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Water-Quality, Bed-Sediment, and Biological Data (October 2009 through September 2010) and Statistical Summaries of Data for Streams in the Clark Fork Basin, Montana

Open-File Report 2011–1314

U.S. Department of the Interior
U.S. Geological Survey

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Conversion Factors, Datum, Abbreviated Water-Quality Units, and Acronyms

Inch/Pound to SI

Multiply	By	To obtain
acre-foot (acre-ft)	1,233	cubic meter (m^3)
cubic foot per second (ft^3/s)	0.02832	cubic meter per second (m^3/s)
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 (km)
ounce (oz)	28.35	gram (g)
part per million (ppm)	1	microgram per gram (µg/g)
square mile (mi^2)	2.59	square kilometer (km^2)
ton	907.2	kilogram
ton per day (ton/d)	907.2	kilogram per day (kg/d)

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

$$°F = (1.8 \times °C) + 32$$

Vertical coordinate information is referenced to the National Geodetic Vertical Datum of 1929 (NGVD 29).

Horizontal coordinate information is referenced to the North American Datum of 1927 (NAD 27).

Water-year definition:

Water year is the 12-month period from October 1 through September 30 of the following calendar year. The water year is designated by the calendar year in which it ends. For example, water year 2010 is the period from October 1, 2009, through September 30, 2010.

Abbreviated water-quality units used in this report:

µg/g	microgram per gram
µg/L	microgram per liter
µg/mL	microgram per milliliter
µm	micrometer
µS/cm	microsiemens per centimeter at 25 degrees Celsius
mg/L	milligrams per liter
mm	millimeter
ppm	part per million

Acronyms used in the report:

FNU	formazin nephelometric units
ICP–AES	inductively coupled plasma–atomic emission spectrometry
ICP–MS	inductively coupled plasma–mass spectrometry
ICP–OES	inductively coupled plasma–optical emission spectrometry
LRL	laboratory reporting level
LT–MDL	long-term method detection level
NTRU	nephelometric turbidity ratio unit
NWQL	USGS National Water Quality Laboratory, Denver, Colo.
RSD	relative standard deviation
spp.	species
SRM	standard reference material
TFE	tetrafluoroethylene
USGS	U.S. Geological Survey
YSI	Yellow Springs Instruments Company

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Abstract

Water, bed sediment, and biota were sampled in streams from Butte to near Missoula, Montana, as part of a monitoring program in the upper Clark Fork basin. The sampling program was conducted by the U.S. Geological Survey in cooperation with the U.S. Environmental Protection Agency to characterize aquatic resources in the Clark Fork basin of western Montana, with emphasis on trace elements associated with historic mining and smelting activities. Sampling sites were located on the Clark Fork and selected tributaries. Water samples were collected periodically at 20 sites from October 2009 through September 2010. Bed-sediment and biota samples were collected once at 13 sites during August 2010.

This report presents the analytical results and quality-assurance data for water-quality, bed-sediment, and biota samples collected at sites from October 2009 through September 2010. Water-quality data include concentrations of selected major ions, trace elements, and suspended sediment. Turbidity was analyzed for water samples collected at the four sites where seasonal daily values of turbidity were being determined. Daily values of suspended-sediment concentration and suspended-sediment discharge were determined for four sites. Bed-sediment data include trace-element concentrations in the fine-grained fraction. Biological data include trace-element concentrations in whole-body tissue of aquatic benthic insects. Statistical summaries of water-quality, bed-sediment, and biological data for sites in the upper Clark Fork basin are provided for the period of record 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-mile (mi) reach of stream from Silver Bow Creek in Butte to the Clark Fork near Missoula, 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-square-mile (mi^2) upper Clark Fork basin above Missoula include irrigation, stock watering, small-scale industry, and habitat for trout fisheries. Current land uses primarily are cattle production, logging, mining, residential development, and recreation. Large-scale mining and smelting were prevalent land uses in the upper basin for more than 100 years but are now either discontinued or substantially smaller in scale.

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 the 1860s to the 1980s (U.S. Environmental Protection Agency, 2004). Moderate- and small-scale mining also occurred in the basins of most of the major tributaries to the upper Clark Fork. Tailings derived from past mineral processing commonly contain large quantities of trace elements such as arsenic, cadmium, copper, lead, and zinc. Tailings have been eroded; mixed with stream sediment; transported downstream; and deposited in stream channels, on flood plains, in the Warm Springs Ponds, and where the former Milltown Reservoir was located (Andrews, 1987). The widely dispersed tailings continue to be reeroded, transported, and redeposited along the stream channel and flood plain, especially during high flows. The occurrence of elevated trace-element concentrations in water and bed sediment can pose a potential risk to aquatic biota and human health (U.S. Environmental Protection Agency, 2004).

Concern about the potential toxicity of trace elements 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 database 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 through 1991; Lambing and others, 1994, 1995; Dodge and others, 1996 through 2010). Trace-element data for bed sediment and biota (aquatic

benthic insects) have been collected intermittently at selected sites since 1986 as part of studies on the contamination of bed-sediment quality and bioaccumulation of metals conducted by the USGS National Research Program (Axtmann and Luoma, 1991; Cain and others, 1992, 1995; Axtmann and others, 1997; Hornberger and others, 1997). In March 1993, an expanded monitoring program for water, bed sediment, and biota in the upper basin was implemented by the USGS in cooperation with the U.S. Environmental Protection Agency to systematically quantify the seasonal and annual variability in selected constituents.

The purpose of this report is to present water-quality data for 20 sites and bed-sediment and biological data for 13 sites in the Clark Fork basin collected from October 2009 through September 2010. Quality-assurance data are presented for water-quality, bed-sediment, and biota samples. Statistical summaries also are provided for water-quality, bed-sediment, and biological data collected since 1985.

Sampling Locations and Types of Data

Sampling sites for the monitoring program in the upper Clark Fork basin from Butte to near Missoula (fig. 1) are located on the Clark Fork main stem (including Silver Bow Creek), three major tributaries (Blacktail Creek, Warm Springs Creek, and Blackfoot River), and three smaller tributaries (Mill Creek, Willow Creek, and Lost Creek). The sites, types of data collected, and period of record for each type of data are listed in table 1. Main-stem sampling 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 the former Milltown Reservoir). Major tributaries were sampled to describe water-quality, bed-sediment, and biological characteristics of important hydrologic sources in the upper basin and to provide reference comparisons to the main stem. The three smaller tributaries were sampled to gain better spatial resolution on sources of metals entering the Clark Fork in an area of historical metal-processing activities near Anaconda. Water-quality data were obtained periodically at 20 sites; daily suspended-sediment data were obtained at 4 sites; and daily turbidity data were obtained by continuous turbidity monitors at 4 sites. Bed-sediment and biological data for 13 sites were obtained once annually. Continuous streamflow data were collected at 19 sites in the long-term monitoring network.

Properties measured onsite and constituents for which water, bed-sediment, and biota samples were analyzed are listed in table 2. Data-quality objectives for analyses of water samples are listed in table 3. Results of onsite measurements of stream properties; laboratory analyses of water-quality, bed-sediment, and biota samples; and quality-assurance data for water year 2010 are listed in tables 4 through 24 at the back of the report. Statistical summaries of water-quality, bed-sediment, and biological data collected between March 1985 and September 2010 are listed in tables 25 through 27 at the back of the report.

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 onsite measurements of selected stream properties and concentrations of chemical and physical constituents analyzed in periodically collected stream samples. Routine water samples for the monitoring program were collected at 20 sites in the upper Clark Fork basin 6–8 times per year on a schedule designed to describe seasonal and hydrologic variability. At the 4 daily suspended-sediment sites, suspended-sediment samples were collected by an observer 2–9 times per week, depending on season and flow conditions. Continuous turbidity monitors were operated seasonally (April–September 2010) at four sites near Anaconda to determine daily values (table 1).

Methods

Water samples were collected from vertical transits throughout the entire stream depth at multiple locations across the stream by using depth- and width-integration methods described by Ward and Harr (1990), Edwards and Glysson (1999), and the USGS National Field Manual for the Collection of Water-Quality Data (variously dated). These methods provide a vertically and laterally discharge-weighted composite sample that is intended to be representative of the entire flow passing through the cross section of a stream. Sampling equipment consisted of depth-integrating suspended-sediment and water-quality samplers (Davis, 2005), which were constructed of plastic or coated with a nonmetallic epoxy paint and equipped with nylon or tetrafluoroethylene (TFE) nozzles.

Instantaneous streamflow at the time of water sampling was determined at all sites, either by direct measurement or from stage-discharge rating tables (Rantz and others, 1982). Daily mean streamflow during ice periods was estimated because backwater affected the stage-discharge relation. Onsite measurements of pH, specific conductance, and water temperature were made during collection of periodic water samples. Onsite sample processing, including filtration and preservation, was performed according to procedures described by Ward and Harr (1990), Horowitz and others (1994), and the USGS National Field Manual for the Collection of Water Quality Data (variously dated).

Composite water samples were analyzed for the constituents listed in table 2. The terms “filtered” and “unfiltered

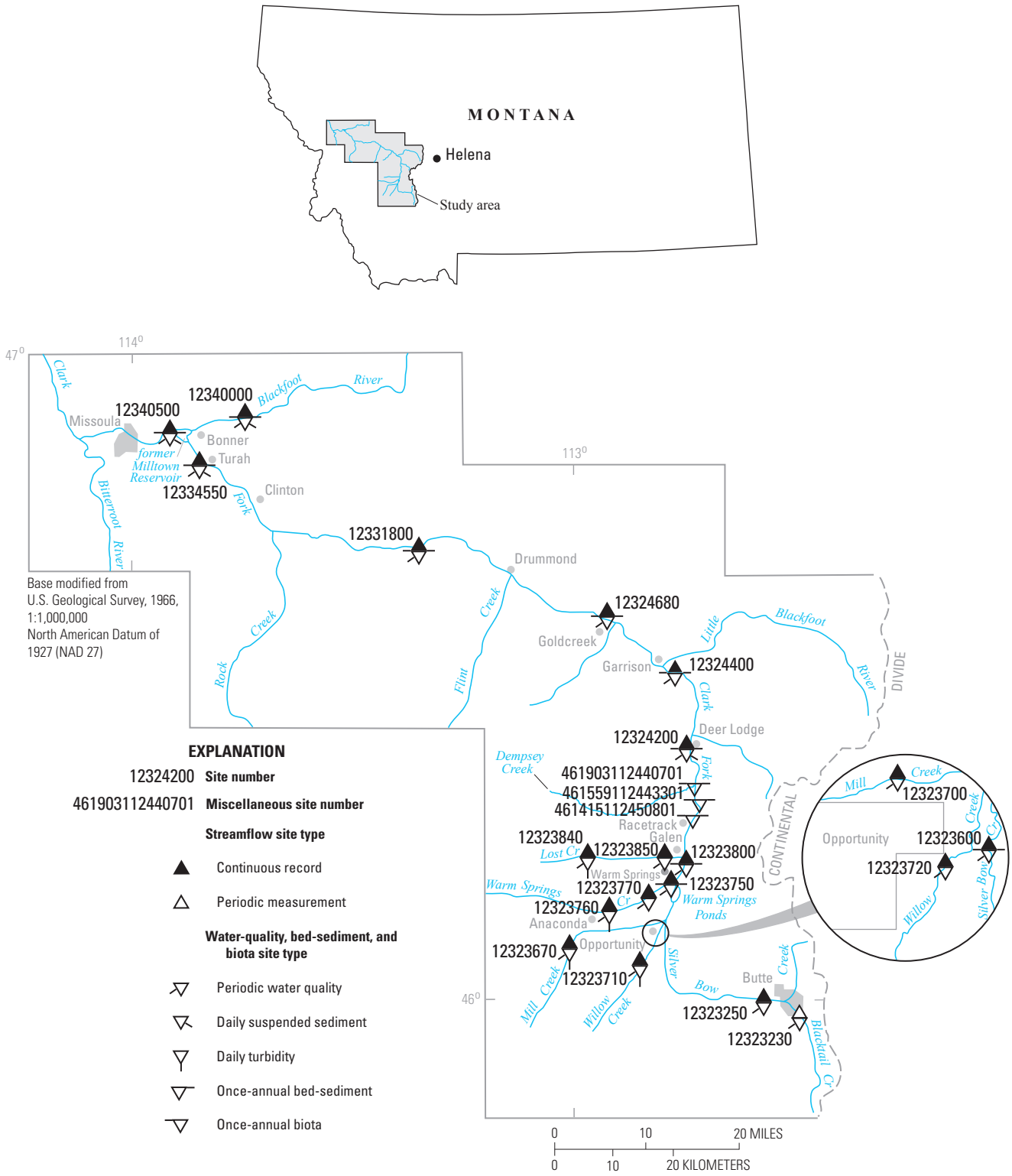

Figure 1. Location of study area in the Clark Fork basin, Montana.

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

[Abbreviations: P, present; D, discontinued. Symbol: --, no data]

Station number (fig. 1)	Station name	Continuous-record streamflow	Periodic water quality[1]	Daily suspended sediment	Daily turbidity (seasonal)	Fine-grained bed sediment[2]	Bulk bed sediment[2,3]	Biota[2]
12323230	Blacktail Creek at Harrison Avenue, at Butte	--	03/93–08/95, 12/96–08/03, 12/04–P	--	--	--	--	--
12323250	Silver Bow Creek below Blacktail Creek, at Butte	10/83–P	03/93–08/95, 12/96–P	--	--	--	--	--
12323600	Silver Bow Creek at Opportunity	07/88–P	03/93–08/95, 12/96–P	03/93–09/95, D	--	07/92–P	08/93–08/95, 08/97–08/04, D	07/92, 08/94–08/95, 08/97–P
12323670	Mill Creek near Anaconda	10/04–P	12/04–P	--	06/06–P	--	--	--
12323700	Mill Creek at Opportunity	04/03–P	03/03–P	--	--	--	--	--
12323710	Willow Creek near Anaconda	03/05–P	12/04–P	--	06/06–P	--	--	--
12323720	Willow Creek at Opportunity	04/03–P	03/03–P	--	--	--	--	--
12323750	Silver Bow Creek at Warm Springs	03/72–09/79, 04/93–P	03/93–P	04/93–09/95, D	--	07/92–P	08/93, 08/95–08/04, D	07/92–P
12323760	Warm Springs Creek near Anaconda	10/97–P	10/05–P	--	05/06–P	--	--	--
12323770	Warm Springs Creek at Warm Springs	10/83–P	03/93–P	--	--	08/95, 08/97, 08/99, 08/02, 08/05, 08/08	08/95, 08/97, 08/99, 08/02, D	08/95, 08/97, 08/99, 08/02, 08/05, 08/08
12323800	Clark Fork near Galen	07/88–P	07/88–P	--	--	08/87, 08/91–P	08/93–08/04, D	08/87, 08/91–P
12323840	Lost Creek near Anaconda	10/04–P	12/04–P	--	05/06–P	--	--	--
12323850	Lost Creek near Galen	04/03–P	03/03–P	--	--	--	--	--
461415112450801	Clark Fork below Lost Creek, near Galen	--	--	--	--	08/96–P	08/96–08/04, D	08/96–P
461559112443301	Clark Fork at county bridge, near Racetrack	--	--	--	--	08/96–P	08/96–08/04, D	08/96–P
461903112440701	Clark Fork at Dempsey Creek diversion, near Racetrack	--	--	--	--	08/96–P	08/96–08/04, D	08/96–P

Table 1. Type and period of data collection at sampling sites in the Clark Fork basin, Montana.—Continued

[Abbreviations: P, present; D, discontinued. Symbol: --, no data]

Station number (fig. 1)	Station name	Continuous-record streamflow	Periodic water quality[1]	Daily suspended sediment	Daily turbidity (seasonal)	Fine-grained bed sediment[2]	Bulk bed sediment[2,3]	Biota[2]
12324200	Clark Fork at Deer Lodge	10/78–P	03/85–P	03/85–08/86, 04/87–03/03, 08/03–P	--	08/86–08/87, 08/90–P	08/93–08/04, D	08/86–08/87, 08/90–P
12324400	Clark Fork above Little Blackfoot River, near Garrison	02/09–P	03/09–P	--	--	08/09–P	--	08/09–P
12324680	Clark Fork at Goldcreek	10/77–P	03/93–P	--	--	07/92–P	08/93–08/04, D	07/92–P
12331800	Clark Fork near Drummond	04/93–P	03/93–P	--	--	08/86, 08/87, 08/91–P	08/93–08/04, D	08/86, 08/91–P
12334550	Clark Fork at Turah Bridge, near Bonner	03/85–P	03/85–P	03/85–03/03, 08/03–P	--	08/86, 08/91–P	08/93–08/04, D	08/86, 08/91–P
12340000	Blackfoot River near Bonner	10/39–P	03/85–P	07/86–04/87, 06/88–09/95, 10/05–P	--	08/86–08/87, 08/91, 08/93–96, 08/98–01, 09/03, 08/06–P	08/93, 08/94, 08/99–01, 09/03, D	08/86–08/87, 08/91, 08/93, 08/96, 08/98, 09/00, 09/03, 08/06–P
12340500	Clark Fork above Missoula	03/29–P	07/86–P[4]	07/86–04/87, 06/88–01/96, 03/96–03/03, 08/03–P	04/07–09/07	08/97–P	08/97–08/04, D	08/97–P

[1]Onsite measurements of physical properties and laboratory analyses for selected major ions, trace elements, and suspended sediment. Prior to March 1993, laboratory analyses included only trace elements and suspended sediment.

[2]Laboratory analyses for trace elements.

[3]Bulk bed-sediment sampling was discontinued in 2005.

[4]Prior to October 1989, water-quality data for Clark Fork above Missoula included only suspended-sediment data.

Table 2. Properties and constituents measured onsite or analyzed in water, bed-sediment, and biota samples from the Clark Fork basin, Montana.

Water		Bed sediment	Biota
Property	**Constituent**	**Constituent**	**Constituent**
Streamflow	Hardness (calculated)	Arsenic	Arsenic
pH	Calcium	Cadmium	Cadmium
Specific conductance	Magnesium	Chromium	Chromium
Temperature	Arsenic	Copper	Copper
Turbidity	Cadmium	Iron	Iron
	Copper	Lead	Lead
	Iron	Manganese	Manganese
	Lead	Nickel	Nickel
	Manganese	Zinc	Zinc
	Zinc		
	Suspended sediment		

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

[Abbreviations: µg/L, micrograms per liter; mg/L, milligrams per liter; mm, millimeter. Symbol: --, not determined]

Constituent	Data-quality objectives		
	Detectability	Precision	Bias
	Laboratory reporting level	Maximum relative standard deviation of replicate analyses (percent)	Maximum deviation of spike recovery (percent)
Calcium, filtered	0.04 mg/L	20	--
Magnesium, filtered	.016 mg/L	20	--
Arsenic, filtered	.04–.13 µg/L	20	25
Arsenic, unfiltered recoverable	.18 µg/L	20	25
Cadmium, filtered	.02–.06 µg/L	20	25
Cadmium, unfiltered recoverable	.04 µg/L	20	25
Copper, filtered	1.0–3.0 µg/L	20	25
Copper, unfiltered recoverable	1.4 µg/L	20	25
Iron, filtered	6 µg/L	20	25
Iron, unfiltered recoverable	9 µg/L	20	25
Lead, filtered	.03–.09 µg/L	20	25
Lead, unfiltered recoverable	.06 µg/L	20	25
Manganese, filtered	.3–.8 µg/L	20	25
Manganese, unfiltered recoverable	.8 µg/L	20	25
Zinc, filtered	2.8–8.4 µg/L	20	25
Zinc, unfiltered recoverable	2.0 µg/L	20	25
Sediment, suspended, percent finer than 0.062 mm	1 percent	20	--
Sediment, suspended	1 mg/L	20	--

recoverable" replace the terms "dissolved" and "total recoverable," respectively, which were used in past reports from this project. Filtered [0.45-micrometer (µm) pore size] and unfiltered recoverable concentrations of the trace elements (arsenic, cadmium, copper, iron, lead, manganese, and zinc) and filtered concentrations of calcium and magnesium were determined by the USGS National Water Quality Laboratory (NWQL) in Denver, Colo. Concentrations of calcium and magnesium were determined in order to enable the calculation of water hardness.

Filtered concentrations of arsenic, cadmium, copper, lead, manganese, and zinc were determined by inductively coupled plasma-mass spectrometry (ICP–MS)(Faires, 1993; Garbarino and others, 2006). Filtered concentrations of calcium, magnesium, and iron were determined by inductively coupled plasma-atomic emission spectrometry (ICP–AES)(Fishman, 1993). Unfiltered recoverable concentrations of trace elements were determined from unfiltered samples that were first digested with dilute hydrochloric acid (Hoffman and others, 1996). For cadmium, iron, lead, and manganese, the digested samples were analyzed by ICP–MS by using the method described by Garbarino and Struzeski (1998). For arsenic, copper, and zinc, the digested samples were analyzed by ICP–MS using the method described by Garbarino and others (2006).

Water samples also were collected from multiple vertical transits for analysis of suspended sediment whenever periodic water samples were collected. These samples were analyzed for suspended-sediment concentration and the percentage of suspended-sediment mass finer than 0.062-millimeter (mm) diameter (silt size and smaller) by the USGS Montana Water Science Center sediment laboratory (hereinafter referred to as the Montana Sediment Laboratory) in Helena, Mont., according to methods described by Guy (1969) and Dodge and Lambing (2006).

Suspended-sediment samples for the four daily suspended-sediment sites (table 1) were collected by local contract observers using the depth-integration method at a single vertical transit near midstream. 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).

Suspended-sediment discharge is determined according to the following equation (Porterfield, 1972):

$$Q_s = Q_w \times C_s \times k \,, \qquad (1)$$

where

Q_s is suspended-sediment discharge, in tons per day;
Q_w is streamflow, in cubic feet per second;
C_s is suspended-sediment concentration, in milligrams per liter; and
k is a units-conversion constant (0.0027) to convert instantaneous suspended-sediment discharge to an equivalent daily suspended-sediment discharge.

Turbidity data were obtained by continuous turbidity monitors (YSI 6136 turbidity sensor) at four tributary sites in the upper Clark Fork basin near Anaconda (table 1). The monitors were installed in May–June 2006 to provide supporting information on runoff conditions in an area where remediation activities are being conducted. They are operated seasonally, generally from early spring (after ice breakup) to early winter (before stream freeze-up). Turbidity values are recorded at 15-minute intervals and can be viewed in real-time on the Web at *http://waterdata.usgs.gov/mt/nwis/current/?type=quality*. Continuous recordings enable the determination of the minimum and maximum values for each day as well as a daily mean turbidity, which is based on the average of all values in a 24-hour period. Procedures for the operation of continuous turbidity monitors and for daily record computations are described by Wagner and others (2006).

Results

Water-quality data for samples collected periodically during water year 2010 are listed in table 4. Daily mean streamflow, daily mean suspended-sediment concentration, and daily suspended-sediment discharge for water year 2010 at the four daily suspended-sediment sites are listed in tables 5 through 8 along with monthly summary statistics and annual totals for streamflow and suspended-sediment discharge. Daily maximum, minimum, and mean turbidity at four sites are listed in tables 9 through 12 along with monthly summary statistics.

Quality Assurance

Quality-assurance procedures used for the collection and field processing of water samples are described by Ward and Harr (1990), Horowitz and others (1994), Edwards and Glysson (1999), Lambing (2006), and the U.S. Geological Survey (variously dated). 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 (1995). Quality-assurance procedures used by the Montana Sediment Laboratory are described by Dodge and Lambing (2006). Standard procedures used for the calibration, measurement, and quality assurance of turbidity monitors are described by Anderson (2004).

The quality of analytical results reported for water samples was evaluated by using 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 that provided 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 samples. Therefore, the total number of quality-control samples represented about 15 percent of the total number of water samples.

In addition to the use of quality-control samples submitted from the field, internal quality-assurance practices are performed systematically by the NWQL to provide quality control of analytical procedures (Pritt and Raese, 1995; Maloney, 2005). These internal practices include analyses of quality-control samples such as calibration standard samples, standard reference water samples, replicate samples, deionized-water blank samples, or spiked samples at a proportion equivalent to at least 10 percent of the sample load. The NWQL participates in a blind-sample program in which standard reference water samples prepared by the USGS Branch of Quality Systems are routinely inserted into the sample line for each analytical method at a frequency proportional to the sample load (*http://bqs.usgs.gov*). The laboratory also participates in external evaluation studies and audits with the National Environmental Laboratory Accreditation Program, the U.S. Environmental Protection Agency, Environment Canada, and the USGS Branch of Quality Systems, in order to assess analytical performance.

Replicate data can be obtained in different ways to provide an assessment of precision (reproducibility) of analytical results. Replicate samples are two or more samples that are considered to be essentially identical in composition. Replicate samples can be obtained in the field (field replicate) by either repeating the collection process to obtain two or more independent composite samples or by splitting a single composite sample into two or more subsamples. The individual replicate samples are then analyzed separately. Likewise, a single sample can be analyzed two or more times in the laboratory to obtain a measure of analytical precision (laboratory replicate).

Precision of analytical results for field replicates 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 overall precision for samples exposed to both field and laboratory sources of variability, replicate stream samples for chemical analysis were obtained in the field by splitting a composite stream sample. Replicate stream samples for suspended-sediment analysis were obtained in the field by concurrently collecting two independent cross-sectional samples. Analyses of these field replicate samples indicate the reproducibility of environmental data that are affected by the combined variability potentially introduced by field and laboratory processes.

Precision of analytical results for laboratory replicates, which exclude field sources of variability, was determined by two independent chemical analyses of aliquots from a single sample selected from the group of samples constituting each analytical run. A separate analysis of the sample was made at the beginning and end of each analytical run to provide information on the reproducibility of laboratory analytical results independent of possible variability caused by field sample collection and processing. Laboratory replicates are not obtainable for suspended-sediment samples because the samples are consumed during the analysis.

Spiked samples are used to evaluate bias, which measures the ability of an analytical method to accurately quantify a known amount of analyte added to a sample. Because some constituents in stream water can potentially interfere with the analysis of a sample for a targeted analyte, it is important to determine whether such effects are causing biased (consistently high or low) results. Deionized-water blank samples and aliquots of stream samples were spiked in the laboratory with known amounts of the same trace elements for which water samples were analyzed. 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 the stream water interferes with the analytical measurement and whether these interferences could contribute substantial bias to reported trace-element concentrations for stream samples.

Deionized-water blank samples were submitted for every field trip and 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 then are 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 stream samples in order 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 routine and quality-control samples submitted from a sampling episode were stored in a secure area of the NWQL and analyzed as a discrete sample group, independent of other samples submitted to the NWQL. Therefore, the quality-control data apply solely to the analytical results for stream samples reported herein and provide a direct measure of data quality for this monitoring program.

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 the analytical requirements of detectability and serve as a guide for identifying questionable data by establishing acceptable limits for precision and bias of laboratory results. Comparisons of quality-control data to data-quality objectives were used to evaluate whether sampling and analytical procedures were producing environmentally representative data in a consistent manner. Data that did not meet the objectives were evaluated for acceptability. If necessary, additional quality-control samples were submitted and corrective action was taken.

The NWQL uses a statistically based convention for establishing minimum laboratory reporting levels (LRLs) for analytical results and for reporting low-concentration data (Childress and others, 1999). Quality-control data are collected by the NWQL on a continuing basis to determine long-term method detection levels (LT–MDLs) and LRLs.

These values are reevaluated each year and, consequently, can change from year to year. The methods used to determine the LRLs are designed to limit the possible occurrence of a false positive or false negative error to 1 percent or less. Accordingly, concentrations are reported as less than the LRL for samples in which the analyte was either not detected or did not pass identification criteria. Analytes that are detected at concentrations between the LT–MDL and the LRL and that pass identification criteria are reported as estimated concentrations. Estimated concentrations are noted with a remark code of "E." These data need to be used with the understanding that their uncertainty is greater than that of data reported without the "E" remark code.

The precision of analytical results for a constituent can be determined by estimating a standard deviation of the differences in concentrations between replicate analyses for several sets of samples. These replicate analyses may consist either of individual analyses of a pair of samples considered to be essentially identical (field replicates) or of 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):

$$S = \sqrt{\frac{\sum d^2}{2k}}\ , \qquad (2)$$

where

S is the standard deviation of the difference in concentration between replicate analyses,
d is the difference in concentration between each pair of replicate analyses, and
k is the number of pairs of replicate analyses.

Precision also can 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 the comparison of precision among individual constituents. The *RSD* is calculated according to the following equation (Taylor, 1987):

$$RSD = \frac{S}{\bar{x}} \times 100\ , \qquad (3)$$

where

RSD is the relative standard deviation;
S is the standard deviation; and
$\bar{x}$ is the mean concentration for all replicate analyses.

Paired analyses of field replicates are listed in table 13. The overall precision estimated for each constituent on the basis of analyses of field replicates, which include both field and laboratory sources of variability, is listed in table 14. The data-quality objective used to indicate acceptable precision of results for field replicates was a maximum *RSD* of 20 percent (table 3). Precision estimates for the analytical results of field replicates were within the 20-percent *RSD* limit for all constituents (table 14).

The precision estimated for each constituent on the basis of laboratory replicate analyses, which include only laboratory sources of variability, is listed in table 15. Statistics for the precision of analytical results for laboratory replicates are calculated by using unrounded values stored in laboratory data files. The data-quality objective used to indicate acceptable precision of results for laboratory replicates was a maximum *RSD* of 20 percent (table 3). Precision estimates for the laboratory replicates were within the 20-percent *RSD* limit for all constituents (table 15). No adjustments were made to analytical data on the basis of replicate analyses precision.

Recovery efficiency for analyses of constituents is determined by analyses of an unspiked sample and a spiked aliquot of the same sample. 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 (table 3). At the laboratory, a spiked deionized-water blank sample 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, in percent, according to equation 4:

$$R = \frac{D}{C} \times 100\ , \qquad (4)$$

where

R is the spike recovery, in percent;
D is the difference between the spiked and unspiked sample concentrations; and
C is the concentration of material used to spike the sample.

If the spike recovery of a trace element was outside a range of 75 to 125 percent, the instrument was recalibrated and the entire sample set and all spiked samples were reanalyzed for that particular trace element until recoveries were improved to the extent possible. Recovery efficiency for individual trace elements in laboratory-spiked deionized-water blank samples and in laboratory-spiked stream samples is listed in tables 16 and 17, respectively. The mean spike recovery for deionized-water blank samples spiked with trace elements (table 16) ranged from 97.2 to 113 percent. The 95-percent confidence intervals (Taylor, 1987) for the mean spike recovery for each constituent for which deionized-water blank samples were analyzed (table 16) did not exceed a 25-percent deviation from an expected 100-percent recovery, except for filtered zinc (94.7–132 percent). The exceedance of this data-quality objective is an artifact of running the final filtered-zinc spike analysis after extensive instrument maintenance, which reduced a high zinc bias. Spikes before and after maintenance met data-quality objectives, but analytical results may not be comparable to each other due to the small number of sample sets. The mean spike recovery for spiked stream samples (table 17) ranged from 93.8 to 111 percent.

The 95-percent confidence intervals for the mean spike recovery for each constituent for which streamwater samples were analyzed (table 17) did not exceed a 25-percent deviation from an expected 100-percent recovery, except for filtered cadmium (87.6 to 132 percent). The exceedance of this data quality objective resulted from one spike sample having a recovery of 136 percent. When this one spiked sample set is removed, filtered cadmium falls within the data-quality objective limit (91.4–121 percent) for the 95-percent confidence interval. No adjustments were made to analytical data on the basis of the mean spike recovery.

High or low bias is indicated if the 95-percent confidence interval does not include 100-percent recovery, thereby indicating a consistent deviation in one direction. All laboratory-spiked deionized-water blank samples (table 16) had confidence intervals for percent recovery that included 100 percent except for filtered iron (101–115 percent). All laboratory-spiked stream samples (table 17) also had confidence intervals for percent recovery that included 100 percent except for unfiltered recoverable iron (103–118 percent) and filtered zinc (101–118 percent). Because the mean spike recoveries for all constituents of laboratory-spiked stream samples met data-quality objectives (less than a 25-percent deviation from 100-percent recovery), no adjustments were made to analytical results for stream samples on the basis of spike recoveries.

Analytical results for field blanks are listed in table 18. A field blank with constituent concentrations equal to or less than the LRL for the analytical method indicates that the entire process of sample collection, field processing, and laboratory analysis is presumably free of contamination. If detectable concentrations of trace elements in field blanks were equal to or greater than twice the LRL, the concentrations were noted during data review. Analytical results from the field blank for the next sample set were evaluated for a consistent trend that could indicate systematic contamination. Sporadic, infrequent exceedances of twice the LRL probably represented random contamination or instrument calibration error that was not persistent in the process and was not likely to cause positive bias in a long-term record of analytical results. However, if concentrations for a particular constituent exceeded twice the LRL in field blanks from two consecutive field trips, blank samples were collected from individual components of the processing sequence and were submitted for analysis to identify the source of contamination.

Trace-element concentrations in field blanks (table 18) were almost always less than the LRL. Two detections exceeded the LRL for unfiltered recoverable zinc (3.3 and 3.4 µg/L), which had a LRL of 2.0 µg/L. Because no trends were indicated in subsequent sampling trips, no adjustments were made to water-quality sample results on the basis of these two detections.

Bed-Sediment Data

Bed-sediment data for the long-term monitoring program in the Clark Fork basin consist of analyses of trace-element concentrations in the fine-grained (<0.063 mm) fraction of bed-sediment samples. Collection of bulk bed sediment (fine-grained plus coarse-grained fractions) was discontinued in 2005; therefore, no bulk bed sediment analytical results or statistical summaries are presented in this report. Bed-sediment samples are collected once annually at 13 sites (fig. 1 and table 1) during low, stable flow conditions at about the same time of year (typically August) as previous samples, in order to facilitate data comparisons among years. One site, Warm Springs Creek at Warm Springs, is sampled once every 3 years rather than once annually.

Methods

Fine-grained bed-sediment samples were collected in August 2010 using protocols described by Axtmann and Luoma (1991). Samples were collected from the surfaces of streambed deposits in low-velocity areas near the edge of the stream by using an acid-washed polypropylene scoop. Whenever possible, samples were collected from both sides of the stream.

Individual samples of bed sediment were collected by scooping material from the surfaces of three to five randomly selected deposits along pools 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 0.063-mm polyester-mesh sieve using ambient stream water. The fraction of bed sediment in each composite sample that was finer than 0.063 mm was transferred to an acid-washed 500-mL polyethylene bottle and transported to the laboratory on ice.

Bed-sediment samples were processed and analyzed at the USGS National Research Program Ecology and Contaminants Project laboratory in Menlo Park, Calif. Bed-sediment samples were oven-dried at 60°C and ground into smaller particle sizes using an acid-washed, ceramic mortar and pestle. Single aliquots of approximately 0.6 grams (g) of sediment from each of the three composite bed-sediment samples were digested by using a hot, concentrated, nitric acid reflux according to methods described by Luoma and Bryan (1981). An additional aliquot was analyzed from one of the sieved replicate samples at each station. After a 2-week digestion period, the aliquots were evaporated to dryness on a hot plate. The dry residue was reconstituted in 10 mL of 0.6N (normal) hydrochloric acid. The reconstituted aliquots then were filtered through a 0.45-µm pore-size filter by using a syringe and in-line disposable filter cartridge. The filtrate was diluted to a 1:10 ratio with 0.6N hydrochloric acid. These final solutions were analyzed for arsenic, cadmium, chromium, copper, iron, lead, manganese, nickel, and zinc by using inductively

coupled plasma-optical emission spectrometry (ICP–OES). The smallest concentration of a constituent that can be reliably reported for analyses of bed sediment is termed the minimum reporting level.

Results

Concentrations of trace elements measured in samples of fine-grained bed sediment collected during August 2010 are listed in table 19. Liquid-phase concentrations, in micrograms per milliliter (µg/mL) (which is equivalent to parts per million; ppm), that were analyzed in the reconstituted aliquots of digested bed sediment were converted to solid-phase concentrations, in micrograms per gram (µg/g), by using the following equation:

$$\mu g/g = \frac{\left(\mu g/mL\right)\left(volume\ of\ digested\ sample,\ in\ mL\right)}{\left(dry\ weight\ of\ sample,\ in\ grams\right)\left(dilution\ ratio\right)}. \quad (5)$$

The reported solid-phase concentrations listed in table 19 are the means of all analyses for replicate aliquots from each composite bed-sediment 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 might differ among 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. Nonmetallic sampling and processing equipment was acid-washed and rinsed with deionized water prior to the collection of the first sample. Polyester-mesh sieves were washed in a laboratory-grade detergent and rinsed with deionized water. All equipment received a final rinse onsite with stream water. Sampling equipment used at more than one site was rinsed between sites with stream water. Separate sieves were used at each site and, therefore, did not require between-site cleaning. Bed-sediment samples were collected sequentially at sites along an increasing concentration gradient to minimize effects from potential site-to-site carryover contamination.

Quality assurance of analytical results for bed-sediment samples 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 (SRMs) and procedural blanks. Each type of quality-control sample was analyzed in a proportion equivalent to about 10 percent of the total number of bed-sediment samples.

SRMs are commercially prepared materials that have certified concentrations of trace elements. Analyses of SRMs are used to indicate the ability of the method to accurately measure a known quantity of a constituent. Multiple analyses of SRMs are made to derive a mean and 95-percent confidence interval for recovery. Recovery efficiency for trace-element analyses of SRMs for bed sediment is listed in table 20. Three SRMs 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 bed sediment of streams 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 for SRM analyses that use less than a total digestion is useful to indicate which trace elements display strong sediment-binding characteristics in the SRM and whether analytical recovery is consistent between multiple sets of analyses.

Although data-quality objectives have not been established for bed sediment, percent recoveries for individual trace elements (table 20) illustrate analytical performance. For cadmium, chromium, copper, iron, manganese, nickel, and zinc, mean SRM recoveries for the low-concentration standard (SRM 2709a) ranged from 81.4 to 103.0 percent of the certified concentrations. Mean recoveries were lower for arsenic and lead (66.8 and 67.4 percent, respectively). The generally small range of variation (less than 7 percent) for the 95-percent confidence interval indicates good reproducibility of multiple analyses of SRM 2709a. Two high-concentration standards were used: SRM 2711 (seven of the samples) and SRM 2711a (3 of the samples). Mean SRM recoveries for cadmium, chromium, copper, iron, lead, manganese, and zinc for SRM 2711 ranged from 86.7 to 104.0 percent of the certified concentrations. Arsenic and nickel recoveries were slightly lower (82.4 and 82.7 percent, respectively). Mean recoveries for SRM 2711a were slightly higher than SRM 2711, ranging from 85.7 to 106.0. The generally small range of variation (less than 11 percent for most constituents) for the 95-percent confidence interval indicates good reproducibility of multiple analyses of SRM 2711 and SRM 2711a. No adjustments were made to trace-element concentrations in bed-sediment samples on the basis of recovery efficiencies.

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, 0.6N hydrochloric acid was added to reconstitute the dry residue. Procedural blanks, therefore, represent the same chemical matrix and exposure to analytical materials and handling as the reagents used to digest and reconstitute bed-sediment samples. Analytical results of procedural blanks for bed sediment (table 21) are reported as a liquid-phase concentration, in micrograms per milliliter. A procedural blank was prepared

and analyzed concurrently with bed-sediment samples for each site. Concentrations of trace elements in all procedural blanks were less than the minimum reporting level; thus, no contamination bias was indicated and no adjustments to the data were necessary.

Biological Data

Biological data for the long-term monitoring program in the Clark Fork basin consist of analyses of trace-element concentrations in the whole-body tissue of aquatic benthic insects. Insect samples are collected once annually at the same 13 sites and on the same dates as bed-sediment samples (fig. 1 and table 1), allowing for a direct comparison of biological data with bed-sediment data among the years. One site, Warm Springs Creek at Warm Springs, is sampled once every 3 years rather than once annually.

Methods

Insect samples were collected using protocols described in Hornberger and others (1997). Benthic insects at immature stages were collected with a large nylon-mesh kick net. A single riffle at each site was sampled repeatedly until an adequate number of individual insects was collected to provide sufficient mass for analysis. Targeted taxa for collection were the order Trichoptera (caddisflies) and the order Plecoptera (stoneflies).

Two caddisfly species of the genus *Hydropsyche* (*Hydropsyche cockerelli* and *Hydropsyche occidentalis)* were targeted for collection in this study because of their occurrence at most sites. *Hydropsyche* species (spp.) that could not be positively identified were categorized as *Hydropsyche* spp. or *Hydropsyche morosa* group (in previous reports). The caddisfly *Arctopsyche grandis* and the stonefly *Claassenia sabulosa* were collected where available to represent additional insect taxa that are commonly distributed in the Clark Fork basin. In addition, specimens from the caddisfly group *Brachycentrus* spp. were collected in previous years when targeted taxa were not available.

Samples of each taxon were sorted by genus in the field and placed in acid-washed plastic containers. Samples were frozen on dry ice within 30 minutes of collection in a small amount of ambient stream water. Between 1986 and 1998, macroinvertebrate containers were kept on ice to allow the insects to evacuate their gut contents (depurate) for a period of 6 to 8 hours. Excess water was drained and insects were frozen for transport to the laboratory. During 1999–2008, samples were immediately frozen on dry ice in the field to reduce the possibility of metal loss through intracellular breakdown during depuration. A comparison of immediately frozen to depurated samples showed that although no substantial difference occurred for most metals, concentrations of copper were about 20 percent lower in the depurated samples than in the samples that were immediately frozen. The data were not adjusted for this difference.

Insect samples were processed and analyzed at the USGS National Research Program Ecology and Contaminants Project laboratory in Menlo Park, Calif. Insects were thawed and rinsed with ultrapure deionized water to remove particulate matter and then sorted to their lowest possible taxonomic level. If large numbers of specimens were collected at a site, 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 0.6N hydrochloric acid, filtered through a 0.45-µm pore-size filter, and analyzed undiluted by ICP–OES for arsenic, cadmium, chromium, copper, iron, lead, manganese, nickel, and zinc. The smallest concentration of a constituent that can be reliably reported for analyses of biota is termed the minimum reporting level.

Results

Concentrations of trace elements in whole-body tissue of aquatic insects collected during August 2010 are listed in table 22. The variability in the number of composite samples among species and among sites reflects differences in insect abundance, with the number of composite samples increasing with the relative abundance of insects. Liquid-phase concentrations, in micrograms per milliliter, analyzed in the reconstituted samples were converted to solid-phase concentrations, in micrograms per gram, by using equation 5. All tissue samples were analyzed undiluted (dilution ratio 1:1). As with minimum reporting levels for trace elements in bed sediment, minimum reporting levels for trace elements in insects may differ among sites as a result of varied sample weights. In general, the smaller the biological-sample weight (primarily 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.

Quality Assurance

The protocols for field collection and processing of biota samples are designed to prevent contamination from metal sources. Nonmetallic nets, sampling equipment, and processing equipment were used in all sample collection. Equipment was acid-washed and rinsed in ultrapure deionized water prior to the first sample collection. Nets and equipment were thoroughly rinsed in ambient stream water at each new main-stem site. New nets were used for all tributary sites. Biota samples were collected sequentially at sites along an increasing concentration gradient to minimize effects from potential site-to-site carryover contamination.

Quality assurance of analytical results for biota samples included laboratory-instrument calibration with standard solutions and analyses of quality-control samples designed to quantify precision and to identify the presence and magnitude of bias. Quality-control samples consisted of 12 replicates of the tissue SRM (lobster hepatopancreas) and 13 procedural blanks (one at each station). Quality-control samples were analyzed in a proportion equivalent to about 20 percent of the total number of biota samples.

Recovery efficiency for trace-element analyses of the SRM for biota is listed in table 23. Data-quality objectives have not been established for analytical recovery in biota, but percent recoveries are shown to illustrate analytical performance. Mean SRM recoveries ranged from 76.4 to 125 percent for all constituents. With the exception of cadmium, chromium, and manganese, which had a slightly higher recovery variation of up to 25 percent, all values fell within 10 percent of the 95-percent confidence interval. These averages represent a reasonable range of recoveries; thus, no adjustments were made to biota samples on the basis of trace-element recovery efficiencies.

Procedural blanks for biota consisted of the same reagents used to digest and reconstitute tissue of aquatic insects and were analyzed undiluted. Analytical results of procedural blanks for biota (table 24) are reported as a liquid-phase concentration, in micrograms per milliliter. A procedural blank was prepared and analyzed concurrently with biota samples for each site. Concentrations of trace elements in all procedural blanks were less than the minimum reporting level; therefore, no adjustments to the data were necessary.

Statistical Summaries of Data

Statistical summaries of long-term water-quality, bed-sediment, and biological data for the Clark Fork basin are listed in tables 25 through 27 for the period of record at each site since 1985. The summaries include the period of record, number of samples, and maximum, minimum, mean, and median concentrations.

Statistical summaries of long-term water-quality data (table 25) are based on results of cross-section samples collected periodically by the USGS for the long-term monitoring program in the Clark Fork basin during the period of record for each site. The summaries do not include data for supplemental samples collected at selected sites. Inclusion of results for supplemental samples that targeted high-flow conditions or maintenance drawdowns of Milltown Reservoir might disproportionately skew the long-term statistics relative to the other sites in the network. Statistical summaries of bed-sediment (table 26) and biological data (table 27) are based on results of samples collected once annually during the indicated years. Because not all sites were sampled for bed sediment and biota every year, the data for some sites do not represent a consecutive annual record. Sampling of bulk bed sediment has been discontinued; therefore, a statistical summary is not presented. Statistical summaries are not presented for discontinued sites.

Statistics for bed-sediment data (table 26) are based on the mean trace-element concentrations determined for each year from the mean of the analyses of composite samples. Therefore, the number of samples for bed sediment represents the number of years that the constituent was analyzed. In contrast, statistics for biological data (table 27) are based on individual analyses for each composite sample collected rather than on a single mean concentration for each year. Also, the number of samples for arsenic for both bed sediment and biota is smaller than the number for other trace elements because sampling for arsenic began in September 2003. In addition, the number of samples analyzed for silver in bed sediment is smaller because analysis for this constituent was discontinued in 2004.

Differences in the number of composited biota samples among species reflect differences in species abundance, both within and between sites and among years. As a result, the statistics for biota describe a wider range of variation in trace-element concentrations than would be evident if results from individual composite samples were averaged. 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 varied minimum reporting levels. Where minimum reporting levels vary among years, differences in concentration with time are difficult to determine, especially when a large percentage of the samples have concentrations less than minimum reporting levels.

The presence or absence of insect species at a given site can vary among 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 because these samples could not be clearly identified to the species level, but the individual insects had *morosa* characteristics.

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Data

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2009 through September 2010.

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

12323230--Blacktail Creek at Harrison Avenue, at Butte

Date	Time	Streamflow, instantaneous (ft^3/s)	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Temperature, water (°C)	Hardness, filtered (mg/L as $CaCO_3$)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)
10/13/2009	0920	8.0	7.6	277	3.5	112	32.5	7.46
03/08/2010	1020	9.6	7.3	294	2.0	106	30.1	7.54
04/12/2010	0845	7.2	7.6	282	4.0	109	31.8	7.17
05/18/2010	0845	17	7.6	213	9.5	83	24.5	5.22
06/01/2010	0900	54	7.5	181	9.0	68	19.6	4.74
06/14/2010	0900	50	7.6	183	11.0	73	20.8	5.04
07/19/2010	0840	11	7.7	263	11.0	107	31.1	7.02
08/23/2010	0850	12	7.6	252	11.0	104	29.8	7.06

Date	Arsenic, filtered (µg/L)	Arsenic, unfiltered recoverable (µg/L)	Cadmium, filtered (µg/L)	Cadmium, unfiltered recoverable (µg/L)	Copper, filtered (µg/L)	Copper, unfiltered recoverable (µg/L)	Iron, filtered (µg/L)	Iron, unfiltered recoverable (µg/L)
10/13/2009	2.2	3.2	0.05	E0.03	1.5	3.2	148	544
03/08/2010	3.8	4.4	.05	E.03	5.2	6.1	286	680
04/12/2010	2.6	3.1	E.04	E.02	E1.6	2.9	165	506
05/18/2010	4.5	5.7	.05	.04	3.4	5.7	276	694
06/01/2010	5.6	6.6	.05	E.03	5.0	8.3	174	676
06/14/2010	8.3	10.0	.04	E.04	5.0	8.0	250	673
07/19/2010	6.5	9.7	.03	.04	2.2	4.1	333	960
08/23/2010	5.0	6.8	.03	E.03	3.0	4.2	274	685

Date	Lead, filtered (µg/L)	Lead, unfiltered recoverable (µg/L)	Manganese, filtered (µg/L)	Manganese, unfiltered recoverable (µg/L)	Zinc, filtered (µg/L)	Zinc, unfiltered recoverable (µg/L)	Sediment, suspended (percent finer than 0.062 mm)	Sediment, suspended (mg/L)	Sediment discharge, suspended (ton/d)
10/13/2009	0.07	0.67	33.4	47.7	3.9	4.2	83	14	0.30
03/08/2010	.15	.62	131	150	4.4	5.2	80	11	.29
04/12/2010	.09	.41	58.3	69.3	--	3.0	93	4	.08
05/18/2010	.16	.76	39.4	62.0	7.7	35.0	87	8	.37
06/01/2010	.15	.87	26.0	47.3	5.4	13.7	68	14	2.0
06/14/2010	.15	.72	32.5	52.8	E2.5	4.6	59	12	1.6
07/19/2010	.16	.77	36.0	87.6	<2.8	3.6	88	9	.27
08/23/2010	.12	.53	32.2	49.0	E2.4	4.8	87	4	.13

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2009 through September 2010.—Continued

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

12323250--Silver Bow Creek below Blacktail Creek, at Butte								
Date	Time	Streamflow, instantaneous (ft^3/s)	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Temperature, water (°C)	Hardness, filtered (mg/L as $CaCO_3$)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)
10/13/2009	1040	23	7.7	488	4.5	170	48.7	11.8
03/08/2010	1215	23	7.5	500	5.5	134	36.9	10.1
04/12/2010	1015	25	7.6	486	5.0	160	44.9	11.6
05/18/2010	1015	34	7.8	375	11.0	121	36.0	7.67
06/01/2010	1040	76	7.7	276	10.0	98	28.1	6.71
06/14/2010	1030	62	7.7	276	12.0	102	29.4	6.90
07/19/2010	0950	25	7.7	454	13.0	157	45.4	10.5
08/23/2010	1050	29	7.7	447	12.5	144	42.0	9.50

Date	Arsenic, filtered (µg/L)	Arsenic, unfiltered recoverable (µg/L)	Cadmium, filtered (µg/L)	Cadmium, unfiltered recoverable (µg/L)	Copper, filtered (µg/L)	Copper, unfiltered recoverable (µg/L)	Iron, filtered (µg/L)	Iron, unfiltered recoverable (µg/L)
10/13/2009	3.3	4.8	0.10	0.16	5.4	14.0	38	421
03/08/2010	4.0	4.6	.10	.11	9.1	13.3	102	321
04/12/2010	3.1	3.9	.15	.15	7.2	15.3	44	340
05/18/2010	4.8	5.9	.07	.14	4.2	13.6	158	552
06/01/2010	6.5	8.9	.08	.19	7.1	21.0	129	946
06/14/2010	8.2	10.3	.07	.13	6.5	15.8	187	672
07/19/2010	5.7	8.5	.08	.21	7.0	17.4	96	524
08/23/2010	5.5	7.6	.07	.13	7.0	15.5	78	381

Date	Lead, filtered (µg/L)	Lead, unfiltered recoverable (µg/L)	Manganese, filtered (µg/L)	Manganese, unfiltered recoverable (µg/L)	Zinc, filtered (µg/L)	Zinc, unfiltered recoverable (µg/L)	Sediment, suspended (percent finer than 0.062 mm)	Sediment, suspended (mg/L)	Sediment discharge, suspended (ton/d)
10/13/2009	0.21	2.96	72.4	113	36.0	48.4	91	10	0.62
03/08/2010	.33	1.35	112	128	37.4	39.5	80	8	.50
04/12/2010	.15	1.25	121	135	35.4	44.0	91	6	.41
05/18/2010	.23	1.99	71.8	100	21.6	34.8	81	8	.73
06/01/2010	.30	5.26	49.8	124	17.2	43.2	78	31	6.4
06/14/2010	.28	2.81	56.0	101	16.5	30.5	75	14	2.3
07/19/2010	.22	1.97	91.2	121	30.5	45.0	86	7	.47
08/23/2010	.27	2.04	54.8	75.6	34.4	45.6	93	7	.55

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2009 through September 2010.—Continued

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

12323600--Silver Bow Creek at Opportunity

Date	Time	Streamflow, instantaneous (ft^3/s)	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Temperature, water (°C)	Hardness, filtered (mg/L as $CaCO_3$)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)
10/13/2009	1645	40	8.7	483	7.0	181	53.7	11.3
03/09/2010	0920	46	8.1	468	2.0	148	42.6	10.0
04/12/2010	1610	42	8.9	472	8.0	169	49.2	11.2
05/18/2010	1630	68	8.8	348	13.0	130	40.4	7.11
06/01/2010	1640	202	8.0	274	11.5	102	30.6	6.12
06/14/2010	1605	197	8.1	261	16.0	104	31.5	6.08
07/19/2010	1615	59	8.9	374	20.5	139	42.1	8.26
08/24/2010	1015	41	8.2	439	11.0	157	46.8	9.75

Date	Arsenic, filtered (µg/L)	Arsenic, unfiltered recoverable (µg/L)	Cadmium, filtered (µg/L)	Cadmium, unfiltered recoverable (µg/L)	Copper, filtered (µg/L)	Copper, unfiltered recoverable (µg/L)	Iron, filtered (µg/L)	Iron, unfiltered recoverable (µg/L)
10/13/2009	6.4	9.1	0.24	0.52	12.0	52.5	20	683
03/09/2010	9.1	14.9	.52	.70	28.8	72.7	71	950
04/12/2010	7.4	9.6	.40	.59	17.7	48.6	11	611
05/18/2010	8.9	11.1	.19	.49	13.9	44.9	31	795
06/01/2010	9.6	35.6	.50	1.88	41.6	261	70	7,380
06/14/2010	10.5	20.7	.25	.86	--	117	93	3,900
07/19/2010	11.7	14.2	.19	.44	16.3	40.6	23	559
08/24/2010	9.7	11.7	.36	.51	19.3	34.0	19	453

Date	Lead, filtered (µg/L)	Lead, unfiltered recoverable (µg/L)	Manganese, filtered (µg/L)	Manganese, unfiltered recoverable (µg/L)	Zinc, filtered (µg/L)	Zinc, unfiltered recoverable (µg/L)	Sediment, suspended (percent finer than 0.062 mm)	Sediment, suspended (mg/L)	Sediment discharge, suspended (ton/d)
10/13/2009	0.31	9.20	75.7	170	45.6	122	91	21	2.3
03/09/2010	.56	13.1	218	292	126	181	88	29	3.6
04/12/2010	.24	9.09	234	282	50.8	145	91	20	2.3
05/18/2010	.22	9.79	96.3	189	25.2	101	85	32	5.9
06/01/2010	.84	78.7	148	548	102	440	72	286	156
06/14/2010	1.01	36.5	84.4	318	42.5	211	45	196	104
07/19/2010	.32	7.27	39.3	90.6	15.2	73.5	74	23	3.7
08/24/2010	.23	5.02	30.3	85.1	73.4	111	57	17	1.9

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2009 through September 2010.—Continued

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

12323670--Mill Creek near Anaconda									
Date	Time	Streamflow, instantaneous (ft^3/s)	Turbidity, unfiltered, lab (NTRU)	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Temperature, water (°C)	Hardness, filtered (mg/L as $CaCO_3$)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)
10/13/2009	1310	15	<2.0	8.0	176	4.0	80	22.3	5.92
03/08/2010	1600	7.7	<2.0	8.3	213	6.0	90	24.2	7.10
04/12/2010	1240	8.1	<2.0	8.2	194	6.0	87	23.9	6.61
05/18/2010	1315	50	E4.6	7.7	101	10.0	44	12.7	2.88
06/01/2010	1320	103	E6.2	7.6	86	8.5	36	10.6	2.42
06/14/2010	1315	131	<2.0	7.9	77	10.0	30	8.75	2.07
07/19/2010	1220	68	<2.0	8.1	95	11.5	40	11.8	2.65
08/23/2010	1415	23	<2.0	7.9	143	14.0	62	17.3	4.43

Date	Arsenic, filtered (µg/L)	Arsenic, unfiltered recoverable (µg/L)	Cadmium, filtered (µg/L)	Cadmium, unfiltered recoverable (µg/L)	Copper, filtered (µg/L)	Copper, unfiltered recoverable (µg/L)	Iron, filtered (µg/L)	Iron, unfiltered recoverable (µg/L)
10/13/2009	12.5	13.3	0.04	0.06	E0.88	E1.4	59	108
03/08/2010	17.4	17.2	.04	.05	1.0	1.5	21	78
04/12/2010	7.3	8.6	E.02	E.03	E.72	E1.3	21	97
05/18/2010	11.7	13.5	.05	.10	2.1	5.5	30	315
06/01/2010	13.1	14.6	.04	.07	3.3	5.7	39	272
06/14/2010	9.2	10.6	.04	.07	2.4	5.9	26	147
07/19/2010	9.3	10.6	.04	.06	1.4	2.6	25	120
08/23/2010	15.3	17.2	.04	.14	2.3	2.7	52	159

Date	Lead, filtered (µg/L)	Lead, unfiltered recoverable (µg/L)	Manganese, filtered (µg/L)	Manganese, unfiltered recoverable (µg/L)	Zinc, filtered (µg/L)	Zinc, unfiltered recoverable (µg/L)	Sediment, suspended (percent finer than 0.062 mm)	Sediment, suspended (mg/L)	Sediment discharge, suspended (ton/d)
10/13/2009	0.06	0.22	7.4	10.9	<2.8	E1.7	80	1	0.04
03/08/2010	E.02	.15	11.9	14.2	<2.8	E1.1	70	2	.04
04/12/2010	E.02	.21	4.6	8.8	<2.8	E1.1	67	1	.02
05/18/2010	.07	1.42	4.7	26.5	<2.8	4.7	67	11	1.5
06/01/2010	.12	1.03	3.8	14.9	E1.6	4.2	57	12	3.3
06/14/2010	.09	.79	3.2	8.5	E1.8	3.1	42	6	2.1
07/19/2010	.09	.53	5.3	10.0	<2.8	2.3	53	5	.92
08/23/2010	.17	.57	6.5	14.8	E1.6	2.2	67	3	.19

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2009 through September 2010.—Continued

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

12323700--Mill Creek at Opportunity

Date	Time	Streamflow, instantaneous (ft^3/s)	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Temperature, water (°C)	Hardness, filtered (mg/L as $CaCO_3$)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)
10/13/2009	1530	9.8	8.0	188	2.5	86	24.1	6.17
03/09/2010	0840	5.0	8.0	229	2.0	96	26.4	7.25
04/12/2010	1515	6.0	8.1	222	6.5	96	26.9	6.97
05/19/2010	0815	18	7.8	109	8.0	46	13.4	3.08
06/02/2010	0735	53	7.7	95	7.0	39	11.3	2.66
06/14/2010	1500	73	7.8	84	12.0	35	10.4	2.30
07/19/2010	1505	47	8.0	104	15.0	45	13.0	2.93
08/24/2010	0800	6.0	7.7	165	9.0	71	19.8	5.16

Date	Arsenic, filtered (µg/L)	Arsenic, unfiltered recoverable (µg/L)	Cadmium, filtered (µg/L)	Cadmium, unfiltered recoverable (µg/L)	Copper, filtered (µg/L)	Copper, unfiltered recoverable (µg/L)	Iron, filtered (µg/L)	Iron, unfiltered recoverable (µg/L)
10/13/2009	14.9	15.5	0.05	0.11	1.5	2.6	61	129
03/09/2010	12.3	12.3	.05	E.04	1.2	1.5	19	59
04/12/2010	9.6	11.5	.05	.04	1.0	1.8	16	61
05/19/2010	15.1	23.2	.05	.30	2.6	12.0	36	726
06/02/2010	15.8	21.7	.06	.25	3.6	13.8	41	763
06/14/2010	12.8	15.5	.06	.11	2.9	7.5	29	323
07/19/2010	13.7	15.8	.05	.10	1.9	4.1	32	173
08/24/2010	16.9	18.6	.04	.07	1.7	2.3	58	117

Date	Lead, filtered (µg/L)	Lead, unfiltered recoverable (µg/L)	Manganese, filtered (µg/L)	Manganese, unfiltered recoverable (µg/L)	Zinc, filtered (µg/L)	Zinc, unfiltered recoverable (µg/L)	Sediment, suspended (percent finer than 0.062 mm)	Sediment, suspended (mg/L)	Sediment discharge, suspended (ton/d)
10/13/2009	0.08	0.41	5.6	11.2	E2.1	3.8	62	1	0.03
03/09/2010	.03	.10	2.8	3.3	E2.1	E1.8	67	1	.01
04/12/2010	E.02	.11	2.7	3.7	<2.8	2.1	90	2	.03
05/19/2010	.12	4.12	6.5	64.1	E2.4	12.9	84	25	1.2
06/02/2010	.15	3.83	4.9	42.2	--	13.0	67	31	4.4
06/14/2010	.10	1.52	3.6	16.6	E1.6	6.5	53	15	3.0
07/19/2010	.13	.90	5.4	13.5	E1.5	3.6	62	6	.76
08/24/2010	.13	.29	9.3	11.9	E2.0	2.5	89	1	.02

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2009 through September 2010.—Continued

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

12323710--Willow Creek near Anaconda									
Date	Time	Streamflow, instantaneous (ft^3/s)	Turbidity, unfiltered, lab (NTRU)	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Temperature, water (°C)	Hardness, filtered (mg/L as $CaCO_3$)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)
10/13/2009	1210	2.6	<2.0	7.9	122	1.0	46	15.3	1.91
03/08/2010	1430	1.6	<2.0	7.6	132	1.0	47	15.5	2.08
04/12/2010	1145	2.0	<2.0	7.8	135	2.5	50	16.5	2.08
05/18/2010	1200	11	E4.7	7.5	88	8.0	32	10.8	1.14
06/01/2010	1210	32	E12	7.6	76	7.0	26	8.70	1.02
06/14/2010	1205	27	E5.0	7.8	86	7.5	33	11.3	1.23
07/19/2010	1120	7.6	E3.6	7.7	113	9.0	41	13.8	1.60
08/23/2010	1300	3.6	<2.0	7.6	123	10.0	45	14.9	1.82

Date	Arsenic, filtered (µg/L)	Arsenic, unfiltered recoverable (µg/L)	Cadmium, filtered (µg/L)	Cadmium, unfiltered recoverable (µg/L)	Copper, filtered (µg/L)	Copper, unfiltered recoverable (µg/L)	Iron, filtered (µg/L)	Iron, unfiltered recoverable (µg/L)
10/13/2009	13.7	14.4	0.04	0.04	1.5	1.7	58	103
03/08/2010	10.6	10.9	E.02	<.04	E.93	E1.1	39	90
04/12/2010	10.3	10.7	--	<.04	E1.1	1.5	28	86
05/18/2010	13.4	14.0	.02	.05	1.9	3.8	46	257
06/01/2010	14.9	16.5	.04	.06	3.6	4.8	120	680
06/14/2010	13.8	13.4	.02	.04	2.1	3.2	152	293
07/19/2010	15.4	16.7	.03	.05	1.8	2.3	54	149
08/23/2010	19.5	21.2	.04	.07	1.9	2.6	75	169

Date	Lead, filtered (µg/L)	Lead, unfiltered recoverable (µg/L)	Manganese, filtered (µg/L)	Manganese, unfiltered recoverable (µg/L)	Zinc, filtered (µg/L)	Zinc, unfiltered recoverable (µg/L)	Sediment, suspended (percent finer than 0.062 mm)	Sediment, suspended (mg/L)	Sediment discharge, suspended (ton/d)
10/13/2009	0.09	0.20	19.9	27.0	E1.8	3.5	88	1	0.01
03/08/2010	.03	.11	13.5	16.6	<2.8	<2.0	78	2	.01
04/12/2010	E.04	.13	10.9	14.0	<2.8	<2.0	90	1	.01
05/18/2010	.09	.61	7.2	23.5	<2.8	3.1	69	8	.24
06/01/2010	.24	1.29	6.2	23.9	E2.1	5.2	52	24	2.1
06/14/2010	.15	.53	6.9	14.2	E2.1	3.2	62	7	.51
07/19/2010	.15	.33	10.3	14.8	E1.5	E2.0	93	3	.06
08/23/2010	.21	.49	13.2	18.0	E1.5	E1.9	87	4	.04

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2009 through September 2010.—Continued

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

12323720--Willow Creek at Opportunity								
Date	Time	Streamflow, instantaneous (ft^3/s)	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Temperature, water (°C)	Hardness, filtered (mg/L as $CaCO_3$)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)
10/13/2009	1610	9.1	8.3	305	9.0	132	39.0	8.49
03/09/2010	1020	6.2	8.0	296	3.0	118	34.3	7.95
04/12/2010	1545	6.8	8.1	313	9.0	131	38.8	8.22
05/19/2010	0850	12	7.9	208	9.0	86	26.6	4.79
06/01/2010	1605	40	7.7	171	12.5	67	20.5	3.88
06/14/2010	1535	19	8.0	200	16.0	86	26.2	5.06
07/19/2010	1540	8.7	9.0	253	17.5	114	33.9	7.09
08/24/2010	0925	6.2	7.9	306	8.5	134	38.9	8.89

Date	Arsenic, filtered (µg/L)	Arsenic, unfiltered recoverable (µg/L)	Cadmium, filtered (µg/L)	Cadmium, unfiltered recoverable (µg/L)	Copper, filtered (µg/L)	Copper, unfiltered recoverable (µg/L)	Iron, filtered (µg/L)	Iron, unfiltered recoverable (µg/L)
10/13/2009	17.1	16.7	0.02	0.07	1.9	3.2	11	112
03/09/2010	15.9	18.7	.04	.06	1.9	3.8	49	187
04/12/2010	15.6	18.1	E.03	.04	E2.3	4.6	14	205
05/19/2010	30.9	33.0	.04	.15	5.7	16.2	68	470
06/01/2010	36.8	44.4	.05	.31	8.5	29.6	87	937
06/14/2010	36.6	41.5	.05	.18	5.7	15.1	61	459
07/19/2010	26.3	28.5	E.02	.04	3.1	4.3	26	129
08/24/2010	17.5	18.6	.02	.05	2.4	4.2	12	105

Date	Lead, filtered (µg/L)	Lead, unfiltered recoverable (µg/L)	Manganese, filtered (µg/L)	Manganese, unfiltered recoverable (µg/L)	Zinc, filtered (µg/L)	Zinc, unfiltered recoverable (µg/L)	Sediment, suspended (percent finer than 0.062 mm)	Sediment, suspended (mg/L)	Sediment discharge, suspended (ton/d)
10/13/2009	0.07	0.65	7.9	12.4	E1.8	5.0	91	2	0.05
03/09/2010	.15	.85	79.5	93.6	5.2	6.4	93	4	.07
04/12/2010	E.08	1.21	82.7	94.7	E2.9	8.7	88	5	.09
05/19/2010	.32	4.18	80.4	129	7.5	19.4	96	17	.55
06/01/2010	.44	7.88	41.6	87.4	12.0	43.9	92	40	4.3
06/14/2010	.41	3.28	28.8	52.7	4.3	17.4	95	17	.87
07/19/2010	.18	.72	3.3	7.6	<2.8	2.6	83	3	.07
08/24/2010	.07	.84	23.5	29.0	3.3	6.2	77	3	.05

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2009 through September 2010.—Continued

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

12323750--Silver Bow Creek at Warm Springs

Date	Time	Streamflow, instantaneous (ft^3/s)	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Temperature, water (°C)	Hardness, filtered (mg/L as $CaCO_3$)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)
10/14/2009	0830	25	8.9	501	4.0	220	64.4	14.4
03/09/2010	1100	64	8.7	596	4.5	227	64.8	15.8
04/13/2010	0840	54	8.1	566	4.5	240	69.2	16.3
05/19/2010	1015	83	8.5	488	12.0	200	58.2	13.2
06/02/2010	0840	274	9.2	389	10.5	155	46.4	9.50
06/15/2010	0740	338	9.3	318	12.0	138	42.7	7.70
07/20/2010	0810	101	9.4	338	15.0	144	44.2	8.19
08/24/2010	1230	46	9.1	444	15.5	193	57.3	12.1

Date	Arsenic, filtered (µg/L)	Arsenic, unfiltered recoverable (µg/L)	Cadmium, filtered (µg/L)	Cadmium, unfiltered recoverable (µg/L)	Copper, filtered (µg/L)	Copper, unfiltered recoverable (µg/L)	Iron, filtered (µg/L)	Iron, unfiltered recoverable (µg/L)
10/14/2009	30.5	31.8	0.03	0.07	2.2	4.1	11	100
03/09/2010	11.2	12.7	.10	.09	4.8	5.6	E6	134
04/13/2010	7.5	10.5	E.03	.09	E2.4	6.2	6	225
05/19/2010	15.0	18.1	.06	.07	2.6	5.4	14	218
06/02/2010	24.4	26.3	.08	.13	7.6	12.6	24	262
06/15/2010	25.2	25.9	.08	.12	9.2	14.3	24	186
07/20/2010	32.0	34.4	.04	.07	6.5	8.7	23	157
08/24/2010	36.8	39.1	E.02	E.03	2.8	3.6	17	83

Date	Lead, filtered (µg/L)	Lead, unfiltered recoverable (µg/L)	Manganese, filtered (µg/L)	Manganese, unfiltered recoverable (µg/L)	Zinc, filtered (µg/L)	Zinc, unfiltered recoverable (µg/L)	Sediment, suspended (percent finer than 0.062 mm)	Sediment, suspended (mg/L)	Sediment discharge, suspended (ton/d)
10/14/2009	0.06	0.66	28.0	64.7	E1.6	5.2	68	2	0.14
03/09/2010	.03	.54	82.0	100	4.5	10.5	83	1	.17
04/13/2010	E.06	1.61	102	130	E6.0	12.6	85	2	.29
05/19/2010	.05	1.14	78.5	139	2.8	7.9	86	2	.45
06/02/2010	.12	1.62	46.1	86.3	E2.2	15.1	89	5	3.7
06/15/2010	.15	1.31	61.5	106	E2.5	12.7	87	4	3.7
07/20/2010	.12	.80	57.1	97.4	E1.5	6.4	93	2	.55
08/24/2010	.04	.38	50.2	77.6	<2.8	3.0	87	1	.12

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2009 through September 2010.—Continued

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

12323760--Warm Springs Creek near Anaconda									
Date	Time	Streamflow, instantaneous (ft^3/s)	Turbidity, unfiltered, lab (NTRU)	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Temperature, water (°C)	Hardness, filtered (mg/L as $CaCO_3$)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)
10/13/2009	1440	83	<2.0	8.4	257	5.0	125	37.5	7.56
04/12/2010	1420	49	<2.0	8.8	266	7.0	132	39.2	8.19
05/19/2010	0735	158	E18	8.1	188	5.5	93	29.1	5.00
06/01/2010	1515	174	E4.1	8.3	190	8.5	93	28.8	5.08
07/19/2010	1355	191	<2.0	8.5	183	11.0	88	27.0	4.87
08/23/2010	1655	123	<2.0	8.4	229	12.0	106	32.2	6.30

Date	Arsenic, filtered (µg/L)	Arsenic, unfiltered recoverable (µg/L)	Cadmium, filtered (µg/L)	Cadmium, unfiltered recoverable (µg/L)	Copper, filtered (µg/L)	Copper, unfiltered recoverable (µg/L)	Iron, filtered (µg/L)	Iron, unfiltered recoverable (µg/L)
10/13/2009	2.1	2.5	0.02	E0.03	<1.0	1.9	E4	38
04/12/2010	1.9	2.3	.02	<.04	E.57	E1.3	E5	31
05/19/2010	1.9	5.1	.04	.14	1.3	28.0	15	1,000
06/01/2010	2.3	2.9	.03	E.03	1.2	4.2	8	186
07/19/2010	1.8	2.3	E.02	E.04	E.94	1.9	E3	70
08/23/2010	2.1	2.9	E.02	E.03	2.0	2.1	E5	87

Date	Lead, filtered (µg/L)	Lead, unfiltered recoverable (µg/L)	Manganese, filtered (µg/L)	Manganese, unfiltered recoverable (µg/L)	Zinc, filtered (µg/L)	Zinc, unfiltered recoverable (µg/L)	Sediment, suspended (percent finer than 0.062 mm)	Sediment, suspended (mg/L)	Sediment discharge, suspended (ton/d)
10/13/2009	E0.02	0.19	0.70	2.1	E2.0	E1.2	83	1	0.22
04/12/2010	<.03	.10	.6	1.7	<2.8	<2.0	70	1	.13
05/19/2010	E.02	3.39	2.2	45.2	<2.8	20.1	65	65	28
06/01/2010	<.03	.48	1.3	9.3	<2.8	3.6	63	10	4.7
07/19/2010	<.03	.19	1.5	4.3	<2.8	3.0	71	4	2.1
08/23/2010	E.02	.30	1.0	5.1	<2.8	3.0	64	4	1.3

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2009 through September 2010.—Continued

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

12323770--Warm Springs Creek at Warm Springs

Date	Time	Streamflow, instantaneous (ft^3/s)	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Temperature, water (°C)	Hardness, filtered (mg/L as $CaCO_3$)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)
10/14/2009	0805	71	8.1	301	5.0	150	46.0	8.61
04/13/2010	0735	48	8.2	331	4.0	172	50.6	11.0
05/19/2010	0945	119	8.0	224	8.0	111	34.5	5.91
06/02/2010	0810	165	8.0	211	7.0	101	31.5	5.46
07/20/2010	0735	151	8.0	210	9.5	99	30.8	5.42
08/24/2010	1130	92	8.3	260	9.0	125	38.2	7.20

Date	Arsenic, filtered (µg/L)	Arsenic, unfiltered recoverable (µg/L)	Cadmium, filtered (µg/L)	Cadmium, unfiltered recoverable (µg/L)	Copper, filtered (µg/L)	Copper, unfiltered recoverable (µg/L)	Iron, filtered (µg/L)	Iron, unfiltered recoverable (µg/L)
10/14/2009	3.2	4.4	0.04	0.08	1.2	11.0	10	187
04/13/2010	3.3	3.7	E.04	.04	E1.5	6.4	10	98
05/19/2010	5.7	15.3	.05	.30	2.7	83.6	17	1,640
06/02/2010	3.6	7.5	.05	.12	2.5	33.2	14	685
07/20/2010	3.4	5.1	E.04	.06	<3.0	11.6	8	229
08/24/2010	3.3	4.7	.02	.04	1.5	6.9	8	154

Date	Lead, filtered (µg/L)	Lead, unfiltered recoverable (µg/L)	Manganese, filtered (µg/L)	Manganese, unfiltered recoverable (µg/L)	Zinc, filtered (µg/L)	Zinc, unfiltered recoverable (µg/L)	Sediment, suspended (percent finer than 0.062 mm)	Sediment, suspended (mg/L)	Sediment discharge, suspended (ton/d)
10/14/2009	0.03	1.06	65.2	111	E1.5	4.9	64	8	1.5
04/13/2010	E.03	.49	61.4	77.6	--	2.9	68	3	.39
05/19/2010	.07	9.58	52.7	266	<2.8	38.0	68	107	34
06/02/2010	.04	3.57	22.3	93.7	<2.8	14.9	65	40	18
07/20/2010	E.08	1.18	19.2	37.2	E5.0	5.9	72	12	4.9
08/24/2010	.03	.70	23.9	37.0	E1.5	4.0	76	5	1.2

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2009 through September 2010.—Continued

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

12323800--Clark Fork near Galen								
Date	Time	Streamflow, instantaneous (ft^3/s)	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Temperature, water (°C)	Hardness, filtered (mg/L as $CaCO_3$)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)
10/14/2009	0945	125	8.5	399	5.0	189	56.6	11.5
03/09/2010	1220	118	8.7	477	4.0	198	57.3	13.3
04/13/2010	1025	103	8.2	460	4.0	210	61.1	13.9
05/19/2010	1145	199	8.3	334	11.0	148	45.4	8.48
06/02/2010	1015	423	8.9	324	10.0	135	40.8	8.01
06/15/2010	1005	610	9.0	248	11.0	111	34.5	6.06
07/20/2010	1005	258	8.9	263	13.0	116	35.8	6.54
08/24/2010	1500	129	8.9	333	14.0	147	44.3	8.80

Date	Arsenic, filtered (µg/L)	Arsenic, unfiltered recoverable (µg/L)	Cadmium, filtered (µg/L)	Cadmium, unfiltered recoverable (µg/L)	Copper, filtered (µg/L)	Copper, unfiltered recoverable (µg/L)	Iron, filtered (µg/L)	Iron, unfiltered recoverable (µg/L)
10/14/2009	16.2	16.3	0.04	0.05	2.2	6.3	11	101
03/09/2010	8.1	9.2	.09	.08	4.3	8.4	7	153
04/13/2010	5.8	7.5	.07	.09	E2.4	11.3	7	219
05/19/2010	9.8	16.3	.05	.21	3.9	50.0	12	934
06/02/2010	16.6	22.5	.06	.21	6.3	44.3	18	751
06/15/2010	15.7	19.0	.09	.14	7.1	32.7	28	520
07/20/2010	15.3	18.1	.03	.07	4.1	12.8	10	201
08/24/2010	15.2	17.1	.03	.05	2.8	7.0	7	118

Date	Lead, filtered (µg/L)	Lead, unfiltered recoverable (µg/L)	Manganese, filtered (µg/L)	Manganese, unfiltered recoverable (µg/L)	Zinc, filtered (µg/L)	Zinc, unfiltered recoverable (µg/L)	Sediment, suspended (percent finer than 0.062 mm)	Sediment, suspended (mg/L)	Sediment discharge, suspended (ton/d)
10/14/2009	0.05	0.72	48.5	80.3	E1.8	5.3	76	3	1.0
03/09/2010	.06	.79	62.1	91.4	3.1	7.5	75	4	1.3
04/13/2010	E.05	1.54	79.1	118	E4.5	16.1	76	5	1.4
05/19/2010	.06	6.17	57.8	229	E1.8	29.3	80	44	24
06/02/2010	.10	5.49	39.9	152	2.8	30.7	60	37	42
06/15/2010	.13	3.61	34.3	109	E1.8	22.1	62	25	41
07/20/2010	.06	1.24	27.2	62.1	<2.8	8.0	72	8	5.6
08/24/2010	.04	1.25	24.0	47.8	<2.8	4.5	79	2	.70

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2009 through September 2010.—Continued

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

12323840--Lost Creek near Anaconda									
Date	Time	Streamflow, instantaneous (ft^3/s)	Turbidity, unfiltered, lab (NTRU)	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Temperature, water (°C)	Hardness, filtered (mg/L as $CaCO_3$)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)
10/13/2009	1345	10	<2.0	8.2	219	3.0	107	32.8	6.15
03/09/2010	0745	5.7	<2.0	8.1	212	2.0	93	27.6	5.78
04/12/2010	1330	4.3	<2.0	8.2	219	5.0	103	31.2	6.17
05/18/2010	1440	8.0	E5.4	7.8	161	10.0	77	23.8	4.22
06/01/2010	1410	16	E8.9	8.0	131	8.0	62	19.2	3.45
06/14/2010	1405	27	E2.8	8.0	139	9.0	68	21.2	3.57
07/19/2010	1305	10	<2.0	8.2	206	10.0	99	30.6	5.43
08/23/2010	1525	12	<2.0	8.2	212	10.5	101	31.0	5.77

Date	Arsenic, filtered (µg/L)	Arsenic, unfiltered recoverable (µg/L)	Cadmium, filtered (µg/L)	Cadmium, unfiltered recoverable (µg/L)	Copper, filtered (µg/L)	Copper, unfiltered recoverable (µg/L)	Iron, filtered (µg/L)	Iron, unfiltered recoverable (µg/L)
10/13/2009	2.8	3.2	0.03	E0.03	E0.86	2.6	7	72
03/09/2010	1.9	2.1	.03	<.04	1.3	1.9	7	40
04/12/2010	1.8	2.2	E.01	<.04	E.95	2.5	E4	51
05/18/2010	2.2	3.1	E.02	.05	1.4	8.0	11	268
06/01/2010	2.6	3.7	.02	.07	2.4	11.8	21	268
06/14/2010	2.6	3.3	.03	.07	1.6	5.7	12	221
07/19/2010	3.2	3.8	E.01	E.02	1.1	2.3	6	64
08/23/2010	2.2	3.1	E.01	E.02	E.89	2.3	7	86

Date	Lead, filtered (µg/L)	Lead, unfiltered recoverable (µg/L)	Manganese, filtered (µg/L)	Manganese, unfiltered recoverable (µg/L)	Zinc, filtered (µg/L)	Zinc, unfiltered recoverable (µg/L)	Sediment, suspended (percent finer than 0.062 mm)	Sediment, suspended (mg/L)	Sediment discharge, suspended (ton/d)
10/13/2009	E0.02	0.31	0.9	3.1	<2.8	E1.7	44	3	0.08
03/09/2010	E.02	.14	.4	1.6	<2.8	<2.0	62	2	.03
04/12/2010	<.03	.20	.6	2.0	<2.8	E1.2	77	2	.02
05/18/2010	E.03	1.22	1.2	12.5	<2.8	4.5	71	14	.30
06/01/2010	.06	1.93	1.5	16.2	<2.8	5.8	54	34	1.5
06/14/2010	.03	.79	1.1	7.4	<2.8	3.3	49	14	1.0
07/19/2010	E.02	.25	1.1	3.4	<2.8	2.2	62	4	.11
08/23/2010	E.02	.28	.8	4.1	<2.8	E1.5	58	3	.10

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2009 through September 2010.—Continued

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

12323850--Lost Creek near Galen

Date	Time	Streamflow, instantaneous (ft^3/s)	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Temperature, water (°C)	Hardness, filtered (mg/L as $CaCO_3$)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)
10/14/2009	0920	71	8.1	576	5.5	283	83.5	18.1
03/09/2010	1150	55	8.3	571	4.0	254	73.2	17.3
04/13/2010	1000	47	8.2	606	3.5	291	83.6	20.0
05/19/2010	1115	9.4	8.3	728	11.0	358	104	24.1
06/02/2010	0940	6.0	8.2	799	10.0	382	107	28.0
06/15/2010	0930	5.3	8.0	689	12.0	313	86.2	23.8
07/20/2010	0935	5.0	8.1	647	13.0	293	80.6	22.2
08/24/2010	1425	13	8.5	619	14.0	306	89.5	20.1

Date	Arsenic, filtered (µg/L)	Arsenic, unfiltered recoverable (µg/L)	Cadmium, filtered (µg/L)	Cadmium, unfiltered recoverable (µg/L)	Copper, filtered (µg/L)	Copper, unfiltered recoverable (µg/L)	Iron, filtered (µg/L)	Iron, unfiltered recoverable (µg/L)
10/14/2009	13.5	14.5	0.02	E0.04	1.4	3.6	10	80
03/09/2010	11.0	12.7	.05	.04	5.6	5.5	16	159
04/13/2010	9.4	11.1	E.02	.05	E1.0	6.1	7	192
05/19/2010	16.4	17.0	.04	E.02	1.4	3.4	20	121
06/02/2010	21.6	24.1	.04	E.03	1.8	3.7	35	117
06/15/2010	13.7	15.3	.05	E.02	1.5	3.2	32	112
07/20/2010	9.1	10.5	.02	E.02	1.5	2.6	7	37
08/24/2010	11.0	13.5	E.01	E.02	1.6	2.2	E5	37

Date	Lead, filtered (µg/L)	Lead, unfiltered recoverable (µg/L)	Manganese, filtered (µg/L)	Manganese, unfiltered recoverable (µg/L)	Zinc, filtered (µg/L)	Zinc, unfiltered recoverable (µg/L)	Sediment, suspended (percent finer than 0.062 mm)	Sediment, suspended (mg/L)	Sediment discharge, suspended (ton/d)
10/14/2009	E0.02	0.33	5.0	9.7	<2.8	2.7	56	15	2.9
03/09/2010	.30	.55	16.6	27.5	E1.8	3.2	46	20	3.0
04/13/2010	E.03	.74	17.7	31.2	--	4.8	82	11	1.4
05/19/2010	E.03	.34	46.2	52.1	E1.6	2.3	58	26	.66
06/02/2010	E.02	.16	41.5	45.6	<2.8	E1.8	32	79	1.3
06/15/2010	E.03	.16	38.5	44.8	E1.9	3.0	85	19	.27
07/20/2010	E.02	.21	6.7	9.1	<2.8	E1.0	49	7	.09
08/24/2010	E.02	.14	2.8	4.9	<2.8	E1.2	62	13	.46

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2009 through September 2010.—Continued

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

12324200--Clark Fork at Deer Lodge

Date	Time	Streamflow, instantaneous (ft^3/s)	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Temperature, water (°C)	Hardness, filtered (mg/L as $CaCO_3$)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)
10/14/2009	1055	306	8.2	463	5.0	211	62.5	13.4
03/09/2010	1400	250	8.5	477	4.0	200	58.5	13.2
04/13/2010	1225	212	8.2	507	4.0	228	66.5	15.0
05/19/2010	1325	193	8.4	411	14.0	190	56.8	11.6
06/02/2010	1210	520	8.1	359	12.0	142	42.5	8.70
06/15/2010	1145	736	8.2	280	13.0	121	37.2	6.85
07/20/2010	1215	272	8.4	322	16.0	138	42.5	7.84
08/25/2010	0755	159	8.1	430	12.5	192	58.0	11.5

Date	Arsenic, filtered (µg/L)	Arsenic, unfiltered recoverable (µg/L)	Cadmium, filtered (µg/L)	Cadmium, unfiltered recoverable (µg/L)	Copper, filtered (µg/L)	Copper, unfiltered recoverable (µg/L)	Iron, filtered (µg/L)	Iron, unfiltered recoverable (µg/L)
10/14/2009	12.5	15.6	0.05	0.14	4.6	26.7	8	437
03/09/2010	8.8	10.8	.08	.10	5.6	19.4	7	322
04/13/2010	8.0	11.0	E.06	.12	4.5	20.5	7	350
05/19/2010	11.8	13.5	.07	.13	6.3	23.9	8	328
06/02/2010	15.5	33.2	.08	.51	10.1	142	15	2,420
06/15/2010	17.4	30.8	.09	.38	11.1	148	21	1,610
07/20/2010	17.3	19.8	.05	.11	7.7	19.6	8	207
08/25/2010	15.2	17.2	.06	.10	5.9	14.8	10	183

Date	Lead, filtered (µg/L)	Lead, unfiltered recoverable (µg/L)	Manganese, filtered (µg/L)	Manganese, unfiltered recoverable (µg/L)	Zinc, filtered (µg/L)	Zinc, unfiltered recoverable (µg/L)	Sediment, suspended (percent finer than 0.062 mm)	Sediment, suspended (mg/L)	Sediment discharge, suspended (ton/d)
10/14/2009	0.04	3.60	20.7	77.9	6.0	26.0	72	18	15
03/09/2010	.05	1.99	48.4	76.6	4.9	16.6	63	14	9.5
04/13/2010	E.07	2.45	46.7	87.2	E7.8	20.5	81	14	8.0
05/19/2010	.06	2.80	34.6	84.8	3.6	19.7	84	14	7.3
06/02/2010	.14	25.9	24.7	275	5.7	109	46	156	219
06/15/2010	.19	31.8	20.2	232	4.6	75.4	31	128	254
07/20/2010	.10	1.95	29.7	54.5	3.8	13.7	79	8	5.9
08/25/2010	.09	1.47	29.1	52.1	6.6	13.9	91	5	2.1

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2009 through September 2010.—Continued

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

12324400--Clark Fork above Little Blackfoot River, near Garrison

Date	Time	Streamflow, instantaneous (ft^3/s)	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Temperature, water (°C)	Hardness, filtered (mg/L as $CaCO_3$)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)
10/14/2009	1220	331	8.4	465	5.0	214	63.2	13.8
03/09/2010	1530	284	8.8	466	5.0	198	57.3	13.3
04/13/2010	1405	238	8.6	494	4.0	221	64.0	14.8
05/19/2010	1520	201	8.4	445	16.0	197	58.8	12.3
06/02/2010	1445	602	8.0	383	12.5	156	46.0	10.1
06/15/2010	1335	968	8.1	297	14.0	131	39.4	8.03
07/20/2010	1400	290	8.4	352	19.0	150	45.4	8.91
08/25/2010	0950	186	8.3	439	13.0	192	57.2	12.0

Date	Arsenic, filtered (µg/L)	Arsenic, unfiltered recoverable (µg/L)	Cadmium, filtered (µg/L)	Cadmium, unfiltered recoverable (µg/L)	Copper, filtered (µg/L)	Copper, unfiltered recoverable (µg/L)	Iron, filtered (µg/L)	Iron, unfiltered recoverable (µg/L)
10/14/2009	12.4	15.9	0.04	0.22	4.3	35.5	E5	564
03/09/2010	10.1	12.4	.08	.16	6.6	29.7	6	459
04/13/2010	9.5	11.9	E.05	.14	5.0	24.4	E5	359
05/19/2010	13.7	15.7	.06	.16	7.1	32.2	7	408
06/02/2010	16.4	37.0	.08	.70	10.5	168	14	2,690
06/15/2010	17.7	31.2	.10	.45	12.9	124	23	1,780
07/20/2010	18.1	19.9	.08	.23	8.8	20.7	E6	180
08/25/2010	15.9	17.9	.06	.08	7.0	12.4	8	119

Date	Lead, filtered (µg/L)	Lead, unfiltered recoverable (µg/L)	Manganese, filtered (µg/L)	Manganese, unfiltered recoverable (µg/L)	Zinc, filtered (µg/L)	Zinc, unfiltered recoverable (µg/L)	Sediment, suspended (percent finer than 0.062 mm)	Sediment, suspended (mg/L)	Sediment discharge, suspended (ton/d)
10/14/2009	0.04	5.38	16.3	118	5.0	36.0	58	28	25
03/09/2010	.06	3.25	41.7	85.8	2.9	25.3	59	25	19
04/13/2010	E.06	2.76	41.0	85.7	E4.8	21.6	80	15	9.6
05/19/2010	.07	3.55	45.3	129	3.0	28.9	78	21	11
06/02/2010	.18	23.6	23.6	304	6.4	145	63	146	237
06/15/2010	.24	15.7	17.0	196	6.7	98.6	53	107	280
07/20/2010	.09	1.69	29.7	54.3	4.2	16.5	70	7	5.5
08/25/2010	.08	.90	19.4	40.5	4.7	10.1	66	5	2.5

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2009 through September 2010.—Continued

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

12324680--Clark Fork at Goldcreek

Date	Time	Streamflow, instantaneous (ft^3/s)	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Temperature, water (°C)	Hardness, filtered (mg/L as $CaCO_3$)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)
10/14/2009	1310	489	8.5	413	5.5	193	57.8	11.9
03/10/2010	0820	460	8.3	422	1.0	177	51.6	11.7
04/13/2010	1520	422	8.4	422	4.0	194	56.3	13.0
05/19/2010	1625	675	8.3	274	14.0	120	36.2	7.08
06/02/2010	1620	1,420	8.1	282	12.0	117	34.8	7.33
06/15/2010	1555	1,820	8.1	255	13.0	114	34.4	6.87
07/20/2010	1455	513	8.4	329	18.5	141	42.6	8.34
08/25/2010	1255	317	8.4	394	16.0	181	55.1	10.6

Date	Arsenic, filtered (µg/L)	Arsenic, unfiltered recoverable (µg/L)	Cadmium, filtered (µg/L)	Cadmium, unfiltered recoverable (µg/L)	Copper, filtered (µg/L)	Copper, unfiltered recoverable (µg/L)	Iron, filtered (µg/L)	Iron, unfiltered recoverable (µg/L)
10/14/2009	9.5	11.1	0.04	0.12	3.3	20.4	8	344
03/10/2010	7.4	9.2	.07	.11	5.2	18.9	15	348
04/13/2010	7.2	8.5	E.05	.09	3.9	16.3	E4	270
05/19/2010	7.7	11.4	.03	.17	4.3	23.4	20	1,080
06/02/2010	10.0	19.0	.05	.37	6.5	74.0	24	1,830
06/15/2010	11.7	19.7	.06	.28	9.6	77.1	28	1,350
07/20/2010	12.4	13.8	.06	.08	6.1	12.3	E5	139
08/25/2010	10.9	12.7	.03	.05	4.8	7.2	E6	75

Date	Lead, filtered (µg/L)	Lead, unfiltered recoverable (µg/L)	Manganese, filtered (µg/L)	Manganese, unfiltered recoverable (µg/L)	Zinc, filtered (µg/L)	Zinc, unfiltered recoverable (µg/L)	Sediment, suspended (percent finer than 0.062 mm)	Sediment, suspended (mg/L)	Sediment discharge, suspended (ton/d)
10/14/2009	0.04	2.74	10.0	78.6	3.0	20.3	78	14	18
03/10/2010	.06	2.10	32.1	68.2	5.8	19.5	71	17	21
04/13/2010	E.04	1.76	21.9	59.2	E4.8	15.6	76	12	14
05/19/2010	.07	5.30	18.4	114	E2.2	29.0	78	59	108
06/02/2010	.17	11.2	10.9	196	4.1	72.7	49	132	506
06/15/2010	.21	9.82	11.3	127	8.0	62.3	48	94	462
07/20/2010	.06	.95	15.1	33.9	3.0	9.3	81	6	8.3
08/25/2010	.04	.47	9.4	22.9	E2.2	5.7	76	3	2.6

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2009 through September 2010.—Continued

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

12331800--Clark Fork near Drummond								
Date	Time	Streamflow, instantaneous (ft^3/s)	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Temperature, water (°C)	Hardness, filtered (mg/L as $CaCO_3$)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)
10/14/2009	1425	760	8.4	442	7.0	204	58.7	14.0
03/10/2010	0945	664	8.3	435	3.5	185	52.5	13.1
04/14/2010	0755	642	8.2	448	5.0	202	57.3	14.2
05/20/2010	0810	862	8.0	308	12.0	136	40.7	8.37
06/03/2010	0815	1,690	8.0	307	11.0	131	38.6	8.46
06/16/2010	0820	2,360	7.9	268	12.0	114	33.7	7.19
07/21/2010	0800	589	8.2	409	16.5	183	53.2	12.2
08/25/2010	1430	466	8.5	475	17.0	209	60.0	14.3

Date	Arsenic, filtered (µg/L)	Arsenic, unfiltered recoverable (µg/L)	Cadmium, filtered (µg/L)	Cadmium, unfiltered recoverable (µg/L)	Copper, filtered (µg/L)	Copper, unfiltered recoverable (µg/L)	Iron, filtered (µg/L)	Iron, unfiltered recoverable (µg/L)
10/14/2009	8.7	10.8	0.03	0.12	2.5	15.1	E3	379
03/10/2010	8.1	9.8	.08	.13	11.8	22.4	16	472
04/14/2010	3.2	9.1	--	.10	--	15.5	E3	310
05/20/2010	9.2	17.6	.03	.36	4.5	48.4	16	1,510
06/03/2010	10.7	25.9	.04	.61	6.8	123	23	3,050
06/16/2010	11.9	25.4	.08	.39	8.8	87.1	30	2,100
07/21/2010	12.9	13.1	E.06	.07	E4.8	9.9	E4	125
08/25/2010	10.9	13.3	.03	.05	3.8	6.3	E4	84

Date	Lead, filtered (µg/L)	Lead, unfiltered recoverable (µg/L)	Manganese, filtered (µg/L)	Manganese, unfiltered recoverable (µg/L)	Zinc, filtered (µg/L)	Zinc, unfiltered recoverable (µg/L)	Sediment, suspended (percent finer than 0.062 mm)	Sediment, suspended (mg/L)	Sediment discharge, suspended (ton/d)
10/14/2009	0.04	3.32	10.0	84.0	3.1	21.1	81	18	37
03/10/2010	.49	3.00	23.6	79.8	10.0	25.4	74	24	43
04/14/2010	E.04	2.12	--	71.0	<14.0	E6.4	80	16	28
05/20/2010	.15	13.6	9.8	242	4.4	74.0	91	78	182
06/03/2010	.22	21.9	9.0	354	4.9	141	58	197	899
06/16/2010	.28	16.8	8.0	242	6.3	108	54	147	937
07/21/2010	.28	.90	13.8	32.0	E4.9	9.9	87	5	8.0
08/25/2010	.05	.64	11.4	30.6	E2.3	5.9	82	4	5.0

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2009 through September 2010.—Continued

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

12334550--Clark Fork at Turah Bridge, near Bonner								
Date	Time	Streamflow, instantaneous (ft^3/s)	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Temperature, water (°C)	Hardness, filtered (mg/L as $CaCO_3$)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)
10/15/2009	0805	984	8.2	368	6.0	167	47.8	11.6
03/10/2010	1145	838	8.4	370	3.0	155	43.6	11.3
04/14/2010	0945	819	8.3	365	5.5	168	47.1	12.3
05/20/2010	1025	2,150	8.0	186	10.0	81	23.3	5.41
06/03/2010	1015	3,090	7.9	218	10.5	96	27.6	6.50
06/16/2010	1115	4,500	7.9	198	12.0	85	24.6	5.73
07/21/2010	0945	1,230	8.2	293	15.5	128	37.0	8.58
08/26/2010	0835	810	8.1	358	13.5	159	44.9	11.3

Date	Arsenic, filtered (µg/L)	Arsenic, unfiltered recoverable (µg/L)	Cadmium, filtered (µg/L)	Cadmium, unfiltered recoverable (µg/L)	Copper, filtered (µg/L)	Copper, unfiltered recoverable (µg/L)	Iron, filtered (µg/L)	Iron, unfiltered recoverable (µg/L)
10/15/2009	6.0	7.5	0.03	0.11	1.8	11.6	<6	284
03/10/2010	6.3	7.7	.06	.11	4.9	15.9	8	346
04/14/2010	5.4	6.2	--	.08	E2.7	10.6	E3	219
05/20/2010	3.8	6.2	E.02	.15	2.4	23.2	23	820
06/03/2010	6.5	13.0	.03	.33	4.2	57.1	23	1,520
06/16/2010	7.4	13.2	.04	.26	5.7	46.8	29	1,160
07/21/2010	7.3	7.8	E.04	.05	3.6	5.8	E4	90
08/26/2010	6.7	8.7	.03	.05	2.6	5.6	E3	99

Date	Lead, filtered (µg/L)	Lead, unfiltered recoverable (µg/L)	Manganese, filtered (µg/L)	Manganese, unfiltered recoverable (µg/L)	Zinc, filtered (µg/L)	Zinc, unfiltered recoverable (µg/L)	Sediment, suspended (percent finer than 0.062 mm)	Sediment, suspended (mg/L)	Sediment discharge, suspended (ton/d)
10/15/2009	E0.03	2.36	4.0	62.8	3.3	18.6	89	14	37
03/10/2010	.06	2.20	9.6	60.2	3.9	20.7	88	17	38
04/14/2010	E.05	1.38	9.3	44.0	--	15.0	83	12	27
05/20/2010	.06	4.12	8.6	99.5	E2.7	34.9	77	50	290
06/03/2010	.15	10.0	8.7	188	3.8	74.6	69	100	834
06/16/2010	.18	7.63	7.9	141	5.5	59.5	67	79	960
07/21/2010	.11	.50	20.4	18.8	E7.0	6.2	77	5	17
08/26/2010	.03	.58	5.0	23.6	E2.4	8.4	83	5	11

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2009 through September 2010.—Continued

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

12340000--Blackfoot River near Bonner

Date	Time	Streamflow, instantaneous (ft^3/s)	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Temperature, water (°C)	Hardness, filtered (mg/L as $CaCO_3$)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)
10/15/2009	0950	553	8.3	282	5.5	146	37.7	12.5
04/14/2010	1200	729	8.4	229	5.5	113	28.5	10.2
05/20/2010	1300	4,140	8.0	140	10.0	69	18.6	5.37
06/03/2010	1250	3,980	8.1	169	10.5	--	--	--
07/21/2010	1155	990	8.6	235	18.0	120	30.8	10.4
08/26/2010	1120	589	8.4	263	15.0	128	32.1	11.6

Date	Arsenic, filtered (µg/L)	Arsenic, unfiltered recoverable (µg/L)	Cadmium, filtered (µg/L)	Cadmium, unfiltered recoverable (µg/L)	Copper, filtered (µg/L)	Copper, unfiltered recoverable (µg/L)	Iron, filtered (µg/L)	Iron, unfiltered recoverable (µg/L)
10/15/2009	1.1	1.3	<0.02	<0.04	<1.0	1.9	<6	34
04/14/2010	.9	.95	--	<.04	--	E1.1	7	91
05/20/2010	.8	1.3	E.01	<.04	1.5	1.9	12	484
06/03/2010	--	1.3	--	<.04	--	1.9	--	409
07/21/2010	.4	1.6	<.02	<.04	<1.0	E1.0	E5	28
08/26/2010	1.2	2.1	<.02	<.04	E.76	E1.0	<6	36

Date	Lead, filtered (µg/L)	Lead, unfiltered recoverable (µg/L)	Manganese, filtered (µg/L)	Manganese, unfiltered recoverable (µg/L)	Zinc, filtered (µg/L)	Zinc, unfiltered recoverable (µg/L)	Sediment, suspended (percent finer than 0.062 mm)	Sediment, suspended (mg/L)	Sediment discharge, suspended (ton/d)
10/15/2009	<0.03	0.08	1.0	3.8	<2.8	<2.0	74	2	3.0
04/14/2010	--	.10	3.6	10.6	--	<2.0	84	5	9.8
05/20/2010	.03	.66	2.7	54.2	<2.8	3.9	82	41	458
06/03/2010	--	.55	--	32.3	--	2.7	85	31	333
07/21/2010	<.03	E.05	.5	3.9	<2.8	<2.0	76	2	5.3
08/26/2010	.04	.08	1.7	6.8	<2.8	E1.2	80	3	4.8

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2009 through September 2010.—Continued

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

12340500--Clark Fork above Missoula								
Date	Time	Streamflow, instantaneous (ft^3/s)	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Temperature, water (°C)	Hardness, filtered (mg/L as $CaCO_3$)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)
10/15/2009	1130	1,640	8.3	336	6.0	162	44.8	12.1
03/10/2010	1415	1,400	8.5	333	3.0	147	39.8	11.6
04/14/2010	1415	1,630	8.4	304	6.5	142	38.0	11.4
05/20/2010	1515	6,500	8.2	157	11.0	74	20.6	5.45
06/03/2010	1445	7,240	8.2	191	11.5	86	23.8	6.50
06/16/2010	1335	7,740	8.0	187	12.5	88	24.5	6.47
07/21/2010	1330	2,290	8.5	267	18.0	125	34.6	9.23
08/26/2010	1445	1,480	8.5	313	17.0	142	38.4	11.1

Date	Arsenic, filtered (µg/L)	Arsenic, unfiltered recoverable (µg/L)	Cadmium, filtered (µg/L)	Cadmium, unfiltered recoverable (µg/L)	Copper, filtered (µg/L)	Copper, unfiltered recoverable (µg/L)	Iron, filtered (µg/L)	Iron, unfiltered recoverable (µg/L)
10/15/2009	4.6	5.3	0.03	0.08	1.6	8.6	E3	203
03/10/2010	4.6	5.5	.04	.08	3.8	11.3	10	247
04/14/2010	3.3	3.8	--	.04	E1.7	6.0	E4	152
05/20/2010	2.1	3.8	E.01	.11	2.3	16.7	17	842
06/03/2010	3.5	9.0	.02	.33	3.1	50.3	18	1,530
06/16/2010	4.6	8.1	.04	.17	3.9	31.1	18	797
07/21/2010	4.5	5.3	.03	.05	3.2	5.0	E3	71
08/26/2010	4.7	5.9	.02	.05	2.4	6.1	<6	135

Date	Lead, filtered (µg/L)	Lead, unfiltered recoverable (µg/L)	Manganese, filtered (µg/L)	Manganese, unfiltered recoverable (µg/L)	Zinc, filtered (µg/L)	Zinc, unfiltered recoverable (µg/L)	Sediment, suspended (percent finer than 0.062 mm)	Sediment, suspended (mg/L)	Sediment discharge, suspended (ton/d)
10/15/2009	0.04	1.57	7.5	44.4	3.3	13.7	80	11	49
03/10/2010	.05	1.66	11.9	45.0	2.9	15.0	87	12	45
04/14/2010	--	.76	9.6	32.6	--	8.6	79	10	44
05/20/2010	.06	5.03	7.3	90.7	E2.1	28.6	56	78	1,370
06/03/2010	.10	8.59	10.6	171	3.0	90.8	47	134	2,620
06/16/2010	.17	5.08	7.1	96.2	3.8	44.3	63	57	1,190
07/21/2010	.05	.48	6.3	15.6	E2.6	6.2	77	5	31
08/26/2010	.08	.81	8.8	22.3	E1.6	7.8	87	7	28

Table 5. Daily mean streamflow and suspended-sediment data for Clark Fork at Deer Lodge, Montana, October 2009 through September 2010.

[Abbreviations: acre-ft, acre-feet; ft³/s, cubic feet per second; e, estimated; max, maximum; mg/L, milligrams per liter; min, minimum; ton/d, tons per day. Symbol: --, no data or value not computed]

Day	Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment	
		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)
		OCTOBER			NOVEMBER			DECEMBER	
1	208	15	8.4	355	20	19	289	13	10
2	203	16	8.8	335	18	16	244	16	11
3	206	17	9.5	326	17	15	231	30	19
4	213	19	11	312	16	13	200	44	24
5	220	20	12	309	16	13	191	48	25
6	235	19	12	310	16	13	e150	49	20
7	246	17	11	309	16	13	e130	51	18
8	283	14	11	305	16	13	e120	52	17
9	275	10	7.4	299	16	13	e130	48	17
10	267	10	7.2	297	17	14	e140	40	15
11	278	10	7.5	300	16	13	e160	32	14
12	274	10	7.4	306	14	12	e170	27	12
13	291	12	9.4	291	12	9.4	e160	26	11
14	302	17	14	288	10	7.8	e170	26	12
15	302	19	15	280	10	7.6	e180	27	13
16	307	19	16	293	13	10	193	27	14
17	322	20	17	310	19	16	228	32	20
18	307	20	17	317	23	20	e240	43	28
19	309	21	18	305	20	16	254	54	37
20	370	32	32	313	16	14	282	60	46
21	345	14	13	310	12	10	294	58	46
22	333	11	9.9	285	11	8.5	e260	48	34
23	317	11	9.4	296	12	9.6	e240	42	27
24	315	12	10	293	13	10	e220	40	24
25	308	12	10	294	14	11	e220	40	24
26	306	12	9.9	299	15	12	e210	43	24
27	303	12	9.8	300	16	13	e210	62	35
28	303	12	9.8	295	16	13	e200	91	49
29	333	13	12	292	14	11	e200	108	58
30	377	19	19	291	13	10	e210	112	64
31	380	21	22	--	--	--	217	112	66
TOTAL	**9,038**	**--**	**386.4**	**9,115**	**--**	**375.9**	**6,343**	**--**	**834**
MEAN	**292**	**16**	**12**	**304**	**15**	**13**	**205**	**48**	**27**
MAX	**380**	**32**	**32**	**355**	**23**	**20**	**294**	**112**	**66**
MIN	**203**	**10**	**7.2**	**280**	**10**	**7.6**	**120**	**13**	**10**

Table 5. Daily mean streamflow and suspended-sediment data for Clark Fork at Deer Lodge, Montana, October 2009 through September 2010.—Continued

[Abbreviations: acre-ft, acre-feet; ft³/s, cubic feet per second; e, estimated; max, maximum; mg/L, milligrams per liter; min, minimum; ton/d, tons per day. Symbol: --, no data or value not computed]

Day	Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment	
		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)
		JANUARY			FEBRUARY			MARCH	
1	238	107	69	234	28	18	232	19	12
2	243	90	59	235	32	20	238	18	12
3	237	69	44	234	32	20	251	16	11
4	228	50	31	246	28	19	267	18	13
5	e210	37	21	237	25	16	257	40	28
6	e190	44	23	237	24	15	251	51	35
7	e180	62	30	238	24	15	250	31	21
8	e180	84	41	233	23	14	248	24	16
9	e190	94	48	224	23	14	250	21	14
10	e200	84	45	e225	23	14	245	25	17
11	215	62	36	228	22	14	236	18	11
12	232	43	27	227	21	13	241	18	12
13	259	31	22	234	20	13	244	18	12
14	256	29	20	232	20	13	239	21	14
15	248	29	19	233	20	13	243	26	17
16	253	29	20	235	24	15	247	28	19
17	254	29	20	235	29	18	251	24	16
18	251	31	21	234	32	20	253	22	15
19	248	37	25	231	32	20	248	20	13
20	242	44	29	222	32	19	245	18	12
21	238	47	30	203	31	17	245	20	13
22	235	46	29	219	31	18	255	16	11
23	251	45	30	229	30	19	246	17	11
24	235	43	27	232	27	17	240	32	21
25	256	42	29	224	24	15	241	28	18
26	241	36	23	221	23	14	248	35	23
27	239	30	19	225	22	13	242	35	23
28	235	25	16	229	21	13	238	57	37
29	246	22	15	--	--	--	239	39	25
30	250	21	14	--	--	--	256	70	48
31	235	24	15	--	--	--	263	60	43
TOTAL	**7,215**	**--**	**897**	**6,436**	**--**	**449**	**7,649**	**--**	**593**
MEAN	**233**	**47**	**29**	**230**	**26**	**16**	**247**	**29**	**19**
MAX	**259**	**107**	**69**	**246**	**32**	**20**	**267**	**70**	**48**
MIN	**180**	**21**	**14**	**203**	**20**	**13**	**232**	**16**	**11**

Table 5. Daily mean streamflow and suspended-sediment data for Clark Fork at Deer Lodge, Montana, October 2009 through September 2010.—Continued

[Abbreviations: acre-ft, acre-feet; ft³/s, cubic feet per second; e, estimated; max, maximum; mg/L, milligrams per liter; min, minimum; ton/d, tons per day. Symbol: --, no data or value not computed]

Day	Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment	
		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)
	APRIL			MAY			JUNE		
1	250	31	21	222	14	8.4	481	175	227
2	240	32	21	220	11	6.5	520	180	253
3	237	28	18	213	12	6.9	588	262	416
4	229	24	15	208	10	5.6	723	254	496
5	226	22	13	195	13	6.8	748	240	485
6	229	21	13	183	17	8.4	761	229	471
7	230	22	14	186	10	5.0	780	168	354
8	226	26	16	185	7	3.5	852	163	375
9	213	37	21	180	14	6.8	816	133	293
10	209	36	20	172	8	3.7	798	151	325
11	209	26	15	171	9	4.2	892	158	381
12	206	16	8.9	172	8	3.7	846	119	272
13	212	18	10	170	7	3.2	739	103	206
14	233	22	14	155	8	3.3	685	98	181
15	238	25	16	153	6	2.5	741	129	258
16	230	30	19	151	6	2.4	1,110	299	896
17	234	24	15	147	7	2.8	1,470	356	1,410
18	241	48	31	151	8	3.3	1,410	246	937
19	244	55	36	191	18	9.3	1,150	156	484
20	256	61	42	290	82	64	1,070	135	390
21	267	31	22	353	100	95	1,090	119	350
22	282	32	24	331	55	49	1,060	106	303
23	298	34	27	327	60	53	1,020	109	300
24	296	26	21	318	50	43	979	98	259
25	276	24	18	325	42	37	972	91	239
26	261	32	23	310	39	33	985	86	229
27	251	28	19	308	31	26	958	68	176
28	249	36	24	383	147	152	888	70	168
29	249	19	13	480	143	185	821	69	153
30	231	19	12	457	121	149	772	46	96
31	--	--	--	432	134	156	--	--	--
TOTAL	**7,252**	**--**	**581.9**	**7,739**	**--**	**1,138.3**	**26,725**	**--**	**11,383**
MEAN	**242**	**30**	**19**	**250**	**39**	**37**	**891**	**154**	**379**
MAX	**298**	**61**	**42**	**480**	**147**	**185**	**1,470**	**356**	**1,410**
MIN	**206**	**16**	**8.9**	**147**	**6**	**2.4**	**481**	**46**	**96**

Table 5. Daily mean streamflow and suspended-sediment data for Clark Fork at Deer Lodge, Montana, October 2009 through September 2010.—Continued

[Abbreviations: acre-ft, acre-feet; ft³/s, cubic feet per second; e, estimated; max, maximum; mg/L, milligrams per liter; min, minimum; ton/d, tons per day. Symbol: --, no data or value not computed]

Day	Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment	
		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)
	JULY			AUGUST			SEPTEMBER		
1	810	32	70	188	10	5.1	195	7	3.7
2	753	17	35	171	10	4.6	191	8	4.1
3	728	10	20	158	10	4.3	194	9	4.7
4	677	10	18	169	9	4.1	191	9	4.6
5	612	10	17	190	8	4.1	200	9	4.9
6	580	10	16	187	7	3.5	199	9	4.8
7	534	10	14	176	7	3.3	193	9	4.7
8	494	10	13	171	7	3.2	187	9	4.5
9	463	10	13	175	7	3.3	246	9	6
10	414	10	11	187	7	3.5	383	9	9.3
11	449	10	12	214	6	3.5	325	8	7
12	438	10	12	235	6	3.8	282	8	6.1
13	390	10	11	236	5	3.2	262	8	5.7
14	353	10	9.5	250	4	2.7	261	8	5.6
15	333	10	9.0	241	4	2.6	303	6	4.9
16	307	9	7.5	228	4	2.5	298	6	4.8
17	294	9	7.1	207	4	2.2	301	7	5.7
18	293	9	7.1	192	5	2.6	296	7	5.6
19	292	8	6.3	178	5	2.4	296	7	5.6
20	275	8	5.9	164	5	2.2	298	7	5.6
21	260	12	8.4	157	5	2.1	300	6	4.9
22	277	14	10	144	5	1.9	296	5	4
23	243	14	9.2	159	5	2.1	292	4	3.2
24	232	14	8.8	167	5	2.3	279	3	2.3
25	227	14	8.6	160	5	2.2	272	3	2.2
26	213	13	7.5	151	6	2.4	256	4	2.8
27	225	12	7.3	136	8	2.9	245	4	2.6
28	243	12	7.9	135	8	2.9	240	4	2.6
29	224	11	6.7	152	7	2.9	237	4	2.6
30	207	10	5.6	175	6	2.8	232	4	2.5
31	193	10	5.2	195	6	3.2	--	--	--
TOTAL	**12,033**	**--**	**399.6**	**5,648**	**--**	**94.4**	**7,750**	**--**	**137.6**
MEAN	**388**	**12**	**13**	**182**	**6**	**3.0**	**258**	**7**	**4.6**
MAX	**810**	**32**	**70**	**250**	**10**	**5.1**	**383**	**9**	**9.3**
MIN	**193**	**8**	**5.2**	**135**	**4**	**1.9**	**187**	**3**	**2.2**

Total for water year 2010 (unrounded sum of daily values): streamflow–112,943 ft³/s (annual runoff–224,000 acre-ft); suspended-sediment discharge–17,270.1 tons.

Table 6. Daily mean streamflow and suspended-sediment data for Clark Fork at Turah Bridge, near Bonner, Montana, October 2009 through September 2010.

[Abbreviations: acre-ft, acre-feet; ft³/s, cubic feet per second; e, estimated; max, maximum; mg/L, milligrams per liter; min, minimum; ton/d, tons per day. Symbol: --, no data or value not computed]

Day	Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment	
		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)
	OCTOBER			NOVEMBER			DECEMBER		
1	754	6	12	1,060	11	31	868	4	9.4
2	777	6	13	1,040	10	28	804	5	11
3	779	5	11	1,000	9	24	e620	6	10
4	793	5	11	986	7	19	e560	7	11
5	807	6	13	962	6	16	e580	7	11
6	865	8	19	970	6	16	e550	8	12
7	890	9	22	967	6	16	e450	8	9.7
8	926	10	25	953	6	15	e350	7	6.6
9	971	10	26	934	6	15	e370	7	7.0
10	950	9	23	913	6	15	e380	6	6.2
11	924	7	17	925	6	15	e420	6	6.8
12	897	6	15	935	6	15	e450	7	8.5
13	925	6	15	924	5	12	e500	16	22
14	972	10	26	856	5	12	e550	12	18
15	1,000	14	38	852	5	12	e600	11	18
16	1,010	12	33	849	5	11	e680	19	35
17	997	12	32	894	5	12	e700	18	34
18	1,000	12	32	915	4	9.9	e720	16	31
19	1,000	12	32	905	4	9.8	e700	14	26
20	1,070	18	52	876	4	9.5	e730	12	24
21	1,130	24	73	903	4	9.8	e750	9	18
22	1,080	20	58	884	4	9.5	e740	7	14
23	1,050	16	45	858	4	9.3	e700	6	11
24	1,050	12	34	874	4	9.4	e680	6	11
25	1,050	9	26	875	4	9.4	e650	6	11
26	1,030	7	19	875	4	9.4	e630	5	8.5
27	1,010	6	16	881	4	9.5	e600	5	8.1
28	1,010	6	16	880	4	9.5	e610	4	6.6
29	988	6	16	869	4	9.4	e640	4	6.9
30	992	6	16	861	4	9.3	e680	4	7.3
31	1,040	8	22	--	--	--	e700	4	7.6
TOTAL	**29,737**	**--**	**808**	**27,476**	**--**	**407.7**	**18,962**	**--**	**427.2**
MEAN	**959**	**10**	**26**	**916**	**5**	**14**	**612**	**8**	**14**
MAX	**1,130**	**24**	**73**	**1,060**	**11**	**31**	**868**	**19**	**35**
MIN	**754**	**5**	**11**	**849**	**4**	**9.3**	**350**	**4**	**6.2**

Table 6. Daily mean streamflow and suspended-sediment data for Clark Fork at Turah Bridge, near Bonner, Montana, October 2009 through September 2010.—Continued

[Abbreviations: acre-ft, acre-feet; ft³/s, cubic feet per second; e, estimated; max, maximum; mg/L, milligrams per liter; min, minimum; ton/d, tons per day. Symbol: --, no data or value not computed]

Day	Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment	
		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)
		JANUARY			FEBRUARY			MARCH	
1	e720	5	9.7	726	5	9.8	779	25	53
2	e740	7	14	715	5	9.7	785	28	59
3	e750	8	16	716	5	9.7	773	28	58
4	e740	6	12	702	4	7.6	836	33	74
5	e700	5	9.5	696	4	7.5	874	38	90
6	e650	5	8.8	718	5	9.7	847	31	71
7	e600	4	6.5	725	6	12	831	23	52
8	625	4	6.8	706	6	11	830	22	49
9	668	4	7.2	692	7	13	860	31	72
10	762	4	8.2	685	8	15	831	21	47
11	749	5	10	715	9	17	773	14	29
12	738	8	16	721	10	19	753	14	28
13	751	10	20	730	10	20	788	14	30
14	770	10	21	735	11	22	796	18	39
15	781	9	19	740	12	24	786	17	36
16	774	8	17	746	13	26	797	16	34
17	775	7	15	738	14	28	825	17	38
18	773	6	13	745	13	26	897	35	85
19	773	6	13	732	11	22	878	45	107
20	770	6	12	699	9	17	817	24	53
21	743	6	12	647	9	16	787	19	40
22	729	5	9.8	609	9	15	814	21	46
23	719	5	9.7	615	9	15	850	27	62
24	719	4	7.8	658	10	18	806	22	48
25	711	4	7.7	739	14	28	778	20	42
26	703	4	7.6	728	14	28	781	20	42
27	732	4	7.9	717	14	27	788	19	40
28	724	4	7.8	742	16	32	777	19	40
29	700	4	7.6	--	--	--	795	22	47
30	691	4	7.5	--	--	--	876	31	73
31	715	5	9.7	--	--	--	919	33	82
TOTAL	**22,495**	**--**	**349.8**	**19,837**	**--**	**505.0**	**25,327**	**--**	**1,666**
MEAN	**726**	**6**	**11**	**708**	**9**	**18**	**817**	**24**	**54**
MAX	**781**	**10**	**21**	**746**	**16**	**32**	**919**	**45**	**107**
MIN	**600**	**4**	**6.5**	**609**	**4**	**7.5**	**753**	**14**	**28**

Table 6. Daily mean streamflow and suspended-sediment data for Clark Fork at Turah Bridge, near Bonner, Montana, October 2009 through September 2010.—Continued

[Abbreviations: acre-ft, acre-feet; ft³/s, cubic feet per second; e, estimated; max, maximum; mg/L, milligrams per liter; min, minimum; ton/d, tons per day. Symbol: --, no data or value not computed]

Day	Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment	
		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)
	APRIL			MAY			JUNE		
1	864	21	49	1,330	24	86	2,560	61	422
2	823	19	42	1,280	22	76	2,900	92	720
3	802	18	39	1,240	22	74	3,230	115	1,000
4	792	15	32	1,230	19	63	3,990	194	2,090
5	767	15	31	1,200	19	62	4,400	178	2,110
6	767	15	31	1,140	15	46	4,580	142	1,760
7	761	15	31	1,110	14	42	4,560	107	1,320
8	761	14	29	1,080	13	38	5,010	143	1,930
9	762	10	21	1,060	13	37	4,860	94	1,230
10	736	11	22	1,040	15	42	4,650	70	879
11	728	13	26	1,020	14	39	4,540	61	748
12	736	12	24	1,010	13	35	4,770	84	1,080
13	761	14	29	1,000	13	35	4,370	66	779
14	812	14	31	976	13	34	4,000	47	508
15	833	19	43	997	13	35	3,860	49	511
16	873	23	54	1,090	13	38	4,510	86	1,050
17	903	24	59	1,210	18	59	5,340	160	2,310
18	970	29	76	1,410	24	91	5,840	173	2,730
19	1,030	33	92	1,750	35	165	5,810	141	2,210
20	1,120	37	112	2,180	60	353	5,580	107	1,610
21	1,300	72	253	2,330	60	377	5,430	86	1,260
22	1,590	98	421	2,220	48	288	5,330	67	964
23	1,810	113	552	2,070	38	212	4,870	62	815
24	1,780	87	418	1,960	32	169	4,600	53	658
25	1,670	59	266	1,970	32	170	4,440	46	551
26	1,550	43	180	1,890	33	168	4,320	45	525
27	1,450	42	164	1,840	33	164	4,140	40	447
28	1,460	35	138	2,020	36	196	3,840	40	415
29	1,460	30	118	2,450	80	529	3,530	37	353
30	1,380	25	93	2,580	100	697	3,460	37	346
31	--	--	--	2,460	70	465	--	--	--
TOTAL	**32,051**	**--**	**3,476**	**48,143**	**--**	**4,885**	**133,320**	**--**	**33,331**
MEAN	**1,068**	**32**	**116**	**1,553**	**31**	**158**	**4,444**	**89**	**1,110**
MAX	**1,810**	**113**	**552**	**2,580**	**100**	**697**	**5,840**	**194**	**2,730**
MIN	**728**	**10**	**21**	**976**	**13**	**34**	**2,560**	**37**	**346**

Table 6. Daily mean streamflow and suspended-sediment data for Clark Fork at Turah Bridge, near Bonner, Montana, October 2009 through September 2010.—Continued

[Abbreviations: acre-ft, acre-feet; ft³/s, cubic feet per second; e, estimated; max, maximum; mg/L, milligrams per liter; min, minimum; ton/d, tons per day. Symbol: --, no data or value not computed]

Day	Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment	
		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)
		JULY			AUGUST			SEPTEMBER	
1	3,390	34	311	1,060	5	14	836	5	11
2	3,280	30	266	1,030	5	14	862	6	14
3	3,020	27	220	990	5	13	844	5	11
4	2,820	25	190	944	5	13	827	5	11
5	2,650	22	157	914	5	12	828	5	11
6	2,460	21	139	918	5	12	844	5	11
7	2,300	18	112	931	5	13	854	5	12
8	2,190	15	89	929	6	15	846	5	11
9	2,010	12	65	914	6	15	867	6	14
10	1,890	12	61	951	6	15	1,120	23	70
11	1,820	13	64	977	7	18	1,210	23	75
12	1,800	10	49	1,030	9	25	1,140	16	49
13	1,720	8	37	1,090	11	32	1,070	12	35
14	1,610	8	35	1,140	11	34	1,040	11	31
15	1,560	8	34	1,090	12	35	1,020	10	28
16	1,520	7	29	1,040	11	31	1,060	9	26
17	1,430	6	23	1,000	9	24	1,070	8	23
18	1,360	5	18	940	7	18	1,090	9	26
19	1,300	6	21	909	6	15	1,070	9	26
20	1,260	5	17	878	6	14	1,060	9	26
21	1,220	4	13	837	6	14	1,080	8	23
22	1,200	4	13	811	6	13	1,070	8	23
23	1,190	4	13	812	6	13	1,050	7	20
24	1,140	4	12	822	6	13	1,030	6	17
25	1,100	4	12	820	6	13	1,010	6	16
26	1,070	4	12	800	5	11	996	6	16
27	1,070	3	8.7	778	4	8.4	977	6	16
28	1,120	4	12	753	4	8.1	959	6	16
29	1,140	4	12	751	4	8.1	947	6	15
30	1,070	4	12	786	3	6.4	931	6	15
31	1,030	4	11	811	4	8.8	--	--	--
TOTAL	**53,740**	**--**	**2,067.7**	**28,456**	**--**	**498.8**	**29,608**	**--**	**698**
MEAN	**1,734**	**11**	**67**	**918**	**6**	**16**	**987**	**8**	**23**
MAX	**3,390**	**34**	**311**	**1,140**	**12**	**35**	**1,210**	**23**	**75**
MIN	**1,030**	**3**	**8.7**	**751**	**3**	**6.4**	**827**	**5**	**11**

Total for water year 2010 (unrounded sum of daily values): streamflow–469,152 ft³/s (annual runoff–930,600 acre-ft); suspended-sediment discharge–49,120.2 tons.

Table 7. Daily mean streamflow and suspended-sediment data for Blackfoot River near Bonner, Montana, October 2009 through September 2010.

[Abbreviations: acre-ft, acre-feet; ft³/s, cubic feet per second; e, estimated; max, maximum; mg/L, milligrams per liter; min, minimum; ton/d, tons per day. Symbol: --, no data or value not computed]

Day	Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment	
		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)
	OCTOBER			NOVEMBER			DECEMBER		
1	499	2	2.7	652	2	3.5	e450	2	2.4
2	502	2	2.7	652	2	3.5	e320	2	1.7
3	502	2	2.7	638	2	3.4	e300	3	2.4
4	506	2	2.7	623	2	3.4	e300	3	2.4
5	506	2	2.7	611	1	1.6	e320	3	2.6
6	507	2	2.7	612	1	1.7	e290	3	2.3
7	519	1	1.4	611	1	1.6	e220	3	1.8
8	529	1	1.4	600	2	3.2	e180	3	1.5
9	543	1	1.5	589	2	3.2	e200	2	1.1
10	521	1	1.4	581	2	3.1	e210	2	1.1
11	494	1	1.3	578	2	3.1	e220	2	1.2
12	493	1	1.3	583	2	3.1	e230	2	1.2
13	538	1	1.5	575	2	3.1	e240	2	1.3
14	544	1	1.5	555	2	3.0	e270	1	.73
15	552	1	1.5	546	2	2.9	e290	2	1.6
16	547	1	1.5	552	2	3.0	e320	2	1.7
17	541	2	2.9	543	2	2.9	e340	3	2.8
18	541	2	2.9	548	2	3.0	e340	3	2.8
19	550	3	4.5	529	2	2.9	e320	3	2.6
20	564	3	4.6	529	2	2.9	e340	3	2.8
21	571	2	3.1	538	2	2.9	e350	3	2.8
22	560	2	3.0	519	2	2.8	e350	2	1.9
23	550	2	3.0	525	2	2.8	e320	2	1.7
24	574	2	3.1	524	2	2.8	e300	2	1.6
25	575	2	3.1	527	2	2.8	e280	2	1.5
26	564	2	3.0	523	2	2.8	e260	2	1.4
27	573	2	3.1	523	2	2.8	e230	2	1.2
28	583	2	3.1	523	1	1.4	e230	2	1.2
29	586	2	3.2	520	1	1.4	e240	1	.65
30	589	2	3.2	517	1	1.4	e260	1	.70
31	614	2	3.3	--	--	--	e280	2	1.5
TOTAL	**16,837**	**--**	**79.6**	**16,946**	**--**	**82.0**	**8,800**	**--**	**54.18**
MEAN	**543**	**2**	**2.6**	**546**	**2**	**2.7**	**284**	**2**	**1.7**
MAX	**614**	**3**	**4.6**	**652**	**2**	**3.5**	**450**	**3**	**2.8**
MIN	**493**	**1**	**1.3**	**517**	**1**	**1.4**	**180**	**1**	**.65**

Table 7. Daily mean streamflow and suspended-sediment data for Blackfoot River near Bonner, Montana, October 2009 through September 2010.—Continued

[Abbreviations: acre-ft, acre-feet; ft³/s, cubic feet per second; e, estimated; max, maximum; mg/L, milligrams per liter; min, minimum; ton/d, tons per day. Symbol: --, no data or value not computed]

Day	Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment	
		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)
		JANUARY			FEBRUARY			MARCH	
1	e290	2	1.6	e300	2	1.6	421	3	3.4
2	e310	2	1.7	e320	2	1.7	422	3	3.4
3	e300	2	1.6	e330	2	1.8	424	5	5.7
4	e280	3	2.3	e340	1	.92	448	6	7.3
5	e250	3	2.0	e330	1	.89	467	6	7.6
6	e210	3	1.7	e350	2	1.9	484	5	6.5
7	e190	3	1.5	e360	2	1.9	492	5	6.6
8	e200	3	1.6	e380	3	3.1	500	5	6.8
9	e210	2	1.1	e400	3	3.2	532	5	7.2
10	e230	2	1.2	e420	3	3.4	518	4	5.6
11	e250	1	.68	437	3	3.5	482	3	3.9
12	e270	1	.73	430	3	3.5	467	3	3.8
13	e270	1	.73	430	3	3.5	479	4	5.2
14	e280	1	.76	425	3	3.4	513	5	6.9
15	e290	1	.78	428	3	3.5	525	6	8.5
16	e300	2	1.6	432	3	3.5	532	6	8.6
17	e300	4	3.2	423	3	3.4	549	5	7.4
18	e300	5	4.0	420	3	3.4	577	6	9.3
19	e290	3	2.3	410	3	3.3	578	6	9.4
20	e290	2	1.6	397	2	2.1	546	5	7.4
21	e280	2	1.5	376	2	2.0	533	4	5.8
22	e260	2	1.4	355	2	1.9	563	5	7.6
23	e260	2	1.4	e330	2	1.8	578	5	7.8
24	e260	2	1.4	e360	2	1.9	567	5	7.7
25	e270	2	1.5	e370	2	2.0	559	5	7.5
26	e270	2	1.5	e390	2	2.1	564	5	7.6
27	e290	2	1.6	407	2	2.2	568	5	7.7
28	e280	2	1.5	414	3	3.4	576	5	7.8
29	e280	2	1.5	--	--	--	617	6	10
30	e270	2	1.5	--	--	--	767	12	25
31	e290	2	1.6	--	--	--	787	10	21
TOTAL	**8,320**	**--**	**49.08**	**10,764**	**--**	**70.81**	**16,635**	**--**	**246**
MEAN	**268**	**2**	**1.6**	**384**	**2**	**2.5**	**537**	**5**	**7.9**
MAX	**310**	**5**	**4.0**	**437**	**3**	**3.5**	**787**	**12**	**25**
MIN	**190**	**1**	**.68**	**300**	**1**	**.89**	**421**	**3**	**3.4**

Table 7. Daily mean streamflow and suspended-sediment data for Blackfoot River near Bonner, Montana, October 2009 through September 2010.—Continued

[Abbreviations: acre-ft, acre-feet; ft³/s, cubic feet per second; e, estimated; max, maximum; mg/L, milligrams per liter; min, minimum; ton/d, tons per day. Symbol: --, no data or value not computed]

Day	Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment	
		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)
	APRIL			MAY			JUNE		
1	793	8	17	1,890	6	31	3,170	16	137
2	778	7	15	1,830	4	20	3,510	22	208
3	769	7	15	1,810	5	24	3,940	30	319
4	745	6	12	1,850	6	30	4,360	39	459
5	725	5	9.8	1,800	5	24	4,670	38	479
6	747	5	10	1,760	5	24	4,780	37	478
7	743	5	10	1,700	5	23	4,640	30	376
8	724	4	7.8	1,650	4	18	4,580	26	322
9	699	4	7.5	1,590	4	17	4,420	24	286
10	671	3	5.4	1,490	4	16	e4,250	22	252
11	653	4	7.1	1,450	4	16	e4,140	19	212
12	645	5	8.7	1,440	4	16	4,000	19	205
13	659	4	7.1	1,470	4	16	3,720	18	181
14	727	5	9.8	1,560	5	21	3,530	15	143
15	750	6	12	1,680	7	32	3,460	14	131
16	e750	6	12	1,900	9	46	3,570	14	135
17	e800	7	15	2,270	14	86	3,950	19	203
18	e850	8	18	2,840	25	192	4,290	27	313
19	947	9	23	3,540	36	344	4,200	30	340
20	1,080	11	32	4,050	42	459	4,040	26	284
21	1,380	22	82	4,000	34	367	4,200	29	329
22	1,950	34	179	3,650	30	296	4,180	24	271
23	2,560	41	283	3,300	24	214	4,020	22	239
24	2,740	28	207	3,030	16	131	3,820	17	175
25	2,560	15	104	2,840	12	92	3,640	13	128
26	2,320	11	69	2,680	12	87	3,440	12	111
27	2,120	8	46	2,580	10	70	3,250	10	88
28	2,080	8	45	2,930	16	127	3,030	10	82
29	2,060	6	33	3,200	16	138	2,830	10	76
30	1,950	5	26	3,170	17	146	2,860	13	100
31	--	--	--	3,110	17	143	--	--	--
TOTAL	**36,975**	**--**	**1,328.2**	**74,060**	**--**	**3,266**	**116,490**	**--**	**7,062**
MEAN	**1,232**	**10**	**44**	**2,389**	**13**	**105**	**3,883**	**22**	**235**
MAX	**2,740**	**41**	**283**	**4,050**	**42**	**459**	**4,780**	**39**	**479**
MIN	**645**	**3**	**5.4**	**1,440**	**4**	**16**	**2,830**	**10**	**76**

Table 7. Daily mean streamflow and suspended-sediment data for Blackfoot River near Bonner, Montana, October 2009 through September 2010.—Continued

[Abbreviations: acre-ft, acre-feet; ft³/s, cubic feet per second; e, estimated; max, maximum; mg/L, milligrams per liter; min, minimum; ton/d, tons per day. Symbol: --, no data or value not computed]

Day	Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment	
		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)
		JULY			AUGUST			SEPTEMBER	
1	2,970	14	112	805	4	8.7	640	4	6.9
2	2,730	10	74	803	5	11	679	4	7.3
3	2,530	8	55	789	5	11	665	4	7.2
4	2,380	8	51	761	5	10	648	4	7.0
5	2,230	7	42	740	5	10	635	5	8.6
6	2,150	6	35	713	5	9.6	628	4	6.8
7	2,040	5	28	688	5	9.3	617	4	6.7
8	1,890	5	26	672	5	9.1	606	4	6.5
9	1,760	4	19	667	5	9.0	627	4	6.8
10	1,670	4	18	685	4	7.4	708	6	11
11	1,600	4	17	714	4	7.7	752	6	12
12	1,540	4	17	708	4	7.6	707	4	7.6
13	1,460	3	12	799	4	8.6	674	4	7.3
14	1,430	3	12	869	9	21	650	4	7.0
15	1,370	4	15	835	9	20	638	4	6.9
16	1,280	4	14	786	7	15	631	4	6.8
17	1,200	13	42	749	6	12	641	3	5.2
18	1,120	4	12	702	6	11	641	3	5.2
19	1,070	2	5.8	660	5	8.9	642	3	5.2
20	1,020	2	5.5	644	5	8.7	633	3	5.1
21	992	2	5.4	636	4	6.9	630	3	5.1
22	974	1	2.6	630	4	6.8	634	2	3.4
23	925	1	2.5	618	4	6.7	624	3	5.1
24	902	2	4.9	615	5	8.3	608	3	4.9
25	876	2	4.7	599	4	6.5	597	3	4.8
26	853	2	4.6	590	3	4.8	588	3	4.8
27	828	2	4.5	600	3	4.9	578	3	4.7
28	830	3	6.7	593	3	4.8	569	3	4.6
29	825	3	6.7	591	3	4.8	559	2	3.0
30	785	3	6.4	610	3	4.9	551	2	3.0
31	771	3	6.2	617	3	5.0	--	--	--
TOTAL	**45,001**	**--**	**667.5**	**21,488**	**--**	**280.0**	**19,000**	**--**	**186.5**
MEAN	**1,452**	**4**	**22**	**693**	**5**	**9.0**	**633**	**4**	**6.2**
MAX	**2,970**	**14**	**112**	**869**	**9**	**21**	**752**	**6**	**12**
MIN	**771**	**1**	**2.5**	**590**	**3**	**4.8**	**551**	**2**	**3.0**

Total for water year 2010 (unrounded sum of daily values): streamflow–391,316 ft³/s (annual runoff–776,200 acre-ft); suspended-sediment discharge–13,371.87 tons.

Table 8. Daily mean streamflow and suspended-sediment data for Clark Fork above Missoula, Montana, October 2009 through September 2010.

[Abbreviations: acre-ft, acre-feet; ft³/s, cubic feet per second; e, estimated; max, maximum; mg/L, milligrams per liter; min, minimum; ton/d, tons per day. Symbol: --, no data or value not computed]

Day	Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment	
		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)
		OCTOBER			NOVEMBER			DECEMBER	
1	1,270	30	103	1,810	8	39	1,460	2	7.9
2	1,320	13	46	1,810	7	34	1,350	3	11
3	1,330	6	22	1,750	5	24	e950	22	56
4	1,350	6	22	1,720	5	23	e900	69	168
5	1,360	6	22	1,680	5	23	e930	58	146
6	1,410	7	27	1,670	5	23	e900	48	117
7	1,460	8	32	1,680	4	18	e850	40	92
8	1,510	9	37	1,650	4	18	e750	39	79
9	1,590	9	39	1,630	4	18	e600	40	65
10	1,590	8	34	1,590	4	17	e640	40	69
11	1,540	7	29	1,590	4	17	e700	38	72
12	1,480	7	28	1,610	4	17	e800	30	65
13	1,540	6	25	1,600	3	13	e900	20	49
14	1,600	7	30	1,500	3	12	e1,000	14	38
15	1,650	10	45	1,480	3	12	e1,000	13	35
16	1,660	10	45	1,460	3	12	e1,100	13	39
17	1,640	9	40	1,510	3	12	e1,200	12	39
18	1,640	9	40	1,540	3	12	e1,200	12	39
19	1,640	10	44	1,530	3	12	e1,300	12	42
20	1,720	12	56	1,480	3	12	e1,300	28	98
21	1,820	17	84	1,520	3	12	e1,400	54	204
22	1,770	15	72	1,500	3	12	e1,400	22	83
23	1,720	12	56	1,450	3	12	e1,400	7	26
24	1,730	10	47	1,470	3	12	1,400	5	19
25	1,730	8	37	1,470	3	12	e1,300	5	18
26	1,710	7	32	1,480	3	12	e1,200	5	16
27	1,680	6	27	1,480	3	12	e1,000	4	11
28	1,690	5	23	1,480	3	12	e950	8	21
29	1,680	4	18	1,470	2	7.9	e1,000	52	140
30	1,670	4	18	1,450	2	7.8	e1,000	46	124
31	1,740	5	23	--	--	--	e1,100	24	71
TOTAL	**49,240**	**--**	**1,203**	**47,060**	**--**	**479.7**	**32,980**	**--**	**2,059.9**
MEAN	**1,588**	**9**	**39**	**1,569**	**4**	**16**	**1,064**	**25**	**66**
MAX	**1,820**	**30**	**103**	**1,810**	**8**	**39**	**1,460**	**69**	**204**
MIN	**1,270**	**4**	**18**	**1,450**	**2**	**7.8**	**600**	**2**	**7.9**

Table 8. Daily mean streamflow and suspended-sediment data for Clark Fork above Missoula, Montana, October 2009 through September 2010.—Continued

[Abbreviations: acre-ft, acre-feet; ft³/s, cubic feet per second; e, estimated; max, maximum; mg/L, milligrams per liter; min, minimum; ton/d, tons per day. Symbol: --, no data or value not computed]

Day	Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment	
		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)
		JANUARY			FEBRUARY			MARCH	
1	e1,200	11	36	1,190	5	16	1,250	11	37
2	e1,200	8	26	1,180	4	13	1,270	13	45
3	e1,200	7	23	1,180	4	13	1,250	16	54
4	e1,300	6	21	1,150	4	12	1,340	18	65
5	e1,300	4	14	1,120	3	9.1	1,420	21	81
6	e1,200	4	13	1,160	3	9.4	1,400	19	72
7	e900	5	12	1,190	4	13	1,390	15	56
8	e950	10	26	1,160	4	13	1,400	13	49
9	e1,000	23	62	1,140	4	12	1,460	17	67
10	e1,200	40	130	1,120	4	12	1,430	14	54
11	e1,200	57	185	1,160	5	16	1,320	8	29
12	e1,200	61	198	1,180	6	19	1,270	8	27
13	e1,300	54	190	1,200	6	19	1,320	9	32
14	e1,300	31	109	1,200	7	23	1,370	10	37
15	e1,300	12	42	1,210	7	23	1,360	11	40
16	1,300	6	21	1,220	8	26	1,390	11	41
17	1,300	4	14	1,200	8	26	1,420	13	50
18	1,290	4	14	1,210	8	26	1,530	30	124
19	1,280	5	17	1,190	8	26	1,540	29	121
20	1,280	7	24	1,140	8	25	1,440	15	58
21	1,230	8	27	1,050	7	20	1,380	12	45
22	1,190	7	22	945	7	18	1,420	13	50
23	1,190	6	19	979	8	21	1,500	18	73
24	1,180	4	13	1,070	8	23	1,440	15	58
25	1,170	3	9.5	1,210	9	29	1,400	11	42
26	1,160	3	9.4	1,190	9	29	1,400	11	42
27	1,210	3	9.8	1,160	9	28	1,410	12	46
28	1,180	3	9.6	1,200	10	32	1,400	12	45
29	1,160	3	9.4	--	--	--	1,450	13	51
30	1,130	4	12	--	--	--	1,700	21	96
31	1,180	4	13	--	--	--	1,800	23	112
TOTAL	**37,180**	**--**	**1,330.7**	**32,304**	**--**	**551.5**	**43,870**	**--**	**1,799**
MEAN	**1,199**	**13**	**43**	**1,154**	**6**	**20**	**1,415**	**15**	**58**
MAX	**1,300**	**61**	**198**	**1,220**	**10**	**32**	**1,800**	**30**	**124**
MIN	**900**	**3**	**9.4**	**945**	**3**	**9.1**	**1,250**	**8**	**27**

Table 8. Daily mean streamflow and suspended-sediment data for Clark Fork above Missoula, Montana, October 2009 through September 2010.—Continued

[Abbreviations: acre-ft, acre-feet; ft³/s, cubic feet per second; e, estimated; max, maximum; mg/L, milligrams per liter; min, minimum; ton/d, tons per day. Symbol: --, no data or value not computed]

Day	Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment	
		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)
	APRIL			MAY			JUNE		
1	1,740	16	75	3,360	11	100	5,740	46	713
2	1,680	12	54	3,250	10	88	6,430	85	1,480
3	1,640	13	58	3,160	12	102	7,170	135	2,610
4	1,610	11	48	3,190	10	86	8,390	238	5,390
5	1,550	10	42	3,120	9	76	9,060	225	5,500
6	1,570	9	38	3,000	8	65	9,420	163	4,150
7	1,560	9	38	2,920	7	55	9,180	123	3,050
8	1,540	8	33	2,820	6	46	9,530	114	2,930
9	1,520	7	29	2,750	8	59	9,120	111	2,730
10	1,460	6	24	2,630	10	71	8,700	67	1,570
11	1,430	8	31	2,550	9	62	8,390	57	1,290
12	1,430	8	31	2,540	8	55	8,460	66	1,510
13	1,480	8	32	2,540	8	55	7,780	53	1,110
14	1,610	9	39	2,570	9	62	7,200	39	758
15	1,650	13	58	2,690	9	65	6,970	38	715
16	1,720	14	65	2,990	11	89	7,640	56	1,160
17	1,780	16	77	3,480	17	160	8,940	114	2,750
18	1,910	21	108	4,290	29	336	10,100	140	3,820
19	2,080	24	135	5,360	54	781	10,000	104	2,810
20	2,290	29	179	6,330	76	1,300	9,530	91	2,340
21	2,760	57	425	6,440	68	1,180	9,440	77	1,960
22	3,640	87	855	5,950	48	771	9,290	62	1,560
23	4,540	92	1,130	5,430	34	498	8,760	47	1,110
24	4,760	68	874	5,040	24	327	8,220	40	888
25	4,460	41	494	4,830	20	261	7,850	38	805
26	4,070	27	297	4,600	20	248	7,520	34	690
27	3,760	22	223	4,430	19	227	7,140	32	617
28	3,690	19	189	4,900	22	291	6,650	28	503
29	3,700	17	170	5,650	41	625	6,170	25	416
30	3,510	14	133	5,800	60	940	6,140	27	448
31	--	--	--	5,620	49	744	--	--	--
TOTAL	**72,140**	**--**	**5,984**	**124,230**	**--**	**9,825**	**244,930**	**--**	**57,383**
MEAN	**2,405**	**23**	**199**	**4,007**	**23**	**317**	**8,164**	**82**	**1,910**
MAX	**4,760**	**92**	**1,130**	**6,440**	**76**	**1,300**	**10,100**	**238**	**5,500**
MIN	**1,430**	**6**	**24**	**2,540**	**6**	**46**	**5,740**	**25**	**416**

Table 8. Daily mean streamflow and suspended-sediment data for Clark Fork above Missoula, Montana, October 2009 through September 2010.—Continued

[Abbreviations: acre-ft, acre-feet; ft³/s, cubic feet per second; e, estimated; max, maximum; mg/L, milligrams per liter; min, minimum; ton/d, tons per day. Symbol: --, no data or value not computed]

Day	Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment	
		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)
		JULY			AUGUST			SEPTEMBER	
1	6,210	26	436	1,940	5	26	1,560	4	17
2	5,870	21	333	1,920	6	31	1,620	7	31
3	5,420	19	278	1,870	5	25	1,600	5	22
4	5,090	18	247	1,800	5	24	1,560	4	17
5	4,800	15	194	1,740	5	23	1,560	3	13
6	4,550	12	147	1,730	5	23	1,560	4	17
7	4,290	11	127	1,720	5	23	1,560	4	17
8	4,040	11	120	1,710	5	23	1,550	5	21
9	3,760	10	102	1,680	5	23	1,580	5	21
10	3,530	9	86	1,730	5	23	1,870	14	71
11	3,410	8	74	1,790	5	24	2,050	17	94
12	3,320	7	63	1,840	5	25	1,950	10	53
13	3,170	6	51	1,960	7	37	1,850	9	45
14	3,050	5	41	2,080	11	62	1,790	9	43
15	2,940	4	32	2,020	10	55	1,750	10	47
16	2,820	4	30	1,930	8	42	1,770	10	48
17	2,680	4	29	1,860	7	35	1,800	11	53
18	2,540	4	27	1,750	6	28	1,810	11	54
19	2,430	4	26	1,670	6	27	1,780	13	62
20	2,360	4	25	1,610	5	22	1,760	16	76
21	2,290	4	25	1,570	5	21	1,770	18	86
22	2,240	4	24	1,530	5	21	1,760	16	76
23	2,190	4	24	1,510	5	20	1,730	14	65
24	2,130	4	23	1,530	6	25	1,690	10	46
25	2,070	4	22	1,510	6	24	1,660	7	31
26	2,020	4	22	1,480	6	24	1,620	6	26
27	2,000	4	22	1,460	5	20	1,590	6	26
28	2,030	4	22	1,420	4	15	1,550	6	25
29	2,060	4	22	1,400	4	15	1,530	7	29
30	1,960	4	21	1,470	3	12	1,490	7	28
31	1,900	4	21	1,510	3	12	--	--	--
TOTAL	**99,170**	**--**	**2,716**	**52,740**	**--**	**810**	**50,720**	**--**	**1,260**
MEAN	**3,199**	**8**	**88**	**1,701**	**6**	**26**	**1,691**	**9**	**42**
MAX	**6,210**	**26**	**436**	**2,080**	**11**	**62**	**2,050**	**18**	**94**
MIN	**1,900**	**4**	**21**	**1,400**	**3**	**12**	**1,490**	**3**	**13**

Total for water year 2010 (unrounded sum of daily values): streamflow–886,564 ft³/s (annual runoff–1,758,000 acre-ft); suspended-sediment discharge–85,401.8 tons.

Table 9. Seasonal daily maximum, minimum, and mean turbidity, with monthly summary statistics at Mill Creek near Anaconda, Montana, April through September 2010.

[Turbidity values are based on near-infrared monochrome light emitted at wavelengths of 780 to 900 nanometers with a detection angle of 90 +/- 2.5 degrees to incident beam, reported in formazin nephelometric units (FNU). Symbol: --, no data]

Day	Maximum	Minimum	Mean	Maximum	Minimum	Mean	Maximum	Minimum	Mean
		APRIL			MAY			JUNE	
1	--	--	--	8.0	4.0	5.5	9.0	3.5	5.0
2	--	--	--	7.5	4.5	5.5	7.0	3.0	4.5
3	--	--	--	9.0	5.0	6.5	18	6.5	10
4	--	--	--	9.0	5.0	6.0	16	6.0	9.0
5	--	--	--	8.0	4.5	6.0	10	4.5	6.5
6	--	--	--	11	5.0	6.5	6.5	2.5	4.0
7	--	--	--	--	--	7.0	9.5	5.0	6.5
8	--	--	--	--	--	--	8.5	3.0	4.5
9	--	--	--	--	--	--	5.0	2.0	3.0
10	--	--	--	--	--	--	3.5	1.5	2.5
11	--	--	--	--	--	--	3.5	1.5	2.0
12	--	--	--	--	--	--	3.0	1.5	2.0
13	--	--	--	--	--	--	4.5	1.0	2.0
14	--	--	--	--	--	--	5.0	1.5	2.5
15	--	--	--	--	--	--	12	4.5	6.5
16	--	--	--	--	--	--	29	10	20
17	--	--	--	--	--	--	18	8.5	11
18	--	--	--	--	--	--	13	6.5	7.5
19	--	--	--	--	--	7.0	8.0	5.5	6.5
20	--	--	--	9.5	3.5	5.0	7.0	5.0	6.0
21	--	--	--	5.0	2.0	3.0	6.5	4.5	5.0
22	--	--	--	6.5	1.5	2.5	7.5	4.0	4.5
23	16	5.0	7.5	5.0	1.5	2.5	5.5	3.5	4.0
24	9.5	4.0	5.5	5.0	2.0	3.0	6.0	3.0	4.0
25	6.0	4.0	5.0	4.0	1.5	2.0	6.0	3.5	4.5
26	5.5	3.5	4.5	4.5	1.5	2.0	5.5	3.0	4.0
27	7.0	3.5	4.5	7.5	1.5	2.5	5.5	3.0	4.0
28	7.0	4.0	5.0	12	3.0	7.0	4.5	2.5	3.5
29	8.0	4.5	5.5	7.0	3.5	5.0	8.0	2.5	4.0
30	8.0	4.5	5.5	5.5	3.5	4.5	11	3.5	6.0
31	--	--	--	8.5	3.0	4.5	--	--	--
MONTH[1]	**16**	**3.5**	**5.4**	**12**	**1.5**	**4.7**	**29**	**1.0**	**5.5**

Table 9. Seasonal daily maximum, minimum, and mean turbidity, with monthly summary statistics at Mill Creek near Anaconda, Montana, April through September 2010.—Continued

[Turbidity values are based on near-infrared monochrome light emitted at wavelengths of 780 to 900 nanometers with a detection angle of 90 +/- 2.5 degrees to incident beam, reported in formazin nephelometric units (FNU). Symbol: --, no data]

Day	Maximum	Minimum	Mean	Maximum	Minimum	Mean	Maximum	Minimum	Mean
		JULY			AUGUST			SEPTEMBER	
1	5.5	3.0	4.0	4.0	1.0	1.5	--	--	--
2	4.5	3.0	3.5	4.0	.5	1.5	--	--	1.5
3	6.0	3.0	3.5	5.5	.5	1.5	4.5	1.0	2.0
4	5.5	3.0	3.5	3.0	1.0	1.5	4.5	1.0	2.0
5	4.0	2.5	3.0	26	.5	5.5	4.5	2.0	2.5
6	3.5	2.5	3.0	12	1.5	3.5	4.5	2.0	3.0
7	5.0	2.0	3.0	3.0	.5	1.5	6.5	2.5	3.0
8	3.5	2.0	2.5	2.5	1.0	1.5	5.5	2.5	3.0
9	6.0	1.5	2.5	3.0	1.0	1.5	28	3.5	9.5
10	5.5	2.0	2.5	3.5	1.0	2.0	5.0	1.5	2.5
11	3.5	1.5	2.0	3.5	1.0	2.0	4.0	1.5	2.0
12	3.0	1.5	2.0	2.5	1.0	1.5	5.5	1.5	2.5
13	4.0	1.5	2.0	3.5	1.0	1.5	5.5	2.0	2.5
14	4.5	1.5	2.0	4.0	.5	1.5	7.5	2.0	3.0
15	4.5	1.0	2.0	3.5	.5	1.5	8.0	2.5	3.5
16	3.5	1.5	2.0	3.5	.5	1.5	6.5	2.5	3.0
17	3.5	1.0	2.0	3.5	.5	1.5	4.5	2.5	3.5
18	3.0	1.0	1.5	4.0	.5	1.5	5.5	2.5	3.5
19	3.5	1.0	2.0	5.5	1.0	2.0	5.0	2.5	3.0
20	3.0	1.0	2.0	6.5	1.5	2.5	6.0	2.5	3.5
21	3.5	1.0	2.0	4.5	1.5	2.5	5.0	2.5	3.5
22	3.0	1.0	1.5	5.0	2.0	2.5	5.0	3.0	3.5
23	3.0	1.0	1.5	7.5	2.0	3.0	4.5	2.5	3.5
24	3.5	1.0	1.5	7.0	2.5	4.0	6.5	3.0	4.0
25	4.0	1.0	2.0	7.5	3.5	5.0	4.5	3.5	4.0
26	3.5	1.0	1.5	6.0	2.5	3.5	7.5	3.5	4.0
27	3.0	1.0	1.5	4.0	2.0	3.0	7.5	4.0	5.0
28	2.5	1.0	1.5	6.0	2.5	3.0	--	--	--
29	3.0	1.0	1.5	--	--	3.5	--	--	--
30	3.5	1.0	2.0	--	--	--	--	--	--
31	4.0	1.0	2.0	--	--	--	--	--	--
MONTH[1]	**6.0**	**1.0**	**2.2**	**26**	**.5**	**2.4**	**28**	**1.0**	**3.3**

[1]For months with missing daily values, the means are calculated using available values.

Table 10. Seasonal daily maximum, minimum, and mean turbidity, with monthly summary statistics at Willow Creek near Anaconda, Montana, April through September 2010.

[Turbidity values are based on near-infrared monochrome light emitted at wavelengths of 780 to 900 nanometers with a detection angle of 90 +/- 2.5 degrees to incident beam, reported in formazin nephelometric units (FNU). Symbols: --, no data]

Day	Maximum	Minimum	Mean	Maximum	Minimum	Mean	Maximum	Minimum	Mean
		APRIL			MAY			JUNE	
1	--	--	--	9.0	7.0	8.0	29	15	20
2	--	--	--	8.0	6.5	7.0	32	13	17
3	--	--	--	8.0	6.5	7.0	--	--	17
4	--	--	--	7.0	6.0	6.5	--	--	--
5	--	--	--	8.5	6.0	6.5	25	12	14
6	--	--	--	8.0	6.0	6.5	31	12	15
7	--	--	--	8.5	5.5	6.0	36	11	17
8	--	--	--	6.5	5.5	6.0	26	10	15
9	--	--	--	6.5	5.0	5.5	17	9.0	11
10	--	--	--	8.0	5.0	5.5	12	8.5	9.5
11	--	--	--	8.0	5.0	5.5	10	8.0	8.5
12	--	--	--	6.5	5.0	5.5	10	8.0	8.5
13	--	--	--	7.0	5.5	6.0	10	7.0	8.5
14	--	--	--	7.5	5.5	6.5	11	7.5	9.0
15	--	--	--	8.0	5.5	6.5	12	9.0	10
16	--	--	--	9.5	6.0	7.0	37	9.5	18
17	--	--	--	10	6.5	8.0	34	18	24
18	--	--	--	11	7.0	8.5	30	20	23
19	--	--	--	13	8.0	9.5	23	17	19
20	--	--	--	12	8.0	9.5	24	14	17
21	--	--	--	11	7.5	9.0	18	13	14
22	--	--	--	9.0	7.0	7.5	17	12	13
23	25	15	18	9.5	6.5	7.5	14	11	12
24	17	13	14	13	6.5	9.0	13	10	11
25	15	11	12	11	7.0	8.5	12	10	11
26	12	10	11	12	9.5	10	12	9.0	10
27	12	9.5	10	--	--	15	11	8.5	9.0
28	12	8.5	9.0	--	--	--	14	8.0	9.5
29	10	8.0	8.5	--	--	--	--	--	9.5
30	9.5	7.5	8.0	41	21	28	--	--	9.5
31	--	--	--	42	18	25	--	--	--
MONTH[1]	**25**	**7.5**	**11**	**42**	**5.0**	**8.8**	**37**	**7.0**	**13**

Table 10. Seasonal daily maximum, minimum, and mean turbidity, with monthly summary statistics at Willow Creek near Anaconda, Montana, April through September 2010.—Continued

[Turbidity values are based on near-infrared monochrome light emitted at wavelengths of 780 to 900 nanometers with a detection angle of 90 +/- 2.5 degrees to incident beam, reported in formazin nephelometric units (FNU). Symbols: --, no data]

Day	Maximum	Minimum	Mean	Maximum	Minimum	Mean	Maximum	Minimum	Mean
		JULY			AUGUST			SEPTEMBER	
1	--	--	8.5	7.0	2.0	3.0	4.5	2.5	3.0
2	--	--	8.0	7.5	1.5	3.5	5.0	2.0	3.0
3	--	--	8.0	5.0	1.5	2.5	4.0	2.5	3.0
4	--	--	6.5	5.5	2.0	2.5	7.0	2.5	3.0
5	--	--	--	--	--	5.5	4.0	2.0	3.0
6	8.0	6.0	6.5	--	--	--	4.0	2.0	2.5
7	7.5	5.5	6.5	--	--	--	6.0	2.0	3.0
8	7.0	5.5	6.0	--	--	--	7.0	3.0	4.0
9	--	--	--	--	--	--	79	3.5	20
10	--	--	--	--	--	8.5	26	4.5	8.5
11	--	--	--	18	6.5	11	7.0	3.5	5.0
12	--	--	--	8.0	5.5	6.5	7.0	3.5	4.0
13	--	--	--	--	--	6.5	6.0	3.0	4.0
14	--	--	--	8.0	4.5	5.5	6.0	3.5	4.5
15	--	--	--	7.5	4.5	5.5	40	4.5	14
16	--	--	--	6.0	4.0	5.0	7.5	4.0	5.5
17	--	--	--	6.0	4.0	4.5	6.0	4.0	4.5
18	--	--	--	6.0	4.0	4.5	6.0	3.5	4.5
19	--	--	3.0	9.0	3.5	4.5	6.5	3.5	4.0
20	8.0	1.5	3.5	9.0	3.5	5.0	5.5	3.0	4.0
21	8.5	2.0	3.5	7.5	3.5	4.0	6.0	3.0	4.0
22	9.0	1.5	3.5	4.5	3.5	4.0	5.0	3.0	3.5
23	5.5	2.0	3.0	7.0	3.5	4.5	5.5	2.5	4.0
24	4.5	2.0	2.5	6.5	3.0	4.0	6.0	3.0	4.0
25	4.5	2.0	2.5	7.0	3.0	4.0	6.5	3.0	4.5
26	6.0	2.0	2.5	8.0	3.0	4.0	8.0	3.0	4.5
27	6.5	2.0	3.0	6.0	3.0	4.0	--	--	5.0
28	4.0	2.0	2.5	5.5	3.0	3.5	10	3.5	5.5
29	5.0	2.0	2.5	5.0	3.0	3.5	10	2.5	4.5
30	4.5	2.0	2.5	7.0	3.0	4.0	--	--	3.0
31	6.0	1.5	3.0	4.5	2.5	3.5	--	--	--
MONTH[1]	**9.0**	**1.5**	**4.4**	**18**	**1.5**	**4.7**	**79**	**2.0**	**5.0**

[1]For months with missing daily values, the means are calculated using available values.

Table 11. Seasonal daily maximum, minimum, and mean turbidity, with monthly summary statistics at Warm Springs Creek near Anaconda, Montana, April through September 2010.

[Turbidity values are based on near-infrared monochrome light emitted at wavelengths of 780 to 900 nanometers with a detection angle of 90 +/- 2.5 degrees to incident beam, reported in formazin nephelometric units (FNU). Symbols: --, no data]

Day	Maximum	Minimum	Mean	Maximum	Minimum	Mean	Maximum	Minimum	Mean
		APRIL			MAY			JUNE	
1	--	--	--	3.5	2.0	3.0	14	5.0	7.5
2	--	--	--	4.5	2.0	2.5	--	--	--
3	--	--	--	29	2.0	4.0	--	--	--
4	--	--	--	4.5	2.0	3.0	--	--	--
5	--	--	--	--	--	--	--	--	--
6	--	--	--	--	--	--	--	--	--
7	--	--	--	--	--	--	--	--	--
8	--	--	--	3.0	2.0	2.5	--	--	11
9	--	--	--	4.0	2.5	3.0	11	6.0	8.5
10	--	--	--	3.5	2.0	2.5	8.5	5.5	6.5
11	--	--	--	18	3.0	5.5	6.5	4.5	5.5
12	--	--	--	9.0	3.0	4.0	6.5	4.0	5.0
13	--	--	--	4.5	2.5	3.5	5.5	3.5	4.5
14	--	--	--	4.5	2.0	3.0	8.0	4.0	5.0
15	--	--	--	4.5	2.5	3.0	22	8.0	13
16	--	--	--	5.5	2.5	3.5	--	--	--
17	--	--	--	8.0	3.5	5.0	--	--	--
18	--	--	--	14	6.5	10	--	--	7.5
19	--	--	--	--	--	--	10	5.5	6.5
20	--	--	--	--	--	--	8.0	5.0	6.0
21	--	--	--	--	--	5.0	9.0	5.5	6.5
22	--	--	5.5	7.5	3.0	4.5	10	5.0	6.0
23	8.0	3.5	4.5	5.0	3.0	3.5	9.5	4.5	5.5
24	6.5	3.0	4.0	39	3.5	7.0	23	5.5	7.5
25	4.5	2.5	3.5	5.5	3.0	3.5	9.5	5.5	7.5
26	6.5	2.5	3.5	4.0	2.5	3.0	9.5	5.5	7.0
27	15	2.5	3.5	36	3.0	5.0	15	5.5	7.0
28	8.5	3.0	4.0	47	5.5	11	8.0	5.0	6.0
29	4.0	2.5	3.0	6.5	4.0	5.0	12	5.5	7.0
30	3.5	2.5	3.0	5.5	3.5	4.0	15	7.0	10
31	--	--	--	9.5	3.5	4.5	--	--	--
MONTH[1]	**15**	**2.5**	**3.8**	**47**	**2.0**	**4.4**	**23**	**3.5**	**7.1**

Table 11. Seasonal daily maximum, minimum, and mean turbidity, with monthly summary statistics at Warm Springs Creek near Anaconda, Montana, April through September 2010.—Continued

[Turbidity values are based on near-infrared monochrome light emitted at wavelengths of 780 to 900 nanometers with a detection angle of 90 +/- 2.5 degrees to incident beam, reported in formazin nephelometric units (FNU). Symbols: --, no data]

Day	Maximum	Minimum	Mean	Maximum	Minimum	Mean	Maximum	Minimum	Mean
		JULY			AUGUST			SEPTEMBER	
1	9.5	5.5	7.0	4.0	3.0	3.5	7.0	3.0	3.5
2	12	5.0	6.0	7.5	3.0	4.0	6.0	3.0	3.5
3	6.5	4.5	5.5	13	5.5	6.5	4.0	2.5	3.0
4	5.5	4.5	5.0	8.0	3.5	6.0	3.5	2.5	3.0
5	6.0	4.0	4.5	69	3.0	8.5	4.5	2.5	3.0
6	6.0	4.0	4.5	--	--	6.0	3.5	2.5	3.0
7	6.0	3.5	4.5	--	--	--	4.0	2.5	3.0
8	5.5	4.0	4.0	--	--	4.0	4.5	2.5	3.5
9	7.0	3.5	4.0	6.5	3.0	4.0	34	2.5	9.5
10	7.0	3.5	4.5	7.0	3.0	3.5	8.5	3.5	5.5
11	6.0	3.5	4.0	8.0	3.0	4.5	4.5	3.5	4.0
12	5.5	3.5	4.0	4.5	3.0	3.5	5.0	3.0	3.5
13	--	--	4.0	9.0	3.0	4.0	5.5	3.0	3.5
14	--	--	3.5	4.0	3.0	3.5	13	3.0	4.5
15	6.0	3.0	3.5	4.5	3.0	3.5	10	2.5	6.5
16	6.5	3.5	4.5	4.0	3.0	3.5	5.5	3.0	3.5
17	8.5	3.0	6.0	5.0	3.0	3.5	6.0	3.0	3.5
18	8.5	3.0	3.5	6.0	3.0	3.5	5.0	3.0	3.5
19	6.0	3.0	3.5	7.0	3.0	4.0	5.0	3.0	3.5
20	--	--	4.5	5.0	3.0	3.5	5.0	3.0	3.0
21	--	--	--	4.5	3.0	3.0	3.5	3.0	3.0
22	--	--	4.0	36	2.5	4.5	3.5	3.0	3.0
23	--	--	5.0	5.5	3.0	4.0	5.0	3.0	3.0
24	--	--	--	6.5	3.0	3.5	5.5	3.0	3.0
25	--	--	--	5.5	3.0	3.5	7.0	3.0	4.5
26	8.0	3.0	3.5	4.5	2.5	3.0	8.5	3.0	5.0
27	7.0	3.0	3.5	--	--	3.0	--	--	7.0
28	4.0	3.0	3.5	--	--	3.5	--	--	7.0
29	4.0	3.0	3.5	9.0	3.0	3.5	8.5	3.5	5.5
30	4.5	3.0	3.5	7.5	3.0	3.5	19	3.5	7.0
31	5.0	3.0	3.5	5.5	3.0	3.5	--	--	--
MONTH[1]	**12**	**3.0**	**4.3**	**69**	**2.5**	**4.0**	**34**	**2.5**	**4.2**

[1]For months with missing daily values, the means are calculated using available values.

Table 12. Seasonal daily maximum, minimum, and mean turbidity, with monthly summary statistics at Lost Creek near Anaconda, Montana, April through September 2010.

[Turbidity values are based on near-infrared monochrome light emitted at wavelengths of 780 to 900 nanometers with a detection angle of 90 +/- 2.5 degrees to incident beam, reported in formazin nephelometric units (FNU). Symbols: <, less than; --, no data]

Day	Maximum	Minimum	Mean	Maximum	Minimum	Mean	Maximum	Minimum	Mean
		APRIL			MAY			JUNE	
1	--	--	--	5.0	3.0	3.5	29	10	17
2	--	--	--	8.5	3.0	4.0	26	13	18
3	--	--	--	7.0	3.5	5.0	47	25	34
4	--	--	--	7.0	3.0	4.0	35	14	22
5	--	--	--	7.0	3.0	4.0	38	17	23
6	--	--	--	4.0	2.5	3.5	23	11	15
7	--	--	--	4.5	3.0	3.5	21	11	14
8	--	--	--	5.0	3.0	3.5	21	10	14
9	--	--	--	4.5	3.0	3.5	15	8.0	10
10	--	--	--	5.0	3.0	3.5	14	7.5	9.0
11	--	--	--	7.5	3.0	4.5	9.5	7.0	8.0
12	--	--	--	6.0	3.0	4.0	8.5	6.0	7.5
13	--	--	--	8.0	3.0	5.0	9.0	6.0	7.0
14	--	--	--	7.5	3.5	4.5	9.5	5.0	7.0
15	--	--	--	8.5	4.0	5.5	18	8.0	11
16	--	--	--	8.5	4.5	6.0	64	13	29
17	--	--	--	11	5.0	7.5	31	12	18
18	--	--	--	24	7.5	13	14	9.5	12
19	--	--	--	31	14	21	15	9.0	11
20	--	--	--	28	9.0	15	12	7.0	9.0
21	--	--	--	12	6.5	8.5	16	6.5	8.5
22	--	--	7.5	12	5.5	8.0	14	6.0	8.0
23	10	4.5	6.5	26	5.5	8.0	13	6.0	8.0
24	8.5	4.0	5.0	9.0	5.5	7.0	10	5.5	7.5
25	8.5	3.5	4.5	10	4.5	6.0	9.5	5.0	6.5
26	6.0	3.5	4.0	11	4.0	5.5	10	5.0	6.5
27	8.5	3.0	4.0	24	4.5	9.0	11	5.0	6.5
28	6.0	3.5	4.5	26	9.0	16	7.5	5.0	6.0
29	5.0	3.0	3.5	13	7.0	9.0	9.0	4.5	6.0
30	4.5	3.0	3.5	8.5	6.0	7.0	9.5	4.0	6.0
31	--	--	--	14	5.5	7.0	--	--	--
MONTH[1]	**10**	**3.0**	**4.8**	**31**	**2.5**	**6.9**	**64**	**4.0**	**12**

Table 12. Seasonal daily maximum, minimum, and mean turbidity, with monthly summary statistics at Lost Creek near Anaconda, Montana, April through September 2010.—Continued

[Turbidity values are based on near-infrared monochrome light emitted at wavelengths of 780 to 900 nanometers with a detection angle of 90 +/- 2.5 degrees to incident beam, reported in formazin nephelometric units (FNU). Symbols: <, less than; --, no data]

Day	Maximum	Minimum	Mean	Maximum	Minimum	Mean	Maximum	Minimum	Mean
		JULY			AUGUST			SEPTEMBER	
1	9.5	4.0	5.5	3.0	1.5	2.0	3.0	2.0	2.0
2	7.0	4.0	4.5	3.0	1.5	2.0	9.5	2.0	2.5
3	6.0	3.5	4.5	5.0	2.0	2.5	4.0	1.5	2.5
4	7.5	3.5	4.5	5.0	2.0	2.5	2.5	1.5	2.0
5	5.5	3.5	4.0	4.5	1.5	2.5	2.5	1.5	2.0
6	5.5	3.0	4.0	3.5	1.5	2.0	2.0	1.5	2.0
7	8.0	3.0	4.0	3.0	1.5	2.0	2.0	1.0	1.5
8	8.0	3.0	4.5	28	1.5	3.5	1.5	1.0	1.0
9	5.0	3.0	3.5	6.5	2.5	3.5	41	1.0	7.5
10	5.0	2.5	3.5	5.5	2.0	3.0	2.5	1.5	2.0
11	5.0	2.5	3.5	6.5	2.0	3.0	2.0	1.5	1.5
12	4.0	2.5	3.0	3.5	2.0	2.5	2.0	1.5	1.5
13	4.0	2.0	3.0	4.0	2.5	3.0	2.0	1.5	1.5
14	4.0	2.0	2.5	4.5	2.0	2.5	2.5	1.5	1.5
15	4.0	2.0	2.5	4.0	2.0	2.5	2.0	1.5	1.5
16	5.0	2.0	2.5	3.5	2.0	2.5	3.5	1.5	2.0
17	4.0	2.0	2.5	4.0	2.0	2.5	3.5	1.5	2.5
18	3.0	1.5	2.5	4.0	2.0	2.5	2.0	1.5	1.5
19	5.0	2.0	2.5	5.0	2.0	2.5	1.5	1.5	1.5
20	4.5	2.0	2.5	5.0	2.0	2.5	2.0	1.5	1.5
21	3.5	2.0	2.5	6.0	2.0	3.0	1.5	1.0	1.0
22	3.5	2.0	2.5	3.5	2.0	2.5	1.5	1.0	1.0
23	3.5	2.0	2.5	5.0	2.0	3.0	1.5	1.0	1.0
24	3.5	2.0	2.5	5.0	2.0	3.0	1.5	1.0	1.0
25	3.5	2.0	2.5	4.0	2.0	2.5	2.0	1.0	1.0
26	3.5	1.5	2.5	9.5	2.0	3.0	2.0	1.0	1.5
27	3.5	2.0	2.5	4.0	2.0	2.5	1.5	1.0	1.0
28	2.5	1.5	2.0	2.5	1.5	2.0	1.5	1.0	1.0
29	2.5	1.5	2.0	3.0	1.5	2.0	1.5	1.0	1.0
30	3.0	1.5	2.0	4.0	1.5	2.0	1.0	.5	1.0
31	2.5	1.5	2.0	2.5	2.0	2.0	--	--	--
MONTH[1]	**9.5**	**1.5**	**3.1**	**28**	**1.5**	**2.5**	**41**	**.5**	**1.7**

[1]For months with missing daily values, the means are calculated using available values.

Table 13. Analyses of field replicates for water samples, Clark Fork basin, Montana.

[Abbreviations: E, estimated; µg/L, micrograms per liter; mg/L, milligrams per liter; mm, millimeter. Symbol: <, less than laboratory reporting level]

Site number (fig. 1)	Site name	Date	Time	Hardness, filtered (mg/L as $CaCO_3$)	Calcium, filtered (mg/L)	Magnesium filtered (mg/L)	Arsenic, filtered (µg/L)	Arsenic, unfiltered recoverable (µg/L)	Cadmium, filtered (µg/L)
12323700	Mill Creek at Opportunity	08/24/2010	0800	70.6	19.8	5.16	16.9	18.6	0.04
		08/24/2010	0805	71.6	20.0	5.25	17.3	18.3	.04
12323750	Silver Bow Creek at Warm Springs	07/20/2010	0810	144	44.2	8.19	32.0	34.4	.04
		07/20/2010	0815	147	45.2	8.29	32.5	34.1	.04
12323840	Lost Creek near Anaconda	04/12/2010	1330	103	31.2	6.17	1.8	2.2	E.01
		04/12/2010	1335	105	31.8	6.26	1.8	2.2	.02
12324200	Clark Fork at Deer Lodge	05/19/2010	1325	190	56.8	11.6	11.8	13.5	.07
		05/19/2010	1330	189	56.8	11.4	12.0	13.2	.08
12324400	Clark Fork above Little Blackfoot, near Garrison	03/09/2010	1530	198	57.3	13.3	10.1	12.4	.08
		03/09/2010	1535	195	56.7	13.1	9.9	12.2	.08
12324680	Clark Fork at Goldcreek	10/14/2009	1310	193	57.8	11.9	9.5	11.1	.04
		10/14/2009	1315	191	57.0	11.8	9.5	10.8	.03
12334550	Clark Fork at Turah Bridge, near Bonner	06/03/2010	1015	95.8	27.6	6.50	6.5	13.0	.03
		06/03/2010	1020	96.2	27.8	6.52	6.6	12.6	.03
12340500	Clark Fork above Missoula	06/16/2010	1335	87.8	24.5	6.47	4.6	8.1	.04
		06/16/2010	1340	86.9	24.3	6.39	4.7	8.1	.03

Table 13. Analyses of field replicates for water samples, Clark Fork basin, Montana.—Continued

[Abbreviations: E, estimated; µg/L, micrograms per liter; mg/L, milligrams per liter; mm, millimeter. Symbol: <, less than laboratory reporting level]

Site number (fig. 1)	Site name	Date	Time	Cadmium, unfiltered recoverable (µg/L)	Copper, filtered (µg/L)	Copper, unfiltered recoverable (µg/L)	Iron, filtered (µg/L)	Iron, unfiltered recoverable (µg/L)	Lead, filtered (µg/L)	Lead, unfiltered recoverable (µg/L)
12323700	Mill Creek at Opportunity	08/24/2010	0800	0.07	1.7	2.3	58	117	0.13	0.29
		08/24/2010	0805	.07	1.7	2.4	59	119	.13	.31
12323750	Silver Bow Creek at Warm Springs	07/20/2010	0810	.07	6.5	8.7	23	157	.12	.80
		07/20/2010	0815	.07	6.5	8.6	24	152	.11	.80
12323840	Lost Creek near Anaconda	04/12/2010	1330	<.04	E.95	2.5	E4	51	<.03	.20
		04/12/2010	1335	<.04	E.96	2.6	E4	53	<.03	.21
12324200	Clark Fork at Deer Lodge	05/19/2010	1325	.13	6.3	23.9	8	328	.06	2.80
		05/19/2010	1330	.12	6.3	23.7	7	336	.06	2.71
12324400	Clark Fork above Little Blackfoot, near Garrison	03/09/2010	1530	.16	6.6	29.7	6	459	.06	3.25
		03/09/2010	1535	.14	7.1	28.7	7	467	.07	3.07
12324680	Clark Fork at Goldcreek	10/14/2009	1310	.12	3.3	20.4	8	344	.04	2.74
		10/14/2009	1315	.12	3.3	20.4	E4	330	.04	2.65
12334550	Clark Fork at Turah Bridge, near Bonner	06/03/2010	1015	.33	4.2	57.1	23	1,520	.15	10.0
		06/03/2010	1020	.32	4.3	55.1	24	1,490	.16	9.82
12340500	Clark Fork above Missoula	06/16/2010	1335	.17	3.9	31.1	18	797	.17	5.08
		06/16/2010	1340	.18	4.0	32.3	20	824	.13	4.98

Table 13. Analyses of field replicates for water samples, Clark Fork basin, Montana.—Continued

[Abbreviations: E, estimated; µg/L, micrograms per liter; mg/L, milligrams per liter; mm, millimeter. Symbol: <, less than laboratory reporting level]

Site number (fig. 1)	Site name	Date	Time	Manganese, filtered (µg/L)	Manganese, unfiltered recoverable (µg/L)	Zinc, filtered (µg/L)	Zinc, unfiltered recoverable (µg/L)	Sediment suspended (percent finer than 0.062 mm)	Sediment, suspended (mg/L)
12323700	Mill Creek at Opportunity	08/24/2010	0800	9.3	11.9	E2.0	2.5	89	1
		08/24/2010	0805	9.7	12.0	E2.2	2.5	88	1
12323750	Silver Bow Creek at Warm Springs	07/20/2010	0810	57.1	97.4	E1.5	6.4	93	2
		07/20/2010	0815	58.2	96.6	E1.4	6.1	85	3
12323840	Lost Creek near Anaconda	04/12/2010	1330	.6	2.0	<2.8	E1.2	77	2
		04/12/2010	1335	.7	2.1	<2.8	E1.2	75	2
12324200	Clark Fork at Deer Lodge	05/19/2010	1325	34.6	84.8	3.6	19.7	84	14
		05/19/2010	1330	34.6	88.5	3.7	19.4	85	13
12324400	Clark Fork above Little Blackfoot, near Garrison	03/09/2010	1530	41.7	85.8	2.9	25.3	59	25
		03/09/2010	1535	41.3	83.6	3.1	24.4	66	22
12324680	Clark Fork at Goldcreek	10/14/2009	1310	10.0	78.6	3.0	20.3	78	14
		10/14/2009	1315	10.1	76.4	4.0	19.7	82	14
12334550	Clark Fork at Turah Bridge, near Bonner	06/03/2010	1015	8.7	188	3.8	74.6	69	100
		06/03/2010	1020	8.7	187	4.2	72.2	64	106
12340500	Clark Fork above Missoula	06/16/2010	1335	7.1	96.2	3.8	44.3	63	57
		06/16/2010	1340	7.2	90.5	4.1	45.0	65	57

Table 14. Precision of analyses of field replicates for water samples, 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[1] (listed units)	Relative standard deviation (percent)	Within limits[2] of data-quality objective
Calcium, filtered, mg/L	8	0.39	0.99	Yes
Magnesium, filtered, mg/L	8	.09	1.0	Yes
Arsenic, filtered, µg/L	8	.18	1.5	Yes
Arsenic, unfiltered recoverable, µg/L	8	.19	1.3	Yes
Cadmium, filtered, µg/L	8	.01	11	Yes
Cadmium, unfiltered recoverable, µg/L	8	.01	5.0	Yes
Copper, filtered, µg/L	8	.13	3.1	Yes
Copper, unfiltered recoverable, µg/L	8	.64	2.9	Yes
Iron, filtered, µg/L	8	1.2	6.7	Yes
Iron, unfiltered recoverable, µg/L	8	11	2.4	Yes
Lead, filtered, µg/L	8	.01	12	Yes
Lead, unfiltered recoverable, µg/L	8	.08	2.4	Yes
Manganese, filtered, µg/L	8	.31	1.5	Yes
Manganese, unfiltered recoverable, µg/L	8	1.9	2.4	Yes
Zinc, filtered, µg/L	8	.29	10	Yes
Zinc, unfiltered recoverable, µg/L	8	.69	2.9	Yes
Sediment, suspended, percent finer than 0.062 mm	8	.18	1.5	Yes
Sediment, suspended, mg/L	8	.19	1.3	Yes

[1]Standard deviation is calculated using one-half the laboratory reporting level for censored values (less than the laboratory reporting level).

[2]Data-quality objective for an acceptable level of precision is a maximum relative standard deviation of 20 percent for field replicate analyses (table 3).

Table 15. Precision of analyses of laboratory replicates for water samples, Clark Fork basin, Montana.

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

Constituent and reporting unit	Number of replicate pairs	Standard deviation[1], in listed units	Relative standard deviation, in percent	Within limits[2] of data-quality objective
Calcium, filtered, mg/L	8	0.53	1.3	Yes
Magnesium, filtered, mg/L	8	.16	1.9	Yes
Arsenic, filtered, µg/L	8	.20	1.7	Yes
Arsenic, unfiltered recoverable, µg/L	8	.20	1.4	Yes
Cadmium, filtered, µg/L	8	.01	16	Yes
Cadmium, unfiltered recoverable, µg/L	8	.02	15	Yes
Copper, filtered, µg/L	8	.23	5.3	Yes
Copper, unfiltered recoverable, µg/L	8	.19	.89	Yes
Iron, filtered, µg/L	8	.45	2.3	Yes
Iron, unfiltered recoverable, µg/L	8	2.4	.51	Yes
Lead, filtered, µg/L	8	.00	2.3	Yes
Lead, unfiltered recoverable, µg/L	8	.06	1.9	Yes
Manganese, filtered, µg/L	8	1.1	5.2	Yes
Manganese, unfiltered recoverable, µg/L	8	.56	.70	Yes
Zinc, filtered, µg/L	8	.24	7.1	Yes
Zinc, unfiltered recoverable, µg/L	8	.22	.94	Yes

[1]Standard deviation is calculated using laboratory reporting level for censored values.

[2]Data-quality objective for an acceptable level of precision is a maximum relative standard deviation of 20 percent for laboratory replicate analyses (table 3).

Table 16. Recovery efficiency for analyses of laboratory-spiked deionized-water blank samples.

[Abbreviation: µg/L, micrograms per liter]

Constituent and reporting unit	Number of samples	95-percent confidence interval for spike recovery, in percent	Mean spike recovery, in percent	Within limits[1] of data-quality objective
Arsenic, filtered, µg/L	5	96.7–113	105	Yes
Arsenic, unfiltered recoverable, µg/L	5	89.7–114	102	Yes
Cadmium, filtered, µg/L	5	94.9–117	106	Yes
Cadmium, unfiltered recoverable, µg/L	5	88.4–112	100	Yes
Copper, filtered, µg/L	5	84.9–109	97.2	Yes
Copper, unfiltered recoverable, µg/L	5	84.0–113	98.6	Yes
Iron, filtered, µg/L	5	101–115	108	Yes
Iron, unfiltered recoverable, µg/L	5	95.8–108	102	Yes
Lead, filtered, µg/L	5	91.5–113	102	Yes
Lead, unfiltered recoverable, µg/L	5	91.0–113	102	Yes
Manganese, filtered, µg/L	5	95.2–111	103	Yes
Manganese, unfiltered recoverable, µg/L	5	97.2–112	105	Yes
Zinc, filtered, µg/L	5	94.7–132	113	No[2]
Zinc, unfiltered recoverable, µg/L	5	89.6–113	101	Yes

[1]Data-quality objective for acceptable bias is a maximum deviation of 25 percent from a theoretical 100-percent recovery (table 3).

[2]Exceedance of data-quality objective is an artifact of running the final filtered-zinc spike analysis after extensive instrument maintenance, which reduced a high zinc bias. Spikes before and after the maintenance met data-quality objectives, but analytical results may not be comparable to each other due to the small number of sample sets.

Table 17. Recovery efficiency for analyses of laboratory-spiked stream samples, Clark Fork basin, Montana.

[Abbreviation: µg/L, micrograms per liter]

Constituent and reporting unit	Number of samples	95-percent confidence interval for spike recovery, in percent	Mean spike recovery, in percent	Within limits[1] of data-quality objective
Arsenic, filtered, µg/L	5	96.0–116	106	Yes
Arsenic, unfiltered recoverable, µg/L	5	90.1–113	102	Yes
Cadmium, filtered, µg/L	5	87.6–132	110	No[2]
Cadmium, unfiltered recoverable, µg/L	5	87.1–109	98.2	Yes
Copper, filtered, µg/L	5	83.6–104	93.8	Yes
Copper, unfiltered recoverable, µg/L	5	84.4–108	96.5	Yes
Iron, filtered, µg/L	5	91.7–119	105	Yes
Iron, unfiltered recoverable, µg/L	5	103–118	111	Yes
Lead, filtered, µg/L	5	87.7–115	101	Yes
Lead, unfiltered recoverable, µg/L	5	91.5–116	104	Yes
Manganese, filtered, µg/L	5	93.3–114	104	Yes
Manganese, unfiltered recoverable, µg/L	5	86.4–111	98.7	Yes
Zinc, filtered, µg/L	5	101–118	109	Yes
Zinc, unfiltered recoverable, µg/L	5	81.3–107	94.0	Yes

[1]Data-quality objective for acceptable bias is a maximum deviation of 25 percent from a theoretical 100-percent recovery (table 3).

[2]Exceedance of data-quality objective resulted from one spike sample having a percent recovery of 136 percent. When this one spiked sample set is removed, filtered cadmium falls within the data-quality objective limit (91.4–121) for the 95-percent confidence interval.

Table 18. Analyses of field blanks for water samples.

[Abbreviations: E, estimated; µg/L, micrograms per liter; µS/cm, microsiemens per centimeter at 25 degrees Celsius; mg/L, milligrams per liter. Symbol: <, less than laboratory reporting level]

Date	Time	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)	Arsenic, filtered (µg/L)	Arsenic, unfiltered recoverable (µg/L)	Cadmium, filtered (µg/L)	Cadmium, unfiltered recoverable (µg/L)
10/13/2009	2100	5.7	2	<0.04	<0.016	<0.04	<0.18	<0.02	<0.04
03/04/2010	1055	5.5	2	<.04	<.016	<.04	<.18	<.02	<.04
04/14/2010	1355	5.8	2	<.04	<.016	<.13	<.18	<.06	<.04
05/18/2010	1535	5.8	2	<.04	<.016	<.04	<.18	<.02	<.04
06/02/2010	1315	5.6	2	<.04	<.016	<.04	<.18	<.02	<.04
06/16/2010	0915	5.6	2	<.04	<.016	<.04	<.18	<.02	<.04
07/20/2010	1105	5.9	2	<.04	<.016	<.09	E.09	<.04	<.04
08/24/2010	1320	5.6	2	<.04	<.016	<.04	<.18	<.02	<.04

Date	Copper, filtered (µg/L)	Copper, unfiltered recoverable (µg/L)	Iron, filtered (µg/L)	Iron, unfiltered recoverable (µg/L)	Lead, filtered (µg/L)	Lead, unfiltered recoverable (µg/L)	Manganese, filtered (µg/L)	Manganese, unfiltered recoverable (µg/L)	Zinc, filtered (µg/L)	Zinc, unfiltered recoverable (µg/L)
10/13/2009	<1.0	<1.4	<6	<9	<0.03	<0.06	<0.3	<0.8	<2.8	3.3
03/04/2010	<1.0	<1.4	<6	<9	<.03	<.06	<.3	<.8	<2.8	<2.0
04/14/2010	<3.0	<1.4	<6	<9	<.09	<.06	<.8	<.8	<8.4	<2.0
05/18/2010	<1.0	<1.4	<6	<9	<.03	<.06	<.3	<.8	<2.8	3.4
06/02/2010	<1.0	<1.4	<6	<9	<.03	<.06	<.3	<.8	<2.8	<2.0
06/16/2010	<1.0	<1.4	<6	<9	<.03	<.06	<.3	<.8	<2.8	E1.4
07/20/2010	<2.0	<1.4	<6	<9	<.06	<.06	<.5	<.8	<5.6	<2.0
08/24/2010	<1.0	<1.4	<6	<9	<.03	<.06	<.3	<.8	<2.8	<2.0

Table 19. Bed-sediment data for the Clark Fork basin, Montana, August 2010.

[Trace-element concentrations in bed sediment were determined for the fine-grained fraction (material less than 0.063 millimeter in diameter). Reported concentrations are the mean of all analyses for replicate aliquots from each composite sample. Abbreviation: µg/g, micrograms per gram of dry sample weight]

Site number (fig. 1)	Site name	Number of composite samples	Concentration (µg/g)								
			Arsenic	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Nickel	Zinc
12323600	Silver Bow Creek at Opportunity	3	34	6.8	50.7	837	33,200	181	1,160	13.6	1,610
12323750	Silver Bow Creek at Warm Springs	3	159	7.5	46.8	466	32,500	83	8,240	20.0	807
12323800	Clark Fork near Galen	3	74	3.9	40.0	1,120	25,400	104	1,870	19.3	721
461415112450801	Clark Fork below Lost Creek, near Galen	3	102	4.9	38.6	1,450	25,600	131	2,460	17.3	930
461559112443301	Clark Fork at county bridge, near Racetrack	3	118	6.6	44.8	1,810	30,800	175	1,840	17.8	1,230
461903112440701	Clark Fork at Dempsey Creek diversion, near Racetrack	3	73	4.7	36.3	1,300	26,100	137	1,330	12.1	966
12324200	Clark Fork at Deer Lodge	3	70	3.5	42.9	1,060	26,500	126	1,070	14.3	844
12324400	Clark Fork above Little Blackfoot River, near Garrison	3	81	4.8	45.5	1,290	27,300	145	1,560	13.9	1,100
12324680	Clark Fork at Goldcreek	3	61	3.7	45.6	967	26,300	115	1,270	14.4	904
12331800	Clark Fork near Drummond	3	55	3.3	40.2	630	41,500	95	2,040	14.5	963
12334550	Clark Fork at Turah Bridge, near Bonner	3	36	2.5	41.9	435	23,500	70	1,230	14.7	786
12340000	Blackfoot River near Bonner	3	3	.05	25.3	18	16,300	10	351	9.6	55
12340500	Clark Fork above Missoula	3	28	2.1	32.5	353	19,500	50	914	13.2	631

Table 20. Recovery efficiency for analyses of standard reference materials for bed-sediment samples.

[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 0.6N (normal) hydrochloric acid used for reconstituting dried residue. Abbreviations: µg/g, micrograms per gram of dry sample weight; SRM, standard reference material (agricultural soils)]

Constituent	Number of analyses	Dilution ratio	Certified concentration (µg/g)	Mean SRM recovery (percent)	95-percent confidence interval for SRM recovery (percent)
SRM sample 2709a					
Arsenic	10	1:10	10.5	66.8	64.9–68.7
Cadmium	10	1:10	.4	81.4	78.0–84.8
Chromium	10	1:10	130	83.0	80.0–85.2
Copper	10	1:10	34	93.0	89.6–96.4
Iron	10	1:10	33,600	95.0	92.8–97.1
Lead	10	1:10	17	67.4	66.0–68.7
Manganese	10	1:10	529	97.5	95.3–99.7
Nickel	10	1:10	85	90.0	88.4–91.6
Zinc	10	1:10	103	103.0	101–105
SRM sample 2711 (2711a)[1]					
Arsenic	10	1:10	105 (107)	82.4 (85.8)	79.8–87.1
Cadmium	10	1:10	41.7 (54.1)	95.4 (98.1)	92.5–99.9
Chromium	10	1:10	47 (52)	87.2 (85.7)	81.8–91.7
Copper	10	1:10	114 (1,410)	104.0 (106.0)	99.3–110
Iron	10	1:10	28,900 (28,200)	87.2 (89.0)	84.0–91.5
Lead	10	1:10	1,160 (1,400)	91.5 (93.0)	88.8–95.2
Manganese	10	1:10	638 (675)	86.7 (86.0)	82.8–90.2
Nickel	10	1:10	20.6 (21.7)	82.7 (89.2)	80.3–89.0
Zinc	10	1:10	350 (414)	97.5 (100.0)	94.5–102

[1]SRM 2711 was used for seven samples and SRM 2711a was used for three samples.

Table 21. Analyses of procedural blanks for bed-sediment samples.

[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 0.6N (normal) hydrochloric acid used for reconstituting dried residue. Abbreviation: µg/mL, micrograms per milliliter. Symbol: <, less than minimum reporting level for liquid-phase concentration, in µg/mL]

Site number (fig. 1)	Site name	Dilution ratio	Trace-element concentration (µg/mL)								
			Arsenic	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Nickel	Zinc
12323600	Silver Bow Creek at Opportunity	1:10	<0.004	<0.0002	<0.01	<0.006	<0.06	<0.004	<0.006	<0.001	<0.01
12323750	Silver Bow Creek at Warm Springs	1:10	<.004	<.0002	<.01	<.006	<.06	<.004	<.006	<.001	<.01
12323800	Clark Fork near Galen	1:10	<.004	<.0002	<.01	<.006	<.06	<.004	<.006	<.001	<.01
461415112450801	Clark Fork below Lost Creek, near Galen	1:10	<.004	<.0002	<.01	<.006	<.06	<.004	<.006	<.001	<.01
461559112443301	Clark Fork at county bridge, near Racetrack	1:10	<.004	<.0002	<.01	<.006	<.06	<.004	<.006	<.001	<.01
461903112440701	Clark Fork at Dempsey Creek diversion, near Racetrack	1:10	<.004	<.0002	<.01	<.006	<.06	<.004	<.006	<.001	<.01
12324200	Clark Fork at Deer Lodge	1:10	<.004	<.0002	<.01	<.006	<.06	<.004	<.006	<.001	<.01
12324400	Clark Fork above Little Blackfoot River, near Garrison	1:10	<.004	<.0002	<.01	<.006	<.06	<.004	<.006	<.001	<.01
12324680	Clark Fork at Goldcreek	1:10	<.004	<.0002	<.01	<.006	<.06	<.004	<.006	<.001	<.01
12331800	Clark Fork near Drummond	1:10	<.004	<.0002	<.01	<.006	<.06	<.004	<.006	<.001	<.01
12334550	Clark Fork at Turah Bridge, near Bonner	1:10	<.004	<.0002	<.01	<.006	<.06	<.004	<.006	<.001	<.01
12340000	Blackfoot River near Bonner	1:10	<.004	<.0002	<.01	<.006	<.06	<.004	<.006	<.001	<.01
12340500	Clark Fork above Missoula	1:10	<.004	<.0002	<.01	<.006	<.06	<.004	<.006	<.001	<.01

Table 22. Biological data for the Clark Fork basin, Montana, August 2010.

[Analyses are for the whole-body tissue of aquatic insects. Composite samples were 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; spp., species. Symbol: <, less than minimum reporting level for solid-phase concentration, in µg/g]

Taxon	Number of composite samples	Concentration (µg/g)								
		Arsenic	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Nickel	Zinc
12323600--Silver Bow Creek at Opportunity										
Hydropsyche cockerelli	1	11.2	7.4	4.9	232	4,960	35.8	788	3.2	741
Hydropsyche spp.	2	6.9	2.5	2.1	111	2,310	19.7	720	1.3	434
12323750--Silver Bow Creek at Warm Springs										
Hydropsyche cockerelli	1	9.7	0.7	0.8	34.4	784	2.9	908	1.1	221
Hydropsyche occidentalis	1	15.6	1.0	.9	40.9	1,460	5.9	1,690	1.5	210
12323800--Clark Fork near Galen										
Hydropsyche occidentalis	1	9.1	1.3	2.4	84.3	1,490	7.3	991	1.8	189
Hydropsyche spp.	2	5.6	.7	1.2	56.0	938	3.9	687	1.0	138
461415112450801--Clark Fork below Lost Creek, near Galen										
Hydropsyche spp.	2	7.2	1.0	1.2	79.5	977	6.1	790	1.1	165
461559112443301--Clark Fork at county bridge, near Racetrack										
Hydropsyche occidentalis	1	11.3	2.2	1.7	129	1,590	12.4	1,330	1.8	261
Hydropsyche spp.	2	7.1	1.2	1.0	78.4	907	6.4	984	.8	165
461903112440701--Clark Fork at Dempsey Creek diversion, near Racetrack										
Hydropsyche occidentalis	2	12.6	1.9	1.6	129	1,890	16.9	1,430	1.4	294
Hydropsyche spp.	2	6.5	1.0	.9	66.2	889	7.6	756	.6	166
12324200--Clark Fork at Deer Lodge										
Arctopsyche grandis	1	5.8	4.7	<7.7	77.3	1,090	11.2	946	1.2	369
Hydropsyche occidentalis	2	9.4	2.1	1.7	125	1,740	13.4	945	1.3	231
Hydropsyche spp.	1	6.0	1.6	.8	91.0	1,070	9.0	837	.9	196
12324400--Clark Fork above Little Blackfoot River, near Garrison										
Arctopsyche grandis	1	5.5	4.9	<2.2	83.6	826	8.1	940	0.8	282
Hydropsyche occidentalis	2	7.9	2.5	1.9	99.8	1,300	11.3	1,220	1.0	232
12324680--Clark Fork at Goldcreek										
Arctopsyche grandis	3	5.5	3.1	1.3	68.4	884	6.2	937	<0.2	252
Claassenia sabulosa	3	1.9	1.8	<1.9	58.6	205	1.6	132	.2	311
Hydropsyche cockerelli	1	8.8	4.2	<18.2	158	2,300	17.6	1,390	3.5	359
Hydropsyche occidentalis	2	6.3	1.8	1.3	81.1	1,190	8.1	1,100	.8	199
Hydropsyche spp.	2	5.8	1.8	1.6	78.6	1,130	8.6	1,150	.8	203

Table 22. Biological data for the Clark Fork basin, Montana, August 2010.—Continued

[Analyses are for the whole-body tissue of aquatic insects. Composite samples were 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; spp., species. Symbol: <, less than minimum reporting level for solid-phase concentration, in µg/g]

Taxon	Number of composite samples	Concentration (µg/g)								
		Arsenic	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Nickel	Zinc
12331800--Clark Fork near Drummond										
Arctopsyche grandis	4	3.9	2.5	1.1	41.7	844	5.9	881	<0.2	257
Claassenia sabulosa	2	1.6	1.3	.6	67.6	214	1.4	206	.2	268
Hydropsyche cockerelli	1	6.3	4.5	1.3	107	2,080	15.0	1,200	1.7	322
Hydropsyche occidentalis	2	5.6	1.9	1.6	71.4	1,380	10.1	1,420	1.0	232
12334550--Clark Fork at Turah Bridge, near Bonner										
Arctopsyche grandis	3	3.7	2.0	1.7	34.5	782	4.5	618	0.7	229
Claassenia sabulosa	2	1.3	1.6	.6	59.1	125	.5	108	.2	208
Hydropsyche cockerelli	2	4.3	1.8	1.6	56.3	1,170	6.5	679	1.0	200
Hydropsyche occidentalis	2	4.0	1.5	1.6	48.4	1,150	5.9	755	1.0	205
12340000--Blackfoot River near Bonner										
Arctopsyche grandis	1	4.4	0.4	1.2	15.3	757	0.8	422	1.3	144
Claassenia sabulosa	1	1.5	.2	.6	36.6	138	.1	59	<.1	192
Hydropsyche cockerelli	1	4.2	.6	3.8	14.8	1,550	1.9	428	<.3	162
Hydropsyche occidentalis	1	3.2	.4	1.8	17.0	1,010	1.1	445	1.1	143
12340500--Clark Fork above Missoula										
Arctopsyche grandis	3	5.3	2.2	1.6	70.4	1,670	6.3	723	1.8	251
Claassenia sabulosa	2	1.4	1.4	<.6	76.3	150	.5	112	.3	261
Hydropsyche cockerelli	1	6.6	2.0	2.3	78.1	2,160	7.7	764	1.8	266
Hydropsyche occidentalis	1	5.5	1.5	1.5	64.7	1,640	6.9	980	1.4	229

Table 23. Recovery efficiency for analyses of standard reference material for biota samples.

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

Constituent	Number of analyses	Certified concentration (µg/g)	Mean SRM recovery (percent)	95-percent confidence interval for SRM recovery (percent)
SRM sample TORT-2				
Arsenic	12	21.6	93.3	92.6–93.9
Cadmium	12	26.7	76.4	74.2–78.6
Chromium	12	.77	125	107–144
Copper	12	106	92.7	92.2–93.2
Iron	12	105	91.0	89.6–93.4
Lead	12	.35	98.1	93.2–103
Manganese	12	13.6	89.6	86.8–92.4
Nickel	12	2.5	94.2	71.7–76.6
Zinc	12	180	91.4	88.8–93.9

Table 24. Analyses of procedural blanks for biota samples.

[Procedural blanks were not diluted prior to analyses. Abbreviation: µg/mL, micrograms per milliliter. Symbol: <, less than minimum reporting level for liquid-phase concentration, in µg/mL]

Site number (fig. 1)	Site name	Dilution ratio	Trace-element concentration (µg/mL)								
			Arsenic	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Nickel	Zinc
12323600	Silver Bow Creek at Opportunity	1:1	<0.003	<0.001	<0.02	<0.005	<0.10	<0.002	<0.008	<0.001	<0.01
12323750	Silver Bow Creek at Warm Springs	1:1	<.003	<.001	<.02	<.005	<.10	<.002	<.008	<.001	<.01
12323800	Clark Fork near Galen	1:1	<.003	<.001	<.02	<.005	<.10	<.002	<.008	<.001	<.01
461415112450801	Clark Fork below Lost Creek, near Galen	1:1	<.003	<.001	<.02	<.005	<.10	<.002	<.008	<.001	<.01
461559112443301	Clark Fork at county bridge, near Racetrack	1:1	<.003	<.001	<.02	<.005	<.10	<.002	<.008	<.001	<.01
461903112440701	Clark Fork at Dempsey Creek diversion, near Racetrack	1:1	<.003	<.001	<.02	<.005	<.10	<.002	<.008	<.001	<.01
12324200	Clark Fork at Deer Lodge	1:1	<.003	<.001	<.02	<.005	<.10	<.002	<.008	<.001	<.01
12324400	Clark Fork above Little Blackfoot River, near Garrison	1:1	<.003	<.001	<.02	<.005	<.10	<.002	<.008	<.001	<.01
12324680	Clark Fork at Goldcreek	1:1	<.003	<.001	<.02	<.005	<.10	<.002	<.008	<.001	<.01
12331800	Clark Fork near Drummond	1:1	<.003	<.001	<.02	<.005	<.10	<.002	<.008	<.001	<.01
12334550	Clark Fork at Turah Bridge, near Bonner	1:1	<.003	<.001	<.02	<.005	<.10	<.002	<.008	<.001	<.01
12340000	Blackfoot River near Bonner	1:1	<.003	<.001	<.02	<.005	<.10	<.002	<.008	<.001	<.01
12340500	Clark Fork above Missoula	1:1	<.003	<.001	<.02	<.005	<.10	<.002	<.008	<.001	<.01

Table 25. Statistical summary of long-term water-quality data for the Clark Fork basin, Montana, March 1985 through September 2010.

[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 laboratory reporting level[1]]

Property or constituent and reporting unit	Number of samples	Maximum	Minimum	Mean	Median
12323230--Blacktail Creek at Harrison Avenue, at Butte					
Period of record for water-quality data: March 1993–August 1995, December 1996–August 2003, December 2004–September 2010					
Streamflow, instantaneous (ft^3/s)	131	156	1.9	14	8.5
pH, onsite (standard units)	131	8.4	7.3	7.8	7.7
Specific conductance, onsite (µS/cm)	131	412	116	263	262
Temperature, water (°C)	131	17.5	1.5	8.2	8.5
Hardness, filtered (mg/L as $CaCO_3$)	131	150	38	103	110
Calcium, filtered (mg/L)	131	41.8	10.6	29.6	30.1
Magnesium, filtered (mg/L)	131	11.0	2.71	7.16	7.17
Arsenic, filtered (µg/L)	130	13	1	4.0	3.2
Arsenic, unfiltered recoverable (µg/L)	131	18	1	[2]5.4	4.5
Cadmium, filtered (µg/L)	129	.5	<.04	[2].05	<1
Cadmium, unfiltered recoverable (µg/L)	131	.11	<.01	[2].04	<1
Copper, filtered (µg/L)	130	10.0	<1.0	[2]3.7	3.2
Copper, unfiltered recoverable (µg/L)	131	52.0	1.5	6.7	5.5
Iron, filtered (µg/L)	131	640	15	181	165
Iron, unfiltered recoverable (µg/L)	131	4,220	139	663	570
Lead, filtered (µg/L)	131	2.80	<.08	[2].20	<1.00
Lead, unfiltered recoverable (µg/L)	131	47.0	<1.00	[2]1.83	.67
Manganese, filtered (µg/L)	131	144	14.2	41.4	37.4
Manganese, unfiltered recoverable (µg/L)	131	240	23.5	58.3	50.6
Zinc, filtered (µg/L)	129	11	<1.0	[2]3.6	2.8
Zinc, unfiltered recoverable (µg/L)	131	130	<10	[2]8.7	4
Sediment, suspended (percent finer than 0.062 mm)	131	97	50	82	83
Sediment, suspended concentration (mg/L)	131	139	1	12	7
Sediment, suspended discharge (ton/d)	131	59	.01	1.0	.16

Table 25. Statistical summary of long-term water-quality data for the Clark Fork basin, Montana, March 1985 through September 2010.—Continued

[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 laboratory reporting level[1]]

Property or constituent and reporting unit	Number of samples	Maximum	Minimum	Mean	Median
12323250--Silver Bow Creek below Blacktail Creek, at Butte Period of record for water-quality data: March 1993–August 1995, December 1996–September 2010					
Streamflow, instantaneous (ft^3/s)	139	134	13	29	24
pH, onsite (standard units)	139	8.1	7.2	7.6	7.6
Specific conductance, onsite (µS/cm)	139	691	226	464	475
Temperature, water (°C)	139	20.0	1.0	10.4	10.0
Hardness, filtered (mg/L as $CaCO_3$)	139	220	66	148	150
Calcium, filtered (mg/L)	139	62.7	19.0	42.1	43.2
Magnesium, filtered (mg/L)	139	14.6	4.51	10.3	10.7
Arsenic, filtered (µg/L)	139	13	2.3	6.3	6.0
Arsenic, unfiltered recoverable (µg/L)	139	45	3	10.4	9.0
Cadmium, filtered (µg/L)	139	6.2	.05	1.01	.70
Cadmium, unfiltered recoverable (µg/L)	139	6.0	.09	1.35	1.00
Copper, filtered (µg/L)	139	303	3.2	33.9	13.9
Copper, unfiltered recoverable (µg/L)	139	550	9.5	78.0	29.9
Iron, filtered (µg/L)	139	270	10	90.0	74.0
Iron, unfiltered recoverable (µg/L)	139	7,400	85	846	552
Lead, filtered (µg/L)	139	2.4	<.5	[2].46	.23
Lead, unfiltered recoverable (µg/L)	139	250	.64	12.0	3.10
Manganese, filtered (µg/L)	139	1,700	21.4	332	246
Manganese, unfiltered recoverable (µg/L)	139	1,600	25.9	374	298
Zinc, filtered (µg/L)	139	2,200	16.0	328	217
Zinc, unfiltered recoverable (µg/L)	139	2,200	28.8	397	247
Sediment, suspended (percent finer than 0.062 mm)	138	98	42	84	86
Sediment, suspended concentration (mg/L)	138	405	2	21	10
Sediment, suspended discharge (ton/d)	138	70	.08	2.5	.68

Table 25. Statistical summary of long-term water-quality data for the Clark Fork basin, Montana, March 1985 through September 2010.—Continued

[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 laboratory reporting level[1]]

Property or constituent and reporting unit	Number of samples	Maximum	Minimum	Mean	Median
12323600--Silver Bow Creek at Opportunity Period of record for water-quality data: March 1993–August 1995, December 1996–September 2010					
Streamflow, instantaneous (ft^3/s)	142	361	13	74	51
pH, onsite (standard units)	141	9.5	7.2	8.4	8.3
Specific conductance, onsite (µS/cm)	141	633	202	414	400
Temperature, water (°C)	141	22.5	0.0	9.5	9.5
Hardness, filtered (mg/L as $CaCO_3$)	141	240	60	148	140
Calcium, filtered (mg/L)	141	71.6	18.5	43.9	43.0
Magnesium, filtered (mg/L)	141	15.0	3.42	9.37	9.01
Arsenic, filtered (µg/L)	141	34	1	11.0	10.3
Arsenic, unfiltered recoverable (µg/L)	141	235	9.1	25.0	17.0
Cadmium, filtered (µg/L)	140	41.0	<.1	[2]1.09	.67
Cadmium, unfiltered recoverable (µg/L)	141	49.0	.38	[2]1.97	1.20
Copper, filtered (µg/L)	139	450	12	44.1	33.6
Copper, unfiltered recoverable (µg/L)	141	3,900	31.1	195	101
Iron, filtered (µg/L)	141	307	<3	[2]47	26
Iron, unfiltered recoverable (µg/L)	140	24,100	240	1,520	780
Lead, filtered (µg/L)	141	5.1	<.5	[2].70	.32
Lead, unfiltered recoverable (µg/L)	141	650	5.02	36.1	14.9
Manganese, filtered (µg/L)	141	9,300	30.3	411	330
Manganese, unfiltered recoverable (µg/L)	141	10,000	85.1	528	420
Zinc, filtered (µg/L)	140	13,000	11.2	282	144
Zinc, unfiltered recoverable (µg/L)	141	15,000	69.7	496	274
Sediment, suspended (percent finer than 0.062 mm)	142	95	37	79	83
Sediment, suspended concentration (mg/L)	142	801	5	48	18
Sediment, suspended discharge (ton/d)	142	781	.18	20	2.6

Table 25. Statistical summary of long-term water-quality data for the Clark Fork basin, Montana, March 1985 through September 2010.—Continued

[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 laboratory reporting level[1]]

Property or constituent and reporting unit	Number of samples	Maximum	Minimum	Mean	Median
12323670--Mill Creek near Anaconda Period of record for water-quality data: December 2004–September 2010					
Streamflow, instantaneous (ft^3/s)	48	213	7.4	58	26
pH, onsite (standard units)	48	8.6	7.6	8.1	8.0
Specific conductance, onsite (µS/cm)	48	213	56	132	133
Temperature, water (°C)	48	17.0	0.0	8.4	8.2
Hardness, filtered (mg/L as $CaCO_3$)	48	98	24	57	60
Calcium, filtered (mg/L)	48	25.9	7.00	15.8	16.8
Magnesium, filtered (mg/L)	48	8.01	1.45	4.28	4.22
Arsenic, filtered (µg/L)	48	32.9	7.3	16.4	15.3
Arsenic, unfiltered recoverable (µg/L)	48	34.8	8.6	17.9	16.9
Cadmium, filtered (µg/L)	47	.11	.02	[2].04	.04
Cadmium, unfiltered recoverable (µg/L)	48	.19	.03	.08	.07
Copper, filtered (µg/L)	48	5.1	.72	2.3	2.1
Copper, unfiltered recoverable (µg/L)	48	10.6	1.3	3.9	3.5
Iron, filtered (µg/L)	48	125	21	47	40
Iron, unfiltered recoverable (µg/L)	48	619	78	192	162
Lead, filtered (µg/L)	48	.24	<.08	[2].12	.11
Lead, unfiltered recoverable (µg/L)	48	3.12	.15	.76	.59
Manganese, filtered (µg/L)	48	11.9	3.2	5.9	5.8
Manganese, unfiltered recoverable (µg/L)	48	36.6	7.4	14.3	12.6
Zinc, filtered (µg/L)	48	4.0	.73	[2]1.5	1.3
Zinc, unfiltered recoverable (µg/L)	48	9.2	1.0	3.0	2.6
Sediment, suspended (percent finer than 0.062 mm)	48	81	28	64	67
Sediment, suspended concentration (mg/L)	48	29	1	6	3
Sediment, suspended discharge (ton/d)	48	13	.02	1.7	.18

Table 25. Statistical summary of long-term water-quality data for the Clark Fork basin, Montana, March 1985 through September 2010.—Continued

[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 laboratory reporting level[1]]

Property or constituent and reporting unit	Number of samples	Maximum	Minimum	Mean	Median
12323700--Mill Creek at Opportunity Period of record for water-quality data: March 2003–September 2010					
Streamflow, instantaneous (ft^3/s)	64	261	0.43	35	9.7
pH, onsite (standard units)	64	8.2	7.7	8.0	8.0
Specific conductance, onsite (µS/cm)	64	230	59	148	153
Temperature, water (°C)	64	20.0	0.0	9.4	9.0
Hardness, filtered (mg/L as $CaCO_3$)	64	100	24	63	67
Calcium, filtered (mg/L)	64	28.0	7.01	17.6	18.8
Magnesium, filtered (mg/L)	64	7.83	1.56	4.56	4.67
Arsenic, filtered (µg/L)	64	55.1	9.0	22.4	20.6
Arsenic, unfiltered recoverable (µg/L)	64	53.5	10	25.7	24.6
Cadmium, filtered (µg/L)	64	.13	.02	.06	.06
Cadmium, unfiltered recoverable (µg/L)	64	.85	.04	.14	.10
Copper, filtered (µg/L)	64	6.1	1.0	3.0	2.6
Copper, unfiltered recoverable (µg/L)	64	38.8	1.5	6.8	4.4
Iron, filtered (µg/L)	64	94	16	48	43
Iron, unfiltered recoverable (µg/L)	64	1,960	44	299	145
Lead, filtered (µg/L)	64	.32	<.08	[2].14	.13
Lead, unfiltered recoverable (µg/L)	64	12.7	.07	1.50	.44
Manganese, filtered (µg/L)	64	32.8	2.2	7.7	5.6
Manganese, unfiltered recoverable (µg/L)	64	113	3.3	19.8	13.0
Zinc, filtered (µg/L)	63	7.7	1.3	3.0	2.8
Zinc, unfiltered recoverable (µg/L)	64	41	1.7	6.7	4.8
Sediment, suspended (percent finer than 0.062 mm)	64	90	26	69	74
Sediment, suspended concentration (mg/L)	64	107	1	12	2
Sediment, suspended discharge (ton/d)	64	55	<.01	[2]3.3	.04

Table 25. Statistical summary of long-term water-quality data for the Clark Fork basin, Montana, March 1985 through September 2010.—Continued

[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 laboratory reporting level[1]]

Property or constituent and reporting unit	Number of samples	Maximum	Minimum	Mean	Median
12323710--Willow Creek near Anaconda Period of record for water-quality data: December 2004–September 2010					
Streamflow, instantaneous (ft^3/s)	44	75	1.0	14	7.6
pH, onsite (standard units)	44	8.2	7.5	7.7	7.7
Specific conductance, onsite (µS/cm)	44	145	66	102	108
Temperature, water (°C)	44	15.5	.5	7.0	7.2
Hardness, filtered (mg/L as $CaCO_3$)	44	52	22	37	38
Calcium, filtered (mg/L)	44	16.5	7.56	12.4	13.0
Magnesium, filtered (mg/L)	44	2.49	.78	1.44	1.42
Arsenic, filtered (µg/L)	44	24.9	9.9	15.2	14.2
Arsenic, unfiltered recoverable (µg/L)	44	27.0	9.8	16.3	15.4
Cadmium, filtered (µg/L)	42	.05	<.04	[2].03	.03
Cadmium, unfiltered recoverable (µg/L)	44	.33	.02	[2].06	.05
Copper, filtered (µg/L)	44	4.2	.90	2.0	1.9
Copper, unfiltered recoverable (µg/L)	44	16.8	1.0	3.8	3.2
Iron, filtered (µg/L)	44	277	28	80	64
Iron, unfiltered recoverable (µg/L)	44	2,380	86	342	216
Lead, filtered (µg/L)	44	.37	.03	[2].14	.12
Lead, unfiltered recoverable (µg/L)	44	7.96	.10	.87	.48
Manganese, filtered (µg/L)	44	34.5	6.0	14.3	13.2
Manganese, unfiltered recoverable (µg/L)	44	99.9	14.0	26.4	23.2
Zinc, filtered (µg/L)	44	3.3	.65	[2]1.7	1.5
Zinc, unfiltered recoverable (µg/L)	44	17.8	<2.0	[2]3.2	2.0
Sediment, suspended (percent finer than 0.062 mm)	44	94	25	73	78
Sediment, suspended concentration (mg/L)	44	195	1	17	6
Sediment, suspended discharge (ton/d)	44	34	<.01	[2]1.8	.12

Table 25. Statistical summary of long-term water-quality data for the Clark Fork basin, Montana, March 1985 through September 2010.—Continued

[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 laboratory reporting level[1]]

Property or constituent and reporting unit	Number of samples	Maximum	Minimum	Mean	Median
12323720--Willow Creek at Opportunity Period of record for water-quality data: March 2003–September 2010					
Streamflow, instantaneous (ft^3/s)	64	70	4.5	17	9.1
pH, onsite (standard units)	64	9.0	7.7	8.1	8.1
Specific conductance, onsite (µS/cm)	64	371	116	276	297
Temperature, water (°C)	64	20.5	1.5	11.3	11.8
Hardness, filtered (mg/L as $CaCO_3$)	64	170	65	120	130
Calcium, filtered (mg/L)	64	47.4	20.1	34.8	36.9
Magnesium, filtered (mg/L)	64	12.3	3.52	7.98	8.56
Arsenic, filtered (µg/L)	64	164	10.9	41.8	32.0
Arsenic, unfiltered recoverable (µg/L)	64	164	12	44.6	33.2
Cadmium, filtered (µg/L)	64	.12	<.04	[2].04	.04
Cadmium, unfiltered recoverable (µg/L)	64	.52	.02	.11	.07
Copper, filtered (µg/L)	64	21.4	1.1	5.6	3.6
Copper, unfiltered recoverable (µg/L)	64	48.8	2.8	11.7	8.0
Iron, filtered (µg/L)	64	179	7	44	36
Iron, unfiltered recoverable (µg/L)	64	1,420	27	272	204
Lead, filtered (µg/L)	64	.58	.04	[2].21	.18
Lead, unfiltered recoverable (µg/L)	64	14.4	.27	2.28	1.49
Manganese, filtered (µg/L)	64	200	3.3	31.8	23.6
Manganese, unfiltered recoverable (µg/L)	64	228	4.7	44.8	34.8
Zinc, filtered (µg/L)	64	19.8	.84	5.3	3.9
Zinc, unfiltered recoverable (µg/L)	64	68	1.1	12.6	9.4
Sediment, suspended (percent finer than 0.062 mm)	64	96	55	85	88
Sediment, suspended concentration (mg/L)	64	84	1	11	5
Sediment, suspended discharge (ton/d)	64	11	.02	.91	.14

Table 25. Statistical summary of long-term water-quality data for the Clark Fork basin, Montana, March 1985 through September 2010.—Continued

[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 laboratory reporting level[1]]

Property or constituent and reporting unit	Number of samples	Maximum	Minimum	Mean	Median
12323750--Silver Bow Creek at Warm Springs Period of record for water-quality data: March 1993–September 2010					
Streamflow, instantaneous (ft^3/s)	148	662	16	137	88
pH, onsite (standard units)	146	9.6	8.0	8.8	8.8
Specific conductance, onsite (µS/cm)	146	783	249	468	478
Temperature, water (°C)	147	25.0	.5	10.8	10.5
Hardness, filtered (mg/L as $CaCO_3$)	146	310	97	194	200
Calcium, filtered (mg/L)	146	90.4	27.9	56.6	57.6
Magnesium, filtered (mg/L)	146	21.4	5.94	12.9	13.0
Arsenic, filtered (µg/L)	146	60	6.8	23.1	23.4
Arsenic, unfiltered recoverable (µg/L)	146	94	10	27.0	26.4
Cadmium, filtered (µg/L)	146	.31	<.04	[2].06	.03
Cadmium, unfiltered recoverable (µg/L)	146	.56	<.1	[2].12	.05
Copper, filtered (µg/L)	146	40.0	1.7	7.9	6.1
Copper, unfiltered recoverable (µg/L)	146	96.8	2.4	15.9	11.4
Iron, filtered (µg/L)	146	93	<5	[2]18	15
Iron, unfiltered recoverable (µg/L)	146	3,000	36	324	244
Lead, filtered (µg/L)	146	1.0	<.08	[2].12	<1.0
Lead, unfiltered recoverable (µg/L)	146	41.8	<1	[2]2.30	1.24
Manganese, filtered (µg/L)	146	875	11.8	121	81.5
Manganese, unfiltered recoverable (µg/L)	146	899	24.0	182	146
Zinc, filtered (µg/L)	146	73	<1.0	[2]7.6	4.0
Zinc, unfiltered recoverable (µg/L)	146	180	2.0	[2]30.9	18.7
Sediment, suspended (percent finer than 0.062 mm)	147	97	43	82	85
Sediment, suspended concentration (mg/L)	148	229	1	10	6
Sediment, suspended discharge (ton/d)	148	279	.07	6.4	1.3

Table 25. Statistical summary of long-term water-quality data for the Clark Fork basin, Montana, March 1985 through September 2010.—Continued

[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 laboratory reporting level[1]]

Property or constituent and reporting unit	Number of samples	Maximum	Minimum	Mean	Median
12323760--Warm Springs Creek near Anaconda Period of record for water-quality data: October 2005–September 2010					
Streamflow, instantaneous (ft^3/s)	30	573	41	137	84
pH, onsite (standard units)	30	8.8	8.0	8.5	8.5
Specific conductance, onsite (µS/cm)	30	271	125	217	234
Temperature, water (°C)	30	16.0	4.5	9.0	8.2
Hardness, filtered (mg/L as $CaCO_3$)	30	130	58	105	110
Calcium, filtered (mg/L)	30	39.2	18.5	31.6	33.8
Magnesium, filtered (mg/L)	30	8.57	2.96	6.36	6.90
Arsenic, filtered (µg/L)	30	3.8	1.8	2.2	2.1
Arsenic, unfiltered recoverable (µg/L)	30	5.6	2.0	2.7	2.5
Cadmium, filtered (µg/L)	30	.04	<.04	[2].02	.02
Cadmium, unfiltered recoverable (µg/L)	30	.14	<.04	[2].04	.03
Copper, filtered (µg/L)	30	2.2	<1.0	[2]1.1	.88
Copper, unfiltered recoverable (µg/L)	30	28.0	1.1	[2]3.7	2.1
Iron, filtered (µg/L)	30	15	<6	[2]7	6
Iron, unfiltered recoverable (µg/L)	30	1,000	28	144	75
Lead, filtered (µg/L)	30	.11	<.03	[2].04	<.08
Lead, unfiltered recoverable (µg/L)	30	3.51	.08	.52	.26
Manganese, filtered (µg/L)	30	2.9	<.2	[2]1.2	1.0
Manganese, unfiltered recoverable (µg/L)	30	45.2	1.2	6.9	4.2
Zinc, filtered (µg/L)	30	2.8	<1.8	[2]1.0	.30
Zinc, unfiltered recoverable (µg/L)	30	20.1	<2	[2]3.6	2.0
Sediment, suspended (percent finer than 0.062 mm)	30	83	32	64	66
Sediment, suspended concentration (mg/L)	30	65	1	9	4
Sediment, suspended discharge (ton/d)	30	68	.13	5.6	.87

Table 25. Statistical summary of long-term water-quality data for the Clark Fork basin, Montana, March 1985 through September 2010.—Continued

[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 laboratory reporting level[1]]

Property or constituent and reporting unit	Number of samples	Maximum	Minimum	Mean	Median
12323770--Warm Springs Creek at Warm Springs Period of record for water-quality data: March 1993–September 2010					
Streamflow, instantaneous (ft^3/s)	109	420	2.8	95	56
pH, onsite (standard units)	108	8.7	7.4	8.3	8.3
Specific conductance, onsite (µS/cm)	108	795	139	294	298
Temperature, water (°C)	109	20.0	0.0	8.7	8.5
Hardness, filtered (mg/L as $CaCO_3$)	108	420	40	142	150
Calcium, filtered (mg/L)	108	130	10.5	43.4	44.4
Magnesium, filtered (mg/L)	108	22.0	3.29	8.18	8.24
Arsenic, filtered (µg/L)	108	14	2	5.1	4.4
Arsenic, unfiltered recoverable (µg/L)	108	27	3	7.4	6.0
Cadmium, filtered (µg/L)	108	.1	<.04	[2].04	<.1
Cadmium, unfiltered recoverable (µg/L)	108	.41	<.06	[2].08	.03
Copper, filtered (µg/L)	108	16.0	1.0	3.3	2.9
Copper, unfiltered recoverable (µg/L)	108	147	2.3	20.0	8.8
Iron, filtered (µg/L)	108	30	<5	[2]11	10
Iron, unfiltered recoverable (µg/L)	108	2,110	39	313	118
Lead, filtered (µg/L)	108	1.8	<.08	[2].08	<.5
Lead, unfiltered recoverable (µg/L)	108	14.0	<1.0	[2]1.96	.55
Manganese, filtered (µg/L)	108	570	19.2	121	92.6
Manganese, unfiltered recoverable (µg/L)	108	1,400	37.0	210	170
Zinc, filtered (µg/L)	107	10	<1.0	[2]2.1	1.4
Zinc, unfiltered recoverable (µg/L)	108	60	<10	[2]9.4	3.0
Sediment, suspended (percent finer than 0.062 mm)	109	88	43	71	71
Sediment, suspended concentration (mg/L)	109	127	1	18	8
Sediment, suspended discharge (ton/d)	109	87	.05	8.5	1.0

Table 25. Statistical summary of long-term water-quality data for the Clark Fork basin, Montana, March 1985 through September 2010.—Continued

[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 laboratory reporting level[1]]

Property or constituent and reporting unit	Number of samples	Maximum	Minimum	Mean	Median
12323800--Clark Fork near Galen					
Period of record for water-quality data: July 1988–September 2010					
Streamflow, instantaneous (ft^3/s)	189	1,050	14	215	129
pH, onsite (standard units)	176	9.2	7.5	8.5	8.6
Specific conductance, onsite (µS/cm)	177	720	197	417	427
Temperature, water (°C)	188	23.5	0.0	9.9	10.0
Hardness, filtered (mg/L as $CaCO_3$)	175	370	81	182	190
Calcium, filtered (mg/L)	175	110	24.2	53.8	55.4
Magnesium, filtered (mg/L)	175	22.0	5.08	11.5	12.0
Arsenic, filtered (µg/L)	175	53	4	15.2	14.7
Arsenic, unfiltered recoverable (µg/L)	175	78	3	19.5	17.0
Cadmium, filtered (µg/L)	175	1.0	<.04	[2].06	<1
Cadmium, unfiltered recoverable (µg/L)	175	3	<.1	[2].19	<1
Copper, filtered (µg/L)	175	50	1.7	7.9	6.0
Copper, unfiltered recoverable (µg/L)	174	240	4.1	27.7	15.5
Iron, filtered (µg/L)	175	110	<3	[2]16	11
Iron, unfiltered recoverable (µg/L)	175	9,200	56	481	270
Lead, filtered (µg/L)	175	3	<.08	[2].15	<1
Lead, unfiltered recoverable (µg/L)	175	31.0	<1.0	[2]3.44	1.83
Manganese, filtered (µg/L)	175	460	24.0	108	81.0
Manganese, unfiltered recoverable (µg/L)	175	1,400	47.3	227	177
Zinc, filtered (µg/L)	175	110	<1.0	[2]9.2	4.6
Zinc, unfiltered recoverable (µg/L)	175	360	<10	[2]37.2	20.0
Sediment, suspended (percent finer than 0.062 mm)	188	97	40	77	78
Sediment, suspended concentration (mg/L)	189	338	1	18	8
Sediment, suspended discharge (ton/d)	189	459	.12	20	2.4

Table 25. Statistical summary of long-term water-quality data for the Clark Fork basin, Montana, March 1985 through September 2010.—Continued

[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 laboratory reporting level[1]]

Property or constituent and reporting unit	Number of samples	Maximum	Minimum	Mean	Median
12323840--Lost Creek near Anaconda Period of record for water-quality data: December 2004–September 2010					
Streamflow, instantaneous (ft^3/s)	47	54	0.37	10	8
pH, onsite (standard units)	47	8.6	7.4	8.2	8.2
Specific conductance, onsite (µS/cm)	47	253	121	198	211
Temperature, water (°C)	47	17.0	1.0	8.1	8.5
Hardness, filtered (mg/L as $CaCO_3$)	47	120	50	94	99
Calcium, filtered (mg/L)	47	37.1	15.7	28.5	30.0
Magnesium, filtered (mg/L)	47	7.22	2.71	5.50	5.78
Arsenic, filtered (µg/L)	47	156	1.8	7.8	3.4
Arsenic, unfiltered recoverable (µg/L)	47	3,860	2	87.2	3.7
Cadmium, filtered (µg/L)	46	.90	<.04	[2].05	.03
Cadmium, unfiltered recoverable (µg/L)	47	147	.01	3.2	.04
Copper, filtered (µg/L)	47	90.5	.86	3.9	1.8
Copper, unfiltered recoverable (µg/L)	47	29,100	1.7	626	4.4
Iron, filtered (µg/L)	47	25	<6	[2]10	9
Iron, unfiltered recoverable (µg/L)	47	99,700	22	2,300	98
Lead, filtered (µg/L)	47	.18	<.03	[2].04	<.12
Lead, unfiltered recoverable (µg/L)	47	1,290	.10	28.3	.42
Manganese, filtered (µg/L)	47	42.4	<.2	[2]2.1	1.1
Manganese, unfiltered recoverable (µg/L)	47	8,830	1.2	194	4.6
Zinc, filtered (µg/L)	47	30.0	<1.8	[2]1.9	1.1
Zinc, unfiltered recoverable (µg/L)	47	7,780	1.0	169	2.4
Sediment, suspended (percent finer than 0.062 mm)	47	97	22	58	61
Sediment, suspended concentration (mg/L)	47	58,900	1	1,270	5
Sediment, suspended discharge (ton/d)	47	1,320	<.01	[2]29	.09

Table 25. Statistical summary of long-term water-quality data for the Clark Fork basin, Montana, March 1985 through September 2010.—Continued

[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 laboratory reporting level[1]]

Property or constituent and reporting unit	Number of samples	Maximum	Minimum	Mean	Median
12323850--Lost Creek near Galen					
Period of record for water-quality data: March 2003–September 2010					
Streamflow, instantaneous (ft^3/s)	64	71	1.3	21	13
pH, onsite (standard units)	64	8.7	8.0	8.3	8.3
Specific conductance, onsite (µS/cm)	64	934	540	648	631
Temperature, water (°C)	64	26.5	0.0	10.8	10.5
Hardness, filtered (mg/L as $CaCO_3$)	64	450	200	301	300
Calcium, filtered (mg/L)	64	122	48.5	84.7	85.2
Magnesium, filtered (mg/L)	64	35.7	17.3	21.7	21.0
Arsenic, filtered (µg/L)	64	41.8	6	14.2	12.6
Arsenic, unfiltered recoverable (µg/L)	64	43	6	15.0	14.0
Cadmium, filtered (µg/L)	63	.05	<.04	[2].03	.02
Cadmium, unfiltered recoverable (µg/L)	64	.11	.01	[2].04	.04
Copper, filtered (µg/L)	64	6.7	.99	2.4	2.4
Copper, unfiltered recoverable (µg/L)	64	22.5	1.6	5.5	4.4
Iron, filtered (µg/L)	64	61	<6	[2]13	10
Iron, unfiltered recoverable (µg/L)	64	293	14	99	77
Lead, filtered (µg/L)	63	.33	<.06	[2].06	<.12
Lead, unfiltered recoverable (µg/L)	64	1.30	.04	.35	.24
Manganese, filtered (µg/L)	64	54.0	1.9	15.4	13.5
Manganese, unfiltered recoverable (µg/L)	64	56.5	2.2	20.5	18.0
Zinc, filtered (µg/L)	63	3.8	<1.0	[2]1.5	1.3
Zinc, unfiltered recoverable (µg/L)	64	9	<2	[2]2.8	2.0
Sediment, suspended (percent finer than 0.062 mm)	64	86	18	57	60
Sediment, suspended concentration (mg/L)	64	79	2	16	15
Sediment, suspended discharge (ton/d)	64	4.2	.01	1.0	.44

Table 25. Statistical summary of long-term water-quality data for the Clark Fork basin, Montana, March 1985 through September 2010.—Continued

[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 laboratory reporting level[1]]

Property or constituent and reporting unit	Number of samples	Maximum	Minimum	Mean	Median
12324200--Clark Fork at Deer Lodge Period of record for water-quality data: March 1985–September 2010					
Streamflow, instantaneous (ft^3/s)	241	1,920	23	297	224
pH, onsite (standard units)	189	8.9	7.4	8.3	8.3
Specific conductance, onsite (µS/cm)	224	642	234	474	500
Temperature, water (°C)	240	23.0	0.0	10.0	10.0
Hardness, filtered (mg/L as $CaCO_3$)	181	280	95	200	210
Calcium, filtered (mg/L)	181	82.0	28.2	59.2	62.0
Magnesium, filtered (mg/L)	181	18.7	5.53	12.7	13.3
Arsenic, filtered (µg/L)	191	39	6.0	14.4	13.5
Arsenic, unfiltered recoverable (µg/L)	190	215	4.8	23.9	17.6
Cadmium, filtered (µg/L)	190	2	<.1	[2].08	<1
Cadmium, unfiltered recoverable (µg/L)	190	5	<.1	[2].40	.06
Copper, filtered (µg/L)	191	120	3.2	10.8	8.0
Copper, unfiltered recoverable (µg/L)	189	1,500	8.2	80.7	37.0
Iron, filtered (µg/L)	191	190	<3	[2]15	9
Iron, unfiltered recoverable (µg/L)	191	29,000	27	1,470	510
Lead, filtered (µg/L)	191	6	<.08	[2].31	<1
Lead, unfiltered recoverable (µg/L)	191	200	.33	[2]10.7	4.60
Manganese, filtered (µg/L)	191	400	1.0	41.7	33.4
Manganese, unfiltered recoverable (µg/L)	191	4,600	11.9	236	133
Zinc, filtered (µg/L)	191	230	<10	[2]11.7	8.0
Zinc, unfiltered recoverable (µg/L)	189	1,700	4	85.4	40.0
Sediment, suspended (percent finer than 0.062 mm)	232	99	31	71	72
Sediment, suspended concentration (mg/L)	241	2,250	1	69	22
Sediment, suspended discharge (ton/d)	241	8,690	.18	146	12

Table 25. Statistical summary of long-term water-quality data for the Clark Fork basin, Montana, March 1985 through September 2010.—Continued

[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 laboratory reporting level[1]]

Property or constituent and reporting unit	Number of samples	Maximum	Minimum	Mean	Median
12324400--Clark Fork above Little Blackfoot River, near Garrison Period of record for water-quality data: March 2009–September 2010					
Streamflow, instantaneous (ft^3/s)	15	1,380	186	532	345
pH, onsite (standard units)	15	8.8	8	8.3	8.3
Specific conductance, onsite (µS/cm)	15	494	253	397	432
Temperature, water (°C)	15	19.0	3.0	10.8	12.5
Hardness, filtered (mg/L as $CaCO_3$)	15	220	100	172	190
Calcium, filtered (mg/L)	15	64.0	31.8	50.7	56.2
Magnesium, filtered (mg/L)	15	14.8	5.93	11.0	12.0
Arsenic, filtered (µg/L)	15	21.6	9.5	15.4	16.1
Arsenic, unfiltered recoverable (µg/L)	15	43.5	11.9	23.7	20.2
Cadmium, filtered (µg/L)	15	.11	.04	.07	.08
Cadmium, unfiltered recoverable (µg/L)	15	.75	.08	.33	.25
Copper, filtered (µg/L)	15	20.2	4.3	10.1	9.1
Copper, unfiltered recoverable (µg/L)	15	197	12.4	75.2	59.4
Iron, filtered (µg/L)	15	33	5	13	10
Iron, unfiltered recoverable (µg/L)	15	3,190	119	1,090	632
Lead, filtered (µg/L)	15	.39	.04	.14	.11
Lead, unfiltered recoverable (µg/L)	15	29.4	.90	10.3	7.75
Manganese, filtered (µg/L)	15	45.3	15.6	26.2	22.6
Manganese, unfiltered recoverable (µg/L)	15	309	40.5	149	131
Zinc, filtered (µg/L)	15	15.9	2.9	6.2	5.8
Zinc, unfiltered recoverable (µg/L)	15	152	10.1	61.8	38.4
Sediment, suspended (percent finer than 0.062 mm)	15	80	42	64	63
Sediment, suspended concentration (mg/L)	15	179	5	59	30
Sediment, suspended discharge (ton/d)	15	428	2.5	118	42

Table 25. Statistical summary of long-term water-quality data for the Clark Fork basin, Montana, March 1985 through September 2010.—Continued

[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 laboratory reporting level[1]]

Property or constituent and reporting unit	Number of samples	Maximum	Minimum	Mean	Median
12324680--Clark Fork at Goldcreek Period of record for water-quality data: March 1993–September 2010					
Streamflow, instantaneous (ft^3/s)	147	3,920	87	752	513
pH, onsite (standard units)	146	8.9	7.9	8.4	8.3
Specific conductance, onsite (µS/cm)	146	510	206	369	384
Temperature, water (°C)	147	23.0	0.0	10.1	10.0
Hardness, filtered (mg/L as $CaCO_3$)	146	230	86	162	170
Calcium, filtered (mg/L)	146	68.0	25.9	47.8	50.1
Magnesium, filtered (mg/L)	146	15.0	5.15	10.4	10.7
Arsenic, filtered (µg/L)	146	20	5.8	10.1	10.0
Arsenic, unfiltered recoverable (µg/L)	146	75	7	14.8	12.0
Cadmium, filtered (µg/L)	146	.2	<.04	[2].04	<.1
Cadmium, unfiltered recoverable (µg/L)	146	2	<.1	[2].17	.05
Copper, filtered (µg/L)	145	36.0	2.1	6.6	5.4
Copper, unfiltered recoverable (µg/L)	145	440	5.2	39.8	23.2
Iron, filtered (µg/L)	146	100	<3	[2]18	12
Iron, unfiltered recoverable (µg/L)	146	12,000	27	850	422
Lead, filtered (µg/L)	144	.6	<.08	[2].11	<.6
Lead, unfiltered recoverable (µg/L)	145	73.0	.14	[2]5.56	2.81
Manganese, filtered (µg/L)	146	57.3	4.0	18.7	16.9
Manganese, unfiltered recoverable (µg/L)	146	1,100	10.5	121	86.4
Zinc, filtered (µg/L)	146	26	<1.0	[2]5.5	4.0
Zinc, unfiltered recoverable (µg/L)	146	510	2	43.5	30.0
Sediment, suspended (percent finer than 0.062 mm)	147	94	43	75	78
Sediment, suspended concentration (mg/L)	147	752	1	48	21
Sediment, suspended discharge (ton/d)	147	7,960	.55	206	33

Table 25. Statistical summary of long-term water-quality data for the Clark Fork basin, Montana, March 1985 through September 2010.—Continued

[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 laboratory reporting level[1]]

Property or constituent and reporting unit	Number of samples	Maximum	Minimum	Mean	Median
12331800--Clark Fork near Drummond					
Period of record for water-quality data: March 1993–September 2010					
Streamflow, instantaneous (ft^3/s)	147	3,860	149	1,050	766
pH, onsite (standard units)	146	8.7	7.8	8.3	8.3
Specific conductance, onsite (µS/cm)	146	630	189	408	420
Temperature, water (°C)	147	22.5	.5	11.0	11.0
Hardness, filtered (mg/L as $CaCO_3$)	146	300	74	183	190
Calcium, filtered (mg/L)	146	83.0	21.0	52.6	54.6
Magnesium, filtered (mg/L)	146	22.0	5.2	12.6	13.0
Arsenic, filtered (µg/L)	146	20	3.2	10.5	10.0
Arsenic, unfiltered recoverable (µg/L)	146	62	8	16.2	13.0
Cadmium, filtered (µg/L)	145	.30	<.04	[2].05	<.1
Cadmium, unfiltered recoverable (µg/L)	146	2.0	<.1	[2].23	.06
Copper, filtered (µg/L)	143	21.0	1.0	6.4	5.0
Copper, unfiltered recoverable (µg/L)	144	360	4.6	42.9	22.2
Iron, filtered (µg/L)	146	150	<3	[2]18	9
Iron, unfiltered recoverable (µg/L)	145	8,800	20	1,000	468
Lead, filtered (µg/L)	142	1.2	<.08	[2].17	<1.0
Lead, unfiltered recoverable (µg/L)	142	56.0	<1.00	[2]7.75	3.50
Manganese, filtered (µg/L)	145	60.7	3.3	16.4	14.0
Manganese, unfiltered recoverable (µg/L)	146	880	8.0	146	93.6
Zinc, filtered (µg/L)	146	21	<3	[2]5.9	4.3
Zinc, unfiltered recoverable (µg/L)	146	490	2.9	60.0	31.0
Sediment, suspended (percent finer than 0.062 mm)	147	92	38	73	74
Sediment, suspended concentration (mg/L)	147	530	2	63	26
Sediment, suspended discharge (ton/d)	147	4,720	1.7	320	49

Table 25. Statistical summary of long-term water-quality data for the Clark Fork basin, Montana, March 1985 through September 2010.—Continued

[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 laboratory reporting level[1]]

Property or constituent and reporting unit	Number of samples	Maximum	Minimum	Mean	Median
12334550--Clark Fork at Turah Bridge, near Bonner Period of record for water-quality data: March 1985–September 2010					
Streamflow, instantaneous (ft^3/s)	244	9,560	296	1,910	1,150
pH, onsite (standard units)	190	8.8	7.4	8.3	8.3
Specific conductance, onsite (µS/cm)	219	483	139	300	313
Temperature, water (°C)	243	22.0	0.0	9.5	10.0
Hardness, filtered (mg/L as $CaCO_3$)	180	200	54	131	130
Calcium, filtered (mg/L)	180	59.0	14.9	36.9	37.2
Magnesium, filtered (mg/L)	180	14.0	3.94	9.40	9.39
Arsenic, filtered (µg/L)	189	17	2.7	6.1	5.5
Arsenic, unfiltered recoverable (µg/L)	189	110	3	9.8	7.0
Cadmium, filtered (µg/L)	188	.10	<.04	[2].03	<.1
Cadmium, unfiltered recoverable (µg/L)	189	4	<.01	[2].25	<1
Copper, filtered (µg/L)	188	25	1.1	4.8	3.8
Copper, unfiltered recoverable (µg/L)	187	500	2.7	33.9	15.9
Iron, filtered (µg/L)	189	190	<3	[2]23	13
Iron, unfiltered recoverable (µg/L)	189	19,000	33	1,000	370
Lead, filtered (µg/L)	185	7	<.08	[2].28	<1
Lead, unfiltered recoverable (µg/L)	185	100	<1.00	[2]6.94	3.00
Manganese, filtered (µg/L)	189	37.4	<1.0	[2]8.2	7.0
Manganese, unfiltered recoverable (µg/L)	189	2,000	8.9	121	60.2
Zinc, filtered (µg/L)	187	39	<3	[2]5.9	4.0
Zinc, unfiltered recoverable (µg/L)	189	1,100	<10	[2]58	29
Sediment, suspended (percent finer than 0.062 mm)	233	98	27	74	75
Sediment, suspended concentration (mg/L)	244	1,370	2	56	18
Sediment, suspended discharge (ton/d)	244	34,700	3.0	615	60

Table 25. Statistical summary of long-term water-quality data for the Clark Fork basin, Montana, March 1985 through September 2010.—Continued

[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 laboratory reporting level[1]]

Property or constituent and reporting unit	Number of samples	Maximum	Minimum	Mean	Median
12340000--Blackfoot River near Bonner					
Period of record for water-quality data: March 1985–September 2010					
Streamflow, instantaneous (ft^3/s)	177	13,400	344	2,660	1,310
pH, onsite (standard units)	137	8.7	7.5	8.3	8.3
Specific conductance, onsite (µS/cm)	154	294	131	209	205
Temperature, water (°C)	177	22.5	0.0	9.5	9.5
Hardness, filtered (mg/L as $CaCO_3$)	129	150	55	104	100
Calcium, filtered (mg/L)	129	37.7	14.0	26.5	26.0
Magnesium, filtered (mg/L)	129	13.2	4.90	9.16	8.69
Arsenic, filtered (µg/L)	136	2	<1	[2].96	.96
Arsenic, unfiltered recoverable (µg/L)	137	4	<1	[2]1.2	1
Cadmium, filtered (µg/L)	135	1	<.02	[2].02	<.1
Cadmium, unfiltered recoverable (µg/L)	137	2	<.01	[2].10	<1
Copper, filtered (µg/L)	133	7.0	<1.0	[2]1.4	.8
Copper, unfiltered recoverable (µg/L)	134	34	<1.0	[2]4.7	2.0
Iron, filtered (µg/L)	136	100	<3	[2]17	10
Iron, unfiltered recoverable (µg/L)	137	3,600	14	417	180
Lead, filtered (µg/L)	131	8	<.03	[2].35	<.6
Lead, unfiltered recoverable (µg/L)	133	25.0	<.06	[2]2.30	.08
Manganese, filtered (µg/L)	136	11.0	<1	[2]2.3	2.0
Manganese, unfiltered recoverable (µg/L)	137	180	<10	[2]28.9	18.2
Zinc, filtered (µg/L)	135	15	<.60	[2]2.1	<10
Zinc, unfiltered recoverable (µg/L)	137	60	<1	[2]5.5	<10
Sediment, suspended (percent finer than 0.062 mm)	175	98	42	80	82
Sediment, suspended concentration (mg/L)	177	271	1	29	8
Sediment, suspended discharge (ton/d)	177	7,670	1.1	509	30

Table 25. Statistical summary of long-term water-quality data for the Clark Fork basin, Montana, March 1985 through September 2010.—Continued

[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 laboratory reporting level[1]]

Property or constituent and reporting unit	Number of samples	Maximum	Minimum	Mean	Median
12340500--Clark Fork above Missoula Period of record for water-quality data: July 1986–September 2010					
Streamflow, instantaneous (ft^3/s)	210	21,600	720	4,450	2,400
pH, onsite (standard units)	167	8.8	7.9	8.3	8.3
Specific conductance, onsite (µS/cm)	187	399	142	253	261
Temperature, water (°C)	207	22.0	0.0	9.6	9.5
Hardness, filtered (mg/L as $CaCO_3$)	167	170	60	117	120
Calcium, filtered (mg/L)	167	46.0	14.0	31.5	32.0
Magnesium, filtered (mg/L)	167	13.4	5.28	9.22	9.20
Arsenic, filtered (µg/L)	167	9	1	3.5	3.0
Arsenic, unfiltered recoverable (µg/L)	167	69	1	5.5	4
Cadmium, filtered (µg/L)	166	.2	<.04	[2].03	<.1
Cadmium, unfiltered recoverable (µg/L)	167	5.0	<.01	[2].17	<1
Copper, filtered (µg/L)	166	12.6	.7	2.8	2.2
Copper, unfiltered recoverable (µg/L)	165	400	2.0	20.0	8.5
Iron, filtered (µg/L)	167	200	<3	[2]21	14
Iron, unfiltered recoverable (µg/L)	167	13,000	43	640	244
Lead, filtered (µg/L)	160	1.2	<.08	[2].15	<1
Lead, unfiltered recoverable (µg/L)	162	78.0	<1.00	[2]3.58	1.60
Manganese, filtered (µg/L)	167	230	5.9	16.4	14.0
Manganese, unfiltered recoverable (µg/L)	167	1,100	10	66.8	40
Zinc, filtered (µg/L)	166	16	<1.0	[2]3.7	2.4
Zinc, unfiltered recoverable (µg/L)	167	1,100	<10	[2]34.6	15
Sediment, suspended (percent finer than 0.062 mm)	205	99	14	83	89
Sediment, suspended concentration (mg/L)	210	950	2	44	12
Sediment, suspended discharge (ton/d)	210	21,900	5.8	1,080	82

[1]Differing less-than (<) values for an individual constituent are the result of changes in the laboratory reporting level during the period of record.

[2]Value for the mean is estimated by using a log-probability regression to predict the values of data less than the laboratory reporting level (Helsel and Cohn, 1988). Minimum values that are not censored are a result of changes in the laboratory reporting level during the period of record.

Table 26. Statistical summary of long-term bed-sediment data for the Clark Fork basin, Montana, August 1986 through August 2010.

[Reported concentrations are in micrograms per gram dry weight (µg/g). 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. Arsenic was not analyzed until 2003; therefore, the number of samples is smaller than that for the other trace elements. Values are reported using U.S. Geological Survey rounding standards. Symbols: <, less than the minimum reporting level; --, indicates insufficient data (less than three samples) to compute statistic]

Constituent	Number of samples	Maximum	Minimum	Mean	Median
12323600--Silver Bow Creek at Opportunity Period of record for bed-sediment data: 1992–2010					
Arsenic	8	186	34	125	138
Cadmium	19	43.9	6.8	29.7	29.3
Chromium	17	50.7	16.8	28.7	25.9
Copper	19	9,020	837	4,180	4,510
Iron	19	45,300	28,200	35,600	34,400
Lead	19	1,030	181	634	581
Manganese	19	9,220	1,160	3,350	2,770
Nickel	18	21.4	12.0	14.9	14.6
Silver	12	20.0	8.3	15.5	15.8
Zinc	19	13,400	1,610	7,250	6,990
12323750--Silver Bow Creek at Warm Springs Period of record for bed-sediment data: 1992–2010					
Arsenic	8	177	67	118	106
Cadmium	19	12.2	4.2	7.2	6.6
Chromium	17	46.8	<15.7	[1]23.3	[1]22.9
Copper	19	769	169	352	294
Iron	19	32,500	15,400	23,400	22,100
Lead	19	100	49	72	73
Manganese	19	17,700	1,470	7,940	8,150
Nickel	18	20.0	9.2	15.0	15.0
Silver	12	4.4	.3	[1]1.9	[1]1.8
Zinc	19	2,220	554	945	728
12323770--Warm Springs Creek at Warm Springs Period of record for bed-sediment data: 1995, 1997, 1999, 2002, 2005, 2008					
Arsenic	2	66	52	59	--
Cadmium	6	5.8	1.3	3.6	3.6
Chromium	6	39.3	27.5	31.9	31.1
Copper	6	1,060	779	908	886
Iron	6	26,600	16,800	21,700	21,900
Lead	6	86	67	81	83
Manganese	6	12,100	2,020	7,950	8,280
Nickel	6	25.5	17.6	20.2	19.4
Silver	4	5.1	3.1	3.8	3.5
Zinc	6	453	372	405	405

Table 26. Statistical summary of long-term bed-sediment data for the Clark Fork basin, Montana, August 1986 through August 2010.—Continued

[Reported concentrations are in micrograms per gram dry weight (µg/g). 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. Arsenic was not analyzed until 2003; therefore, the number of samples is smaller than that for the other trace elements. Values are reported using U.S. Geological Survey rounding standards. Symbols: <, less than the minimum reporting level; --, indicates insufficient data (less than three samples) to compute statistic]

Constituent	Number of samples	Maximum	Minimum	Mean	Median
12323800--Clark Fork near Galen Period of record for bed-sediment data: 1987, 1991–2010					
Arsenic	8	119	73	99	101
Cadmium	21	20.1	3.9	8.4	7.5
Chromium	17	44.6	19.1	28.9	27.0
Copper	21	2,300	838	1,200	1,110
Iron	21	39,800	22,600	27,700	27,000
Lead	21	235	92	133	129
Manganese	21	17,300	1,870	9,520	11,000
Nickel	18	23.2	13.9	18.7	18.6
Silver	14	7.3	<3.2	[1]4.4	[1]4.5
Zinc	21	3,560	721	1,450	1,150
461415112450801--Clark Fork below Lost Creek, near Galen Period of record for bed-sediment data: 1996–2010					
Arsenic	8	204	92	118	108
Cadmium	15	10.0	4.9	7.1	6.8
Chromium	14	42.4	20.5	29.8	29.7
Copper	15	2,050	1,150	1,500	1,440
Iron	15	32,800	24,400	29,400	30,300
Lead	15	218	127	166	168
Manganese	15	9,820	2,460	5,740	5,750
Nickel	15	19.9	11.7	16.2	16.5
Silver	8	7.8	4.2	6.5	6.7
Zinc	15	1,680	930	1,310	1,300
461559112443301--Clark Fork at county bridge, near Racetrack Period of record for bed-sediment data: 1996–2010					
Arsenic	8	118	56	86	88
Cadmium	15	8.7	5.0	6.7	6.4
Chromium	14	45.2	19.0	28.5	28.4
Copper	15	1,810	933	1,280	1,310
Iron	15	31,700	21,200	27,400	28,100
Lead	15	186	103	145	143
Manganese	15	6,310	1,840	3,390	3,130
Nickel	15	18.4	10.3	14.4	14.8
Silver	8	6.1	<3.3	[1]5.0	[1]5.4
Zinc	15	1,550	999	1,210	1,180

Table 26. Statistical summary of long-term bed-sediment data for the Clark Fork basin, Montana, August 1986 through August 2010.—Continued

[Reported concentrations are in micrograms per gram dry weight (µg/g). 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. Arsenic was not analyzed until 2003; therefore, the number of samples is smaller than that for the other trace elements. Values are reported using U.S. Geological Survey rounding standards. Symbols: <, less than the minimum reporting level; --, indicates insufficient data (less than three samples) to compute statistic]

Constituent	Number of samples	Maximum	Minimum	Mean	Median
461903112440701--Clark Fork at Dempsey Creek diversion, near Racetrack Period of record for bed-sediment data: 1996–2010					
Arsenic	8	100	58	78	76
Cadmium	15	10.3	4.3	6.4	5.9
Chromium	14	39.2	16.0	26.9	26.0
Copper	15	1,580	721	1,100	1,090
Iron	15	33,700	20,600	26,800	26,100
Lead	15	155	92	130	132
Manganese	15	8,370	1,330	4,020	3,330
Nickel	15	16.9	8.7	13.0	12.7
Silver	8	6.2	2.7	4.9	5.0
Zinc	15	1,570	900	1,140	1,080
12324200--Clark Fork at Deer Lodge Period of record for bed-sediment data: 1986–87, 1990–2010					
Arsenic	8	102	49	70	69
Cadmium	23	10.0	3.5	6.1	5.5
Chromium	17	50.7	19.5	31.5	28.4
Copper	23	4,180	683	1,260	1,060
Iron	23	35,300	21,100	27,200	26,100
Lead	23	242	103	146	142
Manganese	23	6,020	1,070	2,700	2,460
Nickel	18	21.1	11.5	14.9	13.9
Silver	16	7.9	2.4	4.7	4.5
Zinc	23	1,730	844	1,200	1,140
12324400--Clark Fork above Little Blackfoot River, near Garrison Period of record for bed-sediment data: 2009-2010					
Arsenic	2	83	81	82	--
Cadmium	2	5.5	4.8	5.1	--
Chromium	2	52.8	45.5	49.2	--
Copper	2	1,290	1,270	1,280	--
Iron	2	32,400	27,300	29,900	--
Lead	2	145	140	143	--
Manganese	2	2,950	1,560	2,260	--
Nickel	2	17.2	13.9	15.5	--
Silver	0	--	--	--	--
Zinc	2	1,240	1,100	1,170	--

Table 26. Statistical summary of long-term bed-sediment data for the Clark Fork basin, Montana, August 1986 through August 2010.—Continued

[Reported concentrations are in micrograms per gram dry weight (µg/g). 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. Arsenic was not analyzed until 2003; therefore, the number of samples is smaller than that for the other trace elements. Values are reported using U.S. Geological Survey rounding standards. Symbols: <, less than the minimum reporting level; --, indicates insufficient data (less than three samples) to compute statistic]

Constituent	Number of samples	Maximum	Minimum	Mean	Median
12324680--Clark Fork at Goldcreek Period of record for bed-sediment data: 1992–2010					
Arsenic	8	61	23	40	37
Cadmium	19	8.1	2.6	4.7	4.2
Chromium	17	55.3	21.3	33.4	31.9
Copper	19	1,080	338	690	729
Iron	19	32,100	15,500	23,900	24,300
Lead	19	152	52	96	93
Manganese	19	2,610	1,160	1,850	1,840
Nickel	18	18.6	9.0	14.3	14.7
Silver	12	4.8	2.3	3.3	3.2
Zinc	19	1,320	584	932	985
12331800--Clark Fork near Drummond Period of record for bed-sediment data: 1986–87, 1991–2010					
Arsenic	8	66	31	41	33
Cadmium	22	7.7	2.6	4.4	4.3
Chromium	17	41.9	17.0	29.4	31.3
Copper	22	747	303	484	470
Iron	22	43,700	16,500	24,400	23,200
Lead	22	135	59	89	89
Manganese	22	4,820	1,150	2,140	1,900
Nickel	18	16.8	9.3	13.5	13.8
Silver	15	4.7	<3.2	[1]3.0	[1]2.9
Zinc	22	1,230	673	960	955
12334550--Clark Fork at Turah Bridge, near Bonner Period of record for bed-sediment data: 1986, 1991–2010					
Arsenic	8	43	19	29	27
Cadmium	21	7.3	1.9	3.6	3.5
Chromium	17	42.5	15.3	26.6	27.7
Copper	21	635	211	354	323
Iron	21	25,900	12,600	19,300	17,300
Lead	21	115	47	68	65
Manganese	21	2,340	671	1,320	1,260
Nickel	18	19.1	6.9	12.5	11.6
Silver	14	3.9	<1.9	[1]2.1	[1]1.9
Zinc	21	1,160	584	812	786

Table 26. Statistical summary of long-term bed-sediment data for the Clark Fork basin, Montana, August 1986 through August 2010.—Continued

[Reported concentrations are in micrograms per gram dry weight (µg/g). 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. Arsenic was not analyzed until 2003; therefore, the number of samples is smaller than that for the other trace elements. Values are reported using U.S. Geological Survey rounding standards. Symbols: <, less than the minimum reporting level; --, indicates insufficient data (less than three samples) to compute statistic]

Constituent	Number of samples	Maximum	Minimum	Mean	Median
12340000--Blackfoot River near Bonner					
Period of record for bed-sediment data: 1986–87, 1991, 1993–96, 1998–2001, 2003, 2006–10					
Arsenic	6	6	<0.2	[1]3	[1]3
Cadmium	17	2.0	.05	[1].5	[1].4
Chromium	13	35.2	15.1	22.9	23.6
Copper	17	27	11	20	21
Iron	17	23,000	12,400	17,700	18,100
Lead	17	20	<13	[1]13	[1]13
Manganese	17	746	298	528	542
Nickel	14	14.3	6.0	11.4	11.8
Silver	12	<1.9	<.3	[1].5	[1]<.6
Zinc	17	82	35	61	63
12340500--Clark Fork above Missoula					
Period of record for bed-sediment data: 1997–2010					
Arsenic	8	54	17	35	31
Cadmium	14	5.8	1.5	3.3	3.1
Chromium	13	40.7	19.0	27.6	28.5
Copper	14	551	166	375	382
Iron	14	27,000	18,100	21,200	20,600
Lead	14	78	37	57	58
Manganese	14	2,250	477	1,110	1,070
Nickel	14	15.8	7.6	12.8	13.0
Silver	7	2.9	.8	[1]2.0	[1]2.1
Zinc	14	1,090	438	761	777

[1]Value determined by substituting one-half of the minimum reporting level for censored (<) values when both uncensored and censored values were used to determine the mean and (or) median.

Table 27. Statistical summary of long-term biological data for the Clark Fork basin, Montana, August 1986 through August 2010.

[Concentrations are in micrograms per gram dry weight (µg/g). Number of composite samples represents the total of all individual composite samples collected for every year that the constituent was analyzed. Values for a single sample are arbitrarily listed in the "Mean" column. Because *Hydropsyche* insects were not sorted to the species level during 1986–89, *Hydropsyche* species statistics for stations sampled during those years are based on the results of all *Hydropsyche* species combined. At some sites, statistics of *Hydropsyche morosa* group are based on the combined results of two or more species. Insects collected during 1986–98 were depurated prior to analysis; depuration was discontinued in 1999. Arsenic was not analyzed until 2003; therefore, the number of samples may be small or zero for some taxa. Values are reported using U.S. Geological Survey rounding standards. Abbreviation: spp., one or more similar species. Symbols: <, less than minimum reporting level; --, indicates either too few samples (less than three) or insufficient data to compute statistic, or element not analyzed]

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
12323600--Silver Bow Creek at Opportunity Period of record for biological data: 1992, 1994–95, 1997–2010					
Brachycentrus spp.					
Arsenic	0	--	--	--	--
Cadmium	5	12.5	5.8	10.1	11.6
Chromium	5	5.9	.7	2.1	.9
Copper	5	846	235	587	592
Iron	5	1,190	335	617	469
Lead	5	21.5	7.4	13.7	13.8
Manganese	5	817	231	515	503
Nickel	5	2.1	<.1	[1]1.3	[1]1.6
Zinc	5	995	629	803	815
Hydropsyche cockerelli					
Arsenic	13	33.3	9.5	15.2	13.1
Cadmium	19	9.7	3.1	5.6	5.2
Chromium	19	8.0	1.0	3.3	3.0
Copper	19	1,090	232	420	373
Iron	19	5,890	689	2,460	2,110
Lead	19	68.3	19.0	38.5	39.5
Manganese	19	3,030	180	1,030	1,100
Nickel	19	3.6	.7	2.4	2.5
Zinc	19	1,590	619	891	805
Hydropsyche spp.					
Arsenic	11	23.1	6.1	13.3	11.8
Cadmium	16	11.0	2.0	5.8	5.3
Chromium	16	4.7	.6	2.4	2.6
Copper	16	930	80.7	472	436
Iron	16	3,250	1,050	2,090	2,120
Lead	16	237	19.3	48.9	38.2
Manganese	16	1,340	612	1,040	1,050
Nickel	16	2.7	.7	2.1	2.4
Zinc	16	1,290	388	917	988
Hydropsyche tana					
Arsenic	0	--	--	--	--
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	875	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

Table 27. Statistical summary of long-term biological data for the Clark Fork basin, Montana, August 1986 through August 2010.—Continued

[Concentrations are in micrograms per gram dry weight (µg/g). Number of composite samples represents the total of all individual composite samples collected for every year that the constituent was analyzed. Values for a single sample are arbitrarily listed in the "Mean" column. Because *Hydropsyche* insects were not sorted to the species level during 1986–89, *Hydropsyche* species statistics for stations sampled during those years are based on the results of all *Hydropsyche* species combined. At some sites, statistics of *Hydropsyche morosa* group are based on the combined results of two or more species. Insects collected during 1986–98 were depurated prior to analysis; depuration was discontinued in 1999. Arsenic was not analyzed until 2003; therefore, the number of samples may be small or zero for some taxa. Values are reported using U.S. Geological Survey rounding standards. Abbreviation: spp., one or more similar species. Symbols: <, less than minimum reporting level; --, indicates either too few samples (less than three) or insufficient data to compute statistic, or element not analyzed]

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
12323750--Silver Bow Creek at Warm Springs Period of record for biological data: 1992–2010					
Claassenia sabulosa					
Arsenic	1	--	--	1.8	--
Cadmium	1	--	--	1.1	--
Chromium	1	--	--	2.8	--
Copper	1	--	--	47.6	--
Iron	1	--	--	151	--
Lead	1	--	--	.6	--
Manganese	1	--	--	98.1	--
Nickel	1	--	--	.5	--
Zinc	1	--	--	400	--
Hydropsyche cockerelli					
Arsenic	14	23.6	7.9	12.6	10.3
Cadmium	40	2.1	.2	.6	.5
Chromium	40	4.3	.4	1.1	.8
Copper	40	97.0	16.7	36.6	29.9
Iron	40	1,590	351	788	761
Lead	40	5.7	.3	3.0	2.9
Manganese	40	3,890	491	1,280	992
Nickel	40	1.8	.3	.9	.8
Zinc	40	276	115	175	167
Hydropsyche occidentalis					
Arsenic	7	31.0	10.5	19.8	18.0
Cadmium	22	1.6	.2	.6	.4
Chromium	22	6.8	.3	1.6	1.0
Copper	22	48.9	11.0	32.8	32.0
Iron	22	2,960	372	1,210	989
Lead	22	8.2	<1.7	[1]4.0	[1]3.7
Manganese	22	6,940	1,200	2,490	2,040
Nickel	22	2.7	.7	1.5	1.5
Zinc	22	220	140	180	182
Hydropsyche spp.					
Arsenic	1	--	--	14.0	--
Cadmium	5	2.3	0.4	1.0	0.6
Chromium	5	2.5	.5	1.4	1.3
Copper	5	47.6	34.9	39.9	40.4
Iron	5	1,100	561	763	767
Lead	5	5.1	1.9	4.0	4.5
Manganese	5	1,190	443	817	804
Nickel	5	1.9	<.4	[1]1.0	[1].8
Zinc	5	284	141	188	162

Table 27. Statistical summary of long-term biological data for the Clark Fork basin, Montana, August 1986 through August 2010.—Continued

[Concentrations are in micrograms per gram dry weight (µg/g). Number of composite samples represents the total of all individual composite samples collected for every year that the constituent was analyzed. Values for a single sample are arbitrarily listed in the "Mean" column. Because *Hydropsyche* insects were not sorted to the species level during 1986–89, *Hydropsyche* species statistics for stations sampled during those years are based on the results of all *Hydropsyche* species combined. At some sites, statistics of *Hydropsyche morosa* group are based on the combined results of two or more species. Insects collected during 1986–98 were depurated prior to analysis; depuration was discontinued in 1999. Arsenic was not analyzed until 2003; therefore, the number of samples may be small or zero for some taxa. Values are reported using U.S. Geological Survey rounding standards. Abbreviation: spp., one or more similar species. Symbols: <, less than minimum reporting level; --, indicates either too few samples (less than three) or insufficient data to compute statistic, or element not analyzed]

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
12323770--Warm Springs Creek at Warm Springs Period of record for biological data: 1995, 1997, 1999, 2002, 2005, 2008					
Arctopsyche grandis					
Arsenic	3	9.8	9.5	9.6	9.6
Cadmium	7	3.6	1.9	2.8	3.0
Chromium	7	2.9	.8	2.0	1.8
Copper	7	133	78.3	109	102
Iron	7	1,350	684	980	1040
Lead	7	7.2	3.0	[1]5.2	[1]5.3
Manganese	7	3,560	1,340	2,540	2,480
Nickel	7	3.5	1.8	[1]2.5	[1]2.3
Zinc	7	267	181	206	197
Hydropsyche occidentalis					
Arsenic	3	13.6	12.7	13.2	13.3
Cadmium	5	1.3	.7	1.0	1.2
Chromium	5	8.6	.3	3.8	3.2
Copper	5	183	125	158	165
Iron	5	2,360	1,590	1,940	1,950
Lead	5	12.6	6.7	8.5	7.7
Manganese	5	3,190	2,400	2,800	2,880
Nickel	5	4.5	2.0	3.0	3.0
Zinc	5	204	148	169	166
Hydropsyche spp.					
Arsenic	0	--	--	--	--
Cadmium	2	1.1	0.6	0.9	--
Chromium	2	1.6	1.4	1.5	--
Copper	2	95.9	94.8	95.3	--
Iron	2	1,220	1,150	1,190	--
Lead	2	5.9	5.2	5.6	--
Manganese	2	3,390	956	2,170	--
Nickel	2	2.0	1.8	1.9	--
Zinc	2	129	125	127	--

Table 27. Statistical summary of long-term biological data for the Clark Fork basin, Montana, August 1986 through August 2010.—Continued

[Concentrations are in micrograms per gram dry weight (µg/g). Number of composite samples represents the total of all individual composite samples collected for every year that the constituent was analyzed. Values for a single sample are arbitrarily listed in the "Mean" column. Because *Hydropsyche* insects were not sorted to the species level during 1986–89, *Hydropsyche* species statistics for stations sampled during those years are based on the results of all *Hydropsyche* species combined. At some sites, statistics of *Hydropsyche morosa* group are based on the combined results of two or more species. Insects collected during 1986–98 were depurated prior to analysis; depuration was discontinued in 1999. Arsenic was not analyzed until 2003; therefore, the number of samples may be small or zero for some taxa. Values are reported using U.S. Geological Survey rounding standards. Abbreviation: spp., one or more similar species. Symbols: <, less than minimum reporting level; --, indicates either too few samples (less than three) or insufficient data to compute statistic, or element not analyzed]

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
12323800--Clark Fork near Galen Period of record for biological data: 1987, 1991–2010					
Claassenia sabulosa					
Arsenic	1	--	--	2.0	--
Cadmium	1	--	--	.2	--
Chromium	1	--	--	1.5	--
Copper	1	--	--	54.7	--
Iron	1	--	--	242	--
Lead	1	--	--	1.0	--
Manganese	1	--	--	323	--
Nickel	1	--	--	.5	--
Zinc	1	--	--	237	--
Hydropsyche cockerelli					
Arsenic	8	15.8	13.2	14.1	13.8
Cadmium	33	2.7	.7	1.5	1.5
Chromium	33	4.4	.8	1.9	1.7
Copper	33	181	48.7	105	102
Iron	33	2,660	816	1,470	1,400
Lead	33	11.8	1.2	8.1	7.8
Manganese	33	3,620	1,070	2,250	2,200
Nickel	33	6.5	.9	1.8	1.6
Zinc	33	299	136	210	205
Hydropsyche morosa group					
Arsenic	0	--	--	--	--
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 long-term biological data for the Clark Fork basin, Montana, August 1986 through August 2010.—Continued

[Concentrations are in micrograms per gram dry weight (µg/g). Number of composite samples represents the total of all individual composite samples collected for every year that the constituent was analyzed. Values for a single sample are arbitrarily listed in the "Mean" column. Because *Hydropsyche* insects were not sorted to the species level during 1986–89, *Hydropsyche* species statistics for stations sampled during those years are based on the results of all *Hydropsyche* species combined. At some sites, statistics of *Hydropsyche morosa* group are based on the combined results of two or more species. Insects collected during 1986–98 were depurated prior to analysis; depuration was discontinued in 1999. Arsenic was not analyzed until 2003; therefore, the number of samples may be small or zero for some taxa. Values are reported using U.S. Geological Survey rounding standards. Abbreviation: spp., one or more similar species. Symbols: <, less than minimum reporting level; --, indicates either too few samples (less than three) or insufficient data to compute statistic, or element not analyzed]

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
12323800--Clark Fork near Galen—Continued Period of record for biological data: 1987, 1991–2010					
Hydropsyche occidentalis					
Arsenic	12	17.0	9.1	14.7	15.4
Cadmium	44	1.7	.6	1.1	1.2
Chromium	44	6.6	.4	2.0	1.7
Copper	44	151	49.2	87.5	83.9
Iron	44	2,590	642	1,390	1,320
Lead	44	13.5	1.6	7.6	7.3
Manganese	44	6,170	992	2,660	2,260
Nickel	44	3.5	.8	1.7	1.6
Zinc	44	286	168	203	198
Hydropsyche tana					
Arsenic	0	--	--	--	--
Cadmium	1	--	--	1.5	--
Chromium	1	--	--	1.4	--
Copper	1	--	--	92.9	--
Iron	1	--	--	1,340	--
Lead	1	--	--	9.0	--
Manganese	1	--	--	2,160	--
Nickel	1	--	--	2.1	--
Zinc	1	--	--	206	--
Hydropsyche spp.					
Arsenic	5	15.7	5.5	11.1	14.2
Cadmium	9	3.5	.7	1.8	1.3
Chromium	5	2.4	1.1	1.8	1.9
Copper	9	154	55.3	110	126
Iron	9	2,110	914	1,350	1,300
Lead	9	13.5	3.8	9.0	10.5
Manganese	5	4,760	668	2,410	1,520
Nickel	5	2.7	.9	1.6	1.5
Zinc	9	329	132	239	228

Table 27. Statistical summary of long-term biological data for the Clark Fork basin, Montana, August 1986 through August 2010.—Continued

[Concentrations are in micrograms per gram dry weight (µg/g). Number of composite samples represents the total of all individual composite samples collected for every year that the constituent was analyzed. Values for a single sample are arbitrarily listed in the "Mean" column. Because *Hydropsyche* insects were not sorted to the species level during 1986–89, *Hydropsyche* species statistics for stations sampled during those years are based on the results of all *Hydropsyche* species combined. At some sites, statistics of *Hydropsyche morosa* group are based on the combined results of two or more species. Insects collected during 1986–98 were depurated prior to analysis; depuration was discontinued in 1999. Arsenic was not analyzed until 2003; therefore, the number of samples may be small or zero for some taxa. Values are reported using U.S. Geological Survey rounding standards. Abbreviation: spp., one or more similar species. Symbols: <, less than minimum reporting level; --, indicates either too few samples (less than three) or insufficient data to compute statistic, or element not analyzed]

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
461415112450801--Clark Fork below Lost Creek, near Galen Period of record for biological data: 1996–2010					
Claassenia sabulosa					
Arsenic	1	--	--	1.5	--
Cadmium	2	0.4	0.3	.4	--
Chromium	2	1.9	.4	1.2	--
Copper	2	70.1	67.1	68.6	--
Iron	2	209	189	199	--
Lead	2	1.2	.7	1.0	--
Manganese	2	238	90.4	164	--
Nickel	2	.2	<.2	[1].1	--
Zinc	2	245	208	226	--
Hydropsyche cockerelli					
Arsenic	11	27.8	8.8	14.3	11.6
Cadmium	22	2.8	1.1	1.8	1.6
Chromium	22	3.6	.8	2.0	2.0
Copper	22	338	48.8	134	113
Iron	22	4,080	691	1,530	1,180
Lead	22	28.6	4.5	11.6	9.0
Manganese	22	3,160	1,230	1,850	1,720
Nickel	22	2.8	.9	1.4	1.2
Zinc	22	339	151	228	223
Hydropsyche occidentalis					
Arsenic	9	20.9	12.7	15.8	15.0
Cadmium	23	1.9	.9	1.4	1.4
Chromium	23	3.6	1.2	2.1	2.0
Copper	23	219	52.1	117	119
Iron	23	2,830	963	1,650	1,510
Lead	23	19.4	6.6	11.0	10.7
Manganese	23	4,150	1,220	2,540	2,190
Nickel	23	3.0	.9	1.6	1.5
Zinc	23	308	174	243	245
Hydropsyche spp.					
Arsenic	4	14.5	7.0	10.2	9.7
Cadmium	8	1.8	1.0	1.3	1.3
Chromium	8	2.4	.9	1.4	1.2
Copper	8	153	45.1	96.4	93.0
Iron	8	1,810	533	1,160	1,130
Lead	8	20.5	4.1	9.5	8.0
Manganese	8	1,980	775	1,270	1,230
Nickel	8	2.8	.9	1.6	1.4
Zinc	8	228	143	182	173

Table 27. Statistical summary of long-term biological data for the Clark Fork basin, Montana, August 1986 through August 2010.—Continued

[Concentrations are in micrograms per gram dry weight (µg/g). Number of composite samples represents the total of all individual composite samples collected for every year that the constituent was analyzed. Values for a single sample are arbitrarily listed in the "Mean" column. Because *Hydropsyche* insects were not sorted to the species level during 1986–89, *Hydropsyche* species statistics for stations sampled during those years are based on the results of all *Hydropsyche* species combined. At some sites, statistics of *Hydropsyche morosa* group are based on the combined results of two or more species. Insects collected during 1986–98 were depurated prior to analysis; depuration was discontinued in 1999. Arsenic was not analyzed until 2003; therefore, the number of samples may be small or zero for some taxa. Values are reported using U.S. Geological Survey rounding standards. Abbreviation: spp., one or more similar species. Symbols: <, less than minimum reporting level; --, indicates either too few samples (less than three) or insufficient data to compute statistic, or element not analyzed]

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
461559112443301--Clark Fork at county bridge, near Racetrack Period of record for biological data: 1996–2010					
			Claassenia sabulosa		
Arsenic	0	--	--	--	--
Cadmium	1	--	--	0.4	--
Chromium	1	--	--	.3	--
Copper	1	--	--	40.3	--
Iron	1	--	--	113	--
Lead	1	--	--	.8	--
Manganese	1	--	--	172	--
Nickel	1	--	--	.2	--
Zinc	1	--	--	213	--
			Hydropsyche cockerelli		
Arsenic	10	20.2	11.1	14.1	13.1
Cadmium	21	2.0	.8	1.5	1.5
Chromium	21	2.8	.6	1.7	1.4
Copper	21	198	50.0	102	98.2
Iron	21	3,330	657	1,270	992
Lead	21	17.2	3.7	8.7	7.5
Manganese	21	2,360	646	1,630	1,900
Nickel	21	2.0	.7	1.2	1.0
Zinc	21	302	139	193	186
			Hydropsyche occidentalis		
Arsenic	9	16.8	11.3	14.3	14.9
Cadmium	22	2.3	.7	1.5	1.5
Chromium	22	3.7	1.1	2.2	2.1
Copper	22	164	59.5	117	132
Iron	22	3,690	1,030	1,730	1,610
Lead	22	15.7	4.3	11.0	10.9
Manganese	22	3,770	1,090	2,160	2,070
Nickel	22	2.3	1.1	1.5	1.4
Zinc	22	361	181	238	235
			Hydropsyche spp.		
Arsenic	5	12.8	6.5	10.3	11.9
Cadmium	7	2.4	1.0	1.5	1.5
Chromium	7	3.9	.7	1.7	1.1
Copper	7	144	74.0	101	85.2
Iron	7	1,880	847	1,280	1,200
Lead	7	15.0	5.7	9.1	7.4
Manganese	7	2,370	886	1,340	1,130
Nickel	7	2.0	.7	1.3	1.3
Zinc	7	228	151	188	181

Table 27. Statistical summary of long-term biological data for the Clark Fork basin, Montana, August 1986 through August 2010.—Continued

[Concentrations are in micrograms per gram dry weight (µg/g). Number of composite samples represents the total of all individual composite samples collected for every year that the constituent was analyzed. Values for a single sample are arbitrarily listed in the "Mean" column. Because *Hydropsyche* insects were not sorted to the species level during 1986–89, *Hydropsyche* species statistics for stations sampled during those years are based on the results of all *Hydropsyche* species combined. At some sites, statistics of *Hydropsyche morosa* group are based on the combined results of two or more species. Insects collected during 1986–98 were depurated prior to analysis; depuration was discontinued in 1999. Arsenic was not analyzed until 2003; therefore, the number of samples may be small or zero for some taxa. Values are reported using U.S. Geological Survey rounding standards. Abbreviation: spp., one or more similar species. Symbols: <, less than minimum reporting level; --, indicates either too few samples (less than three) or insufficient data to compute statistic, or element not analyzed]

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
461903112440701--Clark Fork at Dempsey Creek diversion, near Racetrack Period of record for biological data: 1996–2010					
			Arctopsyche grandis		
Arsenic	1	--	--	11.8	--
Cadmium	2	7.1	1.7	4.4	--
Chromium	2	12.9	<2.4	[1]7.0	--
Copper	2	151	30.8	91.0	--
Iron	2	1,500	340	922	--
Lead	2	12.4	<14.5	[1]9.8	--
Manganese	2	1,190	510	852	--
Nickel	2	2.3	1.0	1.7	--
Zinc	2	489	86.8	288	--
			Claassenia sabulosa		
Arsenic	1	--	--	3.1	--
Cadmium	1	--	--	2.4	--
Chromium	1	--	--	1.7	--
Copper	1	--	--	73.4	--
Iron	1	--	--	297	--
Lead	1	--	--	1.9	--
Manganese	1	--	--	115	--
Nickel	1	--	--	.4	--
Zinc	1	--	--	330	--
			Hydropsyche cockerelli		
Arsenic	9	18.8	8.0	13.0	10.4
Cadmium	18	2.0	.7	1.3	1.3
Chromium	18	4.0	.5	1.6	1.3
Copper	18	247	60.7	113	90.2
Iron	18	3,010	552	1,200	923
Lead	18	21.9	3.5	8.7	7.3
Manganese	18	2,650	487	1,370	1,230
Nickel	18	2.5	.5	1.2	1.0
Zinc	18	279	162	208	190

Table 27. Statistical summary of long-term biological data for the Clark Fork basin, Montana, August 1986 through August 2010.—Continued

[Concentrations are in micrograms per gram dry weight (µg/g). Number of composite samples represents the total of all individual composite samples collected for every year that the constituent was analyzed. Values for a single sample are arbitrarily listed in the "Mean" column. Because *Hydropsyche* insects were not sorted to the species level during 1986–89, *Hydropsyche* species statistics for stations sampled during those years are based on the results of all *Hydropsyche* species combined. At some sites, statistics of *Hydropsyche morosa* group are based on the combined results of two or more species. Insects collected during 1986–98 were depurated prior to analysis; depuration was discontinued in 1999. Arsenic was not analyzed until 2003; therefore, the number of samples may be small or zero for some taxa. Values are reported using U.S. Geological Survey rounding standards. Abbreviation: spp., one or more similar species. Symbols: <, less than minimum reporting level; --, indicates either too few samples (less than three) or insufficient data to compute statistic, or element not analyzed]

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
461903112440701--Clark Fork at Dempsey Creek diversion, near Racetrack—Continued Period of record for biological data: 1996–2010					
Hydropsyche occidentalis					
Arsenic	12	24.0	10.2	14.8	15.3
Cadmium	29	2.4	.7	1.4	1.3
Chromium	29	6.2	.8	2.1	1.8
Copper	29	238	74.9	117	95.5
Iron	29	3,390	940	1,640	1,520
Lead	29	21.8	6.1	12.4	11.5
Manganese	29	4,460	826	2,570	2,320
Nickel	29	2.4	1.1	1.6	1.5
Zinc	29	386	211	267	249
Hydropsyche spp.					
Arsenic	2	6.5	6.4	6.4	--
Cadmium	4	1.7	.9	1.3	1.3
Chromium	4	2.1	.8	1.4	1.2
Copper	4	140	65.5	94.1	85.4
Iron	4	1,610	875	1,120	987
Lead	4	13.2	7.3	9.7	9.1
Manganese	4	1,150	638	824	756
Nickel	4	1.6	.6	1.1	1.1
Zinc	4	212	162	184	180

Table 27. Statistical summary of long-term biological data for the Clark Fork basin, Montana, August 1986 through August 2010.—Continued

[Concentrations are in micrograms per gram dry weight (µg/g). Number of composite samples represents the total of all individual composite samples collected for every year that the constituent was analyzed. Values for a single sample are arbitrarily listed in the "Mean" column. Because *Hydropsyche* insects were not sorted to the species level during 1986–89, *Hydropsyche* species statistics for stations sampled during those years are based on the results of all *Hydropsyche* species combined. At some sites, statistics of *Hydropsyche morosa* group are based on the combined results of two or more species. Insects collected during 1986–98 were depurated prior to analysis; depuration was discontinued in 1999. Arsenic was not analyzed until 2003; therefore, the number of samples may be small or zero for some taxa. Values are reported using U.S. Geological Survey rounding standards. Abbreviation: spp., one or more similar species. Symbols: <, less than minimum reporting level; --, indicates either too few samples (less than three) or insufficient data to compute statistic, or element not analyzed]

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
12324200--Clark Fork at Deer Lodge Period of record for biological data: 1986–87, 1990–2010					
Arctopsyche grandis					
Arsenic	2	8.3	5.8	7.1	--
Cadmium	4	4.7	<4.2	[1]3.4	[1]3.1
Chromium	4	4.7	1.0	[1]2.8	[1]2.8
Copper	4	90.5	34.9	68.0	73.2
Iron	4	1,090	537	788	760
Lead	4	11.2	3.8	[1]8.2	[1]<9.5
Manganese	4	1,010	380	766	837
Nickel	4	1.2	<1.3	[1]1.1	[1]1.1
Zinc	4	369	140	250	[2]46
Hydropsyche cockerelli					
Arsenic	6	11.4	5.8	8.2	7.8
Cadmium	29	3.5	.6	1.4	1.3
Chromium	29	3.2	.4	1.6	1.7
Copper	29	180	54.7	98.2	98.2
Iron	29	3,340	490	1,120	1,040
Lead	29	18.1	3.8	9.5	8.9
Manganese	29	1,570	396	879	815
Nickel	29	2.4	.3	1.1	1.0
Zinc	29	391	132	190	185
Hydropsyche occidentalis					
Arsenic	15	12.7	6.6	10.2	9.7
Cadmium	52	3.4	.6	1.5	1.3
Chromium	52	3.6	.6	1.9	1.9
Copper	52	180	49.4	119	114
Iron	52	2,060	558	1,430	1,430
Lead	52	18.6	3.5	11.6	11.5
Manganese	52	2,850	649	1,680	1,700
Nickel	52	12.9	1.0	1.7	1.4
Zinc	52	346	166	244	236
Hydropsyche spp.					
Arsenic	1	--	--	6.0	--
Cadmium	4	2.6	1.6	2.2	2.3
Chromium	1	--	--	.8	--
Copper	4	222	91	166	176
Iron	4	2,220	1,070	1,770	1,900
Lead	4	16.7	9.0	14.4	15.9
Manganese	1	--	--	837	--
Nickel	1	--	--	.9	--
Zinc	4	298	196	242	237

Table 27. Statistical summary of long-term biological data for the Clark Fork basin, Montana, August 1986 through August 2010.—Continued

[Concentrations are in micrograms per gram dry weight (µg/g). Number of composite samples represents the total of all individual composite samples collected for every year that the constituent was analyzed. Values for a single sample are arbitrarily listed in the "Mean" column. Because *Hydropsyche* insects were not sorted to the species level during 1986–89, *Hydropsyche* species statistics for stations sampled during those years are based on the results of all *Hydropsyche* species combined. At some sites, statistics of *Hydropsyche morosa* group are based on the combined results of two or more species. Insects collected during 1986–98 were depurated prior to analysis; depuration was discontinued in 1999. Arsenic was not analyzed until 2003; therefore, the number of samples may be small or zero for some taxa. Values are reported using U.S. Geological Survey rounding standards. Abbreviation: spp., one or more similar species. Symbols: <, less than minimum reporting level; --, indicates either too few samples (less than three) or insufficient data to compute statistic, or element not analyzed]

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
12324400--Clark Fork above Little Blackfoot River, near Garrison Period of record for biological data: 2009-10					
			Arctopsyche grandis		
Arsenic	2	6.0	5.5	5.8	--
Cadmium	2	4.9	3.2	4.1	--
Chromium	2	1.9	<2.2	[1]1.5	--
Copper	2	83.6	65.7	74.6	--
Iron	2	826	694	760	--
Lead	2	8.1	6.6	7.4	--
Manganese	2	990	940	965	--
Nickel	2	.8	.7	.8	--
Zinc	2	282	253	267	--
			Hydropsyche cockerelli		
Arsenic	1	--	--	11.1	--
Cadmium	1	--	--	4.0	--
Chromium	1	--	--	3.4	--
Copper	1	--	--	158	--
Iron	1	--	--	2,150	--
Lead	1	--	--	18.8	--
Manganese	1	--	--	1,500	--
Nickel	1	--	--	1.7	--
Zinc	1	--	--	284	--
			Hydropsyche occidentalis		
Arsenic	4	14.7	7.9	10.4	9.5
Cadmium	4	2.5	2.4	2.5	2.5
Chromium	4	2.1	.7	1.6	1.8
Copper	4	144	98.2	120	120
Iron	4	2,000	1,290	1,620	1,600
Lead	4	17.9	11.1	14.5	14.5
Manganese	4	1,610	1,190	1,400	1,410
Nickel	4	1.7	1.0	1.3	1.3
Zinc	4	266	223	248	253

Table 27. Statistical summary of long-term biological data for the Clark Fork basin, Montana, August 1986 through August 2010.—Continued

[Concentrations are in micrograms per gram dry weight (µg/g). Number of composite samples represents the total of all individual composite samples collected for every year that the constituent was analyzed. Values for a single sample are arbitrarily listed in the "Mean" column. Because *Hydropsyche* insects were not sorted to the species level during 1986–89, *Hydropsyche* species statistics for stations sampled during those years are based on the results of all *Hydropsyche* species combined. At some sites, statistics of *Hydropsyche morosa* group are based on the combined results of two or more species. Insects collected during 1986–98 were depurated prior to analysis; depuration was discontinued in 1999. Arsenic was not analyzed until 2003; therefore, the number of samples may be small or zero for some taxa. Values are reported using U.S. Geological Survey rounding standards. Abbreviation: spp., one or more similar species. Symbols: <, less than minimum reporting level; --, indicates either too few samples (less than three) or insufficient data to compute statistic, or element not analyzed]

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
12324680--Clark Fork at Goldcreek Period of record for biological data: 1992–2010					
Arctopsyche grandis					
Arsenic	28	6.9	1.8	4.2	3.6
Cadmium	57	6.6	.6	2.0	1.8
Chromium	57	3.3	.1	1.2	1.0
Copper	57	129	19.9	44.3	38.4
Iron	57	2,360	195	675	516
Lead	57	10.9	1.0	3.6	3.3
Manganese	57	1,580	436	862	861
Nickel	57	1.8	.2	.7	.6
Zinc	57	326	146	200	184
Claassenia sabulosa					
Arsenic	21	2.5	0.4	1.4	1.5
Cadmium	41	3.5	.1	1.1	.7
Chromium	41	1.6	.2	.5	.5
Copper	41	81.7	33.0	58.6	58.1
Iron	41	567	63.0	185	165
Lead	41	2.3	.4	.9	.8
Manganese	41	320	50.6	152	129
Nickel	41	.7	.1	.3	.3
Zinc	41	364	166	266	258
Hydropsyche cockerelli					
Arsenic	16	9.8	4.1	5.9	5.6
Cadmium	35	4.2	.5	1.5	1.3
Chromium	35	4.7	.5	2.0	1.9
Copper	35	188	17.1	73.6	58.4
Iron	35	3,250	522	1,160	930
Lead	35	17.6	2.4	6.7	5.3
Manganese	35	1,710	538	1,000	963
Nickel	35	3.5	.3	1.2	1.0
Zinc	35	359	106	193	186

Table 27. Statistical summary of long-term biological data for the Clark Fork basin, Montana, August 1986 through August 2010.—Continued

[Concentrations are in micrograms per gram dry weight (µg/g). Number of composite samples represents the total of all individual composite samples collected for every year that the constituent was analyzed. Values for a single sample are arbitrarily listed in the "Mean" column. Because *Hydropsyche* insects were not sorted to the species level during 1986–89, *Hydropsyche* species statistics for stations sampled during those years are based on the results of all *Hydropsyche* species combined. At some sites, statistics of *Hydropsyche morosa* group are based on the combined results of two or more species. Insects collected during 1986–98 were depurated prior to analysis; depuration was discontinued in 1999. Arsenic was not analyzed until 2003; therefore, the number of samples may be small or zero for some taxa. Values are reported using U.S. Geological Survey rounding standards. Abbreviation: spp., one or more similar species. Symbols: <, less than minimum reporting level; --, indicates either too few samples (less than three) or insufficient data to compute statistic, or element not analyzed]

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
12324680--Clark Fork at Goldcreek—Continued Period of record for biological data: 1992–2010					
Hydropsyche morosa group					
Arsenic	0	--	--	--	--
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					
Arsenic	10	8.1	4.7	6.1	5.9
Cadmium	25	2.3	.4	1.3	1.5
Chromium	25	3.9	.4	1.7	1.7
Copper	25	156	26.4	67.3	61.4
Iron	25	2,720	466	1,170	1,120
Lead	25	15.7	2.9	7.1	6.0
Manganese	25	2,210	530	1,260	1,280
Nickel	25	2.5	.8	1.2	1.0
Zinc	25	277	97.0	201	203
Hydropsyche spp.					
Arsenic	2	5.9	5.7	5.8	--
Cadmium	2	1.8	1.7	1.8	--
Chromium	2	1.6	1.6	1.6	--
Copper	2	83.5	73.6	78.6	--
Iron	2	1,150	1,110	1,130	--
Lead	2	9.2	8.0	8.6	--
Manganese	2	1,180	1,130	1,150	--
Nickel	2	.8	.8	.8	--
Zinc	2	210	196	203	--

Table 27. Statistical summary of long-term biological data for the Clark Fork basin, Montana, August 1986 through August 2010.—Continued

[Concentrations are in micrograms per gram dry weight (µg/g). Number of composite samples represents the total of all individual composite samples collected for every year that the constituent was analyzed. Values for a single sample are arbitrarily listed in the "Mean" column. Because *Hydropsyche* insects were not sorted to the species level during 1986–89, *Hydropsyche* species statistics for stations sampled during those years are based on the results of all *Hydropsyche* species combined. At some sites, statistics of *Hydropsyche morosa* group are based on the combined results of two or more species. Insects collected during 1986–98 were depurated prior to analysis; depuration was discontinued in 1999. Arsenic was not analyzed until 2003; therefore, the number of samples may be small or zero for some taxa. Values are reported using U.S. Geological Survey rounding standards. Abbreviation: spp., one or more similar species. Symbols: <, less than minimum reporting level; --, indicates either too few samples (less than three) or insufficient data to compute statistic, or element not analyzed]

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
12331800--Clark Fork near Drummond Period of record for biological data: 1986, 1991–2010					
Arctopsyche grandis					
Arsenic	21	5.3	2.3	3.7	3.8
Cadmium	53	3.8	.4	1.4	1.3
Chromium	53	3.3	.2	1.0	1.0
Copper	53	89.2	16.9	33.1	29.1
Iron	53	1,660	193	603	535
Lead	53	11.8	1.6	4.6	4.1
Manganese	53	2,010	456	844	754
Nickel	53	1.9	.2	.6	.6
Zinc	53	308	140	197	189
Claassenia sabulosa					
Arsenic	17	1.8	0.7	1.2	1.2
Cadmium	53	2.8	.1	1.0	1.0
Chromium	53	3.3	.1	.7	.6
Copper	53	165	18.0	65.0	60.6
Iron	53	387	45.4	166	146
Lead	53	2.9	.2	1.0	.9
Manganese	53	748	33.1	188	150
Nickel	53	1.1	.1	[1].3	[1].2
Zinc	53	567	103	274	261
Hydropsyche cockerelli					
Arsenic	13	7.1	3.9	5.4	5.3
Cadmium	42	4.5	.3	1.2	1.0
Chromium	42	3.5	.4	1.6	1.5
Copper	42	156	30.0	59.5	52.6
Iron	42	2,500	506	1,190	987
Lead	42	15.0	4.7	8.5	7.7
Manganese	42	1,680	549	1,010	934
Nickel	42	2.0	.5	1.1	1.1
Zinc	42	322	134	197	190

Table 27. Statistical summary of long-term biological data for the Clark Fork basin, Montana, August 1986 through August 2010.—Continued

[Concentrations are in micrograms per gram dry weight (µg/g). Number of composite samples represents the total of all individual composite samples collected for every year that the constituent was analyzed. Values for a single sample are arbitrarily listed in the "Mean" column. Because *Hydropsyche* insects were not sorted to the species level during 1986–89, *Hydropsyche* species statistics for stations sampled during those years are based on the results of all *Hydropsyche* species combined. At some sites, statistics of *Hydropsyche morosa* group are based on the combined results of two or more species. Insects collected during 1986–98 were depurated prior to analysis; depuration was discontinued in 1999. Arsenic was not analyzed until 2003; therefore, the number of samples may be small or zero for some taxa. Values are reported using U.S. Geological Survey rounding standards. Abbreviation: spp., one or more similar species. Symbols: <, less than minimum reporting level; --, indicates either too few samples (less than three) or insufficient data to compute statistic, or element not analyzed]

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
12331800--Clark Fork near Drummond—Continued Period of record for biological data: 1986, 1991–2010					
Hydropsyche morosa group					
Arsenic	0	--	--	--	--
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	1,370	1,570	1,600
Lead	6	10.8	7.0	8.9	9.0
Manganese	6	1,940	1,260	1,610	1,610
Nickel	6	1.7	1.3	1.5	1.5
Zinc	6	250	227	239	240
Hydropsyche occidentalis					
Arsenic	13	6.9	4.3	5.4	5.4
Cadmium	29	2.0	.4	1.1	1.0
Chromium	29	8.1	.4	2.2	2.1
Copper	29	118	13.3	56.1	55.2
Iron	29	2,060	424	1,230	1,180
Lead	29	14.0	2.9	8.6	8.7
Manganese	29	2,920	619	1,470	1,230
Nickel	29	2.4	.5	1.3	1.2
Zinc	29	293	157	222	222
Hydropsyche spp.					
Arsenic	0	--	--	--	--
Cadmium	1	--	--	2.6	--
Chromium	0	--	--	--	--
Copper	1	--	--	85.0	--
Iron	1	--	--	913	--
Lead	1	--	--	9.1	--
Manganese	0	--	--	--	--
Nickel	0	--	--	--	--
Zinc	1	--	--	260	--

Table 27. Statistical summary of long-term biological data for the Clark Fork basin, Montana, August 1986 through August 2010.—Continued

[Concentrations are in micrograms per gram dry weight (µg/g). Number of composite samples represents the total of all individual composite samples collected for every year that the constituent was analyzed. Values for a single sample are arbitrarily listed in the "Mean" column. Because *Hydropsyche* insects were not sorted to the species level during 1986–89, *Hydropsyche* species statistics for stations sampled during those years are based on the results of all *Hydropsyche* species combined. At some sites, statistics of *Hydropsyche morosa* group are based on the combined results of two or more species. Insects collected during 1986–98 were depurated prior to analysis; depuration was discontinued in 1999. Arsenic was not analyzed until 2003; therefore, the number of samples may be small or zero for some taxa. Values are reported using U.S. Geological Survey rounding standards. Abbreviation: spp., one or more similar species. Symbols: <, less than minimum reporting level; --, indicates either too few samples (less than three) or insufficient data to compute statistic, or element not analyzed]

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
12334550--Clark Fork at Turah Bridge, near Bonner Period of record for biological data: 1986, 1991–2010					
Arctopsyche grandis					
Arsenic	25	6.1	3.1	4.4	4.4
Cadmium	67	2.7	.3	1.2	.9
Chromium	67	4.1	.5	1.6	1.4
Copper	67	125	20.1	37.1	32.0
Iron	67	2,870	372	910	790
Lead	67	13.2	1.6	4.3	3.7
Manganese	67	902	324	645	660
Nickel	67	2.6	.4	1.1	.9
Zinc	67	276	111	199	198
Claassenia sabulosa					
Arsenic	17	1.9	0.5	1.1	1.2
Cadmium	43	2.5	.1	1.0	.8
Chromium	43	2.0	.2	.7	.6
Copper	43	95.1	37.5	60.1	56.7
Iron	43	340	58.6	127	114
Lead	43	1.6	.2	.6	.6
Manganese	43	229	37.2	99.0	89.4
Nickel	43	.6	.04	.2	.2
Zinc	43	342	144	230	235
Hydropsyche cockerelli					
Arsenic	18	6.0	3.7	4.7	4.9
Cadmium	46	1.8	.3	.9	.7
Chromium	46	8.0	.2	2.0	1.7
Copper	46	118	26.4	48.9	44.3
Iron	46	2,530	566	1,220	1,160
Lead	46	12.1	2.2	5.4	5.1
Manganese	46	831	426	642	659
Nickel	46	2.6	.6	1.3	1.2
Zinc	46	228	119	187	194

Table 27. Statistical summary of long-term biological data for the Clark Fork basin, Montana, August 1986 through August 2010.—Continued

[Concentrations are in micrograms per gram dry weight (µg/g). Number of composite samples represents the total of all individual composite samples collected for every year that the constituent was analyzed. Values for a single sample are arbitrarily listed in the "Mean" column. Because *Hydropsyche* insects were not sorted to the species level during 1986–89, *Hydropsyche* species statistics for stations sampled during those years are based on the results of all *Hydropsyche* species combined. At some sites, statistics of *Hydropsyche morosa* group are based on the combined results of two or more species. Insects collected during 1986–98 were depurated prior to analysis; depuration was discontinued in 1999. Arsenic was not analyzed until 2003; therefore, the number of samples may be small or zero for some taxa. Values are reported using U.S. Geological Survey rounding standards. Abbreviation: spp., one or more similar species. Symbols: <, less than minimum reporting level; --, indicates either too few samples (less than three) or insufficient data to compute statistic, or element not analyzed]

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
12334550--Clark Fork at Turah Bridge, near Bonner—Continued Period of record for biological data: 1986, 1991–2010					
Hydropsyche morosa group					
Arsenic	0	--	--	--	--
Cadmium	2	1.3	1.1	1.2	--
Chromium	2	4.6	2.4	3.5	--
Copper	2	84.1	26.8	55.4	--
Iron	2	1,800	986	1,390	--
Lead	2	6.6	<7.8	[1]5.2	--
Manganese	2	1,320	537	928	--
Nickel	2	1.7	1.3	1.5	--
Zinc	2	231	171	201	--
Hydropsyche occidentalis					
Arsenic	14	5.9	3.6	4.4	4.2
Cadmium	34	1.8	.3	.9	.9
Chromium	34	5.0	.6	1.9	1.7
Copper	34	102	27.4	48.2	45.1
Iron	34	2,310	472	1,230	1,150
Lead	34	14.2	3.0	6.4	5.6
Manganese	34	1,600	454	863	791
Nickel	34	3.2	.6	1.2	1.2
Zinc	34	416	145	213	220
Hydropsyche spp.					
Arsenic	0	--	--	--	--
Cadmium	1	--	--	1.3	--
Chromium	1	--	--	2.4	--
Copper	1	--	--	84.1	--
Iron	1	--	--	1,800	--
Lead	1	--	--	<7.8	--
Manganese	1	--	--	537	--
Nickel	1	--	--	1.3	--
Zinc	1	--	--	171	--

Table 27. Statistical summary of long-term biological data for the Clark Fork basin, Montana, August 1986 through August 2010.—Continued

[Concentrations are in micrograms per gram dry weight (µg/g). Number of composite samples represents the total of all individual composite samples collected for every year that the constituent was analyzed. Values for a single sample are arbitrarily listed in the "Mean" column. Because *Hydropsyche* insects were not sorted to the species level during 1986–89, *Hydropsyche* species statistics for stations sampled during those years are based on the results of all *Hydropsyche* species combined. At some sites, statistics of *Hydropsyche morosa* group are based on the combined results of two or more species. Insects collected during 1986–98 were depurated prior to analysis; depuration was discontinued in 1999. Arsenic was not analyzed until 2003; therefore, the number of samples may be small or zero for some taxa. Values are reported using U.S. Geological Survey rounding standards. Abbreviation: spp., one or more similar species. Symbols: <, less than minimum reporting level; --, indicates either too few samples (less than three) or insufficient data to compute statistic, or element not analyzed]

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
12340000--Blackfoot River near Bonner					
Period of record for biological data: 1986–87, 1991, 1993, 1996, 1998, 2000, 2003, 2006-10					
Arctopsyche grandis					
Arsenic	6	4.6	1.6	3.0	2.5
Cadmium	16	.4	.1	.3	.2
Chromium	11	6.9	.5	2.0	1.3
Copper	16	16.2	9.9	12.8	12.4
Iron	16	1,230	108	664	757
Lead	16	2.3	.5	1.1	.9
Manganese	11	633	286	472	476
Nickel	11	3.7	.7	1.3	1.2
Zinc	16	156	123	140	138
Claassenia sabulosa					
Arsenic	8	3.0	0.3	1.3	1.4
Cadmium	19	.2	.1	.1	.1
Chromium	14	5.2	.3	1.0	.7
Copper	19	88.5	19.0	43.2	41.0
Iron	19	265	46.2	138	135
Lead	19	.8	.1	.3	.2
Manganese	14	133	26.3	82.2	83.8
Nickel	14	1.1	.1	.3	.3
Zinc	19	328	117	221	197
Hydropsyche cockerelli					
Arsenic	5	4.2	2.4	3.2	3.1
Cadmium	5	.6	<.1	[1].4	[1].4
Chromium	5	3.8	2.4	3.2	3.6
Copper	5	16.2	5.6	13.3	14.8
Iron	5	2,390	1,550	1,910	1,970
Lead	5	2.3	1.9	2.1	2.1
Manganese	5	814	428	642	637
Nickel	5	4.6	1.8	2.7	2.2
Zinc	5	162	140	146	142

Table 27. Statistical summary of long-term biological data for the Clark Fork basin, Montana, August 1986 through August 2010.—Continued

[Concentrations are in micrograms per gram dry weight (µg/g). Number of composite samples represents the total of all individual composite samples collected for every year that the constituent was analyzed. Values for a single sample are arbitrarily listed in the "Mean" column. Because *Hydropsyche* insects were not sorted to the species level during 1986–89, *Hydropsyche* species statistics for stations sampled during those years are based on the results of all *Hydropsyche* species combined. At some sites, statistics of *Hydropsyche morosa* group are based on the combined results of two or more species. Insects collected during 1986–98 were depurated prior to analysis; depuration was discontinued in 1999. Arsenic was not analyzed until 2003; therefore, the number of samples may be small or zero for some taxa. Values are reported using U.S. Geological Survey rounding standards. Abbreviation: spp., one or more similar species. Symbols: <, less than minimum reporting level; --, indicates either too few samples (less than three) or insufficient data to compute statistic, or element not analyzed]

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
12340000--Blackfoot River near Bonner—Continued					
Period of record for biological data: 1986–87, 1991, 1993, 1996, 1998, 2000, 2003, 2006-10					
Hydropsyche occidentalis					
Arsenic	7	3.8	1.9	2.7	2.4
Cadmium	19	.5	.1	.2	.2
Chromium	19	5.8	.8	2.2	1.9
Copper	19	20.6	12.0	15.3	14.7
Iron	19	2,090	1,010	1,490	1,500
Lead	19	2.0	.8	1.5	1.6
Manganese	19	798	414	543	510
Nickel	19	4.9	.9	1.6	1.4
Zinc	19	163	116	141	144
Hydropsyche spp.					
Arsenic	0	--	--	--	--
Cadmium	1	--	--	0.6	--
Chromium	1	--	--	1.6	--
Copper	1	--	--	13.9	--
Iron	1	--	--	1,140	--
Lead	1	--	--	2.9	--
Manganese	1	--	--	525	--
Nickel	1	--	--	2.8	--
Zinc	1	--	--	132	--

Table 27. Statistical summary of long-term biological data for the Clark Fork basin, Montana, August 1986 through August 2010.—Continued

[Concentrations are in micrograms per gram dry weight (µg/g). Number of composite samples represents the total of all individual composite samples collected for every year that the constituent was analyzed. Values for a single sample are arbitrarily listed in the "Mean" column. Because *Hydropsyche* insects were not sorted to the species level during 1986–89, *Hydropsyche* species statistics for stations sampled during those years are based on the results of all *Hydropsyche* species combined. At some sites, statistics of *Hydropsyche morosa* group are based on the combined results of two or more species. Insects collected during 1986–98 were depurated prior to analysis; depuration was discontinued in 1999. Arsenic was not analyzed until 2003; therefore, the number of samples may be small or zero for some taxa. Values are reported using U.S. Geological Survey rounding standards. Abbreviation: spp., one or more similar species. Symbols: <, less than minimum reporting level; --, indicates either too few samples (less than three) or insufficient data to compute statistic, or element not analyzed]

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
12340500--Clark Fork above Missoula Period of record for biological data: 1997–2010					
Arctopsyche grandis					
Arsenic	22	7.2	2.1	4.1	4.0
Cadmium	41	2.3	.1	.9	.7
Chromium	41	4.2	.6	1.7	1.6
Copper	41	81.2	19.5	40.9	36.8
Iron	41	2,340	476	1,080	990
Lead	41	8.9	1.2	4.4	4.1
Manganese	41	1,410	476	914	910
Nickel	41	2.1	.5	1.2	1.1
Zinc	41	272	133	200	198
Claassenia sabulosa					
Arsenic	13	1.9	0.5	1.4	1.5
Cadmium	22	2.0	.2	.8	.5
Chromium	22	1.4	.3	.8	.8
Copper	22	81.1	33.0	54.0	51.2
Iron	22	402	95.3	234	233
Lead	22	3.1	.4	1.1	1.0
Manganese	22	683	57.8	213	165
Nickel	22	.5	<.3	[1].4	[1].4
Zinc	22	363	191	279	272
Hydropsyche cockerelli					
Arsenic	16	8.9	3.7	6.5	6.6
Cadmium	25	2.0	.4	1.0	1.0
Chromium	25	6.0	1.8	3.1	3.3
Copper	25	99.7	29.9	68.5	75.9
Iron	25	3,590	1,400	2,170	2,160
Lead	25	12.1	4.2	8.1	7.6
Manganese	25	1,910	764	1,250	1,220
Nickel	25	2.4	1.4	1.9	1.9
Zinc	25	266	156	223	226

Table 27. Statistical summary of long-term biological data for the Clark Fork basin, Montana, August 1986 through August 2010.—Continued

[Concentrations are in micrograms per gram dry weight (µg/g). Number of composite samples represents the total of all individual composite samples collected for every year that the constituent was analyzed. Values for a single sample are arbitrarily listed in the "Mean" column. Because *Hydropsyche* insects were not sorted to the species level during 1986–89, *Hydropsyche* species statistics for stations sampled during those years are based on the results of all *Hydropsyche* species combined. At some sites, statistics of *Hydropsyche morosa* group are based on the combined results of two or more species. Insects collected during 1986–98 were depurated prior to analysis; depuration was discontinued in 1999. Arsenic was not analyzed until 2003; therefore, the number of samples may be small or zero for some taxa. Values are reported using U.S. Geological Survey rounding standards. Abbreviation: spp., one or more similar species. Symbols: <, less than minimum reporting level; --, indicates either too few samples (less than three) or insufficient data to compute statistic, or element not analyzed]

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
12340500--Clark Fork above Missoula—Continued Period of record for biological data: 1997–2010					
Hydropsyche occidentalis					
Arsenic	7	7.4	3.9	6.0	6.2
Cadmium	13	1.5	.4	.9	.7
Chromium	13	5.5	1.5	3.2	3.0
Copper	13	80.7	30.3	58.1	59.5
Iron	13	2,540	1,450	2,060	2,210
Lead	13	11.4	4.0	7.6	7.4
Manganese	13	2,470	939	1,750	1,730
Nickel	13	2.4	1.4	1.9	1.9
Zinc	13	278	192	238	232

[1]Values determined by substituting one-half of the minimum reporting level for censored (<) values when both uncensored and censored values were used in determining the mean and median. When all data were less than the minimum reporting level, the median was determined by ranking the censored values in order of detection.

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