--	--	--
7045	Stream	3/14/94	E	.01	5	16	11.0	7.5
7050	Seep	3/14/94	E	.01	7.7	230	18.5	9
7055	Stream	3/14/94	D	0	--	--	--	--
7060	Stream	3/14/94	P	3.67	8.4	349	13.0	--
8005	Stream	3/15/94	P	.27	7.3	77	14.5	--
8010	Seep	3/15/94	D	0	--	--	--	--
8015	Seep	3/15/94	D	0	--	--	--	--
8020	Stream	3/15/94	P	.24	7.2	51	13.5	--
8025	Stream	3/15/94	L	0	6.6	43	10.0	--
8030	Stream	3/15/94	L	0	5.6	28	9.0	--
8035	Stream	3/15/94	D	0	--	--	--	--
8040	Seep	3/15/94	D	0	--	--	--	--
8045	Seep	3/15/94	D	0	--	--	--	--
8050	Seep	3/15/94	D	0	--	--	--	--
8055	Stream	3/17/94	P	.16	6.5	68	10.0	--
8060	Seep	3/17/94	L	0	5.1	29	9.5	--
8062	Stream	3/17/94	L	0	7.1	251	8.0	--
8063	Seep	3/17/94	L	0	--	--	--	--
8065	Stream	3/17/94	E	.08	6.2	39	10.0	--
8070	Stream	3/17/94	L	0	6	42	8.5	--
8075	Seep	3/17/94	D	0	--	--	--	--
8080	Stream	3/17/94	E	.01	6.1	43	9.0	--
8085	Seep	3/17/94	E	.01	5.8	64	11.0	8.5
8090	Stream	3/17/94	P	.23	6.8	47	10.0	--
8092	Seep	3/17/94	D	0	--	--	--	--
8095	Stream	3/17/94	L	0	6.9	77	6.0	--
8100	Seep	3/17/94	L	0	7.3	89	5.5	10.9
8103	Stream	3/17/94	P	.08	6.3	42	6.0	--
8105	Stream	3/17/94	L	0	6.2	55	9.0	--
8110	Seep	3/17/94	L	0	5.8	55	11.0	7
8115	Stream	3/17/94	L	0	5.7	48	8.5	--
8120	Seep	3/17/94	L	0	5.8	38	10.5	7.4
8125	Stream	3/17/94	E	.04	5.9	47	7.0	--
8130	Seep	3/17/94	E	.04	6	45	10.5	--
8135	Stream	3/16/94	D	0	--	--	--	--
8140	Seep	3/16/94	D	0	--	--	--	--
8145	Seep	3/16/94	D	0	--	--	--	--
8150	Seep	3/16/94	L	0	5.3	38	8.0	9
8200	Seep	3/16/94	D	0	--	--	--	--
8205	Seep	3/16/94	D	0	--	--	--	--
8210	Stream	3/16/94	D	0	--	--	--	--
8220	Seep	3/16/94	D	0	--	--	--	--
8225	Seep	3/16/94	L	0	6.7	42	9.5	--
9005	Stream	3/16/94	P	4.24	7.7	208	7.5	--
9010	Stream	3/16/94	P	.3	8.2	193	13.5	--

**Table 3.** Discharge and water-quality data for the high base flow seepage investigation at Bear Creek Valley, Oak Ridge, Tennessee, March 14 through March 19, 1994—Continued

Site number	Type of site	Date sampled (month/day/year)	Method	Flow (ft <sup>3</sup> /s)	pH	Specific conductance (μS/cm)	Temperature (°C)	Dissolved oxygen (mg/L)
9015	Stream	3/16/94	P	.18	7.1	89	6.0	--
9020	Stream	3/16/94	P	.03	7.1	94	7.0	--
9025	Seep	3/16/94	E	.01	6.7	69	8.5	3.4
9030	Stream	3/16/94	V	.01	6.8	110	9.0	--
9035	Seep	3/16/94	L	0	6.7	118	10.0	7.6
9040	Stream	3/16/94	P	.14	7.2	79	6.5	--
9045	Seep	3/16/94	L	0	7.2	400	11.0	7
9050	Stream	3/16/94	P	.11	7	47	13.0	--
9055	Stream	3/16/94	P	.04	6.7	37	10.0	--
9060	Seep	3/16/94	D	0	--	--	--	--
9065	Stream	3/15/94	P	.04	7.1	55	12.0	--
9068	Seep	3/15/94	V	.01	6	20	12.0	9.6
9070	Seep	3/15/94	V	.01	6.7	30	13.5	9
9075	Stream	3/16/94	L	0	7.1	92	8.5	4.8
9080	Stream	3/16/94	E	.01	5.6	30	10.5	8
9085	Seep	3/16/94	L	0	5.2	31	8.5	8.8
9090	Stream	3/16/94	P	3.32	8.1	343	8.5	--
9092	Stream	3/17/94	P	.32	7.1	20	10.5	--
9093	Spring	3/17/94	P	.18	7.5	215	11.5	9.5
9095	Stream	3/17/94	P	2.75	8.1	366	5.0	--
10005	Stream	3/15/94	P	.3	8	184	14.0	--
10070	Stream	3/15/94	P	.04	6.6	42	11.0	--
10080	Stream	3/15/94	L	0	7.2	57	14.0	--
10090	Stream	3/15/94	P	.03	6.2	26	11.0	--
10095	Seep	3/15/94	L	0	5.3	22	10.5	7.5
10100	Seep	3/15/94	D	0	--	--	--	--
11005	Stream	3/15/94	D	0	--	--	--	--
11010	Stream	3/15/94	V	.01	7	55	12.0	--
11015	Seep	3/15/94	E	.01	6	47	8.0	3.4
11020	Stream	3/15/94	P	.15	7.1	71	13.5	--
11025	Stream	3/15/94	P	.05	6.6	38	12.5	--
11030	Stream	3/15/94	P	.04	6	34	11.0	--
11035	Seep	3/15/94	L	0	5.1	31	9.5	7
11040	Stream	3/15/94	P	.04	6.8	42	12.0	--
11045	Spring	3/15/94	L	0	5.3	40	12.0	8.4
11050	Stream	3/15/94	P	.46	8.1	124	14.5	--
11055	Stream	3/15/94	P	5.02	8	260	12.7	--
11060	Stream	3/15/94	P	5.41	7.8	291	13.5	--
11065	Stream	3/15/94	F	.02	7.9	92	12.0	--
11070	Stream	3/15/94	P	1.02	7.1	100	7.0	--
11075	Seep	3/15/94	E	.01	6.3	33	8.0	10.2
11080	Stream	3/15/94	L	0	7.1	175	7.0	--
11085	Spring	3/15/94	L	0	7.4	165	6.0	9
11090	Stream	3/15/94	F	.08	7.4	91	7.5	--
11095	Spring	3/16/94	L	0	7.5	50	9.0	8.7
11099	Spring	3/15/94	F	.14	7.4	325	13.0	10.2
11100	Stream	3/15/94	P	5.84	8.1	288	13.5	--
11105	Stream	3/15/94	P	5.32	7.8	226	11.5	10.6
12010	Stream	3/15/94	P	.74	7.7	128	12.5	--
12015	Seep	3/15/94	E	.01	8	265	12.5	--

**Table 3.** Discharge and water-quality data for the high base flow seepage investigation at Bear Creek Valley, Oak Ridge, Tennessee, March 14 through March 19, 1994—Continued

Site number	Type of site	Date sampled (month/day/year)	Method	Flow (ft <sup>3</sup> /s)	pH	Specific conductance (μS/cm)	Temperature (°C)	Dis-solved oxygen (mg/L)
12020	Seep	3/15/94	P	.02	7.9	188	13.5	9.8
12025	Spring	3/15/94	P	.7	7.1	118	11.5	8.9
12040	Stream	3/15/94	P	.06	6.1	29	10.5	--
12045	Stream	3/15/94	P	.04	8.1	103	12.0	--
12050	Seep	3/15/94	P	.04	6.1	30	11.0	7.2
13005	Stream	3/17/94	P	6.89	7.7	260	9.5	--
13007	Stream	3/17/94	L	0	6.8	84	8.0	--
13008	Seep	3/17/94	L	0	6.9	65	8.5	10.8
13010	Seep	3/17/94	L	0	6.3	88	8.5	10.1
13015	Seep	3/17/94	L	0	6.4	32	12.0	10.3
13020	Spring	3/17/94	L	0	6.4	14	11.5	9.8
13025	Stream	3/17/94	P	6.2	7.7	257	9.5	--
13030	Stream	3/17/94	E	.01	6.1	53	8.0	--
13035	Seep	3/17/94	D	0	--	--	--	--
13040	Seep	3/17/94	L	0	6.8	30	10.0	7
13060	Stream	3/16/94	P	.21	7.3	44	7.5	--
13070	Stream	3/17/94	P	.1	7.1	47	5.5	--
13075	Stream	3/17/94	E	.01	6.4	35	8.5	--
13080	Seep	3/17/94	E	.01	6.1	40	10.5	--
13085	Stream	3/17/94	E	.05	6.3	34	8.5	--
13086	Seep	3/17/94	E	--	5.9	34	9.0	8
13087	Stream	3/17/94	P	.08	7.1	49	6.5	--
13088	Stream	3/17/94	E	.01	7.5	131	7.5	--
13089	Seep	3/17/94	L	0	6.9	132	11.0	6.2
13090	Stream	3/17/94	E	.05	6.9	37	9.5	--
13095	Seep	3/17/94	E	.01	5.8	30	9.0	7
13140	Stream	3/17/94	L	0	7.7	70	8.5	--
13150	Seep	3/17/94	L	0	5.8	46	10.5	7.4
13155	Stream	3/17/94	P	.07	7	37	8.5	--
13160	Stream	3/17/94	L	0	6.2	62	7.5	--
13165	Seep	3/17/94	L	0	5.3	37	9.5	6.2
13170	Stream	3/17/94	E	.01	7.7	41	8.0	--
13175	Spring	3/17/94	E	.03	7.2	56	10	10.2
13180	Stream	3/17/94	E	.02	5.8	31	8.0	--
13200	Spring	3/17/94	E	.02	6.8	53	10.5	9.6
13205	Stream	3/17/94	P	.16	7.1	58	7.5	--
13210	Stream	3/17/94	P	.08	7.5	54	9.0	--
13215	Seep	3/17/94	L	0	6.9	171	8.5	3.6
13220	Seep	3/17/94	D	0	--	--	--	--
13225	Stream	3/17/94	P	.04	7.2	44	10.0	--
13230	Stream	3/17/94	L	0	7.3	55	8.0	--
13235	Spring	3/17/94	L	0	6.7	101	12.5	7.3
13240	Seep	3/17/94	D	0	--	--	--	--
13245	Stream	3/18/94	E	.01	6.7	37	7.0	--
13250	Seep	3/18/94	E	.01	6.5	30	7.0	4
13255	Stream	3/18/94	P	.03	6.8	39	7.0	--
13260	Stream	3/18/94	L	0	6.3	82	7.5	--
13265	Seep	3/18/94	L	0	6.1	74	7.5	3.9
13270	Stream	3/18/94	L	0	6.2	40	8.5	--
13275	Seep	3/18/94	L	0	5.7	31	8.0	3.9

**Table 3.** Discharge and water-quality data for the high base flow seepage investigation at Bear Creek Valley, Oak Ridge, Tennessee, March 14 through March 19, 1994—Continued

Site number	Type of site	Date sampled (month/day/year)	Method	Flow (ft <sup>3</sup> /s)	pH	Specific conductance (μS/cm)	Temperature (°C)	Dis-solved oxygen (mg/L)
13900	Stream	3/18/94	P	6.63	8	244	7.5	--
14005	Stream	3/19/94	P	5.78	7.9	282	9.0	--
14010	Stream	3/19/94	P	5.49	7.9	281	9.5	--
14015	Stream	3/19/94	D	0	--	--	--	--
14025	Seep	3/19/94	D	0	--	--	--	--
14035	Stream	3/18/94	P	.08	7.7	144	6.0	--
14038	Stream	3/18/94	L	0	--	--	--	--
14040	Stream	3/18/94	P	.18	7.6	134	6.0	--
14045	Stream	3/18/94	V	.01	6.9	63	5.5	--
14050	Stream	3/18/94	V	.01	7	70	5.5	--
14060	Seep	3/18/94	E	.01	6.6	86	10.0	5.1
14065	Wetland	3/18/94	--	0	6.8	102	13.0	3.8
14070	Stream	3/18/94	P	.11	7.5	90	11.5	--
14075	Stream	3/18/94	P	.13	7.9	108	12.5	--
14080	Stream	3/18/94	E	.01	6.3	30	10.5	--
14085	Stream	3/18/94	L	0	5.4	33	10.5	--
14090	Seep	3/18/94	D	0	--	--	--	--
14095	Stream	3/19/94	D	0	--	--	--	--
14097	Stream	3/19/94	P	5.25	7.8	283	9.0	--
14100	Seep	3/18/94	L	0	7.8	252	12.0	6.4
14105	Stream	3/18/94	R	6.67	7.6	280	12.5	--
14110	Spring	3/18/94	P	1	7.7	226	12.0	8.5
14115	Spring	3/18/94	P	.3	7.4	243	12.5	7.9
14120	Seep	3/18/94	E	.01	7.1	146	11.5	5.4
14125	Stream	3/18/94	P	4.26	8.3	291	13.0	--
14130	Seep	3/18/94	E	.01	6.6	96	8.5	1.2
14133	Stream	3/18/94	P	3.46	8.3	312	8.0	--
14135	Stream	3/18/94	P	3.28	8.3	315	8.5	--
14190	Seep	3/19/94	L	0	6	45	10.0	8.4
14195	Seep	3/19/94	L	0	6.8	123	8.5	6.1
14200	Seep	3/19/94	L	0	7.3	36	9.0	10.6
15005	Stream	3/19/94	P	.21	8.1	166	10.0	--
15010	Stream	3/19/94	P	.26	7.8	177	10.0	--
15015	Stream	3/19/94	L	0	7.1	149	9.5	--
15020	Seep	3/19/94	L	0	7.5	214	11.0	--
15025	Seep	3/18/94	D	0	--	--	--	--
15030	Seep	3/18/94	D	0	--	--	--	--
15035	Stream	3/19/94	E	.01	7.2	155	10.5	--
15040	Stream	3/18/94	P	.06	7.5	272	14.0	--
15045	Stream	3/18/94	E	.01	7.5	122	12.5	--
15055	Stream	3/18/94	E	.15	7	98	11.0	--
15056	Stream	3/18/94	P	.02	7	143	11.0	--
15065	Seep	3/18/94	L	0	5.7	57	13.0	5.5
15070	Seep	3/18/94	D	0	--	--	--	--
15075	Seep	3/18/94	E	.01	6.9	71	10.5	7
15080	Seep	3/18/94	L	0	6.7	179	11.0	5
15081	Seep	3/18/94	E	.01	6.3	69	10.5	6.8
15085	Seep	3/18/94	L	0	7.4	284	13.5	8.3
16005	Seep	3/18/94	D	0	--	--	--	--
16010	Stream	3/19/94	P	.1	6.7	121	6.0	--

**Table 3.** Discharge and water-quality data for the high base flow seepage investigation at Bear Creek Valley, Oak Ridge, Tennessee, March 14 through March 19, 1994—Continued

Site number	Type of site	Date sampled (month/day/year)	Method	Flow (ft <sup>3</sup> /s)	pH	Specific conductance (μS/cm)	Temperature (°C)	Dis-solved oxygen (mg/L)
16015	Seep	3/19/94	L	0	6.8	308	9.5	--
16020	Seep	3/19/94	L	0	7.1	148	5.5	--
16025	Stream	3/19/94	V	.01	7.4	119	11.5	--
16030	Seep	3/19/94	L	0	6.7	108	8.5	6.3
16035	Stream	3/19/94	P	.06	7.6	64	13.0	--
16040	Seep	3/19/94	L	0	6.7	109	11.5	5.5
16045	Stream	3/19/94	P	.04	7.2	56	12.0	--
16050	Stream	3/19/94	E	.01	7.2	42	11.5	--
16055	Spring	3/19/94	E	.02	6.9	54	12.0	9.8
16060	Seep	3/19/94	L	0	6.1	39	11.0	8.1
16065	Stream	3/19/94	P	.04	7	49	9.5	--
16067	Seep	3/19/94	L	0	6.7	135	10.5	8.2
16070	Seep	3/19/94	V	.01	6.7	35	11.0	11.3
16075	Stream	3/19/94	D	0	--	--	--	--
16080	Seep	3/19/94	L	0	6.1	48	10.0	--
16085	Stream	3/19/94	L	0	7.3	105	6.5	--
16090	Stream	3/19/94	L	0	6.8	103	7.5	--
16095	Seep	3/19/94	L	0	6.3	110	17.0	--
16100	Seep	3/19/94	L	0	6.6	254	8.5	9.1
16105	Stream	3/19/94	E	.02	7.1	118	9.0	--
16110	Seep	3/19/94	L	0	6.8	199	8.5	4.6
17005	Stream	3/19/94	P	.1	7.4	197	10.0	--
17010	Stream	3/19/94	L	0	8	305	10.5	--
17015	Stream	3/19/94	L	0	7.4	158	8.5	--
17020	Stream	3/19/94	E	.01	7.4	141	9.0	--
17030	Stream	3/19/94	L	0	7.4	188	9.5	--
17035	Seep	3/19/94	L	0	7.1	143	10.0	7.8
17040	Stream	3/19/94	L	0	6.5	61	7.5	--
17045	Seep	3/19/94	D	0	--	--	--	--
17050	Stream	3/19/94	L	0	7.5	131	9.5	--
17055	Seep	3/19/94	D	0	--	--	--	--
17065	Seep	3/19/94	D	0	--	--	--	--
17070	Seep	3/19/94	P	.07	7.6	63	11.5	--
17075	Stream	3/19/94	D	0	--	--	--	--
17082	Seep	3/19/94	D	0	--	--	--	--
17083	Seep	3/19/94	D	0	--	--	--	--
17085	Stream	3/19/94	E	.01	7.3	92	9.5	--
17090	Seep	3/19/94	E	.01	6.9	68	10.0	4.4
17095	Stream	3/19/94	P	.05	7.5	71	12.5	--
17100	Seep	3/19/94	D	0	--	--	--	--
17105	Stream	3/19/94	P	.04	7.1	41	12.5	--
17110	Stream	3/19/94	P	.01	6.7	58	11.5	--
17115	Seep	3/19/94	L	0	6.3	47	15.0	--
17120	Seep	3/19/94	D	0	--	--	--	--
17125	Stream	3/19/94	E	.01	7.4	55	12.0	--
17130	Seep	3/19/94	L	0	6.7	60	11.5	9.5
17135	Seep	3/19/94	L	0	5.8	26	12.0	5
18005	Stream	3/16/94	P	.02	7.6	170	7.5	--
18010	Seep	3/16/94	E	.01	6.5	90	9.0	9.2
18015	Seep	3/16/94	D	0	--	--	--	--

**Table 3.** Discharge and water-quality data for the high base flow seepage investigation at Bear Creek Valley, Oak Ridge, Tennessee, March 14 through March 19, 1994—Continued

Site number	Type of site	Date sampled (month/day/year)	Method	Flow (ft <sup>3</sup> /s)	pH	Specific conductance (μS/cm)	Temperature (°C)	Dis-solved oxygen (mg/L)
18020	Stream	3/16/94	P	.01	7.3	90	8.0	--
18025	Seep	3/16/94	L	0	6.1	74	9.0	2
18060	Stream	3/16/94	P	.13	8.3	190	10.0	--
18065	Seep	3/16/94	E	.01	7.1	163	10.5	8.1
18070	Seep	3/16/94	L	0	7.4	268	11.0	--
18075	Seep	3/16/94	L	0	6.4	62	11.5	10.1
18080	Seep	3/16/94	D	0	--	--	--	--
18085	Spring	3/16/94	P	.09	7.6	245	13.5	9.2
18090	Seep	3/16/94	D	0	--	--	--	--
18095	Seep	3/16/94	L	0	7.2	224	7.5	5.6
18100	Stream	3/16/94	P	.12	7.5	100	6.5	--
18105	Stream	3/16/94	P	.02	7.4	104	6.0	--
18110	Stream	3/16/94	P	.02	6.9	120	6.5	--
18115	Seep	3/16/94	D	0	--	--	--	--
18120	Seep	3/16/94	D	0	--	--	--	--
18125	Seep	3/16/94	D	0	--	--	--	--
18130	Stream	3/16/94	L	0	6.9	123	8.5	--
18140	Seep	3/16/94	D	0	--	--	--	--
18145	Seep	3/16/94	L	0	7	50	10.0	--
18150	Stream	3/16/94	P	.1	7.4	61	6.5	--
18155	Seep	3/16/94	L	0	6.7	118	5.0	3.4
18160	Stream	3/16/94	P	.11	7.5	50	5.5	--
18165	Stream	3/16/94	P	.02	6.5	31	8.0	--
18170	Stream	3/16/94	E	.01	6.5	36	9.5	--
18175	Seep	3/16/94	D	0	--	--	--	--
18180	Seep	3/16/94	E	.01	6	33	10.5	8.3
18185	Stream	3/16/94	P	.03	7.7	86	8.5	--
18190	Seep	3/16/94	L	0	--	--	--	--
18195	Stream	3/16/94	E	.01	7.8	90	9.5	--
18215	Seep	3/16/94	E	0	6.8	133	10.0	3
18220	Seep	3/16/94	L	0	6.7	83	11	9.5
18225	Seep	3/16/94	L	0	5.9	43	8.5	5.8
18230	Seep	3/16/94	E	.01	6	36	10.0	5.8
18250	Stream	3/16/94	P	.04	8	191	7.0	--
18255	Seep	3/16/94	D	0	--	--	--	--
18260	Stream	3/16/94	P	.13	7.5	188	9.5	--
19003	Spring	3/17/94	E	.02	7.6	316	13.5	10.2
19004	Stream	3/18/94	D	0	--	--	--	--
19005	Seep	3/18/94	D	0	--	--	--	--
19007	Spring	3/18/94	E	.03	7.4	242	11.5	8.2
19008	Stream	3/18/94	P	.14	8	169	13.0	--
19010	Seep	3/17/94	D	0	--	--	--	--
19015	Stream	3/18/94	P	.16	8	171	13.5	--
19045	Stream	3/18/94	P	.01	7.3	186	10.5	--
19050	Stream	3/18/94	P	--	7.5	400	9.5	--
19055	Seep	3/18/94	L	0	7.4	186	8.0	8.5
19090	Seep	3/18/94	D	0	--	--	--	--
19095	Stream	3/18/94	L	0	8	328	10.0	--
19100	Stream	3/18/94	P	.1	7.8	125	12.0	--
19105	Stream	3/18/94	E	--	7.6	711	12.5	--



**Table 3.** Discharge and water-quality data for the high base flow seepage investigation at Bear Creek Valley, Oak Ridge, Tennessee, March 14 through March 19, 1994—Continued

Site number	Type of site	Date sampled (month/day/year)	Method	Flow (ft <sup>3</sup> /s)	pH	Specific conductance (μS/cm)	Temperature (°C)	Dis-solved oxygen (mg/L)
19110	Seep	3/18/94	D	0	--	--	--	--
19115	Stream	3/18/94	V	.18	7.9	118	8.5	--
19120	Seep	3/18/94	D	0	--	--	--	--
19125	Wetland	3/18/94	D	0	--	--	--	--
19130	Seep	3/18/94	D	0	--	--	--	--
19135	Stream	3/18/94	P	.12	7.6	81	7.0	--
19140	Stream	3/18/94	P	.05	7.3	42	7.5	--
19145	Stream	3/18/94	L	0	6.8	136	7.0	--
19146	Stream	3/18/94	D	0	--	--	--	--
19148	Seep	3/18/94	L	0	5.8	40	9.5	--
19150	Seep	3/18/94	D	0	7.1	199	7.5	9.6
19155	Stream	3/18/94	E	.01	5.6	42	8.5	--
19156	Stream	3/18/94	L	0	5.6	38	9.0	--
19158	Seep	3/18/94	D	0	--	--	--	--
19160	Stream	3/18/94	D	0	--	--	--	--
19165	Seep	3/18/94	D	0	--	--	--	--
19170	Seep	3/18/94	D	0	--	--	--	--
19175	Seep	3/18/94	L	0	6	37	8.5	--
19180	Stream	3/18/94	P	.05	7.9	166	10.0	--
19285	Stream	3/18/94	P	.14	8.4	119	12.5	--
19290	Stream	3/18/94	D	0	--	--	--	--
19295	Seep	3/18/94	L	0	7.3	150	11.5	--
19300	Stream	3/18/94	P	.23	8.1	167	13.0	--
20005	Stream	3/18/94	P	2.11	8.3	219	10.0	--
20010	Stream	3/18/94	P	.18	7.7	128	11.0	--
20015	Stream	3/18/94	P	--	7.1	72	11.0	--
20020	Seep	3/18/94	L	0	5.7	42	10.5	5.7
20250	Stream	3/19/94	P	1.73	8.3	222	10.0	--
20255	Stream	3/19/94	P	1.42	8.2	293	11.5	--
20258	Seep	3/19/94	L	0	7.6	395	10.5	3.1
20260	Stream	3/19/94	P	1.34	8	223	12.5	--
20265	Stream	3/19/94	P	.11	7.6	112	13.0	--
20280	Stream	3/18/94	P	.06	7.3	80	12.5	--
20285	Seep	3/18/94	E	--	6.9	137	12.0	4.8
20290	Stream	3/18/94	P	.06	7	59	10.5	--
20295	Seep	3/18/94	L	0	5.9	54	8.5	--
20300	Seep	3/18/94	E	.01	6.2	37	8.5	9.2
20305	Stream	3/19/94	P	.02	7.2	58	7.0	--
20310	Seep	3/19/94	E	--	6.4	60	7.5	3.4
20315	Seep	3/18/94	L	0	6.5	69	10.0	8.9
20320	Seep	3/19/94	L	0	5.7	43	7.5	2
20325	Stream	3/19/94	P	.01	7	69	7.0	--
20335	Seep	3/19/94	E	.01	7.2	74	9.5	9.6
20340	Stream	3/18/94	E	.01	7.3	104	9.0	--
20342	Stream	3/18/94	P	.01	7.2	114	11.0	--
20343	Stream	3/18/94	L	0	7.3	100	15.5	--
20350	Stream	3/18/94	P	.09	7.3	92	12.0	--
20355	Seep	3/18/94	E	.01	6.9	184	11.0	7
20360	Stream	3/18/94	P	.02	6.8	42	11.5	--
20365	Stream	3/18/94	E	.01	6	32	10.5	--

**Table 3.** Discharge and water-quality data for the high base flow seepage investigation at Bear Creek Valley, Oak Ridge, Tennessee, March 14 through March 19, 1994—Continued

Site number	Type of site	Date sampled (month/day/year)	Method	Flow (ft <sup>3</sup> /s)	pH	Specific conductance (μS/cm)	Temperature (°C)	Dissolved oxygen (mg/L)
20370	Stream	3/18/94	E	.02	5.8	30	9.0	--
20375	Seep	3/18/94	D	0	--	--	--	--
20380	Seep	3/18/94	E	.05	5.3	28	9.5	5.7
20385	Seep	3/18/94	L	0	6.7	62	9.0	6.3
20390	Stream	3/18/94	E	.01	6.9	32	8.0	--
20395	Seep	3/18/94	D	0	--	--	--	--
20400	Seep	3/18/94	L	0	6.8	44	10.5	9.5
20405	Seep	3/18/94	D	0	--	--	--	--
20410	Stream	3/18/94	P	.02	7	49	8.5	10.5
20415	Seep	3/18/94	L	0	7.2	51	11.5	10
20420	Stream	3/18/94	E	.01	5.6	30	8.5	--
20425	Stream	3/18/94	L	0	5.9	30	10.5	6.7
20430	Stream	3/18/94	P	1.21	7.5	231	12.0	--
21005	Stream	3/19/94	P	.04	6.5	28	7.5	--
21010	Seep	3/19/94	L	0	5.2	29	9.0	6.7
21015	Stream	3/19/94	P	.04	7.1	88	7.5	--
21020	Spring	3/19/94	L	0	7.1	65	7.5	10.1
21025	Stream	3/19/94	L	0	6.4	64	8.0	--
21030	Spring	3/19/94	L	0	5.8	47	9.0	4
21035	Stream	3/19/94	P	.04	7	51	7.5	--
21040	Seep	3/19/94	L	0	6.2	68	7.0	3.4
21045	Stream	3/19/94	L	0	6.1	37	8.5	--
21050	Seep	3/19/94	E	.01	6.9	30	11.0	10
21055	Stream	3/19/94	E	.01	7.3	42	13.0	--
21057	Stream	3/19/94	L	0	6.3	41	11.0	--
21058	Seep	3/19/94	D	0	--	--	--	--
21060	Spring	3/19/94	E	.01	6	22	12.5	9
21065	Stream	3/19/94	L	0	5.5	32	9.5	--
21100	Stream	3/19/94	P	.05	7.5	107	13.5	--
21102	Stream	3/19/94	L	0	7.1	97	9.5	--
21103	Seep	3/19/94	L	0	6.5	85	13.5	5.5
21105	Stream	3/19/94	P	.02	7.9	104	13.5	--
21110	Seep	3/19/94	L	0	--	--	--	--
21115	Seep	3/19/94	D	0	--	--	--	--
21119	Seep	--	--	--	--	--	--	--
21120	Stream	3/19/94	P	.01	7.6	129	15.0	--
21125	Stream	3/19/94	L	0	7.3	125	11.5	--
21130	Seep	3/19/94	D	0	--	--	--	--
22005	Stream	3/18/94	P	.22	7.4	84	14.4	9.3
22006	Seep	3/18/94	L	0	7.1	151	20.6	--
22010	Stream	3/19/94	E	.3	8.2	192	11.5	--
22034	Seep	3/19/94	L	0	7.4	770	10.0	--
22040	Stream	3/19/94	E	.02	7.4	223	11.0	--
22041	Seep	3/19/94	D	0	--	--	--	--
22042	Stream	3/19/94	D	0	--	--	--	--
22044	Stream	3/19/94	E	.01	7.1	98	9.0	--
22045	Stream	3/19/94	P	1.54	8.2	221	12.4	--
22050	Stream	3/19/94	P	.07	7.6	247	13.5	--
22055	Stream	3/19/94	E	.01	7.1	440	11.0	--
22060	Stream	3/19/94	P	.07	7.8	182	12.5	--

**Table 5.** Discharge and water-quality data for the low base flow seepage investigation at Bear Creek Valley, Oak Ridge, Tennessee, September 9 through September 29, 1994

[Methods for measurement: D, no flowing water; E, estimation; F, float; L, less than minimum reportable flow, 0.005 cubic foot per second; P, pygmy meter measurement; R, rating from stream gage; V, volumetric measurement; ft<sup>3</sup>/s, cubic foot per second;  $\mu$ S/cm, microsiemens per centimeter;  $^{\circ}$ C, degree Celsius; mg/L, milligrams per liter; --, no data]

Site number	Type of site	Date sampled (month/day/year)	Method	Flow (ft <sup>3</sup> /s)	pH	Specific conductance ( $\mu$ S/cm)	Temperature ( $^{\circ}$ C)	Dis-solved oxygen (mg/L)
1005	Stream	9/29/94	P	0.02	7.7	1,605	22.5	--
1010	Stream	9/29/94	L	0	7.9	1,936	21.0	--
1015	Stream	9/9/94	L	0	7.8	2,030	19.5	--
1020	Stream	9/9/94	D	0	--	--	--	--
1025	Stream	9/9/94	D	0	--	--	--	--
1030	Stream	9/9/94	D	0	--	--	--	--
1035	Stream	9/9/94	D	0	--	--	--	--
1040	Seep	9/9/94	D	0	--	--	--	--
1045	Seep	9/9/94	D	0	--	--	--	--
1050	Stream	9/9/94	P	0	6.9	755	18.0	6.5
1055	Seep	9/9/94	D	0	--	--	--	--
1060	Stream	9/9/94	D	0	--	--	--	--
1065	Seep	9/9/94	D	0	--	--	--	--
1070	Seep	9/9/94	D	0	--	--	--	--
1075	Stream	9/9/94	L	0	7.9	259	18.0	7.8
1080	Seep	9/9/94	D	0	--	--	--	--
1085	Stream	9/9/94	D	0	--	--	--	--
1090	Stream	9/9/94	D	0	--	--	--	--
1095	Seep	9/9/94	D	0	--	--	--	--
1100	Seep	9/9/94	D	0	--	--	--	--
1105	Stream	9/9/94	L	0	7.4	115	18.5	7.1
1110	Stream	9/9/94	D	0	--	--	--	--
1115	Seep	9/9/94	D	0	--	--	--	--
1120	Stream	9/9/94	D	0	--	--	--	--
1125	Seep	9/9/94	D	0	--	--	--	--
1130	Stream	9/9/94	L	0	--	88	18.5	8.2
1135	Seep	9/9/94	D	0	--	--	--	--
1140	Stream	9/9/94	L	0	7.3	77	19.0	8.1
1145	Stream	9/9/94	D	0	--	--	--	--
1148	Stream	9/9/94	D	0	--	--	--	--
1150	Spring	9/9/94	D	0	--	--	--	--
1155	Seep	9/9/94	D	0	--	--	--	--
1480	Seep	9/9/94	D	0	--	--	--	--
1485	Stream	9/9/94	P	.04	7.8	1,480	19.5	--
1490	Seep	9/9/94	D	0	--	--	--	--
1495	Stream	9/9/94	P	.02	7.8	1,584	20.0	--
1500	Stream	9/9/94	P	.01	7.5	1,685	19.5	--
1502	Spring	9/9/94	L	0	6.9	1,220	18.5	4.1
1505	Stream	9/9/94	L	0	7.7	1,285	19.0	--
1510	Stream	9/9/94	L	0	6.5	666	19.0	--
1515	Stream	9/9/94	E	.01	7.7	759	19.5	--
1520	Seep	9/9/94	D	0	--	--	--	--
1525	Spring	9/9/94	D	0	--	--	--	--
1530	Seep	9/9/94	D	0	--	--	--	--
1535	Seep	9/9/94	L	0	7.5	395	20.0	--
1540	Stream	9/9/94	L	0	7.3	124	20.0	--
1545	Seep	9/9/94	D	0	--	--	--	--
1550	Stream	9/9/94	E	.01	7.3	311	20.0	--
1555	Stream	9/9/94	D	0	--	--	--	--
1560	Seep	9/9/94	L	0	6.6	110	19.5	2.2

**Table 5.** Discharge and water-quality data for the low base flow seepage investigation at Bear Creek Valley, Oak Ridge, Tennessee, September 9 through September 29, 1994—Continued

Site number	Type of site	Date sampled (month/day/year)	Method	Flow (ft <sup>3</sup> /s)	pH	Specific conductance (μS/cm)	Temperature (°C)	Dissolved oxygen (mg/L)
1565	Spring	9/9/94	D	0	--	--	--	--
1570	Stream	9/9/94	D	0	--	--	--	--
1573	Stream	9/9/94	D	0	--	--	--	--
1575	Seep	9/9/94	D	0	--	--	--	--
1576	Seep	9/9/94	D	0	--	--	--	--
1577	Seep	9/9/94	D	0	--	--	--	--
1579	Stream	9/9/94	L	0	6.7	270	20.0	--
1582	Stream	9/9/94	L	0	7.4	72	20.0	--
1585	Spring	9/9/94	L	0	6.9	77	17.0	8.3
1600	Stream	9/9/94	P	.02	7.4	1,251	19.5	--
1610	Seep	9/9/94	D	0	--	--	--	--
2005	Stream	9/12/94	D	0	--	--	--	--
2006	Seep	9/12/94	D	0	--	--	--	--
2010	Seep	9/12/94	D	0	--	--	--	--
2015	Stream	9/12/94	D	0	--	--	--	--
2020	Stream	9/12/94	D	0	--	--	--	--
2025	Stream	9/12/94	D	0	--	--	--	--
2027	Seep	9/12/94	D	0	--	--	--	--
2030	Stream	9/12/94	E	.01	7.7	280	19.0	--
2035	Stream	9/12/94	L	0	7.8	520	20.0	--
2040	Seep	9/12/94	D	0	--	--	--	--
2050	Stream	9/12/94	D	0	--	--	--	--
2055	Seep	9/12/94	D	0	--	--	--	--
2065	Stream	9/12/94	L	0	7.9	238	20.0	--
2067	Seep	9/12/94	D	0	--	--	--	--
2068	Seep	9/12/94	L	0	7.3	348	19.0	--
2070	Stream	9/12/94	D	0	--	--	--	--
2080	Seep	9/12/94	D	0	--	--	--	--
2083	Stream	9/12/94	D	0	--	--	--	--
2085	Seep	9/12/94	D	0	--	--	--	--
2090	Stream	9/12/94	D	0	--	--	--	--
2095	Seep	9/12/94	D	0	--	--	--	--
2100	Stream	9/12/94	D	0	--	--	--	--
2110	Seep	9/12/94	D	0	--	--	--	--
2120	Seep	9/12/94	D	0	--	--	--	--
2125	Stream	9/12/94	L	0	7.5	216	20.0	--
2130	Seep	9/12/94	D	0	--	--	--	--
2135	Stream	9/12/94	L	0	7.6	94	19.5	--
2140	Stream	9/12/94	D	0	--	--	--	--
2145	Stream	9/12/94	D	0	--	--	--	--
2150	Spring	9/12/94	D	0	--	--	--	--
2155	Stream	9/12/94	E	.01	7.6	79	20.0	--
2160	Spring	9/12/94	E	.01	6.9	98	18.0	8.5
2170	Stream	9/12/94	D	0	--	--	--	--
2175	Stream	9/12/94	D	0	--	--	--	--
2180	Seep	9/12/94	D	0	--	--	--	--
2185	Stream	9/12/94	D	0	--	--	--	--
2190	Stream	9/12/94	P	.04	8	860	18.5	--
2195	Stream	9/12/94	D	0	--	--	--	--
2200	Stream	9/12/94	D	0	--	--	--	--

**Table 5.** Discharge and water-quality data for the low base flow seepage investigation at Bear Creek Valley, Oak Ridge, Tennessee, September 9 through September 29, 1994—Continued

Site number	Type of site	Date sampled (month/day/year)	Method	Flow (ft <sup>3</sup> /s)	pH	Specific conductance (μS/cm)	Temperature (°C)	Dissolved oxygen (mg/L)
2205	Wetland	9/12/94	D	0	--	--	--	--
2210	Stream	9/12/94	L	0	7.4	642	20.0	--
2225	Stream	9/12/94	D	0	--	--	--	--
2230	Stream	9/12/94	D	0	--	--	--	--
2235	Stream	9/12/94	D	0	--	--	--	--
2240	Stream	9/12/94	D	0	--	--	--	--
2245	Stream	9/12/94	L	0	7.5	73	19.0	--
2260	Spring	9/12/94	L	0	7.1	84	18.5	7.4
2270	Seep	9/12/94	D	0	--	--	--	--
2275	Stream	9/9/94	D	0	--	--	--	--
2280	Seep	9/9/94	D	0	--	--	--	--
2285	Stream	9/9/94	D	0	7.4	98	20.5	--
2290	Stream	9/9/94	L	0	7.6	90	20.0	--
2295	Stream	9/9/94	L	0	7.6	94	20.0	--
2310	Seep	9/9/94	L	0	6.9	92	17.5	8.2
2315	Stream	9/12/94	L	0	8.2	857	18.0	--
2320	Stream	9/12/94	V	.01	8.2	354	20.5	--
2325	Spring	9/12/94	L	0	6.9	378	14.0	6.4
2330	Spring	9/12/94	L	0	7.5	344	15.5	8.6
2335	Stream	9/12/94	E	.02	8.2	352	16.5	--
2337	Stream	9/12/94	L	0	7.8	341	18.5	--
2339	Spring	9/12/94	L	0	7.7	312	17.0	8
2341	Spring	9/12/94	E	.02	7.2	347	14.0	9.2
2345	Stream	9/12/94	P	.02	7.8	1,441	19.0	--
3005	Stream	9/12/94	P	.07	8	877	16.5	--
3010	Stream	9/12/94	P	.13	8	878	17.0	--
3015	Stream	9/12/94	E	.03	7.5	884	16.0	--
3020	Wetland	9/12/94	D	0	--	--	--	--
3025	Spring	9/12/94	P	.37	7.1	889	15.5	--
3030	Spring	9/12/94	D	0	--	--	--	--
3035	Seep	9/12/94	L	0	7.7	322	19.0	--
3040	Stream	9/12/94	D	0	--	--	--	--
3045	Stream	9/12/94	D	0	--	--	--	--
3050	Stream	9/12/94	D	0	--	--	--	--
3055	Seep	9/12/94	D	0	--	--	--	--
3060	Stream	9/12/94	D	0	--	--	--	--
3065	Seep	9/12/94	D	0	--	--	--	--
3070	Stream	9/12/94	D	0	--	--	--	--
3075	Seep	9/12/94	L	0	7.1	389	20.0	--
3078	Seep	--	--	--	--	--	--	--
3080	Stream	9/12/94	L	0	7.2	305	21.0	--
3085	Seep	9/12/94	D	0	--	--	--	--
3090	Stream	9/13/94	L	0	6.9	452	17.5	--
3095	Stream	9/13/94	D	0	--	--	--	--
3100	Spring	9/13/94	D	0	--	--	--	--
3105	Spring	9/13/94	D	0	--	--	--	--
3110	Stream	--	--	--	--	--	--	--
3115	Seep	9/13/94	D	0	--	--	--	--
3120	Seep	9/13/94	D	0	--	--	--	--
3125	Stream	9/13/94	E	.01	6.9	100	17.5	--

**Table 5.** Discharge and water-quality data for the low base flow seepage investigation at Bear Creek Valley, Oak Ridge, Tennessee, September 9 through September 29, 1994—Continued

Site number	Type of site	Date sampled (month/day/year)	Method	Flow (ft <sup>3</sup> /s)	pH	Specific conductance (μS/cm)	Temperature (°C)	Dis-solved oxygen (mg/L)
3130	Seep	9/13/94	D	0	--	--	--	--
3135	Seep	9/13/94	D	0	--	--	--	--
3140	Seep	9/13/94	D	0	--	--	--	--
3145	Seep	9/13/94	E	.01	6.4	102	17.5	--
3150	Seep	9/13/94	D	0	--	--	--	--
3155	Seep	9/13/94	D	0	--	--	--	--
3160	Stream	9/13/94	E	.01	7.2	87	17.5	--
3165	Spring	9/13/94	L	0	7.1	89	17.0	--
3170	Stream	9/12/94	D	0	--	--	--	--
3175	Seep	9/13/94	D	0	--	--	--	--
3180	Spring	9/13/94	D	0	--	--	--	--
3185	Stream	9/12/94	D	0	--	--	--	--
3190	Stream	9/12/94	D	0	--	--	--	--
3195	Stream	9/12/94	D	0	--	--	--	--
3198	Wetland	9/12/94	D	0	--	--	--	--
3200	Stream	9/12/94	L	0	7.5	221	19.0	--
3202	Stream	9/12/94	D	0	--	--	--	--
3205	Seep	9/12/94	D	0	--	--	--	--
3210	Stream	9/12/94	L	0	7.4	127	21.0	--
3215	Seep	9/12/94	D	0	--	--	--	--
3225	Stream	9/12/94	D	0	--	--	--	--
3230	Seep	9/12/94	D	0	--	--	--	--
3235	Seep	9/12/94	D	0	--	--	--	--
3240	Stream	9/13/94	D	0	--	--	--	--
3245	Seep	9/13/94	D	0	--	--	--	--
3250	Stream	9/13/94	D	0	--	--	--	--
3255	Seep	9/13/94	D	0	--	--	--	--
3260	Stream	9/13/94	D	0	--	--	--	--
3265	Seep	9/13/94	D	0	--	--	--	--
3270	Stream	9/13/94	E	.01	7.7	70	18.5	--
3275	Stream	9/13/94	E	.01	7.6	77	17.5	--
3280	Spring	9/13/94	L	0	7.5	90	17.5	8.7
3285	Stream	9/12/94	D	0	--	--	--	--
3290	Stream	9/13/94	D	0	--	--	--	--
3295	Seep	9/13/94	L	0	7.2	280	16.0	6.8
3300	Spring	9/13/94	L	0	7.1	280	15.0	7
3305	Seep	9/13/94	D	0	--	--	--	--
3310	Stream	9/12/94	D	0	--	--	--	--
4005	Stream	9/12/94	L	0	7.8	360	19.5	--
4010	Stream	9/12/94	L	0	7.1	370	19.0	--
4015	Seep	9/12/94	D	0	--	--	--	--
4017	Seep	9/12/94	D	0	--	--	--	--
4020	Stream	9/12/94	D	0	--	--	--	--
4025	Seep	9/12/94	D	0	--	--	--	--
4030	Stream	9/12/94	L	0	7.4	450	20.0	--
4035	Stream	9/13/94	D	0	--	--	--	--
4040	Seep	9/13/94	D	0	--	--	--	--
4045	Seep	9/13/94	D	0	--	--	--	--
4050	Seep	9/14/94	D	0	--	--	--	--
4055	Stream	9/13/94	D	0	--	--	--	--

**Table 5.** Discharge and water-quality data for the low base flow seepage investigation at Bear Creek Valley, Oak Ridge, Tennessee, September 9 through September 29, 1994—Continued

Site number	Type of site	Date sampled (month/day/year)	Method	Flow (ft <sup>3</sup> /s)	pH	Specific conductance (μS/cm)	Temperature (°C)	Dis-solved oxygen (mg/L)
4060	Seep	9/13/94	D	0	--	--	--	--
4065	Seep	9/13/94	D	0	--	--	--	--
4070	Seep	9/13/94	D	0	--	--	--	--
4075	Spring	9/13/94	D	0	--	--	--	--
4080	Stream	9/13/94	D	0	--	--	--	--
4085	Stream	9/13/94	D	0	--	--	--	--
4090	Seep	9/13/94	D	0	--	--	--	--
4095	Seep	9/13/94	D	0	--	--	--	--
4100	Stream	9/13/94	D	0	--	--	--	--
4105	Spring	9/13/94	D	0	--	--	--	--
4110	Stream	9/12/94	P	.29	7.8	623	16.0	--
4115	Spring	9/13/94	P	.1	7	647	14.0	3.8
4120	Seep	9/13/94	D	0	--	--	--	--
4125	Stream	9/13/94	D	0	--	--	--	--
4400	Stream	9/12/94	P	.04	7.7	776	18.5	--
4405	Stream	9/12/94	P	.01	7.9	467	21.0	--
4410	Stream	9/12/94	E	.01	7.9	793	18.0	--
4415	Seep	9/12/94	L	0	--	--	--	--
4420	Spring	9/12/94	E	.01	7.5	802	17.0	3.4
4425	Seep	9/12/94	D	0	--	--	--	--
4430	Stream	9/12/94	P	.01	7.9	369	19.5	--
4435	Stream	9/12/94	L	0	4.8	454	19.0	--
4440	Stream	9/13/94	E	.01	8	576	15.5	--
4445	Seep	9/13/94	D	0	--	--	--	--
4450	Stream	9/13/94	D	0	--	--	--	--
4455	Stream	9/13/94	E	.01	7.7	725	17.0	--
4472	Seep	9/13/94	D	0	--	--	--	--
4473	Spring	9/13/94	L	0	7.2	94	18.5	--
4475	Stream	9/12/94	P	.02	7.7	326	19.5	--
4480	Stream	9/13/94	P	.01	7.6	194	17.0	--
4485	Stream	9/13/94	E	.01	7.7	193	17.0	--
4490	Stream	9/13/94	L	0	7	395	16.0	--
4495	Seep	9/13/94	D	0	--	--	--	--
4500	Stream	9/13/94	L	0	7.4	90	17.0	--
4505	Seep	9/13/94	D	0	--	--	--	--
4510	Seep	9/13/94	L	0	6.4	142	18.5	--
4515	Spring	9/13/94	L	0	6.8	90	17.0	8.6
4520	Stream	9/12/94	D	0	--	--	--	--
4525	Stream	9/12/94	D	0	--	--	--	--
4530	Stream	9/12/94	P	.08	8	837	18.0	--
4535	Stream	9/13/94	D	0	--	--	--	--
4540	Stream	9/13/94	D	0	--	--	--	--
4545	Stream	9/13/94	D	0	--	--	--	--
4580	Stream	9/13/94	D	0	--	--	--	--
4585	Stream	9/14/94	D	0	--	--	--	--
4590	Stream	9/13/94	D	0	--	--	--	--
4595	Stream	9/13/94	D	0	--	--	--	--
4600	Stream	9/13/94	D	0	--	--	--	--
4605	Seep	9/13/94	D	0	--	--	--	--
4610	Stream	9/13/94	D	0	--	--	--	--

**Table 5.** Discharge and water-quality data for the low base flow seepage investigation at Bear Creek Valley, Oak Ridge, Tennessee, September 9 through September 29, 1994—Continued

Site number	Type of site	Date sampled (month/day/year)	Method	Flow (ft <sup>3</sup> /s)	pH	Specific conductance (μS/cm)	Temperature (°C)	Dis-solved oxygen (mg/L)
4615	Seep	9/13/94	D	0	--	--	--	--
4620	Spring	9/13/94	D	0	--	--	--	--
4630	Stream	9/12/94	P	.07	7.9	879	16.5	--
5005	Stream	9/12/94	P	.2	8.2	597	18.5	--
5010	Stream	9/14/94	D	0	--	--	--	--
5015	Stream	9/13/94	D	0	--	--	--	--
5020	Stream	9/13/94	D	0	--	--	--	--
5025	Seep	9/13/94	D	0	--	--	--	--
5030	Stream	9/12/94	P	.26	8.2	602	18.5	--
5035	Stream	9/13/94	D	0	--	--	--	--
5040	Seep	9/13/94	D	0	--	--	--	--
5045	Stream	9/13/94	D	0	--	--	--	--
5050	Stream	9/14/94	D	0	--	--	--	--
5055	Stream	9/13/94	D	0	--	--	--	--
5060	Seep	9/13/94	D	0	--	--	--	--
5065	Seep	9/13/94	D	0	--	--	--	--
5070	Seep	9/13/94	D	0	--	--	--	--
5075	Stream	9/13/94	D	0	--	--	--	--
5080	Seep	9/13/94	D	0	--	--	--	--
5085	Seep	9/13/94	D	0	--	--	--	--
5090	Stream	9/13/94	D	0	--	--	--	--
5095	Stream	9/13/94	D	0	--	--	--	--
5100	Seep	9/13/94	D	0	--	--	--	--
5105	Stream	9/12/94	P	.22	8.1	613	17.0	--
6005	Stream	9/14/94	F	.03	7.8	258	17.5	--
6007	Stream	9/14/94	D	0	--	--	--	--
6010	Stream	9/13/94	E	.01	8	232	18.5	--
6015	Seep	9/13/94	D	0	--	--	--	--
6020	Seep	9/13/94	D	0	--	--	--	--
6025	Stream	9/13/94	E	0.01	7.2	132	17.5	--
6030	Stream	9/13/94	E	.01	7.4	119	17.0	--
6033	Seep	9/13/94	D	0	--	--	--	--
6035	Stream	9/13/94	E	.01	7.8	101	17.5	--
6045	Seep	9/13/94	E	.01	7.3	83	16.0	9
6050	Stream	9/13/94	D	0	--	--	--	--
6055	Seep	9/13/94	D	0	--	--	--	--
6060	Stream	9/13/94	P	.2	8	591	16.5	--
6065	Stream	9/13/94	P	.19	--	--	--	--
6070	Stream	9/13/94	D	0	--	--	--	--
6075	Stream	9/13/94	D	0	--	--	--	--
6085	Seep	9/13/94	D	0	--	--	--	--
6090	Stream	9/13/94	D	0	--	--	--	--
6095	Seep	9/13/94	D	0	--	--	--	--
6100	Stream	9/13/94	L	0	7.9	299	18.5	--
6105	Seep	9/13/94	D	0	--	--	--	--
6110	Seep	9/13/94	D	0	--	--	--	--
6115	Stream	9/13/94	E	.01	7.5	90	19.0	--
6120	Spring	9/13/94	L	0	7	131	17.5	9.1
7005	Stream	9/13/94	P	.21	8.2	613	15.5	--
7010	Stream	9/13/94	D	0	--	--	--	--



**Table 5.** Discharge and water-quality data for the low base flow seepage investigation at Bear Creek Valley, Oak Ridge, Tennessee, September 9 through September 29, 1994—Continued

Site number	Type of site	Date sampled (month/day/year)	Method	Flow (ft <sup>3</sup> /s)	pH	Specific conductance (μS/cm)	Temperature (°C)	Dissolved oxygen (mg/L)
7015	Stream	9/13/94	E	.01	7.8	238	17.0	--
7020	Spring	9/13/94	E	.01	6.8	272	16.5	6.1
7025	Stream	9/13/94	E	.01	7.6	212	17.5	--
7030	Stream	9/13/94	E	.01	7.6	206	17.0	--
7035	Stream	9/13/94	D	0	--	--	--	--
7040	Wetland	9/13/94	D	0	--	--	--	--
7045	Stream	9/13/94	D	0	--	--	--	--
7050	Seep	9/13/94	D	0	--	--	--	--
7055	Stream	9/13/94	D	0	--	--	--	--
7060	Stream	9/12/94	P	.27	8.2	593	19.5	--
8005	Stream	9/13/94	P	.02	8.1	238	16.0	8
8010	Seep	9/13/94	D	0	--	--	--	--
8015	Seep	9/13/94	D	0	--	--	--	--
8020	Stream	9/13/94	P	.05	8.3	187	15.5	8.5
8025	Stream	9/13/94	D	0	--	--	--	--
8030	Stream	9/13/94	D	0	--	--	--	--
8035	Stream	9/13/94	D	0	--	--	--	--
8040	Seep	9/13/94	D	0	--	--	--	--
8045	Seep	9/13/94	D	0	--	--	--	--
8050	Seep	9/13/94	D	0	--	--	--	--
8055	Stream	9/13/94	F	.01	8.3	184	16.0	8.7
8060	Seep	9/13/94	D	0	--	--	--	--
8062	Stream	9/13/94	F	.01	8.1	227	16.5	7.5
8063	Seep	9/13/94	D	0	--	--	--	--
8065	Stream	9/13/94	D	0	--	--	--	--
8070	Stream	9/13/94	D	0	--	--	--	--
8075	Seep	9/13/94	D	0	--	--	--	--
8080	Stream	9/13/94	D	0	--	--	--	--
8085	Seep	9/13/94	D	0	--	--	--	--
8090	Stream	9/13/94	F	0	7.1	74	17.0	3.9
8092	Seep	9/13/94	D	0	--	--	--	--
8095	Stream	9/13/94	D	0	--	--	--	--
8100	Seep	9/13/94	D	0	--	--	--	--
8103	Stream	9/13/94	L	0	6.2	47	17.5	4.4
8105	Stream	9/13/94	D	0	--	--	--	--
8110	Seep	9/13/94	D	0	--	--	--	--
8115	Stream	9/13/94	D	0	--	--	--	--
8120	Seep	9/13/94	L	0	6.1	36	18.5	--
8125	Stream	9/13/94	L	0	6.2	48	17.0	7.8
8130	Seep	9/13/94	D	0	--	--	--	--
8135	Stream	9/13/94	D	0	--	--	--	--
8140	Seep	9/13/94	D	0	--	--	--	--
8145	Seep	9/13/94	D	0	--	--	--	--
8150	Seep	9/13/94	D	0	--	--	--	--
8200	Seep	9/13/94	D	0	--	--	--	--
8205	Seep	9/13/94	D	0	--	--	--	--
8210	Stream	9/13/94	D	0	--	--	--	--
8220	Seep	9/13/94	D	0	--	--	--	--
8225	Seep	9/13/94	D	0	--	--	--	--
9005	Stream	9/13/94	P	.24	8	539	18.5	--

**Table 5.** Discharge and water-quality data for the low base flow seepage investigation at Bear Creek Valley, Oak Ridge, Tennessee, September 9 through September 29, 1994—Continued

Site number	Type of site	Date sampled (month/day/year)	Method	Flow (ft <sup>3</sup> /s)	pH	Specific conductance (μS/cm)	Temperature (°C)	Dis-solved oxygen (mg/L)
9010	Stream	9/13/94	P	.05	8.2	282	18.5	--
9015	Stream	9/13/94	L	0	7.9	259	19.0	--
9020	Stream	9/13/94	D	0	--	--	--	--
9025	Seep	9/13/94	D	0	--	--	--	--
9030	Stream	9/13/94	D	0	--	--	--	--
9035	Seep	9/13/94	D	0	--	--	--	--
9040	Stream	9/13/94	L	0	7.9	251	19.0	--
9045	Seep	9/13/94	D	0	--	--	--	--
9050	Stream	9/13/94	L	0	7.8	188	18.5	--
9055	Stream	9/14/94	D	0	--	--	--	--
9060	Seep	9/14/94	D	0	--	--	--	--
9065	Stream	9/14/94	L	0	7.8	234	17.5	--
9068	Seep	9/14/94	D	0	--	--	--	--
9070	Seep	9/14/94	D	0	--	--	--	--
9075	Stream	9/14/94	D	0	--	--	--	--
9080	Stream	9/14/94	D	0	--	--	--	--
9085	Seep	9/14/94	D	0	--	--	--	--
9090	Stream	9/13/94	P	.23	8	545	16.5	--
9092	Stream	9/14/94	E	.01	7.6	401	13.5	--
9093	Spring	9/14/94	D	0	--	--	--	--
9095	Stream	9/13/94	P	.21	7.8	577	16.5	--
10005	Stream	9/13/94	P	.09	8	275	18.0	--
10070	Stream	9/13/94	D	0	--	--	--	--
10080	Stream	9/13/94	D	0	--	--	--	--
10090	Stream	9/13/94	D	0	--	--	--	--
10095	Seep	9/13/94	D	0	--	--	--	--
10100	Seep	9/13/94	D	0	--	--	--	--
11005	Stream	9/14/94	D	0	--	--	--	--
11010	Stream	9/14/94	D	0	--	--	--	--
11015	Seep	9/14/94	D	0	--	--	--	--
11020	Stream	9/14/94	P	.01	7.3	246	16.5	--
11025	Stream	9/14/94	D	0	--	--	--	--
11030	Stream	9/14/94	D	0	--	--	--	--
11035	Seep	9/14/94	L	0	6	39	17.0	5.6
11040	Stream	9/14/94	D	0	--	--	--	--
11045	Spring	9/14/94	D	0	--	--	--	--
11050	Stream	9/14/94	D	0	--	--	--	--
11055	Stream	9/13/94	P	.2	8.2	463	18.5	--
11060	Stream	9/13/94	P	.32	8.1	463	18.5	--
11065	Stream	9/14/94	D	0	--	--	--	--
11070	Stream	9/14/94	L	0	7.2	271	17.5	3.6
11075	Seep	9/14/94	D	0	--	--	--	--
11080	Stream	9/14/94	L	0	7.4	243	19.5	--
11085	Spring	9/14/94	D	0	--	--	--	--
11090	Stream	9/14/94	L	0	7.4	332	19.0	--
11095	Spring	9/14/94	L	0	7.2	208	18.5	5.6
11099	Spring	9/14/94	L	0	7.3	371	15.0	8.3
11100	Stream	9/13/94	P	.26	7.8	467	19.5	--
11105	Stream	9/13/94	P	.34	7.8	472	19.0	--
12010	Stream	9/14/94	P	.1	7.8	289	14.5	--

**Table 5.** Discharge and water-quality data for the low base flow seepage investigation at Bear Creek Valley, Oak Ridge, Tennessee, September 9 through September 29, 1994—Continued

Site number	Type of site	Date sampled (month/day/year)	Method	Flow (ft <sup>3</sup> /s)	pH	Specific conductance (μS/cm)	Temperature (°C)	Dis-solved oxygen (mg/L)
12015	Seep	9/14/94	D	0	--	--	--	--
12020	Seep	9/14/94	L	0	7.5	386	17.5	--
12025	Spring	9/14/94	E	.1	7.4	290	14.0	7.8
12040	Stream	9/14/94	D	0	--	--	--	--
12045	Stream	9/14/94	D	0	--	--	--	--
12050	Seep	9/14/94	D	0	--	--	--	--
13005	Stream	9/14/94	P	.6	8.1	395	19.0	--
13007	Stream	9/15/94	D	0	--	--	--	--
13008	Seep	9/15/94	D	0	--	--	--	--
13010	Seep	9/15/94	D	0	--	--	--	--
13015	Seep	9/15/94	D	0	--	--	--	--
13020	Spring	9/15/94	D	0	--	--	--	--
13025	Stream	9/14/94	P	.42	7.9	404	16.5	--
13030	Stream	9/15/94	D	0	--	--	--	--
13035	Seep	9/15/94	D	0	--	--	--	--
13040	Seep	9/15/94	D	0	--	--	--	--
13060	Stream	9/15/94	D	0	--	--	--	--
13070	Stream	9/15/94	D	0	--	--	--	--
13075	Stream	9/15/94	D	0	--	--	--	--
13080	Seep	9/15/94	D	0	--	--	--	--
13085	Stream	9/15/94	D	0	--	--	--	--
13086	Seep	9/15/94	D	0	--	--	--	--
13087	Stream	9/15/94	D	0	--	--	--	--
13088	Stream	9/15/94	D	0	--	--	--	--
13089	Seep	9/15/94	D	0	--	--	--	--
13090	Stream	9/15/94	D	0	--	--	--	--
13095	Seep	9/15/94	D	0	--	--	--	--
13140	Stream	9/15/94	D	0	--	--	--	--
13150	Seep	9/15/94	D	0	--	--	--	--
13155	Stream	9/15/94	L	0	7.4	63	18.0	--
13160	Stream	9/15/94	D	0	--	--	--	--
13165	Seep	9/15/94	D	0	--	--	--	--
13170	Stream	9/15/94	L	0	7.5	70	19.5	--
13175	Spring	9/15/94	L	0	7.6	90	17.5	7.5
13180	Stream	9/15/94	D	0	--	--	--	--
13200	Spring	9/15/94	L	0	7.1	86	20.0	7.8
13205	Stream	9/14/94	D	0	--	--	--	--
13210	Stream	9/14/94	D	0	--	--	--	--
13215	Seep	9/14/94	D	0	--	--	--	--
13220	Seep	9/14/94	D	0	--	--	--	--
13225	Stream	9/14/94	D	0	--	--	--	--
13230	Stream	9/14/94	L	0	7.2	135	20.5	--
13235	Spring	9/14/94	L	0	6.9	123	15.0	7.6
13240	Seep	9/14/94	D	0	--	--	--	--
13245	Stream	9/14/94	D	0	--	--	--	--
13250	Seep	9/14/94	D	0	--	--	--	--
13255	Stream	9/14/94	D	0	--	--	--	--
13260	Stream	9/14/94	D	0	--	--	--	--
13265	Seep	9/14/94	D	0	--	--	--	--
13270	Stream	9/14/94	D	0	--	--	--	--

**Table 5.** Discharge and water-quality data for the low base flow seepage investigation at Bear Creek Valley, Oak Ridge, Tennessee, September 9 through September 29, 1994—Continued

Site number	Type of site	Date sampled (month/day/year)	Method	Flow (ft <sup>3</sup> /s)	pH	Specific conductance (μS/cm)	Temperature (°C)	Dis-solved oxygen (mg/L)
13275	Seep	9/14/94	D	0	--	--	--	--
13900	Stream	9/14/94	P	.76	7.8	403	16.0	--
14005	Stream	9/14/94	P	.6	7.8	404	17.0	--
14010	Stream	9/14/94	P	.59	7.6	405	17.0	--
14015	Stream	9/15/94	D	0	--	--	--	--
14025	Seep	9/15/94	D	0	--	--	--	--
14035	Stream	9/15/94	D	0	--	--	--	--
14038	Stream	9/15/94	D	0	--	--	--	--
14040	Stream	9/15/94	D	0	--	--	--	--
14045	Stream	9/15/94	D	0	--	--	--	--
14050	Stream	9/15/94	D	0	--	--	--	--
14060	Seep	9/15/94	D	0	--	--	--	--
14065	Wetland	9/15/94	D	0	--	--	--	--
14070	Stream	9/15/94	D	0	--	--	--	--
14075	Stream	9/15/94	F	.01	8	275	22.0	--
14080	Stream	9/15/94	D	0	--	--	--	--
14085	Stream	9/15/94	D	0	--	--	--	--
14090	Seep	9/15/94	D	0	--	--	--	--
14095	Stream	9/15/94	D	0	--	--	--	--
14097	Stream	9/15/94	D	0	--	--	--	--
14100	Seep	9/15/94	D	0	--	--	--	--
14105	Stream	9/13/94	P	.42	7.6	385	15.5	--
14110	Spring	9/15/94	P	--	7.4	313	14.5	--
14115	Spring	9/14/94	F	.26	7.3	412	14.0	6.3
14120	Seep	9/14/94	D	0	--	--	--	--
14125	Stream	9/14/94	P	0.1	7.7	453	16.5	--
14130	Seep	9/14/94	D	0	--	--	--	--
14133	Stream	9/14/94	P	.09	8.1	469	20.0	--
14135	Stream	9/14/94	P	.08	8.1	475	20.5	--
14190	Seep	9/15/94	D	0	--	--	--	--
14195	Seep	9/15/94	D	0	--	--	--	--
14200	Seep	9/15/94	D	0	--	--	--	--
15005	Stream	9/14/94	D	0	--	--	--	--
15010	Stream	9/14/94	E	.01	7.9	270	17.0	--
15015	Stream	9/14/94	L	0	7.3	242	17.5	--
15020	Seep	--	--	--	--	--	--	--
15025	Seep	9/14/94	D	0	--	--	--	--
15030	Seep	9/14/94	D	0	--	--	--	--
15035	Stream	9/14/94	L	0	7.3	280	20.5	--
15040	Stream	9/14/94	E	.01	7.4	287	14.5	--
15045	Stream	9/14/94	D	0	--	--	--	--
15055	Stream	9/14/94	E	.01	7.5	284	16.5	--
15056	Stream	9/14/94	L	0	7.5	252	17.5	--
15065	Seep	9/14/94	L	0	6.7	116	18.0	--
15070	Seep	9/14/94	D	0	--	--	--	--
15075	Seep	9/14/94	D	0	--	--	--	--
15080	Seep	9/14/94	D	0	--	--	--	--
15081	Seep	9/14/94	D	0	--	--	--	--
15085	Seep	9/14/94	D	0	--	--	--	--
16005	Seep	9/15/94	D	0	--	--	--	--

**Table 5.** Discharge and water-quality data for the low base flow seepage investigation at Bear Creek Valley, Oak Ridge, Tennessee, September 9 through September 29, 1994—Continued

Site number	Type of site	Date sampled (month/day/year)	Method	Flow (ft <sup>3</sup> /s)	pH	Specific conductance (μS/cm)	Temperature (°C)	Dissolved oxygen (mg/L)
16010	Stream	9/15/94	E	.01	8	316	18.5	--
16015	Seep	9/15/94	D	0	--	--	--	--
16020	Seep	9/15/94	D	0	--	--	--	--
16025	Stream	9/15/94	L	0	7.7	198	19.0	--
16030	Seep	9/15/94	D	0	--	--	--	--
16035	Stream	9/15/94	D	0	--	--	--	--
16040	Seep	9/15/94	D	0	--	--	--	--
16045	Stream	9/15/94	D	0	--	--	--	--
16050	Stream	9/15/94	D	0	--	--	--	--
16055	Spring	9/15/94	L	0	7.7	91	20.0	1
16060	Seep	9/15/94	D	0	--	--	--	--
16065	Stream	9/15/94	L	0	7	120	20.5	--
16067	Seep	9/15/94	D	0	--	--	--	--
16070	Seep	9/15/94	D	0	--	--	--	--
16075	Stream	9/15/94	D	0	--	--	--	--
16080	Seep	9/15/94	D	0	--	--	--	--
16085	Stream	9/15/94	D	0	--	--	--	--
16090	Stream	9/15/94	D	0	--	--	--	--
16095	Seep	9/15/94	D	0	--	--	--	--
16100	Seep	9/15/94	D	0	--	--	--	--
16105	Stream	9/15/94	L	0	7.2	115	17.5	--
16110	Seep	9/15/94	D	0	--	--	--	--
17005	Stream	9/15/94	D	0	--	--	--	--
17010	Stream	9/15/94	D	0	--	--	--	--
17015	Stream	9/15/94	D	0	--	--	--	--
17020	Stream	9/15/94	D	0	--	--	--	--
17030	Stream	9/15/94	D	0	--	--	--	--
17035	Seep	9/15/94	D	0	--	--	--	--
17040	Stream	9/15/94	D	0	--	--	--	--
17045	Seep	9/15/94	D	0	--	--	--	--
17050	Stream	9/15/94	D	0	--	--	--	--
17055	Seep	9/15/94	D	0	--	--	--	--
17065	Seep	9/16/94	D	0	--	--	--	--
17070	Seep	9/16/94	D	0	--	--	--	--
17075	Stream	9/16/94	D	0	--	--	--	--
17082	Seep	9/16/94	D	0	--	--	--	--
17083	Seep	9/16/94	D	0	--	--	--	--
17085	Stream	9/16/94	D	0	--	--	--	--
17090	Seep	9/16/94	D	0	--	--	--	--
17095	Stream	9/16/94	D	0	--	--	--	--
17100	Seep	9/16/94	D	0	--	--	--	--
17105	Stream	9/16/94	L	0	7.5	115	19.5	--
17110	Stream	9/16/94	L	0	7	262	19.0	--
17115	Seep	9/16/94	D	0	--	--	--	--
17120	Seep	9/16/94	D	0	--	--	--	--
17125	Stream	9/16/94	E	.01	7.7	92	19.5	--
17130	Seep	9/16/94	E	.01	7.3	111	18.5	8.5
17135	Seep	9/16/94	D	0	--	--	--	--
18005	Stream	9/14/94	D	0	--	--	--	--
18010	Seep	9/14/94	D	0	--	--	--	--

**Table 5.** Discharge and water-quality data for the low base flow seepage investigation at Bear Creek Valley, Oak Ridge, Tennessee, September 9 through September 29, 1994—Continued

Site number	Type of site	Date sampled (month/day/year)	Method	Flow (ft <sup>3</sup> /s)	pH	Specific conductance (μS/cm)	Temperature (°C)	Dissolved oxygen (mg/L)
18015	Seep	9/14/94	D	0	--	--	--	--
18020	Stream	9/14/94	L	0	7.4	260	15.0	--
18025	Seep	9/15/94	D	0	--	--	--	--
18060	Stream	9/14/94	E	.02	8.1	271	16.5	--
18065	Seep	9/14/94	D	0	--	--	--	--
18070	Seep	9/14/94	D	0	--	--	--	--
18075	Seep	9/14/94	D	0	--	--	--	--
18080	Seep	9/14/94	D	0	--	--	--	--
18085	Spring	9/14/94	E	.02	7.7	271	14.5	8.6
18090	Seep	9/14/94	D	0	--	--	--	--
18095	Seep	9/14/94	D	0	--	--	--	--
18100	Stream	9/14/94	D	0	--	--	--	--
18105	Stream	9/14/94	D	0	--	--	--	--
18110	Stream	9/14/94	L	0	7.2	313	19.0	--
18115	Seep	9/14/94	D	0	--	--	--	--
18120	Seep	9/14/94	D	0	--	--	--	--
18125	Seep	9/14/94	D	0	--	--	--	--
18130	Stream	9/14/94	L	0	7	190	18.5	--
18140	Seep	9/14/94	D	0	--	--	--	--
18145	Seep	9/14/94	L	0	7	512	19.0	2.8
18150	Stream	9/14/94	E	.01	7.6	168	19.5	--
18155	Seep	9/15/94	D	0	--	--	--	--
18160	Stream	9/15/94	E	.01	7.8	142	18.5	--
18165	Stream	9/15/94	D	0	--	--	--	--
18170	Stream	9/15/94	D	0	--	--	--	--
18175	Seep	9/15/94	D	0	--	--	--	--
18180	Seep	9/15/94	D	0	--	--	--	--
18185	Stream	9/15/94	E	.01	7.7	153	18.5	--
18190	Seep	9/15/94	D	0	--	--	--	--
18195	Stream	9/15/94	E	.01	7.7	155	18.5	--
18215	Seep	9/15/94	E	.01	7.5	158	17.5	--
18220	Seep	9/15/94	L	0	7.6	142	18.5	--
18225	Seep	9/15/94	D	0	--	--	--	--
18230	Seep	9/15/94	D	0	--	--	--	--
18250	Stream	9/15/94	D	0	--	--	--	--
18255	Seep	9/15/94	D	0	--	--	--	--
18260	Stream	9/15/94	D	0	--	--	--	--
19003	Spring	9/16/94	D	0	--	--	--	--
19004	Stream	9/16/94	D	0	--	--	--	--
19005	Seep	9/16/94	D	0	--	--	--	--
19007	Spring	9/16/94	D	0	--	--	--	--
19008	Stream	9/16/94	E	.02	8.2	250	--	--
19010	Seep	9/16/94	D	0	--	--	--	--
19015	Stream	9/16/94	E	.01	7.9	262	19.5	--
19045	Stream	9/16/94	D	0	--	--	--	--
19050	Stream	9/16/94	L	0	7.7	270	19.5	--
19055	Seep	9/16/94	D	0	--	--	--	--
19090	Seep	9/16/94	D	0	--	--	--	--
19095	Stream	9/16/94	P	.02	7.9	235	21	--
19100	Stream	9/16/94	D	0	--	--	--	--

**Table 5.** Discharge and water-quality data for the low base flow seepage investigation at Bear Creek Valley, Oak Ridge, Tennessee, September 9 through September 29, 1994—Continued

Site number	Type of site	Date sampled (month/day/year)	Method	Flow (ft <sup>3</sup> /s)	pH	Specific conductance (μS/cm)	Temperature (°C)	Dis-solved oxygen (mg/L)
19105	Stream	9/16/94	D	0	--	--	--	--
19110	Seep	9/16/94	D	0	--	--	--	--
19115	Stream	9/16/94	L	0	7.7	192	18.0	--
19120	Seep	9/16/94	D	0	--	--	--	--
19125	Wetland	9/16/94	D	0	--	--	--	--
19130	Seep	9/15/94	D	0	--	--	--	--
19135	Stream	9/16/94	E	.01	7.6	216	18.5	--
19140	Stream	9/16/94	D	0	--	--	--	--
19145	Stream	9/16/94	D	0	--	--	--	--
19146	Stream	9/16/94	D	0	--	--	--	--
19148	Seep	9/16/94	D	0	--	--	--	--
19150	Seep	9/16/94	D	0	--	--	--	--
19155	Stream	9/16/94	D	0	--	--	--	--
19156	Stream	9/16/94	D	0	--	--	--	--
19158	Seep	9/16/94	D	0	--	--	--	--
19160	Stream	9/16/94	D	0	--	--	--	--
19165	Seep	9/16/94	D	0	--	--	--	--
19170	Seep	9/16/94	D	0	--	--	--	--
19175	Seep	9/16/94	D	0	--	--	--	--
19180	Stream	9/16/94	L	0	8	218	17.5	--
19285	Stream	9/16/94	D	0	--	--	--	--
19290	Stream	9/16/94	D	0	--	--	--	--
19295	Seep	9/16/94	D	0	--	--	--	--
19300	Stream	9/16/94	E	.01	--	--	--	--
20005	Stream	9/16/94	P	.17	8.1	329	18.5	--
20010	Stream	9/16/94	P	--	7.6	385	19.5	--
20015	Stream	9/15/94	L	0	7.3	301	19.0	--
20020	Seep	9/15/94	D	0	--	--	--	--
20250	Stream	9/16/94	P	.05	8	322	18.5	--
20255	Stream	9/16/94	P	.12	8	325	17.5	--
20258	Seep	9/16/94	D	0	--	--	--	--
20260	Stream	9/16/94	P	.13	8.1	326	17.0	--
20265	Stream	9/15/94	P	--	6.5	180	19.5	--
20280	Stream	9/15/94	L	0	7	424	18.0	--
20285	Seep	9/15/94	D	0	--	--	--	--
20290	Stream	9/15/94	D	0	--	--	--	--
20295	Seep	9/15/94	D	0	--	--	--	--
20300	Seep	9/15/94	D	0	--	--	--	--
20305	Stream	9/15/94	D	0	--	--	--	--
20310	Seep	9/15/94	D	0	--	--	--	--
20315	Seep	9/15/94	L	0	7.5	132	19.5	7.7
20320	Seep	9/15/94	D	0	--	--	--	--
20325	Stream	9/15/94	L	0	7.7	121	19.0	--
20335	Seep	9/15/94	L	0	7.3	125	17.5	7.5
20340	Stream	--	--	--	--	--	--	--
20342	Stream	9/15/94	D	0	--	--	--	--
20343	Stream	9/15/94	D	0	--	--	--	--
20350	Stream	9/15/94	E	.01	7.5	344	18.5	--
20355	Seep	9/15/94	L	0	7	238	21.0	--
20360	Stream	9/15/94	L	0	7.1	134	18.0	--

**Table 5.** Discharge and water-quality data for the low base flow seepage investigation at Bear Creek Valley, Oak Ridge, Tennessee, September 9 through September 29, 1994—Continued

Site number	Type of site	Date sampled (month/day/year)	Method	Flow (ft <sup>3</sup> /s)	pH	Specific conductance (μS/cm)	Temperature (°C)	Dis-solved oxygen (mg/L)
20365	Stream	9/15/94	L	0	6.1	226	18.5	--
20370	Stream	9/15/94	D	0	--	--	--	--
20375	Seep	9/15/94	D	0	--	--	--	--
20380	Seep	9/15/94	D	0	--	--	--	--
20385	Seep	9/15/94	D	0	--	--	--	--
20390	Stream	9/15/94	D	0	--	--	--	--
20395	Seep	9/15/94	D	0	--	--	--	--
20400	Seep	9/15/94	L	0	6.7	227	18.5	4.2
20405	Seep	9/15/94	D	0	--	--	--	--
20410	Stream	9/15/94	L	0	7.5	73	18.5	--
20415	Seep	9/15/94	L	0	7.2	78	17.0	8.7
20420	Stream	9/15/94	D	0	--	--	--	--
20425	Stream	9/15/94	D	0	--	--	--	--
20430	Stream	9/15/94	P	.15	7.9	330	16.0	--
21005	Stream	9/15/94	L	0	6.4	177	21.5	--
21010	Seep	9/15/94	D	0	--	--	--	--
21015	Stream	9/15/94	P	.03	7	302	19.5	--
21020	Spring	9/15/94	L	0	6.9	291	19.5	7.6
21025	Stream	9/15/94	D	0	--	--	--	--
21030	Spring	9/15/94	D	0	--	--	--	--
21035	Stream	9/15/94	L	0	7.2	127	18.5	--
21040	Seep	9/15/94	D	0	--	--	--	--
21045	Stream	9/15/94	D	0	--	--	--	--
21050	Seep	9/15/94	L	0	7.2	55	18.5	8.1
21055	Stream	9/15/94	V	.04	7.2	65	19.0	--
21057	Stream	9/15/94	L	0	6.2	87	18.5	--
21058	Seep	9/15/94	D	0	--	--	--	--
21060	Spring	9/15/94	L	0	6.5	26	17.5	7.8
21065	Stream	9/15/94	D	0	--	--	--	--
21100	Stream	9/15/94	P	.02	7.3	155	22.0	--
21102	Stream	9/15/94	D	0	--	--	--	--
21103	Seep	9/15/94	D	0	--	--	--	--
21105	Stream	9/15/94	P	.02	7.3	152	20.0	--
21110	Seep	9/15/94	D	0	--	--	--	--
21115	Seep	9/15/94	V	.01	7.5	147	20.0	8.4
21119	Seep	9/15/94	D	0	--	--	--	--
21120	Stream	9/15/94	V	.01	7.3	184	19.5	--
21125	Stream	9/15/94	D	0	--	--	--	--
21130	Seep	9/15/94	D	0	--	--	--	--
22005	Stream	9/16/94	P	.71	7.7	239	19.5	--
22006	Seep	9/16/94	D	0	--	--	--	--
22010	Stream	9/16/94	D	0	--	--	--	--
22034	Seep	9/16/94	D	0	--	--	--	--
22040	Stream	9/16/94	P	0	7.8	356	19.5	--
22041	Seep	9/16/94	D	0	--	--	--	--
22042	Stream	9/16/94	D	0	--	--	--	--
22044	Stream	9/16/94	D	0	--	--	--	--
22045	Stream	9/16/94	D	0	--	--	--	--
22050	Stream	9/16/94	L	0	7.8	394	20.5	--
22055	Stream	9/16/94	L	0	7.5	556	17.0	--
22060	Stream	9/16/94	P	.02	8	286	20.5	--



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