STORMWATER DATA FOR JEFFERSON COUNTY, KENTUCKY, 1991-92

By Ronald D. Evaldi and Brian L. Moore

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CONTENTS

	Page
Abstract	1
Introduction	1
Purpose and scope	2
Description of study area	2
Climate	2
Population and land use	4
Surface-water hydrology	4
Water-quality standards	6
Methods of data collection, water-quality analyses, and load estimation	6
Field-data collection	6
Sampling sites	7
Sampling procedures	10
Water-quality analyses	11
Laboratory methods	11
Quality assurance	11
Load-estimation methods	12
Discharge-record method	12
Regression models	13
Simple method	15
Stormwater data	15
Rainfall and runoff	16
Water-quality characteristics and constituent concentrations	16
Constituent loads	18
Summary	80
References	81

ILLUSTRATIONS

Page

Figure
1-5. Maps showing:
1. Major stream basins in Jefferson County, Kentucky..... 3
2. Generalized land use in Jefferson County, Kentucky..... 5
3. Stormwater-outfall sampling sites in Jefferson County, Kentucky..... 8
4. Stream-water-quality sampling sites in Jefferson County, Kentucky..... 9
5. Rain gages in Jefferson County, Kentucky..... 17

TABLES

Table 1. Streamflow and basin characteristics at selected continuous-record streamflow-gaging stations in Jefferson County, Kentucky..... 19
2. Selected Kentucky surface-water-quality criteria..... 20
3. Stream-water-quality sampling sites in Jefferson County, Kentucky, and potential sources of contaminants in their drainage basins..... 21
4. Land uses and percentage of impervious cover within the drainage basins of selected stream-water-quality and stormwater-outfall sampling sites in Jefferson County, Kentucky..... 22
5. Chemical constituents and physical properties analyzed in first-flush and flow-weighted composite samples of stormwater in Jefferson County, Kentucky, January 1991-May 1992..... 23
6. Organic compounds selected for analysis in flow-weighted composite samples of the first 3 hours of flow from stormwater outfalls in Jefferson County, Kentucky, January 1991-May 1992..... 24
7. Laboratory methods used for analysis of samples from selected stormwater outfalls in Jefferson County, Kentucky, January 1991-May 1992..... 25
8. Comparison of split-sample analyses by the Louisville and Jefferson County Metropolitan Sewer District laboratory and the U.S. Geological Survey laboratory, January 1991-May 1992..... 29
9. Rainfall intensity, duration, and totals associated with stormwater samples collected in Jefferson County, Kentucky, January 1991-May 1992..... 30

Page

10. Runoff duration and volume associated with stormwater samples collected in Jefferson County, Kentucky, January 1991-May 1992 31
11. Water-quality field analyses made during stormwater sampling at selected stormwater outfalls in Jefferson County, Kentucky, January 1991-May 1992 32
12. Quality of runoff from a high-density residential basin, sampled at site SR1, in Jefferson County, Kentucky, during selected storms, January-October 1991 38
13. Quality of runoff from a basin containing light industry, sampled at site SR2, in Jefferson County, Kentucky, during selected storms, February-October 1991 42
14. Quality of runoff from a low-density residential basin, sampled at site SR3, in Jefferson County, Kentucky, during selected storms, March-December 1991 46
15. Quality of runoff from basin containing heavy industry, sampled at site SR4, in Jefferson County, Kentucky, during selected storms, March 1991-April 1992 50
16. Quality of runoff from a commercial basin, sampled at site SR5, in Jefferson County, Kentucky, during selected storms, March 1991-May 1992 57
17. Quality of runoff from a commercial basin, sampled at site SR6, in Jefferson County, Kentucky, during selected storms, April-December 1991 66
18. Statistical summary of event mean concentrations of selected constituents measured at stormwater outfalls in Jefferson County, Kentucky, January 1991-May 1992 70
19. Storm loads and event mean concentrations of selected constituents measured at stormwater outfalls in Jefferson County, Kentucky, January 1991-May 1992 71
20. Mean storm-load estimates of selected constituents from stormwater-outfall and stream-sampling basins in Jefferson County, Kentucky, based on generalized least-squares regression models of Driver and Tasker (1990) 73
21. Total annual load estimates, March 1988-February 1991, for water-quality constituents measured at selected stream-sampling sites in Jefferson County, Kentucky 74
22. Total annual storm-load estimates of selected constituents from stormwater-outfall and stream-sampling basins in Jefferson County, Kentucky, based on generalized least-squares regression models of Driver and Tasker (1990) 78
23. Total annual storm-load estimates of selected constituents from stormwater-outfall and stream-sampling basins in Jefferson County, Kentucky, based on a computation method by T.R. Schueler (1987) 79

CONVERSION FACTORS AND ABBREVIATIONS

Multiply	By	To obtain
inch (in.)	25.4	millimeter
foot (ft)	0.3048	meter
mile (mi)	1.609	kilometer
pound (lb)	0.4536	kilogram
ton (ton)	907.2	kilogram
acre	0.4047	square hectometers
square mile (mi^2)	2.590	square kilometer
foot per mile (ft/mi)	0.1894	meter per kilometer
ton per square mile (ton/mi^2)	350.3	kilogram per square kilometer
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.

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

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

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ABSTRACT

This report presents results of water-quality analyses and estimates of constituent loads made by the U.S. Geological Survey, in cooperation with the Louisville and Metropolitan Sewer District, to describe stormwater quality in Jefferson County, Ky. Stormwater-constituent concentrations were determined for six basins in the urbanized parts of Jefferson County. Each basin has a predominant land use; two basins contain primarily commercial land, two basins contain primarily residential land, and the other two basins contain primarily industrial land. Load estimates were made for these 6 basins and for a network of 25 stream basins in the county. Samples were analyzed in the field for temperature, pH, specific conductance, and dissolved oxygen concentration.

Fecal-indicator bacteria densities greater than 20,000 colonies per 100 milliliters of water were measured in stormwater from all basins except the one containing heavy industry. Iron concentrations in excess of 1,000 micrograms per liter, the Kentucky chronic criterion for protection of warmwater aquatic habitat, were detected in at least one sample from each basin. The maximum event mean concentrations for chemical and biochemical oxygen demand, 407 and 610 milligrams per liter, respectively, were from commercial basins. The total storm loads ranged over at least one order of magnitude; for example, loads of dissolved-solids ranged from less than 2 to 7,010 pounds, and loads of chemical oxygen demand ranged from about 50 to 700 pounds.

INTRODUCTION

Jefferson County, Ky., which includes the city of Louisville, is a rapidly developing urban area. As urbanization has progressed, rural land has been replaced by residences, businesses, industrial facilities, shopping centers, and parking lots. Associated with urbanization is a potential for change in the types and quantities of contaminants discharged to the surface waters of the county. Storm runoff may wash contaminants, which accumulate during dry periods, into urban drainage systems and degrade the surface-water quality of many streams and drainage channels. Many contaminants in urban runoff are primarily of human origin and include organic debris, sediments, nutrients, petroleum-based products, and potentially toxic chemicals, such as heavy metals and pesticides.

In 1991, the Louisville and Jefferson County Metropolitan Sewer District (MSD) and the U.S. Geological Survey (USGS) began a cooperative program to assess the quality of stormwater runoff in Jefferson County, Ky. The program involved collection of a number of stormwater-quality samples. The goals of the sampling program were to (1) provide a description of the quality of storm runoff from residential, commercial, and industrial land-use areas; (2) define loads of selected constituents in storm runoff; and (3) identify, to the extent possible, the land uses that most affect stormwater quality.

Data from the sampling program were used to describe the major-constituent, nutrient, bacteria, dissolved-oxygen, and organic-constituent concentrations in stormwater of the urban areas of the county. Water managers, policy makers, and the public have interest in the results of this study because it provides data to evaluate the effectiveness of water-quality management programs and to predict the probable effects of changes in land- and water-management practices. Quantification of constituent concentrations in the stormwater and estimation of constituent transport from the drainage basins can help to describe the effects of urbanization on water quality. This information can aid the MSD in assessing the potential effects of future urban expansion on the drainage system, and it may help to identify areas of the county in need of improved resource management. Results of this study may also be of interest to other communities in similar geohydrologic settings.

Purpose and Scope

This report presents data on storm runoff from residential, commercial, and industrial basins sampled at six stormwater outfalls in Jefferson County. These data include rainfall and runoff volumes for selected storms, the water quality of the runoff, and stormwater constituent loads. Mean and total annual storm loads are estimated for the six stormwater outfalls, and for 25 other stream-water-quality sampling sites in the county. The methods of data collection, water-quality analyses, and load estimation also are presented in the report.

Description of Study Area

Jefferson County covers an area of 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. Ten stream systems course through the county and drain parts of five surrounding counties; the combined drainage area is approximately 600 mi^2. Only streams in the northern and eastern parts of the county originate outside of Jefferson County.

Climate

The climate of Louisville, Ky. is classified as "moist-continental" by Strahler and Strahler (1979). It is characterized by changeable weather and only short periods of extreme conditions. Weather systems generally move either north from the Gulf of Mexico, bringing warm moist air in the summer, or southeast from Canada, bringing occasional arctic air masses to the area in the winter. As a result, winters are moderately cold (temperatures rarely below 0 °F), and summers are warm (temperatures rarely above 100 °F). The coldest 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).

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

INDEX MAP

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

The average 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 substantially to the 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. Average annual snowfall is 16.6 in. (5.4 in. in January). Approximately 69 storm events, defined as 0.1 in. accumulation with at least 0.01 in. each hour, occur each year (Steurer and Nold, 1986).

Population and Land Use

According to the 1990 U.S. Census, the population of Jefferson County is approximately 665,000 (Louisville Chamber of Commerce, 1992). This figure represents a 3-percent decline from the 1980 census and a 4 percent decline since 1970. The Louisville Chamber of Commerce, 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 2. The sources of the land-use data shown in figure 2 are 1983 National Atmospheric and Space Administration high-altitude aerial photographs and National High-Altitude Photography program photographs digitized at a scale of 1:250,000 (U.S. Geological Survey, 1986). The degree of 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. Within and immediately surrounding the city limits, residential land use predominates (with some exceptions). The least populated and least developed watersheds in Jefferson County include Pennsylvania Run, which has one population center, and Cedar Creek, which has three population centers (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 (fig. 1).

Surface-Water Hydrology

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

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 basin (fig. 1). The Louisville metropolitan area consists of a dense commercial central business district that is drained mainly by a complex system of combined sanitary and storm sewers, with few open channels.

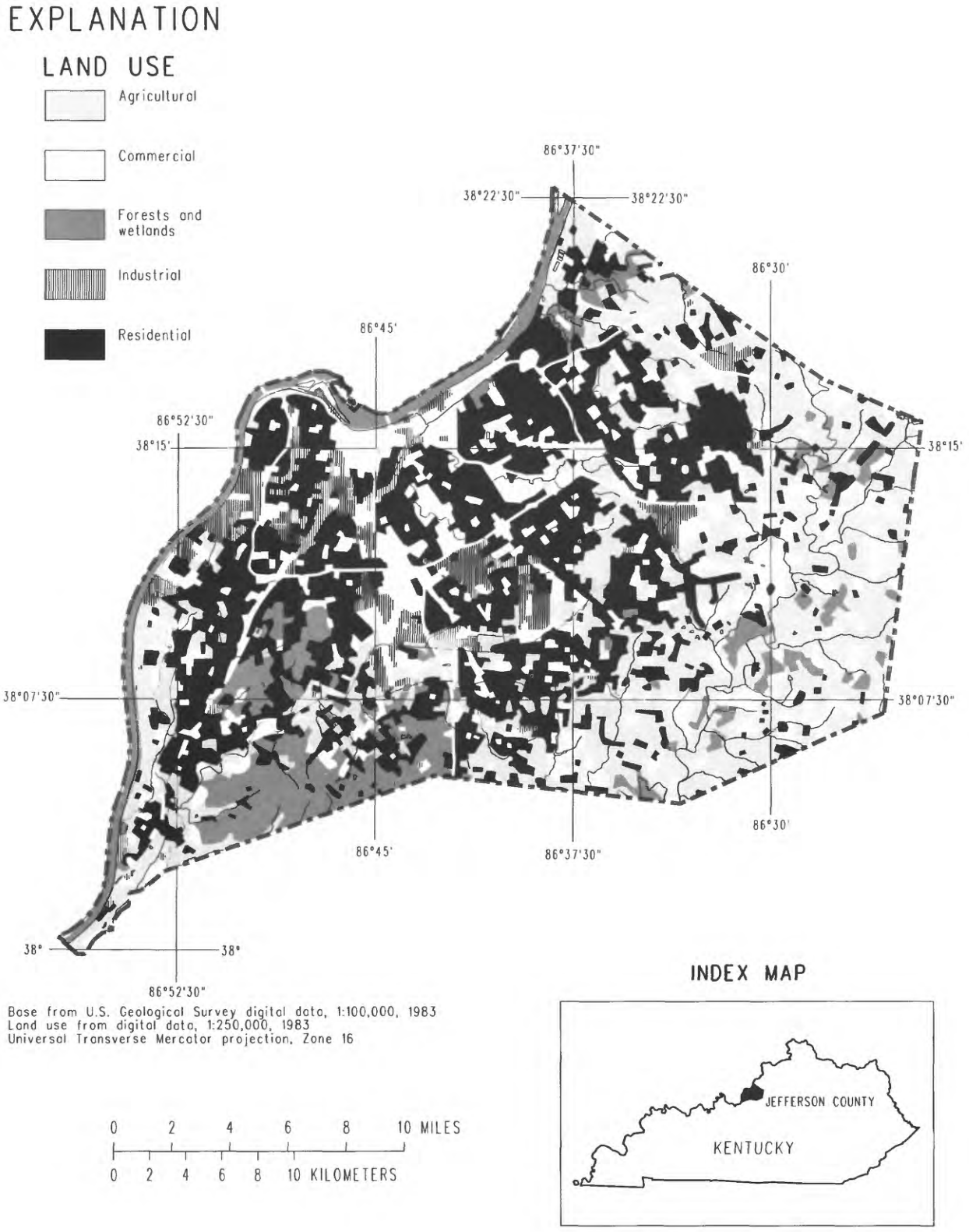

Figure 2.--Generalized land use in Jefferson County, Kentucky.

The average discharge of stream basins in or near Jefferson County is about 1.3 $(ft^3/s)/mi^2$ and is approximately uniform throughout the area (table 1). Basin discharge during hydrologic extremes, however, can differ widely throughout the county. Peak discharge of streams in Kentucky has been shown to be related to drainage area and basin morphologic characteristics, including main-channel slope, basin shape, and channel sinuosity (Choquette, 1988). Peak discharge, drainage area, main-channel slope, and other characteristics of selected streams in Jefferson County are listed in table 1.

WATER-QUALITY STANDARDS

Primary water-quality criteria for public health, aquatic life, and recreation are established by the Federal government. A water-quality criterion is a numerical value or narrative statement for a contaminant that reflects the latest scientific knowledge on the identifiable effects of the contaminant on public health and welfare, aquatic life, and recreation. The Federal criteria are used by the states as guidelines to establish criteria for local conditions on the basis of site-specific analyses. Surface-water-quality criteria adopted by Kentucky are defined as the minimum criteria applicable to all surface water to protect public health and welfare, protect and enhance the quality of water, and fulfill Federal and State requirements for the establishment of water-quality standards. The surface-water-quality criteria, as adopted by Kentucky and approved by the U.S. Environmental Protection Agency (USEPA), are listed in table 2.

METHODS OF DATA COLLECTION, WATER-QUALITY ANALYSES, AND LOAD ESTIMATION

Stormwater samples were collected from storm outfalls in six basins in Jefferson County identified as having a specific predominant land use. These samples were collected to describe the chemical characteristics of stormwater in Jefferson County. Constituent loads were estimated by use of several methods to help assess the degree of contaminant transported to receiving waters from nonpoint sources in the urban environment. These data were supplemented with constituent-load computations from 25 stream-water-quality sampling sites in the county.

Field-Data Collection

At least three storm events that occurred at least 1 month apart were sampled at each of six stormwater outfalls from January 1991 through May 1992. Stormwater sampling generally followed a dry-weather period of at least 72 hours. Three types of stormwater samples were collected for analysis of selected constituents: (1) a first-flush sample (first 30 minutes of stormwater flow), (2) a composite sample during the first 3 hours of stormwater flow, and (3) a composite sample after the first 3 hours of stormwater flow. Samples were analyzed in the field for temperature, pH, specific conductance, and dissolved oxygen.

Sampling Sites

Stormwater-sampling sites were selected so that a significant percentage of the sampled basin was from one of the following land-use categories:

1. Residential development ranging from high-density urban to low-density rural;
2. commercial development, such as hotels and motels, restaurants, shopping centers, office buildings, and municipal facilities; and
3. industrial development.

Samples were collected at major outfalls, defined by the USEPA as either drainage pipes with an inside diameter greater than 36 in. or conveyances other than circular pipe that were associated with a drainage area greater than 50 acres. Also included were either (1) drainage pipes with inside diameters greater than 12 in. that received stormwater from lands zoned for industrial activity or (2) industrial discharges from conveyances other than circular pipe that were associated with a drainage area of 2 acres or more. The stormwater outfalls used for sampling (fig. 3) and the primary land uses in their drainage basins were the following:

SR1. Tributary to South Fork Beargrass Creek at Buechel--High-density residential
SR2. Tributary to Hite Creek at O'Bannon--Light industrial
SR3. Tributary to Middle Fork Beargrass Creek at St. Matthews--Low-density residential
SR4. Tributary to Northern Ditch at Okolona--Heavy industrial
SR5. Tributary to Big Run near Pleasure Ridge Park--Commercial
SR6. Tributary to Middle Fork Beargrass Creek at Hurstbourne Acres--Commercial

A network of stream-water-quality sampling sites operated cooperatively by the MSD and USGS was established in Jefferson County beginning in February 1988 (fig. 4, table 3). Water-quality data from this stream network for February 1988-March 1991 were summarized in a report by Evaldi and others, in press. Site selection for this sampling network was designed to ensure the following: (1) collection of representative data from all the major watersheds in Jefferson County outside of the combined-sewer network, (2) availability of a structure spanning the stream so that samples could be collected and field measurements made during periods of high flow, and (3) positioning of sites at specific stream locations relative to sewage-treatment facilities or areas of different land-use types. Potential sources of contaminants in the drainage area of each sampling site were identified by the MSD (Pamela J. Pulliam, written commun., 1992) (table 3).

The drainage area, the percentage of the area covered by impervious surfaces, and the percentage of selected land uses within the drainage basin are listed in table 4 for the 6 stormwater-outfall and 25 stream-water-quality sampling sites in Jefferson County. These data provide a basis for identification of probable sources of contaminants and are needed in some load-estimation methods.

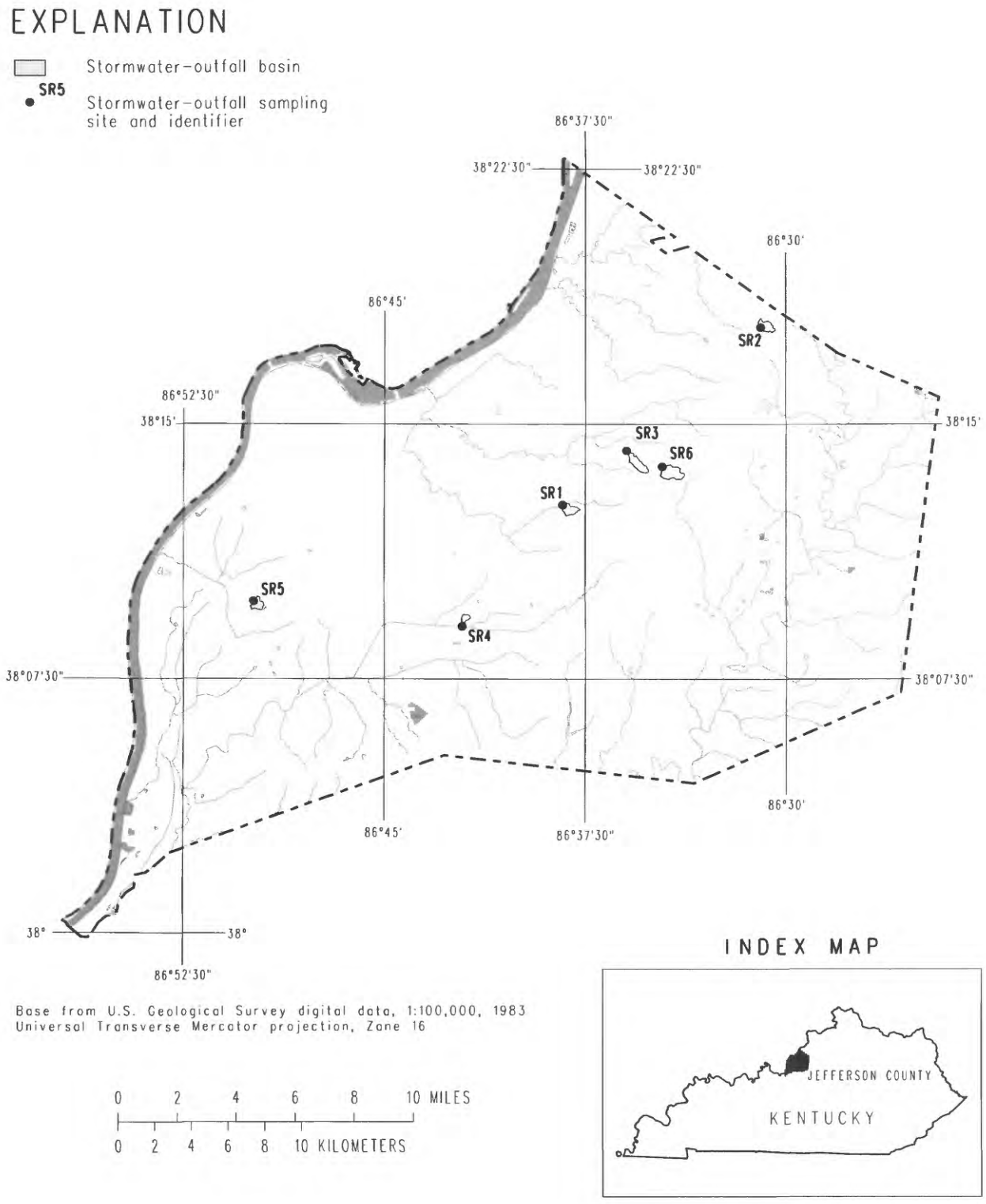

Figure 3.--Stormwater-outfall sampling sites in Jefferson County, Kentucky.

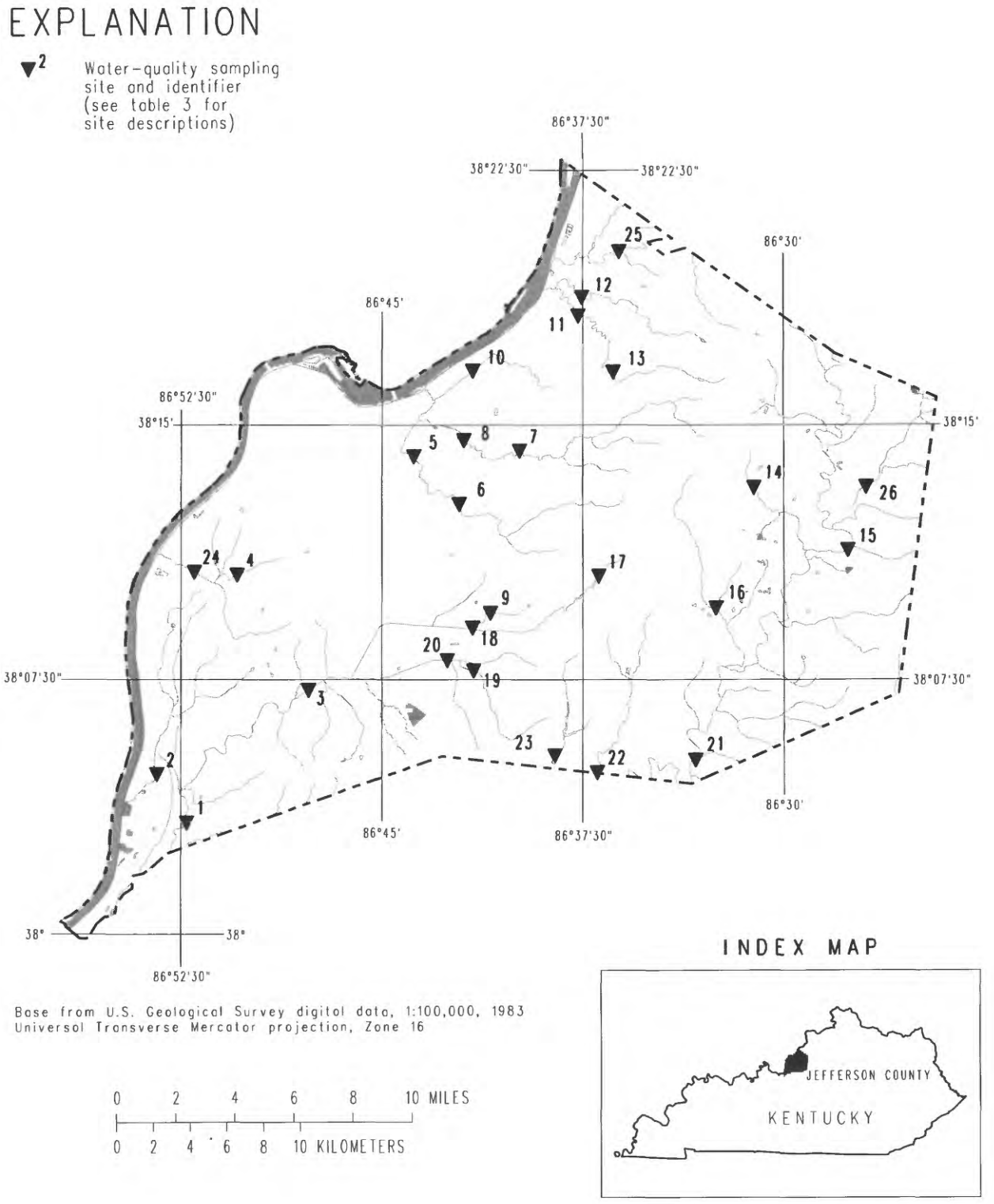

Figure 4.--Stream-water-quality sampling sites in Jefferson County, Kentucky.

Sampling Procedures

Water samples were collected by automated samplers from the centroid of flow. Nonautomated sampling was done with a multivertical depth-integrating sampler made of polytetrafluoroethylene to obtain the most representative sample possible. All collection equipment and containers for nonautomated sampling were cleaned with methanol before sampling. The equal-width-increment (EWI) method (Ward and Harr, 1990), which is a depth-integrating sampling method, was used for all nonautomated sampling. The EWI method requires equal spacing of sampling verticals. Only a few sampling verticals were used for stormwater-outfall sampling because the cross sections were only a few feet wide and the turbulence of flow indicated that the water was well mixed.

A depth-integrated sample was obtained by lowering the sampler from the surface of the water to the outfall bottom at a constant transit rate and immediately raising it back to the surface at the same rate. The same transit rate was used for each vertical in the cross section, and the size of the sampler nozzle was selected such that water entered the sampler isokinetically (without a change in velocity). This ensured that the volume of sample collected at each vertical was proportional to flow volume at the vertical. The composited sample collected by the EWI method was, therefore, representative of the entire flow.

In water so shallow that a depth-integrating sampler could not be submerged, a sample was obtained by open-bottle sampling. This sampling method consists of immersing a hand-held narrow-mouth bottle in the centroid of flow, or at multiple verticals, with the mouth of the bottle directed toward the current. The open-bottle method is also used for specific types of samples, such as for volatile organics, to avoid contamination.

First-flush samples, defined as a discrete sample collected within the first 30 minutes of flow (or as soon as practical thereafter) were collected. Samples of the first 3 hours of flow were composited from aliquots collected 15 minutes apart. For some storms, sample aliquots were also collected by automatic samplers beginning after the first three hours of flow and continuing until flow ceased. Samples collected during these periods were also composited. Data from temporary stage recorders were used to obtain continuous flow records for flow proportioning the composite samples. The incremental sample aliquots were combined in proportion to the volume of flow between the times of sampling.

Samples were composited in a churn splitter (Ward and Harr, 1990) coated with polytetrafluoroethylene. Use of the coated churn splitter allowed subsample volumes to be extracted from the composite sample without changing its chemical and physical properties. Subsamples for organic analyses were withdrawn first as the sample was churned. Next, subsamples for total, total recoverable, or suspended analyses were withdrawn. The water remaining in the churn was used for preparation of filtered subsamples required for determinations of dissolved-constituent concentrations.

Water-Quality Analyses

The first-flush and flow-weighted composite samples were analyzed by the MSD laboratory for the constituents listed in table 5. The flow-weighted composite samples of the first 3 hours of flow were analyzed by the USGS National Water Quality Laboratory for the organic compounds listed in table 6.

Laboratory Methods

The samples were analyzed with methods approved by the USEPA, as listed in 40 CFR Part 136 (Code of Federal Regulations, 1990). The methods used to analyze the samples are listed in table 7.

Quality Assurance

Collection of samples for quality assurance is essential to define the validity of analytical data. A well-designed program must provide unbiased monitoring of the accuracy and precision of reported data. According to Fishman and Friedman (1989), some errors are practically unavoidable in analytical work. Errors may result from the reagents used, from the limitations of either the method or instruments employed, and even from impurities in distilled water. The analyst's skill and judgment often have a direct bearing on the analytical accuracy.

Samples to assess the accuracy of the analytical data consisted of split samples produced by dividing a water sample into two aliquots. An aliquot was sent to both the MSD laboratory and the USGS National laboratory. Quarterly splits from three sites were submitted January 1991 through May 1992. Analytical results of the two laboratories were compared. Percentage differences in the duplicate measurements were calculated by use of the following equation:

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

where P is the percentage difference,
M is the MSD laboratory analysis value, and
U is the USGS laboratory analysis value.

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

The mean of the percentage differences of the duplicate measurements for each constituent was used as a measure of the magnitude of the analytical differences between the two laboratories (table 8). Mean percentage differences in excess of 20 percent were considered to be a disparity that might indicate that some analyses for a constituent may lack acceptable accuracy.

An equipment blank was submitted to the MSD laboratory to assess possible sample contamination during field collection and processing, as well as possible laboratory contamination. The equipment blank was made by filling field sample containers with reagent-grade distilled water and processing it in the same manner as a storm sample. Laboratory analyses were done for oxygen demand, major ions, nutrients, and metals and trace elements. Chemical oxygen demand and biochemical oxygen demand values indicated possible laboratory analytical problems. No other significant constituent concentrations were found in the sample. A field blank for organic analyses was not submitted because analyses for organic compounds in several of the storm samples were all below detection limits, thus indicating no sample contamination.

Load-Estimation Methods

The constituent load in runoff for a given storm event is the concentration of that constituent multiplied by the volume of flow. Concentration and volume data are available for the stormwater samples collected during this study. Several calculation-based methods were used in this study to estimate loads over time, specifically, the mean storm load and total annual load of 12 water-quality constituents, which included biochemical oxygen demand, chemical oxygen demand, suspended solids, dissolved solids, total nitrogen, total Kjeldahl nitrogen, total phosphorus, dissolved phosphorus, total cadmium, total copper, total lead, and total zinc.

Discharge-Record Method

Total annual loads for a selected number of years can be estimated on the basis of analysis of periodic water-quality samples and daily discharge values. Such data were available only for the 25 stream-sampling sites. This method estimates total system loads from point and nonpoint sources of contaminants. Censored values are set equal to one-half of the detection limit, and transport equations with adjustment for seasonality are developed on the basis of the constituent concentrations and corresponding discharges at the time of sampling. The equations include the best combinations of explanatory variables based on the Mallows C_p statistic (Mallows, 1964):

$$\ln(CQ) = I + (a * t) + b(\sin\theta) + c(\cos\theta) + d(\ln Q) + e, \qquad (2)$$

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

The best-fit equation based on available water-quality data for the selected time period is applied to daily values of discharge for the period. The predicted log value is transformed and multiplied by the Duan smearing estimate (Duan, 1983). The total annual load reported is the average of the yearly totals of daily load estimates. All loads are reported regardless of the significance of the regression, but several uncertainty statistics also are reported. For example, the standard error of the regression, in percent, is a measure of the goodness of fit of the regression relation. The flow duration of the highest sampled discharge is listed as a measure of the adequacy of the sampling regime at high flow, when the largest loads usually occur. Flow duration indicates the percent of time that the flow magnitude of the sample was equalled or exceeded during the period of gaging-station records. The percentage of load estimated from discharge greater than the highest sampled flow is a measure of the load resulting from extrapolation beyond the range of data used to derive the regression relation.

Regression Models

Driver and Tasker (1990) developed regression models to estimate mean loads of a storm as functions of physical, land-use, and climate characteristics. The drainage areas of the urban basins used to develop the Driver and Tasker models ranged from 0.014 to 0.830 mi^2. Because the drainage areas of the stream sites in Jefferson County were all greater than 0.830 mi^2, these models could not be applied directly. A scheme of summing predictions for small areas, however, can be used to make load predictions for large urban basins. Mean storm loads of basins with drainage areas greater than 0.5 mi^2 are calculated as though the drainage areas are 0.2 mi^2, and loads are then adjusted on the basis of actual drainage area. This method of estimation is based on the assumption that the estimated constituent loads are conservative and cumulative, which may not always be valid (Tasker and others, 1990). The total annual storm loads are estimated by multiplying the mean storm loads by the average number of storms per year, which is 69, according to Steurer and Nold (1986). The Driver and Tasker (1990) regression models used to compute mean loads of a storm and total annual storm loads for this report were:

$$COD = (10 ** (1.1174 + (2.0069 * SQRTDA) + (0.0051 * IA))) * 1.298 \quad (3)$$

$$TSS = (10 ** (1.5430 + (1.5906 * SQRTDA) + (0.0264 * MAR) + (-0.0297 * MJT))) * 1.521 \quad (4)$$

$$TDS = (10 ** (1.8449 + (2.5468 * SQRTDA) + (-0.0232 * MJT))) * 1.251 \quad (5)$$

$$TN = (10 ** (-0.2433 + (1.6383 * SQRTDA) + (0.0061 * IA) + (-0.4442 * X2))) * 1.345 \quad (6)$$

$$TKN = (10 ** (-0.7282 + (1.6123 * SQRTDA) + (0.0064 * IA) + (0.0226 * MAR) + (-0.0210 * MJT) + (-0.4345 * X2))) * 1.277 \quad (7)$$

$$TP = (10 ** (-1.3884 + (2.0825 * SQRTDA) + (0.0234 * MAR) + (-0.0213 * MJT))) * 1.314 \quad (8)$$

$$DP = (10 ** (-1.3661 + (1.3955 * SQRTDA))) * 1.469 \quad (9)$$

$$CU = (10 ** (-1.4824 + (1.8281 * SQRTDA) + (-0.0141 * MJT))) * 1.403 \quad (10)$$

$$PB = (10 ** (-1.9679 + (1.9037 * SQRTDA) + (0.0070 * IA) + (0.0128 * MAR))) * 1.365 \quad (11)$$

$$ZN = (10 ** (-1.6302 + (2.0392 * SQRTDA) + (0.0072 * IA))) * 1.322 , \quad (12)$$

where COD is mean storm load of chemical oxygen demand, in pounds;
TSS is mean storm load of total suspended solids, in pounds;
TDS is mean storm load of total dissolved solids, in pounds;
TN is mean storm load of total nitrogen, in pounds;
TKN is mean storm load of total Kjeldahl nitrogen, in pounds;
TP is mean storm load of total phosphorus, in pounds;
DP is mean storm load of dissolved phosphorus, in pounds;
CU is mean storm load of total recoverable copper, in pounds;
PB is mean storm load of total recoverable lead, in pounds;
ZN is mean storm load of total recoverable zinc, in pounds;
SQRTDA is square root of drainage area, in square miles;
IA is impervious area, in percent;
X2 is 1 if commercial + industrial land use > 75 percent, or 0 if < 75 percent;
MAR is mean annual rainfall (43.03 in.); and
MJT is mean minimum January temperature (26.2 °F).

Simple Method

A load-estimation procedure by Schueler (1987) that requires minimal data is presented in the draft guidance manual for the preparation of part 2 of the National Pollutant Discharge Elimination System (NPDES) permit-application manual for discharges from municipal separate storm-sewer systems (U.S. Environmental Protection Agency, 1992). This proceedure is termed the "simple method," and can be used to estimate the total annual constituent load from an urban stormwater outfall without accounting for differences in runoff from different land uses. The 1980-81 National Urban Runoff Program (NURP) project in the Washington, D.C., area indicated that there were no significant differences in average constituent concentrations in stormwater from basins with different land uses, and no consistent correlation was found between constituent concentrations and storm volume or intensity. The method is normally restricted to watersheds of less than 100 acres and was therefore applied as though each drainage was 64 acres, and loads were then adjusted on the basis of actual drainage area. The simple method equation for estimation of annual constituent loads in stormwater is:

$$L = (2.72 * P * F * R * C * A) / 12 , \qquad (13)$$

where L is total annual constituent load, in pounds;
P is annual precipitation, in inches (43.03 in.);
F is factor to adjust for nonrunoff storms (0.9 typically used);
R is runoff coefficient [0.05 + 0.009 * (percent imperviousness)];
C is average constituent concentration, in mg/L; and
A is basin area, in acres.

Average constituent concentrations in the simple method equation can be based on locally measured constituent concentrations in urban stormwater, or they can be based on constituent concentrations reported by the NURP. An early draft of the guidance manual for preparation of NPDES permit applications listed the following as concentrations of contaminants from average residential or commercial sites: total suspended solids, 239 mg/L; biochemical oxygen demand, 12 mg/L; chemical oxygen demand, 94 mg/L; total phosphorus, 0.5 mg/L; dissolved phosphorus, 0.15 mg/L; total Kjeldahl nitrogen, 2.3 mg/L; total copper, 0.053 mg/L; total lead, 0.238 mg/L; and total zinc, 0.353 mg/L.

STORMWATER DATA

Recent studies, including the NURP, have shown that stormwater runoff from urban and industrial areas typically contains significant quantities of the same general types of contaminants that are found in wastewater and industrial discharges and which cause similar effects on water quality (U.S. Environmental Protection Agency, 1992). Stormwater was sampled to define its quality and the amount of constituent transport from urban and industrial areas of Jefferson County.

Rainfall and Runoff

Each of the six storm outfalls was sampled at least three times during the period January 1991-May 1992. Table 9 lists the date and time that each sampled storm event began and ended, the total rainfall of the storm, and the number of hours between the storm event sampled and the previous rainfall greater than 0.1 in. The rainfall that occurred before the end of the first 3 hours of runoff and the peak rainfall intensity during this time also are listed in table 9. Because rainfall conditions may differ significantly across drainage basins, rainfall data were averaged over the area by use of selected rain gages from a network throughout the county (fig. 5). The rain gages used to describe the storm for each sample are also listed in table 9. Storms sampled ranged from 0.03 to 2.54 in. of total rainfall. During the first 3 hours of the storms sampled, from 0.03 to 0.92 in. of rain fell.

Outfall discharge was determined at the time of sample collection and continuous flow records were determined for each sampled storm event. The date and time runoff began and ended and the runoff volume for each storm are listed in table 10. These runoff volumes were used with the composite-sample analyses to compute storm loads for selected constituents. Runoff volumes for the first 3 hours of the sampled storms ranged from 100 to 92,400 ft^3. Dates and times of first-flush samples also are listed in table 10.

Water-Quality Characteristics and Constituent Concentrations

Field analyses of temperature, pH, specific conductance, and dissolved-oxygen concentration made during storm sampling are listed in table 11. Stormwater-sample analyses from the six stormwater outfalls sampled January 1991 through May 1992 are listed in tables 12-17. Analyses are presented for first-flush samples, composite samples of the first 3 hours of flow, and composite samples from the end of the first 3 hours of flow until flow ceased. Fecal-indicator bacteria densities of greater than 20,000 col/100ml were measured in stormwater from all basins except the one containing heavy industry. Iron concentrations in excess of 1,000 μg/L, the Kentucky chronic criterion for protection of warmwater aquatic habitat, were detected in at least one sample from each basin.

A statistical summary of the event mean concentrations of selected constituents is presented in table 18. The means of these data were larger than the typical NURP concentrations from residential or commercial sites for chemical and biochemical oxygen demand and for dissolved phosphorus. The means of the event mean concentrations were less than the NURP typical concentrations for suspended solids, total Kjeldahl nitrogen, total phosphorus, total copper, total lead, and total zinc. The maximum chemical and biochemical oxygen demand event-mean concentrations, 407 and 610 mg/L, respectively, occurred in commercial basins.

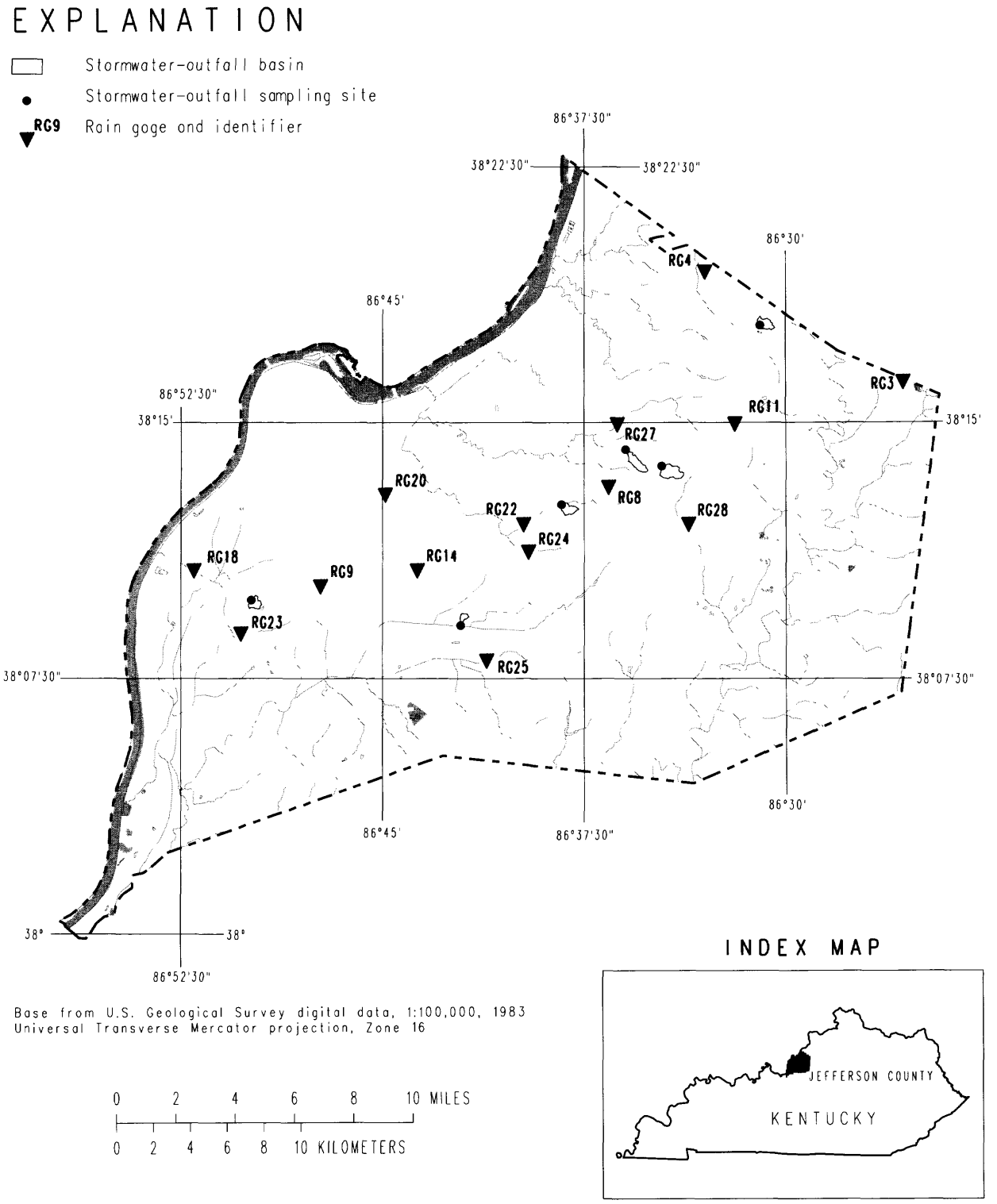

Figure 5.--Rain gages in Jefferson County, Kentucky.

Constituent Loads

Total storm loads of selected constituents measured at the six outfalls in Jefferson County are listed in table 19. The total storm loads in table 19 were computed from the composite sample analyses (tables 12-17) and measured runoff volumes (table 10). A composite sample after the first 3 hours of flow was not always analyzed if it was a small percentage of the total storm runoff. In such cases, the storm load measured during the first 3 hours of flow was increased by the percentage of total runoff not sampled. The total storm loads listed in table 19 all ranged at least one order of magnitude: loads of dissolved solids ranged from less than 2 to 7,010 lb, and loads of chemical oxygen demand ranged from about 50 to 700 lb.

Mean storm loads based on the generalized least-squares regression models of Driver and Tasker (1990) were computed for selected water-quality constituents (table 20). The mean storm estimates were made for the 6 stormwater-outfall sites and the 25 stream-sampling sites in Jefferson County. Variables used in the regression models included land use and impervious cover data listed in table 4 and climatic data for the county.

Total annual loads of selected constituents were estimated by the discharge-record method for the 25 stream basins in Jefferson County (table 21). These total annual loads are based on water-quality sample analyses and daily discharge for March 1988-February 1991 and include storm and nonstorm loads. Data collection and analysis for these mean annual load estimates are detailed in a report by Evaldi and others, in press.

Total annual storm loads based on generalized least-squares regression models of Driver and Tasker (1990) were computed for selected water-quality constituents (table 22). The total annual storm-load estimates were made for the 6 stormwater-outfall sites and the 25 stream-water-quality sampling sites in Jefferson County. The mean storm-load estimates from table 20 were used in these annual load estimates. The mean storm-load estimates from table 20 were multiplied by the average number of storm events that occur each year, which is 69 according to Steurer and Nold (1986).

Total annual storm loads were also estimated by use of the simple method by Schueler (1987) (table 23). One set of computations was based on event mean constituent concentrations measured at the six storm outfalls in Jefferson County (table 18), and one set of computations was based on NURP data.

Table 1.--Streamflow and basin characteristics at selected continuous-record streamflow-gaging stations in Jefferson County, Kentucky

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

Gaging station name	(a) Drainage area mi^2	(b) Channel slope (ft/mi)	Period of record (water years)	Average flow (ft^3/s)	Average unit flow [$(ft^3/s)/mi^2$]	(b) Peak 100-year unit flow [$(ft^3/s)/mi^2$]	(c) 7-day 10-year low flow (ft^3/s)	(c) Streamflow-variability index
Pond Creek at Manslick Road	64.0	12	1944-90	89.3	1.40	121	0.88	0.550
South Fork Beargrass Creek at Trevilian Way	16.9	19	1940 1945-53 1955-62 1971-83 1989-90	22.2	1.29	348	0	.665
Middle Fork Beargrass Creek at Old Cannons Lane	18.4	18	1944-90	25.5	1.35	221	.31	.521
Floyds Fork at former State Highway 155	138	5.5	1944-90	176	1.28	178	0	1.262

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

[b] From Melcher and Ruhl (1984).

[c] From Ruhl and Martin (1991).

Table 2.--Selected Kentucky surface-water-quality criteria

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

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

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

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

Table 3.--Stream-water-quality sampling sites in Jefferson County, Kentucky, and potential sources of contaminants in their drainage basins

[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	380315	855218	NPR, WTE, STD, IW
2 Mill Creek at Orell Road	03294570	380441	855324	NPR, WTE, STD
3 Pond Creek at Manslick Road	03302000	380711	854745	NPR, WTE, STD, IW
5 South Fork Beargrass Creek at Winter Avenue	03292550	381404	854350	NPR, CSO
6 South Fork Beargrass Creek at Trevilian Way	03292500	381239	854207	NPR, CSO
7 Middle Fork Beargrass Creek at Old Cannons Lane	03293000	381414	853953	NPR, CSO
8 Middle Fork Beargrass Creek at Beals Branch Road	03293200	381432	854157	NPR, WTE, STD, CSO
9 Spring Ditch at Private Drive below Hanses Road	03301950	380927	854057	NPR, WTE
10 Muddy Fork at Mockingbird Valley Road	03293530	381635	854137	NPR, WTE, STD
11 Goose Creek at U.S. Highway 42	03292475	381812	853741	NPR, WTE, STD
12 Little Goose Creek at U.S. Highway 42	03292480	381845	853733	NPR, WTE, STD
13 Goose Creek at Old Westport Road	03292474	381633	853622	NPR, WTE, STD
14 Pope Lick at Pope Lick Road	03298100	381309	853107	NPR, WTE, STD
15 Floyds Fork at former State Highway 155	03298000	381118	852737	NPR, WTE, STD
16 Chenoweth Run at Gelhaus Road	03298150	380936	853232	NPR, WTE
17 Fern Creek at Old Bardstown Road	03301900	381032	853655	NPR, WTE
18 Northern Ditch at Preston Highway	03301940	380901	854137	NPR, WTE, STD, IW
19 Fishpool Creek at Bost Road	03301850	380745	854135	NPR, WTE, STD
20 Southern Ditch at Minors Lane	03301880	380804	854234	NPR, WTE, STD
21 Floyds Fork at Bardstown Road	03298200	380507	853318	NPR, WTE, STD
22 Cedar Creek at Thixton Road	03298250	380445	853658	NPR, WTE, STD
23 Pennsylvania Run at Mt. Washington Road	03298300	380515	853833	NPR, WTE, STD
24 Mill Creek Cutoff at Dover Road	03294550	381039	855201	NPR, STD
25 Harrods Creek at Hunting Creek Drive	03292473	382006	853609	NPR, WTE, STD
26 Long Run at State Highway 1531	03297980	381310	852656	NPR, STD

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

Table 4.--Land uses and percentage of impervious cover within the drainage basins of selected stream-water-quality and stormwater-outfall 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 drainage area**				
			Agricultural	Commercial	Forest & wetlands	Industrial	Residential
SR1 Tributary to SF Beargrass Creek at Buechel	0.151	39.6	0	18.3	0	0	81.7
SR2 Tributary to Hite Creek at O'Bannon	.169	20.6	16.1	0	0	57.9	26.0
SR3 Tributary to MF Beargrass Creek at St Matthews	.210	35.0	0	5	15	0	80
SR4 Tributary to Northern Ditch at Okolona	.068	45.5	11.5	0	12.0	76.5	0
SR5 Tributary to Big Run at Pleasure Ridge Park	.132	68.9	3.4	45.9	0	0	50.7
SR6 Tributary to MF Beargrass Cr at Hurstbourne Acres	.282	63.5	0	49.6	0	0	50.4
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	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 basin upstream from site SR3 since 1983, and land-use percentages are based on a visual inspection of the basin.

Table 5.--Chemical constituents and physical properties analyzed in first-flush and flow-weighted composite samples of stormwater in Jefferson County, Kentucky, January 1991-May 1992

Alkalinity	Magnesium, total
Antimony, total	Mercury, total
Arsenic, total	Nickel, total
Barium, total	Nitrate, total
Beryllium, total	Nitrite, total
Biochemical oxygen demand, 5-day	Nitrogen, ammonia, total
Cadmium, total	Nitrogen, organic, total
Calcium, total	Oil and grease[1]
Chemical oxygen demand	pH
Chloride, dissolved	Phenols, total[1]
Chlorine, total residual[1]	Phosphorus, dissolved and total
Chromium, total	Phosphorus, total ortho
Copper, total	Selenium, total
Cyanide, total[1]	Sodium, dissolved
Dissolved solids, total	Silver, total
Fecal coliform[1]	Suspended solids, total
Fecal streptococci[1]	Sulfate, dissolved
Iron, total	Thallium, total
Lead, total	Zinc, total

[1] First-flush samples only.

Table 6.--Organic compounds selected for analysis in flow-weighted composite samples of the first 3 hours of flow from stormwater outfalls in Jefferson County, Kentucky, January 1991-May 1992

VOLATILE ORGANIC COMPOUNDS	
Acrolein, total	Tert-butylbenzene, total recoverable
Acrylonitrile, total	Tetrachloroethylene, total
Benzene, total	Toluene, total
Bromobenzene, total	Trans-1,3-dichloropropene, total
Bromoform, total	Trichloroethylene, total
Carbon tetrachloride, total	Trichlorofluoromethane total
Chlorobenzene, total	Vinyl chloride, total
Chlorodibromomethane, total	Xylene, total recoverable
Chloroethane, total	1,1,1,2-Tetrachloroethane, total
Chloroform, total	1,1,1-Trichloroethane, total
Cis-1,2-dichloroethene, total	1,1,2,2-Tetrachloroethane, total
Cis-1,3-dichloropropene, total	1,1,2-Trichloroethane, total
Dibromochloropropane, total recoverable	1,1-Dichloropropene, total
Dibromomethane, total recoverable	1,1-Dichloroethane, total
Dichlorobromomethane, total	1,1-Dichloroethylene, total
Dichlorodifluoromethane, total	1,2,3-Trichlorobenzene, total recoverable
Ethylbenzene, total	1,2,3-Trichloropropane, total
Methylbromide, total	1,2-Dibromoethane, total
Methylchloride, total	1,2-Dichloroethane, total
Methylenechloride, total	1,2-Dichloropropane, total
N-butylbenzene, total recoverable	1,2-Dichloroethene, total recoverable
O-chlorotoluene, total	1,2-Transdichloroethene, total
P-isopropyltoluene, total recoverable	1,3,5-Trimethylbenzene, total recoverable
Parachlorotoluene, total	1,3-Dichloropropane, total
Sec-butylbenzene, total recoverable	2,2-Dichloropropane, total
Styrene, total	2-Chloroethylvinylether, total

BASE/NEUTRAL ORGANIC COMPOUNDS	
Acenaphthene, total	Isophorone, total
Acenapthylene, total	Isopropylbenzene, total recoverable
Anthracene, total	N-butylbenzyl phthalate, total
Benzidine, total	N-nitrosodi-n-propylamine, total
Benzo(a)anthracene, 1,2-benzanthracene, total	N-nitrosodimethylamine, total
Benzo(a)pyrene, total	N-nitrosodiphenylamine, total
Benzo(b)fluoranthene, total	N-propylbenzene, total recoverable
Benzo(ghi)perylene 1,12-benzoperylene, total	Naphthalene, total
Benzo(k)fluoranthene, total	Naphthalenes, polychlorinated
Bis(2-chloroethyl)ether, total	Nitrobenzene, total
Bis(2-chloroethoxy)methane, total	Phenanthrene, total
Bis(2-chloroisopropyl)ether, total	Pyrene, total
Bis(2-ethylhexyl)phthalate, total	1,2,4-Trichlorobenzene, total
Chrysene, total	1,2,4-Trimethylbenzene, total recoverable
Di-n-butyl phthalate, total	1,2,5,6-Dibenzoanthracene, total
Diethyl phthalate, total	1,2-Dichlorobenzene, total
Dimethyl phthalate, total	1,2-Diphenylhydrazine, total recoverable
Dinoctyl phthalate, total	1,3-Dichlorobenzene, total
Fluoranthene, total	1,4-Dichlorobenzene, total
Fluorene, total	2,4-Dinitrotoluene, total
Hexachlorobenzene, total	2,6-Dinitrotoluene, total
Hexachlorobutadiene, total	2-Chloronaphthalene, total
Hexachlorocyclopentadiene, total	3,3'-Dichlorobenzidine, total
Hexachloroethane, total	4-Bromophenylphenylether, total
Indeno(1,2,3-cd)pyrene, total	4-Chlorophenylphenylether, total

ACID ORGANIC COMPOUNDS	
Parachlorometa cresol, total	2,4-Dinitrophenol, total
Pentachlorophenol, total	2-Chlorophenol, total
Phenol, total	2-Nitrophenol, total
2,4,6-Trichlorophenol, total	4,6-Dinitroorthocresol, total
2,4,Dimethylphenol, total	4-Nitrophenol, total
2,4-Dichlorophenol, total	

PESTICIDE ORGANIC COMPOUNDS	
Aldrin, total	Endosulfan, total ug/L
Aroclor 1016 PCB, total	Endrin, total
Aroclor 1221 PCB, total	Heptachlor epoxide, total
Aroclor 1232 PCB, total	Heptachlor, total
Aroclor 1242 PCB, total	Lindane, total
Aroclor 1248 PCB, total	Methoxychlor, total
Aroclor 1254 PCB, total	Mirex, total
Aroclor 1260 PCB, total	PCB, total
Chlordane, total	Perthane, total
DDD, total	Silvex, total
DDE, total	Toxaphene, total
DDT, total	2,4-D, total
Deildrin, total	

Table 7.--Laboratory methods used for analysis of samples from selected stormwater outfalls in Jefferson County, Kentucky, January 1991-May 1992

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

Constituent or property and unit	Method	USEPA method number
pH and alkalinity:		
pH	Electrometric, glass electrode	150.1
Alkalinity, in mg/L as $CaCO_3$	Electrometric titration to pH 4.5	310.1
Fecal indicator bacteria:		
Coliform, fecal, in colonies per 100 milliliters	Membrane filtered, M-FC medium at 44.5 degrees Celsius	none
Streptococci, fecal, in colonies per 100 milliliters	Membrane filtered, KF agar at 35 degrees Celsius	none
Dissolved solids and related water-quality constituents and characteristics:		
Dissolved solids, in mg/L	Residue on evaporation at 105 degrees Celsius, dissolved, gravimetric	160.3
Specific conductance, in microsiemens per centimeter at 25 degrees Celsius	Wheatstone bridge	120.1
Calcium, total, in mg/L as Ca	Atomic emission spectrometric, induction-coupled argon plasma	200.7
Magnesium, total, in mg/L as Mg	Atomic emission spectrometric, induction-coupled argon plasma	200.7
Residual chlorine	Colorimetric	
Sulfate	Ion chromatographic technique	
Suspended solids:		
Suspended solids, in mg/L	Residue on evaporation at 105 degrees Celsius, suspended, gravimetric	160.2

Table 7.--Laboratory methods used for analysis of samples from selected stormwater outfalls in Jefferson County, Kentucky, January 1991-May 1992--Continued

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

Constituent or property and unit	Method	USEPA method number
Suspended solids--Continued:		
Residue, volatile nonfilterable, in mg/L	Volatile-on-ignition, suspended, gravimetric	160.4
Major metals, trace elements, and miscellaneous inorganic compounds:		
Arsenic, total, in μg/L as As	Digestion, graphite furnace, atomic absorption	206.2
Barium, total, in μg/L as Ba	Atomic emission spectrometric, induction-coupled argon plasma	200.7
Beryllium, total, in μg/L as Be	Atomic emission spectrometric, induction-coupled argon plasma	200.7
Cadmium, total, in μg/L as Cd	Atomic emission spectrometric, induction-coupled argon plasma	200.7
Chromium, total, in μg/L as Cr	Atomic emission spectrometric, induction-coupled argon plasma	200.7
Copper, total, in μg/L as Cu	Atomic emission spectrometric, induction-coupled argon plasma	200.7
Iron, total, in μg/L as Fe	Atomic emission spectrometric, induction-coupled argon plasma	200.7
Lead, total, in μg/L as Pb	Atomic emission spectrometric, induction-coupled argon plasma	200.7
Mercury, total recoverable, in μg/L as Hg	Atomic absorption spectrometric, flameless	245.1
Nickel, total, in μg/L as Ni	Atomic emission spectrometric, induction-coupled argon plasma	200.7
Selenium, total, in μg/L as Se	Digestion, graphite furnace, atomic absorption	270.2

Table 7.--Laboratory methods used for analysis of samples from selected stormwater outfalls in Jefferson County, Kentucky, January 1991-May 1992--Continued

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

Constituent or property and unit	Method	USEPA method number
Major metals, trace elements, and miscellaneous inorganic compounds--Continued:		
Silver, total, in µg/L as Ag	Atomic emission spectrometric, induction-coupled argon plasma	200.7
Zinc, total, in µg/L as Zn	Atomic emission spectrometric, induction-coupled argon plasma	200.7
Cyanide, total, in µg/L as CN	Colorimetric, barbituric acid	335.2
Nutrients:		
Nitrogen, ammonia, total, in mg/L as N	Electrometric, ion-selective electrode	350.3
Nitrogen, nitrate, total, in mg/L as N	Cadmium reduction	353.2
Nitrogen, nitrite, total, in mg/L as N	Colorimetric, diazotization, automated	354.1
Nitrogen, organic plus ammonia, total, in mg/L as N	Titrimetric, digestion-distillation, electrode	351.3
Phosphorus, total, in mg/L as P	Colorimetric, phosphomolybdate	365.2
Phosphorus, orthophosphate, total, in mg/L as P	Colorimetric, phosphomolybdate	365.2
Dissolved oxygen and oxygen demand:		
Dissolved oxygen, in mg/L	Winkler	360.2
Biochemical oxygen demand, in mg/L	Dissolved oxygen depletion, 5-day at 20 degrees Celsius	405.1
Chemical oxygen demand, in mg/L	Titrimetric, 0.25 N dichromate oxidation	410.1

Table 7.--Laboratory methods used for analysis of samples from selected stormwater outfalls in Jefferson County, Kentucky, January 1991-May 1992--Continued

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

Constituent or property and unit	Method	USEPA method number
Synthetic organic compounds, composite samples:		
Chlordane, total, in μg/L	Hexane extraction, gas chromatograph with flame-photometric detectors	608
Endrin, total, in μg/L	Hexane extraction, gas chromatograph with flame-photometric detectors	608
Lindane, total, in μg/L	Hexane extraction, gas chromatograph with flame-photometric detectors	608
Methoxychlor, total, in μg/L	Hexane extraction, gas chromatograph with flame-photometric detectors	608
Toxophene, total, in μg/L	Hexane extraction, gas chromatograph with flame-photometric detectors	608
2,4-D, total, in μg/L	Gas chromatograph with electron capture detectors	625
2,4,5-TP (Silvex), total, in μg/L	Gas chromatograph with electron capture detectors	625
Synthetic organic compounds, first-flush samples:		
Volatiles.--USGS procedure similar to USEPA method 624, but capillary column gas chromatography used as specified in USEPA method 524. The detector is mass spectrometer. Reporting limit is 0.2 μg/L.		
Acid compounds, and base/neutral compounds.--USGS procedure similar to USEPA method 625 by use of capillary column gas chromatography coupled with mass spectrometry.		
Pesticides.--USEPA method 608 with packed columns replaced by capillary columns for better resolution. Electron capture detectors used for analysis.		

Table 8.--Comparison of split-sample analyses by the Louisville and Jefferson County Metropolitan Sewer District laboratory and the U.S. Geological Survey laboratory, January 1991-May 1992

[Comparisons computed as P = ((M - U) / M) * 100), where P is percentage difference, M is Louisville and Jefferson County Metropolitan Sewer District laboratory value; and U is U.S. Geological Survey laboratory value]

Water-quality constituent or property	Number of comparisons	Mean percentage difference	Standard deviation of P	Variance of P
pH and alkalinity:				
pH	32	-0.3	1.9	3.5
Alkalinity, total as $CaCO_3$	46	.3	7.5	57.0
Oxygen demand:				
Chemical oxygen demand	42	-40.3	82.6	6,820
Dissolved and suspended solids:				
Dissolved solids	46	1.3	37.0	1,370
Suspended solids	44	-97.1	269	72,300
Residue, volatile nonfiltrable	37	-176	385	148,000
Nutrients:				
Nitrate, total as N	43	-3.7	118	13,800
Nitrite, total as N	43	-4.0	58.1	3,380
Nitrogen, ammonia, total as N	46	9.9	117	13,700
Phosphorus, total as P	45	16.2	30.2	911
Phosphorus, total ortho as P	44	13.8	38.7	1,500
Major metals, trace elements, and miscellaneous inorganic compounds:				
Arsenic, total as As	9	0	0	0
Barium, total as Ba	9	4.8	14.5	210
Cadmium, total as Cd	9	0	0	0
Chromium, total as Cr	8	43.5	46.6	2,170
Copper, total as Cu	5	0	0	0
Iron, total as Fe	9	32.2	27.3	744
Lead, total as Pb	9	0	0	0
Mercury, total as Hg	9	-78.5	229	52,300
Nickel, total as Ni	6	0	0	0
Selenium, total as Se	9	0	0	0
Zinc, total as Zn	6	79.3	16.8	282
Cyanide, dissolved as CN	9	5.6	16.7	278
Synthetic organic compounds:				
Chlordane, total	8	0	0	0
Endrin, total	8	0	0	0
Lindane, total	8	12.5	23.1	536
Methoxychlor, total	8	0	0	0
Silvex, total	9	15.1	31.2	975
Toxaphene, total	8	0	0	0
2,4-D, total	5	0	0	0

Table 9.--Rainfall intensity, duration, and totals associated with stormwater samples collected in Jefferson County, Kentucky, January 1991-May 1992

[R3, rainfall in inches, from beginning of storm to the end of the first 3 hours of flow; I3, rainfall intensity in inches per 5-minute interval, from beginning of storm to the end of the first 3 hours of flow]

Site	Date and time rainfall began	Date and time rainfall ended	R3	I3	Total storm rainfall, in inches	Time since previous rain, in hours	Rain gages used for assessment[a]
SR1	910115 @ 1650	910116 @ 0250	0.16	0.01	0.18	97.0	RG14
SR1	910419 @ 0320	910419 @ 0436	.22	.03	.22	82.9	RG14, RG20, RG22, RG27
SR1	911005 @ 0458	911005 @ 0840	.35	.08	.40	246.2	RG8, RG22
SR2	910205 @ 1056	910207 @ 0155	.15	.04	1.60	146.1	RG14, RG20
SR2	910419 @ 0320	910419 @ 0436	.22	.03	.22	91.9	RG14, RG20, RG22, RG27
SR2	911005 @ 0455	911005 @ 0838	.40	.16	.44	246.5	RG3, RG4
SR3	910301 @ 1458	910301 @ 2100	.20	.01	.22	268.6	RG14, RG20
SR3	910904 @ 0815	910904 @ 2035	.56	.11	1.41	128.2	RG27
SR3	911212 @ 1222	911213 @ 1845	.04	.02	[b]1.34	71.5	RG8, RG27
SR4	910312 @ 1325	910314 @ 0600	.21	.02	.92	141.2	RG14, RG20
SR4	920212 @ 1426	920213 @ 0958	.08	.01	.48	705.8	RG14, RG24, RG25
SR4	920317 @ 2105	920319 @ 1440	.12	.01	1.74	181.2	RG14, RG24, RG25
SR4	920415 @ 0552	920415 @ 1213	.55	.06	.57	109.5	RG14, RG24, RG25
SR5	910327 @ 1050	910327 @ 1110	.03	.01	.03	116.0	RG20
SR5	910621 @ 1228	910621 @ 1440	.92	.20	.92	18.4	RG9, RG18
SR5	920108 @ 1315	920108 @ 1440	.05	.01	.05	123.5	RG9, RG18, RG23
SR5	920317 @ 2040	920319 @ 1500	.18	.02	2.54	181.0	RG23
SR5	920512 @ 1650	920513 @ 0140	.30	.02	.61	74.3	RG23
SR6	910404 @ 1302	910404 @ 2034	.08	.01	.13	310.2	RG14, RG20, RG22, RG27
SR6	910708 @ 1915	910708 @ 1950	.10	.06	.10	60.1	RG8, RG11
SR6	911212 @ 1149	911213 @ 1915	.04	.02	[c]2.32	70.6	RG8, RG11, RG27, RG28

[a] Location of rain gages shown on figure 5.

[b] Channel went dry briefly 911212 @ 1700--Rain prior to 1700 was 0.04 inches.

[c] Channel went dry briefly 911212 @ 1630--Rain prior to 1630 was 0.04 inches.

Table 10.--Runoff duration and volume associated with stormwater samples collected in Jefferson County, Kentucky, January 1991-May 1992

[--, unknown]

Site	Date and time runoff began	Date and time of first-flush sample	Date and time runoff ended	Runoff during first 3 hours, in cubic feet	Runoff after first 3 hours, in cubic feet
SR1	910115 @ 1715	910115 @ 1800	--	3,654	--
SR1	910419 @ 0345	910419 @ 0400	910419 @ 0740	7,672	106
SR1	911005 @ 0510	911005 @ 0525	911005 @ 0900	9,428	974
SR2	910205 @ 1205	910205 @ 1235	--	5,535	--
SR2	910419 @ 0345	910419 @ 0415	910419 @ 0725	16,020	510
SR2	911005 @ 0500	911005 @ 0515	911006 @ 0200	15,840	1,020
SR3	910301 @ 1515	910301 @ 1530	910301 @ 2215	10,492	4,290
SR3	910904 @ 0815	910904 @ 0830	910905 @ 0700	28,338	143,280
SR3	911212 @ 1300	911212 @ 1330	--	1,659	[a]--
SR4	910312 @ 1600	910312 @ 1615	910314 @ 0100	7,088	66,240
SR4	920212 @ 1550	920212 @ 1605	920213 @ 1900	4,571	31,176
SR4	920317 @ 2220	920317 @ 2320	920319 @ 2230	6,048	471,600
SR4	920415 @ 0845	920415 @ 0945	920416 @ 0200	12,975	17,890
SR5	910327 @ 1045	910327 @ 1100	910328 @ 0600	3,559	7,452
SR5	910621 @ 1230	910621 @ 1250	910622 @ 0115	92,400	12,900
SR5	920108 @ 1500	920108 @ 1515	--	100	--
SR5	920317 @ 2145	920317 @ 2215	920319 @ 2230	2,712	376,200
SR5	920512 @ 1715	920512 @ 1730	920513 @ 0845	9,390	15,300
SR6	910404 @ 1330	910404 @ 1345	910404 @ 1700	3,195	60
SR6	910708 @ 1915	910708 @ 1923	910708 @ 2105	24,570	0
SR6	911212 @ 1245	911212 @ 1300	--	2,306	[b]--

[a] Channel dry briefly 911212 @ 1700--Runoff after first 3 hours was 230 cubic feet.

[b] Channel dry briefly 911212 @ 1630--Runoff after first 3 hours was 68 cubic feet.

Table 11.--Water-quality field analyses made during stormwater sampling at selected stormwater outfalls in Jefferson County, Kentucky, January 1991-May 1992

[Q, outfall discharge, in cubic feet per second; Temp, temperature, in degrees Celsius; Cond, specific conductance, in microsiemens per centimeter at 25 degrees Celsius; DO, dissolved-oxygen concentration, in milligrams per liter; --, missing]

Time	Q	Temp	Cond	DO	pH
Site SR1 January 15, 1991					
1715	0	--	--	--	--
1800	.70	--	192	--	7.2
1815	.62	--	108	--	7.4
1830	.57	--	90	--	7.4
1845	.56	--	92	--	7.5
1900	.38	--	102	--	7.4
1915	.17	--	119	--	7.4
1930	.15	--	137	--	7.4
1945	.13	--	152	--	7.5
2000	.10	--	170	--	7.6
2015	.08	--	191	--	7.8
2030	.07	--	207	--	7.5
2045	.06	--	230	--	7.6
Site SR1 April 19, 1991					
0345	0	--	--	--	--
0348	.38	--	--	--	--
0350	.44	--	--	--	--
0353	.70	--	--	--	--
0356	.92	--	--	--	--
0400	1.7	15.5	--	--	--
0405	1.6	--	--	--	--
0408	1.8	--	--	--	--
0415	1.5	15.5	73	--	7.3
0420	1.7	--	--	--	--
0425	1.7	--	--	--	--
0430	1.5	15.5	63	--	7.2
0445	1.1	15.0	61	--	7.6
0456	1.0	--	--	--	--
0500	.92	15.0	64	--	7.1
0515	.70	15.0	67	--	7.1
0522	.56	--	--	--	--
0530	.50	15.0	74	--	7.0
0545	.31	15.0	81	--	7.1
0600	.17	15.0	99	--	7.1
0615	.13	15.0	99	--	7.0
0630	.08	15.0	110	--	7.0
0645	.06	15.0	121	--	7.1
0700	.05	15.0	--	--	--
0715	.03	15.0	146	--	7.1
0740	0	--	--	--	--
Site SR1 October 5, 1991					
0510	0	--	--	--	--
0515	.13	--	--	--	--
0520	1.4	--	--	--	--
0525	1.7	20.7	83	8.1	8.1
0530	1.7	--	--	--	--
0535	1.6	--	--	--	--
0540	1.5	20.6	72	8.0	7.7
0545	1.3	--	--	--	--
0550	1.1	--	--	--	--
0555	.84	20.1	72	7.2	7.5
0600	.70	--	--	--	--
0605	.63	--	--	--	--
0610	.63	20.4	77	7.1	7.2
0615	.50	--	--	--	--
0620	.44	--	--	--	--
0625	.50	20.1	80	6.8	7.3
0630	.57	--	--	--	--
0635	.63	--	--	--	--
0640	.63	20.2	76	7.1	7.4
0645	.70	--	--	--	--
0650	.84	--	--	--	--
0655	1.0	20.3	68	7.2	7.3
0700	1.2	--	--	--	--
0705	1.3	--	--	--	--
0710	1.3	20.2	63	7.2	7.4
0715	1.1	--	--	--	--
0720	1.1	--	--	--	--
0725	1.1	20.2	55	7.3	7.5
0730	1.1	--	--	--	--
0735	1.0	--	--	--	--
0740	1.0	20.1	53	7.3	7.6
0745	.70	--	--	--	--
0750	.57	--	--	--	--
0755	.44	20.0	57	7.3	7.4
0800	.37	--	--	--	--
0805	.37	--	--	--	--
0810	.25	19.5	62	7.1	7.3
0900	.13	--	--	--	--
1000	.06	--	--	--	--
1100	.03	--	--	--	--
1200	.02	--	--	--	--
1300	.02	--	--	--	--
1400	.02	--	--	--	--
1500	.01	--	--	--	--
2400	.01	--	--	--	--
0100	.01	--	--	--	--
0530	0	--	--	--	--

Table 11.--Water-quality field analyses made during stormwater sampling at selected stormwater outfalls in Jefferson County, Kentucky, January 1991-May 1992--Continued

[Q, outfall discharge, in cubic feet per second; Temp, temperature, in degrees Celsius; Cond, specific conductance, in microsiemens per centimeter at 25 degrees Celsius; DO, dissolved-oxygen concentration, in milligrams per liter; --, missing]

Time	Q	Temp	Cond	DO	pH
Site SR2 February 5, 1991					
1205	0	--	--	--	--
1235	.36	--	764	--	6.6
1250	.41	--	519	--	7.2
1305	.55	--	403	--	7.3
1320	.70	--	251	--	7.8
1350	.70	--	171	--	8.2
1405	.60	--	170	--	8.1
1420	.60	--	182	--	7.9
1435	.55	--	195	--	7.8
1450	.51	--	214	--	7.6
1505	.51	--	217	--	7.6
Site SR2 April 19, 1991					
0345	0	--	--	--	--
0405	1.7	13.9	117	--	--
0410	2.0	13.9	88	--	--
0415	2.4	--	--	--	--
0425	3.4	13.3	55	--	--
0430	3.4	13.0	55	--	--
0435	3.4	12.9	53	--	--
0440	3.4	12.9	49	--	--
0445	3.4	12.8	47	--	--
0453	3.0	--	--	--	--
0455	2.9	12.6	48	--	--
0500	2.0	12.6	50	--	--
0505	1.7	12.4	52	--	--
0510	1.2	12.4	54	--	--
0515	.90	12.4	57	--	--
0520	.90	12.5	58	--	--
0525	.90	12.5	59	--	--
0530	.90	12.6	58	--	7.2
0535	.83	12.8	64	--	--
0540	.83	12.8	64	--	--
0545	.75	12.8	66	--	7.2
0550	.83	12.8	67	--	--
0555	.78	12.7	68	--	--
0600	.75	12.7	70	--	7.3
0605	.75	12.8	71	--	--
0610	.75	12.8	73	--	--
0615	.70	12.9	74	--	7.3
0620	.70	12.7	76	--	--
0625	.70	12.7	77	--	--
0630	.65	12.7	79	--	7.2
0635	.65	12.7	80	--	--
0640	.60	12.7	82	--	--
0645	.60	12.7	84	--	7.2
0650	.55	12.7	84	--	--
0655	.45	12.7	86	--	--
0700	.40	12.7	87	--	7.2
0725	0	--	--	--	--
Site SR2 October 5, 1991					
0500	0	--	--	--	--
0515	2.2	19.5	206	--	7.5
0530	1.2	19.1	131	--	7.3
0535	1.0	--	--	--	--
0540	1.0	--	--	--	--
0545	1.2	18.9	141	--	7.3
0555	.84	--	--	--	--
0600	.84	18.8	144	--	7.3
0605	1.2	--	--	--	--
0610	2.2	--	--	--	--
0615	2.7	18.9	97	--	7.4
0620	1.7	--	--	--	--
0625	1.4	--	--	--	--
0630	1.4	18.6	98	--	7.4
0635	1.4	--	--	--	--
0640	1.4	--	--	--	--
0645	1.4	18.6	88	--	7.5
0650	2.0	--	--	--	--
0655	1.9	--	--	--	--
0700	1.7	18.6	79	--	7.5
0705	2.0	--	--	--	--
0710	2.0	--	--	--	--
0715	2.9	18.6	71	--	7.7
0720	2.7	--	--	--	--
0725	1.9	--	--	--	--
0730	1.6	18.5	73	--	7.6
0735	1.2	--	--	--	--
0740	.95	--	--	--	--
0745	.84	18.4	83	--	7.7
0750	.72	--	--	--	--
0755	.68	--	--	--	--
0800	.59	18.4	94	--	7.8
0805	.50	--	--	--	--
0810	.46	--	--	--	--
0815	.40	18.3	98	--	--

Table 11.--Water-quality field analyses made during stormwater sampling at selected stormwater outfalls in Jefferson County, Kentucky, January 1991-May 1992--Continued

[Q, outfall discharge, in cubic feet per second; Temp, temperature, in degrees Celsius; Cond, specific conductance, in microsiemens per centimeter at 25 degrees Celsius; DO, dissolved-oxygen concentration, in milligrams per liter; --, missing]

Time	Q	Temp	Cond	DO	pH
Site SR3 March 1, 1991					
1515	0	--	--	--	--
1530	.75	11.0	349	--	7.6
1545	.94	--	172	--	7.8
1600	.69	11.0	157	--	7.6
1615	.87	11.0	261	--	8.0
1630	.94	11.0	195	--	7.8
1645	.87	11.0	203	--	8.1
1700	1.1	11.0	195	--	8.2
1715	1.1	11.0	226	--	8.0
1730	1.1	11.0	257	--	8.0
1745	1.1	11.0	291	--	8.1
1800	1.7	11.0	222	--	8.1
1815	1.2	11.0	318	--	8.2
Site SR3 September 4, 1991					
0815	0	--	--	--	--
0830	.29	23.3	630	6.4	6.8
0837	.29	--	--	--	--
0845	.25	--	--	--	7.0
0900	.34	23.2	592	7.4	7.0
0907	.34	--	--	--	--
0915	.29	23.7	561	7.4	7.2
0930	.18	23.6	573	7.4	7.0
0941	.11	--	--	--	--
0945	.34	24.0	580	7.4	7.2
0955	8.3	--	--	--	--
1000	7.2	24.3	77	7.6	7.5
1002	4.9	23.2	592	7.4	7.0
1004	5.0	--	--	--	--
1006	--	24.0	188	7.4	--
1008	4.4	--	--	--	--
1012	4.4	--	--	--	--
1015	4.0	24.1	124	7.3	7.4
1023	4.9	--	--	--	--
1025	5.4	--	--	--	--
1030	4.6	24.2	125	7.4	7.3
1034	8.1	--	--	--	--
1045	4.2	24.1	177	7.2	7.2
1055	3.4	--	--	--	--
1100	4.5	24.2	144	7.4	7.2
1115	6.2	23.9	136	7.2	7.2
1126	6.3	--	--	--	--
1130	13	--	--	--	--
1137	15	--	--	--	--
Site SR3 December 12, 1991					
1300	0	--	--	--	--
1330	.26	11.6	109	--	7.8
1345	.26	11.5	150	--	8.0
1400	.22	11.5	299	--	8.0
1415	.14	11.5	429	--	8.0
1430	.14	11.5	440	--	8.3
1445	.11	11.4	416	--	8.3
1500	.14	11.6	460	--	8.4
1515	.14	11.6	442	--	8.3
1530	.14	11.5	378	--	8.2
1545	.11	11.5	--	--	8.0
1600	.11	11.5	--	--	8.1
1615	.08	11.6	362	--	8.2
1630	.08	11.5	403	--	8.2
1700	0	--	--	--	--

Table 11.--Water-quality field analyses made during stormwater sampling at selected stormwater outfalls in Jefferson County, Kentucky, January 1991-May 1992--Continued

[Q, outfall discharge, in cubic feet per second; Temp, temperature, in degrees Celsius; Cond, specific conductance, in microsiemens per centimeter at 25 degrees Celsius; DO, dissolved-oxygen concentration, in milligrams per liter; --, missing]

Time	Q	Temp	Cond	DO	pH
Site SR4 March 12-14, 1991					
1600	0	--	--	--	--
1615	.07	8.5	1,080	--	7.6
1630	.07	8.5	962	--	7.5
1645	.13	9.0	575	--	7.4
1700	.27	9.0	918	--	7.5
1715	.30	9.0	905	--	7.4
1730	.27	9.0	752	--	7.5
1745	.38	9.0	624	--	7.4
1800	.76	9.0	436	--	7.6
1815	1.3	9.0	353	--	7.8
1830	1.7	9.0	--	--	--
1845	1.7	9.0	--	--	--
1900	1.4	9.0	154	--	7.8
2000	1.0	--	168	--	8.3
2100	2.3	--	109	--	8.2
2200	2.0	--	150	--	8.3
2300	1.5	--	173	--	8.3
2400	1.1	--	260	--	8.2
(March 13)					
0100	1.0	--	240	--	8.2
0200	.76	--	194	--	8.3
0300	.62	--	288	--	8.1
0400	.53	--	362	--	8.1
0500	.47	--	420	--	8.0
0600	.42	--	452	--	7.9
0700	1.0	--	486	--	7.9
0800	.76	--	355	--	8.0
0900	.62	--	217	--	8.0
1000	.53	--	298	--	7.8
1100	.47	--	370	--	7.9
1200	.42	--	--	--	--
1600	.22	--	--	--	--
2000	.08	--	--	--	--
2400	.02	--	--	--	--
(March 14)					
0100	0	--	--	--	--
Site SR4 March 17-19, 1992					
2220	0	--	--	--	--
2320	.60	11.5	186	--	--
2335	.50	11.4	195	--	--
2350	.38	11.3	207	--	--
(March 18)					
0005	.38	11.3	213	--	--
0020	.38	11.2	220	--	--
0035	.27	11.2	231	--	--
0050	.27	11.1	242	--	--
0105	.25	11.0	250	--	--
0120	.23	11.0	258	--	--
0135	.23	10.9	267	--	--
0150	.21	10.7	273	--	--
0205	.21	10.7	272	--	--
0220	.19	10.6	270	--	--
0400	.22	--	--	--	--
0600	.41	--	--	--	--
0800	1.3	--	--	--	--
1000	3.4	--	--	--	--
1200	6.4	--	--	--	--
1400	17	--	--	--	--
1600	20	--	--	--	--
1800	6.9	--	--	--	--
2000	1.9	--	--	--	--
2200	2.2	--	--	--	--
2400	3.6	--	--	--	--
(March 19)					
0200	1.0	--	--	--	--
0400	.60	--	--	--	--
0600	.30	--	--	--	--
2230	0	--	--	--	--
Site SR4 February 12-13, 1992					
1535	0	--	--	--	--
1600	.01	--	--	--	--
1605	.02	--	--	--	--
1620	.04	3.0	386	--	7.0
1630	.05	--	--	--	--
1635	.08	3.0	414	--	7.2
1650	.24	--	328	--	7.0
1655	.38	--	--	--	--
1700	.49	3.0	--	--	--
1705	.62	--	441	--	7.4
1715	.69	--	--	--	--
1720	.69	3.0	349	--	7.5
1725	.73	--	--	--	--
1730	.76	--	--	--	--
1735	.76	--	255	--	7.6
1740	.80	3.5	--	--	--
1750	.73	--	192	--	7.7
1755	.69	3.5	--	--	--
1805	.66	--	164	--	7.6
1820	.59	3.5	150	--	7.6
1835	.49	--	142	--	7.6
1850	.44	--	144	--	7.5
1930	.23	--	--	--	--
2100	.14	--	--	--	--
2130	.13	--	--	--	--
2230	.24	--	--	--	--
2300	.38	--	--	--	--
2400	.40	--	--	--	--
(February 13)					
0030	.73	--	--	--	--
0130	.76	--	--	--	--
0200	.73	--	--	--	--
0300	.53	--	--	--	--
0430	.21	--	--	--	--
0600	.14	--	--	--	--
0630	.17	--	--	--	--
0730	.66	--	--	--	--
0800	.53	--	--	--	--
0900	1.23	--	--	--	--
0930	1.15	--	--	--	--
1030	.53	--	--	--	--
1200	.27	--	--	--	--
1315	.21	--	--	--	--
1900	0	--	--	--	--
Site SR4 April 15, 1992					
0845	0	--	--	--	--
0945	.88	13.6	298	--	7.5
1000	1.0	13.5	247	--	7.5
1015	1.1	13.5	209	--	7.6
1030	1.2	13.6	212	--	7.6
1045	1.8	13.5	172	--	7.8
1100	2.0	13.5	146	--	7.8
1115	2.3	13.5	155	--	7.8
1130	2.1	13.5	125	--	7.8
1145	1.9	13.5	125	--	7.8
1200	1.8	13.5	131	--	7.7
1215	1.6	13.5	145	--	7.6
1230	1.3	13.6	174	--	7.6
1245	1.0	13.8	203	--	7.6

Table 11.--Water-quality field analyses made during stormwater sampling at selected stormwater outfalls in Jefferson County, Kentucky, January 1991-May 1992--Continued

[Q, outfall discharge, in cubic feet per second; Temp, temperature, in degrees Celsius; Cond, specific conductance, in microsiemens per centimeter at 25 degrees Celsius; DO, dissolved-oxygen concentration, in milligrams per liter; --, missing]

Time	Q	Temp	Cond	DO	pH
Site SR5 March 27-28, 1991					
1045	0	--	--	--	--
1100	.39	14.5	400	--	7.4
1115	.58	15.0	--	--	7.8
1130	.56	15.5	324	--	7.5
1145	.43	15.5	379	--	7.5
1200	.39	15.5	336	--	7.4
1215	.33	15.5	278	--	7.4
1230	.29	15.1	255	--	7.3
1245	.21	15.1	231	--	7.3
1300	.21	15.1	224	--	7.2
1315	.21	15.1	214	--	7.2
1330	.21	15.1	205	--	7.3
1345	.21	15.1	203	--	7.3
1400	.19	--	221	--	7.4
1500	.17	--	203	--	7.4
1600	.17	--	201	--	7.4
1700	.19	--	205	--	7.4
1800	.19	--	208	--	7.6
1900	.17	--	207	--	7.6
2000	.17	--	217	--	7.6
2100	.14	--	219	--	7.7
2200	.14	--	222	--	7.7
2300	.12	--	222	--	7.6
2400	.12	--	230	--	7.7
(March 28)					
0100	.12	--	240	--	7.7
0200	.10	--	--	--	--
0300	.08	--	--	--	--
0400	.04	--	--	--	--
0500	.02	--	--	--	--
0600	0	--	--	--	--
Site SR5 June 21-22, 1991					
1230	0	--	--	--	--
1250	32	--	--	--	8.0
1258	24	23.5	35	--	--
1301	22	--	--	--	--
1305	20	23.4	48	--	7.7
1309	18	--	--	--	--
1314	16	--	--	--	--
1318	15	--	--	--	--
1320	14	23.4	53	--	7.4
1323	13	--	--	--	--
1327	11	--	--	--	--
1335	8.1	23.4	58	--	7.3
1340	6.4	--	--	--	--
1345	5.6	--	--	--	--
1350	5.3	23.5	64	--	7.2
1400	5.1	--	--	--	--
1405	5.1	23.9	68	--	7.3
1417	5.1	--	--	--	--
1420	4.6	24.1	69	--	7.3
1435	3.4	24.1	78	--	7.3
1440	3.0	--	--	--	--
1450	2.2	24.1	88	--	7.4
1505	2.1	24.1	99	--	7.4
1510	1.9	--	--	--	--
1515	1.7	--	--	--	--
1520	1.6	24.1	107	--	7.3
1535	1.4	24.1	114	--	7.4
1545	1.3	--	--	--	--
1551	1.2	--	--	--	--
1600	1.0	--	--	--	--
1630	.86	--	147	--	7.3
1700	.68	--	158	--	7.3
1730	.60	--	158	--	7.4
1800	.52	--	160	--	7.3
1830	.43	--	173	--	7.2
1900	.37	--	179	--	7.5
1930	.33	--	185	--	7.3
2000	.31	--	183	--	7.3
2030	.27	--	182	--	7.5
2100	.25	--	--	--	--
2200	.19	--	--	--	--
2300	.12	--	--	--	--
2400	.08	--	--	--	--
(June 22)					
0115	0	--	--	--	--
Site SR5 January 8, 1992					
1500	0	--	--	--	--
1515	.01	6.4	268	6.3	7.1
1525	.01	--	--	--	--
1530	.01	6.9	268	3.9	7.2
1540	.01	--	--	--	--
1545	.01	7.0	293	4.6	7.4
1600	.01	6.9	285	4.8	7.4
1615	.01	7.4	275	4.8	7.4
1630	.01	7.4	270	4.5	7.4
1645	.01	7.2	273	4.3	7.3
1700	.01	7.4	287	3.8	7.4
1715	.01	7.4	294	3.7	7.2
1730	.01	7.6	285	4.1	7.2
1745	.01	7.5	284	4.3	7.3
1800	.01	7.6	291	5.2	7.4
Site SR5 March 17-19, 1992					
2215	0	--	--	--	--
2215	.40	--	--	--	--
2220	.27	--	--	--	--
2225	.24	--	--	--	--
2230	.24	--	--	--	--
2235	.19	--	--	--	--
2240	.17	--	--	--	--
2245	.13	--	--	--	--
2250	.12	--	--	--	--
2255	.11	--	--	--	--
2300	.11	--	--	--	--
2305	.11	--	--	--	--
2310	.08	--	--	--	--
2315	.08	--	--	--	--
2320	.07	--	--	--	--
2325	.06	--	--	--	--
2330	.05	--	--	--	--
2340	.05	--	--	--	--
2345	.05	--	--	--	--
2400	.03	--	--	--	--
(March 18)					
0015	.03	11.5	--	--	--
0030	.03	--	--	--	--
0045	.03	--	--	--	--
0100	.02	--	--	--	--
0200	.02	--	--	--	--
0400	.01	--	--	--	--
0600	.24	--	--	--	--
0800	.89	--	--	--	--
1000	6.6	--	--	--	--
1200	13	--	--	--	--
1400	20	--	--	--	--
1600	3.3	--	--	--	--
1800	.76	--	--	--	--
2000	.24	--	--	--	--
2200	.70	--	--	--	--
2400	5.2	--	--	--	--
(March 19)					
0200	.95	--	--	--	--
0400	.40	--	--	--	--
0600	.27	--	--	--	--
0800	.11	--	--	--	--
1000	.06	--	--	--	--
1200	.04	--	--	--	--
1400	.05	--	--	--	--
1600	.02	--	--	--	--
1800	.01	--	--	--	--
2000	.01	--	--	--	--
2230	0	--	--	--	--

Table 11.--Water-quality field analyses made during stormwater sampling at selected stormwater outfalls in Jefferson County, Kentucky, January 1991-May 1992--Continued

[Q, outfall discharge, in cubic feet per second; Temp, temperature, in degrees Celsius; Cond, specific conductance, in microsiemens per centimeter at 25 degrees Celsius; DO, dissolved-oxygen concentration, in milligrams per liter; --, missing]

Time	Q	Temp	Cond	DO	pH
Site SR5 May 12-13, 1992					
1715	0	--	--	--	--
1720	.04	17.9	254	--	7.2
1725	.37	17.7	308	--	7.1
1730	.70	19.1	200	--	7.2
1737	.70	20.1	154	--	--
1745	1.1	20.3	123	--	7.4
1749	1.6	20.1	130	--	--
1800	1.6	20.3	112	--	7.5
1805	1.6	20.4	91	--	--
1815	1.4	20.7	67	--	7.6
1830	1.4	20.7	57	--	7.4
1845	1.2	20.6	55	--	7.4
1900	1.1	20.5	56	--	7.6
1915	.68	20.4	55	--	7.4
1923	.60	--	--	--	--
1930	.45	20.2	55	--	7.2
1935	.42	--	--	--	--
1942	.40	--	--	--	--
1945	.37	20.1	56	--	7.2
2000	.31	20.0	59	--	7.2
2003	.27	--	--	--	--
2010	.24	--	--	--	--
2015	.24	19.8	66	--	7.2
2100	.12	--	--	--	--
2200	.04	--	--	--	--
2310	.02	--	--	--	--
2315	.45	--	--	--	--
2325	5	--	--	--	--
2330	4.3	--	--	--	--
2345	2.5	--	--	--	--
2400	1.9	--	--	--	--
(May 13)					
0015	1.7	--	--	--	--
0100	.63	--	--	--	--
0200	.17	--	--	--	--
0300	.05	--	--	--	--
0400	.03	--	--	--	--
0600	.02	--	--	--	--
0845	0	--	--	--	--

Time	Q	Temp	Cond	DO	pH
Site SR6 April 4, 1991					
1330	0	--	--	--	--
1345	.15	15.0	233	--	7.3
1400	1.1	15.0	--	--	--
1415	.89	15.0	--	--	--
1430	.40	15.0	125	--	8.0
1445	.17	15.0	131	--	7.9
1500	.09	15.0	140	--	8.0
1515	.08	15.0	158	--	8.0
1530	.07	15.0	167	--	8.0
1545	.11	15.0	156	--	8.0
1600	.09	14.5	148	--	8.1
1615	.07	14.5	150	--	8.0
1630	.07	14.0	161	--	8.0
1700	0	--	--	--	--
Site SR6 July 8, 1991					
1915	0	--	--	--	--
1919	1.5	--	--	--	--
1922	--	26.5	63	--	--
1923	40	--	--	--	--
1927	33	--	--	--	--
1932	10	27.0	66	--	--
1935	5.7	27.0	70	--	6.2
1944	1.5	27.0	77	--	--
1950	.90	26.9	86	--	6.5
1958	.58	26.8	96	--	--
2005	.33	26.8	102	--	6.6
2020	.19	26.6	108	--	6.8
2035	.14	26.4	118	--	6.9
2050	.06	25.9	107	--	7.2
2105	0	--	--	--	--
Site SR6 December 12, 1991					
1245	0	--	--	--	--
1255	.51	11.5	--	--	--
1300	.58	--	--	--	--
1307	.54	--	--	--	--
1313	.48	11.6	157	9.5	--
1315	.44	--	--	--	7.6
1325	.42	11.5	157	9.0	--
1330	.37	--	--	8.8	7.6
1340	.31	11.5	161	--	--
1345	.28	11.5	172	8.5	7.6
1400	.22	11.5	171	8.4	7.7
1415	.17	11.4	178	8.3	7.6
1430	.14	11.6	187	8.2	7.6
1445	.10	11.5	191	8.1	7.7
1455	.07	11.5	192	8.0	--
1500	.06	11.6	197	7.9	7.7
1515	.05	--	--	--	7.7
1530	.05	--	--	--	7.7
1545	.05	--	--	--	7.8
1630	0	--	--	--	--

Table 12.--Quality of runoff from a high-density residential basin, sampled at site SR1, in Jefferson County, Kentucky, during selected storms, January-October 1991

[FF, Discrete first-flush sample; 3C, composite sample of the first 3 hours of flow; RS, composite sample from the end of the first 3 hours of flow to the end of all stormflow; --, missing; µS/cm, microsiemens per centimeter at 25 degrees Celsius; mg/L, milligrams per liter; col/100mL, colonies per 100 milliliters; µg/L, micrograms per iter; <, less than. See table 10 for sample times and volume of runoff]

Water-quality constituent or characteristic	Beginning date of storm								
	January 15, 1991			April 19, 1991			October 5, 1991		
	FF	3C	RS	FF	3C	RS	FF	3C	RS
DISCHARGE									
Discharge, instantaneous, in cubic feet per second	0.70	--	--	1.7	--	--	1.7	--	--
SPECIFIC CONDUCTANCE									
Specific conductance, in µS/cm	192	--	--	--	--	--	83.0	--	--
pH AND ALKALINITY									
pH, in standard units	7.2	7.4	--	7.1	7.1	--	8.1	6.8	8.1
Alkalinity, total as CaCO3, in mg/L	63.0	48.0	--	40.0	42.0	--	18.0	20.0	123
TEMPERATURE									
Temperature, water, in degrees Celsius	--	--	--	15.5	--	--	20.7	--	--
DISSOLVED OXYGEN AND OXYGEN DEMAND									
Dissolved oxygen, in mg/L	--	--	--	--	--	--	8.1	--	--
Chemical oxygen demand, in mg/L	47.0	30.0	--	56.0	108	5.0	75.0	89.0	14.0
Biochemical oxygen demand, 5-day, in mg/L	6.0	7.0	--	--	--	--	11.0	40.0	--
FECAL INDICATOR BACTERIA									
Fecal coliform, in col/100mL	410	--	--	23,000	--	--	22,300	--	--
Fecal streptococci, in col/100mL	3,600	--	--	9,690	--	--	26,200	--	--
MAJOR IONS									
Calcium, total, in mg/L	22.5	16.1	--	15.2	10.6	19.3	12.0	9.2	45.7
Calcium, dissolved, in mg/L	--	--	--	--	8.6	--	--	9.5	--
Magnesium, total, in mg/L	4.8	2.8	--	2.3	1.2	2.8	1.7	1.2	7.5
Sodium, dissolved, in mg/L	--	--	--	--	.70	--	--	1.0	--
Potassium, dissolved, in mg/L	--	--	--	--	3.6	--	--	2.1	--
Sulfate, dissolved, in mg/L	--	--	--	--	19.0	--	--	7.2	--
Chlorine, total residual, in mg/L	<.02	--	--	<.20	--	--	--	--	--
Chloride, dissolved, in mg/L	--	--	--	--	3.7	--	--	1.6	--
DISSOLVED AND SUSPENDED SOLIDS									
Dissolved solids, in mg/L	264	534	--	133	64.0	106	128	82.0	230
Suspended solids, in mg/L	56.0	36.0	--	231	48.0	18.0	58.0	44.0	10.0
Residue, volatile nonfiltrable, in mg/L	41.0	26.0	--	65.0	20.0	5.0	50.0	14.0	--
NUTRIENTS									
Nitrate, total as N, in mg/L	.87	1.1	--	1.2	.96	.91	.95	.69	.51
Nitrite, total as N, in mg/L	.37	.31	--	.10	.07	.08	.06	.05	.03
Nitrogen, ammonia, total as N, in mg/L	.33	.33	--	.84	.54	.31	.37	.21	.06
Nitrogen, total organic as N, in mg/L	1.4	.96	--	3.4	1.9	.85	1.6	.98	1.9
Phosphorus, total as P, in mg/L	.22	.25	--	.76	.46	.25	.48	1.3	.11
Phosphorus, dissolved as P, in mg/L	--	--	--	--	.31	--	--	1.1	--
Phosphorus, total ortho as P, in mg/L	.05	.05	--	.54	.32	.18	.30	.17	.08
METALS AND TRACE ELEMENTS									
Antimony, total as Sb, in µg/L	--	--	--	--	<1.0	--	--	<1.0	--
Arsenic, total as As, in µg/L	<5.0	<5.0	--	<5.0	<5.0	<5.0	5.0	<5.0	--
Barium, total as Ba, in µg/L	24.0	18.0	--	34.0	14.0	22.0	28.0	16.0	42.0
Beryllium, total as Be, in µg/L	<.50	<.50	--	<.50	<.50	<.50	<.50	<.50	<.50
Cadmium, total as Cd, in µg/L	<7.0	<7.0	--	<7.0	<7.0	<7.0	<7.0	<7.0	<7.0
Chromium, total as Cr, in µg/L	5.0	<5.0	--	5.0	<5.0	<5.0	14.0	8.0	7.0

Table 12.--Quality of runoff from a high-density residential basin, sampled at site SR1, in Jefferson County, Kentucky, during selected storms, January-October 1991--Continued

[FF, Discrete first-flush sample; 3C, composite sample of the first 3 hours of flow; RS, composite sample from the end of the first 3 hours of flow to the end of all stormflow; --, missing; µS/cm, microsiemens per centimeter at 25 degrees Celsius; mg/L, milligrams per liter; col/100mL, colonies per 100 milliliters; µg/L, micrograms per iter; <, less than. See table 10 for sample times and volume of runoff]

Water-quality constituent or characteristic	Beginning date of storm								
	January 15, 1991			April 19, 1991			October 5, 1991		
	FF	3C	RS	FF	3C	RS	FF	3C	RS
METALS AND TRACE ELEMENTS--Continued									
Copper, total as Cu, in µg/L	18.0	14.0	--	21.0	9.0	10.0	14.0	<8.0	8.0
Iron, total as Fe, in µg/L	1,590	1,070	--	2,560	566	444	2,200	900	1,060
Lead, total as Pb, in µg/L	<55.0	<55.0	--	140	60.0	<60.0	<60.0	<60.0	<60.0
Mercury, total as Hg, in µg/L	<.20	<.20	--	.30	<.20	<.20	<.20	<.20	--
Nickel, total as Ni, in µg/L	<7.0	7.0	--	<7.0	<7.0	<7.0	19.0	<7.0	<7.0
Selenium, total as Se, in µg/L	<5.0	13.0	--	<5.0	<5.0	<5.0	6.0	<5.0	--
Silver, total as Ag, in µg/L	<5.0	<5.0	--	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Thallium, dissolved, in µg/L	--	--	--	--	<1.0	--	--	<1.0	--
Zinc, total as Zn, in µg/L	76.0	162	--	390	366	75.0	810	62.0	104
Cyanide, dissolved as CN, in mg/L	--	--	--	--	--	--	--	<.01	--
ORGANIC COMPOUNDS									
Carbon, organic, total as C, in mg/L	--	--	--	--	81.0	--	--	34.0	--
Oil and grease, total recoverable, in mg/L	<1.0	--	--	2.0	--	--	<1.0	--	--
VOLATILE ORGANIC COMPOUNDS									
Acrolein, total, in µg/L	--	--	--	--	--	--	<20.0	--	--
Acrylonitrile, total, in µg/L	--	--	--	--	--	--	<20.0	--	--
Benzene, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Bromobenzene, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Bromoform, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Carbon tetrachloride, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Chlorobenzene, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Chlorodibromomethane, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Chloroethane, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Chloroform, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Cis-1,2-dichloroethene, total, in µg/L	--	--	--	--	--	--	<.20	--	--
Cis-1,3-dichloropropene, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Dibromochloropropane, total recoverable, in µg/L	--	--	--	--	--	--	<1.0	--	--
Dibromomethane, total recoverable, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Dichlorobromomethane, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Dichlorodifluoromethane, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Ethylbenzene, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Methylbromide, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Methylchloride, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Methylenechloride, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
O-chlorotoluene, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Parachlorotoluene, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Styrene, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Tetrachloroethylene, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Toluene, total, in µg/L	<.20	--	--	<.20	--	--	.20	--	--
Trans-1,3-dichloropropene, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Trichloroethylene, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Trichlorofluoromethane total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Vinyl chloride, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Xylene, total recoverable, in µg/L	<.20	--	--	<.20	--	--	.40	--	--
1,1,1,2-Tetrachloroethane, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
1,1,1-Trichloroethane, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
1,1,2,2-Tetrachloroethane, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
1,1,2-Trichloroethane, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
1,1-Dichloropropane, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
1,1-Dichloroethane, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--

Table 12.--Quality of runoff from a high-density residential basin, sampled at site SR1, in Jefferson County, Kentucky, during selected storms, January-October 1991--Continued

[FF, Discrete first-flush sample; 3C, composite sample of the first 3 hours of flow; RS, composite sample from the end of the first 3 hours of flow to the end of all stormflow; --, missing; µS/cm, microsiemens per centimeter at 25 degrees Celsius; mg/L, milligrams per liter; col/100mL, colonies per 100 milliliters; µg/L, micrograms per iter; <, less than. See table 10 for sample times and volume of runoff]

Water-quality constituent or characteristic	Beginning date of storm								
	January 15, 1991			April 19, 1991			October 5, 1991		
	FF	3C	RS	FF	3C	RS	FF	3C	RS
VOLATILE ORGANIC COMPOUNDS--Continued									
1,1-Dichloroethylene, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
1,2,3-Trichloropropane, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
1,2-Dibromoethane, total, in µg/L	<0.20	--	--	<0.20	--	--	<0.20	--	--
1,2-Dichloroethane, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
1,2-Dichloropropane, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
1,2-Dichloroethene, total recoverable, in µg/L	<.20	--	--	<.20	--	--	--	--	--
1,2-Transdichloroethene, total, in µg/L	--	--	--	--	--	--	<.20	--	--
1,3-Dichloropropane, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
2,2-Dichloropropane, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
2-Chloroethylvinylether, total, in µg/L	--	--	--	--	--	--	<1.0	--	--
BASE/NEUTRAL ORGANIC COMPOUNDS									
Acenaphthene, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
Acenapthylene, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
Anthracene, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
Benzidine, total, in µg/L	--	--	--	--	--	--	--	<40.0	--
Benzo(a)anthracene, 1,2-benzanthracene, total, in µg/L	--	--	--	--	<10.0	--	--	<10.0	--
Benzo(a)pyrene, total, in µg/L	--	--	--	--	<10.0	--	--	<10.0	--
Benzo(b)fluoranthene, total, in µg/L	--	--	--	--	<10.0	--	--	<10.0	--
Benzo(ghi)perylene 1,12-benzoperylene, total, in µg/L	--	--	--	--	<10.0	--	--	<10.0	--
Benzo(k)fluoranthene, total, in µg/L	--	--	--	--	<10.0	--	--	<10.0	--
Bis(2-chloroethyl)ether, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
Bis(2-chloroethoxy)methane, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
Bis(2-chloroisopropyl)ether, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
Bis(2-ethylhexyl)phthalate, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
Chrysene, total, in µg/L	--	--	--	--	<10.0	--	--	<10.0	--
Di-n-butyl phthalate, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
Diethyl phthalate, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
Dimethyl phthalate, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
Dinoctyl phthalate, total, in µg/L	--	--	--	--	<10.0	--	--	<10.0	--
Fluoranthene, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
Fluorene, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
Hexachlorobenzene, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
Hexachlorobutadiene, total, in µg/L	--	--	--	--	<5.0	--	<.20	<5.0	--
Hexachlorocyclopantadiene, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
Hexachloroethane, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
Indeno(1,2,3-cd)pyrene, total, in µg/L	--	--	--	--	<10.0	--	--	<10.0	--
Isophorone, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
N-butylbenzyl phthalate, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
N-nitrosodi-n-propylamine, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
N-nitrosodimethylamine, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
N-nitrosodiphenylamine, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
Naphthalene, total, in µg/L	--	--	--	--	<5.0	--	.30	<5.0	--
Naphthalenes, polychlorinated, in µg/L	--	--	--	--	<.10	--	--	<.10	--
Nitrobenzene, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
Phenanthrene, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
Pyrene, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
1,2,4-Trichlorobenzene, total, in µg/L	--	--	--	--	<5.0	--	<.20	<5.0	--
1,2,5,6-Dibenzoanthracene, total, in µg/L	--	--	--	--	<10.0	--	--	<10.0	--
1,2-Dichlorobenzene, total, in µg/L	<.20	--	--	<.20	<5.0	--	<.20	<5.0	--
1,2-Diphenylhydrazine, total recoverable, in µg/L	--	--	--	--	--	--	--	<5.0	--
1,3-Dichlorobenzene, total, in µg/L	<.20	--	--	<.20	<5.0	--	<.20	<5.0	--

Table 12.--Quality of runoff from a high-density residential basin, sampled at site SR1, in Jefferson County, Kentucky, during selected storms, January-October 1991--Continued

[FF, Discrete first-flush sample; 3C, composite sample of the first 3 hours of flow; RS, composite sample from the end of the first 3 hours of flow to the end of all stormflow; --, missing; µS/cm, microsiemens per centimeter at 25 degrees Celsius; mg/L, milligrams per liter; col/100mL, colonies per 100 milliliters; µg/L, micrograms per iter; <, less than. See table 10 for sample times and volume of runoff]

Water-quality constituent or characteristic	Beginning date of storm								
	January 15, 1991			April 19, 1991			October 5, 1991		
	FF	3C	RS	FF	3C	RS	FF	3C	RS
BASE/NEUTRAL ORGANIC COMPOUNDS--Continued									
1,4-Dichlorobenzene, total, in µg/L	<.20	--	--	<.20	<5.0	--	<.20	<5.0	--
2,4-Dinitrotoluene, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
2,6-Dinitrotoluene, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
2-Chloronaphthalene, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
3,3'-Dichlorobenzidine, total, in µg/L	--	--	--	--	--	--	--	<20.0	--
4-Bromophenylphenylether, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
4-Chlorophenylphenylether, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
ACID ORGANIC COMPOUNDS									
Parachlorometa cresol, total, in µg/L	--	--	--	--	<30.0	--	--	<30.0	--
Pentachlorophenol, total, in µg/L	--	--	--	--	<30.0	--	--	<30.0	--
Phenol, total, in µg/L	12.0	--	--	30.0	<5.0	--	11.0	<5.0	--
2,4,6-Trichlorophenol, total, in µg/L	--	--	--	--	<20.0	--	--	<20.0	--
2,4,Dimethylphenol, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
2,4-Dichlorophenol, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
2,4-Dinitrophenol, total, in µg/L	--	--	--	--	<20.0	--	--	<20.0	--
2-Chlorophenol, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
2-Nitrophenol, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
4,6-Dinitroorthocresol, total, in µg/L	--	--	--	--	<30.0	--	--	<30.0	--
4-Nitrophenol, total, in µg/L	--	--	--	--	<30.0	--	--	<30.0	--
PESTICIDE ORGANIC COMPOUNDS									
Aldrin, total, in ug/L	--	--	--	--	<.01	--	--	<.01	--
Aroclor 1016 PCB, total, in µg/L	--	--	--	--	<.10	--	--	<.10	--
Aroclor 1221 PCB, total, in µg/L	--	--	--	--	<.10	--	--	<.10	--
Aroclor 1232 PCB, total, in µg/L	--	--	--	--	<.10	--	--	<.10	--
Aroclor 1242 PCB, total, in µg/L	--	--	--	--	<.10	--	--	<.10	--
Aroclor 1248 PCB, total, in µg/L	--	--	--	--	<.10	--	--	<.10	--
Aroclor 1254 PCB, total, in µg/L	--	--	--	--	<.10	--	--	<.10	--
Aroclor 1260 PCB, total, in µg/L	--	--	--	--	<.10	--	--	<.10	--
Chlordane, total, in µg/L	<3.1	--	--	<3.1	<.10	--	<3.1	<.10	--
DDD, total, in µg/L	--	--	--	--	<.01	--	--	<.01	--
DDE, total, in µg/L	--	--	--	--	.01	--	--	.01	--
DDT, total, in µg/L	--	--	--	--	.02	--	--	.01	--
Deildrin, total, in µg/L	--	--	--	--	<.01	--	--	<.01	--
Endosulfan, total µg/L	--	--	--	--	<.01	--	--	<.01	--
Endrin, total, in µg/L	<.04	--	--	<.04	<.01	--	<.02	<.01	--
Heptachlor epoxide, total, in µg/L	--	--	--	--	<.01	--	--	<.01	--
Heptachlor, total, in µg/L	--	--	--	--	<.01	--	--	<.01	--
Lindane, total, in µg/L	<.02	--	--	<.02	<.01	--	.10	<.01	--
Methoxychlor, total, in µg/L	<.09	--	--	<.08	<.01	--	.20	<.01	--
Mirex, total, in µg/L	--	--	--	--	<.01	--	--	<.01	--
PCB, total, in µg/L	--	--	--	--	<.10	--	--	<.10	--
Perthane, total, in µg/L	--	--	--	--	<.10	--	--	<.10	--
Silvex, total, in µg/L	<.01	--	--	.01	--	--	<.01	--	--
Toxaphene, total, in µg/L	<6.3	--	--	<6.3	<1.0	--	<6.3	<1.0	--
2,4-D, total, in µg/L	.37	--	--	4.4	--	--	9.1	--	--

Table 13.--Quality of runoff from a basin containing light industry, sampled at site SR2, in Jefferson County, Kentucky, during selected storms, February-October 1991

[FF, Discrete first-flush sample; 3C, composite sample of the first 3 hours of flow; RS, composite sample from the end of the first 3 hours of flow to the end of all stormflow; --, missing; µS/cm, microsiemens per centimeter at 25 degrees Celsius; mg/L, milligrams per liter; col/100mL, colonies per 100 milliliters; µg/L, micrograms per iter; <, less than. See table 10 for sample times and volume of runoff]

Water-quality constituent or characteristic	Beginning date of storm								
	February 5, 1991			April 19, 1991			October 5, 1991		
	FF	3C	RS	FF	3C	RS	FF	3C	RS
DISCHARGE									
Discharge, instantaneous, in cubic feet per second	0.36	--	--	2.4	--	--	2.2	--	--
SPECIFIC CONDUCTANCE									
Specific conductance, in µS/cm	764	--	--	--	--	--	206	--	--
pH AND ALKALINITY									
pH, in standard units	6.6	7.2	--	6.7	6.7	--	7.5	7.0	--
Alkalinity, total as CaCO3, in mg/L	82.0	58.0	--	31.0	30.0	--	169	32.0	--
TEMPERATURE									
Temperature, water, in degrees Celsius	--	--	--	--	--	--	19.5	--	--
OXYGEN DEMAND									
Chemical oxygen demand, in mg/L	185	189	--	41.0	62.0	--	270	99.0	--
Biochemical oxygen demand, 5-day, in mg/L	20.0	71.0	--	--	--	--	41.0	51.0	--
FECAL INDICATOR BACTERIA									
Fecal coliform, in col/100mL	32.0	--	--	133	--	--	733	--	--
Fecal streptococci, in col/100mL	1,200	--	--	32,800	--	--	3,400	--	--
MAJOR IONS									
Calcium, total, in mg/L	67.7	29.3	--	19.1	12.2	--	60.1	21.2	--
Calcium, dissolved, in mg/L	--	--	--	--	9.7	--	--	14.0	--
Magnesium, total, in mg/L	17.7	4.8	--	1.9	1.3	--	9.0	2.5	--
Sodium, dissolved, in mg/L	--	--	--	--	1.6	--	--	4.2	--
Potassium, dissolved, in mg/L	--	--	--	--	.70	--	--	.90	--
Sulfate, dissolved, in mg/L	--	--	--	--	22.0	--	--	11.0	--
Chlorine, total residual, in mg/L	--	--	--	<.20	--	--	--	--	--
Chloride, dissolved, in mg/L	--	--	--	--	4.2	--	--	5.1	--
DISSOLVED AND SUSPENDED SOLIDS									
Dissolved solids, in mg/L	604	484	--	114	56.0	--	180	60.0	--
Suspended solids, in mg/L	80.0	300	--	86.0	24.0	--	414	202	--
Residue, volatile nonfiltrable, in mg/L	60.0	168	--	41.0	13.0	--	130	96.0	--
NUTRIENTS									
Nitrate, total as N, in mg/L	.78	1.0	--	.84	.79	--	1.2	.83	--
Nitrite, total as N, in mg/L	.33	.13	--	.08	.06	--	.07	.07	--
Nitrogen, ammonia, total as N, in mg/L	.05	.33	--	.30	.24	--	.38	.35	--
Nitrogen, total organic as N, in mg/L	2.3	1.6	--	1.7	.80	--	2.5	1.7	--
Phosphorus, total as P, in mg/L	.92	.81	--	.34	.39	--	1.3	.26	--
Phosphorus, dissolved as P, in mg/L	--	--	--	--	.45	--	--	.20	--
Phosphorus, total ortho as P, in mg/L	.18	.52	--	.34	.45	--	1.2	.95	--
METALS AND TRACE ELEMENTS									
Antimony, total as Sb, in µg/L	--	--	--	--	<1.0	--	--	<1.0	--
Arsenic, total as As, in µg/L	<5.0	<5.0	--	<5.0	<5.0	--	<5.0	<5.0	--
Barium, total as Ba, in µg/L	70.0	36.0	--	26.0	11.0	--	103	23.0	--
Beryllium, total as Be, in µg/L	<.50	<.50	--	<.50	<.50	--	<.50	<.50	--
Cadmium, total as Cd, in µg/L	<7.0	<7.0	--	<7.0	<7.0	--	<7.0	<7.0	--
Chromium, total as Cr, in µg/L	6.0	<5.0	--	5.0	<5.0	--	17.0	11.0	--
Copper, total as Cu, in µg/L	21.0	17.0	--	<8.0	<8.0	--	22.0	<8.0	--
Iron, total as Fe, in µg/L	3,420	2,090	--	1,210	910	--	6,310	1,440	--

Table 13.--Quality of runoff from a basin containing light industry, sampled at site SR2, in Jefferson County, Kentucky, during selected storms, February-October 1991--Continued

[FF, Discrete first-flush sample; 3C, composite sample of the first 3 hours of flow; RS, composite sample from the end of the first 3 hours of flow to the end of all stormflow; --, missing; µS/cm, microsiemens per centimeter at 25 degrees Celsius; mg/L, milligrams per liter; col/100mL, colonies per 100 milliliters; ug/L, micrograms per iter; <, less than. See table 10 for sample times and volume of runoff]

Water-quality constituent or characteristic	Beginning date of storm								
	February 5, 1991			April 19, 1991			October 5, 1991		
	FF	3C	RS	FF	3C	RS	FF	3C	RS
METALS AND TRACE ELEMENTS--Continued									
Lead, total as Pb, in µg/L	<55.0	<55.0	--	<60.0	<60.0	--	<60.0	<60.0	--
Mercury, total as Hg, in µg/L	<.20	<.20	--	.20	<.20	--	.40	<.20	--
Nickel, total as Ni, in µg/L	<7.0	<7.0	--	<7.0	<7.0	--	16.0	14.0	--
Selenium, total as Se, in µg/L	<5.0	<5.0	--	<5.0	<5.0	--	<5.0	<5.0	--
Silver, total as Ag, in µg/L	<5.0	<5.0	--	<5.0	<5.0	--	<5.0	<5.0	--
Thallium, dissolved, in µg/L	--	--	--	--	<1.0	--	--	<1.0	--
Zinc, total as Zn, in µg/L	200	142	--	341	157	--	794	529	--
Cyanide, dissolved as CN, in mg/L	--	--	--	--	--	--	--	<.01	--
ORGANIC COMPOUNDS									
Carbon, organic, total as C, in mg/L	--	--	--	--	17.0	--	--	35.0	--
Oil and grease, total recoverable, in mg/L	3.0	--	--	6.0	--	--	7.0	--	--
VOLATILE ORGANIC COMPOUNDS									
Acrolein, total, in µg/L	--	--	--	--	--	--	<20.0	--	--
Acrylonitrile, total, in µg/L	--	--	--	--	--	--	<20.0	--	--
Benzene, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Bromobenzene, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Bromoform, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Carbon tetrachloride, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Chlorobenzene, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Chlorodibromomethane, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Chloroethane, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Chloroform, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Cis-1,2-dichloroethene, total, in µg/L	--	--	--	--	--	--	<.20	--	--
Cis-1,3-dichloropropene, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Dibromochloropropane, total recoverable, in µg/L	--	--	--	--	--	--	<1.0	--	--
Dibromomethane, total recoverable, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Dichlorobromomethane, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Dichlorodifluoromethane, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Ethylbenzene, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Methylbromide, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Methylchloride, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Methylenechloride, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
O-chlorotoluene, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Parachlorotoluene, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Styrene, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Tetrachloroethylene, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Toluene, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Trans-1,3-dichloropropene, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Trichloroethylene, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Trichlorofluoromethane total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Vinyl chloride, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Xylene, total recoverable, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
1,1,1,2-Tetrachloroethane, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
1,1,1-Trichloroethane, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
1,1,2,2-Tetrachloroethane, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
1,1,2-Trichloroethane, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
1,1-Dichloropropene, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
1,1-Dichloroethane, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
1,1-Dichloroethylene, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
1,2,3-Trichloropropane, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
1,2-Dibromoethane, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--

Table 13.--Quality of runoff from a basin containing light industry, sampled at site SR2, in Jefferson County, Kentucky, during selected storms, February-October 1991--Continued

[FF, Discrete first-flush sample; 3C, composite sample of the first 3 hours of flow; RS, composite sample from the end of the first 3 hours of flow to the end of all stormflow; --, missing; µS/cm, microsiemens per centimeter at 25 degrees Celsius; mg/L, milligrams per liter; col/100mL, colonies per 100 milliliters; µg/L, micrograms per iter; <, less than. See table 10 for sample times and volume of runoff]

Water-quality constituent or characteristic	Beginning date of storm								
	February 5, 1991			April 19, 1991			October 5, 1991		
	FF	3C	RS	FF	3C	RS	FF	3C	RS
VOLATILE ORGANIC COMPOUNDS--Continued									
1,2-Dichloroethane, total, in µg/L	<0.20	--	--	<0.20	--	--	<0.20	--	--
1,2-Dichloropropane, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
1,2-Dichloroethene, total recoverable, in µg/L	<.20	--	--	<.20	--	--	--	--	--
1,2-Transdichloroethene, total, in µg/L	--	--	--	--	--	--	<.20	--	--
1,3-Dichloropropane, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
2,2-Dichloropropane, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
2-Chloroethylvinylether, total, in µg/L	--	--	--	--	--	--	<1.0	--	--
BASE/NEUTRAL ORGANIC COMPOUNDS									
Acenaphthene, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
Acenapthylene, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
Anthracene, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
Benzidine, total, in µg/L	--	--	--	--	--	--	--	<40.0	--
Benzo(a)anthracene, 1,2-benzanthracene, total, in µg/L	--	--	--	--	<10.0	--	--	<10.0	--
Benzo(a)pyrene, total, in µg/L	--	--	--	--	<10.0	--	--	<10.0	--
Benzo(b)fluoranthene, total, in µg/L	--	--	--	--	<10.0	--	--	<10.0	--
Benzo(ghi)perylene 1,12-benzoperylene, total, in µg/L	--	--	--	--	<10.0	--	--	<10.0	--
Benzo(k)fluoranthene, total, in µg/L	--	--	--	--	<10.0	--	--	<10.0	--
Bis(2-chloroethyl)ether, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
Bis(2-chloroethoxy)methane, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
Bis(2-chloroisopropyl)ether, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
Bis(2-ethylhexyl)phthalate, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
Chrysene, total, in µg/L	--	--	--	--	<10.0	--	--	<10.0	--
Di-n-butyl phthalate, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
Diethyl phthalate, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
Dimethyl phthalate, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
Dinoctyl phthalate, total, in µg/L	--	--	--	--	<10.0	--	--	<10.0	--
Fluoranthene, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
Fluorene, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
Hexachlorobenzene, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
Hexachlorobutadiene, total, in µg/L	--	--	--	--	<5.0	--	<.20	<5.0	--
Hexachlorocyclopentadiene, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
Hexachloroethane, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
Indeno(1,2,3-cd)pyrene, total, in µg/L	--	--	--	--	<10.0	--	--	<10.0	--
Isophorone, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
N-butylbenzyl phthalate, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
N-nitrosodi-n-propylamine, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
N-nitrosodimethylamine, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
N-nitrosodiphenylamine, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
Naphthalene, total, in µg/L	--	--	--	--	<5.0	--	<.20	<5.0	--
Naphthalenes, polychlorinated, in µg/L	--	--	--	--	<.10	--	--	<.10	--
Nitrobenzene, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
Phenanthrene, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
Pyrene, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
1,2,4-Trichlorobenzene, total, in µg/L	--	--	--	--	<5.0	--	<.20	<5.0	--
1,2,5,6-Dibenzoanthracene, total, in µg/L	--	--	--	--	<10.0	--	--	<10.0	--
1,2-Dichlorobenzene, total, in µg/L	<.20	--	--	<.20	<5.0	--	<.20	<5.0	--
1,2-Diphenylhydrazine, total recoverable, in µg/L	--	--	--	--	--	--	--	<5.0	--
1,3-Dichlorobenzene, total, in µg/L	<.20	--	--	<.20	<5.0	--	<.20	<5.0	--
1,4-Dichlorobenzene, total, in µg/L	<.20	--	--	<.20	<5.0	--	<.20	<5.0	--
2,4-Dinitrotoluene, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
2,6-Dinitrotoluene, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
2-Chloronaphthalene, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--

Table 13.--Quality of runoff from a basin containing light industry, sampled at site SR2, in Jefferson County, Kentucky, during selected storms, February-October 1991--Continued

[FF, Discrete first-flush sample; 3C, composite sample of the first 3 hours of flow; RS, composite sample from the end of the first 3 hours of flow to the end of all stormflow; --, missing; µS/cm, microsiemens per centimeter at 25 degrees Celsius; mg/L, milligrams per liter; col/100mL, colonies per 100 milliliters; µg/L, micrograms per iter; <, less than. See table 10 for sample times and volume of runoff]

Water-quality constituent or characteristic	Beginning date of storm								
	February 5, 1991			April 19, 1991			October 5, 1991		
	FF	3C	RS	FF	3C	RS	FF	3C	RS
BASE/NEUTRAL ORGANIC COMPOUNDS--Continued									
3,3'-Dichlorobenzidine, total, in µg/L	--	--	--	--	--	--	--	<20.0	--
4-Bromophenylphenylether, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
4-Chlorophenylphenylether, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
ACID ORGANIC COMPOUNDS									
Parachlorometa cresol, total, in µg/L	--	--	--	--	<30.0	--	--	<30.0	--
Pentachlorophenol, total, in µg/L	--	--	--	--	<30.0	--	--	<30.0	--
Phenol, total, in µg/L	12.0	--	--	--	<5.0	--	19.0	<5.0	--
2,4,6-Trichlorophenol, total, in µg/L	--	--	--	--	<20.0	--	--	<20.0	--
2,4,Dimethylphenol, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
2,4-Dichlorophenol, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
2,4-Dinitrophenol, total, in µg/L	--	--	--	--	<20.0	--	--	<20.0	--
2-Chlorophenol, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
2-Nitrophenol, total, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
4,6-Dinitroorthocresol, total, in µg/L	--	--	--	--	<30.0	--	--	<30.0	--
4-Nitrophenol, total, in µg/L	--	--	--	--	<30.0	--	--	<30.0	--
PESTICIDE ORGANIC COMPOUNDS									
Aldrin, total, in ug/L	--	--	--	--	<.01	--	--	<.01	--
Aroclor 1016 PCB, total, in µg/L	--	--	--	--	<.10	--	--	<.10	--
Aroclor 1221 PCB, total, in µg/L	--	--	--	--	<.10	--	--	<.10	--
Aroclor 1232 PCB, total, in µg/L	--	--	--	--	<.10	--	--	<.10	--
Aroclor 1242 PCB, total, in µg/L	--	--	--	--	<.10	--	--	<.10	--
Aroclor 1248 PCB, total, in µg/L	--	--	--	--	<.10	--	--	<.10	--
Aroclor 1254 PCB, total, in µg/L	--	--	--	--	<.10	--	--	<.10	--
Aroclor 1260 PCB, total, in µg/L	--	--	--	--	<.10	--	--	<.10	--
Chlordane, total, in µg/L	<3.1	--	--	--	<.10	--	<3.1	<.10	--
DDD, total, in µg/L	--	--	--	--	<.01	--	--	<.01	--
DDE, total, in µg/L	--	--	--	--	<.01	--	--	<.01	--
DDT, total, in µg/L	--	--	--	--	<.01	--	--	<.01	--
Deildrin, total, in µg/L	--	--	--	--	<.01	--	--	<.01	--
Endosulfan, total µg/L	--	--	--	--	<.01	--	--	<.01	--
Endrin, total, in µg/L	<.03	--	--	--	<.01	--	<.02	<.01	--
Heptachlor epoxide, total, in µg/L	--	--	--	--	<.01	--	--	<.01	--
Heptachlor, total, in µg/L	--	--	--	--	<.01	--	--	<.01	--
Lindane, total, in µg/L	.16	--	--	--	<.01	--	<.02	<.01	--
Methoxychlor, total, in µg/L	.69	--	--	--	<.01	--	<.08	<.01	--
Mirex, total, in µg/L	--	--	--	--	<.01	--	--	<.01	--
PCB, total, in µg/L	--	--	--	--	<.10	--	--	<.10	--
Perthane, total, in µg/L	--	--	--	--	<.10	--	--	<.10	--
Silvex, total, in µg/L	<.01	--	--	--	--	--	<.01	--	--
Toxaphene, total, in µg/L	<6.3	--	--	--	<1.0	--	<6.3	<1.0	--
2,4-D, total, in µg/L	.12	--	--	--	--	--	2.2	--	--

Table 14.--Quality of runoff from a low-density residential basin, sampled at site SR3, in Jefferson County, Kentucky, during selected storms, March-December 1991

[FF, Discrete first-flush sample; 3C, composite sample of the first 3 hours of flow; RS, composite sample from the end of the first 3 hours of flow to the end of all stormflow; --, missing; µS/cm, microsiemens per centimeter at 25 degrees Celsius; mg/L, milligrams per liter; col/100mL, colonies per 100 milliliters; µg/L, micrograms per iter; <, less than. See table 10 for sample times and volume of runoff]

Water-quality constituent or characteristic	Beginning date of storm								
	March 1, 1991			September 4, 1991			December 12, 1991		
	FF	3C	RS	FF	3C	RS	FF	3C	RS
DISCHARGE									
Discharge, instantaneous, in cubic feet per second	0.75	--	--	--	--	--	0.26	--	--
SPECIFIC CONDUCTANCE									
Specific conductance, in µS/cm	349	--	--	--	--	--	109	--	--
pH AND ALKALINITY									
pH, in standard units	7.6	6.7	--	8.0	7.6	--	7.8	7.8	--
Alkalinity, total as CaCO3, in mg/L	62.0	55.0	--	97.0	84.0	--	79.0	115	--
TEMPERATURE									
Temperature, water, in degrees Celsius	11.0	--	--	--	--	--	11.6	--	--
OXYGEN DEMAND									
Chemical oxygen demand, in mg/L	92.0	108	62.0	140	90.0	48.0	248	119	--
Biochemical oxygen demand, 5-day, in mg/L	22.0	24.0	--	23.0	13.0	--	7.0	21.0	--
FECAL INDICATOR BACTERIA									
Fecal coliform, in col/100mL	39,000	--	--	24,000	--	--	76,000	--	--
Fecal streptococci, in col/100mL	206,000	--	--	60,000	--	--	36,000	--	--
MAJOR IONS									
Calcium, total, in mg/L	40.6	20.9	28.7	70.8	16.5	17.3	35.9	57.6	--
Calcium, dissolved, in mg/L	--	18.0	--	--	16.0	--	--	48.0	--
Magnesium, total, in mg/L	9.5	4.3	7.4	19.6	3.0	3.0	10.0	16.6	--
Sodium, dissolved, in mg/L	--	14.0	--	--	7.6	--	--	23.0	--
Potassium, dissolved, in mg/L	--	2.0	--	--	2.8	--	--	3.6	--
Sulfate, dissolved, in mg/L	--	23.0	--	--	24.0	--	--	91.0	--
Chlorine, total residual, in mg/L	<.02	--	--	--	--	--	.30	--	--
Chloride, dissolved, in mg/L	--	22.0	--	--	8.8	--	--	34.0	--
DISSOLVED AND SUSPENDED SOLIDS									
Dissolved solids, in mg/L	192	296	--	486	149	138	580	580	--
Suspended solids, in mg/L	48.0	248	--	30.0	51.0	46.0	800	272	--
Residue, volatile nonfiltrable, in mg/L	34.0	162	--	18.0	12.0	15.0	104	36.0	--
NUTRIENTS									
Nitrate, total as N, in mg/L	.94	.67	--	1.3	.71	.69	3.3	2.9	--
Nitrite, total as N, in mg/L	.25	.11	--	.08	.04	.04	.44	1.0	--
Nitrogen, ammonia, total as N, in mg/L	1.2	.50	--	.33	.20	.14	.77	.31	--
Nitrogen, total organic as N, in mg/L	.03	1.2	--	2.2	.46	.92	.09	1.3	--
Phosphorus, total as P, in mg/L	.21	.08	--	.24	.19	.22	2.5	.37	--
Phosphorus, dissolved as P, in mg/L	--	.05	--	--	.12	--	--	.03	--
Phosphorus, total ortho as P, in mg/L	.11	.13	.04	.12	.11	.12	1.6	.46	--
METALS AND TRACE ELEMENTS									
Antimony, total as Sb, in µg/L	--	1.0	--	--	1.0	--	--	2.0	--
Arsenic, total as As, in µg/L	<5.0	<5.0	--	<5.0	<5.0	<5.0	22.0	12.0	--
Barium, total as Ba, in µg/L	73.0	34.0	65.0	72.0	28.0	45.0	307	174	--
Beryllium, total as Be, in µg/L	<.50	<.50	<.50	<.50	<.50	<.50	2.9	2.0	--
Cadmium, total as Cd, in µg/L	<7.0	<7.0	9.0	<7.0	<7.0	<7.0	<7.0	<7.0	--
Chromium, total as Cr, in µg/L	9.0	<5.0	<5.0	<5.0	<5.0	9.0	90.0	48.0	--
Copper, total as Cu, in µg/L	25.0	17.0	15.0	23.0	12.0	16.0	83.0	37.0	--
Iron, total as Fe, in µg/L	5,970	2,320	1,680	733	837	729	37,400	23,600	--
Lead, total as Pb, in µg/L	<55.0	<55.0	<55.0	<60.0	<60.0	<60.0	<60.0	<60.0	--
Mercury, total as Hg, in µg/L	<.20	<.20	--	.60	.40	.60	.20	.20	--

Table 14.--Quality of runoff from a low-density residential basin, sampled at site SR3, in Jefferson County, Kentucky, during selected storms, March-December 1991--Continued

[FF, Discrete first-flush sample; 3C, composite sample of the first 3 hours of flow; RS, composite sample from the end of the first 3 hours of flow to the end of all stormflow; --, missing; µS/cm, microsiemens per centimeter at 25 degrees Celsius; mg/L, milligrams per liter; col/100mL, colonies per 100 milliliters; µg/L, micrograms per iter; <, less than. See table 10 for sample times and volume of runoff]

Water-quality constituent or characteristic	Beginning date of storm								
	March 1, 1991			September 4, 1991			December 12, 1991		
	FF	3C	RS	FF	3C	RS	FF	3C	RS
METALS AND TRACE ELEMENTS--Continued									
Nickel, total as Ni, in µg/L	<7.0	8.0	<7.0	18.0	<7.0	9.0	106	33.0	--
Selenium, total as Se, in µg/L	<5.0	<5.0	--	<5.0	<5.0	<5.0	<5.0	<5.0	--
Silver, total as Ag, in µg/L	<5.0	<5.0	<5.0	<5.0	<5.0	8.0	<5.0	<5.0	--
Thallium, dissolved, in µg/L	--	<1.0	--	--	<1.0	--	--	<1.0	--
Zinc, total as Zn, in µg/L	218	121	60.0	132	71.0	40.0	310	187	--
Cyanide, dissolved as CN, in mg/L	--	--	--	--	<.01	--	--	<.01	--
ORGANIC COMPOUNDS									
Carbon, organic, total as C, in mg/L	--	32.0	--	--	12.0	--	--	26.0	--
Oil and grease, total recoverable, in mg/L	1.0	--	--	<1.0	--	--	<1.0	--	--
VOLATILE ORGANIC COMPOUNDS									
Acrolein, total, in µg/L	--	--	--	--	--	--	<20.0	--	--
Acrylonitrile, total, in µg/L	--	--	--	--	--	--	<20.0	--	--
Benzene, total, in µg/L	<.20	--	--	<.20	--	--	.20	--	--
Bromobenzene, total, in µg/L	<.20	--	--	<.20	--	--	<3.0	--	--
Bromoform, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Carbon tetrachloride, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Chlorobenzene, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Chlorodibromomethane, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Chloroethane, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Chloroform, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Cis-1,2-dichloroethene, total, in µg/L	--	--	--	--	--	--	<.20	--	--
Cis-1,3-dichloropropene, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Dibromochloropropane, total recoverable, in µg/L	--	--	--	--	--	--	<1.0	--	--
Dibromomethane, total recoverable, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Dichlorobromomethane, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Dichlorodifluoromethane, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Ethylbenzene, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Methylbromide, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Methylchloride, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Methylenechloride, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
O-chlorotoluene, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Parachlorotoluene, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Styrene, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Tetrachloroethylene, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Toluene, total, in µg/L	<.20	--	--	<.20	--	--	.50	--	--
Trans-1,3-dichloropropene, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Trichloroethylene, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Trichlorofluoromethane total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Vinyl chloride, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Xylene, total recoverable, in µg/L	<.20	--	--	<.20	--	--	.70	--	--
1,1,1,2-Tetrachloroethane, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
1,1,1-Trichloroethane, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
1,1,2,2-Tetrachloroethane, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
1,1,2-Trichloroethane, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
1,1-Dichloropropene, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
1,1-Dichloroethane, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
1,1-Dichloroethylene, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
1,2,3-Trichloropropane, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
1,2-Dibromoethane, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
1,2-Dichloroethane, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
1,2-Dichloropropene, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
1,2-Dichloroethene, total recoverable, in µg/L	<.20	--	--	<.20	--	--	--	--	--
1,2-Transdichloroethene, total, in µg/L	--	--	--	--	--	--	<.20	--	--

Table 14.--Quality of runoff from a low-density residential basin, sampled at site SR3, in Jefferson County, Kentucky, during selected storms, March-December 1991--Continued

[FF, Discrete first-flush sample; 3C, composite sample of the first 3 hours of flow; RS, composite sample from the end of the first 3 hours of flow to the end of all stormflow; --, missing; µS/cm, microsiemens per centimeter at 25 degrees Celsius; mg/L, milligrams per liter; col/100mL, colonies per 100 milliliters; µg/L, micrograms per iter; <, less than. See table 10 for sample times and volume of runoff]

Water-quality constituent or characteristic	Beginning date of storm								
	March 1, 1991			September 4, 1991			December 12, 1991		
	FF	3C	RS	FF	3C	RS	FF	3C	RS
VOLATILE ORGANIC COMPOUNDS--Continued									
1,3-Dichloropropane, total, in µg/L	<0.20	--	--	<0.20	--	--	<0.20	--	--
2,2-Dichloropropane, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
2-Chloroethylvinylether, total, in µg/L	--	--	--	--	--	--	<1.0	--	--
BASE/NEUTRAL ORGANIC COMPOUNDS									
Acenaphthene, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
Acenapthylene, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
Anthracene, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
Benzidine, total, in µg/L	--	--	--	--	<40.0	--	--	<40.0	--
Benzo(a)anthracene, 1,2-benzanthracene, total, in µg/L	--	<10.0	--	--	<10.0	--	--	<10.0	--
Benzo(a)pyrene, total, in µg/L	--	<10.0	--	--	<10.0	--	--	<10.0	--
Benzo(b)fluoranthene, total, in µg/L	--	<10.0	--	--	<10.0	--	--	<10.0	--
Benzo(ghi)perylene 1,12-benzoperylene, total, in µg/L	--	<10.0	--	--	<10.0	--	--	<10.0	--
Benzo(k)fluoranthene, total, in µg/L	--	<10.0	--	--	<10.0	--	--	<10.0	--
Bis(2-chloroethyl)ether, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
Bis(2-chloroethoxy)methane, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
Bis(2-chloroisopropyl)ether, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
Bis(2-ethylhexyl)phthalate, total, in µg/L	--	5.0	--	--	<5.0	--	--	5.0	--
Chrysene, total, in µg/L	--	<10.0	--	--	<10.0	--	--	<10.0	--
Di-n-butyl phthalate, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
Diethyl phthalate, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
Dimethyl phthalate, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
Dinoctyl phthalate, total, in µg/L	--	<10.0	--	--	<10.0	--	--	<10.0	--
Fluoranthene, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
Fluorene, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
Hexachlorobenzene, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
Hexachlorobutadiene, total, in µg/L	--	<5.0	--	--	<5.0	--	<.20	<5.0	--
Hexachlorocyclopentadiene, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
Hexachloroethane, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
Indeno(1,2,3-cd)pyrene, total, in µg/L	--	<10.0	--	--	<10.0	--	--	<10.0	--
Isophorone, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
N-butylbenzyl phthalate, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
N-nitrosodi-n-propylamine, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
N-nitrosodimethylamine, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
N-nitrosodiphenylamine, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
Naphthalene, total, in µg/L	--	<5.0	--	--	<5.0	--	.20	<5.0	--
Naphthalenes, polychlorinated, in µg/L	--	<.10	--	--	<.10	--	--	<.10	--
Nitrobenzene, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
Phenanthrene, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
Pyrene, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
1,2,4-Trichlorobenzene, total, in µg/L	--	<5.0	--	--	<5.0	--	<.20	<5.0	--
1,2,5,6-Dibenzoanthracene, total, in µg/L	--	<10.0	--	--	<10.0	--	--	<10.0	--
1,2-Dichlorobenzene, total, in µg/L	<.20	<5.0	--	<.20	<5.0	--	<.20	<5.0	--
1,2-Diphenylhydrazine, total recoverable, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
1,3-Dichlorobenzene, total, in µg/L	<.20	<5.0	--	<.20	<5.0	--	<.20	<5.0	--
1,4-Dichlorobenzene, total, in µg/L	<.20	<5.0	--	<.20	<5.0	--	<.20	<5.0	--
2,4-Dinitrotoluene, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
2,6-Dinitrotoluene, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
2-Chloronaphthalene, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
3,3'-Dichlorobenzidine, total, in µg/L	--	--	--	--	<20.0	--	--	<20.0	--
4-Bromophenylphenylether, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
4-Chlorophenylphenylether, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--

Table 14.--Quality of runoff from a low-density residential basin, sampled at site SR3, in Jefferson County, Kentucky, during selected storms, March-December 1991--Continued

[FF, Discrete first-flush sample; 3C, composite sample of the first 3 hours of flow; RS, composite sample from the end of the first 3 hours of flow to the end of all stormflow; --, missing; µS/cm, microsiemens per centimeter at 25 degrees Celsius; mg/L, milligrams per liter; col/100mL, colonies per 100 milliliters; µg/L, micrograms per iter; <, less than. See table 10 for sample times and volume of runoff]

Water-quality constituent or characteristic	Beginning date of storm								
	March 1, 1991			September 4, 1991			December 12, 1991		
	FF	3C	RS	FF	3C	RS	FF	3C	RS
ACID ORGANIC COMPOUNDS									
Parachlorometa cresol, total, in µg/L	--	<30.0	--	--	<30.0	--	--	<30.0	--
Pentachlorophenol, total, in µg/L	--	<30.0	--	--	<30.0	--	--	<30.0	--
Phenol, total, in µg/L	<10.0	<5.0	--	14.0	<5.0	--	--	<5.0	--
2,4,6-Trichlorophenol, total, in µg/L	--	<20.0	--	--	<20.0	--	--	<20.0	--
2,4,Dimethylphenol, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
2,4-Dichlorophenol, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
2,4-Dinitrophenol, total, in µg/L	--	<20.0	--	--	<20.0	--	--	<20.0	--
2-Chlorophenol, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
2-Nitrophenol, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
4,6-Dinitroorthocresol, total, in µg/L	--	<30.0	--	--	<30.0	--	--	<30.0	--
4-Nitrophenol, total, in µg/L	--	<30.0	--	--	<30.0	--	--	<30.0	--
PESTICIDE ORGANIC COMPOUNDS									
Aldrin, total, in ug/L	--	<.01	--	--	<.01	--	--	<.01	--
Aroclor 1016 PCB, total, in µg/L	--	<.10	--	--	<.10	--	--	<.10	--
Aroclor 1221 PCB, total, in µg/L	--	<.10	--	--	<.10	--	--	<.10	--
Aroclor 1232 PCB, total, in µg/L	--	<.10	--	--	<.10	--	--	<.10	--
Aroclor 1242 PCB, total, in µg/L	--	<.10	--	--	<.10	--	--	<.10	--
Aroclor 1248 PCB, total, in µg/L	--	<.10	--	--	<.10	--	--	<.10	--
Aroclor 1254 PCB, total, in µg/L	--	<.10	--	--	<.10	--	--	<.10	--
Aroclor 1260 PCB, total, in µg/L	--	<.10	--	--	<.10	--	--	<.10	--
Chlordane, total, in µg/L	<3.1	<.10	--	<3.1	<.10	--	<3.1	<.10	--
DDD, total, in µg/L	--	<.01	--	--	<.01	--	--	<.01	--
DDE, total, in µg/L	--	<.01	--	--	<.01	--	--	<.01	--
DDT, total, in µg/L	--	<.01	--	--	<.01	--	--	<.01	--
Deildrin, total, in µg/L	--	<.01	--	--	<.01	--	--	<.01	--
Endosulfan, total µg/L	--	<.01	--	--	<.01	--	--	<.01	--
Endrin, total, in µg/L	<.03	<.01	--	<.02	<.01	--	.39	<.01	--
Heptachlor epoxide, total, in µg/L	--	<.01	--	--	<.01	--	--	<.01	--
Heptachlor, total, in µg/L	--	<.01	--	--	<.01	--	--	<.01	--
Lindane, total, in µg/L	<.02	<.01	--	.22	.01	--	.32	<.01	--
Methoxychlor, total, in µg/L	<.08	<.01	--	<.06	<.01	--	.91	<.01	--
Mirex, total, in µg/L	--	<.01	--	--	<.01	--	--	<.01	--
PCB, total, in µg/L	--	<.10	--	--	<.10	--	--	<.10	--
Perthane, total, in µg/L	--	<.10	--	--	<.10	--	--	<.10	--
Silvex, total, in µg/L	<.01	--	--	<.01	--	--	<.01	--	--
Toxaphene, total, in µg/L	<6.3	<1.0	--	<6.3	<1.0	--	<6.3	<1.0	--
2,4-D, total, in µg/L	.26	--	--	8.7	--	--	.74	--	--

Table 15.--Quality of runoff from a basin containing heavy industry, sampled at site SR4, in Jefferson County, Kentucky, during selected storms, March 1991-April 1992

[FF, Discrete first-flush sample; 3C, composite sample of the first 3 hours of flow; RS, composite sample from the end of the first 3 hours of flow to the end of all stormflow; --, missing; µS/cm, microsiemens per centimeter at 25 degrees Celsius; mg/L, milligrams per liter; col/100mL, colonies per 100 milliliters; µg/L, micrograms per iter; <, less than. See table 10 for sample times and volume of runoff]

Water-quality constituent or characteristic	Beginning date of storm					
	March 12, 1991			February 12, 1992		
	FF	3C	RS	FF	3C	RS
SPECIFIC CONDUCTANCE						
Specific conductance, in µS/cm	1,080	--	--	--	--	--
pH AND ALKALINITY						
pH, in standard units	7.6	6.7	--	7.2	6.4	--
Alkalinity, total as CaCO3, in mg/L	208	73.0	--	158	73.0	--
TEMPERATURE						
Temperature, water, in degrees Celsius	8.5	--	--	--	--	--
OXYGEN DEMAND						
Chemical oxygen demand, in mg/L	56.0	110	46.0	157	159	--
Biochemical oxygen demand, 5-day, in mg/L	23.0	48.0	--	36.0	147	--
FECAL INDICATOR BACTERIA						
Fecal coliform, in col/100mL	500	--	--	2.0	--	--
Fecal streptococci, in col/100mL	4,500	--	--	--	--	--
MAJOR IONS						
Calcium, total, in mg/L	126	47.4	33.4	66.6	52.4	34.7
Calcium, dissolved, in mg/L	--	38.0	--	--	45.0	--
Magnesium, total, in mg/L	41.9	12.9	8.3	19.8	12.0	7.6
Sodium, dissolved, in mg/L	--	13.0	--	--	19.0	--
Potassium, dissolved, in mg/L	--	2.2	--	--	3.2	--
Sulfate, dissolved, in mg/L	--	<1.0	--	--	98.0	--
Chlorine, total residual, in mg/L	<.02	--	--	--	--	--
Chloride, dissolved, in mg/L	--	9.1	--	--	26.0	--
DISSOLVED AND SUSPENDED SOLIDS						
Dissolved solids, in mg/L	820	210	157	554	366	222
Suspended solids, in mg/L	62.0	174	31.0	60.0	80.0	38.0
Residue, volatile nonfiltrable, in mg/L	2.0	26.0	8.0	46.0	70.0	23.0
NUTRIENTS						
Nitrate, total as N, in mg/L	.64	1.1	--	1.1	1.4	.71
Nitrite, total as N, in mg/L	.19	.33	--	.29	.12	.06
Nitrogen, ammonia, total as N, in mg/L	.16	.28	.17	.15	.52	.18
Nitrogen, total organic as N, in mg/L	.48	.70	.16	.33	1.0	.46
Phosphorus, total as P, in mg/L	.86	.19	--	2.8	.30	.61
Phosphorus, dissolved as P, in mg/L	--	.17	--	--	.17	--
Phosphorus, total ortho as P, in mg/L	.12	.15	--	1.4	.17	.60
METALS AND TRACE ELEMENTS						
Antimony, total as Sb, in µg/L	--	1.0	--	--	2.0	--
Arsenic, total as As, in µg/L	<5.0	<5.0	<5.0	7.0	6.0	--
Barium, total as Ba, in µg/L	67.0	38.0	32.0	85.0	39.0	28.0
Beryllium, total as Be, in µg/L	<.50	<.50	<.50	.60	<.50	<.50
Cadmium, total as Cd, in µg/L	<7.0	<7.0	<7.0	<7.0	<7.0	<7.0
Chromium, total as Cr, in µg/L	18.0	7.0	<5.0	<5.0	<5.0	<5.0
Copper, total as Cu, in µg/L	8.0	18.0	11.0	40.0	18.0	12.0
Iron, total as Fe, in µg/L	1,520	2,730	936	2,670	2,000	870
Lead, total as Pb, in µg/L	<60.0	130	<60.0	<55.0	<55.0	<55.0
Mercury, total as Hg, in µg/L	<.20	.20	<.20	<.20	<.20	--
Nickel, total as Ni, in µg/L	<7.0	<7.0	<7.0	63.0	22.0	14.0
Selenium, total as Se, in µg/L	<5.0	<5.0	<5.0	<5.0	<5.0	--
Silver, total as Ag, in µg/L	8.0	<5.0	<5.0	<5.0	<5.0	<5.0
Thallium, dissolved, in µg/L	--	<1.0	--	--	<1.0	--
Zinc, total as Zn, in µg/L	151	211	215	231	202	114

Table 15.--Quality of runoff from a basin containing heavy industry, sampled at site SR4, in Jefferson County, Kentucky, during selected storms, March 1991-April 1992--Continued

[FF, Discrete first-flush sample; 3C, composite sample of the first 3 hours of flow; RS, composite sample from the end of the first 3 hours of flow to the end of all stormflow; --, missing; µS/cm, microsiemens per centimeter at 25 degrees Celsius; mg/L, milligrams per liter; col/100mL, colonies per 100 milliliters; µg/L, micrograms per iter; <, less than. See table 10 for sample times and volume of runoff]

Water-quality constituent or characteristic	Beginning date of storm					
	March 12, 1991			February 12, 1992		
	FF	3C	RS	FF	3C	RS
METALS AND TRACE ELEMENTS--Continued						
Cyanide, dissolved as CN, in mg/L	--	--	--	--	<0.01	--
ORGANIC COMPOUNDS						
Carbon, organic, total as C, in mg/L	--	25.0	--	--	60.0	--
Oil and grease, total recoverable, in mg/L	<1.0	--	--	14.0	--	--
VOLATILE ORGANIC COMPOUNDS						
Acrolein, total, in µg/L	--	--	--	<20.0	--	--
Acrylonitrile, total, in µg/L	--	--	--	<20.0	--	--
Benzene, total, in µg/L	<.20	--	--	<.20	--	--
Bromobenzene, total, in µg/L	<.20	--	--	<.20	--	--
Bromoform, total, in µg/L	<.20	--	--	<.20	--	--
Carbon tetrachloride, total, in µg/L	<.20	--	--	<.20	--	--
Chlorobenzene, total, in µg/L	<.20	--	--	<.20	--	--
Chlorodibromomethane, total, in µg/L	<.20	--	--	<.20	--	--
Chloroethane, total, in µg/L	<.20	--	--	<.20	--	--
Chloroform, total, in µg/L	<.20	--	--	<.20	--	--
Cis-1,2-dichloroethene, total, in µg/L	--	--	--	<.20	--	--
Cis-1,3-dichloropropene, total, in µg/L	<.20	--	--	<.20	--	--
Dibromochloropropane, total recoverable, in µg/L	--	--	--	<1.0	--	--
Dibromomethane, total recoverable, in µg/L	<.20	--	--	<.20	--	--
Dichlorobromomethane, total, in µg/L	<.20	--	--	<.20	--	--
Dichlorodifluoromethane, total, in µg/L	<.20	--	--	<.20	--	--
Ethylbenzene, total, in µg/L	<.20	--	--	<.20	--	--
Methylbromide, total, in µg/L	<.20	--	--	<.20	--	--
Methylchloride, total, in µg/L	<.20	--	--	<.20	--	--
Methylenechloride, total, in µg/L	<.20	--	--	<.20	--	--
O-chlorotoluene, total, in µg/L	<.20	--	--	<.20	--	--
Parachlorotoluene, total, in µg/L	<.20	--	--	<.20	--	--
Styrene, total, in µg/L	<.20	--	--	<.20	--	--
Tetrachloroethylene, total, in µg/L	<.20	--	--	<.20	--	--
Toluene, total, in µg/L	<.20	--	--	.70	--	--
Trans-1,3-dichloropropene, total, in µg/L	<.20	--	--	<.20	--	--
Trichloroethylene, total, in µg/L	<.20	--	--	<.20	--	--
Trichlorofluoromethane total, in µg/L	<.20	--	--	<.20	--	--
Vinyl chloride, total, in µg/L	<.20	--	--	<.20	--	--
Xylene, total recoverable, in µg/L	<.20	--	--	.20	--	--
1,1,1,2-Tetrachloroethane, total, in µg/L	<.20	--	--	<.20	--	--
1,1,1-Trichloroethane, total, in µg/L	<.20	--	--	<.20	--	--
1,1,2,2-Tetrachloroethane, total, in µg/L	<.20	--	--	<.20	--	--
1,1,2-Trichloroethane, total, in µg/L	<.20	--	--	<.20	--	--
1,1-Dichloropropene, total, in µg/L	<.20	--	--	<.20	--	--
1,1-Dichloroethane, total, in µg/L	<.20	--	--	<.20	--	--
1,1-Dichloroethylene, total, in µg/L	<.20	--	--	<.20	--	--
1,2,3-Trichloropropane, total, in µg/L	<.20	--	--	<.20	--	--
1,2-Dibromoethane, total, in µg/L	<.20	--	--	<.20	--	--
1,2-Dichloroethane, total, in µg/L	<.20	--	--	<.20	--	--
1,2-Dichloropropane, total, in µg/L	<.20	--	--	<.20	--	--
1,2-Dichloroethene, total recoverable, in µg/L	<.20	--	--	--	--	--
1,2-Transdichloroethene, total, in µg/L	--	--	--	<.20	--	--
1,3-Dichloropropane, total, in µg/L	<.20	--	--	<.20	--	--
2,2-Dichloropropane, total, in µg/L	<.20	--	--	<.20	--	--
2-Chloroethylvinylether, total, in µg/L	--	--	--	<1.0	--	--
BASE/NEUTRAL ORGANIC COMPOUNDS						
Acenaphthene, total, in µg/L	--	<5.0	--	--	<5.0	--
Acenapthylene, total, in µg/L	--	<5.0	--	--	<5.0	--

Table 15.--Quality of runoff from a basin containing heavy industry, sampled at site SR4, in Jefferson County, Kentucky, during selected storms, March 1991-April 1992--Continued

[FF, Discrete first-flush sample; 3C, composite sample of the first 3 hours of flow; RS, composite sample from the end of the first 3 hours of flow to the end of all stormflow; --, missing; µS/cm, microsiemens per centimeter at 25 degrees Celsius; mg/L, milligrams per liter; col/100mL, colonies per 100 milliliters; µg/L, micrograms per iter; <, less than. See table 10 for sample times and volume of runoff]

Water-quality constituent or characteristic	Beginning date of storm					
	March 12, 1991			February 12, 1992		
	FF	3C	RS	FF	3C	RS
BASE/NEUTRAL ORGANIC COMPOUNDS--Continued						
Anthracene, total, in µg/L	--	<5.0	--	--	<5.0	--
Benzidine, total, in µg/L	--	--	--	--	<40.0	--
Benzo(a)anthracene, 1,2-benzanthracene, total, in µg/L	--	<10.0	--	--	<10.0	--
Benzo(a)pyrene, total, in µg/L	--	<10.0	--	--	<10.0	--
Benzo(b)fluoranthene, total, in µg/L	--	<10.0	--	--	<10.0	--
Benzo(ghi)perylene 1,12-benzoperylene, total, in µg/L	--	<10.0	--	--	<10.0	--
Benzo(k)fluoranthene, total, in µg/L	--	<10.0	--	--	<10.0	--
Bis(2-chloroethyl)ether, total, in µg/L	--	<5.0	--	--	<5.0	--
Bis(2-chloroethoxy)methane, total, in µg/L	--	<5.0	--	--	<5.0	--
Bis(2-chloroisopropyl)ether, total, in µg/L	--	<5.0	--	--	<5.0	--
Bis(2-ethylhexyl)phthalate, total, in µg/L	--	8.0	--	--	<5.0	--
Chrysene, total, in µg/L	--	<10.0	--	--	<10.0	--
Di-n-butyl phthalate, total, in µg/L	--	<5.0	--	--	<5.0	--
Diethyl phthalate, total, in µg/L	--	<5.0	--	--	<5.0	--
Dimethyl phthalate, total, in µg/L	--	<5.0	--	--	<5.0	--
Dinoctyl phthalate, total, in µg/L	--	<10.0	--	--	<10.0	--
Fluoranthene, total, in µg/L	--	6.0	--	--	<5.0	--
Fluorene, total, in µg/L	--	<5.0	--	--	<5.0	--
Hexachlorobenzene, total, in µg/L	--	<5.0	--	--	<5.0	--
Hexachlorobutadiene, total, in µg/L	--	<5.0	--	<0.20	<5.0	--
Hexachlorocyclopentadiene, total, in µg/L	--	<5.0	--	--	<5.0	--
Hexachloroethane, total, in µg/L	--	<5.0	--	--	<5.0	--
Indeno(1,2,3-cd)pyrene, total, in µg/L	--	<10.0	--	--	<10.0	--
Isophorone, total, in µg/L	--	<5.0	--	--	<5.0	--
N-butylbenzyl phthalate, total, in µg/L	--	<5.0	--	--	<5.0	--
N-nitrosodi-n-propylamine, total, in µg/L	--	<5.0	--	--	<5.0	--
N-nitrosodimethylamine, total, in µg/L	--	<5.0	--	--	<5.0	--
N-nitrosodiphenylamine, total, in µg/L	--	<5.0	--	--	<5.0	--
Naphthalene, total, in µg/L	--	<5.0	--	.20	<5.0	--
Naphthalenes, polychlorinated, in µg/L	--	<1.0	--	--	<.10	--
Nitrobenzene, total, in µg/L	--	<5.0	--	--	<5.0	--
Phenanthrene, total, in µg/L	--	<5.0	--	--	<5.0	--
Pyrene, total, in µg/L	--	5.0	--	--	<5.0	--
1,2,4-Trichlorobenzene, total, in µg/L	--	<5.0	--	<.20	<5.0	--
1,2,5,6-Dibenzoanthracene, total, in µg/L	--	<10.0	--	--	<10.0	--
1,2-Dichlorobenzene, total, in µg/L	<0.20	<5.0	--	<.20	<5.0	--
1,2-Diphenylhydrazine, total recoverable, in µg/L	--	--	--	--	<5.0	--
1,3-Dichlorobenzene, total, in µg/L	<.20	<5.0	--	<.20	<5.0	--
1,4-Dichlorobenzene, total, in µg/L	<.20	<5.0	--	<.20	<5.0	--
2,4-Dinitrotoluene, total, in µg/L	--	<5.0	--	--	<5.0	--
2,6-Dinitrotoluene, total, in µg/L	--	<5.0	--	--	<5.0	--
2-Chloronaphthalene, total, in µg/L	--	<5.0	--	--	<5.0	--
3,3'-Dichlorobenzidine, total, in µg/L	--	--	--	--	<20.0	--
4-Bromophenylphenylether, total, in µg/L	--	<5.0	--	--	<5.0	--
4-Chlorophenylphenylether, total, in µg/L	--	<5.0	--	--	<5.0	--
ACID ORGANIC COMPOUNDS						
Parachlorometa cresol, total, in µg/L	--	<30.0	--	--	<30.0	--
Pentachlorophenol, total, in µg/L	--	<30.0	--	--	<30.0	--
Phenol, total, in µg/L	<10.0	<5.0	--	30.0	<5.0	--
2,4,6-Trichlorophenol, total, in µg/L	--	<20.0	--	--	<20.0	--
2,4,Dimethylphenol, total, in µg/L	--	<5.0	--	--	<5.0	--
2,4-Dichlorophenol, total, in µg/L	--	<5.0	--	--	<5.0	--
2,4-Dinitrophenol, total, in µg/L	--	<20.0	--	--	<20.0	--
2-Chlorophenol, total, in µg/L	--	<5.0	--	--	<5.0	--
2-Nitrophenol, total, in µg/L	--	<5.0	--	--	<5.0	--
4,6-Dinitroorthocresol, total, in µg/L	--	<30.0	--	--	<30.0	--

Table 15.--Quality of runoff from a basin containing heavy industry, sampled at site SR4, in Jefferson County, Kentucky, during selected storms, March 1991-April 1992--Continued

[FF, Discrete first-flush sample; 3C, composite sample of the first 3 hours of flow; RS, composite sample from the end of the first 3 hours of flow to the end of all stormflow; --, missing; µS/cm, microsiemens per centimeter at 25 degrees Celsius; mg/L, milligrams per liter; col/100mL, colonies per 100 milliliters; µg/L, micrograms per iter; <, less than. See table 10 for sample times and volume of runoff]

Water-quality constituent or characteristic	Beginning date of storm					
	March 12, 1991			February 12, 1992		
	FF	3C	RS	FF	3C	RS
ACID ORGANIC COMPOUNDS--Continued						
4-Nitrophenol, total, in µg/L	--	<30.0	--	--	<30.0	--
PESTICIDE ORGANIC COMPOUNDS						
Aldrin, total, in ug/L	--	<.01	--	--	<.01	--
Aroclor 1016 PCB, total, in µg/L	--	<.10	--	--	<.10	--
Aroclor 1221 PCB, total, in µg/L	--	<.10	--	--	<.10	--
Aroclor 1232 PCB, total, in µg/L	--	<.10	--	--	<.10	--
Aroclor 1242 PCB, total, in µg/L	--	<.10	--	--	<.10	--
Aroclor 1248 PCB, total, in µg/L	--	<.10	--	--	<.10	--
Aroclor 1254 PCB, total, in µg/L	--	<.10	--	--	<.10	--
Aroclor 1260 PCB, total, in µg/L	--	<.10	--	--	<.10	--
Chlordane, total, in µg/L	<3.1	<.10	--	<3.1	<.10	--
DDD, total, in µg/L	--	<.01	--	--	<.01	--
DDE, total, in µg/L	--	<.01	--	--	<.01	--
DDT, total, in µg/L	--	<.01	--	--	<.01	--
Deildrin, total, in µg/L	--	<.01	--	--	<.01	--
Endosulfan, total µg/L	--	<.01	--	--	<.01	--
Endrin, total, in µg/L	<.04	<.01	--	<.04	<.01	--
Heptachlor epoxide, total, in µg/L	--	<.01	--	--	<.01	--
Heptachlor, total, in µg/L	--	<.01	--	--	<.01	--
Lindane, total, in µg/L	.08	<.01	--	<.03	<.01	--
Methoxychlor, total, in µg/L	.34	<.01	--	.06	<.01	--
Mirex, total, in µg/L	--	<.01	--	--	<.01	--
PCB, total, in µg/L	--	<1.0	--	--	<.10	--
Perthane, total, in µg/L	--	<.10	--	--	<.10	--
Silvex, total, in µg/L	<.01	--	--	<.01	--	--
Toxaphene, total, in µg/L	<6.3	<1.0	--	<6.3	<1.0	--
2,4-D, total, in µg/L	.03	--	--	.15	--	--

Water-quality constituent or characteristic	Beginning date of s orm					
	March 17, 1992			April 15, 1992		
	FF	3C	RS	FF	3C	RS
pH AND ALKALINITY						
pH, in standard units	7.6	7.1	--	7.4	7.9	--
Alkalinity, total as CaCO3, in mg/L	45.0	14.0	--	78.0	61.0	--
OXYGEN DEMAND						
Chemical oxygen demand, in mg/L	14.0	17.0	20.0	53.0	98.0	43.0
Biochemical oxygen demand, 5-day, in mg/L	4.0	4.0	--	6.0	--	--
FECAL INDICATOR BACTERIA						
Fecal coliform, in col/100mL	8,000	--	--	5,380	--	--
Fecal streptococci, in col/100mL	933	--	--	6,200	--	--
MAJOR IONS						
Calcium, total, in mg/L	27.6	29.3	40.2	42.2	36.9	38.5
Calcium, dissolved, in mg/L	--	--	--	--	27.0	--
Magnesium, total, in mg/L	5.5	6.0	9.5	11.6	10.2	11.1
Sodium, dissolved, in mg/L	--	--	--	--	5.6	--
Potassium, dissolved, in mg/L	--	--	--	--	1.4	--
Sulfate, dissolved, in mg/L	--	--	--	--	42.0	--
Chlorine, total residual, in mg/L	--	--	--	<.20	--	--
Chloride, dissolved, in mg/L	--	--	--	--	6.0	--

Table 15.--Quality of runoff from a basin containing heavy industry, sampled at site SR4, in Jefferson County, Kentucky, during selected storms, March 1991-April 1992--Continued

[FF, Discrete first-flush sample; 3C, composite sample of the first 3 hours of flow; RS, composite sample from the end of the first 3 hours of flow to the end of all stormflow; --, missing; µS/cm, microsiemens per centimeter at 25 degrees Celsius; mg/L, milligrams per liter; col/100mL, colonies per 100 milliliters; µg/L, micrograms per iter; <, less than. See table 10 for sample times and volume of runoff]

Water-quality constituent or characteristic	Beginning date of storm					
	March 17, 1992			April 15, 1992		
	FF	3C	RS	FF	3C	RS
DISSOLVED AND SUSPENDED SOLIDS						
Dissolved solids, in mg/L	136	164	236	220	348	192
Suspended solids, in mg/L	52.0	42.0	48.0	60.0	100	34.0
Residue, volatile nonfiltrable, in mg/L	8.0	14.0	4.0	34.0	62.0	24.0
NUTRIENTS						
Nitrate, total as N, in mg/L	.68	.63	.66	1.2	.77	.67
Nitrite, total as N, in mg/L	.04	.05	--	.06	.05	.04
Nitrogen, ammonia, total as N, in mg/L	.08	.08	.02	.65	.47	.20
Nitrogen, total organic as N, in mg/L	.34	.30	.34	.75	.61	.52
Nitrogen, total kjeldahl as N, in mg/L	--	--	--	--	.70	--
Phosphorus, total as P, in mg/L	.08	.07	.12	.10	.11	.10
Phosphorus, total ortho as P, in mg/L	.04	.03	.04	.09	.09	.06
METALS AND TRACE ELEMENTS						
Antimony, total as Sb, in µg/L	--	--	--	--	3.0	--
Arsenic, total as As, in µg/L	12.0	<5.0	--	<5.0	100	--
Barium, total as Ba, in µg/L	22.0	19.0	62.0	32.0	30.0	40.0
Beryllium, total as Be, in µg/L	<.50	<.50	<.50	<.40	<.40	<.40
Cadmium, total as Cd, in µg/L	<7.0	<7.0	7.0	7.0	41.0	10.0
Chromium, total as Cr, in µg/L	30.0	<5.0	<5.0	<10.5	11.0	<10.5
Copper, total as Cu, in µg/L	20.0	20.0	13.0	35.0	25.0	14.0
Iron, total as Fe, in µg/L	1,110	858	1,200	1,580	1,910	930
Lead, total as Pb, in µg/L	<55.0	<55.0	<55.0	<53.0	<53.0	<53.0
Mercury, total as Hg, in µg/L	<.20	.20	--	<.20	.30	--
Nickel, total as Ni, in µg/L	43.0	13.0	<7.0	<14.0	<14.0	<14.0
Selenium, total as Se, in µg/L	5.0	6.0	--	<5.0	54.0	--
Silver, total as Ag, in µg/L	<5.0	<5.0	<5.0	<8.0	<8.0	<8.0
Thallium, dissolved, in µg/L	--	--	--	--	<1.0	--
Zinc, total as Zn, in µg/L	80.0	98.0	68.0	146	171	289
Cyanide, dissolved as CN, in mg/L	--	--	--	--	.02	--
ORGANIC COMPOUNDS						
Carbon, organic, total as C, in mg/L	--	--	--	--	28.0	--
Oil and grease, total recoverable, in mg/L	--	--	--	<1.0	--	--
VOLATILE ORGANIC COMPOUNDS						
Acrolein, total, in µg/L	--	--	--	<20.0	--	--
Acrylonitrile, total, in µg/L	--	--	--	<20.0	--	--
Benzene, total, in µg/L	--	--	--	<.20	--	--
Bromobenzene, total, in µg/L	--	--	--	<.20	--	--
Bromoform, total, in µg/L	--	--	--	<.20	--	--
Carbon tetrachloride, total, in µg/L	--	--	--	<.20	--	--
Chlorobenzene, total, in µg/L	--	--	--	<.20	--	--
Chlorodibromomethane, total, in µg/L	--	--	--	<.20	--	--
Chloroethane, total, in µg/L	--	--	--	<.20	--	--
Chloroform, total, in µg/L	--	--	--	<.20	--	--
Cis-1,2-dichloroethene, total, in µg/L	--	--	--	<.20	--	--
Cis-1,3-dichloropropene, total, in µg/L	--	--	--	<.20	--	--
Dibromochloropropane, total recoverable, in µg/L	--	--	--	<1.0	--	--
Dibromomethane, total recoverable, in µg/L	--	--	--	<.20	--	--
Dichlorobromomethane, total, in µg/L	--	--	--	<.20	--	--
Dichlorodifluoromethane, total, in µg/L	--	--	--	<.20	--	--
Ethylbenzene, total, in µg/L	--	--	--	<.20	--	--
Methylbromide, total, in µg/L	--	--	--	<.20	--	--
Methylchloride, total, in µg/L	--	--	--	<.20	--	--
Methylenechloride, total, in µg/L	--	--	--	<.20	--	--
O-chlorotoluene, total, in µg/L	--	--	--	<.20	--	--

Table 15.--Quality of runoff from a basin containing heavy industry, sampled at site SR4, in Jefferson County, Kentucky, during selected storms, March 1991-April 1992--Continued

[FF, Discrete first-flush sample; 3C, composite sample of the first 3 hours of flow; RS, composite sample from the end of the first 3 hours of flow to the end of all stormflow; --, missing; µS/cm, microsiemens per centimeter at 25 degrees Celsius; mg/L, milligrams per liter; col/100mL, colonies per 100 milliliters; µg/L, micrograms per iter; <, less than. See table 10 for sample times and volume of runoff]

Water-quality constituent or characteristic	Beginning date of storm					
	March 12, 1991			February 12, 1992		
	FF	3C	RS	FF	3C	RS
VOLATILE ORGANIC COMPOUNDS--Continued						
Parachlorotoluene, total, in µg/L	--	--	--	<0.20	--	--
Styrene, total, in µg/L	--	--	--	<.20	--	--
Tetrachloroethylene, total, in µg/L	--	--	--	<.20	--	--
Toluene, total, in µg/L	--	--	--	.30	--	--
Trans-1,3-dichloropropene, total, in µg/L	--	--	--	<.20	--	--
Trichloroethylene, total, in µg/L	--	--	--	<.20	--	--
Trichlorofluoromethane total, in µg/L	--	--	--	<.20	--	--
Vinyl chloride, total, in µg/L	--	--	--	<.20	--	--
Xylene, total recoverable, in µg/L	--	--	--	.20	--	--
1,1,1,2-Tetrachloroethane, total, in µg/L	--	--	--	<.20	--	--
1,1,1-Trichloroethane, total, in µg/L	--	--	--	<.20	--	--
1,1,2,2-Tetrachloroethane, total, in µg/L	--	--	--	<.20	--	--
1,1,2-Trichloroethane, total, in µg/L	--	--	--	<.20	--	--
1,1-Dichloropropene, total, in µg/L	--	--	--	<.20	--	--
1,1-Dichloroethane, total, in µg/L	--	--	--	<.20	--	--
1,1-Dichloroethylene, total, in µg/L	--	--	--	<.20	--	--
1,2,3-Trichloropropane, total, in µg/L	--	--	--	<.20	--	--
1,2-Dibromoethane, total, in µg/L	--	--	--	<.20	--	--
1,2-Dichloroethane, total, in µg/L	--	--	--	<.20	--	--
1,2-Dichloropropane, total, in µg/L	--	--	--	<.20	--	--
1,2-Transdichloroethene, total, in µg/L	--	--	--	<.20	--	--
1,3-Dichloropropane, total, in µg/L	--	--	--	<.20	--	--
2,2-Dichloropropane, total, in µg/L	--	--	--	<.20	--	--
2-Chloroethylvinylether, total, in µg/L	--	--	--	<1.0	--	--
BASE/NEUTRAL ORGANIC COMPOUNDS						
Acenaphthene, total, in µg/L	--	--	--	--	<5.0	--
Acenapthylene, total, in µg/L	--	--	--	--	<5.0	--
Anthracene, total, in µg/L	--	--	--	--	<5.0	--
Benzidine, total, in µg/L	--	--	--	--	<40.0	--
Benzo(a)anthracene, 1,2-benzanthracene, total, in µg/L	--	--	--	--	<10.0	--
Benzo(a)pyrene, total, in µg/L	--	--	--	--	<10.0	--
Benzo(b)fluoranthene, total, in µg/L	--	--	--	--	<10.0	--
Benzo(ghi)perylene 1,12-benzoperylene, total, in µg/L	--	--	--	--	<10.0	--
Benzo(k)fluoranthene, total, in µg/L	--	--	--	--	<10.0	--
Bis(2-chloroethyl)ether, total, in µg/L	--	--	--	--	<5.0	--
Bis(2-chloroethoxy)methane, total, in µg/L	--	--	--	--	<5.0	--
Bis(2-chloroisopropyl)ether, total, in µg/L	--	--	--	--	<5.0	--
Bis(2-ethylhexyl)phthalate, total, in µg/L	--	--	--	--	<5.0	--
Chrysene, total, in µg/L	--	--	--	--	<10.0	--
Di-n-butyl phthalate, total, in µg/L	--	--	--	--	<5.0	--
Diethyl phthalate, total, in µg/L	--	--	--	--	<5.0	--
Dimethyl phthalate, total, in µg/L	--	--	--	--	<5.0	--
Dinoctyl phthalate, total, in µg/L	--	--	--	--	<10.0	--
Fluoranthene, total, in µg/L	--	--	--	--	<5.0	--
Fluorene, total, in µg/L	--	--	--	--	<5.0	--
Hexachlorobenzene, total, in µg/L	--	--	--	--	<5.0	--
Hexachlorobutadiene, total, in µg/L	--	--	--	<.20	<5.0	--
Hexachlorocyclopentadiene, total, in µg/L	--	--	--	--	<5.0	--
Hexachloroethane, total, in µg/L	--	--	--	--	<5.0	--
Indeno(1,2,3-cd)pyrene, total, in µg/L	--	--	--	--	<10.0	--
Isophorone, total, in µg/L	--	--	--	--	<5.0	--
N-butylbenzyl phthalate, total, in µg/L	--	--	--	--	<5.0	--
N-nitrosodi-n-propylamine, total, in µg/L	--	--	--	--	<5.0	--
N-nitrosodimethylamine, total, in µg/L	--	--	--	--	<5.0	--
N-nitrosodiphenylamine, total, in µg/L	--	--	--	--	<5.0	--
Naphthalene, total, in µg/L	--	--	--	<.20	<5.0	--

Table 15.--Quality of runoff from a basin containing heavy industry, sampled at site SR4, in Jefferson County, Kentucky, during selected storms, March 1991-April 1992--Continued

[FF, Discrete first-flush sample; 3C, composite sample of the first 3 hours of flow; RS, composite sample from the end of the first 3 hours of flow to the end of all stormflow; --, missing; µS/cm, microsiemens per centimeter at 25 degrees Celsius; mg/L, milligrams per liter; col/100mL, colonies per 100 milliliters; µg/L, micrograms per iter; <, less than. See table 10 for sample times and volume of runoff]

Water-quality constituent or characteristic	Beginning date of storm					
	March 17, 1992			April 15, 1992		
	FF	3C	RS	FF	3C	RS
BASE/NEUTRAL ORGANIC COMPOUNDS--Continued						
Naphthalenes, polychlorinated, in µg/L	--	--	--	--	<0.10	--
Nitrobenzene, total, in µg/L	--	--	--	--	<5.0	--
Phenanthrene, total, in µg/L	--	--	--	--	<5.0	--
Pyrene, total, in µg/L	--	--	--	--	<5.0	--
1,2,4-Trichlorobenzene, total, in µg/L	--	--	--	<0.20	<5.0	--
1,2,5,6-Dibenzoanthracene, total, in µg/L	--	--	--	--	<10.0	--
1,2-Dichlorobenzene, total, in µg/L	--	--	--	<.20	<5.0	--
1,2-Diphenylhydrazine, total recoverable, in µg/L	--	--	--	--	<5.0	--
1,3-Dichlorobenzene, total, in µg/L	--	--	--	<.20	<5.0	--
1,4-Dichlorobenzene, total, in µg/L	--	--	--	<.20	<5.0	--
2,4-Dinitrotoluene, total, in µg/L	--	--	--	--	<5.0	--
2,6-Dinitrotoluene, total, in µg/L	--	--	--	--	<5.0	--
2-Chloronaphthalene, total, in µg/L	--	--	--	--	<5.0	--
3,3'-Dichlorobenzidine, total, in µg/L	--	--	--	--	<20.0	--
4-Bromophenylphenylether, total, in µg/L	--	--	--	--	<5.0	--
4-Chlorophenylphenylether, total, in µg/L	--	--	--	--	<5.0	--
ACID ORGANIC COMPOUNDS						
Parachlorometa cresol, total, in µg/L	--	--	--	--	<30.0	--
Pentachlorophenol, total, in µg/L	--	--	--	--	<30.0	--
Phenol, total, in µg/L	1.0	--	--	--	<5.0	--
2,4,6-Trichlorophenol, total, in µg/L	--	--	--	--	<20.0	--
2,4,Dimethylphenol, total, in µg/L	--	--	--	--	<5.0	--
2,4-Dichlorophenol, total, in µg/L	--	--	--	--	<5.0	--
2,4-Dinitrophenol, total, in µg/L	--	--	--	--	<20.0	--
2-Chlorophenol, total, in µg/L	--	--	--	--	<5.0	--
2-Nitrophenol, total, in µg/L	--	--	--	--	<5.0	--
4,6-Dinitroorthocresol, total, in µg/L	--	--	--	--	<30.0	--
4-Nitrophenol, total, in µg/L	--	--	--	--	<30.0	--
PESTICIDE ORGANIC COMPOUNDS						
Aldrin, total, in µg/L	--	--	--	--	<.01	--
Aroclor 1016 PCB, total, in µg/L	--	--	--	--	<.10	--
Aroclor 1221 PCB, total, in µg/L	--	--	--	--	<.10	--
Aroclor 1232 PCB, total, in µg/L	--	--	--	--	<.10	--
Aroclor 1242 PCB, total, in µg/L	--	--	--	--	<.10	--
Aroclor 1248 PCB, total, in µg/L	--	--	--	--	<.10	--
Aroclor 1254 PCB, total, in µg/L	--	--	--	--	<.10	--
Aroclor 1260 PCB, total, in µg/L	--	--	--	--	<.10	--
Chlordane, total, in µg/L	<3.1	--	--	<3.1	<.10	--
DDD, total, in µg/L	--	--	--	--	<.01	--
DDE, total, in µg/L	--	--	--	--	<.01	--
DDT, total, in µg/L	--	--	--	--	<.01	--
Deildrin, total, in µg/L	--	--	--	--	<.01	--
Endosulfan, total µg/L	--	--	--	--	<.01	--
Endrin, total, in µg/L	<.14	--	--	<.14	<.01	--
Heptachlor epoxide, total, in µg/L	--	--	--	--	<.01	--
Heptachlor, total, in µg/L	--	--	--	--	<.01	--
Lindane, total, in µg/L	<.01	--	--	<.01	<.01	--
Methoxychlor, total, in µg/L	<.04	--	--	.08	<.01	--
Mirex, total, in µg/L	--	--	--	--	<.01	--
PCB, total, in µg/L	--	--	--	--	<.10	--
Perthane, total, in µg/L	--	--	--	--	<.10	--
Silvex, total, in µg/L	<.01	--	--	<.01	--	--
Toxaphene, total, in µg/L	<6.3	--	--	<6.3	<1.0	--
2,4-D, total, in µg/L	<.01	--	--	.19	--	--

Table 16.--Quality of runoff from a commercial basin, sampled at site SR5, in Jefferson County, Kentucky, during selected storms, March 1991-May 1992

[FF, Discrete first-flush sample; 3C, composite sample of the first 3 hours of flow; RS, composite sample from the end of the first 3 hours of flow to the end of all stormflow; --, missing; µS/cm, microsiemens per centimeter at 25 degrees Celsius; mg/L, milligrams per liter; col/100mL, colonies per 100 milliliters; µg/L, micrograms per iter; <, less than. See table 10 for sample times and volume of runoff]

Water-quality constituent or characteristic	Beginning date of storm								
	March 27, 1991			June 21, 1991			January 8, 1992		
	FF	3C	RS	FF	3C	RS	FF	3C	RS
DISCHARGE									
Discharge, instantaneous, in cubic feet per second	0.39	--	--	32.0	--	--	--	--	--
SPECIFIC CONDUCTANCE									
Specific conductance, in µS/cm	400	--	--	--	--	--	--	--	--
pH AND ALKALINITY									
pH, in standard units	7.4	7.3	--	8.0	6.9	6.8	7.2	7.8	--
Alkalinity, total as CaCO3, in mg/L	100	61.0	--	--	--	--	92.0	91.0	--
TEMPERATURE									
Temperature, water, in degrees Celsius	14.5	--	--	--	--	--	--	--	--
OXYGEN DEMAND									
Chemical oxygen demand, in mg/L	110 1	70.0	29.0	--	26.0	--	--	--	--
Biochemical oxygen demand, 5-day, in mg/L	26.0	610	--	5.0	26.0	--	19.0	20.0	--
FECAL INDICATOR BACTERIA									
Fecal coliform, in col/100mL	960	--	--	61,000	--	--	2,240	--	--
Fecal streptococci, in col/100mL	1,320	--	--	74,000	--	--	--	--	--
MAJOR IONS									
Calcium, total, in mg/L	52.2	47.0	26.5	9.7	7.0	15.8	54.0	54.1	--
Calcium, dissolved, in mg/L	--	30.0	--	--	7.0	--	--	--	--
Magnesium, total, in mg/L	16.0	8.7	3.1	1.8	1.4	2.1	9.6	10.0	--
Sodium, dissolved, in mg/L	--	11.0	--	--	.90	--	--	--	--
Potassium, dissolved, in mg/L	--	2.5	--	--	2.5	--	--	--	--
Sulfate, dissolved, in mg/L	--	68.0	--	--	6.5	--	--	--	--
Chlorine, total residual, in mg/L	<.02	--	--	<.2	--	--	<.20	--	--
Chloride, dissolved, in mg/L	--	13.0	--	--	.60	--	--	--	--
DISSOLVED AND SUSPENDED SOLIDS									
Dissolved solids, in mg/L	289	228	148	107	174	120	286	300	--
Suspended solids, in mg/L	91.0	80.0	56.0	145	132	20.0	25.0	76.0	--
Residue, volatile nonfilterable, in mg/L	36.0	30.0	20.0	11.0	11.0	--	16.0	43.0	--
NUTRIENTS									
Nitrate, total as N, in mg/L	.93	.47	.77	--	--	--	1.2	1.3	--
Nitrite, total as N, in mg/L	.09	.05	.10	--	--	--	.12	.14	--
Nitrogen, ammonia, total as N, in mg/L	.56	.56	.28	.3	60.3	.24	.67	.78	--
Nitrogen, total organic as N, in mg/L	.73	1.6	.34	.1	90.1	.35	.90	.98	--
Phosphorus, total as P, in mg/L	.24	.09	.10	.7	10.2	.07	.37	.38	--
Phosphorus, dissolved as P, in mg/L	--	.07	--	--	.15	--	--	--	--
Phosphorus, total ortho as P, in mg/L	.16	.17	.04	--	--	--	.21	.22	--
METALS AND TRACE ELEMENTS									
Antimony, total as Sb, in µg/L	--	1.0	--	--	<1.0	--	--	--	--
Arsenic, total as As, in µg/L	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--
Barium, total as Ba, in µg/L	43.0	40.0	51.0	24.0	210	52.0	56.0	60.0	--
Beryllium, total as Be, in µg/L	<.50	<.50	<.50	<.5	.60	<.50	<.50	<.50	--

Table 16.--Quality of runoff from a commercial basin, sampled at site SR5, in Jefferson County, Kentucky, during selected storms, March 1991-May 1992--Continued

[FF, Discrete first-flush sample; 3C, composite sample of the first 3 hours of flow; RS, composite sample from the end of the first 3 hours of flow to the end of all stormflow; --, missing; µS/cm, microsiemens per centimeter at 25 degrees Celsius; mg/L, milligrams per liter; col/100mL, colonies per 100 milliliters; µg/L, micrograms per iter; <, less than. See table 10 for sample times and volume of runoff]

Water-quality constituent or characteristic	Beginning date of storm								
	March 27, 1991			June 21, 1991			January 8, 1992		
	FF	3C	RS	FF	3C	RS	FF	3C	RS
METALS AND TRACE ELEMENTS--Continued									
Cadmium, total as Cd, in µg/L	<7.0	<7.0	10.0	<7.0	<7.0	12.0	<7.0	<7.0	--
Chromium, total as Cr, in µg/L	<5.0	22.0	<5.0	<5.0	<5.0	<5.0	6.0	<5.0	--
Copper, total as Cu, in µg/L	19.0	26.0	12.0	11.0	<8.0	8.0	22.0	21.0	--
Iron, total as Fe, in µg/L	1,710	1 940	589	6,170	4,390	872	1,240	2,610	--
Lead, total as Pb, in µg/L	60.0	60.0	<60.0	<60.0	<60.0	<60.0	<55.0	<55.0	--
Mercury, total as Hg, in µg/L	<.20	<.20	<.20	<.2	.20	<.20	<.20	<.20	--
Nickel, total as Ni, in µg/L	<7.0	<7.0	<7.0	<7.0	8.0	<7.0	<7.0	18.0	--
Selenium, total as Se, in µg/L	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--
Silver, total as Ag, in µg/L	<5.0	<5.0	<5.0	12.0	<5.0	<5.0	<5.0	<5.0	--
Thallium, dissolved, in µg/L	--	<1.0	--	--	<1.0	--	--	--	--
Zinc, total as Zn, in µg/L	188	472	122	490	103	79.0	348	330	--
ORGANIC COMPOUNDS									
Carbon, organic, total as C, in mg/L	--	230	--	--	15.0	--	--	--	--
Oil and grease, total recoverable, in mg/L	3.0	--	--	<1.0	--	--	--	--	--
VOLATILE ORGANIC COMPOUNDS									
Benzene, total, in µg/L	<.20	--	--	<.2	--	--	--	--	--
Bromobenzene, total, in µg/L	<.20	--	--	<.2	--	--	--	--	--
Bromoform, total, in µg/L	<.20	--	--	<.2	--	--	--	--	--
Carbon tetrachloride, total, in µg/L	<.20	--	--	<.2	--	--	--	--	--
Chlorobenzene, total, in µg/L	<.20	--	--	<.2	--	--	--	--	--
Chlorodibromomethane, total, in µg/L	<.20	--	--	<.2	--	--	--	--	--
Chloroethane, total, in µg/L	<.20	--	--	<.2	--	--	--	--	--
Chloroform, total, in µg/L	<.20	--	--	<.2	--	--	--	--	--
Cis-1,3-dichloropropene, total, in µg/L	<.20	--	--	<.2	--	--	--	--	--
Dibromomethane, total recoverable, in µg/L	<.20	--	--	<.2	--	--	--	--	--
Dichlorobromomethane, total, in µg/L	<.20	--	--	<.2	--	--	--	--	--
Dichlorodifluoromethane, total, in µg/L	<.20	--	--	<.2	--	--	--	--	--
Ethylbenzene, total, in µg/L	<.20	--	--	<.2	--	--	--	--	--
Methylbromide, total, in µg/L	<.20	--	--	<.2	--	--	--	--	--
Methylchloride, total, in µg/L	<.20	--	--	<.2	--	--	--	--	--
Methylenechloride, total, in µg/L	<.20	--	--	<.2	--	--	--	--	--
O-chlorotoluene, total, in µg/L	<.20	--	--	<.2	--	--	--	--	--
Parachlorotoluene, total, in µg/L	<.20	--	--	<.2	--	--	--	--	--
Styrene, total, in µg/L	<.20	--	--	<.2	--	--	--	--	--
Tetrachloroethylene, total, in µg/L	<.20	--	--	<.2	--	--	--	--	--
Toluene, total, in µg/L	<.20	--	--	<.2	--	--	--	--	--
Trans-1,3-dichloropropene, total, in µg/L	<.20	--	--	<.2	--	--	--	--	--
Trichloroethylene, total, in µg/L	<.20	--	--	<.2	--	--	--	--	--
Trichlorofluoromethane total, in µg/L	<.20	--	--	<.2	--	--	--	--	--
Vinyl chloride, total, in µg/L	<.20	--	--	<.2	--	--	--	--	--
Xylene, total recoverable, in µg/L	<.20	--	--	<.2	--	--	--	--	--
1,1,1,2-Tetrachloroethane, total, in µg/L	<.20	--	--	<.2	--	--	--	--	--
1,1,1-Trichloroethane, total, in µg/L	<.20	--	--	<.2	--	--	--	--	--
1,1,2,2-Tetrachloroethane, total, in µg/L	<.20	--	--	<.2	--	--	--	--	--
1,1,2-Trichloroethane, total, in µg/L	<.20	--	--	<.2	--	--	--	--	--
1,1-Dichloropropene, total, in µg/L	<.20	--	--	<.2	--	--	--	--	--
1,1-Dichloroethane, total, in µg/L	<.20	--	--	<.2	--	--	--	--	--

Table 16.--Quality of runoff from a commercial basin, sampled at site SR5, in Jefferson County, Kentucky, during selected storms, March 1991-May 1992--Continued

[FF, Discrete first-flush sample; 3C, composite sample of the first 3 hours of flow; RS, composite sample from the end of the first 3 hours of flow to the end of all stormflow; --, missing; µS/cm, microsiemens per centimeter at 25 degrees Celsius; mg/L, milligrams per liter; col/100mL, colonies per 100 milliliters; µg/L, micrograms per iter; <, less than. See table 10 for sample times and volume of runoff]

Water-quality constituent or characteristic	Beginning date of storm								
	March 27, 1991			June 21, 1991			January 8, 1992		
	FF	3C	RS	FF	3C	RS	FF	3C	RS
VOLATILE ORGANIC COMPOUNDS--Continued									
1,1-Dichloroethylene, total, in µg/L	<0.20	--	--	<0.2	--	--	--	--	--
1,2,3-Trichloropropane, total, in µg/L	<.20	--	--	<.2	--	--	--	--	--
1,2-Dibromoethane, total, in µg/L	<.20	--	--	<.2	--	--	--	--	--
1,2-Dichloroethane, total, in µg/L	<.20	--	--	<.2	--	--	--	--	--
1,2-Dichloropropane, total, in µg/L	<.20	--	--	<.2	--	--	--	--	--
1,2-Dichloroethene, total recoverable, in µg/L	<.20	--	--	<.2	--	--	--	--	--
1,3-Dichloropropane, total, in µg/L	<.20	--	--	<.2	--	--	--	--	--
2,2-Dichloropropane, total, in µg/L	<.20	--	--	<.2	--	--	--	--	--
BASE/NEUTRAL ORGANIC COMPOUNDS									
Acenaphthene, total, in µg/L	--	<5.0	--	--	<5.0	--	--	--	--
Acenapthylene, total, in µg/L	--	<5.0	--	--	<5.0	--	--	--	--
Anthracene, total, in µg/L	--	<5.0	--	--	<5.0	--	--	--	--
Benzidine, total, in µg/L	--	--	--	--	<40.0	--	--	--	--
Benzo(a)anthracene, 1,2-benzanthracene, total, in µg/L	--	<10.0	--	--	<10.0	--	--	--	--
Benzo(a)pyrene, total, in µg/L	--	<10.0	--	--	<10.0	--	--	--	--
Benzo(b)fluoranthene, total, in µg/L	--	<10.0	--	--	<10.0	--	--	--	--
Benzo(ghi)perylene 1,12-benzoperylene, total, in µg/L	--	<10.0	--	--	<10.0	--	--	--	--
Benzo(k)fluoranthene, total, in µg/L	--	<10.0	--	--	<10.0	--	--	--	--
Bis(2-chloroethyl)ether, total, in µg/L	--	<5.0	--	--	<5.0	--	--	--	--
Bis(2-chloroethoxy)methane, total, in µg/L	--	<5.0	--	--	<5.0	--	--	--	--
Bis(2-chloroisopropyl)ether, total, in µg/L	--	<5.0	--	--	<5.0	--	--	--	--
Bis(2-ethylhexyl)phthalate, total, in µg/L	--	5.0	--	--	<5.0	--	--	--	--
Chrysene, total, in µg/L	--	<10.0	--	--	<10.0	--	--	--	--
Di-n-butyl phthalate, total, in µg/L	--	<5.0	--	--	<5.0	--	--	--	--
Diethyl phthalate, total, in µg/L	--	<5.0	--	--	<5.0	--	--	--	--
Dimethyl phthalate, total, in µg/L	--	<5.0	--	--	<5.0	--	--	--	--
Dinoctyl phthalate, total, in µg/L	--	<10.0	--	--	<10.0	--	--	--	--
Fluoranthene, total, in µg/L	--	<5.0	--	--	<5.0	--	--	--	--
Fluorene, total, in µg/L	--	<5.0	--	--	<5.0	--	--	--	--
Hexachlorobenzene, total, in µg/L	--	<5.0	--	--	<5.0	--	--	--	--
Hexachlorobutadiene, total, in µg/L	--	<5.0	--	--	<5.0	--	--	--	--
Hexachlorocyclopentadiene, total, in µg/L	--	<5.0	--	--	<5.0	--	--	--	--
Hexachloroethane, total, in µg/L	--	<5.0	--	--	<5.0	--	--	--	--
Indeno(1,2,3-cd)pyrene, total, in µg/L	--	<10.0	--	--	<10.0	--	--	--	--
Isophorone, total, in µg/L	--	<5.0	--	--	<5.0	--	--	--	--
N-butylbenzyl phthalate, total, in µg/L	--	<5.0	--	--	<5.0	--	--	--	--
N-nitrosodi-n-propylamine, total, in µg/L	--	<5.0	--	--	<5.0	--	--	--	--
N-nitrosodimethylamine, total, in µg/L	--	<5.0	--	--	<5.0	--	--	--	--
N-nitrosodiphenylamine, total, in µg/L	--	<5.0	--	--	<5.0	--	--	--	--
Naphthalene, total, in µg/L	--	<5.0	--	--	<5.0	--	--	--	--
Naphthalenes, polychlorinated, in µg/L	--	<.10	--	--	<.10	--	--	--	--
Nitrobenzene, total, in µg/L	--	<5.0	--	--	<5.0	--	--	--	--
Phenanthrene, total, in µg/L	--	<5.0	--	--	<5.0	--	--	--	--
Pyrene, total, in µg/L	--	<5.0	--	--	<5.0	--	--	--	--
1,2,4-Trichlorobenzene, total, in µg/L	--	<5.0	--	--	<5.0	--	--	--	--
1,2,5,6-Dibenzoanthracene, total, in µg/L	--	<10.0	--	--	<10.0	--	--	--	--
2,4-Dinitrotoluene, total, in µg/L	--	<5.0	--	--	<5.0	--	--	--	--
2,6-Dinitrotoluene, total, in µg/L	--	<5.0	--	--	<5.0	--	--	--	--

Table 16.--Quality of runoff from a commercial basin, sampled at site SR5, in Jefferson County, Kentucky, during selected storms, March 1991-May 1992--Continued

[FF, Discrete first-flush sample; 3C, composite sample of the first 3 hours of flow; RS, composite sample from the end of the first 3 hours of flow to the end of all stormflow; --, missing; µS/cm, microsiemens per centimeter at 25 degrees Celsius; mg/L, milligrams per liter; col/100mL, colonies per 100 milliliters; µg/L, micrograms per iter; <, less than. See table 10 for sample times and volume of runoff]

Water-quality constituent or characteristic	Beginning date of storm								
	March 27, 1991			June 21, 1991			January 8, 1992		
	FF	3C	RS	FF	3C	RS	FF	3C	RS
BASE/NEUTRAL ORGANIC COMPOUNDS--Continued									
2-Chloronaphthalene, total, in µg/L	--	<5.0	--	--	<5.0	--	--	--	--
3,3'-Dichlorobenzidine, total, in µg/L	--	--	--	--	<20.0	--	--	--	--
4-Bromophenylphenylether, total, in µg/L	--	<5.0	--	--	<5.0	--	--	--	--
4-Chlorophenylphenylether, total, in µg/L	--	<5.0	--	--	<5.0	--	--	--	--
ACID ORGANIC COMPOUNDS									
Parachlorometa cresol, total, in µg/L	--	<30.0	--	--	<30.0	--	--	--	--
Pentachlorophenol, total, in µg/L	--	<30.0	--	--	<30.0	--	--	--	--
Phenol, total, in µg/L	<10.0	<5.0	--	--	<5.0	--	--	--	--
2,4,6-Trichlorophenol, total, in µg/L	--	<20.0	--	--	<20.0	--	--	--	--
2,4,Dimethylphenol, total, in µg/L	--	<5.0	--	--	<5.0	--	--	--	--
2,4-Dichlorophenol, total, in µg/L	--	<5.0	--	--	<5.0	--	--	--	--
2,4-Dinitrophenol, total, in µg/L	--	<20.0	--	--	<20.0	--	--	--	--
2-Chlorophenol, total, in µg/L	--	<5.0	--	--	<5.0	--	--	--	--
2-Nitrophenol, total, in µg/L	--	<5.0	--	--	<5.0	--	--	--	--
4,6-Dinitroorthocresol, total, in µg/L	--	<30.0	--	--	<30.0	--	--	--	--
4-Nitrophenol, total, in µg/L	--	<30.0	--	--	<30.0	--	--	--	--
PESTICIDE ORGANIC COMPOUNDS									
Aldrin, total, in ug/L	--	<.01	--	--	<.01	--	--	--	--
Aroclor 1016 PCB, total, in µg/L	--	<.10	--	--	<.10	--	--	--	--
Aroclor 1221 PCB, total, in µg/L	--	<.10	--	--	<.10	--	--	--	--
Aroclor 1232 PCB, total, in µg/L	--	<.10	--	--	<.10	--	--	--	--
Aroclor 1242 PCB, total, in µg/L	--	<.10	--	--	<.10	--	--	--	--
Aroclor 1248 PCB, total, in µg/L	--	<.10	--	--	<.10	--	--	--	--
Aroclor 1254 PCB, total, in µg/L	--	<.10	--	--	<.10	--	--	--	--
Aroclor 1260 PCB, total, in µg/L	--	<.10	--	--	<.10	--	--	--	--
Chlordane, total, in µg/L	<3.1	<.10	--	<3.1	<.10	--	<3.1	--	--
DDD, total, in µg/L	--	<.01	--	--	<.01	--	--	--	--
DDE, total, in µg/L	--	<.01	--	--	<.01	--	--	--	--
DDT, total, in µg/L	--	<.01	--	--	<.01	--	--	--	--
Deildrin, total, in µg/L	--	<.01	--	--	<.01	--	--	--	--
Endosulfan, total µg/L	--	<.01	--	--	<.01	--	--	--	--
Endrin, total, in µg/L	--	--	--	--	--	--	.12	--	--
Heptachlor epoxide, total, in µg/L	--	<.01	--	--	<.01	--	--	--	--
Heptachlor, total, in µg/L	--	<.01	--	--	<.01	--	--	--	--
Lindane,total, in µg/L	--	--	--	--	--	--	.06	--	--
Methoxychlor, total, in µg/L	--	--	--	--	--	--	.22	--	--
Mirex, total, in µg/L	--	<.01	--	--	<.01	--	--	--	--
PCB, total, in µg/L	--	<.10	--	--	<.10	--	--	--	--
Perthane, total, in µg/L	--	<.10	--	--	<.10	--	--	--	--
Silvex, total, in µg/L	<.01	--	--	--	1.0	--	<.01	--	--
Toxaphene, total, in µg/L	<6.3	<1.0	--	<6.3	<1.0	--	<6.3	--	--
2,4-D, total, in µg/L	.14	--	--	.60	2.0	--	.08	--	--

Table 16.--Quality of runoff from a commercial basin, sampled at site SR5, in Jefferson County, Kentucky, during selected storms, March 1991-May 1992--Continued

[FF, Discrete first-flush sample; 3C, composite sample of the first 3 hours of flow; RS, composite sample from the end of the first 3 hours of flow to the end of all stormflow; --, missing; µS/cm, microsiemens per centimeter at 25 degrees Celsius; mg/L, milligrams per liter; col/100mL, colonies per 100 milliliters; µg/L, micrograms per iter; <, less than. See table 10 for sample times and volume of runoff]

Water-quality constituent or characteristic	Beginning date of storm					
	March 17, 1992			May 12, 1992		
	FF	3C	RS	FF	3C	RS
DISCHARGE						
Discharge, instantaneous, in cubic feet per second	--	--	--	0.70	--	--
SPECIFIC CONDUCTANCE						
Specific conductance, in µS/cm	--	--	--	200	--	--
pH AND ALKALINITY						
pH, in standard units	7.2	7.2	--	7.0	7.0	--
Alkalinity, total as CaCO3, in mg/L	46.0	32.0	--	40.0	28.0	--
TEMPERATURE						
Temperature, water, in degrees Celsius	--	--	--	19.1	--	--
OXYGEN DEMAND						
Chemical oxygen demand, in mg/L	38.0	161	29.0	147	70.0	20.0
Biochemical oxygen demand, 5-day, in mg/L	3.0	96.0	--	36.0	36.0	--
FECAL INDICATOR BACTERIA						
Fecal coliform, in col/100mL	9,000	--	--	5,920	--	--
Fecal streptococci, in col/100mL	1,000	--	--	13,100	--	--
MAJOR IONS						
Calcium, total, in mg/L	8.7	8.9	15.8	33.9	14.3	11.0
Calcium, dissolved, in mg/L	--	--	--	--	11.0	--
Magnesium, total, in mg/L	1.0	1.0	3.5	4.4	1.7	<8.0
Sodium, dissolved, in mg/L	--	--	--	--	2.2	--
Potassium, dissolved, in mg/L	--	--	--	--	1.3	--
Sulfate, dissolved, in mg/L	--	--	--	--	9.2	--
Chlorine, total residual, in mg/L	--	--	--	<.20	--	--
Chloride, dissolved, in mg/L	--	--	--	--	4.0	--
DISSOLVED AND SUSPENDED SOLIDS						
Dissolved solids, in mg/L	68.0	48.0	136	200.0	76.0	46.0
Suspended solids, in mg/L	58.0	50.0	48.0	94.0	34.0	10.0
Residue, volatile nonfiltrable, in mg/L	12.0	8.0	5.0	26.0	9.0	--
NUTRIENTS						
Nitrate, total as N, in mg/L	.81	.79	1.2	1.4	.97	.63
Nitrite, total as N, in mg/L	.07	.07	--	.17	.07	.04
Nitrogen, ammonia, total as N, in mg/L	.19	.17	.07	.83	.38	.23
Nitrogen, total organic as N, in mg/L	.49	.44	.53	.46	1.3	.69
Phosphorus, total as P, in mg/L	.14	.13	.25	.36	.18	.12
Phosphorus, dissolved as P, in mg/L	--	--	--	--	.09	--
Phosphorus, total ortho as P, in mg/L	.09	.09	.16	.16	.09	.09

Table 16.--Quality of runoff from a commercial basin, sampled at site SR5, in Jefferson County, Kentucky, during selected storms, March 1991-May 1992--Continued

[FF, Discrete first-flush sample; 3C, composite sample of the first 3 hours of flow; RS, composite sample from the end of the first 3 hours of flow to the end of all stormflow; --, missing; µS/cm, microsiemens per centimeter at 25 degrees Celsius; mg/L, milligrams per liter; col/100mL, colonies per 100 milliliters; µg/L, micrograms per iter; <, less than. See table 10 for sample times and volume of runoff]

Water-quality constituent or characteristic	Beginning date of storm					
	March 17, 1992			May 12, 1992		
	FF	3C	RS	FF	3C	RS
METALS AND TRACE ELEMENTS						
Antimony, total as Sb, in µg/L	--	--	--	--	1.0	--
Arsenic, total as As, in µg/L	<5.0	6.0	--	<5.0	<5.0	--
Barium, total as Ba, in µg/L	20.0	18.0	24.0	59.0	22.0	14.0
Beryllium, total as Be, in µg/L	<.50	<.50	<.50	.20	<.10	<.10
Cadmium, total as Cd, in µg/L	<7.0	<7.0	<7.0	<7.0	<7.0	<7.0
Chromium, total as Cr, in µg/L	<5.0	<5.0	<5.0	15.0	13.0	13.0
Copper, total as Cu, in µg/L	29.0	19.0	16.0	51.0	16.0	14.0
Iron, total as Fe, in µg/L	1,790	1,720	1,720	3,040	893	600
Lead, total as Pb, in µg/L	<55.0	<55.0	<55.0	<53.0	<53.0	<53.0
Mercury, total as Hg, in µg/L	<.20	.20	--	<.20	.30	1.3
Nickel, total as Ni, in µg/L	10.0	<7.0	<7.0	<14.0	<14.0	<14.0
Selenium, total as Se, in µg/L	<5.0	<5.0	--	<5.0	<5.0	--
Silver, total as Ag, in µg/L	<5.0	<5.0	<5.0	<8.0	<8.0	--
Thallium, dissolved, in µg/L	--	--	--	--	<1.0	--
Zinc, total as Zn, in µg/L	149	133	66.0	386	202	109
Cyanide, dissolved as CN, in mg/L	--	--	--	--	<.01	--
ORGANIC COMPOUNDS						
Carbon, organic, total as C, in mg/L	--	--	--	--	19.0	--
Oil and grease, total recoverable, in mg/L	--	--	--	7.0	--	--
VOLATILE ORGANIC COMPOUNDS						
Acrolein, total, in µg/L	--	--	--	<20.0	--	--
Acrylonitrile, total, in µg/L	--	--	--	<20.0	--	--
Benzene, total, in µg/L	--	--	--	<.20	--	--
Bromobenzene, total, in µg/L	--	--	--	<.20	--	--
Bromoform, total, in µg/L	--	--	--	<.20	--	--
Carbon tetrachloride, total, in µg/L	--	--	--	<.20	--	--
Chlorobenzene, total, in µg/L	--	--	--	<.20	--	--
Chlorodibromomethane, total, in µg/L	--	--	--	<.20	--	--
Chloroethane, total, in µg/L	--	--	--	<.20	--	--
Chloroform, total, in µg/L	--	--	--	12.0	--	--
Cis-1,2-dichloroethene, total, in µg/L	--	--	--	<.20	--	--
Cis-1,3-dichloropropene, total, in µg/L	--	--	--	<.20	--	--
Dibromochloropropene, total recoverable, in µg/L	--	--	--	<1.0	--	--
Dibromomethane, total recoverable, in µg/L	--	--	--	<.20	--	--
Dichlorobromomethane, total, in µg/L	--	--	--	<.20	--	--
Dichlorodifluoromethane, total, in µg/L	--	--	--	<.20	--	--
Ethylbenzene, total, in µg/L	--	--	--	<.20	--	--
Methylbromide, total, in µg/L	--	--	--	<.20	--	--
Methylchloride, total, in µg/L	--	--	--	<.20	--	--
Methylenechloride, total, in µg/L	--	--	--	<.20	--	--
N-butylbenzene, total recoverable, in mg/L	--	--	--	<.20	--	--
O-chlorotoluene, total, in µg/L	--	--	--	<.20	--	--
P-isopropyltoluene, total recoverable, in mg/L	--	--	--	<.20	--	--
Parachlorotoluene, total, in µg/L	--	--	--	<.20	--	--
Sec-butylbenzene, total recoverable, in mg/L	--	--	--	<.20	--	--
Styrene, total, in µg/L	--	--	--	<.20	--	--
Tert-butylbenzene, total recoverable, in mg/L	--	--	--	<.20	--	--

Table 16.--Quality of runoff from a commercial basin, sampled at site SR5, in Jefferson County, Kentucky, during selected storms, March 1991-May 1992--Continued

[FF, Discrete first-flush sample; 3C, composite sample of the first 3 hours of flow; RS, composite sample from the end of the first 3 hours of flow to the end of all stormflow; --, missing; µS/cm, microsiemens per centimeter at 25 degrees Celsius; mg/L, milligrams per liter; col/100mL, colonies per 100 milliliters; µg/L, micrograms per iter; <, less than. See table 10 for sample times and volume of runoff]

Water-quality constituent or characteristic	Beginning date of storm					
	March 17, 1992			May 12, 1992		
	FF	3C	RS	FF	3C	RS
VOLATILE ORGANIC COMPOUNDS--Continued						
Tetrachloroethylene, total, in µg/L	--	--	--	<0.20	--	--
Toluene, total, in µg/L	--	--	--	.20	--	--
Trans-1,3-dichloropropene, total, in µg/L	--	--	--	<.20	--	--
Trichloroethylene, total, in µg/L	--	--	--	<.20	--	--
Trichlorofluoromethane total, in µg/L	--	--	--	<.20	--	--
Vinyl chloride, total, in µg/L	--	--	--	<.20	--	--
Xylene, total recoverable, in µg/L	--	--	--	<.20	--	--
1,1,1,2-Tetrachloroethane, total, in µg/L	--	--	--	<.20	--	--
1,1,1-Trichloroethane, total, in µg/L	--	--	--	<.20	--	--
1,1,2,2-Tetrachloroethane, total, in µg/L	--	--	--	<.20	--	--
1,1,2-Trichloroethane, total, in µg/L	--	--	--	<.20	--	--
1,1-Dichloropropene, total, in µg/L	--	--	--	<.20	--	--
1,1-Dichloroethane, total, in µg/L	--	--	--	<.20	--	--
1,1-Dichloroethylene, total, in µg/L	--	--	--	<.20	--	--
1,2,3-Trichlorobenzene, total recoverable, in µg/L	--	--	--	<.20	--	--
1,2,3-Trichloropropane, total, in µg/L	--	--	--	<.20	--	--
1,2-Dibromoethane, total, in µg/L	--	--	--	<.20	--	--
1,2-Dichloroethane, total, in µg/L	--	--	--	<.20	--	--
1,2-Dichloropropane, total, in µg/L	--	--	--	<.20	--	--
1,2-Transdichloroethene, total, in µg/L	--	--	--	<.20	--	--
1,3,5-Trimethylbenzene, total recoverable, in µg/L	--	--	--	<.20	--	--
1,3-Dichloropropane, total, in µg/L	--	--	--	<.20	--	--
2,2-Dichloropropane, total, in µg/L	--	--	--	<.20	--	--
2-Chloroethylvinylether, total, in µg/L	--	--	--	<1.0	--	--
BASE/NEUTRAL ORGANIC COMPOUNDS						
Acenaphthene, total, in µg/L	--	--	--	--	<5.0	--
Acenapthylene, total, in µg/L	--	--	--	--	<5.0	--
Anthracene, total, in µg/L	--	--	--	--	<5.0	--
Benzidine, total, in µg/L	--	--	--	--	<40.0	--
Benzo(a)anthracene, 1,2-benzanthracene, total, in µg/L	--	--	--	--	<10.0	--
Benzo(a)pyrene, total, in µg/L	--	--	--	--	<10.0	--
Benzo(b)fluoranthene, total, in µg/L	--	--	--	--	<10.0	--
Benzo(ghi)perylene 1,12-benzoperylene, total, in µg/L	--	--	--	--	<10.0	--
Benzo(k)fluoranthene, total, in µg/L	--	--	--	--	<10.0	--
Bis(2-chloroethyl)ether, total, in µg/L	--	--	--	--	<5.0	--
Bis(2-chloroethoxy)methane, total, in µg/L	--	--	--	--	<5.0	--
Bis(2-chloroisopropyl)ether, total, in µg/L	--	--	--	--	<5.0	--
Bis(2-ethylhexyl)phthalate, total, in µg/L	--	--	--	--	8.0	--
Chrysene, total, in µg/L	--	--	--	--	<10.0	--
Di-n-butyl phthalate, total, in µg/L	--	--	--	--	<5.0	--
Diethyl phthalate, total, in µg/L	--	--	--	--	<5.0	--
Dimethyl phthalate, total, in µg/L	--	--	--	--	<5.0	--
Dinoctyl phthalate, total, in µg/L	--	--	--	--	<10.0	--
Fluoranthene, total, in µg/L	--	--	--	--	6.0	--
Fluorene, total, in µg/L	--	--	--	--	<5.0	--
Hexachlorobenzene, total, in µg/L	--	--	--	--	<5.0	--
Hexachlorobutadiene, total, in µg/L	--	--	--	<.20	<5.0	--
Hexachlorocyclopentadiene, total, in µg/L	--	--	--	--	<5.0	--

Table 16.--Quality of runoff from a commercial basin, sampled at site SR5, in Jefferson County, Kentucky, during selected storms, March 1991-May 1992--Continued

[FF, Discrete first-flush sample; 3C, composite sample of the first 3 hours of flow; RS, composite sample from the end of the first 3 hours of flow to the end of all stormflow; --, missing; µS/cm, microsiemens per centimeter at 25 degrees Celsius; mg/L, milligrams per liter; col/100mL, colonies per 100 milliliters; µg/L, micrograms per iter; <, less than. See table 10 for sample times and volume of runoff]

Water-quality constituent or characteristic	Beginning date of storm					
	March 17, 1992			May 12, 1992		
	FF	3C	RS	FF	3C	RS
BASE/NEUTRAL ORGANIC COMPOUNDS--Continued						
Hexachloroethane, total, in µg/L	--	--	--	--	<5.0	--
Indeno(1,2,3-cd)pyrene, total, in µg/L	--	--	--	--	<10.0	--
Isophorone, total, in µg/L	--	--	--	--	<5.0	--
Isopropylbenzene, total recoverable, in µg/L	--	--	--	<0.20	--	--
N-butylbenzyl phthalate, total, in µg/L	--	--	--	--	<5.0	--
N-nitrosodi-n-propylamine, total, in µg/L	--	--	--	--	<5.0	--
N-nitrosodimethylamine, total, in µg/L	--	--	--	--	<5.0	--
N-nitrosodiphenylamine, total, in µg/L	--	--	--	--	<5.0	--
N-propylbenzene, total recoverable, in µg/L	--	--	--	<.20	--	--
Naphthalene, total, in µg/L	--	--	--	<.20	<5.0	--
Naphthalenes, polychlorinated, in µg/L	--	--	--	--	<.10	--
Nitrobenzene, total, in µg/L	--	--	--	--	<5.0	--
Phenanthrene, total, in µg/L	--	--	--	--	<5.0	--
Pyrene, total, in µg/L	--	--	--	--	<5.0	--
1,2,4-Trichlorobenzene, total, in µg/L	--	--	--	<.20	<5.0	--
1,2,4-Trimethylbenzene, total recoverable, in µg/L	--	--	--	<.20	--	--
1,2,5,6-Dibenzoanthracene, total, in µg/L	--	--	--	--	<10.0	--
1,2-Dichlorobenzene, total, in µg/L	--	--	--	<.20	<5.0	--
1,2-Diphenylhydrazine, total recoverable, in µg/L	--	--	--	--	<5.0	--
1,3-Dichlorobenzene, total, in µg/L	--	--	--	<.20	<5.0	--
1,4-Dichlorobenzene, total, in µg/L	--	--	--	<.20	<5.0	--
2,4-Dinitrotoluene, total, in µg/L	--	--	--	--	<5.0	--
2,6-Dinitrotoluene, total, in µg/L	--	--	--	--	<5.0	--
2-Chloronaphthalene, total, in µg/L	--	--	--	--	<5.0	--
3,3'-Dichlorobenzidine, total, in µg/L	--	--	--	--	<20.0	--
4-Bromophenylphenylether, total, in µg/L	--	--	--	--	<5.0	--
4-Chlorophenylphenylether, total, in µg/L	--	--	--	--	<5.0	--
ACID ORGANIC COMPOUNDS						
Parachlorometa cresol, total, in µg/L	--	--	--	--	<30.0	--
Pentachlorophenol, total, in µg/L	--	--	--	--	<30.0	--
Phenol, total, in µg/L	1.0	--	--	230	<5.0	--
2,4,6-Trichlorophenol, total, in µg/L	--	--	--	--	<20.0	--
2,4,Dimethylphenol, total, in µg/L	--	--	--	--	<5.0	--
2,4-Dichlorophenol, total, in µg/L	--	--	--	--	<5.0	--
2,4-Dinitrophenol, total, in µg/L	--	--	--	--	<20.0	--
2-Chlorophenol, total, in µg/L	--	--	--	--	<5.0	--
2-Nitrophenol, total, in µg/L	--	--	--	--	<5.0	--
4,6-Dinitroorthocresol, total, in µg/L	--	--	--	--	<30.0	--
4-Nitrophenol, total, in µg/L	--	--	--	--	<30.0	--
PESTICIDE ORGANIC COMPOUNDS						
Aldrin, total, in ug/L	--	--	--	--	<.01	--
Aroclor 1016 PCB, total, in µg/L	--	--	--	--	<.10	--
Aroclor 1221 PCB, total, in µg/L	--	--	--	--	<.10	--
Aroclor 1232 PCB, total, in µg/L	--	--	--	--	<.10	--
Aroclor 1242 PCB, total, in µg/L	--	--	--	--	<.10	--
Aroclor 1248 PCB, total, in µg/L	--	--	--	--	<.10	--
Aroclor 1254 PCB, total, in µg/L	--	--	--	--	<.10	--

Table 16.--Quality of runoff from a commercial basin, sampled at site SR5, in Jefferson County, Kentucky, during selected storms, March 1991-May 1992--Continued

[FF, Discrete first-flush sample; 3C, composite sample of the first 3 hours of flow; RS, composite sample from the end of the first 3 hours of flow to the end of all stormflow; --, missing; µS/cm, microsiemens per centimeter at 25 degrees Celsius; mg/L, milligrams per liter; col/100mL, colonies per 100 milliliters; µg/L, micrograms per iter; <, less than. See table 10 for sample times and volume of runoff]

Water-quality constituent or characteristic	Beginning date of storm					
	March 17, 1992			May 12, 1992		
	FF	3C	RS	FF	3C	RS
PESTICIDE ORGANIC COMPOUNDS--Continued						
Aroclor 1260 PCB, total, in µg/L	--	--	--	--	<0.10	--
Chlordane, total, in µg/L	<3.1	--	--	<3.1	<.10	--
DDD, total, in µg/L	--	--	--	--	<.01	--
DDE, total, in µg/L	--	--	--	--	<.01	--
DDT, total, in µg/L	--	--	--	--	<.01	--
Deildrin, total, in µg/L	--	--	--	--	<.01	--
Endosulfan, total µg/L	--	--	--	--	<.01	--
Endrin, total, in µg/L	<.14	--	--	<.01	<.01	--
Heptachlor epoxide, total, in µg/L	--	--	--	--	<.01	--
Heptachlor, total, in µg/L	--	--	--	--	<.01	--
Lindane, total, in µg/L	<.01	--	--	.01	.01	--
Methoxychlor, total, in µg/L	<.04	--	--	<.04	<.01	--
Mirex, total, in µg/L	--	--	--	--	<.01	--
PCB, total, in µg/L	--	--	--	--	<.10	--
Perthane, total, in µg/L	--	--	--	--	<.10	--
Silvex, total, in µg/L	<.01	--	--	<.01	--	--
Toxaphene, total, in µg/L	<6.3	--	--	<6.3	<1.0	--
2,4-D, total, in µg/L	<.01	--	--	.46	--	--

Table 17.--Quality of runoff from a commercial basin, sampled at site SR6, in Jefferson County, Kentucky, during selected storms, April-December 1991

[FF, Discrete first-flush sample; 3C, composite sample of the first 3 hours of flow; RS, composite sample from the end of the first 3 hours of flow to the end of all stormflow; --, missing; µS/cm, microsiemens per centimeter at 25 degrees Celsius; mg/L, milligrams per liter; col/100mL, colonies per 100 milliliters; µg/L, micrograms per iter; <, less than. See table 10 for sample times and volume of runoff]

Water-quality constituent or characteristic	Beginning date of storm								
	April 4, 1991			July 8, 1991			December 12, 1991		
	FF	3C	RS	FF	3C	RS	FF	3C	RS
DISCHARGE									
Discharge, instantaneous, in cubic feet per second	0.15	--	--	--	--	--	--	--	--
SPECIFIC CONDUCTANCE									
Specific conductance, in µS/cm	233	--	--	--	--	--	--	--	--
pH AND ALKALINITY									
pH, in standard units	7.3	6.8	--	7.2	7.2	--	6.7	6.9	--
Alkalinity, total as $CaCO_3$, in mg/L	71.0	38.0	--	14.0	16.0	--	40.0	60.0	--
TEMPERATURE									
Temperature, water, in degrees Celsius	15.0	--	--	--	--	--	--	11.5	--
OXYGEN DEMAND									
Chemical oxygen demand, in mg/L	558	407	--	100	140	--	195	359	--
Biochemical oxygen demand, 5-day, in mg/L	--	--	--	16.0	45.0	--	17.0	73.0	--
FECAL INDICATOR BACTERIA									
Fecal coliform, in col/100mL	120	--	--	57,000	--	--	8,670	--	--
Fecal streptococci, in col/100mL	1,400	--	--	12,000	--	--	8,200	--	--
MAJOR IONS									
Calcium, total, in mg/L	59.0	25.9	--	12.3	11.5	--	26.1	25.7	--
Calcium, dissolved, in mg/L	--	20.0	--	--	8.8	--	--	19.0	--
Magnesium, total, in mg/L	7.1	2.0	--	1.8	1.6	--	2.2	1.9	--
Sodium, dissolved, in mg/L	--	4.1	--	--	.90	--	--	6.7	--
Potassium, dissolved, in mg/L	--	2.5	--	--	1.2	--	--	1.4	--
Sulfate, dissolved, in mg/L	--	22.0	--	--	12.0	--	--	27.0	--
Chlorine, total residual, in mg/L	<.02	--	--	<.20	--	--	<.20	--	--
Chloride, dissolved, in mg/L	--	7.0	--	--	58.0	--	--	11.0	--
DISSOLVED AND SUSPENDED SOLIDS									
Dissolved solids, in mg/L	644	152	--	276	264	--	168	144	--
Suspended solids, in mg/L	372	72.0	--	120	126	--	136	112	--
Residue, volatile nonfiltrable, in mg/L	156	28.0	--	84.0	92.0	--	44.0	44.0	--
NUTRIENTS									
Nitrate, total as N, in mg/L	1.6	.41	--	.40	.40	1.0	2.7	2.6	--
Nitrite, total as N, in mg/L	.40	.17	--	--	40.0	6.0	.30	.2	6.0
Nitrogen, ammonia, total as N, in mg/L	.38	1.1	--	.50	60.5	4.0	.50	30.4	4.0
Nitrogen, total organic as N, in mg/L	3.3	.39	--	1.1	.90	7.0	1.1	3.0	--
Phosphorus, total as P, in mg/L	.72	.37	--	.20	20.1	9.0	.70	80.1	8.0
Phosphorus, dissolved as P, in mg/L	--	<.01	--	--	.10	1.0	--	--	5.0
Phosphorus, total ortho as P, in mg/L	.40	.31	--	.10	60.1	6.0	.40	.3	2.0
METALS AND TRACE ELEMENTS									
Antimony, total as Sb, in µg/L	--	2.0	--	--	1.0	--	--	3.0	--
Barium, total as Ba, in µg/L	101	41.0	--	24.0	20.0	--	53.0	44.0	--
Chromium, total as Cr, in µg/L	36.0	25.0	--	12.0	12.0	--	13.0	12.0	--
Copper, total as Cu, in µg/L	59.0	25.0	--	<8.0	10.0	--	15.0	12.0	--

Table 17.--Quality of runoff from a commercial basin, sampled at site SR6, in Jefferson County, Kentucky, during selected storms, April-December 1991--Continued

[FF, Discrete first-flush sample; 3C, composite sample of the first 3 hours of flow; RS, composite sample from the end of the first 3 hours of flow to the end of all stormflow; --, missing; µS/cm, microsiemens per centimeter at 25 degrees Celsius; mg/L, milligrams per liter; col/100mL, colonies per 100 milliliters; µg/L, micrograms per iter; <, less than. See table 10 for sample times and volume of runoff]

Water-quality constituent or characteristic	Beginning date of storm								
	April 4, 1991			July 8, 1991			December 12, 1991		
	FF	3C	RS	FF	3C	RS	FF	3C	RS
METALS AND TRACE ELEMENTS--Continued									
Iron, total as Fe, in µg/L	4,420	1,660	--	1,840	1,490	--	4,240	3,110	--
Nickel, total as Ni, in µg/L	<7.0	<7.0	--	9.0	10.0	--	<7.0	10.0	--
Thallium, dissolved, in µg/L	--	<1.0	--	--	<1.0	--	--	<1.0	--
Zinc, total as Zn, in µg/L	1,210	256	--	246	324	--	273	211	--
Cyanide, dissolved as CN, in mg/L	--	--	--	--	--	--	--	--	1.0
ORGANIC COMPOUNDS									
Carbon, organic, total as C, in mg/L	--	49.0	--	--	48.0	--	--	92.0	--
Oil and grease, total recoverable, in mg/L	3.0	--	--	1.0	--	--	6.0	--	--
VOLATILE ORGANIC COMPOUNDS									
Acrolein, total, in µg/L	--	--	--	--	--	--	<20.0	--	--
Acrylonitrile, total, in µg/L	--	--	--	--	--	--	<20.0	--	--
Benzene, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Bromobenzene, total, in µg/L	<.20	--	--	<.20	--	--	<3.0	--	--
Bromoform, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Carbon tetrachloride, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Chlorobenzene, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Chlorodibromomethane, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Chloroethane, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Chloroform, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Cis-1,2-dichloroethene, total, in µg/L	--	--	--	--	--	--	<.20	--	--
Cis-1,3-dichloropropene, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Dibromochloropropane, total recoverable, in µg/L	--	--	--	--	--	--	<1.0	--	--
Dibromomethane, total recoverable, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Dichlorobromomethane, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Dichlorodifluoromethane, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Ethylbenzene, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Methylbromide, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Methylchloride, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Methylenechloride, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
O-chlorotoluene, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Parachlorotoluene, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Styrene, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Tetrachloroethylene, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Toluene, total, in µg/L	.20	--	--	<.20	--	--	<.20	--	--
Trans-1,3-dichloropropene, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Trichloroethylene, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Trichlorofluoromethane total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Vinyl chloride, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
Xylene, total recoverable, in µg/L	.30	--	--	<.20	--	--	.20	--	--
1,1,1,2-Tetrachloroethane, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
1,1,1-Trichloroethane, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
1,1,2,2-Tetrachloroethane, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
1,1,2-Trichloroethane, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
1,1-Dichloropropene, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
1,1-Dichloroethane, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
1,1-Dichloroethylene, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
1,2,3-Trichloropropane, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--

Table 17.--Quality of runoff from a commercial basin, sampled at site SR6, in Jefferson County, Kentucky, during selected storms, April-December 1991--Continued

[FF, Discrete first-flush sample; 3C, composite sample of the first 3 hours of flow; RS, composite sample from the end of the first 3 hours of flow to the end of all stormflow; --, missing; µS/cm, microsiemens per centimeter at 25 degrees Celsius; mg/L, milligrams per liter; col/100mL, colonies per 100 milliliters; µg/L, micrograms per iter; <, less than. See table 10 for sample times and volume of runoff]

Water-quality constituent or characteristic	Beginning date of storm								
	April 4, 1991			July 8, 1991			December 12, 1991		
	FF	3C	RS	FF	3C	RS	FF	3C	RS
VOLATILE ORGANIC COMPOUNDS--Continued									
1,2-Dibromoethane, total, in µg/L	<0.20	--	--	<0.20	--	--	<0.20	--	--
1,2-Dichloroethane, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
1,2-Dichloropropane, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
1,2-Dichloroethene, total recoverable, in µg/L	<.20	--	--	<.20	--	--	--	--	--
1,2-Transdichloroethene, total, in µg/L	--	--	--	--	--	--	<.20	--	--
1,3-Dichloropropane, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
2,2-Dichloropropane, total, in µg/L	<.20	--	--	<.20	--	--	<.20	--	--
2-Chloroethylvinylether, total, in µg/L	--	--	--	--	--	--	<1.0	--	--
BASE/NEUTRAL ORGANIC COMPOUNDS									
Acenaphthene, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
Acenapthylene, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
Anthracene, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
Benzidine, total, in µg/L	--	--	--	--	<40.0	--	--	<40.0	--
Benzo(a)anthracene, 1,2-benzanthracene, total, in µg/L	--	<10.0	--	--	<10.0	--	--	<10.0	--
Benzo(a)pyrene, total, in µg/L	--	<10.0	--	--	<10.0	--	--	<10.0	--
Benzo(b)fluoranthene, total, in µg/L	--	<10.0	--	--	<10.0	--	--	<10.0	--
Benzo(ghi)perylene 1,12-benzoperylene, total, in µg/L	--	<10.0	--	--	<10.0	--	--	<10.0	--
Benzo(k)fluoranthene, total, in µg/L	--	<10.0	--	--	<10.0	--	--	<10.0	--
Bis(2-chloroethyl)ether, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
Bis(2-chloroethoxy)methane, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
Bis(2-chloroisopropyl)ether, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
Bis(2-ethylhexyl)phthalate, total, in µg/L	--	11.0	--	--	<5.0	--	--	11.0	--
Chrysene, total, in µg/L	--	<10.0	--	--	<10.0	--	--	<10.0	--
Di-n-butyl phthalate, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
Diethyl phthalate, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
Dimethyl phthalate, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
Dinoctyl phthalate, total, in µg/L	--	<10.0	--	--	<10.0	--	--	<10.0	--
Fluoranthene, total, in µg/L	--	6.0	--	--	9.0	--	--	21.0	--
Fluorene, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
Hexachlorobenzene, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
Hexachlorocyclopentadiene, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
Hexachloroethane, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
Indeno(1,2,3-cd)pyrene, total, in µg/L	--	<10.0	--	--	<10.0	--	--	<10.0	--
Isophorone, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
N-butylbenzyl phthalate, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
N-nitrosodi-n-propylamine, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
N-nitrosodimethylamine, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
N-nitrosodiphenylamine, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
Naphthalenes, polychlorinated, in µg/L	--	<1.0	--	--	<.10	--	--	<.1	--
Nitrobenzene, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
Phenanthrene, total, in µg/L	--	<5.0	--	--	<5.0	--	--	7.0	--
Pyrene, total, in µg/L	--	<5.0	--	--	6.0	--	--	14.0	--
1,2,5,6-Dibenzoanthracene, total, in µg/L	--	<10.0	--	--	<10.0	--	--	<10.0	--
1,2-Diphenylhydrazine, total recoverable, in µg/L	--	--	--	--	<5.0	--	--	<5.0	--
2,4-Dinitrotoluene, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
2,6-Dinitrotoluene, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
2-Chloronaphthalene, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
3,3'-Dichlorobenzidine, total, in µg/L	--	--	--	--	<20.0	--	--	<20.0	--

Table 17.--Quality of runoff from a commercial basin, sampled at site SR6, in Jefferson County, Kentucky, during selected storms, April-December 1991--Continued

[FF, Discrete first-flush sample; 3C, composite sample of the first 3 hours of flow; RS, composite sample from the end of the first 3 hours of flow to the end of all stormflow; --, missing; µS/cm, microsiemens per centimeter at 25 degrees Celsius; mg/L, milligrams per liter; col/100mL, colonies per 100 milliliters; µg/L, micrograms per iter; <, less than. See table 10 for sample times and volume of runoff]

Water-quality constituent or characteristic	Beginning date of storm								
	April 4, 1991			July 8, 1991			December 12, 1991		
	FF	3C	RS	FF	3C	RS	FF	3C	RS
BASE/NEUTRAL ORGANIC COMPOUNDS--Continued									
4-Bromophenylphenylether, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
4-Chlorophenylphenylether, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
ACID ORGANIC COMPOUNDS									
Parachlorometa cresol, total, in µg/L	--	<30.0	--	--	<30.0	--	--	<30.0	--
Pentachlorophenol, total, in µg/L	--	<30.0	--	--	<30.0	--	--	<30.0	--
2,4,6-Trichlorophenol, total, in µg/L	--	<20.0	--	--	<20.0	--	--	<20.0	--
2,4,Dimethylphenol, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
2,4-Dichlorophenol, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
2,4-Dinitrophenol, total, in ug/L	--	<20.0	--	--	<20.0	--	--	<20.0	--
2-Chlorophenol, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
2-Nitrophenol, total, in µg/L	--	<5.0	--	--	<5.0	--	--	<5.0	--
4,6-Dinitroorthocresol, total, in µg/L	--	<30.0	--	--	<30.0	--	--	<30.0	--
4-Nitrophenol, total, in µg/L	--	<30.0	--	--	<30.0	--	--	<30.0	--
PESTICIDE ORGANIC COMPOUNDS									
Aldrin, total, in µg/L	--	<.01	--	--	--	1.0	--	--	1.0
Aroclor 1016 PCB, total, in µg/L	--	<.10	--	--	<.10	--	--	<.1	--
Aroclor 1221 PCB, total, in µg/L	--	<.10	--	--	<.10	--	--	<.1	--
Aroclor 1232 PCB, total, in µg/L	--	<.10	--	--	<.10	--	--	<.1	--
Aroclor 1242 PCB, total, in µg/L	--	<.10	--	--	<.10	--	--	<.1	--
Aroclor 1248 PCB, total, in µg/L	--	<.10	--	--	<.10	--	--	<.1	--
Aroclor 1254 PCB, total, in µg/L	--	<.10	--	--	<.10	--	--	<.1	--
Aroclor 1260 PCB, total, in µg/L	--	<.10	--	--	<.10	--	--	<.1	--
DDD, total, in µg/L	--	<.01	--	--	--	1.0	--	--	1.0
DDE, total, in µg/L	--	<.01	--	--	--	1.0	--	--	1.0
DDT, total, in µg/L	--	<.01	--	--	--	1.0	--	--	1.0
Deildrin, total, in µg/L	--	<.01	--	--	--	1.0	--	--	1.0
Endosulfan, total µg/L	--	<.01	--	--	--	1.0	--	--	1.0
Heptachlor epoxide, total, in µg/L	--	<.01	--	--	--	1.0	--	--	1.0
Heptachlor, total, in µg/L	--	<.01	--	--	--	1.0	--	--	1.0
Mirex, total, in µg/L	--	<.01	--	--	--	1.0	--	--	1.0
PCB, total, in µg/L	--	<1.0	--	--	<.10	--	--	<.1	--
Perthane, total, in µg/L	--	<.10	--	--	<.10	--	--	<.1	--
Silvex, total, in µg/L	0.02	--	--	--	1.0	--	--	1.0	--
2,4-D, total, in µg/L	276	--	--	0.70	--	--	0.50	9.0	--

Table 18.--Statistical summary of event mean concentrations of selected constituents measured at stormwater outfalls in Jefferson County, Kentucky, January 1991-May 1992

[COD, chemical oxygen demand; BOD, biochemical oxygen demand; DS, dissolved solids; SS, suspended solids; TN, total nitrogen; TKN, total Kjeldahl nitrogen; TP, total phosphorus; DP, dissolved phosphorus; CD, total cadmium; CU, total copper; PB, total lead; ZN, total zinc. Event mean concentrations reported in milligrams per liter. Censored data for the event mean concentrations were set to the detection limit (maximum probable value) before statistical summary]

	COD	BOD	DS	SS	TN	TKN	TP	DP	CD	CU	PB	ZN
Maximum	407	610	580	300	5.49	2.42	1.19	1.1	0.035	0.037	0.067	0.53
Median	88.3	38.0	167	61.8	2.02	1.24	.25	.12	.007	.014	.060	.16
Minimum	20.0	1.0	56.0	19.1	1.06	.36	.08	.01	.007	.008	.053	.045
Mean	125	74.1	219	97.6	2.37	1.24	.32	.21	.009	.015	.058	.19
Standard deviation	118	139	152	84.9	.988	.57	.27	.27	.007	.007	.003	.12

Table 19.--Storm loads and event mean concentrations of selected constituents measured at stormwater outfalls in Jefferson County, Kentucky, January 1991-May 1992

[mg/L, milligrams per liter; lb, pounds; --, missing. Censored data were set to the detection limit, and indicated loads and concentrations are maximum probable values]

Site	Date storm began	Chemical oxygen demand: Event mean concentration, in mg/L	Chemical oxygen demand: Load for first 3 hours, in lb	Chemical oxygen demand: Total storm load, in lb	Biochemical oxygen demand: Event mean concentration, in mg/L	Biochemical oxygen demand: Load for first 3 hours, in lb	Biochemical oxygen demand: Total storm load, in lb	Dissolved solids: Event mean concentration, in mg/L	Dissolved solids: Load for first 3 hours, in lb	Dissolved solids: Total storm load, in lb
SR1	910115	30.0	6.84	--	7.00	1.60	--	534	122	--
SR1	910419	107	51.7	51.8	--	--	--	64.6	30.7	31.4
SR1	911005	82.0	52.4	53.2	40.0	23.5	25.7	95.9	48.3	62.2
SR2	910205	189	65.3	--	71.0	24.5	--	484	167	--
SR2	910419	62.0	62.0	63.9	--	--	--	56.0	56.0	57.7
SR2	911005	99.0	97.9	104	51.0	50.4	53.5	60.0	59.3	62.9
SR3	910301	94.6	70.7	87.3	24.0	15.7	--	296	194	--
SR3	910904	54.9	159	589	13.0	23.0	--	140	264	1,500
SR3	911212	119	12.3	--	21.0	2.18	--	580	60.1	--
SR4	910312	52.2	48.7	239	48.0	21.2	--	162	92.9	742
SR4	920212	159	45.4	--	147	41.9	--	240	104	537
SR4	920317	20.0	6.42	595	4.00	1.51	--	235	61.9	7,010
SR4	920415	66.1	79.4	127	1.00	.810	--	258	282	496
SR5	910327	365	238	251	610	136	--	174	50.7	120
SR5	910621	26.0	150	168	26.0	150	168	167	1,000	1,100
SR5	920108	--	--	--	20.0	.120	.120	300	1.87	1.87
SR5	920317	29.9	27.3	708	96.0	16.3	--	135	8.13	3,200
SR5	920512	39.0	41.0	60.1	36.0	21.1	--	57.4	44.6	88.5
SR6	910404	407	81.2	82.7	--	--	--	152	30.3	30.9
SR6	910708	140	215	215	45.0	69.0	69.0	264	405	405
SR6	911212	359	51.7	--	73.0	10.5	--	144	20.7	--

		Suspended solids			Total nitrogen			Total Kjeldahl nitrogen		
SR1	910115	36.0	8.21	--	2.70	0.616	--	1.29	0.294	--
SR1	910419	47.6	23.0	23.1	3.45	1.66	1.68	2.42	1.17	1.18
SR1	911005	40.8	25.9	26.5	1.98	1.14	1.29	1.26	.700	.820
SR2	910205	300	104	--	3.06	1.06	--	1.93	.667	--
SR2	910419	24.0	24.0	24.7	1.89	1.89	1.95	1.04	1.04	1.07
SR2	911005	202	200	212	2.95	2.92	3.09	2.05	2.03	2.15
SR3	910301	248	162	--	2.48	1.62	--	1.70	1.11	--
SR3	910904	46.8	90.2	502	1.73	2.49	18.5	.994	1.17	10.6
SR3	911212	272	28.2	--	5.49	.569	--	1.59	.165	--
SR4	910312	44.8	77.0	205	2.41	1.07	--	.393	.434	1.80
SR4	920212	43.4	22.8	96.8	1.62	.868	3.61	.753	.434	1.68
SR4	920317	47.9	15.9	1,430	1.06	.400	--	.360	.143	10.7
SR4	920415	61.7	81.0	119	1.63	1.54	3.14	.871	.875	1.68
SR5	910327	63.8	17.8	43.8	1.87	.596	1.29	1.12	.480	.768
SR5	910621	118	762	778	--	--	--	.476	2.65	3.13
SR5	920108	76.0	.470	.470	3.20	.020	.020	1.76	.011	.011
SR5	920317	48.0	8.47	1,140	1.47	.249	--	.600	.103	14.2
SR5	920512	19.1	19.9	29.5	2.02	1.59	3.11	1.21	.985	1.86
SR6	910404	72.0	14.4	14.6	2.07	.413	.421	1.49	.297	.303
SR6	910708	126	193	193	1.98	3.04	3.04	1.51	2.32	2.32
SR6	911212	112	16.1	--	--	--	--	--	--	--

Table 19.--Storm loads and event mean concentrations of selected constituents measured at stormwater outfalls in Jefferson County, Kentucky, January 1991-May 1992--Continued

[mg/L, milligrams per liter; lb, pounds; --, missing. Censored data were set to the detection limit, and indicated loads and concentrations are maximum probable values]

Site	Date storm began	Total phosphorus: Event mean concentration, in mg/L	Total phosphorus: Load for first 3 hours, in lb	Total phosphorus: Total storm load, in lb	Dissolved phosphorus: Event mean concentration, in mg/L	Dissolved phosphorus: Load for first 3 hours, in lb	Dissolved phosphorus: Total storm load, in lb	Total cadmium: Event mean concentration, in mg/L	Total cadmium: Load for first 3 hours, in lb	Total cadmium: Total storm load, in lb
SR1	910115	0.250	0.060	--	--	--	--	0.007	0.002	--
SR1	910419	.460	.220	0.220	0.310	0.148	0.151	.007	.003	0.003
SR1	911005	1.19	.770	.770	1.10	.648	.708	.007	.004	.005
SR2	910205	.810	.280	--	--	--	--	.007	.002	--
SR2	910419	.390	.390	.400	.450	.450	.464	.007	.007	.007
SR2	911005	.260	.260	.270	.200	.198	.210	.007	.007	.007
SR3	910301	.080	.050	--	.050	.033	--	.008	.005	.007
SR3	910904	.220	.340	2.30	.120	.212	--	.007	.012	.075
SR3	911212	.370	.040	--	.030	.003	--	.007	.001	--
SR4	910312	.190	.080	--	.170	.075	--	.007	.003	.032
SR4	920212	.560	.060	1.25	.170	.049	--	.007	.002	.016
SR4	920317	.120	.030	3.56	--	--	--	.007	.003	.209
SR4	920415	.080	.050	.160	--	--	--	.023	.033	.044
SR5	910327	.100	.020	.070	.070	.016	--	.009	.002	.006
SR5	910621	.180	1.15	1.21	.150	.865	.971	.008	.040	.050
SR5	920108	.380	--	--	--	--	--	.007	--	--
SR5	920317	.250	.020	5.89	--	--	--	.007	.001	.166
SR5	920512	.120	.070	.180	.090	.053	--	.007	.004	.011
SR6	910404	.370	.070	.080	.010	.002	.002	.035	.007	.007
SR6	910708	.190	.290	.290	.110	.169	.169	.007	.011	.011
SR6	911212	.180	.030	--	.050	.007	--	.007	.001	--

		Total copper			Total lead			Total zinc		
SR1	910115	0.014	0.003	--	0.055	0.013	--	0.162	0.037	--
SR1	910419	.009	.004	0.004	.060	.029	0.029	.362	.175	0.176
SR1	911005	.008	.005	.005	.060	.035	.039	.066	.036	.043
SR2	910205	.017	.006	--	.055	.019	--	.142	.049	--
SR2	910419	.008	.008	.008	.060	.060	.062	.157	.157	.162
SR2	911005	.008	.008	.008	.060	.059	.063	.529	.523	.555
SR3	910301	.016	.011	.015	.055	.036	.051	.103	.079	.095
SR3	910904	.015	.021	.164	.060	.106	.643	.045	.126	.483
SR3	911212	.037	.004	--	.060	.006	--	.187	.019	--
SR4	910312	.012	.008	.053	.067	.058	.306	.215	.093	.983
SR4	920212	.013	.005	.028	.055	.016	.123	.125	.058	.280
SR4	920317	.013	.008	.390	.055	.021	1.64	.068	.037	2.04
SR4	920415	.019	.020	.036	.053	.043	.102	.238	.139	.459
SR5	910327	.017	.006	.011	.060	.013	.041	.235	.105	.162
SR5	910621	.008	.046	.053	.060	.346	.394	.100	.594	.658
SR5	920108	.021	--	--	.055	--	--	.330	.002	.002
SR5	920317	.016	.003	.379	.055	.009	1.30	.066	.023	1.57
SR5	920512	.015	.009	.023	.053	.031	.082	.144	.118	.223
SR6	910404	.025	.005	.005	.055	.011	.011	.256	.051	.052
SR6	910708	.010	.015	.015	.060	.092	.092	.324	.497	.497
SR6	911212	.012	.002	--	.060	.009	--	.211	.030	--

Table 20.--Mean storm-load estimates of selected constituents from stormwater-outfall and stream-sampling basins in Jefferson County, Kentucky, based on generalized least-squares regression models of Driver and Tasker (1990)

[If the drainage area of the selected basin was greater than 0.5 square mile, a drainage area of 0.2 square mile was used for the regression model calculation and the result was multiplied by five times the actual drainage area magnitude. All loads are in pounds. COD, chemical oxygen demand; SS, suspended solids; DS, dissolved solids; TN, total nitrogen; TKN, total Kjeldahl nitrogen; TP, total phosphorus; DP, dissolved phosphorus; CU, total recoverable copper; PB, total recoverable lead; ZN, total recoverable zinc]

Site	COD	SS	DS	TN	TKN	TP	DP	CU	PB	ZN
SR1	161	470	225	5.46	4.49	0.973	0.201	0.098	0.530	0.368
SR2	145	526	251	4.68	3.80	1.09	.225	.110	.437	.301
SR3	213	654	312	7.12	5.84	1.35	.279	.136	.685	.474
SR4	77.9	212	101	.961	.812	.438	.090	.044	.263	.183
SR5	199	411	196	7.21	6.05	.851	.176	.086	.743	.523
SR6	399	878	419	14.3	11.9	1.82	.375	.183	1.46	1.02
1	76,100	255,000	122,000	2,500	2,040	529	109	53.2	237	164
2	12,600	43,300	20,700	413	336	89.6	18.5	9.01	38.9	26.8
3	60,800	199,000	95,000	2,010	1,640	412	85.0	41.4	191	132
5	23,600	69,400	33,200	797	655	144	29.7	14.5	77.2	53.6
6	17,800	52,600	25,100	601	494	109	22.5	11.0	58.2	40.4
7	18,800	57,300	27,400	632	519	119	24.5	11.9	60.9	42.2
8	23,200	70,400	33,600	778	638	146	30.1	14.7	74.9	51.9
9	2,720	7,470	3,570	93.3	77.0	15.5	3.19	1.56	9.15	6.37
10	6,950	20,200	9,660	235	193	41.9	8.65	4.21	22.8	15.8
11	8,790	30,500	14,600	287	234	63.2	13.0	6.35	27.0	18.6
12	5,080	18,100	8,620	165	134	37.4	7.72	3.76	15.5	10.7
13	6,100	21,200	10,100	200	163	43.8	9.05	4.41	18.8	13.0
14	2,630	9,340	4,460	85.6	69.6	19.3	3.99	1.94	8.02	5.53
15	113,000	430,000	205,000	3,610	2,920	890	184	89.5	334	229
16	10,400	36,400	17,400	340	276	75.4	15.6	7.58	31.9	22.0
17	3,060	10,600	5,060	100	81.5	21.9	4.52	2.20	9.42	6.50
18	10,400	35,500	16,900	342	279	73.5	15.2	7.39	32.3	22.3
19	4,800	16,800	8,030	157	128	34.8	7.18	3.50	14.7	10.1
20	11,900	40,800	19,500	390	318	84.4	17.4	8.49	36.8	25.4
21	174,000	666,000	318,000	5,570	4,510	1,380	285	139	515	353
22	9,290	35,200	16,800	299	242	72.8	15.0	7.33	27.7	19.0
23	5,070	19,300	9,220	163	132	40.0	8.25	4.02	15.1	10.4
24	16,000	49,800	23,800	534	437	103	21.3	10.4	51.2	35.4
25	81,700	311,000	149,000	2,620	2,120	645	133	64.8	243	167
26	18,900	73,800	35,200	603	487	153	31.5	15.4	55.5	38.1

Table 21.--Total annual load estimates, March 1988-February 1991, for water-quality constituents measured at selected stream-sampling sites in Jefferson County, Kentucky

[<, less than]

Site number and name	Number of observations	Total annual load, in tons	Standard error of regression	Flow duration of greatest sampled discharge, in percent	Percentage of load estimated beyond range of sampled discharge
Chemical oxygen demand					
1 Pond Creek at Pendleton Road	72	2,290	48.8	0.6	12.8
2 Mill Ck at Orell Road	67	311	59.2	.9	21.3
3 Pond Ck at Manslick Road	72	2,810	51.6	2.0	34.4
5 South Fork Beargrass Creek at Winter Avenue	72	666	74.9	.4	11.3
6 South Fork Beargrass Creek at Trevilian Way	73	482	72.5	.6	22.1
7 Middle Fork Beargrass Creek at Old Cannons Lane	74	321	67.4	1.6	23.5
8 Middle Fork Beargrass Creek at Beals Branch Road	73	491	65.8	1.5	27.1
9 Spring Ditch at Private Drive below Hanses Road	73	208	65.7	0	0
10 Muddy Fork at Mockingbird Valley Road	72	178	74.7	1.3	24.4
11 Goose Creek at U.S. Highway 42	71	218	71.7	.7	9.1
12 Little Goose Creek at U.S. Highway 42	73	235	79.4	.4	7.6
13 Goose Creek at Old Westport Road	70	197	62.0	0	0
14 Pope Lick at Pope Lick Road	74	86.6	54.4	.4	9.1
15 Floyds Fork at former State Highway 155	72	4,990	64.6	0	0
16 Chenoweth Run at Gelhaus Road	72	409	63.5	0	0
17 Fern Creek at Old Bardstown Road	72	88.9	69.1	0	0
18 Northern Ditch at Preston Highway	73	431	64.5	.2	3.9
19 Fishpool Creek at Bost Road	74	185	59.0	0	0
20 Southern Ditch at Minors Lane	73	388	67.7	0	0
21 Floyds Fork at Bardstown Road	73	7,440	65.4	1.6	33.0
22 Cedar Creek at Thixton Road	73	291	60.5	.6	11.7
23 Pennsylvania Run at Mt. Washington Road	74	185	55.0	.8	12.9
24 Mill Creek Cutoff at Dover Road	61	519	51.6	.4	16.7
25 Harrods Creek at Hunting Creek Drive	70	2,320	72.0	1.5	18.6
26 Long Run at State Highway 1531	53	1,010	61.4	0	0
Biochemical oxygen demand					
1 Pond Creek at Pendleton Road	73	492	70.8	.6	16.8
2 Mill Ck at Orell Road	68	37.9	52.1	.9	22.0
3 Pond Ck at Manslick Road	73	599	60.6	2.0	40.2
5 South Fork Beargrass Creek at Winter Avenue	74	309	73.5	.4	17.4
7 Middle Fork Beargrass Creek at Old Cannons Lane	74	80.9	55.3	1.6	32.3
8 Middle Fork Beargrass Creek at Beals Branch Road	73	79.2	56.1	1.5	28.4
9 Spring Ditch at Private Drive below Hanses Road	73	22.7	58.1	0	0
10 Muddy Fork at Mockingbird Valley Road	73	20.8	53.1	1.3	21.8
11 Goose Creek at U.S. Highway 42	72	44.3	64.1	.7	12.3
12 Little Goose Creek at U.S. Highway 42	74	32.2	74.8	.4	7.8
13 Goose Creek at Old Westport Road	72	49.3	79.9	0	0
14 Pope Lick at Pope Lick Road	74	18.1	54.7	.4	10.5
15 Floyds Fork at former State Highway 155	73	788	55.6	0	0
16 Chenoweth Run at Gelhaus Road	73	146	56.8	0	0
17 Fern Creek at Old Bardstown Road	73	42.5	65.8	0	0
18 Northern Ditch at Preston Highway	73	100	60.3	.2	5.4
19 Fishpool Creek at Bost Road	74	33.8	59.3	0	0
20 Southern Ditch at Minors Lane	73	74.6	49.1	0	0
21 Floyds Fork at Bardstown Road	73	1,370	54.4	1.6	36.0
22 Cedar Creek at Thixton Road	74	56.0	61.6	.6	15.4
23 Pennsylvania Run at Mt. Washington Road	74	36.1	62.4	.8	16.2
24 Mill Creek Cutoff at Dover Road	62	116	60.9	.4	18.2
25 Harrods Creek at Hunting Creek Drive	70	524	74.6	1.5	22.6
26 Long Run at State Highway 1531	53	187	62.2	0	0
Dissolved solids					
1 Pond Creek at Pendleton Road	73	32,900	29.2	.6	8.4
2 Mill Ck at Orell Road	68	2,170	43.9	.9	12.4
3 Pond Ck at Manslick Road	73	29,700	21.5	2.0	22.0
5 South Fork Beargrass Creek at Winter Avenue	74	12,700	41.7	.4	9.1
6 South Fork Beargrass Creek at Trevilian Way	74	7,910	22.8	.6	11.3
7 Middle Fork Beargrass Creek at Old Cannons Lane	74	8,410	20.2	1.6	21.9
8 Middle Fork Beargrass Creek at Beals Branch Road	72	10,200	19.3	1.5	22.1
9 Spring Ditch at Private Drive below Hanses Road	73	1,080	18.0	0	0
10 Muddy Fork at Mockingbird Valley Road	73	4,180	15.2	1.3	17.9
11 Goose Creek at U.S. Highway 42	73	3,950	14.5	.7	5.9
12 Little Goose Creek at U.S. Highway 42	74	3,150	21.5	.4	4.2
13 Goose Creek at Old Westport Road	72	3,010	31.6	0	0
14 Pope Lick at Pope Lick Road	73	1,730	21.8	.4	6.5
15 Floyds Fork at former State Highway 155	73	82,300	24.3	0	0
16 Chenoweth Run at Gelhaus Road	72	10,400	28.5	0	0
17 Fern Creek at Old Bardstown Road	72	2,550	19.9	0	0
18 Northern Ditch at Preston Highway	72	6,870	24.4	.2	1.6
19 Fishpool Creek at Bost Road	74	2,930	20.9	0	0
20 Southern Ditch at Minors Lane	71	4,900	14.5	0	0
21 Floyds Fork at Bardstown Road	73	122,000	28.0	1.6	28.4
22 Cedar Creek at Thixton Road	73	5,970	27.6	.6	8.0
23 Pennsylvania Run at Mt. Washington Road	74	2,960	35.1	.8	11.9

Table 21.--Total annual load estimates, March 1988-February 1991, for water-quality constituents measured at selected stream-sampling sites in Jefferson County, Kentucky--Continued

[<, less than]

Site number and name	Number of observations	Total annual load, in tons	Standard error of regression	Flow duration of greatest sampled discharge, in percent	Percentage of load estimated beyond range of sampled discharge
Dissolved solids--Continued					
24 Mill Creek Cutoff at Dover Road	62	4,340	34.4	0.4	15.0
25 Harrods Creek at Hunting Creek Drive	70	38,600	20.8	1.5	19.8
26 Long Run at State Highway 1531	52	12,400	15.7	0	0
Suspended solids					
1 Pond Creek at Pendleton Road	73	23,400	78.1	.6	38.8
2 Mill Ck at Orell Road	68	1,040	102.3	.9	25.8
3 Pond Ck at Manslick Road	73	22,600	74.0	2.0	49.7
5 South Fork Beargrass Creek at Winter Avenue	73	11,700	83.1	.4	37.1
6 South Fork Beargrass Creek at Trevilian Way	74	7,430	95.4	.6	50.7
7 Middle Fork Beargrass Creek at Old Cannons Lane	74	1,090	93.6	1.6	43.1
8 Middle Fork Beargrass Creek at Beals Branch Road	72	1,450	104.1	1.5	35.2
9 Spring Ditch at Private Drive below Hanses Road	73	316	95.2	0	0
10 Muddy Fork at Mockingbird Valley Road	73	511	95.7	1.3	25.8
11 Goose Creek at U.S. Highway 42	73	599	92.2	.7	18.5
12 Little Goose Creek at U.S. Highway 42	74	673	99.9	.4	8.2
13 Goose Creek at Old Westport Road	72	570	98.9	0	0
14 Pope Lick at Pope Lick Road	74	253	100.5	.4	25.2
15 Floyds Fork at former State Highway 155	73	21,400	107.9	0	0
16 Chenoweth Run at Gelhaus Road	72	3,340	96.3	0	0
17 Fern Creek at Old Bardstown Road	72	601	102.6	0	0
18 Northern Ditch at Preston Highway	73	1,670	95.6	.2	8.8
19 Fishpool Creek at Bost Road	74	623	111.2	0	0
20 Southern Ditch at Minors Lane	72	1,550	90.6	0	0
21 Floyds Fork at Bardstown Road	73	58,500	93.7	1.6	55.9
22 Cedar Creek at Thixton Road	73	436	103.5	.6	20.0
23 Pennsylvania Run at Mt. Washington Road	74	221	106.2	.8	12.1
24 Mill Creek Cutoff at Dover Road	62	1,340	88.1	.4	27.0
25 Harrods Creek at Hunting Creek Drive	70	6,520	105.7	1.5	22.2
26 Long Run at State Highway 1531	53	3,880	103.2	0	0
Nitrogen, ammonia, total as N					
1 Pond Creek at Pendleton Road	71	35.4	154.8	.6	13.3
3 Pond Ck at Manslick Road	71	83.2	198.3	2.0	39.6
5 South Fork Beargrass Creek at Winter Avenue	72	30.7	186.6	.4	18.4
6 South Fork Beargrass Creek at Trevilian Way	72	15.0	181.0	.6	9.5
9 Spring Ditch at Private Drive below Hanses Road	70	1.0	174.1	0	0
13 Goose Creek at Old Westport Road	71	2.6	202.5	0	0
14 Pope Lick at Pope Lick Road	74	1.6	186.7	.4	2.3
16 Chenoweth Run at Gelhaus Road	71	8.8	211.4	0	0
17 Fern Creek at Old Bardstown Road	71	5.2	189.8	0	0
18 Northern Ditch at Preston Highway	70	14.2	201.2	.2	.9
19 Fishpool Creek at Bost Road	71	2.5	183.9	.3	8.4
20 Southern Ditch at Minors Lane	70	6.4	186.8	1.6	36.0
21 Floyds Fork at Bardstown Road	73	24.5	163.5	1.6	16.6
23 Pennsylvania Run at Mt. Washington Road	72	4.7	198.6	.8	12.3
Nitrogen, nitrate, total as N					
1 Pond Creek at Pendleton Road	73	258	86.4	.6	9.0
2 Mill Ck at Orell Road	67	12.3	111.4	.9	17.8
3 Pond Ck at Manslick Road	73	230	90.0	2.0	20.8
5 South Fork Beargrass Creek at Winter Avenue	73	75.8	93.5	.4	7.4
6 South Fork Beargrass Creek at Trevilian Way	73	53.8	92.2	.6	13.6
7 Middle Fork Beargrass Creek at Old Cannons Lane	74	71.7	102.4	1.6	20.3
8 Middle Fork Beargrass Creek at Beals Branch Road	73	81.7	99.5	1.5	22.7
9 Spring Ditch at Private Drive below Hanses Road	73	11.3	90.6	0	0
10 Muddy Fork at Mockingbird Valley Road	72	31.2	99.8	1.3	8.0
11 Goose Creek at U.S. Highway 42	72	50.3	47.5	.7	6.3
12 Little Goose Creek at U.S. Highway 42	72	47.2	50.7	.4	5.2
13 Goose Creek at Old Westport Road	71	35.0	64.4	0	0
14 Pope Lick at Pope Lick Road	74	13.3	85.3	.4	3.5
15 Floyds Fork at former State Highway 155	72	370	94.3	0	0
16 Chenoweth Run at Gelhaus Road	72	49.8	60.4	0	0
17 Fern Creek at Old Bardstown Road	72	38.9	99.0	0	0
18 Northern Ditch at Preston Highway	73	98.7	122.5	.2	1.0
19 Fishpool Creek at Bost Road	74	28.8	96.4	0	0
20 Southern Ditch at Minors Lane	73	42.2	97.8	0	0
21 Floyds Fork at Bardstown Road	73	634	86.1	1.6	29.2
22 Cedar Creek at Thixton Road	74	46.0	74.3	.6	7.2
23 Pennsylvania Run at Mt. Washington Road	74	22.6	93.7	.8	5.9
24 Mill Creek Cutoff at Dover Road	60	43.5	89.6	.4	11.6
25 Harrods Creek at Hunting Creek Drive	69	339	59.0	1.5	20.5
26 Long Run at State Highway 1531	53	64.6	103.6	0	0

Table 21.--Total annual load estimates, March 1988-February 1991, for water-quality constituents measured at selected stream-sampling sites in Jefferson County, Kentucky--Continued

[<, less than]

Site number and name	Number of observations	Total annual load, in tons	Standard error of regression	Flow duration of greatest sampled discharge, in percent	Percentage of load estimated beyond range of sampled discharge
Nitrogen, nitrite, total as N					
1 Pond Creek at Pendleton Road	73	13.0	75.1	0.6	18.7
2 Mill Ck at Orell Road	68	.9	125.5	.9	21.9
3 Pond Ck at Manslick Road	73	15.8	71.8	2.0	37.2
5 South Fork Beargrass Creek at Winter Avenue	74	2.1	69.1	.4	12.5
6 South Fork Beargrass Creek at Trevilian Way	74	1.7	70.3	.6	26.8
7 Middle Fork Beargrass Creek at Old Cannons Lane	74	.7	84.5	1.6	26.1
8 Middle Fork Beargrass Creek at Beals Branch Road	73	.8	83.0	1.5	23.7
9 Spring Ditch at Private Drive below Hanses Road	73	.3	78.3	0	0
10 Muddy Fork at Mockingbird Valley Road	73	.5	74.5	1.3	19.7
11 Goose Creek at U.S. Highway 42	73	1.1	96.7	.7	12.7
12 Little Goose Creek at U.S. Highway 42	74	.7	74.9	.4	12.9
13 Goose Creek at Old Westport Road	72	1.0	95.6	0	0
14 Pope Lick at Pope Lick Road	74	.4	72.7	.4	6.1
15 Floyds Fork at former State Highway 155	73	15.3	77.2	0	0
16 Chenoweth Run at Gelhaus Road	73	2.1	116.9	0	0
17 Fern Creek at Old Bardstown Road	73	.9	104.5	0	0
18 Northern Ditch at Preston Highway	73	1.8	61.1	.2	1.9
19 Fishpool Creek at Bost Road	74	1.4	104.6	0	0
20 Southern Ditch at Minors Lane	73	1.7	75.4	0	0
21 Floyds Fork at Bardstown Road	73	24.3	81.1	1.6	43.1
22 Cedar Creek at Thixton Road	74	.9	79.7	.6	16.4
23 Pennsylvania Run at Mt. Washington Road	74	1.1	88.4	.8	14.6
24 Mill Creek Cutoff at Dover Road	62	1.8	97.8	.6	12.2
25 Harrods Creek at Hunting Creek Drive	70	6.4	133.3	1.5	27.9
26 Long Run at State Highway 1531	55	1.5	69.7	0	0
Nitrogen, organic, total as N					
1 Pond Creek at Pendleton Road	72	90.2	144.9	.6	12.4
2 Mill Ck at Orell Road	68	5.8	145.5	.9	16.8
3 Pond Ck at Manslick Road	72	82.4	141.8	2.0	23.9
5 South Fork Beargrass Creek at Winter Avenue	74	54.9	146.8	.4	17.0
6 South Fork Beargrass Creek at Trevilian Way	74	24.4	139.4	.6	19.5
7 Middle Fork Beargrass Creek at Old Cannons Lane	74	12.5	152.2	1.6	23.4
8 Middle Fork Beargrass Creek at Beals Branch Road	73	13.4	154.9	1.5	22.0
9 Spring Ditch at Private Drive below Hanses Road	72	8.1	142.2	0	0
10 Muddy Fork at Mockingbird Valley Road	73	3.9	147.1	1.3	16.2
11 Goose Creek at U.S. Highway 42	72	8.0	151.5	.7	9.0
12 Little Goose Creek at U.S. Highway 42	72	4.6	149.1	.4	3.7
13 Goose Creek at Old Westport Road	72	12.1	165.3	0	0
14 Pope Lick at Pope Lick Road	74	5.3	128.6	.4	10.0
15 Floyds Fork at former State Highway 155	72	311	121.5	0	0
16 Chenoweth Run at Gelhaus Road	73	20.7	162.3	0	0
17 Fern Creek at Old Bardstown Road	73	5.9	133.4	0	0
18 Northern Ditch at Preston Highway	72	35.2	160.9	.2	4.7
19 Fishpool Creek at Bost Road	73	9.9	144.4	.3	8.3
20 Southern Ditch at Minors Lane	72	19.4	147.2	1.6	34.0
21 Floyds Fork at Bardstown Road	72	287	139.3	1.6	30.1
22 Cedar Creek at Thixton Road	74	18.7	123.0	.6	14.2
23 Pennsylvania Run at Mt. Washington Road	73	14.1	153.3	.8	17.0
24 Mill Creek Cutoff at Dover Road	62	46.0	145.0	.4	18.1
25 Harrods Creek at Hunting Creek Drive	70	143	228.2	1.5	28.6
26 Long Run at State Highway 1531	53	48.6	119.0	0	0
Phosphorus, total as P					
1 Pond Creek at Pendleton Road	70	66.0	69.6	.6	7.0
2 Mill Ck at Orell Road	65	6.7	91.5	.9	24.7
3 Pond Ck at Manslick Road	68	64.8	62.5	2.0	17.9
5 South Fork Beargrass Creek at Winter Avenue	72	21.7	89.1	.4	23.6
6 South Fork Beargrass Creek at Trevilian Way	70	9.3	86.4	.6	35.6
7 Middle Fork Beargrass Creek at Old Cannons Lane	71	8.1	89.7	1.6	38.3
8 Middle Fork Beargrass Creek at Beals Branch Road	70	7.3	92.6	1.5	26.4
9 Spring Ditch at Private Drive below Hanses Road	68	2.8	62.9	0	0
10 Muddy Fork at Mockingbird Valley Road	71	4.9	66.9	1.3	6.4
11 Goose Creek at U.S. Highway 42	70	12.7	65.4	.7	4.8
12 Little Goose Creek at U.S. Highway 42	71	8.0	72.6	.7	5.1
13 Goose Creek at Old Westport Road	72	10.6	70.7	0	0
14 Pope Lick at Pope Lick Road	70	4.2	79.7	.4	4.6
15 Floyds Fork at former State Highway 155	68	125	66.1	0	0
16 Chenoweth Run at Gelhaus Road	70	19.4	72.7	10.4	37.0
17 Fern Creek at Old Bardstown Road	71	9.0	74.5	0	0
18 Northern Ditch at Preston Highway	71	23.0	72.1	.2	1.2
19 Fishpool Creek at Bost Road	70	7.7	71.9	0	0
20 Southern Ditch at Minors Lane	71	10.5	70.5	0	0
21 Floyds Fork at Bardstown Road	69	141	77.2	1.6	24.2

Table 21.--Total annual load estimates, March 1988-February 1991, for water-quality constituents measured at selected stream-sampling sites in Jefferson County, Kentucky--Continued

[<, less than]

Site number and name	Number of observations	Total annual load, in tons	Standard error of regression	Flow duration of greatest sampled discharge, in percent	Percentage of load estimated beyond range of sampled discharge
Phosphorus, total as P--Continued					
22 Cedar Creek at Thixton Road	71	10.5	66.3	0.6	4.0
23 Pennsylvania Run at Mt. Washington Road	72	6.9	70.4	.8	7.8
24 Mill Creek Cutoff at Dover Road	61	15.1	82.4	.4	13.6
25 Harrods Creek at Hunting Creek Drive	69	46.5	104.5	1.5	17.8
26 Long Run at State Highway 1531	53	28.2	95.4	0	0
Copper, total as Cu					
1 Pond Creek at Pendleton Road	12	2.3	129.6	27.6	85.2
2 Mill Ck at Orell Road	10	.1	112.4	.9	16.9
3 Pond Ck at Manslick Road	12	1.6	137.0	21.4	72.1
5 South Fork Beargrass Creek at Winter Avenue	11	.7	111.4	1.4	31.1
6 South Fork Beargrass Creek at Trevilian Way	11	.4	116.1	1.7	20.7
7 Middle Fork Beargrass Creek at Old Cannons Lane	10	.6	141.6	1.6	10.4
8 Middle Fork Beargrass Creek at Beals Branch Road	10	1.3	129.5	2.0	32.4
9 Spring Ditch at Private Drive below Hanses Road	11	<.1	81.9	18.8	50.7
10 Muddy Fork at Mockingbird Valley Road	11	.2	172.2	33.9	14.5
11 Goose Creek at U.S. Highway 42	10	.2	112.3	32.5	68.9
13 Goose Creek at Old Westport Road	10	.1	112.3	22.9	42.7
14 Pope Lick at Pope Lick Road	13	<.1	94.2	15.8	45.8
15 Floyds Fork at former State Highway 155	13	3.5	92.3	3.8	43.1
16 Chenoweth Run at Gelhaus Road	13	.3	114.6	14.4	49.5
17 Fern Creek at Old Bardstown Road	12	.2	126.8	0	0
18 Northern Ditch at Preston Highway	11	.3	63.9	9.8	28.1
19 Fishpool Creek at Bost Road	10	.3	146.3	15.0	80.4
20 Southern Ditch at Minors Lane	10	.1	117.5	21.1	65.1
21 Floyds Fork at Bardstown Road	12	4.0	88.9	9.0	63.0
22 Cedar Creek at Thixton Road	12	.2	108.8	8.6	48.8
23 Pennsylvania Run at Mt. Washington Road	12	.1	118.2	13.5	56.0
24 Mill Creek Cutoff at Dover Road	10	.1	116.9	9.2	70.8
25 Harrods Creek at Hunting Creek Drive	11	.7	141.4	11.8	18.4
Zinc, total as Zn					
1 Pond Creek at Pendleton Road	12	2.1	154.6	27.6	68.8
2 Mill Ck at Orell Road	10	.3	150.1	.9	16.2
3 Pond Ck at Manslick Road	12	3.6	167.1	21.4	67.4
5 South Fork Beargrass Creek at Winter Avenue	11	1.8	140.4	1.4	23.3
6 South Fork Beargrass Creek at Trevilian Way	11	1.2	177.8	1.7	20.3
7 Middle Fork Beargrass Creek at Old Cannons Lane	10	2.9	157.3	1.6	29.2
8 Middle Fork Beargrass Creek at Beals Branch Road	10	3.3	121.7	2.0	37.6
9 Spring Ditch at Private Drive below Hanses Road	11	.4	119.1	18.8	65.9
10 Muddy Fork at Mockingbird Valley Road	11	.7	148.6	33.9	93.3
11 Goose Creek at U.S. Highway 42	10	.6	154.0	32.5	71.9
12 Little Goose Creek at U.S. Highway 42	12	.3	106.1	9.4	26.8
13 Goose Creek at Old Westport Road	10	.2	152.2	22.9	33.8
14 Pope Lick at Pope Lick Road	13	.2	59.4	15.8	63.2
15 Floyds Fork at former State Highway 155	13	10.7	107.3	3.8	45.4
16 Chenoweth Run at Gelhaus Road	13	.4	134.1	14.4	16.4
17 Fern Creek at Old Bardstown Road	12	1.1	179.9	0	0
18 Northern Ditch at Preston Highway	11	1.1	105.6	9.8	45.3
19 Fishpool Creek at Bost Road	10	.3	107.4	15.0	69.6
20 Southern Ditch at Minors Lane	10	1.5	98.3	21.1	92.9
21 Floyds Fork at Bardstown Road	12	9.3	119.2	9.0	53.6
22 Cedar Creek at Thixton Road	12	.4	108.1	8.6	27.4
23 Pennsylvania Run at Mt. Washington Road	12	.3	111.5	13.5	46.7
25 Harrods Creek at Hunting Creek Drive	11	2.4	248.2	11.8	30.6

Table 22.--Total annual storm-load estimates of selected constituents from stormwater-outfall and stream-sampling basins in Jefferson County, Kentucky, based on generalized least-squares regression models of Driver and Tasker (1990)

[If the drainage area of the selected basin was greater than 0.5 square mile, a drainage area of 0.2 square mile was used for the regression model calculation and the result was multiplied by five times the actual drainage area magnitude to get mean storm loads. Mean annual storm loads were calculated as 69 times the mean storm load. All loads are in tons. COD, chemical oxygen demand; SS, suspended solids; DS, dissolved solids; TN, total nitrogen; TKN, total Kjeldahl nitrogen; TP, total phosphorus; DP, dissolved phosphorus; CU, total recoverable copper; PB, total recoverable lead; ZN, total recoverable zinc]

Site	COD	SS	DS	TN	TKN	TP	DP	CU	PB	ZN
SR1	5.57	16.2	7.74	0.189	0.155	0.034	0.007	0.003	0.018	0.013
SR2	4.99	18.2	8.67	.162	.131	.038	.008	.004	.015	.010
SR3	7.34	22.6	10.8	.246	.202	.047	.010	.005	.024	.016
SR4	2.69	7.30	3.49	.033	.028	.015	.003	.002	.009	.006
SR5	6.87	14.2	6.77	.249	.209	.029	.006	.003	.026	.018
SR6	13.8	30.3	14.5	.493	.412	.063	.013	.006	.050	.035
1	2,620	8,810	4,210	86.4	70.5	18.2	3.76	1.83	8.17	5.64
2	435	1,490	713	14.2	11.6	3.09	.638	.311	1.34	.926
3	2,100	6,860	3,280	69.4	56.7	14.2	2.93	1.43	6.60	4.56
5	814	2,400	1,140	27.5	22.6	4.96	1.02	.499	2.66	1.85
6	615	1,820	867	20.7	17.1	3.76	.776	.378	2.01	1.39
7	650	1,980	944	21.8	17.9	4.09	.845	.412	2.10	1.46
8	799	2,430	1,160	26.8	22.0	5.03	1.04	.505	2.58	1.79
9	94.0	258	123	3.22	2.66	.534	.110	.054	.316	.220
10	240	698	333	8.12	6.67	1.45	.298	.145	.788	.547
11	303	1,050	503	9.91	8.07	2.18	.450	.219	.932	.643
12	175	623	298	5.70	4.64	1.29	.266	.130	.534	.368
13	211	730	349	6.89	5.61	1.51	.312	.152	.648	.447
14	90.8	322	154	2.95	2.40	.667	.138	.067	.277	.191
15	3,880	14,800	7,080	125	101	30.7	6.33	3.09	11.5	7.91
16	359	1,260	600	11.7	9.53	2.60	.537	.262	1.10	.759
17	106	365	174	3.45	2.81	.756	.156	.076	.325	.224
18	359	1,220	585	11.8	9.61	2.53	.523	.255	1.11	.768
19	166	580	277	5.41	4.40	1.20	.248	.121	.508	.350
20	411	1,410	672	13.5	11.0	2.91	.601	.293	1.27	.875
21	5,990	23,000	11,000	192	155	47.6	9.82	4.79	17.8	12.2
22	320	1,210	580	10.3	8.34	2.51	.519	.253	.954	.656
23	175	666	318	5.62	4.55	1.38	.285	.139	.520	.357
24	551	1,720	821	18.4	15.1	3.56	.734	.358	1.77	1.22
25	2,820	10,700	5,130	90.5	73.3	22.2	4.59	2.24	8.38	5.75
26	651	2,550	1,220	20.8	16.8	5.27	1.09	.530	1.92	1.31

Table 23.--Total annual storm-load estimates of selected constituents from stormwater-outfall and stream-sampling basins in Jefferson County, Kentucky, based on a computation method by T.R. Schueler (1987)

[COD, chemical oxygen demand; BOD, biochemical oxygen demand; DS, dissolved solids; SS, suspended solids; TN, total nitrogen; TKN, total Kjeldahl nitrogen; TP, total phosphorus; DP, dissolved phosphorus; CD, total cadmium; CU, total copper; PB, total lead; ZN, total zinc; --, missing. All loads are in tons. Censored data for the event mean concentrations were set to the detection limit (maximum probable value) before load computations]

Site	COD	BOD	DS	SS	TN	TKN	TP	DP	CD	CU	PB	ZN
Load computations based on event mean concentrations measured at storm outfalls in Jefferson County, Kentucky												
SR1	21.5	12.8	37.8	16.8	0.409	0.214	0.055	0.036	0.002	0.003	0.010	0.033
SR2	14.0	8.28	24.5	10.9	.265	.139	.036	.023	.001	.002	.006	.021
SR3	26.9	16.0	47.2	21.0	.510	.267	.069	.045	.002	.003	.012	.041
SR4	11.0	6.50	19.2	8.57	.208	.109	.028	.018	.001	.001	.005	.017
SR5	31.1	18.4	54.4	24.2	.589	.308	.080	.052	.002	.004	.014	.047
SR6	61.5	36.5	108	48.0	1.17	.610	.158	.103	.004	.007	.029	.094
1	8,570	5,080	15,000	6,690	162	85.0	21.9	14.4	.617	1.03	3.97	13.0
2	1,360	809	2,390	1,070	25.9	13.5	3.49	2.29	.098	.164	.633	2.07
3	7,120	4,220	12,500	5,560	135	70.6	18.2	12.0	.513	.854	3.30	10.8
5	3,120	1,850	5,460	2,440	59.1	30.9	7.98	5.24	.225	.374	1.45	4.74
6	2,350	1,390	4,110	1,830	44.5	23.3	6.01	3.94	.169	.282	1.09	3.57
7	2,410	1,430	4,220	1,880	45.7	23.9	6.17	4.05	.174	.289	1.12	3.66
8	2,970	1,760	5,200	2,320	56.3	29.4	7.60	4.99	.214	.356	1.38	4.51
9	381	226	668	298	7.23	3.78	.976	.640	.027	.046	.177	.579
10	928	550	1,630	724	17.6	9.20	2.37	1.56	.067	.111	.430	1.41
11	934	554	1,640	729	17.7	9.26	2.39	1.57	.067	.112	.433	1.42
12	516	306	904	403	9.78	5.12	1.32	.867	.037	.062	.239	.784
13	650	385	1,140	508	12.3	6.45	1.66	1.09	.047	.078	.302	.988
14	268	159	469	209	5.08	2.66	.686	.450	.019	.032	.124	.407
15	9,620	5,700	16,900	7,510	182	95.4	24.6	16.2	.693	1.15	4.46	14.6
16	1,090	646	1,910	850	20.6	10.8	2.79	1.83	.078	.131	.505	1.65
17	327	194	573	255	6.20	3.25	.838	.550	.024	.039	.152	.497
18	1,140	678	2,000	893	21.7	11.3	2.93	1.92	.082	.137	.531	1.74
19	503	298	881	392	9.53	4.99	1.29	.844	.036	.060	.233	.764
20	1,290	767	2,270	1,010	24.5	12.8	3.31	2.17	.093	.155	.600	1.97
21	14,600	8,680	25,700	11,400	278	145	37.5	24.6	1.05	1.76	6.79	22.3
22	813	482	1,420	634	15.4	8.06	2.08	1.36	.059	.098	.377	1.23
23	438	260	767	342	8.30	4.34	1.12	.736	.032	.053	.203	.666
24	1,990	1,180	3,490	1,550	37.7	19.7	5.09	3.34	.143	.239	.923	3.02
25	7,030	4,170	12,300	5,490	133	69.8	18.0	11.8	.506	.844	3.26	10.7
26	1,500	890	2,630	1,170	28.5	14.9	3.84	2.52	.108	.180	.697	2.28
Load computations based on typical storm event concentrations as evaluated by the National Urban Runoff Program												
SR1	16.2	2.07	--	41.2	--	--	.086	.026	--	.009	.041	.061
SR2	10.5	1.34	--	26.7	--	--	.056	.017	--	.006	.027	.039
SR3	20.2	2.58	--	51.5	--	--	.108	.032	--	.011	.051	.076
SR4	8.25	1.05	--	21.0	--	--	.044	.013	--	.005	.021	.031
SR5	23.4	2.98	--	59.4	--	--	.124	.037	--	.013	.059	.088
SR6	46.3	5.91	--	118	--	--	.246	.074	--	.026	.117	.174
1	6,440	822	--	16,400	--	--	34.3	10.3	--	3.63	16.3	24.2
2	1,030	131	--	2,610	--	--	5.46	1.64	--	.578	2.60	3.85
3	5,350	683	--	13,600	--	--	28.5	8.54	--	3.02	13.6	20.1
5	2,350	299	--	5,960	--	--	12.5	3.74	--	1.32	5.94	8.81
6	1,770	225	--	4,490	--	--	9.39	2.82	--	.995	4.47	6.63
7	1,810	231	--	4,610	--	--	9.64	2.89	--	1.02	4.59	6.81
8	2,230	285	--	5,670	--	--	11.9	3.56	--	1.26	5.65	8.38
9	287	36.6	--	729	--	--	1.53	.457	--	.162	.726	1.08
10	698	89.0	--	1,770	--	--	3.71	1.11	--	.393	1.77	2.62
11	702	89.7	--	1,790	--	--	3.74	1.12	--	.396	1.78	2.64
12	388	49.5	--	987	--	--	2.06	.619	--	.219	.983	1.46
13	489	62.4	--	1,240	--	--	2.60	.780	--	.276	1.24	1.84
14	201	25.7	--	512	--	--	1.07	.321	--	.114	.510	.756
15	7,230	923	--	18,400	--	--	38.5	11.5	--	4.08	18.3	27.2
16	819	105	--	2,080	--	--	4.36	1.31	--	.462	2.07	3.08
17	246	31.4	--	626	--	--	1.31	.393	--	.139	.623	.924
18	860	110	--	2,190	--	--	4.58	1.37	--	.485	2.18	3.23
19	378	48.3	--	961	--	--	2.01	.603	--	.213	.957	1.42
20	973	124	--	2,470	--	--	5.18	1.55	--	.549	2.46	3.65
21	11,000	1,410	--	28,000	--	--	58.6	17.6	--	6.21	27.9	41.4
22	611	78.0	--	1,550	--	--	3.25	.975	--	.345	1.55	2.29
23	329	42.0	--	837	--	--	1.75	.526	--	.186	.834	1.24
24	1,500	191	--	3,800	--	--	7.96	2.39	--	.844	3.79	5.62
25	5,290	675	--	13,400	--	--	28.1	8.44	--	2.98	13.4	19.9
26	1,130	144	--	2,870	--	--	6.01	1.80	--	.637	2.86	4.24

SUMMARY

Results of analyses of stormwater samples from Jefferson County, Ky. provided information on urban nonpoint sources of contaminants to surface drainage. Samples were collected from basins characterized by residential, commercial, or industrial development. At least three storm events that occurred at least 1 month apart were sampled at each of six sites. Storm sampling generally followed a dry-weather period of at least 72 hours. The initial water sample was obtained during the first flush of the storm event, and flow-weighted composite samples consisting of aliquots taken 15 minutes apart were obtained for the first 3 hours of flow. Flow-weighted composite samples also were collected for some storms beginning after the first 3 hours of flow and continuing until flow ceased. Samples were analyzed in the field for temperature, pH, specific conductance, and dissolved-oxygen concentration.

Fecal-indicator bacteria densities of greater than 20,000 col/100mL were measured at times from all but the basin containing heavy industry. Iron concentrations in excess of 1,000 μg/L, the Kentucky chronic criterion for protection of warmwater aquatic habitat, were common in the sampled stormwater. The maximum chemical and biochemical oxygen demand event mean concentrations, 407 and 610 mg/L, respectively, were from commercial basins. The measured total storm loads ranged at least one order of magnitude; dissolved solids loads ranged from less than 2 to 7,010 lb, and loads of chemical oxygen demand ranged from about 50 to 700 lb.

Mean storm loads and total annual storm loads of selected constituent were estimated by use of several methods to provide data for the assessment of the degree of contaminant transport to receiving waters from nonpoint sources in the urban environment. These data were supplemented with annual total-system load computations for 25 stream sampling sites in the county.

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