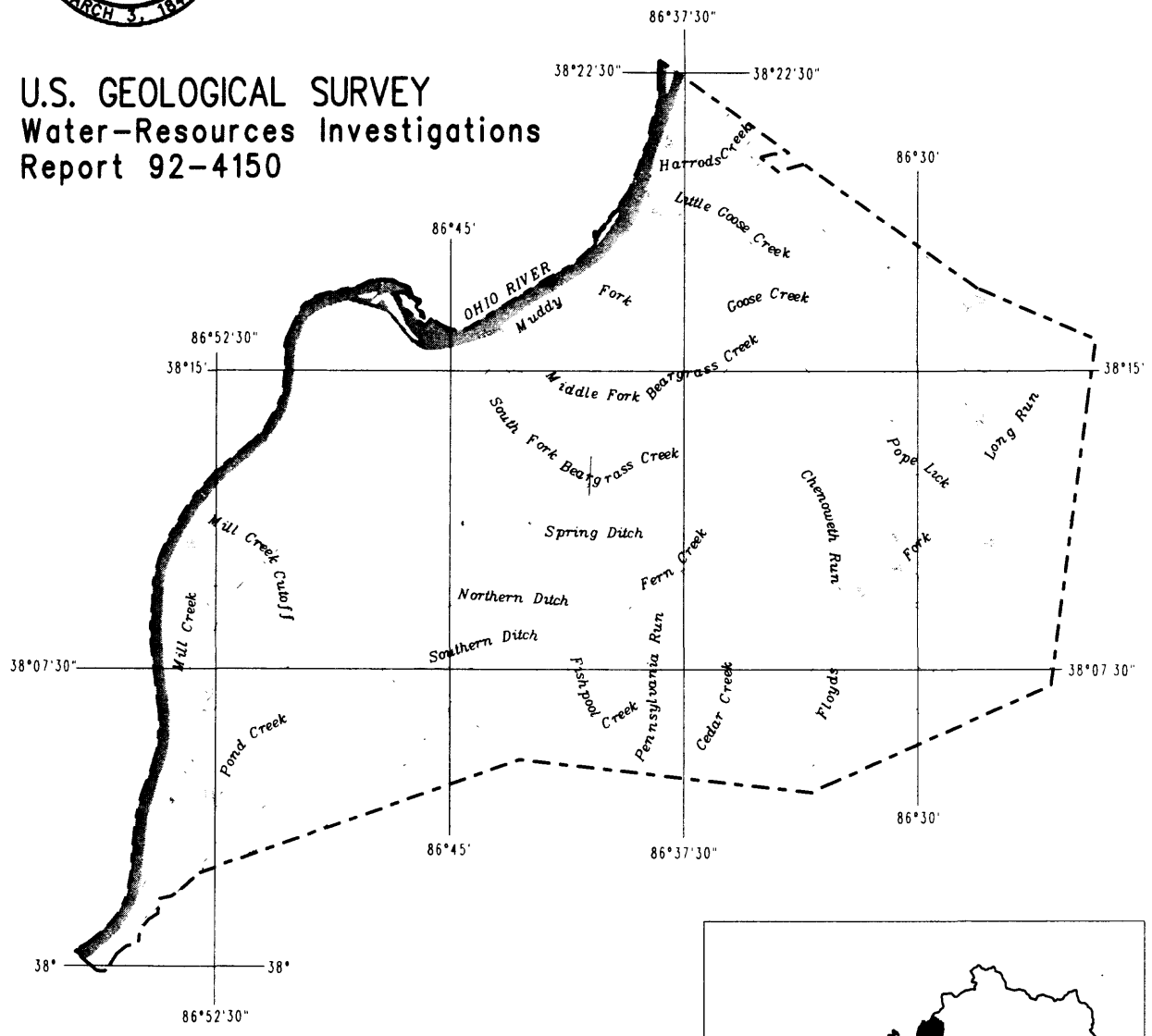
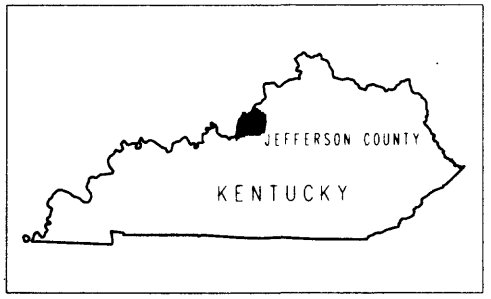
WATER QUALITY OF SELECTED STREAMS IN JEFFERSON COUNTY, KENTUCKY, 1988–91

U.S. GEOLOGICAL SURVEY
Water-Resources Investigations
Report 92-4150





Prepared in cooperation with the
LOUISVILLE AND JEFFERSON COUNTY METROPOLITAN SEWER DISTRICT

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Louisville, Kentucky
1993

U.S. DEPARTMENT OF THE INTERIOR

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CONVERSION FACTORS AND WATER QUALITY ABBREVIATIONS

Multiply	By	To obtain
inch (in.)	25.4	millimeter
foot (ft)	0.3048	meter
mile (mi)	1.609	kilometer
ton (ton)	907.2	kilogram
acre	0.4047	square hectometers
square mile (mi^2)	2.590	square kilometer
foot per mile (ft/mi)	0.1894	meter per kilometer
ton per square mile (ton/mi^2)	350.3	kilogram per square kilometer
mile per hour (mi/hr)	1.609	kilometer per hour
cubic foot per second (ft^3/s)	28.32	cubic decimeter per second
cubic feet per second per square mile [$(ft^3/s)/mi^2$]	10.93	cubic decimeter per second per square kilometer

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

$$°C = (°F - 32)/1.8$$

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

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

Densities of fecal-indicator bacteria are reported in colonies per 100 milliliters of water (col/100mL).

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ABSTRACT

This report presents the results of a study by the U.S. Geological Survey, in cooperation with the Louisville and Jefferson County Metropolitan Sewer District, to describe the water quality of selected streams in Jefferson County, Ky. Water-quality samples were collected at 26 stream sites from February 1988 through March 1991; these samples were supplemented with continuous records of temperature, pH, dissolved oxygen, and specific conductance at four sites. Continuous discharge records were computed for five sites. The stream water-quality data were statistically summarized, constituent loads were estimated, and trend analyses were done by means of the Seasonal Kendall test.

Approximately 20 percent of the fecal-coliform densities in stream samples collected during this study exceeded 1,000 colonies per 100 milliliters of water, and approximately 50 percent exceeded 200 colonies per 100 milliliters. These levels were exceeded occasionally at almost every stream-sampling site. Fecal-coliform densities were greatest in streams draining the most urbanized areas of the county and smallest in streams draining less urbanized areas in the northeastern, eastern, and southern parts of the county.

Dissolved-oxygen concentrations smaller than the Kentucky criterion of 4.0 milligrams per liter were observed occasionally at 14 stream sites. Water in the Mill Creek watershed contained one-half or less dissolved oxygen than in any other watershed. Largest biochemical oxygen demands were measured in the Goose Creek and South Fork Beargrass Creek watersheds. Largest chemical oxygen demands were measured in the Spring Ditch watershed.

Streams in Jefferson County are generally well buffered and slightly alkaline; median pH ranged from 7.5 to 8.0 units. The upper section of the Chenoweth Run watershed and the lower section of the South Fork Beargrass Creek watershed had an average annual yield of dissolved solids in excess of 800 ton/mi^2. The largest concentrations and yields of barium were measured in streams draining surficial rocks of Silurian age. Chromium, copper, and iron concentrations exceeded the Kentucky criteria for protection of warmwater aquatic habitat at almost every stream site. Total-nitrate concentrations exceeded Federal drinking-water standards in greater than 10 percent of the samples from Cedar Creek, Chenoweth Run, Fern Creek, Northern Ditch, Pennsylvania Run, and Pope Lick. The largest average annual yields of total ammonia and total nitrate were estimated from the Fern Creek watershed. The largest concentrations of total 2,4-D were measured in streams that drain predominantly residential and industrial areas.

Predominantly downward trends were indicated in pH, dissolved solids, specific conductance, suspended and volatile solids, ammonia, nitrate,

nitrite, and organic nitrogen. Predominantly upward trends were indicated in water temperature, alkalinity, fecal-coliform bacteria, and fecal-streptococci bacteria.

INTRODUCTION

Jefferson County, Ky. is a rapidly developing urban area. As urbanization progresses, rural land is being replaced by residences, businesses, industrial facilities, shopping centers, and parking lots. Associated with urbanization is a potential for change in the types and quantities of contaminants entering the surface-water resources of the county. A concern exists that the quality of water in many streams and drainage channels in Jefferson County is potentially being degraded by a variety of contaminants from point and nonpoint sources, including effluents from sewage and industrial wastewater-treatment plants, storm-water runoff from a variety of land-use areas, and leachates from septic tanks, impoundments, and landfills. These contaminants are primarily anthropogenic in origin and may include organic debris, sediments, nutrients, petroleum products, and potentially toxic chemicals, such as heavy metals and pesticides.

In 1988, the Louisville and Jefferson County Metropolitan Sewer District (MSD) and the U.S. Geological Survey (USGS) began a cooperative program of water-quality sampling to assess the quality of streams in Jefferson County, Ky. The long-term goals for the sampling program are to (1) provide a consistent description of current water-quality conditions for a large part of the county's surface-water resources; (2) define long-term trends (or lack of trends) in water quality; and (3) identify, describe, and explain, to the extent possible, the major factors that affect observed water-quality conditions and trends. This program is continuing at the present time (1992).

Data for approximately the first 3 years of the cooperative program (February 1988 - March 1991) were evaluated to describe the spatial, temporal and streamflow-related variability of major constituents, nutrients, bacteria, and dissolved-oxygen concentrations in stream waters. These evaluations provided useful information on the quality of surface-water resources in the county, the effects of point and nonpoint sources of contaminants, and identification of problem stream segments. Evaluations were based on statistical summaries of constituent concentrations (boxplots or tabulations), comparisons of constituent concentrations to State and Federal water-quality criteria, load estimates on an annual basis, and trend analyses by means of the Seasonal Kendall test.

The assessment provides the foundation for identification of land areas and stream reaches that have or contribute to significant water-quality problems. Quantification of constituent concentrations in the streams or estimation of constituent transport from the stream basins help describe the effects of urbanization on stream quality. This quantification and estimation may aid in assessment of the effects of future urban expansion on the drainage system.

Purpose and Scope

This report describes water-quality conditions at the 26 stream-sampling sites in Jefferson County from February 1988 through March 1991 and defines water-quality trends during that period. This is the first report on a study to address the long-term goals of the cooperative program to assess the quality of streams in the county. It is not within the scope of this report to provide detailed analyses of the causative factors for the constituent concentrations measured in each selected stream. However, this report provides an overview of stream water-quality in the county which could form the basis for such cause and effect analyses.

Description of study area

Jefferson County covers an area of approximately 400 mi^2 in the north-central part of Kentucky. Within its borders is Louisville, the largest city and the most heavily populated area of the state. Ten stream systems course through the county and drain parts of five surrounding counties, with a combined drainage area of approximately 600 mi^2 (fig. 1). Only streams in the northern and eastern parts of the county originate outside of Jefferson County.

Climate

The climate of Louisville, Kentucky is classified as "moist-continental" by Strahler and Strahler (1979). It is characterized by changeable weather and only short periods of extreme conditions. Weather systems generally track either north from the Gulf of Mexico, bringing warm moist air in the summer, or southeast from Canada, bringing occasional arctic air masses to the area in the winter. As a result, winters are moderately cold (temperatures rarely below 0°F), and summers are warm (temperatures rarely above 100°F). The coldest months are January and February, during which daily minimum temperatures average 25°F; the warmest months are July and August, during which daily maximum temperatures average 87°F (U.S. Department of Agriculture, 1981).

The average annual precipitation at Louisville for 1961-90 is 43.03 in. (U.S. Department of Commerce, 1990). Generally, October is the driest month and March is the wettest. Thunderstorms usually contribute substantially to the rainfall in the spring and summer. Snow usually occurs from November through March, although it can occur as late as April and as early as October. Average annual snowfall is 16.6 in. (5.4 in. in January).

Physiography and Geology

The general geology of Jefferson County consists of limestones, shales, and dolomites of Ordovician, Silurian, and Devonian age overlain by alluvial and lacustrine deposits of Quaternary age (fig. 2). The following discussion

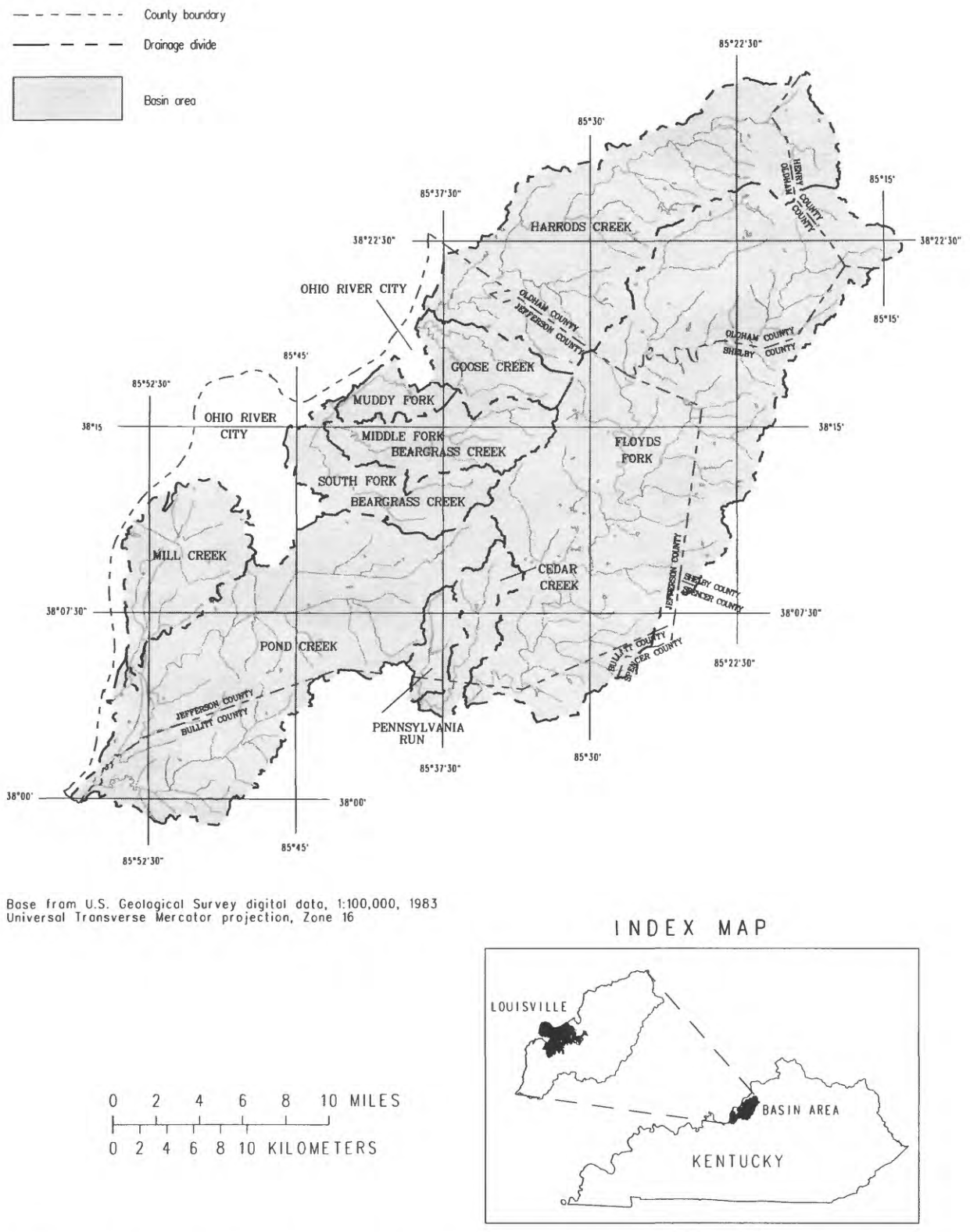

Figure 1.--Major stream basins in Jefferson County, Kentucky.

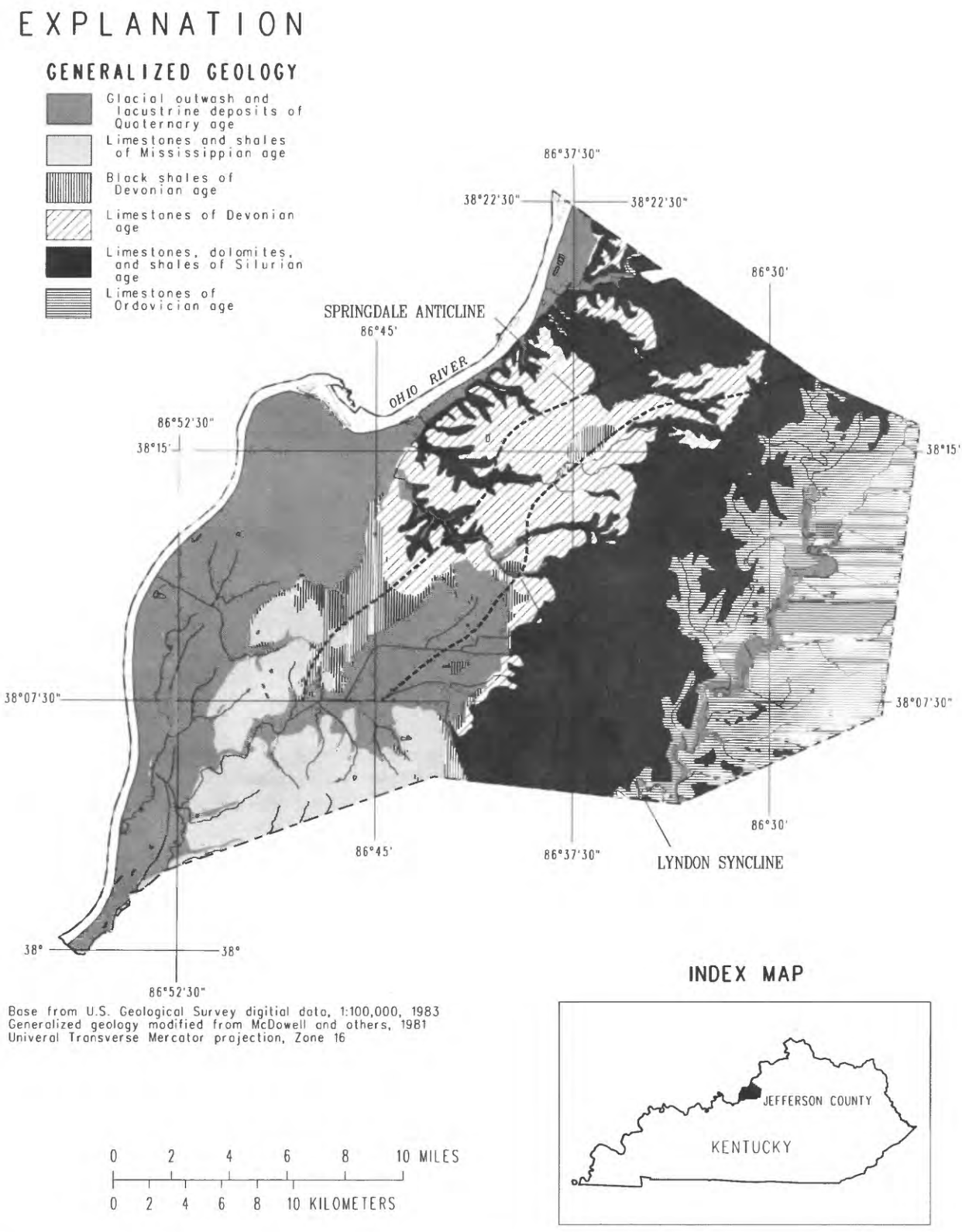

Figure 2.--Generalized geology of Jefferson County, Kentucky.

of the geology of Jefferson County, Ky. is excerpted mainly from the Geologic Map of Kentucky (McDowell and others, 1981) and the accompanying text (McDowell, 1986). Additional information was obtained from MacCary (1956).

Jefferson County lies on the west flank of the Cincinnati Arch. The arch is a regional uplift feature that extends south from Cincinnati, Ohio, through central Kentucky. Rocks on the western flank appear to be flat-lying but dip slightly to the west. This dip creates outcrop bands that trend north-northeast to south-southwest. The age of the rocks decreases east to west; thus, the oldest rocks crop out in the eastern part of the county and the youngest rocks crop out in the western part of the county. The Cincinnati Arch was formed after rocks of Ordovician age were deposited.

There are two minor geologic structures in Jefferson County: the Springdale Anticline and the Lyndon Syncline (fig. 2). The Lyndon Syncline is a downwarped area of the bedrock that trends from the center to the southwestern corner of the county. The Springdale Anticline is an upwarped area of the bedrock about 2 mi northwest of the Lyndon Syncline that trends parallel to it. The effect of these two structures on the geology in some locations is that rocks will have a local dip that is different from the area dip. Thus, rocks of Devonian and more recent age do not crop out in concentric north-south bands. Instead, the rocks crop out in patches that increase in age from south to north.

Limestones and shales of Late Ordovician age crop out in the eastern one-fifth of Jefferson County. This area is part of the Outer Bluegrass physiographic province. The limestone is mainly composed of whole and broken fossil fragments set in a matrix of fine- to coarse-grained fossil fragments. The limestone is mostly free from quartz silt and clay, but some beds of chert nodules contain abundant quartz. The shale beds, whose total thickness is about 150 ft, erode to produce ridges separated by relatively broad, flat stream valleys. The shale is highly calcareous and silty, and splits easily along closely spaced planes. Other Ordovician rocks in eastern Jefferson County include siltstones and dolomites.

Rocks of Silurian age crop out in a broad belt extending north to south across the central part of Jefferson County. The Silurian rocks are of marine origin and are composed of dolomite and shale and minor amounts of limestone and chert. The base of the rocks of Silurian age forms an erosional contact with the underlying rocks. The upper part of the Silurian section has been removed by erosion so that its original thickness is not known. Springs and seeps have developed where fractured and cavernous limestone is underlain by the relatively impermeable shales.

Limestones and organically rich black shales of Devonian age crop out in central and north-central Jefferson County. Carbonate rocks of Middle Devonian age make up the basal part of the Devonian System in the county. These rocks lie on an erosional surface on top of the Louisville Limestone of Silurian age. Thin beds of phosphatic quartz sandstone are common in the limestones. Middle Devonian carbonates are overlain by a thick sequence of shales.

Rocks of the Borden Formation of Early Mississippian age crop out in the south-central part of Jefferson County. The Borden Formation is composed of a sequence of fine-grained sediments that become coarser-grained upward. The character, appearance, and aspect of rocks of the Borden Formation change laterally and vertically, making it difficult to separate the various members in many places. The siltstone members, for example, were deposited along the front of a submarine delta and, thus, become thinner and increase in depth away from the edge of the delta. Siltstone caps a few of the knobs and low hills and also crops out along the sides of the higher ridges.

Unconsolidated sediments consisting of gravel, sand, silt, and clay of Quaternary age overlie most of Jefferson County. The deposits are thin except for alluvium along the bottom of the valley in the Floyds Fork watershed, lacustrine sediments in the Pond Creek watershed, and outwash and other glacial deposits along the Ohio River (fig. 2). The thick deposit of outwash sand and gravel in the Ohio River valley is the most productive aquifer in the county and one of the most productive aquifers in the State.

Land Use and Population

According to the 1990 U.S. Census, the population of Jefferson County is approximately 665,000 (Louisville Chamber of Commerce, 1992). This figure represents a 3 percent decline from the 1980 census and a 4 percent decline since 1970. The Louisville Chamber of Commerce projects that the population of Jefferson County will grow to 673,000 by the end of 1994.

Generalized land-use regions of Jefferson County are shown in figure 3. The sources of the land use data shown in figure 3 are 1983 National Atmospheric and Space Administration high-altitude aerial photographs and National High-Altitude Photography program photographs digitized at a scale of 1:250,000 (U.S. Geological Survey, 1986). The degree of changes in land uses since 1983 are unknown; however, on the basis of this 1983 land use information, most commercial and industrial land is within the Louisville city limits. Within and immediately surrounding the city limits, residential land use predominates. The least populated and least developed watersheds in Jefferson County include Pennsylvania Run, which has one population center, and Cedar Creek, which has three population centers.

Most agricultural and forest land is in the eastern and southern parts of the county; however, some industrial areas are also in these parts of the county. Industrialization is evident in Floyds Fork watershed, which includes parts of an industrial park; Harrods Creek watershed, which includes a truck assembly plant; and Pond Creek watershed, which includes large manufacturing facilities. The largest area of forests is in the southwestern part of the county. The percentages of land-use types within the major stream basins draining water from or through Jefferson County are listed in table 1.

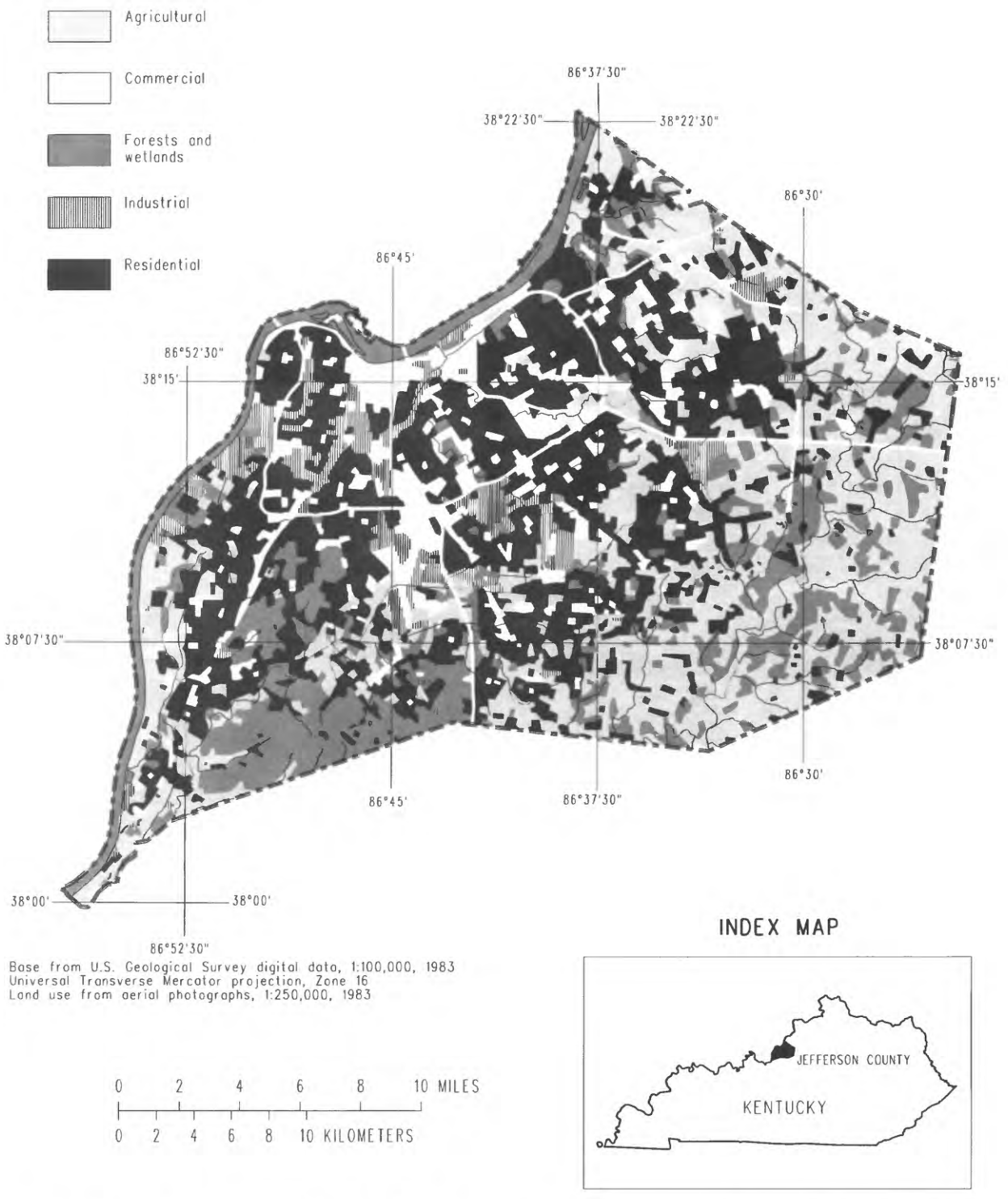

Figure 3.--Generalized land use in Jefferson County, Kentucky.

Table 1.--Percentages of land uses within the major stream basins in and around Jefferson County, Kentucky

Stream basins	Drainage area[1] (square miles)	Land use, in percentage of drainage area[2]				
		Agricultural	Commercial	Forest and wetlands	Industrial	Residential
Cedar Creek	13.5	9.5	0.2	53.6	0.1	36.7
Floyds Fork	222.4	66.9	2.0	14.7	1.4	13.3
Goose Creek	18.7	31.8	13.7	8.8	1.9	43.5
Harrods Creek	107.6	64.5	3.1	20.4	2.0	10.0
Middle Fork Beargrass Creek	25.0	11.9	22.9	1.9	6.2	57.0
Mill Creek	34.2	17.3	8.9	15.2	7.2	51.4
Muddy Fork	8.7	2.3	21.5	4.4	6.6	65.0
Pennsylvania Run	8.5	50.9	.9	13.5	.6	34.2
Pond Creek	125.7	19.9	6.6	40.8	5.4	27.3
South Fork Beargrass Creek	27.2	8.8	20.0	3.6	13.6	53.9

[1] Source: Digital data from 1986 and 1989 aerial photographs at a scale of 1:4,800.

[2] Source: Digital data from 1983 aerial photographs at a scale of 1:250,000.

Surface-Water Hydrology

The major stream basins in Jefferson County are Harrods Creek, Goose Creek, Muddy Fork, Middle Fork Beargrass Creek, South Fork Beargrass Creek, Floyds Fork, Cedar Creek, Pennsylvania Run, Pond Creek, and Mill Creek (fig. 1). These basins range in size from 8.5 mi^2 (Pennsylvania Run) to 222 mi^2 (Floyds Fork). Several of these watersheds, Cedar Creek, Harrods Creek, Pennsylvania Run, and Floyds Fork, extend outside Jefferson County into six other counties.

The Louisville metropolitan area and areas of the county that drain directly to the Ohio River have been designated as the Ohio River City basin (fig. 1). The Louisville metropolitan area consists of a dense commercial central business district that is mainly serviced by a complex system of combined sewers, and few open channels exist.

The nearly 30-mi-long flood wall surrounding Louisville and Jefferson County crosses South Fork Beargrass Creek approximately three-fourths of a mi upstream of the creek mouth at the Ohio River. A large pumping station is located at this point to lift water over the flood wall from Beargrass Creek to the Ohio River when the flood wall must be closed due Ohio River flooding. Two additional pumping stations are located on the flood levees along Mill Creek and Mill Creek Cutoff. Pond Creek and South Fork Beargrass Creek have improved concrete channels in areas of flat, low-lying terrain. The South Fork Beargrass Creek basin also contains two detention structures, one of 8 acres along Buechel Branch and one of 54 acres, known as the dry bed reservoir, on South Fork Beargrass Creek.

The average runoff of stream basins in or near Jefferson County is about 1.3 $(ft^3/s)/mi^2$ and is approximately uniform throughout the area (table 2). Basin runoff during hydrologic extremes, however, can differ widely throughout the area. Peak discharge of streams in Kentucky has been shown to be related to drainage area and basin morphologic characteristics, including main-channel slope, basin shape, and channel sinuosity (Choquette, 1987). Peak discharge, drainage area, main-channel slope, and other characteristics of selected streams in Jefferson County are listed in table 2.

Low-flow statistics, such as the average 7-day low flow of a stream with an expected recurrence interval of 10 years (7-days 10-year low flow), are often used as measures of the expected flow during periods of moderate drought and are commonly used in design of storage and withdrawal facilities and in permitting waste discharges. The 7-days 10-year low flows for selected streams in the county are listed in table 2. Low flow in a stream is principally governed by the amount and rate of ground water discharge, which is related to local geology (Ruhl and Martin, 1991). Because of differences in geology, topography, and land use, low-flow characteristics of streams can differ considerably.

Table 2.--Streamflow and basin characteristics at selected sites in Jefferson County, Kentucky

[mi^2, square mile; ft/mi, feet per mile; ft^3/s, cubic feet per second; $(ft^3/s)/mi^2$, cubic feet per second per square mile]

Site number and name	Drainage area mi^2	Channel slope (ft/mi)[a]	Period of record (water years)	Average flow (ft^3/s)	Average unit flow $(ft^3/s)/mi^2$	Peak 100-year unit flow $(ft^3/s)/mi^2$[a]	7-day 10-year low flow (ft^3/s)[b]	Streamflow variability index[b]
3 Pond Creek at Manslick Road	64.0	12	1944-90	89.3	1.40	121	0.88	0.550
6 South Fork Beargrass Creek at Trevilian Way	17.2	19	1940 1945-53 1955-62 1971-83 1989-90	22.2	1.29	348	0	.665
7 Middle Fork Beargrass Creek at Old Cannons Lane	18.9	18.4	1944-90	25.5	1.35	221	.31	.521
15 Floyds Fork at former State Highway 155	138	5.5	1944-90	176	1.28	178	0	1.262

[a] From Melcher and Ruhl (1984).

[b] From Ruhl and Martin (1991).

Domestic, industrial, and commercial water users depend on public-supplied deliveries for most of their water. The source for most public-supplied water in Jefferson County is the Ohio River; however, some direct stream-water withdrawals other than from the Ohio River are made for some industrial and commercial users such as golf courses and tree nurseries.

Acknowledgments

Personnel of the Louisville and Jefferson County Metropolitan Sewer District (MSD) participated in water-quality sampling and did all laboratory analyses for this study. The authors are especially grateful for the contributions of Pamela J. Pulliam, Water Resources Administrator for the MSD, who provided many comments that significantly enhanced the quality of the report.

WATER-QUALITY STANDARDS

Primary water-quality criteria for public health, aquatic life, and recreation are established by the Federal government. The Federal criteria are then used by the states as guidelines to establish criteria for local conditions on the basis of site-specific analyses.

Federal authority for the protection of water quality is provided by the Clean Water Act, which was most recently amended in 1987. The U.S. Environmental Protection Agency (USEPA) is the principal Federal agency responsible for the development and implementation of the programs called for by this statute. Section 304(a)(1) of the Act requires USEPA to publish and periodically update criteria for ambient water quality. A water-quality criterion is a numerical or narrative statement for a single contaminant reflecting the latest scientific knowledge on the identifiable effects of the contaminant on public health and welfare, aquatic life, and recreation. The criteria are not rules, and they have no regulatory effect. Rather, these criteria present scientific data and guidance that can be used to derive regulatory requirements on the basis of considerations of water-quality effects (U.S. Environmental Protection Agency, 1980).

Section 303 of the Act specifies that water-quality standards be developed for all surface water of the United States. Development of standards involves two steps. First, a stream segment is designated for one or more specific uses. Second, water-quality criteria, similar to those discussed above, are established to preserve or achieve the designated use or uses. The water-quality standard is developed through rule-making proceedings by state and Federal agencies. Thus, the criteria for a specific stream use become standards when, through rule-making proceedings, the criteria are applied to a specific stream segment designated for that use.

The water-quality criteria for freshwater aquatic life are divided into two categories on the basis of toxicity: acute and chronic. Acute toxicity refers to short-term effects on the biotic system that often result in the death of organisms. Chronic toxicity refers to long-term effects on aquatic

organisms including bioaccumulation and reduction in population viability (U.S. Environmental Protection Agency, 1986a). Criteria for freshwater aquatic life are summarized in table 3.

Current and proposed Federal drinking-water standards are listed in table 4. A maximum contaminant level goal (MCLG) is a nonenforceable health goal that is set at the level where no known or anticipated adverse effects on the health of humans occur and where an adequate margin of safety is allowed. A maximum contaminant level (MCL) is an enforceable standard that must be set as close to the MCLG as is feasible. In this context, "feasible" is defined in the Safe Drinking Water Act to mean "with the use of the best technology, treatment techniques, and other means, which the Administrator of the U.S. Environmental Protection Agency finds generally available (taking costs into consideration)." A secondary maximum contaminant level (SMCL) represents a reasonable health goal for drinking water and is intended as a guideline for the states. When a constituent is present at a level much greater than the SMCL, there may be health implications as well as aesthetic degradation.

All surface waters in Kentucky have been assigned an aquatic life use (either warmwater or coldwater aquatic habitat) and a recreational use (primary- and secondary-contact recreation) by the Kentucky Natural Resources and Environmental Protection Cabinet, Division of Water. The designated uses for specific streams or stream segments in the Jefferson County area are listed in table 5. Designated uses for the Salt River are included in table 5 because Floyds Fork is tributary to the Salt River at river mile 25.5 and because Pond Creek is tributary at river mile 0.4. Streams or stream segments not specifically listed in the table are designated as warmwater aquatic habitat, primary- and secondary-contact recreation, and domestic water supply.

Surface-water-quality criteria adopted by Kentucky are defined as the minimum criteria applicable to all surface water to protect public health and welfare, protect and enhance the quality of water, and fulfill Federal and State requirements for the establishment of water-quality standards. The surface-water-quality criteria, as adopted by Kentucky and approved by the USEPA, are listed by category in table 6.

METHODS OF DATA COLLECTION AND ANALYSIS

Water-quality samples were collected at 26 stream sites in Jefferson County. This data base was supplemented with continuous records of temperature, pH, dissolved-oxygen, and specific-conductance measurements at four sites.

Field Data Collection

Stream sampling was begun at most sites in February 1988, and all continuous water-quality monitors and streamflow gages were installed by May 1988. Water-quality samples for dissolved, suspended, and volatile solids, temperature, pH, alkalinity, specific conductance, dissolved oxygen, Biological oxygen demand, Chemical oxygen demand, nutrients, and bacteria were

Table 3.--Selected Federal water-quality criteria for freshwater aquatic life

[mg/L, milligrams per liter; --, not available <, less than; µg/L, micrograms per liter; e, base of natural logarithms-approximately 2.71828; **, raise to indicated power; H, natural logarithm of hardness-in mg/L as $CaCO_3$; from U.S. Environmental Protection Agency, 1986a]

Constituent or property	Aquatic life acute[1]	Aquatic life chronic[2]
Alkalinity, in mg/L as $CaCO_3$	--	< 20
Ammonia, total, in mg/L as NH_3	Criteria are pH and temperature dependent	
Arsenic, total trivalent, in µg/L as As	360	190
Cadmium, total, in µg/L as Cd	e**(1.128H - 3.828)	e**(0.7852H - 3.490)
Chlordane, total, in µg/L	2.4	.0043
Chromium, total, in µg/L as Cr		
Chromium, hexavalent	16	11
Chromium, trivalent	1,700	210
Copper, total, in µg/L as Cu	e**(0.9422H - 1.464)	e**(0.8545H - 1.465)
Cyanide, total, in mg/L as Cn	.022	.0052
Dissolved oxygen, in mg/L	< 4.0	< 5.5
Endrin, total, in µg/L	.18	.0023
Iron, total, in µg/L as Fe	--	1,000
Lead, total, in µg/L as Pb	e**(1.273H - 1.460)	e**(1.273H - 4.705)
Lindane, total, in µg/L	2.0	.080
Mercury, total, in µg/L as Hg	2.4	.012
Methoxychlor, total, in µg/L	--	.03
Nickel, total, in µg/L as Ni	e**(0.76H + 4.02)	e**(0.76H + 1.06)
pH, in standard units	--	6.5-9.0
Selenium, total, in µg/L as Se	260	35
Silver, total, in µg/L as Ag	e**(1.72H - 6.52)	--
Temperature, in degrees Celsius	Species dependent criteria	
Toxaphene, total, in µg/L	1.6	.013
Zinc, total, in µg/L as Zn	e**(0.83H + 1.95)	--

[1] Highest 1-hour average concentration that should not cause unacceptable toxicity to aquatic organisms during short-term exposure.

[2] Highest 4-day average concentration that should not cause unacceptable toxicity to aquatic organisms during long-term exposure.

Table 4.--Selected Federal drinking-water standards

[MCL, maximum contaminant level; MCLG, maximum contaminant level goal; PMCL, proposed MCL; PMCLG, proposed MCLG; SMCL, secondary MCL; µg/L, micrograms per liter; --, not available; mg/L, milligrams per liter; from U.S. Environmental Protection Agency, 1986b, c, and 1987]

Constituent or property	Standard				
	MCL	MCLG	PMCL	PMCLG	SMCL
Arsenic, total, in µg/L as As	50	--	--	--	--
Barium, total, in µg/L as Ba	1,000	--	2,000	2,000	--
Beryllium, total, in µg/L as Be	--	--	1	0	--
Cadmium, total, in µg/L as Cd	5	5	--	--	--
Chlordane, total, in µg/L	2	0	--	--	--
Chromium, total, in µg/L as Cr	100	100	--	--	--
Copper, total, in µg/L as Cu	--	--	1,300	1,300	1,000
Cyanide, total, in mg/L as Cn	--	--	.2	.2	--
Dissolved solids, total, in mg/L	--	--	--	--	500
Endrin, total, in µg/L	.2	--	2	2	--
Iron, total, in µg/L as Fe	--	--	--	--	300
Lead, total, in µg/L as Pb	5	--	5	0	--
Lindane, total, in µg/L	.2	.2	--	--	--
Mercury, total, in µg/L as Hg	2	2	--	--	--
Methoxychlor, total in µg/L	40	40	--	--	--
Nickel, total, in µg/L as Ni	--	--	100	100	--
Nitrogen, total nitrate, in mg/L as N	10	10	--	--	--
Nitrogen, total nitrite, in mg/L as N	1	1	--	--	--
pH, in standard units	--	--	--	--	6.5-8.5
Selenium, total, in µg/L as Se	50	50	--	--	--
Silver, total, in µg/L as Ag	50	--	--	--	100
Toxaphene, in µg/L	3	0	--	--	--
Zinc, total, in µg/L as Zn	--	--	--	--	5,000
2,4-D, total, in µg/L	70	70	--	--	--
2,4,5-TP (silvex), total, in µg/L	50	50	--	--	--

Table 5.--Stream-use designations in Jefferson County, Kentucky

[WAH, warmwater aquatic habitat; PCR, primary-contact recreation; SCR, secondary-contact recreation; DWS, drinking water supply; from Kentucky Natural Resources and Environmental Protection Cabinet, 1990a]

Stream name	Stream segment	Use designation
Chenoweth Run	Source to Floyds Fork	WAH, PCR, SCR
Floyds Fork	Source to Salt River	WAH, PCR, SCR
Mill Creek	Source to Salt River	WAH, PCR, SCR
Salt River	River mile 60.1 to Ohio River	DWS, WAH, PCR, SCR
Paddy's Run	Source to Ohio River	PCR, SCR
Beargrass Creek	Source to Ohio River	WAH, PCR, SCR

Table 6.--Selected Kentucky surface-water-quality criteria

[mg/L, milligrams per liter; --, not available; µg/L, micrograms per liter; (soft), water has an equivalent concentration of calcium carbonate of 0 - 75 milligrams per liter; (hard), water has an equivalent concentration of calcium carbonate of greater than 75 milligrams per liter; e, base of natural logarithms (approximately 2.71828); **, raise to indicated power; H, natural logarithm of hardness, in mg/L as $CaCO_3$; <, less than; P, primary contact recreation; S, secondary contact recreation; V, not to exceed natural seasonal variations; col/100mL, colonies per 100 milliliter; from Kentucky Natural Resources and Environmental Protection Cabinet, 1990b]

Constituent or property	Criterion			
	Domestic water supply	Warmwater aquatic habitat		Recreational waters
		Acute	Chronic	
Ammonia, total un-ionized, in mg/L	--	0.05	--	--
Arsenic, total, in µg/L as As	--	--	50	--
Barium, total, in µg/L as Ba	1,000	--	--	--
Beryllium, total, in µg/L as Be	--	--	11 (soft) 1,100 (hard)	--
Cadmium, total, in µg/L as Cd	10	e**(1.128H - 3.828)	e**(0.7852H - 3.490)	--
Chlordane, total, in µg/L	.00046	2.4	.0043	--
Chromium, total, in µg/L as Cr	50	16	11	--
Copper, total, in µg/L as Cu	1,000	e**(0.9422H - 1.464)	e**(0.8545H - 1.465)	--
Cyanide, total, in mg/L as Cn	--	.005	--	--
Dissolved oxygen, in mg/L	--	<4	--	--
Dissolved solids, total, in mg/L	750	--	--	--
Endrin, total, in µg/L	1	.18	.0023	--
Fecal-coliform bacteria, col/100mL	2,000	--	-- --	200 P[a] 1,000 S[b]
Iron, total, in µg/L as Fe	--	4,000	1,000	--
Lead, total, in µg/L as Pb	50	e**(1.273H - 1.460)	e**(1.273H - 4.705)	--
Lindane, total, in µg/L	--	2.0	.080	--
Mercury, total, in µg/L as Hg	.144	2.4	.012	--
Nickel, total in µg/L as Ni	13.4	--	--	--
Nitrogen, total nitrate, in mg/L as N	10	--	--	--
pH, in standard units	--	6.0-9.0	--	6.0-9.0 P,S
Selenium, total, in µg/L as Se	10	--	--	--
Silver, total, in µg/L as Ag	50	e**(1.72H - 6.52)	--	--
Temperature, in degrees Celsius	--	<31.7	V	--
Toxaphene, total, in µg/L	.00071	.73	.0002	--
Zinc, total, in µg/L as Zn	--	e**(0.8473H + .8604)	e**(0.8473H + .7614)	--
2,4-D, total, in µg/L	3,090	--	--	--

[a] For primary-contact recreation water during the recreation season, fecal-coliform densities shall neither exceed 200 col/100mL as a monthly geometric mean based on not less than 5 samples per month nor exceed 400 col/100mL in 20 percent or more of all samples collected during the month.

[b] For secondary-contact recreation, fecal-coliform densities shall neither exceed 1,000 col/100mL as a monthly geometric mean based on not less than 5 samples per month nor exceed 2,000 col/100mL in 20 percent or more of all samples collected during the month.

obtained twice monthly from February 1988 through September 1990 and monthly from October 1990 through March 1991. Nutrients included ammonia, nitrate, nitrite, and organic nitrogen, phosphorus, phosphate, and orthophosphate. Bacteria samples included fecal coliform and fecal streptococci. Samples for major metals, trace elements, and miscellaneous inorganic compounds were collected quarterly. These included arsenic, barium, beryllium, cadmium, chromium, copper, cyanide, iron, lead, mercury, nickel, selenium, silver, and zinc. Samples for organochlorine insecticides and herbicides also were collected quarterly. The organochlorine insecticides sampled included total chlordane, endrin, lindane, methoxychlor, and toxaphene. Analyses for herbicides were limited to 2,4-D (dichlorophenoxyacetic acid) and 2,4,5-TP (silvex).

Selection of Sampling Sites

Site selection (fig. 4, and table 7) was designed to ensure the following: (1) collection of representative data from all the major watersheds in Jefferson County outside of the combined sewer network, (2) accessibility to a bridge so that samples could be readily collected and field measurements readily made during periods of high water, and (3) positioning of sites at key locations in the stream basin, either upstream or downstream from sewage treatment facilities or in areas of different land uses to help define sources of contaminants. Potential sources of contaminants in the drainage area of each sampling site were determined by the MSD (Pamela J. Pulliam written communication, 1992) (table 7).

Instrumentation

Stage recorders were available at five sampling sites for the computation of continuous streamflow records. Continuous records were already being collected at Middle Fork Beargrass Creek (site 7), Floyds Fork (site 15), and Pond Creek (site 3) before the beginning of this study. Recorders were installed at South Fork Beargrass Creek (site 6) and at Mill Creek Cutoff (site 24) in spring 1988. Water-quality monitors also were installed at all of the continuous-record streamflow sites except for Floyds Fork (site 15). These monitors collected continuous records (30-minute interval) of water temperature, specific conductance, pH, and dissolved oxygen from May 1988 through March 1991.

Sampling Procedures

Samples were collected by means of a standard multivertical depth-integrating sampler to obtain the most representative sample possible. The equal-width-increment (EWI) sampling method was used for all sampling. The EWI method required equal spacing of a number of verticals across the stream cross-section. The stream width was determined from a tagline stretched across the stream or from station markings on bridge railings. The procedure for selection of the sampling intervals was as follows: (1) the stream was visually inspected from bank to bank and the velocity and depth distribution

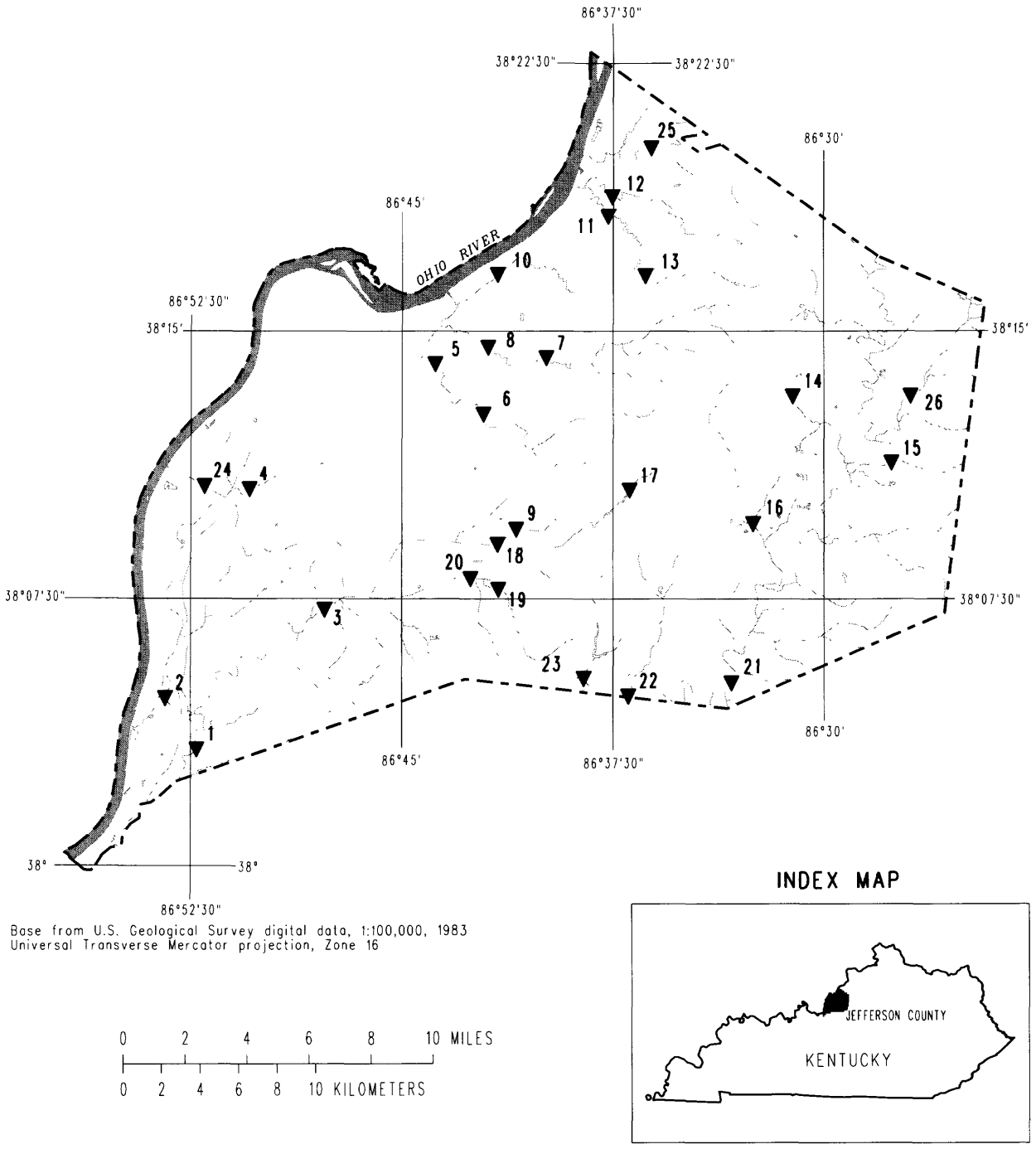

Figure 4.--Stream-water-quality sampling sites in Jefferson County, Kentucky.

Table 7.--Stream-water-quality sampling sites in Jefferson County, Kentucky, and potential sources of contaminants in their drainage areas

[USGS, U.S. Geological Survey; mi^2, square miles; NPR, nonpoint runoff; WTE, wastewater-treatment-plant effluent; STD, septic-tank discharges; IW, industrial wastewater; --, unknown; CSO, combined-sewer or sanitary-sewer overflows]

	Site number and name	USGS station number	Drainage area (mi^2)	Latitude	Longitude	Potential sources of contaminants[a]
1	Pond Creek at Pendleton Road	03302030	80.3	380315	855218	NPR, WTE, STD, IW
2	Mill Creek at Orell Road	03294570	13.5	380441	855324	NPR, WTE, STD
3	Pond Creek at Manslick Road	03302000	64.0	380711	854745	NPR, WTE, STD, IW
4	Mill Creek at Rockford Lane	03294520	--	381034	855025	NPR, STD
5	South Fork Beargrass Creek at Winter Avenue	03292550	22.6	381404	854350	NPR, CSO
6	South Fork Beargrass Creek at Trevilian Way	03292500	17.0	381239	854207	NPR, CSO
7	Middle Fork Beargrass Creek at Old Cannons Lane	03293000	18.9	381414	853953	NPR, CSO
8	Middle Fork Beargrass Creek at Beals Branch Road	03293200	22.7	381432	854157	NPR, WTE, STD, CSO
9	Spring Ditch at Private Drive below Hanses Road	03301950	1.6	380927	854057	NPR, WTE
10	Muddy Fork at Mockingbird Valley Road	03293530	6.2	381635	854137	NPR, WTE, STD
11	Goose Creek at U.S. Highway 42	03292475	10.1	381812	853741	NPR, WTE, STD
12	Little Goose Creek at U.S. Highway 42	03292480	5.8	381845	853733	NPR, WTE, STD
13	Goose Creek at Old Westport Road	03292474	6.0	381633	853622	NPR, WTE, STD
14	Pope Lick at Pope Lick Road	03298100	2.9	381309	853107	NPR, WTE, STD
15	Floyds Fork at former State Highway 155	03298000	138	381118	852737	NPR, WTE, STD
16	Chenoweth Run at Gelhaus Road	03298150	11.6	380936	853232	NPR, WTE
17	Fern Creek at Old Bardstown Road	03301900	3.5	381032	853655	NPR, WTE
18	Northern Ditch at Preston Highway	03301940	11.1	380901	854137	NPR, WTE, STD, IW
19	Fishpool Creek at Bost Road	03301850	5.3	380745	854135	NPR, WTE, STD
20	Southern Ditch at Minors Lane	03301880	12.8	380804	854234	NPR, WTE, STD
21	Floyds Fork at Bardstown Road	03298200	213	380507	853318	NPR, WTE, STD
22	Cedar Creek at Thixton Road	03298250	11.1	380445	853658	NPR, WTE, STD
23	Pennsylvania Run at Mt. Washington Road	03298300	6.4	380515	853833	NPR, WTE, STD
24	Mill Creek Cutoff at Dover Road	03294550	24.4	381039	855201	NPR, STD
25	Harrods Creek at Hunting Creek Drive	03292473	92.1	382006	853609	NPR, WTE, STD
26	Long Run at State Highway 1531	03297980	22.5	381310	852656	NPR, STD

[a] Source, Pamela J. Pulliam, Louisville and Jefferson County Metropolitan Sewer District, written commun., 1992.

was observed; and (2) the size of the interval was determined such that approximately 10 percent of the flow was represented at that part of the cross section where the "unit-width discharge" was highest (generally the deepest, fastest section) or the greatest concentration of sediment was moving. This interval size was then used for the entire EWI and governed the number of intervals used (typically greater than 10).

A depth-integrated sample was obtained by lowering the sampler from the surface of the water to the streambed and immediately raising it back to the surface at the same transit rate for each vertical segment. The size of the sampler nozzle size was selected such that water entered the sampler at the same rate as the velocity of the stream. The composited sample thus collected by the EWI method was representative of the entire stream.

In water so shallow that a depth-integrating sampler could not be submerged, a sample was obtained by dip sampling. This sampling method consists of immersing a hand-held narrow-mouth bottle in the centroid of flow, or at multiple verticals, with the mouth of the bottle directed toward the current. If the water depth was too shallow for dip sampling, a peristaltic pump with silicone or polytetrafluoroethylene tubing was used to skim a sample from the stream.

Upon completion of each vertical, the sample was deposited into a churn splitter, which allowed different subsample volumes to be extracted from a composite sample while the basic chemical and physical properties of the original sample were maintained. While churning the sample, subsamples for total, total recoverable, or suspended analyses were withdrawn first. After all the required total or suspended material subsamples were withdrawn, the water remaining in the churn was available for preparation of filtered subsamples required for determinations of dissolved constituents.

Temporal and Hydrologic Distribution of Samples

The degree of sample repetition depends on the purpose of sampling. Many factors need to be considered in designing a sampling strategy and protocol. Some of these factors include program goals and objectives, environmental factors affecting the constituents of interest and their variation with time, time scales of interest (short-term or long-term), statistical procedures to be used when addressing goals and objectives, the error that can be tolerated in results, and practical constraints, such as costs and laboratory limitations. Taking these factors into consideration, the water-quality samples for total and dissolved solids, nutrients, and bacteria were obtained twice monthly from February 1988 through September 1990, and monthly from October 1990 through March 1991. Samples for metals, major ions, and synthetic organic compounds were obtained quarterly. The temporal distribution of samples collected from February 1988 through March 1991 did not have a seasonal bias because sampling was done at equal intervals regardless of season.

Water-quality sampling should ideally represent the entire range of streamflow because streamflow and, thus, constituent concentrations vary considerably throughout the year. High flows represent surface runoff and

contribute a large proportion of the annual constituent load. Low-flows generally indicate base-flow contributions from ground water and are greatly influenced by point-source discharges. Water during low flow usually contains the highest concentrations of dissolved constituents.

The distribution of samples collected over the flow-duration curve for Pond Creek (site 3) and South Fork Beargrass Creek (site 6) is shown in figures 5 and 6. These sites were selected to show the distribution of samples because they are continuous-record streamflow sites for which a flow-duration curve was available for comparison and because they are considered representative of the other sampling sites. The solid line shows the flow-duration curve of daily mean streamflows from March 1988 through February 1991. The points represent instantaneous discharge at the time of sampling. Comparison of these instantaneous discharges to the duration curve based on daily mean discharges is intended only as an approximation of how well the samples are distributed in terms of flow. Flow-duration statistics based on time increments smaller than daily were not available for the comparisons. A sample set that was well distributed with respect to flow would be evident in two ways. First, the points would extend to each end of the flow-duration curve. (In reality, this pattern of points could have been achieved only by collecting many samples or scheduling sampling to meet specified flow conditions.) Second, the points would lie exactly on the curve. Figures 5 and 6 show that, in general, monthly and bimonthly sampling was not biased toward a particular flow condition and that low-flow and high-flow sampling was adequate; however, quarterly sampling at some sites was not representative of all flow conditions.

Laboratory Procedures

The Louisville and Jefferson County Metropolitan Sewer District (MSD) did all laboratory analyses for this study.

Analytical Methods

The samples were analyzed with approved methods of the U.S. Environmental Protection Agency, as listed in 40 CFR Part 136 (Code of Federal Regulations, 1990). The methods used to analyze the samples are listed in table 8. The detection limits of the laboratory methods used for some water-quality analyses were larger than some State and Federal water-quality criteria. The purpose of this study, however, was not to detect violations of criteria but rather to detect anomalistic concentrations of various water-quality constituents.

Quality Assurance

Collection of samples for quality assurance is essential to ensure the validity of analytical data. A well-designed program must provide unbiased monitoring of the accuracy and precision of reported data. According to Fishman and Friedman, 1989, some errors are practically unavoidable in

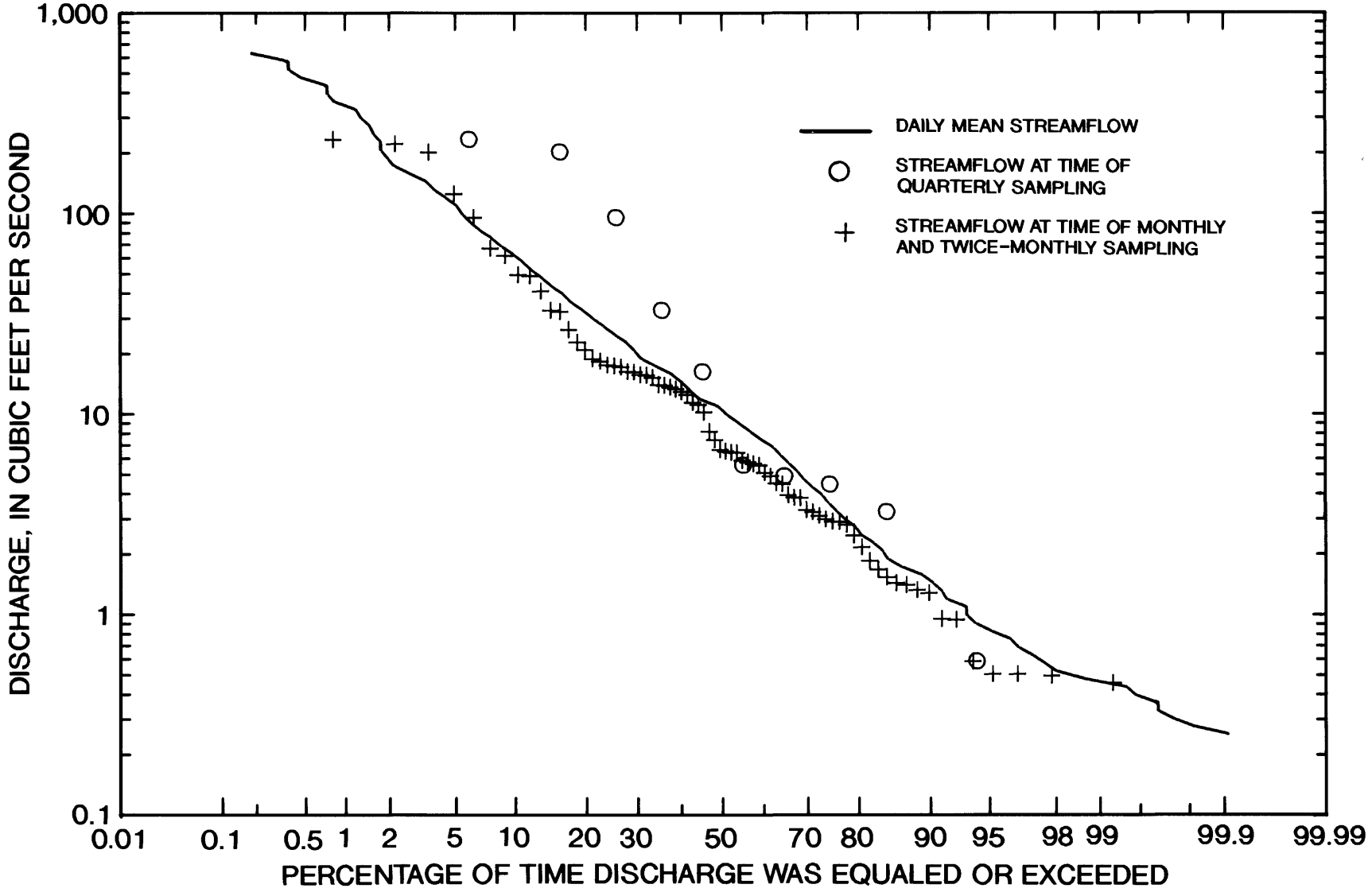

Figure 5.--Streamflow duration and instantaneous streamflow at the time of sampling for Middle Fork Beargrass Creek at Old Cannons Lane (site 7), March 1988-February 1991.

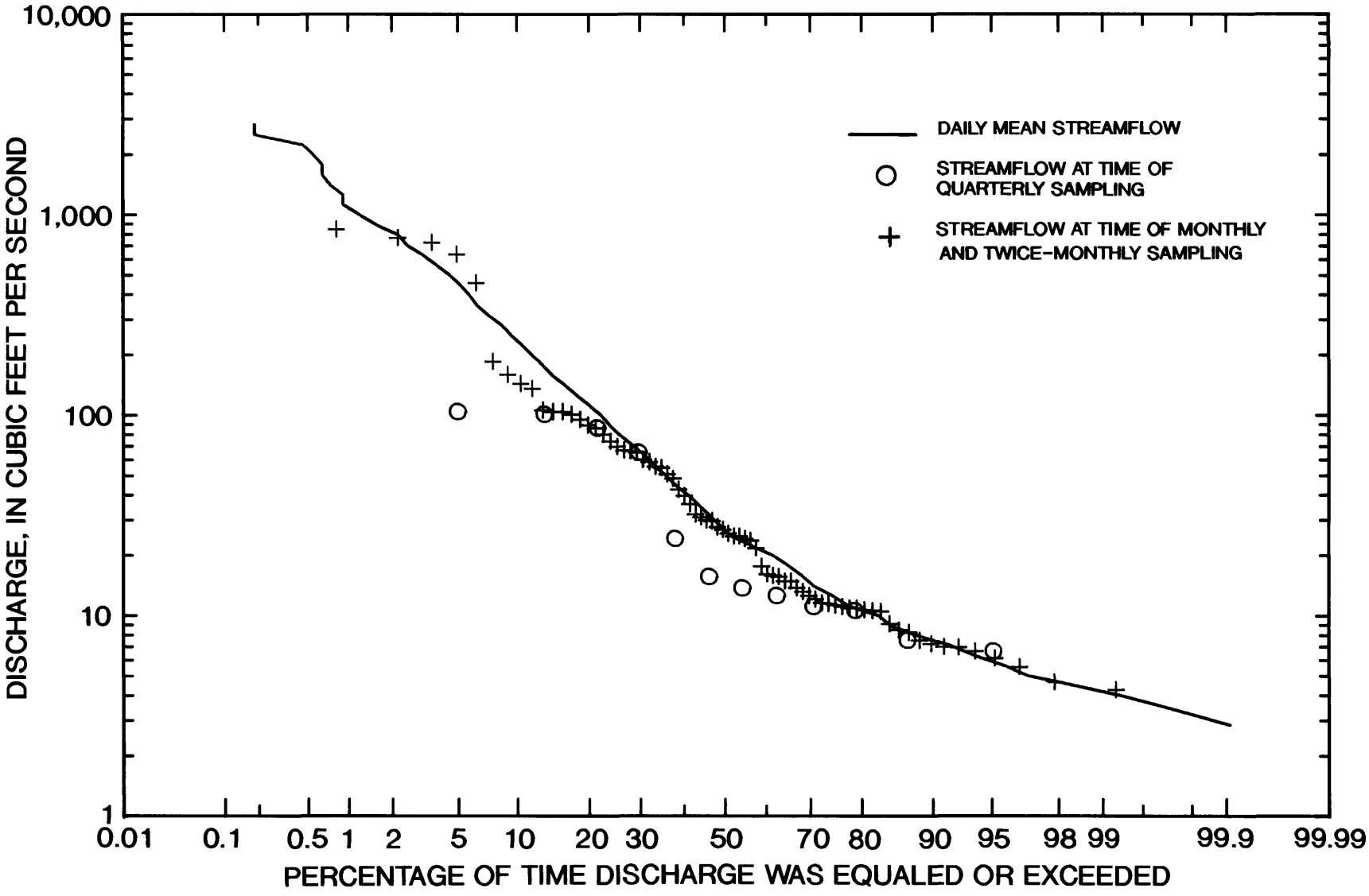

Figure 6.--Streamflow duration and instantaneous streamflow at the time of sampling for Pond Creek at Manslick Road (site 3), March 1988-February 1991.

Table 8.--Methods used by the Louisville and Jefferson County Metropolitan Sewer District laboratory for analysis of water-quality samples from selected streams in Jefferson County, Kentucky, February 1988-March 1991

[USEPA, U.S. Environmental Protection Agency; mg/L, milligrams per liter; µg/L, micrograms per liter]

Constituent or property and units	Method	USEPA method number
pH and alkalinity:		
pH	Electrometric, glass electrode	150.1
Alkalinity, in mg/L as $CaCO_3$	Electrometric titration to pH 4.5	310.1
Dissolved solids and related water-quality constituents and characteristics:		
Dissolved solids, in mg/L	Residue on evaporation at 105 degrees Celsius, dissolved, gravimetric	160.3
Specific conductance, in microsiemens per centimeter at 25 degrees Celsius	Wheatstone bridge	120.1
Calcium, total, in mg/L as Ca	Atomic emission spectrometric, induction-coupled argon plasma	200.7
Magnesium, total, in mg/L as Mg	Atomic emission spectrometric, induction-coupled argon plasma	200.7
Hardness, total, in mg/L as $CaCO_3$	Calculation	
Suspended solids:		
Suspended solids, in mg/L	Residue on evaporation at 105 degrees Celsius, suspended, gravimetric	160.2
Residue, volatile nonfilterable, in mg/L	Volatile-on-ignition, suspended, gravimetric	160.4

Table 8.--Methods used by the Louisville and Jefferson County Metropolitan Sewer District laboratory for analysis of water-quality samples from selected streams in Jefferson County, Kentucky, February 1988-March 1991--Continued

Constituent or property and units	Method	USEPA method number
Major metals, trace elements, and miscellaneous inorganic compounds:		
Arsenic, total, in µg/L as As	Digestion, graphite furnace, atomic absorption	206.2
Barium, total, in µg/L as Ba	Atomic emission spectrometric, induction-coupled argon plasma	200.7
Beryllium, total, in µg/L as Be	Atomic emission spectrometric, induction-coupled argon plasma	200.7
Cadmium, total, in µg/L as Cd	Atomic emission spectrometric, induction-coupled argon plasma	200.7
Chromium, total, in µg/L as Cr	Atomic emission spectrometric, induction-coupled argon plasma	200.7
Copper, total, in µg/L as Cu	Atomic emission spectrometric, induction-coupled argon plasma	200.7
Iron, total, in µg/L as Fe	Atomic emission spectrometric, induction-coupled argon plasma	200.7
Lead, total, in µg/L as Pb	Atomic emission spectrometric, induction-coupled argon plasma	200.7
Mercury, total recoverable, in µg/L as Hg	Atomic absorption spectrometric, flameless	245.1
Nickel, total, in µg/L as Ni	Atomic emission spectrometric, induction-coupled argon plasma	200.7
Selenium, total, in µg/L as Se	Digestion, graphite furnace, atomic absorption	270.2
Silver, total, in µg/L as Ag	Atomic emission spectrometric, induction-coupled argon plasma	200.7
Zinc, total, in µg/L as Zn	Atomic emission spectrometric, induction-coupled argon plasma	200.7
Cyanide, total, in µg/L as CN	Colorimetric, barbituric acid	335.2

Table 8.--Methods used by the Louisville and Jefferson County Metropolitan Sewer District laboratory for analysis of water-quality samples from selected streams in Jefferson County, Kentucky, February 1988-March 1991--Continued

Constituent or property and units	Method	USEPA method number
Nutrients:		
Nitrogen, ammonia, total, in mg/L as N	Electrometric, ion-selective electrode	350.3
Nitrogen, nitrate, total, in mg/L as N	Cadmium reduction	353.2
Nitrogen, nitrite, total, in mg/L as N	Colorimetric, diazotization, automated	354.1
Nitrogen, organic plus ammonia, total, in mg/L as N	Titrimetric, digestion-distillation, electrode	351.3
Phosphorus, total, in mg/L as P	Colorimetric, phosphomolybdate	365.2
Phosphorus, orthophosphate, total, in mg/L as P	Colorimetric, phosphomolybdate	365.2
Dissolved Solids and oxygen demand:		
Dissolved oxygen, in mg/L	Winkler	360.2
Biochemical oxygen demand, in mg/L	Dissolved oxygen depletion, 5-day at 20 degrees Celsius	405.1
Chemical oxygen demand, in mg/L	Titrimetric, 0.25 N dichromate oxidation	410.1
Synthetic organic compounds:		
Chlordane, total, in µg/L	Hexane extraction, gas chromatograph with flame-photometric detectors	608
Endrin, total, in µg/L	Hexane extraction, gas chromatograph with flame-photometric detectors	608
Lindane, total, in µg/L	Hexane extraction, gas chromatograph with flame-photometric detectors	608

Table 8.--Methods used by the Louisville and Jefferson County Metropolitan Sewer District laboratory for analysis of water-quality samples from selected streams in Jefferson County, Kentucky, February 1988-March 1991--Continued

Constituent or property and units	Method	USEPA method number
Synthetic organic compounds--continued:		
Methoxychlor, total, in µg/L	Hexane extraction, gas chromatograph with flame-photometric detectors	608
Toxophene, total, in µg/L	Hexane extraction, gas chromatograph with flame-photometric detectors	608
2,4-D, total, in µg/L	Gas chromatograph with electron capture detectors	625
2,4,5-TP (Silvex), total, in µg/L	Gas chromatograph with electron capture detectors	625
Fecal-indicator bacteria:		
Coliform, fecal, in colonies per 100 milliliters	Membrane filtered, M-FC medium at 44.5 degrees Celsius	none
Streptococci, fecal, in colonies per 100 milliliters	Membrane filtered, KF agar at 35 degrees Celsius	none

analytical work. Errors may result from the reagents used, from the limitations of the method or instruments employed, or even from impurities in distilled water. The analyst's skill and general judgment often have a direct bearing on the analytical accuracy.

Samples were collected for quality assurance of the analytical data. The MSD laboratory did all primary analyses of the stream-water samples for the study. Samples for quality assurance generally consisted of split samples between the MSD laboratory and an independent laboratory. Split samples are produced by dividing a composite sample into two (or more) aliquots. Two laboratories were used for analysis of the quality-assurance samples during the study. Quarterly splits from three sites were sent to the USGS laboratory during the entire study period of February 1988 - March 1991. All samples obtained from October 1990 through February 1991 were split and sent to a local private laboratory. In addition, the MSD laboratory participated in the USGS Analytical Evaluation Program in which standard reference samples were provided semiannually.

Analytical results of the MSD laboratory were compared to results from the 2 independent laboratories, or in the case of the standard reference samples, to the most probable value based on analytical results from more than 100 laboratories. Percentage differences in the duplicate measurements were calculated by use of the following equation:

$$P = ((M - O) / M) * 100 \qquad (1)$$

where P is the percentage difference,
M is the MSD laboratory analysis value, and
O is the comparison laboratory analysis value.

Censored data--concentrations of constituents too low to be accurately determined because of limitations of analytical techniques or equipment, and thus reported as less than a detection limit--were handled as special cases. If both laboratories reported the analytical value as below detection limits, even if the detection limits were not the same, then the percentage difference was considered to be zero. In some cases, one laboratory reported an analysis as below detection, but the other laboratory reported a noncensored value. If the censored value was greater than the noncensored value, then the laboratory analyses were considered in agreement and the percentage difference was considered zero. If the noncensored value was greater than the censored value, however, then a percentage difference was calculated as though both values were noncensored.

The mean of the percentage differences of the duplicate measurements for each constituent was used as a measure of the nonagreement of the analytical values as determined by the different laboratories (table 9). Mean percentage differences in excess of 20 percent were considered at a level of nonagreement that might indicate that some analyses for that constituent may lack acceptable accuracy. Analyses for suspended and volatile solids, ammonia, nitrate, and organic nitrogen, total phosphate, total copper, total silver, and total recoverable mercury all had percentage differences in excess of 20

Table 9.--Accuracy estimates of Louisville and Jefferson County Metropolitan Sewer District (MSD) laboratory analyses, based on comparisons of MSD sample-analysis values to those of other laboratories

[Comparisons computed as P = ((M - V) / M) * 100), where P is percentage difference, M is MSD value; and V is value determined by other laboratory]

Water-quality constituent or property	Number of comparisons	Mean	Standard deviation	Variance
pH and alkalinity:				
pH	157	-2.16	6.85	46.9
Alkalinity	152	7.76	14.5	211
Dissolved solids and related water-quality constituents:				
Dissolved solids	149	1.34	27.2	741
Calcium, total	35	7.81	11.7	137
Magnesium, total	35	1.67	16.3	267
Suspended and volatile solids:				
Suspended solids	149	-35.9	193	37,300
Volatile solids	149	-65.1	248	61,600
Major metals, trace elements, and miscellaneous inorganic compounds:				
Arsenic, total	48	-1.07	6.12	37.5
Barium, total	48	-20.7	93.8	8,800
Beryllium, total	31	.926	5.45	29.7
Cadmium, total	48	-.062	4.24	18.0
Chromium, total	42	16.6	38.0	1,440
Copper, total	48	41.3	35.4	1,250
Iron, total	48	-11.8	94.0	8,830
Lead, total	48	11.9	29.2	855
Mercury, total recoverable	43	-25.3	117	13,800
Nickel, total	48	8.76	25.8	664
Selenium, total	48	-2.02	7.40	54.8
Silver, total	31	-179	436	191,000
Zinc, total	48	31.6	54.3	2,940
Cyanide, total	44	1.79	11.9	141

Table 9.--Accuracy estimates of Louisville and Jefferson County Metropolitan Sewer District (MSD) laboratory analyses, based on comparisons of MSD sample-analysis values to those of other laboratories--Continued

Water-quality constituent or property	Number of comparisons	Mean	Standard deviation	Variance
Nutrients:				
Nitrogen, ammonia, total	154	-328	747	557,000
Nitrogen, nitrate, total	151	-67.9	288	82,700
Nitrogen, nitrite, total	155	-2.67	103	10,700
Nitrogen, organic, dissolved	85	-213	534	285,000
Phosphate, total	7	-35.4	85.1	7,240
Phosphorus, total	159	6.59	64.1	4,110
Phosphorus, orthophosphate, total	147	6.37	87.0	7,570
Oxygen Demand:				
Biochemical oxygen demand	85	-13.4	99.4	9,880
Chemical oxygen demand	149	-15.9	75.4	5,680
Synthetic organic compounds:				
Chlordane, total	44	0	0	0
Endrin, total	44	2.06	13.7	188
Lindane, total	44	4.12	19.1	365
Methoxychlor, total	44	3.57	17.0	288
Toxaphene, total	44	0	0	0
2,4-D, total	43	-4.74	33.5	1,120
2,4,5-TP (silvex), total	43	2.71	12.6	158

percent. Of these constituents, ammonia, organic nitrogen, and total silver had mean percentage differences in excess of 100 percent, which indicates that much of these data may be suspect.

Statistical Analysis

Various mathematical and statistical methods were used to analyze water-quality and streamflow data. The results are presented in tabular and graphical formats. Error estimates of individual computational or analytical procedures are provided, but no attempt was made to estimate the cumulative errors that might result from their interaction. Thus, no limits were set on acceptable errors.

Synthesis of Continuous-Streamflow Records

Daily streamflow data were available for annual load estimates at the five continuous record sites (fig. 4, sites 3, 6, 7, 15, and 24). Measured discharge at the time of water-quality sampling was available at all non-continuous stream-sampling sites except for Harrods Creek (site 25), which was not measured because of the strong influence of backwater. Continuous-daily records of streamflow were synthesized for all noncontinuous-record sites, except site 4 (which was discontinued because of the lack of flow) and site 25. The streamflow was synthesized by defining the relation between the measured discharge at time of sampling and concurrent discharge at one of the nearby continuous-record sites (table 10). Separate relations for low and high flows were determined to give the best estimates. (Use of separate relations was necessary because of discontinuous single relations caused by point source discharge effects.) Low flow was defined as less than 1.0 $(ft^3/s)/mi^2$ of drainage area. Daily streamflow for Harrods Creek (site 25) was synthesized by use of general equations for Jefferson County developed from data for all sites combined.

Treatment of Censored Data

For this report, several methods for treating censored data were used depending on the type of analysis done. The specific treatments of values less than the detection limits are discussed separately in the descriptions of statistical methods.

Descriptive Statistics

Statistics were computed only for sites that had at least 10 sample observations for a given constituent during February 1988 - March 1991. Although no single number of observations is ideal for all conditions, at least 10 observations were required to reduce the influence of extreme values. For sites having less than 10 sample observations, only the extremes were reported.

Table 10.--Regression statistics describing the relation between discharge at continuous-record streamflow-gaging stations and discharge at partial-record streamflow-gaging stations in Jefferson County, Kentucky

[N, number of regression data pairs; R2, coefficient of determination; SE, standard error of the regression; FFAF, Floyds Fork at Fisherville; MFBC, Middle Fork Beargrass Creek at Louisville; SFBC, South Fork Beargrass Creek at Louisville; POND, Pond Creek near Louisville; --, unknown]

Equation used in regression analysis: $y = a[b + c(X)]^2$
where y is the estimated discharge, in cubic feet per second, (ft^3/s);
a is the stream site drainage area, in square miles (mi^2);
b is the regression constant (y-intercept of regression equation);
c is the regression coefficient; and
X is the square root of discharge of indicated continuous-record station, in cubic feet per second per square mile of drainage area [$(ft^3/s)/mi^2$].

Site number and name	N	a	b	c	X	R2	SE
Low flow estimates (less than 1), in $(ft^3/s)/mi^2$							
1 Pond Creek at Pendleton Road	64	80.3	0.25706905	0.65051701	FFAF	0.808	0.040
2 Mill Creek at Orell Road	64	13.5	.05916443	.44214012	MFBC	.627	.043
5 South Fork Beargrass Creek at Winter Avenue	64	22.6	.15070766	.69943295	SFBC	.779	.047
8 Middle Fork Beargrass Creek at Beals Branch Road	62	22.7	-.11211531	1.02842092	SFBC	.844	.057
9 Spring Ditch at Private Drive below Hanses Road	45	1.6	.40122719	.68761407	MFBC	.551	.094
10 Muddy Fork at Mockingbird Valley Road	60	6.2	.05186926	.95558114	SFBC	.779	.066
11 Goose Creek at U.S. Highway 42	52	10.1	.40065110	.65998531	FFAF	.793	.047
12 Little Goose Creek at U.S. Highway 42	47	5.8	.41038058	.71673185	FFAF	.808	.051
13 Goose Creek at Old Westport Road	50	6.0	.46798369	.68616327	FFAF	.663	.070
14 Pope Lick at Pope Lick Road	55	2.9	.15713802	.82504109	MFBC	.742	.066
16 Chenoweth Run at Gelhaus Road	58	11.6	.15910428	.81137410	SFBC	.707	.069
17 Fern Creek at Old Bardstown Road	46	3.5	.12701232	1.11982039	SFBC	.675	.116
18 Northern Ditch at Preston Highway	49	11.1	.39573416	.72857692	MFBC	.699	.069
19 Fishpool Creek at Bost Road	57	5.3	.13306421	.75127590	POND	.543	.092
20 Southern Ditch at Minors Lane	59	12.8	.00291375	.83275487	POND	.823	.051
21 Floyds Fork at Bardstown Road	61	213	.09652314	.83004419	FFAF	.816	.051
22 Cedar Creek at Thixton Road	58	11.1	.29893066	.58487033	FFAF	.650	.057
23 Pennsylvania Run at Mt. Washington Road	59	6.4	.21355648	.63046115	FFAF	.601	.067
26 Long Run at State Highway 1531	46	22.5	-.07792961	.93390777	FFAF	.861	.056
General equation for Jefferson County	1,074	--	.35567859	.50681497	FFAF	.458	.017
High flow estimates (greater than 1), in $(ft^3/s)/mi^2$							
1 Pond Creek at Pendleton Road	27	80.3	.23233127	.75952144	POND	.789	.077
2 Mill Creek at Orell Road	7	13.5	.33031507	.62110570	POND	.833	.113
5 South Fork Beargrass Creek at Winter Avenue	27	22.6	-.13304078	1.11727630	SFBC	.894	.076
8 Middle Fork Beargrass Creek at Beals Branch Road	27	22.7	-.08832488	1.06757675	MFBC	.974	.034
9 Spring Ditch at Private Drive below Hanses Road	48	1.6	.31163378	1.19607819	SFBC	.949	.040
10 Muddy Fork at Mockingbird Valley Road	31	6.2	.13235925	.98060433	MFBC	.941	.045
11 Goose Creek at U.S. Highway 42	40	10.1	.59871951	.61060881	MFBC	.780	.052
12 Little Goose Creek at U.S. Highway 42	44	5.8	.47092227	.86266651	MFBC	.733	.079
13 Goose Creek at Old Westport Road	43	6.0	.62657118	.71374115	MFBC	.818	.052
14 Pope Lick at Pope Lick Road	34	2.9	.28665223	.89385585	SFBC	.884	.056
16 Chenoweth Run at Gelhaus Road	36	11.6	-.27087226	1.42275810	MFBC	.896	.082
17 Fern Creek at Old Bardstown Road	43	3.5	.10019791	1.14722175	MFBC	.812	.085
18 Northern Ditch at Preston Highway	48	11.1	.32448698	.98310382	MFBC	.965	.027
19 Fishpool Creek at Bost Road	32	5.3	-.12350057	1.19014765	MFBC	.935	.056
20 Southern Ditch at Minors Lane	25	12.8	-.18791264	1.08478556	MFBC	.843	.095
21 Floyds Fork at Bardstown Road	25	213	-.01290762	1.08024303	FFAF	.963	.043
22 Cedar Creek at Thixton Road	30	11.1	.32027018	.84023829	POND	.871	.060
23 Pennsylvania Run at Mt. Washington Road	28	6.4	.43088486	.76658222	POND	.887	.053
26 Long Run at State Highway 1531	22	22.5	-.66619773	1.57616801	MFBC	.890	.121
General equation for Jefferson County	630	--	.35401887	.86874258	MFBC	.746	.020

Statistical summaries list the number of sample observations, the number of censored values, and selected data percentiles (table 11 at the end of this report). A minimum of 30 observations was required for the computation of the 10th and 90th percentiles because percentiles computed from smaller sample sizes (less than 30 observations) may be strongly influenced by extreme values. If censored values were present, the data were fit to a log-normal distribution before computation of quantiles. This log-normal fitting procedure (Helsel and Cohn, 1988) was used to synthesize a "most probable" data distribution. Resultant quantiles computed from these synthesized distributions are noted in the tables.

Boxplots

Boxplots (Tukey, 1977) were constructed to provide graphical displays of the median, interquartile range, quartile skew, and extreme data values for selected constituents and physical properties. A boxplot was not constructed if fewer than 10 observations for a site were available. Boxplots consist of a box drawn from the 25th percentile to the 75th percentile (the interquartile range). A horizontal line is drawn across the box at the median, and the two box parts thus depict the quartile skew. Vertical lines (whiskers) are drawn from the quartiles to the largest data value less than or equal to the upper quartile plus 1.5 times the interquartile range (upper adjacent value) and the smallest data value greater than or equal to the lower quartile minus 1.5 times the interquartile range (lower adjacent value). Values more extreme in either direction than these values are plotted individually. Those from 1.5 to 3.0 times the interquartile range (outside values) are plotted with an asterisk. Data more extreme than 3.0 times the interquartile range (far-outside values) are plotted with a circle.

A modified procedure was used to construct boxplots for sites with censored data. The data were fit to a log-normal distribution before computation of medians and quartiles (Helsel and Cohn, 1988). A heavy horizontal line was drawn across the boxplot at the highest detection limit value, and any part of the box below the highest detection limit was shown with dashed lines. If the highest detection limit was greater than the upper adjacent value, no upper whisker was drawn. If the highest detection limit was greater than the 25th percentile, no lower whisker was drawn. If the highest detection limit was less than the 25th percentile, but greater than the lower adjacent value, the lower whisker was not extended below the highest detection limit. Any outside or far-outside values that were less than the highest detection limit were not plotted.

Trend Analysis

The seasonal Kendall test was used to detect trends in water-quality data collected during February 1988 - March 1991. The seasonal Kendall test is a nonparametric test for trend detection applicable to data sets characterized by seasonal variations (Hirsch and others, 1982). With this test, the effect of seasonal variation is reduced by comparing observations from the same season of the year. The null hypothesis for the seasonal Kendall test is that

no trend in the data exists (the variable values are random and are independent and identically distributed). The test statistic (tau) has a value between -1 and +1. Negative values indicate decreasing trends, whereas positive values indicate increasing trends. If no trend exists in the data, then tau approaches zero. A significance probability (p-level) of the trend is computed that indicates the probability of erroneously rejecting the null hypothesis (that no trend exists). The seasonal Kendall test is specifically designed to provide a single summary statistic for the entire record. It should be noted that the selection of the period of record for trend analysis may significantly affect the outcome of the trend test. Assessment of trends from February 1988 through March 1991 does not fully meet the goal of the cooperative sampling program to define long-term trends in water-quality, and additional data collection over time is planned.

Comparisons are made between the median of data grouped into user-defined intervals at multiples of 12 months apart. The comparison intervals are based on equal divisions of a year and thus selection of 4 intervals results in quarterly comparisons, and selection of 12 intervals results in monthly comparisons, approximately. The seasonal Kendall slope estimation is an estimate of the magnitude of the slope of the trend line. This statistic is estimated by computing the difference of the data values and dividing this difference by the period of time separating the data values. The median of these differences (expressed as slopes) is defined as the change per year due to the trend. Use of the median of these individual slope values reduces the effect of extreme values on the trend estimate. The statistic is also unaffected by seasonality because the slopes are always computed between values that are multiples of 12 months apart (Hirsch and others, 1982).

The number of comparison intervals used for the seasonal Kendall test was chosen on the basis of the frequency of data collection. Samples to be analyzed for trace elements and organic constituents were collected quarterly. Other water-quality samples were collected on a monthly or twice monthly schedule. For trend testing of those data obtained quarterly, 4 comparison intervals per year were selected. Data obtained monthly or twice monthly were tested with 12 comparison intervals per year. Daily statistical summaries of the continuous records of water temperature, specific conductance, pH, and dissolved oxygen were tested with 52 comparison intervals per year. Results are reported in table 12 at the end of this report and include the period of record, number of observations and seasonal comparisons, probability level, and the slope of the trend line, or magnitude of the trend. Trend analyses based on less than 10 comparisons were not reported. Trend-line slopes that were not significant at the 0.20 p-level were not reported. By definition, the null hypothesis could be rejected erroneously 20 percent of the time when a 0.20 p-level is used, and these trend test results should be used with caution. The trend-line slope for pH was reported only as increasing or decreasing because computation of the trend-slope magnitude on the basis of logarithmic units is inappropriate.

For data sets that include censored data, sensitivities were tested by applying the seasonal Kendall test twice: once to data with censored values equal to zero and once to data with censored values equal to the detection limit. The results of the two trend tests were then compared. If the results

were similar, it was assumed that the presence of censored values in the data set did not affect the trend results. Therefore, the smaller magnitude trend and the larger probability were reported. Criteria for similarity were that (1) both trend slopes had to have the same numeric sign and (2) each slope had to be bounded by the 95-percent confidence limits of the other slope. If the slopes were not similar, then it was assumed that the presence of censored values altered the trend results, and the trend was then reported only as upward or downward for those test results that had the same numeric sign.

In streams, many water-quality characteristics are related to discharge. For example, much of the constituent loadings may be from point sources; therefore, any increase in flow would tend to be accompanied by a decrease in constituent concentration. Conversely, some constituents are transported on suspended sediment, which tends to increase in concentration as discharge increases, and an increase in flow might be accompanied by an increase in total constituent concentration.

If the rate of streamflow has changed with time, then the concentration of a constituent may indicate a trend solely as a result of the change in streamflow. Compensation for the effects of discharge is necessary to identify trends in water-quality constituents caused by some change in the constituent source. The effects of discharge were minimized by use of the residuals method of flow adjustment. In this method, a best-fit relation between the constituent and discharge is derived. The seasonal Kendall test is then applied either to the residuals or the actual concentrations minus the estimated concentrations obtained from the best-fit curve. The residuals then represent the concentration of a constituent without the effects of discharge.

Some common models used for defining the relation between a water-quality variable and discharge include the following (Crawford and others, 1983):

Linear	$C = a + bQ$	(2)
Ln-linear	$C = a + b(\mathrm{Ln}Q)$	(3)
Quadratic	$C = a + b_1Q + b_2Q^2$	(4)
Inverse	$C = a + b(1/Q)$	(5)
Ln-Ln	$\mathrm{Ln}C = a + b(\mathrm{Ln}Q)$	(6)

where C is the constituent value,
Ln is the natural logarithm,
Q is the discharge, and
a and b are the constant and coefficient of the relation, determined by least-squares regression analysis.

For each constituent at each site, the best model to fit the relation between the constituent and discharge was determined by use of least-squares regression. At least 10 observations of concurrent constituent values and discharge were required. The null hypothesis was that there was no relation between constituent values and discharge. If the regression analysis indicated a relation, the best model was chosen on the basis of the probability level of the regression. If none of the models were significant at the 0.20 probability level, then a flow-adjusted trend was not determined.

Data sets containing censored values were not used because of the uncertainty of deriving residuals from censored values. Residuals from the best-fit model were evaluated for trends by use of the seasonal Kendall test.

In most of the regression models, the residuals have the same units as the constituents tested. With the Ln-Ln model, however, residuals are reported as natural logs of constituent reporting unit. Therefore, residuals from the Ln-Ln model were estimated in original units, and equations were used to compare residuals from all models on the same terms:

$$r = C - De^{aQ^b} \qquad (7)$$

where r is the residual,
D is the Duan smearing estimate, and
e is the base for the natural logarithm.

The Duan smearing estimate is a correction factor for the bias introduced in detransforming dependent variables (Duan, 1983).

Because of the presence of censored data or the lack of a well-defined relation to discharge, compensation for the effects of discharge was not always possible. In such situations, the concentration of a constituent may still indicate a trend solely as a result of a trend in streamflow. Therefore, trends in discharge during the period for which water-quality trend analysis is done must be known in order to identify trends in water-quality constituents caused by some process (source) change. An analysis of trends in discharge was made for continuous-record stations in Jefferson County by means of the seasonal Kendall test. Total monthly discharge for March 1988 - February 1991 indicated an upward trend in South Fork Beargrass Creek (site 6) at a 0.1615 probability level. Seasonal Kendall analyses of discharge for this period at each of the other continuous-record stations (sites 3, 7, 15, and 24) resulted in probability levels in excess of 0.2, indicating no significant trend. Precipitation data from Louisville for the same period also were tested with the seasonal Kendall test; no trend was indicated.

Comparisons to Water-Quality Criteria

Water-quality data were compared to water-quality criteria established by the Federal government and State of Kentucky. The percentage of sample analyses for each constituent that exceeded any of the criteria are shown in table 13 at the end of this report. Censored values were not considered to exceed the criteria even if the applicable criteria were less the the censored value. The percentage of data that exceeded a particular water-quality criterion was reported even if it was not applicable to the stream classification. Thus, comparisons to water-quality criteria were not intended to assess the extent of violations but rather to provide an index for comparison between stream sites.

Loads and Yields

The instantaneous load of a constituent in a stream is simply the concentration of that constituent multiplied by the discharge and a conversion factor. The average load of a constituent over time is more difficult to estimate. Estimates based on mean concentration multiplied by the mean discharge are not accurate for the same reason that the sum of products does not equal the product of sums. In Jefferson County, quarterly or monthly samples are not likely to include the major stormflows that normally carry a large percentage of the total load of a stream.

Mean annual loads for a selected period (March 1988 - February 1991) were estimated from periodic water-quality samples and daily discharge values. Censored values were set equal to one-half of the detection limit. A model was selected from the best combination of explanatory variables based on the Mallows C_p statistic (Mallows, 1964):

$$\ln(CQ) = I + at + b(\sin\theta) + c(\cos\theta) + d(\ln Q) + e \qquad (8)$$

where C is the concentration, in milligrams per liter;
Q is the discharge, in cubic feet per second;
I is the regression intercept;
ln is the natural logarithm;
t is the time, in decimal years, (September 30, 1986, at 2400 hours as t = 0 was used);
θ is the fractional part of the year, in radians;
a, b, c, and d are the regression coefficients; and
e is the residual error (the amount that the predicted value deviates from the observed value).

The sum b sine θ + c cosine θ is a seasonality term and is the functional equivalent of applying a phase shift and amplitude to a linear regression model.

The best-fit model based on available data for March 1988 - February 1991 was applied to the 3 years of daily values of discharge. The predicted log value was transformed and multiplied by the Duan smearing estimate. The 3 years of daily loads were then summed and averaged into a mean annual load for the 3-year period. All loads are reported regardless of the significance of the regression, but several uncertainty statistics also are reported. For example, the standard error of the regression, in percent, is a measure of the goodness of fit of the regression relation. The flow duration of the highest sampled discharge, in percent, represents the adequacy of the sampling regime at high flow, usually when the largest loads occur. The percentage of load estimated from discharge greater than the highest sampled flow is a measure of the load resulting from extrapolation beyond the range of data used to derive the regression relation. These estimates should be used with caution because of the uncertainty of the exact relation beyond the range of data.

Yields are commonly reported for water-quality constituent transport. Yields are expressed as the constituent loads per unit area of the contributing drainage basin. For this study, the unit of measurement used for

yield computations was in tons per square mile and was determined by dividing the mean annual load estimates by the basin drainage area. The resultant yields were in units that facilitated comparisons between basins.

Precipitation wetfall analyses from the National Atmospheric Deposition Program (NADP) were used to estimate the relative effects of precipitation chemistry on stream yields of major ions in the basin. The NADP is a program to determine regional geographical patterns and long-term trends in the chemical composition of wet atmospheric deposition (Bigelow, 1986). Collection of data began in 1978 at seven sites. By 1983, the collection network was 190 sites. No sites are in Jefferson County, but four are in the nearby Kentucky counties of Boyle, Fayette, Grayson, and Pendleton. Analyses of weekly precipitation samples for the period 1983-89 were summarized (R.D. Saylor, Center for Applied Energy Research, University of Kentucky, written commun., 1991). Data included average weekly precipitation amounts, specific conductance, and concentrations of major dissolved ions. Annual precipitation loadings were computed from these data. These transport estimates from the NADP data represent total loads if all constituent inputs from precipitation are assumed to be transported from the basin annually.

WATER QUALITY OF SELECTED STREAMS

Although some useful water-quality information was available from previous data-collection programs, data necessary to make meaningful statistical determinations of conditions and trends in Jefferson County streams were primarily available from the February 1988 - March 1991 period for most constituents and properties. Statistical summaries, load calculations, trend analyses, and comparisons to applicable surface-water-quality criteria were used to describe, to the extent possible, current stream-water-quality conditions. The available data are not without limitations, however. For example, estimations of annual constituent loads can be significantly affected by the limited data available for characterization of high-flow conditions. In addition, the period of record available is very brief, and trend analyses may be suspect.

Temperature

Temperature, one of the most influential factors in the field of water-quality control, affects almost every physical property of water, every physical process that takes place in water, most chemical reactions in water, and, most importantly, all biologic organisms in the aquatic community. It has a direct effect on the quality of water for domestic supplies, fish and wildlife habitat, assimilation of wastes, and industrial and agricultural uses. Low temperatures are moderated somewhat on the large, deep streams because of the additional thermal storage and lower levels of heat transfer between the water and the atmosphere. Seasonality of air temperature is reflected in a corresponding seasonal pattern in water temperature. The monthly range of water temperatures monitored in Pond Creek (site 3), South Fork Beargrass Creek (site 6), Middle Fork Beargrass Creek (site 7), and Mill Creek Cutoff (site 24) shows this seasonal pattern (fig. 7).

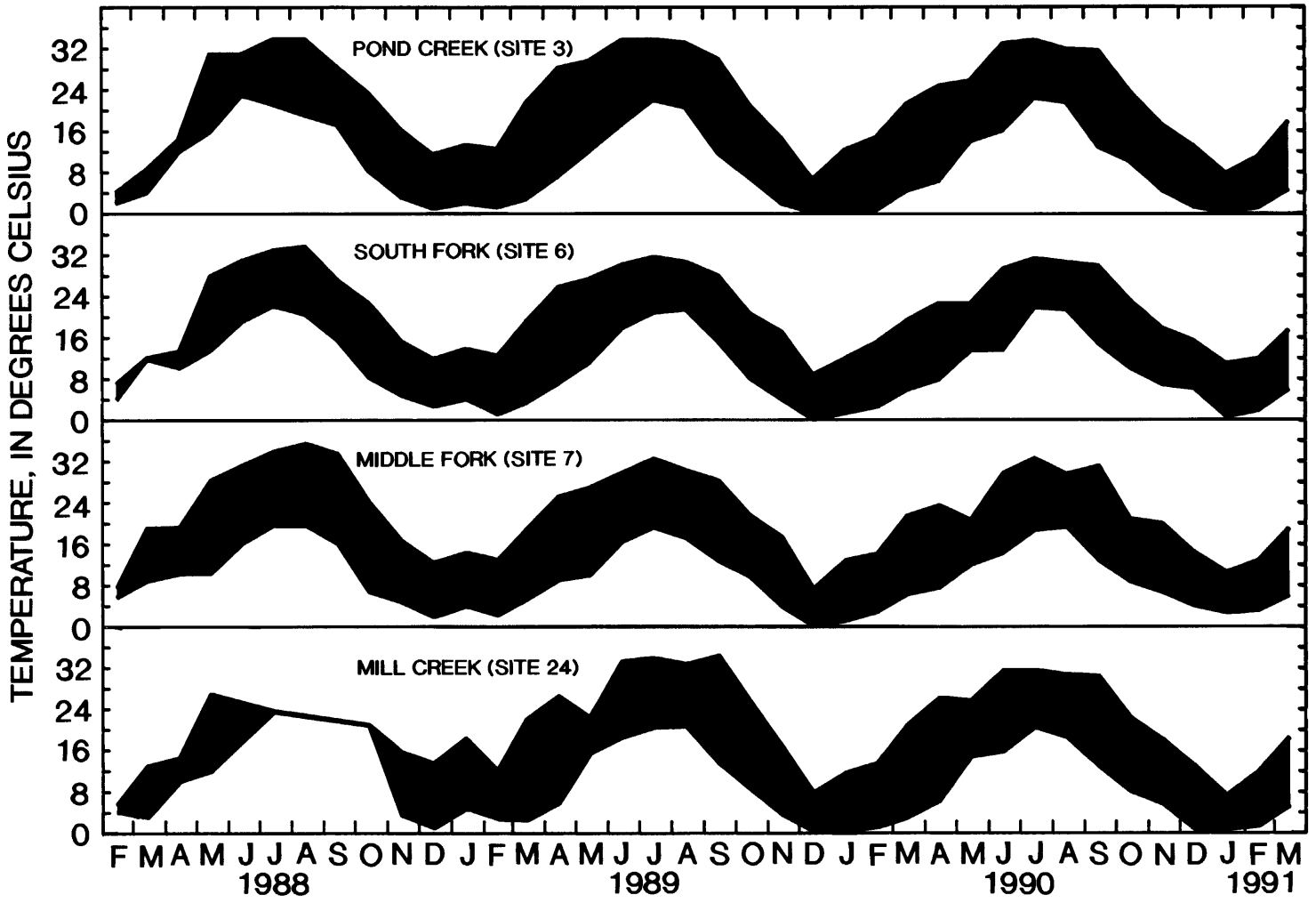

Figure 7.--Monthly range of water temperature in selected streams of Jefferson County, Kentucky, February 1988-March 1991, based on continuous records and twice-monthly observations.

Federal water-quality criteria for temperature for the protection of aquatic life are species dependent. The Kentucky criteria for aquatic habitat require water temperature to be less than 31.7°C for streams classified as "warmwater habitat." None of the 26 stream-sampling sites had a 90th-percentile value greater than the applicable Kentucky criterion of 31.7°C (table 11). The maximum daily temperature recorded at the four continuous-record sites did occasionally exceed the acute criterion of 31.7°C. The available stream-temperature data indicate a possible elevation of minimum temperatures at some sites, which may be the result of wastewater discharges.

The average monthly air temperature record for Louisville was tested for a trend, and no trend was detected. Several significant upward trends in water temperature are apparent, however, from available flow-adjusted data for February 1988 - March 1991 (table 12). Only Chenoweth Run at Gelhaus Road (site 16) had a downward temperature trend that was statistically significant; this trend may be the result of reduced effluent discharge to the stream.

pH and Alkalinity

The pH of a solution is defined as the negative base-10 logarithm of the hydrogen-ion activity. Values of pH less than 7 indicate acidic solutions and those greater than 7 indicate alkaline solutions. The pH of most stream water not affected by contamination is in the range of 6.0 to 8.5 (Hem, 1985, p. 64). Alkalinity is a measure of the capacity of a water to neutralize a strong acid.

The pH of natural water is a measure of the acid-base equilibrium achieved by various dissolved salts and gases. The principal system regulating pH in natural water is the carbonate system, which consists of carbon dioxide, carbonic acid, and bicarbonate and carbonate ions. A departure from near-neutral pH may be caused by the influx of acidic or alkaline wastes, or, in poorly buffered water, fluctuations in algal photosynthesis. Water with a pH in the range from 6.5 to 9.0 units generally provides adequate protection for freshwater fish and bottom-dwelling invertebrates (U.S. Environmental Protection Agency, 1986a).

Streams in Jefferson County are generally well-buffered and slightly alkaline. Median pH ranges from 7.5 to 8.2 (based on available data for February 1988 - March 1991). This slight alkalinity may be caused partly by an abundance of carbonate minerals in the soil and bedrock. Statistical summaries of pH and concentrations of alkalinity are presented in table 11. Lowest pH measured at most stream-sampling sites in the county was greater than 6.0, the Kentucky criterion for warmwater aquatic habitat. Data from the four continuous-record sites, however, showed that pH occasionally was outside the range of 6.0 - 9.0 units (fig. 8). During low-flow periods, pH can have daily cyclic fluctuations in response to algal productivity and associated reduction of carbon dioxide concentrations (fig. 9). pH at the sites where the upper pH criterion occasionally was exceeded may be attributed in part to algal productivity. The pH increases as algae increase photosynthetic activity during daylight hours. Subsequently, algal photosynthetic activity ceases at night, and pH decreases. Storm runoff generally lowered the pH of the streams (fig. 9).

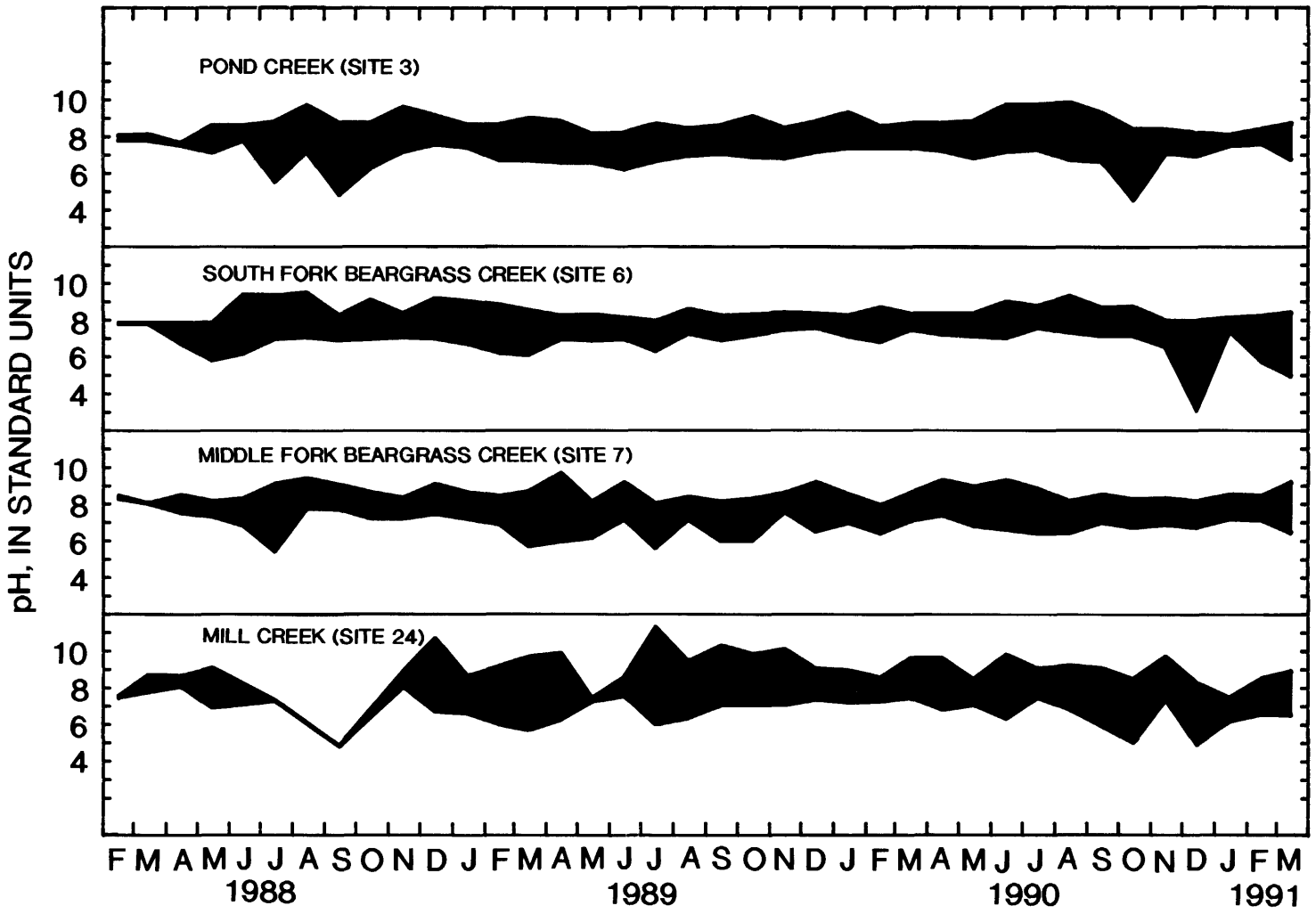

Figure 8.--Monthly range of pH in selected streams of Jefferson County, Kentucky, February 1988-March 1991, based on continuous records and twice-monthly observations.

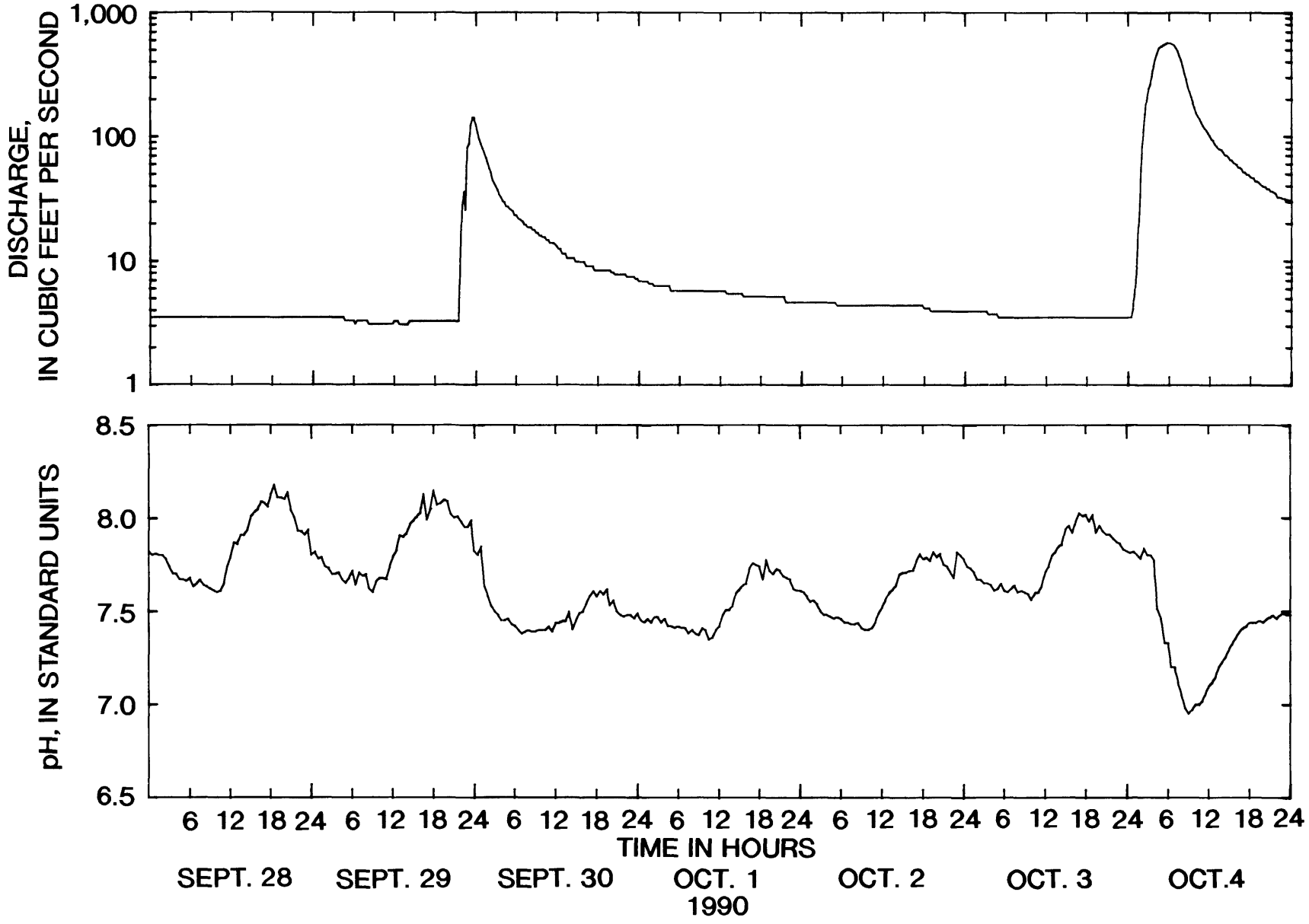

Figure 9.--Discharge and pH (30-minute intervals), of Middle Fork Beargrass Creek (site 7), September 28-October 4, 1990.

Analysis of the periodic sample data from the 26 stream sites indicated significant downward trends in pH at 5 of the sites and an upward trend at 1 (based on available data for February 1988 - March 1991) (table 12). The one site where the periodic pH measurements indicated an upward trend was Pond Creek at Manslick Road (site 3); however, the continuous record of pH at the Pond Creek site did not indicate an upward trend. Analysis of the continuous pH records for the other three monitor sites all indicated possible downward trends in pH. These trends could not be clearly associated with any specific causative factor.

The Federal criterion for alkalinity is set at a level no less than 20 mg/L (milligrams per liter) as $CaCO_3$ for protection of aquatic life (chronic). Samples from only 4 of the 26 stream-sampling sites had any alkalinity values less than the 20 mg/L criterion. At the 10th percentile of available data for February 1988 - March 1991, alkalinity at none of these 26 sites was less than 20-mg/L minimum criterion. The range of alkalinity at the 10th percentile of available data ranged from 51 to 139 mg/L (table 11). Mill Creek drains the Ohio River alluvium and seems to have relatively low alkalinity, when compared to other areas of Jefferson County, probably because of the lack of carbonate materials in the alluvium. No downward trends in alkalinity were indicated. Upward trends in alkalinity were indicated by flow-adjusted trend analysis at 16 of the 26 stream-sampling sites (table 12). These trends were increasing at an average rate of about 9.7 percent per year. The largest increase, approximately 22 percent per year, was indicated for Mill Creek (sites 2 and 24).

Dissolved Solids and Related Water-Quality Constituents and Characteristics

The presence of chemical constituents dissolved in water results from (1) the physical and chemical characteristics of the material over which or through which the water moves, (2) natural weathering processes, and (3) point and nonpoint sources of the constituents. Dissolved ionic constituents can be either positively charged (cations) or negatively charged (anions). The only major cations sampled in streams of Jefferson County were calcium and magnesium; the only major anion sampled was nitrate.

Dissolved Solids

Dissolved solids consist of inorganic salts, small amounts of organic matter, and dissolved materials. Equivalent terminology is "filterable residue." Excessive dissolved-solids concentrations (greater than 500 mg/L) in drinking water are objectionable because of possible physiological effects, unpalatable mineral taste, and costs associated with increased corrosion or the need for additional treatment. The physiological effects directly related to dissolved solids include laxative effects (principally from sodium sulfate and magnesium sulfate), adverse effects of sodium on some patients afflicted with cardiac disease, and toxemia associated with pregnancy (U.S. Environmental Protection Agency, 1986a).

At the 90th percentile of available data for February 1988 - March 1991, dissolved solids at none of the 26 stream-sampling sites exceeded 750 mg/L, the Kentucky maximum criterion for domestic water supplies. Dissolved solids, at the 90th percentile of available data, ranged from 352 to 718 mg/L (table 11). The maximum dissolved-solids concentration, however, exceeded 750 mg/L at 14 of the 26 sampled sites. Dissolved solids exceeded the Federal SMCL of 500 mg/L in more than 20 percent of the samples from Muddy Fork (site 10), Northern Ditch (site 18), and Cedar Creek (site 22) (table 13).

The mean annual mass transport of dissolved solids for March 1988 - February 1991 was estimated for the 26 stream-sampling sites (table 14). The reliability of the transport estimates in table 14 is considered good on the basis of uncertainty factors presented in the table. Dissolved solids were assumed to be conserved in the flow system, and yields of dissolved solids from contributing areas between sampling sites were computed by subtracting upstream mass-transport estimates from downstream estimates for those streams on which two or more sampling sites were located.

Two areas of Jefferson County, the upper section of the Chenoweth Run watershed, and the lower section of the South Fork Beargrass Creek watershed, yielded dissolved solids in excess of 800 ton/mi^2 (fig. 10). It is suspected that these two areas may be affected by point discharges of sewage effluent or combined sewer overflows. In the western part of the county, however, the Mill Creek watershed and the lower section of the Pond Creek watershed yielded less than 200 ton/mi^2 of dissolved solids (fig. 10).

Flow-adjusted analyses of the periodic-sample data from the 26 stream sites indicated significant downward trends in dissolved solids at five of the sites and upward trends at two (based on available data for February 1988 - March 1991) (table 12).

Specific Conductance

Specific conductance is a measure of the ability of water to conduct an electrical current and is related to the quantity and types of ionized substances in water (dissolved solids). Specific conductance is generally inversely related to discharge. Specific conductances measured periodically at the 26 stream-sampling sites ranged from 41 to 1,910 μS/cm. The range of specific conductance at the four continuous-record sites was within these limits (fig. 11). Flow-adjusted seasonal Kendall tests for trend agreed with all the indicated dissolved-solids trends (table 12). In addition, upward specific-conductance trends were indicated at six other sites.

Specific conductance is a common field determination because of the simplicity of its measurement. Because of its relation to ionized substances, specific conductance can be used to estimate concentrations of some individual dissolved constituents in water. Regression statistics describing the relation between specific conductance and selected dissolved water-quality

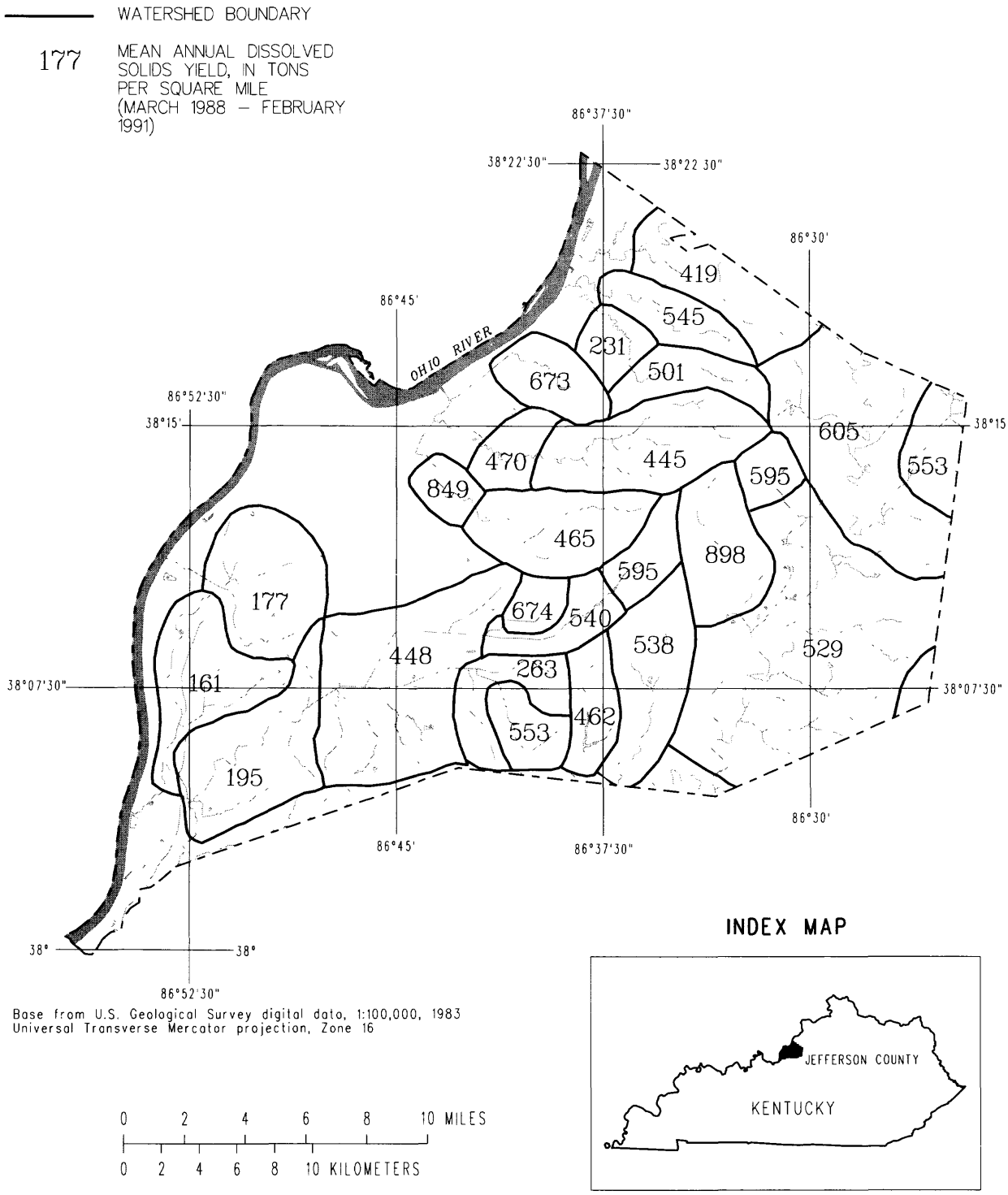

Figure 10.--Mean annual dissolved-solids yields of selected watersheds in Jefferson County, Kentucky, March 1988 – February 1991.

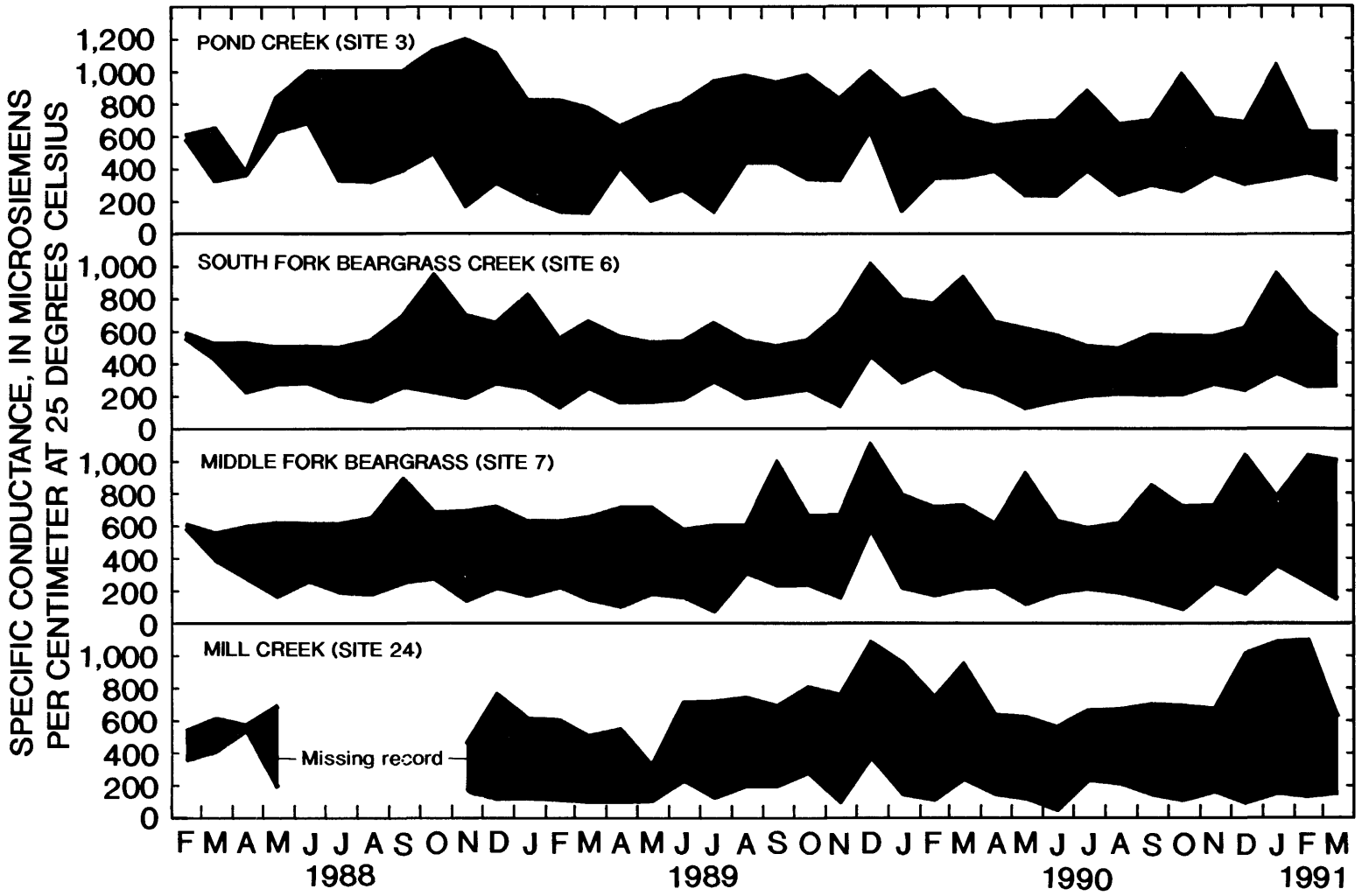

Figure 11.--Monthly range of specific conductance in selected streams of Jefferson County, Kentucky, February 1988-March 1991, based on continuous records and twice-monthly observations.

constituents were determined for selected sites in the basin (table 15). The concentration of a particular constituent can be estimated by the linear regression equation:

$$Y = a + bX + e \qquad (9)$$

where Y is the estimated constituent concentration, in milligrams per liter;
a is the regression constant (y-intercept of regression equation);
b is the regression coefficient (slope of regression equation);
X is the specific conductance, in microsiemens per centimeter; and
e is the residual error.

The regression equation can be reduced to the following form:

$$Y = bX \qquad (10)$$

because as specific conductance approaches zero, concentrations of individual dissolved constituents in water also approach zero (the y-intercept of the linear regression equation is equal to zero). The regression equations should be used with caution in estimating concentrations of constituents because of the large standard error of the estimate at some sites. The relation of dissolved solids to specific conductance at site 13, Goose Creek at Old Westport Road, has a high standard error. This high standard error is believed to be due to an extreme value of dissolved solids, probably in error.

Calcium and Magnesium

Calcium and magnesium are essential elements for plant and animal life forms. Calcium is usually the dominant cation in most natural stream water, and in some aspects of water chemistry, calcium and magnesium may be considered as having similar effects (Hem, 1985, p. 93-97). Concentrations of these constituents at the 26 stream sites ranged from 1.0 to 115 mg/L for total calcium and from 3.2 to 41 mg/L for total magnesium (table 11). Concentrations of calcium and magnesium measured in precipitation by the NADP (Bigelow, 1986) at stations near Jefferson County averaged approximately 0.4 and 0.07 mg/L, respectively.

The maximum measured calcium concentration was from Muddy Fork (site 10). The largest calcium yield during March 1988 - February 1991 (199 ton/mi^2) was also from the Muddy Fork watershed (table 14); however, the yield of magnesium was not correspondingly large (about 18 ton/mi^2). The largest yield of magnesium, from the Fern Creek watershed (site 17), exceeded 50 ton/mi^2. The lowest yields of both calcium and magnesium were from the Mill Creek watershed (sites 2 and 24) where calcium yield was less than 14 ton/mi^2 and magnesium yield was less than 5 ton/mi^2. On the basis of NADP data, atmospheric deposition may have been the source for 1.4 ton/mi^2 of calcium and 0.2 ton/mi^2 of magnesium in the Jefferson County area. No significant flow-adjusted trends in calcium concentrations of any of the streams were indicated. Downward trends in total magnesium were indicated in South Fork Beargrass Creek (sites 5 and 6) and in Pennsylvania Run (site 23).

Table 15.--Regression statistics describing the relations between specific conductance and the values of selected water-quality constituents and properties measured at selected stream-sampling sites in Jefferson County, Kentucky, based on available data from February 1988-March 1991

Equation used in regression analysis: $y = bx$
where y is the estimated constituent concentration, in milligrams per liter;
b is the regression coefficient (slope of regression equation); and
x is the specific conductance, in microsiemens per centimeter.

[N, number of regression data pairs; CV, coefficient of variation]

	Site name and number	N	b	CV
Dissolved solids, residue at 105 degrees Celsius, in milligrams per liter				
1	Pond Creek at Pendleton Road	72	0.678	25
2	Mill Creek at Orell Road	69	.672	33
3	Pond Creek at Manslick Road	73	.677	23
5	South Fork Beargrass Creek at Winter Avenue	74	.657	31
6	South Fork Beargrass Creek at Trevilian Way	74	.676	25
7	Middle Fork Beargrass Creek at Old Cannons Lane	74	.656	17
8	Middle Fork Beargrass Creek at Beals Branch Road	72	.647	20
9	Spring Ditch at Private Drive	74	.644	13
10	Muddy Fork at Mockingbird Valley Road	73	.659	16
11	Goose Creek at U.S. Highway 42	73	.641	18
12	Little Goose Creek at U.S. Highway 42	74	.660	18
13	Goose Creek at Old Westport Road	72	.769	120
14	Pope Lick at Pope Lick Road	73	.673	25
15	Floyds Fork at former State Highway 155	73	.673	50
16	Chenoweth Run at Gelhaus Road	72	.663	63
17	Fern Creek at Old Bardstown Road	72	.664	16
18	Northern Ditch at Preston Highway	73	.675	14
19	Fishpool Creek at Bost Road	74	.674	15
20	Southern Ditch at Minors Lane	71	.664	11
21	Floyds Fork at Bardstown Road	73	.673	60
22	Cedar Creek at Thixton Road	73	.728	34
23	Pennsylvania Run at Mt. Washington Road	74	.710	58
24	Mill Creek Cutoff at Dover Road	62	.693	38
25	Harrods Creek at Hunting Creek Drive	69	.621	13
26	Long Run at State Highway 1531	53	.649	19
	General equation for Jefferson County	1,788	.673	39

Table 15.--Regression statistics describing the relations between specific conductance and the values of selected water-quality constituents and properties measured at selected stream-sampling sites in Jefferson County, Kentucky, based on available data from February 1988-March 1991--Continued

	Site name and number	N	b	CV
Calcium, total, in milligrams per liter as Ca				
1	Pond Creek at Pendleton Road	11	0.0927	16
2	Mill Creek at Orell Road	10	.1109	21
3	Pond Creek at Manslick Road	12	.0913	14
5	South Fork Beargrass Creek at Winter Avenue	11	.1326	22
6	South Fork Beargrass Creek at Trevilian Way	11	.1288	20
7	Middle Fork Beargrass Creek at Old Cannons Lane	10	.1475	13
8	Middle Fork Beargrass Creek at Beals Branch Road	10	.1600	23
9	Spring Ditch at Private Drive	11	.1078	17
10	Muddy Fork at Mockingbird Valley Road	11	.1317	24
11	Goose Creek at U.S. Highway 42	10	.1002	22
12	Little Goose Creek at U.S. Highway 42	12	.1094	23
13	Goose Creek at Old Westport Road	10	.0942	20
14	Pope Lick at Pope Lick Road	13	.1002	17
15	Floyds Fork at former State Highway 155	13	.1368	13
16	Chenoweth Run at Gelhaus Road	13	.0957	23
17	Fern Creek at Old Bardstown Road	12	.1031	29
18	Northern Ditch at Preston Highway	11	.0602	54
19	Fishpool Creek at Bost Road	10	.0778	44
20	Southern Ditch at Minors Lane	10	.0880	23
21	Floyds Fork at Bardstown Road	12	.1282	18
22	Cedar Creek at Thixton Road	12	.1007	15
23	Pennsylvania Run at Mt. Washington Road	12	.0829	34
24	Mill Creek Cutoff at Dover Road	10	.0943	18
25	Harrods Creek at Hunting Creek Drive	11	.0980	36
26	Long Run at State Highway 1531	9	.1764	14
	General equation for Jefferson County	277	.1035	33

Table 15.--Regression statistics describing the relations between specific conductance and the values of selected water-quality constituents and properties measured at selected stream-sampling sites in Jefferson County, Kentucky, based on available data from February 1988-March 1991--Continued

	Site name and number	N	b	CV
Magnesium, total, in milligrams per liter as Mg				
1	Pond Creek at Pendleton Road	11	0.0328	19
2	Mill Creek at Orell Road	10	.0393	29
3	Pond Creek at Manslick Road	12	.0326	17
5	South Fork Beargrass Creek at Winter Avenue	11	.0294	16
6	South Fork Beargrass Creek at Trevilian Way	11	.0315	18
7	Middle Fork Beargrass Creek at Old Cannons Lane	10	.0315	18
8	Middle Fork Beargrass Creek at Beals Branch Road	10	.0327	22
9	Spring Ditch at Private Drive	11	.0265	20
10	Muddy Fork at Mockingbird Valley Road	11	.0190	16
11	Goose Creek at U.S. Highway 42	10	.0395	25
12	Little Goose Creek at U.S. Highway 42	12	.0369	26
13	Goose Creek at Old Westport Road	10	.0383	24
14	Pope Lick at Pope Lick Road	13	.0391	20
15	Floyds Fork at former State Highway 155	13	.0377	12
16	Chenoweth Run at Gelhaus Road	12	.0360	27
17	Fern Creek at Old Bardstown Road	12	.0426	31
18	Northern Ditch at Preston Highway	11	.0214	61
19	Fishpool Creek at Bost Road	10	.0331	51
20	Southern Ditch at Minors Lane	10	.0389	25
21	Floyds Fork at Bardstown Road	12	.0386	21
22	Cedar Creek at Thixton Road	12	.0442	22
23	Pennsylvania Run at Mt. Washington Road	12	.0385	40
24	Mill Creek Cutoff at Dover Road	10	.0299	19
25	Harrods Creek at Hunting Creek Drive	11	.0462	12
26	Long Run at State Highway 1531	9	.0273	29
	General equation for Jefferson County	276	.0339	35

Table 15.--Regression statistics describing the relations between specific conductance and the values of selected water-quality constituents and properties measured at selected stream-sampling sites in Jefferson County, Kentucky, based on available data from February 1988-March 1991--Continued

Site name and number	N	b	CV
Hardness, total, in milligrams per liter as $CaCO_3$			
1 Pond Creek at Pendleton Road	12	0.365	16
2 Mill Creek at Orell Road	10	.439	23
3 Pond Creek at Manslick Road	16	.370	13
5 South Fork Beargrass Creek at Winter Avenue	12	.467	24
6 South Fork Beargrass Creek at Trevilian Way	12	.466	22
7 Middle Fork Beargrass Creek at Old Cannons Lane	11	.499	13
8 Middle Fork Beargrass Creek at Beals Branch Road	11	.533	21
9 Spring Ditch at Private Drive	11	.378	16
10 Muddy Fork at Mockingbird Valley Road	11	.407	22
11 Goose Creek at U.S. Highway 42	10	.413	23
12 Little Goose Creek at U.S. Highway 42	12	.425	24
13 Goose Creek at Old Westport Road	11	.381	22
14 Pope Lick at Pope Lick Road	14	.410	17
15 Floyds Fork at former State Highway 155	15	.489	9
16 Chenoweth Run at Gelhaus Road	12	.390	25
17 Fern Creek at Old Bardstown Road	12	.433	30
18 Northern Ditch at Preston Highway	11	.238	56
19 Fishpool Creek at Bost Road	10	.331	47
20 Southern Ditch at Minors Lane	10	.380	24
21 Floyds Fork at Bardstown Road	13	.475	16
22 Cedar Creek at Thixton Road	13	.428	17
23 Pennsylvania Run at Mt. Washington Road	12	.366	36
24 Mill Creek Cutoff at Dover Road	14	.368	17
25 Harrods Creek at Hunting Creek Drive	12	.439	23
26 Long Run at State Highway 1531	10	.570	16
General equation for Jefferson County	299	.401	29

Hardness

Calcium and magnesium are the cations most often responsible for water hardness, although hardness can be the result of other divalent cations. Because hardness cannot be attributed to a single cation, it is reported as a chemical equivalent concentration of calcium carbonate. Water containing less than 60 mg/L $CaCO_3$ equivalent is considered "soft;" water containing 61 to 120 mg/L is considered "moderately hard;" water containing 121 to 180 mg/L is considered "hard;" and water with greater than 180 mg/L is considered "very hard" (Hem, 1985, p. 159).

For domestic use, hardness can be objectionable if it exceeds 100 mg/L. Hardness can greatly exceed this concentration in areas where water comes in contact with limestone (Hem, 1985, p. 159). Water within Jefferson County is generally classified as "hard" to "very hard" (table 11). No trends in hardness were detected (table 12).

Suspended and Volatile Solids

Suspended and volatile solids are common constituents used in defining municipal or industrial wastewater. The term "suspended solids" refers to that part of a measured sample retained on a glass-fiber filter after the water from the sample is drawn through the filter. After the sample is drawn through the filter, the filter is dried and weighed to determine the increased weight as a result of the residue retained. In water analyses, suspended solids may also be referred to as "nonfilterable residue." Volatile solids are determined by igniting the residue on evaporation at 550 degrees Celsius. Loss of weight on ignition is reported as milligrams per liter of volatile solids. Volatile solids in a waste are often interpreted as being a measure of organic matter (Hammer, 1975).

Suspended solids can affect water quality in several ways: (1) streams with high suspended-solids concentrations are aesthetically unsatisfactory for swimming and other recreation; (2) suspended solids are effective in sorbing and transporting some metals, pesticides, and other organic compounds and nutrients in streams; and (3) increases in suspended-solids loads in streams can adversely affect the biological community of the streams. The quantity of natural solids transported or available for transport from a drainage area by streams is affected by the form and intensity of precipitation and by other climatic conditions, the character of the soil mantle, plant cover, topography, and land use in the drainage area.

Suspended-solids concentrations ranged from less than 1.0 to 4,350 mg/L and were highly variable at each site (table 11). Pond Creek (site 3) had the largest median concentration of suspended solids (58 mg/L), and Mill Creek (site 2) had the maximum suspended-solids concentration (4,350 mg/L). The smallest concentrations of suspended solids were measured in Cedar Creek (site 22). Several of the streams had measured yields of suspended solids in excess of 200 ton/mi^2 (fig. 12 and table 14). These streams include Pond Creek (sites 1 and 3), South Fork Beargrass Creek (sites 5 and 6), Chenoweth Run (site 16), and Floyds Fork (site 21). Cedar Creek (site 22) and

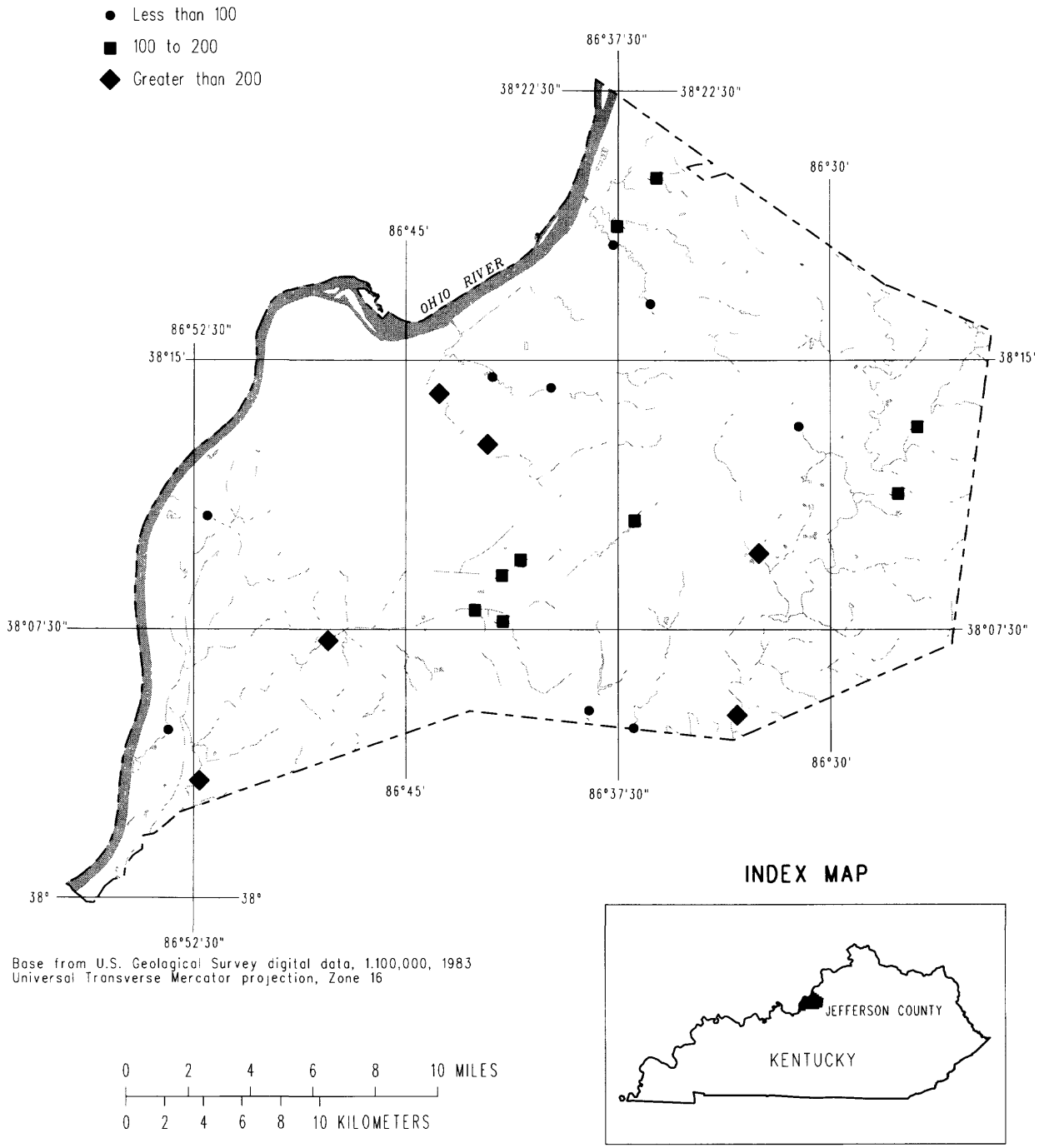

Figure 12.--Mean annual suspended-solids yields of selected streams in Jefferson County, Kentucky, March 1988 – February 1991.

Pennsylvania Run (site 23) had suspended-solids yields of less than 40 ton/mi^2. Downward trends in suspended solids were indicated by analyses of flow-adjusted concentrations at 10 of the 26 stream sites (table 12).

Volatile-solids concentrations ranged from less than 0.1 to 968 mg/L (table 11). The maximum volatile-solids concentrations were measured in samples from Southern Ditch (site 20). The highest median value of any site, however, was only 9 mg/L, in Pond Creek (site 3). Several of the streams had measured yields of volatile solids in excess of 60 ton/mi^2 (table 14). These streams included Pond Creek (site 3), South Fork Beargrass Creek (sites 5 and 6), Chenoweth Run (site 16), and Floyds Fork (site 21). Volatile-solids yields of Cedar Creek (site 22), Pennsylvania Run (site 23), Mill Creek Cutoff (site 24), and Harrods Creek (site 25) were less than 15 ton/mi^2. Flow-adjusted trend analyses were not possible because of censored values in the data set; however, downward trends in volatile solids were indicated by non-flow-adjusted analyses at 7 of the 26 stream sites (table 12).

Major Metals, Trace Elements, and Miscellaneous Inorganic Compounds

Concern about the contamination of receiving water by metals has increased substantially during the last 15 years. Many metals, such as cadmium, copper, lead, and mercury, can be toxic to aquatic organisms when present in high concentrations. These constituents are nondegradable and may persist in the environment for many years. Metals are concentrated in the solid phases of aquatic systems and commonly are associated with particulate matter in water and bottom materials.

Metals and other trace elements can enter receiving water from a variety of sources. Rocks and soils exposed to surface water and ground water are usually the largest natural source. Decomposing vegetation and animal matter also contribute small amounts of the constituents to the environment. High concentrations of some metals have been observed in dry and wet atmospheric precipitation. Many of these metals were associated with the combustion of fossil fuels and the processing of metals.

Urban storm-water runoff has been shown to contain substantial concentrations of lead, zinc, and other metals (Martin and Smoot, 1986). Sources of these metals include automobile exhaust and various commercial and industrial activities in the watershed. Other human-induced sources of metals to streams include domestic and industrial wastewater, paints, biocides, and fertilizers.

Major metals, trace elements, and miscellaneous inorganic constituents analyzed from streams in Jefferson County include arsenic, barium, beryllium, cadmium, chromium, copper, cyanide, iron, lead, mercury, nickel, selenium, silver, and zinc.

Arsenic

Small concentrations of arsenic can be toxic to humans and other organisms. Therefore, the presence of arsenic in surface water is considered highly undesirable. The Federal MCL is 50 µg/L for domestic water supplies. The same criterion has been adopted by Kentucky for protection of warmwater aquatic habitat. Statistical summaries of total arsenic concentrations by stream site (table 11) indicate little site-to-site variability in arsenic concentrations. None of the streams had measured concentrations in excess of water-quality criteria. Most of the arsenic determinations were below detection limits of 5.0 µg/L; a suitable relation to stream discharge was not available for transport estimates. No significant trends in total-arsenic concentrations were detected by use of the seasonal Kendall test.

Barium

Barium is an alkaline-earth metal that is present in low concentrations in most surface water and in treated drinking water. Barium is present in igneous and carbonate sedimentary rocks. The Federal MCL and Kentucky criterion for total barium in domestic water supplies is 1,000 µg/L. Samples for total barium in Jefferson County streams indicated that concentrations were less than the criterion. Concentrations ranged from less than 2.0 to 628 µg/L (table 11). Median concentrations of total barium ranged only from 24 to 58 µg/L. Total-barium yield ranged from 0.023 to 0.219 ton/mi^2 (table 14). The largest concentrations and yields of total barium were measured in streams draining surficial rocks of Silurian age. The smallest yield of total barium was measured in the Mill Creek watershed, which drains alluvial deposits along the Ohio River.

The only trend detected by analyses of flow-adjusted total barium concentrations was an upward trend in Pennsylvania Run (site 23) (table 12). A possible upward trend in total-barium concentration, based on non-flow-adjusted analysis, was indicated in Southern Ditch (site 20), and a downward trend was indicated in Middle Fork Beargrass Creek (sites 7 and 8).

Beryllium

Beryllium is a component of the mineral beryl and is almost nonexistent in natural water. It is used in a number of manufacturing processes, such as electroplating and as a catalyst in the synthesis of organic chemicals. Beryllium has also been used experimentally in rocket fuels and in nuclear reactors (U.S. Environmental Protection Agency, 1972). Beryllium is not likely to be present at toxic concentrations in natural water; however, it is possible that beryllium could enter water in effluents from certain metallurgical plants. Beryllium can be carcinogenic. The Federally proposed maximum contaminant level goal (PMCLG) is zero.

Most of the determinations for total beryllium during February 1988 - March 1991 were below detection limits (table 11). The maximum noncensored total-beryllium concentration was reported as 3.4 µg/L. No data exceeded

Kentucky criteria for protection of aquatic habitat. Only total-beryllium determinations that were greater than the detection limit were considered in excess of the PMCLG and reported in table 13. No suitable relation to discharge could be determined for load estimates, and no significant trends in total beryllium were detected.

Cadmium

The natural occurrence of cadmium in water in more than minute amounts is almost unknown. In previous studies, detectable concentrations of cadmium were usually attributed to contamination from mining or industrial wastes. The Federal criterion for aquatic life (chronic) is hardness dependent (table 3). This criterion was exceeded for 5.8 percent of the data collected during February 1988 - March 1991. Concentrations greater than other Federal and State water-quality criteria are shown in table 13. Total-cadmium concentrations of the streams sampled ranged from less than 1.0 to 19 µg/L (table 11). Most of the total-cadmium determinations were below detection limits, and a relation to discharge could not be defined for load estimates. No significant trends in total cadmium could be detected by means of the seasonal Kendall test.

Chromium

Natural water contains only trace amounts of chromium because it is held in rocks in virtually insoluble forms of trivalent chromium. Under strongly oxidizing conditions, chromium can convert to the hexavalent state (Cr^{+6}) and form chromate and dichromate anions. Chromium is used in metal plating, steel manufacturing, leather tanning, photography, and manufacture of paints, dyes, explosives, and ceramics. Industrial uses of chromium can produce waste solutions containing chromate ions. Acute systematic poisoning can result from high exposure to hexavalent chromium. The chronic health effects are respiratory and dermatological. Chromium, in certain forms, is also known to be carcinogenic.

Concentrations of chromium in natural water not affected by waste disposal are commonly less than 10 µg/L (Hem, 1985, p. 138). A study by Kharkar and others (1968) estimated an average chromium concentration for river water of 1.4 µg/L. An investigation by Durum and others (1971) found chromium concentrations generally less than 5 µg/L in samples from surface water in the United States.

Concentrations of total chromium during February 1988 - March 1991 ranged from less than 4.0 to 1,210 µg/L. Kentucky's chronic criterion for total chromium in surface water is 11 µg/L for protection of warmwater aquatic habitats. The 11 µg/L criterion was exceeded at all but one stream-sampling site (fig. 13, table 13). Maximum total-chromium concentrations at 16 of the sampling sites exceeded 100 µg/L, and they were in excess of 500 µg/L at 12 sites. At the 75th percentile of available data, however, chromium concentrations did not exceed 43 µg/L (table 11). The source of chromium resulting in the large concentrations at times in Jefferson County streams is

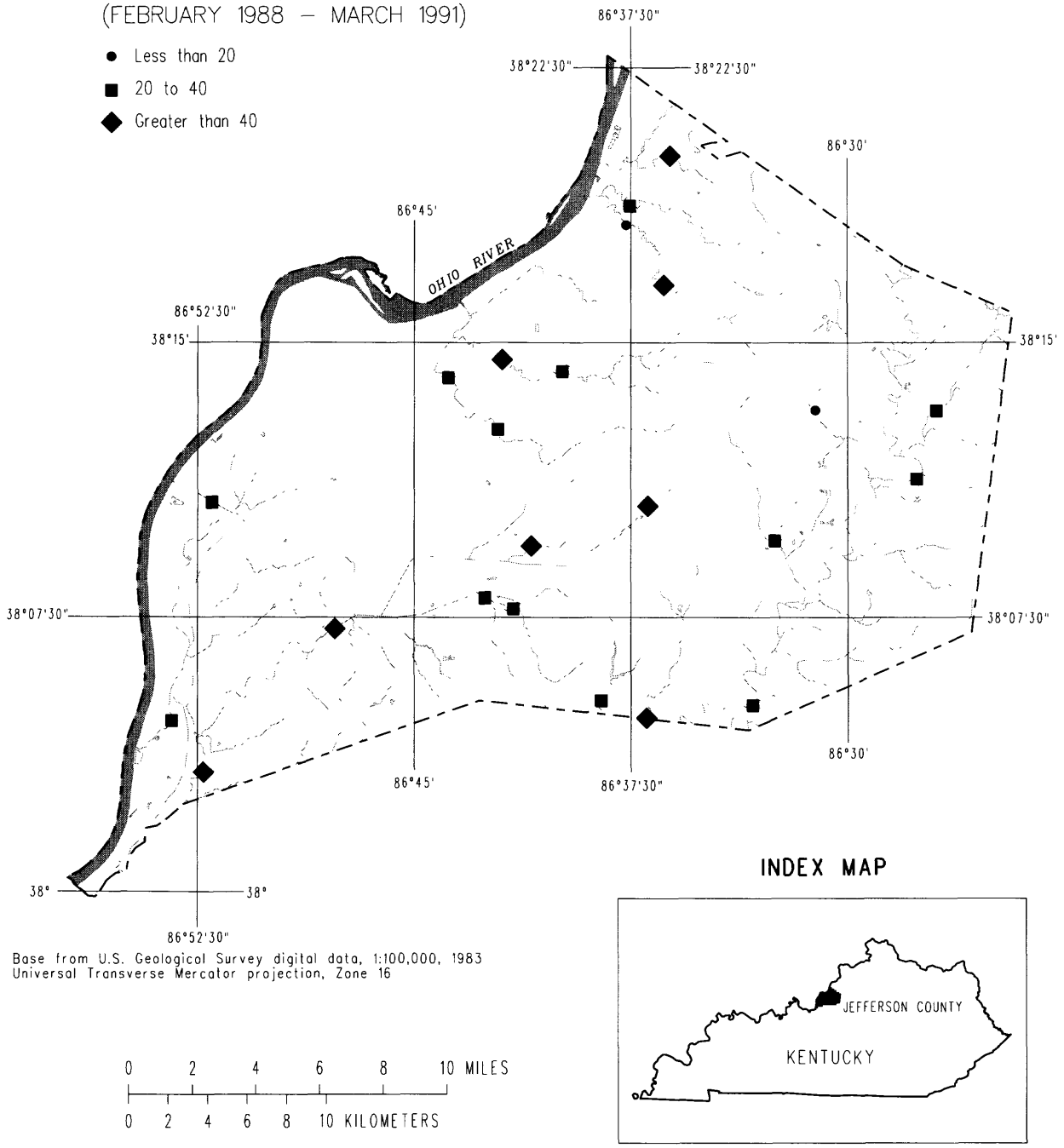

Figure 13.--Percentage of samples from selected streams of Jefferson County, Kentucky, with chromium concentrations that exceeded the State chronic criterion for protection of warmwater aquatic habitat, February 1988 – March 1991.

unknown. A relation to discharge could not be defined for load estimates for some sites. Available chromium-yield estimates ranged from about 0.01 ton/mi^2 in the Pond Creek watershed (sites 1 and 3) to about 0.1 ton/mi^2 in the Fern Creek watershed. Flow-adjusted trends were not possible because of censored values in the data set. Possible downward trends in total chromium were indicated by non-flow-adjusted trend analysis of data from Pond Creek (site 1) and Chenoweth Run (site 16) (table 12).

Copper

Copper has been mined and used in a variety of products since prehistoric times (U.S. Environmental Protection Agency, 1976). Copper and its salts have bactericidal properties and can also be used to eliminate algae (U.S. Environmental Protection Agency, 1972). Copper is essential for plants because it is involved in the synthesis of chlorophyll. It is essential for animal metabolism because it is used for the production of hemoglobin. Copper in water is not known to have an adverse effect on humans (U.S. Environmental Protection Agency, 1976). Concentrations of total copper in stream water are commonly about 10 µg/L (Hem, 1985, p. 141).

The toxicity of copper to various aquatic biota is dependent on the alkalinity of the water because the copper ions are complexed by anions that contribute to alkalinity. Copper is more toxic to aquatic life in water with low alkalinity than in water with high alkalinity (U.S. Environmental Protection Agency, 1976). The Federal and State freshwater aquatic life (chronic) criterion for total copper is hardness dependent. This criterion was exceeded at almost every stream sampling site (fig. 14, table 13). Total-copper concentrations ranged from less than 5 to 1,820 µg/L (table 11). The maximum total-copper concentration was measured in Muddy Fork (site 9), but was considered possibly in error because it was more than 10 times greater than that measured at any other site. Yields of total copper ranged from 0.003 ton/mi^2 in the Mill Creek watershed to 0.059 ton/mi^2 in the Fern Creek watershed. Flow-adjusted trends were not possible because of censored values in the data set. A possible upward trend in total copper was indicated by non-flow-adjusted trend analysis at Harrods Creek (site 25) (table 12).

Iron

Kentucky has established a chronic criterion of 1,000 µg/L for iron in streams for the protection of warmwater aquatic habitats. Ferric hydroxide flocs can coat fish gills, and the smothering effects of settled-iron precipitates can be particularly detrimental to fish eggs and bottom-dwelling organisms. Iron is an objectionable constituent in water supplies primarily because of taste or stain problems at concentrations greater than approximately 300 µg/L, the Federal SMCL.

Total-iron concentrations in 278 samples ranged from less than 10 to 69,200 µg/L (table 11). The maximum total iron concentration was determined in waters of Fern Creek (site 17). County-wide, more than 60 percent of the

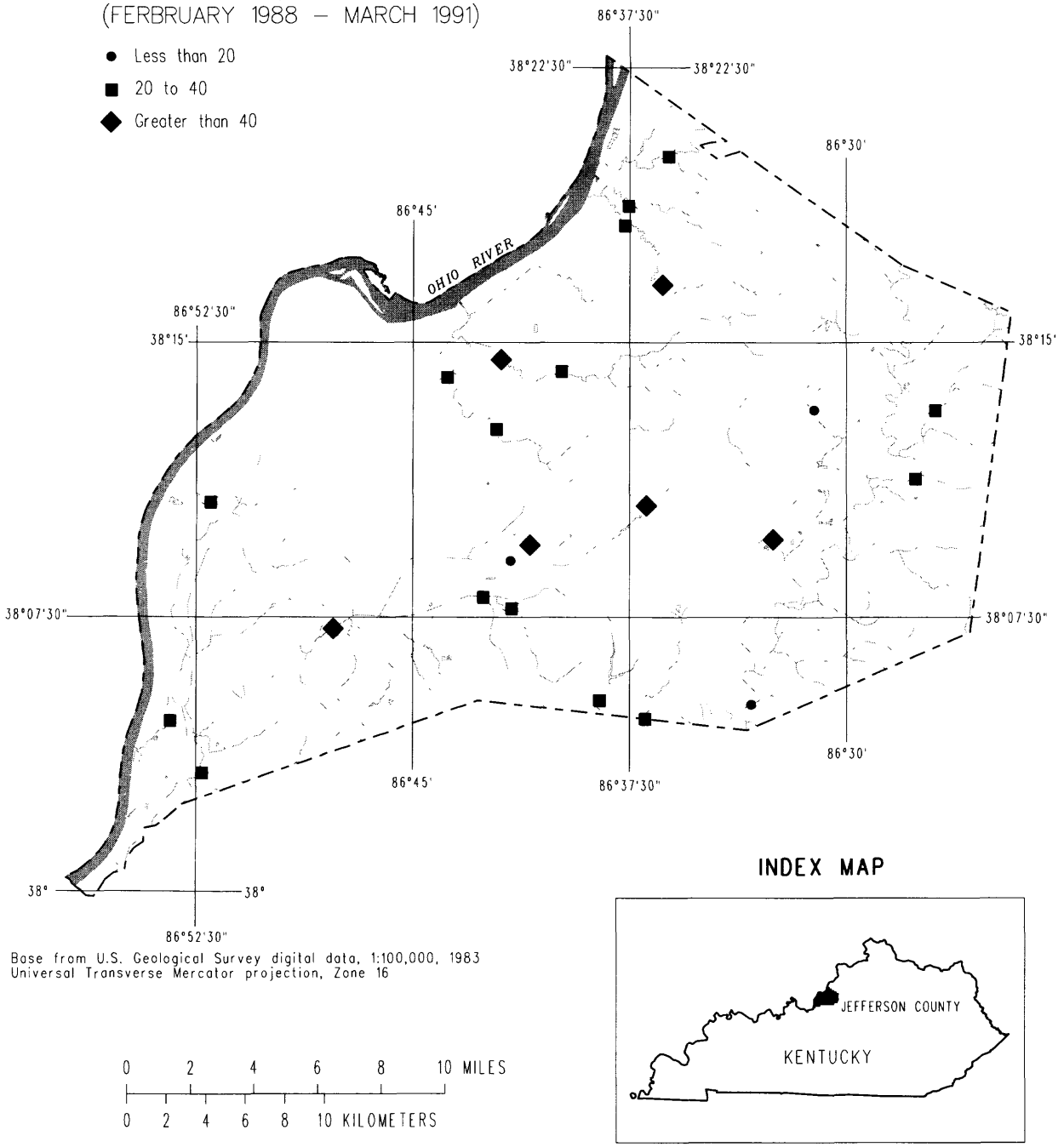

Figure 14.--Percentage of samples from selected streams of Jefferson County, Kentucky, with copper concentrations that exceeded the State chronic criterion for protection of warmwater aquatic habitat, February 1988 – March 1991.

water samples analyzed for total iron had concentrations in excess of the Federal SMCL value of 300 µg/L. The warmwater-aquatic-habitat (chronic) criterion of 1,000 µg/L was exceeded at almost every stream sampling site (table 13). The median concentrations of total iron at three sites exceeded the Kentucky criterion of 1,000 µg/L (table 11). Annual total-iron yields ranged from about 0.47 ton/mi^2 in the Fishpool Creek watershed to about 15 ton/mi^2 in the Fern Creek watershed (table 14). No discernable pattern of total-iron yields was determined (fig. 15).

Flow-adjusted trend analyses indicated a reduction in total-iron concentrations with time at Mill Creek Cutoff (site 24) (table 12). Possible increased total-iron concentrations over time are indicated by non-flow-adjusted trend analyses of data from Harrods Creek (site 26) and South Fork Beargrass Creek (site 5); however, flow-adjusted trend analyses indicate that the apparent upward trend in total iron for the South Fork Beargrass Creek site was possibly the result of a flow trend because no upward trends in total iron were detected when flow adjustment procedures were used.

Lead

Lead is common in sedimentary rocks, but owing to the low solubility of lead hydroxy carbonates, it has little natural mobility (Hem, 1985, p. 143). Lead has been dispersed widely through the environment, however, from such sources as the combustion of leaded gasoline, discharge of effluents from various industries, and the use of lead pipes (Hem, 1985; U.S. Environmental Protection Agency, 1972). Large amounts of lead can also be released in the burning of coal, a fuel commonly used for electricity production and some home heating in the county.

Concentrations of total lead during February 1988 - March 1991 ranged from less than 10 to 190 µg/L (table 11). Concentrations of total lead in excess of 150 µg/L were found only in Mill Creek (sites 2 and 24) and in Pond Creek (site 3). The Federal MCL and Kentucky's domestic water supply criterion for lead is 5 µg/L. The Federal proposed maximum contaminant goal (PMCLG) is 0 µg/L. The Federal and State water-quality criteria for protection of warmwater aquatic habitat are hardness dependent. From 277 samples collected in Jefferson County streams, only 9.7 percent were above detection limits; however, the detection limit used for total-lead analyses was larger than most of the water-quality criteria. Thus, the assessment of percentage total-lead concentrations exceeding criteria listed in table 13 should be considered low. Suitable relations to discharge could not be developed for transport estimates, and no trends were detected by means of the seasonal Kendall test.

Mercury

Several forms of mercury, ranging from elemental to dissolved inorganic and organic species, occur in the environment. Mercury enters natural water in many ways, such as discharge from chlorine-caustic soda plants and pulp mills. It is used in electrical devices, thermometers, fungicides, dental fillings, drugs, and paints (ReVelle and ReVelle, 1984).

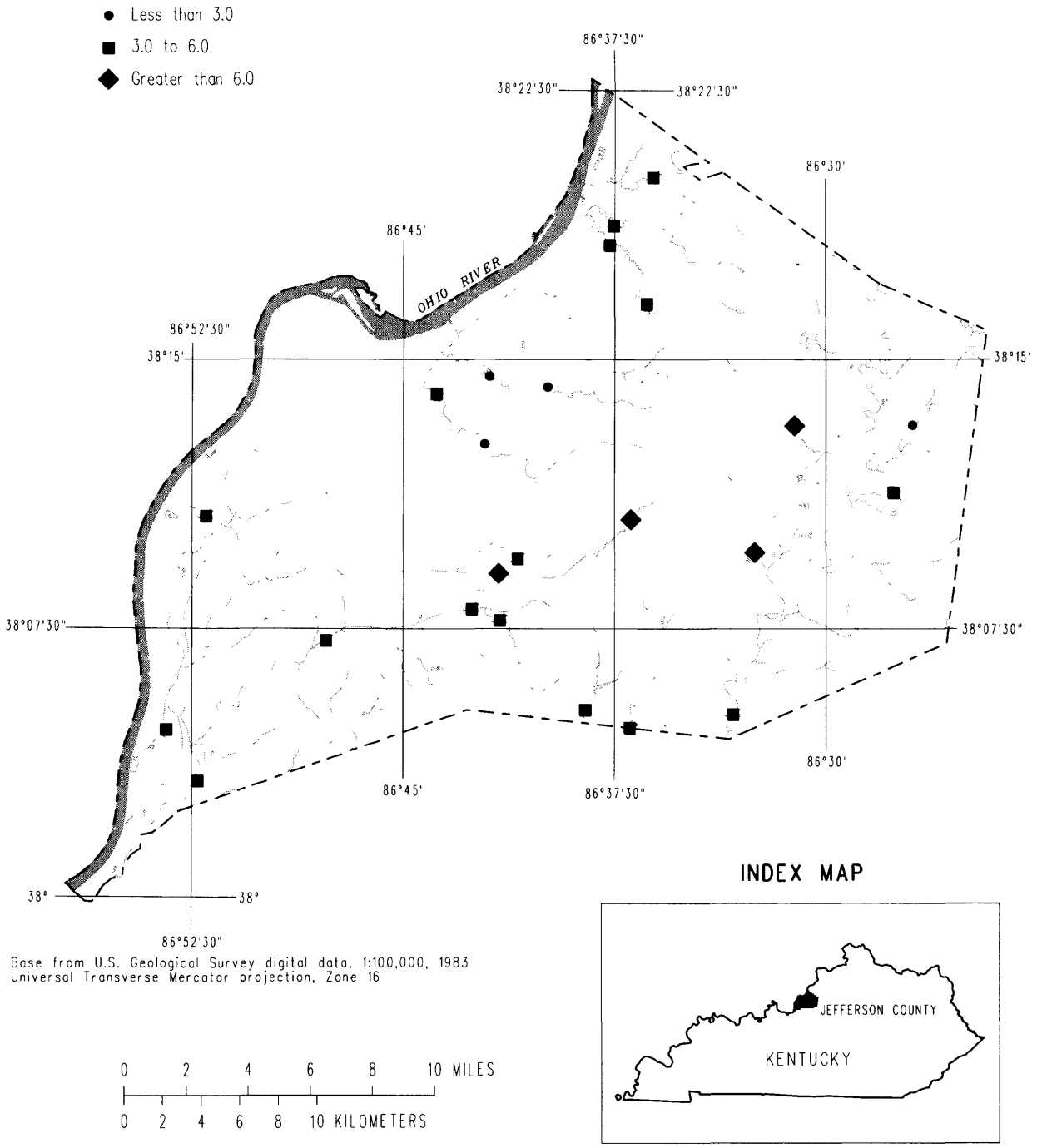

Figure 15.--Mean annual iron yields of selected streams in Jefferson County, Kentucky, March 1988 – February 1991.

Concentrations of total recoverable mercury in stream-water samples during February 1988 - March 1991 ranged from less than 0.2 to 40 µg/L (table 11). The largest concentrations of total recoverable mercury were found in Fern Creek (site 17) and in Floyds Fork (site 15). Fish having more than 1 milligram per gram of tissue is considered unsafe for human consumption (ReVelle and ReVelle, 1984). The detection limit used for mercury analyses was greater than the Federal and State criterion for protection of warmwater aquatic habitat, 0.012 µg/L. Less than 2 percent of the 270 analyses for total recoverable mercury exceeded 2.0 µg/L. The two sites that had the largest percentage of samples that exceeded the Federal and State warmwater-aquatic-habitat criterion (chronic) were Fern Creek (site 17) and Floyds Fork (site 21) (table 13), but no clear causative factor was indicated. Yields of total recoverable mercury could only be estimated for these two sites (0.002 ton/mi^2) (table 14). Flow-adjusted trend analyses were not possible because of censored values in the data set. A possible downward trend in total recoverable mercury was indicated by non-flow-adjusted trend analysis of data from Pope Lick (site 14) (table 12).

Nickel

Nickel is an important industrial metal. It is used extensively in stainless steel and other corrosion-resistant materials (Hem, 1985, p. 139). Nickel is considered to be relatively nontoxic to humans, but its toxicity to aquatic life indicates tolerances that vary widely and are influenced by species, pH, and synergistic effects (U.S. Environmental Protection Agency, 1976). Nickel is toxic to plant life at concentrations as low as 500 µg/L, and reproduction of fathead minnows is considerably affected by concentrations as low as 730 µg/L (U.S. Environmental Protection Agency, 1976). The Federal aquatic life criteria for acute and chronic considerations are hardness dependent. The Federal PMCLG for total nickel is 100 µg/L, and the Kentucky criterion for domestic water supply is 13.4 µg/L.

In the 277 samples collected during February 1988 - March 1991, the concentration of total nickel ranged from less than 7 to 100 µg/L (table 11). Only the Kentucky criterion for domestic water supply was exceeded. At the 75th percentile of available data, the largest concentrations of total nickel were measured in Northern Ditch (site 18) and Spring Ditch (site 9). Both streams drain areas of industrial land use. Water from these sites also had the largest percentage of data that exceeded the Kentucky domestic-water-supply criterion (table 13). Transport estimates were only possible at Spring Ditch (site 9) because of the presence of censored data and lack of a well-defined relation to discharge. Annual total nickel yield from the Spring Ditch watershed was estimated at 0.033 ton/mi^2 (table 14). No significant trends were determined (table 12).

Selenium

Selenium is a naturally occurring element in soils derived from sedimentary rocks. It is used in rectifiers, as a semiconductor, and in xerography (U.S. Environmental Protection Agency, 1972). Selenium also is

present in the fly ash produced by coal-fired powerplants that operate in Kentucky. Much of this selenium is in the smallest fly ash particles, which often elude capture by electrostatic precipitators (ReVelle and ReVelle, 1984). Selenium is a biologically essential element recognized as a metabolic requirement in trace amounts for animals but toxic to them when ingested in amounts ranging from about 0.1 to 10 milligram per kilogram of food (U.S. Environmental Protection Agency, 1976).

The Kentucky criterion for domestic water supply sources for total selenium is 10 µg/L. The Federal criterion for protection of aquatic life (chronic) is 35 µg/L. The method used for total-selenium analyses had detection limits as large as 50 µg/L. Total selenium was not detected in excess of 50 µg/L during February 1988 - March 1991 (table 11). Thus, data were not suitable for comparison with State domestic-water-supply or Federal aquatic-life (chronic) criteria. The Federal criterion of 260 µg/L for protection of aquatic life (acute) was not exceeded. Because of censored data, transport estimates of total selenium could not be calculated. No significant trends were determined for total-selenium concentrations (table 12).

Silver

Silver is used for various chemical and photographic purposes, for jewelry, and in silver plating. It can be used as a disinfectant for water, and concentrations as low as 10 µg/L in alkaline water are toxic to Escherichia coli bacteria. Silver iodide has also been used in seeding clouds with condensation nuclei to induce rain or snowfall (Hem, 1985, p. 141). Silver can accumulate in aquatic vertebrates, especially in the gills and internal organs of fish (U.S. Environmental Protection Agency, 1976).

The Federal MCL and the Kentucky criterion for domestic water supply for total silver is 50 µg/L. The Federal criterion for the protection of aquatic life (acute) is hardness dependent. Concentrations of total silver during February 1988 - March 1991 ranged from less than 1.0 to 166 µg/L (table 11). Concentrations of total silver that exceeded 100 µg/L were measured in Goose Creek (site 13), Fern Creek (site 17), and Harrods Creek (site 25). Total-silver concentrations that exceeded State and Federal criteria were found at only these three sites and in Mill Creek (site 2); these high concentrations represented a small percentage of the data (table 13). Because of censored data, transport estimates of total silver could not be calculated. No significant trends were determined for total silver concentrations (table 12).

Zinc

Zinc is a moderately common element, often associated with lead, in sedimentary rocks such as limestones. Zinc tends to be substantially more soluble in natural water than copper and nickel (Hem, 1985, p. 142). It is used in galvanizing iron and steel. High concentrations of zinc in surface water may indicate the presence of industrial and urban wastes from such sources as galvanized pipes and the dumping of plating baths (U.S. Environmental Protection Agency, 1979).

The Kentucky warmwater-aquatic-habitat (chronic and acute) criteria and the Federal aquatic life (acute) criterion for total zinc are hardness dependent. The Federal SMCL is 5,000 µg/L. The range of concentrations of total zinc during February 1988 - March 1991 were from less than the detection limit of 6 µg/L to 590 µg/L for 277 samples (table 11). The Kentucky warmwater-aquatic-habitat (chronic) criterion was exceeded at 11 sites, but only for about 10 percent of the measurements (table 13). Yields of total zinc ranged from 0.022 to 0.304 ton/mi^2 (table 14). The largest total-zinc yields were determined for the Fern Creek and Spring Ditch watersheds, which drain areas of industrial land use (fig. 16 and table 14). Trends in total zinc were not determined to be significant for any site (table 12).

Cyanide

The cyanide radical is a constituent of many compounds and complex ions that may be present in industrial wastes. Cyanide-bearing wastes may originate from gas works, coke ovens, scrubbing of gases in steel plants, metal-plating operations, and chemical industries. The toxicity of cyanide varies widely with pH, temperature, and dissolved-oxygen concentration (U.S. Environmental Protection Agency, 1972).

The warmwater-aquatic-habitat (acute) criterion for total cyanide adopted by Kentucky is 0.005 mg/L, compared to the 0.0052 mg/L Federal criterion for protection of aquatic life (chronic). In Jefferson County, concentrations of cyanide from 270 samples ranged from less than detection limits of 0.005 mg/L to 0.07 mg/L (table 11). Approximately 20 percent of these 270 samples exceeded the Federal and State criteria for protection of warmwater aquatic life and habitat (chronic). Concentrations of total cyanide exceeded the criteria at some sites in greater than 40 percent of the measurements (fig. 17 and table 13). The largest total-cyanide concentrations, both the maximum and the 75 percentile, were measured in Pennsylvania Run (site 23). Because of censored data or lack of a well-defined relation to discharge, transport estimates of total cyanide could only be calculated for the Pennsylvania Run watershed (0.012 ton/mi^2) (table 14). No significant trends were detected for total-cyanide concentrations (table 12).

Nutrients

In this report, nutrients are defined as nitrogen and phosphorus species. Plants, including algae, require nitrogen and phosphorus, as well as trace amounts of other elements, to grow. Forms of nitrogen in water include organic nitrogen, ammonia, nitrite, and nitrate. Of these forms, nitrate is usually predominant and most readily available for plant growth. Forms of phosphorus in water include the simple ionic orthophosphate and bound phosphate in soluble or particulate form. Bound phosphate can be released by bacterial action. Dissolved forms of nitrate and phosphate are more readily available to plants than bound forms. Consequently, concentrations of dissolved nutrients in natural water are usually relatively low.

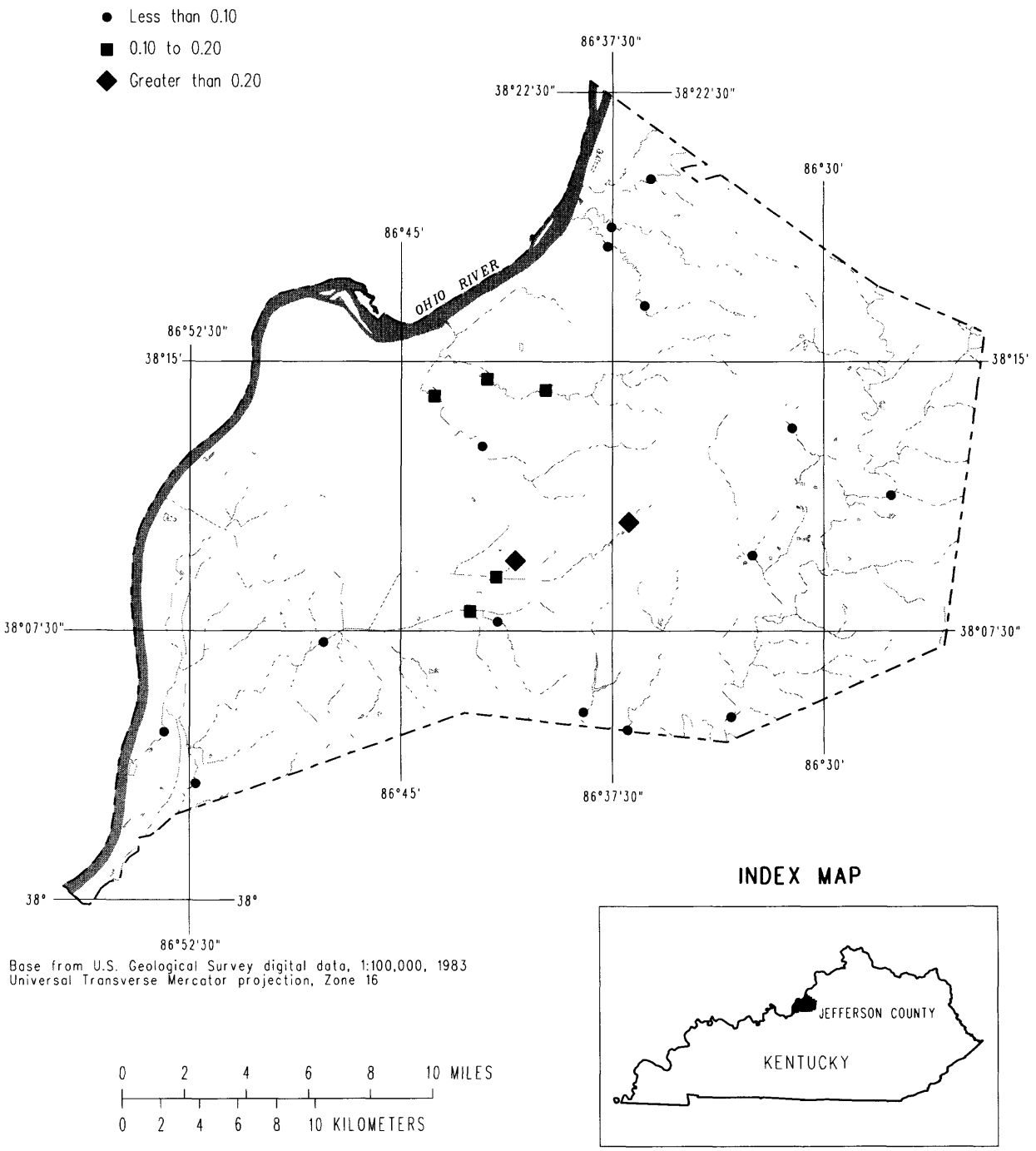

Figure 16.--Mean annual zinc yields of selected streams in Jefferson County, Kentucky, March 1988 – February 1991.

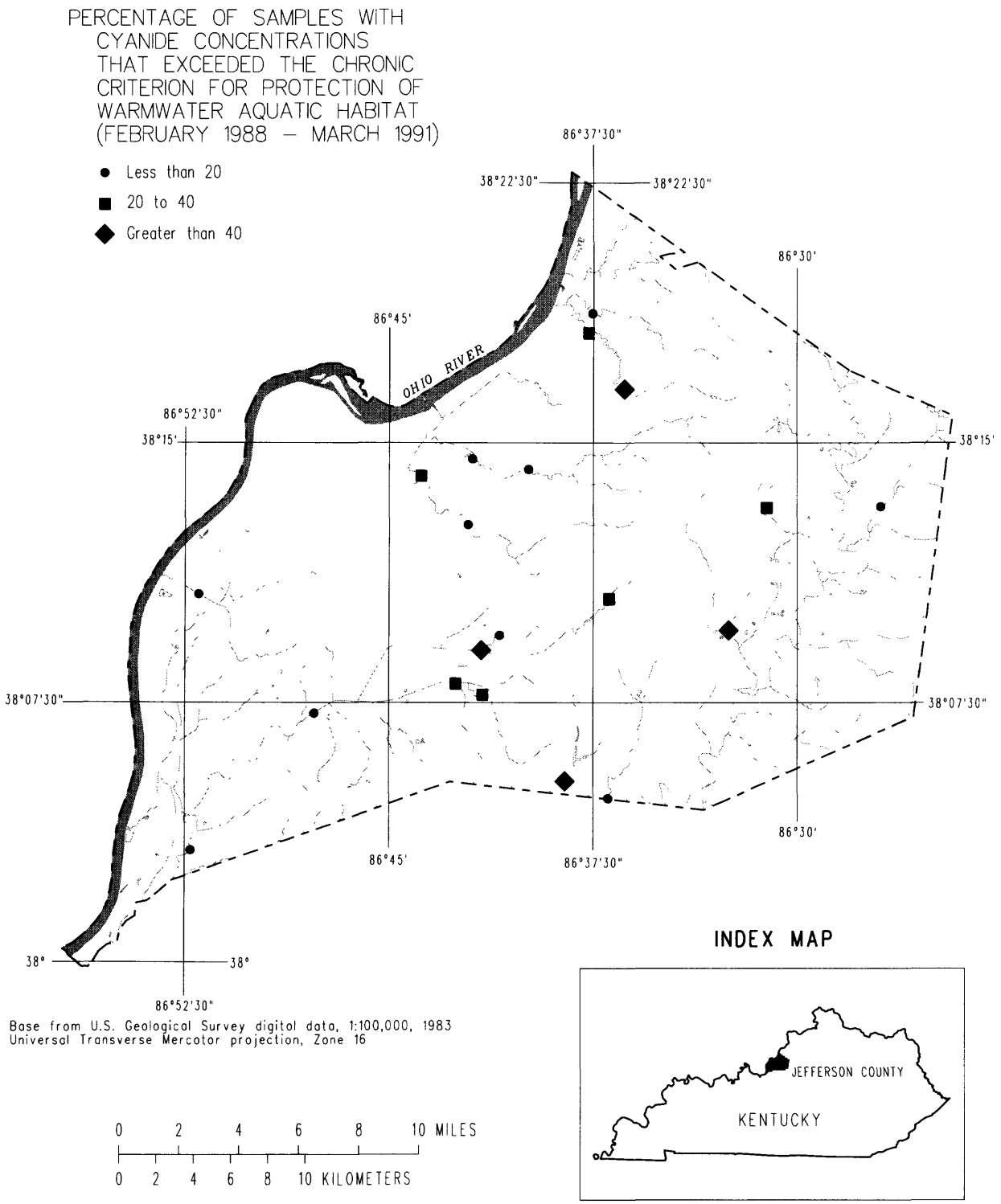

Figure 17.--Percentage of samples from selected streams of Jefferson County, Kentucky, with cyanide concentrations that exceeded the State chronic criterion for protection of warmwater aquatic habitat, February 1988 – March 1991.

Nutrient enrichment can encourage blooms of nuisance algae. Such algal blooms are common in lakes but are seldom seen in free-flowing streams. The effects of nutrient enrichment from agricultural practices and wastewater effluent seem to be reduced by increased stream turbidity from erosion and effluents (Wetzel, 1975).

Nitrogen

Some of the major point-source discharges of nitrogen into natural water are municipal and industrial wastewater and feedlot runoff. Diffuse sources of nitrogen include fertilizers, leachate from waste disposals in dumps or landfills, atmospheric fallout, and natural sources such as mineralization of soil organic matter. Septic tanks are another significant diffuse source of nitrogen (U.S. Environmental Protection Agency, 1976).

High intake of nitrates can pose a hazard to warmblooded animals. Under certain conditions, nitrate can be reduced to nitrite in the gastrointestinal tract. Nitrite reaching the bloodstream reacts directly with hemoglobin, causing impairment of oxygen transport (U.S. Environmental Protection Agency, 1976).

Smith and others (1987) reported that increases in atmospheric nitrogen emissions in the Ohio Valley region were consistent with stream nitrogen increases measured at National Stream Quality Accounting Network (NASQAN) stations; however, these increases are also consistent with increased use of nitrogen compounds for agricultural purposes.

In this report, nitrogen data are in milligrams per liter as N, unless otherwise noted; however, because the Kentucky water-quality criterion for ammonia is established for the un-ionized form of ammonia, the total-ammonia concentrations reported in milligrams per liter as N were converted to total un-ionized ammonia concentrations in milligrams per liter as NH_3 by use of the equation listed in Kentucky statutes 401 KAR 5:031, Surface water standards (Kentucky Natural Resources and Environmental Protection Cabinet, Division of Water, 1990b):

$$Y = 1.2 \left(A \right) / \left[1 + 10^{(k - pH)} \right] \qquad (11)$$

where Y is the un-ionized ammonia, in milligrams per liter;
A is the total ammonia, in milligrams per liter as N;
pH is the negative logarithm of the hydrogen-ion concentration; and

$$k = 0.0902 + \left[2730 / \left(273.2 + T \right) \right] \qquad (12)$$

where T is the water temperature, in degrees Celsius.

About 2 percent of the 1,762 samples analyzed for ammonia had concentrations exceeding the Kentucky un-ionized warmwater-aquatic-habitat criterion of 0.05 mg/L. Stream-sampling sites at which more than 5 percent of the samples had total ammonia concentrations in excess of this criterion

included Chenoweth Run (site 16), Northern Ditch (site 18), Pond Creek (site 3), and Southern Ditch (site 20) (table 13). The discharge of wastewater effluents was believed to be the cause of most of the concentrations greater than the criterion.

Total-ammonia concentrations ranged from less than 0.01 to 9.1 mg/L during February 1988 - March 1991 (table 11). The largest total-ammonia concentrations were measured in Floyds Fork (site 15), Chenoweth Run (site 16), and Northern Ditch (site 18); however, median total ammonia concentrations did not exceed 0.22 mg/L.

The largest average annual yield of total ammonia during March 1988 - February 1991 was estimated from the Fern Creek watershed to be about 1.5 ton/mi^2. Other watersheds yielding total ammonia in excess of 1 ton/mi^2 included the Northern Ditch, upper Pond Creek, and the lower South Fork Beargrass Creek watersheds (table 14). Atmospheric deposition could account for 1.1 ton/mi^2 of ammonia in the Jefferson County area. Total ammonia, however, is not a conservative constituent and is quickly oxidized to other forms of nitrogen. Flow-adjusted trend analyses were not possible because of censored values in the data set. A possible downward trend in total ammonia was indicated by non-flow-adjusted trend analyses of data from 12 of the stream-sampling sites (table 12).

Nitrate is the end product of the oxidation of reduced forms of nitrogen such as ammonia, organic nitrogen, and nitrite. The Federal MCL and the Kentucky criterion for total nitrate are both 10 mg/L as N. About 5 percent of 1,785 stream samples analyzed for total nitrate during February 1988 - March 1991 exceeded 10 mg/L. The concentrations of total nitrate ranged from less than 0.1 mg/L at many sites to a maximum of 33 mg/L in Fern Creek (site 17) (table 11). Total-nitrate concentrations exceeded 10 mg/L in more than 10 percent of the samples from Cedar Creek (site 22), Chenoweth Run (site 16), Fern Creek (site 17), Northern Ditch (site 18), Pennsylvania Run (site 23), and Pope Lick (site 14).

The average annual yield of total nitrate during March 1988 - February 1991 was greater than 11 ton/mi^2 in the upper Fern Creek watershed (table 14). The smallest yield of total nitrate, less than 2 ton/mi^2, was estimated from the Mill Creek watershed. Atmospheric deposition could account for about 1.8 ton/mi^2 of nitrate in the Jefferson County area; however, much of the nitrogen deposited by precipitation may never reach a stream system, and, instead, may be used within the biosphere. Flow-adjusted trend analyses were not possible at most sites because of censored data. A possible downward trend in total nitrate was indicated by non-flow-adjusted trend analyses of data from 12 of the stream-sampling sites (table 12); however, only six of the sites showing downward total-nitrate trends also indicated downward ammonia trends.

The Federal MCL for total nitrite is 1 mg/L as N. The concentration of total nitrite in 1,801 Jefferson County stream samples obtained during February 1988 - March 1991 ranged from less than the detection limit of 0.01 mg/L at most sites to a maximum of 6.0 mg/L in Mill Creek (site 2) (table 11). Total-nitrite concentrations exceeded 1 mg/L in samples from only

five stream sites: Mill Creek (site 2), Pond Creek (site 3), Goose Creek (site 11), Fern Creek (site 17), and Harrods Creek (site 25) (table 13). Only 1 sample of the approximately 70 samples obtained from each of these sites (less then 2 percent) had a concentration larger than 1 mg/L.

The average annual yield of total nitrite during March 1988 - February 1991 ranged from 0.034 to 0.270 ton/mi^2 (table 14). Yields larger than 0.2 ton/mi^2 were estimated from the Fern Creek, Fishpool Creek, and Pond Creek watersheds. The smallest total-nitrite yield was estimated from the Middle Fork Beargrass Creek watershed. A possible downward trend in total nitrite was indicated by non-flow-adjusted trend analyses at four of the stream-sampling sites (table 12), but flow-adjusted trend analyses at two of these sites indicated no significant trends. Flow-adjusted trend analyses were not possible at most of the other sites because of censored values in the data set.

The organic nitrogen content of water is contributed to, in various degrees, by products of biologic processes such as amino acids, polypeptides, and proteins (American Public Health Association and others, 1971). Organic nitrogen enrichment is often a result of sewage effluent or industrial waste discharges. The concentration of total organic nitrogen during February 1988 - March 1991 ranged from less than 0.05 mg/L at most study sites, to a maximum of 6.9 mg/L in Goose Creek (site 11) and in Mill Creek (site 2) (table 11). The largest yield of total organic nitrogen was estimated at about 5.1 ton/mi^2 from the Spring Ditch watershed, which drains an industrial area (table 14). Other watersheds with large total organic nitrogen yields included the Floyds Fork, Goose Creek, Northern Ditch, Pennsylvania Run, and lower South Fork Beargrass Creek watersheds. One possible source of total organic nitrogen in drainage from these watersheds is wastewater discharges. The smallest yield of total organic nitrogen was estimated at about 0.43 ton/mi^2 from the Mill Creek watershed. Downward trends in total organic nitrogen were indicated by non-flow-adjusted trend analyses of data from five of the stream-sampling sites (table 12).

Phosphorus

Phosphorus in streams comes from a number of natural and anthropogenic sources. Some of the more important sources are breakdown and erosion of phosphorus-bearing minerals in the soil, decaying plant and animal material, agricultural and domestic fertilizers, synthetic detergents, sewage effluents, and septic-tank leachates. Elevated concentrations of phosphorus are a concern because of the role this nutrient often plays in nuisance algal blooms. Of the major nutrients, phosphorus is most frequently limiting to plant growth; however, no Federal or State water-quality criteria have been established for phosphorus species.

Concentrations of total phosphate as PO_4 during February 1988 - March 1991 ranged from 0.03 to 26 mg/L (table 11). Yields of total phosphate ranged from about 0.48 to 5.2 ton/mi^2 (table 14). Smallest yields of total phosphate were estimated from the Middle Fork Beargrass Creek and Mill Creek watersheds. Yields larger than 4 ton/mi^2 were estimated from the Fern Creek,

Northern Ditch, and Spring Ditch watersheds, and from the Chenoweth Run watershed (fig. 18). Downward trends in total-phosphate concentrations were indicated by flow-adjusted seasonal Kendall analysis of data for both South Fork Beargrass Creek sites (5 and 6) (table 12). Upward trends were indicated for Pope Lick (site 14) and for Pennsylvania Run (site 23).

Concentrations of total orthophosphate as P during February 1988 - March 1991 ranged from less than 0.01 to 8.6 mg/L (table 11). Yields of total orthophosphate ranged from about 0.14 to 1.7 ton/mi^2 (table 14). Like the previously discussed phosphate species, smallest yields were estimated from the Middle Fork Beargrass Creek and Mill Creek watersheds. Yields larger than 1.5 ton/mi^2 were estimated from the Fern Creek, Northern Ditch, Spring Ditch, Chenoweth Run watersheds. No downward trends in total-orthophosphate concentrations were indicated. Upward trends, based on flow-adjusted seasonal Kendall tests, were indicated for Pope Lick (site 14) and for Pennsylvania Run (site 23) (table 12).

Dissolved Oxygen and Oxygen Demand

Fish and other desirable clean-water organisms require dissolved oxygen to survive and propagate. A minimum dissolved-oxygen concentration of 4.0 mg/L is required in Kentucky to ensure healthy conditions for the maintenance of a well-balanced warmwater-fish community (Kentucky Natural Resources and Environmental Protection Cabinet, 1990b). The Federal criterion for protection of aquatic organisms during long-term exposure is 5.5 mg/L of dissolved oxygen.

Dissolved-oxygen concentrations of streams and rivers can vary significantly over time and space in response to several environmental processes. Oxygen solubility in water is a function of temperature and atmospheric pressure. At 10°C, water is saturated with oxygen when it contains about 11.3 mg/L of dissolved oxygen. At 30°C, water is saturated with oxygen when it contains about 7.6 mg/L of dissolved oxygen. Thus, dissolved-oxygen concentrations in streams are typically lower during the summer than during the winter. Oxygen is replenished in natural water primarily by diffusion of oxygen into the water from the atmosphere and by photosynthesis. Atmospheric diffusion cannot result in dissolved-oxygen concentrations greater than the saturation concentration (the concentration of oxygen in the water that is in equilibrium with the oxygen concentration in the atmosphere). Oxygen in rivers is consumed during bacterial decomposition of organic matter, oxidation of ammonia and nitrite by nitrifying bacteria (nitrification), and respiration of aquatic organisms. During summer months, when streamflows are low and water temperatures are high, the dissolved-oxygen concentrations of streams can be depleted by high organic loadings. The records for the four water-quality monitor sites show dissolved-oxygen depletion can be attributed to organic loading during stormflows. Such a response of dissolved oxygen to organic loading during stormflow occurred in Pond Creek on August 5, 1990 (fig. 19).

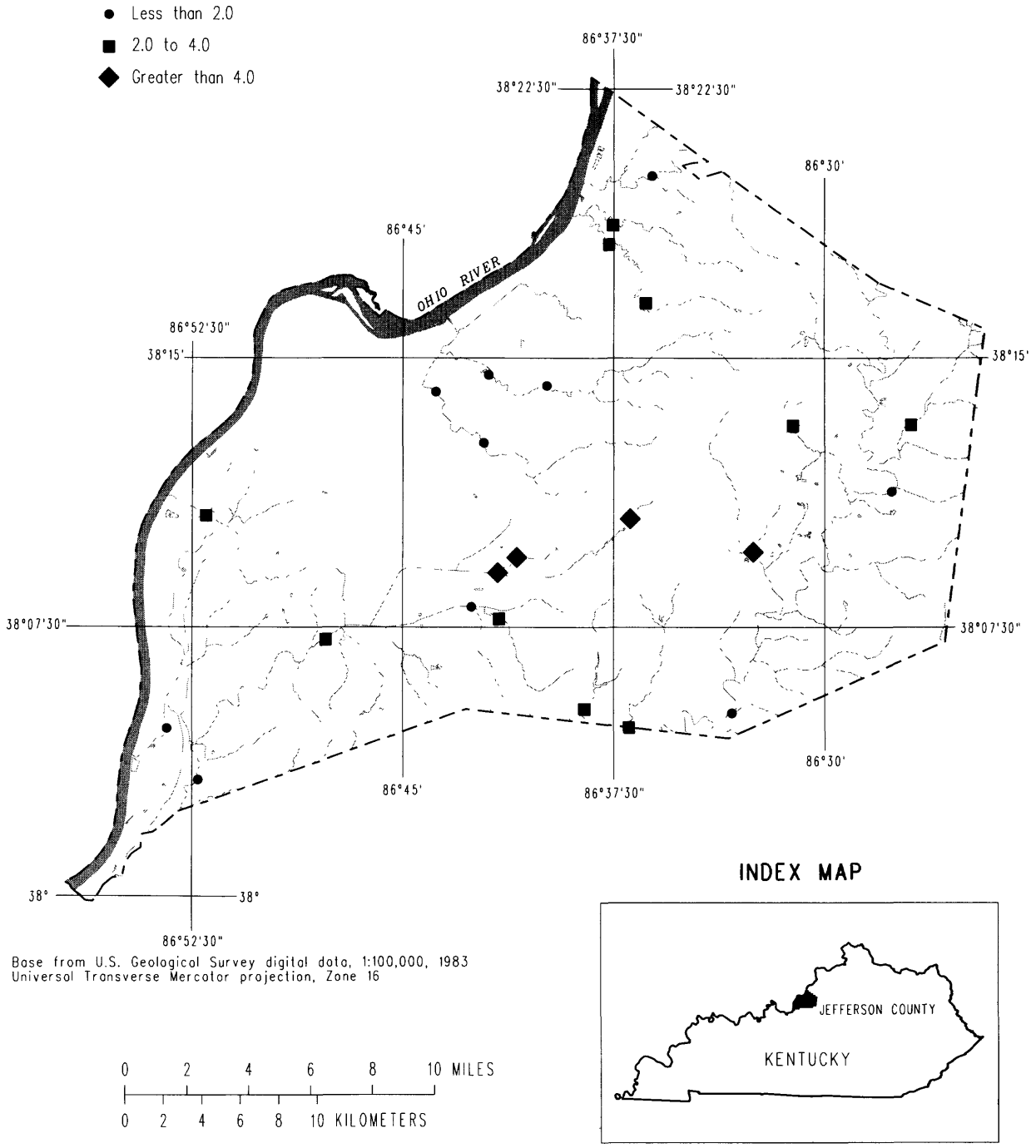

Figure 18.--Mean annual phosphate yields of selected streams in Jefferson County, Kentucky, March 1988 – February 1991.

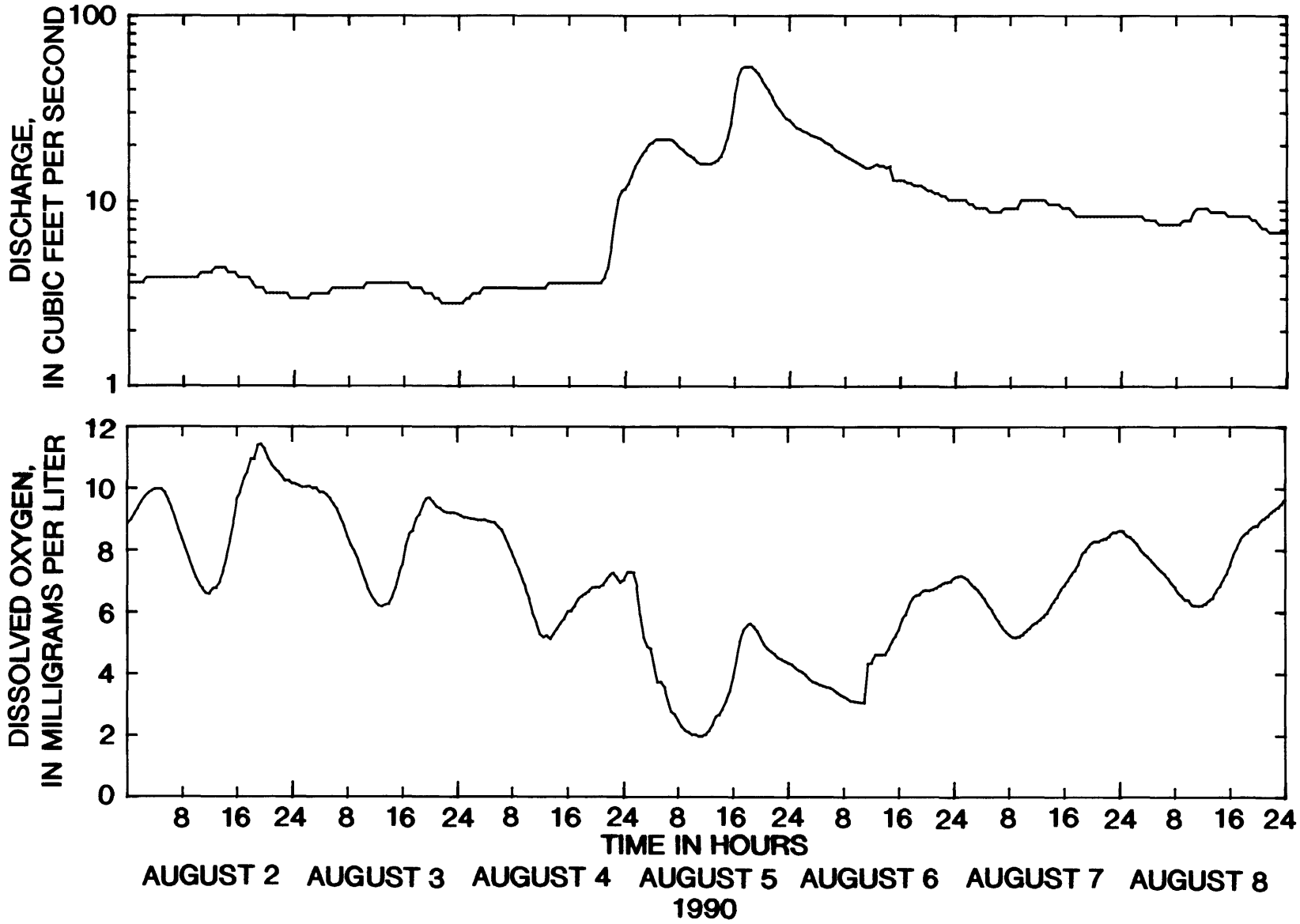

Figure 19.--Discharge and dissolved-oxygen concentration (30-minute intervals), of Pond Creek at Manslick Road (site 3), August 2-8, 1990.

Dissolved-oxygen concentrations in streams can also vary significantly during a 24-hour period in response to algal and macrophytic photosynthesis and respiration. During days with adequate sunlight, algae and other green plants consume carbon dioxide and produce oxygen. In some favorable stream environments, photosynthesis can result in dissolved-oxygen concentrations much higher than the saturation concentration. Dissolved-oxygen concentrations exceeding saturation often occur in deep, slow-moving rivers with an adequate nutrient supply, or in any stream where the rate of photosynthetic oxygen production exceeds the rate of atmospheric gas exchange. During the summer months, algae can become a larger contributor of oxygen to the river than atmospheric diffusion. At night, in the absence of light, oxygen is consumed by algae and other aquatic organisms. Because of the diel variation in algal productivity, dissolved-oxygen concentrations also exhibit diel fluctuations. Algal photosynthesis progresses during daylight hours and typically results in largest dissolved-oxygen concentrations in the late evening. Oxygen is typically consumed during the night and typically results in smallest concentrations in the early morning. Records from the four water-quality monitors on streams in Jefferson County have illustrated these summer dissolved-oxygen-concentration patterns. For example, a diel dissolved-oxygen pattern for Pond Creek (site 3) can be seen in figure 19 every day except August 5 and 6, which were affected by stormflow.

Median dissolved-oxygen concentrations measured without continuous monitors in streams during February 1988 - March 1991 ranged from 7.7 to 11 mg/L (table 11). Dissolved-oxygen concentrations less than the State criterion of 4.0 mg/L were observed occasionally at 14 stream sites (fig. 20, table 11). Fewer than 5 percent of the approximately 75 dissolved-oxygen measurements obtained at these sites were less than the 4.0 mg/L criterion. The exceptions were in South Fork Beargrass Creek (site 5) where 8.1 percent of the measurements were less than the criterion and in Middle Fork Beargrass Creek (site 8) where 12.2 percent of the measurements were less than the criterion (table 13). Observations at these stream sites were made as part of a fixed-station network, and as such, were typically made during the daylight hours. Given the diel variability in dissolved-oxygen concentrations, an accurate assessment of dissolved-oxygen conditions at a site would entail nighttime and daytime measurements. Summaries of dissolved-oxygen monitor records show that the minimum dissolved-oxygen concentrations recorded are much smaller than observed by random daylight sampling (fig. 21). Although dissolved oxygen in stream water fluctuates throughout the day and is not conservative, watershed yields were estimated to provide a comparison between basins. Water in the Mill Creek watershed contained one-half or less dissolved oxygen than water in any other watershed (table 14). A downward trend in dissolved-oxygen concentrations was indicated in Mill Creek (site 2), as well as in Floyds Fork (site 21) and in Pennsylvania Run (site 23) (table 12). A possible upward trend in dissolved-oxygen concentrations was indicated in Spring Ditch (site 9).

Processes that deoxygenate water include microbial decomposition of carbonaceous organic matter. Two gross measures of the amount of oxygen required for biochemical and chemical oxidation of organic material in the water are biochemical oxygen demand (BOD) and chemical oxygen demand (COD). A test duration of 5 days is commonly used to measure BOD, and results are

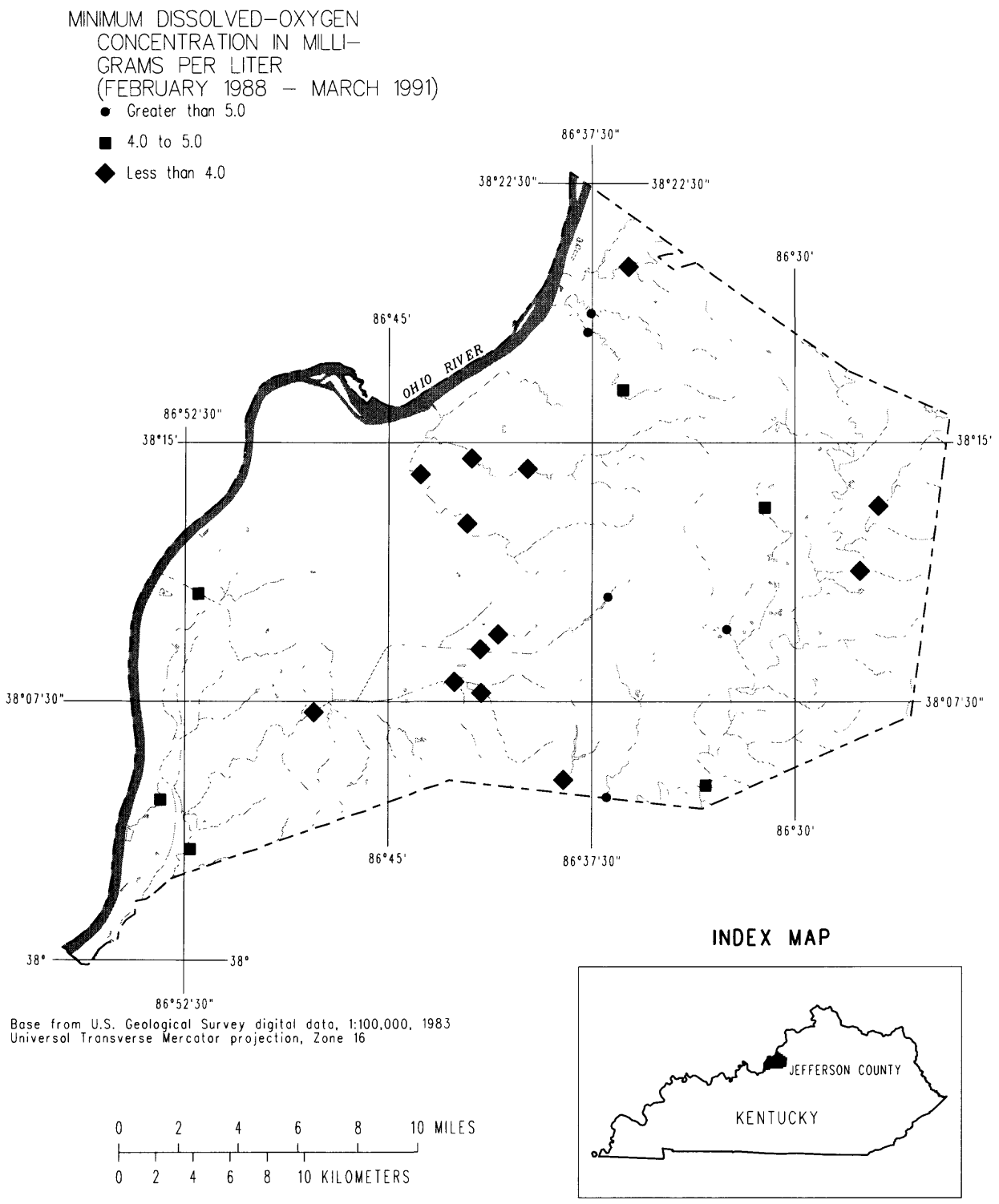

Figure 20.--Minimum dissolved-oxygen concentrations measured in selected streams of Jefferson County, Kentucky, February 1988 - March 1991.

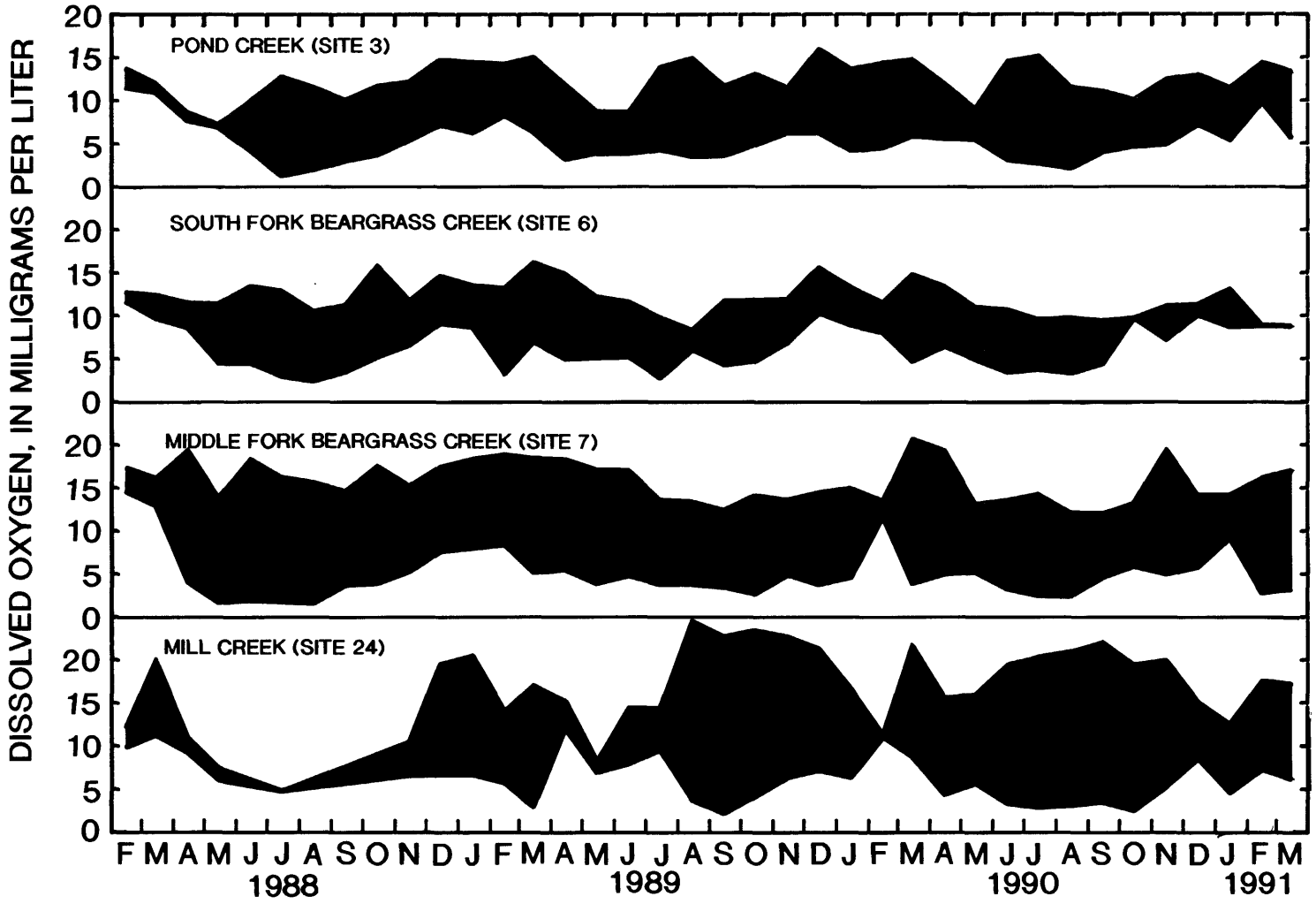

Figure 21.--Monthly range of dissolved-oxygen concentration in selected streams of Jefferson County, Kentucky, February 1988-March 1991, based on continuous records and twice-monthly observations.

expressed as the 5-day BOD in milligrams per liter (of oxygen consumed). COD, reported in milligrams per liter, is a measure of the oxygen required to oxidize organic and reduced inorganic substances in a sample by a strong chemical oxidant. The consistently largest BOD measurements, based on the 90th percentile of data, were in Goose Creek (site 13) and in South Fork Beargrass Creek (site 5). The largest COD measurements were in Spring Ditch (site 9), which drains an industrial area.

BOD and COD are measures of potential oxygen required for oxidation of materials rather than actual measurable quantities of a substance in the water; however, BOD and COD can be treated as if they were constituent concentrations, and transport estimates can be computed to provide an indication of potential oxygen demand on the stream systems. Estimates of the average annual stream BOD and COD loads and yields for March 1988 - February 1991 are listed in table 14. The largest amount of oxygen needed for biochemical oxidation of organic material in the water was about 14 ton/mi^2 in the predominantly industrial Spring Ditch watershed. Other areas that had large potential BOD were the Chenoweth Run, Fern Creek, and lower South Fork Beargrass Creek watersheds. The smallest potential BOD was in the Mill Creek watershed. A potential average annual COD of 130 ton/mi^2 in the Spring Ditch watershed was nearly three times greater than in any of the other sampled watersheds in Jefferson County. A possible downward trend in BOD was indicated in Chenoweth Run (site 16) (table 12). Possible downward trends in COD were indicated at both Mill Creek sites (2 and 24), and in Cedar Creek (site 23), Middle Fork Beargrass Creek (site 8), and Southern Ditch (site 20). Possible upward trends in COD were indicated in Fishpool Creek (site 19) and in Pond Creek (site 3).

Synthetic Organic Compounds

Although production and use of synthetic organic compounds in the United States has increased dramatically over the past 50 years, the environmental effects of the compounds are largely unknown. Many of these compounds are persistent and can be transported by air, water, sediment, and biota. Residues of some organic compounds have been observed even in such remote areas as Antarctica (Smith and others, 1987).

Pesticides are chemicals designed to control various pests that damage agricultural and horticultural crops. These compounds, which are typically classified by the types of pests that are to be controlled, include insecticides, herbicides, fungicides, and rodenticides. Pesticides enter natural water through many routes, including runoff, direct application, spills, and faulty waste-disposal techniques. Movement by erosion of soil particles with adsorbed pesticides is one of the principal means of entry into surface water (U.S. Environmental Protection Agency, 1972).

Organochlorine Insecticides

The use of organochlorine insecticides was initiated with the discovery of dichlorodiphenyltrichloroethane (DDT) in 1939 (Smith and others, 1988). Organochlorine insecticides tend to accumulate in living organisms and

sediment, and they are highly persistent. For example, DDT has a half-life of approximately 20 years (Smith and others, 1987). The production of organochlorine insecticides in the United States is negligible, and use of them is being restricted (Smith and others, 1988). Organochlorine insecticides sampled in streams of Jefferson County include chlordane, endrin, lindane, methoxychlor, and toxaphene. Because of the hydrophobic nature of organochlorine pesticides, they are not often detected in water samples. Flow-adjusted trend analyses were not possible for any of the organochlorine pesticides because of censored values in the data set. No trends based on non-flow-adjusted analyses were indicated.

Variable detection limits were used for total-chlordane analyses. No total-chlordane concentrations larger than the detection limit of 6.2 µg/L were detected in quarterly samples from Jefferson County streams during February 1988 - March 1991.

Variable laboratory detection limits were used for total-endrin analyses. Some of these detection limits were larger than many of the Federal and State criteria. The largest total-endrin concentration measured during February 1988 - March 1991 was 1.1 µg/L in Fishpool Creek (site 19). At least one noncensored concentration of total endrin was detected at 13 stream sites, all of which exceeded some water-quality criteria (table 13).

The maximum concentration of total lindane measured during February 1988 - March 1991 was less than the detection limit of 0.77 µg/L (table 11). This concentration is less than the Federal aquatic life (acute) criterion of 2.0 µg/L and less than the Kentucky warmwater-aquatic-habitat (acute) criterion of 2.4 µg/L. Federal and State criteria of 0.08 µg/L for protection of aquatic life and warmwater aquatic habitat (chronic) was exceeded by at least one non-censored concentration of total lindane at 14 stream sites (table 13).

Variable laboratory detection limits were used for total-methoxychlor analyses, all of which were greater than the Federal criterion of 0.03 µg/L for protection of aquatic life (chronic). Out of 278 samples analyzed for total methoxychlor during February 1988 - March 1991, only about 7 percent were reported as above detection limits and considered to exceed the 0.03 µg/L criterion. This criterion was exceeded at 14 stream sites (table 13). No measured stream concentrations exceeded the Federal MCL for total methoxychlor of 40 µg/L. The largest total-methoxychlor concentration was 2.6 µg/L in Mill Creek Cutoff (site 24) (table 11).

The maximum concentration of total toxaphene during February 1988 - March 1991 was less than the detection limit of 13 µg/L (table 11). Variable detection limits were used, and only five stream sites had any analyses reported as a noncensored value. Each of these noncensored concentrations exceeded all applicable State and Federal water-quality criteria (table 13). Criteria were exceeded in Harrods Creek (site 25), in Middle Fork Beargrass Creek (sites 7 and 8), and in Pond Creek (sites 1 and 3).

Herbicides

Although the use of insecticides has declined in recent years, use of herbicides on crops in the United States has increased (Gilliom and others, 1985). Most herbicides are characterized by high aqueous solubilities and high vapor pressures. Herbicides generally do not bioconcentrate, sorb to sediments, or volatilize from solution to an appreciable extent. Herbicides enter natural water primarily through surface runoff. Consequently, herbicide concentrations in surface water are commonly high if a heavy rain immediately follows the application of the herbicide (Smith and others, 1988). Analyses for herbicides in stream-water samples during February 1988 - March 1991 were limited to 2,4-D (dichlorophenoxyacetic acid) and 2,4,5-TP (silvex).

The Federal MCL for total 2,4-D is 70 µg/L. The concentration of total 2,4-D in stream samples obtained quarterly during February 1988 - March 1991 ranged from less than 0.02 to 12 µg/L (table 11). The largest concentrations of total 2,4-D were measured in streams draining predominantly residential and industrial areas. Large concentrations of total 2,4-D were not measured in streams draining agricultural areas (fig. 22). Because of the lack of a suitable relation of 2,4-D concentrations to stream discharge at most sites, a transport estimate of 2,4-D for March 1988 - February, 1991 was possible only for the upper South Fork Beargrass Creek watershed. The average annual yield of total 2,4-D from this watershed was 0.001 ton/mi^2 (table 14). No trends were indicated in total 2,4-D by use of the seasonal Kendall test.

The Federal MCL for total 2,4,5-TP is 50 µg/L. The concentration of total 2,4,5-TP in stream samples obtained quarterly during February 1988 - March 1991 ranged from less than 0.01 to 0.58 µg/L (table 11). The maximum concentration of total 2,4,5-TP was measured in Pond Creek (site 1). Because of the lack of a suitable relation of 2,4,5-TP concentrations to stream discharge, no transport estimates were possible. No trends were indicated in total 2,4,5-TP by use of the seasonal Kendall test.

Fecal-Indicator Bacteria

Contamination of aquatic systems by the excreta of warm-blooded animals may result in health problems for people and animals and potential disease problems for aquatic life because of the presence of pathogenic bacteria. Bacteria are microscopic unicellular organisms, typically spherical, rodlike, or spiral and threadlike in shape, and often clumped into colonies. Because current laboratory procedures for the detection of disease-causing bacteria are complex and lack the sensitivity and selectivity required for accurate determinations, testing for the bacteriological quality of water is based on nonpathogenic indicator organisms, principally the coliform group. Fecal-coliform and fecal-streptococcal bacteria, which comprise a part of the total-coliform group, are restricted to the intestinal tracts of warm-blooded animals. The major limitation to the use of indicator bacteria is the uncertain correlation to the occurrence of pathogenic bacteria. Presence of fecal coliform and fecal streptococci in water, however, reflect the presence of fecal contamination, which is the most likely source for pathogens.

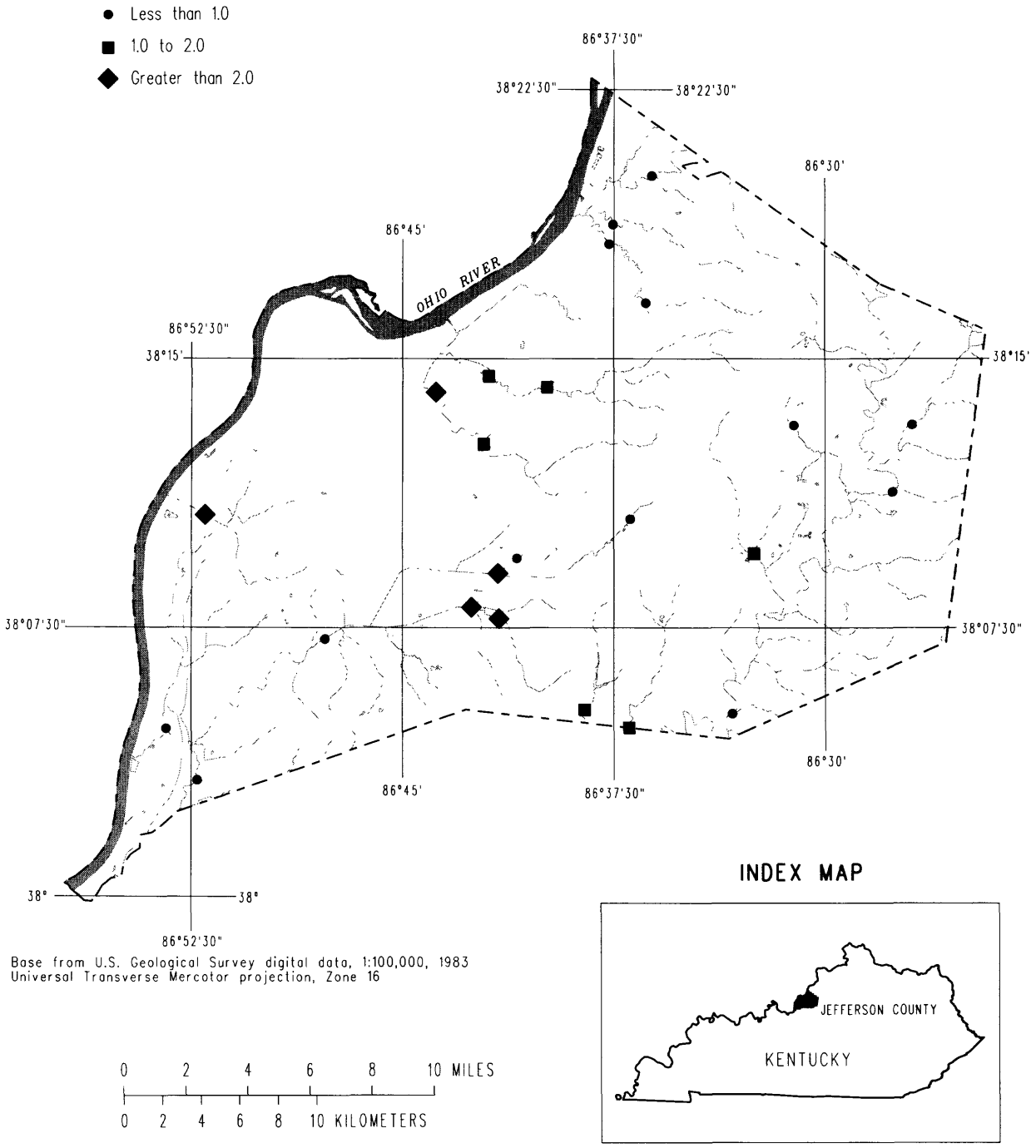

Figure 22.--Maximum 2,4-D concentrations measured in selected streams of Jefferson County, Kentucky, February 1988 – March 1991.

Fecal-coliform densities during February 1988 - March 1991 ranged from less than 2 to 110,000 col/100 mL of water (table 11). Kentucky's domestic-water-supply criterion for fecal-coliform bacteria is a maximum of 2,000 col/100 mL of water. Approximately 13 percent of the fecal-coliform densities exceeded this criterion (table 13). Colony densities exceeding the domestic-water-supply criterion were found in almost every stream sampled.

During the recreation season, Kentucky surface-water criteria for primary-contact recreation requires that fecal-coliform densities shall not exceed 200 col/100 mL as a monthly geometric mean based on no less than five samples per month, nor exceed 400 col/100 mL in 20 percent or more of all samples collected during the month. For secondary-contact recreation, Kentucky criteria require that fecal-coliform densities shall not exceed 1,000 col/100 mL as a monthly geometric mean based on no less than five samples per month, nor exceed 2,000 col/100 mL in 20 percent or more of all samples collected during the month. Repetitive fecal-coliform sampling during each month of this study, which would have been needed to assess suitability of Jefferson County streams for primary- and secondary-contact recreation, was not done. Comparisons of fecal-coliform densities of samples obtained during this study to the geometric mean criteria were made only as an approximation of possible criteria exceedances. Approximately 20 percent of the fecal-coliform densities from stream samples collected during this study exceeded 1,000 col/100 mL, and approximately 50 percent exceeded 200 col/100 mL. These criteria were exceeded occasionally at almost every stream-sampling site (table 13). The percentages of fecal-coliform densities exceeding the criteria levels were greatest in streams draining the most densely urbanized areas of the county, and they were smallest in streams draining the least densely urbanized northeastern, eastern, and southern areas of the county (figs. 23 and 24). A greater percentage of fecal-coliform densities exceeded the Kentucky criteria levels in South Fork Beargrass Creek at site 5 than at site 6. This difference may be caused in part by the combined-sewer overflows, which drain to the stream between these sites during some stormflows.

Density patterns can differ in streams having different sources of fecal-coliform bacteria. If the greatest fecal-coliform densities generally occur during low flow of the stream, then the source is most probably point-source discharges, including effluent from municipal wastewater-treatment facilities; however, if the greatest fecal-coliform densities occur during medium- to high-flow periods, the principal sources of fecal contamination could be from sources such as agricultural and urban nonpoint runoff or from wastewater-system bypasses such as combined-sewer overflows. Boxplots of fecal-coliform bacteria densities during high and low flows indicate that point sources dominate in Little Goose Creek (site 12), Pope Lick (site 14), Fishpool Creek (site 19), and Pennsylvania Run (site 23) (fig. 25). Fecal-coliform densities at most stream sites were high occasionally during low and high flows, which indicates point and nonpoint sources of fecal contamination.

The only downward trend in densities of fecal-coliform bacteria during February 1988 - March 1991 indicated by flow-adjusted seasonal Kendall tests was in Muddy Fork (site 10) (table 12). Upward trends in fecal-coliform

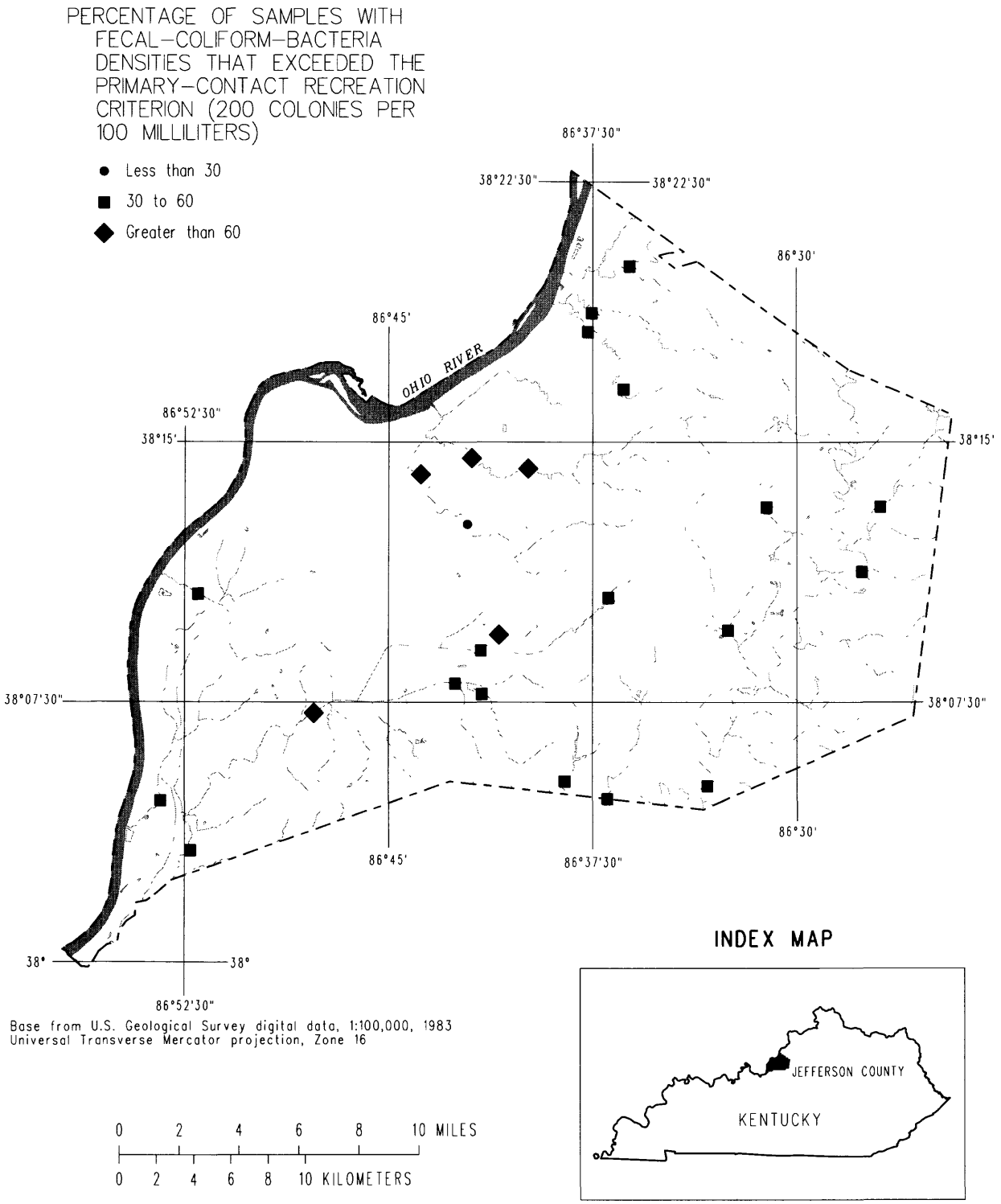

Figure 23.--Percentage of samples from selected streams of Jefferson County, Kentucky, with fecal-coliform-bacteria densities that exceeded the State primary-contact recreation criterion, February 1988 - March 1991.

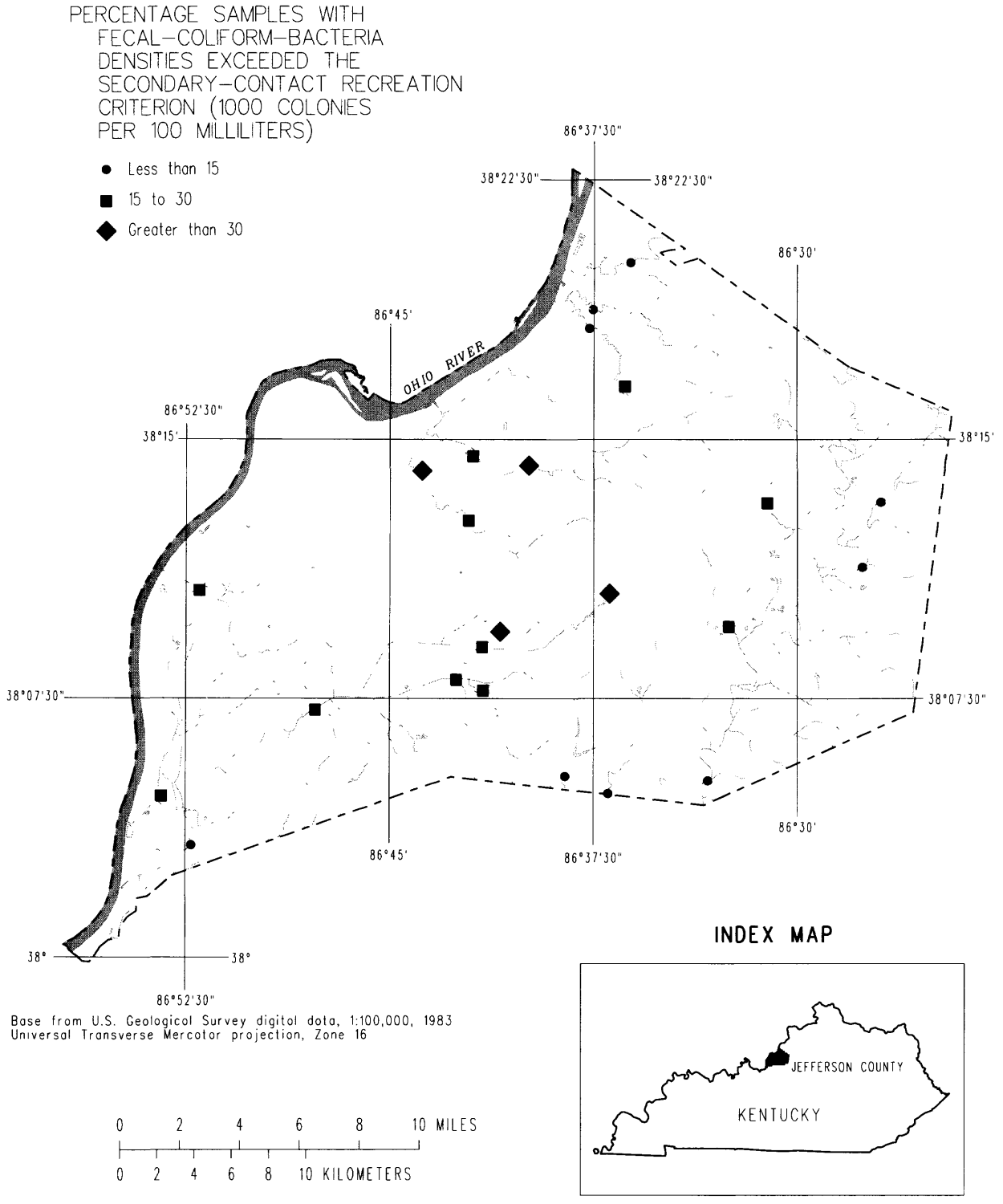

Figure 24.--Percentage of samples from selected streams of Jefferson County, Kentucky, with fecal-coliform-bacteria densities that exceeded the State secondary-contact recreation criterion, February 1988 - March 1991.

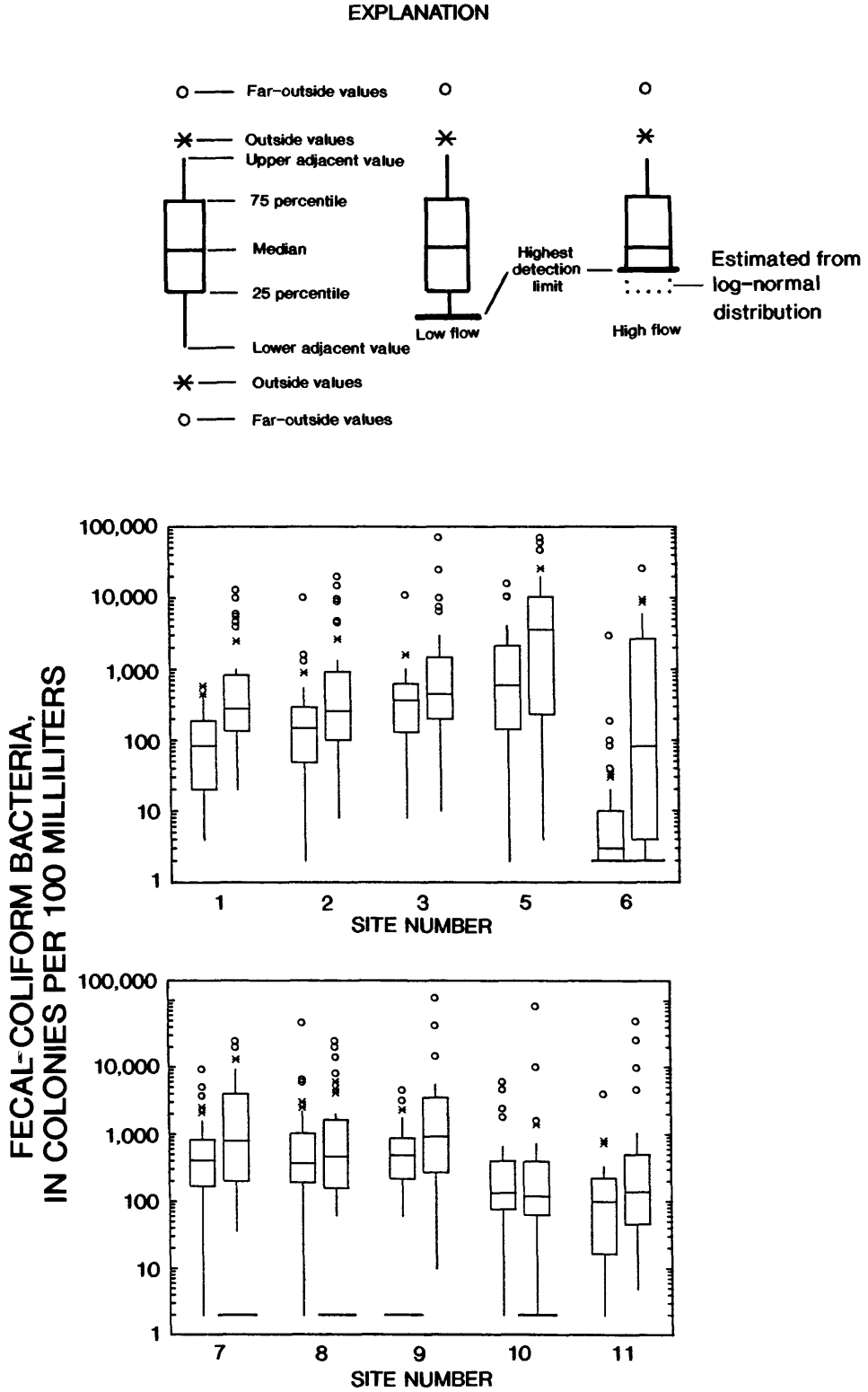

Figure 25.--Fecal-coliform-bacteria densities during low-and high-flow periods February 1988-March 1991, at selected stream sites in Jefferson County, Kentucky. (See table 7 for site descriptions).

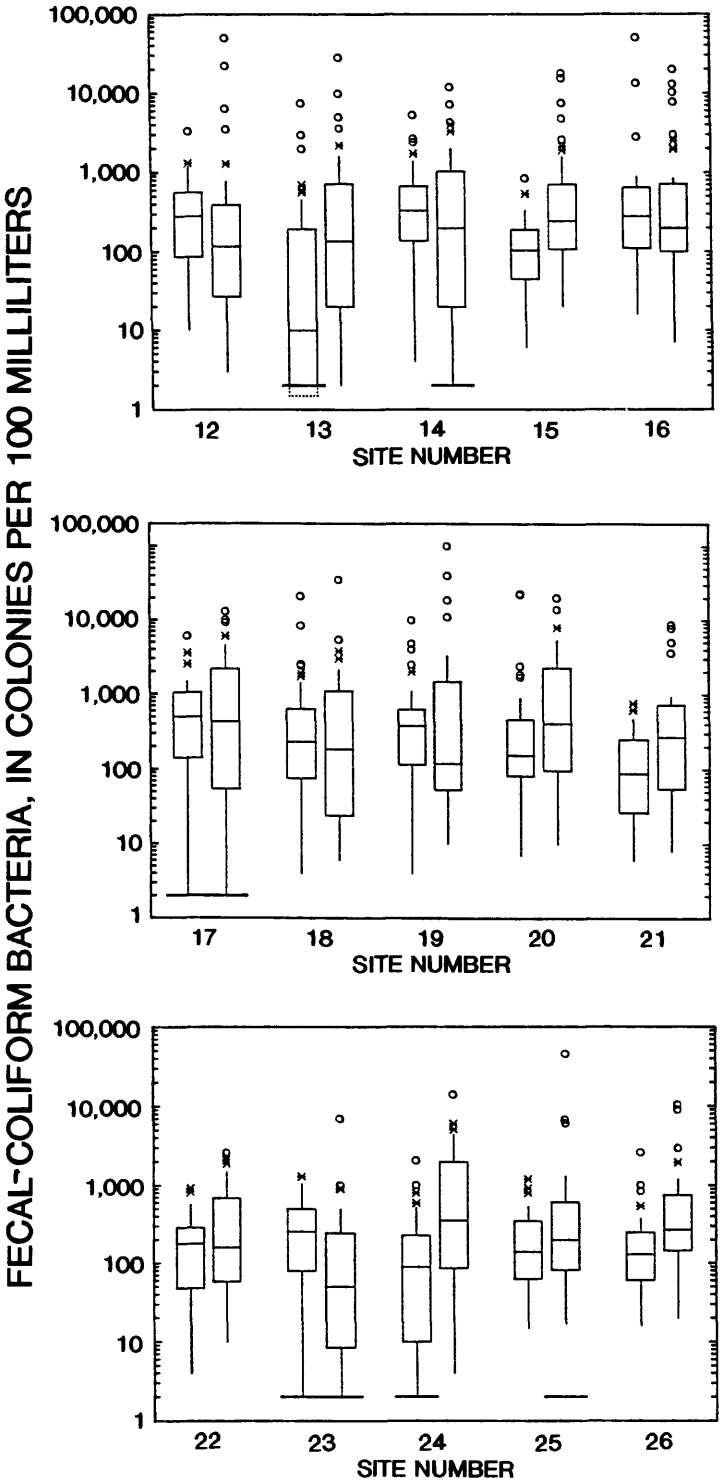

Figure 25.--Fecal-coliform-bacteria densities during low-and high-flow periods,February 1988-March 1991, at selected stream sites in Jefferson County, Kentucky--Continued.

bacteria densities were indicated by flow-adjusted analyses of data from Pond Creek (site 1), Middle Fork Beargrass Creek (site 7), Goose Creek (site 11), and Pennsylvania Run (site 23).

Fecal-streptococci-bacteria densities during February 1988 - March 1991 ranged from less than 2 at several sites to about 3,000,000 col/100 mL at Middle Fork Beargrass Creek (site 8) (table 11). The high fecal-streptococci-bacteria density at Middle Fork Beargrass Creek might have been caused by combined-sewer overflow. The maximum measured fecal-streptococci-bacteria density exceeded 10,000 col/100 mL at almost every stream sampling site in Jefferson County. Downward trends in fecal-streptococci bacteria were indicated in Floyds Fork (site 21) and in Middle Fork Beargrass Creek (site 7). Upward trends in fecal-streptococci bacteria were indicated at six stream sites, two of which also had upward trends in fecal-coliform bacteria (Pond Creek, site 1, and Goose Creek, site 11).

SUMMARY

The Louisville and Jefferson County Metropolitan Sewer District (MSD) and the U.S. Geological Survey began a cooperative program of water sampling in 1988 to assess the quality of streams in Jefferson County, Kentucky. Samples were collected from February 1988 through March 1991 at 26 stream sites. The stream samples were supplemented with continuous records of temperature, pH, dissolved oxygen, and specific conductance at four sites. Continuous discharge records were computed for five sites. Evaluation of these data provided information on the quality of the county's surface-water resources, the effects of point and nonpoint sources of contaminants on surface drainage, and identification of problem stream segments. Most streams in Jefferson County are designated for wildlife habitat and for primary- and secondary-contact recreation. As the basis for evaluation, the stream-water-quality data were statistically summarized, constituent loads were estimated, and trend analyses were done by means of the Seasonal Kendall test.

Water-quality samples for dissolved, suspended, and volatile solids, temperature, pH, alkalinity, specific conductance, dissolved oxygen, BOD, COD, nutrients, and bacteria were obtained twice-monthly from February 1988 through September 1990 and monthly from October 1990 through March 1991. Samples for metals, major ions, and synthetic organic compounds were obtained quarterly. Samples were collected by use of a standard multivertical depth-integrating sampler to obtain a representative sample. The equal-width-increment sampling method was used for all sampling. The temporal distribution of samples did not have seasonal bias. Quarterly samples at some sites were not representative of all flow conditions.

Spacial variability of water temperature was minimal throughout the county. The maximum daily water temperature at some sites occasionally exceeded the Kentucky criterion of 31.7°C for protection of aquatic habitat. The stream-temperature data indicated possible elevations of minimum temperatures at some sites, perhaps resulting from wastewater discharges.

Streams in Jefferson County are generally well buffered and slightly alkaline. Median pH values in the periodic samples ranged from 7.5 to 8.0 units; however, continuous records include occasional pH values above and below the 6.0 - 9.0 units set as the State criteria for protection of aquatic habitat. Samples from only 4 of the 26 stream-sampling sites had alkalinity concentrations less than 20 mg/L, the Federal criterion for protection of aquatic life (chronic).

At the 90th percentile of available data from February 1988 through March 1991, dissolved-solids concentrations did not exceed 750 mg/L, the Kentucky maximum criterion for domestic water supplies, at any of the 26 stream-sampling sites. The maximum dissolved-solids concentration, however, exceeded 750 mg/L at 14 of the 26 sampled sites. The upper part of the Chenoweth Run watershed and the lower part of the South Fork Beargrass Creek watershed had average annual yields of dissolved solids that exceeded 800 ton/mi^2. It is possible that these two parts of watersheds are affected by point discharges of sewage effluent or combined-sewer overflows. In western areas of the county, some yields of average annual dissolved solids were less than 200 ton/mi^2. These areas include the Mill Creek watershed and the lower part of the Pond Creek watershed. Calcium and magnesium were the only major ions analyzed. The largest average annual yield of calcium was from the Muddy Fork watershed, and the largest yield of magnesium was from the Fern Creek watershed. The lowest yield of calcium and magnesium was from the Mill Creek watershed.

Pond Creek had the largest median concentration of suspended solids. The maximum concentration of suspended solids was measured in Mill Creek, whereas the smallest concentration was measured in Cedar Creek. Watersheds having average annual yields of suspended solids that exceeded 200 ton/mi^2 included Chenoweth Run, Floyds Fork, South Fork Beargrass Creek, and Pond Creek. The Cedar Creek and Pennsylvania Run watersheds yielded less than 40 ton/mi^2 per year of suspended solids. Concentrations and yields of volatile solids had patterns similar to those for suspended solids. The maximum volatile-solids concentrations were measured in water from Southern Ditch (site 20). Several of the streams had average annual yields of volatile solids in excess of 60 ton/mi^2.

Major metals, trace elements, and miscellaneous inorganic constituents included total arsenic, barium, beryllium, cadmium, chromium, copper, cyanide, iron, lead, mercury, nickel, selenium, silver, and zinc. Most of the arsenic, cadmium, lead, and selenium determinations were below detection limits. The largest concentrations and yields of barium were measured in streams draining geologic strata of Silurian age. The smallest yield of barium was measured in the Mill Creek watershed, which drains alluvial deposits along the Ohio River. No beryllium concentrations exceeded Kentucky criteria for protection of aquatic habitat. Silver concentrations that exceeded State and Federal criteria represented a small percentage of the data. Chromium, copper, and iron concentrations exceeded the Kentucky criteria for protection of warmwater aquatic habitats at almost every stream-sampling site. The largest nickel and zinc concentrations or yields were measured in streams draining industrial areas. Concentrations of total lead in excess of 150 mg/L were found only in

Mill Creek and Pond Creek. The largest concentrations of mercury were found in Fern Creek and Floyds Fork. The largest total-cyanide concentrations, both the maximum and at the 75th percentile, were measured in Pennsylvania Run.

Nutrients included ammonia, nitrate, nitrite, and organic nitrogen, phosphate, and orthophosphate. Streams that had more than 5 percent total-ammonia data that exceeded the Kentucky warmwater-aquatic-habitat criterion for un-ionized ammonia included Chenoweth Run, Northern Ditch, Pond Creek, and Southern Ditch. Discharge of wastewater effluents is believed to be the cause of most concentrations that exceeded the criterion. The largest average annual yield of total ammonia was estimated to be about 1.5 ton/mi^2 for the Fern Creek watershed. Other watersheds yielding total ammonia in excess of 1 ton/mi^2 included Northern Ditch, upper Pond Creek, and lower South Fork Beargrass Creek.

Total-nitrite concentrations exceeded 1 mg/L in a few samples from Fern Creek, Goose Creek, Harrods Creek, Mill Creek, and Pond Creek. Yields of total nitrite larger than 0.2 ton/mi^2 were estimated for the Fern Creek, Fishpool Creek, and Pond Creek watersheds. The smallest total-nitrite yield was estimated from the Middle Fork Beargrass Creek watershed. The largest yield of dissolved organic nitrogen was estimated at about 5.1 ton/mi^2 for the Spring Ditch watershed, which drains an industrial area. Other watersheds with large yields of dissolved organic nitrogen included Floyds Fork, Goose Creek, Northern Ditch, Pennsylvania Run, and lower South Fork Beargrass Creek.

Nitrate is the end product of the oxidation of reduced forms of nitrogen such as ammonia, organic nitrogen, and nitrite. Those streams in which total-nitrate concentrations exceeded 10 mg/L in more than 10 percent of the samples included Cedar Creek, Chenoweth Run, Fern Creek, Northern Ditch, Pennsylvania Run, and Pope Lick. The average annual yield of total nitrate was larger than 11 ton/mi^2 for the upper Fern Creek watershed and less than 2 ton/mi^2 for the Mill Creek watershed.

Of the major nutrients, phosphorus is most often limiting to plant growth. Smallest yields of total phosphate, and orthophosphate were estimated for the Middle Fork Beargrass Creek and Mill Creek watersheds. Largest yields were estimated for the Fern Creek, Northern Ditch, Spring Ditch, and Chenoweth Run watersheds.

Dissolved-oxygen concentrations of the streams respond to environmental processes. During summer, when streamflows are low and water temperatures are high, the dissolved-oxygen concentrations of streams could be depleted by high organic loadings. Dissolved-oxygen concentrations in streams also vary significantly during a 24-hour period in response to algal and macrophyte photosynthesis and respiration. Summaries of continuous dissolved-oxygen records for Jefferson County show that the minimum dissolved-oxygen concentrations recorded are much smaller than those observed by random daylight sampling. Dissolved-oxygen concentrations smaller than the State criterion of 4.0 mg/L were measured occasionally at 14 stream sites. Water in the Mill Creek watershed contains one-half or less dissolved oxygen than in any other watershed.

Two gross measures of the amount of oxygen required for biochemical and chemical oxidation of organic material in water are biochemical oxygen demand (BOD) and chemical oxygen demand (COD). Largest BOD measurements were in Goose Creek and in South Fork Beargrass Creek. Largest COD measurements were in the Spring Ditch watershed, which also had the largest annual BOD and COD.

Organochlorine insecticides sampled in streams of Jefferson County included total chlordane, endrin, lindane, methoxychlor, and toxaphene. Because of the hydrophobic nature of organochlorine pesticides, they are not often detected in water samples. The laboratory detection limits for these chemicals were generally larger than many of the State and Federal water-quality criteria. At least one noncensored analysis for total endrin was reported at 13 stream sites, all of which exceeded some water-quality criteria. Federal and State criteria of 0.08 µg/L for protection of aquatic life and warmwater-aquatic habitat (chronic) were exceeded by at least one noncensored analysis for total lindane from 14 stream sites. The methoxychlor criterion for protection of aquatic life (chronic) was exceeded at 14 stream sites. Concentrations of toxaphene exceeded all applicable State and Federal water-quality criteria in Harrods Creek, Middle Fork Beargrass Creek, and in Pond Creek. Herbicides sampled in streams of Jefferson County were limited to 2,4-D (dichlorophenoxyacetic acid) and 2,4,5-TP (silvex). The concentration of total 2,4-D in stream samples obtained quarterly ranged from less than 0.02 to 12 µg/L. The largest concentrations of total 2,4-D were measured in streams draining predominantly residential and industrial areas. The maximum concentration of total 2,4,5-TP was measured in Pond Creek.

Kentucky primary- and secondary-contact recreation water criteria are 200 and 100 col/100 mL, respectively, as a geometric mean based on no less than 5 samples per month; however, repetitive fecal-coliform sampling during each month of this study was not done. Comparison of fecal-coliform densities of samples obtained during this study to the geometric mean criteria was done only to approximate possible criteria exceedances. Approximately 20 percent of the fecal-coliform densities from stream samples collected during this study exceeded 1,000 col/100 mL of water, whereas approximately 50 percent exceeded 200 col/100 mL. These criteria were exceeded occasionally at almost every stream-sampling site. The percentages of fecal-coliform densities exceeding the criteria were greatest in streams draining the most densely urbanized areas of the county and smallest in streams draining the mostly rural northeastern, eastern, and southern areas of the county. A greater percentage of fecal-coliform densities exceeded the Kentucky criteria in South Fork Beargrass Creek at site 5 than at site 6. This difference may be caused in part by combined-sewer overflows, which enter the stream between these sites during some stormflows. Boxplots of fecal-coliform bacteria densities during high and low flows indicate that point sources were greater than other sources in Little Goose Creek, Pope Lick, Fishpool Creek, and in Pennsylvania Run. Fecal-coliform bacteria densities at most stream sites were large occasionally during low and high flows, which indicates point and nonpoint sources of fecal contamination. The maximum fecal-streptococci density was measured at Middle Fork Beargrass Creek and may possibly have been caused by combined sewer overflow. The maximum measured fecal-streptococci density exceeded 10,000 col/100 mL at almost every stream-sampling site.

The approximately 3-year period from which data are available for trend analysis is brief, and results may not be indicative of the long term. In general, quarterly sampling produced too few samples for detection of trends. Water-quality constituents for which no trends could be detected included arsenic, beryllium, cadmium, lead, nickel, selenium, silver, zinc, cyanide, chlordane, endrin, lindane, methoxychlor, toxaphene, 2,4-D, and 2,4,5-TP. Predominantly downward trends were indicated for pH, dissolved solids, specific conductance, suspended- and volatile-solids, ammonia, nitrate, nitrite, and organic nitrogen. Predominantly upward trends were indicated for water temperature, alkalinity, fecal-coliform bacteria, and fecal-streptococci bacteria.

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Table 11.--Statistical summary of water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991

[N, number of observations; --, missing; <, less than; *, value was estimated from log-normal fit program; percentiles not computed if fewer than 10 observations available; the 10th and 90th percentiles are not shown if fewer than 30 observations available]

Site number and name	N	N of censored data values	Minimum	Value at indicated percentile 10	25	50 (median)	75	90	Maximum
TEMPERATURE									
Water temperature, in degrees Celsius (miscellaneous observations)									
1 Pond Creek at Pendleton Road	72	0	0.0	5.1	7.0	16	23	25	29
2 Mill Creek at Orell Road	69	0	.0	4.6	8.1	15	21	25	29
3 Pond Creek at Manslick Road	74	0	.3	4.1	7.5	15	23	26	30
4 Mill Creek at Rockford Lane	2	0	5.0	--	--	--	--	--	5.5
5 South Fork Beargrass Creek at Winter Avenue	74	0	.0	6.0	9.6	13	21	24	26
6 South Fork Beargrass Creek at Trevilian Way	75	o	.8	6.6	9.0	15	22	25	28
7 Middle Fork Beargrass Creek at Old Cannons Lane	74	0	.0	6.7	9.2	15	23	26	29
8 Middle Fork Beargrass Creek at Beals Branch Road	74	0	.1	5.3	8.0	14	22	24	26
9 Spring Ditch at Private Drive below Hanses Road	76	0	.4	6.4	8.0	14	20	23	26
10 Muddy Fork at Mockingbird Valley Road	74	0	.2	4.9	8.3	12	20	21	24
11 Goose Creek at U.S. Highway 42	74	0	1.0	5.0	7.6	14	21	23	25
12 Little Goose Creek at U.S. Highway 42	75	0	1.0	5.0	7.2	12	20	23	25
13 Goose Creek at Old Westport Road	74	0	1.4	8.0	10	15	22	25	28
14 Pope Lick at Pope Lick Road	75	0	.5	4.8	8.7	13	20	23	26
15 Floyds Fork at former State Highway 155	74	0	.7	3.5	8.1	14	22	27	30
16 Chenoweth Run at Gelhaus Road	73	0	.0	4.9	8.0	15	21	25	32
17 Fern Creek at Old Bardstown Road	74	0	.1	7.2	10	14	21	24	27
18 Northern Ditch at Preston Highway	76	0	.1	6.4	8.3	15	23	24	28
19 Fishpool Creek at Bost Road	75	0	.7	5.9	8.4	15	23	26	31
20 Southern Ditch at Minors Lane	75	0	1.8	5.6	9.6	17	25	28	31
21 Floyds Fork at Bardstown Road	75	0	.3	3.7	7.8	16	23	27	30
22 Cedar Creek at Thixton Road	75	0	.5	3.9	7.8	13	21	24	27
23 Pennsylvania Run at Mt. Washington Road	75	0	2.5	4.3	8.0	13	21	23	29
24 Mill Creek Cutoff at Dover Road	63	0	.0	5.2	7.8	15	23	28	33
25 Harrods Creek at Hunting Creek Drive	71	0	.7	3.9	6.8	14	22	24	27
26 Long Run at State Highway 1531	55	0	.0	2.8	6.7	13	20	26	29
Water temperature, daily minimum, in degrees Celsius (from continuous records)									
3 Pond Creek at Manslick Road	1,006	0	.0	3.4	6.6	13.3	22.7	26.1	30.7
6 South Fork Beargrass Creek at Trevilian Way	1,010	0	.0	4.7	7.7	14.4	21.9	24.6	28.2
7 Middle Fork Beargrass Creek at Old Cannons Lane	1,060	0	.0	5.6	8.1	12.7	20.0	23.3	29.2
24 Mill Creek Cutoff at Dover Road	825	0	.2	2.9	5.3	10.5	19.7	24.3	31.7
Water temperature, daily maximum, in degrees Celsius (from continuous records)									
3 Pond Creek at Manslick Road	1,006	0	.2	5.8	9.7	16.3	26.5	30.4	33.8
6 South Fork Beargrass Creek at Trevilian Way	1,010	0	.6	7.2	10.9	17.9	25.8	29.1	33.6
7 Middle Fork Beargrass Creek at Old Cannons Lane	1,060	0	.0	8.3	11.5	16.8	24.5	28.3	35.4
24 Mill Creek Cutoff at Dover Road	824	0	.4	5.3	9.0	15.0	24.8	29.5	34.4

Table 11.--Statistical summary of water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

Site number and name	N	N of censored data values	Minimum	Value at indicated percentile 10	25	50 (median)	75	90	Maximum
pH AND ALKALINITY									
pH, laboratory, in standard units									
1 Pond Creek at Pendleton Road	72	0	6.9	7.4	7.6	7.8	8.0	8.2	9.1
2 Mill Creek at Orell Road	69	0	7.0	7.3	7.5	7.8	8.0	8.1	9.0
3 Pond Creek at Manslick Road	74	0	6.8	7.5	7.7	7.8	8.1	8.5	9.0
4 Mill Creek at Rockford Lane	2	0	7.5	--	--	--	--	--	7.5
5 South Fork Beargrass Creek at Winter Avenue	74	0	6.4	7.2	7.5	7.6	7.8	8.0	8.3
6 South Fork Beargrass Creek at Trevilian Way	74	0	5.2	7.3	7.5	7.7	7.9	8.1	8.8
7 Middle Fork Beargrass Creek at Old Cannons Lane	74	0	6.0	7.4	7.7	7.9	8.2	8.5	9.2
8 Middle Fork Beargrass Creek at Beals Branch Road	74	0	6.2	7.3	7.6	7.8	8.0	8.3	8.8
9 Spring Ditch at Private Drive below Hanses Road	76	0	6.6	7.2	7.3	7.6	7.7	7.8	8.3
10 Muddy Fork at Mockingbird Valley Road	74	0	6.4	7.3	7.5	7.8	7.9	8.1	8.8
11 Goose Creek at U.S. Highway 42	74	0	6.4	7.4	7.7	7.9	8.1	8.5	9.1
12 Little Goose Creek at U.S. Highway 42	75	0	6.9	7.5	7.8	8.0	8.2	8.5	9.0
13 Goose Creek at Old Westport Road	74	0	6.4	7.3	7.6	7.8	8.3	8.6	9.3
14 Pope Lick at Pope Lick Road	75	0	6.1	7.2	7.6	7.8	7.9	8.1	8.7
15 Floyds Fork at former State Highway 155	74	0	6.6	7.6	7.7	7.9	8.2	8.4	9.0
16 Chenoweth Run at Gelhaus Road	74	0	6.2	7.5	7.7	7.9	8.1	8.6	9.3
17 Fern Creek at Old Bardstown Road	74	0	7.1	7.4	7.6	7.9	8.1	8.5	8.8
18 Northern Ditch at Preston Highway	76	0	6.8	7.4	7.6	7.8	8.2	8.4	9.4
19 Fishpool Creek at Bost Road	75	0	6.7	7.4	7.6	7.8	8.2	8.6	9.3
20 Southern Ditch at Minors Lane	75	0	6.7	7.2	7.6	7.9	8.2	8.5	9.0
21 Floyds Fork at Bardstown Road	75	0	6.9	7.6	7.7	7.9	8.1	8.2	8.6
22 Cedar Creek at Thixton Road	75	0	6.7	7.5	7.7	7.9	8.1	8.4	9.8
23 Pennsylvania Run at Mt. Washington Road	75	0	5.1	7.1	7.4	7.7	8.0	8.2	8.9
24 Mill Creek Cutoff at Dover Road	63	0	6.2	7.3	7.7	8.0	8.6	9.3	9.6
25 Harrods Creek at Hunting Creek Drive	72	0	6.8	7.4	7.7	7.9	8.2	8.5	9.0
26 Long Run at State Highway 1531	55	0	5.9	7.3	7.8	7.9	8.2	8.6	9.8
pH, daily minimum, in standard units (from continuous records)									
3 Pond Creek at Manslick Road	1,006	0	4.5	6.9	7.3	7.6	7.9	8.4	9.3
6 South Fork Beargrass Creek at Trevilian Way	958	0	4.9	7.0	7.3	7.6	7.8	8.1	9.0
7 Middle Fork Beargrass Creek at Old Cannons Lane	1,041	0	5.4	6.8	7.2	7.5	7.8	8.0	8.9
24 Mill Creek Cutoff at Dover Road	797	0	4.8	6.5	6.9	7.5	8.0	8.7	11.0
pH, daily maximum, in standard units (from continuous records)									
3 Pond Creek at Manslick Road	1,006	0	5.0	7.3	7.6	8.0	8.4	8.7	9.8
6 South Fork Beargrass Creek at Trevilian Way	958	0	5.2	7.4	7.7	7.9	8.2	8.6	9.5
7 Middle Fork Beargrass Creek at Old Cannons Lane	1,041	0	6.0	7.3	7.6	7.9	8.3	8.6	9.7
24 Mill Creek Cutoff at Dover Road	797	0	5.0	7.0	7.6	8.2	8.8	9.4	11.3

Table 11.--Statistical summary of water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

Site number and name	N	N of censored data values	Minimum	Value at indicated percentile 10	25	50 (median)	75	90	Maximum
Alkalinity, titration to pH 4.5, laboratory, in milligrams per liter as $CaCO_3$									
1 Pond Creek at Pendleton Road	73	0	51	91	121	145	173	190	293
2 Mill Creek at Orell Road	69	0	35	51	82	144	227	300	360
3 Pond Creek at Manslick Road	73	0	68	113	132	158	178	199	230
4 Mill Creek at Rockford Lane	2	0	71	--	--	--	--	--	93
5 South Fork Beargrass Creek at Winter Avenue	73	0	56	89	120	145	179	208	240
6 South Fork Beargrass Creek at Trevilian Way	73	0	50	74	98	145	177	196	230
7 Middle Fork Beargrass Creek at Old Cannons Lane	74	0	88	128	168	201	230	247	414
8 Middle Fork Beargrass Creek at Beals Branch Road	73	0	76	126	156	194	220	247	260
9 Spring Ditch at Private Drive below Hanses Road	74	0	29	87	131	162	203	228	490
10 Muddy Fork at Mockingbird Valley Road	73	0	50	120	164	198	227	247	270
11 Goose Creek at U.S. Highway 42	73	0	57	117	157	174	192	210	240
12 Little Goose Creek at U.S. Highway 42	74	0	33	139	162	180	200	212	247
13 Goose Creek at Old Westport Road	72	0	26	109	135	162	192	209	240
14 Pope Lick at Pope Lick Road	74	0	1.5	117	152	186	215	243	280
15 Floyds Fork at former State Highway 155	73	0	50	131	146	178	207	245	270
16 Chenoweth Run at Gelhaus Road	73	0	2.0	92	121	170	191	219	290
17 Fern Creek at Old Bardstown Road	72	0	30	93	140	201	234	259	290
18 Northern Ditch at Preston Highway	74	0	61	119	145	176	200	214	260
19 Fishpool Creek at Bost Road	74	0	9.1	99	140	169	179	200	260
20 Southern Ditch at Minors Lane	73	0	49	98	140	164	183	196	220
21 Floyds Fork at Bardstown Road	73	0	11	111	138	180	206	240	270
22 Cedar Creek at Thixton Road	74	0	80	98	140	171	199	220	260
23 Pennsylvania Run at Mt. Washington Road	74	0	56	97	120	142	158	175	260
24 Mill Creek Cutoff at Dover Road	61	0	50	64	93	119	158	195	220
25 Harrods Creek at Hunting Creek Drive	70	0	76	133	158	188	213	230	240
26 Long Run at State Highway 1531	54	0	90	130	162	182	209	240	250

Table 11.--Statistical summary of water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

Site number and name	N	N of censored data values	Minimum	Value at indicated percentile 10	25	50 (median)	75	90	Maximum
DISSOLVED SOLIDS, AND RELATED WATER-QUALITY CONSTITUENTS AND CHARACTERISTICS									
Dissolved solids, residue at 105 degrees Celsius, in milligrams per liter									
1 Pond Creek at Pendleton Road	73	0	134	238	311	388	476	585	828
2 Mill Creek at Orell Road	69	0	34	156	194	260	394	478	790
3 Pond Creek at Manslick Road	73	0	116	287	335	398	473	566	853
4 Mill Creek at Rockford Lane	2	0	373	--	--	--	--	--	808
5 South Fork Beargrass Creek at Winter Avenue	74	0	21	233	287	344	382	409	760
6 South Fork Beargrass Creek at Trevilian Way	74	0	116	228	288	324	356	405	702
7 Middle Fork Beargrass Creek at Old Cannons Lane	74	0	161	251	312	360	392	422	546
8 Middle Fork Beargrass Creek at Beals Branch Road	72	0	153	236	303	354	390	420	526
9 Spring Ditch at Private Drive below Hanses Road	74	0	36	217	298	397	463	499	532
10 Muddy Fork at Mockingbird Valley Road	73	0	221	371	404	449	494	528	658
11 Goose Creek at U.S. Highway 42	73	0	156	234	290	334	387	426	482
12 Little Goose Creek at U.S. Highway 42	74	0	110	242	308	342	387	449	504
13 Goose Creek at Old Westport Road	72	0	166	217	257	319	380	433	4,210
14 Pope Lick at Pope Lick Road	73	0	196	279	341	397	465	510	875
15 Floyds Fork at former State Highway 155	73	0	199	235	265	303	340	372	1,390
16 Chenoweth Run at Gelhaus Road	72	0	176	294	329	384	443	477	2,240
17 Fern Creek at Old Bardstown Road	72	0	123	297	370	403	453	514	599
18 Northern Ditch at Preston Highway	73	0	121	275	334	414	518	713	1,320
19 Fishpool Creek at Bost Road	74	0	114	281	350	419	470	516	707
20 Southern Ditch at Minors Lane	71	0	160	285	344	401	453	503	612
21 Floyds Fork at Bardstown Road	73	0	168	251	277	310	355	399	1,820
22 Cedar Creek at Thixton Road	73	0	166	295	389	478	587	718	1,480
23 Pennsylvania Run at Mt. Washington Road	74	0	149	215	265	325	404	513	1,740
24 Mill Creek Cutoff at Dover Road	62	0	92	170	241	330	389	447	1,160
25 Harrods Creek at Hunting Creek Drive	70	0	154	231	274	309	350	389	516
26 Long Run at State Highway 1531	53	0	172	204	240	274	308	352	419

Table 11.--Statistical summary of water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

Site number and name	N	N of censored data values	Minimum	Value at indicated percentile 10	25	50 (median)	75	90	Maximum
Specific conductance, in microsiemens per centimeter at 25 degrees Celsius									
1 Pond Creek at Pendleton Road	72	0	270	353	463	564	646	854	946
2 Mill Creek at Orell Road	69	0	111	160	288	383	574	709	957
3 Pond Creek at Manslick Road	74	0	251	357	511	593	696	800	1,040
4 Mill Creek at Rockford Lane	2	0	403	--	--	--	--	--	605
5 South Fork Beargrass Creek at Winter Avenue	74	0	149	280	437	512	574	622	662
6 South Fork Beargrass Creek at Trevilian Way	74	0	138	324	424	486	536	586	648
7 Middle Fork Beargrass Creek at Old Cannons Lane	74	0	41	358	495	540	591	632	786
8 Middle Fork Beargrass Creek at Beals Branch Road	74	0	245	342	425	533	578	641	890
9 Spring Ditch at Private Drive below Hanses Road	76	0	82	329	432	607	720	764	916
10 Muddy Fork at Mockingbird Valley Road	74	0	323	496	639	681	737	783	892
11 Goose Creek at U.S. Highway 42	74	0	178	389	465	519	577	618	706
12 Little Goose Creek at U.S. Highway 42	75	0	145	369	456	517	589	632	741
13 Goose Creek at Old Westport Road	74	0	148	381	430	491	589	618	727
14 Pope Lick at Pope Lick Road	75	0	282	425	501	616	679	736	838
15 Floyds Fork at former State Highway 155	74	0	136	353	398	455	505	549	615
16 Chenoweth Run at Gelhaus Road	74	0	188	466	525	579	664	708	811
17 Fern Creek at Old Bardstown Road	74	0	162	456	585	628	676	713	782
18 Northern Ditch at Preston Highway	76	0	183	426	524	607	779	1,040	1,910
19 Fishpool Creek at Bost Road	75	0	137	387	544	618	680	757	915
20 Southern Ditch at Minors Lane	75	0	202	419	510	600	682	785	841
21 Floyds Fork at Bardstown Road	75	0	262	344	438	469	526	603	771
22 Cedar Creek at Thixton Road	75	0	250	470	571	630	744	946	1,010
23 Pennsylvania Run at Mt. Washington Road	75	0	256	346	400	501	618	676	762
24 Mill Creek Cutoff at Dover Road	63	0	108	232	329	463	576	657	843
25 Harrods Creek at Hunting Creek Drive	71	0	175	377	452	497	552	651	752
26 Long Run at State Highway 1531	54	0	172	313	364	419	482	535	593
Specific conductance, daily minimum, in microsiemens per centimeter at 25 degrees Celsius (from continuous records)									
3 Pond Creek at Manslick Road	987	0	129	366	462	565	664	785	1,020
6 South Fork Beargrass Creek at Trevilian Way	1,008	0	122	281	388	442	507	545	691
7 Middle Fork Beargrass Creek at Old Cannons Lane	1,061	0	74	279	429	511	570	619	961
24 Mill Creek Cutoff at Dover Road	819	0	47	194	274	420	541	621	996
Specific conductance, daily maximum, in microsiemens per centimeter at 25 degrees Celsius (from continuous records)									
3 Pond Creek at Manslick Road	987	0	160	473	543	625	753	905	1,200
6 South Fork Beargrass Creek at Trevilian Way	1,009	0	268	409	450	503	551	606	1,010
7 Middle Fork Beargrass Creek at Old Cannons Lane	1,061	0	275	477	527	568	613	669	1,100
24 Mill Creek Cutoff at Dover Road	818	0	108	297	393	518	613	689	1,090

Table 11.--Statistical summary of water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

Site number and name	N	N of censored data values	Minimum	Value at indicated percentile 10	25	50 (median)	75	90	Maximum
Calcium, total, in milligrams per liter as Ca									
1 Pond Creek at Pendleton Road	11	0	43	--	51	62	72	--	84
2 Mill Creek at Orell Road	10	0	13	--	27	46	71	--	87
3 Pond Creek at Manslick Road	12	0	47	--	53	61	65	--	82
5 South Fork Beargrass Creek at Winter Avenue	11	0	36	--	46	68	83	--	84
6 South Fork Beargrass Creek at Trevilian Way	11	0	35	--	51	58	78	--	82
7 Middle Fork Beargrass Creek at Old Cannons Lane	10	0	41	--	61	73	80	--	89
8 Middle Fork Beargrass Creek at Beals Branch Road	10	0	45	--	54	71	84	--	90
9 Spring Ditch at Private Drive below Hanses Road	11	0	41	--	60	67	84	--	95
10 Muddy Fork at Mockingbird Valley Road	11	0	58	--	63	98	108	--	115
11 Goose Creek at U.S. Highway 42	10	0	39	--	53	55	59	--	66
12 Little Goose Creek at U.S. Highway 42	12	0	43	--	50	60	64	--	69
13 Goose Creek at Old Westport Road	10	0	40	--	41	53	54	--	61
14 Pope Lick at Pope Lick Road	13	0	53	--	60	63	69	--	91
15 Floyds Fork at former State Highway 155	13	0	43	--	53	65	73	--	80
16 Chenoweth Run at Gelhaus Road	13	0	40	--	50	59	65	--	71
17 Fern Creek at Old Bardstown Road	12	0	32	--	59	63	71	--	85
18 Northern Ditch at Preston Highway	11	0	45	--	52	57	63	--	87
19 Fishpool Creek at Bost Road	10	0	18	--	38	54	62	--	68
20 Southern Ditch at Minors Lane	10	0	36	--	45	54	60	--	66
21 Floyds Fork at Bardstown Road	12	0	43	--	52	61	71	--	84
22 Cedar Creek at Thixton Road	12	0	37	--	52	64	76	--	90
23 Pennsylvania Run at Mt. Washington Road	12	0	18	--	38	41	49	--	53
24 Mill Creek Cutoff at Dover Road	10	0	19	--	31	42	54	--	58
25 Harrods Creek at Hunting Creek Drive	11	0	1.0	--	50	56	60	--	73
26 Long Run at State Highway 1531	9	0	48	--	--	--	--	--	99
Magnesium, total, in milligrams per liter as Mg									
1 Pond Creek at Pendleton Road	11	0	14	--	18	21	26	--	29
2 Mill Creek at Orell Road	10	0	3.2	--	8.8	14	27	--	32
3 Pond Creek at Manslick Road	12	0	15	--	19	22	23	--	28
5 South Fork Beargrass Creek at Winter Avenue	11	0	7.7	--	12	14	17	--	20
6 South Fork Beargrass Creek at Trevilian Way	11	0	7.3	--	13	15	18	--	20
7 Middle Fork Beargrass Creek at Old Cannons Lane	10	0	9.1	--	14	15	17	--	19
8 Middle Fork Beargrass Creek at Beals Branch Road	10	0	9.7	--	12	15	17	--	18
9 Spring Ditch at Private Drive below Hanses Road	11	0	11	--	14	18	19	--	22
10 Muddy Fork at Mockingbird Valley Road	11	0	7.6	--	11	13	14	--	18
11 Goose Creek at U.S. Highway 42	10	0	14	--	19	22	25	--	26
12 Little Goose Creek at U.S. Highway 42	12	0	13	--	17	20	22	--	23
13 Goose Creek at Old Westport Road	10	0	15	--	18	21	23	--	26
14 Pope Lick at Pope Lick Road	13	0	20	--	24	26	28	--	35
15 Floyds Fork at former State Highway 155	13	0	11	--	14	18	21	--	23
16 Chenoweth Run at Gelhaus Road	12	0	14	--	18	22	25	--	27
17 Fern Creek at Old Bardstown Road	12	0	13	--	23	28	29	--	32
18 Northern Ditch at Preston Highway	11	0	18	--	19	21	27	--	28
19 Fishpool Creek at Bost Road	10	0	4.7	--	14	24	27	--	32
20 Southern Ditch at Minors Lane	10	0	13	--	20	24	27	--	30
21 Floyds Fork at Bardstown Road	12	0	12	--	15	17	22	--	30
22 Cedar Creek at Thixton Road	12	0	17	--	22	25	37	--	41
23 Pennsylvania Run at Mt. Washington Road	12	0	8.7	--	19	21	22	--	24
24 Mill Creek Cutoff at Dover Road	10	0	5.4	--	8.5	15	17	--	17
25 Harrods Creek at Hunting Creek Drive	11	0	20	--	21	24	27	--	30
26 Long Run at State Highway 1531	9	0	7.4	--	--	--	--	--	18

Table 11.--Statistical summary of water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

Site number and name	N	N of censored data values	Minimum	Value at indicated percentile 10	25	50 (median)	75	90	Maximum
Hardness, total, in milligrams per liter as $CaCO_3$									
1 Pond Creek at Pendleton Road	12	0	162	--	205	243	285	--	329
2 Mill Creek at Orell Road	10	0	45.4	--	103	172	288	--	349
3 Pond Creek at Manslick Road	16	0	179	--	210	249	257	--	321
5 South Fork Beargrass Creek at Winter Avenue	12	0	122	--	168	232	285	--	289
6 South Fork Beargrass Creek at Trevilian Way	12	0	118	--	184	212	271	--	286
7 Middle Fork Beargrass Creek at Old Cannons Lane	11	0	140	--	211	251	280	--	292
8 Middle Fork Beargrass Creek at Beals Branch Road	11	0	153	--	181	236	283	--	292
9 Spring Ditch at Private Drive below Hanses Road	11	0	149	--	212	239	287	--	326
10 Muddy Fork at Mockingbird Valley Road	11	0	175	--	207	298	322	--	362
11 Goose Creek at U.S. Highway 42	10	0	156	--	210	227	248	--	272
12 Little Goose Creek at U.S. Highway 42	12	0	160	--	197	234	251	--	266
13 Goose Creek at Old Westport Road	11	0	165	--	174	218	227	--	258
14 Pope Lick at Pope Lick Road	14	0	214	--	244	265	286	--	372
15 Floyds Fork at former State Highway 155	15	0	152	--	206	225	252	--	294
16 Chenoweth Run at Gelhaus Road	12	0	158	--	196	246	264	--	285
17 Fern Creek at Old Bardstown Road	12	0	134	--	242	273	304	--	333
18 Northern Ditch at Preston Highway	11	0	194	--	214	224	272	--	295
19 Fishpool Creek at Bost Road	10	0	63.3	--	151	232	266	--	297
20 Southern Ditch at Minors Lane	10	0	144	--	196	235	264	--	285
21 Floyds Fork at Bardstown Road	13	0	157	--	196	217	265	--	306
22 Cedar Creek at Thixton Road	13	0	163	--	227	253	337	--	382
23 Pennsylvania Run at Mt. Washington Road	12	0	80.9	--	174	187	211	--	222
24 Mill Creek Cutoff at Dover Road	14	0	70.2	--	94.5	164	206	--	212
25 Harrods Creek at Hunting Creek Drive	12	0	87.3	--	217	241	268	--	308
26 Long Run at State Highway 1531	10	0	152	--	173	233	253	--	298

Table 11.--Statistical summary of water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

Site number and name	N	N of censored data values	Minimum	Value at indicated percentile 10	25	50 (median)	75	90	Maximum
SUSPENDED SOLIDS									
Suspended solids, residue at 105 degrees Celsius, in milligrams per liter									
1 Pond Creek at Pendleton Road	73	0	2.0	5.0	11	24	58	122	500
2 Mill Creek at Orell Road	69	0	2.0	7.0	12	22	41	110	4,350
3 Pond Creek at Manslick Road	73	0	4.0	15	32	58	100	146	1,370
4 Mill Creek at Rockford Lane	2	0	20	--	--	--	--	--	40
5 South Fork Beargrass Creek at Winter Avenue	73	0	2.0	6.0	9.5	22	45	126	1,640
6 South Fork Beargrass Creek at Trevilian Way	74	0	3.0	5.0	8.7	16	30	223	3,030
7 Middle Fork Beargrass Creek at Old Cannons Lane	74	0	1.0	3.5	5.7	10	20	47	202
8 Middle Fork Beargrass Creek at Beals Branch Road	72	0	1.0	4.0	6.0	14	25	82	272
9 Spring Ditch at Private Drive below Hanses Road	74	0	1.0	6.0	12	21	46	99	308
10 Muddy Fork at Mockingbird Valley Road	73	0	2.0	5.4	10	21	43	112	442
11 Goose Creek at U.S. Highway 42	73	0	2.0	4.4	7.0	13	33	68	1,080
12 Little Goose Creek at U.S. Highway 42	74	0	3.0	5.0	8.0	18	36	86	928
13 Goose Creek at Old Westport Road	72	0	1.0	4.3	8.0	16	32	82	1,960
14 Pope Lick at Pope Lick Road	74	0	1.0	4.5	7.0	11	20	61	1,250
15 Floyds Fork at former State Highway 155	73	0	2.0	5.0	9.0	17	36	104	1,640
16 Chenoweth Run at Gelhaus Road	72	0	.70	2.3	5.2	11	20	57	502
17 Fern Creek at Old Bardstown Road	72	0	1.5	4.3	7.0	14	30	69	810
18 Northern Ditch at Preston Highway	74	0	1.0	4.5	7.0	12	29	78	1,190
19 Fishpool Creek at Bost Road	74	0	1.6	4.8	7.0	14	31	90	1,180
20 Southern Ditch at Minors Lane	72	1	<1.0	7.1	12	20	34	60	1,230
21 Floyds Fork at Bardstown Road	73	1	<1.0	3.0	6.5	15	24	70	302
22 Cedar Creek at Thixton Road	73	1	.20	3.4	5.0	7.0	16	41	136
23 Pennsylvania Run at Mt. Washington Road	74	0	1.0	4.5	7.7	15	24	69	552
24 Mill Creek Cutoff at Dover Road	62	0	2.0	4.0	7.0	16	26	40	378
25 Harrods Creek at Hunting Creek Drive	70	0	4.0	10	14	29	51	112	774
26 Long Run at State Highway 1531	54	0	2.0	3.5	6.0	11	23	67	1,390

Table 11.--Statistical summary of water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

Site number and name	N	N of censored data values	Minimum	Value at indicated percentile 10	25	50 (median)	75	90	Maximum
Residue, volatile nonfilterable, in milligrams per liter									
1 Pond Creek at Pendleton Road	73	2	<1.0	2.0	3.5	6.0	13	40	326
2 Mill Creek at Orell Road	69	4	<.10	1.0	4.0	5.0	13	45	510
3 Pond Creek at Manslick Road	73	3	<1.0	1.4	4.5	9.0	25	71	556
4 Mill Creek at Rockford Lane	2	0	10	--	--	--	--	--	11
5 South Fork Beargrass Creek at Winter Avenue	73	4	.30	1.2*	4.0	6.0	19	36	240
6 South Fork Beargrass Creek at Trevilian Way	74	3	<1.0	1.0	2.9	5.5	12	37	308
7 Middle Fork Beargrass Creek at Old Cannons Lane	74	6	<1.0	1.0	2.0	4.0	7.2	22	331
8 Middle Fork Beargrass Creek at Beals Branch Road	72	4	<1.0	1.0	2.0	4.5	10	20	114
9 Spring Ditch at Private Drive below Hanses Road	74	2	<1.0	1.7	4.0	8.0	15	39	96
10 Muddy Fork at Mockingbird Valley Road	73	3	<1.0	2.0	3.0	5.5	11	18	98
11 Goose Creek at U.S. Highway 42	73	3	<.10	1.0	2.0	4.0	8.0	27	88
12 Little Goose Creek at U.S. Highway 42	74	2	<.10	1.0	2.0	4.0	10	24	435
13 Goose Creek at Old Westport Road	72	2	<.10	1.0	3.2	6.0	14	23	310
14 Pope Lick at Pope Lick Road	74	1	<1.0	1.0	2.0	3.5	7.0	16	190
15 Floyds Fork at former State Highway 155	73	4	<.10	1.0	2.0	4.0	12	31	134
16 Chenoweth Run at Gelhaus Road	72	8	<.10	.59*	2.0	4.5	9.0	19	348
17 Fern Creek at Old Bardstown Road	72	6	.40	.86*	2.0	5.0	11	31	232
18 Northern Ditch at Preston Highway	74	4	<.10	1.0	2.0	4.5	10	22	136
19 Fishpool Creek at Bost Road	74	3	<.10	1.0	2.0	6.0	10	27	138
20 Southern Ditch at Minors Lane	72	3	<.10	1.0	2.1	5.7	11	18	968
21 Floyds Fork at Bardstown Road	73	5	<.10	.76*	2.0	4.0	8.0	14	116
22 Cedar Creek at Thixton Road	73	10	<.10	.63*	2.0	4.0	6.0	11	90
23 Pennsylvania Run at Mt. Washington Road	74	3	<.10	1.0	2.0	5.0	8.2	16	79
24 Mill Creek Cutoff at Dover Road	62	1	.50	1.0	2.0	5.0	10	18	156
25 Harrods Creek at Hunting Creek Drive	70	3	<.10	1.0	3.7	6.0	12	21	534
26 Long Run at State Highway 1531	54	2	<1.0	1.0	2.0	5.0	8.2	26	152

Table 11.--Statistical summary of water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

Site number and name	N	N of censored data values	Minimum	Value at indicated percentile 10	25	50 (median)	75	90	Maximum
MAJOR METALS, TRACE ELEMENTS, AND MISCELLANEOUS INORGANIC COMPOUNDS									
Arsenic, total, in micrograms per liter as As									
1 Pond Creek at Pendleton Road	12	8	<5.0	--	4.2*	4.7*	5.0	--	6.0
2 Mill Creek at Orell Road	10	9	<5.0	--	<5.0	<5.0	<5.0	--	6.0
3 Pond Creek at Manslick Road	12	8	<5.0	--	3.6*	4.4*	5.7	--	7.0
5 South Fork Beargrass Creek at Winter Avenue	11	11	<5.0	--	<5.0	<5.0	<5.0	--	<5.0
6 South Fork Beargrass Creek at Trevilian Way	11	11	<5.0	--	<5.0	<5.0	<5.0	--	<5.0
7 Middle Fork Beargrass Creek at Old Cannons Lane	10	10	<5.0	--	<5.0	<5.0	<5.0	--	<5.0
8 Middle Fork Beargrass Creek at Beals Branch Road	10	10	<5.0	--	<5.0	<5.0	<5.0	--	<5.0
9 Spring Ditch at Private Drive below Hanses Road	12	12	<5.0	--	<5.0	<5.0	<5.0	--	<5.0
10 Muddy Fork at Mockingbird Valley Road	11	11	<5.0	--	<5.0	<5.0	<5.0	--	<5.0
11 Goose Creek at U.S. Highway 42	10	9	<5.0	--	<5.0	<5.0	<5.0	--	<50
12 Little Goose Creek at U.S. Highway 42	12	11	<5.0	--	<5.0	<5.0	<5.0	--	12
13 Goose Creek at Old Westport Road	10	9	<5.0	--	<5.0	<5.0	<5.0	--	6.0
14 Pope Lick at Pope Lick Road	13	13	<5.0	--	<5.0	<5.0	<5.0	--	<5.0
15 Floyds Fork at former State Highway 155	13	13	<5.0	--	<5.0	<5.0	<5.0	--	<5.0
16 Chenoweth Run at Gelhaus Road	13	13	<5.0	--	<5.0	<5.0	<5.0	--	<50
17 Fern Creek at Old Bardstown Road	12	11	<5.0	--	<5.0	<5.0	<5.0	--	19
18 Northern Ditch at Preston Highway	12	12	<5.0	--	<5.0	<5.0	<5.0	--	<10
19 Fishpool Creek at Bost Road	10	7	<5.0	--	<5.0	<5.0	5.0	--	6.0
20 Southern Ditch at Minors Lane	10	10	<5.0	--	<5.0	<5.0	<5.0	--	<5.0
21 Floyds Fork at Bardstown Road	12	12	<5.0	--	<5.0	<5.0	<5.0	--	<50
22 Cedar Creek at Thixton Road	12	12	<5.0	--	<5.0	<5.0	<5.0	--	<5.0
23 Pennsylvania Run at Mt. Washington Road	12	12	<5.0	--	<5.0	<5.0	<5.0	--	<50
24 Mill Creek Cutoff at Dover Road	10	8	<5.0	--	<5.0	<5.0	<5.0	--	5.0
25 Harrods Creek at Hunting Creek Drive	11	11	<5.0	--	<5.0	<5.0	<5.0	--	<5.0
26 Long Run at State Highway 1531	9	9	<5.0	--	--	--	--	--	<5.0

Table 11.--Statistical summary of water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

Site number and name	N	N of censored data values	Minimum	Value at indicated percentile 10	25	50 (median)	75	90	Maximum
Barium, total, in micrograms per liter as Ba									
1 Pond Creek at Pendleton Road	12	0	12	--	32	42	50	--	60
2 Mill Creek at Orell Road	10	0	16	--	33	45	57	--	68
3 Pond Creek at Manslick Road	12	0	29	--	41	52	61	--	66
5 South Fork Beargrass Creek at Winter Avenue	11	0	38	--	48	52	66	--	87
6 South Fork Beargrass Creek at Trevilian Way	11	0	38	--	55	58	65	--	73
7 Middle Fork Beargrass Creek at Old Cannons Lane	10	0	39	--	45	55	56	--	67
8 Middle Fork Beargrass Creek at Beals Branch Road	10	0	37	--	42	54	64	--	70
9 Spring Ditch at Private Drive below Hanses Road	11	0	29	--	37	44	45	--	53
10 Muddy Fork at Mockingbird Valley Road	11	0	35	--	42	45	50	--	86
11 Goose Creek at U.S. Highway 42	10	0	20	--	33	40	56	--	64
12 Little Goose Creek at U.S. Highway 42	12	0	19	--	39	45	52	--	86
13 Goose Creek at Old Westport Road	10	0	28	--	35	41	44	--	74
14 Pope Lick at Pope Lick Road	13	1	<2.0	--	28	38	47	--	56
15 Floyds Fork at former State Highway 155	13	0	10	--	29	39	51	--	60
16 Chenoweth Run at Gelhaus Road	13	0	10	--	28	36	41	--	92
17 Fern Creek at Old Bardstown Road	12	0	37	--	41	45	55	--	628
18 Northern Ditch at Preston Highway	11	0	24	--	38	40	45	--	64
19 Fishpool Creek at Bost Road	10	0	7.0	--	29	39	49	--	52
20 Southern Ditch at Minors Lane	10	0	26	--	31	37	47	--	52
21 Floyds Fork at Bardstown Road	12	0	30	--	35	45	49	--	54
22 Cedar Creek at Thixton Road	12	0	20	--	28	36	47	--	57
23 Pennsylvania Run at Mt. Washington Road	12	0	32	--	33	38	48	--	72
24 Mill Creek Cutoff at Dover Road	10	0	16	--	21	24	27	--	32
25 Harrods Creek at Hunting Creek Drive	11	0	9.0	--	37	49	64	--	119
26 Long Run at State Highway 1531	9	0	24	--	--	--	--	--	70
Beryllium, total, in micrograms per liter as Be									
1 Pond Creek at Pendleton Road	11	11	<.20	--	<.50	<.90	<1.0	--	<1.0
2 Mill Creek at Orell Road	10	9	<.20	--	<.50	<1.0	<1.0	--	1.0
3 Pond Creek at Manslick Road	12	12	<.20	--	<.20	<.90	<1.0	--	<1.0
5 South Fork Beargrass Creek at Winter Avenue	11	10	<.20	--	<.20	<1.0	<1.0	--	<1.0
6 South Fork Beargrass Creek at Trevilian Way	11	10	<.20	--	<.20	<.60	<1.0	--	1.7
7 Middle Fork Beargrass Creek at Old Cannons Lane	10	10	<.20	--	<.20	<1.0	<1.0	--	<5.0
8 Middle Fork Beargrass Creek at Beals Branch Road	10	9	<.20	--	<.50	<1.0	<1.0	--	<20
9 Spring Ditch at Private Drive below Hanses Road	11	9	<.20	--	<.50	<.60	<1.0	--	<1.0
10 Muddy Fork at Mockingbird Valley Road	11	11	<.20	--	<.20	<.90	<1.0	--	<1.0
11 Goose Creek at U.S. Highway 42	10	9	<.20	--	<.60	<1.0	<1.0	--	<1.0
12 Little Goose Creek at U.S. Highway 42	12	9	<.20	--	<.45	<.75	<1.0	--	1.0
13 Goose Creek at Old Westport Road	10	10	<.20	--	<.20	<.90	<1.0	--	<1.0
14 Pope Lick at Pope Lick Road	13	12	<.20	--	<.50	<.90	<1.0	--	<1.0
15 Floyds Fork at former State Highway 155	13	13	<.20	--	<.50	<.90	<1.0	--	<1.0
16 Chenoweth Run at Gelhaus Road	13	12	<.20	--	<.50	<.90	<1.0	--	<1.0
17 Fern Creek at Old Bardstown Road	12	9	<.20	--	.04*	.14*	.43*	--	3.4
18 Northern Ditch at Preston Highway	11	9	<.20	--	<.50	<.60	<1.0	--	<1.0
19 Fishpool Creek at Bost Road	10	10	<.20	--	<.20	<.90	<1.0	--	<1.0
20 Southern Ditch at Minors Lane	10	9	<.20	--	<.20	<1.0	<1.0	--	1.0
21 Floyds Fork at Bardstown Road	12	11	<.20	--	<.20	<1.0	<1.0	--	<1.0
22 Cedar Creek at Thixton Road	12	11	<.20	--	<.20	<1.0	<1.0	--	<1.0
23 Pennsylvania Run at Mt. Washington Road	12	12	<.20	--	<.20	<.50	<1.0	--	<1.0
24 Mill Creek Cutoff at Dover Road	10	9	<.20	--	<.20	<.90	<1.0	--	1.0
25 Harrods Creek at Hunting Creek Drive	11	9	<.20	--	<.20	<.90	<1.0	--	1.0
26 Long Run at State Highway 1531	9	9	<.20	--	--	--	--	--	<1.0

Table 11.--Statistical summary of water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

Site number and name	N	N of censored data values	Minimum	Value at indicated percentile 10	25	50 (median)	75	90	Maximum
Cadmium, total, in micrograms per liter as Cd									
1 Pond Creek at Pendleton Road	12	11	<2.0	--	<4.0	<9.0	<9.0	--	<9.0
2 Mill Creek at Orell Road	10	9	<2.0	--	<4.0	<6.0	<9.0	--	10
3 Pond Creek at Manslick Road	12	10	<2.0	--	<4.0	<6.0	<9.0	--	11
5 South Fork Beargrass Creek at Winter Avenue	11	11	<2.0	--	<4.0	<4.0	<9.0	--	<9.0
6 South Fork Beargrass Creek at Trevilian Way	11	11	<2.0	--	<3.0	<4.0	<9.0	--	<9.0
7 Middle Fork Beargrass Creek at Old Cannons Lane	10	10	<2.0	--	<3.0	<4.0	<9.0	--	<9.0
8 Middle Fork Beargrass Creek at Beals Branch Road	10	9	<2.0	--	<3.0	<4.0	<9.0	--	16
9 Spring Ditch at Private Drive below Hanses Road	11	11	<2.0	--	<4.0	<6.0	<9.0	--	<9.0
10 Muddy Fork at Mockingbird Valley Road	11	11	<2.0	--	<4.0	<6.0	<9.0	--	<9.0
11 Goose Creek at U.S. Highway 42	10	10	<2.0	--	<3.0	<4.0	<9.0	--	<9.0
12 Little Goose Creek at U.S. Highway 42	11	10	<2.0	--	<4.0	<6.0	<9.0	--	<10
13 Goose Creek at Old Westport Road	10	9	<1.0	--	<4.0	<9.0	<9.0	--	<9.0
14 Pope Lick at Pope Lick Road	13	13	<2.0	--	<4.0	<6.0	<9.0	--	<9.0
15 Floyds Fork at former State Highway 155	13	11	<2.0	--	<4.0	<9.0	<9.0	--	19
16 Chenoweth Run at Gelhaus Road	13	11	<2.0	--	<4.0	<6.0	<9.0	--	11
17 Fern Creek at Old Bardstown Road	12	8	<2.0	--	<4.0	<6.0	<6.0	--	9.0
18 Northern Ditch at Preston Highway	11	10	<2.0	--	<4.0	<6.0	<9.0	--	<9.0
19 Fishpool Creek at Bost Road	10	9	<2.0	--	<3.0	<4.0	<9.0	--	15
20 Southern Ditch at Minors Lane	10	10	<2.0	--	<3.0	<4.0	<9.0	--	<9.0
21 Floyds Fork at Bardstown Road	12	11	<2.0	--	<4.0	<9.0	<9.0	--	<9.0
22 Cedar Creek at Thixton Road	12	12	<2.0	--	<4.0	<6.0	<9.0	--	<9.0
23 Pennsylvania Run at Mt. Washington Road	12	10	<9.0	--	<4.0	<4.0	<9.0	--	<9.0
24 Mill Creek Cutoff at Dover Road	10	10	<2.0	--	<4.0	<6.0	<9.0	--	<9.0
25 Harrods Creek at Hunting Creek Drive	11	10	<2.0	--	<4.0	<6.0	<9.0	--	<9.0
26 Long Run at State Highway 1531	9	9	<3.0	--	--	--	--	--	<9.0
Chromium, total, in micrograms per liter as Cr									
1 Pond Creek at Pendleton Road	12	5	<4.0	--	2.5*	11	19	--	520
2 Mill Creek at Orell Road	10	5	<4.0	--	1.0*	5.2*	23	--	700
3 Pond Creek at Manslick Road	12	3	<5.0	--	5.3*	15	43	--	510
5 South Fork Beargrass Creek at Winter Avenue	11	5	<4.0	--	4.7*	6.6*	12	--	13
6 South Fork Beargrass Creek at Trevilian Way	11	5	<4.0	--	1.0*	6.4*	17	--	1,210
7 Middle Fork Beargrass Creek at Old Cannons Lane	10	4	<6.0	--	5.9*	10*	22	--	34
8 Middle Fork Beargrass Creek at Beals Branch Road	10	3	<6.0	--	5.7*	11	27	--	142
9 Spring Ditch at Private Drive below Hanses Road	11	4	<4.0	--	4.9*	14	20	--	44
10 Muddy Fork at Mockingbird Valley Road	11	6	<4.0	--	3.0*	5.4*	9.0	--	17
11 Goose Creek at U.S. Highway 42	10	7	4.0	--	3.3*	5.0*	7.5*	--	15
12 Little Goose Creek at U.S. Highway 42	12	7	<5.0	--	2.1*	5.2*	13*	--	79
13 Goose Creek at Old Westport Road	10	5	<6.0	--	1.6*	6.7*	24	--	520
14 Pope Lick at Pope Lick Road	13	9	<4.0	--	2.2*	3.9*	6.9*	--	21
15 Floyds Fork at former State Highway 155	13	7	<4.0	--	1.7*	4.8*	15	--	139
16 Chenoweth Run at Gelhaus Road	12	7	<4.0	--	.91*	3.9*	17*	--	337
17 Fern Creek at Old Bardstown Road	12	5	<4.0	--	1.6*	7.5*	21	--	1,200
18 Northern Ditch at Preston Highway	11	7	<4.0	--	3.5*	4.8*	6.7*	--	10
19 Fishpool Creek at Bost Road	10	7	<4.0	--	.03*	.68*	14*	--	670
20 Southern Ditch at Minors Lane	10	5	<4.0	--	.91*	4.1*	19*	--	690
21 Floyds Fork at Bardstown Road	12	6	<4.0	--	1.4*	5.3*	17	--	510
22 Cedar Creek at Thixton Road	12	6	<4.0	--	1.6*	6.1*	18	--	530
23 Pennsylvania Run at Mt. Washington Road	12	8	<4.0	--	1.4*	3.5*	8.6*	--	29
24 Mill Creek Cutoff at Dover Road	10	3	<6.0	--	2.6*	8.5*	14	--	684
25 Harrods Creek at Hunting Creek Drive	11	3	<6.0	--	4.6*	14	30	--	1,210
26 Long Run at State Highway 1531	9	5	<5.0	--	--	--	--	--	189

Table 11.--Statistical summary of water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

Site number and name	N	N of censored data values	Minimum	Value at indicated percentile 10	25	50 (median)	75	90	Maximum
Copper, total, in micrograms per liter as Cu									
1 Pond Creek at Pendleton Road	12	4	<6.0	--	5.2*	17	39	--	96
2 Mill Creek at Orell Road	10	4	<6.0	--	4.2*	11	20	--	55
3 Pond Creek at Manslick Road	12	4	<6.0	--	5.9*	27	46	--	77
5 South Fork Beargrass Creek at Winter Avenue	11	4	<6.0	--	5.4*	16	29	--	37
6 South Fork Beargrass Creek at Trevilian Way	11	4	5.0	--	4.7*	10*	25	--	73
7 Middle Fork Beargrass Creek at Old Cannons Lane	10	4	<5.0	--	3.7*	20	66	--	146
8 Middle Fork Beargrass Creek at Beals Branch Road	10	1	<6.0	--	7.7	21	66	--	130
9 Spring Ditch at Private Drive below Hanses Road	11	1	6.0	--	9.6*	15	31	--	51
10 Muddy Fork at Mockingbird Valley Road	11	3	<5.0	--	3.2*	16	20	--	1,820
11 Goose Creek at U.S. Highway 42	10	2	<6.0	--	7.5*	16	31	--	73
12 Little Goose Creek at U.S. Highway 42	12	6	<6.0	--	3.2*	7.3*	25	--	40
13 Goose Creek at Old Westport Road	10	2	<6.0	--	7.9*	20	40	--	62
14 Pope Lick at Pope Lick Road	13	3	<6.0	--	6.1*	13	23	--	56
15 Floyds Fork at former State Highway 155	13	2	<6.0	--	8.5	12	36	--	57
16 Chenoweth Run at Gelhaus Road	13	4	<6.0	--	6.8*	20	37	--	88
17 Fern Creek at Old Bardstown Road	12	3	5.0	--	6.4*	14	48	--	87
18 Northern Ditch at Preston Highway	11	1	<6.0	--	11	21	23	--	50
19 Fishpool Creek at Bost Road	10	4	<6.0	--	3.9*	17	52	--	103
20 Southern Ditch at Minors Lane	10	4	<6.0	--	4.2*	11*	29	--	130
21 Floyds Fork at Bardstown Road	12	3	<6.0	--	6.2*	9.5	19	--	40
22 Cedar Creek at Thixton Road	12	5	<5.0	--	3.8*	8.0*	27	--	37
23 Pennsylvania Run at Mt. Washington Road	12	3	<5.0	--	5.3*	12	31	--	82
24 Mill Creek Cutoff at Dover Road	10	4	<6.0	--	4.1*	14	20	--	74
25 Harrods Creek at Hunting Creek Drive	11	4	<5.0	--	3.9*	11	26	--	120
26 Long Run at State Highway 1531	9	2	<6.0	--	--	--	--	--	43
Iron, total, in micrograms per liter as Fe									
1 Pond Creek at Pendleton Road	12	2	<10	--	190	680	2,060	--	16,900
2 Mill Creek at Orell Road	10	0	230	--	455	1,660	3,100	--	13,700
3 Pond Creek at Manslick Road	12	0	370	--	730	2,160	3,200	--	3,530
5 South Fork Beargrass Creek at Winter Avenue	11	0	160	--	280	890	1,930	--	10,800
6 South Fork Beargrass Creek at Trevilian Way	11	2	<10	--	150	460	1,210	--	6,120
7 Middle Fork Beargrass Creek at Old Cannons Lane	10	1	<10	--	113	240	1,320	--	2,720
8 Middle Fork Beargrass Creek at Beals Branch Road	10	1	<10	--	108	620	1,630	--	4,660
9 Spring Ditch at Private Drive below Hanses Road	11	0	50	--	238	430	1,620	--	10,600
10 Muddy Fork at Mockingbird Valley Road	11	1	<40	--	120	440	960	--	3,450
11 Goose Creek at U.S. Highway 42	10	2	<10	--	36*	265	738	--	1,760
12 Little Goose Creek at U.S. Highway 42	12	0	180	--	235	477	1,480	--	3,140
13 Goose Creek at Old Westport Road	10	1	<10	--	118	440	798	--	2,660
14 Pope Lick at Pope Lick Road	13	1	<10	--	130	270	2,380	--	17,700
15 Floyds Fork at former State Highway 155	13	0	10	--	365	1,420	4,350	--	19,500
16 Chenoweth Run at Gelhaus Road	13	1	<10	--	115	410	750	--	7,700
17 Fern Creek at Old Bardstown Road	12	3	<10	--	18*	179	838	--	69,200
18 Northern Ditch at Preston Highway	11	0	90	--	173	250	540	--	2,850
19 Fishpool Creek at Bost Road	10	1	<10	--	158	240	490	--	2,810
20 Southern Ditch at Minors Lane	10	0	240	--	485	680	1,020	--	1,720
21 Floyds Fork at Bardstown Road	12	1	<10	--	230	610	948	--	3,440
22 Cedar Creek at Thixton Road	12	1	<10	--	115	210	368	--	2,200
23 Pennsylvania Run at Mt. Washington Road	12	1	<10	--	430	623	1,280	--	18,100
24 Mill Creek Cutoff at Dover Road	10	0	150	--	385	690	1,580	--	1,930
25 Harrods Creek at Hunting Creek Drive	11	1	<10	--	450	770	1,670	--	9,580
26 Long Run at State Highway 1531	9	0	170	--	--	--	--	--	3,080

Table 11.--Statistical summary of water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

Site number and name	N	N of censored data values	Minimum	Value at indicated percentile 10	25	50 (median)	75	90	Maximum
Lead, total, in micrograms per liter as Pb									
1 Pond Creek at Pendleton Road	12	9	<40	--	24*	33*	45*	--	70
2 Mill Creek at Orell Road	10	8	<10	--	<40	<40	<50	--	170
3 Pond Creek at Manslick Road	12	11	<40	--	<40	<40	<50	--	190
5 South Fork Beargrass Creek at Winter Avenue	11	11	<40	--	<40	<40	<50	--	<60
6 South Fork Beargrass Creek at Trevilian Way	11	11	<40	--	<40	<40	<50	--	<60
7 Middle Fork Beargrass Creek at Old Cannons Lane	10	8	<10	--	<40	<50	<50	--	60
8 Middle Fork Beargrass Creek at Beals Branch Road	10	7	<40	--	<40	<40	<50	--	<60
9 Spring Ditch at Private Drive below Hanses Road	11	9	<40	--	<40	<50	<60	--	60
10 Muddy Fork at Mockingbird Valley Road	11	11	<20	--	<40	<40	<50	--	<60
11 Goose Creek at U.S. Highway 42	10	10	<40	--	<40	<40	<50	--	<50
12 Little Goose Creek at U.S. Highway 42	12	9	<10	--	5.7*	14*	36*	--	150
13 Goose Creek at Old Westport Road	10	10	<40	--	<40	<40	<50	--	<60
14 Pope Lick at Pope Lick Road	13	12	<40	--	<40	<50	<50	--	<60
15 Floyds Fork at former State Highway 155	12	10	<40	--	<40	<40	<60	--	100
16 Chenoweth Run at Gelhaus Road	13	12	<40	--	<40	<40	<50	--	70
17 Fern Creek at Old Bardstown Road	12	10	<10	--	<40	<50	<60	--	120
18 Northern Ditch at Preston Highway	11	11	<40	--	<40	<50	<60	--	<60
19 Fishpool Creek at Bost Road	10	9	<40	--	<40	<40	<50	--	100
20 Southern Ditch at Minors Lane	10	10	<40	--	<40	<40	<50	--	<60
21 Floyds Fork at Bardstown Road	12	12	<10	--	<40	<40	<50	--	<50
22 Cedar Creek at Thixton Road	12	12	<40	--	<40	<40	<50	--	<60
23 Pennsylvania Run at Mt. Washington Road	12	11	<40	--	<40	<50	<60	--	<60
24 Mill Creek Cutoff at Dover Road	10	8	<40	--	<40	<50	<60	--	170
25 Harrods Creek at Hunting Creek Drive	11	11	<40	--	<40	<40	<50	--	<60
26 Long Run at State Highway 1531	9	8	<40	--	--	--	--	--	130
Mercury, total recoverable, in micrograms per liter as Hg									
1 Pond Creek at Pendleton Road	11	8	<.20	--	.05*	.11*	.20	--	.70
2 Mill Creek at Orell Road	10	8	<.20	--	<.20	<.20	<.20	--	.30
3 Pond Creek at Manslick Road	11	7	<.20	--	.07*	.15*	.40	--	.90
5 South Fork Beargrass Creek at Winter Avenue	11	6	<.20	--	.10*	.19*	.40	--	1.0
6 South Fork Beargrass Creek at Trevilian Way	11	6	<.20	--	.06*	.16*	.40	--	3.1
7 Middle Fork Beargrass Creek at Old Cannons Lane	10	5	<.20	--	.14*	.23*	.50	--	.50
8 Middle Fork Beargrass Creek at Beals Branch Road	10	6	<.20	--	.09*	.17*	.35	--	.70
9 Spring Ditch at Private Drive below Hanses Road	12	7	<.20	--	.07*	.14*	.27	--	1.6
10 Muddy Fork at Mockingbird Valley Road	11	5	<.20	--	.15*	.20	.40	--	.60
11 Goose Creek at U.S. Highway 42	10	7	<.20	--	.03*	.09*	.32	--	1.6
12 Little Goose Creek at U.S. Highway 42	12	7	<.20	--	.10*	.16*	.20	--	.70
13 Goose Creek at Old Westport Road	7	4	<.20	--	--	--	--	--	1.1
14 Pope Lick at Pope Lick Road	13	5	<.20	--	.13*	.24*	.45*	--	<2.0
15 Floyds Fork at former State Highway 155	13	8	<.20	--	.02*	.09*	.47*	--	30
16 Chenoweth Run at Gelhaus Road	13	8	<.20	--	.03*	.11*	.40	--	6.0
17 Fern Creek at Old Bardstown Road	12	4	<.20	--	.09*	.30	.75	--	40
18 Northern Ditch at Preston Highway	12	8	<.20	--	.10*	.15*	.27	--	.50
19 Fishpool Creek at Bost Road	9	7	<.20	--	--	--	--	--	.30
20 Southern Ditch at Minors Lane	9	5	<.20	--	--	--	--	--	.90
21 Floyds Fork at Bardstown Road	12	5	<.20	--	.09*	.20	.72	--	4.0
22 Cedar Creek at Thixton Road	12	6	<.20	--	.06*	.18*	.47	--	5.2
23 Pennsylvania Run at Mt. Washington Road	12	6	<.20	--	.10*	.19*	.67	--	.90
24 Mill Creek Cutoff at Dover Road	10	7	<.20	--	<.20	<.20	.22	--	.60
25 Harrods Creek at Hunting Creek Drive	10	5	<.20	--	.12*	.21*	.42	--	1.0
26 Long Run at State Highway 1531	9	8	<.20	--	--	--	--	--	.90

Table 11.--Statistical summary of water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

Site number and name	N	N of censored data values	Minimum	Value at indicated percentile 10	25	50 (median)	75	90	Maximum
Nickel, total, in micrograms per liter as Ni									
1 Pond Creek at Pendleton Road	12	9	<7.0	--	<11	<20	<20	--	20
2 Mill Creek at Orell Road	10	8	<7.0	--	<10	<20	<20	--	25
3 Pond Creek at Manslick Road	12	8	<7.0	--	6.3*	10*	17*	--	39
5 South Fork Beargrass Creek at Winter Avenue	11	11	<7.0	--	<10	<20	<20	--	<20
6 South Fork Beargrass Creek at Trevilian Way	10	6	8.0	--	<12	<17	<20	--	<20
7 Middle Fork Beargrass Creek at Old Cannons Lane	10	8	<9.0	--	<10	<20	<20	--	21
8 Middle Fork Beargrass Creek at Beals Branch Road	10	7	9.0	--	6.7*	9.4*	13*	--	22
9 Spring Ditch at Private Drive below Hanses Road	11	5	<7.0	--	8.2*	13*	21	--	39
10 Muddy Fork at Mockingbird Valley Road	11	10	<7.0	--	<10	<20	<20	--	50
11 Goose Creek at U.S. Highway 42	10	9	<9.0	--	<10	<20	<20	--	<20
12 Little Goose Creek at U.S. Highway 42	12	9	<7.0	--	5.4*	7.9*	11*	--	23
13 Goose Creek at Old Westport Road	10	9	<10	--	<10	<20	<20	--	<20
14 Pope Lick at Pope Lick Road	13	12	<7.0	--	<10	<20	<20	--	30
15 Floyds Fork at former State Highway 155	13	9	<7.0	--	3.2*	7.4*	17*	--	61
16 Chenoweth Run at Gelhaus Road	13	11	<7.0	--	<10	<20	<20	--	30
17 Fern Creek at Old Bardstown Road	12	9	<7.0	--	1.9*	4.5*	11*	--	81
18 Northern Ditch at Preston Highway	11	7	<7.0	--	2.3*	6.4*	26	--	100
19 Fishpool Creek at Bost Road	10	10	<7.0	--	<10	<20	<20	--	<20
20 Southern Ditch at Minors Lane	10	7	<7.0	--	3.5*	7.0*	14*	--	31
21 Floyds Fork at Bardstown Road	12	11	<7.0	--	<10	<20	<20	--	28
22 Cedar Creek at Thixton Road	12	11	<7.0	--	<10	<20	<20	--	20
23 Pennsylvania Run at Mt. Washington Road	12	10	<7.0	--	<10	<20	<20	--	50
24 Mill Creek Cutoff at Dover Road	10	9	<7.0	--	<10	<20	<20	--	<20
25 Harrods Creek at Hunting Creek Drive	11	9	<7.0	--	<10	<20	<20	--	30
26 Long Run at State Highway 1531	9	5	4.0	--	--	--	--	--	31
Selenium, total, in micrograms per liter as Se									
1 Pond Creek at Pendleton Road	12	12	<5.0	--	<10	<10	<10	--	<50
2 Mill Creek at Orell Road	10	10	<5.0	--	<10	<10	<10	--	<50
3 Pond Creek at Manslick Road	12	12	<5.0	--	<5.0	<10	<10	--	<50
5 South Fork Beargrass Creek at Winter Avenue	11	10	<5.0	--	<10	<10	<50	--	<50
6 South Fork Beargrass Creek at Trevilian Way	11	11	<5.0	--	<5.0	<10	<50	--	<50
7 Middle Fork Beargrass Creek at Old Cannons Lane	10	10	<5.0	--	<10	<10	<10	--	<50
8 Middle Fork Beargrass Creek at Beals Branch Road	10	10	<5.0	--	<10	<10	<10	--	<50
9 Spring Ditch at Private Drive below Hanses Road	12	12	<5.0	--	<5.0	<10	<10	--	<50
10 Muddy Fork at Mockingbird Valley Road	11	11	<5.0	--	<10	<10	<50	--	<50
11 Goose Creek at U.S. Highway 42	10	10	<5.0	--	<10	<10	<10	--	<50
12 Little Goose Creek at U.S. Highway 42	12	12	<5.0	--	<5.0	<10	<10	--	<50
13 Goose Creek at Old Westport Road	10	10	<5.0	--	<10	<10	<50	--	<50
14 Pope Lick at Pope Lick Road	13	12	<5.0	--	<10	<10	<10	--	<50
15 Floyds Fork at former State Highway 155	13	13	<5.0	--	<10	<10	<10	--	<50
16 Chenoweth Run at Gelhaus Road	13	13	<5.0	--	<10	<10	<10	--	<50
17 Fern Creek at Old Bardstown Road	12	12	<5.0	--	<5.0	<10	<10	--	<50
18 Northern Ditch at Preston Highway	12	12	<5.0	--	<5.0	<10	<10	--	<50
19 Fishpool Creek at Bost Road	10	10	<5.0	--	<10	<10	<50	--	<50
20 Southern Ditch at Minors Lane	10	10	<5.0	--	<10	<10	<50	--	<50
21 Floyds Fork at Bardstown Road	12	12	<5.0	--	<5.0	<10	<10	--	<50
22 Cedar Creek at Thixton Road	12	12	<5.0	--	<5.0	<10	<10	--	<50
23 Pennsylvania Run at Mt. Washington Road	12	12	<5.0	--	<5.0	<10	<50	--	<50
24 Mill Creek Cutoff at Dover Road	10	9	<5.0	--	<10	<10	<50	--	<50
25 Harrods Creek at Hunting Creek Drive	11	11	<5.0	--	<10	<10	<50	--	<50
26 Long Run at State Highway 1531	9	9	<5.0	--	--	--	--	--	<50

Table 11.--Statistical summary of water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

Site number and name	N	N of censored data values	Minimum	Value at indicated percentile 10	25	50 (median)	75	90	Maximum
Silver, total, in micrograms per liter as Ag									
1 Pond Creek at Pendleton Road	11	8	<1.0	--	<4.0	<4.0	<5.0	--	<9.0
2 Mill Creek at Orell Road	10	7	<1.0	--	.30*	1.0*	6.2	--	17
3 Pond Creek at Manslick Road	12	12	<1.0	--	<1.0	<4.0	<5.0	--	<9.0
5 South Fork Beargrass Creek at Winter Avenue	11	11	<1.0	--	<1.0	<1.0	<4.0	--	<5.0
6 South Fork Beargrass Creek at Trevilian Way	11	10	<1.0	--	<1.0	<4.0	<5.0	--	11
7 Middle Fork Beargrass Creek at Old Cannons Lane	10	8	<1.0	--	<1.0	<3.0	<5.0	--	<9.0
8 Middle Fork Beargrass Creek at Beals Branch Road	10	8	<1.0	--	<1.0	<2.0	<4.0	--	<5.0
9 Spring Ditch at Private Drive below Hanses Road	11	9	<1.0	--	<1.0	<4.0	<5.0	--	<5.0
10 Muddy Fork at Mockingbird Valley Road	11	11	<1.0	--	<1.0	<4.0	<4.0	--	<5.0
11 Goose Creek at U.S. Highway 42	10	9	<1.0	--	<1.0	<1.0	<4.0	--	10
12 Little Goose Creek at U.S. Highway 42	12	11	<1.0	--	<1.0	<4.0	<5.0	--	<9.0
13 Goose Creek at Old Westport Road	10	7	<1.0	--	.03*	.29*	3.2*	--	166
14 Pope Lick at Pope Lick Road	13	5	<1.0	--	.86*	1.6*	4.0	--	<6.0
15 Floyds Fork at former State Highway 155	13	12	<1.0	--	<1.0	<4.0	<5.0	--	<9.0
16 Chenoweth Run at Gelhaus Road	13	10	<1.0	--	<1.0	<4.0	<5.0	--	9.0
17 Fern Creek at Old Bardstown Road	12	10	<1.0	--	<1.0	<5.0	<9.0	--	110
18 Northern Ditch at Preston Highway	11	7	<1.0	--	.56*	1.3*	3.2*	--	14
19 Fishpool Creek at Bost Road	10	9	<1.0	--	<1.0	<4.0	<5.0	--	<9.0
20 Southern Ditch at Minors Lane	10	9	<1.0	--	<1.0	<4.0	<5.0	--	<9.0
21 Floyds Fork at Bardstown Road	12	10	<1.0	--	<1.0	<4.0	<5.0	--	6.0
22 Cedar Creek at Thixton Road	12	10	<1.0	--	<1.0	<4.0	<4.0	--	<5.0
23 Pennsylvania Run at Mt. Washington Road	12	12	<1.0	--	<1.0	<1.0	<5.0	--	<10
24 Mill Creek Cutoff at Dover Road	10	9	<1.0	--	<1.0	<4.0	<5.0	--	6.0
25 Harrods Creek at Hunting Creek Drive	11	8	<1.0	--	.03*	.28*	2.3*	--	110
26 Long Run at State Highway 1531	9	9	<1.0	--	--	--	--	--	<9.0
Zinc, total, in micrograms per liter as Zn									
1 Pond Creek at Pendleton Road	12	3	<6.0	--	7.8*	32	95	--	148
2 Mill Creek at Orell Road	10	3	<6.0	--	6.2*	31	59	--	107
3 Pond Creek at Manslick Road	12	3	<6.0	--	9.8*	43	102	--	351
5 South Fork Beargrass Creek at Winter Avenue	11	2	<6.0	--	15	41	98	--	106
6 South Fork Beargrass Creek at Trevilian Way	11	4	<5.0	--	5.2*	52	64	--	168
7 Middle Fork Beargrass Creek at Old Cannons Lane	10	2	<6.0	--	15*	50	100	--	327
8 Middle Fork Beargrass Creek at Beals Branch Road	10	1	<6.0	--	24	57	116	--	154
9 Spring Ditch at Private Drive below Hanses Road	11	1	<6.0	--	43	84	146	--	175
10 Muddy Fork at Mockingbird Valley Road	11	1	5.0	--	9.0	43	55	--	590
11 Goose Creek at U.S. Highway 42	10	2	<5.0	--	10*	29	95	--	225
12 Little Goose Creek at U.S. Highway 42	12	2	<6.0	--	15	37	59	--	118
13 Goose Creek at Old Westport Road	10	2	<6.0	--	7.4*	16	100	--	163
14 Pope Lick at Pope Lick Road	13		15	--	29	45	62	--	110
15 Floyds Fork at former State Highway 155	13	1	<6.0	--	24	34	72	--	153
16 Chenoweth Run at Gelhaus Road	13	4	<6.0	--	8.2*	41	89	--	244
17 Fern Creek at Old Bardstown Road	12	3	<6.0	--	8.6*	53	140	--	417
18 Northern Ditch at Preston Highway	11	1	<6.0	--	29	42	66	--	117
19 Fishpool Creek at Bost Road	10	1	<6.0	--	14	28	63	--	87
20 Southern Ditch at Minors Lane	10	1	<6.0	--	20	34	86	--	168
21 Floyds Fork at Bardstown Road	12	2	<6.0	--	17	37	53	--	130
22 Cedar Creek at Thixton Road	12	2	<6.0	--	27	39	70	--	98
23 Pennsylvania Run at Mt. Washington Road	12	1	<6.0	--	25	37	75	--	278
24 Mill Creek Cutoff at Dover Road	9	0	19	--	--	--	--	--	188
25 Harrods Creek at Hunting Creek Drive	11	2	5.0	--	8.5*	22	51	--	273
26 Long Run at State Highway 1531	9	1	<6.0	--	--	--	--	--	114

Table 11.--Statistical summary of water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

Site number and name	N	N of censored data values	Minimum	Value at indicated percentile 10	25	50 (median)	75	90	Maximum
Cyanide, total, in milligrams per liter as CN									
1 Pond Creek at Pendleton Road	11	10	<0.01	--	<0.005	<0.005	<0.02	--	<0.02
2 Mill Creek at Orell Road	10	10	<.005	--	<.005	<.005	<.02	--	<.02
3 Pond Creek at Manslick Road	11	8	<.01	--	<.01	<.01	<.02	--	<.02
5 South Fork Beargrass Creek at Winter Avenue	11	10	<.01	--	<.02	<.02	<.02	--	<.02
6 South Fork Beargrass Creek at Trevilian Way	11	8	<.01	--	<.01	<.01	<.01	--	<.02
7 Middle Fork Beargrass Creek at Old Cannons Lane	10	9	<.005	--	<.005	<.005	<.02	--	<.02
8 Middle Fork Beargrass Creek at Beals Branch Road	9	7	<.01	--	--	--	--	--	<.02
9 Spring Ditch at Private Drive below Hanses Road	12	8	<.005	--	<.01	<.01	<.01	--	<.02
10 Muddy Fork at Mockingbird Valley Road	10	7	<.01	--	<.01	<.01	<.01	--	<.02
11 Goose Creek at U.S. Highway 42	10	6	<.01	--	<.01	<.01	<.01	--	<.02
12 Little Goose Creek at U.S. Highway 42	12	10	<.01	--	<.01	<.01	<.01	--	<.02
13 Goose Creek at Old Westport Road	9	4	<.01	--	--	--	--	--	<.02
14 Pope Lick at Pope Lick Road	13	8	<.01	--	.002*	.005*	.01*	--	.05
15 Floyds Fork at former State Highway 155	13	13	<.005	--	<.005	<.005	<.005	--	<.02
16 Chenoweth Run at Gelhaus Road	12	6	<.01	--	.001*	.01*	.01*	--	.02
17 Fern Creek at Old Bardstown Road	11	7	<.01	--	.002*	.004*	.01*	--	.04
18 Northern Ditch at Preston Highway	12	6	<.01	--	.003*	.01*	.02	--	.03
19 Fishpool Creek at Bost Road	10	6	<.01	--	.002*	.005*	.01*	--	.02
20 Southern Ditch at Minors Lane	10	5	<.01	--	.003*	.01*	.01*	--	.02
21 Floyds Fork at Bardstown Road	11	10	<.005	--	<.005	<.005	<.02	--	<.02
22 Cedar Creek at Thixton Road	11	9	<.005	--	<.005	<.005	<.02	--	.05
23 Pennsylvania Run at Mt. Washington Road	12	5	<.01	--	.003*	.01*	.04	--	.07
24 Mill Creek Cutoff at Dover Road	9	8	<.01	--	--	--	--	--	<.02
25 Harrods Creek at Hunting Creek Drive	11	11	<.005	--	<.005	<.005	<.02	--	<.02
26 Long Run at State Highway 1531	9	8	<.01	--	--	--	--	--	<.02

Table 11.--Statistical summary of water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

Site number and name	N	N of censored data values	Minimum	Value at indicated percentile 10	25	50 (median)	75	90	Maximum
NUTRIENTS									
Nitrogen, ammonia, total, in milligrams per liter as N									
1 Pond Creek at Pendleton Road	71	28	<0.01	<0.01*	0.01*	0.06	0.28	0.50	1.1
2 Mill Creek at Orell Road	67	35	<.01	<.01*	<.01*	.01*	.11	.25	.70
3 Pond Creek at Manslick Road	71	23	<.01	<.01*	.01*	.22	.45	.71	1.0
4 Mill Creek at Rockford Lane	2	0	.12	--	--	--	--	--	.13
5 South Fork Beargrass Creek at Winter Avenue	72	25	<.01	<.01*	.01*	.14	.35	.58	2.4
6 South Fork Beargrass Creek at Trevilian Way	72	22	<.01	<.01*	.01*	.22	.37	.76	2.4
7 Middle Fork Beargrass Creek at Old Cannons Lane	72	39	<.01	<.01*	<.01*	.01*	.11	.22	.56
8 Middle Fork Beargrass Creek at Beals Branch Road	71	40	<.01	<.01*	<.01*	.01*	.11	.28	.73
9 Spring Ditch at Private Drive below Hanses Road	71	33	<.01	<.01*	<.01*	.07	.34	.59	.95
10 Muddy Fork at Mockingbird Valley Road	72	38	<.01	<.01*	<.01*	.01*	.14	.24	.64
11 Goose Creek at U.S. Highway 42	73	43	<.01	<.01*	<.01*	.01*	.17	.48	3.2
12 Little Goose Creek at U.S. Highway 42	73	43	<.01	<.01*	<.01*	.01*	.11	.24	.71
13 Goose Creek at Old Westport Road	71	35	<.01	<.01*	<.01*	.01	.50	.80	1.2
14 Pope Lick at Pope Lick Road	74	27	<.01	<.01*	.01*	.12	.39	.78	3.5
15 Floyds Fork at former State Highway 155	73	39	<.01	<.01*	<.01*	.01*	.11	.24	6.6
16 Chenoweth Run at Gelhaus Road	71	31	<.01	<.01*	<.01*	.06	.38	.78	6.8
17 Fern Creek at Old Bardstown Road	71	25	<.01	<.01*	.01*	.11	.34	.72	1.8
18 Northern Ditch at Preston Highway	71	29	<.01	<.01*	<.01*	.17	.62	1.7	9.1
19 Fishpool Creek at Bost Road	71	33	<.01	<.01*	<.01*	.03	.22	.49	.98
20 Southern Ditch at Minors Lane	70	29	<.01	<.01*	<.01*	.10	.27	.45	3.6
21 Floyds Fork at Bardstown Road	73	36	<.01	<.01*	<.01*	.03	.11	.39	2.3
22 Cedar Creek at Thixton Road	73	40	<.01	<.01*	<.01*	.01*	.11	.44	4.0
23 Pennsylvania Run at Mt. Washington Road	72	20	<.01	<.01*	.02*	.17	.39	.72	2.8
24 Mill Creek Cutoff at Dover Road	61	33	<.01	<.01*	<.01*	.01*	.25	.78	3.4
25 Harrods Creek at Hunting Creek Drive	70	46	<.01	<.01*	<.01*	<.01*	.07	.19	.78
26 Long Run at State Highway 1531	54	35	<.01	<.01*	<.01*	<.01*	.10	.31	1.4

Table 11.--Statistical summary of water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

Site number and name	N	N of censored data values	Minimum	Value at indicated percentile 10	25	50 (median)	75	90	Maximum
Nitrogen, nitrate, total, in milligrams per liter as N									
1 Pond Creek at Pendleton Road	73	2	<0.10	0.83	1.4	2.2	3.4	5.6	8.6
2 Mill Creek at Orell Road	68	4	<.10	.12	.31	.76	1.6	2.7	12
3 Pond Creek at Manslick Road	73	3	<.10	.95	1.6	2.3	3.6	5.0	11
4 Mill Creek at Rockford Lane	2	0	1.2	--	--	--	--	--	1.2
5 South Fork Beargrass Creek at Winter Avenue	73	3	<.10	.69	1.1	1.7	2.3	4.0	6.8
6 South Fork Beargrass Creek at Trevilian Way	73	3	<.10	.66	.99	1.6	2.4	3.6	7.6
7 Middle Fork Beargrass Creek at Old Cannons Lane	74	4	<.10	1.0	1.8	2.3	3.2	4.5	13
8 Middle Fork Beargrass Creek at Beals Branch Road	73	4	<.10	.92	1.4	2.0	3.0	4.6	6.0
9 Spring Ditch at Private Drive below Hanses Road	74	3	<.10	.95	1.3	2.1	3.0	4.1	6.1
10 Muddy Fork at Mockingbird Valley Road	72	3	<.10	2.1	3.0	4.7	6.1	10	17
11 Goose Creek at U.S. Highway 42	72	0	.57	2.0	3.0	3.9	4.9	6.6	13
12 Little Goose Creek at U.S. Highway 42	72	0	.37	2.5	3.4	4.4	5.7	6.6	11
13 Goose Creek at Old Westport Road	71	0	.15	1.3	2.6	3.6	4.4	7.8	13
14 Pope Lick at Pope Lick Road	74	1	<.10	1.3	2.2	3.5	7.1	11	15
15 Floyds Fork at former State Highway 155	72	3	<.10	.34	.60	1.1	1.9	3.4	9.6
16 Chenoweth Run at Gelhaus Road	72	0	.32	1.5	2.2	3.8	6.8	11	21
17 Fern Creek at Old Bardstown Road	72	2	<.10	1.8	3.2	5.1	8.8	15	33
18 Northern Ditch at Preston Highway	74	4	<.10	.82	2.4	4.2	6.8	14	24
19 Fishpool Creek at Bost Road	74	3	<.10	.81	1.9	2.9	4.1	7.0	15
20 Southern Ditch at Minors Lane	73	3	<.10	.53	1.0	2.1	3.3	4.5	11
21 Floyds Fork at Bardstown Road	73	3	<.10	.40	.84	1.3	1.9	3.2	9.1
22 Cedar Creek at Thixton Road	74	0	.11	1.2	2.0	3.0	4.6	11	19
23 Pennsylvania Run at Mt. Washington Road	74	1	<.10	.85	1.8	3.1	9.0	13	20
24 Mill Creek Cutoff at Dover Road	60	0	.15	.40	1.1	2.2	4.6	6.1	11
25 Harrods Creek at Hunting Creek Drive	69	0	.53	.89	1.2	1.7	2.7	3.7	10
26 Long Run at State Highway 1531	54	4	<.10	.15	.28	.65	1.3	2.8	5.3

Table 11.--Statistical summary of water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

Site number and name	N	N of censored data values	Minimum	Value at indicated percentile 10	25	50 (median)	75	90	Maximum
Nitrogen, nitrite, total, in milligrams per liter as N									
1 Pond Creek at Pendleton Road	73	2	<0.01	0.02	0.04	0.06	0.08	0.13	0.57
2 Mill Creek at Orell Road	69	22	<.01	0*	.01*	.02	.04	.08	6.0
3 Pond Creek at Manslick Road	73	0	.01	.04	.06	.08	.12	.22	1.1
4 Mill Creek at Rockford Lane	2	0	.07	--	--	--	--	--	.12
5 South Fork Beargrass Creek at Winter Avenue	74	3	<.01	.02	.03	.06	.08	.12	.14
6 South Fork Beargrass Creek at Trevilian Way	74	3	<.01	.01	.02	.04	.07	.09	.43
7 Middle Fork Beargrass Creek at Old Cannons Lane	74	15	<.01	.01*	.01	.02	.03	.05	.21
8 Middle Fork Beargrass Creek at Beals Branch Road	73	12	<.01	.01*	.01	.02	.04	.06	.30
9 Spring Ditch at Private Drive below Hanses Road	74	3	<.01	.02	.03	.04	.06	.10	.71
10 Muddy Fork at Mockingbird Valley Road	73	1	<.01	.02	.02	.04	.05	.08	.58
11 Goose Creek at U.S. Highway 42	73	13	<.01	.01*	.01	.03	.05	.10	1.5
12 Little Goose Creek at U.S. Highway 42	74	9	<.01	.01*	.01	.03	.04	.09	.37
13 Goose Creek at Old Westport Road	72	3	<.01	.01	.03	.05	.09	.24	.45
14 Pope Lick at Pope Lick Road	74	0	.02	.03	.05	.07	.12	.23	.42
15 Floyds Fork at former State Highway 155	73	17	<.01	<.01*	.01	.02	.03	.06	.31
16 Chenoweth Run at Gelhaus Road	73	5	<.01	.01	.03	.07	.17	.31	.45
17 Fern Creek at Old Bardstown Road	73	2	<.01	.02	.03	.06	.10	.23	1.8
18 Northern Ditch at Preston Highway	74	0	.02	.03	.05	.07	.15	.25	.71
19 Fishpool Creek at Bost Road	74	5	<.01	.01	.03	.06	.13	.21	.91
20 Southern Ditch at Minors Lane	73	1	<.01	.02	.04	.07	.10	.15	.35
21 Floyds Fork at Bardstown Road	73	12	<.01	.01*	.01	.02	.03	.07	.17
22 Cedar Creek at Thixton Road	74	7	<.01	.01*	.01	.02	.05	.09	.35
23 Pennsylvania Run at Mt. Washington Road	74	2	<.01	.02	.04	.07	.17	.27	.66
24 Mill Creek Cutoff at Dover Road	62	10	<.01	.01*	.03	.05	.11	.25	.90
25 Harrods Creek at Hunting Creek Drive	70	13	<.01	<.01*	.01	.02	.03	.06	1.5
26 Long Run at State Highway 1531	56	24	<.01	<.01*	.01*	.01	.02	.04	.24

Table 11.--Statistical summary of water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

Site number and name	N	N of censored data values	Minimum	Value at indicated percentile 10	25	50 (median)	75	90	Maximum
Nitrogen, organic, total in milligrams per liter as N									
1 Pond Creek at Pendleton Road	72	14	<0.05	0.05*	0.06	0.56	0.90	1.2	1.8
2 Mill Creek at Orell Road	69	12	.03	.03*	.07	.31	.79	1.1	6.9
3 Pond Creek at Manslick Road	72	13	<.05	.07*	.34	.73	.99	1.4	2.5
4 Mill Creek at Rockford Lane	2	--	.11	--	--	--	--	--	.84
5 South Fork Beargrass Creek at Winter Avenue	74	16	.03	.04*	.10	.53	1.0	1.2	2.0
6 South Fork Beargrass Creek at Trevilian Way	74	16	.04	.04*	.10	.39	.73	1.1	2.5
7 Middle Fork Beargrass Creek at Old Cannons Lane	74	23	.03	.02*	.05*	.32	.51	1.0	3.5
8 Middle Fork Beargrass Creek at Beals Branch Road	73	25	.04	.01*	.04*	.28	.56	.99	3.1
9 Spring Ditch at Private Drive below Hanses Road	73	13	<.05	.06*	.11	.73	1.0	1.4	2.9
10 Muddy Fork at Mockingbird Valley Road	73	21	.03	.02*	.05*	.31	.61	.79	4.0
11 Goose Creek at U.S. Highway 42	72	22	<.05	.02*	.05*	.36	.57	.88	6.9
12 Little Goose Creek at U.S. Highway 42	72	21	.01	.02*	.06*	.36	.67	.98	2.7
13 Goose Creek at Old Westport Road	72	20	<.05	.03*	.08*	.59	.95	1.4	4.8
14 Pope Lick at Pope Lick Road	74	10	<.05	.08*	.26	.61	.81	1.2	3.6
15 Floyds Fork at former State Highway 155	72	11	<.05	.07*	.17	.50	.77	1.0	3.4
16 Chenoweth Run at Gelhaus Road	73	20	.02	.02*	.07*	.45	.84	1.4	3.9
17 Fern Creek at Old Bardstown Road	73	12	<.05	.06*	.20	.56	.89	1.2	4.2
18 Northern Ditch at Preston Highway	73	15	<.05	.04*	.06	.73	1.0	1.7	4.8
19 Fishpool Creek at Bost Road	73	13	<.05	.05*	.09	.62	.88	1.3	1.8
20 Southern Ditch at Minors Lane	72	15	<.05	.04*	.11	.67	.84	1.1	1.9
21 Floyds Fork at Bardstown Road	72	13	.03	.05*	.11	.50	.84	1.1	1.3
22 Cedar Creek at Thixton Road	74	10	<.05	.07*	.22	.50	.73	1.1	2.0
23 Pennsylvania Run at Mt. Washington Road	73	16	<.05	.05*	.13	.73	.93	1.5	2.6
24 Mill Creek Cutoff at Dover Road	62	14	<.05	.04*	.10	.66	.99	1.6	3.4
25 Harrods Creek at Hunting Creek Drive	70	13	.04	.04*	.10	.39	.67	1.2	2.5
26 Long Run at State Highway 1531	54	8	<.05	.06*	.17	.39	.73	1.1	3.4

Table 11.--Statistical summary of water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

Site number and name	N	N of censored data values	Minimum	Value at indicated percentile 10	25	50 (median)	75	90	Maximum
Phosphate, total, in milligrams per liter as PO_4									
1 Pond Creek at Pendleton Road	73	0	0.34	0.87	1.2	2.0	3.3	4.5	14
2 Mill Creek at Orell Road	67	0	.03	.22	.37	.58	1.1	2.1	2.9
3 Pond Creek at Manslick Road	73	0	.34	.91	1.4	2.6	3.8	5.0	16
4 Mill Creek at Rockford Lane	2	0	1.0	--	--	--	--	--	1.3
5 South Fork Beargrass Creek at Winter Avenue	73	0	.03	.06	.15	.28	.57	1.3	3.2
6 South Fork Beargrass Creek at Trevilian Way	72	0	.03	.03	.07	.15	.25	.68	10
7 Middle Fork Beargrass Creek at Old Cannons Lane	69	0	.03	.06	.12	.22	.34	.80	7.3
8 Middle Fork Beargrass Creek at Beals Branch Road	69	0	.03	.09	.15	.28	.49	.71	1.8
9 Spring Ditch at Private Drive below Hanses Road	72	0	.03	.67	1.2	1.9	3.0	4.2	9.2
10 Muddy Fork at Mockingbird Valley Road	72	0	.12	.53	1.2	2.1	3.8	4.7	16
11 Goose Creek at U.S. Highway 42	73	0	.15	.72	1.4	2.8	4.2	5.5	13
12 Little Goose Creek at U.S. Highway 42	74	0	.25	.54	1.2	2.5	3.8	5.5	11
13 Goose Creek at Old Westport Road	72	0	.15	.71	1.3	3.1	4.6	6.5	12
14 Pope Lick at Pope Lick Road	73	0	.22	.74	1.2	3.3	4.5	6.4	26
15 Floyds Fork at former State Highway 155	72	0	.03	.12	.22	.37	.67	1.1	3.6
16 Chenoweth Run at Gelhaus Road	71	0	.46	1.2	2.2	3.7	5.7	8.1	23
17 Fern Creek at Old Bardstown Road	72	0	.18	1.2	1.8	3.5	5.5	7.7	24
18 Northern Ditch at Preston Highway	73	0	.18	.82	1.9	3.7	4.3	7.4	17
19 Fishpool Creek at Bost Road	72	0	.15	.74	1.5	3.2	4.3	5.6	14
20 Southern Ditch at Minors Lane	72	0	.06	.74	1.3	2.5	3.7	4.7	14
21 Floyds Fork at Bardstown Road	72	0	.09	.29	.43	.78	1.6	3.2	13
22 Cedar Creek at Thixton Road	73	0	.31	.67	1.3	2.9	4.7	5.6	15
23 Pennsylvania Run at Mt. Washington Road	73	0	.22	.53	.92	2.8	4.9	6.7	23
24 Mill Creek Cutoff at Dover Road	61	0	.15	.71	1.3	2.1	3.6	5.2	11
25 Harrods Creek at Hunting Creek Drive	70	0	.03	.16	.31	.57	1.4	2.3	5.2
26 Long Run at State Highway 1531	53	0	.03	.07	.09	.22	.46	1.0	14

Table 11.--Statistical summary of water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

Site number and name	N	N of censored data values	Minimum	Value at indicated percentile 10	25	50 (median)	75	90	Maximum
Phosphorus, orthophosphate, total, in milligrams per liter as P									
1 Pond Creek at Pendleton Road	73	0	0.11	0.28	0.38	0.64	1.1	1.5	4.5
2 Mill Creek at Orell Road	68	1	<.01	.07	.10	.19	.34	.69	.96
3 Pond Creek at Manslick Road	73	0	.11	.30	.47	.84	1.3	1.6	5.2
4 Mill Creek at Rockford Lane	2	0	.33	--	--	--	--	--	.44
5 South Fork Beargrass Creek at Winter Avenue	73	0	.01	.02	.05	.09	.19	.42	1.0
6 South Fork Beargrass Creek at Trevilian Way	73	1	<.01	.01	.02	.05	.08	.22	3.3
7 Middle Fork Beargrass Creek at Old Cannons Lane	73	4	<.01	.01	.03	.07	.10	.24	2.4
8 Middle Fork Beargrass Creek at Beals Branch Road	72	3	<.01	.02	.04	.09	.16	.23	.59
9 Spring Ditch at Private Drive below Hanses Road	74	2	<.01	.14	.36	.61	.95	1.4	3.0
10 Muddy Fork at Mockingbird Valley Road	72	0	.04	.17	.38	.68	1.2	1.5	5.3
11 Goose Creek at U.S. Highway 42	73	0	.05	.23	.44	.93	1.4	1.8	4.2
12 Little Goose Creek at U.S. Highway 42	74	0	.08	.17	.39	.82	1.2	1.8	3.7
13 Goose Creek at Old Westport Road	72	0	.05	.23	.41	1.0	1.5	2.1	4.0
14 Pope Lick at Pope Lick Road	73	0	.07	.24	.38	1.1	1.5	2.1	8.6
15 Floyds Fork at former State Highway 155	72	0	.01	.04	.07	.12	.22	.36	1.2
16 Chenoweth Run at Gelhaus Road	71	0	.15	.39	.71	1.2	1.9	2.6	7.5
17 Fern Creek at Old Bardstown Road	72	0	.06	.39	.59	1.2	1.8	2.5	7.8
18 Northern Ditch at Preston Highway	74	1	<.01	.24	.55	1.2	1.4	2.4	5.4
19 Fishpool Creek at Bost Road	73	1	<.01	.19	.46	1.0	1.4	1.8	4.7
20 Southern Ditch at Minors Lane	73	1	<.01	.22	.42	.81	1.2	1.5	4.5
21 Floyds Fork at Bardstown Road	72	0	.03	.09	.14	.25	.53	1.0	4.4
22 Cedar Creek at Thixton Road	73	0	.10	.22	.43	.96	1.5	1.8	4.9
23 Pennsylvania Run at Mt. Washington Road	73	0	.07	.17	.30	.92	1.6	2.2	7.4
24 Mill Creek Cutoff at Dover Road	61	0	.05	.23	.41	.68	1.2	1.7	3.6
25 Harrods Creek at Hunting Creek Drive	70	0	.01	.05	.10	.19	.46	.76	1.7
26 Long Run at State Highway 1531	54	1	<.01	.02	.03	.06	.15	.32	4.6

Table 11.--Statistical summary of water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

Site number and name	N	N of censored data values	Minimum	Value at indicated percentile 10	25	50 (median)	75	90	Maximum
DISSOLVED OXYGEN AND OXYGEN DEMAND									
Dissolved oxygen, in milligrams per liter									
1 Pond Creek at Pendleton Road	72	0	4.3	5.6	6.1	8.4	10	12	17
2 Mill Creek at Orell Road	67	0	4.4	5.7	6.3	8.0	10	13	18
3 Pond Creek at Manslick Road	74	0	3.1	5.1	6.1	7.7	10	11	15
4 Mill Creek at Rockford Lane	2	0	12	--	--	--	--	--	14
5 South Fork Beargrass Creek at Winter Avenue	74	0	1.9	4.1	6.3	7.9	9.9	12	13
6 South Fork Beargrass Creek at Trevilian Way	73	0	4.9	6.3	7.5	8.7	10	12	14
7 Middle Fork Beargrass Creek at Old Cannons Lane	74	0	3.9	7.3	8.9	11	13	16	19
8 Middle Fork Beargrass Creek at Beals Branch Road	74	0	2.4	3.4	5.1	8.5	11	12	13
9 Spring Ditch at Private Drive below Hanses Road	74	0	1.9	4.7	6.4	8.2	9.9	12	16
10 Muddy Fork at Mockingbird Valley Road	74	0	5.8	6.4	7.6	8.8	10	11	16
11 Goose Creek at U.S. Highway 42	74	0	6.9	8.0	8.7	10	12	13	17
12 Little Goose Creek at U.S. Highway 42	75	0	6.1	7.6	8.4	10	11	12	15
13 Goose Creek at Old Westport Road	74	0	4.9	7.3	8.9	11	13	14	18
14 Pope Lick at Pope Lick Road	75	0	4.8	5.7	6.7	8.9	11	12	14
15 Floyds Fork at former State Highway 155	74	0	3.0	6.2	7.5	9.4	12	13	16
16 Chenoweth Run at Gelhaus Road	74	0	6.6	7.3	8.7	10	12	14	17
17 Fern Creek at Old Bardstown Road	74	0	6.7	7.5	8.3	10	12	13	16
18 Northern Ditch at Preston Highway	76	0	3.9	8.0	9.3	11	13	15	17
19 Fishpool Creek at Bost Road	75	0	3.7	5.2	8.2	10	12	14	17
20 Southern Ditch at Minors Lane	75	0	2.0	5.9	7.4	9.2	11	14	16
21 Floyds Fork at Bardstown Road	75	0	4.2	6.3	7.6	9.3	12	13	16
22 Cedar Creek at Thixton Road	75	0	5.8	6.8	8.0	10	12	14	17
23 Pennsylvania Run at Mt. Washington Road	75	0	3.3	4.9	5.4	8.0	11	12	14
24 Mill Creek Cutoff at Dover Road	63	0	4.7	7.3	9.6	11	15	18	--
25 Harrods Creek at Hunting Creek Drive	70	0	3.1	5.4	6.4	8.9	11	12	15
26 Long Run at State Highway 1531	55	0	3.1	8.3	10	11	13	13	16
Dissolved oxygen, daily minimum, in milligrams per liter (from continuous records)									
3 Pond Creek at Manslick Road	947	0	1.2	4.3	5.4	6.9	8.8	10.2	14.4
6 South Fork Beargrass Creek at Trevilian Way	811	0	2.3	4.8	5.9	7.3	9.2	11.0	13.9
7 Middle Fork Beargrass Creek at Old Cannons Lane	993	0	1.5	3.7	5.1	6.8	8.7	10.0	19.3
24 Mill Creek Cutoff at Dover Road	697	0	2.1	5.2	6.4	8.3	10.1	12.2	19.9
Dissolved oxygen, daily maximum, in milligrams per liter (from continuous records)									
3 Pond Creek at Manslick Road	947	0	3.8	6.8	8.2	9.6	10.9	12.4	18.5
6 South Fork Beargrass Creek at Trevilian Way	811	0	3.9	7.0	8.5	9.8	11.5	12.8	16.2
7 Middle Fork Beargrass Creek at Old Cannons Lane	993	0	4.7	8.5	9.9	11.6	13.4	15.5	20.6
24 Mill Creek Cutoff at Dover Road	697	0	4.0	8.5	10.4	12.9	17.2	19.9	24.5

Table 11.--Statistical summary of water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

Site number and name	N	N of censored data values	Minimum	Value at indicated percentile 10	25	50 (median)	75	90	Maximum
Biochemical oxygen demand, 5-day at 20 degrees Celsius, in milligrams per liter									
1 Pond Creek at Pendleton Road	73	20	<2.0	1.0*	1.5*	2.0	4.0	7.6	24
2 Mill Creek at Orell Road	69	20	.90	1.2*	1.6*	2.0	3.0	4.0	10
3 Pond Creek at Manslick Road	73	8	<2.0	1.5*	2.0	3.0	4.0	8.0	20
4 Mill Creek at Rockford Lane	2	0	2.0	--	--	--	--	--	3.0
5 South Fork Beargrass Creek at Winter Avenue	74	14	<2.0	1.3*	2.0	3.0	5.0	9.0	25
6 South Fork Beargrass Creek at Trevilian Way	74	39	.60	.40*	.77*	1.6*	3.0	6.0	72
7 Middle Fork Beargrass Creek at Old Cannons Lane	74	35	<2.0	1.0*	1.4*	2.0	3.0	4.0	9.0
8 Middle Fork Beargrass Creek at Beals Branch Road	73	36	<2.0	1.0*	1.4*	2.0	3.0	4.0	8.0
9 Spring Ditch at Private Drive below Hanses Road	74	12	<2.0	1.5*	2.0	3.0	4.0	6.5	18
10 Muddy Fork at Mockingbird Valley Road	73	35	1.0	1.0*	1.4*	2.0	2.0	3.0	10
11 Goose Creek at U.S. Highway 42	72	28	.40	.82*	1.3*	2.0	3.0	5.0	13
12 Little Goose Creek at U.S. Highway 42	74	33	.10	.59*	1.0*	2.0	3.0	5.0	12
13 Goose Creek at Old Westport Road	72	18	1.0	1.1*	1.7*	3.0	6.0	9.0	15
14 Pope Lick at Pope Lick Road	74	18	<2.0	1.4*	1.9*	2.4	3.0	5.0	9.0
15 Floyds Fork at former State Highway 155	73	19	<2.0	1.2*	1.6*	2.0	3.0	5.0	14
16 Chenoweth Run at Gelhaus Road	73	14	<2.0	1.2*	2.0	2.0	3.0	5.0	23
17 Fern Creek at Old Bardstown Road	73	21	<2.0	1.1*	1.6*	2.0	4.0	7.0	16
18 Northern Ditch at Preston Highway	74	17	<2.0	1.4*	2.0	3.0	4.0	6.0	11
19 Fishpool Creek at Bost Road	74	29	<2.0	1.0*	1.4*	2.0	3.0	5.0	15
20 Southern Ditch at Minors Lane	73	13	<2.0	1.4*	2.0	2.0	3.0	5.0	10
21 Floyds Fork at Bardstown Road	73	24	<2.0	1.2*	1.6*	2.0	3.0	3.0	14
22 Cedar Creek at Thixton Road	74	34	<1.7	.85*	1.3*	2.0	3.0	4.5	12
23 Pennsylvania Run at Mt. Washington Road	74	14	1.0	1.2*	2.0	2.0	3.1	5.0	20
24 Mill Creek Cutoff at Dover Road	62	7	1.0	1.5*	2.0	3.0	5.0	7.0	18
25 Harrods Creek at Hunting Creek Drive	70	17	<2.0	1.2*	1.7*	2.0	4.0	7.0	13
26 Long Run at State Highway 1531	54	17	1.0	1.0*	1.5*	2.0	3.0	5.5	10

Table 11.--Statistical summary of water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

Site number and name	N	N of censored data values	Minimum	Value at indicated percentile 10	25	50 (median)	75	90	Maximum
Chemical oxygen demand, 0.25 N dichromate, in milligrams per liter									
1 Pond Creek at Pendleton Road	72	5	<10	10	14	20	26	34	45
2 Mill Creek at Orell Road	68	10	<10	9.4*	12	19	25	32	49
3 Pond Creek at Manslick Road	72	6	8.0	10*	15	20	29	38	55
4 Mill Creek at Rockford Lane	2	0	11	--	--	--	--	--	17
5 South Fork Beargrass Creek at Winter Avenue	72	22	2.0	5.4*	8.2*	14	21	31	60
6 South Fork Beargrass Creek at Trevilian Way	73	31	8.0	4.1*	6.5*	11	18	32	81
7 Middle Fork Beargrass Creek at Old Cannons Lane	74	29	3.0	5.2*	7.5*	12	18	23	41
8 Middle Fork Beargrass Creek at Beals Branch Road	73	26	<10	5.9*	8.4*	13	19	25	58
9 Spring Ditch at Private Drive below Hanses Road	74	8	<10	11*	16	27	39	50	141
10 Muddy Fork at Mockingbird Valley Road	72	24	1.0	4.6*	7.3*	12	23	30	64
11 Goose Creek at U.S. Highway 42	71	21	5.0	5.6*	8.4*	13	20	29	70
12 Little Goose Creek at U.S. Highway 42	73	20	9.0	4.6*	7.6*	12	19	34	710
13 Goose Creek at Old Westport Road	70	9	<10	8.5*	12	18	25	36	138
14 Pope Lick at Pope Lick Road	74	11	<10	8.5*	11	15	22	28	50
15 Floyds Fork at former State Highway 155	72	14	<10	8.0*	10	18	24	31	94
16 Chenoweth Run at Gelhaus Road	72	13	6.0	8.1*	10	17	23	29	61
17 Fern Creek at Old Bardstown Road	72	26	6.0	5.2*	7.8*	13	20	28	74
18 Northern Ditch at Preston Highway	74	18	7.0	7.1*	10*	16	22	31	103
19 Fishpool Creek at Bost Road	74	14	<10	8.5*	10	17	23	32	47
20 Southern Ditch at Minors Lane	73	16	3.0	7.4*	11	19	26	32	105
21 Floyds Fork at Bardstown Road	73	18	<10	6.9*	9.7*	14	23	31	70
22 Cedar Creek at Thixton Road	73	17	5.0	7.2*	10*	16	22	27	101
23 Pennsylvania Run at Mt. Washington Road	74	8	8.0	10*	15	20	27	33	40
24 Mill Creek Cutoff at Dover Road	61	1	<10	13	17	23	32	43	105
25 Harrods Creek at Hunting Creek Drive	70	12	2.0	6.9*	11	17	21	38	55
26 Long Run at State Highway 1531	54	13	5.0	6.9*	9.6*	15	20	26	49

Table 11.--Statistical summary of water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

Site number and name	N	N of censored data values	Minimum	Value at indicated percentile 10	25	50 (median)	75	90	Maximum
SYNTHETIC ORGANIC COMPOUNDS									
Chlordane, total, in micrograms per liter									
1 Pond Creek at Pendleton Road	12	12	<3.1	--	<3.1	<6.2	<6.2	--	<6.2
2 Mill Creek at Orell Road	10	10	<3.1	--	<3.1	<6.2	<6.2	--	<6.2
3 Pond Creek at Manslick Road	12	12	<3.1	--	<3.1	<6.2	<6.2	--	<6.2
5 South Fork Beargrass Creek at Winter Avenue	11	11	<3.1	--	<3.1	<6.2	<6.2	--	<6.2
6 South Fork Beargrass Creek at Trevilian Way	11	11	<3.1	--	<3.1	<6.2	<6.2	--	<6.2
7 Middle Fork Beargrass Creek at Old Cannons Lane	9	9	<3.1	--	--	--	--	--	<6.2
8 Middle Fork Beargrass Creek at Beals Branch Road	10	10	<3.1	--	<3.1	<6.2	<6.2	--	<6.2
9 Spring Ditch at Private Drive below Hanses Road	12	12	<3.1	--	<3.1	<6.2	<6.2	--	<6.2
10 Muddy Fork at Mockingbird Valley Road	11	11	<3.1	--	<3.1	<6.2	<6.2	--	<6.2
11 Goose Creek at U.S. Highway 42	10	10	<3.1	--	<6.2	<6.2	<6.2	--	<6.2
12 Little Goose Creek at U.S. Highway 42	12	12	<3.1	--	<3.1	<6.2	<6.2	--	<6.2
13 Goose Creek at Old Westport Road	10	10	<3.1	--	<3.1	<6.2	<6.2	--	<6.2
14 Pope Lick at Pope Lick Road	13	13	<3.1	--	<3.1	<6.2	<6.2	--	<6.2
15 Floyds Fork at former State Highway 155	13	13	<3.1	--	<3.1	<6.2	<6.2	--	<6.2
16 Chenoweth Run at Gelhaus Road	13	13	<3.1	--	<3.1	<6.2	<6.2	--	<6.3
17 Fern Creek at Old Bardstown Road	12	12	<3.1	--	<3.1	<6.2	<6.2	--	<6.2
18 Northern Ditch at Preston Highway	12	12	<3.1	--	<3.1	<6.2	<6.2	--	<6.2
19 Fishpool Creek at Bost Road	10	10	<3.1	--	<3.1	<6.2	<6.2	--	<6.2
20 Southern Ditch at Minors Lane	10	10	<3.1	--	<3.1	<6.2	<6.2	--	<6.2
21 Floyds Fork at Bardstown Road	12	12	<3.1	--	<3.1	<6.2	<6.2	--	<6.2
22 Cedar Creek at Thixton Road	12	12	<3.1	--	<3.1	<6.2	<6.2	--	<6.2
23 Pennsylvania Run at Mt. Washington Road	12	12	<3.1	--	<3.1	<6.2	<6.2	--	<6.2
24 Mill Creek Cutoff at Dover Road	10	10	<3.1	--	<3.1	<3.1	<6.2	--	<6.2
25 Harrods Creek at Hunting Creek Drive	11	11	<3.1	--	<3.1	<6.2	<6.2	--	<6.2
26 Long Run at State Highway 1531	9	9	<3.1	--	--	--	--	--	<6.2

Table 11.--Statistical summary of water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

Site number and name	N	N of censored data values	Minimum	Value at indicated percentile 10	25	50 (median)	75	90	Maximum
Endrin, total, in micrograms per liter									
1 Pond Creek at Pendleton Road	12	10	<0.02	--	<0.04	<0.08	<0.18	--	<0.39
2 Mill Creek at Orell Road	10	10	<.02	--	<.04	<.16	<.18	--	<.39
3 Pond Creek at Manslick Road	12	12	<.02	--	<.02	<.05	<.18	--	<.39
5 South Fork Beargrass Creek at Winter Avenue	11	11	<.02	--	<.02	<.03	<.08	--	<.39
6 South Fork Beargrass Creek at Trevilian Way	11	10	<.02	--	<.02	<.05	<.39	--	.50
7 Middle Fork Beargrass Creek at Old Cannons Lane	9	9	<.02	--	--	--	--	--	<.39
8 Middle Fork Beargrass Creek at Beals Branch Road	10	10	<.02	--	<.02	<.04	<.08	--	<.39
9 Spring Ditch at Private Drive below Hanses Road	12	11	<.02	--	<.02	<.05	<.39	--	.49
10 Muddy Fork at Mockingbird Valley Road	10	10	<.02	--	<.02	<.05	<.08	--	<.39
11 Goose Creek at U.S. Highway 42	10	8	<.02	--	<.02	<.07	<.20	--	<.39
12 Little Goose Creek at U.S. Highway 42	12	11	<.02	--	<.02	<.05	<.39	--	<.39
13 Goose Creek at Old Westport Road	10	9	<.02	--	<.02	<.08	<.39	--	<.39
14 Pope Lick at Pope Lick Road	13	13	<.02	--	<.02	<.04	<.16	--	<.39
15 Floyds Fork at former State Highway 155	13	12	<.02	--	<.04	<.06	<.18	--	<.39
16 Chenoweth Run at Gelhaus Road	13	13	<.02	--	<.02	<.06	<.16	--	<.39
17 Fern Creek at Old Bardstown Road	12	11	<.02	--	<.02	<.05	<.39	--	<.39
18 Northern Ditch at Preston Highway	12	11	<.02	--	<.02	<.05	<.39	--	<.39
19 Fishpool Creek at Bost Road	10	9	<.02	--	<.02	<.06	<.39	--	1.1
20 Southern Ditch at Minors Lane	10	8	<.02	--	<.04	<.16	<.39	--	.98
21 Floyds Fork at Bardstown Road	12	11	<.02	--	<.02	<.06	<.39	--	<.39
22 Cedar Creek at Thixton Road	12	12	<.02	--	<.02	<.06	<.16	--	<.39
23 Pennsylvania Run at Mt. Washington Road	12	12	<.02	--	<.02	<.05	<.08	--	<.39
24 Mill Creek Cutoff at Dover Road	10	9	<.02	--	<.05	<.05	<.08	--	<.39
25 Harrods Creek at Hunting Creek Drive	11	11	<.02	--	<.02	<.05	<.18	--	<.39
26 Long Run at State Highway 1531	9	9	<.02	--	--	--	--	--	<.08
Lindane, total, in micrograms per liter									
1 Pond Creek at Pendleton Road	12	10	<.01	--	<.03	<.20	<.21	--	<.62
2 Mill Creek at Orell Road	10	10	<.01	--	<.02	<.02	<.21	--	<.62
3 Pond Creek at Manslick Road	12	10	<.01	--	<.02	<.03	<.14	--	<.62
5 South Fork Beargrass Creek at Winter Avenue	11	10	<.01	--	<.02	<.04	<.62	--	<.62
6 South Fork Beargrass Creek at Trevilian Way	11	11	<.01	--	<.02	<.04	<.21	--	<.62
7 Middle Fork Beargrass Creek at Old Cannons Lane	9	8	<.01	--	--	--	--	--	<.62
8 Middle Fork Beargrass Creek at Beals Branch Road	10	10	<.01	--	<.01	<.04	<.07	--	<.62
9 Spring Ditch at Private Drive below Hanses Road	12	11	<.01	--	<.02	<.04	<.62	--	<.62
10 Muddy Fork at Mockingbird Valley Road	10	6	<.01	--	<.02	<.10	<.58	--	<.62
11 Goose Creek at U.S. Highway 42	10	10	<.01	--	<.01	<.04	<.21	--	<.62
12 Little Goose Creek at U.S. Highway 42	12	11	<.01	--	<.02	<.04	<.62	--	<.62
13 Goose Creek at Old Westport Road	10	7	<.01	--	<.03	<.10	<.21	--	<.62
14 Pope Lick at Pope Lick Road	13	11	<.01	--	<.02	<.04	<.08	--	<.62
15 Floyds Fork at former State Highway 155	13	12	<.01	--	<.02	<.04	<.21	--	<.62
16 Chenoweth Run at Gelhaus Road	13	11	<.01	--	<.02	<.02	<.04	--	<.77
17 Fern Creek at Old Bardstown Road	12	10	<.01	--	<.02	<.04	<.21	--	<.62
18 Northern Ditch at Preston Highway	12	10	<.01	--	<.02	<.04	<.08	--	<.62
19 Fishpool Creek at Bost Road	10	10	<.01	--	<.02	<.02	<.04	--	<.62
20 Southern Ditch at Minors Lane	10	9	<.01	--	<.01	<.04	<.62	--	<.62
21 Floyds Fork at Bardstown Road	12	9	<.01	--	0*	.01*	.03*	--	<.62
22 Cedar Creek at Thixton Road	12	9	<.02	--	0*	.01*	.05*	--	<.62
23 Pennsylvania Run at Mt. Washington Road	12	10	<.01	--	<.02	<.02	<.07	--	<.62
24 Mill Creek Cutoff at Dover Road	10	8	<.01	--	<.02	<.05	<.08	--	<.62
25 Harrods Creek at Hunting Creek Drive	11	11	<.01	--	<.02	<.04	<.21	--	<.62
26 Long Run at State Highway 1531	9	7	<.01	--	--	--	--	--	.11

Table 11.--Statistical summary of water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

Site number and name	N	N of censored data values	Minimum	Value at indicated percentile 10	25	50 (median)	75	90	Maximum
Methoxychlor, total, in micrograms per liter									
1 Pond Creek at Pendleton Road	12	11	<0.08	--	<0.08	<0.51	<1.3	--	<1.3
2 Mill Creek at Orell Road	10	10	<.08	--	<.09	<.41	<.51	--	<1.3
3 Pond Creek at Manslick Road	12	12	<.08	--	<.08	<.13	<.51	--	<1.3
5 South Fork Beargrass Creek at Winter Avenue	11	11	<.08	--	<.08	<.10	<.20	--	<1.3
6 South Fork Beargrass Creek at Trevilian Way	11	9	<.08	--	<.08	<.16	<.74	--	<1.3
7 Middle Fork Beargrass Creek at Old Cannons Lane	9	8	<.08	--	--	--	--	--	<1.3
8 Middle Fork Beargrass Creek at Beals Branch Road	10	10	<.08	--	<.08	<.12	<.20	--	<1.3
9 Spring Ditch at Private Drive below Hanses Road	12	12	<.08	--	<.08	<.17	<.20	--	<1.3
10 Muddy Fork at Mockingbird Valley Road	10	9	<.08	--	<.10	<.17	<1.3	--	<1.3
11 Goose Creek at U.S. Highway 42	10	9	<.08	--	<.08	<.51	<1.3	--	<1.3
12 Little Goose Creek at U.S. Highway 42	12	10	<.08	--	<.08	<.25	<.51	--	<1.3
13 Goose Creek at Old Westport Road	10	10	<.08	--	<.08	<.16	<.51	--	<1.3
14 Pope Lick at Pope Lick Road	13	13	<.08	--	<.08	<.14	<.41	--	<1.3
15 Floyds Fork at former State Highway 155	13	12	<.08	--	<.10	<.16	<.51	--	<1.3
16 Chenoweth Run at Gelhaus Road	13	13	<.08	--	<.08	<.16	<.41	--	<3.1
17 Fern Creek at Old Bardstown Road	12	11	<.08	--	<.08	<.17	<1.3	--	<1.3
18 Northern Ditch at Preston Highway	12	12	<.08	--	<.08	<.17	<.20	--	<1.3
19 Fishpool Creek at Bost Road	10	8	.07	--	<.08	<.17	<1.3	--	2.1
20 Southern Ditch at Minors Lane	10	7	<.08	--	<.09	<.11	<.17	--	<1.3
21 Floyds Fork at Bardstown Road	12	11	<.08	--	<.08	<.17	<1.3	--	<1.3
22 Cedar Creek at Thixton Road	12	11	<.08	--	<.08	<.18	<1.3	--	<1.3
23 Pennsylvania Run at Mt. Washington Road	12	12	<.08	--	<.08	<.10	<.20	--	<1.3
24 Mill Creek Cutoff at Dover Road	10	9	<.08	--	<.08	<.16	<.20	--	2.6
25 Harrods Creek at Hunting Creek Drive	11	10	<.08	--	<.08	<.16	<1.3	--	<1.3
26 Long Run at State Highway 1531	9	9	<.08	--	--	--	--	--	<.20
Toxophene, total, in micrograms per liter									
1 Pond Creek at Pendleton Road	12	11	<12	--	<12	<12	<13	--	<13
2 Mill Creek at Orell Road	10	10	<6.3	--	<12	<12	<13	--	<13
3 Pond Creek at Manslick Road	12	11	<6.3	--	<12	<13	<13	--	<13
5 South Fork Beargrass Creek at Winter Avenue	11	11	<6.3	--	<12	<12	<13	--	<13
6 South Fork Beargrass Creek at Trevilian Way	11	11	<6.3	--	<12	<12	<13	--	<13
7 Middle Fork Beargrass Creek at Old Cannons Lane	9	8	<12	--	--	--	--	--	<13
8 Middle Fork Beargrass Creek at Beals Branch Road	10	9	<12	--	<12	<13	<13	--	<13
9 Spring Ditch at Private Drive below Hanses Road	12	12	<6.3	--	<12	<13	<13	--	<13
10 Muddy Fork at Mockingbird Valley Road	11	11	<6.3	--	<12	<12	<13	--	<13
11 Goose Creek at U.S. Highway 42	10	10	<12	--	<12	<12	<13	--	<13
12 Little Goose Creek at U.S. Highway 42	12	12	<6.3	--	<12	<12	<13	--	<13
13 Goose Creek at Old Westport Road	10	10	<12	--	<12	<12	<13	--	<13
14 Pope Lick at Pope Lick Road	13	13	<6.3	--	<12	<12	<13	--	<13
15 Floyds Fork at former State Highway 155	13	13	<6.3	--	<12	<12	<13	--	<13
16 Chenoweth Run at Gelhaus Road	13	13	<6.3	--	<12	<12	<13	--	<13
17 Fern Creek at Old Bardstown Road	12	12	<6.3	--	<12	<13	<13	--	<13
18 Northern Ditch at Preston Highway	12	12	<6.3	--	<12	<12	<13	--	<13
19 Fishpool Creek at Bost Road	10	10	<12	--	<12	<12	<13	--	<13
20 Southern Ditch at Minors Lane	10	10	<12	--	<12	<12	<13	--	<13
21 Floyds Fork at Bardstown Road	12	12	<6.3	--	<12	<12	<13	--	<13
22 Cedar Creek at Thixton Road	12	12	<6.3	--	<12	<13	<13	--	<13
23 Pennsylvania Run at Mt. Washington Road	12	12	<6.3	--	<12	<12	<13	--	<13
24 Mill Creek Cutoff at Dover Road	10	10	<6.3	--	<12	<13	<13	--	<13
25 Harrods Creek at Hunting Creek Drive	11	10	<6.3	--	<12	<13	<13	--	<13
26 Long Run at State Highway 1531	9	9	<6.3	--	--	--	--	--	<13

Table 11.--Statistical summary of water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

Site number and name	N	N of censored data values	Minimum	Value at indicated percentile 10	25	50 (median)	75	90	Maximum
2,4-D, total, in micrograms per liter									
1 Pond Creek at Pendleton Road	12	8	<0.03	--	0.01*	0.05*	0.19*	--	0.96
2 Mill Creek at Orell Road	10	5	<.02	--	.01*	.06*	.49	--	.92
3 Pond Creek at Manslick Road	12	7	<.02	--	.01*	.05*	.57	--	.95
5 South Fork Beargrass Creek at Winter Avenue	11	6	<.03	--	.02*	.09*	.54	--	3.2
6 South Fork Beargrass Creek at Trevilian Way	11	5	<.03	--	.03*	.11*	.48	--	1.8
7 Middle Fork Beargrass Creek at Old Cannons Lane	9	6	<.03	--	--	--	--	--	1.8
8 Middle Fork Beargrass Creek at Beals Branch Road	10	6	<.03	--	.01*	.05*	.74	--	1.3
9 Spring Ditch at Private Drive below Hanses Road	12	10	<.02	--	<.03	<.15	<.35	--	.52
10 Muddy Fork at Mockingbird Valley Road	10	9	<.02	--	<.03	<.15	<.35	--	1.2
11 Goose Creek at U.S. Highway 42	10	8	<.03	--	<.03	<.20	<.35	--	.37
12 Little Goose Creek at U.S. Highway 42	12	9	<.02	--	0*	.01*	.06*	--	.74
13 Goose Creek at Old Westport Road	10	10	<.03	--	<.03	<.17	<.20	--	<.35
14 Pope Lick at Pope Lick Road	13	9	<.02	--	0*	.02*	.12*	--	.89
15 Floyds Fork at former State Highway 155	13	9	<.02	--	<.03	<.14	<.20	--	<.35
16 Chenoweth Run at Gelhaus Road	13	11	<.02	--	<.03	<.20	<.20	--	1.6
17 Fern Creek at Old Bardstown Road	12	10	<.02	--	<.03	<.17	<.35	--	.93
18 Northern Ditch at Preston Highway	12	8	<.02	--	0*	.02*	.50	--	3.6
19 Fishpool Creek at Bost Road	10	6	<.03	--	0*	.03*	.52	--	8.8
20 Southern Ditch at Minors Lane	10	7	<.03	--	0*	.01*	.15*	--	12
21 Floyds Fork at Bardstown Road	12	8	<.02	--	.01*	.03*	.15*	--	.94
22 Cedar Creek at Thixton Road	12	8	<.02	--	0*	.03*	.17*	--	1.3
23 Pennsylvania Run at Mt. Washington Road	12	7	<.02	--	.01*	.04*	.17*	--	1.8
24 Mill Creek Cutoff at Dover Road	10	6	<.02	--	.01*	.05*	.33*	--	3.4
25 Harrods Creek at Hunting Creek Drive	11	9	<.02	--	<.03	<.15	<.35	--	.58
26 Long Run at State Highway 1531	9	7	<.02	--	--	--	--	--	.56
2,4,5-TP (silvex), total, in micrograms per liter									
1 Pond Creek at Pendleton Road	12	11	<.01	--	<.05	<.05	<.43	--	.58
2 Mill Creek at Orell Road	10	9	<.01	--	<.01	<.05	<.10	--	<.43
3 Pond Creek at Manslick Road	12	11	<.01	--	<.01	<.05	<.43	--	<.43
5 South Fork Beargrass Creek at Winter Avenue	11	10	<.01	--	<.01	<.05	<.43	--	<.43
6 South Fork Beargrass Creek at Trevilian Way	11	10	<.01	--	<.01	<.05	<.43	--	<.43
7 Middle Fork Beargrass Creek at Old Cannons Lane	9	9	<.01	--	--	--	--	--	<.43
8 Middle Fork Beargrass Creek at Beals Branch Road	10	9	<.01	--	<.01	<.05	<.43	--	<.43
9 Spring Ditch at Private Drive below Hanses Road	12	10	<.01	--	<.03	<.05	<.08	--	<.43
10 Muddy Fork at Mockingbird Valley Road	10	10	<.01	--	<.01	<.05	<.10	--	<.43
11 Goose Creek at U.S. Highway 42	10	10	<.01	--	<.01	<.05	<.10	--	<.43
12 Little Goose Creek at U.S. Highway 42	12	11	<.01	--	<.01	<.05	<.43	--	<.43
13 Goose Creek at Old Westport Road	10	10	<.01	--	<.01	<.05	<.10	--	<.43
14 Pope Lick at Pope Lick Road	13	13	<.01	--	<.01	<.05	<.10	--	<.43
15 Floyds Fork at former State Highway 155	13	12	<.01	--	<.01	<.05	<.10	--	<.43
16 Chenoweth Run at Gelhaus Road	13	9	<.01	--	<.01	<.03	<.05	--	<.43
17 Fern Creek at Old Bardstown Road	12	12	<.01	--	<.01	<.05	<.10	--	<.43
18 Northern Ditch at Preston Highway	12	12	<.01	--	<.01	<.05	<.10	--	<.43
19 Fishpool Creek at Bost Road	10	10	<.01	--	<.01	<.05	<.10	--	<.43
20 Southern Ditch at Minors Lane	10	9	<.01	--	<.05	<.05	<.43	--	<.43
21 Floyds Fork at Bardstown Road	12	11	<.01	--	<.01	<.05	<.43	--	<.43
22 Cedar Creek at Thixton Road	12	11	<.01	--	<.01	<.05	<.43	--	<.43
23 Pennsylvania Run at Mt. Washington Road	12	12	<.01	--	<.01	<.05	<.10	--	<.43
24 Mill Creek Cutoff at Dover Road	10	9	<.01	--	<.01	<.05	<.10	--	<.43
25 Harrods Creek at Hunting Creek Drive	11	10	<.01	--	<.01	<.05	<.43	--	<.43
26 Long Run at State Highway 1531	9	8	<.01	--	--	--	--	--	<.05

Table 11.--Statistical summary of water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

Site number and name	N	N of censored data values	Minimum	Value at indicated percentile 10	25	50 (median)	75	90	Maximum
FECAL INDICATOR BACTERIA									
Coliform, fecal, membrane filtered, M-FC medium at 44.5 degrees Celsius, in colonies per 100 milliliters									
1 Pond Creek at Pendleton Road	74	0	4	20	47	151	412	3,220	13,000
2 Mill Creek at Orell Road	72	0	2	17	62	187	540	3,960	20,000
3 Pond Creek at Manslick Road	75	0	8	80	180	410	800	2,970	70,400
4 Mill Creek at Rockford Lane	2	0	5	--	--	--	--	--	240
5 South Fork Beargrass Creek at Winter Avenue	75	0	2	9	200	1,600	5,600	16,000	70,000
6 South Fork Beargrass Creek at Trevilian Way	74	10	<2	<1*	2	9	126	3,990	26,000
7 Middle Fork Beargrass Creek at Old Cannons Lane	77	1	<2	52	169	520	1,250	7,400	25,000
8 Middle Fork Beargrass Creek at Beals Branch Road	75	1	<2	76	170	400	1,320	6,000	47,000
9 Spring Ditch at Private Drive below Hanses Road	77	1	<2	90	258	560	1,740	4,530	110,000
10 Muddy Fork at Mockingbird Valley Road	76	1	<2	17	67	130	388	1,660	82,000
11 Goose Creek at U.S. Highway 42	72	0	2	11	35	106	326	898	50,000
12 Little Goose Creek at U.S. Highway 42	73	0	3	20	48	210	535	1,260	50,000
13 Goose Creek at Old Westport Road	71	10	<2	<1*	7	60	560	2,830	28,000
14 Pope Lick at Pope Lick Road	77	3	<2	6	60	250	685	2,450	11,900
15 Floyds Fork at former State Highway 155	75	0	6	30	68	144	340	1,720	17,800
16 Chenoweth Run at Gelhaus Road	78	0	7	46	109	222	652	3,480	50,000
17 Fern Creek at Old Bardstown Road	75	2	<2	3	82	500	1,300	5,130	13,100
18 Northern Ditch at Preston Highway	77	0	4	13	59	215	735	2,620	35,000
19 Fishpool Creek at Bost Road	77	0	4	27	66	260	945	3,440	100,000
20 Southern Ditch at Minors Lane	76	0	7	44	88	226	860	3,620	22,800
21 Floyds Fork at Bardstown Road	73	0	6	17	34	158	415	836	8,800
22 Cedar Creek at Thixton Road	74	0	4	19	55	169	332	1,020	2,600
23 Pennsylvania Run at Mt. Washington Road	75	2	<2	2	22	149	460	920	7,000
24 Mill Creek Cutoff at Dover Road	63	1	<2	5	40	150	800	2,580	13,900
25 Harrods Creek at Hunting Creek Drive	69	1	<2	30	76	170	425	1,100	46,000
26 Long Run at State Highway 1531	55	0	16	42	92	170	500	1,500	10,400

Table 11.--Statistical summary of water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

Site number and name	N	N of censored data values	Minimum	Value at indicated percentile 10	25	50 (median)	75	90	Maximum
Streptococci, fecal, membrane filtered, KF agar, in colonies per 100 milliliters									
1 Pond Creek at Pendleton Road	71	2	<2	46	120	250	940	7,380	48,000
2 Mill Creek at Orell Road	66	0	3	34	130	376	1,200	12,200	30,000
3 Pond Creek at Manslick Road	69	0	5	48	115	280	800	7,800	86,000
4 Mill Creek at Rockford Lane	2	0	165	--	--	--	--	--	300
5 South Fork Beargrass Creek at Winter Avenue	72	0	2	22	162	955	4,540	11,600	85,000
6 South Fork Beargrass Creek at Trevilian Way	73	14	<2	<1*	2	8	100	6,060	55,000
7 Middle Fork Beargrass Creek at Old Cannons Lane	70	3	<2	23	115	450	1,360	9,100	93,000
8 Middle Fork Beargrass Creek at Beals Branch Road	72	2	<2	53	112	465	1,200	14,700	3,000,000
9 Spring Ditch at Private Drive below Hanses Road	71	2	<2	92	200	420	1,100	7,410	130,000
10 Muddy Fork at Mockingbird Valley Road	70	2	<2	38	110	340	1,020	3,300	12,600
11 Goose Creek at U.S. Highway 42	74	0	4	20	50	274	818	2,670	90,000
12 Little Goose Creek at U.S. Highway 42	75	0	4	32	70	390	1,800	5,600	143,000
13 Goose Creek at Old Westport Road	72	9	<2	<2*	10	62	825	2,630	40,000
14 Pope Lick at Pope Lick Road	70	2	<2	20	108	390	1,620	3,460	10,000
15 Floyds Fork at former State Highway 155	69	1	<2	26	80	230	960	5,000	22,200
16 Chenoweth Run at Gelhaus Road	68	1	<2	21	68	168	806	3,150	30,000
17 Fern Creek at Old Bardstown Road	71	3	<2	10	80	638	2,550	7,080	53,000
18 Northern Ditch at Preston Highway	71	1	<2	10	42	140	573	2,320	150,000
19 Fishpool Creek at Bost Road	71	1	<2	72	148	430	1,600	6,940	125,000
20 Southern Ditch at Minors Lane	70	1	<2	47	122	305	1,130	5,990	21,400
21 Floyds Fork at Bardstown Road	72	1	<2	22	60	176	540	3,350	42,500
22 Cedar Creek at Thixton Road	73	1	<2	28	84	320	655	3,500	14,000
23 Pennsylvania Run at Mt. Washington Road	73	3	<2	3	26	180	845	1,980	68,000
24 Mill Creek Cutoff at Dover Road	59	0	4	10	33	132	1,320	4,380	20,300
25 Harrods Creek at Hunting Creek Drive	70	1	<2	39	100	250	716	2,250	190,000
26 Long Run at State Highway 1531	52	0	12	46	92	350	932	5,110	10,100

Table 12.--Trend-test results for water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991

[N, number of observations; SC, number of seasonal comparisons; S, number of seasons constructed; P, probability; --, missing; *, censored values used in analysis; <, less than; **, censored values affect trend analysis; trend-line slopes not significant at 0.2 probability level are not reported, and those significant at the 0.1 probability level are underlined]

Site number and name	N	SC	S	Results of seasonal Kendall tests for time trend[1]: Trends, unadjusted for flow: P level	Trend-line slope: Units per year	Trend-line slope: Percent median value per year	Flow-adjusted trends[2]: P level	Trend-line slope[3]: Units per year	Trend-line slope[3]: Percent median value per year
TEMPERATURE									
Water temperature, in degrees Celsius (miscellaneous observations)									
1 Pond Creek at Pendleton Road	72	48	12	0.785	--	--	0.081	0.3	2.2
2 Mill Ck at Orell Road	69	48	12	.146	0.8	5.2	.073	2.0	14
3 Pond Ck at Manslick Road	74	48	12	.212	--	--	.275	--	--
5 South Fork Beargrass Creek at Winter Avenue	74	48	12	.104	.6	4.4	.072	1.4	10
6 South Fork Beargrass Creek at Trevilian Way	75	48	12	.200	.5	3.4	.051	1.3	8.7
7 Middle Fork Beargrass Creek at Old Cannons Lane	74	48	12	.434	--	--	.130	1.1	7.5
8 Middle Fork Beargrass Creek at Beals Branch Road	74	48	12	.505	--	--	.224	--	--
9 Spring Ditch at Private Drive below Hanses Road	76	48	12	.233	--	--	.325	--	--
10 Muddy Fork at Mockingbird Valley Road	74	48	12	.123	.7	5.6	.123	1.4	12
11 Goose Creek at U.S. Highway 42	74	48	12	.540	--	--	.089	1.1	8.0
12 Little Goose Creek at U.S. Highway 42	75	48	12	.635	--	--	.083	1.2	11
13 Goose Creek at Old Westport Road	74	48	12	.130	.2	1.2	.086	.8	5.4
14 Pope Lick at Pope Lick Road	75	48	12	.531	--	--	.134	1.1	8.8
15 Floyds Fork at former State Highway 155	74	48	12	.104	1.0	7.1	.096	2.0	14
16 Chenoweth Run at Gelhaus Road	73	48	12	.118	-1.8	-13	.118	-1.9	-13
17 Fern Creek at Old Bardstown Road	74	48	12	.597	--	--	.597	--	--
18 Northern Ditch at Preston Highway	76	48	12	.525	--	--	.049	1.3	8.8
19 Fishpool Creek at Bost Road	75	48	12	.862	--	--	.077	1.8	11
20 Southern Ditch at Minors Lane	75	48	12	.710	--	--	.042	1.0	6.0
21 Floyds Fork at Bardstown Road	75	48	12	.294	--	--	.275	--	--
22 Cedar Creek at Thixton Road	75	48	12	.411	--	--	.050	1.1	8.4
23 Pennsylvania Run at Mt. Washington Road	75	48	12	.561	--	--	.089	1.0	8.0
24 Mill Creek Cutoff at Dover Road	63	48	12	.165	1.5	9.7	.085	1.6	11
25 Harrods Creek at Hunting Creek Drive	71	48	12	1.000	--	--	--	--	--
26 Long Run at State Highway 1531	55	48	12	.695	--	--	.329	--	--
Water temperature, daily minimum, in degrees Celsius (from continuous records)									
3 Pond Creek at Manslick Road	992	208	52	.766	--	--	.057	.2	1.9
6 South Fork Beargrass Creek at Trevilian Way	999	208	52	.958	--	--	.120	.5	3.2
7 Middle Fork Beargrass Creek at Old Cannons Lane	1,053	208	52	.882	--	--	.247	--	--
24 Mill Creek Cutoff at Dover Road	807	208	52	.484	--	--	.768	--	--
Water temperature, daily maximum, in degrees Celsius (from continuous records)									
3 Pond Creek at Manslick Road	992	208	52	.733	--	--	.718	--	--
6 South Fork Beargrass Creek at Trevilian Way	999	208	52	.588	--	--	.257	--	--
7 Middle Fork Beargrass Creek at Old Cannons Lane	1,053	208	52	.487	--	--	.726	--	--
24 Mill Creek Cutoff at Dover Road	806	208	52	.385	--	--	.593	--	--

Table 12.--Trend-test results for water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

Site number and name	N	SC	S	Results of seasonal Kendall tests for time trend[1]: Trends, unadjusted for flow: P level	Trends, unadjusted for flow: Trend-line slope: Units per year	Trends, unadjusted for flow: Trend-line slope: Percent median value per year	Flow-adjusted trends[2]: P level	Flow-adjusted trends[2]: Trend-line slope[3]: Units per year	Flow-adjusted trends[2]: Trend-line slope[3]: Percent median value per year
pH AND ALKALINITY									
pH, laboratory, in standard units									
1 Pond Creek at Pendleton Road	72	48	12	0.836	--	--	--	--	--
2 Mill Ck at Orell Road	69	48	12	1.000	--	--	1.000	--	--
3 Pond Ck at Manslick Road	74	48	12	.051	up	--	.136	up	--
5 South Fork Beargrass Creek at Winter Avenue	74	48	12	.344	--	--	.868	--	--
6 South Fork Beargrass Creek at Trevilian Way	74	48	12	.341	--	--	.686	--	--
7 Middle Fork Beargrass Creek at Old Cannons Lane	74	48	12	.471	--	--	.903	--	--
8 Middle Fork Beargrass Creek at Beals Branch Road	74	48	12	.293	--	--	.188	down	--
9 Spring Ditch at Private Drive below Hanses Road	76	48	12	.738	--	--	--	--	--
10 Muddy Fork at Mockingbird Valley Road	74	48	12	.175	down	--	.104	down	--
11 Goose Creek at U.S. Highway 42	74	48	12	.918	--	--	--	--	--
12 Little Goose Creek at U.S. Highway 42	75	48	12	.371	--	--	.240	--	--
13 Goose Creek at Old Westport Road	74	48	12	.708	--	--	.763	--	--
14 Pope Lick at Pope Lick Road	75	48	12	.111	down	--	.115	down	--
15 Floyds Fork at former State Highway 155	74	48	12	.721	--	--	.625	--	--
16 Chenoweth Run at Gelhaus Road	74	48	12	.171	down	--	--	--	--
17 Fern Creek at Old Bardstown Road	74	48	12	.866	--	--	1.000	--	--
18 Northern Ditch at Preston Highway	76	48	12	.724	--	--	.523	--	--
19 Fishpool Creek at Bost Road	75	48	12	1.000	--	--	--	--	--
20 Southern Ditch at Minors Lane	75	48	12	.660	--	--	.804	--	--
21 Floyds Fork at Bardstown Road	75	48	12	.177	down	--	.144	down	--
22 Cedar Creek at Thixton Road	75	48	12	.551	--	--	.398	--	--
23 Pennsylvania Run at Mt. Washington Road	75	48	12	.374	--	--	.268	--	--
24 Mill Creek Cutoff at Dover Road	63	48	12	.799	--	--	.638	--	--
25 Harrods Creek at Hunting Creek Drive	72	48	12	.428	--	--	--	--	--
26 Long Run at State Highway 1531	55	48	12	.245	--	--	.209	--	--
pH, daily minimum, in standard units (from continuous records)									
3 Pond Creek at Manslick Road	993	208	52	1.000	--	--	.468	--	--
6 South Fork Beargrass Creek at Trevilian Way	942	208	52	.813	--	--	.644	--	--
7 Middle Fork Beargrass Creek at Old Cannons Lane	1,032	208	52	.058	down	--	.059	down	--
24 Mill Creek Cutoff at Dover Road	764	208	52	.733	--	--	.926	--	--
pH, daily maximum, in standard units (from continuous records)									
3 Pond Creek at Manslick Road	993	208	52	.971	--	--	.902	--	--
6 South Fork Beargrass Creek at Trevilian Way	942	208	52	.181	down	--	.372	--	--
7 Middle Fork Beargrass Creek at Old Cannons Lane	1,032	208	52	.045	down	--	.040	down	--
24 Mill Creek Cutoff at Dover Road	777	208	52	.162	down	--	.350	--	--

Table 12.--Trend-test results for water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

	Site number and name	N	SC	S	Results of seasonal Kendall tests for time trend[1]: Trends, unadjusted for flow: P level	Trend-line slope: Units per year	Trend-line slope: Percent median value per year	Flow-adjusted trends[2]: P level	Trend-line slope[3]: Units per year	Trend-line slope[3]: Percent median value per year
Alkalinity, titration to pH 4.5, laboratory, in milligrams per liter as $CaCO_3$										
1	Pond Creek at Pendleton Road	73	48	12	0.149	8.0	5.5	0.149	8.0	5.5
2	Mill Ck at Orell Road	69	48	12	.193	32	22	.169	32	22
3	Pond Ck at Manslick Road	73	48	12	.453	--	--	.166	6.6	4.2
5	South Fork Beargrass Creek at Winter Avenue	73	48	12	.200	9.0	6.2	.673	--	--
6	South Fork Beargrass Creek at Trevilian Way	73	48	12	.338	--	--	.519	--	--
7	Middle Fork Beargrass Creek at Old Cannons Lane	74	48	12	.635	--	--	.665	--	--
8	Middle Fork Beargrass Creek at Beals Branch Road	73	48	12	.374	--	--	.160	17	8.9
9	Spring Ditch at Private Drive below Hanses Road	74	48	12	.722	--	--	.254	--	--
10	Muddy Fork at Mockingbird Valley Road	73	48	12	.065	19	9.7	.137	18	8.9
11	Goose Creek at U.S. Highway 42	73	48	12	.129	12	7.1	.140	11	6.4
12	Little Goose Creek at U.S. Highway 42	74	48	12	.370	--	--	.432	--	--
13	Goose Creek at Old Westport Road	72	48	12	.411	--	--	.164	14	8.5
14	Pope Lick at Pope Lick Road	74	48	12	.111	20	10	.091	15	8.4
15	Floyds Fork at former State Highway 155	73	48	12	.100	25	14	.096	19	11
16	Chenoweth Run at Gelhaus Road	73	48	12	.068	26	15	.071	21	12
17	Fern Creek at Old Bardstown Road	72	48	12	.068	17	8.5	.306	--	--
18	Northern Ditch at Preston Highway	74	48	12	.245	--	--	.241	--	--
19	Fishpool Creek at Bost Road	74	48	12	.276	--	--	.064	5.5	3.3
20	Southern Ditch at Minors Lane	73	48	12	.410	--	--	.186	6.6	4.0
21	Floyds Fork at Bardstown Road	73	48	12	.079	30	16	.074	26	14
22	Cedar Creek at Thixton Road	74	48	12	.125	30	17	.162	21	12
23	Pennsylvania Run at Mt. Washington Road	74	48	12	.076	5.1	3.6	.195	4.9	3.5
24	Mill Creek Cutoff at Dover Road	61	48	12	.194	24	20	.082	27	22
25	Harrods Creek at Hunting Creek Drive	70	48	12	.230	--	--	--	--	--
26	Long Run at State Highway 1531	54	48	12	.293	--	--	.370	--	--

Table 12.--Trend-test results for water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

	Site number and name	N	SC	S	Results of seasonal Kendall tests for time trend[1]: Trends, unadjusted for flow: P level	Trend-line slope: Units per year	Trend-line slope: Percent median value per year	Flow-adjusted trends[2]: P level	Trend-line slope[3]: Units per year	Trend-line slope[3]: Percent median value per year
	DISSOLVED SOLIDS, AND RELATED WATER-QUALITY CONSTITUENTS AND CHARACTERISTICS									
	Dissolved solids, residue at 105 degrees Celsius, in milligrams per liter									
1	Pond Creek at Pendleton Road	73	48	12	0.235	--	--	0.132	-30	-7.8
2	Mill Ck at Orell Road	69	48	12	.220	--	--	.076	27	10
3	Pond Ck at Manslick Road	73	48	12	.074	-50	-13	.086	-38	-9.6
5	South Fork Beargrass Creek at Winter Avenue	74	48	12	.321	--	--	.102	-39	-11
6	South Fork Beargrass Creek at Trevilian Way	74	48	12	.289	--	--	--	--	--
7	Middle Fork Beargrass Creek at Old Cannons Lane	74	48	12	.880	--	--	.299	--	--
8	Middle Fork Beargrass Creek at Beals Branch Road	72	48	12	.773	--	--	.432	--	--
9	Spring Ditch at Private Drive below Hanses Road	74	48	12	1.000	--	--	1.000	--	--
10	Muddy Fork at Mockingbird Valley Road	73	48	12	.808	--	--	1.000	--	--
11	Goose Creek at U.S. Highway 42	73	48	12	.182	-3.5	-1.0	1.000	--	--
12	Little Goose Creek at U.S. Highway 42	74	48	12	.152	-19	-5.6	1.000	--	--
13	Goose Creek at Old Westport Road	72	48	12	.100	-14	-4.4	.096	8.1	2.6
14	Pope Lick at Pope Lick Road	73	48	12	.874	--	--	.386	--	--
15	Floyds Fork at former State Highway 155	73	48	12	.778	--	--	.470	--	--
16	Chenoweth Run at Gelhaus Road	72	48	12	1.000	--	--	1.000	--	--
17	Fern Creek at Old Bardstown Road	72	48	12	.078	-16	-3.8	1.000	--	--
18	Northern Ditch at Preston Highway	73	48	12	.066	-100	-25	.186	-61	-15
19	Fishpool Creek at Bost Road	74	48	12	.071	-19	-4.5	1.000	--	--
20	Southern Ditch at Minors Lane	71	48	12	.051	-16	-3.9	.137	-13	-3.2
21	Floyds Fork at Bardstown Road	73	48	12	.817	--	--	.324	--	--
22	Cedar Creek at Thixton Road	73	48	12	.197	-46	-9.6	.243	--	--
23	Pennsylvania Run at Mt. Washington Road	74	48	12	.651	--	--	1.000	--	--
24	Mill Creek Cutoff at Dover Road	62	48	12	.215	--	--	.228	--	--
25	Harrods Creek at Hunting Creek Drive	70	48	12	.915	--	--	--	--	--
26	Long Run at State Highway 1531	53	48	12	.404	--	--	.275	--	--

Table 12.--Trend-test results for water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

Site number and name	N	SC	S	Results of seasonal Kendall tests for time trend[1]: Trends, unadjusted for flow: P level	Trend-line slope: Units per year	Trend-line slope: Percent median value per year	Flow-adjusted trends[2]: P level	Trend-line slope[3]: Units per year	Trend-line slope[3]: Percent median value per year
Specific conductance, in microsiemens per centimeter at 25 degrees Celsius									
1 Pond Creek at Pendleton Road	72	48	12	0.141	-55	-9.7	0.062	-28	-4.9
2 Mill Ck at Orell Road	69	48	12	.077	54	14	.100	85	22
3 Pond Ck at Manslick Road	74	48	12	.132	-50	-8.4	.086	-27	-4.6
5 South Fork Beargrass Creek at Winter Avenue	74	48	12	.857	--	--	.212	--	--
6 South Fork Beargrass Creek at Trevilian Way	74	48	12	.453	--	--	.264	--	--
7 Middle Fork Beargrass Creek at Old Cannons Lane	74	48	12	1.000	--	--	.115	17	3.1
8 Middle Fork Beargrass Creek at Beals Branch Road	74	48	12	.756	--	--	.745	--	--
9 Spring Ditch at Private Drive below Hanses Road	76	48	12	.338	--	--	.753	--	--
10 Muddy Fork at Mockingbird Valley Road	74	48	12	.823	--	--	.890	--	--
11 Goose Creek at U.S. Highway 42	74	48	12	.081	-28	-5.4	.225	--	--
12 Little Goose Creek at U.S. Highway 42	75	48	12	.102	-16	-3.0	.755	--	--
13 Goose Creek at Old Westport Road	74	48	12	.172	-32	-6.4	.192	6.9	1.4
14 Pope Lick at Pope Lick Road	75	48	12	.931	--	--	.149	18	2.9
15 Floyds Fork at former State Highway 155	74	48	12	.760	--	--	1.000	--	--
16 Chenoweth Run at Gelhaus Road	74	48	12	.540	--	--	.405	--	--
17 Fern Creek at Old Bardstown Road	74	48	12	.358	--	--	.083	15	2.4
18 Northern Ditch at Preston Highway	76	48	12	.043	-93	-15	.046	-52	-8.6
19 Fishpool Creek at Bost Road	75	48	12	.040	-40	-6.4	.842	--	--
20 Southern Ditch at Minors Lane	75	48	12	.045	-32	-5.3	.194	-12	-1.9
21 Floyds Fork at Bardstown Road	75	48	12	.426	--	--	.055	21	4.4
22 Cedar Creek at Thixton Road	75	48	12	.059	-50	-7.9	.810	--	--
23 Pennsylvania Run at Mt. Washington Road	75	48	12	.368	--	--	.304	--	--
24 Mill Creek Cutoff at Dover Road	63	48	12	.184	52	11	.065	63	14
25 Harrods Creek at Hunting Creek Drive	71	48	12	.148	-21	-4.2	--	--	--
26 Long Run at State Highway 1531	54	48	12	.724	--	--	.335	--	--
Specific conductance, daily minimum, in microsiemens per centimeter at 25 degrees Celsius (from continuous records)									
3 Pond Creek at Manslick Road	973	208	52	.052	-51	-9.0	.062	-50	-8.8
6 South Fork Beargrass Creek at Trevilian Way	997	208	52	.261	--	--	.119	13	2.9
7 Middle Fork Beargrass Creek at Old Cannons Lane	1,054	208	52	.961	--	--	.482	--	--
24 Mill Creek Cutoff at Dover Road	800	208	52	.546	--	--	.525	--	--
Specific conductance, daily maximum, in microsiemens per centimeter at 25 degrees Celsius (from continuous records)									
3 Pond Creek at Manslick Road	973	208	52	.036	-76	-12	.046	-76	-12
6 South Fork Beargrass Creek at Trevilian Way	998	208	52	.136	16	3.2	.128	15	3.0
7 Middle Fork Beargrass Creek at Old Cannons Lane	1,054	208	52	1.000	--	--	.386	--	--
24 Mill Creek Cutoff at Dover Road	800	208	52	.779	--	--	.286	--	--

Table 12.--Trend-test results for water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

Site number and name	N	SC	S	Results of seasonal Kendall tests for time trend[1]: Trends, unadjusted for flow: P level	Trend-line slope: Units per year	Trend-line slope: Percent median value per year	Flow-adjusted trends[2]: P level	Trend-line slope[3]: Units per year	Trend-line slope[3]: Percent median value per year
Calcium, total, in milligrams per liter as Ca									
1 Pond Creek at Pendleton Road	11	16	4	1.000	--	--	1.000	--	--
2 Mill Ck at Orell Road	10	16	4	1.000	--	--	.296	--	--
3 Pond Ck at Manslick Road	12	16	4	.617	--	--	1.000	--	--
5 South Fork Beargrass Creek at Winter Avenue	11	16	4	.242	--	--	.579	--	--
6 South Fork Beargrass Creek at Trevilian Way	11	16	4	.613	--	--	.613	--	--
7 Middle Fork Beargrass Creek at Old Cannons Lane	10	16	4	.540	--	--	.264	--	--
8 Middle Fork Beargrass Creek at Beals Branch Road	10	16	4	.387	--	--	.387	--	--
9 Spring Ditch at Private Drive below Hanses Road	11	16	4	1.000	--	--	1.000	--	--
10 Muddy Fork at Mockingbird Valley Road	11	16	4	.794	--	--	.540	--	--
11 Goose Creek at U.S. Highway 42	10	12	4	.358	--	--	.540	--	--
12 Little Goose Creek at U.S. Highway 42	12	16	4	.477	--	--	--	--	--
13 Goose Creek at Old Westport Road	10	12	4	.672	--	--	--	--	--
14 Pope Lick at Pope Lick Road	13	16	4	.358	--	--	--	--	--
15 Floyds Fork at former State Highway 155	13	16	4	1.000	--	--	1.000	--	--
16 Chenoweth Run at Gelhaus Road	13	16	4	.724	--	--	.724	--	--
17 Fern Creek at Old Bardstown Road	12	16	4	1.000	--	--	1.000	--	--
18 Northern Ditch at Preston Highway	11	16	4	.131	-8.8	-15	--	--	--
19 Fishpool Creek at Bost Road	10	16	4	1.000	--	--	--	--	--
20 Southern Ditch at Minors Lane	10	16	4	.520	--	--	1.000	--	--
21 Floyds Fork at Bardstown Road	12	16	4	1.000	--	--	--	--	--
22 Cedar Creek at Thixton Road	12	16	4	.149	-5.7	-9.0	.411	--	--
23 Pennsylvania Run at Mt. Washington Road	12	16	4	.817	--	--	1.000	--	--
24 Mill Creek Cutoff at Dover Road	10	16	4	1.000	--	--	1.000	--	--
25 Harrods Creek at Hunting Creek Drive	11	16	4	.114	3.8	6.9	--	--	--
Magnesium, total, in milligrams per liter as Mg									
1 Pond Creek at Pendleton Road	11	16	4	.584	--	--	1.000	--	--
2 Mill Ck at Orell Road	10	16	4	1.000	--	--	.296	--	--
3 Pond Ck at Manslick Road	12	16	4	.617	--	--	.699	--	--
5 South Fork Beargrass Creek at Winter Avenue	11	16	4	.086	-2.3	-17	.086	-1.8	-13
6 South Fork Beargrass Creek at Trevilian Way	11	16	4	.062	-1.2	-7.8	.062	-1.1	-7.6
7 Middle Fork Beargrass Creek at Old Cannons Lane	10	16	4	.540	--	--	.540	--	--
8 Middle Fork Beargrass Creek at Beals Branch Road	10	16	4	.829	--	--	--	--	--
9 Spring Ditch at Private Drive below Hanses Road	11	16	4	1.000	--	--	1.000	--	--
10 Muddy Fork at Mockingbird Valley Road	11	16	4	.540	--	--	--	--	--
11 Goose Creek at U.S. Highway 42	10	12	4	1.000	--	--	.617	--	--
12 Little Goose Creek at U.S. Highway 42	12	16	4	.806	--	--	--	--	--
13 Goose Creek at Old Westport Road	10	12	4	1.000	--	--	--	--	--
14 Pope Lick at Pope Lick Road	13	16	4	.699	--	--	.453	--	--
15 Floyds Fork at former State Highway 155	13	16	4	.823	--	--	.623	--	--
16 Chenoweth Run at Gelhaus Road	12	16	4	.724	--	--	.810	--	--
17 Fern Creek at Old Bardstown Road	12	16	4	1.000	--	--	1.000	--	--
18 Northern Ditch at Preston Highway	11	16	4	.054	2.0	9.8	--	--	--
19 Fishpool Creek at Bost Road	10	16	4	1.000	--	--	--	--	--
20 Southern Ditch at Minors Lane	10	16	4	.520	--	--	--	--	--
21 Floyds Fork at Bardstown Road	12	16	4	.453	--	--	.453	--	--
22 Cedar Creek at Thixton Road	12	16	4	.411	--	--	--	--	--
23 Pennsylvania Run at Mt. Washington Road	12	16	4	.289	--	--	.068	-1.1	-5.4
24 Mill Creek Cutoff at Dover Road	10	16	4	1.000	--	--	1.000	--	--
25 Harrods Creek at Hunting Creek Drive	11	16	4	.584	--	--	--	--	--

Table 12.--Trend-test results for water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

	Site number and name	N	SC	S	Results of seasonal Kendall tests for time trend[1]: Trends, unadjusted for flow: P level	Trend-line slope: Units per year	Trend-line slope: Percent median value per year	Flow-adjusted trends[2]: P level	Trend-line slope[3]: Units per year	Trend-line slope[3]: Percent median value per year
Hardness, total, in milligrams per liter as $CaCO_3$										
1	Pond Creek at Pendleton Road	12	16	4	0.584	--	--	1.000	--	--
2	Mill Ck at Orell Road	10	16	4	1.000	--	--	.296	--	--
3	Pond Ck at Manslick Road	16	16	4	.617	--	--	.698	--	--
5	South Fork Beargrass Creek at Winter Avenue	12	16	4	.096	-29	-12	.579	--	--
6	South Fork Beargrass Creek at Trevilian Way	12	16	4	.182	-14	-6.5	.371	--	--
7	Middle Fork Beargrass Creek at Old Cannons Lane	11	16	4	.540	--	--	.289	--	--
8	Middle Fork Beargrass Creek at Beals Branch Road	11	16	4	.387	--	--	.264	--	--
9	Spring Ditch at Private Drive below Hanses Road	11	16	4	1.000	--	--	--	--	--
10	Muddy Fork at Mockingbird Valley Road	11	16	4	1.000	--	--	.386	--	--
11	Goose Creek at U.S. Highway 42	10	12	4	.358	--	--	.617	--	--
12	Little Goose Creek at U.S. Highway 42	12	16	4	.652	--	--	--	--	--
13	Goose Creek at Old Westport Road	11	12	4	.427	--	--	--	--	--
14	Pope Lick at Pope Lick Road	14	16	4	.617	--	--	.358	--	--
15	Floyds Fork at former State Highway 155	15	16	4	.540	--	--	.540	--	--
16	Chenoweth Run at Gelhaus Road	12	16	4	.724	--	--	.724	--	--
17	Fern Creek at Old Bardstown Road	12	16	4	1.000	--	--	1.000	--	--
18	Northern Ditch at Preston Highway	11	16	4	.401	--	--	--	--	--
19	Fishpool Creek at Bost Road	10	16	4	1.000	--	--	--	--	--
20	Southern Ditch at Minors Lane	10	16	4	.520	--	--	1.000	--	--
21	Floyds Fork at Bardstown Road	13	16	4	.850	--	--	.850	--	--
22	Cedar Creek at Thixton Road	13	16	4	.411	--	--	.411	--	--
23	Pennsylvania Run at Mt. Washington Road	12	16	4	1.000	--	--	1.000	--	--
24	Mill Creek Cutoff at Dover Road	14	16	4	1.000	--	--	1.000	--	--
25	Harrods Creek at Hunting Creek Drive	12	16	4	.114	15	6.2	--	--	--
26	Long Run at State Highway 1531	10	12	4	.245	--	--	.540	--	--

Table 12.--Trend-test results for water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

	Site number and name	N	SC	S	Results of seasonal Kendall tests for time trend[1]: Trends, unadjusted for flow: P level	Trend-line slope: Units per year	Trend-line slope: Percent median value per year	Flow-adjusted trends[2]: P level	Trend-line slope[3]: Units per year	Trend-line slope[3]: Percent median value per year
	SUSPENDED SOLIDS									
	Suspended solids, residue at 105 degrees Celsius, in milligrams per liter									
1	Pond Creek at Pendleton Road	73	48	12	0.865	--	--	0.141	-5.5	-23
2	Mill Ck at Orell Road	69	48	12	.155	-12	-52	.400	--	--
3	Pond Ck at Manslick Road	73	48	12	.509	--	--	.077	-12	-22
5	South Fork Beargrass Creek at Winter Avenue	73	48	12	.681	--	--	.110	-16	-74
6	South Fork Beargrass Creek at Trevilian Way	74	48	12	.769	--	--	.085	-25	-157
7	Middle Fork Beargrass Creek at Old Cannons Lane	74	48	12	.583	--	--	.281	--	--
8	Middle Fork Beargrass Creek at Beals Branch Road	72	48	12	.183	-6.5	-48	.162	-9.1	-68
9	Spring Ditch at Private Drive below Hanses Road	74	48	12	.221	--	--	.218	--	--
10	Muddy Fork at Mockingbird Valley Road	73	48	12	.134	-12	-59	--	--	--
11	Goose Creek at U.S. Highway 42	73	48	12	.076	-7.0	-54	.423	--	--
12	Little Goose Creek at U.S. Highway 42	74	48	12	.087	-4.8	-27	.180	-2.8	-16
13	Goose Creek at Old Westport Road	72	48	12	.778	--	--	.169	-33	-211
14	Pope Lick at Pope Lick Road	74	48	12	1.000	--	--	.213	--	--
15	Floyds Fork at former State Highway 155	73	48	12	.432	--	--	.052	-7.1	-42
16	Chenoweth Run at Gelhaus Road	72	48	12	.112	-3.0	-29	.410	--	--
17	Fern Creek at Old Bardstown Road	72	48	12	.734	--	--	.242	--	--
18	Northern Ditch at Preston Highway	74	48	12	.129	-4.5	-38	.059	-9.1	-76
19	Fishpool Creek at Bost Road	74	48	12	1.000	--	--	.037	-6.1	-43
20	Southern Ditch at Minors Lane	72	48*	12	.121	7.0	36	--	--	--
21	Floyds Fork at Bardstown Road	73	48*	12	1.000	--	--	--	--	--
22	Cedar Creek at Thixton Road	73	48*	12	.314	--	--	--	--	--
23	Pennsylvania Run at Mt. Washington Road	74	48	12	.146	-4.8	-33	.315	--	--
24	Mill Creek Cutoff at Dover Road	62	48	12	.734	--	--	1.000	--	--
25	Harrods Creek at Hunting Creek Drive	70	48	12	.388	--	--	--	--	--
26	Long Run at State Highway 1531	54	48	12	.113	-2.5	-23	.525	--	--

Table 12.--Trend-test results for water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

	Site number and name	N	SC	S	Results of seasonal Kendall tests for time trend[1]: Trends, unadjusted for flow: P level	Trend-line slope: Units per year	Trend-line slope: Percent median value per year	Flow-adjusted trends[2]: P level	Trend-line slope[3]: Units per year	Trend-line slope[3]: Percent median value per year
Residue, volatile nonfilterable, in milligrams per liter										
1	Pond Creek at Pendleton Road	73	48*	12	1.000	--	--	--	--	--
2	Mill Ck at Orell Road	69	48*	12	.332	--	--	--	--	--
3	Pond Ck at Manslick Road	73	48*	12	.062	-2.4	-26	--	--	--
5	South Fork Beargrass Creek at Winter Avenue	73	48*	12	.573	--	--	--	--	--
6	South Fork Beargrass Creek at Trevilian Way	74	48*	12	.333	--	--	--	--	--
7	Middle Fork Beargrass Creek at Old Cannons Lane	74	48*	12	1.000	--	--	--	--	--
8	Middle Fork Beargrass Creek at Beals Branch Road	72	48*	12	.330	--	--	--	--	--
9	Spring Ditch at Private Drive below Hanses Road	74	48*	12	.643	--	--	--	--	--
10	Muddy Fork at Mockingbird Valley Road	73	48*	12	.171	-2.0	-36	--	--	--
11	Goose Creek at U.S. Highway 42	73	48*	12	.186	-1.0	-25	--	--	--
12	Little Goose Creek at U.S. Highway 42	74	48*	12	.333	--	--	--	--	--
13	Goose Creek at Old Westport Road	72	48*	12	.200	-2.2	-38	--	--	--
14	Pope Lick at Pope Lick Road	74	48*	12	.281	--	--	--	--	--
15	Floyds Fork at former State Highway 155	73	48*	12	.072	-1.5	-38	--	--	--
16	Chenoweth Run at Gelhaus Road	72	48*	12	.051	-1.5	-33	--	--	--
17	Fern Creek at Old Bardstown Road	72	48*	12	.597	--	--	--	--	--
18	Northern Ditch at Preston Highway	74	48*	12	.643	--	--	--	--	--
19	Fishpool Creek at Bost Road	74	48*	12	.870	--	--	--	--	--
20	Southern Ditch at Minors Lane	72	48*	12	.363	--	--	--	--	--
21	Floyds Fork at Bardstown Road	73	48*	12	.367	--	--	--	--	--
22	Cedar Creek at Thixton Road	73	48*	12	.450	--	--	--	--	--
23	Pennsylvania Run at Mt. Washington Road	74	48*	12	.534	--	--	--	--	--
24	Mill Creek Cutoff at Dover Road	62	48*	12	.371	--	--	--	--	--
25	Harrods Creek at Hunting Creek Drive	70	48*	12	.099	-2.0	-33	--	--	--
26	Long Run at State Highway 1531	54	48*	12	.773	--	--	--	--	--

Table 12.--Trend-test results for water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

	Site number and name	N	SC	S	Results of seasonal Kendall tests for time trend[1]: Trends, unadjusted for flow: P level	Trend-line slope: Units per year	Trend-line slope: Percent median value per year	Flow-adjusted trends[2]: P level	Trend-line slope[3]: Units per year	Trend-line slope[3]: Percent median value per year
MAJOR METALS, TRACE ELEMENTS, AND MISCELLANEOUS INORGANIC COMPOUNDS										
Arsenic, total, in micrograms per liter as As										
1	Pond Creek at Pendleton Road	12	16*	4	1.000	--	--	--	--	--
2	Mill Ck at Orell Road	10	16*	4	1.000	--	--	--	--	--
3	Pond Ck at Manslick Road	12	16*	4	.479	--	--	--	--	--
5	South Fork Beargrass Creek at Winter Avenue	11	16*	4	1.000	--	--	--	--	--
6	South Fork Beargrass Creek at Trevilian Way	11	16*	4	1.000	--	--	--	--	--
7	Middle Fork Beargrass Creek at Old Cannons Lane	10	16*	4	1.000	--	--	--	--	--
8	Middle Fork Beargrass Creek at Beals Branch Road	10	16*	4	1.000	--	--	--	--	--
9	Spring Ditch at Private Drive below Hanses Road	12	16*	4	1.000	--	--	--	--	--
10	Muddy Fork at Mockingbird Valley Road	11	16*	4	1.000	--	--	--	--	--
11	Goose Creek at U.S. Highway 42	10	12*	4	1.000	--	--	--	--	--
12	Little Goose Creek at U.S. Highway 42	12	16*	4	.540	--	--	--	--	--
13	Goose Creek at Old Westport Road	10	12*	4	1.000	--	--	--	--	--
14	Pope Lick at Pope Lick Road	13	16*	4	1.000	--	--	--	--	--
15	Floyds Fork at former State Highway 155	13	16*	4	1.000	--	--	--	--	--
16	Chenoweth Run at Gelhaus Road	13	16*	4	1.000	--	--	--	--	--
17	Fern Creek at Old Bardstown Road	12	16*	4	1.000	--	--	--	--	--
18	Northern Ditch at Preston Highway	12	16*	4	1.000	--	--	--	--	--
19	Fishpool Creek at Bost Road	10	16*	4	1.000	--	--	--	--	--
20	Southern Ditch at Minors Lane	10	16*	4	1.000	--	--	--	--	--
21	Floyds Fork at Bardstown Road	12	16*	4	1.000	--	--	--	--	--
22	Cedar Creek at Thixton Road	12	16*	4	1.000	--	--	--	--	--
23	Pennsylvania Run at Mt. Washington Road	12	16*	4	1.000	--	--	--	--	--
24	Mill Creek Cutoff at Dover Road	10	16*	4	1.000	--	--	--	--	--
25	Harrods Creek at Hunting Creek Drive	11	16*	4	1.000	--	--	--	--	--

Table 12.--Trend-test results for water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

	Site number and name	N	SC	S	Results of seasonal Kendall tests for time trend[1]: Trends, unadjusted for flow: P level	Trends, unadjusted for flow: Trend-line slope: Units per year	Trends, unadjusted for flow: Trend-line slope: Percent median value per year	Flow-adjusted trends[2]: P level	Flow-adjusted trends[2]: Trend-line slope[3]: Units per year	Flow-adjusted trends[2]: Trend-line slope[3]: Percent median value per year
Barium, total, in micrograms per liter as Ba										
1	Pond Creek at Pendleton Road	12	16	4	0.584	--	--	0.643	--	--
2	Mill Ck at Orell Road	10	16	4	1.000	--	--	1.000	--	--
3	Pond Ck at Manslick Road	12	16	4	.411	--	--	.810	--	--
5	South Fork Beargrass Creek at Winter Avenue	11	16	4	1.000	--	--	.697	--	--
6	South Fork Beargrass Creek at Trevilian Way	11	16	4	.397	--	--	.717	--	--
7	Middle Fork Beargrass Creek at Old Cannons Lane	10	16	4	.130	-6.5	-12	--	--	--
8	Middle Fork Beargrass Creek at Beals Branch Road	10	16	4	.130	-12	-22	--	--	--
9	Spring Ditch at Private Drive below Hanses Road	11	16	4	1.000	--	--	1.000	--	--
10	Muddy Fork at Mockingbird Valley Road	11	16	4	.296	--	--	--	--	--
11	Goose Creek at U.S. Highway 42	10	12	4	.296	--	--	--	--	--
12	Little Goose Creek at U.S. Highway 42	12	16	4	.722	--	--	--	--	--
13	Goose Creek at Old Westport Road	10	12	4	1.000	--	--	--	--	--
14	Pope Lick at Pope Lick Road	13	16*	4	1.000	--	--	--	--	--
15	Floyds Fork at former State Highway 155	13	16	4	.617	--	--	1.000	--	--
16	Chenoweth Run at Gelhaus Road	13	16	4	.387	--	--	.387	--	--
17	Fern Creek at Old Bardstown Road	12	16	4	.747	--	--	1.000	--	--
18	Northern Ditch at Preston Highway	11	16	4	1.000	--	--	1.000	--	--
19	Fishpool Creek at Bost Road	10	16	4	.248	--	--	--	--	--
20	Southern Ditch at Minors Lane	10	16	4	.093	10	28	--	--	--
21	Floyds Fork at Bardstown Road	12	16	4	1.000	--	--	--	--	--
22	Cedar Creek at Thixton Road	12	16	4	.453	--	--	.823	--	--
23	Pennsylvania Run at Mt. Washington Road	12	16	4	.699	--	--	.171	1.9	4.9
24	Mill Creek Cutoff at Dover Road	10	16	4	1.000	--	--	--	--	--
25	Harrods Creek at Hunting Creek Drive	11	16	4	1.000	--	--	--	--	--

Table 12.--Trend-test results for water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

	Site number and name	N	SC	S	Results of seasonal Kendall tests for time trend[1]: Trends, unadjusted for flow: P level	Trend-line slope: Units per year	Trend-line slope: Percent median value per year	Flow-adjusted trends[2]: P level	Trend-line slope[3]: Units per year	Trend-line slope[3]: Percent median value per year
Beryllium, total, in micrograms per liter as Be										
1	Pond Creek at Pendleton Road	11	16*	4	1.000	--	--	--	--	--
2	Mill Ck at Orell Road	10	16*	4	1.000	--	--	--	--	--
3	Pond Ck at Manslick Road	12	16*	4	1.000	--	--	--	--	--
5	South Fork Beargrass Creek at Winter Avenue	11	16*	4	1.000	--	--	--	--	--
6	South Fork Beargrass Creek at Trevilian Way	11	16*	4	1.000	--	--	--	--	--
7	Middle Fork Beargrass Creek at Old Cannons Lane	10	16*	4	1.000	--	--	--	--	--
8	Middle Fork Beargrass Creek at Beals Branch Road	10	16*	4	1.000	--	--	--	--	--
9	Spring Ditch at Private Drive below Hanses Road	11	16*	4	1.000	--	--	--	--	--
10	Muddy Fork at Mockingbird Valley Road	11	16*	4	1.000	--	--	--	--	--
11	Goose Creek at U.S. Highway 42	10	12*	4	1.000	--	--	--	--	--
12	Little Goose Creek at U.S. Highway 42	12	16*	4	1.000	--	--	--	--	--
13	Goose Creek at Old Westport Road	10	12*	4	1.000	--	--	--	--	--
14	Pope Lick at Pope Lick Road	13	16*	4	.880	--	--	--	--	--
15	Floyds Fork at former State Highway 155	13	16*	4	1.000	--	--	--	--	--
16	Chenoweth Run at Gelhaus Road	13	16*	4	1.000	--	--	--	--	--
17	Fern Creek at Old Bardstown Road	12	16*	4	1.000	--	--	--	--	--
18	Northern Ditch at Preston Highway	11	16*	4	1.000	--	--	--	--	--
19	Fishpool Creek at Bost Road	10	16*	4	1.000	--	--	--	--	--
20	Southern Ditch at Minors Lane	10	16*	4	1.000	--	--	--	--	--
21	Floyds Fork at Bardstown Road	12	16*	4	1.000	--	--	--	--	--
22	Cedar Creek at Thixton Road	12	16*	4	1.000	--	--	--	--	--
23	Pennsylvania Run at Mt. Washington Road	12	16*	4	1.000	--	--	--	--	--
24	Mill Creek Cutoff at Dover Road	10	16*	4	1.000	--	--	--	--	--
25	Harrods Creek at Hunting Creek Drive	11	16*	4	1.000	--	--	--	--	--
Cadmium, total, in micrograms per liter as Cd										
1	Pond Creek at Pendleton Road	12	16*	4	1.000	--	--	--	--	--
2	Mill Ck at Orell Road	10	16*	4	1.000	--	--	--	--	--
3	Pond Ck at Manslick Road	12	16*	4	1.000	--	--	--	--	--
5	South Fork Beargrass Creek at Winter Avenue	11	16*	4	1.000	--	--	--	--	--
6	South Fork Beargrass Creek at Trevilian Way	11	16*	4	1.000	--	--	--	--	--
7	Middle Fork Beargrass Creek at Old Cannons Lane	10	16*	4	1.000	--	--	--	--	--
8	Middle Fork Beargrass Creek at Beals Branch Road	10	16*	4	.540	--	--	--	--	--
9	Spring Ditch at Private Drive below Hanses Road	11	16*	4	1.000	--	--	--	--	--
10	Muddy Fork at Mockingbird Valley Road	11	16*	4	1.000	--	--	--	--	--
11	Goose Creek at U.S. Highway 42	10	12*	4	1.000	--	--	--	--	--
12	Little Goose Creek at U.S. Highway 42	11	16*	4	1.000	--	--	--	--	--
13	Goose Creek at Old Westport Road	10	12*	4	1.000	--	--	--	--	--
14	Pope Lick at Pope Lick Road	13	16*	4	1.000	--	--	--	--	--
15	Floyds Fork at former State Highway 155	13	16*	4	.540	--	--	--	--	--
16	Chenoweth Run at Gelhaus Road	13	16*	4	1.000	--	--	--	--	--
17	Fern Creek at Old Bardstown Road	12	16*	4	1.000	--	--	--	--	--
18	Northern Ditch at Preston Highway	11	16*	4	1.000	--	--	--	--	--
19	Fishpool Creek at Bost Road	10	16*	4	1.000	--	--	--	--	--
20	Southern Ditch at Minors Lane	10	16*	4	1.000	--	--	--	--	--
21	Floyds Fork at Bardstown Road	12	16*	4	.540	--	--	--	--	--
22	Cedar Creek at Thixton Road	12	16*	4	1.000	--	--	--	--	--
23	Pennsylvania Run at Mt. Washington Road	12	16*	4	.358	--	--	--	--	--
24	Mill Creek Cutoff at Dover Road	10	16*	4	1.000	--	--	--	--	--
25	Harrods Creek at Hunting Creek Drive	11	16*	4	.540	--	--	--	--	--

Table 12.--Trend-test results for water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

Site number and name	N	SC	S	Results of seasonal Kendall tests for time trend[1]: Trends, unadjusted for flow: P level	Trend-line slope: Units per year	Trend-line slope: Percent median value per year	Flow-adjusted trends[2]: P level	Trend-line slope[3]: Units per year	Trend-line slope[3]: Percent median value per year
Chromium, total, in micrograms per liter as Cr									
1 Pond Creek at Pendleton Road	12	16*	4	0.165	-2.9	-27	--	--	--
2 Mill Ck at Orell Road	10	16*	4	.640	--	--	--	--	--
3 Pond Ck at Manslick Road	12	16*	4	.579	--	--	--	--	--
5 South Fork Beargrass Creek at Winter Avenue	11	16*	4	.308	--	--	--	--	--
6 South Fork Beargrass Creek at Trevilian Way	11	16*	4	.371	--	--	--	--	--
7 Middle Fork Beargrass Creek at Old Cannons Lane	10	16*	4	.794	--	--	--	--	--
8 Middle Fork Beargrass Creek at Beals Branch Road	10	16*	4	1.000	--	--	--	--	--
9 Spring Ditch at Private Drive below Hanses Road	11	16*	4	1.000	--	--	--	--	--
10 Muddy Fork at Mockingbird Valley Road	11	16*	4	.579	--	--	--	--	--
11 Goose Creek at U.S. Highway 42	10	12*	4	.579	--	--	--	--	--
12 Little Goose Creek at U.S. Highway 42	12	16*	4	.722	--	--	--	--	--
13 Goose Creek at Old Westport Road	10	12*	4	1.000	--	--	--	--	--
14 Pope Lick at Pope Lick Road	13	16*	4	.643	--	--	--	--	--
15 Floyds Fork at former State Highway 155	13	16*	4	.857	--	--	--	--	--
16 Chenoweth Run at Gelhaus Road	12	16*	4	.102	-5.0	-129	--	--	--
17 Fern Creek at Old Bardstown Road	12	16*	4	.540	--	--	--	--	--
18 Northern Ditch at Preston Highway	11	16*	4	1.000	--	--	--	--	--
19 Fishpool Creek at Bost Road	10	16*	4	1.000	--	--	--	--	--
20 Southern Ditch at Minors Lane	10	16*	4	1.000	--	--	--	--	--
21 Floyds Fork at Bardstown Road	12	16*	4	1.000	--	--	--	--	--
22 Cedar Creek at Thixton Road	12	16*	4	1.000	--	--	--	--	--
23 Pennsylvania Run at Mt. Washington Road	12	16*	4	1.000	--	--	--	--	--
24 Mill Creek Cutoff at Dover Road	10	16*	4	.617	--	--	--	--	--
25 Harrods Creek at Hunting Creek Drive	11	16*	4	.479	--	--	--	--	--
Copper, total, in micrograms per liter as Cu									
1 Pond Creek at Pendleton Road	12	16*	4	.546	--	--	--	--	--
2 Mill Ck at Orell Road	10	16*	4	1.000	--	--	--	--	--
3 Pond Ck at Manslick Road	12	16*	4	.579	--	--	--	--	--
5 South Fork Beargrass Creek at Winter Avenue	11	16*	4	.242	--	--	--	--	--
6 South Fork Beargrass Creek at Trevilian Way	11	16*	4	.534	--	--	--	--	--
7 Middle Fork Beargrass Creek at Old Cannons Lane	10	16*	4	1.000	--	--	--	--	--
8 Middle Fork Beargrass Creek at Beals Branch Road	10	16*	4	.387	--	--	--	--	--
9 Spring Ditch at Private Drive below Hanses Road	11	16*	4	1.000	--	--	--	--	--
10 Muddy Fork at Mockingbird Valley Road	11	16*	4	1.000	--	--	--	--	--
11 Goose Creek at U.S. Highway 42	10	12*	4	1.000	--	--	--	--	--
12 Little Goose Creek at U.S. Highway 42	12	16*	4	.820	--	--	--	--	--
13 Goose Creek at Old Westport Road	10	12*	4	1.000	--	--	--	--	--
14 Pope Lick at Pope Lick Road	13	16*	4	.453	--	--	--	--	--
15 Floyds Fork at former State Highway 155	13	16*	4	.617	--	--	--	--	--
16 Chenoweth Run at Gelhaus Road	13	16*	4	.743	--	--	--	--	--
17 Fern Creek at Old Bardstown Road	12	16*	4	1.000	--	--	--	--	--
18 Northern Ditch at Preston Highway	11	16*	4	1.000	--	--	--	--	--
19 Fishpool Creek at Bost Road	10	16*	4	1.000	--	--	--	--	--
20 Southern Ditch at Minors Lane	10	16*	4	1.000	--	--	--	--	--
21 Floyds Fork at Bardstown Road	12	16*	4	.534	--	--	--	--	--
22 Cedar Creek at Thixton Road	12	16*	4	.831	--	--	--	--	--
23 Pennsylvania Run at Mt. Washington Road	12	16*	4	1.000	--	--	--	--	--
24 Mill Creek Cutoff at Dover Road	10	16*	4	.712	--	--	--	--	--
25 Harrods Creek at Hunting Creek Drive	11	16*	4	.182	9.4	85	--	--	--

Table 12.--Trend-test results for water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

	Site number and name	N	SC	S	Results of seasonal Kendall tests for time trend[1]: Trends, unadjusted for flow: P level	Trend-line slope: Units per year	Trend-line slope: Percent median value per year	Flow-adjusted trends[2]: P level	Trend-line slope[3]: Units per year	Trend-line slope[3]: Percent median value per year
Iron, total, in micrograms per liter as Fe										
1	Pond Creek at Pendleton Road	12	16*	4	1.000	--	--	--	--	--
2	Mill Ck at Orell Road	10	16	4	1.000	--	--	--	--	--
3	Pond Ck at Manslick Road	12	16	4	.810	--	--	--	--	--
5	South Fork Beargrass Creek at Winter Avenue	11	16	4	.096	550	62	0.447	--	--
6	South Fork Beargrass Creek at Trevilian Way	11	16*	4	1.000	--	--	--	--	--
7	Middle Fork Beargrass Creek at Old Cannons Lane	10	16*	4	.411	--	--	--	--	--
8	Middle Fork Beargrass Creek at Beals Branch Road	10	16*	4	.794	--	--	--	--	--
9	Spring Ditch at Private Drive below Hanses Road	11	16	4	1.000	--	--	1.000	--	--
10	Muddy Fork at Mockingbird Valley Road	11	16*	4	.540	--	--	--	--	--
11	Goose Creek at U.S. Highway 42	10	12*	4	.540	--	--	--	--	--
12	Little Goose Creek at U.S. Highway 42	12	16	4	1.000	--	--	--	--	--
13	Goose Creek at Old Westport Road	10	12*	4	.558	--	--	--	--	--
14	Pope Lick at Pope Lick Road	13	16*	4	1.000	--	--	--	--	--
15	Floyds Fork at former State Highway 155	13	16	4	1.000	--	--	--	--	--
16	Chenoweth Run at Gelhaus Road	13	16*	4	.433	--	--	--	--	--
17	Fern Creek at Old Bardstown Road	12	16*	4	1.000	--	--	--	--	--
18	Northern Ditch at Preston Highway	11	16	4	1.000	--	--	1.000	--	--
19	Fishpool Creek at Bost Road	10	16*	4	1.000	--	--	--	--	--
20	Southern Ditch at Minors Lane	10	16	4	1.000	--	--	1.000	--	--
21	Floyds Fork at Bardstown Road	12	16*	4	.724	--	--	--	--	--
22	Cedar Creek at Thixton Road	12	16*	4	.387	--	--	--	--	--
23	Pennsylvania Run at Mt. Washington Road	12	16*	4	.773	--	--	--	--	--
24	Mill Creek Cutoff at Dover Road	10	16	4	1.000	--	--	.105	-490	-71
25	Harrods Creek at Hunting Creek Drive	11	16*	4	.114	280	36	--	--	--
Lead, total, in micrograms per liter as Pb										
1	Pond Creek at Pendleton Road	12	16*	4	.773	--	--	--	--	--
2	Mill Ck at Orell Road	10	16*	4	.296	--	--	--	--	--
3	Pond Ck at Manslick Road	12	16*	4	.794	--	--	--	--	--
5	South Fork Beargrass Creek at Winter Avenue	11	16*	4	1.000	--	--	--	--	--
6	South Fork Beargrass Creek at Trevilian Way	11	16*	4	1.000	--	--	--	--	--
7	Middle Fork Beargrass Creek at Old Cannons Lane	10	16*	4	1.000	--	--	--	--	--
8	Middle Fork Beargrass Creek at Beals Branch Road	10	16*	4	1.000	--	--	--	--	--
9	Spring Ditch at Private Drive below Hanses Road	11	16*	4	.683	--	--	--	--	--
10	Muddy Fork at Mockingbird Valley Road	11	16*	4	1.000	--	--	--	--	--
11	Goose Creek at U.S. Highway 42	10	12*	4	1.000	--	--	--	--	--
12	Little Goose Creek at U.S. Highway 42	12	16*	4	.831	--	--	--	--	--
13	Goose Creek at Old Westport Road	10	12*	4	1.000	--	--	--	--	--
14	Pope Lick at Pope Lick Road	13	16*	4	.829	--	--	--	--	--
15	Floyds Fork at former State Highway 155	12	16*	4	1.000	--	--	--	--	--
16	Chenoweth Run at Gelhaus Road	13	16*	4	1.000	--	--	--	--	--
17	Fern Creek at Old Bardstown Road	12	16*	4	1.000	--	--	--	--	--
18	Northern Ditch at Preston Highway	11	16*	4	1.000	--	--	--	--	--
19	Fishpool Creek at Bost Road	10	16*	4	1.000	--	--	--	--	--
20	Southern Ditch at Minors Lane	10	16*	4	1.000	--	--	--	--	--
21	Floyds Fork at Bardstown Road	12	16*	4	1.000	--	--	--	--	--
22	Cedar Creek at Thixton Road	12	16*	4	1.000	--	--	--	--	--
23	Pennsylvania Run at Mt. Washington Road	12	16*	4	.540	--	--	--	--	--
24	Mill Creek Cutoff at Dover Road	10	16*	4	.326	--	--	--	--	--
25	Harrods Creek at Hunting Creek Drive	11	16*	4	1.000	--	--	--	--	--

Table 12.--Trend-test results for water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

	Site number and name	N	SC	S	Results of seasonal Kendall tests for time trend[1]: Trends, unadjusted for flow: P level	Trend-line slope: Units per year	Trend-line slope: Percent median value per year	Flow-adjusted trends[2]: P level	Trend-line slope[3]: Units per year	Trend-line slope[3]: Percent median value per year
Mercury, total recoverable, in micrograms per liter as Hg										
1	Pond Creek at Pendleton Road	11	16*	4	0.296	--	--	--	--	--
2	Mill Ck at Orell Road	10	16*	4	.540	--	--	--	--	--
3	Pond Ck at Manslick Road	11	16*	4	1.000	--	--	--	--	--
5	South Fork Beargrass Creek at Winter Avenue	11	16*	4	.699	--	--	--	--	--
6	South Fork Beargrass Creek at Trevilian Way	11	16*	4	.322	--	--	--	--	--
7	Middle Fork Beargrass Creek at Old Cannons Lane	10	16*	4	.337	--	--	--	--	--
8	Middle Fork Beargrass Creek at Beals Branch Road	10	16*	4	1.000	--	--	--	--	--
9	Spring Ditch at Private Drive below Hanses Road	12	16*	4	.516	--	--	--	--	--
10	Muddy Fork at Mockingbird Valley Road	11	16*	4	1.000	--	--	--	--	--
11	Goose Creek at U.S. Highway 42	10	12*	4	.558	--	--	--	--	--
12	Little Goose Creek at U.S. Highway 42	12	16*	4	1.000	--	--	--	--	--
14	Pope Lick at Pope Lick Road	13	16*	4	.182	-0.08	-31	--	--	--
15	Floyds Fork at former State Highway 155	13	16*	4	1.000	--	--	--	--	--
16	Chenoweth Run at Gelhaus Road	13	16*	4	1.000	--	--	--	--	--
17	Fern Creek at Old Bardstown Road	12	16*	4	.221	--	--	--	--	--
18	Northern Ditch at Preston Highway	12	16*	4	1.000	--	--	--	--	--
21	Floyds Fork at Bardstown Road	12	16*	4	1.000	--	--	--	--	--
22	Cedar Creek at Thixton Road	12	16*	4	.685	--	--	--	--	--
23	Pennsylvania Run at Mt. Washington Road	12	16*	4	.248	--	--	--	--	--
24	Mill Creek Cutoff at Dover Road	10	16*	4	1.000	--	--	--	--	--
25	Harrods Creek at Hunting Creek Drive	10	16*	4	.540	--	--	--	--	--
Nickel, total, in micrograms per liter as Ni										
1	Pond Creek at Pendleton Road	12	16*	4	1.000	--	--	--	--	--
2	Mill Ck at Orell Road	10	16*	4	1.000	--	--	--	--	--
3	Pond Ck at Manslick Road	12	16*	4	.488	--	--	--	--	--
5	South Fork Beargrass Creek at Winter Avenue	11	16*	4	1.000	--	--	--	--	--
6	South Fork Beargrass Creek at Trevilian Way	10	16*	4	.806	--	--	--	--	--
7	Middle Fork Beargrass Creek at Old Cannons Lane	10	16*	4	.829	--	--	--	--	--
8	Middle Fork Beargrass Creek at Beals Branch Road	10	16*	4	1.000	--	--	--	--	--
9	Spring Ditch at Private Drive below Hanses Road	11	16*	4	.724	--	--	--	--	--
10	Muddy Fork at Mockingbird Valley Road	11	16*	4	.540	--	--	--	--	--
11	Goose Creek at U.S. Highway 42	10	12*	4	1.000	--	--	--	--	--
12	Little Goose Creek at U.S. Highway 42	12	16*	4	1.000	--	--	--	--	--
13	Goose Creek at Old Westport Road	10	12*	4	1.000	--	--	--	--	--
14	Pope Lick at Pope Lick Road	13	16*	4	.540	--	--	--	--	--
15	Floyds Fork at former State Highway 155	13	16*	4	.546	--	--	--	--	--
16	Chenoweth Run at Gelhaus Road	13	16*	4	.784	--	--	--	--	--
17	Fern Creek at Old Bardstown Road	12	16*	4	.471	--	--	--	--	--
18	Northern Ditch at Preston Highway	11	16*	4	.308	--	--	--	--	--
19	Fishpool Creek at Bost Road	10	16*	4	1.000	--	--	--	--	--
20	Southern Ditch at Minors Lane	10	16*	4	1.000	--	--	--	--	--
21	Floyds Fork at Bardstown Road	12	16*	4	1.000	--	--	--	--	--
22	Cedar Creek at Thixton Road	12	16*	4	1.000	--	--	--	--	--
23	Pennsylvania Run at Mt. Washington Road	12	16*	4	1.000	--	--	--	--	--
24	Mill Creek Cutoff at Dover Road	10	16*	4	1.000	--	--	--	--	--
25	Harrods Creek at Hunting Creek Drive	11	16*	4	1.000	--	--	--	--	--

Table 12.--Trend-test results for water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

Site number and name	N	SC	S	Results of seasonal Kendall tests for time trend[1]: Trends, unadjusted for flow: P level	Trend-line slope: Units per year	Trend-line slope: Percent median value per year	Flow-adjusted trends[2]: P level	Trend-line slope[3]: Units per year	Trend-line slope[3]: Percent median value per year
Selenium, total, in micrograms per liter as Se									
1 Pond Creek at Pendleton Road	12	16*	4	1.000	--	--	--	--	--
2 Mill Ck at Orell Road	10	16*	4	1.000	--	--	--	--	--
3 Pond Ck at Manslick Road	12	16*	4	1.000	--	--	--	--	--
5 South Fork Beargrass Creek at Winter Avenue	11	16*	4	1.000	--	--	--	--	--
6 South Fork Beargrass Creek at Trevilian Way	11	16*	4	1.000	--	--	--	--	--
7 Middle Fork Beargrass Creek at Old Cannons Lane	10	16*	4	1.000	--	--	--	--	--
8 Middle Fork Beargrass Creek at Beals Branch Road	10	16*	4	1.000	--	--	--	--	--
9 Spring Ditch at Private Drive below Hanses Road	12	16*	4	1.000	--	--	--	--	--
10 Muddy Fork at Mockingbird Valley Road	11	16*	4	1.000	--	--	--	--	--
11 Goose Creek at U.S. Highway 42	10	12*	4	1.000	--	--	--	--	--
12 Little Goose Creek at U.S. Highway 42	12	16*	4	1.000	--	--	--	--	--
13 Goose Creek at Old Westport Road	10	12*	4	1.000	--	--	--	--	--
14 Pope Lick at Pope Lick Road	13	16*	4	1.000	--	--	--	--	--
15 Floyds Fork at former State Highway 155	13	16*	4	1.000	--	--	--	--	--
16 Chenoweth Run at Gelhaus Road	13	16*	4	1.000	--	--	--	--	--
17 Fern Creek at Old Bardstown Road	12	16*	4	1.000	--	--	--	--	--
18 Northern Ditch at Preston Highway	12	16*	4	1.000	--	--	--	--	--
19 Fishpool Creek at Bost Road	10	16*	4	1.000	--	--	--	--	--
20 Southern Ditch at Minors Lane	10	16*	4	1.000	--	--	--	--	--
21 Floyds Fork at Bardstown Road	12	16*	4	1.000	--	--	--	--	--
22 Cedar Creek at Thixton Road	12	16*	4	1.000	--	--	--	--	--
23 Pennsylvania Run at Mt. Washington Road	12	16*	4	1.000	--	--	--	--	--
24 Mill Creek Cutoff at Dover Road	10	16*	4	1.000	--	--	--	--	--
25 Harrods Creek at Hunting Creek Drive	11	16*	4	1.000	--	--	--	--	--
Silver, total, in micrograms per liter as Ag									
1 Pond Creek at Pendleton Road	11	16*	4	.540	--	--	--	--	--
2 Mill Ck at Orell Road	10	16*	4	1.000	--	--	--	--	--
3 Pond Ck at Manslick Road	12	16*	4	1.000	--	--	--	--	--
5 South Fork Beargrass Creek at Winter Avenue	11	16*	4	1.000	--	--	--	--	--
6 South Fork Beargrass Creek at Trevilian Way	11	16*	4	1.000	--	--	--	--	--
7 Middle Fork Beargrass Creek at Old Cannons Lane	10	16*	4	1.000	--	--	--	--	--
8 Middle Fork Beargrass Creek at Beals Branch Road	10	16*	4	1.000	--	--	--	--	--
9 Spring Ditch at Private Drive below Hanses Road	11	16*	4	1.000	--	--	--	--	--
10 Muddy Fork at Mockingbird Valley Road	11	16*	4	1.000	--	--	--	--	--
11 Goose Creek at U.S. Highway 42	10	12*	4	.540	--	--	--	--	--
12 Little Goose Creek at U.S. Highway 42	12	16*	4	1.000	--	--	--	--	--
13 Goose Creek at Old Westport Road	10	12*	4	1.000	--	--	--	--	--
14 Pope Lick at Pope Lick Road	13	16*	4	1.000	--	--	--	--	--
15 Floyds Fork at former State Highway 155	13	16*	4	1.000	--	--	--	--	--
16 Chenoweth Run at Gelhaus Road	13	16*	4	.296	--	--	--	--	--
17 Fern Creek at Old Bardstown Road	12	16*	4	1.000	--	--	--	--	--
18 Northern Ditch at Preston Highway	11	16*	4	.337	--	--	--	--	--
19 Fishpool Creek at Bost Road	10	16*	4	1.000	--	--	--	--	--
20 Southern Ditch at Minors Lane	10	16*	4	1.000	--	--	--	--	--
21 Floyds Fork at Bardstown Road	12	16*	4	1.000	--	--	--	--	--
22 Cedar Creek at Thixton Road	12	16*	4	.743	--	--	--	--	--
23 Pennsylvania Run at Mt. Washington Road	12	16*	4	1.000	--	--	--	--	--
24 Mill Creek Cutoff at Dover Road	10	16*	4	1.000	--	--	--	--	--
25 Harrods Creek at Hunting Creek Drive	11	16*	4	1.000	--	--	--	--	--

Table 12.--Trend-test results for water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

	Site number and name	N	SC	S	Results of seasonal Kendall tests for time trend [1]: Trends, unadjusted for flow: P level	Trend-line slope: Units per year	Trend-line slope: Percent median value per year	Flow-adjusted trends [2]: P level	Trend-line slope [3]: Units per year	Trend-line slope [3]: Percent median value per year
Zinc, total, in micrograms per liter as Zn										
1	Pond Creek at Pendleton Road	12	16*	4	0.798	--	--	--	--	--
2	Mill Ck at Orell Road	10	16*	4	1.000	--	--	--	--	--
3	Pond Ck at Manslick Road	12	16*	4	.829	--	--	--	--	--
5	South Fork Beargrass Creek at Winter Avenue	11	16*	4	1.000	--	--	--	--	--
6	South Fork Beargrass Creek at Trevilian Way	11	16*	4	.308	--	--	--	--	--
7	Middle Fork Beargrass Creek at Old Cannons Lane	10	16*	4	.699	--	--	--	--	--
8	Middle Fork Beargrass Creek at Beals Branch Road	10	16*	4	1.000	--	--	--	--	--
9	Spring Ditch at Private Drive below Hanses Road	11	16*	4	1.000	--	--	--	--	--
10	Muddy Fork at Mockingbird Valley Road	11	16*	4	1.000	--	--	--	--	--
11	Goose Creek at U.S. Highway 42	10	12*	4	1.000	--	--	--	--	--
12	Little Goose Creek at U.S. Highway 42	12	16*	4	.204	--	--	--	--	--
13	Goose Creek at Old Westport Road	10	12*	4	.242	--	--	--	--	--
14	Pope Lick at Pope Lick Road	13	16	4	.646	--	--	0.646	--	--
15	Floyds Fork at former State Highway 155	13	16*	4	1.000	--	--	--	--	--
16	Chenoweth Run at Gelhaus Road	13	16*	4	.760	--	--	--	--	--
17	Fern Creek at Old Bardstown Road	12	16*	4	1.000	--	--	--	--	--
18	Northern Ditch at Preston Highway	11	16*	4	1.000	--	--	--	--	--
19	Fishpool Creek at Bost Road	10	16*	4	.520	--	--	--	--	--
20	Southern Ditch at Minors Lane	10	16*	4	.520	--	--	--	--	--
21	Floyds Fork at Bardstown Road	12	16*	4	.868	--	--	--	--	--
22	Cedar Creek at Thixton Road	12	16*	4	1.000	--	--	--	--	--
23	Pennsylvania Run at Mt. Washington Road	12	16*	4	.665	--	--	--	--	--
25	Harrods Creek at Hunting Creek Drive	11	16*	4	1.000	--	--	--	--	--
Cyanide, total, in milligrams per liter as Cn										
1	Pond Creek at Pendleton Road	11	16*	4	1.000	--	--	--	--	--
2	Mill Ck at Orell Road	10	16*	4	1.000	--	--	--	--	--
3	Pond Ck at Manslick Road	11	16*	4	1.000	--	--	--	--	--
5	South Fork Beargrass Creek at Winter Avenue	11	16*	4	1.000	--	--	--	--	--
6	South Fork Beargrass Creek at Trevilian Way	11	16*	4	1.000	--	--	--	--	--
7	Middle Fork Beargrass Creek at Old Cannons Lane	10	16*	4	.540	--	--	--	--	--
9	Spring Ditch at Private Drive below Hanses Road	12	16*	4	1.000	--	--	--	--	--
10	Muddy Fork at Mockingbird Valley Road	10	16*	4	1.000	--	--	--	--	--
11	Goose Creek at U.S. Highway 42	10	12*	4	1.000	--	--	--	--	--
12	Little Goose Creek at U.S. Highway 42	12	16*	4	.540	--	--	--	--	--
14	Pope Lick at Pope Lick Road	13	16*	4	.387	--	--	--	--	--
15	Floyds Fork at former State Highway 155	13	16*	4	1.000	--	--	--	--	--
16	Chenoweth Run at Gelhaus Road	12	16*	4	1.000	--	--	--	--	--
17	Fern Creek at Old Bardstown Road	11	16*	4	1.000	--	--	--	--	--
18	Northern Ditch at Preston Highway	12	16*	4	.784	--	--	--	--	--
19	Fishpool Creek at Bost Road	10	16*	4	1.000	--	--	--	--	--
20	Southern Ditch at Minors Lane	10	16*	4	1.000	--	--	--	--	--
21	Floyds Fork at Bardstown Road	11	16*	4	1.000	--	--	--	--	--
22	Cedar Creek at Thixton Road	11	16*	4	.540	--	--	--	--	--
23	Pennsylvania Run at Mt. Washington Road	12	16*	4	1.000	--	--	--	--	--
25	Harrods Creek at Hunting Creek Drive	11	16*	4	1.000	--	--	--	--	--

Table 12.--Trend-test results for water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

	Site number and name	N	SC	S	Results of seasonal Kendall tests for time trend[1]: Trends, unadjusted for flow: P level	Trend-line slope: Units per year	Trend-line slope: Percent median value per year	Flow-adjusted trends[2]: P level	Trend-line slope[3]: Units per year	Trend-line slope[3]: Percent median value per year
	NUTRIENTS									
	Nitrogen, ammonia, total, in milligrams per liter as N									
1	Pond Creek at Pendleton Road	71	48*	12	0.068	-0.10	-172	--	--	--
2	Mill Ck at Orell Road	67	48*	12	.236	--	--	--	--	--
3	Pond Ck at Manslick Road	71	48*	12	.151	-.07	-32	--	--	--
5	South Fork Beargrass Creek at Winter Avenue	72	48*	12	.287	--	--	--	--	--
6	South Fork Beargrass Creek at Trevilian Way	72	48*	12	.166	-.09	-40	--	--	--
7	Middle Fork Beargrass Creek at Old Cannons Lane	72	48*	12	.249	--	--	--	--	--
8	Middle Fork Beargrass Creek at Beals Branch Road	71	48*	12	.582	--	--	--	--	--
9	Spring Ditch at Private Drive below Hanses Road	71	48*	12	.206	--	--	--	--	--
10	Muddy Fork at Mockingbird Valley Road	72	48*	12	.179	-.04	-420	--	--	--
11	Goose Creek at U.S. Highway 42	73	48*	12	.193	-.06	-600	--	--	--
12	Little Goose Creek at U.S. Highway 42	73	48*	12	.161	-.04	-400	--	--	--
13	Goose Creek at Old Westport Road	71	48*	12	.177	-.16	-1,650	--	--	--
14	Pope Lick at Pope Lick Road	74	48*	12	.112	-.02	-21	--	--	--
15	Floyds Fork at former State Highway 155	73	48*	12	.289	--	--	--	--	--
16	Chenoweth Run at Gelhaus Road	71	48*	12	.186	-.05	-83	--	--	--
17	Fern Creek at Old Bardstown Road	71	48*	12	.251	--	--	--	--	--
18	Northern Ditch at Preston Highway	71	48*	12	.163	-.27	-158	--	--	--
19	Fishpool Creek at Bost Road	71	48*	12	.350	--	--	--	--	--
20	Southern Ditch at Minors Lane	70	48*	12	.183	-.08	-83	--	--	--
21	Floyds Fork at Bardstown Road	73	48*	12	.242	--	--	--	--	--
22	Cedar Creek at Thixton Road	73	48*	12	.330	--	--	--	--	--
23	Pennsylvania Run at Mt. Washington Road	72	48*	12	1.000	--	--	--	--	--
24	Mill Creek Cutoff at Dover Road	61	48*	12	.066	-.14	-1,450	--	--	--
25	Harrods Creek at Hunting Creek Drive	70	48*	12	.293	--	--	--	--	--
26	Long Run at State Highway 1531	54	48*	12	.717	--	--	--	--	--

Table 12.--Trend-test results for water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

	Site number and name	N	SC	S	Results of seasonal Kendall tests for time trend[1]: Trends, unadjusted for flow: P level	Trend-line slope: Units per year	Trend-line slope: Percent median value per year	Flow-adjusted trends[2]: P level	Trend-line slope[3]: Units per year	Trend-line slope[3]: Percent median value per year
Nitrogen, nitrate, total, in milligrams per liter as N										
1	Pond Creek at Pendleton Road	73	48*	12	0.081	-0.64	-29	--	--	--
2	Mill Ck at Orell Road	68	48*	12	.080	-.42	-55	--	--	--
3	Pond Ck at Manslick Road	73	48*	12	.152	-.23	-10	--	--	--
5	South Fork Beargrass Creek at Winter Avenue	73	48*	12	.336	--	--	--	--	--
6	South Fork Beargrass Creek at Trevilian Way	73	48*	12	.523	--	--	--	--	--
7	Middle Fork Beargrass Creek at Old Cannons Lane	74	48*	12	.408	--	--	--	--	--
8	Middle Fork Beargrass Creek at Beals Branch Road	73	48*	12	.473	--	--	--	--	--
9	Spring Ditch at Private Drive below Hanses Road	74	48*	12	.215	--	--	--	--	--
10	Muddy Fork at Mockingbird Valley Road	72	48*	12	.350	--	--	--	--	--
11	Goose Creek at U.S. Highway 42	72	48	12	.227	--	--	0.341	--	--
12	Little Goose Creek at U.S. Highway 42	72	48	12	.352	--	--	.403	--	--
13	Goose Creek at Old Westport Road	71	48	12	.121	-.72	-20	.376	--	--
14	Pope Lick at Pope Lick Road	74	48*	12	.064	-1.1	-31	--	--	--
15	Floyds Fork at former State Highway 155	72	48*	12	.080	-.62	-58	--	--	--
16	Chenoweth Run at Gelhaus Road	72	48	12	.103	-1.2	-30	.390	--	--
17	Fern Creek at Old Bardstown Road	72	48*	12	.144	-1.9	-37	--	--	--
18	Northern Ditch at Preston Highway	74	48*	12	.086	-2.4	-58	--	--	--
19	Fishpool Creek at Bost Road	74	48*	12	.726	--	--	--	--	--
20	Southern Ditch at Minors Lane	73	48*	12	.515	--	--	--	--	--
21	Floyds Fork at Bardstown Road	73	48*	12	.121	-.27	-21	--	--	--
22	Cedar Creek at Thixton Road	74	48	12	.181	-1.3	-45	.175	-0.97	-32
23	Pennsylvania Run at Mt. Washington Road	74	48*	12	.652	--	--	--	--	--
24	Mill Creek Cutoff at Dover Road	60	48	12	.282	--	--	.391	--	--
25	Harrods Creek at Hunting Creek Drive	69	48	12	.519	--	--	--	--	--
26	Long Run at State Highway 1531	54	48*	12	.120	-.46	-72	--	--	--
Nitrogen, nitrite, total, in milligrams per liter as N										
1	Pond Creek at Pendleton Road	73	48*	12	.361	--	--	--	--	--
2	Mill Ck at Orell Road	69	48*	12	.242	--	--	--	--	--
3	Pond Ck at Manslick Road	73	48	12	.312	--	--	.445	--	--
5	South Fork Beargrass Creek at Winter Avenue	74	48*	12	.603	--	--	--	--	--
6	South Fork Beargrass Creek at Trevilian Way	74	48*	12	.212	--	--	--	--	--
7	Middle Fork Beargrass Creek at Old Cannons Lane	74	48*	12	.438	--	--	--	--	--
8	Middle Fork Beargrass Creek at Beals Branch Road	73	48*	12	.211	--	--	--	--	--
9	Spring Ditch at Private Drive below Hanses Road	74	48*	12	.209	--	--	--	--	--
10	Muddy Fork at Mockingbird Valley Road	73	48*	12	.779	--	--	--	--	--
11	Goose Creek at U.S. Highway 42	73	48*	12	.261	--	--	--	--	--
12	Little Goose Creek at U.S. Highway 42	74	48*	12	.363	--	--	--	--	--
13	Goose Creek at Old Westport Road	72	48*	12	.309	--	--	--	--	--
14	Pope Lick at Pope Lick Road	74	48	12	.071	-.01	-11	.551	--	--
15	Floyds Fork at former State Highway 155	73	48*	12	.826	--	--	--	--	--
16	Chenoweth Run at Gelhaus Road	73	48*	12	.584	--	--	--	--	--
17	Fern Creek at Old Bardstown Road	73	48*	12	.849	--	--	--	--	--
18	Northern Ditch at Preston Highway	74	48	12	.050	-.03	-43	.542	--	--
19	Fishpool Creek at Bost Road	74	48*	12	.862	--	--	--	--	--
20	Southern Ditch at Minors Lane	73	48*	12	.149	.01	14	--	--	--
21	Floyds Fork at Bardstown Road	73	48*	12	.852	--	--	--	--	--
22	Cedar Creek at Thixton Road	74	48*	12	.158	<-.01	-25	--	--	--
23	Pennsylvania Run at Mt. Washington Road	74	48*	12	.633	--	--	--	--	--
24	Mill Creek Cutoff at Dover Road	62	48*	12	.350	--	--	--	--	--
25	Harrods Creek at Hunting Creek Drive	70	48*	12	1.000	--	--	--	--	--
26	Long Run at State Highway 1531	56	48*	12	.332	--	--	--	--	--

Table 12.--Trend-test results for water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

	Site number and name	N	SC	S	Results of seasonal Kendall tests for time trend[1]: Trends, unadjusted for flow: P level	Trend-line slope: Units per year	Trend-line slope: Percent median value per year	Flow-adjusted trends[2]: P level	Trend-line slope[3]: Units per year	Trend-line slope[3]: Percent median value per year
Nitrogen, organic, total, in milligrams per liter as N										
1	Pond Creek at Pendleton Road	72	48*	12	0.885	--	--	--	--	--
2	Mill Ck at Orell Road	69	48*	12	.347	--	--	--	--	--
3	Pond Ck at Manslick Road	72	48*	12	.681	--	--	--	--	--
5	South Fork Beargrass Creek at Winter Avenue	74	48*	12	.745	--	--	--	--	--
6	South Fork Beargrass Creek at Trevilian Way	74	48*	12	.644	--	--	--	--	--
7	Middle Fork Beargrass Creek at Old Cannons Lane	74	48*	12	.694	--	--	--	--	--
8	Middle Fork Beargrass Creek at Beals Branch Road	73	48*	12	.641	--	--	--	--	--
9	Spring Ditch at Private Drive below Hanses Road	73	48*	12	.702	--	--	--	--	--
10	Muddy Fork at Mockingbird Valley Road	73	48*	12	.785	--	--	--	--	--
11	Goose Creek at U.S. Highway 42	72	48*	12	.115	-0.04	-11	--	--	--
12	Little Goose Creek at U.S. Highway 42	72	48*	12	.523	--	--	--	--	--
13	Goose Creek at Old Westport Road	72	48*	12	.383	--	--	--	--	--
14	Pope Lick at Pope Lick Road	74	48*	12	.073	-.13	-21	--	--	--
15	Floyds Fork at former State Highway 155	72	48*	12	1.000	--	--	--	--	--
16	Chenoweth Run at Gelhaus Road	73	48*	12	.436	--	--	--	--	--
17	Fern Creek at Old Bardstown Road	73	48*	12	.548	--	--	--	--	--
18	Northern Ditch at Preston Highway	73	48*	12	.515	--	--	--	--	--
19	Fishpool Creek at Bost Road	73	48*	12	.800	--	--	--	--	--
20	Southern Ditch at Minors Lane	72	48*	12	.663	--	--	--	--	--
21	Floyds Fork at Bardstown Road	72	48*	12	.102	-.14	-28	--	--	--
22	Cedar Creek at Thixton Road	74	48*	12	.672	--	--	--	--	--
23	Pennsylvania Run at Mt. Washington Road	73	48*	12	.167	-.11	-15	--	--	--
24	Mill Creek Cutoff at Dover Road	62	48*	12	.137	-.16	-25	--	--	--
25	Harrods Creek at Hunting Creek Drive	70	48*	12	1.000	--	--	--	--	--
26	Long Run at State Highway 1531	54	48*	12	1.000	--	--	--	--	--

Table 12.--Trend-test results for water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

	Site number and name	N	SC	S	Results of seasonal Kendall tests for time trend[1]: Trends, unadjusted for flow: P level	Trend-line slope: Units per year	Trend-line slope: Percent median value per year	Flow-adjusted trends[2]: P level	Trend-line slope[3]: Units per year	Trend-line slope[3]: Percent median value per year
Phosphate, total, in milligrams per liter as PO_4										
1	Pond Creek at Pendleton Road	73	48	12	0.498	--	--	0.540	--	--
2	Mill Ck at Orell Road	67	48	12	.511	--	--	.553	--	--
3	Pond Ck at Manslick Road	73	48	12	.933	--	--	.32	--	--
5	South Fork Beargrass Creek at Winter Avenue	73	48	12	.486	--	--	.170	-0.08	-29
6	South Fork Beargrass Creek at Trevilian Way	72	48	12	.561	--	--	.090	-.11	-73
7	Middle Fork Beargrass Creek at Old Cannons Lane	69	48	12	.562	--	--	--	--	--
8	Middle Fork Beargrass Creek at Beals Branch Road	69	48	12	.561	--	--	.681	--	--
9	Spring Ditch at Private Drive below Hanses Road	72	48	12	.947	--	--	1.000	--	--
10	Muddy Fork at Mockingbird Valley Road	72	48	12	1.000	--	--	.329	--	--
11	Goose Creek at U.S. Highway 42	73	48	12	.521	--	--	.887	--	--
12	Little Goose Creek at U.S. Highway 42	74	48	12	.376	--	--	.862	--	--
13	Goose Creek at Old Westport Road	72	48	12	.545	--	--	.726	--	--
14	Pope Lick at Pope Lick Road	73	48	12	.887	--	--	.190	.47	14
15	Floyds Fork at former State Highway 155	72	48	12	.247	--	--	.609	--	--
16	Chenoweth Run at Gelhaus Road	71	48	12	.683	--	--	.581	--	--
17	Fern Creek at Old Bardstown Road	72	48	12	1.000	--	--	.821	--	--
18	Northern Ditch at Preston Highway	73	48	12	.525	--	--	1.000	--	--
19	Fishpool Creek at Bost Road	72	48	12	.605	--	--	1.000	--	--
20	Southern Ditch at Minors Lane	72	48	12	.657	--	--	1.000	--	--
21	Floyds Fork at Bardstown Road	72	48	12	.585	--	--	1.000	--	--
22	Cedar Creek at Thixton Road	73	48	12	1.000	--	--	.486	--	--
23	Pennsylvania Run at Mt. Washington Road	73	48	12	.165	0.88	31	.136	1.3	46
24	Mill Creek Cutoff at Dover Road	61	48	12	.516	--	--	.516	--	--
25	Harrods Creek at Hunting Creek Drive	70	48	12	.616	--	--	--	--	--
26	Long Run at State Highway 1531	53	48	12	.113	.08	37	.923	--	--

Table 12.--Trend-test results for water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

	Site number and name	N	SC	S	Results of seasonal Kendall tests for time trend[1]: Trends, unadjusted for flow: P level	Trend-line slope: Units per year	Trend-line slope: Percent median value per year	Flow-adjusted trends[2]: P level	Trend-line slope[3]: Units per year	Trend-line slope[3]: Percent median value per year
Phosphorus, orthophosphate, total, in milligrams per liter as P										
1	Pond Creek at Pendleton Road	73	48	12	0.498	--	--	0.540	--	--
2	Mill Ck at Orell Road	68	48*	12	.341	--	--	--	--	--
3	Pond Ck at Manslick Road	73	48	12	.933	--	--	.323	--	--
5	South Fork Beargrass Creek at Winter Avenue	73	48	12	.550	--	--	.202	--	--
6	South Fork Beargrass Creek at Trevilian Way	73	48*	12	.561	--	--	--	--	--
7	Middle Fork Beargrass Creek at Old Cannons Lane	73	48*	12	.872	--	--	--	--	--
8	Middle Fork Beargrass Creek at Beals Branch Road	72	48*	12	.558	--	--	--	--	--
9	Spring Ditch at Private Drive below Hanses Road	74	48*	12	1.000	--	--	--	--	--
10	Muddy Fork at Mockingbird Valley Road	72	48	12	.926	--	--	.329	--	--
11	Goose Creek at U.S. Highway 42	73	48	12	.521	--	--	.887	--	--
12	Little Goose Creek at U.S. Highway 42	74	48	12	.376	--	--	.862	--	--
13	Goose Creek at Old Westport Road	72	48	12	.545	--	--	.726	--	--
14	Pope Lick at Pope Lick Road	73	48	12	.887	--	--	.190	0.15	14
15	Floyds Fork at former State Highway 155	72	48	12	.247	--	--	.609	--	--
16	Chenoweth Run at Gelhaus Road	71	48	12	.683	--	--	.581	--	--
17	Fern Creek at Old Bardstown Road	72	48	12	1.000	--	--	.821	--	--
18	Northern Ditch at Preston Highway	74	48*	12	.672	--	--	--	--	--
19	Fishpool Creek at Bost Road	73	48*	12	.605	--	--	--	--	--
20	Southern Ditch at Minors Lane	73	48*	12	.657	--	--	--	--	--
21	Floyds Fork at Bardstown Road	72	48	12	.585	--	--	1.000	--	--
22	Cedar Creek at Thixton Road	73	48	12	1.000	--	--	.854	--	--
23	Pennsylvania Run at Mt. Washington Road	73	48	12	.183	0.28	31	.133	.42	46
24	Mill Creek Cutoff at Dover Road	61	48	12	.516	--	--	.516	--	--
26	Long Run at State Highway 1531	54	48*	12	.572	--	--	--	--	--

Table 12.--Trend-test results for water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

Site number and name	N	SC	S	Results of seasonal Kendall tests for time trend[1]: Trends, unadjusted for flow: P level	Trend-line slope: Units per year	Trend-line slope: Percent median value per year	Flow-adjusted trends[2]: P level	Trend-line slope[3]: Units per year	Trend-line slope[3]: Percent median value per year
DISSOLVED OXYGEN AND OXYGEN DEMAND									
Dissolved oxygen, in milligrams per liter									
1 Pond Creek at Pendleton Road	72	48	12	0.371	--	--	0.387	--	--
2 Mill Ck at Orell Road	67	48	12	.260	--	--	.095	-0.54	-6.8
3 Pond Ck at Manslick Road	74	48	12	1.000	--	--	.857	--	--
5 South Fork Beargrass Creek at Winter Avenue	74	48	12	1.000	--	--	.907	--	--
6 South Fork Beargrass Creek at Trevilian Way	73	48	12	.260	--	--	--	--	--
7 Middle Fork Beargrass Creek at Old Cannons Lane	74	48	12	.697	--	--	.252	--	--
8 Middle Fork Beargrass Creek at Beals Branch Road	74	48	12	.360	--	--	1.000	--	--
9 Spring Ditch at Private Drive below Hanses Road	74	48	12	.115	1.2	14	--	--	--
10 Muddy Fork at Mockingbird Valley Road	74	48	12	.842	--	--	.293	--	--
11 Goose Creek at U.S. Highway 42	74	48	12	1.000	--	--	.304	--	--
12 Little Goose Creek at U.S. Highway 42	75	48	12	.671	--	--	.662	--	--
13 Goose Creek at Old Westport Road	74	48	12	.508	--	--	.281	--	--
14 Pope Lick at Pope Lick Road	75	48	12	.652	--	--	.540	--	--
15 Floyds Fork at former State Highway 155	74	48	12	.643	--	--	.918	--	--
16 Chenoweth Run at Gelhaus Road	74	48	12	.695	--	--	.488	--	--
17 Fern Creek at Old Bardstown Road	74	48	12	.931	--	--	.931	--	--
18 Northern Ditch at Preston Highway	76	48	12	.823	--	--	.358	--	--
19 Fishpool Creek at Bost Road	75	48	12	.933	--	--	1.000	--	--
20 Southern Ditch at Minors Lane	75	48	12	.367	--	--	1.000	--	--
21 Floyds Fork at Bardstown Road	75	48	12	.453	--	--	.062	-.55	-6.0
22 Cedar Creek at Thixton Road	75	48	12	.557	--	--	.284	--	--
23 Pennsylvania Run at Mt. Washington Road	75	48	12	.211	--	--	.129	-.30	-3.8
24 Mill Creek Cutoff at Dover Road	63	48	12	.917	--	--	.877	--	--
25 Harrods Creek at Hunting Creek Drive	70	48	12	1.000	--	--	--	--	--
26 Long Run at State Highway 1531	55	48	12	.264	--	--	1.000	--	--
Dissolved oxygen, daily minimum, in milligrams per liter (from continuous records)									
3 Pond Creek at Manslick Road	928	208	52	.839	--	--	.914	--	--
6 South Fork Beargrass Creek at Trevilian Way	788	208	52	.508	--	--	.928	--	--
7 Middle Fork Beargrass Creek at Old Cannons Lane	979	208	52	.826	--	--	1.000	--	--
24 Mill Creek Cutoff at Dover Road	671	208	52	.675	--	--	.616	--	--
Dissolved oxygen, daily maximum, in milligrams per liter (from continuous records)									
3 Pond Creek at Manslick Road	993	208	52	.971	--	--	.523	--	--
6 South Fork Beargrass Creek at Trevilian Way	942	208	52	.181	down	--	.085	-.32	-3.3
7 Middle Fork Beargrass Creek at Old Cannons Lane	1,032	208	52	.045	down	--	.312	--	--
24 Mill Creek Cutoff at Dover Road	777	208	52	.162	down	--	1.000	--	--

Table 12.--Trend-test results for water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

	Site number and name	N	SC	S	Results of seasonal Kendall tests for time trend[1]: Trends, unadjusted for flow: P level	Trend-line slope: Units per year	Trend-line slope: Percent median value per year	Flow-adjusted trends[2]: P level	Trend-line slope[3]: Units per year	Trend-line slope[3]: Percent median value per year
Biochemical oxygen demand, 5-day at 20 degrees Celsius, in milligrams per liter										
1	Pond Creek at Pendleton Road	73	48*	12	1.000	--	--	--	--	--
2	Mill Ck at Orell Road	69	48**	12	.171	down	down	--	--	--
3	Pond Ck at Manslick Road	73	48*	12	1.000	--	--	--	--	--
5	South Fork Beargrass Creek at Winter Avenue	74	48*	12	1.000	--	--	--	--	--
6	South Fork Beargrass Creek at Trevilian Way	74	48*	12	.397	--	--	--	--	--
7	Middle Fork Beargrass Creek at Old Cannons Lane	74	48*	12	.726	--	--	--	--	--
8	Middle Fork Beargrass Creek at Beals Branch Road	73	48*	12	.134	<0.01	--	--	--	--
9	Spring Ditch at Private Drive below Hanses Road	74	48*	12	.385	--	--	--	--	--
10	Muddy Fork at Mockingbird Valley Road	73	48*	12	.245	--	--	--	--	--
11	Goose Creek at U.S. Highway 42	72	48*	12	.321	--	--	--	--	--
12	Little Goose Creek at U.S. Highway 42	74	48*	12	.427	--	--	--	--	--
13	Goose Creek at Old Westport Road	72	48*	12	.710	--	--	--	--	--
14	Pope Lick at Pope Lick Road	74	48*	12	.888	--	--	--	--	--
15	Floyds Fork at former State Highway 155	73	48*	12	.667	--	--	--	--	--
16	Chenoweth Run at Gelhaus Road	73	48*	12	.059	-.30	-15	--	--	--
17	Fern Creek at Old Bardstown Road	73	48*	12	.391	--	--	--	--	--
18	Northern Ditch at Preston Highway	74	48*	12	.436	--	--	--	--	--
19	Fishpool Creek at Bost Road	74	48*	12	.540	--	--	--	--	--
20	Southern Ditch at Minors Lane	73	48*	12	.092	<.01	--	--	--	--
21	Floyds Fork at Bardstown Road	73	48*	12	1.000	--	--	--	--	--
22	Cedar Creek at Thixton Road	74	48*	12	.387	--	--	--	--	--
23	Pennsylvania Run at Mt. Washington Road	74	48*	12	.211	--	--	--	--	--
24	Mill Creek Cutoff at Dover Road	62	48*	12	.294	--	--	--	--	--
25	Harrods Creek at Hunting Creek Drive	70	48*	12	.447	--	--	--	--	--
26	Long Run at State Highway 1531	54	48*	12	.171	<.01	--	--	--	--
Chemical oxygen demand, 0.25 normal dicromate, in milligrams per liter										
1	Pond Creek at Pendleton Road	72	48*	12	1.000	--	--	--	--	--
2	Mill Ck at Orell Road	68	48*	12	.057	-1.5	-8.1	--	--	--
3	Pond Ck at Manslick Road	72	48*	12	.196	2.5	13	--	--	--
5	South Fork Beargrass Creek at Winter Avenue	72	48*	12	1.000	--	--	--	--	--
6	South Fork Beargrass Creek at Trevilian Way	73	48*	12	1.000	--	--	--	--	--
7	Middle Fork Beargrass Creek at Old Cannons Lane	74	48*	12	.695	--	--	--	--	--
8	Middle Fork Beargrass Creek at Beals Branch Road	73	48**	12	.120	down	down	--	--	--
9	Spring Ditch at Private Drive below Hanses Road	74	48*	12	.605	--	--	--	--	--
10	Muddy Fork at Mockingbird Valley Road	72	48*	12	.908	--	--	--	--	--
11	Goose Creek at U.S. Highway 42	71	48*	12	1.000	--	--	--	--	--
12	Little Goose Creek at U.S. Highway 42	73	48*	12	.352	--	--	--	--	--
13	Goose Creek at Old Westport Road	70	48*	12	.477	--	--	--	--	--
14	Pope Lick at Pope Lick Road	74	48*	12	1.000	--	--	--	--	--
15	Floyds Fork at former State Highway 155	72	48*	12	.652	--	--	--	--	--
16	Chenoweth Run at Gelhaus Road	72	48*	12	1.000	--	--	--	--	--
17	Fern Creek at Old Bardstown Road	72	48*	12	.667	--	--	--	--	--
18	Northern Ditch at Preston Highway	74	48*	12	.613	--	--	--	--	--
19	Fishpool Creek at Bost Road	74	48*	12	.070	2.5	15	--	--	--
20	Southern Ditch at Minors Lane	73	48*	12	.102	-1.5	-7.9	--	--	--
21	Floyds Fork at Bardstown Road	73	48*	12	.404	--	--	--	--	--
22	Cedar Creek at Thixton Road	73	48**	12	.084	down	down	--	--	--
23	Pennsylvania Run at Mt. Washington Road	74	48*	12	1.000	--	--	--	--	--
24	Mill Creek Cutoff at Dover Road	61	48*	12	.079	-3.5	-15	--	--	--
25	Harrods Creek at Hunting Creek Drive	70	48*	12	1.000	--	--	--	--	--
26	Long Run at State Highway 1531	54	48*	12	.211	--	--	--	--	--

Table 12.--Trend-test results for water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

	Site number and name	N	SC	S	Results of seasonal Kendall tests for time trend[1]: Trends, unadjusted for flow: P level	Trend-line slope: Units per year	Trend-line slope: Percent median value per year	Flow-adjusted trends[2]: P level	Trend-line slope[3]: Units per year	Trend-line slope[3]: Percent median value per year
	SYNTHETIC ORGANIC COMPOUNDS									
	Chlordane, total, in micrograms per liter									
1	Pond Creek at Pendleton Road	12	16*	4	1.000	--	--	--	--	--
2	Mill Ck at Orell Road	10	16*	4	1.000	--	--	--	--	--
3	Pond Ck at Manslick Road	12	16*	4	1.000	--	--	--	--	--
5	South Fork Beargrass Creek at Winter Avenue	11	16*	4	1.000	--	--	--	--	--
6	South Fork Beargrass Creek at Trevilian Way	11	16*	4	1.000	--	--	--	--	--
8	Middle Fork Beargrass Creek at Beals Branch Road	10	16*	4	1.000	--	--	--	--	--
9	Spring Ditch at Private Drive below Hanses Road	12	16*	4	1.000	--	--	--	--	--
10	Muddy Fork at Mockingbird Valley Road	11	16*	4	1.000	--	--	--	--	--
11	Goose Creek at U.S. Highway 42	10	12*	4	1.000	--	--	--	--	--
12	Little Goose Creek at U.S. Highway 42	12	16*	4	1.000	--	--	--	--	--
13	Goose Creek at Old Westport Road	10	12*	4	1.000	--	--	--	--	--
14	Pope Lick at Pope Lick Road	13	16*	4	1.000	--	--	--	--	--
15	Floyds Fork at former State Highway 155	13	16*	4	1.000	--	--	--	--	--
16	Chenoweth Run at Gelhaus Road	13	16*	4	1.000	--	--	--	--	--
17	Fern Creek at Old Bardstown Road	12	16*	4	1.000	--	--	--	--	--
18	Northern Ditch at Preston Highway	12	16*	4	1.000	--	--	--	--	--
19	Fishpool Creek at Bost Road	10	16*	4	1.000	--	--	--	--	--
20	Southern Ditch at Minors Lane	10	16*	4	1.000	--	--	--	--	--
21	Floyds Fork at Bardstown Road	12	16*	4	1.000	--	--	--	--	--
22	Cedar Creek at Thixton Road	12	16*	4	1.000	--	--	--	--	--
23	Pennsylvania Run at Mt. Washington Road	12	16*	4	1.000	--	--	--	--	--
24	Mill Creek Cutoff at Dover Road	10	16*	4	1.000	--	--	--	--	--
25	Harrods Creek at Hunting Creek Drive	11	16*	4	1.000	--	--	--	--	--
	Endrin, total, in micrograms per liter									
1	Pond Creek at Pendleton Road	12	16*	4	.584	--	--	--	--	--
2	Mill Ck at Orell Road	10	16*	4	1.000	--	--	--	--	--
3	Pond Ck at Manslick Road	12	16*	4	1.000	--	--	--	--	--
5	South Fork Beargrass Creek at Winter Avenue	11	16*	4	1.000	--	--	--	--	--
6	South Fork Beargrass Creek at Trevilian Way	11	16*	4	1.000	--	--	--	--	--
8	Middle Fork Beargrass Creek at Beals Branch Road	10	16*	4	1.000	--	--	--	--	--
9	Spring Ditch at Private Drive below Hanses Road	12	16*	4	1.000	--	--	--	--	--
10	Muddy Fork at Mockingbird Valley Road	10	16*	4	1.000	--	--	--	--	--
11	Goose Creek at U.S. Highway 42	10	12*	4	1.000	--	--	--	--	--
12	Little Goose Creek at U.S. Highway 42	12	16*	4	1.000	--	--	--	--	--
13	Goose Creek at Old Westport Road	10	12*	4	1.000	--	--	--	--	--
14	Pope Lick at Pope Lick Road	13	16*	4	1.000	--	--	--	--	--
15	Floyds Fork at former State Highway 155	13	16*	4	1.000	--	--	--	--	--
16	Chenoweth Run at Gelhaus Road	13	16*	4	1.000	--	--	--	--	--
17	Fern Creek at Old Bardstown Road	12	16*	4	1.000	--	--	--	--	--
18	Northern Ditch at Preston Highway	12	16*	4	1.000	--	--	--	--	--
19	Fishpool Creek at Bost Road	10	16*	4	1.000	--	--	--	--	--
20	Southern Ditch at Minors Lane	10	16*	4	1.000	--	--	--	--	--
21	Floyds Fork at Bardstown Road	12	16*	4	1.000	--	--	--	--	--
22	Cedar Creek at Thixton Road	12	16*	4	1.000	--	--	--	--	--
23	Pennsylvania Run at Mt. Washington Road	12	16*	4	1.000	--	--	--	--	--
24	Mill Creek Cutoff at Dover Road	10	16*	4	.589	--	--	--	--	--
25	Harrods Creek at Hunting Creek Drive	11	16*	4	1.000	--	--	--	--	--

Table 12.--Trend-test results for water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

Site number and name	N	SC	S	Results of seasonal Kendall tests for time trend[1]: Trends, unadjusted for flow: P level	Trend-line slope: Units per year	Trend-line slope: Percent median value per year	Flow-adjusted trends[2]: P level	Trend-line slope[3]: Units per year	Trend-line slope[3]: Percent median value per year
Lindane, total, in micrograms per liter									
1 Pond Creek at Pendleton Road	12	16*	4	0.584	--	--	--	--	--
2 Mill Ck at Orell Road	10	16*	4	1.000	--	--	--	--	--
3 Pond Ck at Manslick Road	12	16*	4	1.000	--	--	--	--	--
5 South Fork Beargrass Creek at Winter Avenue	11	16*	4	1.000	--	--	--	--	--
6 South Fork Beargrass Creek at Trevilian Way	11	16*	4	1.000	--	--	--	--	--
8 Middle Fork Beargrass Creek at Beals Branch Road	10	16*	4	1.000	--	--	--	--	--
9 Spring Ditch at Private Drive below Hanses Road	12	16*	4	1.000	--	--	--	--	--
10 Muddy Fork at Mockingbird Valley Road	10	16*	4	1.000	--	--	--	--	--
11 Goose Creek at U.S. Highway 42	10	12*	4	1.000	--	--	--	--	--
12 Little Goose Creek at U.S. Highway 42	12	16*	4	1.000	--	--	--	--	--
13 Goose Creek at Old Westport Road	10	12*	4	.332	--	--	--	--	--
14 Pope Lick at Pope Lick Road	13	16*	4	1.000	--	--	--	--	--
15 Floyds Fork at former State Highway 155	13	16*	4	.862	--	--	--	--	--
16 Chenoweth Run at Gelhaus Road	13	16*	4	1.000	--	--	--	--	--
17 Fern Creek at Old Bardstown Road	12	16*	4	.743	--	--	--	--	--
18 Northern Ditch at Preston Highway	12	16*	4	1.000	--	--	--	--	--
19 Fishpool Creek at Bost Road	10	16*	4	1.000	--	--	--	--	--
20 Southern Ditch at Minors Lane	10	16*	4	1.000	--	--	--	--	--
21 Floyds Fork at Bardstown Road	12	16*	4	.829	--	--	--	--	--
22 Cedar Creek at Thixton Road	12	16*	4	.743	--	--	--	--	--
23 Pennsylvania Run at Mt. Washington Road	12	16*	4	1.000	--	--	--	--	--
24 Mill Creek Cutoff at Dover Road	10	16*	4	1.000	--	--	--	--	--
25 Harrods Creek at Hunting Creek Drive	11	16*	4	1.000	--	--	--	--	--
Methoxychlor, total, in micrograms per liter									
1 Pond Creek at Pendleton Road	12	16*	4	1.000	--	--	--	--	--
2 Mill Ck at Orell Road	10	16*	4	1.000	--	--	--	--	--
3 Pond Ck at Manslick Road	12	16*	4	1.000	--	--	--	--	--
5 South Fork Beargrass Creek at Winter Avenue	11	16*	4	1.000	--	--	--	--	--
6 South Fork Beargrass Creek at Trevilian Way	11	16*	4	1.000	--	--	--	--	--
8 Middle Fork Beargrass Creek at Beals Branch Road	10	16*	4	1.000	--	--	--	--	--
9 Spring Ditch at Private Drive below Hanses Road	12	16*	4	1.000	--	--	--	--	--
10 Muddy Fork at Mockingbird Valley Road	10	16*	4	1.000	--	--	--	--	--
11 Goose Creek at U.S. Highway 42	10	12*	4	1.000	--	--	--	--	--
12 Little Goose Creek at U.S. Highway 42	12	16*	4	.672	--	--	--	--	--
13 Goose Creek at Old Westport Road	10	12*	4	1.000	--	--	--	--	--
14 Pope Lick at Pope Lick Road	13	16*	4	1.000	--	--	--	--	--
15 Floyds Fork at former State Highway 155	13	16*	4	1.000	--	--	--	--	--
16 Chenoweth Run at Gelhaus Road	13	16*	4	1.000	--	--	--	--	--
17 Fern Creek at Old Bardstown Road	12	16*	4	1.000	--	--	--	--	--
18 Northern Ditch at Preston Highway	12	16*	4	1.000	--	--	--	--	--
19 Fishpool Creek at Bost Road	10	16*	4	1.000	--	--	--	--	--
20 Southern Ditch at Minors Lane	10	16*	4	1.000	--	--	--	--	--
21 Floyds Fork at Bardstown Road	12	16*	4	1.000	--	--	--	--	--
22 Cedar Creek at Thixton Road	12	16*	4	.540	--	--	--	--	--
23 Pennsylvania Run at Mt. Washington Road	12	16*	4	1.000	--	--	--	--	--
24 Mill Creek Cutoff at Dover Road	10	16*	4	.540	--	--	--	--	--
25 Harrods Creek at Hunting Creek Drive	11	16*	4	1.000	--	--	--	--	--

Table 12.--Trend-test results for water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

	Site number and name	N	SC	S	Results of seasonal Kendall tests for time trend[1]: Trends, unadjusted for flow: P level	Trend-line slope: Units per year	Trend-line slope: Percent median value per year	Flow-adjusted trends[2]: P level	Trend-line slope[3]: Units per year	Trend-line slope[3]: Percent median value per year
Toxaphene, total, in micrograms per liter										
1	Pond Creek at Pendleton Road	12	16*	4	1.000	--	--	--	--	--
2	Mill Ck at Orell Road	10	16*	4	1.000	--	--	--	--	--
3	Pond Ck at Manslick Road	12	16*	4	1.000	--	--	--	--	--
5	South Fork Beargrass Creek at Winter Avenue	11	16*	4	1.000	--	--	--	--	--
6	South Fork Beargrass Creek at Trevilian Way	11	16*	4	1.000	--	--	--	--	--
8	Middle Fork Beargrass Creek at Beals Branch Road	10	16*	4	1.000	--	--	--	--	--
9	Spring Ditch at Private Drive below Hanses Road	12	16*	4	1.000	--	--	--	--	--
10	Muddy Fork at Mockingbird Valley Road	11	16*	4	1.000	--	--	--	--	--
11	Goose Creek at U.S. Highway 42	10	12*	4	1.000	--	--	--	--	--
12	Little Goose Creek at U.S. Highway 42	12	16*	4	1.000	--	--	--	--	--
13	Goose Creek at Old Westport Road	10	12*	4	1.000	--	--	--	--	--
14	Pope Lick at Pope Lick Road	13	16*	4	1.000	--	--	--	--	--
15	Floyds Fork at former State Highway 155	13	16*	4	1.000	--	--	--	--	--
16	Chenoweth Run at Gelhaus Road	13	16*	4	1.000	--	--	--	--	--
17	Fern Creek at Old Bardstown Road	12	16*	4	1.000	--	--	--	--	--
18	Northern Ditch at Preston Highway	12	16*	4	1.000	--	--	--	--	--
19	Fishpool Creek at Bost Road	10	16*	4	1.000	--	--	--	--	--
20	Southern Ditch at Minors Lane	10	16*	4	1.000	--	--	--	--	--
21	Floyds Fork at Bardstown Road	12	16*	4	1.000	--	--	--	--	--
22	Cedar Creek at Thixton Road	12	16*	4	1.000	--	--	--	--	--
23	Pennsylvania Run at Mt. Washington Road	12	16*	4	1.000	--	--	--	--	--
24	Mill Creek Cutoff at Dover Road	10	16*	4	1.000	--	--	--	--	--
25	Harrods Creek at Hunting Creek Drive	11	16*	4	1.000	--	--	--	--	--
2,4-D, total, in micrograms per liter										
1	Pond Creek at Pendleton Road	12	16*	4	1.000	--	--	--	--	--
2	Mill Ck at Orell Road	10	16*	4	1.000	--	--	--	--	--
3	Pond Ck at Manslick Road	12	16*	4	.546	--	--	--	--	--
5	South Fork Beargrass Creek at Winter Avenue	11	16*	4	.814	--	--	--	--	--
6	South Fork Beargrass Creek at Trevilian Way	11	16*	4	.766	--	--	--	--	--
8	Middle Fork Beargrass Creek at Beals Branch Road	10	16*	4	.829	--	--	--	--	--
9	Spring Ditch at Private Drive below Hanses Road	12	16*	4	.433	--	--	--	--	--
10	Muddy Fork at Mockingbird Valley Road	10	16*	4	1.000	--	--	--	--	--
11	Goose Creek at U.S. Highway 42	10	12*	4	1.000	--	--	--	--	--
12	Little Goose Creek at U.S. Highway 42	12	16*	4	.722	--	--	--	--	--
13	Goose Creek at Old Westport Road	10	12*	4	1.000	--	--	--	--	--
14	Pope Lick at Pope Lick Road	13	16*	4	1.000	--	--	--	--	--
15	Floyds Fork at former State Highway 155	13	16*	4	.358	--	--	--	--	--
16	Chenoweth Run at Gelhaus Road	13	16*	4	1.000	--	--	--	--	--
17	Fern Creek at Old Bardstown Road	12	16*	4	.372	--	--	--	--	--
18	Northern Ditch at Preston Highway	12	16*	4	1.000	--	--	--	--	--
19	Fishpool Creek at Bost Road	10	16*	4	1.000	--	--	--	--	--
20	Southern Ditch at Minors Lane	10	16*	4	1.000	--	--	--	--	--
21	Floyds Fork at Bardstown Road	12	16*	4	.192	<0.01	--	--	--	--
22	Cedar Creek at Thixton Road	12	16*	4	.760	--	--	--	--	--
23	Pennsylvania Run at Mt. Washington Road	12	16*	4	.817	--	--	--	--	--
24	Mill Creek Cutoff at Dover Road	10	16*	4	1.000	--	--	--	--	--
25	Harrods Creek at Hunting Creek Drive	11	16*	4	1.000	--	--	--	--	--

Table 12.--Trend-test results for water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

	Site number and name	N	SC	S	Results of seasonal Kendall tests for time trend[1]: Trends, unadjusted for flow: P level	Trend-line slope: Units per year	Trend-line slope: Percent median value per year	Flow-adjusted trends[2]: P level	Trend-line slope[3]: Units per year	Trend-line slope[3]: Percent median value per year
2,4,5-TP (silvex), total, in micrograms per liter										
1	Pond Creek at Pendleton Road	12	16*	4	1.000	--	--	--	--	--
2	Mill Ck at Orell Road	10	16*	4	1.000	--	--	--	--	--
3	Pond Ck at Manslick Road	12	16*	4	1.000	--	--	--	--	--
5	South Fork Beargrass Creek at Winter Avenue	11	16*	4	1.000	--	--	--	--	--
6	South Fork Beargrass Creek at Trevilian Way	11	16*	4	1.000	--	--	--	--	--
8	Middle Fork Beargrass Creek at Beals Branch Road	10	16*	4	.810	--	--	--	--	--
9	Spring Ditch at Private Drive below Hanses Road	12	16*	4	.743	--	--	--	--	--
10	Muddy Fork at Mockingbird Valley Road	10	16*	4	1.000	--	--	--	--	--
11	Goose Creek at U.S. Highway 42	10	12*	4	1.000	--	--	--	--	--
12	Little Goose Creek at U.S. Highway 42	12	16*	4	1.000	--	--	--	--	--
13	Goose Creek at Old Westport Road	10	12*	4	1.000	--	--	--	--	--
14	Pope Lick at Pope Lick Road	13	16*	4	1.000	--	--	--	--	--
15	Floyds Fork at former State Highway 155	13	16*	4	.540	--	--	--	--	--
16	Chenoweth Run at Gelhaus Road	13	16*	4	1.000	--	--	--	--	--
17	Fern Creek at Old Bardstown Road	12	16*	4	1.000	--	--	--	--	--
18	Northern Ditch at Preston Highway	12	16*	4	1.000	--	--	--	--	--
19	Fishpool Creek at Bost Road	10	16*	4	1.000	--	--	--	--	--
20	Southern Ditch at Minors Lane	10	16*	4	1.000	--	--	--	--	--
21	Floyds Fork at Bardstown Road	12	16*	4	1.000	--	--	--	--	--
22	Cedar Creek at Thixton Road	12	16*	4	1.000	--	--	--	--	--
23	Pennsylvania Run at Mt. Washington Road	12	16*	4	1.000	--	--	--	--	--
24	Mill Creek Cutoff at Dover Road	10	16*	4	1.000	--	--	--	--	--
25	Harrods Creek at Hunting Creek Drive	11	16*	4	1.000	--	--	--	--	--

Table 12.--Trend-test results for water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

	Site number and name	N	SC	S	Results of seasonal Kendall tests for time trend[1]: Trends, unadjusted for flow: P level	Trend-line slope: Units per year	Trend-line slope: Percent median value per year	Flow-adjusted trends[2]: P level	Trend-line slope[3]: Units per year	Trend-line slope[3]: Percent median value per year
	FECAL-INDICATOR BACTERIA									
	Fecal coliform, membrane filter M-FC agar, in colonies per 100 milliliters									
1	Pond Creek at Pendleton Road	74	48	12	0.778	--	--	0.156	79	52
2	Mill Ck at Orell Road	72	48	12	.468	--	--	.451	--	--
3	Pond Ck at Manslick Road	75	48	12	.504	--	--	.774	--	--
5	South Fork Beargrass Creek at Winter Avenue	75	48	12	.115	1,200	73	.386	--	--
6	South Fork Beargrass Creek at Trevilian Way	74	48	12	.062	160	1,830	.931	--	--
7	Middle Fork Beargrass Creek at Old Cannons Lane	77	48	12	.051	500	97	.082	360	69
8	Middle Fork Beargrass Creek at Beals Branch Road	75	48	12	.190	69	17	.662	--	--
9	Spring Ditch at Private Drive below Hanses Road	77	48	12	.443	--	--	1.000	--	--
10	Muddy Fork at Mockingbird Valley Road	76	48	12	.253	--	--	.119	-330	-256
11	Goose Creek at U.S. Highway 42	72	48	12	.778	--	--	.146	190	182
12	Little Goose Creek at U.S. Highway 42	73	48	12	.664	--	--	1.000	--	--
13	Goose Creek at Old Westport Road	71	48	12	.039	180	302	.858	--	--
14	Pope Lick at Pope Lick Road	77	48	12	.628	--	--	.437	--	--
15	Floyds Fork at former State Highway 155	75	48	12	1.000	--	--	.640	--	--
16	Chenoweth Run at Gelhaus Road	78	48	12	.417	--	--	.432	--	--
17	Fern Creek at Old Bardstown Road	75	48	12	.102	150	30	1.000	--	--
18	Northern Ditch at Preston Highway	77	48	12	1.000	--	--	.326	--	--
19	Fishpool Creek at Bost Road	77	48	12	.070	74	28	.670	--	--
20	Southern Ditch at Minors Lane	76	48	12	.164	190	82	.605	--	--
21	Floyds Fork at Bardstown Road	73	48	12	.274	--	--	.539	--	--
22	Cedar Creek at Thixton Road	74	48	12	1.000	--	--	1.000	--	--
23	Pennsylvania Run at Mt. Washington Road	75	48	12	.487	--	--	.095	120	79
24	Mill Creek Cutoff at Dover Road	63	48	12	.643	--	--	.444	--	--
25	Harrods Creek at Hunting Creek Drive	69	48	12	.452	--	--	--	--	--
26	Long Run at State Highway 1531	55	48	12	.901	--	--	.203	--	--

Table 12.--Trend-test results for water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, February 1988-March 1991--Continued

Site number and name	N	SC	S	Results of seasonal Kendall tests for time trend[1]: Trends, unadjusted for flow: P level	Trend-line slope: Units per year	Trend-line slope: Percent median value per year	Flow-adjusted trends[2]: P level	Trend-line slope[3]: Units per year	Trend-line slope[3]: Percent median value per year
Fecal streptococci, membrane filter KF agar, in colonies per 100 milliliters									
1 Pond Creek at Pendleton Road	71	48	12	0.336	--	--	0.088	120	46
2 Mill Ck at Orell Road	66	48	12	.114	-85	-23	.406	--	--
3 Pond Ck at Manslick Road	69	48	12	.494	--	--	.142	290	104
5 South Fork Beargrass Creek at Winter Avenue	72	48	12	.264	--	--	1.000	--	--
6 South Fork Beargrass Creek at Trevilian Way	73	48	12	.064	11	138	.544	--	--
7 Middle Fork Beargrass Creek at Old Cannons Lane	70	48	12	.498	--	--	.095	-370	-450
8 Middle Fork Beargrass Creek at Beals Branch Road	72	48	12	.293	--	--	.308	--	--
9 Spring Ditch at Private Drive below Hanses Road	71	48	12	.190	100	25	.371	--	--
10 Muddy Fork at Mockingbird Valley Road	70	48	12	.332	--	--	--	--	--
11 Goose Creek at U.S. Highway 42	74	48	12	.578	--	--	.076	430	157
12 Little Goose Creek at U.S. Highway 42	75	48	12	1.000	--	--	.050	1,200	303
13 Goose Creek at Old Westport Road	72	48	12	.056	330	535	.854	--	--
14 Pope Lick at Pope Lick Road	70	48	12	.278	--	--	--	--	--
15 Floyds Fork at former State Highway 155	69	48	12	1.000	--	--	.685	--	--
16 Chenoweth Run at Gelhaus Road	68	48	12	.832	--	--	1.000	--	--
17 Fern Creek at Old Bardstown Road	71	48	12	.066	57	9.0	.817	--	--
18 Northern Ditch at Preston Highway	71	48	12	.160	89	64	.437		--
19 Fishpool Creek at Bost Road	71	48	12	.054	150	35	.100	340	78
20 Southern Ditch at Minors Lane	70	48	12	.104	290	96	.053	170	55
21 Floyds Fork at Bardstown Road	72	48	12	.837	--	--	.074	-230	128
22 Cedar Creek at Thixton Road	73	48	12	.685	--	--	1.000	--	--
23 Pennsylvania Run at Mt. Washington Road	73	48	12	1.000	--	--	--	--	--
24 Mill Creek Cutoff at Dover Road	59	48	12	.714	--	--	.342	--	--
25 Harrods Creek at Hunting Creek Drive	70	48	12	.291	--	--	--	--	--
26 Long Run at State Highway 1531	52	48	12	.784	--	--	.425	--	--

[1] The null hypothesis for the seasonal Kendall test is that no trend in the data exists (the probability distribution of a selected water-quality property or constituent for each of the seasons is unchanged over the period of record tested). The possible outcomes of the test were (a) the null hypothesis was rejected with some degree of confidence [probability (p)level = 0.2] and it was declared that a trend existed in the data, or (b) the null hypothesis was not rejected and it was declared that a trend could not be discerned.

[2] Flow-adjusted trends were not computed when (a) censored data were present or (b) the relation between the water-quality property or constituent and discharge was not statistically significant (p level greater than 0.2).

[3] The trend-line slope for pH was reported only as increasing or decreasing because it is inappropriate to compute the trend slope on the basis of logarithmic units. It was also only reported as increasing or decreasing if censored values affected trend analysis.

Table 13.--Number of water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, and percentage of samples not meeting indicated water-quality criteria, based on available data from February 1988-March 1991

[N, number of measurements; --, missing; censored values greater than the water-quality criteria were not considered as violations]

U.S. ENVIRONMENTAL PROTECTION AGENCY

MCL = maximum contaminant level
MCLG = maximum contaminant level goal
PMCLG = proposed MCLG
SMCL = secondary MCL
ALA = aquatic life, acute
ALC = aquatic life, chronic

KENTUCKY

KYDWS = domestic water supply
KYAHA = aquatic habitat, acute
KYAHC = aquatic habitat, chronic
KYRP = primary-contact recreation
KYRS = secondary-contact recreation

Site number and name	N	MCL	MCLG	PMCLG	SMCL	ALA	ALC	KYDWS	KYAHA	KYAHC	KYRP	KYRS
DISSOLVED SOLIDS												
Dissolved solids, residue at 105 degrees Celsius, in milligrams per liter												
1 Pond Creek at Pendleton Road	73	--	--	--	17.8	--	--	1.4	--	--	--	--
2 Mill Creek at Orell Road	69	--	--	--	7.2	--	--	1.4	--	--	--	--
3 Pond Creek at Manslick Road	73	--	--	--	16.4	--	--	1.4	--	--	--	--
4 Mill Creek at Rockford Lane	2	--	--	--	50.0	--	--	50.0	--	--	--	--
5 South Fork Beargrass Creek at Winter Avenue	74	--	--	--	1.4	--	--	1.4	--	--	--	--
6 South Fork Beargrass Creek at Trevilian Way	74	--	--	--	2.7	--	--	--	--	--	--	--
7 Middle Fork Beargrass Creek at Old Cannons Lane	74	--	--	--	1.4	--	--	--	--	--	--	--
8 Middle Fork Beargrass Creek at Beals Branch Road	72	--	--	--	2.8	--	--	--	--	--	--	--
9 Spring Ditch at Private Drive below Hanses Road	74	--	--	--	9.5	--	--	--	--	--	--	--
10 Muddy Fork at Mockingbird Valley Road	73	--	--	--	20.5	--	--	--	--	--	--	--
12 Little Goose Creek at U.S. Highway 42	74	--	--	--	1.4	--	--	--	--	--	--	--
13 Goose Creek at Old Westport Road	72	--	--	--	2.8	--	--	1.4	--	--	--	--
14 Pope Lick at Pope Lick Road	73	--	--	--	13.7	--	--	1.4	--	--	--	--
15 Floyds Fork at former State Highway 155	73	--	--	--	2.7	--	--	1.4	--	--	--	--
16 Chenoweth Run at Gelhaus Road	72	--	--	--	4.2	--	--	1.4	--	--	--	--
17 Fern Creek at Old Bardstown Road	72	--	--	--	9.7	--	--	--	--	--	--	--
18 Northern Ditch at Preston Highway	73	--	--	--	26.0	--	--	8.2	--	--	--	--
19 Fishpool Creek at Bost Road	74	--	--	--	13.5	--	--	--	--	--	--	--
20 Southern Ditch at Minors Lane	71	--	--	--	9.9	--	--	--	--	--	--	--
21 Floyds Fork at Bardstown Road	73	--	--	--	1.4	--	--	1.4	--	--	--	--
22 Cedar Creek at Thixton Road	73	--	--	--	41.1	--	--	4.1	--	--	--	--
23 Pennsylvania Run at Mt. Washington Road	74	--	--	--	12.2	--	--	2.7	--	--	--	--
24 Mill Creek Cutoff at Dover Road	62	--	--	--	4.8	--	--	1.6	--	--	--	--
25 Harrods Creek at Hunting Creek Drive	70	--	--	--	2.9	--	--	--	--	--	--	--
MAJOR METALS, TRACE ELEMENTS, AND MISCELLANEOUS INORGANIC COMPOUNDS												
Beryllium, total, in micrograms per liter as Be												
2 Mill Creek at Orell Road	10	--	--	10.0	--	--	--	--	--	--	--	--
5 South Fork Beargrass Creek at Winter Avenue	11	--	--	9.1	--	--	--	--	--	--	--	--
6 South Fork Beargrass Creek at Trevilian Way	11	--	--	9.1	--	--	--	--	--	--	--	--
8 Middle Fork Beargrass Creek at Beals Branch Road	10	--	--	10.0	--	--	--	--	--	--	--	--
9 Spring Ditch at Private Drive below Hanses Road	11	--	--	18.2	--	--	--	--	--	--	--	--
11 Goose Creek at U.S. Highway 42	10	--	--	10.0	--	--	--	--	--	--	--	--
12 Little Goose Creek at U.S. Highway 42	12	--	--	25.0	--	--	--	--	--	--	--	--
14 Pope Lick at Pope Lick Road	13	--	--	7.7	--	--	--	--	--	--	--	--
16 Chenoweth Run at Gelhaus Road	13	--	--	7.7	--	--	--	--	--	--	--	--
17 Fern Creek at Old Bardstown Road	12	--	--	25.0	--	--	--	--	--	--	--	--
18 Northern Ditch at Preston Highway	11	--	--	18.2	--	--	--	--	--	--	--	--
20 Southern Ditch at Minors Lane	10	--	--	10.0	--	--	--	--	--	--	--	--
21 Floyds Fork at Bardstown Road	12	--	--	8.3	--	--	--	--	--	--	--	--
22 Cedar Creek at Thixton Road	12	--	--	8.3	--	--	--	--	--	--	--	--
24 Mill Creek Cutoff at Dover Road	10	--	--	10.0	--	--	--	--	--	--	--	--
25 Harrods Creek at Hunting Creek Drive	11	--	--	18.2	--	--	--	--	--	--	--	--

Table 13.--Number of water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, and percentage of samples not meeting indicated water-quality criteria, based on available data from February 1988-March 1991--Continued

Site number and name	N	MCL	MCLG	PMCLG	SMCL	ALA	ALC	KYDWS	KYAHA	KYAHC	KYRP	KYRS
Cadmium, total, in micrograms per liter as Cd												
1 Pond Creek at Pendleton Road	12	--	--	--	--	--	8.3	--	--	8.3	--	--
2 Mill Creek at Orell Road	10	10.0	10.0	--	--	10.0	10.0	--	10.0	10.0	--	--
3 Pond Creek at Manslick Road	12	8.3	8.3	--	--	--	16.7	8.3	--	16.7	--	--
8 Middle Fork Beargrass Creek at Beals Branch Road	10	10.0	10.0	--	--	10.0	10.0	10.0	10.0	10.0	--	--
12 Little Goose Creek at U.S. Highway 42	11	--	--	--	--	--	9.1	--	--	9.1	--	--
13 Goose Creek at Old Westport Road	10	--	--	--	--	--	10.0	--	--	10.0	--	--
15 Floyds Fork at former State Highway 155	13	7.7	7.7	--	--	7.7	7.7	7.7	7.7	7.7	--	--
16 Chenoweth Run at Gelhaus Road	13	7.7	7.7	--	--	--	15.4	7.7	--	15.4	--	--
17 Fern Creek at Old Bardstown Road	12	8.3	8.3	--	--	--	16.7	--	--	16.7	--	--
18 Northern Ditch at Preston Highway	11	--	--	--	--	--	9.1	--	--	9.1	--	--
19 Fishpool Creek at Bost Road	10	10.0	10.0	--	--	10.0	10.0	10.0	10.0	10.0	--	--
23 Pennsylvania Run at Mt. Washington Road	12	8.3	8.3	--	--	8.3	16.7	--	8.3	16.7	--	--
Chromium, total, in micrograms per liter as Cr												
1 Pond Creek at Pendleton Road	12	8.3	8.3	--	--	25.0	41.7	16.7	25.0	41.7	--	--
2 Mill Creek at Orell Road	10	10.0	10.0	--	--	30.0	30.0	10.0	30.0	30.0	--	--
3 Pond Creek at Manslick Road	12	8.3	8.3	--	--	41.7	58.3	16.7	41.7	58.3	--	--
5 South Fork Beargrass Creek at Winter Avenue	11	--	--	--	--	--	27.3	--	--	27.3	--	--
6 South Fork Beargrass Creek at Trevilian Way	11	18.2	18.2	--	--	27.3	36.4	18.2	27.3	36.4	--	--
7 Middle Fork Beargrass Creek at Old Cannons Lane	10	--	--	--	--	40.0	40.0	--	40.0	40.0	--	--
8 Middle Fork Beargrass Creek at Beals Branch Road	10	10.0	10.0	--	--	30.0	50.0	10.0	30.0	50.0	--	--
9 Spring Ditch at Private Drive below Hanses Road	11	--	--	--	--	45.5	54.5	--	45.5	54.5	--	--
10 Muddy Fork at Mockingbird Valley Road	11	--	--	--	--	18.2	18.2	--	18.2	18.2	--	--
11 Goose Creek at U.S. Highway 42	10	--	--	--	--	--	10.0	--	--	10.0	--	--
12 Little Goose Creek at U.S. Highway 42	12	--	--	--	--	25.0	25.0	8.3	25.0	25.0	--	--
13 Goose Creek at Old Westport Road	10	10.0	10.0	--	--	30.0	50.0	10.0	30.0	50.0	--	--
14 Pope Lick at Pope Lick Road	13	--	--	--	--	7.7	7.7	--	7.7	7.7	--	--
15 Floyds Fork at former State Highway 155	13	7.7	7.7	--	--	7.7	30.8	7.7	7.7	30.8	--	--
16 Chenoweth Run at Gelhaus Road	12	8.3	8.3	--	--	25.0	25.0	8.3	25.0	25.0	--	--
17 Fern Creek at Old Bardstown Road	12	8.3	8.3	--	--	33.3	50.0	16.7	33.3	50.0	--	--
19 Fishpool Creek at Bost Road	10	20.0	20.0	--	--	20.0	20.0	20.0	20.0	20.0	--	--
20 Southern Ditch at Minors Lane	10	10.0	10.0	--	--	10.0	20.0	10.0	10.0	20.0	--	--
21 Floyds Fork at Bardstown Road	12	8.3	8.3	--	--	25.0	33.3	8.3	25.0	33.3	--	--
22 Cedar Creek at Thixton Road	12	8.3	8.3	--	--	33.3	41.7	8.3	33.3	41.7	--	--
23 Pennsylvania Run at Mt. Washington Road	12	--	--	--	--	16.7	25.0	--	16.7	25.0	--	--
24 Mill Creek Cutoff at Dover Road	10	10.0	10.0	--	--	10.0	30.0	10.0	10.0	30.0	--	--
25 Harrods Creek at Hunting Creek Drive	11	9.1	9.1	--	--	36.4	63.6	18.2	36.4	63.6	--	--
26 Long Run at State Highway 1531	9	11.1	11.1	--	--	22.2	33.3	11.1	22.2	33.3	--	--

Table 13.--Number of water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, and percentage of samples not meeting indicated water-quality criteria, based on available data from February 1988-March 1991--Continued

Site number and name	N	MCL	MCLG	PMCLG	SMCL	ALA	ALC	KYDWS	KYAHA	KYAHC	KYRP	KYRS
Copper, total, in micrograms per liter as Cu												
1 Pond Creek at Pendleton Road	12	--	--	--	--	25.0	25.0	--	25.0	25.0	--	--
2 Mill Creek at Orell Road	10	--	--	--	--	30.0	40.0	--	30.0	40.0	--	--
3 Pond Creek at Manslick Road	12	--	--	--	--	33.3	50.0	--	33.3	50.0	--	--
5 South Fork Beargrass Creek at Winter Avenue	11	--	--	--	--	27.3	36.4	--	27.3	36.4	--	--
6 South Fork Beargrass Creek at Trevilian Way	11	--	--	--	--	27.3	27.3	--	27.3	27.3	--	--
7 Middle Fork Beargrass Creek at Old Cannons Lane	10	--	--	--	--	30.0	40.0	--	30.0	40.0	--	--
8 Middle Fork Beargrass Creek at Beals Branch Road	10	--	--	--	--	30.0	50.0	--	30.0	50.0	--	--
9 Spring Ditch at Private Drive below Hanses Road	11	--	--	--	--	18.2	45.5	--	18.2	45.5	--	--
10 Muddy Fork at Mockingbird Valley Road	11	--	--	9.1	9.1	18.2	18.2	9.1	18.2	18.2	--	--
11 Goose Creek at U.S. Highway 42	10	--	--	--	--	10.0	40.0	--	10.0	40.0	--	--
12 Little Goose Creek at U.S. Highway 42	12	--	--	--	--	--	33.3	--	--	33.3	--	--
13 Goose Creek at Old Westport Road	10	--	--	--	--	30.0	50.0	--	30.0	50.0	--	--
14 Pope Lick at Pope Lick Road	13	--	--	--	--	--	15.4	--	--	15.4	--	--
15 Floyds Fork at former State Highway 155	13	--	--	--	--	23.1	30.8	--	23.1	30.8	--	--
16 Chenoweth Run at Gelhaus Road	13	--	--	--	--	23.1	46.2	--	23.1	46.2	--	--
17 Fern Creek at Old Bardstown Road	12	--	--	--	--	25.0	33.3	--	25.0	33.3	--	--
18 Northern Ditch at Preston Highway	11	--	--	--	--	9.1	9.1	--	9.1	9.1	--	--
19 Fishpool Creek at Bost Road	10	--	--	--	--	30.0	40.0	--	30.0	40.0	--	--
20 Southern Ditch at Minors Lane	10	--	--	--	--	20.0	20.0	--	20.0	20.0	--	--
21 Floyds Fork at Bardstown Road	12	--	--	--	--	8.3	16.7	--	8.3	16.7	--	--
22 Cedar Creek at Thixton Road	12	--	--	--	--	--	25.0	--	--	25.0	--	--
23 Pennsylvania Run at Mt. Washington Road	12	--	--	--	--	16.7	25.0	--	16.7	25.0	--	--
24 Mill Creek Cutoff at Dover Road	10	--	--	--	--	20.0	30.0	--	20.0	30.0	--	--
25 Harrods Creek at Hunting Creek Drive	11	--	--	--	--	18.2	27.3	--	18.2	27.3	--	--
26 Long Run at State Highway 1531	9	--	--	--	--	33.3	33.3	--	33.3	33.3	--	--
Iron, total, in micrograms per liter as Fe												
1 Pond Creek at Pendleton Road	12	--	--	--	50.0	--	50.0	--	8.3	50.0	--	--
2 Mill Creek at Orell Road	10	--	--	--	80.0	--	70.0	--	10.0	70.0	--	--
3 Pond Creek at Manslick Road	12	--	--	--	100.0	--	66.7	--	--	66.7	--	--
5 South Fork Beargrass Creek at Winter Avenue	11	--	--	--	72.7	--	45.5	--	9.1	45.5	--	--
6 South Fork Beargrass Creek at Trevilian Way	11	--	--	--	63.6	--	36.4	--	18.2	36.4	--	--
7 Middle Fork Beargrass Creek at Old Cannons Lane	10	--	--	--	40.0	--	20.0	--	--	20.0	--	--
8 Middle Fork Beargrass Creek at Beals Branch Road	10	--	--	--	60.0	--	40.0	--	10.0	40.0	--	--
9 Spring Ditch at Private Drive below Hanses Road	11	--	--	--	63.6	--	27.3	--	9.1	27.3	--	--
10 Muddy Fork at Mockingbird Valley Road	11	--	--	--	63.6	--	18.2	--	--	18.2	--	--
11 Goose Creek at U.S. Highway 42	10	--	--	--	40.0	--	10.0	--	--	10.0	--	--
12 Little Goose Creek at U.S. Highway 42	12	--	--	--	66.7	--	41.7	--	--	41.7	--	--
13 Goose Creek at Old Westport Road	10	--	--	--	60.0	--	20.0	--	--	20.0	--	--
14 Pope Lick at Pope Lick Road	13	--	--	--	46.2	--	38.5	--	15.4	38.5	--	--
15 Floyds Fork at former State Highway 155	13	--	--	--	76.9	--	53.8	--	23.1	53.8	--	--
16 Chenoweth Run at Gelhaus Road	13	--	--	--	53.8	--	7.7	--	7.7	7.7	--	--
17 Fern Creek at Old Bardstown Road	12	--	--	--	41.7	--	16.7	--	8.3	16.7	--	--
18 Northern Ditch at Preston Highway	11	--	--	--	45.5	--	18.2	--	--	18.2	--	--
19 Fishpool Creek at Bost Road	10	--	--	--	30.0	--	10.0	--	--	10.0	--	--
20 Southern Ditch at Minors Lane	10	--	--	--	90.0	--	20.0	--	--	20.0	--	--
21 Floyds Fork at Bardstown Road	12	--	--	--	75.0	--	16.7	--	--	16.7	--	--
22 Cedar Creek at Thixton Road	12	--	--	--	25.0	--	8.3	--	--	8.3	--	--
23 Pennsylvania Run at Mt. Washington Road	12	--	--	--	83.3	--	25.0	--	16.7	25.0	--	--
24 Mill Creek Cutoff at Dover Road	10	--	--	--	80.0	--	30.0	--	--	30.0	--	--
25 Harrods Creek at Hunting Creek Drive	11	--	--	--	90.9	--	36.4	--	9.1	36.4	--	--
26 Long Run at State Highway 1531	9	--	--	--	77.8	--	44.4	--	--	44.4	--	--

Table 13.--Number of water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, and percentage of samples not meeting indicated water-quality criteria, based on available data from February 1988-March 1991--Continued

Site number and name	N	MCL	MCLG	PMCLG	SMCL	ALA	ALC	KYDWS	KYAHA	KYAHC	KYRP	KYRS
Lead, total, in micrograms per liter as Pb												
1 Pond Creek at Pendleton Road	12	25.0	--	25.0	--	--	25.0	16.7	--	25.0	--	--
2 Mill Creek at Orell Road	10	20.0	--	20.0	--	10.0	20.0	20.0	10.0	20.0	--	--
3 Pond Creek at Manslick Road	12	8.3	--	8.3	--	--	8.3	8.3	--	8.3	--	--
7 Middle Fork Beargrass Creek at Old Cannons Lane	10	20.0	--	20.0	--	--	20.0	20.0	--	20.0	--	--
8 Middle Fork Beargrass Creek at Beals Branch Road	10	30.0	--	30.0	--	--	30.0	--	--	30.0	--	--
9 Spring Ditch at Private Drive below Hanses Road	11	18.2	--	18.2	--	--	18.2	9.1	--	18.2	--	--
12 Little Goose Creek at U.S. Highway 42	12	25.0	--	25.0	--	--	25.0	16.7	--	25.0	--	--
14 Pope Lick at Pope Lick Road	13	7.7	--	7.7	--	--	7.7	--	--	7.7	--	--
15 Floyds Fork at former State Highway 155	12	16.7	--	16.7	--	--	16.7	16.7	--	16.7	--	--
16 Chenoweth Run at Gelhaus Road	13	7.7	--	7.7	--	--	7.7	7.7	--	7.7	--	--
17 Fern Creek at Old Bardstown Road	12	16.7	--	16.7	--	--	16.7	8.3	--	16.7	--	--
19 Fishpool Creek at Bost Road	10	10.0	--	10.0	--	10.0	10.0	10.0	10.0	10.0	--	--
23 Pennsylvania Run at Mt. Washington Road	12	8.3	--	8.3	--	--	8.3	--	--	8.3	--	--
24 Mill Creek Cutoff at Dover Road	10	20.0	--	20.0	--	10.0	20.0	20.0	10.0	20.0	--	--
26 Long Run at State Highway 1531	9	11.1	--	11.1	--	--	11.1	11.1	--	11.1	--	--
Mercury, total recoverable, in micrograms per liter as Hg												
1 Pond Creek at Pendleton Road	11	--	--	--	--	--	27.3	27.3	--	27.3	--	--
2 Mill Creek at Orell Road	10	--	--	--	--	--	20.0	20.0	--	20.0	--	--
3 Pond Creek at Manslick Road	11	--	--	--	--	--	36.4	36.4	--	36.4	--	--
5 South Fork Beargrass Creek at Winter Avenue	11	--	--	--	--	--	45.5	45.5	--	45.5	--	--
6 South Fork Beargrass Creek at Trevilian Way	11	9.1	9.1	--	--	9.1	45.5	45.5	9.1	45.5	--	--
7 Middle Fork Beargrass Creek at Old Cannons Lane	10	--	--	--	--	--	50.0	50.0	--	50.0	--	--
8 Middle Fork Beargrass Creek at Beals Branch Road	10	--	--	--	--	--	40.0	40.0	--	40.0	--	--
9 Spring Ditch at Private Drive below Hanses Road	12	--	--	--	--	--	41.7	41.7	--	41.7	--	--
10 Muddy Fork at Mockingbird Valley Road	11	--	--	--	--	--	54.5	54.5	--	54.5	--	--
11 Goose Creek at U.S. Highway 42	10	--	--	--	--	--	30.0	30.0	--	30.0	--	--
12 Little Goose Creek at U.S. Highway 42	12	--	--	--	--	--	41.7	41.7	--	41.7	--	--
13 Goose Creek at Old Westport Road	7	--	--	--	--	--	42.9	42.9	--	42.9	--	--
14 Pope Lick at Pope Lick Road	13	--	--	--	--	--	53.8	53.8	--	53.8	--	--
15 Floyds Fork at former State Highway 155	12	--	--	--	--	--	33.3	33.3	--	33.3	--	--
16 Chenoweth Run at Gelhaus Road	13	7.7	7.7	--	--	7.7	38.5	38.5	7.7	38.5	--	--
17 Fern Creek at Old Bardstown Road	11	--	--	--	--	--	63.6	63.6	--	63.6	--	--
18 Northern Ditch at Preston Highway	12	--	--	--	--	--	33.3	33.3	--	33.3	--	--
19 Fishpool Creek at Bost Road	9	--	--	--	--	--	22.2	22.2	--	22.2	--	--
20 Southern Ditch at Minors Lane	9	--	--	--	--	--	44.4	44.4	--	44.4	--	--
21 Floyds Fork at Bardstown Road	12	8.3	8.3	--	--	8.3	58.3	58.3	8.3	58.3	--	--
22 Cedar Creek at Thixton Road	12	8.3	8.3	--	--	8.3	50.0	50.0	8.3	50.0	--	--
23 Pennsylvania Run at Mt. Washington Road	12	--	--	--	--	--	50.0	50.0	--	50.0	--	--
24 Mill Creek Cutoff at Dover Road	10	--	--	--	--	--	30.0	30.0	--	30.0	--	--
25 Harrods Creek at Hunting Creek Drive	10	--	--	--	--	--	50.0	50.0	--	50.0	--	--
26 Long Run at State Highway 1531	9	--	--	--	--	--	11.1	11.1	--	11.1	--	--

Table 13.--Number of water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, and percentage of samples not meeting indicated water-quality criteria, based on available data from February 1988-March 1991--Continued

Site number and name	N	MCL	MCLG	PMCLG	SMCL	ALA	ALC	KYDWS	KYAHA	KYAHC	KYRP	KYRS
Nickel, total, in micrograms per liter as Ni												
1 Pond Creek at Pendleton Road	12	--	--	--	--	--	--	16.7	--	--	--	--
2 Mill Creek at Orell Road	10	--	--	--	--	--	--	10.0	--	--	--	--
3 Pond Creek at Manslick Road	12	--	--	--	--	--	--	25.0	--	--	--	--
6 South Fork Beargrass Creek at Trevilian Way	10	--	--	--	--	--	--	10.0	--	--	--	--
7 Middle Fork Beargrass Creek at Old Cannons Lane	10	--	--	--	--	--	--	20.0	--	--	--	--
8 Middle Fork Beargrass Creek at Beals Branch Road	10	--	--	--	--	--	--	20.0	--	--	--	--
9 Spring Ditch at Private Drive below Hanses Road	11	--	--	--	--	--	--	45.5	--	--	--	--
10 Muddy Fork at Mockingbird Valley Road	11	--	--	--	--	--	--	9.1	--	--	--	--
12 Little Goose Creek at U.S. Highway 42	12	--	--	--	--	--	--	8.3	--	--	--	--
14 Pope Lick at Pope Lick Road	13	--	--	--	--	--	--	7.7	--	--	--	--
15 Floyds Fork at former State Highway 155	13	--	--	--	--	--	--	23.1	--	--	--	--
16 Chenoweth Run at Gelhaus Road	13	--	--	--	--	--	--	15.4	--	--	--	--
17 Fern Creek at Old Bardstown Road	12	--	--	--	--	--	--	8.3	--	--	--	--
18 Northern Ditch at Preston Highway	11	--	--	--	--	--	--	27.3	--	--	--	--
20 Southern Ditch at Minors Lane	10	--	--	--	--	--	--	20.0	--	--	--	--
21 Floyds Fork at Bardstown Road	12	--	--	--	--	--	--	8.3	--	--	--	--
22 Cedar Creek at Thixton Road	12	--	--	--	--	--	--	8.3	--	--	--	--
23 Pennsylvania Run at Mt. Washington Road	12	--	--	--	--	--	--	8.3	--	--	--	--
24 Mill Creek Cutoff at Dover Road	10	--	--	--	--	--	--	10.0	--	--	--	--
25 Harrods Creek at Hunting Creek Drive	11	--	--	--	--	--	--	9.1	--	--	--	--
26 Long Run at State Highway 1531	9	--	--	--	--	--	--	22.2	--	--	--	--
Silver, total, in micrograms per liter as Ag												
2 Mill Creek at Orell Road	10	--	--	--	--	10.0	--	--	10.0	--	--	--
13 Goose Creek at Old Westport Road	10	10.0	--	--	10.0	10.0	--	10.0	10.0	--	--	--
17 Fern Creek at Old Bardstown Road	12	8.3	--	--	8.3	8.3	--	8.3	8.3	--	--	--
25 Harrods Creek at Hunting Creek Drive	11	9.1	--	--	9.1	9.1	--	9.1	9.1	--	--	--
Zinc, total, in micrograms per liter as Zn												
2 Mill Creek at Orell Road	10	--	--	--	--	--	--	--	--	10.0	--	--
3 Pond Creek at Manslick Road	12	--	--	--	--	--	--	--	8.3	8.3	--	--
7 Middle Fork Beargrass Creek at Old Cannons Lane	10	--	--	--	--	--	--	--	10.0	10.0	--	--
8 Middle Fork Beargrass Creek at Beals Branch Road	10	--	--	--	--	--	--	--	--	10.0	--	--
10 Muddy Fork at Mockingbird Valley Road	11	--	--	--	--	--	--	--	9.1	9.1	--	--
11 Goose Creek at U.S. Highway 42	10	--	--	--	--	--	--	--	10.0	10.0	--	--
16 Chenoweth Run at Gelhaus Road	13	--	--	--	--	--	--	--	--	7.7	--	--
17 Fern Creek at Old Bardstown Road	12	--	--	--	--	--	--	--	8.3	16.7	--	--
20 Southern Ditch at Minors Lane	10	--	--	--	--	--	--	--	10.0	10.0	--	--
23 Pennsylvania Run at Mt. Washington Road	12	--	--	--	--	8.3	--	--	8.3	8.3	--	--
24 Mill Creek Cutoff at Dover Road	9	--	--	--	--	--	--	--	11.1	11.1	--	--

Table 13.--Number of water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, and percentage of samples not meeting indicated water-quality criteria, based on available data from February 1988-March 1991--Continued

Site number and name	N	MCL	MCLG	PMCLG	SMCL	ALA	ALC	KYDWS	KYAHA	KYAHC	KYRP	KYRS
Cyanide, total, in milligrams per liter as CN												
1 Pond Creek at Pendleton Road	11	--	--	--	--	--	9.1	--	9.1	--	--	--
3 Pond Creek at Manslick Road	11	--	--	--	--	--	9.1	--	9.1	--	--	--
5 South Fork Beargrass Creek at Winter Avenue	11	--	--	--	--	--	9.1	--	9.1	--	--	--
6 South Fork Beargrass Creek at Trevilian Way	11	--	--	--	--	--	18.2	--	18.2	--	--	--
7 Middle Fork Beargrass Creek at Old Cannons Lane	10	--	--	--	--	--	10.0	--	10.0	--	--	--
8 Middle Fork Beargrass Creek at Beals Branch Road	9	--	--	--	--	--	11.1	--	11.1	--	--	--
9 Spring Ditch at Private Drive below Hanses Road	12	--	--	--	--	--	8.3	--	8.3	--	--	--
10 Muddy Fork at Mockingbird Valley Road	10	--	--	--	--	--	20.0	--	20.0	--	--	--
11 Goose Creek at U.S. Highway 42	10	--	--	--	--	--	30.0	--	30.0	--	--	--
12 Little Goose Creek at U.S. Highway 42	12	--	--	--	--	--	8.3	--	8.3	--	--	--
13 Goose Creek at Old Westport Road	9	--	--	--	--	--	55.6	--	55.6	--	--	--
14 Pope Lick at Pope Lick Road	13	--	--	--	--	7.7	38.5	--	38.5	--	--	--
16 Chenoweth Run at Gelhaus Road	12	--	--	--	--	--	50.0	--	50.0	--	--	--
17 Fern Creek at Old Bardstown Road	11	--	--	--	--	18.2	36.4	--	36.4	--	--	--
18 Northern Ditch at Preston Highway	12	--	--	--	--	8.3	41.7	--	41.7	--	--	--
19 Fishpool Creek at Bost Road	10	--	--	--	--	10.0	40.0	--	40.0	--	--	--
20 Southern Ditch at Minors Lane	10	--	--	--	--	10.0	40.0	--	40.0	--	--	--
22 Cedar Creek at Thixton Road	11	--	--	--	--	9.1	9.1	--	9.1	--	--	--
23 Pennsylvania Run at Mt. Washington Road	12	--	--	--	--	25.0	50.0	--	50.0	--	--	--
24 Mill Creek Cutoff at Dover Road	9	--	--	--	--	--	11.1	--	11.1	--	--	--
26 Long Run at State Highway 1531	9	--	--	--	--	--	11.1	--	11.1	--	--	--
NUTRIENTS												
Nitrogen, ammonia, total, in milligrams per liter as N												
1 Pond Creek at Pendleton Road	70	--	--	--	--	--	--	--	1.4	--	--	--
2 Mill Creek at Orell Road	67	--	--	--	--	--	--	--	1.5	--	--	--
3 Pond Creek at Manslick Road	71	--	--	--	--	--	--	--	5.6	--	--	--
6 South Fork Beargrass Creek at Trevilian Way	72	--	--	--	--	--	--	--	2.8	--	--	--
11 Goose Creek at U.S. Highway 42	73	--	--	--	--	--	--	--	2.7	--	--	--
12 Little Goose Creek at U.S. Highway 42	73	--	--	--	--	--	--	--	1.4	--	--	--
13 Goose Creek at Old Westport Road	71	--	--	--	--	--	--	--	4.2	--	--	--
14 Pope Lick at Pope Lick Road	74	--	--	--	--	--	--	--	2.7	--	--	--
15 Floyds Fork at former State Highway 155	73	--	--	--	--	--	--	--	2.7	--	--	--
16 Chenoweth Run at Gelhaus Road	70	--	--	--	--	--	--	--	7.1	--	--	--
18 Northern Ditch at Preston Highway	71	--	--	--	--	--	--	--	7.0	--	--	--
19 Fishpool Creek at Bost Road	71	--	--	--	--	--	--	--	1.4	--	--	--
20 Southern Ditch at Minors Lane	70	--	--	--	--	--	--	--	5.7	--	--	--
22 Cedar Creek at Thixton Road	73	--	--	--	--	--	--	--	1.4	--	--	--
23 Pennsylvania Run at Mt. Washington Road	72	--	--	--	--	--	--	--	2.8	--	--	--
24 Mill Creek Cutoff at Dover Road	61	--	--	--	--	--	--	--	3.3	--	--	--
26 Long Run at State Highway 1531	54	--	--	--	--	--	--	--	3.7	--	--	--

Table 13.--Number of water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, and percentage of samples not meeting indicated water-quality criteria, based on available data from February 1988-March 1991--Continued

Site number and name	N	MCL	MCLG	PMCLG	SMCL	ALA	ALC	KYDWS	KYAHA	KYAHC	KYRP	KYRS
Nitrogen, nitrate, total, in milligrams per liter as N												
2 Mill Creek at Orell Road	68	1.5	1.5	--	--	--	--	1.5	--	--	--	--
3 Pond Creek at Manslick Road	73	1.4	1.4	--	--	--	--	1.4	--	--	--	--
7 Middle Fork Beargrass Creek at Old Cannons Lane	74	1.4	1.4	--	--	--	--	1.4	--	--	--	--
10 Muddy Fork at Mockingbird Valley Road	72	9.7	9.7	--	--	--	--	9.7	--	--	--	--
11 Goose Creek at U.S. Highway 42	72	1.4	1.4	--	--	--	--	1.4	--	--	--	--
12 Little Goose Creek at U.S. Highway 42	72	1.4	1.4	--	--	--	--	1.4	--	--	--	--
13 Goose Creek at Old Westport Road	71	2.8	2.8	--	--	--	--	2.8	--	--	--	--
14 Pope Lick at Pope Lick Road	74	13.5	13.5	--	--	--	--	13.5	--	--	--	--
16 Chenoweth Run at Gelhaus Road	72	15.3	15.3	--	--	--	--	15.3	--	--	--	--
17 Fern Creek at Old Bardstown Road	72	20.8	20.8	--	--	--	--	20.8	--	--	--	--
18 Northern Ditch at Preston Highway	74	14.9	14.9	--	--	--	--	14.9	--	--	--	--
19 Fishpool Creek at Bost Road	74	5.4	5.4	--	--	--	--	5.4	--	--	--	--
20 Southern Ditch at Minors Lane	73	1.4	1.4	--	--	--	--	1.4	--	--	--	--
22 Cedar Creek at Thixton Road	74	12.2	12.2	--	--	--	--	12.2	--	--	--	--
23 Pennsylvania Run at Mt. Washington Road	74	20.3	20.3	--	--	--	--	20.3	--	--	--	--
24 Mill Creek Cutoff at Dover Road	60	3.3	3.3	--	--	--	--	3.3	--	--	--	--
Nitrogen, nitrite, total, in milligrams per liter as N												
2 Mill Creek at Orell Road	69	1.4	1.4	--	--	--	--	--	--	--	--	--
3 Pond Creek at Manslick Road	73	1.4	1.4	--	--	--	--	--	--	--	--	--
11 Goose Creek at U.S. Highway 42	73	1.4	1.4	--	--	--	--	--	--	--	--	--
17 Fern Creek at Old Bardstown Road	73	1.4	1.4	--	--	--	--	--	--	--	--	--
25 Harrods Creek at Hunting Creek Drive	70	1.4	1.4	--	--	--	--	--	--	--	--	--
DISSOLVED OXYGEN												
Dissolved oxygen, in milligrams per liter												
1 Pond Creek at Pendleton Road	72	--	--	--	--	--	8.3	--	--	--	--	--
2 Mill Creek at Orell Road	67	--	--	--	--	--	7.5	--	--	--	--	--
3 Pond Creek at Manslick Road	74	--	--	--	--	2.7	16.2	--	2.7	--	--	--
5 South Fork Beargrass Creek at Winter Avenue	74	--	--	--	--	8.1	14.9	--	8.1	--	--	--
6 South Fork Beargrass Creek at Trevilian Way	73	--	--	--	--	--	2.7	--	--	--	--	--
7 Middle Fork Beargrass Creek at Old Cannons Lane	74	--	--	--	--	1.4	2.7	--	1.4	--	--	--
8 Middle Fork Beargrass Creek at Beals Branch Road	74	--	--	--	--	12.2	25.7	--	12.2	--	--	--
9 Spring Ditch at Private Drive below Hanses Road	74	--	--	--	--	2.7	14.9	--	2.7	--	--	--
13 Goose Creek at Old Westport Road	74	--	--	--	--	--	1.4	--	--	--	--	--
14 Pope Lick at Pope Lick Road	75	--	--	--	--	--	5.3	--	--	--	--	--
15 Floyds Fork at former State Highway 155	74	--	--	--	--	2.7	4.1	--	2.7	--	--	--
18 Northern Ditch at Preston Highway	76	--	--	--	--	1.3	1.3	--	1.3	--	--	--
19 Fishpool Creek at Bost Road	75	--	--	--	--	1.3	12.0	--	1.3	--	--	--
20 Southern Ditch at Minors Lane	75	--	--	--	--	2.7	8.0	--	2.7	--	--	--
21 Floyds Fork at Bardstown Road	75	--	--	--	--	--	6.7	--	--	--	--	--
23 Pennsylvania Run at Mt. Washington Road	75	--	--	--	--	4.0	26.7	--	4.0	--	--	--
24 Mill Creek Cutoff at Dover Road	63	--	--	--	--	--	3.2	--	--	--	--	--
25 Harrods Creek at Hunting Creek Drive	70	--	--	--	--	4.3	11.4	--	4.3	--	--	--
26 Long Run at State Highway 1531	55	--	--	--	--	1.8	1.8	--	1.8	--	--	--

Table 13.--Number of water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, and percentage of samples not meeting indicated water-quality criteria, based on available data from February 1988-March 1991--Continued

Site number and name	N	MCL	MCLG	PMCLG	SMCL	ALA	ALC	KYDWS	KYAHA	KYAHC	KYRP	KYRS
					SYNTHETIC ORGANIC COMPOUNDS							
Endrin, total, in micrograms per liter												
1 Pond Creek at Pendleton Road	12	--	--	--	--	--	16.7	--	--	16.7	--	--
6 South Fork Beargrass Creek at Trevilian Way	11	9.1	--	--	--	9.1	9.1	--	9.1	9.1	--	--
9 Spring Ditch at Private Drive below Hanses Road	12	8.3	--	--	--	8.3	8.3	--	8.3	8.3	--	--
11 Goose Creek at U.S. Highway 42	10	--	--	--	--	10.0	20.0	--	10.0	20.0	--	--
12 Little Goose Creek at U.S. Highway 42	12	--	--	--	--	--	8.3	--	--	8.3	--	--
13 Goose Creek at Old Westport Road	10	--	--	--	--	--	10.0	--	--	10.0	--	--
15 Floyds Fork at former State Highway 155	13	--	--	--	--	--	7.7	--	--	7.7	--	--
17 Fern Creek at Old Bardstown Road	12	8.3	--	--	--	8.3	8.3	--	8.3	8.3	--	--
18 Northern Ditch at Preston Highway	12	--	--	--	--	--	8.3	--	--	8.3	--	--
19 Fishpool Creek at Bost Road	10	10.0	--	--	--	10.0	10.0	10.0	10.0	10.0	--	--
20 Southern Ditch at Minors Lane	10	20.0	--	--	--	20.0	20.0	--	20.0	20.0	--	--
21 Floyds Fork at Bardstown Road	12	8.3	--	--	--	8.3	8.3	--	8.3	8.3	--	--
24 Mill Creek Cutoff at Dover Road	10	--	--	--	--	--	10.0	--	--	10.0	--	--
Lindane, total, in micrograms per liter												
1 Pond Creek at Pendleton Road	12	8.3	8.3	--	--	--	16.7	--	--	16.7	--	--
7 Middle Fork Beargrass Creek at Old Cannons Lane	9	--	--	--	--	--	11.1	--	--	11.1	--	--
9 Spring Ditch at Private Drive below Hanses Road	12	8.3	8.3	--	--	--	8.3	--	--	8.3	--	--
10 Muddy Fork at Mockingbird Valley Road	10	20.0	20.0	--	--	--	30.0	--	--	30.0	--	--
13 Goose Creek at Old Westport Road	10	--	--	--	--	--	30.0	--	--	30.0	--	--
14 Pope Lick at Pope Lick Road	13	--	--	--	--	--	7.7	--	--	7.7	--	--
15 Floyds Fork at former State Highway 155	13	--	--	--	--	--	7.7	--	--	7.7	--	--
17 Fern Creek at Old Bardstown Road	12	8.3	8.3	--	--	--	8.3	--	--	8.3	--	--
18 Northern Ditch at Preston Highway	12	--	--	--	--	--	16.7	--	--	16.7	--	--
21 Floyds Fork at Bardstown Road	12	8.3	8.3	--	--	--	8.3	--	--	8.3	--	--
22 Cedar Creek at Thixton Road	12	16.7	16.7	--	--	--	16.7	--	--	16.7	--	--
23 Pennsylvania Run at Mt. Washington Road	12	8.3	8.3	--	--	--	16.7	--	--	16.7	--	--
24 Mill Creek Cutoff at Dover Road	10	10.0	10.0	--	--	--	10.0	--	--	10.0	--	--
26 Long Run at State Highway 1531	9	--	--	--	--	--	22.2	--	--	22.2	--	--
Methoxychlor, total, in micrograms per liter												
1 Pond Creek at Pendleton Road	12	--	--	--	--	--	8.3	--	--	--	--	--
6 South Fork Beargrass Creek at Trevilian Way	11	--	--	--	--	--	18.2	--	--	--	--	--
7 Middle Fork Beargrass Creek at Old Cannons Lane	9	--	--	--	--	--	11.1	--	--	--	--	--
10 Muddy Fork at Mockingbird Valley Road	10	--	--	--	--	--	10.0	--	--	--	--	--
11 Goose Creek at U.S. Highway 42	10	--	--	--	--	--	10.0	--	--	--	--	--
12 Little Goose Creek at U.S. Highway 42	12	--	--	--	--	--	16.7	--	--	--	--	--
15 Floyds Fork at former State Highway 155	13	--	--	--	--	--	7.7	--	--	--	--	--
17 Fern Creek at Old Bardstown Road	12	--	--	--	--	--	8.3	--	--	--	--	--
19 Fishpool Creek at Bost Road	10	--	--	--	--	--	20.0	--	--	--	--	--
20 Southern Ditch at Minors Lane	10	--	--	--	--	--	30.0	--	--	--	--	--
21 Floyds Fork at Bardstown Road	12	--	--	--	--	--	8.3	--	--	--	--	--
22 Cedar Creek at Thixton Road	12	--	--	--	--	--	8.3	--	--	--	--	--
24 Mill Creek Cutoff at Dover Road	10	--	--	--	--	--	10.0	--	--	--	--	--
25 Harrods Creek at Hunting Creek Drive	11	--	--	--	--	--	9.1	--	--	--	--	--
Toxophene, total, in micrograms per liter												
1 Pond Creek at Pendleton Road	12	8.3	8.3	--	--	8.3	8.3	8.3	8.3	8.3	--	--
3 Pond Creek at Manslick Road	12	8.3	8.3	--	--	8.3	8.3	8.3	8.3	8.3	--	--
7 Middle Fork Beargrass Creek at Old Cannons Lane	9	11.1	11.1	--	--	11.1	11.1	11.1	11.1	11.1	--	--
8 Middle Fork Beargrass Creek at Beals Branch Road	10	10.0	10.0	--	--	10.0	10.0	10.0	10.0	10.0	--	--
25 Harrods Creek at Hunting Creek Drive	11	9.1	9.1	--	--	9.1	9.1	9.1	9.1	9.1	--	--

Table 13.--Number of water-quality constituent concentrations and water-quality characteristics measured at selected stream-sampling sites in Jefferson County, Kentucky, and percentage of samples not meeting indicated water-quality criteria, based on available data from February 1988-March 1991--Continued

Site number and name	N	MCL	MCLG	PMCLG	SMCL	ALA	ALC	KYDWS	KYAHA	KYAHC	KYRP	KYRS
FECAL-INDICATOR BACTERIA												
Coliform, fecal, membrane filtered, M-FC medium at 44.5 degrees Celsius, in colonies per 100 milliliters												
1 Pond Creek at Pendleton Road	74	--	--	--	--	--	--	10.8	--	--	43.2	10.8
2 Mill Creek at Orell Road	72	--	--	--	--	--	--	11.1	--	--	47.2	16.7
3 Pond Creek at Manslick Road	75	--	--	--	--	--	--	13.3	--	--	70.7	18.7
4 Mill Creek at Rockford Lane	2	--	--	--	--	--	--	--	--	--	50.0	--
5 South Fork Beargrass Creek at Winter Avenue	75	--	--	--	--	--	--	45.3	--	--	74.7	54.7
6 South Fork Beargrass Creek at Trevilian Way	74	--	--	--	--	--	--	14.9	--	--	21.6	16.2
7 Middle Fork Beargrass Creek at Old Cannons Lane	77	--	--	--	--	--	--	19.5	--	--	70.1	32.5
8 Middle Fork Beargrass Creek at Beals Branch Road	75	--	--	--	--	--	--	18.7	--	--	73.3	28.0
9 Spring Ditch at Private Drive below Hanses Road	77	--	--	--	--	--	--	19.5	--	--	79.2	35.1
10 Muddy Fork at Mockingbird Valley Road	76	--	--	--	--	--	--	7.9	--	--	32.9	13.2
11 Goose Creek at U.S. Highway 42	72	--	--	--	--	--	--	6.9	--	--	36.1	8.3
12 Little Goose Creek at U.S. Highway 42	73	--	--	--	--	--	--	6.8	--	--	50.7	13.7
13 Goose Creek at Old Westport Road	71	--	--	--	--	--	--	11.3	--	--	33.8	15.5
14 Pope Lick at Pope Lick Road	77	--	--	--	--	--	--	10.4	--	--	54.5	22.1
15 Floyds Fork at former State Highway 155	75	--	--	--	--	--	--	8.0	--	--	37.3	12.0
16 Chenoweth Run at Gelhaus Road	78	--	--	--	--	--	--	12.8	--	--	52.6	15.4
17 Fern Creek at Old Bardstown Road	75	--	--	--	--	--	--	17.3	--	--	60.0	32.0
18 Northern Ditch at Preston Highway	77	--	--	--	--	--	--	13.0	--	--	51.9	23.4
19 Fishpool Creek at Bost Road	77	--	--	--	--	--	--	14.3	--	--	58.4	23.4
20 Southern Ditch at Minors Lane	76	--	--	--	--	--	--	17.1	--	--	55.3	21.1
21 Floyds Fork at Bardstown Road	73	--	--	--	--	--	--	6.8	--	--	42.5	6.8
22 Cedar Creek at Thixton Road	74	--	--	--	--	--	--	4.1	--	--	44.6	9.5
23 Pennsylvania Run at Mt. Washington Road	75	--	--	--	--	--	--	1.3	--	--	44.0	5.3
24 Mill Creek Cutoff at Dover Road	63	--	--	--	--	--	--	12.7	--	--	46.0	19.0
25 Harrods Creek at Hunting Creek Drive	69	--	--	--	--	--	--	4.3	--	--	42.0	10.1
26 Long Run at State Highway 1531	55	--	--	--	--	--	--	7.3	--	--	40.0	12.7

Table 14.--Estimates of mean annual loads and mean annual yields, March 1988-February 1991, for water-quality constituents measured at selected stream-sampling sites in Jefferson County, Kentucky

[mi2, square miles; <, less than]

Site number and name	Number of observations	Mean annual load, in tons	Mean annual yield in tons/mi2	Standard error of regression	Flow duration of greatest sampled discharge, in percent	Percentage of load estimated beyond range of sampled discharge
DISSOLVED SOLIDS AND RELATED WATER-QUALITY CONSTITUENTS						
Dissolved solids, residue at 105 degrees Celsius						
1 Pond Creek at Pendleton Road	73	32,900	410	29.2	0.6	8.4
2 Mill Ck at Orell Road	68	2,170	161	43.9	.9	12.4
3 Pond Ck at Manslick Road	73	29,700	464	21.5	2.0	22.0
5 South Fork Beargrass Creek at Winter Avenue	74	12,700	560	41.7	.4	9.1
6 South Fork Beargrass Creek at Trevilian Way	74	7,910	465	22.8	.6	11.3
7 Middle Fork Beargrass Creek at Old Cannons Lane	74	8,410	445	20.2	1.6	21.9
8 Middle Fork Beargrass Creek at Beals Branch Road	72	10,200	449	19.3	1.5	22.1
9 Spring Ditch at Private Drive below Hanses Road	73	1,080	674	18.0	.0	.0
10 Muddy Fork at Mockingbird Valley Road	73	4,180	674	15.2	1.3	17.9
11 Goose Creek at U.S. Highway 42	73	3,950	391	14.5	.7	5.9
12 Little Goose Creek at U.S. Highway 42	74	3,150	544	21.5	.4	4.2
13 Goose Creek at Old Westport Road	72	3,010	501	31.6	.0	.0
14 Pope Lick at Pope Lick Road	73	1,730	595	21.8	.4	6.5
15 Floyds Fork at former State Highway 155	73	82,300	597	24.3	.0	.0
16 Chenoweth Run at Gelhaus Road	72	10,400	898	28.5	.0	.0
17 Fern Creek at Old Bardstown Road	72	2,550	729	19.9	.0	.0
18 Northern Ditch at Preston Highway	72	6,870	619	24.4	.2	1.6
19 Fishpool Creek at Bost Road	74	2,930	553	20.9	.0	.0
20 Southern Ditch at Minors Lane	71	4,900	383	14.5	.0	.0
21 Floyds Fork at Bardstown Road	73	122,000	574	28.0	1.6	28.4
22 Cedar Creek at Thixton Road	73	5,970	538	27.6	.6	8.0
23 Pennsylvania Run at Mt. Washington Road	74	2,960	462	35.1	.8	11.9
24 Mill Creek Cutoff at Dover Road	62	4,340	178	34.4	.4	15.0
25 Harrods Creek at Hunting Creek Drive	70	38,600	419	20.8	1.5	19.8
26 Long Run at State Highway 1531	52	12,400	553	15.7	.0	.0

Table 14.--Estimates of mean annual loads and mean annual yields, March 1988-February 1991, for water-quality constituents measured at selected stream-sampling sites in Jefferson County, Kentucky--Continued

Site number and name	Number of observations	Mean annual load, in tons	Mean annual yield in tons/mi2	Standard error of regression	Flow duration of greatest sampled discharge, in percent	Percentage of load estimated beyond range of sampled discharge
Calcium, total as Ca						
1 Pond Creek at Pendleton Road	11	5,190	64.7	14.8	27.6	76.3
2 Mill Ck at Orell Road	10	187	13.8	43.6	.9	8.6
3 Pond Ck at Manslick Road	12	4,770	74.5	9.9	21.4	72.9
5 South Fork Beargrass Creek at Winter Avenue	11	2,340	104	26.1	1.4	27.5
6 South Fork Beargrass Creek at Trevilian Way	11	1,190	70.2	13.5	1.7	17.9
7 Middle Fork Beargrass Creek at Old Cannons Lane	10	1,580	83.4	12.1	1.6	20.5
8 Middle Fork Beargrass Creek at Beals Branch Road	10	1,880	82.7	15.9	2.0	24.8
9 Spring Ditch at Private Drive below Hanses Road	11	241	150	16.5	18.8	59.0
10 Muddy Fork at Mockingbird Valley Road	11	1,230	199	17.1	33.9	88.2
11 Goose Creek at U.S. Highway 42	10	868	85.9	12.7	32.5	74.0
12 Little Goose Creek at U.S. Highway 42	12	594	102	13.4	9.4	40.8
13 Goose Creek at Old Westport Road	10	528	88.1	9.3	22.9	58.5
14 Pope Lick at Pope Lick Road	13	357	123	10.9	15.8	66.1
15 Floyds Fork at former State Highway 155	13	14,600	106	13.8	3.8	45.0
16 Chenoweth Run at Gelhaus Road	13	1,770	153	12.9	14.4	73.4
17 Fern Creek at Old Bardstown Road	12	451	129	23.7	.0	.0
18 Northern Ditch at Preston Highway	11	1,190	107	5.7	9.8	42.1
19 Fishpool Creek at Bost Road	10	550	104	42.0	15.0	75.0
20 Southern Ditch at Minors Lane	10	1,190	93.0	19.0	21.1	84.8
21 Floyds Fork at Bardstown Road	12	26,900	126	21.7	9.0	68.0
22 Cedar Creek at Thixton Road	12	918	82.7	22.4	8.6	47.5
23 Pennsylvania Run at Mt. Washington Road	12	427	66.7	28.7	13.5	62.6
24 Mill Creek Cutoff at Dover Road	10	319	13.1	19.5	9.2	71.5
25 Harrods Creek at Hunting Creek Drive	11	15,400	167	189	11.8	69.9
Magnesium, total as Mg						
1 Pond Creek at Pendleton Road	11	1,840	22.9	16.4	27.6	76.1
2 Mill Ck at Orell Road	10	55.3	4.10	53.7	.9	7.5
3 Pond Ck at Manslick Road	12	1,740	27.3	8.6	21.4	72.8
5 South Fork Beargrass Creek at Winter Avenue	11	507	22.4	21.9	1.4	27.1
6 South Fork Beargrass Creek at Trevilian Way	11	277	16.3	15.7	1.7	17.0
7 Middle Fork Beargrass Creek at Old Cannons Lane	10	368	19.5	8.3	1.6	21.5
8 Middle Fork Beargrass Creek at Beals Branch Road	10	425	18.7	15.9	2.0	26.2
9 Spring Ditch at Private Drive below Hanses Road	11	70.0	43.7	17.6	18.8	62.3
10 Muddy Fork at Mockingbird Valley Road	11	110	17.8	20.9	33.9	81.4
11 Goose Creek at U.S. Highway 42	10	310	30.7	9.6	32.5	71.6
12 Little Goose Creek at U.S. Highway 42	12	207	35.8	13.4	9.4	41.8
13 Goose Creek at Old Westport Road	10	220	36.7	8.8	22.9	58.8
14 Pope Lick at Pope Lick Road	13	150	51.9	11.1	15.8	67.4
15 Floyds Fork at former State Highway 155	13	3,230	23.4	17.7	3.8	40.9
16 Chenoweth Run at Gelhaus Road	12	558	48.1	14.5	14.4	69.2
17 Fern Creek at Old Bardstown Road	12	191	54.5	26.0	.0	.0
18 Northern Ditch at Preston Highway	11	528	47.6	8.8	9.8	48.2
19 Fishpool Creek at Bost Road	10	258	48.7	59.3	15.0	77.3
20 Southern Ditch at Minors Lane	10	522	40.8	27.5	21.1	85.0
21 Floyds Fork at Bardstown Road	12	7,440	34.9	26.5	9.0	66.8
22 Cedar Creek at Thixton Road	12	445	40.1	25.0	8.6	50.1
23 Pennsylvania Run at Mt. Washington Road	12	228	35.7	22.8	13.5	64.9
24 Mill Creek Cutoff at Dover Road	10	50.5	2.07	22.7	9.2	57.0
25 Harrods Creek at Hunting Creek Drive	11	2,960	32.1	11.9	11.8	48.1

Table 14.--Estimates of mean annual loads and mean annual yields, March 1988-February 1991, for water-quality constituents measured at selected stream-sampling sites in Jefferson County, Kentucky--Continued

Site number and name	Number of observations	Mean annual load, in tons	Mean annual yield in tons/mi2	Standard error of regression	Flow duration of greatest sampled discharge, in percent	Percentage of load estimated beyond range of sampled discharge
			SUSPENDED SOLIDS			
Suspended solids, residue at 105 degrees Celsius						
1 Pond Creek at Pendleton Road	73	23,400	291	78.1	0.6	38.8
2 Mill Ck at Orell Road	68	1,040	76.8	102.3	.9	25.8
3 Pond Ck at Manslick Road	73	22,600	353	74.0	2.0	49.7
5 South Fork Beargrass Creek at Winter Avenue	73	11,700	516	83.1	.4	37.1
6 South Fork Beargrass Creek at Trevilian Way	74	7,430	437	95.4	.6	50.7
7 Middle Fork Beargrass Creek at Old Cannons Lane	74	1,090	57.7	93.6	1.6	43.1
8 Middle Fork Beargrass Creek at Beals Branch Road	72	1,450	63.7	104.1	1.5	35.2
9 Spring Ditch at Private Drive below Hanses Road	73	316	198	95.2	.0	.0
10 Muddy Fork at Mockingbird Valley Road	73	511	82.4	95.7	1.3	25.8
11 Goose Creek at U.S. Highway 42	73	599	59.3	92.2	.7	18.5
12 Little Goose Creek at U.S. Highway 42	74	673	116	99.9	.4	8.2
13 Goose Creek at Old Westport Road	72	570	95.0	98.9	.0	.0
14 Pope Lick at Pope Lick Road	74	253	87.1	100.5	.4	25.2
15 Floyds Fork at former State Highway 155	73	21,400	155	107.9	.0	.0
16 Chenoweth Run at Gelhaus Road	72	3,340	288	96.3	.0	.0
17 Fern Creek at Old Bardstown Road	72	601	172	102.6	.0	.0
18 Northern Ditch at Preston Highway	73	1,670	150	95.6	.2	8.8
19 Fishpool Creek at Bost Road	74	623	118	111.2	.0	.0
20 Southern Ditch at Minors Lane	72	1,550	121	90.6	.0	.0
21 Floyds Fork at Bardstown Road	73	58,500	275	93.7	1.6	55.9
22 Cedar Creek at Thixton Road	73	436	39.2	103.5	.6	20.0
23 Pennsylvania Run at Mt. Washington Road	74	221	34.6	106.2	.8	12.1
24 Mill Creek Cutoff at Dover Road	62	1,340	55.1	88.1	.4	27.0
25 Harrods Creek at Hunting Creek Drive	70	6,520	70.8	105.7	1.5	22.2
26 Long Run at State Highway 1531	53	3,880	172	103.2	.0	.0

Table 14.--Estimates of mean annual loads and mean annual yields, March 1988-February 1991, for water-quality constituents measured at selected stream-sampling sites in Jefferson County, Kentucky--Continued

Site number and name	Number of observations	Mean annual load, in tons	Mean annual yield in tons/mi2	Standard error of regression	Flow duration of greatest sampled discharge, in percent	Percentage of load estimated beyond range of sampled discharge
Residue, volatile nonfilterable						
1 Pond Creek at Pendleton Road	73	3,520	43.8	108.9	0.6	26.6
2 Mill Ck at Orell Road	68	354	26.2	147.7	.9	25.4
3 Pond Ck at Manslick Road	73	5,290	82.7	123.7	2.0	45.9
5 South Fork Beargrass Creek at Winter Avenue	73	3,970	176	120.0	.4	29.1
6 South Fork Beargrass Creek at Trevilian Way	74	2,510	147	99.6	.6	48.1
7 Middle Fork Beargrass Creek at Old Cannons Lane	74	454	24.0	116.1	1.6	39.2
8 Middle Fork Beargrass Creek at Beals Branch Road	72	423	18.7	102.0	1.5	32.6
9 Spring Ditch at Private Drive below Hanses Road	73	68.9	43.1	107.2	.0	.0
10 Muddy Fork at Mockingbird Valley Road	73	103	16.6	100.6	1.3	23.2
11 Goose Creek at U.S. Highway 42	73	156	15.4	130.5	.7	13.4
12 Little Goose Creek at U.S. Highway 42	74	149	25.8	128.1	.4	8.3
13 Goose Creek at Old Westport Road	72	173	28.8	127.1	.0	.0
14 Pope Lick at Pope Lick Road	74	38.8	13.4	108.1	.4	11.2
15 Floyds Fork at former State Highway 155	73	4,770	34.6	145.2	.0	.0
16 Chenoweth Run at Gelhaus Road	72	1,000	86.2	135.7	.0	.0
17 Fern Creek at Old Bardstown Road	72	200	57.0	125.2	.0	.0
18 Northern Ditch at Preston Highway	73	395	35.6	128.0	.2	5.9
19 Fishpool Creek at Bost Road	74	186	35.1	134.2	.0	.0
20 Southern Ditch at Minors Lane	72	393	30.7	135.9	.0	.0
21 Floyds Fork at Bardstown Road	73	13,500	63.2	101.9	1.6	54.1
22 Cedar Creek at Thixton Road	73	152	13.7	123.3	.6	18.0
23 Pennsylvania Run at Mt. Washington Road	74	69.4	10.8	116.9	.8	12.4
24 Mill Creek Cutoff at Dover Road	62	293	12.0	106.2	.4	23.2
25 Harrods Creek at Hunting Creek Drive	70	1,380	14.9	179.9	1.5	17.0
26 Long Run at State Highway 1531	53	471	20.9	115.4	.0	.0
MAJOR METALS, TRACE ELEMENTAS, AND MISCELLANEOUS INORGANIC COMPOUNDS						
Barium, total as Ba						
1 Pond Creek at Pendleton Road	12	5.7	.071	43.6	27.6	84.4
2 Mill Ck at Orell Road	10	.4	.029	42.0	.9	15.4
3 Pond Ck at Manslick Road	12	4.4	.068	24.7	21.4	75.9
5 South Fork Beargrass Creek at Winter Avenue	11	2.4	.106	25.8	1.4	28.5
6 South Fork Beargrass Creek at Trevilian Way	11	1.4	.083	16.8	1.7	24.3
7 Middle Fork Beargrass Creek at Old Cannons Lane	10	1.4	.073	16.3	1.6	24.2
8 Middle Fork Beargrass Creek at Beals Branch Road	10	1.8	.080	22.9	2.0	30.4
9 Spring Ditch at Private Drive below Hanses Road	11	.2	.106	15.9	18.8	62.4
10 Muddy Fork at Mockingbird Valley Road	11	.5	.078	25.0	33.9	83.4
11 Goose Creek at U.S. Highway 42	10	.6	.064	35.5	32.5	73.6
12 Little Goose Creek at U.S. Highway 42	12	.5	.085	36.0	9.4	42.4
13 Goose Creek at Old Westport Road	10	.4	.067	26.9	22.9	56.5
14 Pope Lick at Pope Lick Road	13	.2	.052	110.1	15.8	56.5
15 Floyds Fork at former State Highway 155	13	7.8	.056	55.3	3.8	43.8
16 Chenoweth Run at Gelhaus Road	13	1.8	.151	48.5	14.4	82.5
17 Fern Creek at Old Bardstown Road	12	.8	.219	57.8	.0	.0
18 Northern Ditch at Preston Highway	11	1.1	.102	21.7	9.8	53.4
19 Fishpool Creek at Bost Road	10	.3	.063	66.2	15.0	71.3
20 Southern Ditch at Minors Lane	10	.7	.057	17.6	21.1	81.5
21 Floyds Fork at Bardstown Road	12	18.5	.087	19.5	9.0	68.0
22 Cedar Creek at Thixton Road	12	.6	.050	33.1	8.6	47.9
23 Pennsylvania Run at Mt. Washington Road	12	.3	.048	17.2	13.5	55.5
24 Mill Creek Cutoff at Dover Road	10	.6	.023	19.6	9.2	84.2
25 Harrods Creek at Hunting Creek Drive	11	2.9	.032	46.3	11.8	29.8

Table 14.--Estimates of mean annual loads and mean annual yields, March 1988-February 1991, for water-quality constituents measured at selected stream-sampling sites in Jefferson County, Kentucky--Continued

Site number and name	Number of observations	Mean annual load, in tons	Mean annual yield in tons/mi2	Standard error of regression	Flow duration of greatest sampled discharge, in percent	Percentage of load estimated beyond range of sampled discharge
Chromium, total as Cr						
1 Pond Creek at Pendleton Road	12	0.8	0.011	153.8	27.6	60.2
3 Pond Ck at Manslick Road	12	.9	.013	136.6	21.4	35.0
5 South Fork Beargrass Creek at Winter Avenue	11	.5	.023	50.5	1.4	42.0
6 South Fork Beargrass Creek at Trevilian Way	11	1.2	.068	218.2	1.7	21.5
7 Middle Fork Beargrass Creek at Old Cannons Lane	10	.5	.026	78.7	1.6	34.4
8 Middle Fork Beargrass Creek at Beals Branch Road	10	1.1	.050	111.7	2.0	43.1
9 Spring Ditch at Private Drive below Hanses Road	11	.1	.077	96.9	18.8	81.9
17 Fern Creek at Old Bardstown Road	12	.4	.107	189.8	.0	.0
24 Mill Creek Cutoff at Dover Road	10	.4	.017	161.2	9.2	90.2
25 Harrods Creek at Hunting Creek Drive	11	6.3	.069	481.8	11.8	60.0
Copper, total as Cu						
1 Pond Creek at Pendleton Road	12	2.3	.028	129.6	27.6	85.2
2 Mill Ck at Orell Road	10	.1	.010	112.4	.9	16.9
3 Pond Ck at Manslick Road	12	1.6	.025	137.0	21.4	72.1
5 South Fork Beargrass Creek at Winter Avenue	11	.7	.031	111.4	1.4	31.1
6 South Fork Beargrass Creek at Trevilian Way	11	.4	.020	116.1	1.7	20.7
7 Middle Fork Beargrass Creek at Old Cannons Lane	10	.6	.029	141.6	1.6	10.4
8 Middle Fork Beargrass Creek at Beals Branch Road	10	1.3	.057	129.5	2.0	32.4
9 Spring Ditch at Private Drive below Hanses Road	11	<.1	.030	81.9	18.8	50.7
10 Muddy Fork at Mockingbird Valley Road	11	.2	.024	172.2	33.9	14.5
11 Goose Creek at U.S. Highway 42	10	.2	.023	112.3	32.5	68.9
13 Goose Creek at Old Westport Road	10	.1	.022	112.3	22.9	42.7
14 Pope Lick at Pope Lick Road	13	<.1	.013	94.2	15.8	45.8
15 Floyds Fork at former State Highway 155	13	3.5	.026	92.3	3.8	43.1
16 Chenoweth Run at Gelhaus Road	13	.3	.023	114.6	14.4	49.5
17 Fern Creek at Old Bardstown Road	12	.2	.059	126.8	.0	.0
18 Northern Ditch at Preston Highway	11	.3	.025	63.9	9.8	28.1
19 Fishpool Creek at Bost Road	10	.3	.051	146.3	15.0	80.4
20 Southern Ditch at Minors Lane	10	.1	.010	117.5	21.1	65.1
21 Floyds Fork at Bardstown Road	12	4.0	.019	88.9	9.0	63.0
22 Cedar Creek at Thixton Road	12	.2	.016	108.8	8.6	48.8
23 Pennsylvania Run at Mt. Washington Road	12	.1	.022	118.2	13.5	56.0
24 Mill Creek Cutoff at Dover Road	10	.1	.003	116.9	9.2	70.8
25 Harrods Creek at Hunting Creek Drive	11	.7	.007	141.4	11.8	18.4

Table 14.--Estimates of mean annual loads and mean annual yields, March 1988-February 1991, for water-quality constituents measured at selected stream-sampling sites in Jefferson County, Kentucky--Continued

Site number and name	Number of obser-vations	Mean annual load, in tons	Mean annual yield in tons/mi2	Standard error of regression	Flow duration of greatest sampled discharge, in percent	Percentage of load estimated beyond range of sampled discharge
Iron, total as Fe						
1 Pond Creek at Pendleton Road	12	953	11.9	228.4	27.6	98.8
2 Mill Ck at Orell Road	10	32.7	2.42	132.6	.9	19.7
3 Pond Ck at Manslick Road	12	160	2.50	81.7	21.4	77.1
5 South Fork Beargrass Creek at Winter Avenue	11	74.8	3.31	134.4	1.4	33.7
6 South Fork Beargrass Creek at Trevilian Way	11	69.2	4.07	250.2	1.7	37.6
7 Middle Fork Beargrass Creek at Old Cannons Lane	10	55.9	2.96	169.5	1.6	51.5
8 Middle Fork Beargrass Creek at Beals Branch Road	10	96.6	4.26	200.4	2.0	49.7
9 Spring Ditch at Private Drive below Hanses Road	11	5.7	3.56	160.3	18.8	75.9
10 Muddy Fork at Mockingbird Valley Road	11	5.0	.810	152.6	33.9	86.5
11 Goose Creek at U.S. Highway 42	10	10.3	1.02	212.7	32.5	86.6
12 Little Goose Creek at U.S. Highway 42	12	9.4	1.62	106.4	9.4	40.4
13 Goose Creek at Old Westport Road	10	6.4	1.06	201.7	22.9	56.8
14 Pope Lick at Pope Lick Road	13	4.3	1.47	213.4	15.8	36.5
15 Floyds Fork at former State Highway 155	13	1,890	13.7	191.5	3.8	62.6
16 Chenoweth Run at Gelhaus Road	13	6.6	.567	171.2	14.4	26.5
17 Fern Creek at Old Bardstown Road	12	51.0	14.6	233.0	.0	.0
18 Northern Ditch at Preston Highway	11	25.0	2.25	94.2	9.8	73.8
19 Fishpool Creek at Bost Road	10	2.5	.468	167.0	15.0	53.9
20 Southern Ditch at Minors Lane	10	6.6	.513	50.2	21.1	64.2
21 Floyds Fork at Bardstown Road	12	1,550	7.26	175.2	9.0	86.9
22 Cedar Creek at Thixton Road	12	8.7	.781	145.5	8.6	62.8
23 Pennsylvania Run at Mt. Washington Road	12	8.4	1.31	183.5	13.5	35.1
24 Mill Creek Cutoff at Dover Road	10	98.0	4.02	55.9	9.2	94.5
25 Harrods Creek at Hunting Creek Drive	11	133	1.45	338.6	11.8	14.9
Mercury, total recoverable as Hg						
10 Muddy Fork at Mockingbird Valley Road	11	<.01	<.001	76.6	33.9	75.5
14 Pope Lick at Pope Lick Road	13	<.01	<.001	92.0	15.8	49.4
17 Fern Creek at Old Bardstown Road	12	.01	.002	173.3	.0	.0
21 Floyds Fork at Bardstown Road	12	.36	.002	118.9	9.0	79.3
Nickel, total as Ni						
9 Spring Ditch at Private Drive below Hanses Road	11	<.1	.033	76.7	18.8	60.1

Table 14.--Estimates of mean annual loads and mean annual yields, March 1988-February 1991, for water-quality constituents measured at selected stream-sampling sites in Jefferson County, Kentucky--Continued

Site number and name	Number of observations	Mean annual load, in tons	Mean annual yield in tons/mi2	Standard error of regression	Flow duration of greatest sampled discharge, in percent	Percentage of load estimated beyond range of sampled discharge
Zinc, total as Zn						
1 Pond Creek at Pendleton Road	12	2.1	0.026	154.6	27.6	68.8
2 Mill Ck at Orell Road	10	.3	.022	150.1	.9	16.2
3 Pond Ck at Manslick Road	12	3.6	.056	167.1	21.4	67.4
5 South Fork Beargrass Creek at Winter Avenue	11	1.8	.081	140.4	1.4	23.3
6 South Fork Beargrass Creek at Trevilian Way	11	1.2	.073	177.8	1.7	20.3
7 Middle Fork Beargrass Creek at Old Cannons Lane	10	2.9	.155	157.3	1.6	29.2
8 Middle Fork Beargrass Creek at Beals Branch Road	10	3.3	.145	121.7	2.0	37.6
9 Spring Ditch at Private Drive below Hanses Road	11	.4	.241	119.1	18.8	65.9
10 Muddy Fork at Mockingbird Valley Road	11	.7	.109	148.6	33.9	93.3
11 Goose Creek at U.S. Highway 42	10	.6	.061	154.0	32.5	71.9
12 Little Goose Creek at U.S. Highway 42	12	.3	.052	106.1	9.4	26.8
13 Goose Creek at Old Westport Road	10	.2	.035	152.2	22.9	33.8
14 Pope Lick at Pope Lick Road	13	.2	.078	59.4	15.8	63.2
15 Floyds Fork at former State Highway 155	13	10.7	.078	107.3	3.8	45.4
16 Chenoweth Run at Gelhaus Road	13	.4	.036	134.1	14.4	16.4
17 Fern Creek at Old Bardstown Road	12	1.1	.304	179.9	.0	.0
18 Northern Ditch at Preston Highway	11	1.1	.100	105.6	9.8	45.3
19 Fishpool Creek at Bost Road	10	.3	.051	107.4	15.0	69.6
20 Southern Ditch at Minors Lane	10	1.5	.120	98.3	21.1	92.9
21 Floyds Fork at Bardstown Road	12	9.3	.044	119.2	9.0	53.6
22 Cedar Creek at Thixton Road	12	.4	.031	108.1	8.6	27.4
23 Pennsylvania Run at Mt. Washington Road	12	.3	.048	111.5	13.5	46.7
25 Harrods Creek at Hunting Creek Drive	11	2.4	.026	248.2	11.8	30.6
Cyanide, total as Cn						
23 Pennsylvania Run at Mt. Washington Road	12	.1	.012	79.0	13.5	19.7
NUTURIENTS						
Nitrogen, ammonia, total as N						
1 Pond Creek at Pendleton Road	71	35.4	.441	154.8	.6	13.3
3 Pond Ck at Manslick Road	71	83.2	1.30	198.3	2.0	39.6
5 South Fork Beargrass Creek at Winter Avenue	72	30.7	1.36	186.6	.4	18.4
6 South Fork Beargrass Creek at Trevilian Way	72	15.0	.885	181.0	.6	9.5
9 Spring Ditch at Private Drive below Hanses Road	70	1.0	.619	174.1	.0	.0
13 Goose Creek at Old Westport Road	71	2.6	.425	202.5	.0	.0
14 Pope Lick at Pope Lick Road	74	1.6	.541	186.7	.4	2.3
16 Chenoweth Run at Gelhaus Road	71	8.8	.757	211.4	.0	.0
17 Fern Creek at Old Bardstown Road	71	5.2	1.49	189.8	.0	.0
18 Northern Ditch at Preston Highway	70	14.2	1.28	201.2	.2	.9
19 Fishpool Creek at Bost Road	71	2.5	.472	183.9	.3	8.4
20 Southern Ditch at Minors Lane	70	6.4	.498	186.8	1.6	36.0
21 Floyds Fork at Bardstown Road	73	24.5	.115	163.5	1.6	16.6
23 Pennsylvania Run at Mt. Washington Road	72	4.7	.731	198.6	.8	12.3

Table 14.--Estimates of mean annual loads and mean annual yields, March 1988-February 1991, for water-quality constituents measured at selected stream-sampling sites in Jefferson County, Kentucky--Continued

Site number and name	Number of observations	Mean annual load, in tons	Mean annual yield in tons/mi2	Standard error of regression	Flow duration of greatest sampled discharge, in percent	Percentage of load estimated beyond range of sampled discharge
Nitrogen, nitrate, total as N						
1 Pond Creek at Pendleton Road	73	258	3.21	86.4	0.6	9.0
2 Mill Ck at Orell Road	67	12.3	.913	111.4	.9	17.8
3 Pond Ck at Manslick Road	73	230	3.59	90.0	2.0	20.8
5 South Fork Beargrass Creek at Winter Avenue	73	75.8	3.36	93.5	.4	7.4
6 South Fork Beargrass Creek at Trevilian Way	73	53.8	3.16	92.2	.6	13.6
7 Middle Fork Beargrass Creek at Old Cannons Lane	74	71.7	3.79	102.4	1.6	20.3
8 Middle Fork Beargrass Creek at Beals Branch Road	73	81.7	3.60	99.5	1.5	22.7
9 Spring Ditch at Private Drive below Hanses Road	73	11.3	7.04	90.6	.0	.0
10 Muddy Fork at Mockingbird Valley Road	72	31.2	5.02	99.8	1.3	8.0
11 Goose Creek at U.S. Highway 42	72	50.3	4.98	47.5	.7	6.3
12 Little Goose Creek at U.S. Highway 42	72	47.2	8.14	50.7	.4	5.2
13 Goose Creek at Old Westport Road	71	35.0	5.84	64.4	.0	.0
14 Pope Lick at Pope Lick Road	74	13.3	4.56	85.3	.4	3.5
15 Floyds Fork at former State Highway 155	72	370	2.68	94.3	.0	.0
16 Chenoweth Run at Gelhaus Road	72	49.8	4.29	60.4	.0	.0
17 Fern Creek at Old Bardstown Road	72	38.9	11.1	99.0	.0	.0
18 Northern Ditch at Preston Highway	73	98.7	8.89	122.5	.2	1.0
19 Fishpool Creek at Bost Road	74	28.8	5.43	96.4	.0	.0
20 Southern Ditch at Minors Lane	73	42.2	3.30	97.8	.0	.0
21 Floyds Fork at Bardstown Road	73	634	2.98	86.1	1.6	29.2
22 Cedar Creek at Thixton Road	74	46.0	4.05	74.3	.6	7.2
23 Pennsylvania Run at Mt. Washington Road	74	22.6	3.54	93.7	.8	5.9
24 Mill Creek Cutoff at Dover Road	60	43.5	1.78	89.6	.4	11.6
25 Harrods Creek at Hunting Creek Drive	69	339	3.68	59.0	1.5	20.5
26 Long Run at State Highway 1531	53	64.6	2.87	103.6	.0	.0
Nitrogen, nitrite, total as N						
1 Pond Creek at Pendleton Road	73	13.0	.161	75.1	.6	18.7
2 Mill Ck at Orell Road	68	.9	.066	125.5	.9	21.9
3 Pond Ck at Manslick Road	73	15.8	.247	71.8	2.0	37.2
5 South Fork Beargrass Creek at Winter Avenue	74	2.1	.094	69.1	.4	12.5
6 South Fork Beargrass Creek at Trevilian Way	74	1.7	.101	70.3	.6	26.8
7 Middle Fork Beargrass Creek at Old Cannons Lane	74	.7	.035	84.5	1.6	26.1
8 Middle Fork Beargrass Creek at Beals Branch Road	73	.8	.034	83.0	1.5	23.7
9 Spring Ditch at Private Drive below Hanses Road	73	.3	.163	78.3	.0	.0
10 Muddy Fork at Mockingbird Valley Road	73	.5	.079	74.5	1.3	19.7
11 Goose Creek at U.S. Highway 42	73	1.1	.109	96.7	.7	12.7
12 Little Goose Creek at U.S. Highway 42	74	.7	.128	74.9	.4	12.9
13 Goose Creek at Old Westport Road	72	1.0	.168	95.6	.0	.0
14 Pope Lick at Pope Lick Road	74	.4	.131	72.7	.4	6.1
15 Floyds Fork at former State Highway 155	73	15.3	.111	77.2	.0	.0
16 Chenoweth Run at Gelhaus Road	73	2.1	.180	116.9	.0	.0
17 Fern Creek at Old Bardstown Road	73	.9	.249	104.5	.0	.0
18 Northern Ditch at Preston Highway	73	1.8	.159	61.1	.2	1.9
19 Fishpool Creek at Bost Road	74	1.4	.270	104.6	.0	.0
20 Southern Ditch at Minors Lane	73	1.7	.130	75.4	.0	.0
21 Floyds Fork at Bardstown Road	73	24.3	.114	81.1	1.6	43.1
22 Cedar Creek at Thixton Road	74	.9	.080	79.7	.6	16.4
23 Pennsylvania Run at Mt. Washington Road	74	1.1	.172	88.4	.8	14.6
24 Mill Creek Cutoff at Dover Road	62	1.8	.076	97.8	.6	12.2
25 Harrods Creek at Hunting Creek Drive	70	6.4	.069	133.3	1.5	27.9
26 Long Run at State Highway 1531	55	1.5	.067	69.7	.0	.0

Table 14.--Estimates of mean annual loads and mean annual yields, March 1988-February 1991, for water-quality constituents measured at selected stream-sampling sites in Jefferson County, Kentucky--Continued

Site number and name	Number of observations	Mean annual load, in tons	Mean annual yield in tons/mi2	Standard error of regression	Flow duration of greatest sampled discharge, in percent	Percentage of load estimated beyond range of sampled discharge
Nitrogen, organic, total as N						
1 Pond Creek at Pendleton Road	72	90.2	1.12	144.9	0.6	12.4
2 Mill Ck at Orell Road	68	5.8	.427	145.5	.9	16.8
3 Pond Ck at Manslick Road	72	82.4	1.29	141.8	2.0	23.9
5 South Fork Beargrass Creek at Winter Avenue	74	54.9	2.43	146.8	.4	17.0
6 South Fork Beargrass Creek at Trevilian Way	74	24.4	1.44	139.4	.6	19.5
7 Middle Fork Beargrass Creek at Old Cannons Lane	74	12.5	.662	152.2	1.6	23.4
8 Middle Fork Beargrass Creek at Beals Branch Road	73	13.4	.592	154.9	1.5	22.0
9 Spring Ditch at Private Drive below Hanses Road	72	8.1	5.07	142.2	.0	.0
10 Muddy Fork at Mockingbird Valley Road	73	3.9	.623	147.1	1.3	16.2
11 Goose Creek at U.S. Highway 42	72	8.0	.794	151.5	.7	9.0
12 Little Goose Creek at U.S. Highway 42	72	4.6	.802	149.1	.4	3.7
13 Goose Creek at Old Westport Road	72	12.1	2.02	165.3	.0	.0
14 Pope Lick at Pope Lick Road	74	5.3	1.83	128.6	.4	10.0
15 Floyds Fork at former State Highway 155	72	311	2.26	121.5	.0	.0
16 Chenoweth Run at Gelhaus Road	73	20.7	1.79	162.3	.0	.0
17 Fern Creek at Old Bardstown Road	73	5.9	1.69	133.4	.0	.0
18 Northern Ditch at Preston Highway	72	35.2	3.17	160.9	.2	4.7
19 Fishpool Creek at Bost Road	73	9.9	1.87	144.4	.3	8.3
20 Southern Ditch at Minors Lane	72	19.4	1.52	147.2	1.6	34.0
21 Floyds Fork at Bardstown Road	72	287	1.35	139.3	1.6	30.1
22 Cedar Creek at Thixton Road	74	18.7	1.68	123.0	.6	14.2
23 Pennsylvania Run at Mt. Washington Road	73	14.1	2.21	153.3	.8	17.0
24 Mill Creek Cutoff at Dover Road	62	46.0	1.89	145.0	.4	18.1
25 Harrods Creek at Hunting Creek Drive	70	143	1.55	228.2	1.5	28.6
26 Long Run at State Highway 1531	53	48.6	2.16	119.0	.0	.0

Table 14.--Estimates of mean annual loads and mean annual yields, March 1988-February 1991, for water-quality constituents measured at selected stream-sampling sites in Jefferson County, Kentucky--Continued

Site number and name	Number of observations	Mean annual load, in tons	Mean annual yield in tons/mi2	Standard error of regression	Flow duration of greatest sampled discharge, in percent	Percentage of load estimated beyond range of sampled discharge
Phosphate, total as PO_4						
1 Pond Creek at Pendleton Road	73	149	1.86	61.1	0.6	6.0
2 Mill Ck at Orell Road	66	12.9	.958	80.5	.9	24.1
3 Pond Ck at Manslick Road	73	168	2.63	57.6	2.0	18.6
5 South Fork Beargrass Creek at Winter Avenue	73	29.7	1.32	90.7	.4	21.1
6 South Fork Beargrass Creek at Trevilian Way	72	20.9	1.23	95.5	.6	36.1
7 Middle Fork Beargrass Creek at Old Cannons Lane	69	13.5	.716	99.7	1.6	35.5
8 Middle Fork Beargrass Creek at Beals Branch Road	69	11.0	.483	81.6	1.5	25.0
9 Spring Ditch at Private Drive below Hanses Road	71	6.5	4.08	74.6	.0	.0
10 Muddy Fork at Mockingbird Valley Road	72	9.6	1.55	58.3	1.3	4.9
11 Goose Creek at U.S. Highway 42	73	25.1	2.48	54.6	.7	3.5
12 Little Goose Creek at U.S. Highway 42	74	18.8	3.24	59.7	.4	2.3
13 Goose Creek at Old Westport Road	72	23.5	3.92	70.8	.0	.0
14 Pope Lick at Pope Lick Road	73	8.0	2.74	68.6	.4	3.7
15 Floyds Fork at former State Highway 155	72	203	1.47	80.6	.0	.0
16 Chenoweth Run at Gelhaus Road	71	60.6	5.23	58.3	.0	.0
17 Fern Creek at Old Bardstown Road	72	18.2	5.19	64.3	.0	.0
18 Northern Ditch at Preston Highway	72	49.5	4.46	70.4	.2	1.0
19 Fishpool Creek at Bost Road	72	16.5	3.11	73.3	.0	.0
20 Southern Ditch at Minors Lane	72	22.4	1.75	76.1	.0	.0
21 Floyds Fork at Bardstown Road	72	243	1.14	67.3	1.6	21.2
22 Cedar Creek at Thixton Road	73	26.6	2.39	69.3	.6	4.6
23 Pennsylvania Run at Mt. Washington Road	73	15.0	2.35	68.9	.8	6.7
24 Mill Creek Cutoff at Dover Road	61	63.2	2.59	85.5	.4	18.7
25 Harrods Creek at Hunting Creek Drive	70	106	1.16	108.0	1.5	17.3
26 Long Run at State Highway 1531	52	85.2	3.78	96.4	.0	.0
Phosphorus, orthophosphate, total as P						
1 Pond Creek at Pendleton Road	73	48.6	.605	61.1	.6	6.0
2 Mill Ck at Orell Road	67	4.6	.342	87.2	.9	25.3
3 Pond Ck at Manslick Road	73	54.8	.857	57.6	2.0	18.6
5 South Fork Beargrass Creek at Winter Avenue	73	9.7	.430	90.7	.4	21.1
6 South Fork Beargrass Creek at Trevilian Way	73	7.2	.421	97.2	.6	37.4
7 Middle Fork Beargrass Creek at Old Cannons Lane	73	4.5	.237	111.7	1.6	36.7
8 Middle Fork Beargrass Creek at Beals Branch Road	72	3.3	.145	92.7	1.5	23.7
9 Spring Ditch at Private Drive below Hanses Road	73	2.5	1.54	99.3	.0	.0
10 Muddy Fork at Mockingbird Valley Road	72	3.1	.506	58.3	1.3	4.9
11 Goose Creek at U.S. Highway 42	73	8.2	.811	54.6	.7	3.5
12 Little Goose Creek at U.S. Highway 42	74	6.1	1.06	59.7	.4	2.3
13 Goose Creek at Old Westport Road	72	7.7	1.28	70.8	.0	.0
14 Pope Lick at Pope Lick Road	73	2.6	.893	68.6	.4	3.7
15 Floyds Fork at former State Highway 155	72	66.3	.481	80.6	.0	.0
16 Chenoweth Run at Gelhaus Road	71	19.8	1.70	58.3	.0	.0
17 Fern Creek at Old Bardstown Road	72	5.9	1.69	64.3	.0	.0
18 Northern Ditch at Preston Highway	73	18.0	1.62	89.5	.2	1.0
19 Fishpool Creek at Bost Road	73	5.9	1.11	90.7	.0	.0
20 Southern Ditch at Minors Lane	73	8.6	.673	91.2	.0	.0
21 Floyds Fork at Bardstown Road	72	79.2	.372	67.3	1.6	21.2
22 Cedar Creek at Thixton Road	73	8.7	.781	69.3	.6	4.6
23 Pennsylvania Run at Mt. Washington Road	73	4.9	.767	68.9	.8	6.7
24 Mill Creek Cutoff at Dover Road	61	20.6	.845	85.5	.4	18.7
25 Harrods Creek at Hunting Creek Drive	70	34.9	.379	108.1	1.5	17.3
26 Long Run at State Highway 1531	53	26.5	1.18	104.0	.0	.0

Table 14.--Estimates of mean annual loads and mean annual yields, March 1988-February 1991, for water-quality constituents measured at selected stream-sampling sites in Jefferson County, Kentucky--Continued

Site number and name	Number of observations	Mean annual load, in tons	Mean annual yield in tons/mi2	Standard error of regression	Flow duration of greatest sampled discharge, in percent	Percentage of load estimated beyond range of sampled discharge
DISSOLVED OXYGEN AND OXYGEN DEMAND						
Dissolved oxygen						
1 Pond Creek at Pendleton Road	72	956	11.9	14.8	0.6	10.6
2 Mill Ck at Orell Road	66	101	7.50	16.3	.9	16.7
3 Pond Ck at Manslick Road	74	879	13.7	19.3	2.0	28.4
5 South Fork Beargrass Creek at Winter Avenue	74	360	16.0	29.0	.4	9.1
6 South Fork Beargrass Creek at Trevilian Way	73	246	14.5	32.0	.6	11.6
7 Middle Fork Beargrass Creek at Old Cannons Lane	74	321	17.0	24.7	1.6	24.6
8 Middle Fork Beargrass Creek at Beals Branch Road	74	423	18.6	37.3	1.5	30.1
9 Spring Ditch at Private Drive below Hanses Road	73	42.8	26.8	36.0	.0	.0
10 Muddy Fork at Mockingbird Valley Road	74	95.6	15.4	15.4	1.3	19.6
11 Goose Creek at U.S. Highway 42	74	152	15.1	11.0	.7	7.9
12 Little Goose Creek at U.S. Highway 42	75	116	20.1	12.6	.4	6.1
13 Goose Creek at Old Westport Road	74	116	19.3	22.1	.0	.0
14 Pope Lick at Pope Lick Road	75	46.4	16.0	15.6	.4	7.2
15 Floyds Fork at former State Highway 155	74	3,090	22.4	21.3	.0	.0
16 Chenoweth Run at Gelhaus Road	74	290	25.0	17.4	.0	.0
17 Fern Creek at Old Bardstown Road	74	80.4	23.0	15.0	.0	.0
18 Northern Ditch at Preston Highway	75	235	21.1	22.5	.18	2.7
19 Fishpool Creek at Bost Road	75	101	19.0	28.6	.00	.0
20 Southern Ditch at Minors Lane	75	159	12.4	28.3	.00	.0
21 Floyds Fork at Bardstown Road	75	5,180	24.3	18.2	1.6	33.1
22 Cedar Creek at Thixton Road	75	186	16.8	15.8	.6	10.1
23 Pennsylvania Run at Mt. Washington Road	75	94.8	14.8	15.7	.8	14.3
24 Mill Creek Cutoff at Dover Road	63	150	6.16	26.4	.4	14.8
25 Harrods Creek at Hunting Creek Drive	70	1,550	16.8	20.8	1.5	19.8
26 Long Run at State Highway 1531	54	493	21.9	15.1	.0	.0
Biochemical oxygen demand, 5-day at 20 degrees Celsius						
1 Pond Creek at Pendleton Road	73	492	6.12	70.8	.6	16.8
2 Mill Ck at Orell Road	68	37.9	2.81	52.1	.9	22.0
3 Pond Ck at Manslick Road	73	599	9.36	60.6	2.0	40.2
5 South Fork Beargrass Creek at Winter Avenue	74	309	13.7	73.5	.4	17.4
7 Middle Fork Beargrass Creek at Old Cannons Lane	74	80.9	4.28	55.3	1.6	32.3
8 Middle Fork Beargrass Creek at Beals Branch Road	73	79.2	3.49	56.1	1.5	28.4
9 Spring Ditch at Private Drive below Hanses Road	73	22.7	14.2	58.1	.0	.0
10 Muddy Fork at Mockingbird Valley Road	73	20.8	3.35	53.1	1.3	21.8
11 Goose Creek at U.S. Highway 42	72	44.3	4.38	64.1	.7	12.3
12 Little Goose Creek at U.S. Highway 42	74	32.2	5.56	74.8	.4	7.8
13 Goose Creek at Old Westport Road	72	49.3	8.21	79.9	.0	.0
14 Pope Lick at Pope Lick Road	74	18.1	6.26	54.7	.4	10.5
15 Floyds Fork at former State Highway 155	73	788	5.71	55.6	.0	.0
16 Chenoweth Run at Gelhaus Road	73	146	12.6	56.8	.0	.0
17 Fern Creek at Old Bardstown Road	73	42.5	12.2	65.8	.0	.0
18 Northern Ditch at Preston Highway	73	100	9.02	60.3	.2	5.4
19 Fishpool Creek at Bost Road	74	33.8	6.38	59.3	.0	.0
20 Southern Ditch at Minors Lane	73	74.6	5.83	49.1	.0	.0
21 Floyds Fork at Bardstown Road	73	1,370	6.41	54.4	1.6	36.0
22 Cedar Creek at Thixton Road	74	56.0	5.04	61.6	.6	15.4
23 Pennsylvania Run at Mt. Washington Road	74	36.1	5.65	62.4	.8	16.2
24 Mill Creek Cutoff at Dover Road	62	116	4.75	60.9	.4	18.2
25 Harrods Creek at Hunting Creek Drive	70	524	5.69	74.6	1.5	22.6
26 Long Run at State Highway 1531	53	187	8.33	62.2	.0	.0

Table 14.--Estimates of mean annual loads and mean annual yields, March 1988-February 1991, for water-quality constituents measured at selected stream-sampling sites in Jefferson County, Kentucky--Continued

Site number and name	Number of observations	Mean annual load, in tons	Mean annual yield in tons/mi2	Standard error of regression	Flow duration of greatest sampled discharge, in percent	Percentage of load estimated beyond range of sampled discharge
Chemical oxygen demand, .25N dicromate						
1 Pond Creek at Pendleton Road	72	2,290	28.5	48.8	0.6	12.8
2 Mill Ck at Orell Road	67	311	23.0	59.2	.9	21.3
3 Pond Ck at Manslick Road	72	2,810	43.8	51.6	2.0	34.4
5 South Fork Beargrass Creek at Winter Avenue	72	666	29.5	74.9	.4	11.3
6 South Fork Beargrass Creek at Trevilian Way	73	482	28.3	72.5	.6	22.1
7 Middle Fork Beargrass Creek at Old Cannons Lane	74	321	17.0	67.4	1.6	23.5
8 Middle Fork Beargrass Creek at Beals Branch Road	73	491	21.6	65.8	1.5	27.1
9 Spring Ditch at Private Drive below Hanses Road	73	208	130	65.7	.0	.0
10 Muddy Fork at Mockingbird Valley Road	72	178	28.6	74.7	1.3	24.4
11 Goose Creek at U.S. Highway 42	71	218	21.6	71.7	.7	9.1
12 Little Goose Creek at U.S. Highway 42	73	235	40.5	79.4	.4	7.6
13 Goose Creek at Old Westport Road	70	197	32.8	62.0	.0	.0
14 Pope Lick at Pope Lick Road	74	86.6	29.8	54.4	.4	9.1
15 Floyds Fork at former State Highway 155	72	4,990	36.1	64.6	.0	.0
16 Chenoweth Run at Gelhaus Road	72	409	35.2	63.5	.0	.0
17 Fern Creek at Old Bardstown Road	72	88.9	25.4	69.1	.0	.0
18 Northern Ditch at Preston Highway	73	431	38.9	64.5	.2	3.9
19 Fishpool Creek at Bost Road	74	185	35.0	59.0	.0	.0
20 Southern Ditch at Minors Lane	73	388	30.3	67.7	.0	.0
21 Floyds Fork at Bardstown Road	73	7,440	34.9	65.4	1.6	33.0
22 Cedar Creek at Thixton Road	73	291	26.3	60.5	.6	11.7
23 Pennsylvania Run at Mt. Washington Road	74	185	28.9	55.0	.8	12.9
24 Mill Creek Cutoff at Dover Road	61	519	21.3	51.6	.4	16.7
25 Harrods Creek at Hunting Creek Drive	70	2,320	25.2	72.0	1.5	18.6
26 Long Run at State Highway 1531	53	1,010	44.8	61.4	.0	.0
SYNTHETIC ORGANIC COMPOUNDS						
2,4-D, total						
6 South Fork Beargrass Creek at Trevilian Way	11	.01	.001	154.3	1.7	30.9

WATER QUALITY OF SELECTED STREAMS IN JEFFERSON COUNTY, KENTUCKY, 1988-91

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