WATER-QUALITY, BED-SEDIMENT, AND BIOLOGICAL DATA (OCTOBER 1994 THROUGH SEPTEMBER 1995) AND STATISTICAL SUMMARIES OF DATA FOR STREAMS IN THE UPPER CLARK FORK BASIN, MONTANA

By Kent A. Dodge, Michelle I. Hornberger, and Ellen V. Axtmann

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CONVERSION FACTORS AND ABBREVIATED WATER-QUALITY UNITS

Multiply	By	To obtain
cubic foot per second (ft^3/s)	0.028317	cubic meter per second
foot (ft)	0.3048	meter (m)
gallon (gal)	3.785	liter (L)
gallon (gal)	3,785	milliliter (ml)
inch (in.)	25.4	millimeter (mm)
inch (in.)	25,400	micrometer (µm)
mile (mi)	1.609	kilometer
ounce (oz)	28.35	gram (g)
part per million	1	microgram per gram (µg/g)
square mile (mi^2)	2.59	square kilometer
ton per day (ton/d)	907.2	kilogram per day

Temperature can be converted from degrees Celsius (°C) to degrees Fahrenheit (°F) by the equation:

$$°F = 9/5\ (°C) + 32$$

Abbreviated water-quality units used in this report:

µg/g micrograms per gram
µg/L micrograms per liter
µg/mL micrograms per milliliter
µS/cm microsiemens per centimeter at 25 degrees Celsius
mg/L milligrams per liter

Water-year definition:

A water year is the 12-month period from October 1 through September 30. It is designated by the calendar year in which it ends.

Water-Quality, Bed-Sediment, and Biological Data (October 1994 through September 1995) and Statistical Summaries of Data for Streams in the Upper Clark Fork Basin, Montana

By Kent A. Dodge, Michelle I. Hornberger, *and* Ellen V. Axtmann

Abstract

Water, bed sediment, and biota were sampled in streams from Butte to below Missoula as part of a program to characterize aquatic resources in the upper Clark Fork basin of western Montana. Sampling stations were located on the Clark Fork and major tributaries. Water-quality data were obtained periodically at 16 stations during October 1994 through September 1995 (water year 1995). Data for 12 bed-sediment and 11 biological stations were obtained in August 1995. The primary constituents analyzed were trace elements associated with tailings from historical mining and smelting activities.

Water-quality data include concentrations of major ions, trace elements, and suspended sediment in stream samples collected periodically during water year 1995. Daily values of streamflow, suspended-sediment concentration, and suspended-sediment discharge are given for six stations. Bed-sediment data include trace-element concentrations in the fine-grained and bulk fractions. Biological data include trace-element concentrations in whole-body tissue of aquatic benthic insects. Quality-assurance data are reported for analytical results of water, bed sediment, and biota. Statistical summaries of water-quality, bed-sediment, and biological data are provided for the period of record at each station since 1985.

INTRODUCTION

The Clark Fork originates near Warm Springs in western Montana at the confluence of Silver Bow and Warm Springs Creeks (fig. 1). Along the 148-mi reach of stream from Silver Bow Creek in Butte to the Clark Fork at Milltown Reservoir, six major tributaries enter: Blacktail Creek, Warm Springs Creek, Little Blackfoot River, Flint Creek, Rock Creek, and Blackfoot River. Principal surface-water uses in the 6,000-mi^2 Clark Fork basin above Missoula include irrigation, stock watering, light industry, hydroelectric power generation, and habitat for trout fisheries. Current land uses primarily are cattle production, logging, mining, and recreation. Large-scale mining and smelting had been prevalent land uses in the upper basin for more than one hundred years, but are now largely discontinued.

Deposits of copper, gold, silver, and lead ores were extensively mined, milled, and smelted in the drainages of Silver Bow and Warm Springs Creeks from about 1860 to 1980. Moderate- and small-scale mining also occurred in the basins of most of the major tributaries to the upper Clark Fork. Tailings derived from mineral processing commonly contain large quantities of trace elements such as cadmium, copper, lead, and zinc that can accumulate to potentially toxic levels in aquatic organisms. Tailings have been eroded and transported downstream since the late 1800's and redeposited in stream channels, on flood plains, and in Warm Springs Ponds and Milltown Reservoir. The river continues to erode, transport, and redeposit sediment along the stream channel and flood plain, especially during high flows.

Concern about the potential toxicity of tailings to aquatic biota and human health has resulted in a comprehensive effort by State, Federal, and private entities to characterize the aquatic resources in the upper Clark Fork basin to guide and monitor remedial cleanup activities. A long-term data base was considered necessary to detect trends over time in order to evaluate the effectiveness of remediation. Water-quality data have been collected by the U.S. Geological Survey (USGS) at selected sites in the upper Clark Fork basin since 1985 (Lambing, 1987,1988,1989,1990, and 1991;

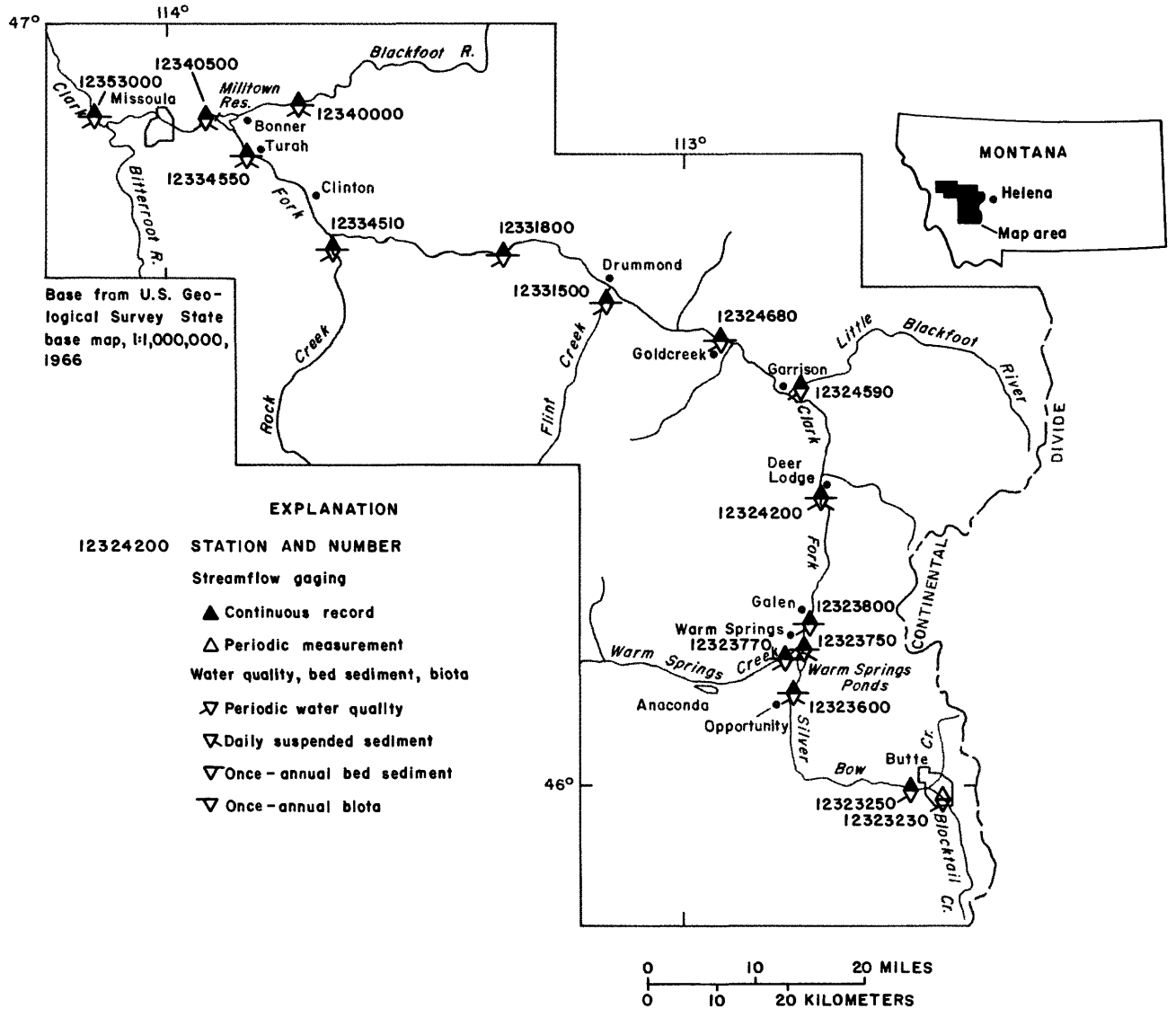

Figure 1. Location of study area.

Lambing and others, 1994, 1995). Trace-element data for bed sediment and biota (aquatic benthic insects) have been collected intermittently since 1986 at selected sites as part of studies on bed-sediment contamination and bioaccumulation of metals conducted by the USGS National Research Program (Axtmann and Luoma, 1991; Cain and others, 1992). In March 1993, an expanded sampling program for water, bed sediment, and biota was implemented in cooperation with the U.S. Environmental Protection Agency to provide systematic, long-term monitoring.

The purpose of this report is to present water-quality data for 16 stations and trace-element data for 12 bed-sediment and 11 biological stations in the upper Clark Fork basin collected from October 1994 through September 1995 (water year 1995). Quality-assurance data are presented for water quality, bed sediment, and biota. Statistical summaries also are provided for water-quality, bed-sediment, and biological data collected since 1985.

SAMPLING LOCATIONS AND TYPES OF DATA

Sampling stations in the upper Clark Fork basin are located on both the Clark Fork mainstem and major

tributaries from Butte to below Missoula (fig. 1). Mainstem sites were selected to divide the upper Clark Fork into reaches of relatively uniform length, with each reach encompassing either a major tributary or depositional environment (Warm Springs Ponds and Milltown Reservoir). Tributaries were sampled to describe water-quality characteristics for major hydrologic sources in the upper basin and to provide reference comparisons to the mainstem for bed sediment and biota. Water-quality data were obtained periodically at 16 stations; daily suspended-sediment data were obtained at 6 of these stations. Data for 12 bed-sediment and 11 biological stations were obtained once-annually (table 1).

A list of properties and constituents analyzed in samples of water, bed sediment, and biota is given in table 2. Results of analyses for water, bed sediment, and biota for water year 1995 are listed in tables 4 through 23 at the back of the report. Statistical summaries of water-quality, bed-sediment, and biological data collected since 1985 are given in tables 24-27 at the back of the report.

Table 1. Type and period of data collection at sampling stations in the upper Clark Fork basin, Montana

[Abbreviation: P, present. Symbol: --, no data]

Station number (fig. 1)	Station name	Continuous-record streamflow	Periodic water quality[1]	Daily suspended sediment	Fine-grained bed sediment[2]	Bulk bed sediment[2]	Biota[2]
12323230	Blacktail Creek at Harrison Avenue, at Butte	--	03/93-P	--	--	--	--
12323250	Silver Bow Creek below Blacktail Creek, at Butte	10/83-P	03/93-P	--	--	--	--
12323600	Silver Bow Creek at Opportunity	07/88-P	03/93-P	03/93-P	07/92-P	08/93-P	07/92, 08/94-P
12323750	Silver Bow Creek at Warm Springs	03/72-09/79, 04/93-P	03/93-P	04/93-P	07/92-P	08/93, 08/95	07/92-P
12323770	Warm Springs Creek at Warm Springs	10/83-P	03/93-P	--	08/95	08/95	08/95
12323800	Clark Fork near Galen	07/88-P	07/88-P	--	08/87, 08/91-P	08/93-P	08/87, 08/91-P
12324200	Clark Fork at Deer Lodge	10/78-P	03/85-P	03/85-08/86, 04/87-P	08/86, 08/87, 08/90-P	08/93-P	08/86, 08/87, 08/90-P
12324590	Little Blackfoot River near Garrison	10/72-P	03/85-P	--	08/86, 08/87, 08/94	08/94	08/87, 08/94
12324680	Clark Fork at Goldcreek	10/77-P	03/93-P	--	07/92-P	08/93-P	07/92-P
12331500	Flint Creek near Drummond	08/90-P	03/85-P	--	08/86, 08/89, 07/92-P	08/93-P	08/86, 07/92-P
12331800	Clark Fork near Drummond	04/93-P	03/93-P	--	08/86, 08/87, 08/91-P	08/93-P	08/86, 08/87, 08/91-P
12334510	Rock Creek near Clinton	10/72-P	03/85-P	--	08/86, 08/87, 08/89, 08/91-P	08/93-P	08/87, 08/91-P
12334550	Clark Fork at Turah Bridge, near Bonner	03/85-P	03/85-P	03/85-P	08/86, 08/91-P	08/93-P	08/86, 08/91-P
12340000	Blackfoot River near Bonner	10/39-P	03/85-P	07/86-03/87, 06/88-P	08/86, 08/87, 08/91, 08/93-P	08/93-08/94	08/86, 08/87, 08/91, 08/93
12340500	Clark Fork above Missoula	03/29-P	07/86-P	07/86-03/87, 06/88-P	--	--	--
12353000	Clark Fork below Missoula[3]	10/29-P	03/85-P	--	08/86, 08/90-P	08/93-P	08/86, 08/90-P

[1]Onsite measurements of physical properties and laboratory analyses of major ions, trace elements, and suspended sediment. Prior to March 1993, laboratory analyses included only trace elements and suspended sediment, with the exception of Clark Fork below Missoula.

[2]Laboratory analyses of trace elements.

[3]Bed sediment and biota sampled about 30 miles downstream from water-quality station to conform to previous sampling location.

Quality assurance of data was maintained through the use of documented procedures designed to provide environmentally representative data. Acceptable performance of the procedures was verified with quality-control samples that were collected systematically to provide a measure of the accuracy, precision, and bias of the environmental data and to identify problems associated with sampling, processing, or analysis.

WATER-QUALITY DATA

Water-quality data consist of measurements of physical properties and concentrations of chemical and physical constituents analyzed in stream samples. Samples were collected 6 to 10 times per year on a schedule designed to adequately describe seasonal and hydrologic variability.

Methods

Cross-sectional water samples were collected from multiple verticals across the stream using depth-integration methods described by USGS (1977), Knapton (1985), and Edwards and Glysson (1988). These methods provide a vertically and laterally discharge-weighted sample that is representative of the entire flow through the cross section of a stream. Sampling equipment consisted of standard USGS depth-integrating suspended-sediment samplers (DH-81 and D-74TM) which are either constructed of plastic or equipped with nylon nozzles and coated with a nonmetallic epoxy paint.

Onsite measurements of water temperature, specific conductance, and pH were made during collection of periodic water-quality samples. Onsite sample processing, including filtration and acidification, was performed according to procedures described by Horowitz and others (1994), Ward and Harr (1990), USGS (1977), and Knapton (1985). Instantaneous streamflow at the time of water sampling was determined at all stations, either by direct measurement or from stage-discharge rating tables (Rantz and others, 1982).

Water samples were analyzed for the constituents listed in table 2 by the USGS National Water Quality Laboratory (NWQL) in Arvada, Colo. The trace elements arsenic, cadmium, copper, iron, lead, manganese, and zinc were analyzed for both dissolved and total-recoverable concentrations. Analytical methods

Table 2. Properties and constituents analyzed in samples of water, bed sediment, and biota from the upper Clark Fork basin, Montana

Water		Bed sediment	Biota
Property	**Constituent**	**Constituent**	**Constituent**
Streamflow	Hardness	Cadmium	Cadmium
Specific conductance	Calcium	Chromium	Chromium
pH	Magnesium	Copper	Copper
Temperature	Sodium	Iron	Iron
	Potassium	Lead	Lead
	Alkalinity	Manganese	Manganese
	Sulfate	Nickel	Nickel
	Chloride	Silver	Zinc
	Fluoride	Zinc	
	Silica		
	Dissolved solids		
	Arsenic		
	Cadmium		
	Copper		
	Iron		
	Lead		
	Manganese		
	Zinc		
	Suspended sediment		

are described by Fishman and Friedman (1989) and Fishman (1993).

Cross-sectional water samples also were collected for analysis of suspended sediment whenever periodic water-quality samples were collected. These samples were analyzed for suspended-sediment concentration and sand-silt distribution (percent less than 0.062 mm diameter) by the USGS sediment laboratory in Helena, Mont., according to methods described by Guy (1969) and Lambing and Dodge (1993).

At the six daily suspended-sediment stations (table 1), suspended-sediment samples were collected 2 to 7 times per week. These samples were collected by local contracted observers using the depth-integration method at a single vertical near mid-stream. The samples were analyzed for suspended-sediment concentration and were used to determine daily mean suspended-sediment concentrations according to methods described by Porterfield (1972).

Results

Water-quality data for samples collected periodically during October 1994 through September 1995 (water year 1995) are presented in table 4. The types of data include instantaneous streamflow, onsite measurements of water-quality properties, and analytical results for chemical constituents and suspended sediment.

Daily streamflow and suspended-sediment data for water year 1995 at the six daily suspended-sediment stations are given in tables 5 through 10. Monthly descriptive statistics for each parameter are provided along with totals for the annual discharge of water and suspended sediment.

Quality Assurance

Quality-assurance procedures used for the collection and field processing of water-quality samples are described by Horowitz and others (1994), Ward and Harr (1990), Edwards and Glysson (1988), Knapton and Nimick (1991), and Knapton (1985). Standard procedures used by the NWQL for internal sample handling and quality assurance are described by Friedman and Erdmann (1982), Jones (1987), and Pritt and Raese (1992). Quality-assurance procedures used by the Montana District sediment laboratory are described by Lambing and Dodge (1993).

The quality of analytical results reported for water-quality samples was evaluated by quality-control samples that were submitted from the field and analyzed concurrently in the laboratory with routine samples. These quality-control samples consisted of replicates, spikes, and blanks which provide quantitative information on the precision and bias of the overall field and laboratory process. Each type of quality-control sample was submitted at a proportion equivalent to about 5 percent of the total number of water-quality samples. Therefore, the total number of quality-control samples represented about 15 percent of the total number of water-quality samples.

In addition to quality-control samples submitted from the field, internal quality-assurance practices at the NWQL are performed systematically to provide quality control of analytical procedures (Pritt and Raese, 1992). These internal practices include analyses of quality-control samples such as calibration standards, standard reference water samples, replicate samples, deionized-water blanks, or spiked samples at a proportion equivalent to at least 10 percent of the sample load. The NWQL participates in a blind-sample program where standard reference water samples prepared by the USGS Branch of Technical Development and Quality Systems are routinely inserted into the sample line for each analytical method at a frequency proportional to the sample load. The laboratory also participates in external evaluation studies twice-yearly with the U.S. Environmental Protection Agency, the Canadian Center for Inland Water, and the Branch of Technical Development and Quality Systems to assess analytical performance.

Replicate samples are two or more samples considered to be essentially identical in composition. Analyses of replicate samples indicate the precision (reproducibility) of results. Precision is affected by numerous sources of variability within the field and laboratory environments, including sample collection, sample processing, and sample analysis. To provide data on precision for samples exposed to all sources of variability combined, replicate samples were obtained in the field by splitting a composite stream sample. Analyses of these field replicates indicate the reproducibility of environmental data that are affected by the combined variability potentially introduced by field and laboratory processes.

Analytical precision was evaluated by excluding field sources of variability. Replicate analyses were made of an individual sample selected randomly in the laboratory from the group of samples comprising each analytical run. A separate analysis of the sample was made at the beginning and end of each analytical run to provide information on laboratory analytical precision independent of possible effects on precision caused by field collection and processing of samples.

Spiked samples are used to evaluate the ability of an analytical method to accurately measure a known amount of analyte added to a sample. Deionized-water blanks and aliquots of stream samples were spiked in the laboratory with known amounts of the same trace elements analyzed in water samples. Analyses of spiked blanks indicate if the spiking procedure and analytical method are within control for a water matrix that is presumably free of chemical interference. Analyses of spiked aliquots of stream samples indicate if the chemical matrix of ambient stream water interferes with the analytical measurement and whether these interferences could contribute significant bias to reported trace-element concentrations for stream samples.

Blank samples of deionized water were routinely analyzed to identify the presence and magnitude of contamination that potentially could bias analytical results. The particular type of blank sample routinely tested was a "field" blank. Field blanks are aliquots of deionized water that are certified as trace-element free and are processed through the sampling equipment used to collect stream samples. These blanks are then subjected to the same processing (sample splitting, filtration, preservation, transportation, and laboratory handling) as stream samples. Blank samples are analyzed for the same constituents as those of stream samples to identify whether any detectable concentrations exist.

All water samples were handled in accordance with chain-of-custody procedures that provide documentation of sample identity, shipment, receipt, and laboratory handling. All samples submitted from a sampling episode were stored and analyzed as a discrete sample group, independent of other samples submitted to the NWQL. Therefore, statistical descriptions of quality-control data generated for this program are directly applicable to the analytical results for stream samples reported herein.

Data-quality objectives (table 3) were established for water-quality data as part of the study plan for the expanded long-term monitoring program that was initiated in 1993. The objectives identify analytical requirements of detectability and serve as a guide for identifying questionable data by establishing limits for precision and bias of laboratory results. Comparisons of quality-control data to data-quality objectives are used to evaluate whether sampling and analytical procedures are producing environmentally representative data in a consistent manner. Data that did not meet the objectives were evaluated for acceptability, and corrective action was taken, when appropriate.

The precision of analytical results for a constituent can be determined by estimating a standard deviation from the differences of several sets of replicate measurements. These replicate measurements may consist either of individual analyses of a pair of samples considered to be essentially identical (field replicates) or multiple analyses of an individual sample (laboratory replicates). The differences in concentration between replicate analyses can be used to estimate a standard deviation according to the following equation (Taylor, 1987):

$$S = \sqrt{\frac{\Sigma d^2}{2k}} \quad (1)$$

where

S = standard deviation of the difference in concentration between replicate analyses,

d = difference in concentration between each pair of replicate analyses, and

k = number of pairs of replicate analyses.

Precision can also be expressed as a relative standard deviation (RSD), in percent, which is computed from the standard deviation and the mean concentration for all the replicate analyses. Expressing precision relative to a mean concentration standardizes comparison of precision among individual constituents. The RSD, in percent, is calculated according to the following equation (Taylor, 1987):

$$RSD = \frac{S}{\bar{x}} \times 100 \quad (2)$$

where

RSD= relative standard deviation,

S = standard deviation, and

$\bar{x}$ = mean of all replicate concentrations.

Paired analyses of field replicates are presented in table 11. The precision estimated for each constituent based on these paired results, which include the combined sources of field and laboratory variability is reported in table 12. Statistics for precision of field-replicate analyses were based on the values reported in table 11 which are rounded to standard USGS reporting levels for the particular constituent and its analytical method (Timme, 1994). Analytical precision for chemical constituents based on replicate laboratory analyses of individual samples, which includes only laboratory sources of variability, is reported in table 13. Statistics for analytical precision of laboratory-replicate analyses are based on unrounded values

Table 3. Data-quality objectives for analyses of water-quality samples collected in the upper Clark Fork basin, Montana

[Abbreviations: µg/L, micrograms per liter; µS/cm, microsiemens per centimeter at 25 degrees Celsius; mg/L, milligrams per liter. Symbol: --, not determined]

Property or constituent	Data-quality objectives		
	Detectability	Precision	Bias
	Minimum reporting level, in units	Maximum relative standard deviation of laboratory replicate analyses, in percent	Maximum deviation of spike recovery, in percent
Specific conductance	1 µS/cm	2	--
pH	.1 standard units	5	--
Hardness	1 mg/L as $CaCO_3$	20	--
Calcium, dissolved	.1 mg/L	20	--
Magnesium, dissolved	.1 mg/L	20	--
Sodium, dissolved	.1 mg/L	20	--
Potassium, dissolved	.1 mg/L	20	--
Alkalinity, dissolved	1 mg/L as $CaCO_3$	20	--
Sulfate, dissolved	.1 mg/L	20	--
Chloride, dissolved	.1 mg/L	20	--
Fluoride, dissolved	.1 mg/L	20	--
Silica, dissolved	.1 mg/L	20	--
Arsenic, total recoverable	1 µg/L	20	25
Arsenic, dissolved	1 µg/L	20	25
Cadmium, total recoverable	1 µg/L	20	25
Cadmium, dissolved	.1 µg/L	20	25
Copper, total recoverable	1 µg/L	20	25
Copper, dissolved	1 µg/L	20	25
Iron, total recoverable	10 µg/L	20	25
Iron, dissolved	3 µg/L	20	25
Lead, total recoverable	1 µg/L	20	25
Lead, dissolved	.5 µg/L	20	25
Manganese, total recoverable	10 µg/L	20	25
Manganese, dissolved	1 µg/L	20	25
Zinc, total recoverable	10 µg/L	20	25
Zinc, dissolved	3 µg/L	20	25
Sediment, suspended	1 mg/L	--	--
Sediment, suspended (percent finer than 0.062 mm)	1 percent	--	--

stored in laboratory data files. Concentrations less than the minimum reporting level (censored values) were included in the calculations by arbitrarily substituting a value of one-half the reporting level.

The data-quality objective for analytical precision, based on laboratory-replicate analyses, is a maximum relative standard deviation of 20 percent. Precision estimates for laboratory-replicate analyses were within the 20-percent relative standard deviation limits for all constituents (table 13). The precision data, therefore, indicate acceptable reproducibility of analytical results for stream samples.

Data-quality objectives for precision are not directly applicable to field replicates because of the additional potential for variability resulting from field sampling and processing. However, a statistical calculation of precision for the field replicates is provided in table 12 to illustrate overall reproducibility of environmental data that incorporates both field and laboratory sources of variability. Relative standard deviations estimated from differences in analytical results between field replicates were within 20 percent for all constituents, except dissolved iron.

The large relative standard deviation for dissolved iron was the result of the November 28 sample being processed through two different types of filters as part of a test of new USGS protocols. Apparently, colloidal iron is retained more effectively on flat membrane filters compared to the convoluted surface of capsule filters recommended in the new protocols. Other elements displayed no discernible difference between filters. If this sample were omitted, the relative standard deviation of dissolved iron would be $\pm$ 6.6 percent. Because detection of long-term trends could be affected by converting to new equipment having different sampling characteristics, it was decided to continue usage of the flat membrane filters.

Analyses of an unspiked sample and a spiked aliquot of the same sample enable calculation of the spike recovery for each trace element and thereby provide a measure of the recovery efficiency for the analytical method. Spike recovery, in percent, was calculated using equation 3 (see below).

The data-quality objective for acceptable spike recovery of trace elements in water samples was a maximum deviation of 25 percent from a theoretical 100-percent recovery of added constituent. At the laboratory, a spiked deionized-water blank and a spiked aliquot of a stream sample were prepared and analyzed along with the original unspiked sample. The differences between the spiked and unspiked sample concentrations were determined and used to compute recovery according to equation 3. If the spike recovery for a trace element was outside a range of 75 to 125 percent, the entire sample set and spiked samples were reanalyzed for that particular trace element until recoveries were within acceptable limits. Results of recovery efficiency for individual trace elements in spiked deionized-water blanks and spiked stream samples are presented in tables 14 and 15, respectively.

The mean spike recovery for deionized-water samples spiked with trace elements ranged from 93.8 to 106.8 percent. The mean spike recovery for spiked stream samples ranged from 97.4 to 104.7 percent. The 95-percent confidence intervals (Taylor, 1987) for the mean of spike recovery for each constituent did not

$$\text{Spike recovery in percent} = \frac{\text{spiked sample concentration} - \text{unspiked sample concentration}}{\text{spike concentration}} \times 100 \qquad (3)$$

exceed a 25-percent deviation from an expected 100-percent recovery. Consequently, spike recoveries for each trace element were within the limits of data-quality objectives and indicate acceptable analytical performance for stream samples. Bias is indicated, however, if the confidence interval does not include 100 percent. The confidence interval for analytical recovery of dissolved zinc in spiked stream samples was 101-108 percent. Because the identified bias was small and mean spike recoveries met data-quality objectives, no adjustments were made to analytical results for stream samples on the basis of spike recoveries.

Analytical results for field blanks are presented in table 16. A field blank with constituent concentrations equal to or less than the minimum reporting level for the analytical method indicates that the entire sample collection, processing, and analytical process is presumably free of significant contamination. If detectable concentrations in field blanks were equal to or greater than twice the minimum reporting level (typical measurement precision at the detection level), the concentrations were noted. Analytical results from the field blank for the next sample set is evaluated for a consistent trend that may indicate systematic contamination. Sporadic, infrequent exceedances of twice the minimum reporting level probably represent random contamination or instrument calibration error that is not persistent in the process and which is not likely to cause significant positive bias in analytical results. However, if concentrations for a particular constituent exceed twice the minimum reporting level in field blanks from two consecutive field trips, blank samples are collected from individual components of the processing sequence and are submitted for analysis in order to identify the source of contamination.

Constituent concentrations in field blanks were almost always less than the minimum reporting level. Exceedances of twice the minimum reporting level generally were infrequent and random, thereby indicating no systematic positive bias of reported water-quality data. There were no occurrences of concentrations greater than the minimum reporting level in two consecutive blank samples.

BED-SEDIMENT DATA

Bed-sediment data consist of analyses of solid-phase concentrations of trace elements in the fine-grained and bulk fractions. Bed-sediment samples are collected once-annually during low, stable flow conditions to facilitate data comparisons between years.

Methods

Bed-sediment samples were collected in August 1995 using protocols described by E.V. Axtmann (U.S. Geological Survey, written commun., 1994). Samples were collected using an acid-washed polypropylene scoop from the surfaces of streambed deposits in low-velocity areas near the edge of the stream. Samples were collected from both sides of the stream whenever possible. Three composite samples of fine-grained bed sediment and one composite sample of bulk bed sediment were collected at each site.

Individual samples of fine-grained bed sediment were collected from the surfaces of three to five randomly selected deposits along pool or low-velocity areas. The three to five individual samples were combined to form a single composite sample. This collection process was repeated three times to obtain three composite samples. Each composite sample was wet-sieved onsite through a 0.064-mm nylon-mesh sieve using ambient stream water. The fraction of bed sediment in each composite sample that was finer than 0.064 mm was transferred to an acid-washed 500-mL high-density polyethylene bottle and transported to the laboratory on ice.

Individual samples of bulk bed sediment also were collected from the surfaces of three to five randomly selected deposits. Because the streambed at most sampling locations is predominantly gravel and cobble, deposits were selected where cobbles and gravel could be seen and, therefore, excluded from the samples. Bulk bed-sediment samples generally are composed of particles smaller than about 10 mm in diameter. The individual unsieved samples were composited and stored in acid-washed polyethylene bottles that were transported to the laboratory on ice.

Bed-sediment samples were processed at the USGS National Research Program laboratory in Boulder, Colo. Fine-grained and bulk bed-sediment samples were oven-dried at 60 °C and ground using an acid-washed ceramic mortar and pestle. Duplicate aliquots of approximately 0.6 g of sediment from each composite fine-grained bed sediment sample were digested using a hot, concentrated nitric acid reflux according to methods described by Luoma and Bryan (1981). Triplicate aliquots were analyzed from each composite sample of bulk bed sediment. After a digestion period of up to several weeks, the aliquots were evaporated to dryness on a hot plate. The dry residue was redissolved with 20 mL of 0.6 N (normal) hydrochloric acid. The reconstituted aliquots then were filtered through a 0.45-µm filter using a syringe and in-

line disposable filter cartridge. The filtrate was subsequently diluted to either a 1:5 or 1:10 ratio with 0.6 N hydrochloric acid. These final solutions then were analyzed for cadmium, chromium, copper, iron, manganese, nickel, and zinc using Inductively Coupled Argon Plasma Emission Spectroscopy (ICAPES) at the USGS National Research Program laboratory in Menlo Park, Calif. Lead and silver were analyzed in undiluted digests by flame atomic absorption (AA) at the USGS National Research Program laboratory in Boulder, Colo.

Results

Solid-phase concentrations of trace elements measured in samples of fine-grained bed sediment and bulk bed sediment collected during August 1995 are summarized in tables 17 and 18, respectively. Liquid-phase concentrations, in µg/mL, that were analyzed in the reconstituted aliquots of digested bed sediment were converted to solid-phase concentrations, in µg/g, using the following equation:

$$\frac{\mu g/g = \mu g/mL \times \text{volume of digested sample, in mL}}{\text{dry weight of sample, in g} \times \text{dilution ratio}} \quad (4)$$

The reported solid-phase concentrations in table 17 and 18 are the means of all analyses of replicate aliquots from each composite sample collected at the site. Because the conversion from liquid-phase to solid-phase concentration is dependent on both the dilution ratio and the dry weight of the sample, minimum reporting levels for some trace elements may differ between stations and among years.

Quality Assurance

The protocols for field collection and processing of bed-sediment samples are designed to prevent contamination from metal sources. Non-metallic sampling and processing equipment was acid-washed and rinsed with deionized water prior to the first sample collection. Nylon-mesh sieves were washed in a laboratory-grade detergent and rinsed with deionized water. All equipment was given a final rinse onsite with stream water. Sampling equipment that was reused at each site was rinsed between sites with 10-percent nitric acid, deionized water, and stream water. Separate sieves were used at each site and, therefore, did not require between-site cleaning. Samples were collected along an increasing concentration gradient from the downstream tributaries and mainstem to the upstream tributaries and mainstem to minimize any effects from potential station-to-station carryover contamination.

Quality assurance of analytical results for bed sediment included laboratory instrument calibration with standard solutions and analysis of quality-control samples designed to identify the presence and magnitude of bias (E.V. Axtmann, U.S. Geological Survey, written commun., 1994). Quality-control samples consisted of standard reference materials and procedural blanks. Each type of sample was analyzed in a proportion equivalent to about 10 to 20 percent of the total number of bed-sediment samples.

Standard reference materials (SRM) have certified concentrations of trace elements. Replicate analyses of standard reference materials are used to indicate the repeatability of measurements and the ability of the method to accurately measure a known quantity of a constituent. Recovery efficiency of trace-element analyses of standard reference materials for bed sediment is summarized in table 19. Two standard reference materials consisting of agricultural soils representing low and high concentrations of trace elements were analyzed to test recovery efficiency for a range of concentrations generally similar to those occurring in the upper Clark Fork basin. The digestion process used to analyze bed-sediment samples is not a "total" digestion (does not liberate elements associated with crystalline lattices); therefore, 100-percent recovery may not be achieved for elements strongly bound to the sediment. The percent recovery of trace elements in standard reference materials under such conditions serve to indicate which trace elements display strong sediment-binding characteristics and whether analytical recovery is consistent between multiple sets of analyses. Although data-quality objectives have not been established for bed sediment, elements with mean recoveries outside a 25-percent deviation from complete recovery were chromium and lead for the low-concentration range (SRM 2709), and chromium for the high-concentration range (SRM 2711). Mean recoveries were low for these elements, indicating that the digestion during sample preparation did not release all of the element from the solid-phase matrix.

Procedural blanks for bed-sediment samples consisted of the same reagents used for sample digestion and reconstitution. Concentrated nitric acid used

for sample digestion was heated and evaporated to dryness. After evaporation, 0.6 N hydrochloric acid was added quantitatively to the dry residue to obtain the same dilution ratio as that used in the analysis of bed sediment. Procedural blanks, therefore, represent the same chemical matrix as the reagents used to digest and reconstitute bed-sediment samples. Analytical results for procedural blanks can indicate the presence and magnitude of potential contamination associated with sample handling and analysis in the laboratory environment. Results of trace-element analyses of procedural blanks for bed sediment are in table 20.

Analytical results of procedural blanks are reported as a liquid-phase concentration, in µg/mL, which is equivalent to parts per million. Determination of the significance of a detectable blank concentration is based on the magnitude of the equivalent solid-phase concentration, in µg/g, relative to the ambient concentration of the trace element in bed-sediment samples. Because sample weights of individual aliquots may vary, the relative significance of blank concentrations may differ among samples. If a detectable blank concentration, after conversion to a solid-phase concentration, represents 10 percent or more of the ambient solid-phase concentration, then the blank concentration is subtracted to remove potential contamination bias. Almost all procedural blanks had concentrations less than analytical detection levels. Therefore, no adjustments were made to trace-element concentrations in bed-sediment samples on the basis of procedural blanks.

BIOLOGICAL DATA

Biological data consist of analyses of solid-phase concentrations of trace elements in the whole-body tissue of aquatic benthic insects. Insect samples are collected once-annually at the same stations where bed-sediment samples are collected (table 1). Biota samples are collected concurrently with bed-sediment samples to facilitate comparisons of results between years and between concentrations in bed sediment and biota.

Methods

Insect samples were collected using protocols described by M.I. Hornberger (U.S. Geological Survey, written commun., 1994). Immature stages of aquatic benthic insects were collected using a large nylon-mesh kick net. A single riffle at each station was sampled repeatedly until an adequate number of individuals was collected to provide sufficient mass for analysis. Targeted taxa for collection were *Hydropsyche* spp., Family Trichoptera (caddisflies); *Arctopsyche grandis*, Family Trichoptera; and *Claassenia sabulosa*, Family Plecoptera (stoneflies). Samples of each taxon were stored separately, by genus, in acid-washed plastic containers. Containers were kept on ice in the field while the insects were allowed to evacuate the gut contents in ambient stream water for a period of six to eight hours. Excess water then was drained and insects were frozen for transport to the laboratory.

Insect samples were processed and analyzed at the USGS National Research Program laboratory in Menlo Park, Calif. Insects were thawed and rinsed with ultra-pure deionized water to remove particulate matter. The insects then were sorted to their lowest possible taxonomic level. When large numbers of specimens were collected from a station, similar-sized individuals were composited into replicate subsamples. Subsamples were placed in tared scintillation vials and oven-dried at 70 °C. Subsamples were weighed to obtain a final dry weight and digested by reflux using concentrated nitric acid (Cain and others, 1992). After digestion, insect samples were evaporated to dryness on a hot plate. The dry residue was reconstituted in 0.6 N hydrochloric acid, filtered through a 0.45-µm filter, and analyzed undiluted by ICAPES for cadmium, chromium, copper, iron, lead, manganese, nickel, and zinc.

Results

Solid-phase concentrations of trace elements in whole-body tissue of aquatic insects collected during August 1995 are summarized in table 21. The variability in the number of composite samples between species and between sites reflects the difference in insect abundance, with number of composite samples increasing with abundance of insects. Liquid-phase concentrations analyzed in the reconstituted samples were converted to solid-phase concentrations using equation 4. As in bed sediment, minimum reporting levels may differ between sites as a result of variable sample weights. In general, the smaller the biological sample weight (a function of insect abundance), the higher the minimum reporting level. Therefore, higher minimum reporting levels do not necessarily imply a higher trace-element concentration in tissue.

Two genera of *Hydropsyche* were collected for this study: *Hydropsyche occidentalis* and *Hydropsyche morosa* group. Two species of *Hydropsyche* were identified within the morosa group (*H. cockerelli* and *H. tana*). Results of analyses are listed for the individual species within the *morosa* group where positive identification was possible. In some instances (as

noted at the individual station), a sample was not positively identifiable as *H. cockerelli* although it could be identified as belonging to the *morosa* group. These samples are most likely *H. cockerelli* based on a distinct head pattern. However, the small size of the insect made it difficult to determine the precise species. *Hydropsyche* samples that could not be identified clearly to the species but had *morosa* characteristics were listed separately as *H. morosa* group.

Quality Assurance

The protocols for field collection and processing of biota samples are designed to prevent contamination from metal sources. Non-metallic nets, sampling, and processing equipment were employed in all sample collection. Equipment was acid-washed and rinsed in ultra-pure deionized water prior to the first sample collection. Biota samples were collected concurrently with bed-sediment samples along an increasing concentration gradient to prevent station-to-station carryover contamination. Nets and equipment were thoroughly rinsed in ambient stream water at each new mainstem station. New nets and depuration chambers were used for the tributary stations.

Quality assurance of analytical results for biota samples included laboratory instrument calibration with standard solutions and analyses of quality-control samples designed to identify the presence and magnitude of bias (M.I. Hornberger, U.S. Geological Survey, written commun., 1994). Quality-control samples consisted of standard reference material and procedural blanks. Each type of sample was analyzed in a proportion equivalent to about 10 to 20 percent of the total number of biota samples.

Recovery efficiency for trace-element analyses of standard reference material for biota is summarized in table 22. The reference material tested was oyster tissue. Data-quality objectives have not been established for analytical recovery in biota, but mean recoveries were within 10 percent of complete recovery for all trace elements, with the exception of chromium (mean recovery within 20 percent). A low bias is indicated for iron, manganese, and zinc (confidence interval does not include 100 percent) and a high bias is indicated for cadmium and chromium. The cause of this minor bias is unknown, and no adjustments to insect data were warranted.

Results of trace-element analyses of procedural blanks for biota are in table 23. Procedural blanks for biota consisted of the same reagents used to digest and reconstitute tissue of aquatic insects. The blanks were analyzed undiluted at a proportion of one blank per site. No adjustments for procedural blanks were necessary because all blanks had concentrations that, when converted to solid-phase concentrations, were less than 10 percent of ambient solid-phase trace-element concentrations in insects.

STATISTICAL SUMMARIES OF DATA

Statistical summaries of water-quality, bed-sediment, and biological data are provided in tables 24-27 for the period of record at each station since 1985. The summaries include the period of record, number of samples, maximum, minimum, mean, and median of concentrations.

Statistical summaries of water-quality data (table 24) are based on results of samples collected periodically during the station's period of record. Statistical summaries of bed-sediment (table 25 and 26) and biological data (table 27) are based on results of samples collected once-annually during the indicated years. Because not all stations were sampled for bed sediment and biota every year, these data do not represent a consecutive annual record.

Sample sizes and statistics for bed-sediment data are based on the annual mean concentrations determined from the combined results of composite samples for a given year. Therefore, sample sizes for bed sediment represent the number of years sampled. Sample sizes and statistics for biological data are based on individual analyses for each composite sample collected in individual years rather than the annual mean concentration. Biota sample sizes therefore reflect differences in species abundance and the statistics describe the full range of variability in trace-element assimilation among species. Consequently, a sample size greater than one can be generated for a single year. The abundance of aquatic insects at a particular site in a given year limits the biomass of the sample which, in turn, may result in different taxa analyzed between years or in variable analytical detection limits. Where minimum reporting levels vary between years, statistical summaries are provided only as a general indication of the range of detection.

The presence or absence of insect species at a given site can vary between years and may result in different taxa being analyzed in the long-term period of record. Because *Hydropsyche* insects were not sorted to the species level during 1986-89, statistics for stations sampled during those years are based on the results of all *Hydropsyche* species combined. At some sites, statistics for the *Hydropsyche morosa* group are based on the combined results for two or more species.

The biological statistical summary table shows samples listed separately as *H. cockerelli* and *H. morosa* group. This is a slightly different format from the biological summary table for the 1994 water year (Lambing and others, 1995), where these *H. cockerelli* and *H. morosa* group samples were combined for the statistical summary. Table 27 also includes samples listed as *H. species*. In addition, some *Hydropsyche* samples in recent years were not identifiable to the species or group level; therefore, these samples were grouped into *H.* spp. *Hydropsyche* were not sorted by species during the earlier part of the study (1986-1989).

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DATA

Table 4. Water-quality data for the upper Clark Fork basin, Montana, Octobr 1994 through September 1995

[Abbreviations: ft^3/s, cubic feet per second; °C, degrees Celsius; E, estimated; µg/L, micrograms per liter; µS/cm, microsiemens per centimeter at 25 °C; mg/L, milligrams per liter; mm, millimeter; ton/d, tons per day. Symbols: <, less than minimum reporting level; --, no data

12323230--BLACKTAIL CREEK AT HARRISON AVENUE, AT BUTTE, MONT.

Date	Time	Stream-flow, instan-taneous (ft^3/s)	Specific conduct-ance, onsite (µS/cm)	pH, onsite (stand-ard units)	Temper-ature, water (°C)	Hard-ness, total (mg/L as $CaCO_3$)	Calcium, dis-solved (mg/L)	Magne-sium, dis-solved (mg/L)	Sodium, dis-solved (mg/L)	Potas-sium, dis-solved (mg/L)	Alka-linity (mg/L as $CaCO_3$)
Nov 1994											
28...	1105	6.0	302	7.3	4.0	130	36	8.6	12	2.8	104
Feb 1995											
06...	1000	4.3	318	7.7	4.0	120	35	9.1	13	6.4	101
Mar											
09...	1000	5.7	338	7.9	4.0	130	36	8.9	18	2.9	98
Apr											
10...	1505	11	236	7.9	7.0	88	25	6.2	11	2.4	71
28...	1310	10	241	7.9	6.0	95	27	6.7	9.2	2.7	77
May											
08...	1055	49	194	7.7	5.5	74	21	5.2	7.8	3.5	57
22...	1230	42	177	7.9	9.5	71	20	5.0	6.4	2.4	59
Jun											
05...	1005	85	186	7.8	12.0	77	22	5.3	6.8	3.7	65
Jul											
11...	1055	18	236	7.9	15.0	100	29	6.9	7.4	2.5	95
Aug											
07...	0930	7.5	292	7.8	13.5	120	34	8.1	9.8	2.7	109

Date	Sulfate, dis-solved (mg/L)	Chloride, dis-solved (mg/L)	Fluo-ride, dis-solved (mg/L)	Silica, dis-solved (mg/L)	Solids, sum of constit-uents, dissolved (mg/L)	Arsenic, total recov-erable (µg/L)	Arsenic, dis-solved (µg/L)	Cad-mium, total recov-erable (µg/L)	Cad-mium, dis-solved (µg/L)	Copper, total recov-erable (µg/L)	Copper, dis-solved (µg/L)
Nov 1994											
28...	34	6.5	0.30	28	191	2	2	<1	<0.1	5	1
Feb 1995											
06...	34	10	.30	26	195	4	2	<1	<.1	8	6
Mar											
09...	33	18	.30	27	203	3	2	<1	<.1	7	2
Apr											
10...	22	12	.40	21	143	6	3	<1	<.1	9	4
28...	26	8.3	.40	20	147	4	3	<1	<.1	8	5
May											
08...	27	3.8	.30	20	123	9	5	<1	<.1	14	7
22...	19	2.8	.30	23	114	9	8	<1	<.1	10	7
Jun											
05...	19	2.8	.30	24	123	17	13	<1	<.1	18	10
Jul											
11...	15	3.5	.30	27	149	18	12	<1	<.1	5	4
Aug											
07...	25	5.3	.30	27	178	11	7	<1	<.1	4	3

Date	Iron, total recov-erable (µg/L)	Iron, dis-solved (µg/L)	Lead, total recov-erable (µg/L)	Lead, dis-solved (µg/L)	Manga-nese, total recov-erable (µg/L)	Manga-nese, dis-solved (µg/L)	Zinc, total recov-erable (µg/L)	Zinc, dis-solved (µg/L)	Sedi-ment, sus-pended (mg/L)	Sedi-ment dis-charge, sus-pended (ton/d)	Sediment, suspended (percent finer than 0.062 mm)
Nov 1994											
28...	590	58	<1	<0.5	70	61	<10	<3	7	0.11	91
Feb 1995											
06...	590	190	1	<.5	90	76	20	8	10	.12	92
Mar											
09...	550	71	4	<.5	70	51	10	6	14	.22	95
Apr											
10...	1,100	160	9	.6	60	38	20	6	20	.59	94
28...	480	130	3	<.5	50	43	<10	<3	25	.68	72
May											
08...	1,800	230	4	<.5	70	21	20	3	50	6.6	60
22...	680	170	1	<.5	30	19	<10	<3	15	1.7	60
Jun											
05...	1,800	290	4	<.5	60	25	10	9	74	17	50
Jul											
11...	920	330	1	<.5	60	39	<10	<3	7	.34	92
Aug											
07...	620	200	<1	<.5	60	45	<10	<3	2	.04	93

Table 4. Water-quality data for the upper Clark Fork basin, Montana, October 1994 through September 1995 (Continued)

12323250--SILVER BOW CREEK BELOW BLACKTAIL CREEK, AT BUTTE, MONT.

Date	Time	Stream-flow, instan-taneous (ft^3/s)	Specific conduct-ance, onsite (µS/cm)	pH, onsite (stand-ard units)	Temper-ature, water (°C)	Hard-ness, total (mg/L as $CaCO_3$)	Calcium, dis-solved (mg/L)	Magne-sium, dis-solved (mg/L)	Sodium, dis-solved (mg/L)	Potas-sium, dis-solved (mg/L)	Alka-linity (mg/L as $CaCO_3$)
Nov 1994											
28...	1240	19	487	7.5	7.5	150	43	11	28	5.7	90
Feb 1995											
06...	1210	21	480	7.5	7.5	150	42	11	29	6.8	89
Mar											
09...	1150	23	555	7.4	7.5	170	47	12	36	5.8	81
Apr											
10...	1355	35	691	7.5	8.0	160	44	11	66	9.8	81
28...	1215	26	478	7.6	7.0	150	43	11	25	14	96
May											
08...	1245	65	309	7.6	8.0	100	29	7.2	15	7.8	69
22...	1355	54	300	7.7	12.0	98	28	6.8	14	8.0	70
Jun											
05...	1150	93	265	7.6	12.5	97	28	6.5	12	7.6	74
Jul											
11...	1230	35	409	7.5	17.0	140	42	9.6	20	4.8	94
Aug											
07...	1100	25	500	7.5	15.5	170	47	12	26	5.0	103

Date	Sulfate, dis-solved (mg/L)	Chloride, dis-solved (mg/L)	Fluo-ride, dis-solved (mg/L)	Silica, dis-solved (mg/L)	Solids, sum of constit-uents, dissolved (mg/L)	Arsenic, total recov-erable (µg/L)	Arsenic, dis-solved (µg/L)	Cad-mium, total recov-erable (µg/L)	Cad-mium, dis-solved (µg/L)	Copper, total recov-erable (µg/L)	Copper, dis-solved (µg/L)
Nov 1994											
28...	69	20	0.40	26	258	22	8	4	0.5	220	22
Feb 1995											
06...	71	24	.40	24	263	18	5	3	1.3	170	45
Mar											
09...	88	30	.40	25	294	22	10	2	1.6	170	50
Apr											
10...	86	88	.60	22	378	23	8	4	2.5	290	50
28...	80	18	.40	21	271	12	9	2	1.9	110	71
May											
08...	50	9.4	.40	21	182	22	7	2	.9	160	53
22...	43	9.0	.40	23	175	18	9	1	.9	91	50
Jun											
05...	35	6.7	.40	24	165	28	13	2	.5	150	42
Jul											
11...	62	15	.60	26	238	22	11	3	2.2	150	70
Aug											
07...	87	19	.40	25	285	18	10	3	2.9	190	100

Date	Iron, total recov-erable (µg/L)	Iron, dis-solved (µg/L)	Lead, total recov-erable (µg/L)	Lead, dis-solved (µg/L)	Manga-nese, total recov-erable (µg/L)	Manga-nese, dis-solved (µg/L)	Zinc, total recov-erable (µg/L)	Zinc, dis-solved (µg/L)	Sedi-ment, sus-pended (mg/L)	Sedi-ment dis-charge, sus-pended (ton/d)	Sediment, suspended (percent finer than 0.062 mm)
Nov 1994											
28...	2,600	130	48	<0.5	780	670	1,200	580	64	3.3	88
Feb 1995											
06...	1,500	230	34	2.0	740	680	900	670	31	1.8	78
Mar											
09...	1,200	57	21	<.5	980	970	730	600	32	2.0	80
Apr											
10...	4,200	45	110	.9	1,000	790	1,200	850	125	12	76
28...	740	110	9	<.5	590	580	770	710	12	.84	71
May											
08...	2,500	190	48	1.5	490	300	530	330	94	16	48
22...	1,100	170	16	1.2	320	270	380	320	--	--	--
Jun											
05...	2,200	270	60	2.2	350	210	350	200	99	25	42
Jul											
11...	1,200	140	28	.8	710	640	870	710	25	2.4	60
Aug											
07...	760	49	7	<.5	770	740	1,100	960	11	.74	58

Table 4. Water-quality data for the upper Clark Fork basin, Montana, October 1994 through September 1995 (Continued)
12323600--SILVER BOW CREEK AT OPPORTUNITY, MONT.

Date	Time	Streamflow, instantaneous (ft^3/s)	Specific conductance, onsite (µS/cm)	pH, onsite (standard units)	Temperature, water (°C)	Hardness, total (mg/L as $CaCO_3$)	Calcium, dissolved (mg/L)	Magnesium, dissolved (mg/L)	Sodium, dissolved (mg/L)	Potassium, dissolved (mg/L)	Alkalinity (mg/L as $CaCO_3$)
Nov 1994											
28...	1430	E33	403	8.1	0.5	150	44	9.8	20	4.4	103
Feb 1995											
06...	1330	62	441	8.1	5.0	150	44	9.0	26	6.4	84
Mar											
09...	1350	51	471	8.0	4.5	160	46	10	26	4.4	87
Apr											
10...	1225	75	342	8.4	5.0	120	36	7.8	16	4.7	87
28...	1050	63	370	8.4	4.5	140	40	8.6	17	6.5	94
May											
08...	1400	189	266	7.9	7.0	98	29	6.2	12	4.1	68
22...	1505	173	239	8.2	11.5	93	28	5.5	9.1	3.1	73
Jun											
05...	1405	315	219	7.8	10.0	88	27	4.9	8.1	3.6	64
Jul											
11...	1350	155	289	8.1	14.0	110	32	6.3	13	4.2	82
Aug											
07...	1215	49	403	8.7	18.0	150	43	9.4	19	4.0	105

Date	Sulfate, dissolved (mg/L)	Chloride, dissolved (mg/L)	Fluoride, dissolved (mg/L)	Silica, dissolved (mg/L)	Solids, sum of constituents, dissolved (mg/L)	Arsenic, total recoverable (µg/L)	Arsenic, dissolved (µg/L)	Cadmium, total recoverable (µg/L)	Cadmium, dissolved (µg/L)	Copper, total recoverable (µg/L)	Copper, dissolved (µg/L)
Nov 1994											
28...	63	13	0.50	23	240	16	8	1	0.7	92	25
Feb 1995											
06...	73	24	.70	22	257	34	14	3	1.4	300	63
Mar											
09...	72	23	.50	22	257	22	8	2	1.5	170	35
Apr											
10...	55	9.7	.40	21	204	22	7	2	1.1	160	30
28...	62	11	.40	21	224	16	8	2	1.2	100	33
May											
08...	46	5.6	.30	21	166	44	9	3	1.2	320	66
22...	32	4.3	.30	20	147	22	11	1	.6	120	38
Jun											
05...	32	3.2	.30	18	136	100	11	4	1.2	560	100
Jul											
11...	39	5.8	.40	21	172	92	20	4	1.9	560	120
Aug											
07...	72	12	.40	24	248	22	9	3	1.7	260	80

Date	Iron, total recoverable (µg/L)	Iron, dissolved (µg/L)	Lead, total recoverable (µg/L)	Lead, dissolved (µg/L)	Manganese, total recoverable (µg/L)	Manganese, dissolved (µg/L)	Zinc, total recoverable (µg/L)	Zinc, dissolved (µg/L)	Sediment, suspended (mg/L)	Sediment discharge, suspended (ton/d)	Sediment, suspended (percent finer than 0.062 mm)
Nov 1994											
28...	980	21	16	<0.5	620	490	640	390	24	2.1	70
Feb 1995											
06...	2,200	120	62	2.3	810	670	740	400	53	8.9	84
Mar											
09...	1,300	11	34	<.5	770	730	590	370	26	3.6	90
Apr											
10...	1,700	27	39	.7	480	420	460	250	28	5.7	90
28...	830	27	17	<.5	490	460	480	340	19	3.2	72
May											
08...	3,700	150	87	2.1	610	390	630	320	176	90	52
22...	1,400	170	29	2.0	230	190	240	130	39	18	66
Jun											
05...	7,900	210	190	2.7	600	310	700	260	258	219	71
Jul											
11...	4,600	52	150	<.5	870	620	930	310	201	84	79
Aug											
07...	810	22	11	<.5	700	650	630	260	10	1.3	92

Table 4. Water-quality data for the upper Clark Fork basin, Montana, October 1994 through September 1995 (Continued)

12323750--SILVER BOW CREEK AT WARM SPRINGS, MONT.

Date	Time	Streamflow, instantaneous (ft^3/s)	Specific conductance, onsite (µS/cm)	pH, onsite (standard units)	Temperature, water (°C)	Hardness, total (mg/L as $CaCO_3$)	Calcium, dissolved (mg/L)	Magnesium, dissolved (mg/L)	Sodium, dissolved (mg/L)	Potassium, dissolved (mg/L)	Alkalinity (mg/L as $CaCO_3$)
Nov 1994											
28...	1530	48	595	8.8	3.0	250	73	17	23	8.3	130
Feb 1995											
06...	1445	121	519	8.9	5.5	220	62	15	22	5.6	119
Mar											
09...	1500	81	514	8.8	3.0	220	66	14	18	5.3	101
Apr											
10...	1050	114	515	8.7	5.5	220	67	14	18	4.9	113
28...	0900	121	491	8.7	8.0	210	61	13	17	4.9	106
May											
08...	1515	195	472	8.7	10.0	200	59	13	17	4.8	109
22...	1600	303	348	8.9	14.0	140	44	8.5	13	3.5	97
Jun											
05...	1725	452	353	8.6	13.5	150	46	9.1	11	3.8	95
Jul											
11...	1525	219	281	8.3	16.5	120	36	6.7	8.2	2.6	85
Aug											
07...	1340	E85	364	9.0	20.0	150	45	9.9	10	2.9	91

Date	Sulfate, dissolved (mg/L)	Chloride, dissolved (mg/L)	Fluoride, dissolved (mg/L)	Silica, dissolved (mg/L)	Solids, sum of constituents, dissolved (mg/L)	Arsenic, total recoverable (µg/L)	Arsenic, dissolved (µg/L)	Cadmium, total recoverable (µg/L)	Cadmium, dissolved (µg/L)	Copper, total recoverable (µg/L)	Copper, dissolved (µg/L)
Nov 1994											
28...	160	12	1.0	10	382	17	14	<1	<0.1	13	8
Feb 1995											
06...	120	13	.80	13	323	14	8	<1	.1	19	12
Mar											
09...	130	12	.70	12	319	17	11	<1	.2	56	25
Apr											
10...	130	11	.80	11	325	13	9	<1	<.1	16	11
28...	120	10	.80	6.3	297	12	9	<1	<.1	14	10
May											
08...	110	9.2	.70	8.5	288	14	12	<1	<.1	14	8
22...	67	5.3	.50	15	215	29	28	<1	<.1	29	17
Jun											
05...	75	4.2	.50	15	222	48	35	<1	<.1	70	13
Jul											
11...	44	2.9	.50	15	167	39	30	<1	<.1	16	8
Aug											

Date	Iron, total recoverable (µg/L)	Iron, dissolved (µg/L)	Lead, total recoverable (µg/L)	Lead, dissolved (µg/L)	Manganese, total recoverable (µg/L)	Manganese, dissolved (µg/L)	Zinc, total recoverable (µg/L)	Zinc, dissolved (µg/L)	Sediment, suspended (mg/L)	Sediment discharge, suspended (ton/d)	Sediment, suspended (percent finer than 0.062 mm)
Nov 1994											
28...	450	4	<1	<0.5	130	81	40	7	4	0.52	91
Feb 1995											
06...	430	6	2	<.5	250	200	70	13	4	1.3	73
Mar											
09...	750	35	14	.7	310	220	100	27	12	2.6	96
Apr											
10...	290	8	2	<.5	100	65	40	14	3	.92	82
28...	360	15	1	<.5	130	95	30	4	6	2.0	92
May											
08...	340	10	1	<.5	170	110	30	6	7	3.7	63
22...	400	17	3	<.5	110	73	50	9	14	11	72
Jun											
05...	3,000	21	12	<.5	310	76	70	16	229	279	77
Jul											
11...	440	23	2	<.5	190	120	40	5	10	5.9	95
Aug											
07...	180	11	<1	<.5	80	46	<10	6	4	.92	90

Table 4. Water-quality data for the upper Clark Fork basin, Montana, October 1994 through September 1995 (Continued)

12323770--WARM SPRINGS CREEK AT WARM SPRINGS, MONT.

Date	Time	Streamflow, instantaneous (ft^3/s)	Specific conductance, onsite (µS/cm)	pH, onsite (standard units)	Temperature, water (°C)	Hardness, total (mg/L as $CaCO_3$)	Calcium, dissolved (mg/L)	Magnesium, dissolved (mg/L)	Sodium, dissolved (mg/L)	Potassium, dissolved (mg/L)	Alkalinity (mg/L as $CaCO_3$)
Nov 1984											
28...	1650	36	382	8.2	1.0	200	60	12	4.4	1.6	136
Mar 1995											
09...	1530	39	428	8.5	4.0	230	68	14	5.0	1.7	138
Apr											
28...	0930	26	457	8.3	5.0	230	69	14	5.0	1.7	147
May											
22...	1635	106	253	8.4	11.5	120	37	6.9	2.5	1.1	96
Jun											
05...	1545	333	172	7.4	7.0	80	25	4.3	2.0	1.3	61
Aug											
07...	1410	43	283	8.4	15.0	130	40	7.5	3.0	1.2	106

Date	Sulfate, dissolved (mg/L)	Chloride, dissolved (mg/L)	Fluoride, dissolved (mg/L)	Silica, dissolved (mg/L)	Solids, sum of constituents, dissolved (mg/L)	Arsenic, total recoverable (µg/L)	Arsenic, dissolved (µg/L)	Cadmium, total recoverable (µg/L)	Cadmium, dissolved (µg/L)	Copper, total recoverable (µg/L)	Copper, dissolved (µg/L)
Nov 1994											
28...	64	1.2	0.50	12	238	3	3	<1	<0.1	5	1
Mar 1995											
09...	85	3.6	.50	10	271	5	4	<1	<1	9	2
Apr											
28...	89	1.9	.50	9.7	279	4	4	<1	<1	4	2
May											
22...	31	.80	.40	9.5	147	7	5	<1	<1	19	3
Jun											
05...	24	.60	.40	8.4	103	23	8	<1	<1	88	9
Aug											
07...	35	.90	.40	11	163	8	5	<1	<1	7	3

Date	Iron, total recoverable (µg/L)	Iron, dissolved (µg/L)	Lead, total recoverable (µg/L)	Lead, dissolved (µg/L)	Manganese, total recoverable (µg/L)	Manganese, dissolved (µg/L)	Zinc, total recoverable (µg/L)	Zinc, dissolved (µg/L)	Sediment, suspended (mg/L)	Sediment discharge, suspended (ton/d)	Sediment, suspended (percent finer than 0.062 mm)
Nov 1994											
28...	80	6	<1	<0.5	400	350	<10	<3	3	0.29	81
Mar 1995											
09...	140	4	1	<.5	450	370	20	6	16	1.7	83
Apr											
28...	60	6	<1	<.5	470	450	<10	<3	8	.56	83
May											
22...	380	9	2	<.5	320	110	20	<3	20	5.7	76
Jun											
05...	1,300	26	14	<.5	330	65	50	<3	81	73	77
Aug											
07...	90	7	<1	<.5	170	140	<10	<3	4	.46	64

Table 4. Water-quality data for the upper Clark Fork basin, Montana, October 1994 through September 1995 (Continued)

12323800--CLARK FORK NEAR GALEN, MONT.

Date	Time	Stream-flow, instan-taneous (ft^3/s)	Specific conduct-ance, onsite (µS/cm)	pH, onsite (stand-ard units)	Temper-ature, water (°C)	Hard-ness, total (mg/L as $CaCO_3$)	Calcium, dis-solved (mg/L)	Magne-sium, dis-solved (mg/L)	Sodium, dis-solved (mg/L)	Potas-sium, dis-solved (mg/L)	Alka-linity (mg/L as $CaCO_3$)
Nov 1994											
29...	0815	84	532	8.2	1.0	240	70	15	16	5.9	136
Feb 1995											
06...	1620	153	501	8.9	6.0	220	64	15	19	4.8	124
Mar											
09...	1730	122	502	8.5	4.0	220	67	14	15	4.4	112
Apr											
10...	1700	145	522	8.6	7.5	230	69	15	16	4.3	120
26...	1415	129	476	8.7	10.0	210	62	13	15	4.2	114
May											
09...	0705	227	457	8.4	8.5	200	59	12	15	4.3	114
22...	1800	372	329	8.8	13.5	140	43	8.1	10	3.0	97
Jun											
05...	1900	832	292	8.4	10.0	130	39	7.3	7.5	2.8	83
06...	0935	1,050	308	8.4	9.5	130	40	7.4	8.4	3.3	86
Jul											
11...	1645	400	246	8.3	16.0	100	32	5.9	5.7	2.0	79
Aug											
07...	1530	126	341	9.0	19.5	150	44	9.1	8.1	2.5	98

Date	Sulfate, dis-solved (mg/L)	Chloride, dis-solved (mg/L)	Fluo-ride, dis-solved (mg/L)	Silica, dis-solved (mg/L)	Solids, sum of constit-uents, dissolved (mg/L)	Arsenic, total recov-erable (µg/L)	Arsenic, dis-solved (µg/L)	Cad-mium, total recov-erable (µg/L)	Cad-mium, dis-solved (µg/L)	Copper, total recov-erable (µg/L)	Copper, dis-solved (µg/L)
Nov 1994											
29...	120	8.7	0.80	10	328	11	9	<1	<0.1	8	6
Feb 1995											
06...	110	11	.80	12	311	12	10	<1	<.1	18	10
Mar											
09...	120	10	.60	11	309	14	9	<1	.1	43	19
Apr											
10...	130	10	.80	11	328	12	7	<1	<.1	17	9
26...	110	8.9	.70	8.1	290	12	11	<1	<.1	16	9
May											
09...	100	8.0	.60	9.4	277	14	12	<1	<.1	22	8
22...	60	4.5	.50	13	200	26	24	<1	<.1	34	14
Jun											
05...	57	3.0	.50	13	180	38	21	<1	<.1	86	13
06...	61	3.3	.50	14	190	47	27	1	.2	150	25
Jul											
11...	34	2.0	.40	12	141	27	19	<1	<.1	19	6
Aug											
07...	68	3.3	.60	14	208	25	21	<1	<.1	9	6

Date	Iron, total recov-erable (µg/L)	Iron, dis-solved (µg/L)	Lead, total recov-erable (µg/L)	Lead, dis-solved (µg/L)	Manga-nese, total recov-erable (µg/L)	Manga-nese, dis-solved (µg/L)	Zinc, total recov-erable (µg/L)	Zinc, dis-solved (µg/L)	Sedi-ment, sus-pended (mg/L)	Sedi-ment dis-charge, sus-pended (ton/d)	Sediment, suspended (percent finer than 0.062 mm)
Nov 1994											
29...	270	5	<1	<0.5	200	160	30	8	4	0.91	88
Feb 1995											
06...	380	4	2	<.5	270	170	60	10	6	2.5	74
Mar											
09...	600	21	10	<.5	330	220	70	18	10	3.3	90
Apr											
10...	340	7	2	<.5	170	110	30	11	6	2.3	73
26...	250	17	2	<.5	180	110	20	7	5	1.7	83
May											
09...	420	10	2	<.5	250	110	40	4	11	6.7	69
22...	530	15	3	<.5	200	68	50	6	18	18	77
Jun											
05...	2,100	22	10	<.5	390	64	80	9	130	292	82
06...	2,900	29	17	<.5	500	74	180	18	162	459	71
Jul											
11...	360	16	2	<.5	150	76	30	5	11	12	76
Aug											
07	120	10	<1	<.5	90	52	<10	<3	3	1.0	76

Table 4. Water-quality data for the upper Clark Fork basin, Montana, October 1994 through September 1995 (Continued)

12324200--CLARK FORK AT DEER LODGE, MONT.

Date	Time	Stream-flow, instan-taneous (ft^3/s)	Specific conduct-ance, onsite (µS/cm)	pH, onsite (stand-ard units)	Temper-ature, water (°C)	Hard-ness, total (mg/L as $CaCO_3$)	Calcium, dis-solved (mg/L)	Magne-sium, dis-solved (mg/L)	Sodium, dis-solved (mg/L)	Potas-sium, dis-solved (mg/L)	Alka-linity (mg/L as $CaCO_3$)
Nov 1994											
29...	0920	E210	535	8.2	0.5	250	72	16	17	4.2	161
Feb 1995											
07...	0800	262	513	8.3	4.0	230	67	15	18	4.2	144
Mar											
10...	0705	252	505	8.2	4.0	230	69	15	16	3.6	140
Apr											
10...	1810	262	550	8.6	7.5	250	73	16	18	4.0	149
26...	0730	229	548	8.3	5.5	240	71	16	17	4.0	147
May											
08...	1700	340	564	8.4	10.5	250	74	17	17	4.3	144
24...	1045	437	373	8.3	11.0	160	48	9.5	12	3.1	112
Jun											
06...	1200	1,120	410	8.0	9.0	180	52	11	13	4.4	101
Jul											
11...	1815	500	305	8.5	17.0	140	41	8.0	8.6	2.4	102
Aug											
07...	1810	133	427	8.7	19.0	180	54	11	14	3.2	137

Date	Sulfate, dis-solved (mg/L)	Chloride, dis-solved (mg/L)	Fluo-ride, dis-solved (mg/L)	Silica, dis-solved (mg/L)	Solids, sum of constit-uents, dissolved (mg/L)	Arsenic, total recov-erable (µg/L)	Arsenic, dis-solved (µg/L)	Cad-mium, total recov-erable (µg/L)	Cad-mium, dis-solved (µg/L)	Copper, total recov-erable (µg/L)	Copper, dis-solved (µg/L)
Nov 1994											
29...	110	7.7	0.70	18	342	9	8	<1	0.1	13	4
Feb 1995											
07...	100	9.2	.70	16	317	18	8	<1	<.1	62	7
Mar											
10...	110	8.8	.70	16	323	20	8	<1	<.1	83	9
Apr											
10...	120	9.8	.70	15	346	14	9	<1	<.1	38	8
26...	120	9.1	.70	11	337	13	10	<1	<.1	32	8
May											
08...	130	8.0	.70	13	350	24	13	<1	<.1	76	9
24...	66	5.2	.50	15	227	28	19	<1	<.1	80	14
Jun											
06...	98	5.2	.60	16	261	100	33	3	.1	600	33
Jul											
11...	44	3.1	.50	15	184	32	21	<1	<.1	42	10
Aug											
07...	75	5.9	.70	21	267	25	22	<1	<.1	32	17

Date	Iron, total recov-erable (µg/L)	Iron, dis-solved (µg/L)	Lead, total recov-erable (µg/L)	Lead, dis-solved (µg/L)	Manga-nese, total recov-erable (µg/L)	Manga-ness, dis-solved (µg/L)	Zinc, total recov-erable (µg/L)	Zinc, dis-solved (µg/L)	Sedi-ment, sus-pended (mg/L)	Sedi-ment dis-charge, sus-pended (ton/d)	Sediment, suspended (percent finer than 0.062 mm)
Nov 1994											
29...	250	5	1	<0.5	90	52	30	9	10	5.7	77
Feb 1995											
07...	1,000	9	8	<.5	230	34	80	10	44	31	68
Mar											
10...	1,300	16	12	<.5	250	51	100	18	57	39	71
Apr											
10...	600	8	4	<.5	130	41	40	12	27	19	60
26...	490	8	4	<.5	140	50	40	9	25	15	73
May											
08...	1,300	7	9	<.5	280	25	90	5	72	66	53
24...	1,100	17	8	<.5	240	19	70	11	46	54	59
Jun											
06...	8,500	48	79	<.5	1,100	130	510	36	462	1,400	58
Jul											
11...	520	8	4	<.5	130	18	40	4	23	31	62
Aug											
07...	230	7	1	<.5	80	43	10	12	6	2.2	85

Table 4. Water-quality data for the upper Clark Fork basin, Montana, October 1994 through September 1995 (Continued)

12324590--LITTLE BLACKFOOT RIVER NEAR GARRISON, MONT.

Date	Time	Stream-flow, instan-taneous (ft^3/s)	Specific conduct-ance, onsite (µS/cm)	pH, onsite (stand-ard units)	Temper-ature, water (°C)	Hard-ness, total (mg/L as $CaCO_3$)	Calcium, dis-solved (mg/L)	Magne-sium, dis-solved (mg/L)	Sodium, dis-solved (mg/L)	Potas-sium, dis-solved (mg/L)	Alka-linity (mg/L as $CaCO_3$)
Nov 1994											
29...	1035	E56	279	8.2	0.5	130	39	8.8	6.6	2.0	125
Mar 1995											
10...	0815	154	235	8.2	2.5	100	30	7.3	6.3	2.9	100
Apr											
26...	0840	144	222	8.2	3.5	100	30	7.0	5.0	1.7	100
May											
09...	0845	411	163	8.0	5.5	74	21	5.2	3.7	1.5	69
Jun											
07...	1745	1,030	175	8.0	7.0	79	23	5.3	4.5	1.9	78
Aug											
07...	1700	76	273	8.4	19.0	120	35	8.0	5.9	2.2	131

Date	Sulfate, dis-solved (mg/L)	Chloride, dis-solved (mg/L)	Fluo-ride, dis-solved (mg/L)	Silica, dis-solved (mg/L)	Solids, sum of constit-uents, dissolved (mg/L)	Arsenic, total recov-erable (µg/L)	Arsenic, dis-solved (µg/L)	Cad-mium, total recov-erable (µg/L)	Cad-mium, dis-solved (µg/L)	Copper, total recov-erable (µg/L)	Copper, dis-solved (µg/L)
Nov 1994											
29...	14	1.6	0.20	21	168	4	4	<1	<0.1	<1	<1
Mar 1995											
10...	16	2.8	.20	17	143	7	6	<1	<.1	4	2
Apr											
26...	14	1.7	.20	17	137	4	4	<1	<.1	1	1
May											
09...	11	1.1	.20	17	102	5	4	<1	<.1	2	2
Jun											
07...	10	1.3	.20	18	111	11	6	<1	<.1	6	3
Aug											
07...	12	1.5	.20	23	166	7	6	<1	<.1	1	2

Date	Iron, total recov-erable (µg/L)	Iron, dis-solved (µg/L)	Lead, total recov-erable (µg/L)	Lead, dis-solved (µg/L)	Manga-nese, total recov-erable (µg/L)	Manga-nese, dis-solved (µg/L)	Zinc, total recov-erable (µg/L)	Zinc, dis-solved (µg/L)	Sedi-ment, sus-pended (mg/L)	Sedi-ment dis-charge, sus-pended (ton/d)	Sediment, suspended (percent finer than 0.062 mm)
Nov 1994											
29...	50	4	<1	<0.5	10	6	<10	<3	2	0.30	90
Mar 1995											
10...	770	120	2	<.5	50	6	10	4	36	15	89
Apr											
26...	220	17	<1	<.5	10	6	<10	<3	9	3.5	87
May											
09...	1,000	86	3	<.5	80	5	10	<3	56	62	59
Jun											
07...	2,400	62	5	<.5	100	13	20	<3	123	342	68
Aug											
07...	100	5	<1	<.5	20	10	<10	<3	3	.62	89

Table 4. Water-quality data for the upper Clark Fork basin, Montana, October 1994 through September 1995 (Continued)

12324680--CLARK FORK AT GOLDCREEK, MONT.

Date	Time	Stream-flow, instan-taneous (ft^3/s)	Specific conduct-ance, onsite (µS/cm)	pH, onsite (stand-ard units)	Temper-ature, water (°C)	Hard-ness, total (mg/L as $CaCO_3$)	Calcium, dis-solved (mg/L)	Magne-sium, dis-solved (mg/L)	Sodium, dis-solved (mg/L)	Potas-sium, dis-solved (mg/L)	Alka-linity (mg/L as $CaCO_3$)
Nov 1994											
29...	1135	E290	496	8.2	0.5	230	68	15	15	3.9	163
Feb 1995											
07...	1010	481	432	8.3	3.0	190	56	13	14	4.1	137
Mar											
10...	0920	529	400	8.2	4.0	180	52	11	12	3.9	127
Apr											
11...	1555	458	448	8.7	7.0	210	59	14	17	3.4	140
26...	0945	430	435	8.5	5.0	200	57	13	13	3.3	139
May											
09...	0950	934	350	8.2	7.5	150	43	10	10	2.8	109
24...	0900	1,150	257	8.2	9.0	110	33	6.9	6.9	2.1	93
Jun											
06...	1430	3,920	264	8.0	7.0	110	33	7.1	7.9	3.4	98
Jul											
12...	1705	1,020	315	8.3	17.5	140	41	8.6	9.3	2.0	122
Aug											
08...	1800	280	398	8.7	16.5	170	51	11	12	2.8	151

Date	Sulfate, dis-solved (mg/L)	Chloride, dis-solved (mg/L)	Fluo-ride, dis-solved (mg/L)	Silica, dis-solved (mg/L)	Solids, sum of constit-uents, dissolved (mg/L)	Arsenic, total recov-erable (µg/L)	Arsenic, dis-solved (µg/L)	Cad-mium, total recov-erable (µg/L)	Cad-mium, dis-solved (µg/L)	Copper, total recov-erable (µg/L)	Copper, dis-solved (µg/L)
Nov 1994											
29...	88	6.1	0.60	19	313	8	7	<1	<0.1	11	3
Feb 1995											
07...	70	6.8	.50	17	264	13	9	<1	<.1	40	6
Mar											
10...	65	6.1	.40	17	244	17	8	<1	<.1	76	9
Apr											
11...	82	7.2	.50	16	283	11	7	<1	<.1	27	6
26...	79	6.3	.50	14	269	9	8	<1	<.1	19	5
May											
09...	61	4.4	.40	16	213	17	8	<1	<.1	58	6
24...	31	2.5	.30	16	155	16	11	<1	<.1	43	7
Jun											
06...	37	2.6	<.10	16	166	75	17	2	<.1	440	23
Jul											
12...	32	2.9	.40	18	187	25	14	<1	<.1	54	9
Aug											
08...	51	4.4	.50	23	246	17	14	<1	<.1	10	7

Date	Iron, total recov-erable (µg/L)	Iron, dis-solved (µg/L)	Lead, total recov-erable (µg/L)	Lead, dis-solved (µg/L)	Manga-nese, total recov-erable (µg/L)	Manga-nese, dis-solved (µg/L)	Zinc, total recov-erable (µg/L)	Zinc, dis-solved (µg/L)	Sedi-ment, sus-pended (mg/L)	Sedi-ment dis-charge, sus-pended (ton/d)	Sediment, suspended (percent finer than 0.062 mm)
Nov 1994											
29...	280	<3	1	<0.5	90	24	30	4	14	11	79
Feb 1995											
07...	730	22	5	<.5	160	19	60	9	28	36	83
Mar											
10...	1,700	30	11	<.5	220	22	100	13	78	111	78
Apr											
11...	520	7	3	<.5	90	18	30	5	20	25	78
26...	330	9	3	<.5	80	22	30	5	16	19	85
May											
09...	1,600	30	8	<.5	220	12	70	<3	83	209	66
24...	1,000	30	6	<.5	120	12	60	7	54	168	55
Jun											
06...	12,000	73	73	<.5	1,100	43	510	16	752	7,960	58
Jul											
12...	2,100	16	9	<.5	210	22	70	<3	119	328	93
Aug											
08	90	<3	<1	<.5	30	17	<10	4	2	1.5	93

Table 4. Water-quality data for the upper Clark Fork basin, Montana, October 1994 through September 1995 (Continued)

12331500--FLINT CREEK NEAR DRUMMOND, MONT.

Date	Time	Strsem-flow, instan-taneous (ft^3/s)	Specific conduct-ance, onsite (µS/cm)	pH, onsite (stand-ard units)	Temper-ature, water (°C)	Hard-ness, total (mg/L as $CaCO_3$)	Calcium, dis-solved (mg/L)	Magne-sium, dis-solved (mg/L)	Sodium, dis-solved (mg/L)	Potas-sium, dis-solved (mg/L)	Alka-linity (mg/L as $CaCO_3$)
Nov 1994											
29...	1245	E100	341	8.3	1.0	160	44	13	8.8	3.0	159
Feb 1995											
02...	0945	534	189	8.1	.5	70	18	6.0	3.9	7.1	74
Mar											
10...	1030	229	243	8.2	3.5	110	28	9.0	6.9	5.4	106
Apr											
11...	1430	113	299	8.6	5.5	140	38	12	7.3	2.5	143
26...	1105	114	301	8.5	5.0	140	38	12	7.4	2.6	143
May											
09...	1100	268	217	8.3	8.0	94	25	7.7	5.9	2.8	96
23...	1430	186	204	8.5	11.0	94	26	7.1	4.3	1.7	95
Jun											
06...	1820	505	224	8.1	6.0	99	27	7.7	5.6	3.5	100
Jul											
12...	1515	437	337	8.2	15.0	150	40	13	8.8	4.5	160
Aug											
08...	1640	42	413	8.6	14.5	190	50	15	10	4.0	199

Date	Sulfate, dis-solved (mg/L)	Chloride, dis-solved (mg/L)	Fluo-ride, dis-solved (mg/L)	Silica, dis-solved (mg/L)	Solids, sum of constit-uents, dissolved (mg/L)	Arsenic, total recov-erable (µg/L)	Arsenic, dis-solved (µg/L)	Cad-mium, total recov-erable (µg/L)	Cad-mium, dis-solved (µg/L)	Copper, total recov-erable (µg/L)	Copper, dis-solved (µg/L)
Nov 1994											
29...	18	3.6	0.20	22	208	10	7	<1	<0.1	3	<1
Feb 1995											
02...	6.5	5.7	<.10	11	103	44	17	<1	<.1	15	5
Mar											
10...	12	5.1	.10	16	146	57	11	<1	<.1	20	4
Apr											
11...	14	3.7	.20	18	182	11	7	<1	<.1	2	<1
26...	14	4.1	.20	16	180	11	8	<1	<.1	2	1
May											
09...	13	2.6	.10	17	132	20	8	<1	<.1	8	3
23...	8.6	1.8	.10	13	120	15	7	<1	<.1	6	2
Jun											
06...	11	2.8	.10	15	133	28	10	<1	<.1	9	3
Jul											
12...	12	3.6	.20	22	200	36	14	<1	<.1	9	3
Aug											
08...	20	4.6	.20	25	248	13	11	<1	<.1	2	1

Date	Iron, total recov-erable (µg/L)	Iron, dis-solved (µg/L)	Lead, total recov-erable (µg/L)	Lead, dis-solved (µg/L)	Manga-nese, total recov-erable (µg/L)	Manga-nese, dis-solved (µg/L)	Zinc, total recov-erable (µg/L)	Zinc, dis-solved (µg/L)	Sedi-ment, sus-pended (mg/L)	Sedi-ment dis-charge, sus-pended (ton/d)	Sediment, suspended (percent finer than 0.062 mm)
Nov 1994											
29...	420	10	6	<0.5	140	26	30	<3	26	7.0	76
Feb 1995											
02...	2,500	240	41	2.3	610	71	120	18	168	242	70
Mar											
10...	2,700	110	54	1.1	680	25	140	8	191	118	83
Apr											
11...	260	11	3	<.5	70	32	10	8	11	3.4	84
26...	330	13	4	<.5	90	33	10	<3	17	5.2	87
May											
09...	1,300	110	14	<.5	250	30	50	<3	82	59	80
23...	690	29	10	<.5	160	25	30	<3	39	20	77
Jun											
06...	1,100	51	20	.6	300	48	50	4	90	123	68
Jul											
12...	1,200	41	20	<.5	400	64	60	<3	108	127	68
Aug											
08...	120	8	1	<.5	70	43	<10	4	4	.45	96

Table 4. Water-quality data for the upper Clark Fork basin, Montana, October 1994 through September 1995 (Continued)

12331800--CLARK FORK NEAR DRUMMOND, MONT.

Date	Time	Stream-flow, instan-taneous (ft^3/s)	Specific conduct-ance, onsite (µS/cm)	pH, onsite (stand-ard units)	Temper-ature, water (°C)	Hard-ness, total (mg/L as $CaCO_3$)	Calcium, dis-solved (mg/L)	Magne-sium, dis-solved (mg/L)	Sodium, dis-solved (mg/L)	Potas-sium, dis-solved (mg/L)	Alka-linity (mg/L as $CaCO_3$)
Nov 1994											
30...	0900	505	499	8.4	2.5	240	68	16	14	3.8	169
Feb 1995											
02...	1230	2,370	233	8.0	1.5	91	26	6.4	5.6	10	81
Mar											
10...	1245	749	429	8.2	5.0	200	56	14	12	3.5	142
Apr											
11...	1305	598	459	8.3	6.0	210	60	15	13	3.3	150
26...	1215	582	450	8.5	8.0	210	59	14	12	3.2	149
May											
09...	1300	1,180	351	8.2	10.0	150	43	11	9.8	3.1	114
23...	1225	1,500	287	8.2	11.0	120	36	8.1	7.4	2.3	100
Jun											
06...	1645	3,300	281	8.2	8.0	120	36	7.8	8.1	3.4	103
Jul											
12...	1335	1,540	364	8.3	16.5	160	46	11	10	3.1	143
Aug											
08...	1515	344	506	8.5	16.5	220	65	15	14	3.7	178

Date	Sulfate, dis-solved (mg/L)	Chloride, dis-solved (mg/L)	Fluo-ride, dis-solved (mg/L)	Silica, dis-solved (mg/L)	Solids, sum of constit-uents, dissolved (mg/L)	Arsenic, total recov-erable (µg/L)	Arsenic, dis-solved (µg/L)	Cad-mium, total recov-erable (µg/L)	Cad-mium, dis-solved (µg/L)	Copper, total recov-erable (µg/L)	Copper, dis-solved (µg/L)
Nov 1994											
30...	85	5.9	0.50	19	314	9	8	<1	<0.1	15	2
Feb 1995											
02...	25	4.9	.20	10	137	30	12	<1	<.1	97	14
Mar											
10...	68	6.1	.40	18	263	31	9	<1	<.1	100	6
Apr											
11...	78	6.3	.50	16	282	11	7	<1	<.1	22	5
26...	79	5.9	.50	14	277	11	9	<1	<.1	19	5
May											
09...	57	4.1	.30	16	213	24	10	<1	<.1	86	6
23...	39	2.8	.30	16	172	18	11	<1	<.1	57	9
Jun											
06...	35	2.7	.30	17	172	62	19	2	<.1	360	21
Jul											
12...	38	3.5	.40	20	218	27	15	<1	<.1	51	9
Aug											
08...	80	5.3	.50	24	314	16	14	<1	<.1	8	6

Date	Iron, total recov-erable (µg/L)	Iron, dis-solved (µg/L)	Lead, total recov-erable (µg/L)	Lead, dis-solved (µg/L)	Manga-nese, total recov-erable (µg/L)	Manga-nese, dis-solved (µg/L)	Zinc, total recov-erable (µg/L)	Zinc, dis-solved (µg/L)	Sedi-ment, sus-pended (mg/L)	Sedi-ment dis-charge, sus-pended (ton/d)	Sediment, suspended (percent finer than 0.062 mm)
Nov 1994											
30...	320	<3	2	<0.5	90	13	30	5	16	22	88
Feb 1995											
02...	3,700	140	26	.9	550	50	210	18	222	1,420	63
Mar											
10...	2,700	14	28	<.5	400	12	170	10	155	313	77
Apr											
11...	440	6	3	<.5	70	16	30	7	22	36	76
26...	380	7	3	<.5	80	15	30	4	18	28	86
May											
09...	2,600	34	15	<.5	320	15	140	4	147	468	66
23...	1,400	23	9	<.5	170	14	80	6	77	312	62
Jun											
06...	8,800	54	56	.6	880	34	490	16	530	4,720	63
Jul											
12...	1,200	12	10	<.5	220	22	80	7	73	304	70
Aug											
08...	80	4	<1	<.5	30	15	<10	8	2	1.9	91

Table 4. Water-quality data for the upper Clark Fork basin, Montana, October 1994 through September 1995 (Continued)

12334510--ROCK CREEK NEAR CLINTON, MONT.

Date	Time	Stream-flow, instan-taneous (ft^3/s)	Specific conduct-ance, onsite (µS/cm)	pH, onsite (stand-ard units)	Temper-sture, water (°C)	Hard-ness, total (mg/L as $CaCO_3$)	Calcium, dis-solved (mg/L)	Magne-sium, dis-solved (mg/L)	Sodium, dis-solved (mg/L)	Potas-sium, dis-solved (mg/L)	Alka-linity (mg/L as $CaCO_3$)
Nov 1994											
30...	1020	183	150	8.3	2.0	69	18	5.9	3.3	1.2	74
Mar 1995											
11...	1430	406	124	8.2	3.0	58	15	5.0	2.8	1.6	59
Apr											
25...	1745	323	121	7.9	8.0	55	14	4.8	2.9	1.1	58
May											
10...	0920	1,030	85	7.8	7.0	38	9.6	3.3	2.3	1.0	39
Jun											
07...	1500	2,510	71	7.7	6.0	33	8.6	2.7	1.6	1.1	34
Aug											
08...	1350	383	128	8.4	14.5	57	15	4.7	2.5	1.0	63

Date	Sulfate, dis-solved (mg/L)	Chloride, dis-solved (mg/L)	Fluo-ride, dis-solved (mg/L)	Silica, dis-solved (mg/L)	Solids, sum of constit-uents, dissolved (mg/L)	Arsenic, total recov-erable (µg/L)	Arsenic, dis-solved (µg/L)	Cad-mium, total recov-erable (µg/L)	Cad-mium, dis-solved (µg/L)	Copper, total recov-erable (µg/L)	Copper, dis-solved (µg/L)
Nov 1994											
30...	4.5	0.60	0.20	12	90	<1	<1	<1	<0.1	<1	<1
Mar 1995											
11...	3.7	1.0	.10	9.9	75	<1	1	<1	<.1	<1	<1
Apr											
25...	3.9	.70	.10	11	73	<1	<1	<1	<.1	3	<1
May											
10...	3.3	.50	.10	12	56	<1	<1	<1	<.1	7	2
Jun											
07...	2.2	.40	<.10	9.7	47	1	<1	<1	<.1	4	1
Aug											
08...	4.3	.40	.10	9.7	75	<1	<1	<1	<.1	<1	<1

Date	Iron, total recov-erable (µg/L)	Iron, dis-solved (µg/L)	Lead, total recov-erable (µg/L)	Lead, dis-solved (µg/L)	Manga-nese, total recov-erable (µg/L)	Manga-nese, dis-solved (µg/L)	Zinc, total recov-erable (µg/L)	Zinc, dis-solved (µg/L)	Sedi-ment, sus-pended (mg/L)	Sedi-ment dis-charge, sus-pended (ton/d)	Sediment, suspended (percent finer than 0.062 mm)
Nov 1994											
30...	20	8	<1	<0.5	<10	<1	<10	<3	1	0.49	86
Mar 1995											
11...	130	28	<1	<.5	<10	<1	<10	4	5	5.5	89
Apr											
25...	90	17	1	<.5	<10	<1	<10	<3	5	4.4	76
May											
10...	340	70	1	<.5	20	2	<10	<3	16	44	78
Jun											
07...	500	49	1	<.5	50	3	<10	<3	45	305	53
Aug											
08...	60	12	<1	<.5	<10	2	<10	4	1	1.0	86

Table 4. Water-quality data for the upper Clark Fork basin, Montana, October 1994 through September 1995 (Continued)

12334550--CLARK FORK AT TURAH BRIDGE, NEAR BONNER, MONT.

Date	Time	Stream-flow, instan-taneous (ft^3/s)	Specific conduct-ance, onsite (µS/cm)	pH, onsite (stand-ard units)	Temper-aturs, water (°C)	Hard-ness, total (mg/L as $CaCO_3$)	Calcium, dis-solved (mg/L)	Magne-sium, dis-solved (mg/L)	Sodium, dis-solved (mg/L)	Potas-sium, dis-solved (mg/L)	Alka-linity (mg/L as $CaCO_3$)
Nov 1994											
30...	1200	695	408	8.4	3.0	190	54	14	11	3.0	146
Feb 1995											
08...	1050	1,040	371	8.4	3.0	170	47	12	10	3.6	128
Mar											
11...	0900	1,180	340	8.3	5.0	150	43	11	9.3	3.3	116
Apr											
11...	1040	980	353	8.3	5.0	160	44	12	9.2	2.4	121
25...	1515	1,000	353	8.4	10.0	160	45	11	9.2	2.5	123
May											
10...	1130	2,330	243	8.1	10.0	110	30	7.8	6.4	2.1	85
23...	1010	3,220	195	8.1	9.0	82	23	5.9	4.8	1.6	72
Jun											
07...	0815	6,950	210	8.0	6.5	90	26	6.0	5.8	2.7	79
Jul											
12...	0850	2,640	275	8.2	15.0	120	35	8.5	7.1	2.0	109
Aug											
08...	1215	734	323	8.6	15.0	140	39	10	7.8	2.2	121

Date	Sulfate, dis-solved (mg/L)	Chloride, dis-solved (mg/L)	Fluo-ride, dis-solved (mg/L)	Silica, dis-solved (mg/L)	Solids, sum of constit-uents, dissolved (mg/L)	Arsenic, total recov-erable (µg/L)	Arsenic, dis-solved (µg/L)	Cad-mium, total recov-erable (µg/L)	Cad-mium, dis-solved (µg/L)	Copper, total recov-erable (µg/L)	Copper, dis-solved (µg/L)
Nov 1994											
30...	62	4.2	0.40	16	252	5	5	<1	<0.1	6	2
Feb 1995											
08...	53	4.7	.40	16	223	11	7	<1	<.1	37	5
Mar											
11...	48	4.5	.30	15	204	17	7	<1	<.1	60	9
Apr											
11...	52	3.7	.30	15	211	7	4	<1	<.1	12	3
25...	54	4.1	.30	12	212	8	6	<1	<.1	13	4
May											
10...	32	2.3	.20	14	146	12	7	<1	<.1	43	5
23...	20	1.7	.20	13	113	10	6	<1	<.1	30	6
Jun											
07...	25	1.9	.20	14	129	33	12	1	<.1	180	14
Jul											
12...	24	2.1	.30	16	160	14	9	<1	<.1	32	6
Aug											
08...	40	2.7	.30	15	190	8	7	<1	<.1	4	2

Date	Iron, total recov-erable (µg/L)	Iron, dis-solved (µg/L)	Lead, total recov-erable (µg/L)	Lead, dis-solved (µg/L)	Manga-nese, total recov-erable (µg/L)	Manga-nese, dis-solved (µg/L)	Zinc, total recov-erable (µg/L)	Zinc, dis-solved (µg/L)	Sedi-ment, sus-pended (mg/L)	Sedi-ment dis-charge, sus-pended (ton/d)	Sediment, suspended (percent finer than 0.062 mm)
Nov 1994											
30...	120	<3	<1	<0.5	30	3	10	<3	6	11	90
Feb 1995											
08...	710	20	5	<.5	130	9	60	9	30	84	88
Mar											
11...	1,500	27	14	<.5	230	6	100	8	74	236	89
Apr											
11...	280	9	2	<.5	270	6	20	6	13	34	86
25...	290	6	2	<.5	50	5	20	4	14	38	92
May											
10...	1,400	41	8	<.5	170	6	70	<3	77	484	68
23...	760	35	6	<.5	120	7	50	4	64	556	49
Jun											
07...	4,900	56	33	<.5	580	13	270	10	325	6,100	63
Jul											
12...	840	22	5	<.5	130	11	50	6	46	328	80
Aug											
08...	60	4	<1	<.5	20	7	<10	5	2	4.0	91

Table 4. Water-quality data for the upper Clark Fork basin, Montana, October 1994 through September 1995 (Continued)

12340000--BLACKFOOT RIVER NEAR BONNER, MONT.

Date	Time	Streamflow, instantaneous (ft^3/s)	Specific conductance, onsite (µS/cm)	pH, onsite (standard units)	Temperature, water (°C)	Hardness, total (mg/L as $CaCO_3$)	Calcium, dissolved (mg/L)	Magnesium, dissolved (mg/L)	Sodium, dissolved (mg/L)	Potassium, dissolved (mg/L)	Alkalinity (mg/L as $CaCO_3$)
Nov 1994											
30...	1320	472	263	8.6	2.0	140	36	12	3.3	0.90	140
Mar 1995											
11...	1050	869	215	8.6	4.0	110	29	10	2.8	.90	111
Apr											
25...	1330	1,360	203	8.4	8.0	100	26	9.0	2.5	.80	105
May											
10...	1540	3,410	181	8.3	11.0	86	22	7.6	1.9	.70	92
Jun											
07...	1045	6,440	168	8.2	7.0	83	22	6.9	2.0	.80	86
Aug											
08...	1030	779	253	8.6	15.0	120	31	11	2.5	.70	131

Date	Sulfate, dissolved (mg/L)	Chloride, dissolved (mg/L)	Fluoride, dissolved (mg/L)	Silica, dissolved (mg/L)	Solids, sum of constituents, dissolved (mg/L)	Arsenic, total recoverable (µg/L)	Arsenic, dissolved (µg/L)	Cadmium, total recoverable (µg/L)	Cadmium, dissolved (µg/L)	Copper, total recoverable (µg/L)	Copper, dissolved (µg/L)
Nov 1994											
30...	5.5	0.70	0.10	9.4	152	<1	1	<1	<0.1	<1	<1
Mar 1995											
11...	5.0	1.0	<.10	7.6	123	1	1	<1	<.1	1	<1
Apr											
25...	4.2	.80	<.10	7.5	114	<1	<1	<1	<.1	<1	<1
May											
10...	5.3	.40	<.10	8.1	101	1	<1	<1	<.1	4	1
Jun											
07...	4.3	.40	<.10	7.4	95	2	1	<1	<.1	15	1
Aug											
08...	5.8	.50	<.10	8.1	138	<1	1	<1	<.1	<1	<1

Date	Iron, total recoverable (µg/L)	Iron, dissolved (µg/L)	Lead, total recoverable (µg/L)	Lead, dissolved (µg/L)	Manganese, total recoverable (µg/L)	Manganese, dissolved (µg/L)	Zinc, total recoverable (µg/L)	Zinc, dissolved (µg/L)	Sediment, suspended (mg/L)	Sediment discharge, suspended (ton/d)	Sediment, suspended (percent finer than 0.062 mm)
Nov 1994											
30...	20	<3	<1	<0.5	<10	<1	<10	<3	1	1.3	88
Mar 1995											
11...	170	14	<1	<.5	<10	2	<10	<3	6	14	94
Apr											
25...	110	10	<1	<.5	20	2	<10	<3	8	29	87
May											
10...	1,000	22	2	<.5	90	3	10	<3	70	644	91
Jun											
07...	1,200	22	2	<.5	60	2	<10	<3	99	1,720	83
Aug											
08...	50	<3	<1	<.5	<10	2	<10	<3	4	8.4	95

Table 4. Water-quality data for the upper Clark Fork basin, Montana, October 1994 through September 1995 (Continued)

12340500--CLARK FORK ABOVE MISSOULA, MONT.

Date	Time	Stream-flow, instan-taneous (ft^3/s)	Specific conduct-ance, onsite (µS/cm)	pH, onsite (stand-ard units)	Temper-ature, water (°C)	Hard-ness, total (mg/L as $CaCO_3$)	Calcium, dis-solved (mg/L)	Magne-sium, dis-solved (mg/L)	Sodium, dis-solved (mg/L)	Potas-sium, dis-solved (mg/L)	Alka-linity (mg/L as $CaCO_3$)
Nov 1994											
30...	1450	1,210	350	8.4	2.0	170	45	13	7.8	2.1	143
Feb 1995											
08...	1315	1,580	319	8.4	2.5	150	40	11	7.7	3.8	121
Mar											
11...	1230	2,190	297	8.4	5.0	140	38	11	6.7	2.0	118
Apr											
11...	0815	2,410	260	8.3	5.5	120	32	9.5	5.4	1.5	108
25...	1130	2,360	274	8.3	8.5	130	35	10	5.5	1.5	114
May											
10...	1330	5,760	208	8.2	10.0	94	25	7.6	3.7	1.3	89
23...	0800	7,620	179	8.2	9.5	83	22	6.7	2.9	1.0	82
Jun											
07...	1235	13,100	191	8.1	7.0	90	25	6.6	4.0	1.8	83
Jul											
12...	1120	4,810	253	8.3	16.0	120	32	8.8	5.1	1.5	101
Aug											
08...	0830	1,720	283	8.5	17.0	130	34	10	5.2	1.4	123

Date	Sulfate, dis-solved (mg/L)	Chloride, dis-solved (mg/L)	Fluo-ride, dis-solved (mg/L)	Silica, dis-solved (mg/L)	Solids, sum of constit-uents, dissolved (mg/L)	Arsenic, total recov-erable (µg/L)	Arsenic, dis-solved (µg/L)	Cad-mium, total recov-erable (µg/L)	Cad-mium, dis-solved (µg/L)	Copper, total recov-erable (µg/L)	Copper, dis-solved (µg/L)
Nov 1994											
30...	39	2.8	0.30	13	209	3	3	<1	<0.1	5	3
Feb 1995											
08...	34	3.6	.30	14	187	7	5	<1	<.1	13	4
Mar											
11...	31	3.1	.30	12	175	6	5	<1	<.1	18	3
Apr											
11...	23	2.2	.20	11	150	3	2	<1	<.1	7	2
25...	25	2.4	.20	9.6	158	3	3	<1	<.1	7	2
May											
10...	16	1.3	<.10	11	119	6	3	<1	<.1	16	3
23...	11	1.0	.10	9.6	104	5	3	<1	<.1	22	3
Jun											
07...	15	1.2	.10	11	115	18	7	<1	<.1	110	8
Jul											
12...	16	1.5	.20	13	139	10	6	<1	<.1	23	4
Aug											
08...	22	1.6	.20	11	159	6	4	<1	<.1	5	2

Date	Iron, total recov-erable (µg/L)	Iron, dis-solved (µg/L)	Lead, total recov-erable (µg/L)	Lead, dis-solved (µg/L)	Manga-nese, total recov-erable (µg/L)	Manga-nese, dis-solved (µg/L)	Zinc, total recov-erable (µg/L)	Zinc, dis-solved (µg/L)	Sedi-ment, sus-pended (mg/L)	Sedi-ment dis-charge, sus-pended (ton/d)	Sediment, suspended (percent finer than 0.062 mm)
Nov 1994											
30...	60	<3	<1	<0.5	20	7	<10	<3	2	6.5	94
Feb 1995											
08...	380	30	2	<.5	70	14	30	3	12	51	99
Mar											
11...	450	11	4	<.5	70	22	30	8	18	106	98
Apr											
11...	190	15	1	<.5	30	21	20	6	8	52	96
25...	180	11	2	<.5	40	26	10	3	10	64	92
May											
10...	890	30	4	<.5	100	19	30	<3	54	840	95
23...	700	26	4	<.5	60	17	30	4	45	926	89
Jun											
07...	3,100	45	16	<.5	300	23	160	11	186	6,580	80
Jul											
12...	680	16	4	<.5	120	39	40	<3	36	468	91
Aug											
08...	140	6	<1	<.5	30	18	<10	5	6	28	97

Table 4. Water-quality data for the upper Clark Fork basin, Montana, October 1994 through September 1995 (Continued)

12353000--CLARK FORK BELOW MISSOULA, MONT.

Date	Time	Streamflow, instantaneous (ft^3/s)	Specific conductance, onsite (µS/cm)	pH, onsite (standard units)	Temperature, water (°C)	Hardness, total (mg/L as $CaCO_3$)	Calcium, dissolved (mg/L)	Magnesium, dissolved (mg/L)	Sodium, dissolved (mg/L)	Potassium, dissolved (mg/L)	Alkalinity (mg/L as $CaCO_3$)
Oct 1994											
18...	1115	1,730	315	8.3	9.0	140	41	10	7.6	2.4	131
Dec											
20...	1045	1,850	267	7.8	1.5	120	34	9.2	7.0	1.8	112
Feb 1995											
21...	1130	5,710	178	7.9	2.0	78	22	5.6	4.4	1.9	69
Apr											
18...	1115	3,950	188	8.2	8.0	90	25	6.7	4.8	1.3	84
Jun											
16...	0920	16,500	115	7.5	13.0	53	15	3.8	2.7	.90	54
Aug											
08...	1000	2,610	233	8.0	16.0	--	--	--	--	--	--
23...	1000	2,420	224	8.0	8.5	100	28	7.8	5.6	1.8	101

Date	Sulfate, dissolved (mg/L)	Chloride, dissolved (mg/L)	Fluoride, dissolved (mg/L)	Silica, dissolved (mg/L)	Solids, sum of constituents, dissolved (mg/L)	Arsenic, total recoverable (µg/L)	Arsenic, dissolved (µg/L)	Cadmium, total recoverable (µg/L)	Cadmium, dissolved (µg/L)	Copper, total recoverable (µg/L)	Copper, dissolved (µg/L)
Oct 1994											
18...	28	3.0	0.20	15	179	3	<1	<1	<0.1	4	2
Dec											
20...	25	2.7	.20	13	153	--	--	--	--	--	--
Feb 1995											
21...	13	2.2	.10	11	107	6	3	<1	<.1	25	6
Apr											
18...	15	1.8	.20	10	114	3	2	<1	<.1	4	2
Jun											
16...	9.8	.80	<.10	9.9	70	3	2	<1	<.1	12	4
Aug											
08...	--	--	--	--	--	--	--	--	--	--	--
23...	12	2.0	.20	12	127	--	--	--	--	--	--

Date	Iron, total recoverable (µg/L)	Iron, dissolved (µg/L)	Lead, total recoverable (µg/L)	Lead, dissolved (µg/L)	Manganese, total recoverable (µg/L)	Manganese, dissolved (µg/L)	Zinc, total recoverable (µg/L)	Zinc, dissolved (µg/L)	Sediment, suspended (mg/L)	Sediment discharge, suspended (ton/d)	Sediment, suspended (percent finer than 0.062 mm)
Oct 1994											
18...	140	16	<1	0.5	30	5	10	<10	5	23	88
Dec											
20...	--	--	--	--	--	--	--	--	3	15	91
Feb 1995											
21...	1,600	47	4	<.5	110	7	40	10	52	802	79
Apr											
18...	180	26	<1	<.5	20	11	20	<10	9	96	87
Jun											
16...	580	93	2	<.5	60	8	20	<10	42	1,870	62
Aug											
08...	--	--	--	--	--	--	--	--	4	28	91
23...	--	--	--	--	--	--	--	--	3	20	90

Table 5. Daily streamflow and suspended-sediment data for Silver Bow at Opportunity, Montana, October 1994 through September 1995

[Abbreviations: ft^3/s, cubic feet per second; mg/L, milligrams per liter; ton/d, tons per day. Symbol: ---, no data]

Day	Mean streamflow (ft^3/s)	Suspended sediment		Mean streamflow (ft^3/s)	Suspended sediment		Mean streamflow (ft^3/s)	Suspended sediment	
		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)
				1994					
	October			November			December		
1	28	11	0.83	49	16	2.1	49	79	10
2	29	11	.86	43	19	2.2	41	42	4.6
3	31	10	.84	39	16	1.7	39	34	3.6
4	30	10	.81	43	16	1.8	38	33	3.4
5	30	9	.73	40	15	1.6	36	28	2.7
6	29	9	.70	40	14	1.5	33	20	1.8
7	29	10	.78	39	15	1.6	32	14	1.2
8	29	12	.94	38	15	1.5	31	10	.84
9	29	14	1.1	39	15	1.5	32	10	.86
10	33	14	1.2	36	16	1.6	30	10	.81
11	34	13	1.2	36	18	1.7	31	10	.84
12	36	12	1.2	36	20	1.9	30	10	.81
13	33	13	1.2	35	22	2.1	31	10	.84
14	32	15	1.3	33	25	2.2	32	9	.78
15	45	33	4.0	37	26	2.6	34	8	.73
16	36	25	2.4	35	27	2.6	37	8	.80
17	36	20	1.9	34	27	2.5	40	7	.76
18	37	20	2.0	31	28	2.3	45	8	.97
19	36	20	1.9	30	29	2.3	50	10	1.4
20	36	14	1.4	32	29	2.5	49	22	2.9
21	35	13	1.2	32	30	2.6	49	20	2.6
22	36	12	1.2	31	33	2.8	47	14	1.8
23	36	12	1.2	32	30	2.6	48	12	1.6
24	34	12	1.1	32	23	2.0	45	11	1.3
25	34	12	1.1	32	18	1.6	42	11	1.2
26	36	12	1.2	32	16	1.4	40	11	1.2
27	41	13	1.4	33	20	1.8	40	11	1.2
28	53	22	3.1	33	24	2.1	41	34	3.8
29	45	16	1.9	34	25	2.3	39	16	1.7
30	41	14	1.5	40	62	6.7	36	13	1.3
31	42	14	1.6	---	---	---	31	12	1.0
TOTAL	1,091	---	43.79	1,076	---	65.7	1,198	---	59.34
MEAN	35	14	1.4	36	23	2.2	39	19	2.0
MAX	53	33	4.0	49	63	6.8	50	81	11
MIN	28	9	.70	30	14	1.4	30	7	.73

Table 5. Daily streamflow and suspended-sediment data for Silver Bow at Opportunity, Montana, October 1994 through September 1995 (Continued)

Day	Mean streamflow (ft^3/s)	Suspended sediment		Mean streamflow (ft^3/s)	Suspended sediment		Mean streamflow (ft^3/s)	Suspended sediment	
		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)
				1995					
	Janusry			February			March		
1	30	12	.97	100	121	33	52	31	4.4
2	29	11	.86	160	200	86	47	53	6.7
3	29	11	.86	120	130	42	47	14	1.8
4	28	12	.91	90	106	26	45	21	2.6
5	28	12	.91	73	61	12	44	35	4.2
6	30	13	1.1	68	52	9.5	42	30	3.4
7	30	14	1.1	64	40	6.9	40	44	4.8
8	35	14	1.3	65	27	4.7	45	36	4.4
9	40	14	1.5	64	22	3.8	57	40	6.2
10	50	15	2.0	61	23	3.8	100	185	50
11	70	16	3.0	45	24	2.9	151	235	96
12	80	16	3.5	40	26	2.8	110	80	24
13	80	17	3.7	35	27	2.6	83	45	10
14	76	18	3.7	33	28	2.5	75	40	8.1
15	70	18	3.4	32	29	2.5	82	50	11
16	66	17	3.0	32	30	2.6	80	39	8.4
17	64	16	2.8	35	31	2.9	74	34	6.8
18	56	16	2.4	40	31	3.3	72	26	5.1
19	54	17	2.5	150	31	13	69	21	3.9
20	42	18	2.0	400	34	37	67	26	4.7
21	40	18	1.9	300	260	211	71	29	5.6
22	38	19	1.9	120	180	58	69	26	4.8
23	37	19	1.9	79	70	15	67	28	5.1
24	40	19	2.1	73	52	10	65	20	3.5
25	42	20	2.3	73	56	11	61	23	3.8
26	45	22	2.7	69	38	7.1	62	21	3.5
27	46	23	2.9	59	32	5.1	62	18	3.0
28	47	23	2.9	54	17	2.5	59	18	2.9
29	45	23	2.8	---	---	---	60	16	2.6
30	45	23	2.8	---	---	---	57	20	3.1
31	60	57	9.2	---	---	---	62	22	3.7
TOTAL	1,472	---	74.91	2,534	---	619.5	2,077	---	308.1
MEAN	48	18	2.4	90	63	22	67	43	9.9
MAX	80	57	9.2	400	260	211	151	235	96
MIN	28	11	.86	32	17	2.5	40	14	1.8

Table 5. Daily streamflow and suspended-sediment data for Silver Bow at Opportunity, Montana, October 1994 through September 1995 (Continued)

Day	Mean streamflow (ft^3/s)	Suspended sediment		Mean streamflow (ft^3/s)	Suspended sediment		Mean streamflow (ft^3/s)	Suspended sediment	
		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)
				1995					
	April			May			June		
1	64	16	2.8	68	29	5.3	147	40	16
2	66	16	2.9	70	34	6.4	151	43	18
3	66	15	2.7	83	55	12	174	48	23
4	70	21	4.0	80	46	9.9	320	225	194
5	77	30	6.2	83	45	10	330	220	196
6	81	33	7.2	168	362	164	447	410	495
7	84	29	6.6	206	219	122	412	250	278
8	88	32	7.6	204	160	88	356	165	159
9	80	24	5.2	191	70	36	334	120	108
10	79	40	8.5	190	51	26	322	105	91
11	75	33	6.7	229	81	50	311	102	86
12	74	20	4.0	261	166	117	300	90	73
13	79	20	4.3	260	130	91	296	79	63
14	89	31	7.4	222	85	51	290	67	52
15	79	25	5.3	196	64	34	281	61	46
16	71	22	4.2	189	55	28	270	64	47
17	75	21	4.3	192	54	28	258	62	43
18	69	16	3.0	201	66	36	238	61	39
19	74	15	3.0	202	65	35	244	42	28
20	82	21	4.6	195	51	27	224	43	26
21	73	22	4.3	190	46	24	199	35	19
22	71	16	3.1	179	46	22	204	31	17
23	75	17	3.4	168	38	17	179	29	14
24	68	17	3.1	158	30	13	160	25	11
25	73	21	4.1	149	29	12	149	27	11
26	67	16	2.9	146	25	9.9	142	29	11
27	69	17	3.2	139	22	8.3	156	47	20
28	68	22	4.0	132	21	7.5	143	29	11
29	72	29	5.6	129	20	7.0	135	24	8.7
30	68	22	4.0	136	24	8.8	125	22	7.4
31	---	---	---	140	30	11	---	---	---
TOTAL	2,226	---	138.2	5,156	---	1,117.1	7,297	---	2,211.1
MEAN	74	23	4.6	166	72	36	243	86	74
MAX	89	40	8.5	261	362	164	447	410	495
MIN	64	15	2.7	68	20	5.3	125	22	7.4

Table 5. Daily streamflow and suspended-sediment data for Silver Bow at Opportunity, Montana, October 1994 through September 1995 (Continued)

Day	Mean streamflow (ft^3/s)	Suspended sediment		Mean streamflow (ft^3/s)	Suspended sediment		Mean streamflow (ft^3/s)	Suspended sediment	
		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)
				1995					
	July			August			September		
1	119	20	6.4	68	16	2.9	29	10	.78
2	111	19	5.7	61	16	2.6	28	9	.68
3	111	18	5.4	57	16	2.5	27	9	.66
4	108	17	5.0	58	19	3.0	28	25	1.9
5	102	14	3.9	56	17	2.6	53	180	26
6	100	15	4.1	52	13	1.8	36	148	14
7	96	17	4.4	48	11	1.4	37	150	15
8	90	18	4.4	47	10	1.3	93	225	56
9	93	30	7.5	48	10	1.3	69	70	13
10	136	330	121	47	10	1.3	62	60	10
11	180	330	160	45	10	1.2	51	23	3.2
12	187	340	172	41	11	1.2	48	14	1.8
13	213	563	324	43	11	1.3	50	21	2.8
14	174	129	61	42	10	1.1	46	13	1.6
15	136	47	17	41	10	1.1	46	12	1.5
16	120	33	11	43	10	1.2	44	12	1.4
17	110	27	8.0	49	14	1.9	44	12	1.4
18	103	22	6.1	49	11	1.5	45	12	1.5
19	98	18	4.8	46	10	1.2	47	21	2.7
20	94	19	4.8	42	9	1.0	61	76	13
21	88	16	3.8	42	10	1.1	50	15	2.0
22	84	14	3.2	38	10	1.0	48	14	1.8
23	79	13	2.8	37	10	1.0	47	13	1.6
24	76	12	2.5	36	11	1.1	46	12	1.5
25	71	11	2.1	38	11	1.1	47	12	1.5
26	69	10	1.9	39	11	1.2	44	11	1.3
27	65	10	1.8	31	11	.92	42	10	1.1
28	58	9	1.4	31	11	.92	41	10	1.1
29	65	30	5.3	30	11	.89	44	9	1.1
30	105	90	26	28	10	.76	43	9	1.0
31	78	19	4.0	28	10	.76	---	---	---
TOTAL	3,319	---	991.3	1,361	---	44.15	1,396	---	182.92
MEAN	107	75	32	44	12	1.4	46	41	6.1
MAX	213	563	324	68	19	3.0	93	225	56
MIN	58	9	1.4	28	9	.76	27	9	.66

TOTAL FOR WATER YEAR 1995:
STREAMFLOW--30,203 ft^3/s
SEDIMENT DISCHARGE--5,856.11 tons

Table 6 . Daily streamflow and suspended-sediment data for Silver Bow Creek at Warm Springs, Montana, October 1994 through September 1995

[Abbreviations: ft^3/s, cubic feet per second; mg/L, milligrams per liter; ton/d, tons per day. Symbol: ---, no data]

Day	Mean streamflow (ft^3/s)	Suspended sediment		Mean streamflow (ft^3/s)	Suspended sediment		Mean streamflow (ft^3/s)	Suspended sediment	
		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)
				1994					
	October			November			December		
1	28	4	0.30	57	4	0.62	52	4	0.56
2	27	3	.22	57	4	.62	55	5	.74
3	26	3	.21	56	4	.60	59	5	.80
4	26	3	.21	61	7	1.2	60	5	.81
5	25	3	.20	54	6	.87	59	4	.64
6	25	3	.20	56	6	.91	57	4	.62
7	26	4	.28	56	6	.91	57	4	.62
8	27	4	.29	57	6	.92	56	4	.60
9	30	4	.32	56	5	.76	51	4	.55
10	30	4	.32	56	4	.60	49	5	.66
11	27	4	.29	54	4	.58	48	5	.65
12	28	4	.30	54	4	.58	47	5	.63
13	32	3	.26	57	4	.62	47	5	.63
14	37	3	.30	57	4	.62	48	5	.65
15	46	3	.37	57	7	1.1	47	4	.51
16	48	3	.39	45	6	.73	45	4	.49
17	49	3	.40	49	8	1.1	46	4	.50
18	50	3	.41	52	10	1.4	49	4	.53
19	52	3	.42	51	10	1.4	52	3	.42
20	51	3	.41	48	7	.91	53	3	.43
21	56	5	.76	46	5	.62	52	3	.42
22	53	3	.43	48	5	.65	52	4	.56
23	52	3	.42	45	5	.61	53	5	.72
24	51	3	.41	44	5	.59	53	6	.86
25	51	3	.41	45	5	.61	54	5	.73
26	52	5	.70	48	5	.65	56	4	.60
27	49	5	.66	49	5	.66	55	3	.45
28	46	3	.37	48	4	.52	57	3	.46
29	53	3	.43	50	4	.54	60	4	.65
30	58	3	.47	50	4	.54	56	4	.60
31	62	6	1.0	---	---	---	55	5	.74
TOTAL	1,273	---	12.16	1,563	---	23.04	1,640	---	18.83
MEAN	41	4	.39	52	5	.77	53	4	.61
MAX	62	6	1.0	61	10	1.4	60	6	.86
MIN	25	3	.20	44	4	.52	45	3	.42

Table 6. Daily streamflow and suspended-sediment data for Silver Bow Creek at Warm Springs, Montana, October 1994 through September 1995 (Continued)

Day	Mean streamflow (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)	Mean streamflow (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)	Mean streamflow (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)
				1995					
	January			February			March		
1	52	5	.70	54	5	.73	106	14	4.0
2	47	6	.76	90	8	1.9	97	12	3.1
3	44	6	.71	153	12	5.0	90	14	3.4
4	42	7	.79	163	13	5.7	88	15	3.6
5	39	7	.74	143	9	3.5	87	14	3.3
6	39	7	.74	121	5	1.6	84	11	2.5
7	39	7	.74	107	6	1.7	83	12	2.7
8	39	7	.74	92	10	2.5	81	11	2.4
9	39	7	.74	77	11	2.3	81	10	2.2
10	43	7	.81	61	12	2.0	84	11	2.5
11	46	6	.75	57	12	1.8	92	13	3.2
12	49	6	.79	55	12	1.8	110	10	3.0
13	53	5	.72	53	12	1.7	120	10	3.2
14	55	5	.74	52	12	1.7	117	11	3.5
15	56	5	.76	53	12	1.7	107	13	3.8
16	56	5	.76	55	13	1.9	102	10	2.8
17	56	5	.76	57	14	2.2	100	9	2.4
18	57	5	.77	59	14	2.2	97	8	2.1
19	53	5	.72	64	14	2.4	93	8	2.0
20	50	5	.68	90	15	3.6	93	8	2.0
21	50	5	.68	149	18	7.2	88	7	1.7
22	50	5	.68	171	14	6.5	90	7	1.7
23	48	5	.65	163	11	4.8	90	14	3.4
24	47	5	.63	150	8	3.2	85	8	1.8
25	45	5	.61	135	10	3.6	84	6	1.4
26	44	5	.59	127	15	5.1	83	6	1.3
27	47	5	.63	121	18	5.9	82	6	1.3
28	48	5	.65	113	18	5.5	81	7	1.5
29	49	5	.66	---	---	---	81	7	1.5
30	48	5	.65	---	---	---	81	5	1.1
31	49	5	.66	---	---	---	82	3	.66
TOTAL	1,479	---	22.01	2,785	---	89.73	2,839	---	75.06
MEAN	48	6	.71	100	12	3.2	92	10	2.4
MAX	57	7	.81	171	18	7.2	120	15	4.0
MIN	39	5	.59	52	5	.73	81	3	.66

Table 6. Daily streamflow and suspended-sediment data for Silver Bow Creek at Warm Springs, Montana, October 1994 through September 1995 (Continued)

Day	Mean streamflow (ft^3/s)	Suspended sediment		Mean streamflow (ft^3/s)	Suspended sediment		Mean streamflow (ft^3/s)	Suspended sediment	
		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)
				1995					
	April			May			June		
1	82	3	.66	123	5	1.7	323	13	11
2	80	4	.86	121	3	.98	334	17	15
3	80	4	.86	123	3	1.0	391	34	36
4	88	4	.95	125	3	1.0	405	42	46
5	100	5	1.4	124	5	1.7	463	155	194
6	104	5	1.4	140	8	3.0	677	165	302
7	108	5	1.5	171	6	2.8	661	93	166
8	112	4	1.2	196	7	3.7	555	43	64
9	114	3	.92	203	8	4.4	533	74	106
10	114	3	.92	204	8	4.4	509	70	96
11	112	4	1.2	211	7	4.0	468	51	64
12	110	4	1.2	242	28	18	457	44	54
13	109	5	1.5	298	58	47	491	24	32
14	113	4	1.2	310	42	35	477	20	26
15	112	3	.91	304	34	28	468	18	23
16	111	4	1.2	298	24	19	450	17	21
17	109	4	1.2	291	17	13	451	14	17
18	107	3	.87	302	31	25	442	15	18
19	108	4	1.2	317	30	26	457	21	26
20	115	3	.93	306	28	23	452	15	18
21	116	3	.94	270	23	17	441	13	15
22	114	3	.92	305	17	14	429	12	14
23	114	3	.92	303	14	11	403	11	12
24	114	4	1.2	308	14	12	365	10	9.9
25	110	3	.89	314	13	11	343	9	8.3
26	111	3	.90	307	12	9.9	324	11	9.6
27	111	4	1.2	303	12	9.8	315	15	13
28	121	5	1.6	290	8	6.3	311	19	16
29	125	4	1.4	276	8	6.0	301	14	11
30	124	3	1.0	284	9	6.9	284	12	9.2
31	---	---	---	309	11	9.2	---	---	---
TOTAL	3,248	---	33.05	7,678	---	375.78	12,980	---	1,453.0
MEAN	108	4	1.1	248	16	12	433	36	48
MAX	125	5	1.6	317	58	47	677	165	302
MIN	80	3	.66	121	3	.98	284	9	8.3

Table 6. Daily streamflow and suspended-sediment data for Silver Bow Creek at Warm Springs, Montana, October 1994 through September 1995 (Continued)

Day	Mean streamflow (ft^3/s)	Suspended sediment		Mean streamflow (ft^3/s)	Suspended sediment		Mean streamflow (ft^3/s)	Suspended sediment	
		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)
				1995					
	July			August			September		
1	266	12	8.6	106	8	2.3	41	3	.33
2	250	11	7.4	106	8	2.3	42	4	.45
3	235	9	5.7	105	8	2.3	43	4	.46
4	231	9	5.6	104	8	2.2	44	4	.48
5	223	8	4.8	95	8	2.1	48	4	.52
6	201	8	4.3	91	6	1.5	47	4	.51
7	189	14	7.1	85	4	.92	48	7	.91
8	238	18	12	70	4	.76	78	18	3.8
9	214	14	8.1	64	5	.86	88	21	5.0
10	208	11	6.2	59	5	.80	88	11	2.6
11	220	15	8.9	61	5	.82	88	7	1.7
12	221	19	11	59	4	.64	83	5	1.1
13	224	16	9.7	57	4	.62	83	5	1.1
14	209	18	10	58	4	.63	84	5	1.1
15	203	12	6.6	56	4	.60	83	4	.90
16	201	11	6.0	55	4	.59	87	4	.94
17	200	11	5.9	59	4	.64	87	4	.94
18	198	10	5.3	58	4	.63	83	4	.90
19	196	10	5.3	58	4	.63	86	7	1.6
20	192	9	4.7	57	4	.62	93	5	1.3
21	184	8	4.0	58	4	.63	86	4	.93
22	175	7	3.3	54	4	.58	82	3	.66
23	163	7	3.1	54	4	.58	79	3	.64
24	154	7	2.9	50	4	.54	77	3	.62
25	144	6	2.3	50	4	.54	77	3	.62
26	108	6	1.7	49	4	.53	76	3	.62
27	91	6	1.5	45	3	.36	73	3	.59
28	89	6	1.4	45	3	.36	69	4	.75
29	92	6	1.5	41	3	.33	68	4	.73
30	108	7	2.0	38	2	.21	70	5	.95
31	108	7	2.0	39	2	.21	---	---	---
TOTAL	5,735	---	168.9	1,986	---	27.33	2,181	---	33.75
MEAN	185	10	5.4	64	5	.88	73	5	1.1
MAX	266	19	12	106	8	2.3	93	21	5.0
MIN	89	6	1.4	38	2	.21	41	3	.33

TOTAL FOR WATER YEAR 1995:
STREAMFLOW--45,387 ft^3/s
SEDIMENT DISCHARGE--2,332.64 tons

Table 7. Daily streamflow and suspended-sediment data for Clark Fork at Deer Lodge, Montana, October 1994 through September 1995

[Abbreviations: ft^3/s, cubic feet per second; mg/L, milligrams per liter; ton/d, tons per day. Symbol: ---, no data]

Day	Mean streamflow (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)	Mean streamflow (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)	Mean streamflow (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)
				1994					
	October			November			December		
1	116	13	4.1	214	18	10	248	25	17
2	109	12	3.5	219	18	11	234	23	15
3	110	11	3.3	216	18	10	223	22	13
4	134	17	6.2	210	18	10	221	21	13
5	152	26	11	200	19	10	210	20	11
6	152	24	9.8	200	19	10	190	19	9.7
7	153	20	8.3	210	18	10	180	18	8.7
8	154	16	6.7	210	18	10	170	17	7.8
9	152	13	5.3	215	17	9.9	170	18	8.3
10	149	13	5.2	229	17	11	170	20	9.2
11	148	15	6.0	226	17	10	180	22	11
12	153	17	7.0	222	18	11	180	22	11
13	154	18	7.5	222	19	11	170	21	9.6
14	162	20	8.7	215	20	12	170	20	9.2
15	187	21	11	206	20	11	180	19	9.2
16	211	22	13	208	22	12	165	18	8.0
17	210	23	13	205	23	13	186	18	9.0
18	209	22	12	180	24	12	189	22	11
19	205	20	11	170	25	11	191	26	13
20	205	20	11	170	26	12	192	27	14
21	219	20	12	170	27	12	208	27	15
22	214	20	12	160	28	12	198	28	15
23	214	20	12	170	27	12	210	28	16
24	207	20	11	170	24	11	203	28	15
25	204	20	11	180	20	9.7	191	28	14
26	204	20	11	180	18	8.7	192	27	14
27	208	18	10	190	16	8.2	197	26	14
28	208	16	9.0	200	14	7.6	209	25	14
29	202	15	8.2	210	12	6.8	202	26	14
30	200	16	8.6	220	20	12	197	28	15
31	203	17	9.3	---	---	---	193	31	16
TOTAL	5,508	---	277.7	5,997	---	316.9	6,019	---	379.7
MEAN	178	---	9.0	200	---	11	194	---	12
MAX	219	26	13	229	28	13	248	31	17
MIN	109	11	3.3	160	12	6.8	165	17	7.8

Table 7. Daily streamflow and suspended-sediment data for Clark Fork at Deer Lodge, Montana, October 1994 through September 1995 (Continued)

Day	Mean streamflow (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)	Mean streamflow (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)	Mean streamflow (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)
				1995					
	January			February			March		
1	160	32	14	250	46	31	220	34	20
2	150	31	13	279	64	48	210	38	22
3	145	30	12	279	63	47	210	38	22
4	140	26	9.8	299	60	48	200	31	17
5	140	24	9.1	293	56	44	200	31	17
6	140	26	9.8	274	51	38	210	37	21
7	150	30	12	258	35	24	211	47	27
8	160	34	15	244	20	13	215	44	26
9	170	35	16	226	18	11	233	42	26
10	180	35	17	207	17	9.5	251	49	33
11	211	35	20	180	16	7.8	249	38	26
12	188	37	19	150	16	6.5	256	45	31
13	194	45	24	130	19	6.7	271	41	30
14	204	55	30	120	23	7.5	267	42	30
15	205	50	28	130	27	9.5	265	34	24
16	195	43	23	160	38	16	251	29	20
17	193	36	19	187	57	29	243	26	17
18	187	31	16	204	74	41	237	25	16
19	190	30	15	235	85	54	233	23	14
20	178	36	17	255	88	61	226	30	18
21	160	45	19	294	90	71	226	29	18
22	150	50	20	309	84	70	221	23	14
23	150	48	19	303	64	52	227	22	13
24	150	44	18	293	48	38	215	23	13
25	160	39	17	288	42	33	208	23	13
26	164	33	15	280	38	29	206	26	14
27	177	28	13	267	36	26	202	22	12
28	180	24	12	252	34	23	202	18	9.8
29	170	21	9.6	---	---	---	200	18	9.7
30	170	21	9.6	---	---	---	203	27	15
31	187	22	11	---	---	---	210	22	12
TOTAL	5,298	---	501.9	6,646	---	894.5	6,978	---	600.5
MEAN	171	---	16	237	---	32	225	---	19
MAX	211	55	30	309	90	71	271	49	33
MIN	140	21	9.1	120	16	6.5	200	18	9.7

Table 7. Daily streamflow and suspended-sediment data for Clark Fork at Deer Lodge, Montana, October 1994 through September 1995 (Continued)

Day	Mean streamflow (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)	Mean streamflow (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)	Mean streamflow (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)
				1995					
	April			May			June		
1	207	18	10	239	18	12	487	86	113
2	202	14	7.6	249	20	13	508	96	132
3	207	13	7.3	279	37	28	543	114	167
4	213	15	8.6	264	25	18	722	147	287
5	237	18	12	247	25	17	718	143	277
6	243	32	21	287	46	36	1,060	311	890
7	248	29	19	355	89	85	1,180	221	704
8	251	37	25	349	76	72	1,010	130	355
9	261	28	20	356	63	61	877	102	242
10	265	27	19	361	74	72	800	96	207
11	271	21	15	386	84	88	725	95	186
12	257	23	16	389	74	78	686	81	150
13	248	23	15	459	179	222	731	85	168
14	249	22	15	459	113	140	761	85	175
15	242	29	19	449	93	113	775	82	172
16	238	19	12	432	75	87	775	80	167
17	233	20	13	418	68	77	762	78	160
18	228	17	10	423	74	85	778	73	153
19	230	17	11	460	86	107	802	68	147
20	246	22	15	471	83	106	799	64	138
21	266	24	17	407	56	62	725	56	110
22	262	30	21	450	53	64	699	49	92
23	246	23	15	437	58	68	664	43	77
24	243	20	13	439	45	53	616	38	63
25	241	21	14	436	42	49	586	35	55
26	237	34	22	423	43	49	582	39	61
27	241	25	16	415	36	40	623	43	72
28	247	20	13	391	36	38	663	39	70
29	256	25	17	386	33	34	635	31	53
30	241	20	13	387	35	37	532	31	45
31	---	---	---	455	71	87	---	---	---
TOTAL	7,256	---	451.5	11,958	---	2,098	21,824	---	5,688
MEAN	242	---	15	386	---	68	727	---	190
MAX	271	37	25	471	179	22	1,180	311	890
MIN	202	13	7.3	239	18	12	487	31	45

Table 7. Daily streamflow and suspended-sediment data for Clark Fork at Deer Lodge, Montana, October 1994 through September 1995 (Continued)

Day	Mean streamflow (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)	Mean streamflow (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)	Mean streamflow (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)
				1995					
	July			August			September		
1	489	30	40	226	7	4.3	58	6	.94
2	501	27	37	187	7	3.5	64	5	.86
3	503	26	35	180	6	2.9	66	8	1.4
4	497	24	32	176	6	2.9	115	29	9.0
5	434	21	25	167	6	2.7	135	30	11
6	427	20	23	153	6	2.5	120	22	7.1
7	422	22	25	139	6	2.3	122	36	12
8	468	24	30	122	6	2.0	238	121	78
9	464	25	31	114	6	1.8	323	88	77
10	444	24	29	108	6	1.7	289	36	28
11	496	23	31	103	5	1.4	261	23	16
12	503	26	35	95	5	1.3	241	18	12
13	571	33	51	92	4	.99	230	16	9.9
14	569	28	43	92	4	.99	236	16	10
15	509	21	29	92	4	.99	237	15	9.6
16	485	26	34	82	4	.89	233	14	8.8
17	473	12	15	87	4	.94	226	12	7.3
18	442	11	13	94	4	1.0	219	11	6.5
19	435	12	14	89	4	.96	226	11	6.7
20	427	13	15	83	4	.90	272	12	8.8
21	410	14	15	79	4	.85	256	10	6.9
22	408	15	17	76	4	.82	248	10	6.7
23	379	16	16	79	4	.85	269	12	8.7
24	334	15	14	83	5	1.1	261	10	7.0
25	314	9	7.6	96	5	1.3	256	8	5.5
26	271	7	5.1	88	5	1.2	247	7	4.7
27	236	8	5.1	83	6	1.3	242	7	4.6
28	213	10	5.8	69	6	1.1	241	7	4.6
29	207	11	6.1	67	7	1.3	240	7	4.5
30	249	14	9.4	59	8	1.3	243	7	4.6
31	244	11	7.2	55	7	1.0	---	---	---
TOTAL	12,824	---	695.3	3,315	---	49.08	6,414	---	378.70
MEAN	414	---	22	107	---	1.6	214	---	13
MAX	571	33	51	226	8	4.3	323	121	78
MIN	207	7	5.1	55	4	.82	58	5	.86

TOTAL FOR WATER YEAR 1995:
STREAMFLOW--100,037 ft^3/s
SEDIMENT DISCHARGE--12,331.78 tons

Table 8. Daily streamflow and suspended-sediment data for Clark Fork at Turah Bridge, near Bonner, Montana, October 1994 through September 1995

[Abbreviations: ft^3/s, cubic feet per second; mg/L, milligrams per liter; ton/d, tons per day. Symbol: ---, no data]

Day	Mean streamflow (ft^3/s)	Suspended sediment		Mean streamflow (ft^3/s)	Suspended sediment		Mean streamflow (ft^3/s)	Suspended sediment	
		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)
				1994					
	October			November			December		
1	465	12	15	864	10	23	760	9	18
2	474	10	13	925	13	32	817	12	26
3	478	9	12	870	10	23	771	9	19
4	490	8	11	821	6	13	703	7	13
5	518	8	11	801	5	11	648	6	10
6	543	9	13	821	5	11	646	5	8.7
7	566	9	14	819	5	11	657	5	8.9
8	581	10	16	787	5	11	684	4	7.4
9	587	10	16	737	5	9.9	662	4	7.1
10	598	11	18	791	6	13	662	4	7.1
11	602	11	18	795	6	13	656	4	7.1
12	632	14	24	788	7	15	625	5	8.4
13	687	21	39	777	7	15	646	6	10
14	703	21	40	765	7	14	660	6	11
15	744	22	44	741	6	12	574	6	9.3
16	796	22	47	724	6	12	625	9	15
17	812	22	48	739	6	12	713	16	31
18	817	22	49	675	6	11	672	13	24
19	841	22	50	617	6	10	699	10	19
20	830	20	45	684	7	13	642	8	14
21	823	17	38	701	7	13	642	7	12
22	829	13	29	635	7	12	644	7	12
23	818	11	24	626	9	15	582	6	9.4
24	796	11	24	695	11	21	619	5	8.4
25	783	11	23	728	11	22	689	5	9.3
26	772	11	23	712	8	15	663	5	9.0
27	759	11	23	671	6	11	690	8	15
28	810	11	24	669	5	9.0	682	9	17
29	862	11	26	665	5	9.0	679	10	18
30	823	10	22	686	6	11	641	9	16
31	800	9	19	---	---	---	587	7	11
TOTAL	21,639	---	818	22,329	---	422.9	20,640	---	411.1
MEAN	698	---	26	744	---	14	666	---	13
MAX	862	22	50	925	13	32	817	16	31
MIN	465	8	11	617	5	9.0	574	4	7.1

Table 8. Daily streamflow and suspended-sediment data for Clark Fork at Turah Bridge, near Bonner, Montana, October 1994 through September 1995 (Continued)

Day	Mean streamflow (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)	Mean streamflow (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)	Mean streamflow (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)
				1995					
	January			February			March		
1	499	4	5.4	1,450	87	341	818	15	33
2	372	3	3.0	3,680	211	2,100	762	15	31
3	320	4	3.5	1,910	94	485	781	15	32
4	300	4	3.2	1,360	46	169	850	14	32
5	320	4	3.5	1,310	55	195	791	10	21
6	350	4	3.8	1,230	57	189	785	9	19
7	400	4	4.3	1,120	58	175	760	13	27
8	450	3	3.6	1,030	31	86	739	11	22
9	500	3	4.1	938	21	53	787	11	23
10	550	4	5.9	887	19	46	930	25	63
11	600	9	15	757	19	39	1,170	66	208
12	650	22	39	675	20	36	1,090	39	115
13	700	31	59	450	22	27	1,010	24	65
14	700	15	28	350	24	23	970	17	45
15	811	20	44	400	26	28	962	18	47
16	895	23	56	500	25	34	973	17	45
17	733	14	28	600	20	32	938	14	35
18	678	13	24	700	15	28	911	13	32
19	665	12	22	796	22	47	912	11	27
20	631	12	20	1,280	71	245	902	10	24
21	617	11	18	1,570	134	568	901	10	24
22	521	10	14	1,260	70	238	894	9	22
23	490	10	13	1,120	48	145	874	8	19
24	447	9	11	1,050	36	102	860	8	19
25	465	8	10	1,060	29	83	840	6	14
26	497	8	11	1,070	26	75	822	4	8.9
27	591	8	13	1,010	24	65	801	4	8.7
28	613	8	13	924	17	42	786	4	8.5
29	599	8	13	---	---	---	772	4	8.3
30	543	8	12	---	---	---	753	4	8.1
31	597	21	34	---	---	---	764	4	8.3
TOTAL	17,104	---	537.3	30,487	---	5,696	26,908	---	1,094.8
MEAN	552	---	17	1,089	--	203	868	---	35
MAX	895	31	59	3,680	211	2,100	1,170	66	208
MIN	300	3	3.0	350	15	23	739	4	8.1

Table 8. Daily streamflow and suspended-sediment data for Clark Fork at Turah Bridge, near Bonner, Montana, October 1994 through September 1995 (Continued)

Day	Mean streamflow (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)	Mean streamflow (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)	Mean streamflow (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)
				1995					
	April			May			June		
1	768	5	10	949	12	31	3,320	65	583
2	769	6	12	961	13	34	3,630	79	774
3	767	8	17	1,020	15	41	3,820	90	928
4	767	9	19	1,080	18	52	4,890	200	2,640
5	801	13	28	1,080	21	61	5,780	225	3,510
6	869	15	35	1,140	25	77	6,340	205	3,510
7	898	14	34	1,780	134	644	6,880	280	5,200
8	966	18	47	2,320	146	915	5,870	155	2,460
9	1,020	21	58	2,360	96	612	5,090	105	1,440
10	1,010	15	41	2,340	77	486	4,560	85	1,050
11	982	13	34	2,520	85	578	4,130	72	803
12	958	14	36	2,920	115	907	3,920	64	677
13	950	16	41	3,240	136	1,190	4,000	61	659
14	1,010	16	44	3,160	114	973	4,180	63	711
15	1,060	18	52	2,880	81	630	4,320	63	735
16	1,040	12	34	2,790	72	542	4,350	61	716
17	1,010	12	33	2,780	67	503	4,370	60	708
18	991	13	35	2,960	76	607	4,260	60	690
19	995	17	46	3,210	83	719	4,280	56	647
20	1,000	14	38	3,340	82	739	4,310	49	570
21	1,010	7	19	3,340	73	658	3,810	41	422
22	1,000	8	22	3,320	68	610	3,540	35	335
23	998	17	46	3,250	65	570	3,360	33	299
24	994	14	38	3,130	59	499	3,120	33	278
25	994	14	38	3,010	49	398	2,920	28	221
26	996	12	32	2,890	46	359	2,820	24	183
27	968	12	31	2,770	42	314	2,850	24	185
28	952	13	33	2,560	40	276	2,860	23	178
29	955	12	31	2,490	36	242	2,720	21	154
30	954	12	31	2,630	40	284	2,500	21	142
31	---	---	---	2,880	49	381	---	---	---
TOTAL	28,452	---	1,015	77,100	---	14,932	122,800	---	31,408
MEAN	948	---	34	2,487	---	482	4,093	---	1,050
MAX	1,060	21	58	3,340	146	1,190	6,880	280	5,200
MIN	767	5	10	949	12	31	2,500	21	142

Table 8. Daily streamflow and suspended-sediment data for Clark Fork at Turah Bridge, near Bonner, Montana, October 1994 through September 1995 (Continued)

Day	Mean streamflow (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)	Mean streamflow (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)	Mean streamflow (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)
				1995					
	July			August			September		
1	2,320	22	138	1,110	6	18	490	5	6.6
2	2,180	20	118	1,040	5	14	491	5	6.6
3	2,240	20	121	992	5	13	480	5	6.5
4	2,420	23	150	922	5	12	473	6	7.7
5	2,290	20	124	884	4	9.5	516	7	9.8
6	2,130	16	92	843	3	6.8	613	11	18
7	2,180	16	94	783	2	4.2	624	9	15
8	2,120	17	97	753	2	4.1	783	16	34
9	2,090	17	96	747	4	8.1	1,220	43	142
10	2,210	17	101	703	5	9.5	1,200	28	91
11	2,380	23	148	683	5	9.2	1,150	14	43
12	2,670	47	339	666	5	9.0	1,050	9	26
13	3,000	60	486	663	5	9.0	981	8	21
14	2,960	51	408	644	5	8.7	947	8	20
15	2,660	31	223	622	5	8.4	939	8	20
16	2,390	21	136	647	5	8.7	931	9	23
17	2,220	18	108	695	5	9.4	923	9	22
18	2,050	16	89	679	5	9.2	918	10	25
19	1,920	14	73	652	5	8.8	923	10	25
20	1,780	13	62	629	4	6.8	1,040	13	37
21	1,680	11	50	607	4	6.6	1,080	12	35
22	1,630	10	44	583	4	6.3	1,040	11	31
23	1,550	9	38	569	5	7.7	1,030	10	28
24	1,470	8	32	574	5	7.7	1,020	9	25
25	1,380	7	26	545	5	7.4	998	8	22
26	1,290	6	21	532	5	7.2	984	9	24
27	1,230	6	20	513	5	6.9	982	10	27
28	1,150	6	19	499	5	6.7	974	10	26
29	1,080	6	17	501	5	6.8	974	10	26
30	1,110	8	24	490	5	6.6	968	10	26
31	1,160	8	25	490	5	6.6	---	---	---
TOTAL	60,940	---	3,519	21,260	---	262.9	26,742	---	869.2
MEAN	1,966	---	114	686	---	8.5	891	---	29
MAX	3,000	60	486	1,110	6	18	1,220	43	142
MIN	1,080	6	17	490	2	4.1	473	5	6.5

TOTAL FOR WATER YEAR 1995:

STREAMFLOW--476,401 ft^3/s

SEDIMENT DISCHARGE--60,986.2 tons

Table 9. Daily streamflow and suspended-sediment data for Blackfoot River near Bonner, Montana, October 1994 through September 1995

[Abbreviations: ft^3/s, cubic feet per second; mg/L, milligrams per liter; ton/d, tons per day. Symbol: ---, no data]

Day	Mean streamflow (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)	Mean streamflow (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)	Mean streamflow (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)
				1994					
	October			November			December		
1	383	3	3.1	595	3	4.8	512	3	4.1
2	401	3	3.2	598	3	4.8	511	3	4.1
3	424	3	3.4	578	3	4.7	514	3	4.2
4	410	3	3.3	548	3	4.4	457	4	4.9
5	404	2	2.2	540	2	2.9	424	8	9.2
6	396	2	2.1	525	2	2.8	392	5	5.3
7	393	2	2.1	519	2	2.8	400	3	3.2
8	391	2	2.1	516	2	2.8	410	3	3.3
9	394	2	2.1	510	2	2.8	430	3	3.5
10	393	2	2.1	512	2	2.8	420	3	3.4
11	405	2	2.2	519	1	1.4	400	3	3.2
12	412	2	2.2	521	1	1.4	380	3	3.1
13	409	1	1.1	513	1	1.4	380	3	3.1
14	413	2	2.2	506	1	1.4	390	3	3.2
15	425	2	2.3	488	1	1.3	400	3	3.2
16	430	2	2.3	491	1	1.3	430	4	4.6
17	428	2	2.3	490	1	1.3	500	4	5.4
18	417	2	2.3	440	2	2.4	490	3	4.0
19	411	2	2.2	452	2	2.4	480	3	3.9
20	413	2	2.2	494	2	2.7	450	2	2.4
21	427	2	2.3	443	2	2.4	420	1	1.1
22	426	2	2.3	360	2	1.9	400	1	1.1
23	425	1	1.1	340	2	1.8	380	2	2.1
24	421	1	1.1	464	2	2.5	400	2	2.2
25	419	1	1.1	526	1	1.4	420	2	2.3
26	418	1	1.1	480	1	1.3	450	2	2.4
27	439	1	1.2	458	1	1.2	470	2	2.5
28	490	2	2.6	454	1	1.2	480	2	2.6
29	527	2	2.8	436	1	1.2	470	2	2.5
30	502	2	2.7	461	1	1.2	450	2	2.4
31	499	3	4.0	---	---	---	400	2	2.2
TOTAL	13,145	---	69.3	14,777	---	68.7	13,510	---	104.7
MEAN	424	---	2.2	493	---	2.3	436	---	3.4
MAX	527	3	4.0	598	3	4.8	514	8	9.2
MIN	383	1	1.1	340	1	1.2	380	1	1.1

Table 9. Daily streamflow and suspended-sediment data for Blackfoot River near Bonner, Montana, October 1994 through September 1995 (Continued)

Day	Mean streamflow (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)	Mean streamflow (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)	Mean streamflow (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)
				1995					
	January			February			March		
1	350	2	1.9	500	7	9.5	876	6	14
2	300	2	1.6	1,440	13	51	858	5	12
3	250	4	2.7	1,600	19	82	890	6	14
4	200	5	2.7	1,220	12	40	896	6	15
5	220	5	3.0	949	8	20	815	3	6.6
6	250	4	2.7	822	7	16	811	4	8.8
7	280	3	2.3	771	6	12	790	4	8.5
8	300	2	1.6	692	6	11	759	4	8.2
9	350	3	2.8	633	6	10	764	4	8.3
10	400	4	4.3	590	6	9.6	776	5	10
11	450	5	6.1	467	5	6.3	878	6	14
12	500	8	11	373	5	5.0	991	8	21
13	550	17	25	300	5	4.1	988	9	24
14	580	9	14	250	5	3.4	956	7	18
15	600	4	6.5	300	4	3.2	973	7	18
16	600	5	8.1	350	4	3.8	1,000	6	16
17	550	4	5.9	400	3	3.2	999	6	16
18	500	3	4.1	450	2	2.4	997	6	16
19	480	2	2.6	550	5	7.4	1,010	8	22
20	450	2	2.4	1,060	24	69	1,020	6	17
21	430	2	2.3	1,580	30	128	1,060	6	17
22	400	2	2.2	1,510	22	90	1,090	8	24
23	350	2	1.9	1,350	22	80	1,070	8	23
24	300	2	1.6	1,180	27	86	1,070	7	20
25	350	3	2.8	1,210	31	101	1,050	5	14
26	400	3	3.2	1,200	24	78	1,040	4	11
27	450	3	3.6	1,110	16	48	1,010	4	11
28	450	3	3.6	990	10	27	1,000	4	11
29	430	3	3.5	---	---	---	999	6	16
30	400	3	3.2	---	---	---	985	7	19
31	400	3	3.2	---	---	---	976	6	16
TOTAL	12,520	---	142.4	23,847	---	1,006.9	29,397	---	469.4
MEAN	404	---	4.6	852	---	36	948	---	15
MAX	600	17	25	1,600	31	128	1,090	9	24
MIN	200	2	1.6	250	2	2.4	759	3	6.6

Table 9. Daily streamflow and suspended-sediment data for Blackfoot River near Bonner, Montana, October 1994 through September 1995 (Continued)

Day	Mean streamflow (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)	Mean streamflow (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)	Mean streamflow (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)
				1995					
	April			May			June		
1	971	7	18	1,290	6	21	5,000	67	904
2	971	6	16	1,350	7	26	5,220	72	1,010
3	966	6	16	1,470	10	40	5,460	77	1,140
4	986	6	16	1,540	10	42	5,870	97	1,540
5	1,030	9	25	1,650	11	49	6,050	95	1,550
6	1,120	10	30	1,860	19	95	6,440	108	1,880
7	1,200	10	32	2,470	42	280	6,370	105	1,810
8	1,320	15	53	3,060	73	603	5,610	86	1,300
9	1,400	14	53	3,310	91	813	4,860	49	643
10	1,420	11	42	3,370	74	673	4,360	37	436
11	1,400	10	38	3,560	62	596	4,040	32	349
12	1,380	10	37	3,910	61	644	3,980	37	398
13	1,370	9	33	4,170	57	642	4,150	43	482
14	1,450	10	39	3,990	54	582	4,380	46	544
15	1,500	10	40	3,690	38	379	4,430	47	562
16	1,480	7	28	3,570	29	280	4,490	47	570
17	1,440	8	31	3,750	27	273	4,480	45	544
18	1,400	7	26	4,230	37	423	4,280	41	474
19	1,380	8	30	4,520	50	610	4,090	32	353
20	1,410	8	30	4,540	43	527	3,950	28	299
21	1,390	13	49	4,550	37	455	3,600	28	272
22	1,360	15	55	4,470	35	422	3,310	27	241
23	1,370	8	30	4,320	27	315	3,180	21	180
24	1,360	9	33	4,160	23	258	3,020	16	130
25	1,360	7	26	4,040	20	218	2,910	15	118
26	1,350	6	22	3,840	18	187	2,870	18	139
27	1,350	7	26	3,580	14	135	2,810	15	114
28	1,340	7	25	3,400	13	119	2,720	12	88
29	1,330	6	22	3,490	15	141	2,560	10	69
30	1,320	6	21	3,910	25	264	2,390	10	65
31	---	---	---	4,510	52	633	---	---	---
TOTAL	39,124	---	942	105,570	---	10,745	126,880	---	18,204
MEAN	1,304	---	31	3,405	---	347	4,229	---	607
MAX	1,500	15	55	4,550	91	813	6,440	108	1,880
MIN	966	6	16	1,290	6	21	2,390	10	65

Table 9. Daily streamflow and suspended-sediment data for Blackfoot River near Bonner, Montana, October 1994 through September 1995 (Continued)

Day	Mean streamflow (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)	Mean streamflow (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)	Mean streamflow (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)
				1995					
	July			August			September		
1	2,240	10	60	961	5	13	598	2	3.2
2	2,150	9	52	915	5	12	583	2	3.1
3	2,140	7	40	878	5	12	573	2	3.1
4	2,120	7	40	852	5	12	570	2	3.1
5	2,050	8	44	828	4	8.9	601	3	4.9
6	1,960	8	42	797	4	8.6	601	2	3.2
7	1,990	8	43	780	4	8.4	611	3	4.9
8	1,890	8	41	773	4	8.3	700	4	7.6
9	1,840	8	40	778	5	11	799	6	13
10	1,850	8	40	773	5	10	816	5	11
11	1,860	9	45	767	5	10	781	5	11
12	1,940	10	52	739	5	10	727	4	7.9
13	1,970	10	53	736	6	12	683	3	5.5
14	2,070	11	61	740	6	12	655	3	5.3
15	1,940	8	42	727	6	12	636	4	6.9
16	1,820	6	29	727	6	12	635	5	8.6
17	1,700	7	32	791	5	11	600	4	6.5
18	1,600	8	35	794	4	8.6	592	4	6.4
19	1,500	8	32	773	3	6.3	599	3	4.9
20	1,420	12	46	743	3	6.0	614	2	3.3
21	1,360	15	55	719	3	5.8	607	1	1.6
22	1,330	13	47	696	3	5.6	600	1	1.6
23	1,300	10	35	678	3	5.5	596	1	1.6
24	1,250	8	27	676	3	5.5	596	1	1.6
25	1,190	5	16	669	3	5.4	592	1	1.6
26	1,130	6	18	669	3	5.4	585	2	3.2
27	1,110	6	18	660	3	5.3	578	2	3.1
28	1,060	6	17	647	3	5.2	587	2	3.2
29	1,030	6	17	634	3	5.1	593	3	4.8
30	1,010	6	16	621	2	3.4	594	3	4.8
31	998	5	13	615	2	3.3	---	---	---
TOTAL	50,818	---	1,148	23,156	---	259.6	18,902	---	150.5
MEAN	1,639	---	37	747	---	8.4	630	---	5.0
MAX	2,240	15	61	961	6	13	816	6	13
MIN	998	5	13	615	2	3.3	570	1	1.6

TOTAL FOR WATER YEAR 1995:
STREAMFLOW--471,646 ft^3/s
SEDIMENT DISCHARGE--33,310.5 tons

Table 10. Daily streamflow and suspended-sediment data for Clark Fork above Missoula, Montana, October 1994 through September 1995

[Abbreviations: ft^3/s, cubic feet per second; mg/L, milligrams per liter; ton/d, tons per day. Symbol: ---, no data]

Day	Mean streamflow (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)	Mean streamflow (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)	Mean streamflow (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)
				1994					
	October			November			December		
1	867	4	9.4	1,450	6	23	1,270	4	14
2	892	4	9.6	1,520	5	21	1,340	5	18
3	923	5	12	1,450	4	16	1,310	4	14
4	929	5	13	1,380	3	11	1,220	3	9.9
5	944	4	10	1,340	3	11	1,050	2	5.7
6	960	4	10	1,350	3	11	1,000	3	8.1
7	974	4	11	1,350	3	11	1,000	4	11
8	979	4	11	1,320	3	11	1,050	4	11
9	1,020	6	17	1,270	3	10	1,100	4	12
10	1,000	6	16	1,290	3	10	1,050	4	11
11	1,020	6	17	1,320	3	11	1,000	3	8.1
12	1,060	6	17	1,310	3	11	950	2	5.1
13	1,100	6	18	1,300	3	11	950	2	5.1
14	1,130	6	18	1,280	3	10	1,000	2	5.4
15	1,170	7	22	1,260	3	10	1,050	2	5.7
16	1,230	7	23	1,220	3	9.9	1,070	3	8.7
17	1,260	8	27	1,240	3	10	1,240	3	10
18	1,250	8	27	1,150	3	9.3	1,230	3	10
19	1,260	7	24	1,050	3	8.5	1,220	4	13
20	1,250	5	17	1,200	3	9.7	1,170	4	13
21	1,250	5	17	1,180	3	9.6	1,050	3	8.5
22	1,260	4	14	1,030	4	11	1,000	3	8.1
23	1,250	4	13	994	4	11	950	4	10
24	1,240	4	13	1,050	6	17	1,000	5	13
25	1,210	4	13	1,310	9	32	1,050	5	14
26	1,200	4	13	1,270	7	24	1,100	5	15
27	1,210	5	16	1,190	5	16	1,170	4	13
28	1,280	5	17	1,120	3	9.1	1,240	3	10
29	1,410	5	19	1,130	2	6.1	1,180	4	13
30	1,350	5	18	1,180	2	6.4	1,110	5	15
31	1,290	6	21	---	---	---	1,000	5	13
TOTAL	35,168	---	503.0	37,504	---	377.6	34,120	---	331.4
MEAN	1,134	---	16	1,250	---	13	1,101	---	11
MAX	1,410	8	27	1,520	9	32	1,340	5	18
MIN	867	4	9.4	994	2	6.1	950	2	5.1

Table 10. Daily streamflow and suspended-sediment data for Clark Fork above Missoula, Montana, October 1994 through September 1995 (Continued)

Day	Mean streamflow (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)	Mean streamflow (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)	Mean streamflow (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)
				1995					
	January			February			March		
1	800	6	13	1,850	27	135	1,650	8	36
2	700	6	11	4,430	168	2,010	1,550	7	29
3	600	5	8.1	2,930	58	459	1,610	6	26
4	500	5	6.8	2,390	26	168	1,730	8	37
5	550	4	5.9	2,110	18	103	1,590	7	30
6	600	4	6.5	1,980	18	96	1,560	8	34
7	700	5	9.5	1,850	18	90	1,550	7	29
8	800	5	11	1,700	12	55	1,490	8	32
9	900	5	12	1,580	9	38	1,510	8	33
10	1,000	5	13	1,490	7	28	1,590	11	47
11	1,100	6	18	1,260	5	17	2,020	19	104
12	1,300	7	25	1,000	4	11	2,070	21	117
13	1,400	7	26	800	5	11	2,010	17	92
14	1,380	6	22	600	5	8.1	1,920	13	67
15	1,370	7	26	700	5	9.5	1,920	11	57
16	1,440	16	62	900	5	12	1,960	11	58
17	1,230	9	30	1,000	5	13	1,920	10	52
18	1,140	4	12	1,200	5	16	1,880	10	51
19	1,130	4	12	1,400	6	23	1,880	10	51
20	1,050	5	14	2,000	15	81	1,870	10	50
21	1,000	5	13	2,780	47	353	1,900	9	46
22	900	5	12	2,340	37	234	1,920	8	41
23	800	6	13	2,260	28	171	1,900	8	41
24	750	7	14	2,110	22	125	1,880	7	36
25	800	8	17	2,240	19	115	1,850	7	35
26	927	8	20	2,240	15	91	1,810	7	34
27	1,060	8	23	2,090	11	62	1,760	7	33
28	1,050	7	20	1,880	8	41	1,740	5	23
29	1,030	7	19	---	---	---	1,720	5	23
30	983	7	19	---	---	---	1,710	6	28
31	1,000	8	22	---	---	---	1,700	7	32
TOTAL	29,990	---	535.8	51,110	---	4,575.6	55,170	---	1,404
MEAN	967	---	17	1,825	---	163	1,780	---	45
MAX	1,440	16	62	4,430	168	2,010	2,070	21	117
MIN	500	4	5.9	600	4	8.1	1,490	5	23

Table 10. Daily streamflow and suspended-sediment data for Clark Fork above Missoula, Montana, October 1994 through September 1995 (Continued)

Day	Mean streamflow (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)	Mean streamflow (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)	Mean streamflow (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)
				1995					
	April			May			June		
1	1,690	9	41	2,190	7	41	8,220	45	999
2	1,690	8	37	2,230	8	48	8,790	53	1,260
3	1,690	8	37	2,420	9	59	9,130	55	1,360
4	1,700	9	41	2,540	10	69	10,400	92	2,580
5	1,770	9	43	2,690	9	65	11,500	121	3,760
6	1,890	9	46	2,920	11	87	12,300	123	4,080
7	2,010	9	49	4,150	19	213	13,000	181	6,350
8	2,250	14	85	5,310	41	588	11,500	136	4,220
9	2,410	10	65	5,630	52	790	10,100	88	2,400
10	2,390	9	58	5,670	54	827	8,970	71	1,720
11	2,350	9	57	5,980	51	823	8,150	50	1,100
12	2,320	9	56	6,820	62	1,140	7,880	53	1,130
13	2,270	10	61	7,250	65	1,270	8,060	56	1,220
14	2,390	10	65	7,170	66	1,280	8,480	53	1,210
15	2,530	10	68	6,560	52	921	8,640	50	1,170
16	2,480	10	67	6,370	44	757	8,750	49	1,160
17	2,420	8	52	6,460	41	715	8,740	48	1,130
18	2,340	9	57	7,130	44	847	8,470	43	983
19	2,340	11	69	7,700	57	1,190	8,250	37	824
20	2,370	10	64	7,840	57	1,210	8,140	34	747
21	2,320	8	50	7,790	55	1,160	7,390	31	619
22	2,330	7	44	7,740	47	982	6,810	27	496
23	2,330	7	44	7,570	42	858	6,440	23	400
24	2,300	8	50	7,250	36	705	6,090	21	345
25	2,300	9	56	7,030	29	550	5,760	17	264
26	2,310	8	50	6,730	26	472	5,600	14	212
27	2,260	9	55	6,370	23	396	5,580	14	211
28	2,250	9	55	5,910	22	351	5,550	16	240
29	2,220	7	42	5,920	17	272	5,250	16	227
30	2,220	6	36	6,480	19	332	4,860	14	184
31	---	---	---	7,240	30	586	---	---	---
TOTAL	66,140	---	1,600	181,060	---	19,604	246,800	---	42,601
MEAN	2,205	---	53	5,841	---	632	8,227	---	1,420
MAX	2,530	14	85	7,840	66	1,280	13,000	181	6,350
MIN	1,690	6	36	2,190	7	41	4,860	14	184

Table 10. Daily streamflow and suspended-sediment data for Clark Fork above Missoula, Montana, October 1994 through September 1995 (Continued)

Day	Mean streamflow (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)	Mean streamflow (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)	Mean streamflow (ft^3/s)	Suspended sediment: Mean concentration (mg/L)	Suspended sediment: Discharge (ton/d)
				1995					
	July			August			September		
1	4,540	12	147	2,120	9	52	1,090	4	12
2	4,350	10	117	2,020	8	44	1,070	4	12
3	4,370	11	130	1,950	7	37	1,040	4	11
4	4,530	11	135	1,910	7	36	1,030	4	11
5	4,350	11	129	1,820	6	29	1,060	4	11
6	4,110	11	122	1,810	6	29	1,180	3	9.6
7	4,120	11	122	1,750	6	28	1,210	4	13
8	4,060	10	110	1,720	6	28	1,420	5	19
9	3,890	10	105	1,680	7	32	1,890	7	36
10	4,060	12	132	1,650	6	27	1,980	8	43
11	4,190	13	147	1,600	6	26	1,910	6	31
12	4,520	26	317	1,560	5	21	1,810	4	20
13	4,900	28	370	1,550	5	21	1,630	3	13
14	4,960	25	335	1,530	5	21	1,560	4	17
15	4,600	20	248	1,490	5	20	1,530	4	17
16	4,200	17	193	1,470	4	16	1,520	4	16
17	3,910	13	137	1,590	5	21	1,500	4	16
18	3,650	12	118	1,580	4	17	1,460	4	16
19	3,460	11	103	1,530	4	17	1,480	4	16
20	3,230	11	96	1,450	4	16	1,590	4	17
21	3,030	11	90	1,360	4	15	1,650	4	18
22	2,990	11	89	1,360	4	15	1,630	4	18
23	2,840	12	92	1,300	4	14	1,600	4	17
24	2,740	12	89	1,290	4	14	1,580	4	17
25	2,500	13	88	1,250	4	13	1,560	4	17
26	2,550	12	83	1,210	4	13	1,530	4	17
27	2,250	11	67	1,200	4	13	1,520	4	16
28	2,230	8	48	1,170	4	13	1,540	5	21
29	2,180	7	41	1,120	4	12	1,540	5	21
30	2,080	8	45	1,120	4	12	1,540	5	21
31	2,200	9	53	1,100	4	12	---	---	---
TOTAL	111,590	---	4,098	47,260	---	684	44,650	---	539.6
MEAN	3,600	---	132	1,525	---	22	1,488	---	18
MAX	4,960	28	370	2,120	9	52	1,980	8	43
MIN	2,080	7	41	1,100	4	12	1,030	3	9.6

TOTAL FOR WATER YEAR 1995:
STREAMFLOW--940,562 ft^3/s
SEDIMENT DISCHARGE--76,854.0 tons

Table 11. Chemical and suspended-sediment analyses of field replicates for water samples, upper Clark Fork basin, Montana

[Abbreviations: µg/L, micrograms per liter; mg/L, milligrams per liter. Symbols: <, less than minimum reporting level; --, no data]

Station number	Station name	Date	Time	Hardness total (mg/L as $CaCO_3$)	Calcium, dissolved (mg/L)	Magnesium, dissolved (mg/L)
12323230	Blacktail Creek at Harrison Avenue, at Butte	11-28-94[1]	1105	130	36	8.6
		11-28-94	1110	120	35	8.5
12323250	Silver Bow Creek below Blacktail Creek, at Butte	03-09-95	1150	170	47	12
		03-09-95	1155	160	46	12
12323750	Silver Bow Creek at Warm Springs	06-05-95	1725	150	46	9.1
		06-05-95	1730	160	47	9.2
12324200	Clark Fork at Deer Lodge	02-07-95	0800	230	67	15
		02-07-95	0805	230	66	15
12324680	Clark Fork at Goldcreek	04-26-95	0945	200	57	13
		04-26-95	0950	200	57	13
12331800	Clark Fork near Drummond	04-11-95	1305	210	60	15
		04-11-95	1310	210	59	15
12334550	Clark Fork at Turah Bridge, near Bonner	05-10-95	1130	110	30	7.8
		05-10-95	1135	100	29	7.7
12340500	Clark Fork above Missoula	05-23-95	0800	83	22	6.7
		05-23-95	0805	85	23	6.7

Table 11. Chemical and suspended-sediment analyses of field replicates for water samples, upper Clark Fork basin, Montana (Continued)

Station number	Date	Sodium, dissolved (mg/L)	Potassium, dissolved (mg/L)	Alkalinity, (mg/L as $CaCO_3$)	Sulfate, dissolved (mg/L)	Chloride, dissolved (mg/L)	Fluoride, dissolved (mg/L)	Silica, dissolved (mg/L)	Solids, sum of constituents, dissolved (mg/L)	Arsenic, total recoverable (µg/L)
12323230	11-28-94[1]	12	2.8	104	34	6.5	0.3	28	191	2
	11-28-94	12	2.8	103	34	6.8	.3	28	189	2
12323600	03-09-95	36	5.8	81	88	30	.4	25	294	22
	03-09-96	36	5.6	81	88	31	.4	25	294	23
12323770	06-05-95	11	3.8	95	75	4.2	.5	15	222	48
	06-05-95	11	3.9	95	75	4.2	.5	15	223	49
12324200	02-07-95	18	4.2	144	100	9.2	.7	16	317	18
	02-07-95	18	4.1	144	100	9.2	.7	16	315	18
12324680	04-26-95	13	3.3	139	79	6.3	.5	14	269	9
	04-26-95	13	3.3	138	79	6.5	.5	13	268	9
12331800	04-11-95	13	3.3	150	78	6.3	.5	16	282	11
	04-11-95	13	3.3	150	78	6.3	.5	16	281	11
12334550	05-10-95	6.4	2.1	85	32	2.3	.2	14	146	12
	05-10-95	6.3	2.1	85	31	2.3	.3	13	143	12
12340500	05-23-95	2.9	1.0	82	11	1.0	.1	9.6	104	5
	05-23-95	2.9	1.0	82	10	.90	.1	9.6	103	6

Table 11. Chemical and suspended-sediment analyses of field replicates for water samples, upper Clark Fork basin, Montana (Continued)

Station number	Date	Arsenic, dissolved (µg/L)	Cadmium, total recoverable (µg/L)	Cadmium, dissolved (µg/L)	Copper, total recoverable (µg/L)	Copper, dissolved (µg/L)	Iron, total recoverable (µg/L)	Iron, dissolved (µg/L)	Lead, total recoverable (µg/L)
12323230	11-28-94[1]	1	<1	<0.1	5	1	590	58	<1
	11-28-94	1	<1	<.1	5	3	580	110	1
12323600	03-09-95	10	2	1.6	170	50	1,200	57	21
	03-09-96	10	2	1.6	160	52	1,100	56	24
12323770	06-05-95	35	<1	<.1	70	13	3,000	21	12
	06-05-95	34	<1	<.1	70	13	3,000	16	12
12324200	02-07-95	8	<1	<.1	62	7	1,000	9	8
	02-07-95	9	<1	<.1	60	7	1,000	8	7
12324680	04-26-95	8	<1	<.1	19	5	330	9	3
	04-26-95	7	<1	<.1	20	5	340	7	2
12331800	04-11-95	7	<1	<.1	22	5	440	6	3
	04-11-95	7	<1	<.1	22	5	440	5	3
12334550	05-10-95	7	<1	<.1	43	5	1,400	41	8
	05-10-95	6	<1	<.1	40	6	1,300	42	8
12340500	05-23-95	3	<1	<.1	22	3	700	26	4
	05-23-95	3	<1	<.1	21	3	730	26	4

Table 11. Chemical and suspended-sediment analyses of field replicates for water samples, upper Clark Fork basin, Montana (Continued)

Station number	Date	Lead, dissolved (µg/L)	Manganese, total recoverable (µg/L)	Manganese, dissolved (µg/L)	Zinc, total recoverable (µg/L)	Zinc, dissolved (µg/L)	Sediment, suspended (mg/L)	Sediment, suspended, diameter, percent finer than 0.062 mm
12323230	11-28-94[1]	<0.5	70	61	<10	<3	7	91
	11-28-94	.5	80	60	<10	<3	10	71
12323600	03-09-95	.5	980	970	730	600	32	80
	03-09-96	.5	990	960	730	600	32	84
12323770	06-05-95	.5	310	76	70	16	229	77
	06-05-95	.5	290	77	80	7	223	78
12324200	02-07-95	.5	230	34	80	10	44	68
	02-07-95	.5	220	34	80	10	44	68
12324680	04-26-95	.5	80	22	30	5	16	85
	04-26-95	.5	90	22	20	<3	15	86
12331800	04-11-95	.5	70	16	30	7	22	76
	04-11-95	.5	70	16	40	8	22	76
12334550	05-10-95	.5	170	6	70	<3	77	68
	05-10-95	.5	170	6	70	3	78	67
12340500	05-23-95	.5	60	17	30	4	45	89
	05-23-95	.5	40	17	30	<3	45	89

[1]Dissolved constituents for the 11-28-94 sample were collected through two different types of filters as part of a USGS test of new sampling protocols.

Table 12. Precision of chemical and suspended-sediment analyses of field replicates for water samples, upper Clark Fork basin, Montana

[Abbreviations: µg/L, micrograms per liter; mg/L, milligrams per liter; mm, millimeter]

Constituent and reporting unit	Number of replicate pairs	Standard deviation, in units (+/-)	Relative standard deviation, in percent (+/-)
Calcium, dissolved, mg/L	8	0.66	1.5
Magnesium, dissolved, mg/L	8	.04	.4
Sodium, dissolved, mg/L	8	.02	.1
Potassium, dissolved, mg/L	8	.06	1.8
Alkalinity, mg/L as $CaCO_3$	8	.35	.3
Sulfate, dissolved, mg/L	8	.35	.6
Chloride, dissolved, mg/L	8	.27	3.2
Fluoride, dissolved, mg/L	8	.02	4.9
Silica, dissolved, mg/L	8	.35	2.0
Arsenic, total recoverable, µg/L	8	.43	2.7
Arsenic, dissolved, µg/L	8	.56	5.7
Cadmium, total recoverable, µg/L	8	.0	.0
Cadmium, dissolved, µg/L	8	.0	.0
Copper, total recoverable, µg/L	8	2.7	5.3
Copper, dissolved, µg/L	8	.75	6.6
Iron, total recoverable, µg/L	8	36	3.4
Iron, dissolved, µg/L	8	13	42
Lead, total recoverable, µg/L	8	.84	11
Lead, dissolved, µg/L	8	.0	.0
Manganese, total recoverable, µg/L	8	8.7	3.6
Manganese, dissolved, µg/L	8	2.5	1.7
Zinc, total recoverable, µg/L	8	4.3	3.3
Zinc, dissolved, µg/L	8	2.5	3.1
Sediment, suspended, mg/L	8	1.7	2.9
Sediment, suspended, percent finer than 0.062 mm	8	5.4	6.9

Table 13. Precision of chemical analyses of laboratory replicates for water samples, upper Clark Fork basin, Montana

[Abbreviations: µg/L, micrograms per liter; µS/cm, microsiemens per centimeter at 25 degrees Celsius; mg/L, milligrams per liter]

Property or constituent and reporting unit	Number of replicate pairs	Standard deviation, in units (+/-)	Relative standard deviation, in percent (+/-)	Within limits of data-quality objective
Specific conductance, µS/cm	10	4.4	1.3	Yes
pH, standard units	10	.05	.6	Yes
Calcium, dissolved, mg/L	10	.68	1.6	Yes
Magnesium, dissolved, mg/L	10	.09	.9	Yes
Sodium, dissolved, mg/L	10	.12	1.0	Yes
Potassium, dissolved, mg/L	11	.11	3.5	Yes
Alkalinity, mg/L as $CaCO_3$	10	.42	.4	Yes
Sulfate, dissolved, mg/L	10	.13	.4	Yes
Chloride, dissolved, mg/L	10	.13	2.1	Yes
Fluoride, dissolved, mg/L	10	.01	2.6	Yes
Silica, dissolved, mg/L	10	.07	.4	Yes
Arsenic, total recoverable, µg/L	10	.33	1.6	Yes
Arsenic, dissolved, µg/L	10	.28	3.5	Yes
Cadmium, total recoverable, µg/L	10	.01	1.3	Yes
Cadmium, dissolved, µg/L	10	.01	2.9	Yes
Copper, total recoverable, µg/L	10	5.2	5.1	Yes
Copper, dissolved, µg/L	10	1.3	5.7	Yes
Iron, total recoverable, µg/L	10	15	1.3	Yes
Iron, dissolved, µg/L	11	1.7	5.4	Yes
Lead, total recoverable, µg/L	10	.71	2.9	Yes
Lead, dissolved, µg/L	10	.04	16	Yes
Manganese, total recoverable, µg/L	10	3.6	1.7	Yes
Manganese, dissolved, µg/L	10	4.1	2.8	Yes
Zinc, total recoverable, µg/L	10	4.2	2.5	Yes
Zinc, dissolved, µg/L	10	3.5	5.3	Yes

Table 14. Recovery efficiency for trace-element analyses of laboratory-spiked deionized-water blanks

[Abbreviation: µg/L, micrograms per liter]

Constituent and reporting unit	Number of samples	Mean spike recovery, in percent	95-percent confidence interval for spike recovery, in percent	Within limits of data-quality objective
Arsenic, total recoverable, µg/L	8	106.8	103-110	Yes
Arsenic, dissolved, µg/L	8	103.9	99.1-109	Yes
Cadmium, total recoverable, µg/L	8	101.3	97.5-105	Yes
Cadmium, dissolved, µg/L	8	100.0	97.3-103	Yes
Copper, total recoverable, µg/L	8	97.6	92.3-103	Yes
Copper, dissolved, µg/L	8	102.7	101-105	Yes
Iron, total recoverable, µg/L	8	102.2	97.8-107	Yes
Iron, dissolved, µg/L	8	93.8	87.9-99.7	Yes
Lead, total recoverable, µg/L	8	100.8	96.6-105	Yes
Lead, dissolved, µg/L	8	102.3	97.7-107	Yes
Manganese, total recoverable, µg/L	8	96.5	92.0-101	Yes
Manganese, dissolved, µg/L	8	98.5	93.1-104	Yes
Zinc, total recoverable, µg/L	8	101.5	97.1-106	Yes
Zinc, dissolved, µg/L	8	102.3	97.1-108	Yes

Table 15. Recovery efficiency for trace-element analyses of laboratory-spiked stream samples, upper Clark Fork basin, Montana

[Abbreviation: µg/L, micrograms per liter]

Constituent	Number of samples	Mean spike recovery, in percent	95-percent confidence interval for spike recovery, in percent	Within limits of data-quality objective
Arsenic, total recoverable, µg/L	8	102.2	97.1-107	Yes
Arsenic, dissolved, µg/L	8	103.8	94.6-113	Yes
Cadmium, total recoverable, µg/L	8	102.9	98.0-108	Yes
Cadmium, dissolved, µg/L	8	101.3	96.7-106	Yes
Copper, total recoverable, µg/L	8	98.0	92.7-103	Yes
Copper, dissolved, µg/L	8	99.8	96.2-103	Yes
Iron, total recoverable, µg/L	8	99.5	96.1-103	Yes
Iron, dissolved, µg/L	8	101.4	96.2-107	Yes
Lead, total recoverable, µg/L	8	100.0	96.7-103	Yes
Lead, dissolved, µg/L	8	102.9	98.6-107	Yes
Manganese, total recoverable, µg/L	8	97.4	92.9-102	Yes
Manganese, dissolved, µg/L	9	103.8	99.0-109	Yes
Zinc, total recoverable, µg/L	8	101.1	99.1-103	Yes
Zinc, dissolved, µg/L	9	104.7	101-108	Yes

Table 16. Chemical analyses of field blanks for water samples

[Abbreviations: °C, degrees Celsius; µg/L, micrograms per liter; µS/cm, microsiemens per centimeter at 25 °C; mg/L, milligrams per liter. Symbols: <, less than minimum reporting level]

Date	Time	Specific conductance, onsite (µS/cm)	pH, onsite (standard units)	Calcium, dissolved (mg/L)	Magnesium, dissolved (mg/L)	Sodium, dissolved (mg/L)	Potassium, dissolved (mg/L)	Alkalinity (mg/L as $CaCO_3$)	Sulfate, dissolved (mg/L)
Nov 1994									
28...	1830	3	5.5	<0.02	<0.01	<0.02	<0.1	1.6	0.2
Feb 1995									
03...	1000	2	5.6	<.02	<.01	<.02	<.1	<1.0	<.1
Mar									
10...	1100	2	5.7	<.02	<.01	<.02	<.1	1.1	<.1
Apr									
10...	1900	3	5.8	<.02	<.01	<.02	<.1	1.1	<.1
25...	1630	3	5.8	<.02	<.01	<.02	<.1	1.1	<.1
May									
09...	1415	2	5.8	.07	<.01	<.02	<.1	1.1	<.1
23...	1330	3	5.8	<.02	<.01	<.02	<.1	1.5	<.1
Jun									
06...	2015	3	5.6	<.02	<.01	<.02	<.1	1.3	<.1
Jul									
11...	1450	2	5.8	<.02	<.01	<.02	<.1	1.1	<.1

Table 16. Chemical analyses of field blanks for water samples (Continued)

Date	Chloride, dissolved (mg/L)	Fluoride, dissolved (mg/L)	Silica, dissolved (mg/L)	Arsenic, total recoverable (µg/L)	Arsenic, dissolved (µg/L)	Cadmium, total recoverable (µg/L)	Cadmium, dissolved (µg/L)	Copper, total recoverable (µg/L)	Copper, dissolved (µg/L)
Nov 1994									
28...	<0.1	<0.1	<0.1	<1	<1	<1	<0.1	<1	<1
Feb 1995									
03...	<.1	<.1	<.1	<1	<1	<1	<.1	<1	<1
Mar									
10...	<.1	<.1	<.1	<1	<1	<1	<.1	<1	<1
Apr									
10...	<.1	<.1	<.1	<1	<1	<1	<.1	<1	<1
25...	<.1	<.1	.2	<1	<1	<1	<.1	<1	<1
May									
09...	<.1	<.1	.1	<1	<1	<1	<.1	<1	<1
23...	<.1	<.1	.1	<1	<1	<1	<.1	3	<1
Jun									
06...	<.1	<.1	.2	<1	<1	<1	<.1	1	<1
Jul									
11...	<.1	<.1	<.1	<1	<1	<1	<.1	<1	<1

Table 16. Chemical analyses of field blanks for water samples (Continued)

Date	Iron, total recoverable (µg/L)	Iron, dissolved (µg/L)	Lead, total recoverable (µg/L)	Lead, dissolved (µg/L)	Manganese, total recoverable (µg/L)	Manganese, dissolved (µg/L)	Zinc, total recoverable (µg/L)	Zinc, dissolved (µg/L)
Nov 1994								
28...	<10	<3	<1	<0.5	<10	<1	<10	<3
Feb 1995								
03...	<10	<3	<1	.6	<10	<1	<10	<3
Mar								
10...	<10	<3	<1	<.5	<10	<1	<10	<3
Apr								
10...	<10	<3	<1	<.5	<10	<1	<10	<3
25...	<10	<3	<1	<.5	<10	<1	<10	<3
May								
09...	<10	<3	<1	<.5	<10	<1	<10	<3
23...	<10	<3	<1	<.5	<10	<1	<10	<3
Jun								
06...	<10	<3	<1	<.5	<10	<1	<10	<3
Jul								
11...	<10	<3	<1	<.5	<10	<1	<10	<3

Table 17. Trace-element analyses of fine-grained bed sediment, upper Clark Fork basin, Montana, August 1995

[Fine-grained sediment is material less than 0.064 millimeter in diameter. Concentrations are the mean of all analyses for duplicate aliquots from each composite sample. Abbreviation: µg/g, micrograms per gram of dry sample weight. Symbol: <, less than]

Station number (fig. 1)	Station name	Number of composite samples	Concentration, in µg/g								
			Cadmium	Chromium	Copper	Iron	Lead	Manganese	Nickel	Silver	Zinc
12323600	Silver Bow Creek at Opportunity	3	36.7	30.1	6,280	41,200	899	2,460	14.5	17.8	9,390
12323750	Silver Bow Creek at Warm Springs	3	6.0	22.9	259	19,500	58	7,230	14.4	1.0	620
12323770	Warm Springs Creek at Warm Springs	3	3.9	33.4	892	21,900	85	8,790	21.9	3.2	421
12323800	Clark Fork near Galen	3	7.5	30.9	1,220	28,500	133	4,890	17.7	3.7	1,370
12324200	Clark Fork at Deer Lodge	3	9.0	35.4	1,480	31,700	186	2,440	16.8	5.5	1,610
12324680	Clark Fork at Goldcreek	3	5.8	37.8	829	27,500	120	1,730	16.4	3.2	1,160
12331500	Flint Creek near Drummond	3	4.5	26.0	63	24,800	168	3,910	13.5	5.6	674
12331800	Clark Fork near Drummond	3	4.8	34.0	579	26,100	114	2,780	15.9	3.3	1,170
12334510	Rock Creek near Clinton	3	<1.1	26.3	15	20,900	10	269	13.7	<.3	51
12334550	Clark Fork at Turah Bridge, near Bonner	3	3.4	19.2	317	17,200	70	1,130	11.6	1.8	786
12340000	Blackfoot River near Bonner	3	<1.1	22.0	23	19,100	13	672	12.5	<.3	73
12353000	Clark Fork below Missoula[1]	3	1.9	25.6	194	21,100	48	1,740	13.4	1.2	463

[1]Samples collected about 30 miles downstream of water-quality station to conform to previous sampling location.

Table 18. Trace-element analyses of bulk bed sediment, upper Clark Fork basin, Montana, August 1995

[Bulk bed sediment collected in this study generally is material smaller than about 10 millimeters in diameter. Concentrations are the mean of all analyses for triplicate aliquots for each composite sample. Abbreviation: µg/g, micrograms per gram of dry sample weight. Symbol: <, less than]

Station number (fig. 1)	Station name	Number of composite samples	Concentration, in µg/g								
			Cadmium	Chromium	Copper	Iron	Lead	Manganese	Nickel	Silver	Zinc
12323600	Silver Bow Creek at Opportunity	1	8.5	12.7	976	19,700	221	745	6.8	3.4	2,270
12323750	Silver Bow Creek at Warm Springs	1	<1.1	10.1	42	12,300	11	830	5.5	<.3	137
12323770	Warm Springs Creek at Warm Springs	1	1.0	9.7	205	8,980	34	2,650	7.8	.9	148
12323800	Clark Fork near Galen	1	4.0	14.8	542	22,500	79	1,540	8.8	1.6	696
12324200	Clark Fork at Deer Lodge	1	3.1	12.1	449	15,700	74	1,050	8.3	1.4	619
12324680	Clark Fork at Goldcreek	1	3.4	20.3	471	19,600	71	749	12.0	1.5	696
12331500	Flint Creek near Drummond	1	3.2	11.0	40	15,000	120	2,440	8.0	5.1	429
12331800	Clark Fork near Drummond	1	1.8	23.1	235	16,600	44	1,210	10.3	1.2	497
12334510	Rock Creek near Clinton	1	<1.1	8.9	5	8,960	5	145	5.7	<.3	20
12334550	Clark Fork at Turah Bridge, near Bonner	1	<1.1	9.1	75	9,530	21	234	6.8	<.3	281
12353000	Clark Fork below Missoula[1]	1	<1.1	5.4	28	6,890	10	381	4.5	<.3	101

[1]Samples collected about 30 miles downstream of water-quality station to conform to previous sampling location.

Table 19. Recovery efficiency for trace-element analyses of standard reference materials for bed sediment

[Abbreviations: µg/g, micrograms per gram of dry sample weight; SRM, standard reference material. Symbol: --, recovery could not be determined because all analyses were less than the analytical detection limit of 0.8 µg/g for cadmium and 0.5 µg/g for silver]

Constituent	Number of measurements	Dilution ratio	Certified concentration (µg/g)	Mean SRM recovery (percent)	95-percent confidence interval for SRM recovery (percent)
			SRM sample 2709		
Cadmium	9	1:5	0.4	--	--
Chromium	9	1:5	130	69.0	61.5-76.5
Copper	9	1:5	35	79.9	72.4-87.4
Iron	9	1:5	35,000	88.3	83.4-93.2
Lead	8	1:1	19	61.1	58.4-63.8
Manganese	9	1:5	538	93.0	88.5-97.5
Nickel	9	1:5	88	87.3	83.2-95.2
Silver	9	1:1	.4	115	94.1-135
Zinc	9	1:5	106	93.4	87.4-99.4
			SRM sample 2711		
Cadmium	8	1:10	41.7	104	102-106
Chromium	8	1:10	47.0	61.2	54.5-67.9
Copper	8	1:10	114	88.6	87.5-89.7
Iron	8	1:10	28,900	81.0	77.0-85.0
Lead	8	1:5	1,160	99.2	98.3-100.1
Manganese	8	1:10	638	83.3	82.2-84.4
Nickel	8	1:10	20.6	77.9	73.2-82.6
Silver	8	1:1	4.6	82.5	80.0-85.0
Zinc	8	1:10	350	94.1	93.3-94.9

Table 20. Trace-element analyses of procedural blanks for bed sediment

[Abbreviation: µg/mL, micrograms per milliliter. Dilution ratio is the proportion of initial volume of concentrated nitric acid used as a digesting reagent to final volume of solution after addition of 0.6 N hydrochloric acid used for reconstituting dried residue. Symbols: <, less than; --, no data]

Sample identification	Dilution ratio	Trace-element concentration, in µg/mL								
		Cadmium	Chromium	Copper	Iron	Lead	Manganese	Nickel	Silver	Zinc
A	1:1	--	--	--	--	<0.02	--	--	<0.01	--
A	1:5	<0.007	<0.002	0.012	<0.057	--	<0.002	<0.005	--	<0.012
A	1:10	<.007	<.002	<.010	<.057	--	<.002	<.005	--	<.012
B	1:1	--	--	--	--	<.02	--	--	<.01	--
B	1:5	<.007	<.002	<.010	<.057	--	<.002	<.005	--	<.012
B	1:10	<.007	<.002	<.010	.062	--	<.002	<.005	--	<.012
C	1:1	--	--	--	--	<.02	--	--	<.01	--
C	1:5	<.007	<.002	<.010	<.057	--	<.002	<.005	--	<.012
C	1:10	<.007	<.002	<.010	<.057	--	<.002	<.005	--	<.012
D	1:1	--	--	--	--	<.02	--	--	<.01	--
D	1:5	<.007	<.002	<.010	<.057	--	<.002	<.005	--	<.012
D	1:10	<.007	<.002	<.010	<.057	--	<.002	<.005	--	<.012
E	1:1	--	--	--	--	<.02	--	--	<.01	--
E	1:5	<.007	<.002	<.011	<.057	--	<.002	<.005	--	<.012
E	1:10	<.007	<.002	<.010	<.057	--	<.002	<.005	--	<.012
F	1:1	--	--	--	--	<.02	--	--	<.01	--
F	1:5	<.007	<.002	<.010	<.057	--	<.002	<.005	--	<.012
F	1:10	<.007	<.002	<.010	<.057	--	<.002	<.005	--	<.012
G	1:1	--	--	--	--	<.02	--	--	<.01	--
G	1:5	<.007	<.002	<.010	<.057	--	<.002	<.005	--	<.012
G	1:10	<.007	<.002	<.010	<.057	--	<.002	<.005	--	<.012
H	1:1	--	--	--	--	<.02	--	--	<.01	--
H	1:5	<.007	<.002	<.010	<.057	--	<.002	<.005	--	<.012
H	1:10	<.007	<.002	<.010	<.057	--	<.002	<.005	--	<.012

Table 21. Trace-element analyses of biota, upper Clark Fork basin, Montana, August 1995

[Analyses are of whole-body tissue of aquatic insects. Composite samples made by combining similar-sized insects of the same species into a sample of sufficient mass for analysis. Concentrations for biota samples composed of two or more composite samples are the means of all analyses. Abbreviations: µg/g, micrograms per gram of dry sample weight. Symbol: <, less than minimum reporting level]

Taxon	Number of composite samples	Concentration, in µg/g							
		Cadmium	Chromium	Copper	Iron	Lead	Manganese	Nickel	Zinc
12323600 Silver Bow Creek at Opportunity									
Hydropsyche cockerelli	1	6.3	3.1	439	689	21.7	180	0.7	871
Hydropsyche tana	1	9.2	2.0	456	875	21.0	307	.7	1,010
12323750 Silver Bow Creek at Warm Springs									
Hydropsyche cockerelli	4	.6	1.0	36.9	783	2.6	670	.9	158
12323770 Warm Springs Creek at Warm Springs									
Arctopsyche grandis	1	2.4	1.9	98.8	684	5.6	2,280	2.3	222
12323800 Clark Fork near Galen									
Hydropsyche cockerelli	2	1.5	1.7	89.7	1,250	7.8	1,510	1.8	189
Hydropsyche occidentalis	4	1.1	1.7	71.7	1,200	6.6	2,180	1.3	178
12324200 Clark Fork at Deer Lodge									
Hydropsyche cockerelli	1	1.3	3.2	104	1,360	16.6	686	2.4	197
Hydropsyche occidentalis	5	1.4	2.1	104	1,360	10.7	1,690	1.5	232
12324680 Clark Fork at Goldcreek									
Arctopsyche grandis	2	2.3	.8	29.6	361	2.3	665	.3	206
Claassenia sabulosa	2	1.6	.8	56.3	161	1.4	86.6	.3	231
Hydropsyche cockerelli	2	1.7	1.0	46.6	602	5.8	552	1.0	141
Hydropsyche occidentalis	4	1.4	1.0	41.3	698	4.6	819	1.1	148
Hydropsyche sp.	1	1.2	1.3	34.4	540	5.8	625	.8	128
12331500 Flint Creek near Drummond									
Arctopsyche grandis	6	.4	2.1	16.2	1,650	9.2	1,190	1.4	203
Hydropsyche cockerelli	1	<.5	1.0	9.5	996	7.2	401	.9	85
Hydropsyche occidentalis	1	.9	4.1	26.4	2,550	29.2	2,690	3.6	243
12331800 Clark Fork near Drummond									
Arctopsyche grandis	5	1.5	.8	25.9	386	3.3	555	.3	173
Claassenia sabulosa	4	1.6	.7	71.5	122	.9	132	.3	262
Hydropsyche cockerelli	4	1.5	1.3	58.8	891	6.5	754	1.1	175
Hydropsyche occidentalis	1	1.5	1.6	51.1	972	8.7	1,220	2.4	196
12334510 Rock Creek near Clinton									
Arctopsyche grandis	4	.2	1.2	9.9	625	.4	250	1.1	131
Claassenia sabulosa	3	.3	.6	37.6	85.8	.4	33.4	.3	185
Hydropsyche cockerelli	1	<.3	.9	13.1	609	<1.5	258	.9	99
Hydropsyche occidentalis	1	<.3	.9	9.6	752	<2.0	262	.9	99
12334550 Clark Fork at Turah Bridge, near Bonner									
Arctopsyche grandis	4	1.0	1.3	28.7	729	3.0	513	.7	169
Claassenia sabulosa	4	1.0	.6	61.8	92.7	.6	96.5	.1	196
Hydropsyche cockerelli	3	.8	1.5	40.7	890	5.3	554	.8	158
Hydropsyche occidentalis	3	.7	1.5	39.6	880	5.0	680	.7	167
12353000 Clark Fork below Missoula[1]									
Claassenia sabulosa	3	.7	.6	42.9	102	.8	77.5	.2	183
Hydropsyche cockerelli	4	.5	1.7	32.2	1,260	2.4	590	1.3	142
Hydropsyche occidentalis	1	.6	1.7	27.6	1,050	3.5	790	1.4	151

[1]Samples collected about 30 miles downstream of water-quality station to conform to previous sampling location.

Table 22. Recovery efficiency for trace-element analyses of standard reference material for biota

[Abbreviations: SRM, standard reference material; µg/g, micrograms per gram of dry sample weight]

Constituent	Number of measurements	Certified concentration (µg/g)	Mean SRM recovery (percent)	95-percent confidence interval for SRM recovery (percent)
		SRM sample 1566 a		
Cadmium	12	4.15	104	102-106
Chromium	12	1.43	120	115-125
Copper	12	66.3	100	97.1-103
Iron	12	539	93.8	92.0-95.6
Lead	12	.37	109	91.1-127
Manganese	12	12.3	92.9	91.5-94.3
Nickel	12	2.25	103	85.0-121
Zinc	12	830	97.0	95.5-98.5

Table 23. Trace-element analyses of procedural blanks for biota

[Procedural blanks were not diluted prior to analysis. Abbreviation: µg/mL, micrograms per milliliter. Symbol: <, less than]

Station number	Station name	Dilution ratio	Trace-element concentration, in µg/mL							
			Cadmium	Chromium	Copper	Iron	Lead	Manganese	Nickel	Zinc
12323600	Silver Bow Creek at Opportunity	1:1	<0.003	0.021	<0.002	<0.35	<0.02	0.017	<0.004	<0.01
12323750	Silver Bow Creek at Warm Springs	1:1	<.003	.009	<.002	<.35	<.02	<.003	<.004	<.01
12323770	Warm Springs Creek at Warm Springs	1:1	<.003	.011	<.002	.47	<.02	.019	<.004	<.01
12323800	Clark Fork near Galen	1:1	<.003	.013	<.002	<.35	<.02	.010	<.004	<.01
12324200	Clark Fork at Deer Lodge	1:1	<.003	.013	<.002	<.35	<.02	.004	<.004	<.01
12324680	Clark Fork at Goldcreek	1:1	<.003	.014	<.002	<.35	<.02	.007	<.004	<.01
12331500	Flint Creek near Drummond	1:1	<.003	.011	<.002	<.35	<.02	<.003	<.004	<.01
12331800	Clark Fork near Drummond	1:1	<.003	.012	<.002	<.35	<.02	.005	<.004	<.01
12334510	Rock Creek near Clinton	1:1	<.003	.017	<.002	<.35	<.02	.004	<.004	<.01
12334550	Clark Fork at Turah Bridge, near Bonner	1:1	<.003	.014	<.002	<.35	<.02	<.003	<.004	<.01
12353000	Clark Fork below Missoula	1:1	<.003	.014	<.002	<.35	<.02	.004	<.004	<.01

Table 24. Statistical summary of water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 1995

[Abbreviations: ft^3/s, cubic feet per second; °C, degrees Celsius; µg/L, micrograms per liter; µS/cm, microsiemens per centimeter at 25 °C; mg/L, milligrams per liter; mm, millimeter; ton/d, tons per day. Symbols: <, less than minimum reporting level[1]; --, indicates insufficient data greater than minimum reporting level to compute statistic]

Property or constituent and reporting unit	Number of samples	Maximum	Minimum	Mean	Median
12323230--BLACKTAIL CREEK AT HARRISON AVENUE, AT BUTTE, MONT.					
Period of record for water-quality data: March 1993-September 1995					
Streamflow, instantaneous (ft^3/s)	28	85	3.1	15	8.2
Specific conductance, onsite (µS/cm)	28	340	177	256	254
Temperature, water (°C)	28	17.0	2.5	8.4	7.5
pH, onsite (standard units)	28	8.2	7.3	7.8	7.8
Hardness, total (mg/L as $CaCO_3$)	28	140	71	102	100
Calcium, dissolved (mg/L)	28	39	20	29	30
Magnesium, dissolved (mg/L)	28	9.7	5.0	7.0	7.0
Sodium, dissolved (mg/L)	28	18	6.4	10	10
Potassium, dissolved (mg/L)	28	6.4	2.0	2.8	2.6
Alkalinity (mg/L as $CaCO_3$)	28	117	57	87	89
Sulfate, dissolved (mg/L)	28	36	15	26	26
Chloride, dissolved (mg/L)	28	18	2.8	6.5	5.6
Fluoride, dissolved (mg/L)	28	.6	.2	.3	.3
Silica, dissolved (mg/L)	28	32	14	24	24
Dissolved solids, calculated (mg/L)	28	208	114	159	161
Arsenic, total recoverable (µg/L)	28	18	2	7	6
Arsenic, dissolved (µg/L)	28	13	2	5	4
Cadmium, total recoverable (µg/L)	28	<1	<1	--	<1
Cadmium, dissolved (µg/L)	28	.1	<.1	--	<.1
Copper, total recoverable (µg/L)	28	52	2	10	7
Copper, dissolved (µg/L)	28	10	1	4	4
Iron, total recoverable (µg/L)	28	3,800	260	861	595
Iron, dissolved (µg/L)	28	360	24	169	170
Lead, total recoverable (µg/L)	28	47	<1	[2]5	1
Lead, dissolved (µg/L)	28	1	<.5	--	<.5
Manganese, total recoverable (µg/L)	28	190	30	66	60
Manganese, dissolved (µg/L)	28	99	17	42	40
Zinc, total recoverable (µg/L)	28	130	<10	[2]17	10
Zinc, dissolved (µg/L)	28	11	<3	[2]5	5
Sediment, suspended concentration (mg/L)	28	123	2	20	8
Sediment, suspended discharge (ton/d)	28	17	.04	1.3	.16
Sediment, suspended (percent finer than 0.062 mm)	28	95	50	84	90

Table 24. Statistical summary of water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 1995 (Continued)

Property or constituent and reporting unit	Number of samples	Maximum	Minimum	Mean	Median
12323250--SILVER BOW CREEK BELOW BLACKTAIL CREEK, AT BUTTE, MONT. **Period of record for water-quality data: March 1993-September 1995**					
Streamflow, instantaneous (ft^3/s)	28	93	15	31	26
Specific conductance, onsite (µS/cm)	28	691	265	462	470
Temperature, water (°C)	28	17.0	1.5	10.4	9.0
pH, onsite (standard units)	28	7.8	7.3	7.5	7.5
Hardness, total (mg/L as $CaCO_3$)	28	170	97	142	150
Calcium, dissolved (mg/L)	28	48	28	41	42
Magnesium, dissolved (mg/L)	28	12	6.5	9.9	10
Sodium, dissolved (mg/L)	28	66	12	25	25
Potassium, dissolved (mg/L)	28	35	4.0	9.0	6.0
Alkalinity (mg/L as $CaCO_3$)	27	133	65	87	89
Sulfate, dissolved (mg/L)	27	96	35	72	75
Chloride, dissolved (mg/L)	27	88	6.7	22	20
Fluoride, dissolved (mg/L)	27	.8	.3	.5	.4
Silica, dissolved (mg/L)	27	28	17	23	23
Dissolved solids, calculated (mg/L)	27	378	165	256	258
Arsenic, total recoverable (µg/L)	28	39	10	18	18
Arsenic, dissolved (µg/L)	28	13	5	8	8
Cadmium, total recoverable (µg/L)	28	6	1	3	2
Cadmium, dissolved (µg/L)	28	6.2	.5	2.0	1.9
Copper, total recoverable (µg/L)	28	550	85	189	155
Copper, dissolved (µg/L)	28	120	22	71	68
Iron, total recoverable (µg/L)	28	7,400	310	1,630	1,150
Iron, dissolved (µg/L)	28	270	26	109	102
Lead, total recoverable (µg/L)	28	250	3	36	18
Lead, dissolved (µg/L)	28	2.4	<.5	[2].9	.8
Manganese, total recoverable (µg/L)	28	1,600	320	771	720
Manganese, dissolved (µg/L)	28	1,700	210	694	675
Zinc, total recoverable (µg/L)	28	2,200	350	911	885
Zinc, dissolved (µg/L)	28	2,200	200	722	710
Sediment, suspended concentration (mg/L)	27	162	3	38	19
Sediment, suspended discharge (ton/d)	27	25	.14	4.1	1.5
Sediment, suspended (percent finer than 0.062 mm)	27	93	42	81	86

Table 24. Statistical summary of water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 1995 (Continued)

Property or constituent and reporting unit	Number of samples	Maximum	Minimum	Mean	Median
12323600--SILVER BOW CREEK AT OPPORTUNITY, MONT. **Period of record for water-quality data: March 1993-September 1995**					
Streamflow, instantaneous (ft^3/s)	30	315	26	85	57
Specific conductance, onsite (µS/cm)	29	593	219	363	370
Temperature, water (°C)	29	18.0	0.0	9.0	9.0
pH, onsite (standard units)	29	8.9	7.2	8.2	8.2
Hardness, total (mg/L as $CaCO_3$)	29	200	88	130	130
Calcium, dissolved (mg/L)	29	54	27	38	40
Magnesium, dissolved (mg/L)	29	15	4.9	8.2	8.4
Sodium, dissolved (mg/L)	29	26	8.1	17	16
Potassium, dissolved (mg/L)	29	16	2.9	5.2	4.2
Alkalinity (mg/L as $CaCO_3$)	28	117	60	88	86
Sulfate, dissolved (mg/L)	28	190	32	65	62
Chloride, dissolved (mg/L)	28	24	3.2	11	11
Fluoride, dissolved (mg/L)	28	.8	.2	.4	.4
Silica, dissolved (mg/L)	28	28	15	21	21
Dissolved solids, calculated (mg/L)	28	374	136	220	226
Arsenic, total recoverable (µg/L)	29	170	11	34	18
Arsenic, dissolved (µg/L)	29	34	1	10	9
Cadmium, total recoverable (µg/L)	29	49	1	4	2
Cadmium, dissolved (µg/L)	29	41	.5	2.6	1.2
Copper, total recoverable (µg/L)	29	3,900	79	345	150
Copper, dissolved (µg/L)	29	450	25	77	57
Iron, total recoverable (µg/L)	29	8,600	290	1,960	980
Iron, dissolved (µg/L)	29	210	3	62	44
Lead, total recoverable (µg/L)	29	260	7	47	17
Lead, dissolved (µg/L)	29	2.7	<.5	[2].8	<.5
Manganese, total recoverable (µg/L)	29	10,000	230	927	610
Manganese, dissolved (µg/L)	29	9,300	190	815	500
Zinc, total recoverable (µg/L)	29	15,000	230	1,040	520
Zinc, dissolved (µg/L)	29	13,000	110	727	310
Sediment, suspended concentration (mg/L)	30	384	6	63	20
Sediment, suspended discharge (ton/d)	30	219	.42	21	3.8
Sediment, suspended (percent finer than 0.062 mm)	30	92	52	76	78

Table 24. Statistical summary of water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 1995 (Continued)

Property or constituent and reporting unit	Number of samples	Maximum	Minimum	Mean	Median
12323750--SILVER BOW CREEK AT WARM SPRINGS, MONT. **Period of record for water-quality data: March 1993-September 1995**					
Streamflow, instantaneous (ft^3/s)	30	452	24	147	118
Specific conductance, onsite (µS/cm)	28	614	281	461	475
Temperature, water (°C)	29	22.0	2.0	11.9	13.5
pH, onsite (standard units)	28	9.3	8.0	8.8	8.8
Hardness, total (mg/L as $CaCO_3$)	28	260	120	194	195
Calcium, dissolved (mg/L)	28	78	36	57	58
Magnesium, dissolved (mg/L)	28	19	6.7	13	13
Sodium, dissolved (mg/L)	28	23	8.2	16	17
Potassium, dissolved (mg/L)	28	8.3	2.6	4.5	4.4
Alkalinity (mg/L as $CaCO_3$)	28	130	69	99	96
Sulfate, dissolved (mg/L)	28	210	44	119	120
Chloride, dissolved (mg/L)	28	15	1.3	7.9	7.5
Fluoride, dissolved (mg/L)	28	1.2	.5	.7	.7
Silica, dissolved (mg/L)	28	20	6.3	12	12
Dissolved solids, calculated (mg/L)	28	396	167	290	294
Arsenic, total recoverable (µg/L)	28	48	12	21	20
Arsenic, dissolved (µg/L)	28	35	8	18	16
Cadmium, total recoverable (µg/L)	28	<1	<1	--	<1
Cadmium, dissolved (µg/L)	28	.2	<.1	[2].1	<.1
Copper, total recoverable (µg/L)	28	70	10	28	23
Copper, dissolved (µg/L)	28	32	7	14	12
Iron, total recoverable (µg/L)	28	3,000	130	462	350
Iron, dissolved (µg/L)	28	35	3	13	11
Lead, total recoverable (µg/L)	28	14	<1	[2]2	1
Lead, dissolved (µg/L)	28	.7	<.5	--	<.5
Manganese, total recoverable (µg/L)	28	570	80	227	195
Manganese, dissolved (µg/L)	28	500	34	144	115
Zinc, total recoverable (µg/L)	28	180	10	69	65
Zinc, dissolved (µg/L)	28	73	3	15	10
Sediment, suspended concentration (mg/L)	30	229	2	15	7
Sediment, suspended discharge (ton/d)	30	279	.26	13	1.9
Sediment, suspended (percent finer than 0.062 mm)	29	97	63	82	82

Table 24. Statistical summary of water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 1995 (Continued)

Property or constituent and reporting unit	Number of samples	Maximum	Minimum	Mean	Median
12323770--WARM SPRINGS CREEK AT WARM SPRINGS, MONT. **Period of record for water quality data: March 1993-September 1995**					
Streamflow, instantaneous (ft^3/s)	18	333	2.8	97	84
Specific conductance, onsite (µS/cm)	17	795	172	342	283
Temperature, water (°C)	18	16.0	.5	8.2	8.8
pH, onsite (standard units)	17	8.6	7.4	8.2	8.3
Hardness, total (mg/L as $CaCO_3$)	17	420	80	170	130
Calcium, dissolved (mg/L)	17	130	25	52	40
Magnesium, dissolved (mg/L)	17	22	4.3	9.8	7.5
Sodium, dissolved (mg/L)	17	7.4	1.8	3.6	3.0
Potassium, dissolved (mg/L)	17	4.7	.9	1.6	1.3
Alkalinity (mg/L as $CaCO_3$)	17	147	61	108	106
Sulfate, dissolved (mg/L)	17	270	20	66	37
Chloride, dissolved (mg/L)	17	3.6	.5	1.3	1.0
Fluoride, dissolved (mg/L)	17	.6	.3	.4	.4
Silica, dissolved (mg/L)	17	13	8.4	10	10
Dissolved solids, calculated (mg/L)	17	536	103	210	163
Arsenic, total recoverable (µg/L)	17	23	3	8	6
Arsenic, dissolved (µg/L)	17	14	3	5	4
Cadmium, total recoverable (µg/L)	17	<1	<1	--	<1
Cadmium, dissolved (µg/L)	17	<.1	<.1	--	<.1
Copper, total recoverable (µg/L)	17	88	4	23	9
Copper, dissolved (µg/L)	17	16	1	4	3
Iron, total recoverable (µg/L)	17	1,400	40	376	140
Iron, dissolved (µg/L)	17	30	4	12	9
Lead, total recoverable (µg/L)	17	14	<1	[2]3	<1
Lead, dissolved (µg/L)	17	1.8	<.5	--	<.5
Manganese, total recoverable (µg/L)	17	1,400	120	358	320
Manganese, dissolved (µg/L)	17	570	65	198	110
Zinc, total recoverable (µg/L)	17	60	<10	[2]17	10
Zinc, dissolved (µg/L)	17	10	<3	[2]3	<3
Sediment, suspended concentration (mg/L)	18	90	3	24	12
Sediment, suspended discharge (ton/d)	18	73	.14	10	1.4
Sediment, suspended (percent finer than 0.062 mm)	18	88	57	76	77

Table 24. Statistical summary of water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 1995 (Continued)

Property or constituent and reporting unit	Number of samples	Maximum	Minimum	Mean	Median
12323800--CLARK FORK NEAR GALEN, MONT. **Period of record for water-quality data: July 1988-September 1995**					
Streamflow, instantaneous (ft^3/s)	71	1,050	14	192	117
Specific conductance, onsite (µS/cm)	59	720	220	453	469
Temperature, water (°C)	70	22.5	.0	9.6	9.8
pH, onsite (standard units)	58	9.0	7.5	8.4	8.4
Hardness, total (mg/L as $CaCO_3$)	57	370	96	201	200
Calcium, dissolved (mg/L)	57	110	29	60	61
Magnesium, dissolved (mg/L)	57	22	5.7	13	13
Sodium, dissolved (mg/L)	29	19	3.6	12	13
Potassium, dissolved (mg/L)	29	5.9	2.0	3.6	3.3
Alkalinity (mg/L as $CaCO_3$)	29	136	79	103	98
Sulfate, dissolved (mg/L)	29	220	34	99	100
Chloride, dissolved (mg/L)	29	11	2.0	6.4	6.4
Fluoride, dissolved (mg/L)	29	1.1	.4	.6	.6
Silica, dissolved (mg/L)	29	17	8.1	12	12
Dissolved solids, calculated (mg/L)	29	428	141	261	266
Arsenic, total recoverable (µg/L)	57	60	3	18	15
Arsenic, dissolved (µg/L)	57	30	4	13	12
Cadmium, total recoverable (µg/L)	57	3	<1	[2].4	<1
Cadmium, dissolved (µg/L)	57	1	<.1	[2].1	<1
Copper, total recoverable (µg/L)	56	240	8	41	25
Copper, dissolved (µg/L)	57	50	3	12	9
Iron, total recoverable (µg/L)	57	9,200	90	717	330
Iron, dissolved (µg/L)	57	110	3	18	10
Lead, total recoverable (µg/L)	57	28	<1	[2]5	2
Lead, dissolved (µg/L)	57	3	<.5	[2].4	<.5
Manganese, total recoverable (µg/L)	57	1,400	80	324	270
Manganese, dissolved (µg/L)	57	360	33	134	110
Zinc, total recoverable (µg/L)	57	360	10	69	50
Zinc, dissolved (µg/L)	57	110	3	18	12
Sediment, suspended concentration (mg/L)	71	338	2	23	8
Sediment, suspended discharge (ton/d)	71	459	.12	26	2.2
Sediment, suspended (percent finer than 0.062 mm)	70	97	64	79	79

Table 24. Statistical summary of water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 1995 (Continued)

Property or constituent and reporting unit	Number of samples	Maximum	Minimum	Mean	Median
12324200--CLARK FORK AT DEER LODGE, MONT. **Period of record for water-quality data: March 1985-September 1995**					
Streamflow, instantaneous (ft^3/s)	123	1,920	23	271	123
Specific conductance, onsite (µS/cm)	106	642	262	510	536
Temperature, water (°C)	122	23.0	.0	9.4	10.0
pH, onsite (standard units)	71	8.7	7.4	8.2	8.2
Hardness, total (mg/L as $CaCO_3$)	63	270	120	217	230
Calcium, dissolved (mg/L)	63	81	37	64	67
Magnesium, dissolved (mg/L)	63	18	7.2	14	14
Sodium, dissolved (mg/L)	28	25	8.6	15	15
Potassium, dissolved (mg/L)	28	6.3	2.4	3.7	3.6
Alkalinity (mg/L as $CaCO_3$)	29	182	101	133	141
Sulfate, dissolved (mg/L)	28	140	44	98	98
Chloride, dissolved (mg/L)	28	12	1.2	7.0	7.2
Fluoride, dissolved (mg/L)	28	.7	.1	.6	.6
Silica, dissolved (mg/L)	28	34	11	17	16
Dissolved solids, calculated (mg/L)	28	374	184	297	312
Arsenic, total recoverable (µg/L)	73	200	8	25	17
Arsenic, dissolved (µg/L)	73	39	7	14	12
Cadmium, total recoverable (µg/L)	73	5	<1	[2].7	<1
Cadmium, dissolved (µg/L)	73	2	<.1	--	<1
Copper, total recoverable (µg/L)	72	1,500	11	112	50
Copper, dissolved (µg/L)	73	120	4	13	9
Iron, total recoverable (µg/L)	73	29,000	60	2,350	730
Iron, dissolved (µg/L)	73	150	<3	[2]16	9
Lead, total recoverable (µg/L)	73	200	<1	[2]15	5
Lead, dissolved (µg/L)	73	6	<.5	[2].7	<1
Manganese, total recoverable (µg/L)	73	4,600	30	359	210
Manganese, dissolved (µg/L)	73	400	1	47	32
Zinc, total recoverable (µg/L)	73	1,700	10	134	70
Zinc, dissolved (µg/L)	73	230	3	18	14
Sediment, suspended concentration (mg/L)	123	2,250	2	88	24
Sediment, suspended discharge (ton/d)	123	8,690	.29	207	11
Sediment, suspended (percent finer than 0.062 mm)	114	99	40	72	73

Table 24. Statistical summary of water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 1995 (Continued)

Property or constituent and reporting unit	Number of samples	Maximum	Minimum	Mean	Median
12324590--LITTLE BLACKFOOT RIVER NEAR GARRISON, MONT. **Period of record for water-quality data: March 1985-September 1995**					
Streamflow, instantaneous (ft^3/s)	62	2,080	21	298	178
Specific conductance, onsite (µS/cm)	50	300	120	220	216
Temperature, water (°C)	61	22	.0	7.2	7.0
pH, onsite (standard units)	49	8.5	7.0	7.9	8.0
Hardness, total (mg/L as $CaCO_3$)	44	140	51	101	100
Calcium, dissolved (mg/L)	44	43	14	29	30
Magnesium, dissolved (mg/L)	44	9.4	3.3	6.8	7.0
Sodium, dissolved (mg/L)	18	7.3	3.4	5.2	5.3
Potassium, dissolved (mg/L)	17	4.5	1.3	2.0	1.8
Alkalinity (mg/L as $CaCO_3$)	17	141	52	97	100
Sulfate, dissolved (mg/L)	17	20	9.8	13	14
Chloride, dissolved (mg/L)	17	3.4	.8	1.5	1.3
Fluoride, dissolved (mg/L)	17	.2	.1	.2	.2
Silica, dissolved (mg/L)	18	23	17	19	18
Dissolved solids, calculated (mg/L)	17	182	96	135	137
Arsenic, total recoverable (µg/L)	49	17	4	7	6
Arsenic, dissolved (µg/L)	49	7	3	5	5
Cadmium, total recoverable (µg/L)	49	2	<1	[2].4	<1
Cadmium, dissolved (µg/L)	49	1	<.1	--	<1
Copper, total recoverable (µg/L)	48	45	<1	[2]6	3
Copper, dissolved (µg/L)	49	7	<1	[2]2	2
Iron, total recoverable (µg/L)	49	25,000	20	1,670	330
Iron, dissolved (µg/L)	49	120	<3	[2]36	23
Lead, total recoverable (µg/L)	49	25	<1	[2]4	1
Lead, dissolved (µg/L)	48	6	<.5	[2].6	<1
Manganese, total recoverable (µg/L)	49	1,100	<10	[2]95	30
Manganese, dissolved (µg/L)	49	30	1	8	6
Zinc, total recoverable (µg/L)	49	140	<10	[2]19	10
Zinc, dissolved (µg/L)	49	24	<3	[2]4	4
Sediment, suspended concentration (mg/L)	62	1,410	1	66	10
Sediment, suspended discharge (ton/d)	62	7,920	.08	200	4.4
Sediment, suspended (percent finer than 0.062 mm)	62	95	49	75	80

Table 24. Statistical summary of water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 1995 (Continued)

Property or constituent and reporting unit	Number of samples	Maximum	Minimum	Mean	Median
12324680--CLARK FORK AT GOLDCREEK MONT.					
Period of record for water-quality data: March 1993-September 1995					
Streamflow, instantaneous (ft^3/s)	29	3,920	87	752	529
Specific conductance, onsite (µS/cm)	28	496	257	379	399
Temperature, water (°C)	29	20.0	.0	8.9	8.0
pH, onsite (standard units)	28	8.7	8.0	8.3	8.3
Hardness, total (mg/L as $CaCO_3$)	28	230	110	167	175
Calcium, dissolved (mg/L)	28	68	33	49	52
Magnesium, dissolved (mg/L)	28	15	6.9	11	11
Sodium, dissolved (mg/L)	28	19	6.9	12	12
Potassium, dissolved (mg/L)	28	6.9	2.0	3.1	3.0
Alkalinity (mg/L as $CaCO_3$)	28	172	89	128	131
Sulfate, dissolved (mg/L)	28	88	31	59	56
Chloride, dissolved (mg/L)	28	7.2	2.5	4.7	4.4
Fluoride, dissolved (mg/L)	28	.6	.1	.4	.4
Silica, dissolved (mg/L)	28	25	14	18	18
Dissolved solids, calculated (mg/L)	28	313	155	234	245
Arsenic, total recoverable (µg/L)	28	75	8	16	14
Arsenic, dissolved (µg/L)	28	18	6	10	10
Cadmium, total recoverable (µg/L)	28	2	<1	--	<1
Cadmium, dissolved (µg/L)	28	<.1	<.1	--	<.1
Copper, total recoverable (µg/L)	27	440	8	54	34
Copper, dissolved (µg/L)	27	23	3	8	6
Iron, total recoverable (µg/L)	28	12,000	60	1,240	540
Iron, dissolved (µg/L)	28	73	<3	[2]19	14
Lead, total recoverable (µg/L)	27	73	<1	[2]8	4
Lead, dissolved (µg/L)	27	<.5	<.5	--	<.5
Manganese, total recoverable (µg/L)	28	1,100	30	174	125
Manganese, dissolved (µg/L)	28	43	11	22	22
Zinc, total recoverable (µg/L)	28	510	10	70	50
Zinc, dissolved (µg/L)	28	22	<3	[2]9	7
Sediment, suspended concentration (mg/L)	29	752	2	67	23
Sediment, suspended discharge (ton/d)	29	7,960	.94	364	38
Sediment, suspended (percent finer than 0.062 mm)	29	93	52	78	79

Table 24. Statistical summary of water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 1995 (Continued)

Property or constituent and reporting unit	Number of samples	Maximum	Minimum	Mean	Median
12331500--FLINT CREEK NEAR DRUMMOND, MONT.					
Period of record for water-quality data: March 1985-September 1995					
Streamflow, instantaneous (ft^3/s)	78	892	4.2	172	114
Specific conductance, onsite (µS/cm)	67	507	135	306	301
Temperature, water (°C)	76	21.0	.0	8.7	9.0
pH, onsite (standard units)	64	8.8	7.5	8.2	8.3
Hardness, total (mg/L as $CaCO_3$)	57	260	60	146	140
Calcium, dissolved (mg/L)	57	73	17	40	39
Magnesium, dissolved (mg/L)	57	20	4.3	11	12
Sodium, dissolved (mg/L)	29	15	3.8	7.5	7.5
Potassium, dissolved (mg/L)	28	7.8	1.0	3.4	3.0
Alkalinity (mg/L as $CaCO_3$)	28	237	65	134	142
Sulfate, dissolved (mg/L)	28	32	6.5	15	14
Chloride, dissolved (mg/L)	28	6.5	1.5	3.7	3.6
Fluoride, dissolved (mg/L)	28	.4	.1	.2	.2
Silica, dissolved (mg/L)	29	32	11	19	19
Dissolved solids, calculated (mg/L)	28	318	94	177	182
Arsenic, total recoverable (µg/L)	64	57	7	19	15
Arsenic, dissolved (µg/L)	64	20	5	10	9
Cadmium, total recoverable (µg/L)	64	3	<1	[2].3	<1
Cadmium, dissolved (µg/L)	64	<1	<.1	--	<1
Copper, total recoverable (µg/L)	63	32	1	8	7
Copper, dissolved (µg/L)	64	7	<1	[2]2	2
Iron, total recoverable (µg/L)	64	7,200	70	1,140	580
Iron, dissolved (µg/L)	64	240	4	38	26
Lead, total recoverable (µg/L)	64	87	<1	[2]14	9
Lead, dissolved (µg/L)	64	7	<.5	[2]1	<5
Manganese, total recoverable (µg/L)	64	1,600	50	255	155
Manganese, dissolved (µg/L)	64	120	15	44	40
Zinc, total recoverable (µg/L)	64	290	<10	[2]49	30
Zinc, dissolved (µg/L)	64	27	<3	[2]7	4
Sediment, suspended concentration (mg/L)	78	556	3	57	28
Sediment, suspended discharge (ton/d)	78	904	.03	50	8.8
Sediment, suspended (percent finer than 0.062 mm)	78	98	28	81	84

Table 24. Statistical summary of water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 1995 (Continued)

Property or constituent and reporting unit	Number of samples	Maximum	Minimum	Mean	Median
12331800--CLARK FORK NEAR DRUMMOND, MONT. **Period of record for water-quality data: March 1993-September 1995**					
Streamflow, instantaneous (ft^3/s)	29	3,300	149	1,010	846
Specific conductance, onsite (µS/cm)	28	630	233	409	432
Temperature, water (°C)	29	21.0	1.0	10.0	10.0
pH, onsite (standard units)	28	8.5	8.0	8.3	8.3
Hardness, total (mg/L as $CaCO_3$)	28	300	91	185	195
Calcium, dissolved (mg/L)	28	83	26	53	56
Magnesium, dissolved (mg/L)	28	22	6.4	13	13
Sodium, dissolved (mg/L)	28	20	5.6	12	12
Potassium, dissolved (mg/L)	28	10	2.1	3.7	3.4
Alkalinity (mg/L as $CaCO_3$)	28	199	81	140	144
Sulfate, dissolved (mg/L)	28	130	25	65	64
Chloride, dissolved (mg/L)	28	7.8	2.7	4.8	4.6
Fluoride, dissolved (mg/L)	28	.5	.2	.4	.4
Silica, dissolved (mg/L)	28	24	10	19	18
Dissolved solids, calculated (mg/L)	28	410	137	253	266
Arsenic, total recoverable (µg/L)	28	62	8	18	14
Arsenic, dissolved (µg/L)	28	19	7	11	10
Cadmium, total recoverable (µg/L)	28	2	<1	--	<1
Cadmium, dissolved (µg/L)	28	.2	<.1	--	<.1
Copper, total recoverable (µg/L)	26	360	5	54	26
Copper, dissolved (µg/L)	26	21	1	7	6
Iron, total recoverable (µg/L)	28	8,800	50	1,370	650
Iron, dissolved (µg/L)	28	140	<3	[2]20	10
Lead, total recoverable (µg/L)	24	56	<1	[2]11	5
Lead, dissolved (µg/L)	24	1.2	<.5	--	<.5
Manganese, total recoverable (µg/L)	28	880	20	201	125
Manganese, dissolved (µg/L)	28	50	8	17	15
Zinc, total recoverable (µg/L)	28	490	<10	[2]89	50
Zinc, dissolved (µg/L)	28	21	3	9	8
Sediment, suspended concentration (mg/L)	29	530	2	81	30
Sediment, suspended discharge (ton/d)	29	4,720	1.9	379	76
Sediment, suspended (percent finer than 0.062 mm)	29	91	53	74	75

Table 24. Statistical summary of water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 1995 (Continued)

Property or constituent and reporting unit	Number of samples	Maximum	Minimum	Mean	Median
12334510--ROCK CREEK NEAR CLINTON, MONT. **Period of record for water-quality data: March 1985-September 1995**					
Streamflow, instantaneous (ft^3/s)	61	3,010	113	836	515
Specific conductance, onsite (µS/cm)	52	155	55	107	102
Temperature, water (°C)	61	18	.0	7.8	8.0
pH, onsite (standard units)	51	8.6	6.9	7.9	7.9
Hardness, total (mg/L as $CaCO_3$)	43	90	25	51	55
Calcium, dissolved (mg/L)	43	23	6.5	13	14
Magnesium, dissolved (mg/L)	43	8.0	2.2	4.4	4.7
Sodium, dissolved (mg/L)	17	3.5	1.6	2.6	2.5
Potassium, dissolved (mg/L)	17	1.6	.8	1.1	1.1
Alkalinity (mg/L as $CaCO_3$)	17	75	26	53	58
Sulfate, dissolved (mg/L)	17	5.2	2.0	3.6	3.7
Chloride, dissolved (mg/L)	17	1.0	.3	.6	.6
Fluoride, dissolved (mg/L)	17	.2	<.1	[2].1	.1
Silica, dissolved (mg/L)	17	13	9.7	11	11
Dissolved solids, calculated (mg/L)	17	90	40	68	73
Arsenic, total recoverable (µg/L)	49	2	<1	[2].8	<1
Arsenic, dissolved (µg/L)	49	1	<1	[2]1	<1
Cadmium, total recoverable (µg/L)	49	3	<1	[2].5	<1
Cadmium, dissolved (µg/L)	49	1	<.1	--	<1
Copper, total recoverable (µg/L)	47	41	<1	[2]5	3
Copper, dissolved (µg/L)	48	6	<1	[2]1	1
Iron, total recoverable (µg/L)	49	2,100	20	344	160
Iron, dissolved (µg/L)	49	110	5	33	33
Lead, total recoverable (µg/L)	47	19	<1	[2]3	1
Lead, dissolved (µg/L)	47	5	<.5	[2].8	<1
Manganese, total recoverable (µg/L)	49	90	<10	[2]19	10
Manganese, dissolved (µg/L)	49	8	<1	[2]2	1
Zinc, total recoverable (µg/L)	49	60	<10	[2]11	<10
Zinc, dissolved (µg/L)	49	15	<3	[2]3	<3
Sediment, suspended concentration (mg/L)	61	157	1	18	5
Sediment, suspended discharge (ton/d)	61	1,280	.31	88	8.9
Sediment, suspended (percent finer than 0.062 mm)	61	95	35	71	74

Table 24. Statistical summary of water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 1995 (Continued)

Property or constituent and reporting unit	Number of samples	Maximum	Minimum	Mean	Median
12334550--CLARK FORK AT TURAH BRIDGE, NEAR BONNER, MONT.					
Period of record for water-quality data: March 1985-September 1995					
Streamflow, instantaneous (ft^3/s)	126	9,370	296	1,660	1,020
Specific conductance, onsite (µS/cm)	101	483	160	320	340
Temperature, water (°C)	125	22.0	.0	9.1	9.5
pH, onsite (standard units)	72	8.7	7.4	8.2	8.2
Hardness, total (mg/L as $CaCO_3$)	62	210	67	142	150
Calcium, dissolved (mg/L)	62	59	19	40	42
Magnesium, dissolved (mg/L)	62	14	4.8	10	11
Sodium, dissolved (mg/L)	28	12	4.3	8.0	8.4
Potassium, dissolved (mg/L)	28	5.7	1.6	2.5	2.4
Alkalinity (mg/L as $CaCO_3$)	29	146	65	108	116
Sulfate, dissolved (mg/L)	28	68	20	42	41
Chloride, dissolved (mg/L)	28	5.6	1.7	3.1	3.0
Fluoride, dissolved (mg/L)	28	.4	.2	.3	.3
Silica, dissolved (mg/L)	28	19	12	15	15
Dissolved solids, calculated (mg/L)	28	252	108	185	196
Arsenic, total recoverable (µg/L)	71	110	5	12	8
Arsenic, dissolved (µg/L)	71	17	4	6	5
Cadmium, total recoverable (µg/L)	71	4	<1	[2].5	<1
Cadmium, dissolved (µg/L)	71	1	<.1	--	<1
Copper, total recoverable (µg/L)	69	500	3	51	23
Copper, dissolved (µg/L)	70	25	2	6	5
Iron, total recoverable (µg/L)	71	19,000	60	1,610	530
Iron, dissolved (µg/L)	71	190	<3	[2]25	14
Lead, total recoverable (µg/L)	67	100	<1	[2]12	5
Lead, dissolved (µg/L)	67	7	<.5	[2].6	<1
Manganese, total recoverable (µg/L)	71	2,000	10	186	90
Manganese, dissolved (µg/L)	71	31	1	8	7
Zinc, total recoverable (µg/L)	71	1,100	<10	[2]95	40
Zinc, dissolved (µg/L)	71	39	<3	[2]9	7
Sediment, suspended concentration (mg/L)	126	1,370	2	68	22
Sediment, suspended discharge (ton/d)	126	34,700	3.5	749	61
Sediment, suspended (percent finer than 0.062 mm)	115	98	27	72	72

Table 24. Statistical summary of water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 1995 (Continued)

Property or constituent and reporting unit	Number of samples	Maximum	Minimum	Mean	Median
12340000--BLACKFOOT RIVER NEAR BONNER, MONT. **Period of record for water-quality data: March 1985-September 1995**					
Streamflow, instantaneous (ft^3/s)	92	10,300	344	2,420	1,020
Specific conductance, onsite (µS/cm)	69	294	131	207	205
Temperature, water (°C)	92	20.5	.0	8.7	8.5
pH, onsite (standard units)	52	8.7	7.5	8.2	8.2
Hardness, total (mg/L as $CaCO_3$)	45	140	55	101	100
Calcium, dissolved (mg/L)	45	37	14	26	26
Magnesium, dissolved (mg/L)	45	13	4.9	9.0	8.5
Sodium, dissolved (mg/L)	17	3.4	1.2	2.4	2.5
Potassium, dissolved (mg/L)	17	2.8	.5	.9	.8
Alkalinity (mg/L as $CaCO_3$)	17	140	76	109	105
Sulfate, dissolved (mg/L)	17	6.6	1.1	4.7	5.0
Chloride, dissolved (mg/L)	17	1.6	.3	.6	.5
Fluoride, dissolved (mg/L)	17	.1	<.1	--	<.1
Silica, dissolved (mg/L)	17	12	6.8	8.6	8.1
Dissolved solids, calculated (mg/L)	17	154	82	119	114
Arsenic, total recoverable (µg/L)	52	4	<1	[2]1	1
Arsenic, dissolved (µg/L)	52	2	<1	[2].8	<1
Cadmium, total recoverable (µg/L)	52	2	<1	[2].5	<1
Cadmium, dissolved (µg/L)	52	1	<.1	--	<1
Copper, total recoverable (µg/L)	49	34	<1	[2]8	6
Copper, dissolved (µg/L)	50	7	<1	[2]2	2
Iron, total recoverable (µg/L)	52	3,600	20	611	240
Iron, dissolved (µg/L)	52	100	<3	[2]20	14
Lead, total recoverable (µg/L)	48	25	<1	[2]6	2
Lead, dissolved (µg/L)	48	8	<.5	[2]1	<1
Manganese, total recoverable (µg/L)	52	180	<10	[2]40	20
Manganese, dissolved (µg/L)	52	11	<1	[2]3	2
Zinc, total recoverable (µg/L)	52	60	<10	[2]13	<10
Zinc, dissolved (µg/L)	52	15	<3	[2]4	<3
Sediment, suspended concentration (mg/L)	92	271	1	30	8
Sediment, suspended discharge (ton/d)	92	7,540	1.1	495	22
Sediment, suspended (percent finer than 0.062 mm)	90	98	42	78	81

Table 24. Statistical summary of water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 1995 (Continued)

Property or constituent and reporting unit	Number of samples	Maximum	Minimum	Mean	Median
12340500--CLARK FORK ABOVE MISSOULA, MONT. **Period of record for water-quality data: July 1986-September 1995**					
Streamflow, instantaneous (ft^3/s)	92	15,100	720	3,810	2,040
Specific conductance, onsite (µS/cm)	69	399	145	265	275
Temperature, water (°C)	89	19.5	.0	9.1	8.5
pH, onsite (standard units)	49	8.6	7.9	8.3	8.3
Hardness, total (mg/L as $CaCO_3$)	49	170	61	123	130
Calcium, dissolved (mg/L)	49	46	14	33	34
Magnesium, dissolved (mg/L)	49	13	5.6	9.6	9.7
Sodium, dissolved (mg/L)	28	7.8	2.4	5.3	5.4
Potassium, dissolved (mg/L)	28	4.5	.9	1.7	1.5
Alkalinity (mg/L as $CaCO_3$)	28	143	71	108	111
Sulfate, dissolved (mg/L)	28	43	9.3	23	23
Chloride, dissolved (mg/L)	28	4.2	.9	1.9	1.8
Fluoride, dissolved (mg/L)	28	.3	<.1	[2].2	.2
Silica, dissolved (mg/L)	28	16	9.4	12	11
Dissolved solids, calculated (mg/L)	28	209	90	152	154
Arsenic, total recoverable (µg/L)	49	18	2	5	4
Arsenic, dissolved (µg/L)	49	7	1	3	3
Cadmium, total recoverable (µg/L)	49	<1	<1	--	<1
Cadmium, dissolved (µg/L)	49	.1	<.1	--	<.1
Copper, total recoverable (µg/L)	47	110	2	13	8
Copper, dissolved (µg/L)	48	10	1	3	2
Iron, total recoverable (µg/L)	49	3,100	60	520	250
Iron, dissolved (µg/L)	49	45	<3	[2]18	16
Lead, total recoverable (µg/L)	44	16	<1	[2]3	2
Lead, dissolved (µg/L)	44	1	<.5	[2].7	<.5
Manganese, total recoverable (µg/L)	49	300	10	58	40
Manganese, dissolved (µg/L)	49	39	7	16	14
Zinc, total recoverable (µg/L)	49	160	<10	[2]23	20
Zinc, dissolved (µg/L)	49	16	<3	[2]5	4
Sediment, suspended concentration (mg/L)	92	297	2	30	10
Sediment, suspended discharge (ton/d)	92	7,670	6.1	674	55
Sediment, suspended (percent finer than 0.062 mm)	87	99	44	88	90

Table 24. Statistical summary of water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 1995 (Continued)

Property or constituent and reporting unit	Number of samples	Maximum	Minimum	Mean	Median
12353000--CLARK FORK BELOW MISSOULA, MONT. **Period of record for water-quality data: March 1985-September 1995**					
Streamflow, instantaneous (ft^3/s)	64	19,800	869	4,650	2,680
Specific conductance, onsite (µS/cm)	64	320	108	223	242
Temperature, water (°C)	64	20.5	.0	8.4	8.2
pH, onsite (standard units)	64	8.8	7.1	8.0	8.0
Hardness, total (mg/L as $CaCO_3$)	64	150	48	104	110
Calcium, dissolved (mg/L)	64	42	13	29	32
Magnesium, dissolved (mg/L)	64	11	3.7	7.8	8.4
Sodium, dissolved (mg/L)	64	8.5	2.2	5.7	6.2
Potassium, dissolved (mg/L)	64	3.4	.6	1.6	1.8
Alkalinity (mg/L as $CaCO_3$)	63	135	47	95	101
Sulfate, dissolved (mg/L)	64	34	6	19	18
Chloride, dissolved (mg/L)	64	4.7	.3	2.4	2.5
Fluoride, dissolved (mg/L)	64	.3	<.1	[2].2	.2
Silica, dissolved (mg/L)	64	15	5.8	12	12
Dissolved solids, calculated (mg/L)	64	194	63	134	144
Arsenic, total recoverable (µg/L)	11	6	2	3	3
Arsenic, dissolved (µg/L)	37	6	<1	[2]2	2
Cadmium, total recoverable (µg/L)	11	<1	<1	--	<1
Cadmium, dissolved (µg/L)	37	2	<.1	--	<1
Copper, total recoverable (µg/L)	11	25	2	9	7
Copper, dissolved (µg/L)	37	9	1	3	3
Iron, total recoverable (µg/L)	11	1,600	90	417	180
Iron, dissolved (µg/L)	42	93	4	19	17
Lead, total recoverable (µg/L)	10	4	<1	[2]2	<1
Lead, dissolved (µg/L)	35	5	<.5	[2].6	<1
Manganese, total recoverable (µg/L)	11	120	20	45	30
Manganese, dissolved (µg/L)	42	18	3	8	6
Zinc, total recoverable (µg/L)	11	40	<10	18	20
Zinc, dissolved (µg/L)	37	24	<3	[2]7	4
Sediment, suspended concentration (mg/L)	64	85	1	16	9
Sediment, suspended discharge (ton/d)	64	4,540	4.3	330	70
Sediment, suspended (percent finer than 0.062 mm)	63	93	35	75	79

[1]Multiple minimum reporting levels during the period of record may result in varying values identified with a less-than (<) symbol.

[2]Value is estimated by using a log-probability regression to predict the values of data less than the minimum reporting level (Helsel and Cohn, 1988).

Table 25. Statistical summary of fine-grained bed-sediment data for the upper Clark Fork basin, Montana, August 1986 through August 1995

[Fine-grained bed sediment is material less than 0.064 millimeter in diameter. Concentrations are in micrograms per gram dry weight. Symbols: <, less than minimum reporting level; --, indicates either too few samples or insufficient data greater than the minimum reporting level to compute statistic. Number of samples represents the number of years that the constituent was analyzed, with each year represented by a single mean concentration of composite samples. Values for single samples are arbitrarily listed in the "Mean" column]

Constituent	Number of samples	Maximum	Minimum	Mean	Median
12323600--SILVER BOW CREEK AT OPPORTUNITY, MONT.					
Period of record for fine-grained bed-sediment data: 1992-95					
Cadmium	4	38.2	27.1	32.8	33.0
Chromium	3	30.1	24.2	27.3	27.6
Copper	4	6,280	4,560	5,110	4,790
Iron	4	41,200	34,400	38,200	38,600
Lead	4	1,030	752	879	866
Manganese	4	3,200	1,680	2,440	2,440
Nickel	3	16.3	14.5	15.6	16.0
Silver	4	19.6	13.7	16.4	16.1
Zinc	4	9,390	6,850	8,230	8,340
12323750--SILVER BOW CREEK AT WARM SPRINGS, MONT.					
Period of record for fine-grained bed-sediment data: 1992-95					
Cadmium	4	12.2	6.0	9.3	9.4
Chromium	3	22.9	12.8	17.5	16.7
Copper	4	769	259	570	626
Iron	4	26,000	19,500	21,700	20,600
Lead	4	99	58	78	78
Manganese	4	17,700	7,230	10,400	8,370
Nickel	3	16.5	14.4	15.6	15.8
Silver	4	1.3	.3	.9	1.0
Zinc	4	2,220	620	1,580	1,730
1232770--WARM SPRINGS CREEK AT WARM SPRINGS, MONT.					
Period of record for fine-grained bed-sediment data: 1995					
Cadmium	1	--	--	3.9	--
Chromium	1	--	--	33.4	--
Copper	1	--	--	892	
Iron	1	--	--	21,900	--
Lead	1	--	--	85	--
Manganese	1	--	--	8,790	--
Nickel	1	--	--	21.9	--
Silver	1	--	--	3.2	--
Zinc	1	--	--	421	--
12323800--CLARK FORK NEAR GALEN, MONT.					
Period of record for fine-grained bed-sediment data: 1987, 1991-95					
Cadmium	6	20.1	7.5	13.1	12.6
Chromium	3	30.9	22.1	25.4	23.3
Copper	6	2,300	1,220	1,460	1,250
Iron	6	39,800	22,600	29,300	28,100
Lead	6	235	116	158	139
Manganese	6	15,600	4,890	11,000	12,300
Nickel	3	23.2	17.7	20.9	21.8
Silver	6	5.5	2.8	3.8	3.7
Zinc	6	3,560	1,370	2,380	2,460

Table 25. Statistical summary of fine-grained bed-sediment data for the upper Clark Fork basin, Montana, August 1986 through August 1995 (Continued)

Constituent	Number of samples	Maximum	Minimum	Mean	Median
12324200--CLARK FORK AT DEER LODGE, MONT.					
Period of record for fine-grained bed-sediment data: 1986-87, 1990-95					
Cadmium	8	9.0	5.1	7.2	7.6
Chromium	3	35.4	19.5	27.8	28.4
Copper	8	4,180	837	1,680	1,130
Iron	8	31,700	22,600	27,400	27,600
Lead	8	242	121	167	164
Manganese	8	6,020	1,460	2,820	2,380
Nickel	8	16.8	15.0	15.7	15.3
Silver	8	7.9	2.4	4.5	4.4
Zinc	8	1,730	977	1,390	1,420
12324590--LITTLE BLACKFOOT RIVER NEAR GARRISON, MONT.					
Period of record for fine-grained bed-sediment data: 1986-87, 1994					
Cadmium	3	.9	.2	.6	.7
Chromium	1	--	--	22.1	--
Copper	3	85	38	54	40
Iron	3	26,400	16,100	22,100	23,800
Lead	3	53	37	43	40
Manganese	3	2,700	907	1,550	1,040
Nickel	1	--	--	13.6	--
Silver	3	.9	<.5	.4	<.5
Zinc	3	180	161	170	170
12324680--CLARK FORK AT GOLDCREEK, MONT.					
Period of record for fine-grained bed-sediment data: 1992-95					
Cadmium	4	6.2	5.4	5.8	5.8
Chromium	3	37.8	31.6	33.8	31.9
Copper	4	1,030	653	811	779
Iron	4	27,500	20,500	24,500	25,000
Lead	4	152	93	118	114
Manganese	4	2,610	1,180	1,990	2,090
Nickel	3	17.0	15.0	16.1	16.4
Silver	4	3.7	2.3	3.0	3.0
Zinc	4	1,320	1,120	1,200	1,180
12331500--FLINT CREEK NEAR DRUMMOND, MONT.					
Period of record for fine-grained bed-sediment data: 1986, 1989, 1992-95					
Cadmium	6	4.5	<1.0	[1]2.6	2.8
Chromium	3	26.0	21.1	23.8	24.3
Copper	6	73	55	62	60
Iron	6	28,100	21,100	23,800	23,200
Lead	6	240	151	189	185
Manganese	6	5,510	2,710	3,860	3,740
Nickel	3	13.5	11.7	12.6	12.5
Silver	5	7.8	5.0	6.3	6.4
Zinc	6	727	610	668	673

Table 25. Statistical summary of fine-grained bed-sediment data for the upper Clark Fork basin, Montana, August 1986 through August 1995 (Continued)

Constituent	Number of samples	Maximum	Minimum	Mean	Median
12331800--CLARK FORK NEAR DRUMMOND, MONT.					
Period of record for fine-grained bed-sediment data: 1986-87, 1991-95					
Cadmium	7	5.4	4.1	4.7	4.8
Chromium	3	34.0	17.0	27.0	30.1
Copper	7	614	469	549	551
Iron	7	26,100	16,500	21,900	23,200
Lead	7	135	85	104	102
Manganese	7	2,780	1,220	1,970	1,940
Nickel	3	15.9	14.0	15.2	15.7
Silver	7	3.5	2.1	2.9	2.9
Zinc	7	1,230	1,030	1,120	1,120
12334510--ROCK CREEK NEAR CLINTON, MONT.					
Period of record for fine-grained bed-sediment data: 1986-87, 89, 1991-95					
Cadmium	8	<1.2	<.3	--[1]	[1]<.6
Chromium	3	26.3	16.5	20.7	19.3
Copper	8	15	3	12	14
Iron	8	21,400	13,100	17,600	17,800
Lead	8	16	<3	[1]8	10
Manganese	8	598	126	311	274
Nickel	3	13.7	10.8	12.4	12.7
Silver	7	<.7	<.3	--[1]	[1]<.5
Zinc	8	58	36	48	50
12334550--CLARK FORK AT TURAH BRIDGE, NEAR BONNER, MONT.					
Period of record for fine-grained bed-sediment data: 1986, 1991-95					
Cadmium	6	5.2	3.1	3.8	3.5
Chromium	3	26.7	15.3	20.4	19.2
Copper	6	561	300	387	322
Iron	6	23,200	15,100	18,400	17,200
Lead	6	115	62	80	72
Manganese	6	1,670	671	1,140	1,200
Nickel	3	15.9	11.6	13.2	12.0
Silver	6	2.9	1.3	2.0	2.0
Zinc	6	1,160	775	909	861
12340000--BLACKFOOT RIVER NEAR BONNER, MONT.					
Period of record for fine-grained bed-sediment data: 1986-87, 1991, 1993-95					
Cadmium	6	<1.2	<.3	--[1]	[1]<.6
Chromium	3	22.0	15.1	17.5	15.3
Copper	6	25	16	21	22
Iron	6	19,100	12,400	15,900	15,500
Lead	6	20	9	12	11
Manganese	6	672	298	490	492
Nickel	3	12.7	11.7	12.3	12.5
Silver	6	<.7	<.3	--[1]	[1]<.5
Zinc	6	73	54	63	62

Table 25. Statistical summary of fine-grained bed-sediment data for the upper Clark Fork basin, Montana, August 1986 through August 1995 (Continued)

Constituent	Number of samples	Maximum	Minimum	Mean	Median
12353000--CLARK FORK BELOW MISSOULA, MONT.[2]					
Period of record for fine-grained bed-sediment data: 1986, 1990-95					
Cadmium	7	2.6	1.1	1.7	1.7
Chromium	3	25.6	18.8	22.0	21.5
Copper	7	293	98	166	138
Iron	7	21,100	14,500	18,600	19,500
Lead	7	58	33	42	38
Manganese	7	2,530	752	1,540	1,340
Nickel	3	14.1	13.3	13.6	13.4
Silver	7	2.1	.4	1.1	1.2
Zinc	7	675	319	432	409

[1]Value determined by arbitrarily substituting one-half of the detection level for censored (<) values, when both uncensored and censored values are used in determining the mean. When all data are below the detection level, the median is determined by ranking the censored values in order of detection level. No mean is reported when all values are below the detection level.

[2]Samples collected about 30 miles downstream of water-quality station to conform to previous sampling location.

Table 26. Statistical summary of bulk bed-sediment data for the upper Clark Fork basin, Montana, August 1993 through August 1995

[Bulk bed sediment is material smaller than about 10 mm in diameter. Concentrations are in micrograms per gram dry weight. Symbols: <, less than minimum reporting level; --, indicates either too few samples or insufficient data greater than the minimum reporting level to compute statistic. Number of samples represents the number of years that the constituent was analyzed, with each year represented by a single mean concentration of composite samples. Values for single samples are arbitrarily listed in the "Mean" column]

Constituent	Number of samples	Maximum	Minimum	Mean	Median
12323600--SILVER BOW CREEK AT OPPORTUNITY, MONT.					
Period of record for bulk bed-sediment data: 1993-95					
Cadmium	3	12.7	6.7	9.3	8.5
Chromium	3	14.9	9.6	12.4	12.7
Copper	3	1,550	831	1,120	976
Iron	3	27,200	18,600	21,800	19,700
Lead	3	300	221	256	248
Manganese	3	1,670	671	1,030	745
Nickel	3	8.9	6.0	7.2	6.8
Silver	3	4.8	3.4	4.0	3.9
Zinc	3	3,420	2,050	2,580	2,270
12323750--SILVER BOW CREEK AT WARM SPRINGS, MONT.					
Period of record for bulk bed-sediment data: 1993, 1995					
Cadmium	2	1.2	<1.1	.9	--
Chromium	2	10.1	9.9	10.0	--
Copper	2	111	42	76	--
Iron	2	12,300	9,160	10,700	--
Lead	2	33	11	22	--
Manganese	2	830	543	686	--
Nickel	2	8.1	5.5	6.8	--
Silver	2	<.5	<.3	--[1]	--
Zinc	2	303	137	220	--
12327700--WARM SPRINGS CREEK AT WARM SPRINGS, MONT.					
Period of record for bulk bed-sediment data: 1995					
Cadmium	1	--	--	1.0	--
Chromium	1	--	--	9.7	--
Copper	1	--	--	205	
Iron	1	--	--	8,980	--
Lead	1	--	--	34	--
Manganese	1	--	--	2,650	--
Nickel	1	--	--	7.8	--
Silver	1	--	--	.9	
Zinc	1	--	--	148	--
12323800--CLARK FORK NEAR GALEN, MONT.					
Period of record for bulk bed-sediment data: 1993-95					
Cadmium	3	6.0	1.5	3.8	4.0
Chromium	3	18.4	4.2	12.5	14.8
Copper	3	685	223	483	542
Iron	3	25,900	9,930	19,400	22,500
Lead	3	87	41	69	79
Manganese	3	5,410	1,280	2,740	1,540
Nickel	3	12.5	4.9	8.7	8.8
Silver	3	1.6	.7	1.3	1.6
Zinc	6	1,280	498	825	696

Table 26. Statistical summary of bulk bed-sediment data for the upper Clark Fork basin, Montana, August 1993 through August 1995 (Continued)

Constituent	Number of samples	Maximum	Minimum	Mean	Median
12324200--CLARK FORK AT DEER LODGE, MONT.					
Period of record for bulk bed-sediment data: 1993-95					
Cadmium	3	3.1	2.0	2.5	2.4
Chromium	3	16.1	12.1	13.8	13.3
Copper	3	449	281	371	383
Iron	3	17,900	13,200	15,600	15,700
Lead	3	85	45	68	74
Manganese	3	2,060	998	1,370	1,050
Nickel	3	10.2	7.7	8.7	8.3
Silver	3	1.6	<.7	[1]1.1	1.4
Zinc	3	619	456	558	599
12324590--LITTLE BLACKFOOT RIVER NEAR GARRISON, MONT.					
Period of record for bulk bed-sediment data: 1994					
Cadmium	1	--	--	<1.2	--
Chromium	1	--	--	14.7	--
Copper	1	--	--	19	--
Iron	1	--	--	15,600	--
Lead	1	--	--	12	--
Manganese	1	--	--	420	--
Nickel	1	--	--	8.6	--
Silver	1	--	--	<.7	--
Zinc	1	--	--	73	--
12324680--CLARK FORK AT GOLDCREEK, MONT.					
Period of record for bulk bed-sediment data: 1993-95					
Cadmium	3	3.4	2.3	2.7	2.4
Chromium	3	23.4	17.6	20.4	20.3
Copper	3	471	282	374	370
Iron	3	19,600	15,500	17,900	18,600
Lead	3	72	46	63	71
Manganese	3	1,190	649	863	749
Nickel	3	12.4	9.1	11.2	12.0
Silver	3	1.6	<.7	[1]1.2	1.5
Zinc	3	696	549	640	676
12331500--FLINT CREEK NEAR DRUMMOND, MONT.					
Period of record for bulk bed-sediment data: 1993-95					
Cadmium	3	3.2	.3	1.7	1.7
Chromium	3	11.0	4.9	8.7	10.3
Copper	3	40	19	28	25
Iron	3	15,000	8,630	12,300	13,400
Lead	3	120	51	83	79
Manganese	3	3,200	1,150	2,260	2,440
Nickel	3	8.0	5.8	6.6	6.0
Silver	3	5.1	3.3	4.1	3.9
Zinc	3	429	190	301	284

Table 26. Statistical summary of bulk bed-sediment data for the upper Clark Fork basin, Montana, August 1993 through August 1995 (Continued)

Constituent	Number of samples	Maximum	Minimum	Mean	Median
12331800--CLARK FORK NEAR DRUMMOND, MONT.					
Period of record for bulk bed-sediment data: 1993-95					
Cadmium	3	1.8	1.5	1.7	1.8
Chromium	3	23.1	13.8	17.9	16.9
Copper	3	276	173	228	235
Iron	3	16,600	14,100	15,500	15,900
Lead	3	61	35	47	44
Manganese	3	1,210	711	915	820
Nickel	3	11.0	9.0	10.1	10.3
Silver	3	1.7	.5	1.1	1.2
Zinc	3	621	434	517	497
12334510--ROCK CREEK NEAR CLINTON, MONT.					
Period of record for bulk bed-sediment data: 1993-95					
Cadmium	3	<1.2	<.8	--[1]	[1]<1.1
Chromium	3	10.8	6.6	8.8	8.9
Copper	3	7	4	5	5
Iron	3	9,840	6,380	8,390	8,960
Lead	3	5	5	5	5
Manganese	3	195	91	144	145
Nickel	3	6.2	4.9	5.6	5.7
Silver	3	<.7	.1	[1].2	<.3
Zinc	3	29	16	22	20
12334550--CLARK FORK AT TURAH BRIDGE, NEAR BONNER, MONT.					
Period of record for bulk bed-sediment data: 1993-95					
Cadmium	3	1.8	.5	1.0	<1.1
Chromium	3	15.5	6.9	10.5	9.1
Copper	3	182	75	126	122
Iron	3	13,200	9,530	11,100	10,700
Lead	3	37	21	29	30
Manganese	3	487	234	378	414
Nickel	3	8.8	6.4	7.3	6.8
Silver	3	<.7	<.3	.3	.3
Zinc	3	510	281	379	345
12340000--BLACKFOOT RIVER NEAR BONNER, MONT.					
Period of record for bulk bed-sediment data: 1993-94					
Cadmium	2	<1.2	<.8	--[1]	--
Chromium	2	17.7	6.7	12.2	--
Copper	2	19	14	16	--
Iron	2	16,600	10,300	13,400	--
Lead	2	10	8	9	--
Manganese	2	305	179	242	--
Nickel	2	9.8	7.6	8.7	--
Silver	2	<.7	<.5	--[1]	--
Zinc	2	58	33	46	--

Table 26. Statistical summary of bulk bed-sediment data for the upper Clark Fork basin, Montana, August 1993 through August 1995 (Continued)

Constituent	Number of samples	Maximum	Minimum	Mean	Median
12353000--CLARK FORK BELOW MISSOULA, MONT.[2]					
Period of record for bulk bed-sediment data: 1993-95					
Cadmium	3	<1.2	.5	[1].6	<1.1
Chromium	3	8.7	4.4	6.2	5.4
Copper	3	77	22	42	28
Iron	3	10,200	6,160	7,750	6,890
Lead	3	19	8	12	10
Manganese	3	381	223	318	351
Nickel	3	7.1	3.5	5.0	4.5
Silver	3	.5	<.3	[1].3	<.7
Zinc	3	172	88	120	101

[1]Value determined by arbitrarily substituting one-half of the detection level for censored (<) values, when both uncensored and censored values are used in determining the mean. When all data are below the detection level, the median is determined by ranking the censored values in order of detection level. No mean is reported when all values are below the detection level.

[2]Samples collected about 30 miles downstream of water-quality station to conform to previous sampling location.

Table 27. Statistical summary of biological data for the upper Clark Fork basin, Montana, August 1986 through August 1995

[Concentrations are in micrograms per gram dry weight. Symbols: <, less than minimum reporting level; --, indicates either too few samples or insufficient data greater than the minimum reporting level to compute statistic, or element not analyzed. Number of composite samples represents the total of all individual composite samples collected for every year that the constituent was analyzed. Values for single samples are arbitrarily listed in the "Mean" column. Because *Hydropsyche* insects were not sorted to the species level during 1986-89, statistics for stations sampled during those years are based on the results of all *Hydropsyche* species combined. At some sites, statistics for the *Hydropsyche morosa* group are based on the combined results for two or more species]

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
12323600--SILVER BOW CREEK AT OPPORTUNITY, MONT.					
Period of record for biological data: 1992, 94-95					
		Hydropsyche cockerelli			
Cadmium	5	6.3	4.1	4.9	4.7
Chromium	5	8.0	1.0	3.7	3.1
Copper	5	462	269	365	333
Iron	5	1,180	689	931	953
Lead	5	21.7	19.0	20.3	20.1
Manganese	5	718	180	460	434
Nickel	5	2.1	.7	1.4	1.6
Zinc	5	898	749	818	805
		Hydropsyche tana			
Cadmium	6	9.2	4.8	6.8	6.9
Chromium	6	11.5	.9	4.5	1.8
Copper	6	456	10.5	236	298
Iron	6	1,520	857	1,100	1,050
Lead	6	21.0	15.6	18.6	18.3
Manganese	6	969	307	634	675
Nickel	6	1.8	.7	1.4	1.6
Zinc	6	1,070	760	961	1,020
12323750--SILVER BOW CREEK AT WARM SPRINGS, MONT.					
Period of record for biological data: 1992-95					
		Hydropsyche cockerelli			
Cadmium	10	2.1	.5	1.1	.9
Chromium	10	1.3	.5	.8	.8
Copper	10	96.9	25.1	56.1	51.3
Iron	10	1,240	553	810	758
Lead	10	5.6	.3	2.9	2.9
Manganese	10	2,450	528	1,240	1,160
Nickel	10	1.8	.7	1.0	.9
Zinc	10	276	118	197	197
		Hydropsyche occidentalis			
Cadmium	3	1.1	.4	.8	.9
Chromium	3	.9	.3	.6	.7
Copper	3	46.5	38.6	41.5	39.4
Iron	3	1,040	372	803	998
Lead	3	<3.6	<2.3	[1]1.6	1.7
Manganese	3	2,250	1,780	2,060	2,140
Nickel	3	1.5	.7	1.0	.9
Zinc	3	202	149	184	201

Table 27. Statistical summary of biological data for the upper Clark Fork basin, Montana, August 1986 through August 1995 (Continued)

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
12323750--SILVER BOW CREEK AT WARM SPRINGS, MONT.--Continued					
Period of record for biological data: 1992-95					
		***Hydropsyche* spp.**			
Cadmium	1	--	--	2.3	--
Chromium	1	--	--	1.4	--
Copper	1	--	--	47.6	--
Iron	1	--	--	619	--
Lead	1	--	--	5.1	--
Manganese	1	--	--	1,100	--
Nickel	1	--	--	<.4	--
Zinc	1	--	--	284	--
12323770--WARM SPRINGS CREEK AT WARM SPRINGS, MONT.					
Period of record for biological data: 1995					
		Arctopsyche grandis			
Cadmium	1	--	--	2.4	--
Chromium	1	--	--	1.9	--
Copper	1	--	--	98.8	--
Iron	1	--	--	684	--
Lead	1	--	--	5.6	--
Manganese	1	--	--	2,280	--
Nickel	1	--	--	2.3	--
Zinc	1	--	--	222	--
12323800--CLARK FORK NEAR GALEN, MONT.					
Period of record for biological data: 1987, 1991-95					
		Hydropsyche cockerelli			
Cadmium	10	2.7	1.3	1.8	1.8
Chromium	10	3.3	.8	1.5	1.2
Copper	10	181	80.5	105	98.8
Iron	10	1,500	901	1,180	1,170
Lead	10	9.3	1.2	6.5	7.5
Manganese	10	2,950	1,410	2,130	2,140
Nickel	10	3.1	1.0	1.6	1.5
Zinc	10	299	174	228	230
		***Hydropsyche morosa* group**			
Cadmium	5	3.2	2.4	2.5	2.4
Chromium	5	4.6	1.8	2.6	2.2
Copper	5	185	156	173	175
Iron	5	1,890	1,360	1,510	1,430
Lead	5	12.4	7.1	8.5	7.9
Manganese	5	3,960	2,360	3,500	3,860
Nickel	5	3.6	1.9	2.3	2.1
Zinc	5	349	292	309	303

Table 27. Statistical summary of biological data for the upper Clark Fork basin, Montana, August 1986 through August 1995 (Continued)

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
12323800--CLARK FORK NEAR GALEN, MONT.--Continued					
Period of record for biological data: 1987, 1991-95					
Hydropsyche occidentalis					
Cadmium	12	1.6	1.0	1.2	1.2
Chromium	12	6.6	.7	1.8	1.5
Copper	12	84.1	66.7	75.5	74.5
Iron	12	1,300	642	991	1,060
Lead	12	8.0	1.6	5.1	5.0
Manganese	12	4,070	1,980	2,930	2,920
Nickel	12	3.5	1.1	1.7	1.6
Zinc	12	278	170	211	205
***Hydropsyche* spp.**					
Cadmium	4	3.5	2.6	3.0	3.0
Chromium	0	--	--	--	--
Copper	4	154	135	148	152
Iron	4	1,540	1,190	1,400	1,450
Lead	4	13.5	10.5	12.2	12.4
Manganese	0	--	--	--	--
Nickel	0	--	--	--	--
Zinc	4	329	279	308	313
12324200--CLARK FORK AT DEER LODGE, MONT.					
Period of record for biological data: 1986-87, 1990-95					
Hydropsyche cockerelli					
Cadmium	15	2.3	.8	1.4	1.3
Chromium	15	3.2	.4	1.6	1.9
Copper	15	136	54.7	95.9	98.2
Iron	15	3,340	490	1,170	1,040
Lead	15	18.2	4.3	9.1	8.9
Manganese	15	1,030	499	708	688
Nickel	15	2.4	.3	1.2	1.1
Zinc	15	391	132	188	184
Hydropsyche occidentalis					
Cadmium	15	2.7	.8	1.4	1.3
Chromium	15	2.3	.6	1.8	2.0
Copper	15	134	49	103	109
Iron	15	1,580	557	1,310	1,350
Lead	15	13.4	6.3	10.3	9.9
Manganese	15	2,840	1,130	1,810	1,730
Nickel	15	12.9	1.1	2.3	1.6
Zinc	15	299	196	239	228

Table 27. Statistical summary of biological data for the upper Clark Fork basin, Montana, August 1986 through August 1995 (Continued)

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
12324200--CLARK FORK AT DEER LODGE, MONT.--Continued					
Period of record for biological data: 1986-87, 1990-95					
		***Hydropsyche* spp.**			
Cadmium	3	2.0	1.2	1.6	1.6
Chromium	0	--	--	--	--
Copper	3	222	103	145	111
Iron	3	2,220	1,110	1,520	1,240
Lead	3	15.0	5.6	8.8	5.7
Manganese	0	--	--	--	--
Nickel	0	--	--	--	--
Zinc	3	203	185	195	197
12324590--LITTLE BLACKFOOT RIVER NEAR GARRISON, MONT.					
Period of record for biological data: 1987, 1994					
		Arctopsyche grandis			
Cadmium	9	.4	.2	.3	.3
Chromium	9	.8	.6	.7	.8
Copper	9	14.0	9.1	11.5	11.8
Iron	9	325	177	242	230
Lead	9	1.3	.5	.8	.8
Manganese	9	596	318	471	492
Nickel	9	.6	.4	.5	.5
Zinc	9	179	113	146	145
		Claassenia sabulosa			
Cadmium	4	.3	.1	.2	.2
Chromium	4	.8	.7	.8	.8
Copper	4	34.0	20.0	27.9	28.8
Iron	4	200	98	138	127
Lead	4	<.7	<.4	<.6	<.6
Manganese	4	62.1	46.7	53.4	51.3
Nickel	4	.7	.5	.6	.5
Zinc	4	233	191	206	201
		Hydropsyche cockerelli			
Cadmium	1	--	--	.6	--
Chromium	1	--	--	1.6	--
Copper	1	--	--	28.4	--
Iron	1	--	--	478	--
Lead	1	--	--	3.6	--
Manganese	1	--	--	399	--
Nickel	1	--	--	1.2	--
Zinc	1	--	-	123	--

Table 27. Statistical summary of biological data for the upper Clark Fork basin, Montana, August 1986 through August 1995 (Continued)

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
12324590--LITTLE BLACKFOOT RIVER NEAR GARRISON, MONT.--Continued					
Period of record for biological data: 1987, 1994					
		Hydropsyche occidentalis			
Cadmium	1	--	--	<.7	--
Chromium	1	--	--	1.3	--
Copper	1	--	--	15.1	--
Iron	1	--	--	426	--
Lead	1	--	--	<3.7	--
Manganese	1	--	--	434	--
Nickel	1	--	--	.8	--
Zinc	1	--	-	110	--
12324680--CLARK FORK AT GOLDCREEK, MONT.					
Period of record for biological data: 1992-95					
		Arctopsyche grandis			
Cadmium	5	6.6	1.4	2.8	2.0
Chromium	5	2.3	.8	1.2	1.0
Copper	5	39.9	28.8	32.5	31.5
Iron	5	476	339	412	387
Lead	5	3.8	2.3	2.8	2.9
Manganese	5	1,100	592	907	1,030
Nickel	5	1.0	.2	.5	.6
Zinc	5	309	175	218	195
		Claassenia sabulosa			
Cadmium	7	2.1	.6	1.1	.9
Chromium	7	1.6	.3	.8	.8
Copper	7	66.6	33.0	52.8	50.6
Iron	7	230	63.0	155	171
Lead	7	1.6	.8	1.1	1.0
Manganese	7	179	65.1	111	90.3
Nickel	7	.7	.2	.3	.3
Zinc	7	296	166	237	257
		Hydropsyche cockerelli			
Cadmium	6	2.1	.6	1.6	1.8
Chromium	6	4.2	.7	2.0	1.8
Copper	6	67.1	33.5	54.5	58.0
Iron	6	655	589	617	617
Lead	6	6.9	4.5	5.4	5.1
Manganese	6	713	538	607	596
Nickel	6	1.5	.6	1.1	1.2
Zinc	6	201	137	171	172

Table 27. Statistical summary of biological data for the upper Clark Fork basin, Montana, August 1986 through August 1995 (Continued)

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
12324680--CLARK FORK AT GOLDCREEK, MONT.--Continued					
Period of record for biological data: 1992-95					
***Hydropsyche morosa* group**					
Cadmium	4	1.7	1.1	1.4	1.4
Chromium	4	1.4	1.3	1.4	1.4
Copper	4	72.9	43.8	60.5	62.7
Iron	4	1,320	612	1,050	1,130
Lead	4	6.9	2.4	4.6	4.6
Manganese	4	1,030	538	804	822
Nickel	4	1.4	.9	1.2	1.2
Zinc	4	190	137	167	170
Hydropsyche occidentalis					
Cadmium	7	1.7	.7	1.2	1.2
Chromium	7	1.7	.4	1.0	1.0
Copper	7	55.5	26.4	41.6	45.0
Iron	7	1,180	466	750	751
Lead	7	6.0	2.9	5.0	5.4
Manganese	7	1,800	530	1,140	959
Nickel	7	1.2	.8	1.0	1.0
Zinc	7	207	97	167	170
12331500--FLINT CREEK NEAR DRUMMOND, MONT.					
Period of record for biological data: 1986, 1992-95					
Arctopsyche grandis					
Cadmium	22	.6	.2	.4	.4
Chromium	22	4.7	.6	2.0	1.8
Copper	22	19.7	9.8	15.0	15.0
Iron	22	2,460	606	1,320	1,300
Lead	22	17.5	3.7	9.0	7.6
Manganese	22	2,480	848	1,570	1,340
Nickel	22	2.3	.6	1.3	1.2
Zinc	22	275	151	199	186
Hydropsyche cockerelli					
Cadmium	4	.4	.2	.3	.4
Chromium	4	1.2	1.0	1.0	1.0
Copper	4	28.3	9.5	18.3	17.8
Iron	4	1,500	996	1,220	1,180
Lead	4	11.1	3.1	6.8	6.4
Manganese	4	1,440	401	955	992
Nickel	4	2.2	.9	1.6	1.5
Zinc	4	193	85	132	126

Table 27. Statistical summary of biological data for the upper Clark Fork basin, Montana, August 1986 through August 1995 (Continued)

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
12331500--FLINT CREEK NEAR DRUMMOND, MONT.--Continued					
Period of record for biological data: 1986, 1992-95					
		Hydropsyche occidentalis			
Cadmium	4	1.0	.2	.6	.6
Chromium	4	17.6	.7	6.0	2.8
Copper	4	26.4	15.1	20.2	17.2
Iron	4	2,550	912	1,770	1,810
Lead	4	29.2	5.8	16.6	15.7
Manganese	4	2,690	1,400	1,820	1,600
Nickel	4	6.9	.8	3.7	3.6
Zinc	4	243	128	180	175
		Hydropsyche tana			
Cadmium	2	<1.2	<.1	<.7	<.7
Chromium	2	10.3	.6	5.4	5.4
Copper	2	16.0	5.4	10.7	10.7
Iron	2	1,320	729	1,020	1,020
Lead	2	15.3	5.0	10.2	10.2
Manganese	2	1,400	1,180	1,290	1,290
Nickel	2	3.1	.5	1.8	1.8
Zinc	2	139	107	123	123
12331800--CLARK FORK NEAR DRUMMOND, MONT.					
Period of record for biological data: 1986, 1991-95					
		Arctopsyche grandis			
Cadmium	13	1.8	.7	1.2	1.1
Chromium	13	1.0	.2	.8	.8
Copper	13	44.3	18.2	26.0	23.7
Iron	13	931	240	497	443
Lead	13	11.8	2.1	4.5	3.8
Manganese	13	2,010	462	923	643
Nickel	13	1.9	.2	.6	.4
Zinc	13	308	142	193	189
		Claassenia sabulosa			
Cadmium	20	2.2	.3	1.1	1.0
Chromium	20	3.3	.3	.9	.6
Copper	20	130	18	60.2	50.0
Iron	20	290	76.0	139	108
Lead	20	2.2	.2	.9	.7
Manganese	20	270	45.9	132	144
Nickel	20	1.1	.1	.4	.3
Zinc	20	469	140	266	235

Table 27. Statistical summary of biological data for the upper Clark Fork basin, Montana, August 1986 through August 1995 (Continued)

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
12331800--CLARK FORK NEAR DRUMMOND, MONT.--Continued					
Period of record for biological data: 1986, 1991-95					
		Hydropsyche cockerelli			
Cadmium	8	1.7	.7	1.2	1.4
Chromium	8	1.8	.4	1.2	1.4
Copper	8	67.2	37.9	50.6	49.2
Iron	8	1,060	506	730	737
Lead	8	9.0	5.1	6.3	5.9
Manganese	8	901	549	706	697
Nickel	8	1.2	.5	.8	.8
Zinc	8	195	164	175	169
		***Hydropsyche morosa* group**			
Cadmium	6	1.3	1.1	1.2	1.2
Chromium	6	2.8	1.9	2.3	2.2
Copper	6	57.4	50.2	55.2	55.8
Iron	6	1,730	1,380	1,570	1,600
Lead	6	10.8	7.0	8.9	9.0
Manganese	6	1,940	1,260	1,610	1,620
Nickel	6	1.7	1.3	1.5	1.5
Zinc	6	250	227	239	240
		Hydropsyche occidentalis			
Cadmium	8	1.5	.7	1.1	1.1
Chromium	8	8.1	.4	2.5	2.0
Copper	8	57.2	13.3	46.5	49.3
Iron	8	1,800	424	1,080	865
Lead	8	12.5	2.9	8.1	7.3
Manganese	8	2,920	619	1,670	1,210
Nickel	8	2.4	.5	1.5	1.7
Zinc	8	283	164	226	222
		***Hydropsyche* spp.**			
Cadmium	1	--	--	2.6	--
Chromium	0	--	--	--	--
Copper	1	--	--	85.0	--
Iron	1	--	--	940	--
Lead	1	--	--	9.1	--
Manganese	0	--	--	--	--
Nickel	0	--	--	--	--
Zinc	1	--	--	260	--

Table 27. Statistical summary of biological data for the upper Clark Fork basin, Montana, August 1986 through August 1995 (Continued)

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
12334510--ROCK CREEK NEAR CLINTON, MONT.					
Period of record for biological data: 1987, 1991-95					
		Arctopsyche grandis			
Cadmium	22	.3	.1	.2	.1
Chromium	22	2.9	.5	1.1	1.0
Copper	22	12.3	4.7	8.0	7.5
Iron	22	770	191	418	398
Lead	22	1.0	.1	.4	.3
Manganese	22	328	113	207	214
Nickel	22	1.6	.2	.7	.5
Zinc	22	189	84	122	120
		Claassenia sabulosa			
Cadmium	11	.3	.1	.2	.1
Chromium	11	1.8	.5	.9	.6
Copper	11	40.7	18.1	29.5	28.5
Iron	11	115	49.8	81.3	81.3
Lead	11	1.0	.1	.4	.3
Manganese	11	43.2	15.7	28.5	29.0
Nickel	11	.9	.1	.3	.3
Zinc	11	242	164	201	211
		Hydropsyche cockerelli			
Cadmium	3	<.2	<.2	--[1]	<.2
Chromium	3	1.0	.9	.9	.9
Copper	3	13.1	6.0	8.6	6.6
Iron	3	609	485	530	497
Lead	3	<1.1	<1.1	--[1]	<1.1
Manganese	3	258	192	219	208
Nickel	3	.9	.4	.6	.4
Zinc	3	99	82	89	86
		Hydropsyche occidentalis			
Cadmium	4	<1.0	<.3	--[1]	<.3
Chromium	4	2.4	.9	1.6	.9
Copper	4	17.6	9.6	12.0	10.2
Iron	4	752	520	642	648
Lead	4	6.0	1.2	3.0	1.2
Manganese	4	268	169	228	215
Nickel	4	1.7	.6	1.2	.9
Zinc	4	144	99	121	117

Table 27. Statistical summary of biological data for the upper Clark Fork basin, Montana, August 1986 through August 1995 (Continued)

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
12334550--CLARK FORK AT TURAH BRIDGE, NEAR BONNER, MONT.					
Period of record for biological data: 1986, 1991-95					
Arctopsyche grandis					
Cadmium	15	1.9	.6	.9	.8
Chromium	15	2.1	.6	1.3	1.2
Copper	15	33.8	20.1	25.2	25.2
Iron	15	960	420	616	592
Lead	15	3.9	2.1	2.9	2.8
Manganese	15	825	351	537	505
Nickel	15	.9	.4	.7	.6
Zinc	15	240	152	180	167
Claassenia sabulosa					
Cadmium	14	1.7	.3	.8	.7
Chromium	14	2.0	.4	.9	.8
Copper	14	76.5	43.0	56.5	55.6
Iron	14	181	58.6	97.4	94.1
Lead	14	1.0	.2	.6	.6
Manganese	14	117	42.0	73.8	65.9
Nickel	14	.6	.1	.2	.2
Zinc	14	268	144	210	208
Hydropsyche cockerelli					
Cadmium	12	1.4	.6	.8	.7
Chromium	12	8.0	1.0	2.0	1.5
Copper	12	48.6	26.4	36.7	35.7
Iron	12	1,100	688	934	949
Lead	12	5.7	2.2	3.7	3.7
Manganese	12	788	426	544	533
Nickel	12	2.6	.6	1.1	1.0
Zinc	12	224	148	177	175
***Hydropsyche morosa* group**					
Cadmium	1	--	--	1.1	--
Chromium	1	--	--	4.6	--
Copper	1	--	--	26.8	--
Iron	1	--	--	986	--
Lead	1	--	--	6.6	--
Manganese	1	--	--	1,320	--
Nickel	1	--	--	1.7	--
Zinc	1	--	--	231	--

Table 27. Statistical summary of biological data for the upper Clark Fork basin, Montana, August 1986 through August 1995 (Continued)

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
12334550--CLARK FORK AT TURAH BRIDGE, NEAR BONNER, MONT.--Continued					
Period of record for biological data: 1986, 1991-95					
Hydropsyche occidentalis					
Cadmium	9	.9	.3	.7	.7
Chromium	9	2.4	.6	1.6	1.5
Copper	9	42.5	34.1	37.6	38.1
Iron	9	1,130	472	859	868
Lead	9	8.2	3.0	5.0	4.6
Manganese	9	1,510	454	795	666
Nickel	9	1.1	.6	.8	.8
Zinc	9	231	145	185	179
12340000--BLACKFOOT RIVER NEAR BONNER, MONT.					
Period of record for biological data: 1986-87, 1991, 1993					
Arctopsyche grandis					
Cadmium	6	<.4	<.1	<.3	<.3
Chromium	0	--	--	--	--
Copper	6	17.9	12.1	14.3	13.1
Iron	6	483	108	327	431
Lead	6	<2.1	<.6	<1.1	<1.5
Manganese	0	--	--	--	--
Nickel	0	--	--	--	--
Zinc	6	366	123	223	136
Claassenia sabulosa					
Cadmium	9	.6	.1	.4	.5
Chromium	0	--	--	--	--
Copper	9	51.0	32.0	43.0	44.0
Iron	9	199	68.0	116	113
Lead	9	<.9	<.3	<.5	<.5
Manganese	0	--	--	--	--
Nickel	0	--	--	--	--
Zinc	9	233	184	203	197
Hydropsyche occidentalis					
Cadmium	7	2.2	.8	1.2	1.0
Chromium	7	2.1	1.2	1.7	1.6
Copper	7	20.6	13.2	15.4	14.7
Iron	7	1,530	1,060	1,300	1,300
Lead	7	1.9	1.1	1.5	1.6
Manganese	7	474	414	447	452
Nickel	7	1.7	.9	1.2	1.2
Zinc	7	150	130	142	145

Table 27. Statistical summary of biological data for the upper Clark Fork basin, Montana, August 1986 through August 1995 (Continued)

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
12353000--CLARK FORK BELOW MISSOULA, MONT.[2]					
Period of record for biological data: 1986, 1990-95					
Arctopsyche grandis					
Cadmium	6	.9	.3	.5	.4
Chromium	6	2.7	.5	1.1	1.0
Copper	6	22.0	9.4	15.8	16.7
Iron	6	525	343	435	432
Lead	6	1.9	1.0	1.4	1.3
Manganese	6	1,090	511	773	712
Nickel	6	1.0	.4	.7	.7
Zinc	6	169	106	139	140
Claassenia sabulosa					
Cadmium	22	.7	.2	.4	.3
Chromium	22	1.2	.05	.6	.5
Copper	22	57.8	31.1	44.8	44.9
Iron	22	127	66.6	86.7	81.3
Lead	22	1.3	.1	.4	.3
Manganese	22	168	48.9	95.7	91.8
Nickel	22	.3	.1	.2	.2
Zinc	22	286	146	200	195
Hydropsyche cockerelli					
Cadmium	18	.7	.2	.5	.6
Chromium	18	3.4	.8	2.0	1.9
Copper	18	39.3	12.4	28.0	29.5
Iron	18	1,590	645	1,140	1,170
Lead	18	3.6	1.2	2.1	1.9
Manganese	18	1,180	353	728	663
Nickel	18	1.5	.5	1.2	1.3
Zinc	18	172	77.4	145	163
Hydropsyche occidentalis					
Cadmium	8	.9	.2	.4	.2
Chromium	8	3.5	.2	1.4	1.2
Copper	8	30.5	18.9	23.4	20.7
Iron	8	1,420	482	806	731
Lead	8	3.5	.7	1.8	1.8
Manganese	8	1,460	667	949	956
Nickel	8	2.2	.5	1.0	.8
Zinc	8	193	116	141	131

[1]Values determined by arbitrarily substituting one-half of the detection level for censored (<) values, when both uncensored and censored values are used in determining the mean. When all data are below the detection level, the median is determined by ranking the censored values in order of detection level. No mean is reported when all values are below the detection level.

[2]Samples collected about 30 miles downstream of water-quality station to conform to previous sampling location.

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