YIELDS OF SELECTED CONSTITUENTS IN BASE FLOW AND STORMFLOW IN URBAN WATERSHEDS OF JEFFERSON COUNTY, KENTUCKY, 1988-92

By Ronald D. Evaldi and Brian L. Moore

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CONVERSION FACTORS AND ABBREVIATED WATER-QUALITY UNITS

Multiply	By	To obtain
inch (in.)	25.4	millimeter
ton (ton)	907.2	kilogram
square mile (mi^2)	2.590	square kilometer
ton per square mile (ton/mi^2)	350.3	kilogram per square kilometer
cubic foot per second (ft^3/s)	28.32	cubic decimeter per second
cubic foot 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.

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ABSTRACT

In 1988, the U.S. Geological Survey began a cooperative program with the Louisville and Jefferson County Metropolitan Sewer District to assess the effects of urbanization on the water quality of streams in Jefferson County, Kentucky. This report presents mean annual base-flow and stormflow yields of selected water-quality constituents from watersheds of the county for 1988-92. These yields were estimated to help describe the proportions of constituent transport due to point and nonpoint sources.

Dissolved-oxygen transport was related to the amount of nonurban land use in the watersheds. Chemical oxygen demand (COD) generally was greatest during stormflow and was related to the amount of industrial land use in each watershed. The highly industrialized Spring Ditch Watershed yielded nearly twice the COD--76.6 tons per square mile (ton/mi^2)--of any other sampled watershed in the county. Oxygen needed for biochemical oxidation of organic material in the water (BOD) was greatest in the Chenoweth Run Watershed (16.9 ton/mi^2).

Dissolved-solids transport occurred primarily during stormflow except in the Fern Creek, Goose Creek, Little Goose Creek, Northern Ditch, and Spring Ditch Watersheds, an indication that these areas may be affected by point-source discharges. Yields of dissolved solids in base flow ranged from less than 100 ton/mi^2 in the Mill Creek Watershed to greater than 300 ton/mi^2 in the Fern Creek, upper Goose Creek, and Northern Ditch Watersheds. Yields of dissolved solids in stormflow ranged from less than 100 ton/mi^2 in the lower Goose Creek and Mill Creek Watersheds to greater than 500 ton/mi^2 in the Chenoweth Run and lower South Fork Beargrass Creek Watersheds. Transport of volatile and nonvolatile suspended solids occurred primarily during stormflow.

Nitrite and phosphorus transport was inversely proportional to the amount of nonurban and commercial land use in the watersheds. Nitrite transport occurred primarily during stormflow, except in the upper Goose Creek Watershed. Greater than 60 percent of the nitrate transport in the Goose Creek, Little Goose Creek, and Northern Ditch Watersheds occurred during base flow. Ammonia transport occurred primarily during stormflow except in the Little Goose Creek, Northern Ditch, and Spring Ditch Watersheds. Yields of total organic nitrogen in base flow were largest in the upper Goose Creek, Northern Ditch, Pennsylvania Run, and Spring Ditch Watersheds.

Transport of metals from most of the watersheds occurred primarily during stormflow; however, yields of barium, copper, and iron in base flow exceeded yields in stormflow in the Goose Creek Watershed. Chromium and nickel yields were largest in the highly industrialized Spring Ditch Watershed. Yields of zinc in base flow and stormflow were related to the degree of urbanization in each watershed and were largest in the Muddy Fork Watershed.

INTRODUCTION

Jefferson County, which includes the city of Louisville, is a rapidly developing urban area. As urbanization has progressed, rural areas have been replaced by residences, businesses, industrial facilities, shopping centers, and parking lots. Drainage from such urban areas can contain many contaminants that are primarily anthropogenic and include organic debris, sediments, nutrients, petroleum-based products, and potentially toxic chemicals such as trace metals and pesticides. The pathways by which such contaminants reach urban streams can be either be direct discharge through some conveyance to a definable point on the stream (point-source discharge), or by widespread drainage (nonpoint-source discharge).

Contaminants from point sources, such as municipal and industrial wastewater discharges, commonly enter urban streams during periods of stormflow and base flow; the greatest detrimental effects, however, are usually noted during base flow because of the reduced potential for dilution. In contrast, contaminants from nonpoint sources are likely to affect the water quality of urban streams during stormflow periods because nonpoint-source contaminants, which accumulate during dry periods, can be transported in the storm runoff. Urban planners and managers need information on the relative amounts of point- and nonpoint-source contamination to the stream systems in order to prioritize capital improvements for municipal wastewater drainage systems and to develop appropriate management practices. To provide such information the U.S. Geological Survey (USGS), in cooperation with the Louisville and Jefferson County Metropolitan Sewer District (MSD), conducted a study to assess the quality of streams in Jefferson County, Ky., during 1988-92.

Purpose and Scope

This report presents estimates of yields of selected water-quality constituents in base flow and stormflow in watersheds of Jefferson County, Ky. The yield of a constituent in a watershed is a summation over a given time period of its discharge per unit of drainage area. The yield estimates presented in this report are based on streamflow and water-quality data collected at a network of 25 stream sites in the county during 1988-92. Constituents for which estimated yields are reported include dissolved oxygen and oxygen demand, dissolved solids, suspended and volatile solids, nutrients, metals, and synthetic organic compounds.

Description of Study Area

Jefferson County covers approximately 400 mi^2 in the north-central part of Kentucky along the Ohio River (fig. 1). Within its borders is Louisville, the largest city and the most densely populated area of the State.

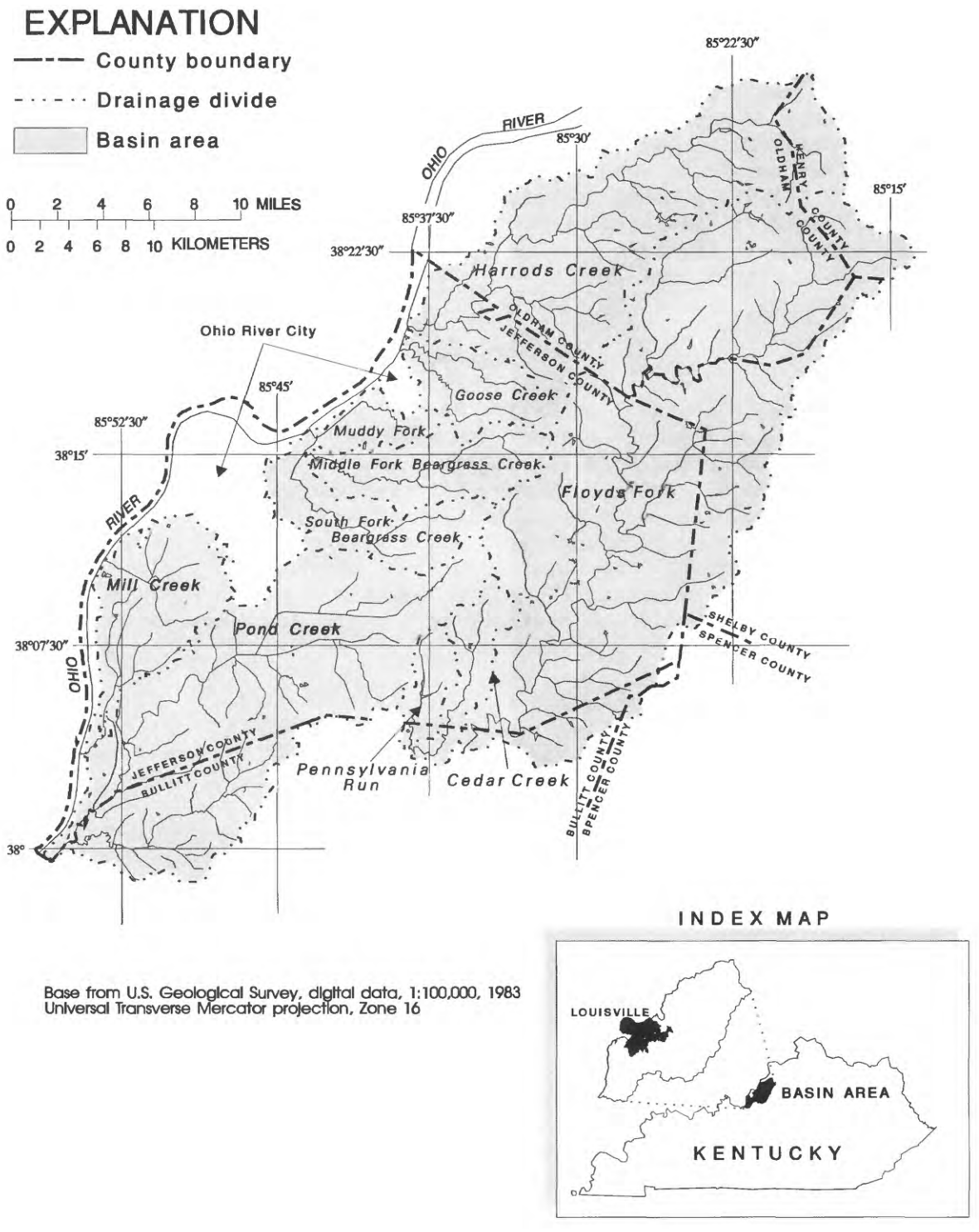


Figure 1. Major stream basins in Jefferson County, Kentucky.

Watersheds

Jefferson County has 10 major watersheds that drain parts of 5 surrounding counties (fig. 1). These watersheds are Cedar Creek, Floyds Fork, Goose Creek, Harrods Creek, Middle Fork Beargrass Creek, Mill Creek, Muddy Fork, Pennsylvania Run, Pond Creek, and South Fork Beargrass Creek. The drainage areas of these 10 watersheds range in size from 8.5 mi^2 (Pennsylvania Run) to 222 mi^2 (Floyds Fork) and have a combined area of approximately 600 mi^2. The Louisville metropolitan area and other parts of the county that drain directly to the Ohio River are known locally as the Ohio River City Watershed. The Louisville metropolitan area consists of a dense commercial business district that is drained mainly by a complex system of combined sanitary and storm sewers; open channels are few.

Climate

The climate of Louisville, Ky. is classified as "moist-continental" and is characterized by changeable weather and only short periods of extreme conditions (Strahler and Strahler, 1979). 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 in the winter. As a result, winter temperatures are rarely below 0°F, and summer temperatures are rarely above 100°F. The coldest month is January, during which the daily minimum temperature averages 26.2°F; the warmest month is July, during which the daily maximum temperature averages 88.1°F (National Oceanic and Atmospheric Administration, 1990).

The mean annual precipitation at Louisville is 43.03 in. (National Oceanic and Atmospheric Administration, 1990). Generally, October is the driest month and March is the wettest. Thunderstorms usually contribute substantial amounts of rainfall in the spring and summer. Snow usually occurs from November through March, although it has occurred as late as April and as early as October. Mean annual snowfall is 16.6 in. (5.4 in. in January). Approximately 69 storm events, defined as 0.1 in. accumulation and an intensity of at least 0.01 in. per hour, occur each year (Steurer and Nold, 1986).

Geology

The general geology of Jefferson County consists of limestones, shales, and dolomites that range from Ordovician to Mississippian in age. These rocks are overlain by alluvial and lacustrine deposits of Quarternary age (fig. 2). The following discussion 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).

Limestones and shales of Upper Ordovician age crop out in the eastern part of Jefferson County. This area corresponds with the Floyds Fork Watershed. The limestone is mainly composed of whole and broken fossil fragments set in a matrix of fine to coarse-grained fossil fragments. The

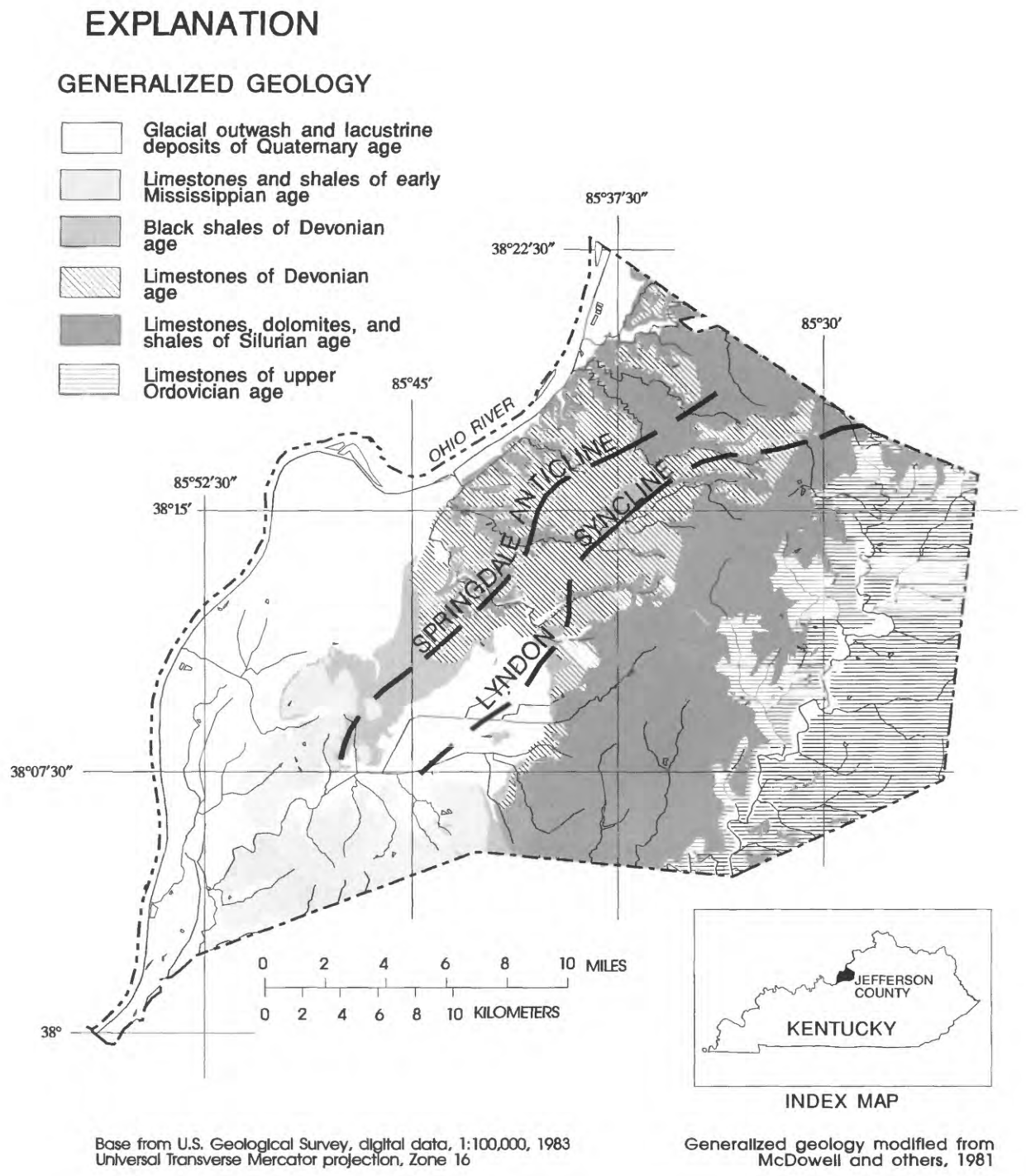


Figure 2. Generalized geology of Jefferson County, Kentucky.

shale is highly calcareous and silty and has eroded to produce ridges separated by relatively broad, flat stream valleys. Other Upper Ordovician rocks in eastern Jefferson County include siltstones and dolomites.

Rocks of Silurian age crop out in Jefferson County in a broad belt extending north to south across the central part of the county. These rocks, which are of marine origin, are the predominant units within the Cedar Creek, Pennsylvania Run, Harrods Creek, and Goose Creek Watersheds. Silurian rocks also crop out in the stream valleys of Middle and South Forks of Beargrass Creek and in Muddy Fork. These Silurian rocks are composed of dolomite and shale, and minor amounts of limestone and chert.

Carbonate rocks of Middle Devonian age crop out predominantly in the Middle and South Fork Beargrass Creek and Muddy Fork Watersheds. Middle Devonian carbonates are overlain by a thick sequence of shales. Limestones and organically rich black shales of Devonian age crop out in central and north-central Jefferson County within the Pond Creek and Middle Fork Beargrass Creek Watersheds. Thin beds of phosphatic quartz sandstone are common in the limestones.

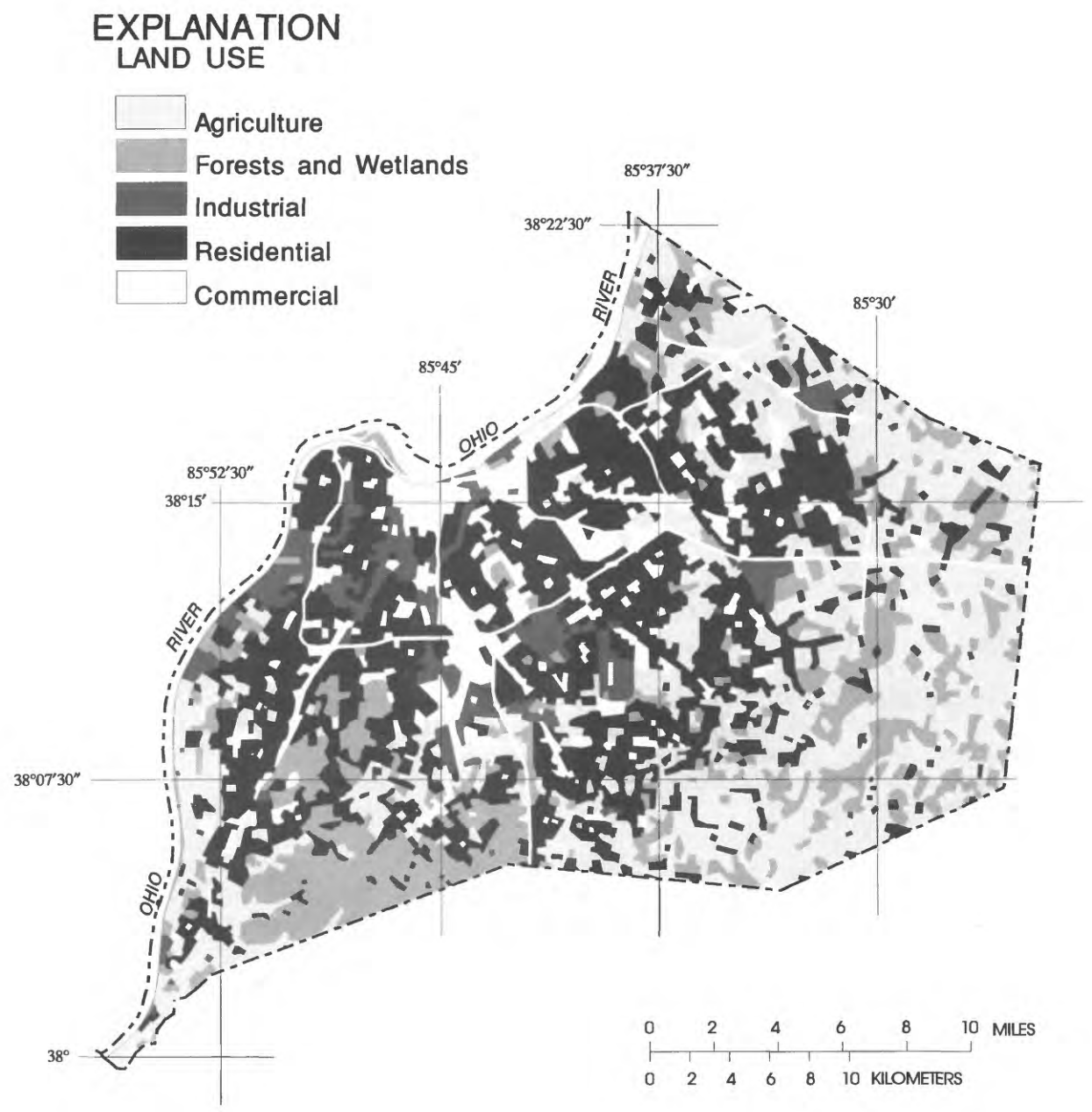
Rocks of the Borden Formation of Early Mississippian age crop out in the south-central part of Jefferson County, primarily within the Pond Creek Watershed. The Borden Formation is composed of a sequence of fine-grained sediments that become coarser grained upward. Siltstone caps a few of the knobs and low hills and also crops out along the sides of the highest ridges.

Unconsolidated sediments consisting of gravel, sand, silt, and clay of Quaternary age overlie most of Jefferson County. The Mill Creek and Ohio River City Watersheds are overlain extensively by these sediments. 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 in the Ohio River City Watershed.

Population and Land Use

According to the 1990 U.S. Census, the population of Jefferson County was 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, however, 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 land-use data shown in figure 3 are from 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 change in land use since 1983 is unknown; however, on the basis of this 1983 land-use information, most commercial and industrial land is within the Louisville city limits. In this report, agricultural, forest, and wetland uses were considered to be nonurban.



Base from U.S. Geological Survey, digital data, 1:100,000, 1983
Land use from digital data, 1:250,000, 1983
Universal Transverse Mercator projection, Zone 16

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

Within, and immediately surrounding the city limits, residential land use predominates (with some exceptions). The least populated and least developed watersheds in Jefferson County are Pennsylvania Run, which has one population center, and Cedar Creek, which has three population centers (fig. 1). Most agricultural and forest land is in the eastern, southern, and southwestern parts of the county. Industrial areas are also in these parts of the county, however, and include parts of an industrial park in the Floyds Fork Watershed, an industrial park and truck-assembly plant in the Harrods Creek Watershed, and large manufacturing facilities in the Pond Creek Watershed.

WATER QUALITY AND QUANTITY

Periodic water-quality samples were collected since February 1988 at about 25 streams draining predominantly urban watersheds of Jefferson County. Samples were analyzed by the Louisville and Jefferson County Metropolitan Sewer District laboratory. Stream discharge was measured at each site when water-quality samples were collected. Daily discharge records were computed for five sites from 1988 through 1992. Daily discharge records were synthesized for the ungaged sites for the same time period.

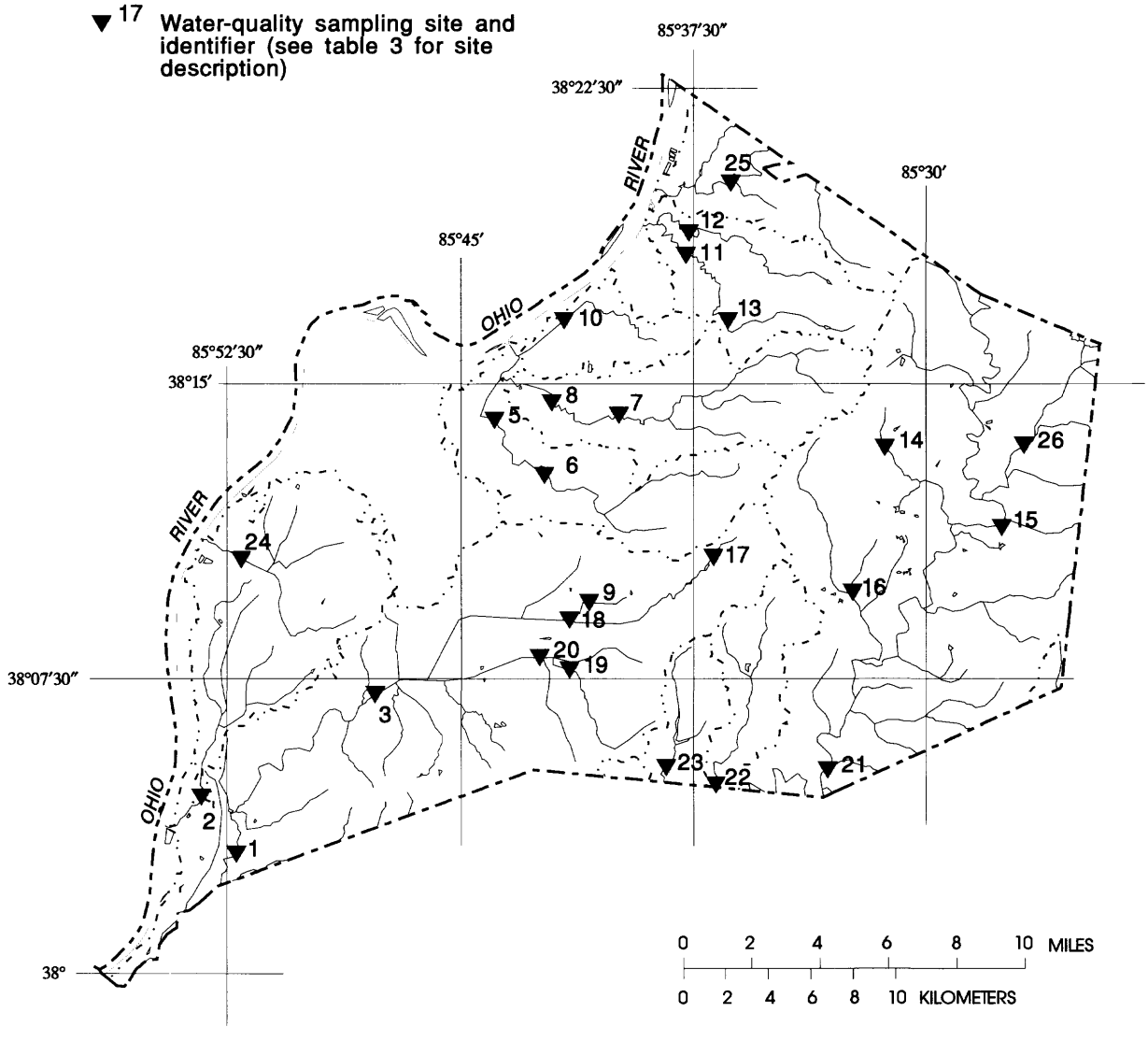
Sampling Sites

Site selection was designed to ensure the following: (1) collection of representative data from all the major stream basins 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 major stream basins, either upstream or downstream from sewage-treatment facilities or in areas of different land uses to help define sources of contaminants. The locations of the sampling sites in the major stream basins are shown in figure 4.

Potential sources of contaminants in the watershed upstream of each sampling site were determined by the MSD (Pamela J. Pulliam, Louisville and Jefferson County Metropolitan Sewer District, written commun., 1992) (table 1). The drainage area, the percentage of the area covered by impervious surfaces, and the percentage of selected land uses within the watersheds are listed in table 2.

Constituent Concentrations

Stream sampling began at most of the sites in February 1988. Dissolved oxygen, chemical-oxygen demand, biochemical-oxygen demand, dissolved, suspended, and volatile solids, alkalinity, nutrients, and bacteria were sampled for or field measured twice a month from February 1988 through September 1990 and once a month from October 1990 through December 1992. Nutrients included ammonia, nitrate, nitrite, and organic nitrogen; and phosphorus, phosphate, and orthophosphate. Samples for major metals, trace elements, and miscellaneous inorganic compounds were collected quarterly. These included calcium, magnesium, arsenic, barium, beryllium, cadmium,



Base from U.S. Geological Survey, digital data, 1:100,000, 1983
Universal Transverse Mercator projection, Zone 16

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

Table 1. Stream-water-quality sampling sites in Jefferson County, Kentucky, and potential sources of contaminants in their watersheds

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

Site number and name	USGS station number	Latitude	Longitude	Potential sources of contaminants[1]
1 Pond Creek at Pendleton Road	03302030	38°03'15"	85°52'18"	NPR, WTE, STD, IW
2 Mill Creek at Orell Road	03294570	38°04'41"	85°53'24"	NPR, WTE, STD
3 Pond Creek at Manslick Road	03302000	38°07'11"	85°47'45"	NPR, WTE, STD, IW
5 South Fork Beargrass Creek at Winter Avenue	03292550	38°14'04"	85°43'50"	NPR, CSO
6 South Fork Beargrass Creek at Trevilian Way	03292500	38°12'39"	85°42'07"	NPR, CSO
7 Middle Fork Beargrass Creek at Old Cannons Lane	03293000	38°14'14"	85°39'53"	NPR, CSO
8 Middle Fork Beargrass Creek at Beals Branch Road	03293200	38°14'32"	85°41'57"	NPR, WTE, STD, CSO
9 Spring Ditch at Private Drive below Hanses Road	03301950	38°09'27"	85°40'57"	NPR, WTE
10 Muddy Fork at Mockingbird Valley Road	03293530	38°16'35"	85°41'37"	NPR, WTE, STD
11 Goose Creek at U.S. Highway 42	03292475	38°18'12"	85°37'41"	NPR, WTE, STD
12 Little Goose Creek at U.S. Highway 42	03292480	38°18'45"	85°37'33"	NPR, WTE, STD
13 Goose Creek at Old Westport Road	03292474	38°16'33"	85°36'22"	NPR, WTE, STD
14 Pope Lick at Pope Lick Road	03298100	38°13'09"	85°31'07"	NPR, WTE, STD
15 Floyds Fork at former State Highway 155	03298000	38°11'18"	85°27'37"	NPR, WTE, STD
16 Chenoweth Run at Gelhaus Road	03298150	38°09'36"	85°32'32"	NPR, WTE
17 Fern Creek at Old Bardstown Road	03301900	38°10'32"	85°36'55"	NPR, WTE
18 Northern Ditch at Preston Highway	03301940	38°09'01"	85°41'37"	NPR, WTE, STD, IW
19 Fishpool Creek at Bost Road	03301850	38°07'45"	85°41'35"	NPR, WTE, STD
20 Southern Ditch at Minors Lane	03301880	38°08'04"	85°42'34"	NPR, WTE, STD
21 Floyds Fork at Bardstown Road	03298200	38°05'07"	85°33'18"	NPR, WTE, STD
22 Cedar Creek at Thixton Road	03298250	38°04'45"	85°36'58"	NPR, WTE, STD
23 Pennsylvania Run at Mt. Washington Road	03298300	38°05'15"	85°38'33"	NPR, WTE, STD
24 Mill Creek Cutoff at Dover Road	03294550	38°10'39"	85°52'01"	NPR, STD
25 Harrods Creek at Hunting Creek Drive	03292473	38°20'06"	85°36'09"	NPR, WTE, STD
26 Long Run at State Highway 1531	03297980	38°13'10"	85°26'56"	NPR, STD

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

Table 2. Land uses and percentage of impervious cover within the watersheds of selected stream-water-quality sampling sites in Jefferson County, Kentucky

Site number and name	Drainage area, in square miles*	Impervious cover, in percentage of drainage area*	Land use, in percentage of drainage area**				
			Agricultural	Commercial	Forest & wetlands	Industrial	Residential
1 Pond Creek at Pendleton Road	82.0	27.5	19.5	9.5	24.5	8.2	38.3
2 Mill Creek at Orell Road	13.9	25.5	30.2	6.9	14.7	5.1	43.1
3 Pond Creek at Manslick Road	63.9	29.7	19.2	11.3	18.4	10.4	40.7
5 South Fork Beargrass Creek at Winter Avenue	22.3	38.7	10.6	16.7	4.0	12.5	56.2
6 South Fork Beargrass Creek at Trevilian Way	16.9	38.4	14.1	16.4	2.0	12.7	54.8
7 Middle Fork Beargrass Creek at Old Cannons Lane	18.4	35.9	16.3	23.2	2.6	4.4	53.5
8 Middle Fork Beargrass Creek at Beals Branch Road	22.6	36.0	13.2	22.2	2.1	6.2	56.3
9 Spring Ditch at Private Drive below Hanses Road	2.4	44.7	20.0	15.3	1.8	37.3	25.6
10 Muddy Fork at Mockingbird Valley Road	6.5	39.6	3.1	12.1	5.8	6.7	72.3
11 Goose Creek at U.S. Highway 42	9.8	24.6	26.3	11.7	4.5	3.6	53.9
12 Little Goose Creek at U.S. Highway 42	5.8	22.6	51.2	14.7	8.4	.1	25.6
13 Goose Creek at Old Westport Road	6.8	24.7	27.3	12.7	3.3	1.7	55.0
14 Pope Lick at Pope Lick Road	3.0	22.7	29.4	14.6	8.6	0	47.4
15 Floyds Fork at former State Highway 155	138	16.5	71.5	2.1	12.1	1.1	13.2
16 Chenoweth Run at Gelhaus Road	11.7	23.9	34.8	5.1	10.9	12.7	36.5
17 Fern Creek at Old Bardstown Road	3.4	24.9	21.7	2.5	9.5	0	66.3
18 Northern Ditch at Preston Highway	11.4	26.2	24.5	7.4	7.5	4.4	56.2
19 Fishpool Creek at Bost Road	5.4	23.9	34.4	4.6	4.2	2.4	54.4
20 Southern Ditch at Minors Lane	13.1	25.7	25.2	7.7	13.8	1.3	52.0
21 Floyds Fork at Bardstown Road	214	16.1	66.4	2.0	14.4	1.4	13.6
22 Cedar Creek at Thixton Road	11.3	17.2	55.9	1.0	14.2	.3	28.6
23 Pennsylvania Run at Mt. Washington Road	6.2	16.8	46.4	1.2	18.2	.8	33.4
24 Mill Creek Cutoff at Dover Road	16.0	33.8	4.7	12.5	14.0	6.8	62.0
25 Harrods Creek at Hunting Creek Drive	100	16.7	66.5	3.0	20.2	1.9	8.4
26 Long Run at State Highway 1531	23.7	14.5	74.9	1.5	16.5	1.3	5.8

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

**Source: Digital data from 1983 aerial photographs at a scale of 1:250,000. Residential development has occurred in the watershed upstream from site SR3 since 1983, and land-use percentages for site SR3 are based on visual inspections.

chromium, copper, iron, lead, mercury, nickel, silver, zinc, selenium, and cyanide. Samples for organochlorine insecticides and herbicides also were collected quarterly. The organochlorine insecticides sampled for 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). Summaries of these data are presented at the end of this report.

Depth-integrated, multivertical samples were collected by use of the equal-width-increment method (Ward and Harr, 1990). All samples were analyzed by the MSD laboratory by use of approved methods of the U.S. Environmental Protection Agency, as listed in 40 CFR Part 136 (Code of Federal Regulations, 1990). Periodic replicate samples were analyzed by an independent laboratory for quality assurance of the analytical data. Replicate samples are collected in a manner such that they are considered to be essentially identical in composition. Two laboratories were used for analysis of the quality-assurance samples during the study. Quarterly replicates from three sites were sent to the USGS laboratory during February 1988-December 1992. All replicate samples obtained from October 1990 through February 1991 were 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.

Sample analyses by the MSD laboratory for suspended and volatile solids; ammonia, nitrate, and organic nitrogen; total phosphate; total copper; total silver; and total recoverable mercury did not agree closely with analyses by the other laboratories from February 1988 through March 1991 (Evaldi and others, 1993). Sample analyses by the MSD laboratory for chemical-oxygen demand, suspended and volatile solids, total chromium, and total iron did not agree closely with analyses by the USGS laboratory from January 1991 through May 1992 (Evaldi and Moore, 1992). All sample data were used in the study evaluations.

Discharge Data

Daily discharge data were available for annual load estimates at five continuous-record sites (fig. 4, sites 3, 6, 7, 15, and 24). Discharge was measured at the time of water-quality sampling at all noncontinuous stream-sampling sites except for Harrods Creek (site 25), which was not measured because of the strong influence of backwater. Continuous daily records of discharge for 1988-92 were synthesized for all noncontinuous-record sites. Except for site 25, these daily discharges were synthesized by defining the relations between the measured discharges at the time of sampling and concurrent discharges at one of the nearby continuous-record sites (table 3). Separate relations for low and high flows were determined to give the best estimates. (Use of separate relations was necessary because point-source discharge effects caused single relations to be discontinuous.) Low flow was defined as discharge 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.

Table 3. Regression statistics describing the relation between discharge at continuous-record streamflow-gaging sites and discharge at partial-record streamflow-gaging sites in Jefferson County, Kentucky, 1988-92

[N, number of regression data pairs; Index site, continuous-record discharge site; 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 the indicated index site, in cubic feet per second per square mile of drainage area ($(ft^3/s)/mi^2$).

Site number and name	N	a	b	c	Index site	R2	SE
Low-flow estimates[1]							
1 Pond Creek at Pendleton Road	64	80.3	0.25706905	0.65051701	FFAF	0.808	0.128
2 Mill Creek at Orell Road	64	13.5	.05916443	.44214012	MFBC	.627	.025
5 South Fork Beargrass Creek at Winter Avenue	64	22.6	.15070766	.69943295	SFBC	.779	.050
8 Middle Fork Beargrass Creek at Beals Branch Road	62	22.7	-.11211531	1.02842092	SFBC	.844	.073
9 Spring Ditch at Private Drive below Hanses Road	45	1.6	.40122719	.68761407	MFBC	.551	.014
10 Muddy Fork at Mockingbird Valley Road	60	6.2	.05186926	.95558114	SFBC	.779	.027
11 Goose Creek at U.S. Highway 42	52	10.1	.40065110	.65998531	FFAF	.793	.022
12 Little Goose Creek at U.S. Highway 42	47	5.8	.41038058	.71673185	FFAF	.808	.015
13 Goose Creek at Old Westport Road	50	6.0	.46798369	.68616327	FFAF	.663	.029
14 Pope Lick at Pope Lick Road	55	2.9	.15713802	.82504109	MFBC	.742	.013
16 Chenoweth Run at Gelhaus Road	58	11.6	.15910428	.81137410	SFBC	.707	.055
17 Fern Creek at Old Bardstown Road	46	3.5	.12701232	1.11982039	SFBC	.675	.047
18 Northern Ditch at Preston Highway	49	11.1	.39573416	.72857692	MFBC	.699	.053
19 Fishpool Creek at Bost Road	57	5.3	.13306421	.75127590	POND	.543	.046
20 Southern Ditch at Minors Lane	59	12.8	.00291375	.83275487	POND	.823	.033
21 Floyds Fork at Bardstown Road	61	213	.09652314	.83004419	FFAF	.816	.554
22 Cedar Creek at Thixton Road	58	11.1	.29893066	.58487033	FFAF	.650	.036
23 Pennsylvania Run at Mt. Washington Road	59	6.4	.21355648	.63046115	FFAF	.601	.029
26 Long Run at State Highway 1531	46	22.5	-.07792961	.93390777	FFAF	.861	.071
General equation for Jefferson County	1,074	---	.35567859	.50681497	FFAF	.458	---
High-flow estimates							
1 Pond Creek at Pendleton Road	27	80.3	.23233127	.75952144	POND	.789	.476
2 Mill Creek at Orell Road	7	13.5	.33031507	.62110570	POND	.833	.172
5 South Fork Beargrass Creek at Winter Avenue	27	22.6	-.13304078	1.11727630	SFBC	.894	.131
8 Middle Fork Beargrass Creek at Beals Branch Road	27	22.7	-.08832488	1.06757675	MFBC	.974	.026
9 Spring Ditch at Private Drive below Hanses Road	48	1.6	.31163378	1.19607819	SFBC	.949	.003
10 Muddy Fork at Mockingbird Valley Road	31	6.2	.13235925	.98060433	MFBC	.941	.013
11 Goose Creek at U.S. Highway 42	40	10.1	.59871951	.61060881	MFBC	.780	.027
12 Little Goose Creek at U.S. Highway 42	44	5.8	.47092227	.86266651	MFBC	.733	.036
13 Goose Creek at Old Westport Road	43	6.0	.62657118	.71374115	MFBC	.818	.016
14 Pope Lick at Pope Lick Road	34	2.9	.28665223	.89385585	SFBC	.884	.009
16 Chenoweth Run at Gelhaus Road	36	11.6	-.27087226	1.42275810	MFBC	.896	.078
17 Fern Creek at Old Bardstown Road	43	3.5	.10019791	1.14722175	MFBC	.812	.025
18 Northern Ditch at Preston Highway	48	11.1	.32448698	.98310382	MFBC	.965	.008
19 Fishpool Creek at Bost Road	32	5.3	-.12350057	1.19014765	MFBC	.935	.017
20 Southern Ditch at Minors Lane	25	12.8	-.18791264	1.08478556	MFBC	.843	.116
21 Floyds Fork at Bardstown Road	25	213	-.01290762	1.08024303	FFAF	.963	.394
22 Cedar Creek at Thixton Road	30	11.1	.32027018	.84023829	POND	.871	.040
23 Pennsylvania Run at Mt. Washington Road	28	6.4	.43088486	.76658222	POND	.887	.018
26 Long Run at State Highway 1531	22	22.5	-.66619773	1.57616801	MFBC	.890	.329
General equation for Jefferson County	630	---	.35401887	.86874258	MFBC	.746	---

[1]Discharges less than 1 $(ft^3/s)/mi^2$.

[2]Discharges greater than 1 $(ft^3/s)/mi^2$.

Because daily discharge was used for annual load computations, the accuracy of the discharge estimates was evaluated. Two sources of error must be considered in the regressions of measured discharge at the noncontinuous-record sites to concurrent discharge of the continuous-record sites: (1) the error in estimating the y-intercept of the true regression line, and (2) the error in estimating the slope of the true regression line. The error in estimating the slope becomes more pronounced with distance from the average predictor value; thus confidence bands are bowed about the regression line. The minimum interval of such confidence bands is at the mean value of the predictor variable. An approximation of 95-percent confidence bands at their minimum intervals for each discharge relation in table 3 was computed from tables of Student's t-Distribution (Iman and Conover, 1983) and the standard errors of regressions listed in the table. The 95-percent confidence intervals for low-flow discharge estimates at some sites exceeded $\pm$ 5 percent. High-flow discharge estimate 95-percent confidence intervals at their minimum extent were within $\pm$ 2 percent. Confidence intervals for estimated discharge of site 25 (Harrods Creek at Hunting Creek Drive) could not be approximated.

METHODS OF DATA ANALYSIS

The yield of a constituent in a stream is the concentration of that constituent multiplied by the discharge and divided by the drainage area of the upstream watershed. The sources that contribute to the total stream yield, however, are commonly both point and nonpoint; determination of the relative contribution of each type of constituent source is essential for cause-and-effect assessments. Discharges from point sources are commonly fairly constant and can be considered as part of the base flow of a stream. Contributions from nonpoint sources are generally transported to receiving waters during stormflow. Techniques are presented in this section by which annual watershed yields during base flow and during stormflow can be estimated. Nonpoint contributions from ground water could be significant during base flow, especially if the ground water is contaminated. Point-source contributions during stormflow could also be significant, owing to increased wastewater discharges or sewer overflows. Data were not available to assess the relative amounts of point and nonpoint contributions during base flow and stormflow, and annual watershed yields include contributions from both of these sources. In this report, however, it is assumed that constituent yields during base flow are primarily from point sources and constituent yields during stormflow are primarily from nonpoint sources.

Streamflow Partitioning

A computerized method for streamflow partitioning has been developed by the USGS Regional Aquifer System Analysis (RASA) program to estimate ground-water recharge (Rutledge, 1992). Streamflow partitioning is a method for separation of stream-discharge records into their base-flow and stormflow components. The streamflow partitioning method developed by the RASA program includes the following two steps for determining base flow: (1) base flow, which includes point-source discharges, is set equal to streamflow during times of negligible runoff, and (2) base flow between these periods (during stormflow) is interpolated.

An estimate of the daily base-flow component of total discharge was made for each day from January 1, 1988, to December 31, 1992. The stormflow component was thus the discharge remaining. Partitioned hydrographs for four continuous discharge and periodic water-quality-sampling sites are shown in figure 5. Summaries of the partitioned streamflow records are listed in the appendix of this report.

Yield Computations

Constituent yields rather than loads were computed in this report to allow for comparison among watersheds. Yields were computed by dividing the annual constituent loads (in tons) for each site by the upstream drainage area of the watershed (in square miles).

The discharge-record method described by Evaldi and Moore (1992) was used to compute annual base-flow yields and annual total yields for the 25 stream-sampling sites in Jefferson County. The calibration data used for annual total yield estimations were based on periodic water-quality samples collected from February 1988 through December 1992. These data are summarized in the appendix of this report. Calibration data for estimation of base-flow yields were subsets of the data used for total-yield estimates. Samples were not retained in the base-flow calibration data if greater than 10 percent of the streamflow at the time of sampling was from storm runoff. At least 10 samples were needed to define a relation of water-quality constituent concentration to flow. Thus, yield estimates of some water-quality constituents were not possible for watersheds where 10 samples could not be collected during the course of the study.

Mean annual yields were computed for 1988-92. Total daily discharge was used to compute the total-yield estimates, and daily base flow was used to compute the nonstorm-yield estimates. Stormflow yields were calculated as the difference between the total-yield estimates and the base-flow-yield estimates.

YIELDS OF SELECTED CONSTITUENTS IN BASE FLOW AND STORMFLOW

Estimates of mean annual base-flow and stormflow yields of selected water-quality constituents from watersheds in Jefferson County are presented in table 4. The discussions of constituent yields that follow are all referenced to table 4 unless otherwise noted. The standard errors of the regressions used for computation of the 1988-92 mean annual yields and uncertainty measures of the estimates are listed in the appendix of this report.

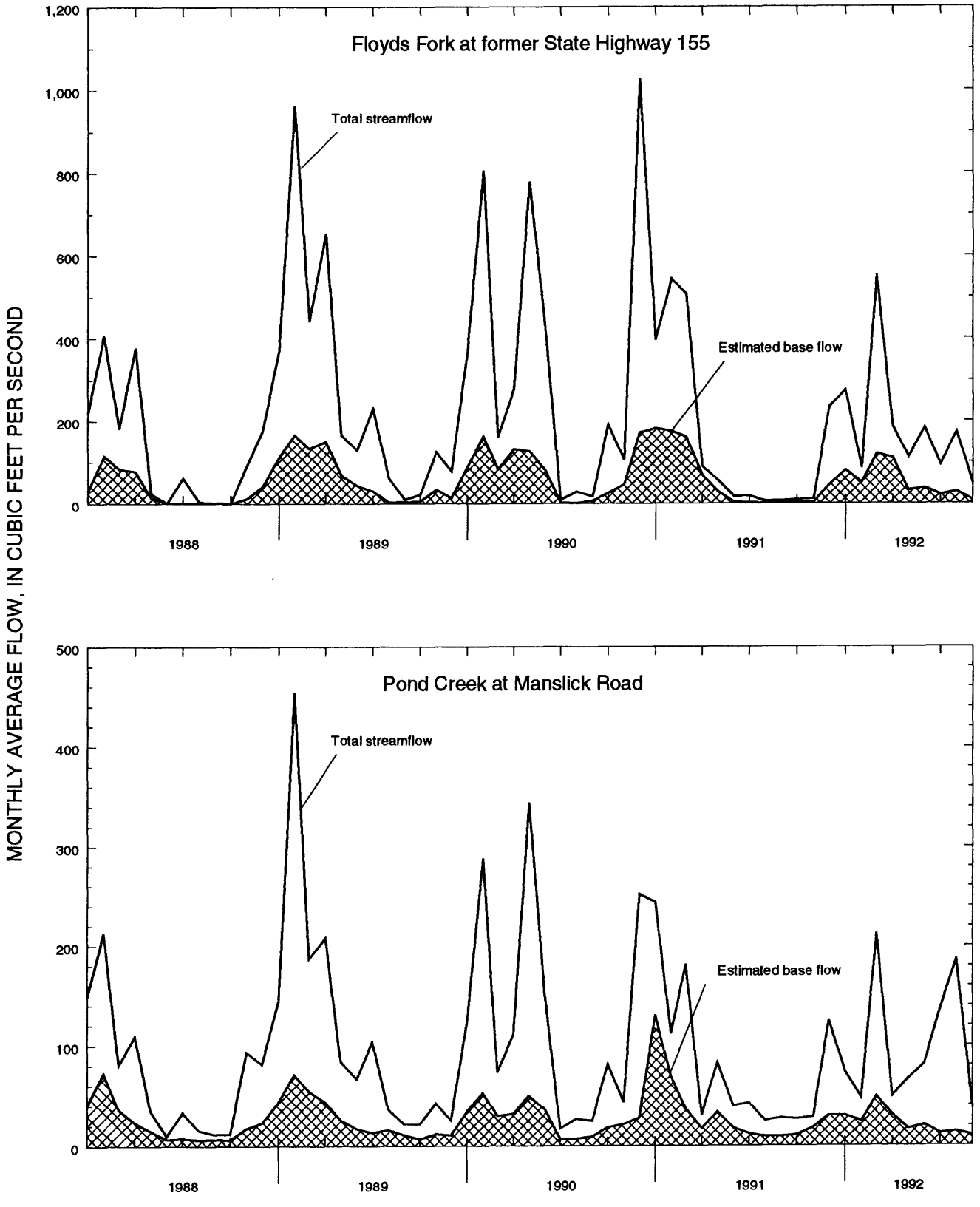


Figure 5. Partitioned flow of selected streams in Jefferson County, Kentucky, 1988-92.

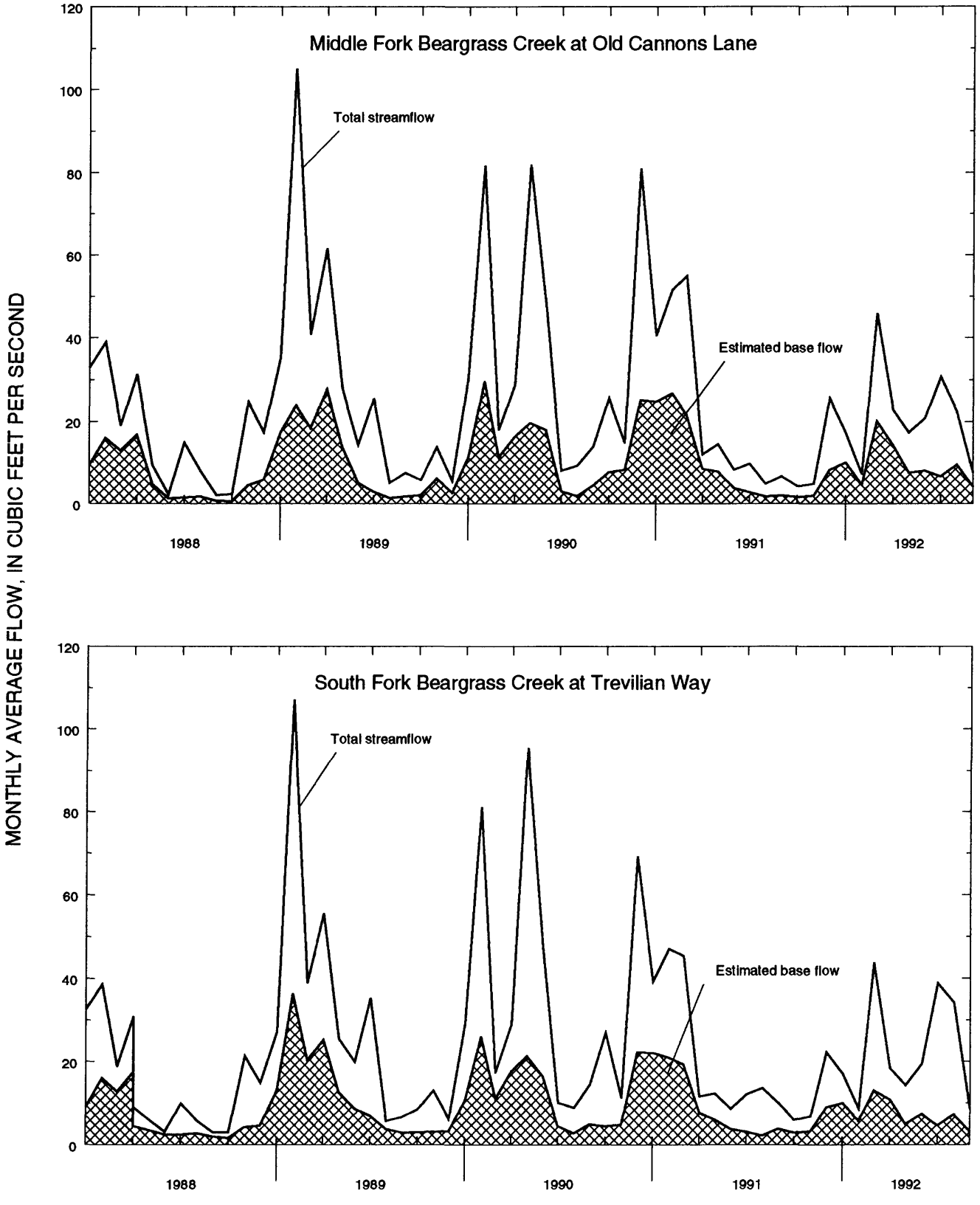


Figure 5. Partitioned flow of selected streams in Jefferson County, Kentucky, 1988-92--Continued.

Table 4. Estimates of mean annual base-flow and stormflow yields of selected water-quality constituents from urban watersheds of Jefferson County, Kentucky, 1988-92

[mi^2, square mile; ton/mi^2, tons per square mile; ---, unknown]

	Site number and name	Drainage area (mi^2)	Annual yield (ton/mi^2)			Percentage of total annual yield	
			Base flow	Stormflow	Total	Base flow	Stormflow
	DISSOLVED OXYGEN AND OXYGEN DEMAND						
	Dissolved oxygen						
1	Pond Creek at Pendleton Road	82.0	4.54	6.20	10.7	42.3	57.7
2	Mill Creek at Orell Road	13.9	2.11	4.58	6.69	31.6	68.4
3	Pond Creek at Manslick Road	63.9	4.11	8.70	12.8	32.1	67.9
5	South Fork Beargrass Creek at Winter Avenue	22.3	4.70	8.88	13.6	34.6	65.4
6	South Fork Beargrass Creek at Trevilian Way	16.9	5.08	6.79	11.9	42.8	57.2
7	Middle Fork Beargrass Cr at Old Cannons Lane	18.4	6.72	8.02	14.7	45.6	54.4
8	Middle Fork Beargrass Cr at Beals Branch Road	22.6	4.38	9.68	14.1	31.1	68.9
9	Spring Ditch at Private Drive below Hanses Road	2.4	7.60	7.13	14.7	51.6	48.4
10	Muddy Fork at Mockingbird Valley Road	6.5	5.51	7.15	12.7	43.5	56.5
11	Goose Creek at U.S. Highway 42	9.8	8.83	4.98	13.8	63.9	36.1
12	Little Goose Creek at U.S. Highway 42	5.8	10.2	7.56	17.7	57.3	42.7
13	Goose Creek at Old Westport Road	6.8	10.5	4.48	15.0	70.2	29.8
14	Pope Lick at Pope Lick Road	3.0	6.32	6.93	13.3	47.7	52.3
15	Floyds Fork at former State Highway 155	138	4.82	13.6	18.4	26.2	73.8
16	Chenoweth Run at Gelhaus Road	11.7	7.83	13.8	21.6	36.2	63.8
17	Fern Creek at Old Bardstown Road	3.4	9.85	10.6	20.4	48.2	51.8
18	Northern Ditch at Preston Highway	11.4	11.2	7.35	18.5	60.4	39.6
19	Fishpool Creek at Bost Road	5.4	5.93	10.1	16.0	37.0	63.0
20	Southern Ditch at Minors Lane	13.1	3.80	7.28	11.1	34.3	65.7
21	Floyds Fork at Bardstown Road	214	4.97	14.1	19.1	26.1	73.9
22	Cedar Creek at Thixton Road	11.3	7.54	7.55	15.1	50.0	50.0
23	Pannsylvania Run at Mt. Washington Road	6.2	5.59	8.23	13.8	40.5	59.5
24	Mill Creek Cutoff at Dover Road	16.0	1.07	7.35	8.43	12.7	87.3
25	Harrods Creek at Hunting Creek Drive	100	6.12	7.56	13.7	44.7	55.3
26	Long Run at State Highway 1531	23.7	4.10	13.5	17.6	23.3	76.7
	Chemical oxygen demand						
1	Pond Creek at Pendleton Road	82.0	6.31	18.1	24.4	25.9	74.1
2	Mill Creek at Orell Road	13.9	3.96	16.5	20.4	19.4	80.6
3	Pond Creek at Manslick Road	63.9	6.31	34.9	41.2	15.3	84.7
5	South Fork Beargrass Creek at Winter Avenue	22.3	5.56	21.0	26.6	20.9	79.1
6	South Fork Beargrass Creek at Trevilian Way	16.9	---	---	25.5	---	---
7	Middle Fork Beargrass Cr at Old Cannons Lane	18.4	---	---	17.6	---	---
8	Middle Fork Beargrass Cr at Beals Branch Road	22.6	3.95	16.9	20.9	18.9	81.1
9	Spring Ditch at Private Drive below Hanses Road	2.4	24.3	52.3	76.6	31.7	68.3
10	Muddy Fork at Mockingbird Valley Road	6.5	6.25	20.2	26.4	23.7	76.3
11	Goose Creek at U.S. Highway 42	9.8	11.1	10.2	21.3	52.3	47.7
12	Little Goose Creek at U.S. Highway 42	5.8	20.9	21.9	42.8	48.9	51.1
13	Goose Creek at Old Westport Road	6.8	14.1	13.7	27.9	50.7	49.3
14	Pope Lick at Pope Lick Road	3.0	8.05	19.8	27.8	28.9	71.1
15	Floyds Fork at former State Highway 155	138	5.06	24.3	29.4	17.2	82.8
16	Chenoweth Run at Gelhaus Road	11.7	10.1	25.5	35.7	28.4	71.6
17	Fern Creek at Old Bardstown Road	3.4	10.2	16.7	27.0	38.0	62.0
18	Northern Ditch at Preston Highway	11.4	14.2	22.0	36.1	39.3	60.7
19	Fishpool Creek at Bost Road	5.4	8.06	23.8	31.9	25.3	74.7
20	Southern Ditch at Minors Lane	13.1	4.83	22.4	27.2	17.7	82.3
21	Floyds Fork at Bardstown Road	214	5.14	24.9	30.1	17.1	82.9
22	Cedar Creek at Thixton Road	11.3	7.06	23.3	30.3	23.3	76.7
23	Pennsylvania Run at Mt. Washington Road	6.2	10.1	19.6	29.7	34.0	66.0
24	Mill Creek Cutoff at Dover Road	16.0	2.47	27.2	29.7	8.3	91.7
25	Harrods Creek at Hunting Creek Drive	100	6.58	16.3	22.9	28.8	71.2
26	Long Run at State Highway 1531	23.7	3.84	29.2	33.0	11.6	88.4
	Biochemical oxygen demand						
1	Pond Creek at Pendleton Road	82.0	2.34	6.88	9.22	25.4	74.6
2	Mill Creek at Orell Road	13.9	.757	3.82	4.57	16.6	83.4
3	Pond Creek at Manslick Road	63.9	2.42	9.92	12.3	19.6	80.4
5	South Fork Beargrass Creek at Winter Avenue	22.3	2.45	11.8	14.2	17.2	82.8
6	South Fork Beargrass Creek at Trevilian Way	16.9	3.03	10.4	13.5	22.5	77.5
7	Middle Fork Beargrass Cr at Old Cannons Lane	18.4	2.08	4.34	6.43	32.4	67.6
8	Middle Fork Beargrass Cr at Beals Branch Road	22.6	1.34	3.89	5.23	25.6	74.4
9	Spring Ditch at Private Drive below Hanses Road	2.4	4.37	7.52	11.9	36.8	63.2
10	Muddy Fork at Mockingbird Valley Road	6.5	1.99	3.72	5.72	34.9	65.1
11	Goose Creek at U.S. Highway 42	9.8	4.62	3.95	8.57	53.9	46.1
12	Little Goose Creek at U.S. Highway 42	5.8	4.79	5.89	10.7	44.9	55.1
13	Goose Creek at Old Westport Road	6.8	6.32	3.66	9.98	63.3	36.7
14	Pope Lick at Pope Lick Road	3.0	2.97	4.90	7.87	37.7	62.3
15	Floyds Fork at former State Highway 155	138	1.71	5.53	7.24	23.6	76.4
16	Chenoweth Run at Gelhaus Road	11.7	4.16	12.7	16.9	24.7	75.3
17	Fern Creek at Old Bardstown Road	3.4	4.39	11.9	16.3	26.9	73.1
18	Northern Ditch at Preston Highway	11.4	5.54	6.71	12.3	45.2	54.8
19	Fishpool Creek at Bost Road	5.4	2.20	5.74	7.94	27.7	72.3
20	Southern Ditch at Minors Lane	13.1	1.78	4.41	6.19	28.7	71.3

Table 4. Estimates of mean annual base-flow and stormflow yields of selected water-quality constituents from urban watersheds of Jefferson County, Kentucky, 1988-92--Continued

[mi^2, square mile; ton/mi^2, tons per square mile; ---, unknown]

	Site number and name	Drainage area (mi^2)	Annual yield (ton/mi^2)			Percentage of total annual yield	
			Base flow	Stormflow	Total	Base flow	Stormflow
	Biochemical oxygen demand--Continued						
21	Floyds Fork at Bardstown Road	214	1.94	5.67	7.61	25.5	74.5
22	Cedar Creek at Thixton Road	11.3	2.76	7.29	10.1	27.5	72.5
23	Pennsylvania Run at Mt. Washington Road	6.2	2.65	6.14	8.79	30.2	69.8
24	Mill Creek Cutoff at Dover Road	16.0	.725	10.1	10.8	6.7	93.3
25	Harrods Creek at Hunting Creek Drive	100	2.62	4.89	7.51	34.9	65.1
26	Long Run at State Highway 1531	23.7	1.58	8.32	9.90	16.0	84.0
	DISSOLVED SOLIDS AND RELATED WATER-QUALITY CONSTITUENTS						
	Calcium, total						
1	Pond Creek at Pendleton Road	82.0	26.4	30.3	56.7	46.6	53.4
2	Mill Creek at Orell Road	13.9	7.77	8.09	15.9	49.0	51.0
3	Pond Creek at Manslick Road	63.9	25.3	47.2	72.5	34.9	65.1
5	South Fork Beargrass Creek at Winter Avenue	22.3	34.3	29.8	64.1	53.5	46.5
6	South Fork Beargrass Creek at Trevilian Way	16.9	35.8	27.3	63.1	56.7	43.3
7	Middle Fork Beargrass Cr at Old Cannons Lane	18.4	---	---	73.7	---	---
8	Middle Fork Beargrass Cr at Beals Branch Road	22.6	---	---	72.6	---	---
9	Spring Ditch at Private Drive below Hanses Road	2.4	51.3	25.6	76.9	66.7	33.3
10	Muddy Fork at Mockingbird Valley Road	6.5	59.0	48.2	107	55.0	45.0
11	Goose Creek at U.S. Highway 42	9.8	46.8	26.8	73.6	63.6	36.4
12	Little Goose Creek at U.S. Highway 42	5.8	55.3	39.4	94.6	58.4	41.6
13	Goose Creek at Old Westport Road	6.8	50.5	25.6	76.1	66.4	33.6
14	Pope Lick at Pope Lick Road	3.0	38.7	60.1	98.8	39.2	60.8
15	Floyds Fork at former State Highway 155	138	28.0	61.5	89.4	31.3	68.7
16	Chenoweth Run at Gelhaus Road	11.7	40.3	91.2	132	30.7	69.3
17	Fern Creek at Old Bardstown Road	3.4	56.4	59.5	116	48.7	51.3
18	Northern Ditch at Preston Highway	11.4	53.8	35.6	89.4	60.2	39.8
19	Fishpool Creek at Bost Road	5.4	---	---	94.6	---	---
20	Southern Ditch at Minors Lane	13.1	---	---	71.9	---	---
21	Floyds Fork at Bardstown Road	214	28.9	76.7	106	27.4	72.6
22	Cedar Creek at Thixton Road	11.3	51.9	46.0	97.9	53.0	47.0
23	Pennsylvania Run at Mt. Washington Road	6.2	26.1	38.7	64.8	40.3	59.7
24	Mill Creek Cutoff at Dover Road	16.0	---	---	19.8	---	---
25	Harrods Creek at Hunting Creek Drive	100	30.1	68.8	98.8	30.4	69.6
26	Long Run at State Highway 1531	23.7	---	---	101	---	---
	Magnesium, total						
1	Pond Creek at Pendleton Road	82.0	9.75	11.1	20.9	46.8	53.2
2	Mill Creek at Orell Road	13.9	2.74	2.16	4.90	55.9	44.1
3	Pond Creek at Manslick Road	63.9	9.85	16.8	26.6	37.0	63.0
5	South Fork Beargrass Creek at Winter Avenue	22.3	7.34	11.0	18.3	40.1	59.9
6	South Fork Beargrass Creek at Trevilian Way	16.9	8.43	6.24	14.7	57.5	42.5
7	Middle Fork Beargrass Cr at Old Cannons Lane	18.4	---	---	16.6	---	---
8	Middle Fork Beargrass Cr at Beals Branch Road	22.6	---	---	15.5	---	---
9	Spring Ditch at Private Drive below Hanses Road	2.4	13.4	6.32	19.7	67.9	32.1
10	Muddy Fork at Mockingbird Valley Road	6.5	7.99	5.57	13.6	58.9	41.1
11	Goose Creek at U.S. Highway 42	9.8	19.7	7.13	26.8	73.4	26.6
12	Little Goose Creek at U.S. Highway 42	5.8	19.0	13.6	32.6	58.4	41.6
13	Goose Creek at Old Westport Road	6.8	21.2	8.56	29.8	71.3	28.7
14	Pope Lick at Pope Lick Road	3.0	16.7	27.0	43.6	38.2	61.8
15	Floyds Fork at former State Highway 155	138	7.00	12.7	19.7	35.5	64.5
16	Chenoweth Run at Gelhaus Road	11.7	15.1	44.7	59.8	25.3	74.7
17	Fern Creek at Old Bardstown Road	3.4	24.7	24.6	49.3	50.1	49.9
18	Northern Ditch at Preston Highway	11.4	21.2	16.9	38.1	55.7	44.3
19	Fishpool Creek at Bost Road	5.4	---	---	45.4	---	---
20	Southern Ditch at Minors Lane	13.1	---	---	32.8	---	---
21	Floyds Fork at Bardstown Road	214	10.7	14.8	25.5	42.0	58.0
22	Cedar Creek at Thixton Road	11.3	26.7	23.2	50.0	53.5	46.5
23	Pennsylvania Run at Mt. Washington Road	6.2	13.0	22.6	35.6	36.5	63.5
24	Mill Creek Cutoff at Dover Road	16.0	---	---	6.33	---	---
25	Harrods Creek at Hunting Creek Drive	100	13.8	12.6	26.5	52.3	47.7
26	Long Run at State Highway 1531	23.7	---	---	17.2	---	---
	Alkalinity as $CaCO_3$						
1	Pond Creek at Pendleton Road	82.0	73.9	83.9	158	46.8	53.2
2	Mill Creek at Orell Road	13.9	43.4	32.2	75.6	57.4	42.6
3	Pond Creek at Manslick Road	63.9	82.5	109	191	43.2	56.8
5	South Fork Beargrass Creek at Winter Avenue	22.3	90.3	108	198	45.5	54.5
6	South Fork Beargrass Creek at Trevilian Way	16.9	110	96.8	207	53.2	46.8
7	Middle Fork Beargrass Cr at Old Cannons Lane	18.4	114	116	230	49.6	50.4
8	Middle Fork Beargrass Cr at Beals Branch Road	22.6	90.0	123	213	42.4	57.6
9	Spring Ditch at Private Drive below Hanses Road	2.4	130	75.9	206	63.2	36.8
10	Muddy Fork at Mockingbird Valley Road	6.5	131	149	280	46.8	53.2

Table 4. Estimates of mean annual base-flow and stormflow yields of selected water-quality constituents from urban watersheds of Jefferson County, Kentucky, 1988-92--Continued

[mi^2, square mile; ton/mi^2, tons per square mile; ---, unknown]

	Site number and name	Drainage area (mi^2)	Annual yield (ton/mi^2) Base flow	Stormflow	Total	Percentage of total annual yield Base flow	Stormflow
	Alkalinity as $CaCO_3$--Continued						
11	Goose Creek at U.S. Highway 42	9.8	159	55.4	215	74.2	25.8
12	Little Goose Creek at U.S. Highway 42	5.8	184	87.6	271	67.7	32.3
13	Goose Creek at Old Westport Road	6.8	171	59.2	230	74.3	25.7
14	Pope Lick at Pope Lick Road	3.0	139	130	269	51.6	48.4
15	Floyds Fork at former State Highway 155	138	77.7	186	263	29.5	70.5
16	Chenoweth Run at Gelhaus Road	11.7	129	192	321	40.3	59.7
17	Fern Creek at Old Bardstown Road	3.4	216	203	419	51.5	48.5
18	Northern Ditch at Preston Highway	11.4	186	104	290	64.1	35.9
19	Fishpool Creek at Bost Road	5.4	93.0	111	204	45.6	54.4
20	Southern Ditch at Minors Lane	13.1	61.6	90.0	152	40.6	59.4
21	Floyds Fork at Bardstown Road	214	97.9	193	291	33.7	66.3
22	Cedar Creek at Thixton Road	11.3	142	96.7	239	59.5	40.5
23	Pennsylvania Run at Mt. Washington Road	6.2	92.0	123	215	42.7	57.3
24	Mill Creek Cutoff at Dover Road	16.0	14.6	79.4	94.0	15.5	84.5
25	Harrods Creek at Hunting Creek Drive	100	115	115	230	49.9	50.1
26	Long Run at State Highway 1531	23.7	73.1	223	297	24.7	75.3
	Dissolved solids, residue at 105° Celsius						
1	Pond Creek at Pendleton Road	82.0	163	200	363	44.8	55.2
2	Mill Creek at Orell Road	13.9	60.3	83.9	144	41.8	58.2
3	Pond Creek at Manslick Road	63.9	175	262	438	40.0	60.0
5	South Fork Beargrass Creek at Winter Avenue	22.3	166	307	472	35.1	64.9
6	South Fork Beargrass Creek at Trevilian Way	16.9	187	222	409	45.7	54.3
7	Middle Fork Beargrass Cr at Old Cannons Lane	18.4	187	205	392	47.7	52.3
8	Middle Fork Beargrass Cr at Beals Branch Road	22.6	152	233	384	39.5	60.5
9	Spring Ditch at Private Drive below Hanses Road	2.4	279	137	416	67.0	33.0
10	Muddy Fork at Mockingbird Valley Road	6.5	262	299	561	46.7	53.3
11	Goose Creek at U.S. Highway 42	9.8	257	117	373	68.8	31.2
12	Little Goose Creek at U.S. Highway 42	5.8	309	187	497	62.3	37.7
13	Goose Creek at Old Westport Road	6.8	302	126	428	70.5	29.5
14	Pope Lick at Pope Lick Road	3.0	231	253	485	47.7	52.3
15	Floyds Fork at former State Highway 155	138	126	372	498	25.3	74.7
16	Chenoweth Run at Gelhaus Road	11.7	237	552	789	30.1	69.9
17	Fern Creek at Old Bardstown Road	3.4	369	299	669	55.2	44.8
18	Northern Ditch at Preston Highway	11.4	353	181	534	66.1	33.9
19	Fishpool Creek at Bost Road	5.4	201	269	470	42.8	57.2
20	Southern Ditch at Minors Lane	13.1	140	225	365	38.4	61.6
21	Floyds Fork at Bardstown Road	214	132	332	464	28.5	71.5
22	Cedar Creek at Thixton Road	11.3	246	244	490	50.1	49.9
23	Pennsylvania Run at Mt. Washington Road	6.2	209	255	464	45.0	55.0
24	Mill Creek Cutoff at Dover Road	16.0	33.6	220	254	13.2	86.8
25	Harrods Creek at Hunting Creek Drive	100	162	197	359	45.0	55.0
26	Long Run at State Highway 1531	23.7	103	312	416	24.9	75.1
	SUSPENDED AND VOLATILE SOLIDS						
	Suspended solids, residue at 105° Celsius						
1	Pond Creek at Pendleton Road	82.0	12.2	250	262	4.7	95.3
2	Mill Creek at Orell Road	13.9	1.99	87.5	89.5	2.2	97.8
3	Pond Creek at Manslick Road	63.9	17.2	333	350	4.9	95.1
5	South Fork Beargrass Creek at Winter Avenue	22.3	10.2	325	335	3.0	97.0
6	South Fork Beargrass Creek at Trevilian Way	16.9	8.75	286	295	3.0	97.0
7	Middle Fork Beargrass Cr at Old Cannons Lane	18.4	3.62	42.0	45.6	7.9	92.1
8	Middle Fork Beargrass Cr at Beals Branch Road	22.6	4.27	48.2	52.5	8.1	91.9
9	Spring Ditch at Private Drive below Hanses Road	2.4	19.0	73.6	92.6	20.5	79.5
10	Muddy Fork at Mockingbird Valley Road	6.5	13.8	75.4	89.2	15.5	84.5
11	Goose Creek at U.S. Highway 42	9.8	8.24	46.4	54.7	15.1	84.9
12	Little Goose Creek at U.S. Highway 42	5.8	16.6	93.5	110	15.1	84.9
13	Goose Creek at Old Westport Road	6.8	23.1	77.8	101	22.9	77.1
14	Pope Lick at Pope Lick Road	3.0	8.72	114	122	7.1	92.9
15	Floyds Fork at former State Highway 155	138	4.79	141	146	3.3	96.7
16	Chenoweth Run at Gelhaus Road	11.7	6.49	213	220	3.0	97.0
17	Fern Creek at Old Bardstown Road	3.4	16.6	153	170	9.8	90.2
18	Northern Ditch at Preston Highway	11.4	10.8	118	129	8.4	91.6
19	Fishpool Creek at Bost Road	5.4	8.63	85.4	94.1	9.2	90.8
20	Southern Ditch at Minors Lane	13.1	6.07	81.1	87.1	7.0	93.0
21	Floyds Fork at Bardstown Road	214	5.75	293	299	1.9	98.1
22	Cedar Creek at Thixton Road	11.3	4.18	36.1	40.3	10.4	89.6
23	Pennsylvania Run at Mt. Washington Road	6.2	10.3	23.8	34.1	30.3	69.7
24	Mill Creek Cutoff at Dover Road	16.0	1.06	88.8	89.9	1.2	98.8
25	Harrods Creek at Hunting Creek Drive	100	12.0	66.6	78.7	15.3	84.7
26	Long Run at State Highway 1531	23.7	4.64	154	159	2.9	97.1

Table 4. Estimates of mean annual base-flow and stormflow yields of selected water-quality constituents from urban watersheds of Jefferson County, Kentucky, 1988-92--Continued

[mi^2, square mile; ton/mi^2, tons per square mile; ---, unknown]

	Site number and name	Drainage area (mi^2)	Annual yield (ton/mi^2)			Percentage of total annual yield	
			Base flow	Stormflow	Total	Base flow	Stormflow
	Residue, volatile nonfilterable						
1	Pond Creek at Pendleton Road	82.0	2.18	37.8	40.0	5.4	94.6
2	Mill Creek at Orell Road	13.9	1.50	19.0	20.5	7.3	92.7
3	Pond Creek at Manslick Road	63.9	3.64	69.8	73.4	5.0	95.0
5	South Fork Beargrass Creek at Winter Avenue	22.3	7.07	138	145	4.9	95.1
6	South Fork Beargrass Creek at Trevilian Way	16.9	3.69	101	105	3.5	96.5
7	Middle Fork Beargrass Cr at Old Cannons Lane	18.4	4.65	24.4	29.0	16.0	84.0
8	Middle Fork Beargrass Cr at Beals Branch Road	22.6	1.58	11.8	13.3	11.8	88.2
9	Spring Ditch at Private Drive below Hanses Road	2.4	6.72	15.9	22.6	29.8	70.2
10	Muddy Fork at Mockingbird Valley Road	6.5	3.85	15.0	18.9	20.4	79.6
11	Goose Creek at U.S. Highway 42	9.8	4.02	9.89	13.9	28.9	71.1
12	Little Goose Creek at U.S. Highway 42	5.8	10.5	18.2	28.7	36.5	63.5
13	Goose Creek at Old Westport Road	6.8	9.81	21.4	31.2	31.4	68.6
14	Pope Lick at Pope Lick Road	3.0	4.40	16.6	21.0	21.0	79.0
15	Floyds Fork at former State Highway 155	138	1.46	41.5	43.0	3.4	96.6
16	Chenoweth Run at Gelhaus Road	11.7	3.12	60.4	63.5	4.9	95.1
17	Fern Creek at Old Bardstown Road	3.4	8.96	56.6	63.6	11.0	89.0
18	Northern Ditch at Preston Highway	11.4	5.71	16.7	22.4	25.4	74.6
19	Fishpool Creek at Bost Road	5.4	3.87	23.3	27.2	14.3	85.7
20	Southern Ditch at Minors Lane	13.1	2.46	22.8	25.2	9.8	90.2
21	Floyds Fork at Bardstown Road	214	2.56	60.2	62.8	4.1	95.9
22	Cedar Creek at Thixton Road	11.3	3.36	8.71	12.1	27.9	72.1
23	Pennsylvania Run at Mt. Washington Road	6.2	3.33	6.05	9.38	35.6	64.4
24	Mill Creek Cutoff at Dover Road	16.0	.400	17.9	18.3	2.2	97.8
25	Harrods Creek at Hunting Creek Drive	100	5.26	---	---	---	---
26	Long Run at State Highway 1531	23.7	1.15	16.1	17.3	6.7	93.3
	Suspended solids, nonvolatile on ignition						
1	Pond Creek at Pendleton Road	82.0	6.54	57.0	63.5	10.3	89.7
2	Mill Creek at Orell Road	13.9	7.90	14.3	22.2	35.5	64.5
3	Pond Creek at Manslick Road	63.9	13.3	384	397	3.4	96.6
5	South Fork Beargrass Creek at Winter Avenue	22.3	5.40	77.1	82.5	6.5	93.5
7	Middle Fork Beargrass Cr at Old Cannons Lane	18.4	1.31	28.7	30.1	4.4	95.6
8	Middle Fork Beargrass Cr at Beals Branch Road	22.6	1.37	17.8	19.1	7.1	92.9
9	Spring Ditch at Private Drive below Hanses Road	2.4	4.17	12.5	16.7	25.0	75.0
11	Goose Creek at U.S. Highway 42	9.8	2.75	6.24	8.99	30.6	69.4
12	Little Goose Creek at U.S. Highway 42	5.8	6.84	34.4	41.2	16.6	83.4
13	Goose Creek at Old Westport Road	6.8	21.8	46.8	68.6	31.8	68.2
14	Pope Lick at Pope Lick Road	3.0	34.5	166	201	17.2	82.8
15	Floyds Fork at former State Highway 155	138	---	---	96.0	---	---
17	Fern Creek at Old Bardstown Road	3.4	6.29	142	148	4.2	95.8
18	Northern Ditch at Preston Highway	11.4	6.35	9.10	15.4	41.1	58.9
19	Fishpool Creek at Bost Road	5.4	4.17	51.8	55.9	7.5	92.5
20	Southern Ditch at Minors Lane	13.1	1.81	53.4	55.2	3.3	96.7
21	Floyds Fork at Bardstown Road	214	3.32	458	461	.7	99.3
23	Pennsylvania Run at Mt. Washington Road	6.2	2.53	9.72	12.2	20.6	79.4
24	Mill Creek Cutoff at Dover Road	16.0	1.16	402	403	.3	99.7
25	Harrods Creek at Hunting Creek Drive	100	5.54	---	---	---	---
26	Long Run at State Highway 1531	23.7	---	---	30.2	---	---
	NUTRIENTS						
	Nitrogen, nitrate, total as N						
1	Pond Creek at Pendleton Road	82.0	.956	1.63	2.59	36.9	63.1
2	Mill Creek at Orell Road	13.9	.171	.672	.843	20.3	79.7
3	Pond Creek at Manslick Road	63.9	.869	1.99	2.86	30.4	69.6
5	South Fork Beargrass Creek at Winter Avenue	22.3	1.14	1.41	2.55	44.8	55.2
6	South Fork Beargrass Creek at Trevilian Way	16.9	.951	1.46	2.41	39.4	60.6
7	Middle Fork Beargrass Cr at Old Cannons Lane	18.4	1.29	1.34	2.63	49.1	50.9
8	Middle Fork Beargrass Cr at Beals Branch Road	22.6	.991	1.44	2.43	40.8	59.2
9	Spring Ditch at Private Drive below Hanses Road	2.4	1.67	1.74	3.42	49.0	51.0
10	Muddy Fork at Mockingbird Valley Road	6.5	1.97	1.48	3.45	57.1	42.9
11	Goose Creek at U.S. Highway 42	9.8	2.81	1.34	4.15	67.7	32.3
12	Little Goose Creek at U.S. Highway 42	5.8	4.17	2.45	6.62	62.9	37.1
13	Goose Creek at Old Westport Road	6.8	2.98	1.37	4.35	68.6	31.4
14	Pope Lick at Pope Lick Road	3.0	1.69	1.83	3.53	48.0	52.0
15	Floyds Fork at former State Highway 155	138	.360	1.89	2.25	16.0	84.0
16	Chenoweth Run at Gelhaus Road	11.7	2.22	1.58	3.81	58.4	41.6
17	Fern Creek at Old Bardstown Road	3.4	4.08	3.58	7.66	53.3	46.7
18	Northern Ditch at Preston Highway	11.4	3.21	1.78	4.99	64.4	35.6
19	Fishpool Creek at Bost Road	5.4	1.63	2.23	3.86	42.3	57.7
20	Southern Ditch at Minors Lane	13.1	.971	1.91	2.88	33.7	66.3
21	Floyds Fork at Bardstown Road	214	.520	2.26	2.78	18.7	81.3

Table 4. Estimates of mean annual base-flow and stormflow yields of selected water-quality constituents from urban watersheds of Jefferson County, Kentucky, 1988-92--Continued

[mi^2, square mile; ton/mi^2, tons per square mile; ---, unknown]

	Site number and name	Drainage area (mi^2)	Annual yield (ton/mi^2)			Percentage of total annual yield	
			Base flow	Stormflow	Total	Base flow	Stormflow
	Nitrogen, nitrate, total as N--Continued						
22	Cedar Creek at Thixton Road	11.3	1.60	1.37	2.97	53.9	46.1
23	Pennsylvania Run at Mt. Washington Road	6.2	1.59	1.13	2.71	58.5	41.5
24	Mill Creek Cutoff at Dover Road	16.0	.229	2.38	2.61	8.8	91.2
25	Harrods Creek at Hunting Creek Drive	100	1.15	1.45	2.60	44.3	55.7
26	Long Run at State Highway 1531	23.7	.337	1.85	2.18	15.4	84.6
	Nitrogen, nitrite, total as N						
1	Pond Creek at Pendleton Road	82.0	0.035	0.113	0.148	23.6	76.4
3	Pond Creek at Manslick Road	63.9	.041	.202	.243	16.9	83.1
5	South Fork Beargrass Creek at Winter Avenue	22.3	.021	.058	.079	26.6	73.4
6	South Fork Beargrass Creek at Trevilian Way	16.9	.017	.072	.089	19.1	80.9
7	Middle Fork Beargrass Cr at Old Cannons Lane	18.4	.009	.020	.029	31.0	69.0
8	Middle Fork Beargrass Cr at Beals Branch Road	22.6	.007	.021	.028	25.0	75.0
9	Spring Ditch at Private Drive below Hanses Road	2.4	.033	.059	.092	35.9	64.1
10	Muddy Fork at Mockingbird Valley Road	6.5	.031	.046	.077	40.3	59.7
11	Goose Creek at U.S. Highway 42	9.8	.041	.077	.118	34.7	65.3
12	Little Goose Creek at U.S. Highway 42	5.8	.041	.066	.107	38.3	61.7
13	Goose Creek at Old Westport Road	6.8	.094	.062	.156	60.3	39.7
14	Pope Lick at Pope Lick Road	3.0	.053	.074	.127	41.7	58.3
15	Floyds Fork at former State Highway 155	138	.009	.088	.097	9.3	90.7
16	Chenoweth Run at Gelhaus Road	11.7	.065	.101	.166	39.2	60.8
17	Fern Creek at Old Bardstown Road	3.4	.059	.176	.235	25.1	74.9
18	Northern Ditch at Preston Highway	11.4	.060	.059	.119	50.4	49.6
19	Fishpool Creek at Bost Road	5.4	.059	.148	.207	28.5	71.5
20	Southern Ditch at Minors Lane	13.1	.027	.101	.128	21.1	78.9
21	Floyds Fork at Bardstown Road	214	.008	.119	.127	6.3	93.7
22	Cedar Creek at Thixton Road	11.3	.021	.064	.085	24.7	75.3
23	Pennsylvania Run at Mt. Washington Road	6.2	.068	.122	.190	35.8	64.2
24	Mill Creek Cutoff at Dover Road	16.0	.019	.141	.160	11.9	88.1
25	Harrods Creek at Hunting Creek Drive	100	.026	.057	.083	31.3	68.7
26	Long Run at State Highway 1531	23.7	---	---	.054	---	---
	Nitrogen, ammonia, total as N						
1	Pond Creek at Pendleton Road	82.0	.103	.231	.334	30.8	69.2
2	Mill Creek at Orell Road	13.9	.007	.042	.049	14.3	85.7
3	Pond Creek at Manslick Road	63.9	.242	.516	.758	31.9	68.1
5	South Fork Beargrass Creek at Winter Avenue	22.3	.134	.482	.616	21.8	78.2
6	South Fork Beargrass Creek at Trevilian Way	16.9	.178	.189	.367	48.5	51.5
7	Middle Fork Beargrass Cr at Old Cannons Lane	18.4	.026	.106	.132	19.7	80.3
8	Middle Fork Beargrass Cr at Beals Branch Road	22.6	.038	.056	.094	40.4	59.6
9	Spring Ditch at Private Drive below Hanses Road	2.4	.142	.141	.283	50.2	49.8
10	Muddy Fork at Mockingbird Valley Road	6.5	.037	.083	.120	30.8	69.2
11	Goose Creek at U.S. Highway 42	9.8	.100	.086	.186	53.8	46.2
12	Little Goose Creek at U.S. Highway 42	5.8	.076	.048	.124	61.3	38.7
14	Pope Lick at Pope Lick Road	3.0	.133	.214	.347	38.3	61.7
17	Fern Creek at Old Bardstown Road	3.4	.206	.482	.688	29.9	70.1
18	Northern Ditch at Preston Highway	11.4	.270	.126	.396	68.2	31.8
19	Fishpool Creek at Bost Road	5.4	.056	.255	.311	18.0	82.0
20	Southern Ditch at Minors Lane	13.1	.055	.324	.379	14.5	85.5
21	Floyds Fork at Bardstown Road	214	.054	.077	.131	41.2	58.8
22	Cedar Creek at Thixton Road	11.3	.090	.154	.244	36.9	63.1
23	Pennsylvania Run at Mt. Washington Road	6.2	.090	.394	.484	18.6	81.4
24	Mill Creek Cutoff at Dover Road	16.0	.049	.710	.759	6.5	93.5
	Nitrogen, organic, total as N						
1	Pond Creek at Pendleton Road	82.0	.273	.422	.695	39.3	60.7
2	Mill Creek at Orell Road	13.9	.052	.296	.348	14.9	85.1
3	Pond Creek at Manslick Road	63.9	.255	.590	.845	30.2	69.8
5	South Fork Beargrass Creek at Winter Avenue	22.3	.227	1.13	1.36	16.7	83.3
6	South Fork Beargrass Creek at Trevilian Way	16.9	.170	.677	.847	20.1	79.9
7	Middle Fork Beargrass Cr at Old Cannons Lane	18.4	.138	.328	.466	29.6	70.4
8	Middle Fork Beargrass Cr at Beals Branch Road	22.6	.096	.308	.404	23.8	76.2
9	Spring Ditch at Private Drive below Hanses Road	2.4	.575	1.19	1.77	32.5	67.5
10	Muddy Fork at Mockingbird Valley Road	6.5	.154	.264	.418	36.8	63.2
11	Goose Creek at U.S. Highway 42	9.8	.322	.321	.643	50.1	49.9
12	Little Goose Creek at U.S. Highway 42	5.8	.307	.317	.624	49.2	50.8
13	Goose Creek at Old Westport Road	6.8	.541	.547	1.09	49.7	50.3
14	Pope Lick at Pope Lick Road	3.0	.367	.846	1.21	30.3	69.7
15	Floyds Fork at former State Highway 155	138	.198	1.16	1.36	14.6	85.4
16	Chenoweth Run at Gelhaus Road	11.7	.368	.748	1.12	33.0	67.0
17	Fern Creek at Old Bardstown Road	3.4	.382	.847	1.23	31.1	68.9
18	Northern Ditch at Preston Highway	11.4	.668	.985	1.65	40.4	59.6
19	Fishpool Creek at Bost Road	5.4	.237	.800	1.04	22.9	77.1
20	Southern Ditch at Minors Lane	13.1	.171	.754	.925	18.5	81.5

Table 4. Estimates of mean annual base-flow and stormflow yields of selected water-quality constituents from urban watersheds of Jefferson County, Kentucky, 1988-92--Continued

[mi^2, square mile; ton/mi^2, tons per square mile; ---, unknown]

	Site number and name	Drainage area (mi^2)	Annual yield (ton/mi^2)			Percentage of total annual yield	
			Base flow	Stormflow	Total	Base flow	Stormflow
	Nitrogen, organic, total as N--Continued						
21	Floyds Fork at Bardstown Road	214	.145	.779	.924	15.7	84.3
22	Cedar Creek at Thixton Road	11.3	.315	.662	.977	32.2	67.8
23	Pennsylvania Run at Mt. Washington Road	6.2	.532	.920	1.45	36.6	63.4
24	Mill Creek Cutoff at Dover Road	16.0	.086	1.55	1.64	5.3	94.7
25	Harrods Creek at Hunting Creek Drive	100	.333	.564	.897	37.1	62.9
26	Long Run at State Highway 1531	23.7	.084	1.32	1.40	6.0	94.0
	Phosphate, total as PO_4						
1	Pond Creek at Pendleton Road	82.0	0.724	0.919	1.64	44.1	55.9
2	Mill Creek at Orell Road	13.9	.165	.688	.853	19.3	80.7
3	Pond Creek at Manslick Road	63.9	.895	1.44	2.33	38.3	61.7
5	South Fork Beargrass Creek at Winter Avenue	22.3	.186	.895	1.08	17.2	82.8
6	South Fork Beargrass Creek at Trevilian Way	16.9	.109	1.03	1.14	9.6	90.4
7	Middle Fork Beargrass Cr at Old Cannons Lane	18.4	.166	.572	.738	22.5	77.5
8	Middle Fork Beargrass Cr at Beals Branch Road	22.6	.082	.307	.389	21.1	78.9
9	Spring Ditch at Private Drive below Hanses Road	2.4	1.37	1.01	2.37	57.6	42.4
10	Muddy Fork at Mockingbird Valley Road	6.5	1.10	.354	1.45	75.6	24.4
11	Goose Creek at U.S. Highway 42	9.8	1.69	.686	2.38	71.2	28.8
12	Little Goose Creek at U.S. Highway 42	5.8	1.77	1.16	2.93	60.4	39.6
13	Goose Creek at Old Westport Road	6.8	1.90	1.02	2.92	65.1	34.9
14	Pope Lick at Pope Lick Road	3.0	1.27	1.18	2.45	51.9	48.1
15	Floyds Fork at former State Highway 155	138	.160	1.06	1.22	13.1	86.9
16	Chenoweth Run at Gelhaus Road	11.7	1.79	2.52	4.31	41.5	58.5
17	Fern Creek at Old Bardstown Road	3.4	2.73	1.91	4.64	58.8	41.2
18	Northern Ditch at Preston Highway	11.4	2.64	1.24	3.89	68.0	32.0
19	Fishpool Creek at Bost Road	5.4	1.26	1.26	2.51	50.0	50.0
20	Southern Ditch at Minors Lane	13.1	.689	.987	1.68	41.1	58.9
21	Floyds Fork at Bardstown Road	214	.220	.934	1.15	19.1	80.9
22	Cedar Creek at Thixton Road	11.3	1.33	.855	2.18	60.9	39.1
23	Pennsylvania Run at Mt. Washington Road	6.2	1.64	.616	2.25	72.7	27.3
24	Mill Creek Cutoff at Dover Road	16.0	.441	2.79	3.24	13.6	86.4
25	Harrods Creek at Hunting Creek Drive	100	.297	.681	.978	30.4	69.6
26	Long Run at State Highway 1531	23.7	.120	2.97	3.09	3.9	96.1
	Phosphorus, total as P						
1	Pond Creek at Pendleton Road	82.0	.268	.437	.705	38.0	62.0
2	Mill Creek at Orell Road	13.9	.089	.389	.478	18.6	81.4
3	Pond Creek at Manslick Road	63.9	.340	.605	.945	36.0	64.0
5	South Fork Beargrass Creek at Winter Avenue	22.3	.105	.672	.777	13.5	86.5
6	South Fork Beargrass Creek at Trevilian Way	16.9	.047	.452	.499	9.4	90.6
7	Middle Fork Beargrass Cr at Old Cannons Lane	18.4	.074	.309	.383	19.3	80.7
8	Middle Fork Beargrass Cr at Beals Branch Road	22.6	.059	.213	.272	21.7	78.3
9	Spring Ditch at Private Drive below Hanses Road	2.4	.658	.434	1.09	60.3	39.7
10	Muddy Fork at Mockingbird Valley Road	6.5	.492	.250	.742	66.3	33.7
11	Goose Creek at U.S. Highway 42	9.8	.684	.404	1.09	62.9	37.1
12	Little Goose Creek at U.S. Highway 42	5.8	.859	.489	1.35	63.7	36.3
13	Goose Creek at Old Westport Road	6.8	.812	.523	1.33	60.8	39.2
14	Pope Lick at Pope Lick Road	3.0	.607	.800	1.41	43.1	56.9
15	Floyds Fork at former State Highway 155	138	.081	.632	.713	11.4	88.6
16	Chenoweth Run at Gelhaus Road	11.7	.774	.665	1.44	53.8	46.2
17	Fern Creek at Old Bardstown Road	3.4	1.41	1.07	2.48	56.8	43.2
18	Northern Ditch at Preston Highway	11.4	1.26	.582	1.84	68.5	31.5
19	Fishpool Creek at Bost Road	5.4	.559	.630	1.19	47.0	53.0
20	Southern Ditch at Minors Lane	13.1	.290	.519	.809	35.8	64.2
21	Floyds Fork at Bardstown Road	214	.091	.541	.632	14.4	85.6
22	Cedar Creek at Thixton Road	11.3	.581	.348	.929	62.5	37.5
23	Pennsylvania Run at Mt. Washington Road	6.2	.777	.268	1.05	74.4	25.6
24	Mill Creek Cutoff at Dover Road	16.0	.161	.869	1.03	15.6	84.4
25	Harrods Creek at Hunting Creek Drive	100	.132	.360	.492	26.8	73.2
26	Long Run at State Highway 1531	23.7	.051	.993	1.04	4.9	95.1
	Phosphorus, orthophosphate, total as P						
1	Pond Creek at Pendleton Road	82.0	.236	.300	.536	44.0	56.0
2	Mill Creek at Orell Road	13.9	.055	.243	.298	18.5	81.5
3	Pond Creek at Manslick Road	63.9	.292	.469	.761	38.4	61.6
5	South Fork Beargrass Creek at Winter Avenue	22.3	.061	.291	.352	17.3	82.7
6	South Fork Beargrass Creek at Trevilian Way	16.9	.034	.346	.380	8.9	91.1
7	Middle Fork Beargrass Cr at Old Cannons Lane	18.4	.048	.180	.228	21.1	78.9
8	Middle Fork Beargrass Cr at Beals Branch Road	22.6	.024	.097	.121	19.8	80.2
9	Spring Ditch at Private Drive below Hanses Road	2.4	.433	.325	.758	57.1	42.9
10	Muddy Fork at Mockingbird Valley Road	6.5	.360	.114	.474	75.9	24.1
11	Goose Creek at U.S. Highway 42	9.8	.551	.225	.776	71.0	29.0
12	Little Goose Creek at U.S. Highway 42	5.8	.576	.379	.955	60.3	39.7
13	Goose Creek at Old Westport Road	6.8	.621	.332	.953	65.2	34.8

Table 4. Estimates of mean annual base-flow and stormflow yields of selected water-quality constituents from urban watersheds of Jefferson County, Kentucky, 1988-92--Continued

[mi^2, square mile; ton/mi^2, tons per square mile; ---, unknown]

	Site number and name	Drainage area (mi^2)	Annual yield (ton/mi^2)			Percentage of total annual yield	
			Base flow	Stormflow	Total	Base flow	Stormflow
	Phosphorus, orthophosphate, total as P--Continued						
14	Pope Lick at Pope Lick Road	3.0	.413	.387	.800	51.6	48.4
15	Floyds Fork at former State Highway 155	138	.052	.345	.397	13.1	86.9
16	Chenoweth Run at Gelhaus Road	11.7	.583	.822	1.40	41.5	58.5
17	Fern Creek at Old Bardstown Road	3.4	.888	.624	1.51	58.7	41.3
18	Northern Ditch at Preston Highway	11.4	.863	.365	1.23	70.2	29.8
19	Fishpool Creek at Bost Road	5.4	.389	.430	.819	47.5	52.5
20	Southern Ditch at Minors Lane	13.1	.203	.344	.547	37.1	62.9
21	Floyds Fork at Bardstown Road	214	.072	.304	.376	19.1	80.9
22	Cedar Creek at Thixton Road	11.3	.434	.278	.712	61.0	39.0
23	Pennsylvania Run at Mt. Washington Road	6.2	.535	.200	.735	72.8	27.2
24	Mill Creek Cutoff at Dover Road	16.0	.144	.911	1.05	13.6	86.4
25	Harrods Creek at Hunting Creek Drive	100	.097	.222	.319	30.4	69.6
26	Long Run at State Highway 1531	23.7	.039	.900	.939	4.2	95.8
	METALS						
	Barium, total as Ba						
1	Pond Creek at Pendleton Road	82.0	0.018	0.037	0.055	32.7	67.3
2	Mill Creek at Orell Road	13.9	.009	.020	.029	31.0	69.0
3	Pond Creek at Manslick Road	63.9	.021	.047	.068	30.9	69.1
5	South Fork Beargrass Creek at Winter Avenue	22.3	.025	.064	.089	28.1	71.9
6	South Fork Beargrass Creek at Trevilian Way	16.9	.028	.044	.072	38.9	61.1
7	Middle Fork Beargrass Cr at Old Cannons Lane	18.4	---	---	.061	---	---
8	Middle Fork Beargrass Cr at Beals Branch Road	22.6	---	---	.065	---	---
9	Spring Ditch at Private Drive below Hanses Road	2.4	.033	.025	.058	56.9	43.1
10	Muddy Fork at Mockingbird Valley Road	6.5	.028	.043	.071	39.4	60.6
11	Goose Creek at U.S. Highway 42	9.8	.035	.018	.053	66.0	34.0
12	Little Goose Creek at U.S. Highway 42	5.8	.041	.052	.093	44.1	55.9
13	Goose Creek at Old Westport Road	6.8	.041	.018	.059	69.5	30.5
14	Pope Lick at Pope Lick Road	3.0	.020	.027	.047	42.6	57.4
15	Floyds Fork at former State Highway 155	138	.011	.048	.059	18.6	81.4
16	Chenoweth Run at Gelhaus Road	11.7	.029	.062	.091	31.9	68.1
17	Fern Creek at Old Bardstown Road	3.4	.041	.135	.176	23.3	76.7
18	Northern Ditch at Preston Highway	11.4	.037	.049	.086	43.0	57.0
19	Fishpool Creek at Bost Road	5.4	---	---	.085	---	---
20	Southern Ditch at Minors Lane	13.1	---	---	.053	---	---
21	Floyds Fork at Bardstown Road	214	.014	.070	.084	16.7	83.3
22	Cedar Creek at Thixton Road	11.3	.025	.044	.069	36.2	63.8
23	Pennsylvania Run at Mt. Washington Road	6.2	.019	.033	.052	36.5	63.5
24	Mill Creek Cutoff at Dover Road	16.0	---	---	.039	---	---
25	Harrods Creek at Hunting Creek Drive	100	.016	.046	.062	25.8	74.2
26	Long Run at State Highway 1531	23.7	---	---	.038	---	---
	Chromium, total as Cr						
1	Pond Creek at Pendleton Road	82.0	.010	.023	.033	30.3	69.7
3	Pond Creek at Manslick Road	63.9	.010	.009	.019	52.6	47.4
9	Spring Ditch at Private Drive below Hanses Road	2.4	.008	.042	.050	16.0	84.0
	Copper, total recoverable as Cu						
1	Pond Creek at Pendleton Road	82.0	.005	.018	.023	21.7	78.3
3	Pond Creek at Manslick Road	63.9	.010	.025	.035	28.6	71.4
5	South Fork Beargrass Creek at Winter Avenue	22.3	.006	.025	.031	19.4	80.6
8	Middle Fork Beargrass Cr at Beals Branch Road	22.6	---	---	.055	---	---
9	Spring Ditch at Private Drive below Hanses Road	2.4	.008	.017	.025	32.0	68.0
11	Goose Creek at U.S. Highway 42	9.8	.014	.008	.022	63.6	36.4
13	Goose Creek at Old Westport Road	6.8	.009	.009	.018	50.0	50.0
14	Pope Lick at Pope Lick Road	3.0	.007	.006	.013	53.8	46.2
15	Floyds Fork at former State Highway 155	138	.005	.037	.042	11.9	88.1
16	Chenoweth Run at Gelhaus Road	11.7	---	---	.034	---	---
17	Fern Creek at Old Bardstown Road	3.4	.012	.029	.041	29.3	70.7
18	Northern Ditch at Preston Highway	11.4	.012	.006	.018	66.7	33.3
20	Southern Ditch at Minors Lane	13.1	---	---	.017	---	---
21	Floyds Fork at Bardstown Road	214	---	---	.015	---	---
22	Cedar Creek at Thixton Road	11.3	.004	.012	.016	25.0	75.0
23	Pennsylvania Run at Mt. Washington Road	6.2	.006	.013	.019	31.6	68.4
24	Mill Creek Cutoff at Dover Road	16.0	---	---	.005	---	---
26	Long Run at State Highway 1531	23.7	---	---	.080	---	---
	Iron, total as Fe						
2	Mill Creek at Orell Road	13.9	.635	5.35	5.99	10.6	89.4
3	Pond Creek at Manslick Road	63.9	.834	3.09	3.93	21.2	78.8
5	South Fork Beargrass Creek at Winter Avenue	22.3	.350	38.1	38.4	.9	99.1
6	South Fork Beargrass Creek at Trevilian Way	16.9	.212	1.96	2.17	9.8	90.2

Table 4. Estimates of mean annual base-flow and stormflow yields of selected water-quality constituents from urban watersheds of Jefferson County, Kentucky, 1988-92--Continued

[mi^2, square mile; ton/mi^2, tons per square mile; ---, unknown]

	Site number and name	Drainage area (mi^2)	Annual yield (ton/mi^2)			Percentage of total annual yield	
			Base flow	Stormflow	Total	Base flow	Stormflow
	Iron, total as Fe--Continued						
7	Middle Fork Beargrass Cr at Old Cannons Lane	18.4	---	---	1.71	---	---
8	Middle Fork Beargrass Cr at Beals Branch Road	22.6	---	---	2.47	---	---
9	Spring Ditch at Private Drive below Hanses Road	2.4	.550	3.74	4.29	12.8	87.2
10	Muddy Fork at Mockingbird Valley Road	6.5	.363	43.0	43.4	.8	99.2
11	Goose Creek at U.S. Highway 42	9.8	.327	.481	.808	40.5	59.5
12	Little Goose Creek at U.S. Highway 42	5.8	.531	3.86	4.39	12.1	87.9
13	Goose Creek at Old Westport Road	6.8	.624	.476	1.10	56.7	43.3
15	Floyds Fork at former State Highway 155	138	1.19	20.6	21.8	5.5	94.5
16	Chenoweth Run at Gelhaus Road	11.7	.274	.229	.503	54.5	45.5
17	Fern Creek at Old Bardstown Road	3.4	.408	21.1	21.5	1.9	98.1
18	Northern Ditch at Preston Highway	11.4	.253	3.19	3.44	7.4	92.6
19	Fishpool Creek at Bost Road	5.4	---	---	.796	---	---
20	Southern Ditch at Minors Lane	13.1	---	---	.624	---	---
21	Floyds Fork at Bardstown Road	214	.123	7.38	7.50	1.6	98.4
22	Cedar Creek at Thixton Road	11.3	.140	.418	.558	25.1	74.9
23	Pennsylvania Run at Mt. Washington Road	6.2	.374	.226	.600	62.3	37.7
24	Mill Creek Cutoff at Dover Road	16.0	---	---	8.00	---	---
25	Harrods Creek at Hunting Creek Drive	100	.647	18.0	18.6	3.5	96.5
26	Long Run at State Highway 1531	23.7	---	---	1.93	---	---
	Mercury, total recoverable as Hg						
21	Floyds Fork at Bardstown Road	214	---	---	0.003	---	---
22	Cedar Creek at Thixton Road	11.3	0.000	0.002	.002	0.0	100
	Nickel, total as Ni						
6	South Fork Beargrass Creek at Trevilian Way	18.9	---	---	.014	---	---
9	Spring Ditch at Private Drive below Hanses Road	2.4	.008	.017	.025	32.0	68.0
	Zinc, total as Zn						
1	Pond Creek at Pendleton Road	82.0	.049	.005	.054	90.7	9.3
2	Mill Creek at Orell Road	13.9	.006	.024	.030	20.0	80.0
3	Pond Creek at Manslick Road	63.9	.021	.042	.063	33.3	66.7
5	South Fork Beargrass Creek at Winter Avenue	22.3	.022	.654	.676	3.3	96.7
6	South Fork Beargrass Creek at Trevilian Way	16.9	.053	.501	.554	9.6	90.4
7	Middle Fork Beargrass Cr at Old Cannons Lane	18.4	---	---	.163	---	---
8	Middle Fork Beargrass Cr at Beals Branch Road	22.6	---	---	.128	---	---
9	Spring Ditch at Private Drive below Hanses Road	2.4	.083	.259	.342	24.3	75.7
10	Muddy Fork at Mockingbird Valley Road	6.5	.135	1.48	1.62	8.3	91.7
11	Goose Creek at U.S. Highway 42	9.8	.096	.143	.239	40.2	59.8
12	Little Goose Creek at U.S. Highway 42	5.8	.024	.038	.062	38.7	61.3
13	Goose Creek at Old Westport Road	8.8	.056	.094	.150	37.3	62.7
14	Pope Lick at Pope Lick Road	3.0	.053	.020	.073	72.6	27.4
15	Floyds Fork at former State Highway 155	138	.018	.112	.130	13.8	86.2
16	Chenoweth Run at Gelhaus Road	11.7	.034	.004	.038	89.5	10.5
17	Fern Creek at Old Bardstown Road	3.4	.029	.236	.265	10.9	89.1
18	Northern Ditch at Preston Highway	11.4	.058	.105	.163	35.6	64.4
19	Fishpool Creek at Bost Road	5.4	---	---	.152	---	---
20	Southern Ditch at Minors Lane	13.1	---	---	.229	---	---
21	Floyds Fork at Bardstown Road	214	.019	.027	.046	41.3	58.7
22	Cedar Creek at Thixton Road	11.3	.028	.004	.032	87.5	12.5
23	Pennsylvania Run at Mt. Washington Road	6.2	.032	.026	.058	55.2	44.8
24	Mill Creek Cutoff at Dover Road	16.0	---	---	.325	---	---
25	Harrods Creek at Hunting Creek Drive	100	.051	.034	.085	60.0	40.0
26	Long Run at State Highway 1531	23.7	---	---	.180	---	---
	CYANIDE						
	Cyanide, total as Cn						
13	Goose Creek at Old Westport Road	6.8	.009	---	---	---	---
16	Chenoweth Run at Gelhaus Road	11.7	.005	---	---	---	---
	SYNTHETIC ORGANIC COMPOUNDS						
	2,4-D, total						
5	South Fork Beargrass Creek at Winter Avenue	22.3	---	---	.001	---	---
6	South Fork Beargrass Creek at Trevilian Way	16.9	.000	.001	.001	.0	100

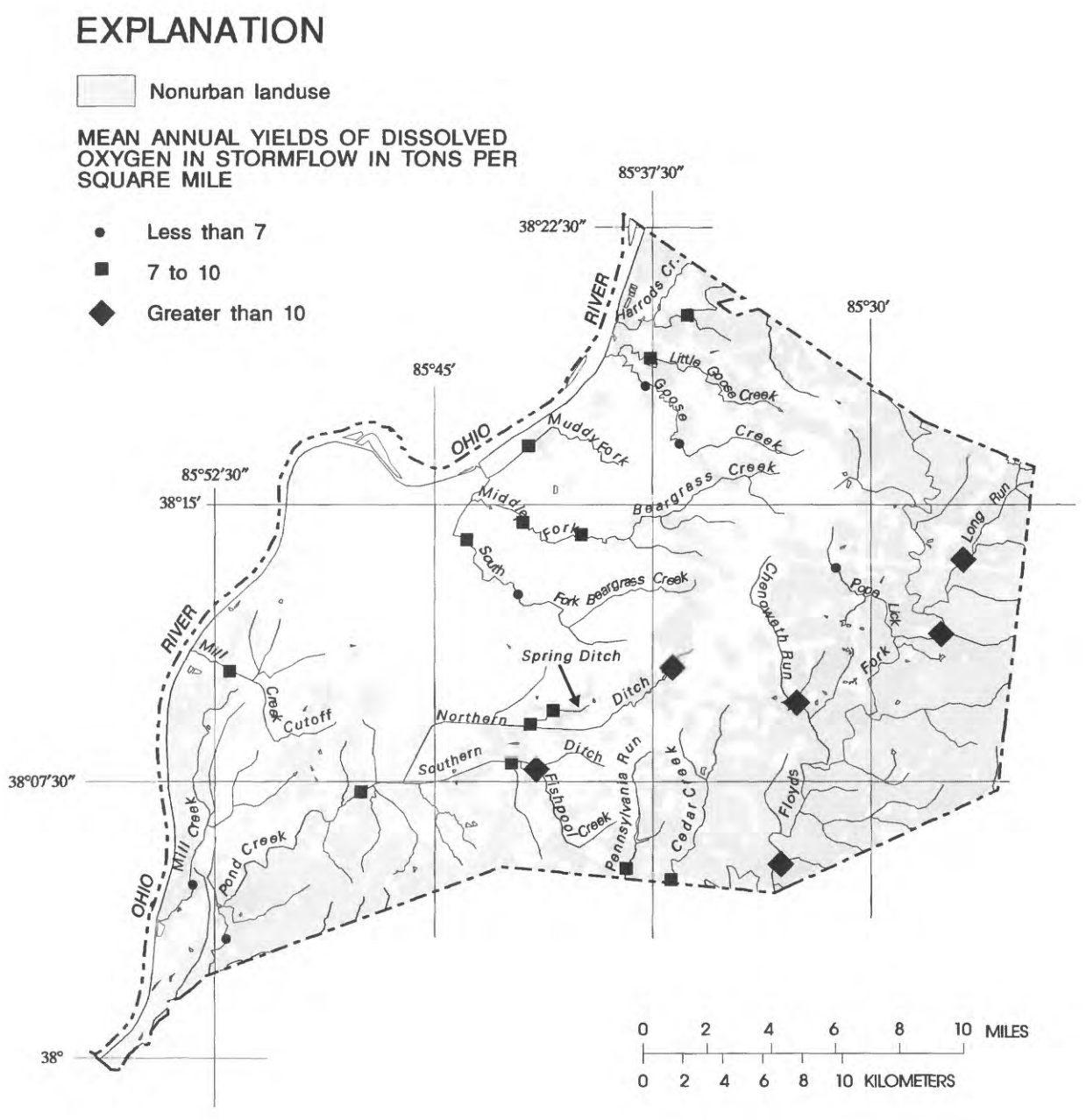
Dissolved Oxygen and Oxygen Demand

Dissolved-oxygen concentrations of streams can vary significantly over time and space in response to several environmental processes. Oxygen in streams 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. Oxygen is replenished in natural water primarily by diffusion of oxygen into the water from the atmosphere and by photosynthesis.

Dissolved-oxygen monitors in Jefferson County showed that the minimum dissolved-oxygen concentrations recorded were much smaller than those observed by random daylight sampling (Evaldi and others, 1993). Although dissolved oxygen in stream water fluctuates throughout the day and is not conservative, watershed yields were estimated to provide a comparison between basins. Yields of dissolved oxygen in the Mill Creek Watershed were less than those in any other watershed. Although dissolved-oxygen yields for base flow were largest in the Goose Creek, Little Goose Creek, and Northern Ditch Watersheds, dissolved-oxygen transport occurred primarily during stormflow in the other watersheds and was related to the amount of nonurban land use in the watersheds (fig. 6).

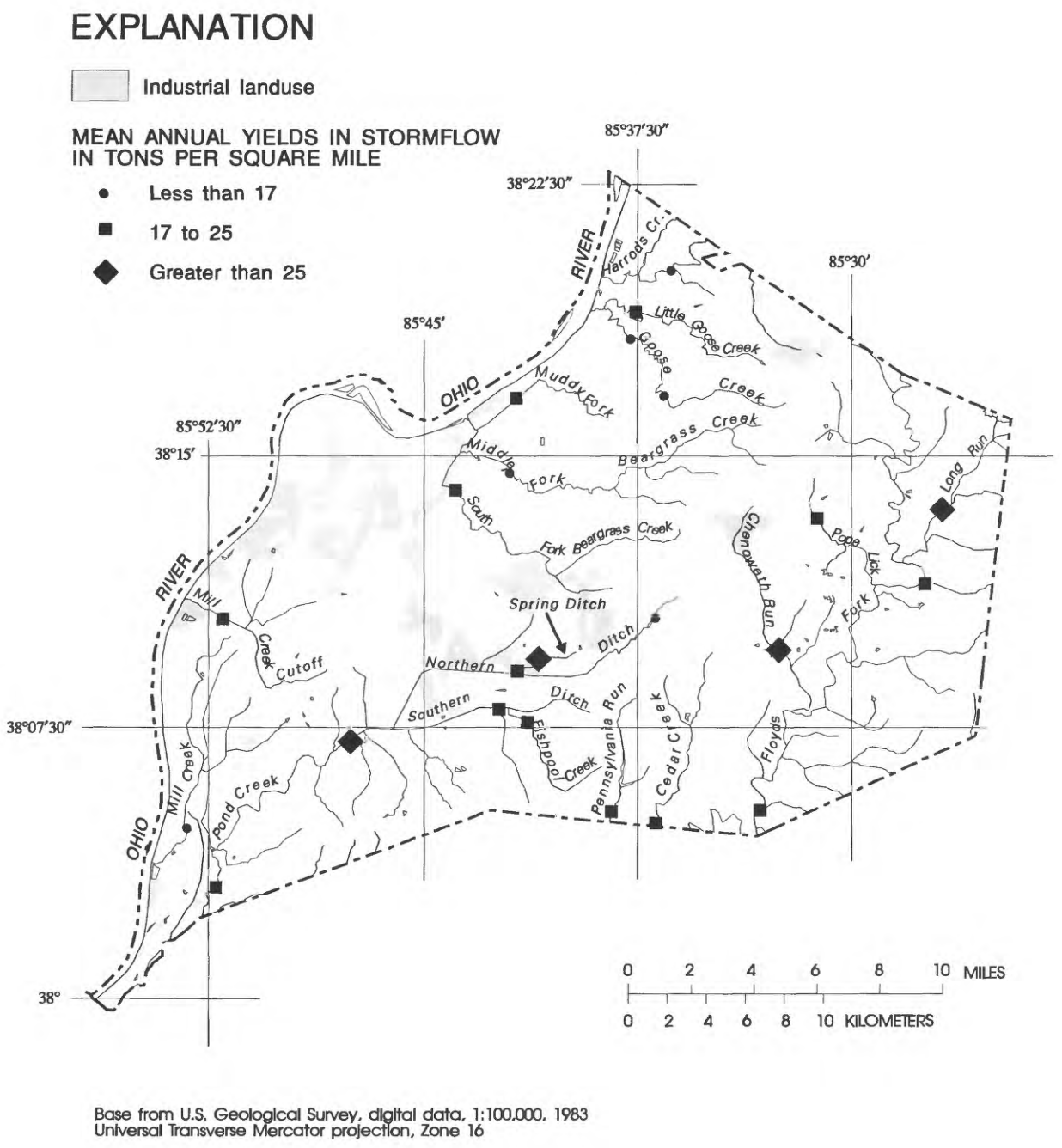
Two gross measures of the amount of oxygen required for biochemical and chemical oxidation of organic material in the water are chemical oxygen demand (COD) and biochemical oxygen demand (BOD). COD is a measure of the oxygen required to oxidize organic and reduced inorganic substances in a sample by a strong chemical oxidant. BOD, in contrast, is a measure of the amount of oxygen removed from the sample by life processes of microorganisms. A test duration of 5 days is commonly used to measure BOD, and results are expressed as the 5-day amount of oxygen consumed. COD and BOD are measures of potential oxygen required for oxidation of materials rather than the actual measurable quantities of a substance in the water; however, COD and BOD were treated as if they were constituent concentrations, and transport estimates were computed to provide an indication of potential oxygen demand on the stream systems.

A mean annual COD of 76.6 ton/mi^2 in the highly industrialized Spring Ditch Watershed during 1988-92 was nearly twice as large as the mean in any of the other sampled watersheds in Jefferson County. The COD yield was greatest during stormflow for all watersheds except Goose Creek and Little Goose Creek. COD during stormflow was related to the amount of industrial land use in the watersheds (fig. 7). The largest BOD was about 16.9 ton/mi^2 in the Chenoweth Run Watershed. Other areas that had large BOD's were the Fern Creek and lower South Fork Beargrass Creek Watersheds. The smallest base-flow BOD's and COD's were in the lower Mill Creek Watershed.



Base from U.S. Geological Survey, digital data, 1:100,000, 1983
Universal Transverse Mercator projection, Zone 16

Figure 6. Mean annual yields of dissolved oxygen in stormflow in selected watersheds of Jefferson County, Kentucky, 1988-92.



Base from U.S. Geological Survey, digital data, 1:100,000, 1983
Universal Transverse Mercator projection, Zone 16

Figure 7. Mean annual yields of chemical oxygen demand in stormflow in selected watersheds of Jefferson County, Kentucky, 1988-92.

Dissolved Solids and Related Water-Quality Constituents

The presence of chemical constituents dissolved in water results from the physical and chemical characteristics of the material over which or through which the water moves, the natural weathering processes, and point and nonpoint sources of the constituents.

Calcium and Magnesium

Calcium and magnesium are essential elements for plant and animal life. 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). The largest mean annual calcium and magnesium yields for 1988-92, 132 and 59.8 ton/mi^2, respectively, were in the Chenoweth Run Watershed. The smallest yields of both calcium and magnesium were in the Mill Creek Watershed where calcium yield was less than 20 ton/mi^2 and magnesium yield was less than 7 ton/mi^2. On the basis of National Atmospheric Deposition Program 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 (Evaldi and others, 1993, p. 48). The largest stormflow yields of calcium were in watersheds composed of limestones and dolomites (fig. 2). More than half of the transport of calcium and magnesium occurred during base flow in the headwaters of the South Fork Beargrass and Northern Ditch Watersheds, the Muddy Fork Watershed, and in the Goose Creek and Little Goose Creek Watersheds.

Alkalinity

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. Alkalinity is a measure of the capacity of a water to neutralize a strong acid and not an actual quantity of a substance in the water; however, it was treated as if it was a constituent concentration, and transport estimates were computed to provide an indication of the potential neutralization capacity of the stream systems. Mill Creek drains alluvial deposits along the Ohio River (fig. 2), and its watershed yields less alkalinity during base flow than do other areas of Jefferson County. Greatest potential capacity to neutralize acid was in the Fern Creek Watershed.

Dissolved Solids

Dissolved solids consist of inorganic salts, small amounts of organic matter, and dissolved materials. Equivalent terminology is "filterable residue." 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. Dissolved-solids transport occurred primarily during stormflow except in the

Fern Creek, Goose Creek, Little Goose Creek, Northern Ditch, and Spring Ditch Watersheds, indicating that these areas may be affected by point-source discharges. Dissolved-solids yields in base flow ranged from less than 100 ton/mi^2 in the Mill Creek Watershed to greater than 300 ton/mi^2 in the Fern Creek, upper Goose Creek, and Northern Ditch Watersheds (fig. 8). Yields of dissolved solids in stormflow ranged from less than 100 ton/mi^2 in the lower Goose Creek and Mill Creek Watersheds to greater than 500 ton/mi^2 in the Chenoweth Run and lower South Fork Beargrass Creek Watersheds (fig. 9).

Suspended and Volatile Solids

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°C. Loss of weight on ignition is reported as milligrams per liter of volatile solids. Volatile solids in a waste are commonly interpreted as being a measure of organic matter (Hammer, 1975).

Mean annual 1988-92 yields of suspended solids ranged from 34.1 to 350 ton/mi^2; yields in the Floyds Fork, South Fork Beargrass Creek, and Pond Creek Watersheds were all in excess of 200 ton/mi^2. Annual yields of nonvolatile suspended solids exceeded those for total suspended solids for some watersheds. Given the standard errors of the regressions used for the yield calculations, the nonvolatile suspended-solids yield estimates are probably less accurate than those for total suspended solids. The nonvolatile suspended-solids yield estimates ranged from 9 to 461 ton/mi^2. Mean annual yields of volatile nonfilterable residue (volatile suspended solids) were less than 10 ton/mi^2 in the Pennsylvania Run Watershed but exceeded 100 ton/mi^2 in the South Fork Beargrass Creek Watershed. Suspended-solids transport, both volatile and nonvolatile, occurred primarily during stormflow.

Nutrients

In this report, nutrients are defined as nitrogen and phosphorus species. Forms of nitrogen in water include organic nitrogen, ammonia, nitrite, and nitrate. Forms of phosphorus in water include the simple ionic orthophosphate and bound phosphate in soluble or particulate form.

Nitrogen

Some of the major point-source discharges of nitrogen into streams 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 organic matter in soil. Septic tanks are another significant diffuse source of nitrogen (U.S. Environmental Protection Agency, 1976).

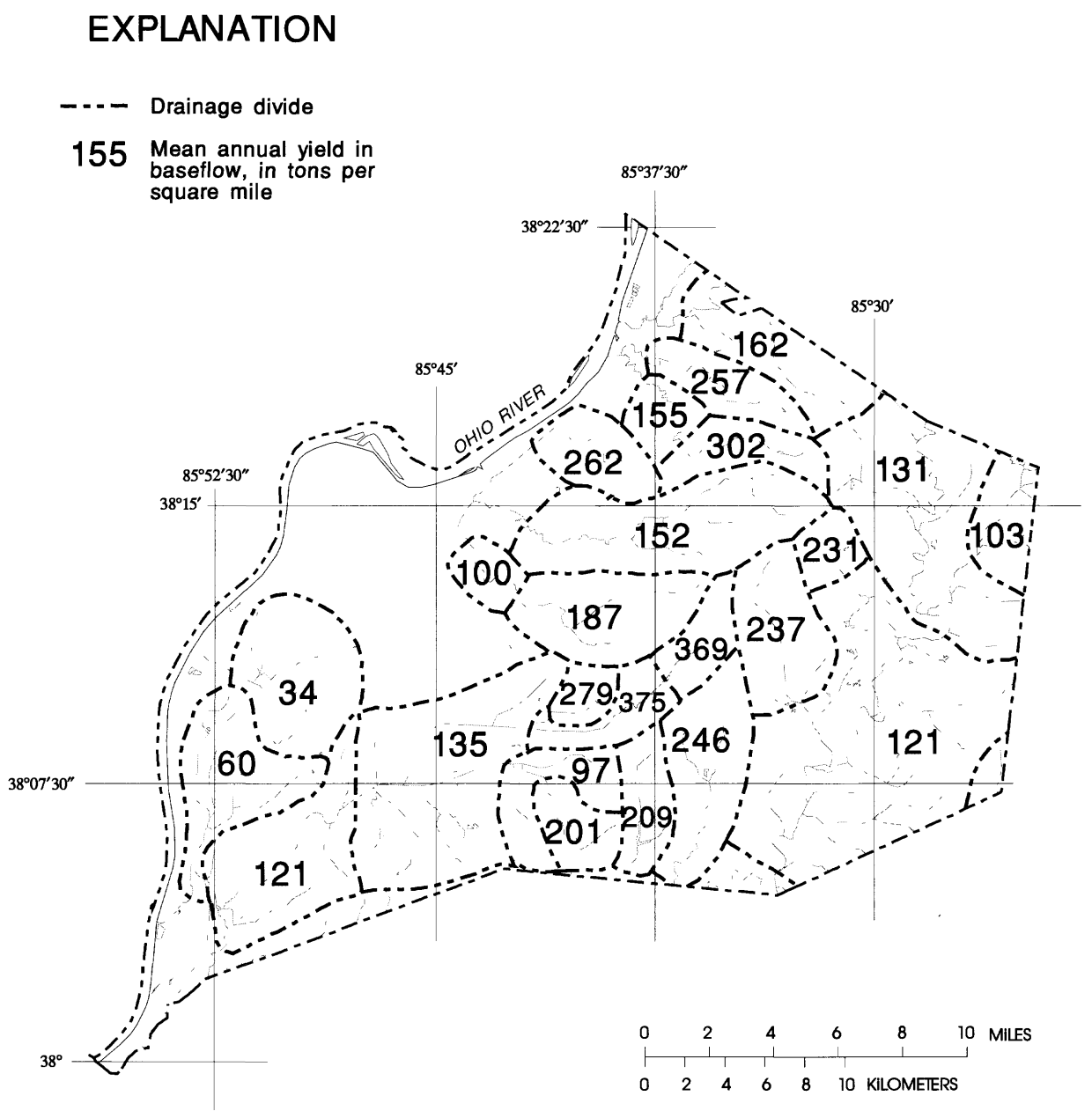
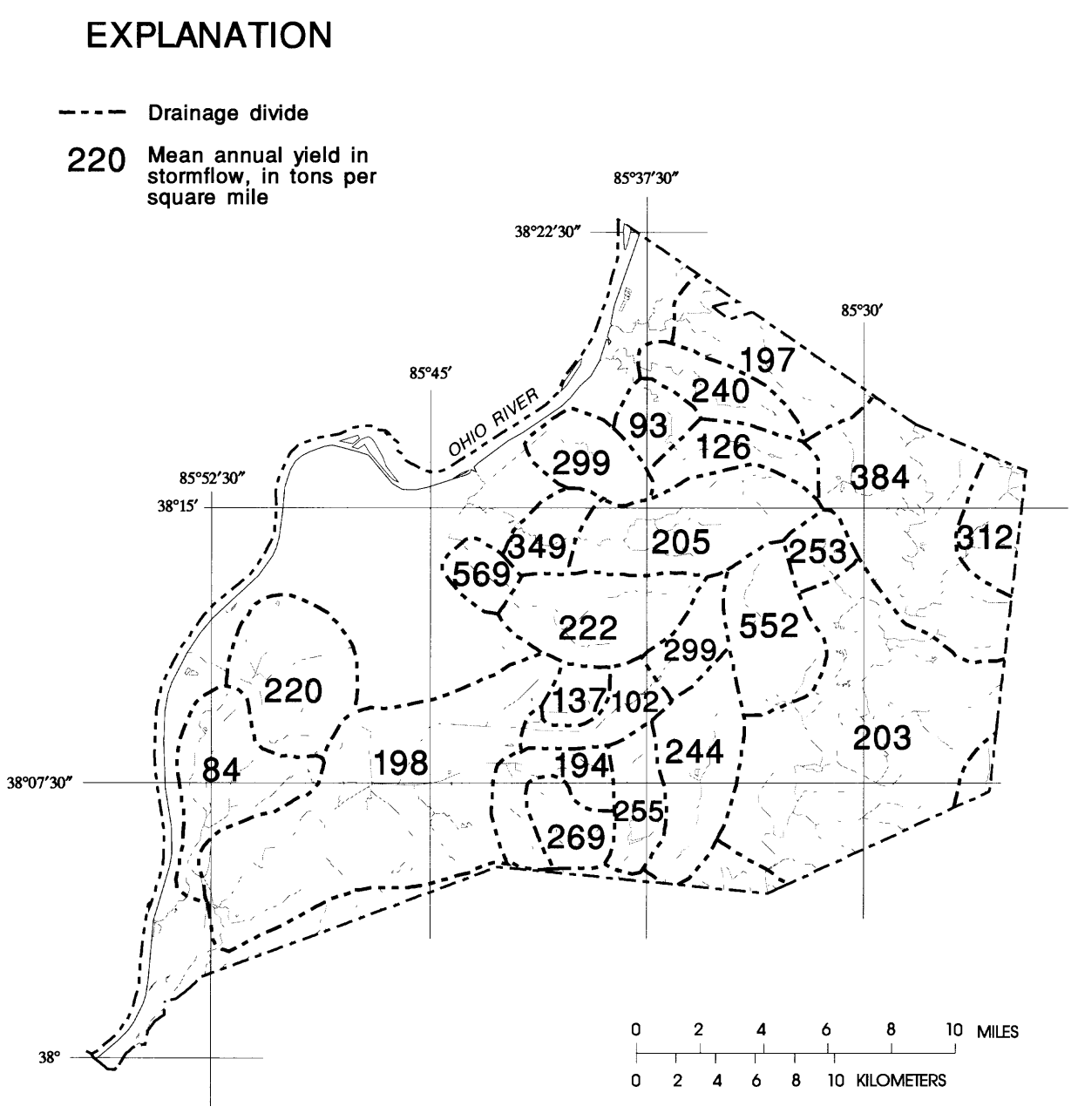


Figure 8. Mean annual dissolved-solids yields in baseflow in selected watersheds of Jefferson County, Kentucky, 1988-92.



Base from U.S. Geological Survey, digital data, 1:100,000, 1983
Universal Transverse Mercator projection, Zone 16

Figure 9. Mean annual dissolved-solids yields in stormflow in selected watersheds of Jefferson County, Kentucky, 1988-92.

Nitrate is the end product of the oxidation of reduced forms of nitrogen such as ammonia, organic nitrogen, and nitrite. The mean annual yield of total nitrate during 1988-92 was greater than 6 ton/mi^2 in the Little Goose Creek and upper Fern Creek Watersheds. The smallest yield of total nitrate, less than 1 ton/mi^2, was in the lower Mill Creek Watershed. Greater than 60 percent of the nitrate transport from the Goose Creek, Little Goose Creek, and Northern Ditch Watersheds occurred during base flow. Atmospheric deposition could account for about 1.8 ton/mi^2 of nitrate in the Jefferson County area; however, much of the nitrogen that is deposited by precipitation may never reach a stream but, instead, may be used within the biosphere (Evaldi and others, 1993, p. 69).

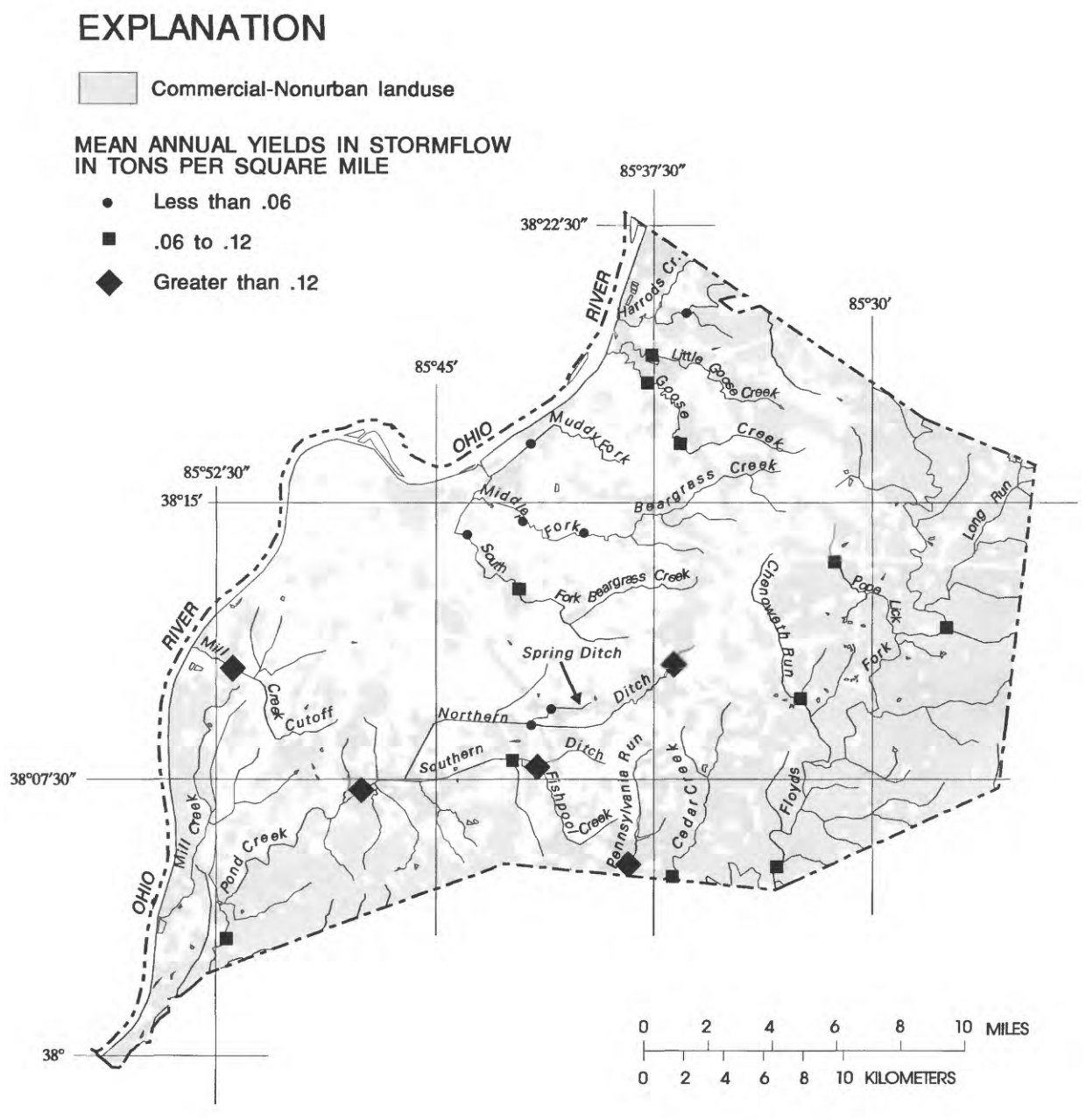
Estimated mean annual yields of total nitrite during 1988-92 ranged from less than 0.03 ton/mi^2 to greater than 0.2 ton/mi^2. Estimated yields exceeded 0.2 ton/mi^2 in the Fern Creek, Fishpool Creek, and parts of the Pond Creek Watersheds. The smallest estimated total-nitrite yield occurred in the Middle Fork Beargrass Creek Watershed. Nitrite transport occurred primarily during stormflow except in the upper Goose Creek Watershed. Stormflow transport of total nitrite nitrogen was inversely proportional to the amount of nonurban and commercial land use in the watershed (fig. 10).

Estimated mean annual yields of total ammonia during 1988-92 ranged from 0.049 ton/mi^2 in the upper Mill Creek Watershed (Mill Creek Cutoff) to 0.759 ton/mi^2 in the lower Mill Creek Watershed. Other areas of the county that had estimated mean annual yields of total ammonia during 1988-92 in excess of 0.6 ton/mi^2 included the upper Fern Creek and Pond Creek Watersheds and the lower South Fork Beargrass Creek Watershed. Ammonia transport occurred primarily during stormflow except in the Little Goose Creek, Northern Ditch, and Spring Ditch Watersheds. Atmospheric deposition could have accounted for a mean annual yield of 1.1 ton/mi^2 of ammonia in the Jefferson County area during part of the study period (Evaldi and others, 1993, p. 69). Total ammonia, however, is not a conservative constituent and quickly oxidizes to other forms of nitrogen.

The organic nitrogen content of water is derived, to variable degree, from products of biologic processes such as amino acids, polypeptides, and proteins (American Public Health Association and others, 1971). Organic nitrogen enrichment is commonly a result of sewage effluent or industrial waste discharges. Estimates of mean annual yields of total organic nitrogen during 1988-92 ranged from 0.348 ton/mi^2 in the lower Mill Creek Watershed to 1.77 ton/mi^2 in the Spring Ditch Watershed. Estimates of mean annual yields of total organic nitrogen in base flow during 1988-92 exceeded 0.5 ton/mi^2 in the upper Goose Creek, Northern Ditch, Pennsylvania Run, and Spring Ditch Watersheds.

Phosphorus

Phosphorus in streams is derived from a number of natural and anthropogenic sources. Some of the principal 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. Smallest mean annual yields of



Base from U.S. Geological Survey, digital data, 1:100,000, 1983
Universal Transverse Mercator projection, Zone 16

Figure 10. Mean annual yields of total nitrite nitrogen as N in stormflow in selected watersheds of Jefferson County, Kentucky, 1988-92.

phosphorus during 1988-92 were in the Middle Fork Beargrass Creek Watershed. Largest mean annual yields of phosphorus during 1988-92 (2.5 ton/mi^2) were in the Fern Creek Watershed. Largest yields in base flow (greater than 1.2 ton/mi^2) occurred in the Fern Creek and Northern Ditch Watersheds. Total transport of phosphate in base flow and stormflow was inversely proportional to the amount of nonurban and commercial land use in each watershed (fig. 11).

Metals

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 can 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. Rocks and soils exposed to surface water and ground water are usually the primary natural sources. Decomposing vegetation and animal matter also contribute small amounts of the constituents to the environment. Urban stormwater runoff has been shown to contain substantial concentrations of zinc and other metals (Martin and Smoot, 1986). Sources of these metals include automobile exhaust, domestic wastes, and various commercial and industrial activities in the watersheds.

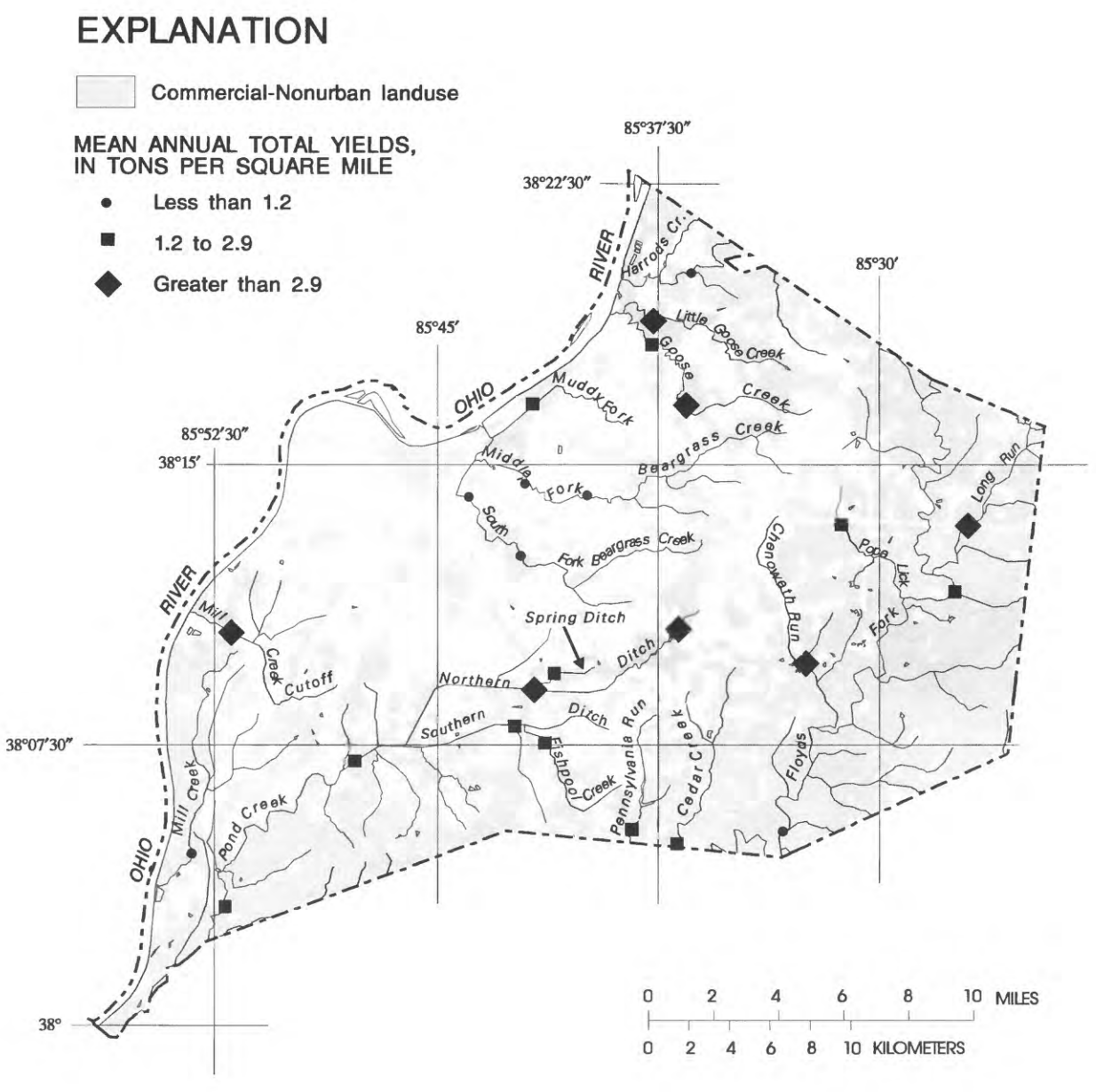
Metals for which stream waters in Jefferson County were analyzed include arsenic, barium, beryllium, cadmium, chromium, copper, cyanide, iron, lead, mercury, nickel, selenium, silver, and zinc. Much of the laboratory analytical data for these metals, from some sites, were reported as below a detection limit and well-defined relations of metals concentrations in the water to the amount of flow could not always be determined. Thus, it was not possible to estimate yields of all of the metals sampled for in watersheds of Jefferson County.

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. Mean annual estimates of total barium yields during 1988-92 ranged from 0.029 to 0.176 ton/mi^2. The smallest yield of total barium was in the lower Mill Creek Watershed, which drains alluvial deposits along the Ohio River. The largest yield of total barium was in the Fern Creek Watershed. Most of the total barium transport occurred during stormflow except in the Goose Creek and Spring Ditch Watersheds, where most total barium transport occurred during base flow.

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,



Base from U.S. Geological Survey, digital data, 1:100,000, 1983
Universal Transverse Mercator projection, Zone 16

Figure 11. Mean annual total yields of total phosphate as PO_4 in selected watersheds of Jefferson County, Kentucky, 1988-92.

explosives, and ceramics. Industrial uses of chromium can produce waste solutions containing chromate ions. Estimates of chromium yields were available for only the Pond Creek and Spring Ditch watersheds, and total transport ranged from .019 to 0.050 ton/mi^2.

Copper

Modern industrial civilization uses copper extensively, and many of these uses result in its dispersal in the environment (Hem, 1985). Estimates of mean annual yields of total-recoverable copper during 1988-92 were made for 18 watersheds. The smallest estimated copper yield was 0.005 ton/mi^2 in the upper Mill Creek Watershed, and the largest was 0.080 ton/mi^2 in the Long Run Watershed. Copper transport occurred primarily during stormflow except in the Goose Creek, Pope Lick, and Northern Ditch Watersheds, where copper transport occurred primarily during base flow.

Iron

Because of the widespread use of iron for many industrial activities, iron is a common contaminant in the aquatic environment (U.S. Environmental Protection Agency, 1972). Estimates of mean annual yields of total iron for 1988-92 varied greatly throughout Jefferson County, ranging from 0.503 to 43.4 ton/mi^2. Iron transport occurred primarily during stormflow except in parts of the Chenoweth Run, Goose Creek, and Pennsylvania Run Watersheds, where iron transport occurred primarily during base flow.

Mercury

Surface waters may contain mercury originating from naturally occurring geological sources or from industrial, agricultural, scientific, and medical uses of mercury (Wershaw, 1970). The element tends to sorb readily on a variety of materials, including the bottom sediments of streams, greatly reducing the levels that might otherwise remain in solution (Hem, 1970). Estimated mean annual yields of total recoverable mercury during 1988-92 could be determined only for the Floyds Fork and Cedar Creek Watersheds (0.003 and 0.002 ton/mi^2, respectively).

Nickel

Nickel is an important industrial metal. It is used extensively in stainless steel and other corrosion-resistant materials (Hem, 1985). Estimated mean annual yields of total nickel during 1988-92 could be determined only for the South Fork Beargrass Creek and Spring Ditch Watersheds. A yield of 0.014 ton/mi^2 was estimated for the predominantly residential South Fork Beargrass Creek Watershed, and a yield of 0.025 ton/mi^2 was estimated for the predominantly industrial Spring Ditch Watershed.

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 water than copper and nickel are (Hem, 1985). 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). Regression analysis of zinc yields in base flow and stormflow in Jefferson County indicated that the amount of zinc transport was directly related to the degree of urbanization in each watershed (fig. 12). Yields of zinc in both base flow and stormflow in the Muddy Fork Watershed were larger than in any other watershed (0.135 and 1.48 ton/mi^2, respectively). The total base flow and stormflow zinc yield in the Muddy Fork Watershed (1.62 ton/mi^2) was at least twice that of any other watershed yield. Zinc transport occurred primarily during stormflow in most watersheds. Zinc yields in base flow exceeded yields in stormflow in the Cedar Creek, Harrods Creek, and Pope Lick Watersheds.

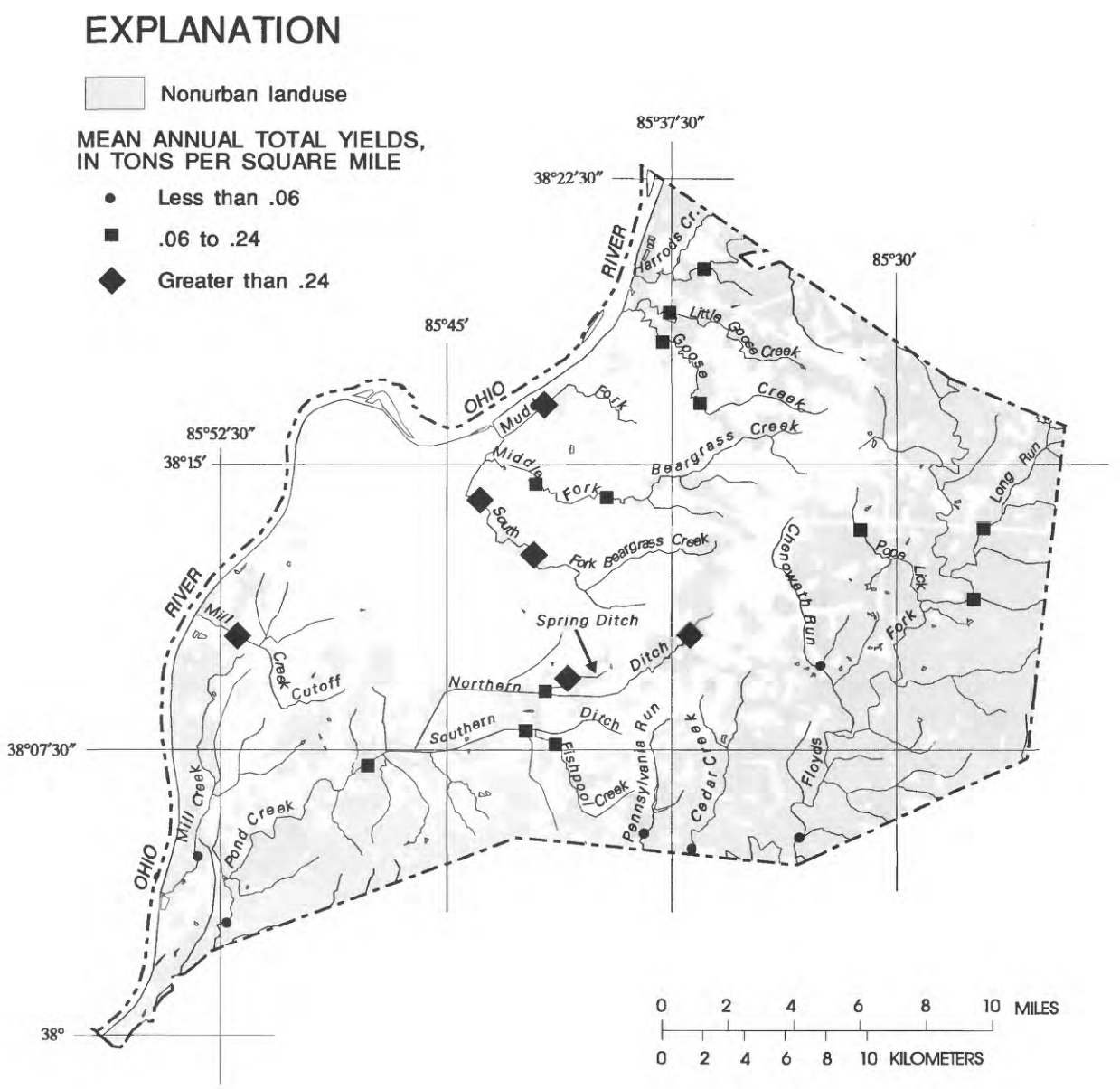
Cyanide

The cyanide radical is a constituent of many compounds and complex ions that may be present in industrial wastes. Estimates of mean annual yields of total cyanide in base flow during 1988-92 for the Chenoweth Run and Goose Creek Watersheds (0.005 and 0.009 ton/mi^2, respectively) were the only yield estimates available for cyanide.

Synthetic Organic Compounds

Although production and use of synthetic organic compounds in the United States has increased dramatically since the 1940's, 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. Among these chemicals are pesticides, chemicals designed to control various pests that damage agricultural and horticultural crops. Pesticides, which are typically classified by the types of pests that are to be controlled, include insecticides, herbicides, fungicides, and rodenticides. Pesticides enter streamwater through many routes, including runoff, direct application, spills, ground water discharge, 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 for which streams of Jefferson County were sampled included chlordane, endrin, lindane, methoxychlor, and toxaphene. Because of the hydrophobic nature of organochlorine pesticides, they are not often detected in water samples. Most of the laboratory analytical data for these compounds were reported as below the detection limit and well-defined relations of organochlorine insecticide concentrations in the water to the amount of flow could not be determined. Thus, it was not possible to estimate yields of these compounds.



Base from U.S. Geological Survey, digital data, 1:100,000, 1983
Universal Transverse Mercator projection, Zone 16

Figure 12. Mean annual total yields of total zinc as Zn in selected watersheds of Jefferson County, Kentucky, 1982-92.

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 collected during 1988-92 were limited to 2,4-D (dichlorophenoxyacetic acid) and 2,4,5-TP (silvex). Because of the lack of a suitable relation of concentrations to stream discharge at most sites, transport estimates of 2,4,5-TP were not possible and estimates of 2,4-D were possible only for the South Fork Beargrass Creek Watershed. The mean annual yield of total 2,4-D from this watershed was 0.001 ton/mi^2.

SUMMARY

The Louisville and Jefferson County Metropolitan Sewer District and the U.S. Geological Survey began a cooperative program of water sampling in 1988 to assess the quality of streams in the county. Mean annual yield estimates for 1988-92 were calculated from daily streamflow records and periodic stream water-quality samples. Daily streamflow data were available at 5 continuous-record sites and were synthesized for 20 other stream sites. The daily streamflow records were partitioned into their stormflow and base-flow components. Total daily streamflows were used to compute the total yield estimates, and daily nonstorm flows were used to compute the base-flow estimates. Stormloads were calculated as the difference between the total yield estimates and the base-flow yield estimates.

This report presents estimates of base-flow and stormflow yields of selected water-quality constituents from watersheds in Jefferson County, Ky. The yield of a constituent in a watershed is a summation over a given time period of its transport in the watershed discharge per unit of drainage area. The sources that contribute to the total stream yield, however, are often both point and nonpoint. Point-source discharges are commonly fairly constant and can be considered as part of the base flow of a stream. Nonpoint contaminants are generally transported to receiving waters during stormflow.

Dissolved-oxygen transport in the county was related to the amount of nonurban land use in the watersheds. Chemical oxygen demand (COD) generally was greatest during stormflow and was related to the amount of industrial land use in each watershed. The highly industrialized Spring Ditch Watershed yielded 76.6 ton/mi^2 of COD--a yield nearly twice that of any other sampled watershed in the county. Potentially, oxygen needed for biochemical oxidation of organic material in the water (BOD) was greatest in the Chenoweth Run Watershed (16.9 ton/mi^2).

Dissolved-solids transport occurred primarily during stormflow except in the Fern Creek, Goose Creek, Little Goose Creek, Northern Ditch, and Spring Ditch Watersheds, an indication that these watersheds may be affected by point-source discharges. Dissolved-solids yields in base flow ranged from less than 100 ton/mi^2 in the Mill Creek Watershed to greater than 300 ton/mi^2 in the Fern Creek, upper Goose Creek, and Northern Ditch Watersheds. Yields of dissolved solids in stormflow ranged from less than 100 ton/mi^2 in the

lower Goose Creek and Mill Creek Watersheds to greater than 500 ton/mi^2 in the Chenoweth Run and lower South Fork Beargrass Creek Watersheds. Transport of volatile and nonvolatile suspended solids occurred primarily during stormflow.

The estimated mean annual 1988-92 yield of total nitrate nitrogen exceeded 6 ton/mi^2 in the Little Goose Creek and upper Fern Creek Watersheds. Greater than 60 percent of the nitrate transport in the Goose Creek, Little Goose Creek, and Northern Ditch Watersheds occurred during base flow. Estimated mean annual yields of total nitrite nitrogen during 1988-92 exceeded 0.2 ton/mi^2 in the Fern Creek, Fishpool Creek, and parts of the Pond Creek Watersheds. Nitrite transport occurred primarily during stormflow, except in the upper Goose Creek Watershed. Transport of nitrite during stormflow was inversely proportional to the amount of nonurban and commercial land use in each watershed. Ammonia transport occurred primarily during stormflow except in the Little Goose Creek, Northern Ditch, and Spring Ditch Watersheds. Estimated mean annual yields of total organic nitrogen in base flow during 1988-92 exceeded 0.5 ton/mi^2 in the upper Goose Creek, Northern Ditch, Pennsylvania Run, and Spring Ditch Watersheds. Total base flow and stormflow transport of phosphate was inversely proportional to the amount of nonurban and commercial land use in each watershed.

It was not possible to estimate yields of all of the metals sampled from Jefferson County watersheds. Transport of metals from most of the watersheds occurred primarily during stormflow. The largest yield of barium was 0.176 ton/mi^2 in the Fern Creek Watershed. Estimated yields of barium, copper, and iron in base flow exceeded yields in stormflow in the Goose Creek Watershed. Estimated yields of chromium and nickel, 0.050 and 0.025 ton/mi^2, respectively, were largest in the highly industrialized Spring Ditch Watershed. Estimated yields of zinc in base flow and stormflow were related to the degree of urbanization in the watershed and were largest in the Muddy Fork Watershed (0.135 and 1.48 ton/mi^2, respectively).

Mean annual 1988-92 yields of total cyanide in base flow for the Chenoweth Run and Goose Creek Watersheds were 0.005 and 0.009 ton/mi^2 respectively. The mean annual yield of total 2,4-D from the South Fork Beargrass Creek Watershed was 0.001 ton/mi^2.

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APPENDIX:

SUPPLEMENTAL STREAMFLOW AND WATER-QUALITY INFORMATION

Table 5. Statistical summary of constituent concentrations in selected streams of Jefferson County, Kentucky, 1988-92

[N, number of observations; Cr, Creek; SF, South Fork; MF, Middle Fork; mg/L, milligrams per liter; °C, degrees Celsius; µg/L, micrograms per liter; ---, missing; <, less than; *, value estimated from log-normal fit program; percentiles not computed if fewer than 10 observations; the 10th and 90th percentiles are not shown if fewer than 30 observations]

Site number and name	N	N of censored data values	Minimum	Value at indicated percentile 10	25	50 (median)	75	90	Maximum
Dissolved oxygen, in mg/L									
1 Pond Cr at Pendleton Road	93	0	4.3	5.5	6.1	8.2	10	12	17
2 Mill Cr at Orell Road	87	0	4.4	5.5	6.2	7.9	10	12	18
3 Pond Cr at Manslick Road	95	0	2.8	5.0	6.0	7.7	9.9	11	15
5 SF Beargrass Cr at Winter Avenue	95	0	1.9	4.1	6.2	7.7	10	12	13
6 SF Beargrass Cr at Trevilian Way	94	0	4.9	6.1	7.0	8.5	10	12	14
7 MF Beargrass Cr at Old Cannons Lane	95	0	3.3	6.9	8.6	10	13	16	19
8 MF Beargrass Cr at Beals Branch Road	95	0	2.4	3.5	5.1	8.2	10	12	14
9 Spring Ditch at Private Drive	94	0	1.9	4.7	6.4	8.3	10	12	16
10 Muddy Fork at Mockingbird Valley Road	95	0	5.2	6.4	7.4	8.5	10	11	16
11 Goose Cr at U.S. Highway 42	95	0	6.9	7.9	8.4	9.9	12	13	17
12 Little Goose Cr at U.S. Highway 42	96	0	6.1	7.5	8.4	9.9	11	12	15
13 Goose Cr at Old Westport Road	95	0	4.9	7.2	8.5	11	12	14	18
14 Pope Lick at Pope Lick Road	96	0	4.4	5.6	6.5	8.7	10	12	14
15 Floyds Fork at former State Highway 155	95	0	3.0	6.2	7.5	8.9	12	13	16
16 Chenoweth Run at Gelhaus Road	94	0	6.6	7.8	9.0	11	13	14	17
17 Fern Cr at Old Bardstown Road	95	0	6.7	7.4	8.2	9.7	12	13	16
18 Northern Ditch at Preston Highway	96	0	3.9	8.0	9.6	11	13	15	17
19 Fishpool Cr at Bost Road	96	0	3.7	5.5	7.7	10	12	14	17
20 Southern Ditch at Minors Lane	96	0	2.0	5.9	7.4	9.1	11	13	16
21 Floyds Fork at Bardstown Road	95	0	4.2	5.8	7.5	9.0	12	13	16
22 Cedar Cr at Thixton Road	96	0	5.8	6.7	8.0	9.8	12	14	17
23 Pennsylvania Run at Mt. Washington Road	96	0	3.3	4.2	5.2	7.5	11	12	14
24 Mill Cr Cutoff at Dover Road	84	0	4.5	7.0	9.5	11	14	17	22
25 Harrods Cr at Hunting Cr Drive	91	0	3.1	5.3	6.4	8.6	11	12	15
26 Long Run at State Highway 1531	71	0	6.8	8.7	10	11	13	13	16
Chemical oxygen demand, 0.25N dicromate, in mg/L									
1 Pond Cr at Pendleton Road	89	10	<10	10*	14	20	26	33	45
2 Mill Cr at Orell Road	84	11	<10	9.5*	12	18	25	31	49
3 Pond Cr at Manslick Road	89	10	<10	10*	14	20	25	38	55
5 SF Beargrass Cr at Winter Avenue	88	26	<10	5.7*	8.6*	14	21	31	60
6 SF Beargrass Cr at Trevilian Way	89	37	<10	4.4*	6.9*	11	20	32	81
7 MF Beargrass Cr at Old Cannons Lane	89	36	<10	5.1*	7.4*	12	18	23	41
8 MF Beargrass Cr at Beals Branch Road	90	29	<10	6.0*	8.7*	14	21	26	84
9 Spring Ditch at Private Drive	90	10	<10	10*	15	24	37	50	141
10 Muddy Fork at Mockingbird Valley Road	89	28	<10	6.0*	8.8*	13	24	30	64
11 Goose Cr at U.S. Highway 42	88	28	<10	5.6*	8.5*	13	20	31	70
12 Little Goose Cr at U.S. Highway 42	89	26	<10	4.8*	7.7*	12	19	33	710
13 Goose Cr at Old Westport Road	87	11	<10	8.3*	12	17	26	36	138
14 Pope Lick at Pope Lick Road	92	13	<10	8.4*	11	15	22	28	59
15 Floyds Fork at former State Highway 155	89	15	<10	8.5*	11	18	23	30	94
16 Chenoweth Run at Gelhaus Road	89	15	<10	8.8*	11	18	24	30	61
17 Fern Cr at Old Bardstown Road	89	30	<10	5.5*	8.3*	13	21	29	74
18 Northern Ditch at Preston Highway	91	21	<10	7.4*	11	18	24	33	103
19 Fishpool Cr at Bost Road	89	15	<10	8.9*	12	17	25	32	47
20 Southern Ditch at Minors Lane	90	18	<10	8.7*	13	20	26	33	105
21 Floyds Fork at Bardstown Road	90	20	<10	7.2*	10	15	24	31	70
22 Cedar Cr at Thixton Road	91	20	<10	7.7*	10	17	23	31	101
23 Pennsylvania Run at Mt. Washington Road	92	10	<10	11*	15	21	28	33	49
24 Mill Cr Cutoff at Dover Road	76	1	<10	12	16	23	31	40	105
25 Harrods Cr at Hunting Cr Drive	89	18	<10	7.5*	11	17	24	40	55
26 Long Run at State Highway 1531	63	15	<10	7.0*	9.7*	15	20	26	49
Biochemical oxygen demand, 5-day at 20°C, in mg/L									
1 Pond Cr at Pendleton Road	89	20	<2.0	1.1*	2.0	3.0	6.1	10	24
2 Mill Cr at Orell Road	85	20	<2.0	1.2*	2.0	3.0	5.3	9.7	12
3 Pond Cr at Manslick Road	90	8	<2.0	2.0	2.0	4.0	6.9	9.7	20
5 SF Beargrass Cr at Winter Avenue	91	14	<2.0	1.5*	2.0	4.0	6.9	10	25
6 SF Beargrass Cr at Trevilian Way	91	39	<2.0	.54*	1.1*	2.0	6.1	9.2	72
7 MF Beargrass Cr at Old Cannons Lane	91	34	<2.0	.79*	1.4*	2.0	5.0	10	16
8 MF Beargrass Cr at Beals Branch Road	92	35	<2.0	.87*	1.4*	2.0	4.7	8.3	14
9 Spring Ditch at Private Drive	91	12	<2.0	1.6*	2.0	4.0	6.0	9.9	18
10 Muddy Fork at Mockingbird Valley Road	90	35	<2.0	.79*	1.3*	2.0	4.2	8.4	11
11 Goose Cr at U.S. Highway 42	90	27	<2.0	.91*	1.6*	2.0	7.6	12	13
12 Little Goose Cr at U.S. Highway 42	91	32	<2.0	.81*	1.5*	2.0	7.1	11	13
13 Goose Cr at Old Westport Road	90	18	<2.0	1.3*	2.0	4.0	8.0	11	15
14 Pope Lick at Pope Lick Road	92	18	<2.0	1.3*	2.0	3.0	5.0	8.9	12
15 Floyds Fork at former State Highway 155	91	18	<2.0	1.1*	2.0	2.0	6.2	9.0	14
16 Chenoweth Run at Gelhaus Road	90	14	<2.0	1.2*	2.0	3.0	6.6	13	23
17 Fern Cr at Old Bardstown Road	91	21	<2.0	1.2*	2.0	3.0	7.6	11	16
18 Northern Ditch at Preston Highway	92	17	<2.0	1.3*	2.0	3.4	7.4	13	15
19 Fishpool Cr at Bost Road	91	29	<2.0	.92*	1.5*	2.0	5.6	9.7	15
20 Southern Ditch at Minors Lane	91	13	<2.0	1.3*	2.0	3.0	5.2	8.2	14
21 Floyds Fork at Bardstown Road	90	24	<2.0	1.0*	1.6*	2.2	4.3	9.3	14
22 Cedar Cr at Thixton Road	92	34	<1.7	.75*	1.3*	2.0	6.6	11	14

Table 5. Statistical summary of constituent concentrations in selected streams of Jefferson County, Kentucky, 1988-92--Continued

[N, number of observations; Cr, Creek; SF, South Fork; MF, Middle Fork; mg/L, milligrams per liter; °C, degrees Celsius; µg/L, micrograms per liter; ---, missing; <, less than; *, value estimated from log-normal fit program; percentiles not computed if fewer than 10 observations; the 10th and 90th percentiles are not shown if fewer than 30 observations]

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°C, in mg/L--Continued									
23 Pennsylvania Run at Mt. Washington Road	92	14	<2.0	1.4*	2.0	3.0	5.0	9.7	20
24 Mill Cr Cutoff at Dover Road	79	7	<2.0	2.0	3.0	4.0	8.0	12	18
25 Harrods Cr at Hunting Cr Drive	89	16	<2.0	1.3*	2.0	3.0	6.6	10	13
26 Long Run at State Highway 1531	65	16	<2.0	.99*	1.7*	2.0	8.5	12	14
Calcium, total, in mg/L as Ca									
1 Pond Cr at Pendleton Road	17	0	43	---	50	56	66	---	84
2 Mill Cr at Orell Road	15	0	13	---	31	50	71	---	92
3 Pond Cr at Manslick Road	18	0	47	---	53	58	63	---	82
5 SF Beargrass Cr at Winter Avenue	16	0	31	---	44	61	76	---	84
6 SF Beargrass Cr at Trevilian Way	16	0	35	---	46	57	76	---	82
7 MF Beargrass Cr at Old Cannons Lane	16	0	32	---	58	71	79	---	96
8 MF Beargrass Cr at Beals Branch Road	16	0	45	---	52	69	84	---	90
9 Spring Ditch at Private Drive	16	0	27	---	59	68	77	---	95
10 Muddy Fork at Mockingbird Valley Road	17	0	58	---	63	85	105	---	117
11 Goose Cr at U.S. Highway 42	16	0	39	---	52	55	60	---	66
12 Little Goose Cr at U.S. Highway 42	16	0	43	---	52	60	64	---	69
13 Goose Cr at Old Westport Road	16	0	40	---	49	53	59	---	66
14 Pope Lick at Pope Lick Road	18	0	52	---	60	64	68	---	91
15 Floyds Fork at former State Highway 155	18	0	42	---	54	64	71	---	80
16 Chenoweth Run at Gelhaus Road	18	0	40	---	51	60	66	---	102
17 Fern Cr at Old Bardstown Road	17	0	32	---	55	62	70	---	85
18 Northern Ditch at Preston Highway	16	0	41	---	49	55	60	---	87
19 Fishpool Cr at Bost Road	16	0	18	---	51	55	60	---	68
20 Southern Ditch at Minors Lane	16	0	36	---	49	54	59	---	69
21 Floyds Fork at Bardstown Road	17	0	32	---	53	63	70	---	84
22 Cedar Cr at Thixton Road	17	0	20	---	53	64	74	---	90
23 Pennsylvania Run at Mt. Washington Road	17	0	18	---	39	45	50	---	53
24 Mill Cr Cutoff at Dover Road	15	0	19	---	32	46	58	---	75
25 Harrods Cr at Hunting Cr Drive	16	0	1.0	---	47	53	58	---	73
26 Long Run at State Highway 1531	12	0	48	---	60	71	77	---	161
Magnesium, total, in mg/L as Mg									
1 Pond Cr at Pendleton Road	17	0	14	---	18	21	24	---	29
2 Mill Cr at Orell Road	15	0	3.2	---	9.7	16	28	---	33
3 Pond Cr at Manslick Road	18	0	15	---	20	22	23	---	28
5 SF Beargrass Cr at Winter Avenue	16	0	4.9	---	9.9	13	16	---	20
6 SF Beargrass Cr at Trevilian Way	16	0	7.1	---	12	15	17	---	20
7 MF Beargrass Cr at Old Cannons Lane	16	0	6.9	---	13	15	17	---	19
8 MF Beargrass Cr at Beals Branch Road	16	0	9.7	---	11	15	16	---	18
9 Spring Ditch at Private Drive	16	0	5.5	---	13	16	19	---	22
10 Muddy Fork at Mockingbird Valley Road	17	0	7.5	---	11	12	14	---	20
11 Goose Cr at U.S. Highway 42	16	0	14	---	21	22	24	---	26
12 Little Goose Cr at U.S. Highway 42	16	0	13	---	17	20	22	---	23
13 Goose Cr at Old Westport Road	16	0	15	---	19	22	24	---	26
14 Pope Lick at Pope Lick Road	18	0	19	---	24	26	27	---	35
15 Floyds Fork at former State Highway 155	18	0	11	---	13	17	20	---	23
16 Chenoweth Run at Gelhaus Road	17	0	14	---	18	22	24	---	27
17 Fern Cr at Old Bardstown Road	17	0	13	---	23	27	30	---	32
18 Northern Ditch at Preston Highway	16	0	15	---	19	21	25	---	28
19 Fishpool Cr at Bost Road	16	0	4.7	---	20	25	28	---	32
20 Southern Ditch at Minors Lane	16	0	13	---	22	25	27	---	30
21 Floyds Fork at Bardstown Road	17	0	9.5	---	15	18	21	---	30
22 Cedar Cr at Thixton Road	17	0	7.3	---	22	28	35	---	41
23 Pennsylvania Run at Mt. Washington Road	17	0	8.7	---	19	21	22	---	24
24 Mill Cr Cutoff at Dover Road	15	0	5.4	---	11	16	18	---	25
25 Harrods Cr at Hunting Cr Drive	16	0	18	---	21	24	26	---	30
26 Long Run at State Highway 1531	12	0	7.4	---	8.0	11	12	---	18
Alkalinity, in mg/L as $CaCO_3$									
1 Pond Cr at Pendleton Road	91	0	51	97	121	145	175	190	293
2 Mill Cr at Orell Road	86	0	35	54	94	151	240	297	360
3 Pond Cr at Manslick Road	91	0	68	114	134	158	180	197	230
5 SF Beargrass Cr at Winter Avenue	90	0	56	90	123	148	181	206	240
6 SF Beargrass Cr at Trevilian Way	90	0	50	75	105	145	179	196	230
7 MF Beargrass Cr at Old Cannons Lane	91	0	88	131	175	203	230	241	414
8 MF Beargrass Cr at Beals Branch Road	92	0	76	130	156	194	213	240	260
9 Spring Ditch at Private Drive	91	0	29	90	131	169	203	227	490
10 Muddy Fork at Mockingbird Valley Road	90	0	50	121	164	199	228	249	300
11 Goose Cr at U.S. Highway 42	91	0	57	124	157	176	192	210	240
12 Little Goose Cr at U.S. Highway 42	91	0	33	144	160	180	199	210	247
13 Goose Cr at Old Westport Road	90	0	26	111	143	164	192	205	240
14 Pope Lick at Pope Lick Road	92	0	1.5	119	153	186	213	239	280

Table 5. Statistical summary of constituent concentrations in selected streams of Jefferson County, Kentucky, 1988-92--Continued

[N, number of observations; Cr, Creek; SF, South Fork; MF, Middle Fork; mg/L, milligrams per liter; °C, degrees Celsius; µg/L, micrograms per liter; ---, missing; <, less than; *, value estimated from log-normal fit program; percentiles not computed if fewer than 10 observations; the 10th and 90th percentiles are not shown if fewer than 30 observations]

Site number and name	N	N of censored data values	Minimum	Value at indicated percentile 10	25	50 (median)	75	90	Maximum
Alkalinity, in mg/L as $CaCO_3$--Continued									
15 Floyds Fork at former State Highway 155	91	0	50	132	151	180	207	240	270
16 Chenoweth Run at Gelhaus Road	90	0	2.0	100	123	171	200	220	290
17 Fern Cr at Old Bardstown Road	90	0	30	98	149	210	244	258	290
18 Northern Ditch at Preston Highway	92	0	61	120	149	184	200	219	260
19 Fishpool Cr at Bost Road	91	0	9.1	101	145	172	189	206	260
20 Southern Ditch at Minors Lane	91	0	46	99	147	164	183	198	237
21 Floyds Fork at Bardstown Road	90	0	11	111	139	180	201	237	270
22 Cedar Cr at Thixton Road	92	0	8.8	99	136	173	200	220	265
23 Pennsylvania Run at Mt. Washington Road	92	0	56	100	121	144	161	175	260
24 Mill Cr Cutoff at Dover Road	78	0	42	66	96	123	162	210	279
25 Harrods Cr at Hunting Cr Drive	89	0	76	133	157	187	207	226	240
26 Long Run at State Highway 1531	65	0	90	136	164	180	205	240	250
Dissolved solids, residue at 105°C, in mg/L									
1 Pond Cr at Pendleton Road	91	0	134	238	315	374	450	555	828
2 Mill Cr at Orell Road	86	0	34	159	196	263	384	457	790
3 Pond Cr at Manslick Road	91	0	116	286	333	394	446	557	853
5 SF Beargrass Cr at Winter Avenue	91	0	21	232	290	345	381	408	760
6 SF Beargrass Cr at Trevilian Way	91	0	116	226	291	323	364	405	702
7 MF Beargrass Cr at Old Cannons Lane	91	0	161	250	304	352	390	422	546
8 MF Beargrass Cr at Beals Branch Road	91	0	124	234	292	351	385	421	834
9 Spring Ditch at Private Drive	91	0	36	232	304	394	463	500	602
10 Muddy Fork at Mockingbird Valley Road	90	0	221	355	408	454	500	535	658
11 Goose Cr at U.S. Highway 42	91	0	156	231	292	332	390	437	522
12 Little Goose Cr at U.S. Highway 42	91	0	110	250	306	340	390	448	504
13 Goose Cr at Old Westport Road	90	0	166	226	272	319	382	449	4,210
14 Pope Lick at Pope Lick Road	91	0	133	279	343	399	464	513	875
15 Floyds Fork at former State Highway 155	91	0	199	238	266	305	340	373	1,390
16 Chenoweth Run at Gelhaus Road	89	0	176	306	338	394	444	487	2,240
17 Fern Cr at Old Bardstown Road	90	0	123	305	377	413	470	520	731
18 Northern Ditch at Preston Highway	91	0	121	282	337	401	486	644	1,320
19 Fishpool Cr at Bost Road	90	0	114	286	360	416	462	512	707
20 Southern Ditch at Minors Lane	88	0	160	291	345	401	448	506	612
21 Floyds Fork at Bardstown Road	90	0	164	235	275	310	358	409	1,820
22 Cedar Cr at Thixton Road	91	0	158	273	368	461	555	704	1,480
23 Pennsylvania Run at Mt. Washington Road	92	0	149	217	266	326	427	528	1,740
24 Mill Cr Cutoff at Dover Road	79	0	92	174	243	328	390	449	1,160
25 Harrods Cr at Hunting Cr Drive	89	0	154	232	276	310	356	406	516
26 Long Run at State Highway 1531	64	0	92	205	239	275	298	338	419
Suspended solids, residue at 105°C, in mg/L									
1 Pond Cr at Pendleton Road	91	0	2.0	5.0	8.0	20	52	113	500
2 Mill Cr at Orell Road	86	0	2.0	4.0	7.0	17	31	92	4,350
3 Pond Cr at Manslick Road	91	0	4.0	14	27	48	95	143	1,370
5 SF Beargrass Cr at Winter Avenue	90	0	2.0	6.0	9.7	20	40	71	1,640
6 SF Beargrass Cr at Trevilian Way	91	0	2.0	5.0	8.0	15	28	175	3,030
7 MF Beargrass Cr at Old Cannons Lane	91	0	1.0	3.0	5.0	8.0	16	42	202
8 MF Beargrass Cr at Beals Branch Road	91	0	1.0	4.0	5.0	10	24	65	272
9 Spring Ditch at Private Drive	91	0	1.0	5.2	11	18	36	86	308
10 Muddy Fork at Mockingbird Valley Road	90	0	2.0	5.0	10	18	39	115	442
11 Goose Cr at U.S. Highway 42	91	0	2.0	4.2	7.0	12	29	66	1,080
12 Little Goose Cr at U.S. Highway 42	91	0	3.0	4.4	8.0	17	28	85	928
13 Goose Cr at Old Westport Road	90	0	1.0	6.0	8.9	18	42	118	1,960
14 Pope Lick at Pope Lick Road	92	0	1.0	4.0	7.0	11	20	64	1,250
15 Floyds Fork at former State Highway 155	91	0	2.0	4.2	8.0	16	30	102	1,640
16 Chenoweth Run at Gelhaus Road	89	0	.70	2.0	5.0	8.0	16	48	502
17 Fern Cr at Old Bardstown Road	90	0	1.5	5.0	7.0	13	27	66	810
18 Northern Ditch at Preston Highway	92	0	1.0	4.0	7.0	11	26	56	1,190
19 Fishpool Cr at Bost Road	91	0	1.6	4.8	7.0	12	27	72	1,180
20 Southern Ditch at Minors Lane	90	1	<1.0	5.0	11	19	32	51	1,230
21 Floyds Fork at Bardstown Road	90	1	<1.0	3.1	7.0	15	27	106	302
22 Cedar Cr at Thixton Road	91	1	<1.0	3.0	5.0	7.0	16	42	136
23 Pennsylvania Run at Mt. Washington Road	92	0	1.0	4.0	7.0	14	22	57	552
24 Mill Cr Cutoff at Dover Road	79	0	2.0	4.0	6.0	13	25	42	684
25 Harrods Cr at Hunting Cr Drive	89	0	4.0	10	14	28	45	103	998
26 Long Run at State Highway 1531	65	0	2.0	3.0	5.0	10	20	61	1,390
Residue, volatile nonfilterable, in mg/L									
1 Pond Cr at Pendleton Road	91	2	<1.0	2.0	3.0	5.0	10	32	326
2 Mill Cr at Orell Road	86	4	<.10	1.0	2.0	4.1	11	26	510
3 Pond Cr at Manslick Road	91	3	<1.0	2.0	4.0	9.0	20	59	556
5 SF Beargrass Cr at Winter Avenue	90	4	<1.0	1.0	4.0	6.0	16	33	382
6 SF Beargrass Cr at Trevilian Way	91	3	<1.0	1.0	2.7	5.0	12	31	308

Table 5. Statistical summary of constituent concentrations in selected streams of Jefferson County, Kentucky, 1988-92--Continued

[N, number of observations; Cr, Creek; SF, South Fork; MF, Middle Fork; mg/L, milligrams per liter; °C, degrees Celsius; µg/L, micrograms per liter; ---, missing; <, less than; *, value estimated from log-normal fit program; percentiles not computed if fewer than 10 observations; the 10th and 90th percentiles are not shown if fewer than 30 observations]

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 mg/L--Continued									
7 MF Beargrass Cr at Old Cannons Lane	91	6	<1.0	1.0	2.0	4.0	7.0	20	331
8 MF Beargrass Cr at Beals Branch Road	91	4	<1.0	1.0	2.0	4.0	9.0	19	114
9 Spring Ditch at Private Drive	91	2	<1.0	1.4	3.0	7.0	14	27	96
10 Muddy Fork at Mockingbird Valley Road	90	3	<1.0	2.0	3.0	6.0	11	17	144
11 Goose Cr at U.S. Highway 42	91	3	<.10	1.0	2.0	4.0	8.0	25	88
12 Little Goose Cr at U.S. Highway 42	91	2	<.10	1.0	2.0	4.0	9.0	20	435
13 Goose Cr at Old Westport Road	90	2	<.10	1.0	4.0	6.0	14	24	310
14 Pope Lick at Pope Lick Road	92	1	<1.0	1.0	2.0	4.0	7.0	16	190
15 Floyds Fork at former State Highway 155	91	4	<.10	1.0	2.0	4.0	11	32	134
16 Chenoweth Run at Gelhaus Road	89	7	<.10	.40*	2.0	4.0	7.5	18	348
17 Fern Cr at Old Bardstown Road	90	6	<1.0	1.0	2.0	5.0	9.2	24	232
18 Northern Ditch at Preston Highway	92	4	<.10	1.0	2.0	4.0	8.0	19	136
19 Fishpool Cr at Bost Road	91	3	<.10	1.0	2.0	5.0	10	21	138
20 Southern Ditch at Minors Lane	90	3	<.10	1.0	2.0	5.0	10	18	968
21 Floyds Fork at Bardstown Road	90	5	<.10	1.0	2.0	4.0	9.0	20	116
22 Cedar Cr at Thixton Road	91	10	<.10	.70*	2.0	4.0	6.0	12	90
23 Pennsylvania Run at Mt. Washington Road	92	3	<.10	1.0	2.0	4.5	8.7	15	79
24 Mill Cr Cutoff at Dover Road	79	1	<1.0	1.0	2.0	4.0	9.0	18	156
25 Harrods Cr at Hunting Cr Drive	89	2	<.10	1.5	3.0	6.0	11	20	534
26 Long Run at State Highway 1531	65	2	<1.0	1.0	2.0	4.0	7.0	15	152
Suspended solids, nonvolatile, in mg/L									
1 Pond Cr at Pendleton Road	20	0	1.0	---	2.2	6.5	22	---	214
2 Mill Cr at Orell Road	21	0	1.0	---	2.0	3.0	8.0	---	106
3 Pond Cr at Manslick Road	21	0	1.0	---	9.0	22	44	---	280
5 SF Beargrass Cr at Winter Avenue	20	0	<5.0	---	5.0	10	19	---	110
6 SF Beargrass Cr at Trevilian Way	20	0	<3.0	---	3.0	7.5	15	---	70
7 MF Beargrass Cr at Old Cannons Lane	20	0	1.0	---	1.0	2.5	6.7	---	24
8 MF Beargrass Cr at Beals Branch Road	21	0	1.0	---	2.0	3.0	6.0	---	101
9 Spring Ditch at Private Drive	20	0	2.0	---	4.0	7.0	10	---	19
10 Muddy Fork at Mockingbird Valley Road	19	0	1.0	---	3.0	8.0	12	---	131
11 Goose Cr at U.S. Highway 42	20	0	1.0	---	3.2	5.5	8.0	---	115
12 Little Goose Cr at U.S. Highway 42	20	0	2.0	---	3.0	5.5	15	---	176
13 Goose Cr at Old Westport Road	20	0	3.0	---	7.5	16	42	---	250
14 Pope Lick at Pope Lick Road	20	0	<3.0	---	3.0	4.5	16	---	61
15 Floyds Fork at former State Highway 155	20	0	1.0	---	2.2	8.0	19	---	160
16 Chenoweth Run at Gelhaus Road	19	0	<1.0	---	1.0	3.0	4.0	---	8.0
17 Fern Cr at Old Bardstown Road	20	0	2.0	---	3.0	4.5	11	---	352
18 Northern Ditch at Preston Highway	21	0	1.0	---	2.0	4.0	6.5	---	26
19 Fishpool Cr at Bost Road	19	0	2.0	---	3.0	5.0	10	---	54
20 Southern Ditch at Minors Lane	20	0	2.0	---	4.0	8.5	16	---	594
21 Floyds Fork at Bardstown Road	19	0	<5.0	---	5.0	9.0	38	---	210
22 Cedar Cr at Thixton Road	20	0	<2.0	---	2.0	5.0	12	---	110
23 Pennsylvania Run at Mt. Washington Road	20	0	1.0	---	2.1	4.0	7.0	---	54
24 Mill Cr Cutoff at Dover Road	19	0	1.0	---	3.0	4.0	9.0	---	628
25 Harrods Cr at Hunting Cr Drive	21	0	2.0	---	5.5	12	26	---	916
26 Long Run at State Highway 1531	14	0	1.0	---	1.0	2.5	5.0	---	60
Nitrogen, nitrate, total, in mg/L as N									
1 Pond Cr at Pendleton Road	91	2	<.10	.60	1.3	2.0	3.2	4.3	8.6
2 Mill Cr at Orell Road	85	4	<.10	.11	.23	.52	1.4	2.6	12
3 Pond Cr at Manslick Road	91	3	<.10	.89	1.5	2.1	3.0	4.9	11
5 SF Beargrass Cr at Winter Avenue	89	3	<.10	.57	1.0	1.4	2.1	3.2	6.8
6 SF Beargrass Cr at Trevilian Way	89	3	<.10	.66	.96	1.5	2.3	3.5	7.6
7 MF Beargrass Cr at Old Cannons Lane	90	4	<.10	.62	1.5	2.2	3.0	4.4	13
8 MF Beargrass Cr at Beals Branch Road	91	4	<.10	.75	1.2	1.9	2.8	4.3	6.0
9 Spring Ditch at Private Drive	91	3	<.10	.48	1.1	2.0	3.0	4.0	6.1
10 Muddy Fork at Mockingbird Valley Road	89	3	<.10	1.7	2.8	4.3	5.8	9.0	17
11 Goose Cr at U.S. Highway 42	90	0	.57	1.7	2.5	3.6	4.6	5.8	13
12 Little Goose Cr at U.S. Highway 42	89	0	.37	2.2	3.2	4.0	5.4	6.4	11
13 Goose Cr at Old Westport Road	89	0	.15	1.2	2.4	3.3	4.1	6.3	13
14 Pope Lick at Pope Lick Road	92	1	<.10	1.1	2.1	3.1	6.1	10	15
15 Floyds Fork at former State Highway 155	90	3	<.10	.27	.49	.91	1.8	3.2	9.6
16 Chenoweth Run at Gelhaus Road	89	0	.14	1.3	2.1	3.7	5.7	11	21
17 Fern Cr at Old Bardstown Road	90	2	<.10	1.7	2.8	4.5	7.7	14	33
18 Northern Ditch at Preston Highway	92	4	<.10	1.2	2.2	3.5	6.2	13	24
19 Fishpool Cr at Bost Road	91	3	<.10	.87	1.7	2.8	4.0	6.3	15
20 Southern Ditch at Minors Lane	91	3	<.10	.62	1.0	1.9	3.1	4.4	11
21 Floyds Fork at Bardstown Road	90	3	<.10	.33	.82	1.3	1.8	3.2	9.1
22 Cedar Cr at Thixton Road	92	0	.11	1.2	1.9	2.9	4.4	10	19
23 Pennsylvania Run at Mt. Washington Road	92	1	<.10	.83	1.6	2.8	6.2	13	20
24 Mill Cr Cutoff at Dover Road	77	0	.15	.55	1.1	1.9	3.7	5.7	11
25 Harrods Cr at Hunting Cr Drive	88	0	.19	.79	1.2	1.7	2.3	3.5	10
26 Long Run at State Highway 1531	65	4	<.10	.11	.24	.54	1.2	1.7	5.3

Table 5. Statistical summary of constituent concentrations in selected streams of Jefferson County, Kentucky, 1988-92--Continued

[N, number of observations; Cr, Creek; SF, South Fork; MF, Middle Fork; mg/L, milligrams per liter; °C, degrees Celsius; µg/L, micrograms per liter; ---, missing; <, less than; *, value estimated from log-normal fit program; percentiles not computed if fewer than 10 observations; the 10th and 90th percentiles are not shown if fewer than 30 observations]

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 mg/L as N									
1 Pond Cr at Pendleton Road	91	2	<0.01	0.01	0.03	0.06	0.08	0.12	0.57
2 Mill Cr at Orell Road	86	22	<.01	<.01*	.01*	.02	.04	.08	6.0
3 Pond Cr at Manslick Road	91	0	.01	.04	.06	.08	.12	.20	1.1
5 SF Beargrass Cr at Winter Avenue	90	3	<.01	.02	.03	.06	.08	.11	.14
6 SF Beargrass Cr at Trevilian Way	90	3	<.01	.01	.02	.05	.06	.08	.43
7 MF Beargrass Cr at Old Cannons Lane	90	14	<.01	.01*	.01	.02	.03	.05	.21
8 MF Beargrass Cr at Beals Branch Road	91	11	<.01	.01*	.01	.02	.03	.05	.30
9 Spring Ditch at Private Drive	91	3	<.01	.02	.03	.04	.06	.10	.71
10 Muddy Fork at Mockingbird Valley Road	90	1	<.01	.02	.02	.04	.06	.09	.58
11 Goose Cr at U.S. Highway 42	91	13	<.01	.01*	.01	.03	.05	.10	1.5
12 Little Goose Cr at U.S. Highway 42	91	8	<.01	.01*	.01	.03	.04	.09	.37
13 Goose Cr at Old Westport Road	90	3	<.01	.02	.03	.05	.11	.27	.45
14 Pope Lick at Pope Lick Road	92	0	.01	.03	.05	.07	.12	.23	1.3
15 Floyds Fork at former State Highway 155	91	17	<.01	.01*	.01	.02	.04	.06	.31
16 Chenoweth Run at Gelhaus Road	90	5	<.01	.01	.03	.07	.19	.32	.45
17 Fern Cr at Old Bardstown Road	91	2	<.01	.02	.03	.05	.10	.22	1.8
18 Northern Ditch at Preston Highway	92	0	.01	.03	.04	.07	.12	.23	.71
19 Fishpool Cr at Bost Road	91	5	<.01	.02	.04	.06	.13	.21	.91
20 Southern Ditch at Minors Lane	91	1	<.01	.02	.04	.07	.11	.15	.36
21 Floyds Fork at Bardstown Road	90	12	<.01	.01*	.01	.02	.03	.09	.17
22 Cedar Cr at Thixton Road	92	7	<.01	.01	.01	.03	.05	.08	.35
23 Pennsylvania Run at Mt. Washington Road	92	2	<.01	.02	.04	.08	.18	.28	.81
24 Mill Cr Cutoff at Dover Road	79	10	<.01	.01*	.03	.06	.11	.21	.90
25 Harrods Cr at Hunting Cr Drive	89	13	<.01	.01*	.01	.02	.04	.06	1.5
26 Long Run at State Highway 1531	67	23	<.01	<.01*	.01*	.01	.02	.04	.24
Nitrogen, ammonia, total, in mg/L as N									
1 Pond Cr at Pendleton Road	89	28	<.01	<.01*	.01*	.11	.28	.49	1.1
2 Mill Cr at Orell Road	84	35	<.01	<.01*	.01*	.04	.11	.18	.70
3 Pond Cr at Manslick Road	89	23	<.01	.01*	.02*	.25	.45	.62	5.3
5 SF Beargrass Cr at Winter Avenue	89	25	<.01	<.01*	.02*	.17	.32	.56	2.4
6 SF Beargrass Cr at Trevilian Way	89	22	<.01	.01*	.02*	.22	.34	.73	5.6
7 MF Beargrass Cr at Old Cannons Lane	89	39	<.01	<.01*	<.01*	.04	.11	.22	4.5
8 MF Beargrass Cr at Beals Branch Road	90	40	<.01	<.01*	<.01*	.04	.11	.28	4.6
9 Spring Ditch at Private Drive	88	32	<.01	<.01*	.01*	.10	.34	.50	.95
10 Muddy Fork at Mockingbird Valley Road	89	38	<.01	<.01*	<.01*	.06	.14	.22	.64
11 Goose Cr at U.S. Highway 42	91	43	<.01	<.01*	<.01*	.04	.11	.42	3.2
12 Little Goose Cr at U.S. Highway 42	90	43	<.01	<.01*	<.01*	.02	.09	.20	.71
13 Goose Cr at Old Westport Road	89	35	<.01	<.01*	.01*	.10	.45	.78	1.3
14 Pope Lick at Pope Lick Road	92	27	<.01	<.01*	.01*	.13	.33	.77	3.5
15 Floyds Fork at former State Highway 155	91	39	<.01	<.01*	<.01*	.04	.09	.37	6.6
16 Chenoweth Run at Gelhaus Road	88	31	<.01	<.01*	.01*	.09	.36	.76	6.8
17 Fern Cr at Old Bardstown Road	89	25	<.01	<.01*	.01*	.11	.32	.67	1.8
18 Northern Ditch at Preston Highway	89	28	<.01	<.01*	.01*	.16	.42	1.6	9.1
19 Fishpool Cr at Bost Road	88	33	<.01	<.01*	.01*	.07	.22	.45	.98
20 Southern Ditch at Minors Lane	88	29	<.01	<.01*	.01*	.11	.24	.45	3.6
21 Floyds Fork at Bardstown Road	90	36	<.01	<.01*	.01*	.06	.11	.35	2.3
22 Cedar Cr at Thixton Road	91	40	<.01	<.01*	<.01*	.06	.12	.38	4.0
23 Pennsylvania Run at Mt. Washington Road	90	20	<.01	.01*	.04	.20	.39	.69	2.8
24 Mill Cr Cutoff at Dover Road	78	33	<.01	<.01*	<.01*	.06	.22	.66	3.4
25 Harrods Cr at Hunting Cr Drive	89	46	<.01	<.01*	<.01*	.01*	.10	.19	.78
26 Long Run at State Highway 1531	65	35	<.01	<.01*	<.01*	.01*	.08	.24	1.4
Nitrogen, organic, dissolved, in mg/L									
1 Pond Cr at Pendleton Road	91	14	<.05	.06*	.24	.51	.70	1.1	1.8
2 Mill Cr at Orell Road	87	12	<.05	.04*	.11	.31	.67	.97	6.9
3 Pond Cr at Manslick Ro	91	13	<.05	.09*	.40	.67	.90	1.3	2.5
5 SF Beargrass Cr at Winter Avenue	92	16	<.05	.06*	.22	.47	.78	1.2	2.0
6 SF Beargrass Cr at Trevilian Way	92	16	<.05	.05*	.22	.39	.67	1.0	2.5
7 MF Beargrass Cr at Old Cannons Lane	92	23	<.05	.03*	.06*	.32	.48	.89	3.5
8 MF Beargrass Cr at Beals Branch Road	93	25	<.05	.02*	.06*	.28	.51	.86	3.1
9 Spring Ditch at Private Drive	91	13	<.05	.06*	.19	.64	.91	1.3	2.9
10 Muddy Fork at Mockingbird Valley Road	91	21	<.05	.03*	.07*	.31	.56	.75	4.0
11 Goose Cr at U.S. Highway 42	91	22	<.05	.03*	.08*	.43	.56	.86	6.9
12 Little Goose Cr at U.S. Highway 42	90	21	<.05	.03*	.07*	.39	.62	.90	2.7
13 Goose Cr at Old Westport Road	91	20	<.05	.04*	.13	.65	.95	1.4	4.8
14 Pope Lick at Pope Lick Road	93	10	<.05	.10*	.32	.60	.78	1.2	3.6
15 Floyds Fork at former State Highway 155	91	11	<.05	.07*	.17	.44	.73	1.0	3.4
16 Chenoweth Run at Gelhaus Road	91	20	<.05	.03*	.09*	.45	.80	1.2	3.9
17 Fern Cr at Old Bardstown Road	92	12	<.05	.07*	.20	.50	.84	1.2	4.2
18 Northern Ditch at Preston Highway	92	15	<.05	.05*	.11	.62	.95	1.5	4.8
19 Fishpool Cr at Bost Road	90	13	<.05	.07*	.22	.62	.84	1.3	1.8
20 Southern Ditch at Minors Lane	91	14	<.05	.06*	.17	.64	.84	1.1	1.9
21 Floyds Fork at Bardstown Road	90	13	<.05	.07*	.22	.50	.84	1.1	1.3
22 Cedar Cr at Thixton Road	93	10	<.05	.09*	.26	.50	.73	1.1	2.0

Table 5. Statistical summary of constituent concentrations in selected streams of Jefferson County, Kentucky, 1988-92--Continued

[N, number of observations; Cr, Creek; SF, South Fork; MF, Middle Fork; mg/L, milligrams per liter; °C, degrees Celsius; µg/L, micrograms per liter; ---, missing; <, less than; *, value estimated from log-normal fit program; percentiles not computed if fewer than 10 observations; the 10th and 90th percentiles are not shown if fewer than 30 observations]

Site number and name	N	N of censored data values	Minimum	Value at indicated percentile 10	25	50 (median)	75	90	Maximum
Nitrogen, organic, dissolved, in mg/L--Continued									
23 Pennsylvania Run at Mt. Washington Road	92	16	<0.05	0.06*	0.22	0.65	0.90	1.4	2.6
24 Mill Cr Cutoff at Dover Road	80	14	<.05	.06*	.22	.62	.85	1.3	3.4
25 Harrods Cr at Hunting Cr Drive	90	13	<.05	.06*	.12	.42	.65	1.0	2.5
26 Long Run at State Highway 1531	66	8	<.05	.07*	.18	.39	.67	.88	3.4
Phosphate, total, in mg/L as PO_4									
1 Pond Cr at Pendleton Road	91	0	.34	.86	1.1	1.7	3.0	4.2	14
2 Mill Cr at Orell Road	84	0	.03	.20	.28	.49	.86	1.6	2.9
3 Pond Cr at Manslick Road	91	0	.34	.93	1.3	2.2	3.5	4.5	16
5 SF Beargrass Cr at Winter Avenue	90	0	.03	.09	.15	.25	.47	1.2	3.2
6 SF Beargrass Cr at Trevilian Way	89	0	.03	.06	.09	.18	.25	.61	10
7 MF Beargrass Cr at Old Cannons Lane	85	0	.03	.06	.12	.22	.31	.64	7.3
8 MF Beargrass Cr at Beals Branch Road	87	0	.03	.09	.15	.28	.46	.71	1.8
9 Spring Ditch at Private Drive	88	0	.03	.80	1.2	1.8	2.7	4.2	9.2
10 Muddy Fork at Mockingbird Valley Road	89	0	.12	.64	1.2	2.0	3.9	4.6	16
11 Goose Cr at U.S. Highway 42	90	0	.15	.75	1.4	2.8	4.0	5.1	13
12 Little Goose Cr at U.S. Highway 42	91	0	.25	.55	1.2	2.4	3.8	5.4	11
13 Goose Cr at Old Westport Road	89	0	.15	.71	1.3	2.7	4.4	6.0	12
14 Pope Lick at Pope Lick Road	91	0	.09	.75	1.2	3.1	4.3	6.3	26
15 Floyds Fork at former State Highway 155	90	0	.03	.13	.22	.35	.58	1.1	3.6
16 Chenoweth Run at Gelhaus Road	87	0	.46	1.1	2.2	3.7	5.5	7.7	23
17 Fern Cr at Old Bardstown Road	90	0	.15	1.2	1.8	3.5	5.4	7.2	24
18 Northern Ditch at Preston Highway	89	0	.18	.95	2.0	3.6	4.3	6.8	17
19 Fishpool Cr at Bost Road	89	0	.15	.86	1.5	3.1	4.1	5.2	14
20 Southern Ditch at Minors Lane	90	0	.06	.80	1.3	2.4	3.5	4.4	14
21 Floyds Fork at Bardstown Road	89	0	.09	.31	.48	.86	1.6	3.4	13
22 Cedar Cr at Thixton Road	91	0	.31	.83	1.4	2.7	4.2	5.3	15
23 Pennsylvania Run at Mt. Washington Road	91	0	.22	.56	1.1	2.7	4.9	6.1	23
24 Mill Cr Cutoff at Dover Road	78	0	.09	.49	1.2	1.8	3.4	4.6	11
25 Harrods Cr at Hunting Cr Drive	88	0	.03	.18	.31	.63	1.4	2.2	5.2
26 Long Run at State Highway 1531	64	0	.03	.06	.09	.18	.43	.86	14
Phosphorus, total, in mg/L as P									
1 Pond Cr at Pendleton Road	88	0	.12	.33	.39	.59	1.1	2.0	7.4
2 Mill Cr at Orell Road	83	1	<.01	.08	.11	.20	.37	.84	2.5
3 Pond Cr at Manslick Road	86	0	.11	.37	.50	.77	1.2	2.1	9.1
5 SF Beargrass Cr at Winter Avenue	89	0	.02	.05	.08	.12	.24	.65	1.9
6 SF Beargrass Cr at Trevilian Way	87	0	.02	.03	.07	.08	.13	.28	3.7
7 MF Beargrass Cr at Old Cannons Lane	88	0	.01	.04	.06	.10	.16	.34	1.7
8 MF Beargrass Cr at Beals Branch Road	89	0	.02	.04	.08	.13	.23	.40	1.6
9 Spring Ditch at Private Drive	86	0	.11	.34	.51	.67	1.1	1.9	4.1
10 Muddy Fork at Mockingbird Valley Road	88	0	.13	.30	.48	.86	1.7	2.3	18
11 Goose Cr at U.S. Highway 42	88	0	.15	.28	.56	1.1	1.8	2.1	6.1
12 Little Goose Cr at U.S. Highway 42	88	0	.09	.24	.45	.96	1.5	2.5	7.2
13 Goose Cr at Old Westport Road	89	0	.12	.33	.56	1.2	2.0	2.7	5.8
14 Pope Lick at Pope Lick Road	88	0	.09	.34	.52	1.2	2.1	2.8	9.8
15 Floyds Fork at former State Highway 155	86	0	.03	.07	.11	.17	.28	.48	1.5
16 Chenoweth Run at Gelhaus Road	86	0	.15	.34	.80	1.6	2.6	3.5	12
17 Fern Cr at Old Bardstown Road	89	0	.19	.58	.75	1.7	2.6	3.5	32
18 Northern Ditch at Preston Highway	89	0	.14	.47	.79	1.4	2.1	3.1	9.9
19 Fishpool Cr at Bost Road	87	0	.09	.35	.58	1.1	1.7	2.4	6.8
20 Southern Ditch at Minors Lane	89	0	.10	.32	.52	.90	1.6	2.0	6.8
21 Floyds Fork at Bardstown Road	86	0	.05	.13	.23	.35	.79	1.3	5.8
22 Cedar Cr at Thixton Road	89	0	.12	.33	.58	1.0	1.8	2.6	6.0
23 Pennsylvania Run at Mt. Washington Road	90	0	.15	.22	.46	1.0	2.2	2.7	8.0
24 Mill Cr Cutoff at Dover Road	78	0	.05	.21	.47	.74	1.3	2.2	10
25 Harrods Cr at Hunting Cr Drive	87	0	.03	.09	.13	.26	.55	1.0	2.6
26 Long Run at State Highway 1531	65	0	.03	.04	.06	.11	.22	.58	5.9
Phosphorus, orthophosphate, total, in mg/L as P									
1 Pond Cr at Pendleton Road	91	0	.11	.28	.35	.54	.97	1.4	4.5
2 Mill Cr at Orell Road	85	1	<.01	.06	.09	.16	.28	.53	.96
3 Pond Cr at Manslick Road	91	0	.11	.30	.44	.73	1.1	1.5	5.2
5 SF Beargrass Cr at Winter Avenue	90	0	.01	.03	.05	.08	.15	.39	1.0
6 SF Beargrass Cr at Trevilian Way	90	1	<.01	.01	.03	.05	.08	.20	3.3
7 MF Beargrass Cr at Old Cannons Lane	89	4	<.01	.01	.03	.06	.10	.20	2.4
8 MF Beargrass Cr at Beals Branch Road	90	3	<.01	.02	.05	.08	.14	.23	.59
9 Spring Ditch at Private Drive	90	2	<.01	.21	.37	.60	.88	1.3	3.0
10 Muddy Fork at Mockingbird Valley Road	89	0	.04	.21	.40	.67	1.3	1.5	5.3
11 Goose Cr at U.S. Highway 42	90	0	.05	.24	.46	.90	1.3	1.7	4.2
12 Little Goose Cr at U.S. Highway 42	91	0	.08	.18	.39	.80	1.2	1.8	3.7
13 Goose Cr at Old Westport Road	89	0	.05	.23	.42	.89	1.4	2.0	4.0
14 Pope Lick at Pope Lick Road	91	0	.03	.24	.39	1.0	1.4	2.1	8.6

Table 5. Statistical summary of constituent concentrations in selected streams of Jefferson County, Kentucky, 1988-92--Continued

[N, number of observations; Cr, Creek; SF, South Fork; MF, Middle Fork; mg/L, milligrams per liter; °C, degrees Celsius; µg/L, micrograms per liter; ---, missing; <, less than; *, value estimated from log-normal fit program; percentiles not computed if fewer than 10 observations; the 10th and 90th percentiles are not shown if fewer than 30 observations]

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 mg/L as P--Continued									
15 Floyds Fork at former State Highway 155	90	0	0.01	0.04	0.07	0.11	0.19	0.36	1.2
16 Chenoweth Run at Gelhaus Road	87	0	.15	.35	.71	1.2	1.8	2.5	7.5
17 Fern Cr at Old Bardstown Road	90	0	.05	.38	.59	1.2	1.8	2.4	7.8
18 Northern Ditch at Preston Highway	90	1	<.01	.29	.65	1.2	1.4	2.3	5.4
19 Fishpool Cr at Bost Road	90	1	<.01	.27	.46	1.0	1.3	1.7	4.7
20 Southern Ditch at Minors Lane	91	1	<.01	.24	.43	.77	1.1	1.4	4.5
21 Floyds Fork at Bardstown Road	89	0	.03	.10	.16	.28	.52	1.1	4.4
22 Cedar Cr at Thixton Road	91	0	.10	.27	.47	.87	1.4	1.7	4.9
23 Pennsylvania Run at Mt. Washington Road	91	0	.07	.18	.35	.87	1.6	2.0	7.4
24 Mill Cr Cutoff at Dover Road	78	0	.03	.16	.38	.60	1.1	1.5	3.6
25 Harrods Cr at Hunting Cr Drive	88	0	.01	.06	.10	.20	.45	.72	1.7
26 Long Run at State Highway 1531	65	1	<.01	.02	.03	.06	.14	.28	4.6
Arsenic, total, in µg/L as As									
1 Pond Cr at Pendleton Road	18	13	<5.0	---	3.7*	4.3*	5.0	---	7.0
2 Mill Cr at Orell Road	15	14	<5.0	---	<5.0	<5.0	<5.0	---	6.0
3 Pond Cr at Manslick Road	18	13	<5.0	---	3.5*	4.2*	5.0	---	7.0
5 SF Beargrass Cr at Winter Avenue	16	16	<5.0	---	<5.0	<5.0	<5.0	---	<5.0
6 SF Beargrass Cr at Trevilian Way	16	16	<5.0	---	<5.0	<5.0	<5.0	---	<5.0
7 MF Beargrass Cr at Old Cannons Lane	16	16	<5.0	---	<5.0	<5.0	<5.0	---	<5.0
8 MF Beargrass Cr at Beals Branch Road	16	15	<5.0	---	<5.0	<5.0	<5.0	---	11
9 Spring Ditch at Private Drive	17	17	<5.0	---	<5.0	<5.0	<5.0	---	<5.0
10 Muddy Fork at Mockingbird Valley Road	17	16	<5.0	---	<5.0	<5.0	<5.0	---	9.0
11 Goose Cr at U.S. Highway 42	16	15	<5.0	---	<5.0	<5.0	<5.0	---	5.0
12 Little Goose Cr at U.S. Highway 42	16	15	<5.0	---	<5.0	<5.0	<5.0	---	12
13 Goose Cr at Old Westport Road	16	15	<5.0	---	<5.0	<5.0	<5.0	---	6.0
14 Pope Lick at Pope Lick Road	18	17	<5.0	---	<5.0	<5.0	<5.0	---	22
15 Floyds Fork at former State Highway 155	18	18	<5.0	---	<5.0	<5.0	<5.0	---	<5.0
16 Chenoweth Run at Gelhaus Road	18	18	<5.0	---	<5.0	<5.0	<5.0	---	<5.0
17 Fern Cr at Old Bardstown Road	17	15	<5.0	---	<5.0	<5.0	<5.0	---	19
18 Northern Ditch at Preston Highway	17	17	<5.0	---	<5.0	<5.0	<5.0	---	<10
19 Fishpool Cr at Bost Road	16	12	<5.0	---	<5.0	<5.0	<5.0	---	17
20 Southern Ditch at Minors Lane	16	15	<5.0	---	<5.0	<5.0	<5.0	---	28
21 Floyds Fork at Bardstown Road	17	17	<5.0	---	<5.0	<5.0	<5.0	---	<5.0
22 Cedar Cr at Thixton Road	17	17	<5.0	---	<5.0	<5.0	<5.0	---	<5.0
23 Pennsylvania Run at Mt. Washington Road	17	16	<5.0	---	<5.0	<5.0	<5.0	---	10
24 Mill Cr Cutoff at Dover Road	15	12	<5.0	---	<5.0	<5.0	<5.0	---	13
25 Harrods Cr at Hunting Cr Drive	16	15	<5.0	---	<5.0	<5.0	<5.0	---	7.0
26 Long Run at State Highway 1531	12	12	<5.0	---	<5.0	<5.0	<5.0	---	<5.0
Barium, total, in µg/L as Ba									
1 Pond Cr at Pendleton Road	18	0	12	---	40	43	49	---	60
2 Mill Cr at Orell Road	15	0	16	---	38	44	59	---	68
3 Pond Cr at Manslick Road	18	0	29	---	42	50	58	---	66
5 SF Beargrass Cr at Winter Avenue	16	0	38	---	48	54	63	---	87
6 SF Beargrass Cr at Trevilian Way	16	0	38	---	54	57	61	---	73
7 MF Beargrass Cr at Old Cannons Lane	16	0	37	---	44	52	56	---	67
8 MF Beargrass Cr at Beals Branch Road	16	0	36	---	43	52	57	---	70
9 Spring Ditch at Private Drive	16	0	24	---	38	42	45	---	53
10 Muddy Fork at Mockingbird Valley Road	17	0	35	---	44	48	55	---	86
11 Goose Cr at U.S. Highway 42	16	0	20	---	37	42	50	---	64
12 Little Goose Cr at U.S. Highway 42	16	0	19	---	40	47	52	---	86
13 Goose Cr at Old Westport Road	16	0	28	---	36	43	56	---	85
14 Pope Lick at Pope Lick Road	18	1	<2.0	---	34	41	47	---	56
15 Floyds Fork at former State Highway 155	18	0	10	---	29	38	50	---	60
16 Chenoweth Run at Gelhaus Road	18	0	10	---	31	37	43	---	110
17 Fern Cr at Old Bardstown Road	17	0	37	---	42	45	51	---	628
18 Northern Ditch at Preaton Highway	16	0	24	---	39	40	45	---	64
19 Fishpool Cr at Bost Road	16	0	7.0	---	36	45	49	---	54
20 Southern Ditch at Minors Lane	16	0	26	---	32	42	47	---	56
21 Floyds Fork at Bardstown Road	17	0	29	---	35	42	48	---	57
22 Cedar Cr at Thixton Road	17	0	20	---	29	37	45	---	57
23 Pennsylvania Run at Mt. Washington Road	17	0	30	---	33	35	46	---	72
24 Mill Cr Cutoff at Dover Road	15	0	16	---	22	25	27	---	32
25 Harrods Cr at Hunting Cr Drive	16	0	9.0	---	39	51	62	---	157
26 Long Run at State Highway 1531	12	0	22	---	24	29	40	---	177
Beryllium, total, in µg/L as Be									
1 Pond Cr at Pendleton Road	17	16	<.20	---	<.50	<.60	<1.0	---	.60
2 Mill Cr at Orell Road	15	14	<.20	---	<.50	<.50	<1.0	---	1.0
3 Pond Cr at Manslick Road	18	18	<.20	---	<.40	<.50	<1.0	---	<1.0
5 SF Beargrass Cr at Winter Avenue	16	15	<.20	---	<.40	<.50	<1.0	---	.30
6 SF Beargrass Cr at Trevilian Way	16	15	<.20	---	<.40	<.50	<1.0	---	1.7
7 MF Beargrass Cr at Old Cannons Lane	16	15	<.20	---	<.50	<.50	<1.0	---	.60

Table 5. Statistical summary of constituent concentrations in selected streams of Jefferson County, Kentucky, 1988-92--Continued

[N, number of observations; Cr, Creek; SF, South Fork; MF, Middle Fork; mg/L, milligrams per liter; °C, degrees Celsius; µg/L, micrograms per liter; ---, missing; <, less than; *, value estimated from log-normal fit program; percentiles not computed if fewer than 10 observations; the 10th and 90th percentiles are not shown if fewer than 30 observations]

Site number and name	N	N of censored data values	Minimum	Value at indicated percentile 10	25	50 (median)	75	90	Maximum
Beryllium, total, in µg/L as Be--Continued									
8 MF Beargrass Cr at Beals Branch Road	16	15	<0.20	---	<0.50	<0.50	<1.0	---	0.20
9 Spring Ditch at Private Drive	16	13	<.20	---	.03*	.10*	.33*	---	3.5
10 Muddy Fork at Mockingbird Valley Road	17	17	<.20	---	<.50	<.50	<.90	---	<1.0
11 Goose Cr at U.S. Highway 42	10	8	<.20	---	<.40	<.50	<.60	---	.70
12 Little Goose Cr at U.S. Highway 42	12	9	<.20	---	.14*	.22*	.36*	---	1.0
13 Goose Cr at Old Westport Road	16	15	<.20	---	<.40	<.50	<1.0	---	.60
14 Pope Lick at Pope Lick Road	11	8	<.20	---	.11*	.19*	.33*	---	.70
15 Floyds Fork at former State Highway 155	18	18	<.20	---	<.50	<.50	<1.0	---	<1.0
16 Chenoweth Run at Gelhaus Road	18	17	<.20	---	<.50	<.60	<1.0	---	.50
17 Fern Cr at Old Bardstown Road	17	14	<.20	---	.03*	.09*	.28*	---	3.4
18 Northern Ditch at Preston Highway	12	10	<.20	---	<.50	<.50	<.50	---	.90
19 Fishpool Cr at Bost Road	16	16	<.20	---	<.40	<.50	<.90	---	<1.0
20 Southern Ditch at Minors Lane	12	10	<.20	---	<.20	<.50	<.60	---	1.0
21 Floyds Fork at Bardstown Road	17	16	<.20	---	<.50	<.50	<1.0	---	.90
22 Cedar Cr at Thixton Road	17	16	<.20	---	<.50	<.50	<1.0	---	.90
23 Pennsylvania Run at Mt. Washington Road	12	10	<.20	---	<.20	<.50	<.50	---	.60
24 Mill Cr Cutoff at Dover Road	12	10	<.20	---	<.20	<.50	<.90	---	1.0
25 Harrods Cr at Hunting Cr Drive	16	12	<.20	---	.09*	.20*	.44*	---	1.3
26 Long Run at State Highway 1531	12	11	<.20	---	<.50	<.50	<1.0		
Cadmium, total, in µg/L as Cd									
1 Pond Cr at Pendleton Road	18	17	<2.0	---	<4.0	<6.4	<9.0	---	3.0
2 Mill Cr at Orell Road	15	14	<2.0	---	<4.0	<6.0	<9.0	---	10
3 Pond Cr at Manslick Road	18	16	<2.0	---	<5.0	<6.0	<9.0	---	11
5 SF Beargrass Cr at Winter Avenue	16	16	<2.0	---	<4.0	<6.0	<6.9	---	<9.0
6 SF Beargrass Cr at Trevilian Way	16	16	<2.0	---	<4.0	<6.0	<6.4	---	<9.0
7 MF Beargrass Cr at Old Cannons Lane	16	16	<2.0	---	<4.0	<6.0	<6.4	---	<9.0
8 MF Beargrass Cr at Beals Branch Road	16	15	<2.0	---	<4.0	<6.0	<6.4	---	16
9 Spring Ditch at Private Drive	16	16	<2.0	---	<4.0	<6.0	<6.4	---	<9.0
10 Muddy Fork at Mockingbird Valley Road	17	17	<2.0	---	<4.0	<6.0	<6.9	---	<9.0
11 Goose Cr at U.S. Highway 42	16	16	<2.0	---	<4.0	<6.0	<6.9	---	<9.0
12 Little Goose Cr at U.S. Highway 42	16	15	<2.0	---	<4.0	<6.0	<9.0	---	4.0
13 Goose Cr at Old Westport Road	10	9	<1.0	---	<4.0	<9.0	<9.0	---	6.0
14 Pope Lick at Pope Lick Road	18	18	<2.0	---	<4.0	<6.0	<9.0	---	<9.0
15 Floyds Fork at former State Highway 155	18	16	<2.0	---	<6.0	<6.4	<9.0	---	19
16 Chenoweth Run at Gelhaus Road	18	16	<2.0	---	<4.0	<6.0	<9.0	---	11
17 Fern Cr at Old Bardstown Road	15	13	<2.0	---	<4.0	<6.0	<6.4	---	9.0
18 Northern Ditch at Preston Highway	16	15	<2.0	---	<4.0	<6.0	<6.9	---	3.0
19 Fishpool Cr at Bost Road	16	15	<2.0	---	<4.0	<6.0	<6.4	---	15
20 Southern Ditch at Minors Lane	16	16	<2.0	---	<4.0	<6.0	<6.4	---	<9.0
21 Floyds Fork at Bardstown Road	17	16	<2.0	---	<6.0	<6.0	<9.0	---	2.0
22 Cedar Cr at Thixton Road	17	17	<2.0	---	<4.0	<6.0	<9.0	---	<9.0
23 Pennsylvania Run at Mt. Washington Road	13	11	<4.0	---	<4.0	<6.0	<6.4	---	7.0
24 Mill Cr Cutoff at Dover Road	15	14	<2.0	---	<4.0	<6.0	<9.0	---	13
25 Harrods Cr at Hunting Cr Drive	16	15	<2.0	---	<4.0	<6.0	<9.0	---	2.0
26 Long Run at State Highway 1531	12	12	<3.0	---	<6.0	<6.0	<9.0	---	<9.0
Chromium, total, in µg/L as Cr									
1 Pond Cr at Pendleton Road	18	7	<4.0	---	3.1*	8.4*	13	---	520
2 Mill Cr at Orell Road	15	10	<4.0	---	.25*	1.7*	11	---	700
3 Pond Cr at Manslick Road	18	5	<5.0	---	4.3*	11*	20	---	510
5 SF Beargrass Cr at Winter Avenue	16	8	<4.0	---	3.9*	6.0*	12	---	13
6 SF Beargrass Cr at Trevilian Way	16	8	<4.0	---	.79*	4.4*	13	---	1,210
7 MF Beargrass Cr at Old Cannons Lane	16	9	<4.9	---	2.8*	5.9*	19	---	34
8 MF Beargrass Cr at Beals Branch Road	16	8	<4.9	---	2.4*	6.3*	15	---	142
9 Spring Ditch at Private Drive	16	6	<4.0	---	4.3*	13	20	---	44
10 Muddy Fork at Mockingbird Valley Road	17	11	<4.0	---	2.2*	4.0*	7.3*	---	17
11 Goose Cr at U.S. Highway 42	16	10	<4.9	---	3.7*	5.3*	7.7*	---	15
12 Little Goose Cr at U.S. Highway 42	16	9	<4.9	---	2.4*	5.2*	11*	---	79
13 Goose Cr at Old Westport Road	16	9	<4.9	---	1.1*	4.2*	15	---	520
14 Pope Lick at Pope Lick Road	18	11	<4.0	---	2.8*	4.7*	7.8*	---	21
15 Floyds Fork at former State Highway 155	18	10	<4.0	---	1.8*	4.6*	14	---	139
16 Chenoweth Run at Gelhaus Road	17	10	<4.0	---	1.0*	3.9*	14*	---	337
17 Fern Cr at Old Bardstown Road	17	9	<4.0	---	.87*	4.2*	16	---	1,200
18 Northern Ditch at Preston Highway	16	10	<4.0	---	3.4*	4.9*	7.2*	---	12
19 Fishpool Cr at Bost Road	16	11	<4.0	---	.10*	1.1*	12*	---	670
20 Southern Ditch at Minors Lane	16	9	<4.0	---	.85*	3.3*	13*	---	690
21 Floyds Fork at Bardstown Road	17	9	<4.0	---	1.3*	4.9*	16	---	510
22 Cedar Cr at Thixton Road	17	9	<4.0	---	1.5*	5.3*	17	---	530
23 Pennsylvania Run at Mt. Washington Road	17	12	<4.0	---	1.1*	2.7*	7.0*	---	29
24 Mill Cr Cutoff at Dover Road	15	7	<4.0	---	1.4*	4.8*	16*	---	684
25 Harrods Cr at Hunting Cr Drive	16	7	<4.9	---	1.9*	7.8*	24	---	1,210
26 Long Run at State Highway 1531	12	8	<4.9	---	.61*	2.7*	12*	---	189

Table 5. Statistical summary of constituent concentrations in selected streams of Jefferson County, Kentucky, 1988-92--Continued

[N, number of observations; Cr, Creek; SF, South Fork; MF, Middle Fork; mg/L, milligrams per liter; °C, degrees Celsius; µg/L, micrograms per liter; ---, missing; <, less than; *, value estimated from log-normal fit program; percentiles not computed if fewer than 10 observations; the 10th and 90th percentiles are not shown if fewer than 30 observations]

Site number and name	N	N of censored data values	Minimum	Value at indicated percentile 10	25	50 (median)	75	90	Maximum
Copper, total recoverable, in µg/L as Cu									
1 Pond Cr at Pendleton Road	18	8	<6.0	---	3.5*	8.5	25	---	96
2 Mill Cr at Orell Road	15	8	<6.0	---	3.0*	6.5*	15	---	55
3 Pond Cr at Manslick Road	18	8	<6.0	---	3.6*	11	36	---	77
5 SF Beargrass Cr at Winter Avenue	16	6	<6.0	---	5.0*	8.5	22	---	37
6 SF Beargrass Cr at Trevilian Way	16	8	<6.0	---	3.1*	7.1*	16*	---	73
7 MF Beargrass Cr at Old Cannons Lane	16	8	<5.0	---	2.3*	7.7*	36	---	146
8 MF Beargrass Cr at Beals Branch Road	16	5	<6.0	---	5.0*	9.0	29	---	130
9 Spring Ditch at Private Drive	16	3	<8.0	---	8.1*	14	28	---	51
10 Muddy Fork at Mockingbird Valley Road	17	5	<5.0	---	3.0*	10	20	---	1,820
11 Goose Cr at U.S. Highway 42	16	5	<6.0	---	5.6*	11	29	---	73
12 Little Goose Cr at U.S. Highway 42	16	8	<6.0	---	3.4*	7.0*	20	---	40
13 Goose Cr at Old Westport Road	16	4	<6.0	---	6.6*	12	31	---	62
14 Pope Lick at Pope Lick Road	18	4	<6.0	---	6.4*	11	20	---	56
15 Floyds Fork at former State Highway 155	18	6	<6.0	---	5.8*	11	22	---	57
16 Chenoweth Run at Gelhaus Road	18	8	<6.0	---	3.8*	9.2*	31	---	88
17 Fern Cr at Old Bardstown Road	17	6	<6.0	---	4.5*	10	30	---	87
18 Northern Ditch at Preston Highway	16	4	<6.0	---	8.0*	13	23	---	50
19 Fishpool Cr at Bost Road	16	8	<6.0	---	2.6*	7.4*	20	---	103
20 Southern Ditch at Minors Lane	16	6	<6.0	---	5.0*	11*	23	---	130
21 Floyds Fork at Bardstown Road	17	5	<6.0	---	6.1*	9.0	15	---	40
22 Cedar Cr at Thixton Road	17	6	<5.0	---	4.9*	9.0	19	---	37
23 Pennsylvania Run at Mt. Washington Road	17	5	<5.0	---	4.9*	9.0	14	---	82
24 Mill Cr Cutoff at Dover Road	15	7	<6.0	---	3.5*	8.0	15	---	74
25 Harrods Cr at Hunting Cr Drive	16	8	<5.0	---	2.6*	7.0*	24	---	120
26 Long Run at State Highway 1531	12	3	<6.0	---	7.9*	15	31	---	43
Iron, total, in µg/L as Fe									
1 Pond Cr at Pendleton Road	18	2	<10	---	265	707	1,210	---	16,900
2 Mill Cr at Orell Road	15	0	209	---	263	1,110	2,830	---	13,700
3 Pond Cr at Manslick Road	18	0	370	---	789	1,300	2,650	---	3,530
5 SF Beargrass Cr at Winter Avenue	16	0	160	---	475	995	1,840	---	10,800
6 SF Beargrass Cr at Trevilian Way	16	2	<10	---	213	506	1,170	---	6,120
7 MF Beargrass Cr at Old Cannons Lane	16	1	<10	---	173	252	900	---	2,720
8 MF Beargrass Cr at Beals Branch Road	16	1	<10	---	189	602	1,110	---	4,660
9 Spring Ditch at Private Drive	16	0	50	---	244	416	1,440	---	10,600
10 Muddy Fork at Mockingbird Valley Road	17	1	<40	---	253	580	1,080	---	3,580
11 Goose Cr at U.S. Highway 42	16	2	<10	---	78	229	565	---	1,760
12 Little Goose Cr at U.S. Highway 42	16	0	180	---	229	477	1,600	---	5,210
13 Goose Cr at Old Westport Road	16	1	<10	---	164	473	1,110	---	2,680
14 Pope Lick at Pope Lick Road	18	1	<10	---	164	267	1,150	---	17,700
15 Floyds Fork at former State Highway 155	18	0	10	---	255	744	2,110	---	19,500
16 Chenoweth Run at Gelhaus Road	18	1	<10	---	106	284	580	---	7,700
17 Fern Cr at Old Bardstown Road	17	3	<10	---	119	268	775	---	69,200
18 Northern Ditch at Preston Highway	16	0	90	---	168	225	691	---	2,850
19 Fishpool Cr at Bost Road	16	1	<10	---	214	268	391	---	2,810
20 Southern Ditch at Minors Lane	16	0	240	---	415	687	855	---	1,720
21 Floyds Fork at Bardstown Road	17	1	<10	---	238	520	935	---	5,530
22 Cedar Cr at Thixton Road	17	1	<10	---	120	190	370	---	2,200
23 Pennsylvania Run at Mt. Washington Road	17	1	<10	---	223	520	895	---	18,100
24 Mill Cr Cutoff at Dover Road	15	0	102	---	250	595	1,460	---	1,930
25 Harrods Cr at Hunting Cr Drive	16	1	<10	---	482	748	1,610	---	14,100
26 Long Run at State Highway 1531	12	0	149	---	249	680	1,800	---	3,080
Lead, total, in µg/L as Pb									
1 Pond Cr at Pendleton Road	18	15	<40	---	22*	30*	41*	---	70
2 Mill Cr at Orell Road	15	13	<10	---	<40	<50	<53	---	170
3 Pond Cr at Manslick Road	18	17	<40	---	<40	<50	<53	---	190
5 SF Beargrass Cr at Winter Avenue	16	15	<40	---	<40	<50	<50	---	<50
6 SF Beargrass Cr at Trevilian Way	16	16	<40	---	<40	<50	<53	---	<60
7 MF Beargrass Cr at Old Cannons Lane	15	13	<10	---	<40	<50	<53	---	60
9 Spring Ditch at Private Drive	13	10	<40	---	29*	35*	44*	---	60
10 Muddy Fork at Mockingbird Valley Road	17	17	<20	---	<40	<50	<50	---	<60
11 Goose Cr at U.S. Highway 42	16	16	<40	---	<40	<50	<50	---	<60
12 Little Goose Cr at U.S. Highway 42	16	12	<10	---	5.9*	15*	40*	---	150
13 Goose Cr at Old Westport Road	16	15	<40	---	<40	<50	<50	---	70
14 Pope Lick at Pope Lick Road	16	14	<40	---	<40	<50	<50	---	60
15 Floyds Fork at former State Highway 155	17	15	<40	---	<40	<50	<60	---	100
16 Chenoweth Run at Gelhaus Road	18	17	<40	---	<40	<50	<53	---	70
17 Fern Cr at Old Bardstown Road	17	15	<10	---	<40	<50	<55	---	120
18 Northern Ditch at Preston Highway	16	16	<40	---	<40	<50	<53	---	<60
19 Fishpool Cr at Bost Road	16	15	<40	---	<40	<50	<53	---	100
20 Southern Ditch at Minors Lane	16	16	<40	---	<40	<50	<50	---	<60
21 Floyds Fork at Bardstown Road	17	17	<10	---	<40	<50	<50	---	<60
22 Cedar Cr at Thixton Road	17	16	<40	---	<40	<50	<53	---	80

Table 5. Statistical summary of constituent concentrations in selected streams of Jefferson County, Kentucky, 1988-92--Continued

[N, number of observations; Cr, Creek; SF, South Fork; MF, Middle Fork; mg/L, milligrams per liter; °C, degrees Celsius; µg/L, micrograms per liter; ---, missing; <, less than; *, value estimated from log-normal fit program; percentiles not computed if fewer than 10 observations; the 10th and 90th percentiles are not shown if fewer than 30 observations]

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 µg/L as Pb--Continued									
23 Pennsylvania Run at Mt. Washington Road	17	16	<40	---	<50	<50	<55	---	50
24 Mill Cr Cutoff at Dover Road	15	13	<40	---	<40	<50	<55	---	170
25 Harrods Cr at Hunting Cr Drive	16	16	<40	---	<40	<50	<53	---	<60
26 Long Run at State Highway 1531	12	11	<40	---	<40	<50	<60	---	130
Mercury, total recoverable, in µg/L as Hg									
1 Pond Cr at Pendleton Road	17	12	<.20	---	<.20	<.20	.20	---	.70
2 Mill Cr at Orell Road	15	11	<.20	---	<.01*	.02*	.07*	---	.30
3 Pond Cr at Manslick Road	17	12	<.20	---	.05*	.11*	.30	---	.90
5 SF Beargrass Cr at Winter Avenue	16	10	<.20	---	.08*	.15*	.30	---	1.0
6 SF Beargrass Cr at Trevilian Way	16	9	<.20	---	.01*	.05*	.37	---	3.1
7 MF Beargrass Cr at Old Cannons Lane	16	9	<.20	---	.11*	.19*	.40	---	.50
8 MF Beargrass Cr at Beals Branch Road	16	12	<.20	---	.05*	.10*	.21*	---	.70
9 Spring Ditch at Private Drive	17	10	<.20	---	.07*	.15*	.25	---	1.6
10 Muddy Fork at Mockingbird Valley Road	17	9	<.20	---	.12*	.20*	.40	---	.60
11 Goose Cr at U.S. Highway 42	16	12	<.20	---	.03*	.07*	.20*	---	1.6
12 Little Goose Cr at U.S. Highway 42	16	11	<.20	---	<.20	<.20	.20	---	.70
13 Goose Cr at Old Westport Road	13	8	<.20	---	.07*	.14*	.25	---	1.1
14 Pope Lick at Pope Lick Road	17	9	<.20	---	.09*	.18*	.35*	---	1.5
15 Floyds Fork at former State Highway 155	17	9	<.20	---	.10*	.18*	.34*	---	1.5
16 Chenoweth Run at Gelhaus Road	18	12	<.20	---	.03*	.09*	.30	---	6.0
17 Fern Cr at Old Bardstown Road	16	9	<.20	---	.08*	.17*	.55	---	1.0
18 Northern Ditch at Preston Highway	17	12	<.20	---	.08*	.13*	.25	---	.50
19 Fishpool Cr at Bost Road	15	10	<.20	---	.09*	.15*	.30	---	.60
20 Southern Ditch at Minors Lane	15	9	<.20	---	.10*	.16*	.25*	---	.90
21 Floyds Fork at Bardstown Road	17	7	<.20	---	.10*	.20	.65	---	4.0
22 Cedar Cr at Thixton Road	17	7	<.20	---	.10*	.20	.45	---	5.2
23 Pennsylvania Run at Mt. Washington Road	17	8	<.20	---	.10*	.20	.55	---	1.0
24 Mill Cr Cutoff at Dover Road	15	11	<.20	---	.05*	.11*	.20	---	.60
25 Harrods Cr at Hunting Cr Drive	15	10	<.20	---	.06*	.13*	.30	---	1.0
26 Long Run at State Highway 1531	12	11	<.20	---	<.20	<.20	<.20	---	.90
Nickel, total, in µg/L as Ni									
1 Pond Cr at Pendleton Road	18	12	<7.0	---	5.8*	9.3*	15*	---	31
2 Mill Cr at Orell Road	15	12	<7.0	---	3.1*	5.3*	8.9*	---	25
3 Pond Cr at Manslick Road	18	11	<7.0	---	4.4*	9.0*	19*	---	89
5 SF Beargrass Cr at Winter Avenue	12	12	<6.7	---	<10	<20	<20	---	13
6 SF Beargrass Cr at Trevilian Way	10	2	<10	---	8.5*	10*	12*	---	16
7 MF Beargrass Cr at Old Cannons Lane	16	13	<6.7	---	.42*	1.7*	6.7*	---	99
8 MF Beargrass Cr at Beals Branch Road	16	13	<6.7	---	2.5*	4.5*	8.1*	---	22
9 Spring Ditch at Private Drive	16	6	<7.0	---	8.1*	13*	20*	---	39
10 Muddy Fork at Mockingbird Valley Road	17	13	<6.7	---	2.0*	4.3*	9.4*	---	50
11 Goose Cr at U.S. Highway 42	16	12	<7.0	---	2.5*	5.4*	11*	---	47
12 Little Goose Cr at U.S. Highway 42	16	11	<7.0	---	5.6*	7.8*	11*	---	23
13 Goose Cr at Old Westport Road	11	10	<7.0	---	<10	<20	<20	---	13
14 Pope Lick at Pope Lick Road	18	14	<6.7	---	1.8*	4.1*	9.3*	---	49
15 Floyds Fork at former State Highway 155	18	13	<6.0	---	2.0*	5.0*	13*	---	61
16 Chenoweth Run at Gelhaus Road	18	14	<7.0	---	2.0*	4.4*	9.8*	---	30
17 Fern Cr at Old Bardstown Road	17	13	<7.0	---	1.2*	3.4*	9.5*	---	81
18 Northern Ditch at Preston Highway	16	12	<6.7	---	.74*	2.7*	9.7*	---	100
19 Fishpool Cr at Bost Road	11	11	<6.7	---	<10	<20	<20	---	10
20 Southern Ditch at Minors Lane	16	10	<6.7	---	3.2*	6.8*	14*	---	44
21 Floyds Fork at Bardstown Road	17	14	<7.0	---	1.8*	3.8*	8.3*	---	28
22 Cedar Cr at Thixton Road	11	8	<7.0	---	3.6*	5.5*	8.4*	---	20
23 Pennsylvania Run at Mt. Washington Road	17	13	<7.0	---	1.6*	3.9*	9.2*	---	50
24 Mill Cr Cutoff at Dover Road	15	12	<7.0	---	2.4*	4.9*	9.7*	---	30
25 Harrods Cr at Hunting Cr Drive	16	13	<6.7	---	2.4*	4.5*	8.4*	---	30
26 Long Run at State Highway 1531	12	7	<7.0	---	4.0*	6.7*	11*	---	31
Silver, total, in µg/L as Ag									
1 Pond Cr at Pendleton Road	14	11	<1.0	---	.50*	1.0*	2.1*	---	6.0
2 Mill Cr at Orell Road	15	12	<1.0	---	.22*	.75*	2.5*	---	17
3 Pond Cr at Manslick Road	18	17	<1.0	---	<1.0	<4.7	<5.0	---	7.0
5 SF Beargrass Cr at Winter Avenue	16	16	<1.0	---	<1.0	<4.0	<5.0	---	<8.0
6 SF Beargrass Cr at Trevilian Way	16	14	<1.0	---	<1.0	<4.7	<5.0	---	11
7 MF Beargrass Cr at Old Cannons Lane	14	11	<1.0	---	.26*	.68*	1.8*	---	7.0
8 MF Beargrass Cr at Beals Branch Road	10	8	<1.0	---	<1.0	<2.0	<4.0	---	4.0
9 Spring Ditch at Private Drive	11	9	<1.0	---	<1.0	<4.0	<5.0	---	2.0
10 Muddy Fork at Mockingbird Valley Road	17	16	<1.0	---	<1.0	<4.0	<5.0	---	5.0
11 Goose Cr at U.S. Highway 42	16	14	<1.0	---	<1.0	<4.0	<5.0	---	10
12 Little Goose Cr at U.S. Highway 42	11	9	<1.0	---	<1.0	<4.0	<4.7	---	5.0
13 Goose Cr at Old Westport Road	16	12	<1.0	---	.05*	.35*	2.6*	---	166
14 Pope Lick at Pope Lick Road	17	11	<1.0	---	.91*	1.7*	3.1*	---	7.0
15 Floyds Fork at former State Highway 155	16	14	<1.0	---	<1.0	<4.0	<5.0	---	6.0

Table 5. Statistical summary of constituent concentrations in selected streams of Jefferson County, Kentucky, 1988-92--Continued

[N, number of observations; Cr, Creek; SF, South Fork; MF, Middle Fork; mg/L, milligrams per liter; °C, degrees Celsius; µg/L, micrograms per liter; ---, missing; <, less than; *, value estimated from log-normal fit program; percentiles not computed if fewer than 10 observations; the 10th and 90th percentiles are not shown if fewer than 30 observations]

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 µg/L as Ag--Continued									
16 Chenoweth Run at Gelhaus Road	17	14	<1.0	---	0.22*	0.58*	1.5*	---	9.0
17 Fern Cr at Old Bardstown Road	17	13	<1.0	---	.04*	.31*	2.3*	---	110
18 Northern Ditch at Preston Highway	16	12	<1.0	---	.50*	1.2*	2.7*	---	14
19 Fishpool Cr at Bost Road	16	15	<1.0	---	<1.0	<4.7	<5.0	---	1.0
20 Southern Ditch at Minors Lane	15	13	<1.0	---	<1.0	<4.7	<5.0	---	9.0
21 Floyds Fork at Bardstown Road	16	14	<1.0	---	<1.0	<4.0	<5.0	---	6.0
22 Cedar Cr at Thixton Road	12	10	<1.0	---	<1.0	<4.0	<4.0	---	4.0
23 Pennsylvania Run at Mt. Washington Road	17	17	<.80	---	<1.0	<4.0	<5.0	---	<10
24 Mill Cr Cutoff at Dover Road	14	12	<1.0	---	<1.0	<4.7	<5.0	---	6.0
25 Harrods Cr at Hunting Cr Drive	16	13	<1.0	---	.02*	.17*	1.3*	---	110
26 Long Run at State Highway 1531	12	12	<1.0	---	<4.0	<5.0	<5.0	---	<9.0
Zinc, total, in µg/L as Zn									
1 Pond Cr at Pendleton Road	18	3	<6.0	---	11	44	128	---	1,660
2 Mill Cr at Orell Road	15	3	<6.0	---	7.0	40	55	---	107
3 Pond Cr at Manslick Road	18	3	<6.0	---	25	60	102	---	351
5 SF Beargrass Cr at Winter Avenue	16	2	<6.0	---	24	66	98	---	117
6 SF Beargrass Cr at Trevilian Way	16	4	<5.0	---	10*	54	165	---	1,230
7 MF Beargrass Cr at Old Cannons Lane	16	2	<6.0	---	35	50	104	---	327
8 MF Beargrass Cr at Beals Branch Road	16	2	<6.0	---	26*	47	101	---	154
9 Spring Ditch at Private Drive	16	1	<6.0	---	43	86	140	---	500
10 Muddy Fork at Mockingbird Valley Road	17	1	<6.0	---	19	52	130	---	590
11 Goose Cr at U.S. Highway 42	16	2	<5.0	---	20	43	196	---	310
12 Little Goose Cr at U.S. Highway 42	16	2	<6.0	---	21	41	81	---	364
13 Goose Cr at Old Westport Road	16	2	<6.0	---	9.2	52	122	---	622
14 Pope Lick at Pope Lick Road	18	0	15	---	36	48	89	---	502
15 Floyds Fork at former State Highway 155	18	1	<6.0	---	25	35	66	---	268
16 Chenoweth Run at Gelhaus Road	18	4	<6.0	---	14*	51	69	---	244
17 Fern Cr at Old Bardstown Road	17	3	<6.0	---	14	52	205	---	417
18 Northern Ditch at Preston Highway	16	1	<6.0	---	29	48	117	---	527
19 Fishpool Cr at Bost Road	16	2	<6.0	---	16	44	81	---	490
20 Southern Ditch at Minors Lane	16	1	<6.0	---	24	62	149	---	545
21 Floyds Fork at Bardstown Road	17	2	<6.0	---	22	36	55	---	258
22 Cedar Cr at Thixton Road	17	2	<6.0	---	25	36	70	---	123
23 Pennsylvania Run at Mt. Washington Road	17	1	<6.0	---	29	43	81	---	854
24 Mill Cr Cutoff at Dover Road	14	0	19	---	43	86	187	---	917
25 Harrods Cr at Hunting Cr Drive	16	2	<6.0	---	13	28	65	---	440
26 Long Run at State Highway 1531	12	1	<6.0	---	17	33	81	---	114
Selenium, total, in µg/L as Se									
1 Pond Cr at Pendleton Road	18	17	<5.0	---	<5.0	<10	<10	---	5.0
2 Mill Cr at Orell Road	15	15	<5.0	---	<5.0	<10	<10	---	<50
3 Pond Cr at Manslick Road	18	18	<5.0	---	<5.0	<5.0	<10	---	<50
5 SF Beargrass Cr at Winter Avenue	16	15	<5.0	---	<5.0	<10	<10	---	6.0
6 SF Beargrass Cr at Trevilian Way	16	16	<5.0	---	<5.0	<5.0	<10	---	<50
7 MF Beargrass Cr at Old Cannons Lane	16	16	<5.0	---	<5.0	<5.0	<10	---	<50
8 MF Beargrass Cr at Beals Branch Road	16	16	<5.0	---	<5.0	<5.0	<10	---	<50
9 Spring Ditch at Private Drive	14	12	<5.0	---	<5.0	<10	<10	---	11
10 Muddy Fork at Mockingbird Valley Road	11	11	<5.0	---	<10	<10	<50	---	9.0
11 Goose Cr at U.S. Highway 42	16	15	<5.0	---	<5.0	<10	<10	---	6.0
12 Little Goose Cr at U.S. Highway 42	16	16	<5.0	---	<5.0	<5.0	<10	---	<50
13 Goose Cr at Old Westport Road	16	15	<5.0	---	<5.0	<10	<10	---	7.0
14 Pope Lick at Pope Lick Road	16	14	<5.0	---	<5.0	<10	<10	---	11
15 Floyds Fork at former State Highway 155	18	18	<5.0	---	<5.0	<10	<10	---	<50
16 Chenoweth Run at Gelhaus Road	18	18	<5.0	---	<5.0	<10	<10	---	<50
17 Fern Cr at Old Bardstown Road	17	17	<5.0	---	<5.0	<10	<10	---	<50
18 Northern Ditch at Preston Highway	17	17	<5.0	---	<5.0	<10	<10	---	<50
19 Fishpool Cr at Bost Road	16	15	<5.0	---	<5.0	<10	<10	---	7.0
20 Southern Ditch at Minors Lane	16	15	<5.0	---	<5.0	<10	<10	---	15
21 Floyds Fork at Bardstown Road	17	16	<5.0	---	<5.0	<10	<10	---	5.0
22 Cedar Cr at Thixton Road	17	17	<5.0	---	<5.0	<10	<10	---	<50
23 Pennsylvania Run at Mt. Washington Road	17	16	<5.0	---	<5.0	<10	<20	---	5.0
24 Mill Cr Cutoff at Dover Road	13	11	<5.0	---	<5.0	<10	<10	---	12
25 Harrods Cr at Hunting Cr Drive	16	16	<5.0	---	<5.0	<10	<10	---	<50
26 Long Run at State Highway 1531	9	9	<5.0	---	---	---	---	---	8.0
Cyanide, total, in mg/L as Cn									
1 Pond Cr at Pendleton Road	17	16	<.01	---	<.02	<.02	<.02	---	.01
2 Mill Cr at Orell Road	15	15	<.02	---	<.02	<.02	<.02	---	<.02
3 Pond Cr at Manslick Road	11	8	<.01	---	<.01	<.01	<.02	---	<.02
5 SF Beargrass Cr at Winter Avenue	16	15	<.01	---	<.02	<.02	<.02	---	.01
6 SF Beargrass Cr at Trevilian Way	15	13	<.01	---	<.01	<.01	<.01	---	.01
7 MF Beargrass Cr at Old Cannons Lane	16	15	<.01	---	<.02	<.02	<.02	---	.01
8 MF Beargrass Cr at Beals Branch Road	9	7	<.01	---	---	---	---	---	<.02

Table 5. Statistical summary of constituent concentrations in selected streams of Jefferson County, Kentucky, 1988-92--Continued

[N, number of observations; Cr, Creek; SF, South Fork; MF, Middle Fork; mg/L, milligrams per liter; °C, degrees Celsius; µg/L, micrograms per liter; ---, missing; <, less than; *, value estimated from log-normal fit program; percentiles not computed if fewer than 10 observations; the 10th and 90th percentiles are not shown if fewer than 30 observations]

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 mg/L as Cn--Continued									
9 Spring Ditch at Private Drive	12	18	<0.01	---	<0.01	<0.01	<0.01	---	<0.02
10 Muddy Fork at Mockingbird Valley Road	16	11	<.01	---	<.01*	<.01*	.01*	---	.03
11 Goose Cr at U.S. Highway 42	14	10	<.01	---	<.01	<.01	.01	---	.01
12 Little Goose Cr at U.S. Highway 42	10	7	<.01	---	<.01	<.01	.01	---	.01
13 Goose Cr at Old Westport Road	15	8	<.01	---	.01*	.01*	.01*	---	.03
14 Pope Lick at Pope Lick Road	18	10	<.01	---	<.01*	.01*	.01*	---	.05
15 Floyds Fork at former State Highway 155	18	18	<.01	---	<.02	<.02	<.02	---	<.02
16 Chenoweth Run at Gelhaus Road	17	9	<.01	---	<.01*	.01*	.01*	---	.02
17 Fern Cr at Old Bardstown Road	16	11	<.01	---	<.01*	<.01*	.01*	---	.04
18 Northern Ditch at Preston Highway	17	11	<.01	---	<.01*	.01*	.01*	---	.03
19 Fishpool Cr at Bost Road	16	10	<.01	---	<.01*	.01*	.01*	---	.02
20 Southern Ditch at Minors Lane	16	11	<.01	---	<.01*	<.01*	.01*	---	.02
21 Floyds Fork at Bardstown Road	16	15	<.01	---	<.02	<.02	<.02	---	.01
22 Cedar Cr at Thixton Road	16	14	<.01	---	<.02	<.02	<.02	---	.05
23 Pennsylvania Run at Mt. Washington Road	17	9	<.01	---	<.01*	.01*	.02	---	.07
24 Mill Cr Cutoff at Dover Road	11	9	<.01	---	<.01	<.01	<.01	---	.02
25 Harrods Cr at Hunting Cr Drive	16	16	<.01	---	<.02	<.02	<.02	---	<.02
26 Long Run at State Highway 1531	12	11	<.01	---	<.02	<.02	<.02	---	.01
Chlordane, total, in µg/L									
1 Pond Cr at Pendleton Road	14	14	<3.1	---	<3.1	<6.2	<6.2	---	<6.2
2 Mill Cr at Orell Road	12	12	<3.1	---	<3.1	<6.2	<6.2	---	<6.2
3 Pond Cr at Manslick Road	14	14	<3.1	---	<3.1	<6.2	<6.2	---	<6.2
5 SF Beargrass Cr at Winter Avenue	13	13	<3.1	---	<3.1	<6.2	<6.2	---	<6.2
6 SF Beargrass Cr at Trevilian Way	13	13	<3.1	---	<3.1	<6.2	<6.2	---	<6.2
7 MF Beargrass Cr at Old Cannons Lane	12	12	<3.1	---	<3.1	<3.1	<6.2	---	<6.2
8 MF Beargrass Cr at Beals Branch Road	13	13	<3.1	---	<3.1	<3.1	<6.2	---	<6.2
9 Spring Ditch at Private Drive	14	14	<3.1	---	<3.1	<3.1	<6.2	---	<6.2
10 Muddy Fork at Mockingbird Valley Road	14	14	<3.1	---	<3.1	<3.1	<6.2	---	<6.2
11 Goose Cr at U.S. Highway 42	13	13	<3.1	---	<3.1	<6.2	<6.2	---	<6.2
12 Little Goose Cr at U.S. Highway 42	13	13	<3.1	---	<3.1	<6.2	<6.2	---	<6.2
13 Goose Cr at Old Westport Road	12	12	<3.1	---	<3.1	<6.2	<6.2	---	<6.2
14 Pope Lick at Pope Lick Road	15	15	<3.1	---	<3.1	<6.2	<6.2	---	<6.2
15 Floyds Fork at former State Highway 155	15	15	<3.1	---	<3.1	<6.2	<6.2	---	<6.2
16 Chenoweth Run at Gelhaus Road	15	15	<3.1	---	<3.1	<6.2	<6.2	---	<6.3
17 Fern Cr at Old Bardstown Road	14	14	<3.1	---	<3.1	<3.1	<6.2	---	<6.2
18 Northern Ditch at Preston Highway	13	13	<3.1	---	<3.1	<6.2	<6.2	---	<6.2
19 Fishpool Cr at Bost Road	13	13	<3.1	---	<3.1	<6.2	<6.2	---	<6.2
20 Southern Ditch at Minors Lane	12	12	<3.1	---	<3.1	<6.2	<6.2	---	<6.2
21 Floyds Fork at Bardstown Road	14	14	<3.1	---	<3.1	<6.2	<6.2	---	<6.2
22 Cedar Cr at Thixton Road	14	14	<3.1	---	<3.1	<6.2	<6.2	---	<6.2
23 Pennsylvania Run at Mt. Washington Road	14	14	<3.1	---	<3.1	<3.1	<6.2	---	<6.2
24 Mill Cr Cutoff at Dover Road	12	12	<3.1	---	<3.1	<3.1	<6.2	---	<6.2
25 Harrods Cr at Hunting Cr Drive	13	13	<3.1	---	<3.1	<6.2	<6.2	---	<6.2
26 Long Run at State Highway 1531	10	10	<3.1	---	<3.1	<3.1	<6.2	---	<6.2
Endrin, total, in µg/L									
1 Pond Cr at Pendleton Road	12	10	<.02	---	<.04	<.08	<.18	---	<.39
2 Mill Cr at Orell Road	12	12	<.02	---	<.02	<.04	<.18	---	<.39
3 Pond Cr at Manslick Road	14	14	<.02	---	<.02	<.05	<.16	---	<.39
5 SF Beargrass Cr at Winter Avenue	13	13	<.02	---	<.02	<.03	<.08	---	<.39
6 SF Beargrass Cr at Trevilian Way	13	12	<.02	---	<.02	<.03	<.18	---	.50
7 MF Beargrass Cr at Old Cannons Lane	12	12	<.02	---	<.02	.04	<.08	---	<.39
8 MF Beargrass Cr at Beals Branch Road	13	13	<.02	---	<.02	<.04	<.04	---	<.39
9 Spring Ditch at Private Drive	14	13	<.02	---	<.02	<.05	<.08	---	.49
10 Muddy Fork at Mockingbird Valley Road	13	13	<.02	---	<.05	<.05	<.06	---	<.39
11 Goose Cr at U.S. Highway 42	11	9	<.01	---	<.02	<.05	<.18	---	.20
12 Little Goose Cr at U.S. Highway 42	13	12	<.02	---	<.05	<.05	<.18	---	.18
13 Goose Cr at Old Westport Road	12	11	<.02	---	<.02	<.05	<.39	---	.04
14 Pope Lick at Pope Lick Road	15	15	<.02	---	<.02	<.04	<.16	---	<.39
15 Floyds Fork at former State Highway 155	15	14	<.02	---	<.02	<.04	<.18	---	.11
16 Chenoweth Run at Gelhaus Road	15	15	<.02	---	<.02	<.04	<.16	---	<.39
17 Fern Cr at Old Bardstown Road	14	13	<.02	---	<.02	<.05	<.18	---	.22
18 Northern Ditch at Preston Highway	13	12	<.01	---	<.02	<.05	<.08	---	.09
19 Fishpool Cr at Bost Road	13	12	<.01	---	<.02	<.04	<.16	---	1.1
20 Southern Ditch at Minors Lane	12	10	<.02	---	<.04	<.06	<.39	---	.98
21 Floyds Fork at Bardstown Road	14	13	<.02	---	<.02	<.06	<.16	---	.30
22 Cedar Cr at Thixton Road	14	14	<.02	---	<.02	<.06	<.08	---	<.39
23 Pennsylvania Run at Mt. Washington Road	14	14	<.02	---	<.02	<.05	<.08	---	<.39
24 Mill Cr Cutoff at Dover Road	12	11	<.02	---	<.02	<.05	<.06	---	.05
25 Harrods Cr at Hunting Cr Drive	13	13	<.02	---	<.02	<.05	<.08	---	<.39
26 Long Run at State Highway 1531	10	10	<.02	---	<.02	<.05	<.05	---	<.08

Table 5. Statistical summary of constituent concentrations in selected streams of Jefferson County, Kentucky, 1988-92--Continued

[N, number of observations; Cr, Creek; SF, South Fork; MF, Middle Fork; mg/L, milligrams per liter; °C, degrees Celsius; µg/L, micrograms per liter; ---, missing; <, less than; *, value estimated from log-normal fit program; percentiles not computed if fewer than 10 observations; the 10th and 90th percentiles are not shown if fewer than 30 observations]

Site number and name	N	N of censored data values	Minimum	Value at indicated percentile 10	25	50 (median)	75	90	Maximum
Lindane, total, in µg/L									
1 Pond Cr at Pendleton Road	12	10	<0.01	---	<0.01	<0.03	<0.21	---	0.39
2 Mill Cr at Orell Road	12	12	<.01	---	<.02	<.02	<.21	---	<.62
3 Pond Cr at Manslick Road	11	8	<.01	---	<.01*	.01*	.03	---	.08
5 SF Beargrass Cr at Winter Avenue	10	8	<.01	---	<.02	<.02	<.04	---	.08
6 SF Beargrass Cr at Trevilian Way	13	12	<.01	---	<.02	<.04	<.21	---	.05
7 MF Beargrass Cr at Old Cannons Lane	10	8	<.01	---	<.02	<.02	<.07	---	.12
8 MF Beargrass Cr at Beals Branch Road	10	10	<.01	---	<.01	<.04	<.07	---	<.62
9 Spring Ditch at Private Drive	12	9	<.01	---	<.01*	.01*	.02*	---	.22
10 Muddy Fork at Mockingbird Valley Road	11	7	<.01	---	<.01*	.01*	.15	---	.58
11 Goose Cr at U.S. Highway 42	13	12	<.01	---	<.02	<.04	<.21	---	.01
12 Little Goose Cr at U.S. Highway 42	13	12	<.01	---	<.02	<.04	<.21	---	.02
13 Goose Cr at Old Westport Road	10	7	<.01	---	<.03	<.10	<.21	---	<.62
14 Pope Lick at Pope Lick Road	12	9	<.01	---	<.01*	.01*	.02*	---	.09
15 Floyds Fork at former State Highway 155	12	10	<.01	---	<.02	<.02	<.04	---	.13
16 Chenoweth Run at Gelhaus Road	13	9	<.01	---	<.01*	.01*	.02*	---	.21
17 Fern Cr at Old Bardstown Road	12	10	<.01	---	<.02	<.04	<.21	---	.61
18 Northern Ditch at Preston Highway	11	8	<.01	---	<.01*	.01*	.03*	---	.13
19 Fishpool Cr at Bost Road	10	8	<.01	---	<.02	<.02	<.03	---	.04
20 Southern Ditch at Minors Lane	10	9	<.01	---	<.01	<.04	<.62	---	<.62
21 Floyds Fork at Bardstown Road	12	8	<.01	---	<.01*	.01*	.03*	---	.22
22 Cedar Cr at Thixton Road	12	8	<.01	---	<.01*	.01*	.05*	---	.36
23 Pennsylvania Run at Mt. Washington Road	12	8	<.01	---	<.01*	.01*	.03*	---	.49
24 Mill Cr Cutoff at Dover Road	11	9	<.01	---	<.02	<.04	<.08	---	.30
25 Harrods Cr at Hunting Cr Drive	13	12	<.01	---	<.02	<.04	<.21	---	.04
26 Long Run at State Highway 1531	10	8	<.01	---	<.02	<.04	<.09	---	.11
Methoxychlor, total, in µg/L									
1 Pond Cr at Pendleton Road	14	13	<.05	---	<.08	<.13	<.51	---	.12
2 Mill Cr at Orell Road	12	12	<.05	---	<.08	<.16	<.51	---	<1.3
3 Pond Cr at Manslick Road	14	14	<.05	---	<.08	<.10	<.40	---	<1.3
5 SF Beargrass Cr at Winter Avenue	13	13	<.05	---	<.08	<.08	<.18	---	<1.3
6 SF Beargrass Cr at Trevilian Way	11	9	<.05	---	<.08	<.10	<.51	---	.74
7 MF Beargrass Cr at Old Cannons Lane	9	8	<.08	---	---	---	---	---	<1.3
8 MF Beargrass Cr at Beals Branch Road	13	12	<.08	---	<.08	<.10	<.20	---	.10
9 Spring Ditch at Private Drive	14	14	<.06	---	<.08	<.14	<.18	---	<1.3
10 Muddy Fork at Mockingbird Valley Road	13	12	<.06	---	<.08	<.10	<.18	---	.10
11 Goose Cr at U.S. Highway 42	13	12	<.05	---	<.08	<.10	<.51	---	.22
12 Little Goose Cr at U.S. Highway 42	13	11	<.07	---	<.08	<.25	<.51	---	<1.3
13 Goose Cr at Old Westport Road	12	12	<.05	---	<.08	<.13	<.51	---	<1.3
14 Pope Lick at Pope Lick Road	15	15	<.06	---	<.08	<.10	<.41	---	<1.3
15 Floyds Fork at former State Highway 155	15	14	<.08	---	<.08	<.14	<.51	---	.26
16 Chenoweth Run at Gelhaus Road	15	15	<.08	---	<.08	<.10	<.41	---	<3.1
17 Fern Cr at Old Bardstown Road	14	13	<.07	---	<.08	<.17	<.51	---	.37
18 Northern Ditch at Preston Highway	13	13	<.05	---	<.08	<.10	<.18	---	<1.3
19 Fishpool Cr at Bost Road	13	11	<.05	---	<.08	<.10	<1.3	---	2.1
20 Southern Ditch at Minors Lane	10	7	<.08	---	<.09	<.11	<.17	---	<1.3
21 Floyds Fork at Bardstown Road	14	13	<.05	---	<.08	<.17	<.41	---	.12
22 Cedar Cr at Thixton Road	14	13	<.05	---	<.08	<.17	<.41	---	.24
23 Pennsylvania Run at Mt. Washington Road	14	14	<.05	---	<.08	<.10	<.18	---	<1.3
24 Mill Cr Cutoff at Dover Road	12	11	<.05	---	<.08	<.14	<.20	---	2.6
25 Harrods Cr at Hunting Cr Drive	13	12	<.06	---	<.08	<.13	<.51	---	.08
26 Long Run at State Highway 1531	10	10	<.08	---	<.08	<.08	<.16	---	<.20
Toxaphene, total, in µg/L									
1 Pond Cr at Pendleton Road	14	13	<6.3	---	<12	<12	<13	---	12
2 Mill Cr at Orell Road	12	12	<6.3	---	<6.3	<12	<13	---	<13
3 Pond Cr at Manslick Road	14	13	<6.3	---	<12	<12	<13	---	12
5 SF Beargrass Cr at Winter Avenue	13	13	<6.3	---	<12	<12	<13	---	<13
6 SF Beargrass Cr at Trevilian Way	13	13	<6.3	---	<12	<12	<13	---	<13
7 MF Beargrass Cr at Old Cannons Lane	12	11	<6.3	---	<6.3	<12	<13	---	12
8 MF Beargrass Cr at Beals Branch Road	13	12	<6.3	---	<12	<13	<13	---	12
9 Spring Ditch at Private Drive	14	14	<6.3	---	<12	<12	<13	---	<13
10 Muddy Fork at Mockingbird Valley Road	14	14	<6.3	---	<6.3	<12	<13	---	<13
11 Goose Cr at U.S. Highway 42	13	13	<6.3	---	<12	<12	<13	---	<13
12 Little Goose Cr at U.S. Highway 42	13	13	<6.3	---	<12	<12	<13	---	<13
13 Goose Cr at Old Westport Road	12	12	<6.3	---	<12	<12	<13	---	<13
14 Pope Lick at Pope Lick Road	15	15	<6.3	---	<12	<12	<13	---	<13
15 Floyds Fork at former State Highway 155	15	15	<6.3	---	<12	<12	<13	---	<13
16 Chenoweth Run at Gelhaus Road	15	15	<6.3	---	<12	<12	<13	---	<13
17 Fern Cr at Old Bardstown Road	14	14	<6.3	---	<12	<12	<13	---	<13
18 Northern Ditch at Preston Highway	13	13	<6.3	---	<12	<12	<13	---	<13
19 Fishpool Cr at Bost Road	13	13	<6.3	---	<12	<12	<13	---	<13
20 Southern Ditch at Minors Lane	12	12	<6.3	---	<12	<12	<13	---	<13
21 Floyds Fork at Bardstown Road	14	14	<6.3	---	<12	<12	<13	---	<13
22 Cedar Cr at Thixton Road	14	14	<6.3	---	<12	<12	<13	---	<13

Table 5. Statistical summary of constituent concentrations in selected streams of Jefferson County, Kentucky, 1988-92--Continued

[N, number of observations; Cr, Creek; SF, South Fork; MF, Middle Fork; mg/L, milligrams per liter; °C, degrees Celsius; µg/L, micrograms per liter; ---, missing; <, less than; *, value estimated from log-normal fit program; percentiles not computed if fewer than 10 observations; the 10th and 90th percentiles are not shown if fewer than 30 observations]

Site number and name	N	N of censored data values	Minimum	Value at indicated percentile 10	25	50 (median)	75	90	Maximum
Toxaphene, total, in µg/L									
23 Pennsylvania Run at Mt. Washington Road	14	14	<6.3	---	<6.3	<12	<13	---	<13
24 Mill Cr Cutoff at Dover Road	12	12	<6.3	---	<6.3	<12	<13	---	<13
25 Harrods Cr at Hunting Cr Drive	13	12	<6.3	---	<12	<12	<13	---	12
26 Long Run at State Highway 1531	10	10	<6.3	---	<6.3	<12	<13	---	<13
2,4-D, total, in µg/L									
1 Pond Cr at Pendleton Road	18	9	<.03	---	.04*	.11*	.32*	---	1.0
2 Mill Cr at Orell Road	15	7	<.01	---	.01*	.04*	.43	---	.92
3 Pond Cr at Manslick Road	18	9	<.01	---	.01*	.06*	.44	---	.95
5 SF Beargrass Cr at Winter Avenue	16	7	<.01	---	.02*	.13*	1.1	---	5.0
6 SF Beargrass Cr at Trevilian Way	16	6	<.01	---	.03*	.11*	.46	---	3.5
7 MF Beargrass Cr at Old Cannons Lane	15	8	<.01	---	.01*	.04*	.48	---	1.8
8 MF Beargrass Cr at Beals Branch Road	16	8	<.01	---	.01*	.06*	.71	---	1.3
9 Spring Ditch at Private Drive	17	13	<.01	---	<.01*	.01*	.04*	---	.52
10 Muddy Fork at Mockingbird Valley Road	16	12	<.01	---	<.01*	<.01*	.06*	---	1.6
11 Goose Cr at U.S. Highway 42	16	10	<.03	---	.01*	.04*	.10*	---	.37
12 Little Goose Cr at U.S. Highway 42	16	12	<.01	---	<.01*	.01*	.05*	---	.74
13 Goose Cr at Old Westport Road	15	13	<.02	---	<.04	<.15	<.35	---	.65
14 Pope Lick at Pope Lick Road	18	11	<.01	---	.01*	.03*	.12*	---	.89
15 Floyds Fork at former State Highway 155	16	11	<.01	---	<.01*	.02*	.06*	---	.27
16 Chenoweth Run at Gelhaus Road	18	14	<.01	---	<.01*	<.01*	.03*	---	1.6
17 Fern Cr at Old Bardstown Road	17	13	<.01	---	<.01*	.01*	.04*	---	.93
18 Northern Ditch at Preston Highway	16	10	<.01	---	<.01*	.02*	.18*	---	3.6
19 Fishpool Cr at Bost Road	16	8	<.01	---	.01*	.05*	.25*	---	8.8
20 Southern Ditch at Minors Lane	16	8	<.03	---	.01*	.06*	.30*	---	12
21 Floyds Fork at Bardstown Road	17	9	<.01	---	.01*	.05*	.20*	---	.94
22 Cedar Cr at Thixton Road	17	10	<.01	---	.01*	.04*	.23*	---	1.6
23 Pennsylvania Run at Mt. Washington Road	17	9	<.01	---	.01*	.04*	.17*	---	1.8
24 Mill Cr Cutoff at Dover Road	15	8	<.01	---	.01*	.04*	.30*	---	3.4
25 Harrods Cr at Hunting Cr Drive	16	12	<.01	---	<.01*	.01*	.05*	---	.58
26 Long Run at State Highway 1531	12	9	<.01	---	<.01*	<.01*	.03*	---	.56
Silvex, total, in µg/L									
1 Pond Cr at Pendleton Road	18	16	<.01	---	<.01	<.05	<.10	---	.58
2 Mill Cr at Orell Road	15	14	<.01	---	<.01	<.01	<.05	---	.23
3 Pond Cr at Manslick Road	18	17	<.01	---	<.01	<.01	<.05	---	.25
5 SF Beargrass Cr at Winter Avenue	16	15	<.01	---	<.01	<.01	<.05	---	.08
6 SF Beargrass Cr at Trevilian Way	16	15	<.01	---	<.01	<.01	<.05	---	.11
7 MF Beargrass Cr at Old Cannons Lane	15	14	<.01	---	<.01	<.01	<.10	---	.02
8 MF Beargrass Cr at Beals Branch Road	16	15	<.01	---	<.01	<.01	<.05	---	.07
9 Spring Ditch at Private Drive	15	12	<.01	---	<.01*	<.01*	.01*	---	.13
10 Muddy Fork at Mockingbird Valley Road	16	15	<.01	---	<.01	<.01	<.06	---	.03
11 Goose Cr at U.S. Highway 42	16	16	<.01	---	<.01	<.01	<.05	---	<.43
12 Little Goose Cr at U.S. Highway 42	16	15	<.01	---	<.01	<.01	<.05	---	.12
13 Goose Cr at Old Westport Road	15	15	<.01	---	<.01	<.01	<.05	---	<.43
14 Pope Lick at Pope Lick Road	18	17	<.01	---	<.01	<.05	<.10	---	.07
15 Floyds Fork at former State Highway 155	11	9	<.01	---	<.01	<.01	<.01	---	.03
16 Chenoweth Run at Gelhaus Road	16	14	<.01	---	<.01	<.01	<.05	---	.30
17 Fern Cr at Old Bardstown Road	17	17	<.01	---	<.01	<.01	<.05	---	<.43
18 Northern Ditch at Preston Highway	16	16	<.01	---	<.01	<.01	<.05	---	<.43
19 Fishpool Cr at Bost Road	11	9	<.01	---	<.01	<.01	<.04	---	.05
20 Southern Ditch at Minors Lane	10	9	<.01	---	<.05	<.05	<.43	---	<.43
21 Floyds Fork at Bardstown Road	17	16	<.01	---	<.01	<.01	<.05	---	.41
22 Cedar Cr at Thixton Road	15	13	<.01	---	<.01	<.05	<.05	---	.26
23 Pennsylvania Run at Mt. Washington Road	17	16	<.01	---	<.01	<.05	<.10	---	.02
24 Mill Cr Cutoff at Dover Road	15	14	<.01	---	<.01	<.01	<.05	---	.04
25 Harrods Cr at Hunting Cr Drive	16	15	<.01	---	<.01	<.01	<.05	---	.01
26 Long Run at State Highway 1531	12	11	<.01	---	<.01	<.01	<.05	---	.02

Table 6. Mean annual total streamflow and mean annual base flow in selected streams of Jefferson County, Kentucky, 1988-92

[ft^3/s, cubic feet per second]

Site number and name	Total streamflow, (ft^3/s)	Base flow (ft^3/s)	Base flow Percent
1 Pond Creek at Pendleton Road	96.2	39.9	41.5
2 Mill Creek at Orell Road	10.5	3.00	28.6
3 Pond Creek at Manslick Road	99.7	31.9	32.0
5 South Fork Beargrass Creek at Winter Avenue	33.5	11.0	32.9
6 South Fork Beargrass Creek at Trevilian Way	24.0	9.30	38.7
7 Middle Fork Beargrass Creek at Old Cannons Lane	24.1	9.53	39.6
8 Middle Fork Beargrass Creek at Beals Branch Road	29.1	9.71	33.4
9 Spring Ditch at Private Drive below Hanses Road	4.26	2.04	47.9
10 Muddy Fork at Mockingbird Valley Road	8.80	3.85	43.8
11 Goose Creek at U.S. Highway 42	12.7	8.08	63.4
12 Little Goose Creek at U.S. Highway 42	9.97	5.70	57.2
13 Goose Creek at Old Westport Road	9.87	6.38	64.6
14 Pope Lick at Pope Lick Road	4.34	1.96	45.2
15 Floyds Fork at former State Highway 155	213	56.8	26.7
16 Chenoweth Run at Gelhaus Road	23.6	7.81	33.1
17 Fern Creek at Old Bardstown Road	6.78	3.18	46.9
18 Northern Ditch at Preston Highway	20.6	10.9	52.9
19 Fishpool Creek at Bost Road	8.24	2.82	34.2
20 Southern Ditch at Minors Lane	15.3	4.79	31.3
21 Floyds Fork at Bardstown Road	372	89.3	24.0
22 Cedar Creek at Thixton Road	16.8	6.98	41.5
23 Pennsylvania Run at Mt. Washington Road	9.15	3.88	42.4
24 Mill Creek Cutoff at Dover Road	17.4	1.67	9.6
25 Harrods Creek at Hunting Creek Drive	131	59.5	45.4
26 Long Run at State Highway 1531	40.0	8.25	20.6

Table 7. Standard errors of the regressions used for computation of 1988-92 mean annual constituent yields in watersheds of Jefferson County, Kentucky, and uncertainty measures of the estimates

[Cr, Creek; SF, South Fork; MF, Middle Fork; °C, degrees Celsius; ---, unknown]

Site number and name	Total mean annual yield estimates				Mean annual base-flow yield estimates			
	Number of observations	Standard error of regression, in percent	Flow duration of greatest sampled discharge, in percent	Percentage estimated beyond range of sampled discharge	Number of observations	Standard error of regression, in percent	Flow duration of greatest sampled discharge, in percent	Percentage estimated beyond range of sampled discharge
Dissolved oxygen								
1 Pond Cr at Pendleton Road	93	15.7	0.5	9.7	65	15.4	3.7	22.8
2 Mill Cr at Orell Road	87	16.7	.9	16.7	63	15.7	7.6	54.7
3 Pond Cr at Manslick Road	95	20.5	1.8	26.0	55	16.6	2.6	22.3
5 SF Beargrass Cr at Winter Avenue	95	27.2	.3	8.9	72	28.9	.4	4.4
6 SF Beargrass Cr at Trevilian Way	94	13.5	.5	10.1	61	12.1	8.2	31.4
7 MF Beargrass Cr at Old Cannons Lane	95	26.3	1.3	23.0	64	24.5	.8	6.2
8 MF Beargrass Cr at Beals Branch Road	95	26.3	1.2	27.2	70	24.0	.6	6.0
9 Spring Ditch at Private Drive	94	30.9	0	0	70	28.3	.1	.7
10 Muddy Fork at Mockingbird Valley Road	95	15.7	1.0	18.2	74	16.0	2.5	13.3
11 Goose Cr at U.S. Highway 42	95	10.6	.6	6.9	68	11.2	.1	.3
12 Little Goose Cr at U.S. Highway 42	96	11.8	.2	4.1	74	12.4	.3	1.5
13 Goose Cr at Old Westport Road	95	20.9	0	0	69	23.3	.6	2.5
14 Pope Lick at Pope Lick Road	96	16.5	.3	6.8	63	17.8	2.4	13.4
15 Floyds Fork at former State Highway 155	95	19.9	0	0	37	18.8	3.3	18.0
16 Chenoweth Run at Gelhaus Road	94	17.7	0	0	69	17.7	3.8	21.6
17 Fern Cr at Old Bardstown Road	95	14.2	0	0	65	12.1	3.2	13.6
18 Northern Ditch at Preston Highway	96	21.2	.1	1.7	71	19.4	.4	2.0
19 Fishpool Cr at Bost Road	96	27.3	0	0	63	28.9	.3	3.5
20 Southern Ditch at Minors Lane	96	26.6	0	0	59	23.4	.5	4.4
21 Floyds Fork at Bardstown Road	95	17.8	1.3	30.1	54	17.9	9.4	41.9
22 Cedar Cr at Thixton Road	96	15.5	.5	9.1	64	14.1	5.9	35.1
23 Pennsylvania Run at Mt. Washington Road	96	16.0	.8	15.1	63	16.9	1.7	15.1
24 Mill Cr Cutoff at Dover Road	84	27.4	.2	9.9	50	20.0	7.0	36.4
25 Harrods Cr at Hunting Cr Drive	91	19.0	1.2	18.8	55	21.8	1.3	8.1
26 Long Run at State Highway 1531	71	14.3	0	0	34	13.0	2.7	23.7
Chemical oxygen demand, 0.25N dicromate								
1 Pond Cr at Pendleton Road	89	55.0	.5	13.3	61	57.2	3.7	13.5
2 Mill Cr at Orell Road	84	56.2	.9	22.2	60	57.3	7.6	54.0
3 Pond Cr at Manslick Road	89	54.0	1.8	36.0	50	50.5	2.6	12.5
5 SF Beargrass Cr at Winter Avenue	88	73.2	.3	12.3	67	66.1	.4	2.5
6 SF Beargrass Cr at Trevilian Way	89	73.5	.5	21.1	---	---	---	---
7 MF Beargrass Cr at Old Cannons Lane	89	66.5	1.3	26.3	---	---	---	---
8 MF Beargrass Cr at Beals Branch Road	90	69.8	1.2	25.2	66	62.7	.6	3.2
9 Spring Ditch at Private Drive	90	65.9	0	0	65	71.6	.1	1.5
10 Muddy Fork at Mockingbird Valley Road	89	67.2	1.0	24.9	69	63.1	2.5	7.8
11 Goose Cr at U.S. Highway 42	88	71.9	.6	9.1	63	68.8	.1	.2
12 Little Goose Cr at U.S. Highway 42	89	76.5	.2	5.0	68	75.9	.3	1.6
13 Goose Cr at Old Westport Road	87	62.6	0	0	64	59.8	.6	1.5
14 Pope Lick at Pope Lick Road	92	56.1	.3	11.3	59	59.2	2.4	9.3
15 Floyds Fork at former State Highway 155	89	63.1	0	0	34	51.3	3.3	13.7
16 Chenoweth Run at Gelhaus Road	89	60.7	0	0	64	57.2	3.8	16.1
17 Fern Cr at Old Bardstown Road	89	70.4	0	0	61	61.5	3.2	9.8
18 Northern Ditch at Preston Highway	91	65.3	.1	2.5	67	66.2	.4	1.0
19 Fishpool Cr at Bost Road	89	57.4	0	0	58	60.6	.3	2.1
20 Southern Ditch at Minors Lane	90	63.3	0	0	53	58.3	.7	3.2
21 Floyds Fork at Bardstown Road	90	63.9	1.3	29.0	50	65.7	9.4	33.9
22 Cedar Cr at Thixton Road	91	62.6	.5	15.1	60	61.2	5.9	23.7
23 Pennsylvania Run at Mt. Washington Road	92	55.8	.8	14.6	60	51.5	1.7	18.6
24 Mill Cr Cutoff at Dover Road	76	49.1	.2	12.3	45	37.5	7.0	42.2
25 Harrods Cr at Hunting Cr Drive	89	63.8	1.2	19.1	52	56.2	1.3	3.6
26 Long Run at State Highway 1531	63	62.8	0	0	30	58.4	2.7	22.1

Table 7. Standard errors of the regressions used for computation of 1988-92 mean annual constituent yields in watersheds of Jefferson County, Kentucky, and uncertainty measures of the estimates--Continued

[Cr, Creek; SF, South Fork; MF, Middle Fork; °C, degrees Celsius; ---, unknown]

Site number and name	Total mean annual yield estimates				Mean annual base-flow yield estimates			
	Number of observations	Standard error of regression, in percent	Flow duration of greatest sampled discharge, in percent	Percentage estimated beyond range of sampled discharge	Number of observations	Standard error of regression, in percent	Flow duration of greatest sampled discharge, in percent	Percentage estimated beyond range of sampled discharge
Biochemical oxygen demand, 5-day at 20°C								
1 Pond Cr at Pendleton Road	89	74.4	0.5	16.3	61	74.7	3.7	17.2
2 Mill Cr at Orell Road	85	61.7	.9	18.6	60	60.1	7.6	39.6
3 Pond Cr at Manslick Road	90	65.5	1.8	34.0	51	62.3	2.6	23.9
5 SF Beargrass Cr at Winter Avenue	91	72.2	.3	18.9	69	74.9	.4	4.4
6 SF Beargrass Cr at Trevilian Way	91	78.7	.5	25.7	59	73.5	8.2	22.5
7 MF Beargrass Cr at Old Cannons Lane	91	62.9	1.3	20.7	61	57.4	.8	2.9
8 MF Beargrass Cr at Beals Branch Road	92	67.3	1.2	21.9	68	62.0	.6	2.7
9 Spring Ditch at Private Drive	91	65.4	0	0	66	68.4	.1	1.1
10 Muddy Fork at Mockingbird Valley Road	90	65.1	1.0	19.7	70	63.7	2.5	8.4
11 Goose Cr at U.S. Highway 42	90	71.3	.6	10.7	64	74.0	.1	.2
12 Little Goose Cr at U.S. Highway 42	91	74.5	.2	4.1	70	77.1	.3	1.2
13 Goose Cr at Old Westport Road	90	75.6	0	0	66	73.3	.6	1.6
14 Pope Lick at Pope Lick Road	92	58.5	.3	9.6	59	57.9	2.4	10.5
15 Floyds Fork at former State Highway 155	91	66.1	0	0	35	56.3	3.3	12.5
16 Chenoweth Run at Gelhaus Road	90	69.7	0	0	65	60.6	3.8	16.9
17 Fern Cr at Old Bardstown Road	91	70.3	0	0	62	68.4	3.2	13.8
18 Northern Ditch at Preston Highway	92	72.0	.1	2.3	68	75.7	.4	1.6
19 Fishpool Cr at Bost Road	91	66.6	0	0	59	62.4	.3	1.8
20 Southern Ditch at Minors Lane	91	51.2	0	0	54	48.6	.7	5.1
21 Floyds Fork at Bardstown Road	90	60.8	1.3	24.7	50	65.5	9.4	33.4
22 Cedar Cr at Thixton Road	92	74.0	.5	15.2	61	76.7	5.9	24.6
23 Pennsylvania Run at Mt. Washington Road	92	63.2	.8	17.2	60	59.7	1.7	24.3
24 Mill Cr Cutoff at Dover Road	79	64.8	.2	15.2	47	74.5	7.0	29.8
25 Harrods Cr at Hunting Cr Drive	89	68.6	1.2	19.9	52	74.2	1.3	7.0
26 Long Run at State Highway 1531	65	74.3	0	0	30	70.3	2.7	17.7
Calcium, total as Ca								
1 Pond Cr at Pendleton Road	17	13.5	10.1	51.0	15	14.6	5.9	23.9
2 Mill Cr at Orell Road	15	39.7	.9	8.9	14	41.0	10.6	43.7
3 Pond Cr at Manslick Road	18	10.6	19.4	71.7	13	11.8	2.6	19.4
5 SF Beargrass Cr at Winter Avenue	16	30.0	1.2	17.7	14	22.2	4.4	27.1
6 SF Beargrass Cr at Trevilian Way	16	18.4	1.5	18.2	12	10.7	8.2	31.3
7 MF Beargrass Cr at Old Cannons Lane	16	20.2	1.3	17.8	---	---	---	---
8 MF Beargrass Cr at Beals Branch Road	16	16.2	1.6	23.3	---	---	---	---
9 Spring Ditch at Private Drive	16	19.5	6.7	31.5	13	15.7	3.7	13.4
10 Muddy Fork at Mockingbird Valley Road	17	20.1	3.0	27.7	12	8.8	11.0	47.0
11 Goose Cr at U.S. Highway 42	16	11.7	8.0	36.0	14	11.8	19.6	47.5
12 Little Goose Cr at U.S. Highway 42	16	11.8	6.7	35.2	13	12.9	.3	1.3
13 Goose Cr at Old Westport Road	16	15.1	10.0	39.3	14	13.7	8.2	23.1
14 Pope Lick at Pope Lick Road	18	12.3	12.9	60.8	15	9.4	8.7	32.0
15 Floyds Fork at former State Highway 155	18	13.8	3.0	40.6	10	10.1	11.9	43.2
16 Chenoweth Run at Gelhaus Road	18	19.2	11.9	68.8	16	20.2	5.9	28.1
17 Fern Cr at Old Bardstown Road	17	21.1	0	0	12	8.1	4.5	17.2
18 Northern Ditch at Preston Highway	16	6.8	8.3	38.3	12	7.7	.4	1.8
19 Fishpool Cr at Bost Road	16	33.6	12.3	70.6	---	---	---	---
20 Southern Ditch at Minors Lane	16	16.7	18.0	78.7	---	---	---	---
21 Floyds Fork at Bardstown Road	17	24.6	7.3	64.6	10	17.9	25.8	69.7
22 Cedar Cr at Thixton Road	17	36.9	8.5	54.7	12	28.7	5.9	39.2
23 Pennsylvania Run at Mt. Washington Road	17	24.5	12.4	60.9	13	28.8	1.7	16.4
24 Mill Cr Cutoff at Dover Road	15	21.5	8.2	65.8	---	---	---	---
25 Harrods Cr at Hunting Cr Drive	16	101	3.6	40.2	10	10.1	8.6	30.6
26 Long Run at State Highway 1531	12	27.5	3.9	50.3	---	---	---	---

Table 7. Standard errors of the regressions used for computation of 1988-92 mean annual constituent yields in watersheds of Jefferson County, Kentucky, and uncertainty measures of the estimates--Continued

[Cr, Creek; SF, South Fork; MF, Middle Fork; °C, degrees Celsius; ---, unknown]

Site number and name	Total mean annual yield estimates				Mean annual base-flow yield estimates			
	Number of observations	Standard error of regression, in percent	Flow duration of greatest sampled discharge, in percent	Percentage estimated beyond range of sampled discharge	Number of observations	Standard error of regression, in percent	Flow duration of greatest sampled discharge, in percent	Percentage estimated beyond range of sampled discharge
Magnesium, total as Mg								
1 Pond Cr at Pendleton Road	17	15.1	10.1	50.8	15	15.9	5.9	23.7
2 Mill Cr at Orell Road	15	48.4	.9	7.6	14	49.5	10.6	42.5
3 Pond Cr at Manslick Road	18	8.9	19.4	71.4	13	9.8	2.6	19.7
5 SF Beargrass Cr at Winter Avenue	16	34.7	1.2	25.4	14	20.4	4.4	27.3
6 SF Beargrass Cr at Trevilian Way	16	23.8	1.5	17.7	12	7.9	8.2	30.4
7 MF Beargrass Cr at Old Cannons Lane	16	19.7	1.3	18.6	---	---	---	---
8 MF Beargrass Cr at Beals Branch Road	16	16.8	1.6	23.8	---	---	---	---
9 Spring Ditch at Private Drive	16	24.4	6.7	33.4	13	16.3	3.7	14.4
10 Muddy Fork at Mockingbird Valley Road	17	20.9	3.0	23.4	12	14.4	11.0	40.5
11 Goose Cr at U.S. Highway 42	16	12.1	8.0	33.3	14	12.3	19.6	49.2
12 Little Goose Cr at U.S. Highway 42	16	11.5	6.7	35.6	13	12.5	.3	1.3
13 Goose Cr at Old Westport Road	16	15.1	10.0	37.7	14	12.4	8.2	23.7
14 Pope Lick at Pope Lick Road	18	12.1	12.9	63.4	15	9.8	8.7	34.5
15 Floyds Fork at former State Highway 155	18	18.8	3.0	36.6	10	12.7	11.9	39.8
16 Chenoweth Run at Gelhaus Road	17	16.7	11.9	74.8	15	15.9	5.9	32.4
17 Fern Cr at Old Bardstown Road	17	23.1	0	0	12	10.2	4.5	17.7
18 Northern Ditch at Preston Highway	16	13.5	8.3	42.3	12	12.7	.4	2.0
19 Fishpool Cr at Bost Road	16	47.3	12.3	72.9	---	---	---	---
20 Southern Ditch at Minors Lane	16	21.6	18.0	79.3	---	---	---	---
21 Floyds Fork at Bardstown Road	17	24.5	7.3	58.9	10	15.4	25.8	74.5
22 Cedar Cr at Thixton Road	17	41.0	8.5	57.6	12	36.1	5.9	44.4
23 Pennsylvania Run at Mt. Washington Road	17	19.7	12.4	64.4	13	21.6	1.7	18.0
24 Mill Cr Cutoff at Dover Road	15	29.6	8.2	65.7	---	---	---	---
25 Harrods Cr at Hunting Cr Drive	16	12.9	3.6	26.4	10	10.6	8.6	27.9
26 Long Run at State Highway 1531	12	26.6	3.9	53.5	---	---	---	---
Alkalinity, titration to 4.5, as $CaCO_3$								
1 Pond Cr at Pendleton Road	91	26.5	.5	8.9	63	25.3	3.7	20.2
2 Mill Cr at Orell Road	86	49.8	.9	11.0	61	42.8	7.6	60.6
3 Pond Cr at Manslick Road	91	17.3	1.8	21.5	52	16.2	2.6	23.8
5 SF Beargrass Cr at Winter Avenue	90	27.6	.3	8.0	68	22.1	.4	4.4
6 SF Beargrass Cr at Trevilian Way	90	30.9	.5	11.2	58	20.4	8.2	40.6
7 MF Beargrass Cr at Old Cannons Lane	91	22.8	1.3	19.7	61	18.5	.8	5.8
8 MF Beargrass Cr at Beals Branch Road	92	22.0	1.2	20.2	68	14.1	.6	5.1
9 Spring Ditch at Private Drive	91	28.1	0	0	66	29.7	.1	.4
10 Muddy Fork at Mockingbird Valley Road	90	23.9	1.0	17.3	70	21.7	2.5	14.2
11 Goose Cr at U.S. Highway 42	91	17.6	.6	5.4	65	14.8	.1	.3
12 Little Goose Cr at U.S. Highway 42	91	18.8	.2	2.7	70	13.1	.3	1.4
13 Goose Cr at Old Westport Road	90	24.4	0	0	66	19.9	.6	2.5
14 Pope Lick at Pope Lick Road	92	53.2	.3	6.8	59	15.1	2.4	12.9
15 Floyds Fork at former State Highway 155	91	25.5	0	0	35	28.0	3.3	15.8
16 Chenoweth Run at Gelhaus Road	90	49.6	0	0	65	17.2	3.8	24.6
17 Fern Cr at Old Bardstown Road	90	32.1	0	0	62	27.7	3.2	18.0
18 Northern Ditch at Preston Highway	92	18.5	.1	1.6	68	13.5	.4	2.1
19 Fishpool Cr at Bost Road	91	34.8	0	0	59	16.6	.3	3.2
20 Southern Ditch at Minors Lane	91	25.5	0	0	54	18.4	.7	5.8
21 Floyds Fork at Bardstown Road	90	42.6	1.3	26.0	50	40.3	9.4	43.4
22 Cedar Cr at Thixton Road	92	38.6	.5	9.5	61	39.7	5.9	40.0
23 Pennsylvania Run at Mt. Washington Road	92	21.2	.8	13.7	60	22.0	1.7	17.6
24 Mill Cr Cutoff at Dover Road	78	35.2	.2	10.9	46	27.3	7.2	36.1
25 Harrods Cr at Hunting Cr Drive	89	19.0	1.2	15.0	52	14.7	1.3	6.8
26 Long Run at State Highway 1531	65	19.8	0	0	30	16.5	2.7	25.0

Table 7. Standard errors of the regressions used for computation of 1988-92 mean annual constituent yields in watersheds of Jefferson County, Kentucky, and uncertainty measures of the estimates--Continued

[Cr, Creek; SF, South Fork; MF, Middle Fork; °C, degrees Celsius; ---, unknown]

Site number and name	Total mean annual yield estimates				Mean annual base-flow yield estimates			
	Number of observations	Standard error of regression, in percent	Flow duration of greatest sampled discharge, in percent	Percentage estimated beyond range of sampled discharge	Number of observations	Standard error of regression, in percent	Flow duration of greatest sampled discharge, in percent	Percentage estimated beyond range of sampled discharge
Dissolved solids, residue at 105°C								
1 Pond Cr at Pendleton Road	91	27.7	0.5	8.3	63	22.4	3.7	16.0
2 Mill Cr at Orell Road	86	43.0	.9	12.5	61	47.4	7.6	48.0
3 Pond Cr at Manslick Road	91	20.1	1.8	20.6	52	20.7	2.6	16.4
5 SF Beargrass Cr at Winter Avenue	91	38.5	.3	9.2	69	35.6	.4	3.1
6 SF Beargrass Cr at Trevilian Way	91	24.3	.5	10.0	59	13.2	8.2	31.7
7 MF Beargrass Cr at Old Cannons Lane	91	19.7	1.3	19.7	61	16.2	.8	5.4
8 MF Beargrass Cr at Beals Branch Road	91	24.5	1.2	20.4	68	18.2	.6	4.9
9 Spring Ditch at Private Drive	91	17.6	0	0	66	15.2	.1	.5
10 Muddy Fork at Mockingbird Valley Road	90	15.3	1.0	16.3	70	14.4	2.5	12.7
11 Goose Cr at U.S. Highway 42	91	15.0	.6	5.1	65	11.6	.1	.2
12 Little Goose Cr at U.S. Highway 42	91	20.5	.2	2.8	70	11.1	.3	1.2
13 Goose Cr at Old Westport Road	90	30.1	0	0	66	32.6	.6	1.9
14 Pope Lick at Pope Lick Road	91	22.5	.3	6.3	58	13.1	2.4	9.6
15 Floyds Fork at former State Highway 155	91	23.3	0	0	35	13.0	3.3	15.8
16 Chenoweth Run at Gelhaus Road	89	26.4	0	0	65	10.3	3.8	17.0
17 Fern Cr at Old Bardstown Road	90	20.9	0	0	61	12.4	3.2	11.2
18 Northern Ditch at Preston Highway	91	22.7	.1	1.1	67	23.8	.4	1.3
19 Fishpool Cr at Bost Road	90	20.4	0	0	59	18.5	.3	2.9
20 Southern Ditch at Minors Lane	88	17.4	0	0	53	12.6	.7	5.4
21 Floyds Fork at Bardstown Road	90	27.1	1.3	24.9	50	14.9	9.4	36.4
22 Cedar Cr at Thixton Road	91	29.1	.5	7.9	60	24.3	5.9	25.2
23 Pennsylvania Run at Mt. Washington Road	92	33.2	.8	12.7	60	32.0	1.7	17.4
24 Mill Cr Cutoff at Dover Road	79	37.6	.2	10.1	47	20.6	7.0	39.5
25 Harrods Cr at Hunting Cr Drive	89	19.1	1.2	13.7	52	14.0	1.3	4.9
26 Long Run at State Highway 1531	64	20.8	0	0	30	14.6	2.7	24.1
Suspended solids, residue at 105°C								
1 Pond Cr at Pendleton Road	91	84.4	.5	43.4	63	78.1	3.7	29.4
2 Mill Cr at Orell Road	86	100	.9	34.0	61	73.7	7.6	27.3
3 Pond Cr at Manslick Road	91	73.1	1.8	56.4	52	53.1	2.6	21.4
5 SF Beargrass Cr at Winter Avenue	90	86.2	.3	40.0	68	78.9	.4	3.8
6 SF Beargrass Cr at Trevilian Way	91	98.0	.5	48.3	59	71.8	8.2	29.7
7 MF Beargrass Cr at Old Cannons Lane	91	88.6	1.3	43.0	61	72.1	.8	4.1
8 MF Beargrass Cr at Beals Branch Road	91	105	1.2	35.7	68	91.3	.6	3.7
9 Spring Ditch at Private Drive	91	90.5	0	0	66	93.8	.1	.9
10 Muddy Fork at Mockingbird Valley Road	90	99.2	1.0	33.1	70	93.2	2.5	11.1
11 Goose Cr at U.S. Highway 42	91	92.7	.6	19.7	65	70.7	.1	.3
12 Little Goose Cr at U.S. Highway 42	91	98.1	.2	7.2	70	82.7	.3	1.5
13 Goose Cr at Old Westport Road	90	109	0	0	66	98.6	.6	2.0
14 Pope Lick at Pope Lick Road	92	101	.3	31.7	59	86.3	2.4	13.0
15 Floyds Fork at former State Highway 155	91	107	0	0	35	85.3	3.3	12.1
16 Chenoweth Run at Gelhaus Road	89	88.4	0	0	65	84.5	3.8	23.3
17 Fern Cr at Old Bardstown Road	90	100	0	0	61	81.6	3.2	17.4
18 Northern Ditch at Preston Highway	92	92.3	.1	6.4	68	79.6	.4	1.8
19 Fishpool Cr at Bost Road	91	104	0	0	59	89.7	.3	2.8
20 Southern Ditch at Minors Lane	90	97.2	0	0	53	73.0	.7	6.7
21 Floyds Fork at Bardstown Road	90	90.6	1.3	51.1	50	71.6	9.4	40.4
22 Cedar Cr at Thixton Road	91	106	.5	22.8	60	88.5	5.9	14.1
23 Pennsylvania Run at Mt. Washington Road	92	102	.8	14.8	60	105	1.7	8.0
24 Mill Cr Cutoff at Dover Road	79	90.8	.2	20.0	47	74.3	7.0	42.7
25 Harrods Cr at Hunting Cr Drive	89	93.7	1.2	23.2	52	72.6	1.3	3.0
26 Long Run at State Highway 1531	65	98.3	0	0	30	90.7	2.7	21.9

Table 7. Standard errors of the regressions used for computation of 1988-92 mean annual constituent yields in watersheds of Jefferson County, Kentucky, and uncertainty measures of the estimates--Continued

[Cr, Creek; SF, South Fork; MF, Middle Fork; °C, degrees Celsius; ---, unknown]

Site number and name	Total mean annual yield estimates				Mean annual base-flow yield estimates			
	Number of observations	Standard error of regression, in percent	Flow duration of greatest sampled discharge, in percent	Percentage estimated beyond range of sampled discharge	Number of observations	Standard error of regression, in percent	Flow duration of greatest sampled discharge, in percent	Percentage estimated beyond range of sampled discharge
Residue, volatile, nonfilterable								
1 Pond Cr at Pendleton Road	91	106	0.5	31.0	63	83.8	3.7	13.5
2 Mill Cr at Orell Road	86	132	.9	31.4	61	134	7.6	47.7
3 Pond Cr at Manslick Road	91	116	1.8	52.0	52	103	2.6	11.5
5 SF Beargrass Cr at Winter Avenue	90	126	.3	36.4	68	127	.4	3.9
6 SF Beargrass Cr at Trevilian Way	91	105	.5	48.7	59	99.7	8.2	32.8
7 MF Beargrass Cr at Old Cannons Lane	91	109	1.3	38.7	61	109	.8	5.0
8 MF Beargrass Cr at Beals Branch Road	91	103	1.2	32.3	68	93.7	.6	3.1
9 Spring Ditch at Private Drive	91	101	0	0	66	94.8	.1	.5
10 Muddy Fork at Mockingbird Valley Road	90	106	1.0	26.7	70	99.1	2.5	9.9
11 Goose Cr at U.S. Highway 42	91	125	.6	13.9	65	127	.1	.2
12 Little Goose Cr at U.S. Highway 42	91	118	.2	6.6	70	125	.3	1.3
13 Goose Cr at Old Westport Road	90	130	0	0	66	129	.6	1.9
14 Pope Lick at Pope Lick Road	92	108	.3	16.5	59	100	2.4	9.5
15 Floyds Fork at former State Highway 155	59	147	0	0	35	106	3.3	12.5
16 Chenoweth Run at Gelhaus Road	89	169	0	0	65	167	3.8	14.3
17 Fern Cr at Old Bardstown Road	90	115	0	0	61	100	3.2	16.6
18 Northern Ditch at Preston Highway	92	121	.1	3.8	68	117	.4	1.7
19 Fishpool Cr at Bost Road	91	127	0	0	59	128	.3	3.0
20 Southern Ditch at Minors Lane	90	132	0	0	53	109	.7	4.8
21 Floyds Fork at Bardstown Road	90	101	1.3	47.8	50	101	9.4	46.6
22 Cedar Cr at Thixton Road	91	120	.5	14.5	60	130	5.9	28.9
23 Pennsylvania Run at Mt. Washington Road	92	112	.8	13.3	60	124	1.7	12.3
24 Mill Cr Cutoff at Dover Road	79	104	.2	19.0	47	91.4	7.0	34.9
25 Harrods Cr at Hunting Cr Drive	---	---	---	---	52	125	1.3	3.9
26 Long Run at State Highway 1531	65	109	0	0	30	96.0	2.7	18.1
Suspended solids, nonvolatile								
1 Pond Cr at Pendleton Road	20	141	10.1	77.0	16	123	12.0	44.2
2 Mill Cr at Orell Road	21	120	.9	29.9	16	60.8	9.8	69.1
3 Pond Cr at Manslick Road	21	115	7.1	88.0	14	78.3	2.6	24.4
5 SF Beargrass Cr at Winter Avenue	20	277	1.2	52.7	15	316	.4	4.0
7 MF Beargrass Cr at Old Cannons Lane	20	69.5	3.1	68.9	13	66.6	.8	8.2
8 MF Beargrass Cr at Beals Branch Road	21	114	3.0	52.0	16	54.9	.6	5.1
9 Spring Ditch at Private Drive	20	65.8	6.1	49.5	15	52.8	.1	.5
10 Muddy Fork at Mockingbird Valley Road	19	94.5	3.0	82.2	13	101	4.3	20.3
11 Goose Cr at U.S. Highway 42	20	100	3.1	26.4	13	79.3	.9	2.1
12 Little Goose Cr at U.S. Highway 42	20	102	6.7	57.7	15	81.8	.3	1.4
13 Goose Cr at Old Westport Road	20	104	5.1	38.8	13	88.4	2.0	1.7
14 Pope Lick at Pope Lick Road	20	235	1.5	71.2	13	287	19.2	90.4
15 Floyds Fork at former State Highway 155	20	121	4.3	75.0	---	---	---	---
16 Chenoweth Run at Gelhaus Road	19	245	21.7	21.4	15	274	7.6	5.5
17 Fern Cr at Old Bardstown Road	20	102	5.1	80.6	15	76.1	3.4	16.0
18 Northern Ditch at Preston Highway	21	90.0	9.3	58.3	14	51.8	19.6	27.9
19 Fishpool Cr at Bost Road	19	69.7	3.9	72.9	12	52.8	13.0	64.6
20 Southern Ditch at Minors Lane	20	108	.4	23.2	12	63.7	10.0	31.7
21 Floyds Fork at Bardstown Road	19	291	4.1	83.1	10	48.2	9.4	44.3
23 Pennsylvania Run at Mt. Washington Road	20	96.8	2.2	29.9	13	82.8	1.7	10.8
24 Mill Cr Cutoff at Dover Road	19	78.1	.2	33.9	14	60.4	20.4	87.5
25 Harrods Cr at Hunting Cr Drive	---	---	---	---	11	74.4	8.1	23.9
26 Long Run at State Highway 1531	14	92.1	5.6	80.4	---	---	---	---

Table 7. Standard errors of the regressions used for computation of 1988-92 mean annual constituent yields in watersheds of Jefferson County, Kentucky, and uncertainty measures of the estimates--Continued

[Cr, Creek; SF, South Fork; MF, Middle Fork; °C, degrees Celsius; ---, unknown]

Site number and name	Total mean annual yield estimates				Mean annual base-flow yield estimates			
	Number of observations	Standard error of regression, in percent	Flow duration of greatest sampled discharge, in percent	Percentage estimated beyond range of sampled discharge	Number of observations	Standard error of regression, in percent	Flow duration of greatest sampled discharge, in percent	Percentage estimated beyond range of sampled discharge
Nitrogen, nitrate, total as N								
1 Pond Cr at Pendleton Road	91	85.8	0.5	10.1	63	82.8	3.7	19.1
2 Mill Cr at Orell Road	85	112	.9	23.5	61	110	7.6	38.5
3 Pond Cr at Manslick Road	91	85.9	1.8	22.2	52	92.8	2.6	13.4
5 SF Beargrass Cr at Winter Avenue	89	88.4	.3	7.6	68	75.3	.4	7.2
6 SF Beargrass Cr at Trevilian Way	89	86.6	.5	11.6	58	86.1	8.2	35.7
7 MF Beargrass Cr at Old Cannons Lane	90	99.8	1.3	21.1	61	88.4	.8	6.2
8 MF Beargrass Cr at Beals Branch Road	91	93.0	1.2	22.8	68	82.1	.6	6.1
9 Spring Ditch at Private Drive	91	89.9	0	0	66	95.8	.1	.7
10 Muddy Fork at Mockingbird Valley Road	89	92.4	1.0	7.7	70	89.3	2.5	6.0
11 Goose Cr at U.S. Highway 42	90	45.7	.6	6.1	64	50.7	.1	.3
12 Little Goose Cr at U.S. Highway 42	89	46.7	.2	3.6	68	48.5	.3	1.5
13 Goose Cr at Old Westport Road	89	63.9	0	0	65	66.2	.6	2.5
14 Pope Lick at Pope Lick Road	92	83.0	.3	3.6	59	91.0	2.4	6.5
15 Floyds Fork at former State Highway 155	90	93.1	0	0	35	113	3.3	13.8
16 Chenoweth Run at Gelhaus Road	89	73.1	0	0	64	79.2	3.8	10.7
17 Fern Cr at Old Bardstown Road	90	91.4	0	0	61	87.9	3.2	10.2
18 Northern Ditch at Preston Highway	92	110	.1	.8	68	111	.4	.8
19 Fishpool Cr at Bost Road	91	91.9	0	0	59	104	.3	2.3
20 Southern Ditch at Minors Lane	91	95.0	0	0	54	97.8	.7	6.2
21 Floyds Fork at Bardstown Road	90	111	1.3	29.9	50	65.1	9.4	36.6
22 Cedar Cr at Thixton Road	92	77.6	.5	6.1	61	63.0	5.9	18.9
23 Pennsylvania Run at Mt. Washington Road	92	86.4	.8	7.0	60	84.1	1.7	11.2
24 Mill Cr Cutoff at Dover Road	77	82.6	.2	9.3	46	90.0	7.0	37.0
25 Harrods Cr at Hunting Cr Drive	88	55.4	1.2	18.8	51	49.2	1.3	8.8
26 Long Run at State Highway 1531	65	106	0	0	30	118	2.7	22.8
Nitrogen, nitrite, total as N								
1 Pond Cr at Pendleton Road	91	75.5	.5	19.5	63	71.5	3.7	26.6
3 Pond Cr at Manslick Road	91	66.1	1.8	36.3	52	57.4	2.6	20.3
5 SF Beargrass Cr at Winter Avenue	90	64.5	.3	14.9	69	58.1	.4	2.1
6 SF Beargrass Cr at Trevilian Way	90	65.0	.5	27.8	59	48.7	8.2	20.0
7 MF Beargrass Cr at Old Cannons Lane	90	80.0	1.3	24.6	61	78.4	.8	2.8
8 MF Beargrass Cr at Beals Branch Road	91	81.6	1.2	20.8	68	62.4	.6	2.4
9 Spring Ditch at Private Drive	91	75.2	0	0	66	57.6	.1	.5
10 Muddy Fork at Mockingbird Valley Road	90	76.1	1.0	19.0	70	73.5	2.5	11.8
11 Goose Cr at U.S. Highway 42	91	91.3	.6	13.5	65	74.9	.1	.4
12 Little Goose Cr at U.S. Highway 42	91	84.4	.2	7.2	70	83.1	.3	1.5
13 Goose Cr at Old Westport Road	90	104	0	0	66	110	.6	3.0
14 Pope Lick at Pope Lick Road	92	79.6	.3	8.4	59	82.7	2.4	8.3
15 Floyds Fork at former State Highway 155	91	74.4	0	0	35	80.5	3.3	14.8
16 Chenoweth Run at Gelhaus Road	90	117	0	0	65	117	3.8	14.5
17 Fern Cr at Old Bardstown Road	91	101	0	0	62	89.1	3.2	12.0
18 Northern Ditch at Preston Highway	92	61.5	.1	1.4	68	56.7	.4	.8
19 Fishpool Cr at Bost Road	91	97.8	0	0	59	111	.3	2.1
20 Southern Ditch at Minors Lane	91	72.4	0	0	54	70.6	.7	5.0
21 Floyds Fork at Bardstown Road	90	79.6	1.3	41.0	50	66.5	9.4	38.1
22 Cedar Cr at Thixton Road	92	81.1	.5	14.8	61	79.9	5.9	19.4
23 Pennsylvania Run at Mt. Washington Road	92	87.3	.8	18.7	60	81.9	1.7	16.9
24 Mill Cr Cutoff at Dover Road	79	100	.2	11.8	47	104	7.0	53.9
25 Harrods Cr at Hunting Cr Drive	89	97.4	1.2	24.5	52	98.7	1.3	7.0
26 Long Run at State Highway 1531	67	66.5	0	0	---	---	---	---

Table 7. Standard errors of the regressions used for computation of 1988-92 mean annual constituent yields in watersheds of Jefferson County, Kentucky, and uncertainty measures of the estimates--Continued

[Cr, Creek; SF, South Fork; MF, Middle Fork; °C, degrees Celsius; ---, unknown]

Site number and name	Total mean annual yield estimates				Mean annual base-flow yield estimates			
	Number of observations	Standard error of regression, in percent	Flow duration of greatest sampled discharge, in percent	Percentage estimated beyond range of sampled discharge	Number of observations	Standard error of regression, in percent	Flow duration of greatest sampled discharge, in percent	Percentage estimated beyond range of sampled discharge
Nitrogen, ammonia, total as N								
1 Pond Cr at Pendleton Road	89	176	0.5	8.1	61	173	3.7	22.4
2 Mill Cr at Orell Road	84	159	.9	16.1	59	149	7.6	9.4
3 Pond Cr at Manslick Road	89	196	1.8	35.9	51	198	2.6	44.0
5 SF Beargrass Cr at Winter Avenue	89	187	.3	16.4	67	193	.4	4.8
6 SF Beargrass Cr at Trevilian Way	89	191	.5	9.2	58	184	8.2	9.8
7 MF Beargrass Cr at Old Cannons Lane	89	167	1.3	19.4	59	156	.8	2.9
8 MF Beargrass Cr at Beals Branch Road	90	170	1.2	13.4	66	165	.6	1.6
9 Spring Ditch at Private Drive	88	196	0	0	65	197	.1	.7
10 Muddy Fork at Mockingbird Valley Road	89	172	1.0	15.8	69	158	2.5	4.5
11 Goose Cr at U.S. Highway 42	91	184	.6	8.4	65	178	.1	.3
12 Little Goose Cr at U.S. Highway 42	90	163	.6	8.0	70	161	.3	1.5
14 Pope Lick at Pope Lick Road	92	191	.3	1.8	59	167	2.4	1.9
17 Fern Cr at Old Bardstown Road	89	186	0	0	60	190	3.2	16.2
18 Northern Ditch at Preston Highway	89	212	.1	.8	68	215	.4	.6
19 Fishpool Cr at Bost Road	88	185	.2	6.3	59	177	.3	2.3
20 Southern Ditch at Minors Lane	88	186	.4	15.3	54	185	.7	6.9
21 Floyds Fork at Bardstown Road	90	169	1.3	17.0	50	173	9.4	30.0
22 Cedar Cr at Thixton Road	91	185	.5	11.1	60	179	5.9	10.4
23 Pennsylvania Run at Mt. Washington Road	90	190	.8	13.6	58	177	1.7	9.8
24 Mill Cr Cutoff at Dover Road	78	176	.2	16.5	46	160	7.0	64.7
Nitrogen, organic, dissolved as N								
1 Pond Cr at Pendleton Road	90	132	.5	12.2	62	121	3.7	23.0
2 Mill Cr at Orell Road	86	136	.9	16.1	61	124	7.6	28.6
3 Pond Cr at Manslick Road	90	128	1.8	22.8	51	111	2.6	15.7
5 SF Beargrass Cr at Winter Avenue	91	135	.3	16.2	69	140	.4	3.1
6 SF Beargrass Cr at Trevilian Way	91	132	.5	16.8	59	130	8.2	24.7
7 MF Beargrass Cr at Old Cannons Lane	91	141	1.3	21.1	61	132	.8	4.0
8 MF Beargrass Cr at Beals Branch Road	92	142	1.2	19.8	68	128	.6	2.4
9 Spring Ditch at Private Drive	90	139	0	0	66	152	.1	1.1
10 Muddy Fork at Mockingbird Valley Road	90	137	1.0	14.6	70	137	2.5	7.4
11 Goose Cr at U.S. Highway 42	90	142	.6	9.1	65	145	.1	.3
12 Little Goose Cr at U.S. Highway 42	89	145	.2	2.6	69	141	.3	.9
13 Goose Cr at Old Westport Road	90	155	0	0	66	154	.6	2.3
14 Pope Lick at Pope Lick Road	92	119	.3	10.8	59	132	2.4	12.6
15 Floyds Fork at former State Highway 155	90	113	0	0	35	105	3.3	16.9
16 Chenoweth Run at Gelhaus Road	90	151	0	0	65	151	3.8	21.0
17 Fern Cr at Old Bardstown Road	91	129	0	0	62	119	3.2	5.6
18 Northern Ditch at Preston Highway	91	148	.1	3.0	68	154	.4	2.1
19 Fishpool Cr at Bost Road	89	134	.2	5.4	59	140	.3	2.4
20 Southern Ditch at Minors Lane	90	140	.4	13.8	54	149	.7	5.8
21 Floyds Fork at Bardstown Road	89	129	1.3	28.3	49	127	9.4	33.3
22 Cedar Cr at Thixton Road	92	117	.5	13.3	61	120	5.9	32.0
23 Pennsylvania Run at Mt. Washington Road	91	142	.8	18.7	60	141	1.7	20.5
24 Mill Cr Cutoff at Dover Road	79	133	.2	13.9	47	143	7.0	49.2
25 Harrods Cr at Hunting Cr Drive	89	124	1.2	25.2	52	123	1.3	9.6
26 Long Run at State Highway 1531	65	111	0	0	30	116	2.7	18.1

Table 7. Standard errors of the regressions used for computation of 1988-92 mean annual constituent yields in watersheds of Jefferson County, Kentucky, and uncertainty measures of the estimates--Continued

[Cr, Creek; SF, South Fork; MF, Middle Fork; °C, degrees Celsius; ---, unknown]

Site number and name	Total mean annual yield estimates				Mean annual base-flow yield estimates			
	Number of observations	Standard error of regression, in percent	Flow duration of greatest sampled discharge, in percent	Percentage estimated beyond range of sampled discharge	Number of observations	Standard error of regression, in percent	Flow duration of greatest sampled discharge, in percent	Percentage estimated beyond range of sampled discharge
Phosphate, total as PO_4								
1 Pond Cr at Pendleton Road	91	57.4	0.5	7.7	63	47.7	3.7	12.2
2 Mill Cr at Orell Road	84	76.4	.9	27.7	59	78.4	7.6	59.4
3 Pond Cr at Manslick Road	91	54.7	1.8	19.3	52	50.1	2.6	9.2
5 SF Beargrass Cr at Winter Avenue	90	84.7	.3	21.5	68	86.7	.4	5.2
6 SF Beargrass Cr at Trevilian Way	89	89.6	.5	33.5	57	79.2	8.2	36.3
7 MF Beargrass Cr at Old Cannons Lane	85	93.2	1.3	33.9	56	104	3.8	15.6
8 MF Beargrass Cr at Beals Branch Road	87	75.0	1.2	24.3	64	72.7	3.8	13.4
9 Spring Ditch at Private Drive	88	69.7	0	0	63	74.7	.1	.3
10 Muddy Fork at Mockingbird Valley Road	89	54.8	1.0	4.5	69	52.0	2.5	2.9
11 Goose Cr at U.S. Highway 42	90	53.4	.6	3.2	65	47.1	.1	.1
12 Little Goose Cr at U.S. Highway 42	91	59.4	.2	1.5	70	55.5	.3	.6
13 Goose Cr at Old Westport Road	89	70.2	0	0	65	70.0	.6	1.0
14 Pope Lick at Pope Lick Road	91	67.3	.3	3.3	58	59.1	2.4	4.2
15 Floyds Fork at former State Highway 155	90	76.1	0	0	35	77.3	3.3	14.3
16 Chenoweth Run at Gelhaus Road	87	61.1	0	0	62	44.4	3.8	8.5
17 Fern Cr at Old Bardstown Road	90	71.9	0	0	61	70.8	3.2	6.7
18 Northern Ditch at Preston Highway	89	64.2	.1	.6	67	66.7	.4	.7
19 Fishpool Cr at Bost Road	89	68.4	0	0	57	68.5	.3	1.6
20 Southern Ditch at Minors Lane	90	70.4	0	0	53	57.8	.7	3.5
21 Floyds Fork at Bardstown Road	89	68.5	1.3	19.2	49	55.6	9.4	20.6
22 Cedar Cr at Thixton Road	91	63.5	.5	4.6	60	62.4	5.9	19.1
23 Pennsylvania Run at Mt. Washington Road	91	68.9	.8	5.1	59	68.2	1.7	14.7
24 Mill Cr Cutoff at Dover Road	78	99.4	.2	12.1	46	109	7.0	61.0
25 Harrods Cr at Hunting Cr Drive	88	83.7	1.2	16.5	51	76.4	1.3	2.8
26 Long Run at State Highway 1531	64	94.1	0	0	30	83.2	2.7	35.1
Phosphorus, total as P								
1 Pond Cr at Pendleton Road	88	65.4	0.5	8.2	61	52.0	3.7	9.4
2 Mill Cr at Orell Road	83	85.8	.9	29.4	60	85.2	7.6	60.6
3 Pond Cr at Manslick Road	86	60.3	1.8	19.2	49	50.9	2.6	7.9
5 SF Beargrass Cr at Winter Avenue	89	81.8	.3	24.2	68	84.6	.4	5.1
6 SF Beargrass Cr at Trevilian Way	87	78.7	.5	35.8	56	67.7	8.2	28.9
7 MF Beargrass Cr at Old Cannons Lane	88	82.4	1.3	37.4	59	89.6	.8	5.3
8 MF Beargrass Cr at Beals Branch Road	89	85.1	1.2	26.2	65	85.4	.6	3.1
9 Spring Ditch at Private Drive	86	60.5	0	0	61	62.5	.1	.5
10 Muddy Fork at Mockingbird Valley Road	88	63.3	1.0	6.0	68	64.7	2.5	4.2
11 Goose Cr at U.S. Highway 42	88	63.7	.6	4.0	63	51.8	.1	.1
12 Little Goose Cr at U.S. Highway 42	88	73.1	.6	4.7	68	75.9	.3	.6
13 Goose Cr at Old Westport Road	89	70.1	0	0	65	68.1	.6	1.0
14 Pope Lick at Pope Lick Road	88	73.3	.3	5.4	56	68.1	2.4	3.9
15 Floyds Fork at former State Highway 155	86	63.7	0	0	32	68.2	3.3	18.5
16 Chenoweth Run at Gelhaus Road	86	73.2	8.6	29.4	63	64.4	3.8	8.3
17 Fern Cr at Old Bardstown Road	89	72.3	0	0	60	70.4	3.2	6.9
18 Northern Ditch at Preston Highway	89	69.0	.1	.5	65	69.1	.4	1.1
19 Fishpool Cr at Bost Road	87	68.1	0	0	55	66.7	.3	1.8
20 Southern Ditch at Minors Lane	89	66.1	0	0	52	63.7	.7	3.4
21 Floyds Fork at Bardstown Road	86	76.0	1.3	21.6	46	57.5	9.4	21.0
22 Cedar Cr at Thixton Road	89	63.5	.5	4.1	58	60.8	5.9	17.7
23 Pennsylvania Run at Mt. Washington Road	90	72.5	.8	5.8	58	76.0	1.7	12.2
24 Mill Cr Cutoff at Dover Road	78	91.9	.2	9.5	47	92.6	7.0	57.9
25 Harrods Cr at Hunting Cr Drive	87	86.9	1.2	18.0	51	71.6	1.3	3.3
26 Long Run at State Highway 1531	65	94.4	0	0	30	86.6	2.7	28.0

Table 7. Standard errors of the regressions used for computation of 1988-92 mean annual constituent yields in watersheds of Jefferson County, Kentucky, and uncertainty measures of the estimates--Continued

[Cr, Creek; SF, South Fork; MF, Middle Fork; °C, degrees Celsius; ---, unknown]

Site number and name	Total mean annual yield estimates				Mean annual base-flow yield estimates			
	Number of observations	Standard error of regression, in percent	Flow duration of greatest sampled discharge, in percent	Percentage estimated beyond range of sampled discharge	Number of observations	Standard error of regression, in percent	Flow duration of greatest sampled discharge, in percent	Percentage estimated beyond range of sampled discharge
Phosphorus, orthophosphate, total as P								
1 Pond Cr at Pendleton Road	91	57.4	0.5	7.7	63	47.7	3.7	12.2
2 Mill Cr at Orell Road	85	81.8	.9	28.9	60	85.6	7.6	59.4
3 Pond Cr at Manslick Road	91	54.7	1.8	19.3	52	50.1	2.6	9.2
5 SF Beargrass Cr at Winter Avenue	90	84.7	.3	21.5	68	86.8	.4	5.2
6 SF Beargrass Cr at Trevilian Way	90	92.1	.5	35.1	58	83.9	8.2	35.4
7 MF Beargrass Cr at Old Cannons Lane	89	104	1.3	34.7	60	117	.8	4.2
8 MF Beargrass Cr at Beals Branch Road	90	85.7	1.2	23.0	67	82.6	.6	2.3
9 Spring Ditch at Private Drive	90	93.1	0	0	65	103	.1	.3
10 Muddy Fork at Mockingbird Valley Road	89	54.8	1.0	4.5	69	52.0	2.5	2.9
11 Goose Cr at U.S. Highway 42	90	53.4	.6	3.2	65	47.1	.1	.1
12 Little Goose Cr at U.S. Highway 42	91	59.4	.2	1.5	70	55.5	.3	.6
13 Goose Cr at Old Westport Road	89	70.2	0	0	65	70.0	.6	1.0
14 Pope Lick at Pope Lick Road	91	67.3	.3	3.3	58	59.1	2.4	4.2
15 Floyds Fork at former State Highway 155	90	76.2	0	0	35	77.3	3.3	14.3
16 Chenoweth Run at Gelhaus Road	87	61.1	0	0	62	44.4	3.8	8.5
17 Fern Cr at Old Bardstown Road	90	71.9	0	0	61	70.8	3.2	6.7
18 Northern Ditch at Preston Highway	90	82.0	.1	.3	67	66.7	.4	.7
19 Fishpool Cr at Bost Road	90	83.8	0	0	58	92.3	.3	1.4
20 Southern Ditch at Minors Lane	91	84.0	0	0	54	84.3	.7	2.8
21 Floyds Fork at Bardstown Road	89	68.5	1.3	19.2	49	55.6	9.4	20.6
22 Cedar Cr at Thixton Road	91	63.5	.5	4.6	60	62.4	5.9	19.1
23 Pennsylvania Run at Mt. Washington Road	91	69.0	.8	5.1	59	68.2	1.7	14.7
24 Mill Cr Cutoff at Dover Road	78	99.3	.2	12.1	46	109	7.0	61.0
25 Harrods Cr at Hunting Cr Drive	88	83.7	1.2	16.5	51	76.4	1.3	2.8
26 Long Run at State Highway 1531	65	100	0	0	30	83.3	2.7	35.1
Barium, total as Ba								
1 Pond Cr at Pendleton Road	18	31.8	10.1	60.6	15	34.2	5.9	25.8
2 Mill Cr at Orell Road	15	35.9	.9	16.0	14	37.1	10.6	54.0
3 Pond Cr at Manslick Road	16	17.8	19.4	74.9	13	20.7	2.6	21.8
5 SF Beargrass Cr at Winter Avenue	16	23.1	1.2	27.4	14	19.1	4.4	20.2
6 SF Beargrass Cr at Trevilian Way	16	15.4	1.5	24.2	12	12.8	8.2	27.7
7 MF Beargrass Cr at Old Cannons Lane	16	13.7	1.3	22.2	---	---	---	---
8 MF Beargrass Cr at Beals Branch Road	16	16.5	1.6	28.6	---	---	---	---
9 Spring Ditch at Private Drive	16	15.4	6.7	37.0	13	13.8	3.7	13.4
10 Muddy Fork at Mockingbird Valley Road	17	20.2	3.0	33.3	12	14.9	11.0	38.7
11 Goose Cr at U.S. Highway 42	16	24.9	8.0	34.0	14	26.8	19.6	46.8
12 Little Goose Cr at U.S. Highway 42	16	30.5	6.7	41.6	13	27.4	.3	1.3
13 Goose Cr at Old Westport Road	16	30.9	10.0	34.1	14	33.5	8.2	19.9
14 Pope Lick at Pope Lick Road	18	89.1	12.9	50.8	15	33.1	8.7	29.4
15 Floyds Fork at former State Highway 155	18	36.0	3.0	44.0	10	44.0	11.9	35.9
16 Chenoweth Run at Gelhaus Road	18	44.9	11.9	68.6	16	35.3	5.9	32.7
17 Fern Cr at Old Bardstown Road	17	34.5	0	0	12	9.8	4.5	17.6
18 Northern Ditch at Preston Highway	16	17.7	8.3	49.4	12	15.9	.4	2.2
19 Fishpool Cr at Bost Road	16	46.4	12.3	75.0	---	---	---	---
20 Southern Ditch at Minors Lane	16	15.9	18.0	77.7	---	---	---	---
21 Floyds Fork at Bardstown Road	17	14.7	7.3	68.7	10	13.4	25.8	64.5
22 Cedar Cr at Thixton Road	17	23.5	8.5	58.6	12	26.8	5.9	35.3
23 Pennsylvania Run at Mt. Washington Road	17	17.6	12.4	58.5	13	19.5	1.7	12.6
24 Mill Cr Cutoff at Dover Road	15	15.7	8.2	83.9	---	---	---	---
25 Harrods Cr at Hunting Cr Drive	16	62.1	3.6	25.8	10	29.7	8.6	11.4
26 Long Run at State Highway 1531	12	42.0	3.9	43.8	---	---	---	---

Table 7. Standard errors of the regressions used for computation of 1988-92 mean annual constituent yields in watersheds of Jefferson County, Kentucky, and uncertainty measures of the estimates--Continued

[Cr, Creek; SF, South Fork; MF, Middle Fork; °C, degrees Celsius; ---, unknown]

Site number and name	Total mean annual yield estimates				Mean annual base-flow yield estimates			
	Number of observations	Standard error of regression, in percent	Flow duration of greatest sampled discharge, in percent	Percentage estimated beyond range of sampled discharge	Number of observations	Standard error of regression, in percent	Flow duration of greatest sampled discharge, in percant	Percentage estimated beyond range of sampled discharge
Chromium, total as Cr								
1 Pond Cr at Pendleton Road	18	118	10.1	62.3	15	128	5.9	14.8
3 Pond Cr at Manslick Road	18	110	19.4	57.1	13	131	2.6	2.2
9 Spring Ditch at Private Drive	16	78.9	6.7	63.8	13	79.0	3.7	18.8
Copper, total recoverable as Cu								
1 Pond Cr at Pendleton Road	18	87.1	10.1	64.1	15	96.5	5.9	12.7
3 Pond Cr at Manslick Road	18	115	19.4	81.4	13	94.9	2.6	26.0
5 SF Beargrass Cr at Winter Avenue	16	93.6	1.2	35.3	14	100	4.4	24.4
8 MF Beargrass Cr at Beals Branch Road	16	94.6	1.6	43.4	---	---	---	---
9 Spring Ditch at Private Drive	16	84.1	6.7	36.1	13	79.8	3.7	9.8
11 Goose Cr at U.S. Highway 42	16	107	8.0	34.4	14	116	19.6	44.1
13 Goose Cr at Old Westport Road	16	98.1	10.0	26.1	14	80.7	8.2	8.5
14 Pope Lick at Pope Lick Road	18	84.4	12.9	44.2	15	61.9	8.7	27.0
15 Floyds Fork at former State Highway 155	18	87.7	3.0	51.1	10	91.5	11.9	32.4
16 Chenoweth Run at Gelhaus Road	18	112	11.9	64.5	---	---	---	---
17 Fern Cr at Old Bardstown Road	17	115	0	0	12	94.4	4.5	11.5
18 Northern Ditch at Preston Highway	16	67.3	8.3	21.9	12	42.0	.4	.7
20 Southern Ditch at Minors Lane	16	114	18.0	66.3	---	---	---	---
21 Floyds Fork at Bardstown Road	17	80.0	7.3	57.9	---	---	---	---
22 Cedar Cr at Thixton Road	17	92.2	8.5	48.8	12	79.6	5.9	13.7
23 Pennsylvania Run at Mt. Washington Road	17	104	12.4	55.1	13	94.3	1.7	9.8
24 Mill Cr Cutoff at Dover Road	15	101	8.2	64.6	---	---	---	---
26 Long Run at State Highway 1531	12	72.6	3.9	68.6	---	---	---	---
Iron, total as Fe								
2 Mill Cr at Orell Road	15	111	.9	33.2	14	116	10.6	60.5
3 Pond Cr at Manslick Road	18	63.8	19.4	85.4	13	81.6	2.6	26.3
5 SF Beargrass Cr at Winter Avenue	16	79.5	1.2	74.8	14	72.3	4.4	8.5
6 SF Beargrass Cr at Trevilian Way	16	205	1.5	34.4	12	156	8.2	9.0
7 MF Beargrass Cr at Old Cannons Lane	16	139	1.3	45.5	---	---	---	---
8 MF Beargrass Cr at Beals Branch Road	16	155	1.6	46.9	---	---	---	---
9 Spring Ditch at Private Drive	16	140	6.7	60.8	13	129	3.7	13.6
10 Muddy Fork at Mockingbird Valley Road	17	105	3.0	85.2	12	106	11.0	37.9
11 Goose Cr at U.S. Highway 42	16	168	8.0	48.5	14	178	19.6	49.3
12 Little Goose Cr at U.S. Highway 42	16	101	6.7	60.0	13	78.2	.3	1.1
13 Goose Cr at Old Westport Road	16	173	10.0	38.6	14	182	8.2	19.9
15 Floyds Fork at former State Highway 155	18	140	3.0	62.4	10	222	11.9	37.6
16 Chenoweth Run at Gelhaus Road	18	150	11.9	35.3	16	149	5.9	6.0
17 Fern Cr at Old Bardstown Road	17	164	0	0	12	171	4.5	2.7
18 Northern Ditch at Preston Highway	16	67.2	8.3	82.5	12	53.7	.4	2.9
19 Fishpool Cr at Bost Road	16	117	12.3	73.1	---	---	---	---
20 Southern Ditch at Minors Lane	16	51.9	18.0	70.4	---	---	---	---
21 Floyds Fork at Bardstown Road	17	160	7.3	84.6	10	155	25.8	20.3
22 Cedar Cr at Thixton Road	17	135	8.5	51.2	12	154	5.9	15.2
23 Pennsylvania Run at Mt. Washington Road	17	166	12.4	34.9	13	184	1.7	4.4
24 Mill Cr Cutoff at Dover Road	15	66.4	8.2	93.9	---	---	---	---
25 Harrods Cr at Hunting Cr Drive	16	153	3.6	71.0	10	188	8.6	12.7
26 Long Run at State Highway 1531	12	109	3.9	56.2	---	---	---	---

Table 7. Standard errors of the regressions used for computation of 1988-92 mean annual constituent yields in watersheds of Jefferson County, Kentucky, and uncertainty measures of the estimates--Continued

[Cr, Creek; SF, South Fork; MF, Middle Fork; °C, degrees Celsius; ---, unknown]

Site number and name	Total mean annual yield estimates				Mean annual base-flow yield estimates			
	Number of observations	Standard error of regression, in percent	Flow duration of greatest sampled discharge, in percent	Percentage estimated beyond range of sampled discharge	Number of observations	Standard error of regression, in percent	Flow duration of greatest sampled discharge, in percent	Percentage estimated beyond range of sampled discharge
Mercury, total recoverable as Hg								
6 SF Beargrass Cr at Trevilian Way	---	---	---	---	12	130	8.2	40.3
21 Floyds Fork at Bardstown Road	17	99.1	7.3	84.5	---	---	---	---
22 Cedar Cr at Thixton Road	17	110	8.5	60.9	12	69.7	5.9	18.2
23 Pennsylvania Run at Mt. Washington Road	17	84.9	12.4	46.3	13	90.8	1.7	11.0
Nickel, total as Ni								
6 SF Beargrass Cr at Trevilian Way	15	30.6	1.5	25.7	---	---	---	---
9 Spring Ditch at Private Drive	16	74.1	6.7	46.5	13	78.1	3.7	12.7
Zinc, total as Zn								
1 Pond Cr at Pendleton Road	18	169	10.1	10.4	15	142	5.9	2.3
2 Mill Cr at Orell Road	15	131	.9	17.7	14	131	10.6	43.2
3 Pond Cr at Manslick Road	18	144	19.4	61.3	13	154	2.6	3.4
5 SF Beargrass Cr at Winter Avenue	16	96.1	1.2	67.3	14	97.2	4.4	13.9
6 SF Beargrass Cr at Trevilian Way	16	143	1.5	51.5	12	132	8.2	3.6
7 MF Beargrass Cr at Old Cannons Lane	16	92.1	1.3	32.4	---	---	---	---
8 MF Beargrass Cr at Beals Branch Road	16	73.2	1.6	42.2	---	---	---	---
9 Spring Ditch at Private Drive	16	102	6.7	61.0	13	98.1	3.7	15.7
10 Muddy Fork at Mockingbird Valley Road	17	132	3.0	80.2	12	128	11.0	70.3
11 Goose Cr at U.S. Highway 42	16	137	8.0	47.5	14	146	19.6	46.4
12 Little Goose Cr at U.S. Highway 42	16	112	6.7	20.9	13	87.3	.3	.4
13 Goose Cr at Old Westport Road	16	164	10.0	39.0	14	149	8.2	6.9
14 Pope Lick at Pope Lick Road	18	78.8	12.9	43.1	15	91.3	8.7	31.5
15 Floyds Fork at former State Highway 155	18	85.3	3.0	49.5	10	89.3	11.9	28.2
16 Chenoweth Run at Gelhaus Road	18	119	11.9	22.5	16	105	5.9	25.1
17 Fern Cr at Old Bardstown Road	17	155	0	0	12	124	4.5	3.8
18 Northern Ditch at Preston Highway	16	121	8.3	42.2	12	113	.4	1.5
19 Fishpool Cr at Bost Road	16	119	12.3	77.6	---	---	---	---
20 Southern Ditch at Minors Lane	16	120	18.0	85.6	---	---	---	---
21 Floyds Fork at Bardstown Road	17	113	7.3	48.5	10	111	25.8	65.7
22 Cedar Cr at Thixton Road	17	98.7	8.5	32.7	12	103	5.9	28.2
23 Pennsylvania Run at Mt. Washington Road	17	116	12.4	37.4	13	127	1.7	6.1
24 Mill Cr Cutoff at Dover Road	14	94.8	8.2	84.9	---	---	---	---
25 Harrods Cr at Hunting Cr Drive	16	149	3.6	27.7	10	132	8.6	16.1
26 Long Run at State Highway 1531	12	81.0	3.9	65.7	---	---	---	---
Cyanide, total as Cn								
13 Goose Cr at old Westport Road	---	---	---	---	13	79.4	8.2	22.5
16 Chenoweth Run at Gelhaus Road	---	---	---	---	15	67.1	5.9	14.9
2,4-D, total								
1 Pond Cr at Pendleton Road	---	---	---	---	15	108	5.9	5.6
2 Mill Cr at Orell Road	15	172	.9	5.5	14	179	10.6	24.2
5 SF Beargrass Cr at Winter Avenue	16	201	1.2	18.2	---	---	---	---
6 SF Beargrass Cr at Trevilian Way	16	182	1.5	23.9	12	184	8.2	24.6