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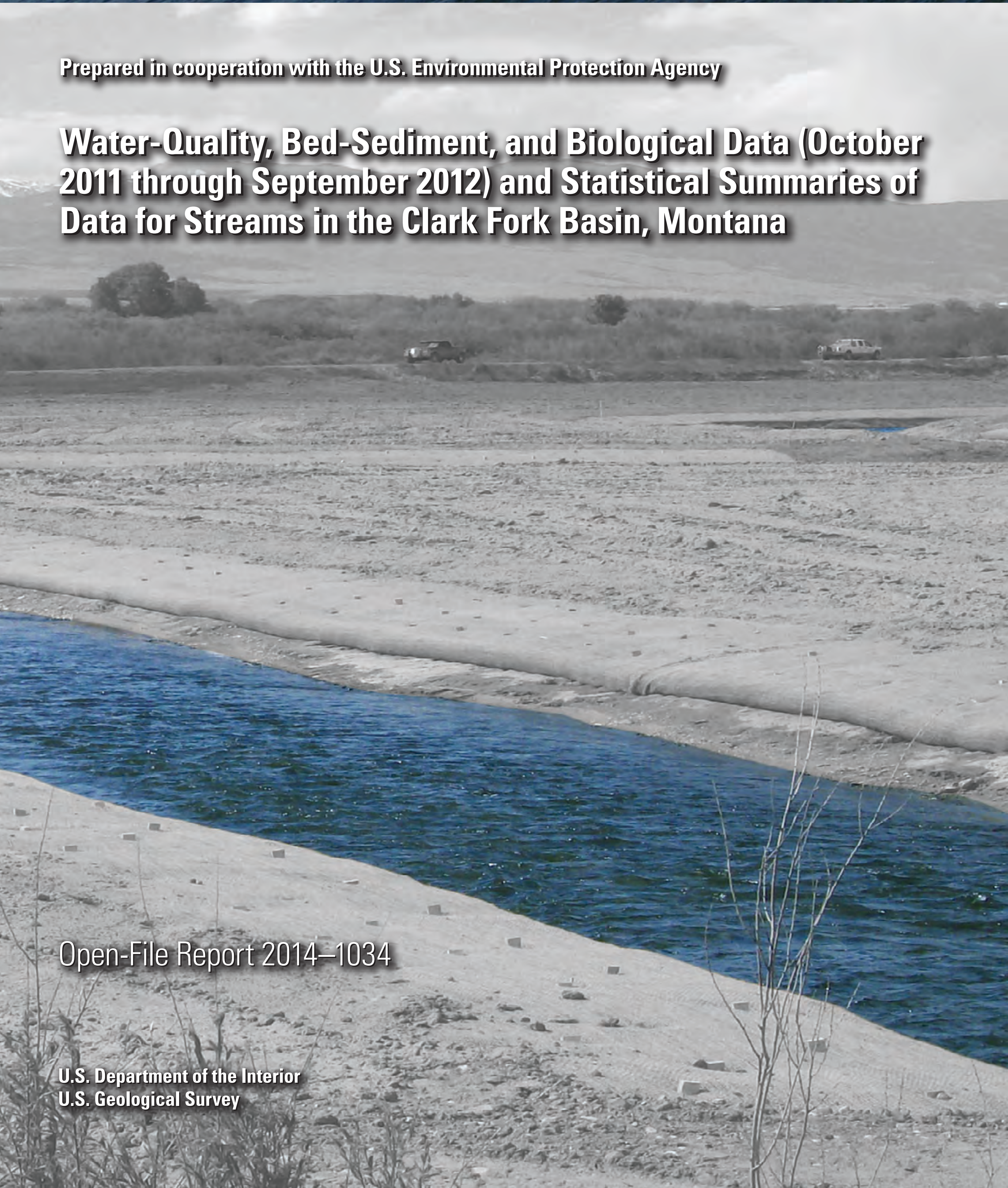
Water-Quality, Bed-Sediment, and Biological Data (October 2011 through September 2012) and Statistical Summaries of Data for Streams in the Clark Fork Basin, Montana



Open-File Report 2014–1034

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

Cover. Reconfigured channel of Silver Bow Creek near Opportunity, Montana, June 2013. Photograph by Kent A. Dodge, U.S. Geological Survey.

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By Kent A. Dodge, Michelle I. Hornberger, and Jessica L. Dyke

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U.S. Department of the Interior
SALLY JEWELL, Secretary

U.S. Geological Survey
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Conversion Factors, Datum, Abbreviated Water-Quality Units, and Abbreviations

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 x °C) + 32

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

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 2012 is the period from October 1, 2011, through September 30, 2012.

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

Abbreviations

FNU	formazin nephelometric units
ICP–AES	inductively coupled plasma–atomic emission spectrometry
ICP–MS	inductively coupled plasma–mass spectrometry
LRL	laboratory reporting level
LT–MDL	long-term method detection level
MRL	minimum reporting level
NTRU	nephelometric turbidity ratio unit
NWQL	USGS National Water Quality Laboratory, Denver, Colorado
PTFE	polytetrafluoroethylene
RSD	relative standard deviation
spp.	species
SRM	standard reference material
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 of western Montana. 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, 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 2011 through September 2012. Bed-sediment and biota samples were collected once at 13 sites during August 2012.

This report presents the analytical results and quality-assurance data for water-quality, bed-sediment, and biota samples collected at sites from October 2011 through September 2012. 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 mean 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 the town of 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 6,000square-mile (mi^2) upper Clark Fork Basin above Missoula include irrigation, stock watering, small-scale industry (Cannon and Johnson, 2004) , and habitat for trout fisheries. Primary current land uses 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 (2014) either discontinued or substantially reduced 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 took place in the basins of most of the major tributaries to the upper Clark Fork. Tailings produced during past mineral processing commonly contain large quantities of trace elements such as arsenic, cadmium, copper, lead, and zinc. Eroded tailings mix with stream sediment and get deposited farther downstream in stream channels, on flood plains, in the Warm Springs Ponds, and at the location of the former Milltown Reservoir (Milltown Dam was breached on March 28, 2008) (Andrews, 1987), especially during times of increased flow. 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, Tribal, 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, 2012 through 2013). 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 from samples collected at 20 sites and bed-sediment and biological data from samples collected at 13 sites in the Clark Fork Basin from October 2011 through September 2012 (fig. 1). Quality-assurance data are presented for water-quality, bed-sediment, and biota samples collected during the same time period. Statistical summaries also are provided for water-quality, bed-sediment, and biological data collected at the sites 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 approximate 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, Montana. Water-quality samples were collected periodically at 20 sites. Daily suspended-sediment samples were collected at four sites, and daily turbidity data were measured by continuous turbidity monitors recording every 15 minutes at four sites. Bed-sediment and biological samples were collected once annually at 13 sites. Continuous streamflow data were collected at 19 sites.

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 2012 are listed in tables 4 through 24 at the back of the report. Statistical summaries of long-term water-quality, bed-sediment, and biological data collected between March 1985 and September 2012 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 described in the following sections, which were designed to provide environmentally representative data. Acceptable results 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. Water samples 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 2–11 times per week, depending on season and flow conditions. Continuous turbidity monitors were operated seasonally (April to September 2012) at four sites near Anaconda; turbidity data (recorded every 15 minutes) were used to compute daily mean turbidity values (table 1).

Methods

Water samples were collected and composited 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 U.S. Geological Survey (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. Samplers consisted of isokinetic depth-integrating water-quality samplers (Davis, 2005) that were constructed of plastic or coated with a nonmetallic rubber-coating paint and equipped with nylon or polytetrafluoroethylene (PTFE) nozzles.

Instantaneous streamflow was determined at the time of water sampling either by direct measurement or from stage-discharge rating tables (Rantz and others, 1982). Daily mean streamflow values during ice periods were estimated because backwater affected the stage-discharge relation. Onsite measurements of pH, specific conductance, and water temperature

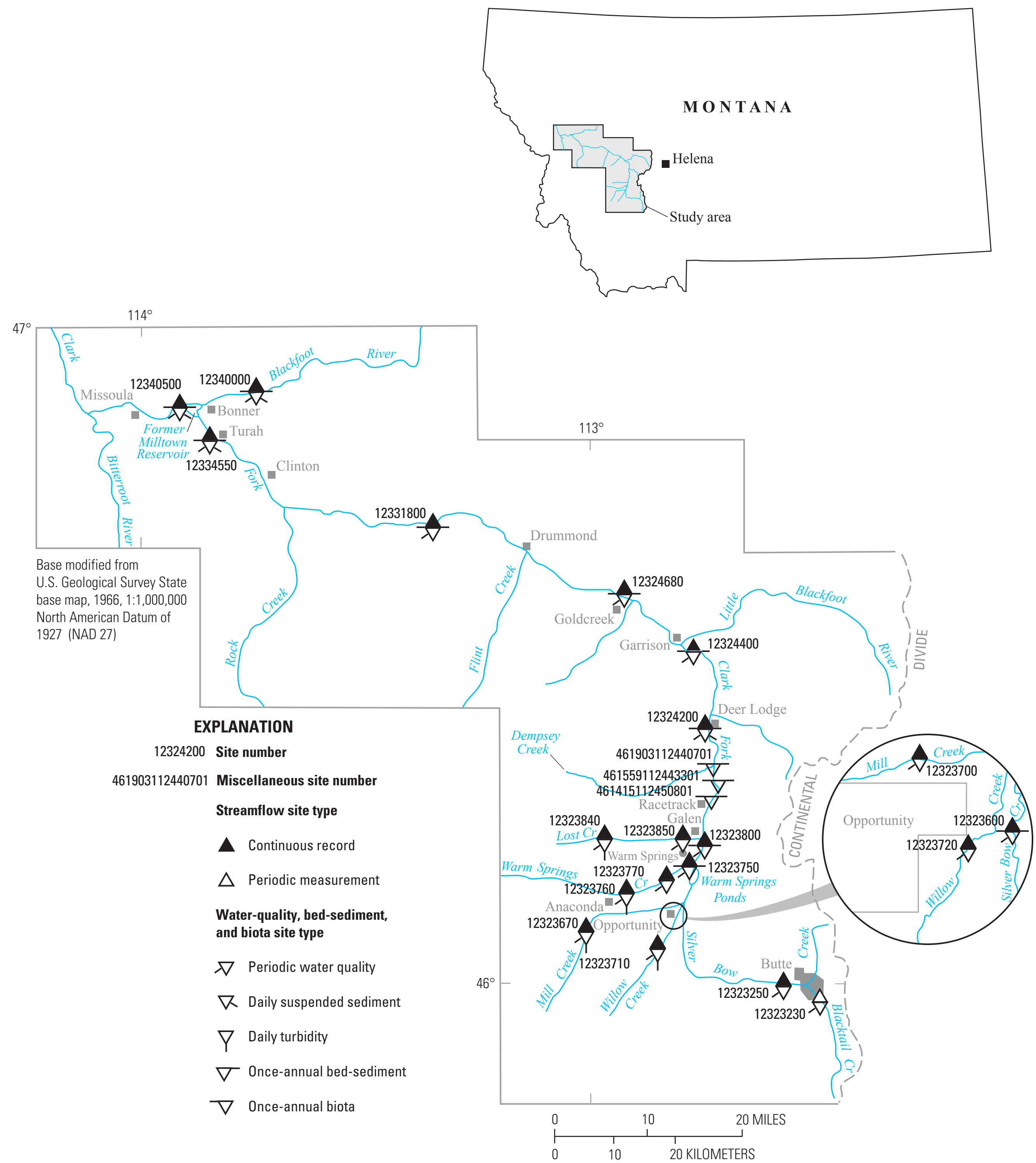

Figure 1. Location of study area in the Clark Fork Basin, Montana.

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

[--, no data; P, present; D, discontinued]

Station number (fig. 1)	Station name	Continuous-record streamflow	Periodic water quality[1]	Daily suspended sediment	Daily turbidity (seasonal)	Fine-grained bed sediment[2]	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	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	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, 08/11	08/95, 08/97, 08/99, 08/02, 08/05, 08/08, 08/11
12323800	Clark Fork near Galen	07/88–P	07/88–P	--	--	08/87, 08/91–P	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–P
461559112443301	Clark Fork at county bridge, near Racetrack	--	--	--	--	08/96–P	08/96–P
461903112440701	Clark Fork at Dempsey Creek diversion, near Racetrack	--	--	--	--	08/96–P	08/96–P
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	08/86–08/87, 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	07/92–P

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

[--, no data; P, present; D, discontinued]

Station number (fig. 1)	Station name	Continuous-record streamflow	Periodic water quality[1]	Daily suspended sediment	Daily turbidity (seasonal)	Fine-grained bed sediment[2]	Biota[2]
12331800	Clark Fork near Drummond	04/93–P	03/93–P	--	--	08/86, 08/87, 08/91–P	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	08/86, 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, 08/93–08/96, 08/98–08/01, 09/03, 08/06–P	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[3]	07/86–04/87, 06/88–01/96, 03/96–03/03, 08/03–P	04/07–09/07	08/97–P	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]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.

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

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	0.022 mg/L	20	--
Magnesium, filtered	0.011 mg/L	20	--
Arsenic, filtered	0.03 µg/L	20	25
Arsenic, unfiltered recoverable	0.28 µg/L	20	25
Cadmium, filtered	0.016 µg/L	20	25
Cadmium, unfiltered recoverable	0.016 µg/L	20	25
Copper, filtered	0.80 µg/L	20	25
Copper, unfiltered recoverable	0.70 µg/L	20	25
Iron, filtered	3.2 µg/L	20	25
Iron, unfiltered recoverable	4.6 µg/L	20	25
Lead, filtered	0.025 µg/L	20	25
Lead, unfiltered recoverable	0.04 µg/L	20	25
Manganese, filtered	0.13 µg/L	20	25
Manganese, unfiltered recoverable	0.4 µg/L	20	25
Zinc, filtered	1.4 µg/L	20	25
Zinc, unfiltered recoverable	3.0 µg/L	20	25
Sediment, suspended, percent finer than 0.062 mm	1 percent	20	--
Sediment, suspended	1 mg/L	20	--

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 U.S. Geological Survey (variously dated).

Composite water samples were analyzed for the constituents listed in table 2. The terms “filtered” and “unfiltered recoverable” replaced the terms “dissolved” and “total recoverable,” respectively in 2003. Filtered [0.45-micrometer (µm) pore size] and unfiltered recoverable concentrations of trace elements (arsenic, cadmium, copper, iron, lead, manganese, and zinc) and filtered concentrations of calcium and magnesium were measured by the USGS National Water Quality Laboratory (NWQL) in Denver, Colorado. Concentrations of calcium and magnesium were used in the calculation of water hardness.

Filtered concentrations of arsenic, cadmium, copper, lead, manganese, and zinc were measured using inductively coupled plasma-mass spectrometry (ICP–MS) (Faires, 1993; Garbarino and others, 2006). Filtered concentrations of calcium, magnesium, and iron were measured using inductively coupled plasma-atomic emission spectrometry (ICP–AES) (Fishman, 1993). Unfiltered recoverable concentrations of trace elements were measured in 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 as described by Garbarino and Struzeski (1998). For arsenic, copper, and zinc, the digested samples were analyzed by ICP–MS as described by Garbarino and others (2006).

Water samples for analysis of suspended-sediment also were collected from multiple vertical transits when 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 Wyoming-Montana Water Science Center Sediment Laboratory (hereinafter referred to as the Wyoming-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 used to calculate daily mean suspended-sediment concentrations according to methods described by Porterfield (1972).

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

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

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 measured using continuous turbidity monitors [Yellow Springs Instruments Company (YSI) 6136 turbidity sensor] at four tributary sites in the upper Clark Fork Basin near Anaconda (table 1). 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 fall (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 determination of the minimum and maximum value 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 from samples collected periodically during water year 2012 are listed in table 4. Daily mean streamflow, daily mean suspended-sediment concentration, and daily suspended-sediment discharge for water year 2012 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 Wyoming-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 (2005).

The quality of analytical results reported for water samples was evaluated 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 (D.L. Stevenson, U.S. Geological Survey, written commun., 2012). 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, to assess analytical performance.

Replicate data can be collected in different ways to provide an assessment of precision (reproducibility) of analytical results. Replicate samples are two or more samples considered to be essentially identical in composition. Replicate samples can be collected in the field (field replicate) either by 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 can be affected by numerous sources of variability within the field and laboratory environments, including sample collection, processing, and analysis. To provide data on overall precision for samples exposed to 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 collecting two independent cross-sectional samples. Analyses of field replicate samples indicate the reproducibility of environmental data that are affected by the combined potential variability introduced by field and laboratory processes.

Precision of analytical results for laboratory replicates, which exclude field sources of variability, was determined using 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 potentially can 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 being 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 could potentially bias analytical results. The 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 in the field 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 (Driscoll and Hatcher, 2010). 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 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 produced 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 likelihood of a 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):

$$S = \sqrt{\frac{\sum d^2}{2k}}, \tag{2}$$

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):

$$RSD = \frac{S}{\bar{x}} \times 100, \tag{3}$$

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 for each constituent estimated from analyses of field replicates, which include 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 for each constituent estimated from 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 comparison of a sample and a spiked aliquot of the same sample. The data-quality objective for acceptable spike recovery of trace elements in water samples determined by NWQL 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:

$$R = \frac{D}{C} \times 100, \tag{4}$$

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 98.1 to 106 percent with the smallest individual constituent recovery being arsenic, filtered, at 90.4 percent and the largest being iron, unfiltered recoverable, at 117 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 25percent deviation from an expected 100-percent recovery. The mean spike recovery for spiked stream samples (table 17) ranged from 89.8 to 108 percent with the smallest individual constituent recovery being zinc, unfiltered recoverable, at 82.4 percent and the largest being iron, filtered, at 114 percent. The 95-percent confidence intervals for the mean spike recovery for each constituent for which stream water samples were analyzed (table 17) did not exceed a 25-percent deviation from an expected 100-percent recovery. 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 or bias, either high or low. Confidence intervals for percent recovery include 100 percent for all laboratory-spiked deionized-water blank samples (table 16) except for filtered iron (102–108 percent) and filtered manganese (101–110 percent). Confidence intervals for percent recovery include 100 percent for all laboratory-spiked stream samples (table 17) except for filtered arsenic (101–106 percent), filtered cadmium (104–110 percent), filtered copper (90.9–97.0 percent), filtered iron (102–114 percent), and unfiltered zinc (82.4–97.2). 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 collected as part of the subsequent sample set were evaluated for evidence of a consistent trend that could indicate systematic contamination. Sporadic, infrequent, nonconsecutive 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, additional 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. One sample concentration of filtered iron [4.2 micrograms per liter (µg/L)] exceeded the LRL of 3.2 µg/L. Seven sample concentrations of filtered manganese (ranging from 0.15 to 0.57 µg/L) exceeded the LRL of 0.13 µg/L. The systematic presence of filtered manganese has been documented and is currently (2014) being reviewed by the USGS Office of Water Quality. No adjustments were made to water-quality sample data pending the results of this review.

Bed-Sediment Data

Bed-sediment data for the long-term monitoring program in the Clark Fork Basin consist of trace-element concentrations in the fine-grained (less than 0.063 mm) fraction of bed-sediment samples. 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 as previous samples (typically August), to facilitate data comparisons among years. Warm Springs Creek at Warm Springs is sampled once every 3 years rather than once annually and was not sampled during water year 2012.

Methods

Fine-grained bed-sediment samples were collected in August 2012 using protocols described by Axtmann and Luoma (1991). Samples were collected from the surfaces of streambed deposits in areas near the edge of the stream 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 collected in an acid-washed 500-milliliter (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, California. Bed-sediment samples were oven-dried at 60 °Celsius (C) and ground into smaller particle sizes using an acid-washed, ceramic mortar and pestle. Single aliquots of approximately 0.5–0.6 grams (g) of sediment from each of the three composite bed-sediment samples were digested using a hot, concentrated, nitric acid reflux according to methods described by Luoma and Bryan (1981). Laboratory replicates were analyzed by taking an aliquot from one of the three 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 were then 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-atomic emission spectrometry (ICP–AES). The smallest concentration of a constituent that can be reliably reported for analyses of bed sediment is termed the minimum reporting level (MRL).

Results

Concentrations of trace elements measured in samples of fine-grained bed sediment collected during August 2012 are listed in table 19. Liquid-phase concentrations, measured in microgram per milliliter (µg/mL), were analyzed in the reconstituted aliquots of digested bed sediment. Solid-phase concentrations, measured in microgram per gram (µg/g), were calculated using the following equation:

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

The reported solid-phase concentrations (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, MRLs for some trace elements might differ among stations and among years.

Quality Assurance

The USGS protocols for field collection and processing of bed-sediment samples are designed to prevent contamination from metal sources. Nonmetallic sampling and processing equipment (white plastic scoop, funnel-frame apparatus, and 500-mL sample bottles) were acid-washed and rinsed with deionized water before the collection of the first sample. Polyester-mesh sieves were washed in laboratory-grade detergent and rinsed with deionized water. All equipment received a final rinse onsite with native stream water. Sampling equipment used at more than one site was rinsed thoroughly between sites with native 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 (downstream to upstream sites) 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 (Ellen V. Axtmann, U.S. Geological Survey, written commun., 1994). Quality-control samples consisted of standard reference materials (SRMs) and procedural blanks. Thirteen procedural blanks, 10 low-concentration SRMs, and 10 high-concentration SRMs were analyzed.

Standard reference materials 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. Two SRMs consisting of agricultural soils representing low and high concentrations of trace elements were analyzed to test recovery efficiency for a range of concentrations similar to those occurring in the bed sediment in 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. In August 2012, the low-concentration standard (SRM 2709a) yielded better precision, that is, a lower range of variation. The high-concentration standard (SRM 2711a) generally had a better recovery accuracy (mean SRM recovery). For copper, iron, manganese, nickel, and zinc, mean SRM recoveries for the low-concentration standard (SRM sample 2709a) ranged from 82.1 to 95.2 percent of the certified concentrations. Mean recoveries were somewhat lower for arsenic (56.9 percent), chromium (77.5 percent), and lead (60.0 percent). Cadmium recovery was lowest at just 21.4 percent. The small range of variation (6–11 percent) in the 95-percent confidence interval indicates good reproducibility of multiple analyses of SRM sample 2709a. Mean recoveries of all elements for the high-concentration standard (SRM sample 2711a) ranged from 78.4–100 percent. The range of variation for the 95-percent confidence interval in SRM sample 2711a recoveries (13.8–20.4 percent) was higher than the range of variation for SRM sample 2709a. 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 MRL indicating no contamination bias. No adjustments to the trace-element concentrations in bed sediment samples were made.

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 through the years. Warm Springs Creek at Warm Springs is sampled once every 3 years, rather than once annually, and was not sampled this year.

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 were 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). On the few occasions when *Hydropsyche* were not present, other caddisflies, including *Brachycentrus* spp. and *Rhyacophila* spp., were collected. The caddisfly *Arctopsyche grandis* and the stoneflies *Claassenia sabulosa* and *Hesperoperla* spp. were collected where available to represent additional insect taxa that are commonly distributed in the Clark Fork Basin.

Samples of each taxon were sorted by genus in the field and placed in acid-washed plastic containers. Samples were frozen in a small amount of ambient stream water on dry ice within 30 minutes of collection. Between 1986 and 1998, macroinvertebrate containers were kept on ice to allow the insects to evacuate their gut contents (depurate) for 6 to 8 hours. Excess water was drained and insects were frozen for transport to the laboratory. Since 1999, 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 indicated 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–AES 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 MRL.

Results

Concentrations of trace elements in whole-body tissue of aquatic insects collected during August 2012 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 µg/mL, analyzed in the reconstituted samples were converted to solid-phase concentrations, in µg/g, by using equation 5 (used earlier in this report to calculate solid-phase concentrations of trace elements in bed sediment). All tissue samples were analyzed undiluted (dilution ratio 1:1). As with MRLs for trace elements in bed sediment, MRLs 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 MRL. Therefore, higher MRLs 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 before the first sample collection. Nets and equipment were thoroughly rinsed in ambient stream water at each main-stem site. New nets were used at each tributary site. Biota samples were collected sequentially at sites along an increasing concentration gradient, which was from downstream sites to upstream sites to minimize effects from potential site-to-site carryover contamination (Hornberger and others, 1997).

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 sample TORT-2 (lobster hepatopancreas) and 13 procedural blanks (1 at each site). 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 sample TORT-2 for biota is listed in table 23. Data-quality objectives have not been established for analytical recovery in biota, but percent recoveries indicate analytical performance. Mean SRM sample TORT-2 recoveries ranged from 79.8 to 129 percent for all constituents. With the exception of chromium, lead and nickel, all of which had relatively low certified concentrations in the SRM sample TORT-2 (0.77 µg/g, 0.35 µg/g and 2.5 µg/g, respectively), the range of variation of the 95-percent confidence interval was within 13 percent, indicating reasonable recoveries in the SRM sample TORT-2. No adjustments were made to trace-element concentrations in biota samples on the basis of recovery efficiencies.

Procedural blanks for biota consisted of undiluted aliquots of the same reagents used to digest and reconstitute tissue of aquatic insects. Analytical results of procedural blanks for biota (table 24) are reported as a liquid-phase concentration, in microgram 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 MRL; 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 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 that targeted high-flow conditions or maintenance drawdowns of Milltown Reservoir, which 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 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. 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. The number of samples for arsenic for bed sediment 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.

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. 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. Also, the number of samples for arsenic in biota samples is smaller than the number for other trace elements because sampling for arsenic began in September 2003. 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 MRLs. When MRLs vary among years, differences in concentration with time are difficult to determine, especially when a large percentage of the samples have concentrations less than MRLs.

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 2011 through September 2012.

[mg/L, milligrams per liter; ft³/s, cubic feet per second; µS/cm, microsiemens per centimeter at 25 °C; °C, degrees Celsius; $CaCO_3$, calcium carbonate; µg/L, micrograms per liter; <, less than laboratory reporting level; mm, millimeters; ton/d, tons per day; lab, laboratory; NTRU, nephelometric turbidity ratio unit; E, estimated; --, 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)
11/07/2011	0945	8.9	7.6	304	1.0	129	36.8	8.94
03/19/2012	1000	17	7.5	279	1.0	107	29.7	7.97
04/09/2012	0915	24	7.6	265	2.0	108	30.6	7.67
05/14/2012	0905	12	7.6	273	8.0	115	33.0	7.90
06/04/2012	0855	18	7.6	232	10.0	94.3	26.8	6.67
06/18/2012	0840	10	7.6	265	10.0	108	31.1	7.47
07/16/2012	0900	21	7.6	253	13.0	101	28.8	7.03
08/13/2012	0830	4.5	7.6	322	11.0	132	37.9	9.17

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)
11/07/2011	2.0	3.2	0.032	0.033	1.5	2.9	127	632
03/19/2012	3.9	4.7	0.040	0.031	3.0	4.6	371	726
04/09/2012	3.2	4.4	0.030	0.033	2.8	4.4	357	910
05/14/2012	3.6	4.4	0.026	0.037	2.3	2.9	304	704
06/04/2012	5.0	6.2	0.024	0.029	3.1	4.9	304	781
06/18/2012	4.7	6.0	0.025	0.034	2.3	3.5	285	710
07/16/2012	7.3	9.9	0.031	0.061	4.7	9.0	374	1,510
08/13/2012	2.9	3.3	0.037	<0.016	1.2	2.0	51.9	228

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)
11/07/2011	0.041	0.52	94.4	113	2.9	5.3	84	7	0.17
03/19/2012	0.223	0.66	120	131	3.5	4.7	75	6	0.28
04/09/2012	0.192	0.78	75.3	89.0	2.3	3.8	73	9	0.58
05/14/2012	0.134	0.47	70.5	82.8	2.1	<3.0	88	5	0.16
06/04/2012	0.194	0.78	55.5	87.4	1.5	3.3	89	7	0.34
06/18/2012	0.154	0.55	66.4	78.4	<1.4	<3.0	91	4	0.11
07/16/2012	0.243	1.85	92.0	178	2.4	9.2	85	22	1.2
08/13/2012	0.043	0.23	36.6	44.1	1.6	<3.0	79	4	0.05

Table 4. Water-quality data for the Clark Fork Basin, Montana, October 2011 through September 2012.—Continued

[mg/L, milligrams per liter; ft³/s, cubic feet per second; µS/cm, microsiemens per centimeter at 25 °C; °C, degrees Celsius; $CaCO_3$, calcium carbonate; µg/L, micrograms per liter; <, less than laboratory reporting level; mm, millimeters; ton/d, tons per day; lab, laboratory; NTRU, nephelometric turbidity ratio unit; E, estimated; --, no data]

12323250—Silver Bow Creek below Blacktail Creek, at Butte

Date	Time	Streamflow, instantaneous (ft³/s)	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Temperature, water (°C)	Hardness, filtered (mg/L as CaCO³)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)
11/07/2011	1115	21	7.8	526	4.0	184	52.2	13.0
03/19/2012	1140	33	7.7	435	2.5	145	40.5	10.7
04/09/2012	1055	40	7.7	413	4.0	148	41.8	10.5
05/14/2012	1030	27	7.7	445	10.5	154	44.7	10.4
06/04/2012	1030	33	7.9	385	12.0	135	38.8	9.28
06/18/2012	1000	24	7.8	458	12.0	155	44.7	10.6
07/16/2012	1045	30	7.6	387	15.0	127	36.8	8.61
08/13/2012	1005	16	7.5	579	16.0	203	59.7	13.0

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)
11/07/2011	2.9	3.9	0.083	0.114	2.9	9.9	43.1	296
03/19/2012	3.9	5.0	0.074	0.130	4.6	13.7	231	645
04/09/2012	3.5	4.8	0.058	0.113	4.7	13.7	232	729
05/14/2012	3.8	4.4	0.060	0.091	3.5	9.1	118	388
06/04/2012	4.8	6.1	0.050	0.081	4.0	9.3	150	517
06/18/2012	4.4	5.2	0.051	0.103	3.3	10.8	108	447
07/16/2012	6.4	7.4	0.046	0.087	4.5	9.7	196	593
08/13/2012	3.9	4.2	0.053	0.084	3.1	11.0	28.1	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)
11/07/2011	0.181	1.50	105	110	30.7	37.5	73	6	0.34
03/19/2012	0.430	3.06	132	148	20.9	33.3	79	12	1.1
04/09/2012	0.268	2.06	95.8	111	19.6	30.3	84	11	1.2
05/14/2012	0.211	0.93	73.2	84.6	22.2	23.6	80	4	0.29
06/04/2012	0.232	1.40	57.4	87.1	13.8	20.5	83	6	0.53
06/18/2012	0.243	1.40	69.7	92.6	17.6	25.0	88	7	0.45
07/16/2012	0.319	1.93	51.5	73.5	16.6	23.9	95	7	0.57
08/13/2012	0.193	0.61	65.4	69.2	32.7	36.2	81	3	0.13

Table 4. Water-quality data for the Clark Fork Basin, Montana, October 2011 through September 2012.—Continued

[mg/L, milligrams per liter; ft^3/s, cubic feet per second; µS/cm, microsiemens per centimeter at 25 °C; °C, degrees Celsius; $CaCO_3$, calcium carbonate; µg/L, micrograms per liter; <, less than laboratory reporting level; mm, millimeters; ton/d, tons per day; lab, laboratory; NTRU, nephelometric turbidity ratio unit; E, estimated; --, 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)
11/08/2011	0720	E52	8.1	497	0.0	195	57.5	12.4
03/19/2012	1630	64	8.2	485	4.5	165	46.3	12.0
04/10/2012	0740	81	7.9	428	5.0	159	46.3	10.5
05/15/2012	0800	76	8.3	379	10.0	149	45.4	8.75
06/05/2012	0730	83	8.0	331	11.5	127	38.4	7.61
06/19/2012	0740	59	8.0	420	8.5	154	46.1	9.38
07/17/2012	0750	95	8.0	446	15.5	160	47.1	10.4
08/14/2012	0745	21	8.2	592	13.5	217	64.0	13.8

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)
11/08/2011	6.8	7.8	0.530	0.519	14.3	27.0	20.4	325
03/19/2012	6.6	9.3	0.408	0.629	17.5	45.2	116	1,110
04/10/2012	6.1	8.7	0.437	0.624	16.1	38.6	60.4	1,040
05/15/2012	7.4	8.2	0.227	0.370	11.3	23.6	33.5	494
06/05/2012	7.3	8.5	0.215	0.373	11.4	26.0	46.2	517
06/19/2012	8.7	8.9	0.247	0.370	11.2	23.6	44.7	398
07/17/2012	10.8	25.3	0.148	2.05	16.5	192	62.1	6,910
08/14/2012	11.7	11.5	0.394	0.532	16.6	25.8	21.9	196

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)
11/08/2011	0.243	4.15	106	114	116	128	91	7	0.98
03/19/2012	0.628	9.44	159	225	75.5	131	69	40	6.9
04/10/2012	0.312	8.45	189	244	120	163	55	38	8.3
05/15/2012	0.235	4.22	102	146	38.7	76.5	71	22	4.5
06/05/2012	0.335	5.23	83.0	150	42.9	77.6	77	21	4.7
06/19/2012	0.354	4.51	89.4	124	56.4	79.2	84	12	1.9
07/17/2012	0.795	59.5	108	671	32.8	410	62	311	80
08/14/2012	0.184	1.81	59.2	111	55.1	87.9	94	8	0.45

Table 4. Water-quality data for the Clark Fork Basin, Montana, October 2011 through September 2012.—Continued

[mg/L, milligrams per liter; ft³/s, cubic feet per second; µS/cm, microsiemens per centimeter at 25 °C; °C, degrees Celsius; $CaCO_3$, calcium carbonate; µg/L, micrograms per liter; <, less than laboratory reporting level; mm, millimeters; ton/d, tons per day; lab, laboratory; NTRU, nephelometric turbidity ratio unit; E, estimated; --, no data]

12323670—Mill Creek near Anaconda

Date	Time	Streamflow, instantaneous (ft³/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)
11/07/2011	1405	E13	<2.0	7.9	200	0.0	98.0	26.7	7.60
03/19/2012	1310	12	<2.0	8.0	199	3.0	95.2	25.4	7.70
04/09/2012	1330	20	<2.0	7.9	166	6.0	71.9	19.5	5.63
05/14/2012	1310	75	<2.0	7.8	97	10.0	43.4	12.2	3.11
06/04/2012	1300	212	E2.8	7.7	64	9.5	28.0	8.17	1.84
06/18/2012	1250	96	<2.0	7.7	76	9.0	33.5	9.66	2.28
07/16/2012	1320	41	E5.4	7.9	115	14.5	51.0	14.3	3.70
08/13/2012	1240	18	<2.0	8.2	169	15.0	79.1	21.6	6.12

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)
11/07/2011	13.4	12.9	0.062	0.062	1.0	1.5	54.4	105
03/19/2012	14.5	15.0	0.073	0.071	1.4	2.4	49.7	101
04/09/2012	17.0	17.8	0.055	0.067	2.4	3.2	44.8	152
05/14/2012	12.8	13.1	0.035	0.063	2.3	3.2	35.5	138
06/04/2012	8.2	9.3	0.033	0.075	2.9	4.5	31.4	379
06/18/2012	7.8	7.8	0.031	0.046	1.7	2.8	29.6	134
07/16/2012	15.7	16.4	0.030	0.065	2.0	3.3	54.2	246
08/13/2012	21.6	21.9	0.036	0.044	1.5	2.1	64.0	134

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)
11/07/2011	0.071	0.24	10.7	12.3	2.3	<3.0	63	1	0.04
03/19/2012	0.075	0.40	7.96	10.0	2.1	<3.0	67	1	0.03
04/09/2012	0.126	0.52	6.76	9.1	1.9	<3.0	72	3	0.16
05/14/2012	0.106	0.50	4.18	8.1	1.7	<3.0	38	8	1.6
06/04/2012	0.092	0.99	4.49	17.5	2.0	4.4	44	18	10
06/18/2012	0.089	0.49	3.80	8.3	<1.4	3.8	32	7	1.8
07/16/2012	0.151	0.72	9.15	12.9	<1.4	<3.0	84	9	1.0
08/13/2012	0.187	0.37	5.90	10.7	<1.4	<3.0	81	2	0.10

Table 4. Water-quality data for the Clark Fork Basin, Montana, October 2011 through September 2012.—Continued

[mg/L, milligrams per liter; ft³/s, cubic feet per second; µS/cm, microsiemens per centimeter at 25 °C; °C, degrees Celsius; $CaCO_3$, calcium carbonate; µg/L, micrograms per liter; <, less than laboratory reporting level; mm, millimeters; ton/d, tons per day; lab, laboratory; NTRU, nephelometric turbidity ratio unit; E, estimated; --, no data]

12323700—Mill Creek at Opportunity

Date	Time	Streamflow, instantaneous (ft³/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)
11/07/2011	1630	16	8.0	239	-1.0	112	31.0	8.44
03/19/2012	1510	E8.0	8.2	228	2.0	104	28.4	8.11
04/09/2012	1610	11	8.1	192	8.0	83.1	22.9	6.29
05/14/2012	1600	37	7.9	108	13.0	48.4	13.8	3.39
06/04/2012	1605	122	7.7	70	12.0	30.2	8.75	2.03
06/18/2012	1445	59	7.9	84	10.0	36.3	10.6	2.41
07/16/2012	1555	20	8.1	131	16.0	56.9	16.1	4.08
08/13/2012	1515	3.6	8.3	190	18.0	85.5	23.9	6.28

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)
11/07/2011	16.1	16.4	0.090	0.091	1.4	2.0	58.6	130
03/19/2012	14.2	14.7	0.041	0.058	1.5	2.2	35.4	69.8
04/09/2012	16.2	17.1	0.055	0.077	2.4	3.4	42.5	136
05/14/2012	14.5	14.6	0.040	0.092	2.5	4.2	33.2	185
06/04/2012	10.7	12.1	0.040	0.141	2.9	8.0	33.3	536
06/18/2012	10.1	10.6	0.038	0.073	2.0	3.7	29.1	186
07/16/2012	19.1	19.5	0.046	0.085	2.1	3.5	44.0	200
08/13/2012	24.8	22.9	0.038	0.034	2.4	2.1	42.3	74.8

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)
11/07/2011	0.097	0.30	10.2	12.2	3.9	4.6	74	2	0.09
03/19/2012	0.066	0.19	3.68	4.2	2.1	<3.0	83	1	0.02
04/09/2012	0.121	0.44	5.40	7.8	2.1	3.1	68	3	0.09
05/14/2012	0.120	0.77	4.02	11.6	1.9	3.2	60	8	0.80
06/04/2012	0.132	2.25	3.75	23.9	1.7	6.3	51	29	9.6
06/18/2012	0.101	0.99	4.06	10.3	<1.4	3.5	60	7	1.1
07/16/2012	0.124	0.63	7.01	11.7	<1.4	3.7	91	6	0.32
08/13/2012	0.117	0.20	7.51	6.6	<1.4	<3.0	91	1	0.01

Table 4. Water-quality data for the Clark Fork Basin, Montana, October 2011 through September 2012.—Continued

[mg/L, milligrams per liter; ft^3/s, cubic feet per second; µS/cm, microsiemens per centimeter at 25 °C; °C, degrees Celsius; $CaCO_3$, calcium carbonate; µg/L, micrograms per liter; <, less than laboratory reporting level; mm, millimeters; ton/d, tons per day; lab, laboratory; NTRU, nephelometric turbidity ratio unit; E, estimated; --, 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)
11/07/2011	1255	E2.5	<2.0	7.6	138	0.0	54.7	17.7	2.53
04/09/2012	1225	2.9	E4.2	7.7	127	2.5	47.0	15.3	2.14
05/14/2012	1205	12	E3.2	7.6	85	7.0	32.2	10.7	1.32
06/04/2012	1205	22	E4.7	7.6	80	9.0	30.1	10.1	1.22
06/18/2012	1140	11	E2.4	7.8	93	8.0	35.6	11.9	1.43
07/16/2012	1220	5.4	E11	7.8	107	13.0	39.6	13.1	1.68
08/13/2012	1150	2.1	E2.8	7.7	112	13.0	42.7	14.2	1.74

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)
11/07/2011	15.2	14.6	0.047	0.053	1.8	2.1	75.3	153
04/09/2012	14.7	15.5	0.031	0.042	2.4	2.8	89.2	317
05/14/2012	15.7	14.7	0.025	0.032	2.1	2.4	89.3	190
06/04/2012	15.3	14.5	0.025	0.039	2.5	3.0	120	289
06/18/2012	15.5	14.8	0.028	0.032	2.0	2.5	115	154
07/16/2012	22.7	24.2	0.053	0.091	2.4	4.0	64.0	407
08/13/2012	25.7	25.3	0.041	0.066	1.8	2.5	97.8	228

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)
11/07/2011	0.106	0.30	25.8	31.3	2.0	<3.0	63	3	0.02
04/09/2012	0.165	0.43	20.2	22.4	1.8	<3.0	69	3	0.02
05/14/2012	0.162	0.36	10.5	12.8	1.5	<3.0	74	3	0.10
06/04/2012	0.184	0.58	9.84	16.8	1.9	<3.0	83	4	0.24
06/18/2012	0.159	0.32	12.6	14.0	<1.4	<3.0	88	3	0.09
07/16/2012	0.210	1.14	15.2	26.7	<1.4	3.3	95	16	0.23
08/13/2012	0.235	0.54	17.3	24.8	<1.4	<3.0	87	4	0.02

Table 4. Water-quality data for the Clark Fork Basin, Montana, October 2011 through September 2012.—Continued

[mg/L, milligrams per liter; ft³/s, cubic feet per second; µS/cm, microsiemens per centimeter at 25 °C; °C, degrees Celsius; $CaCO_3$, calcium carbonate; µg/L, micrograms per liter; <, less than laboratory reporting level; mm, millimeters; ton/d, tons per day; lab, laboratory; NTRU, nephelometric turbidity ratio unit; E, estimated; --, no data]

12323720—Willow Creek at Opportunity

Date	Time	Streamflow, instantaneous (ft³/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)
11/07/2011	1705	5.9	8.1	308	4.0	141	41.1	9.26
03/19/2012	1550	8.4	7.9	302	5.5	129	37.8	8.51
04/09/2012	1650	11	8.0	314	10.5	126	37.1	8.21
05/14/2012	1640	12	8.2	178	17.0	77.6	23.6	4.56
06/04/2012	1650	22	8.1	207	17.0	90.8	27.3	5.51
06/18/2012	1520	18	8.2	234	15.0	106	31.1	6.76
07/16/2012	1640	10	8.1	261	15.0	115	33.4	7.72
08/13/2012	1550	6.2	8.7	288	18.0	133	37.9	9.23

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)
11/07/2011	11.9	12.5	0.041	0.047	2.1	4.2	21.3	119
03/19/2012	21.6	25.7	0.051	0.078	3.9	7.1	144	361
04/09/2012	30.1	34.0	0.052	0.085	5.3	8.4	90.1	308
05/14/2012	27.3	27.2	0.032	0.083	4.9	7.7	72.9	292
06/04/2012	48.1	43.5	0.044	0.085	6.2	10.2	78.4	367
06/18/2012	46.7	44.7	0.045	0.086	5.4	7.9	55.0	244
07/16/2012	28.9	27.3	0.031	0.051	3.5	4.9	41.5	142
08/13/2012	17.1	15.4	0.019	0.023	2.4	3.0	6.1	40.7

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)
11/07/2011	0.161	1.19	11.1	12.5	3.3	6.0	96	3	0.05
03/19/2012	0.365	1.37	83.2	91.9	5.6	9.2	92	7	0.16
04/09/2012	0.272	1.29	84.3	93.3	5.1	8.9	92	6	0.18
05/14/2012	0.398	1.60	34.5	47.2	3.0	7.1	92	8	0.26
06/04/2012	0.321	1.94	30.6	57.8	2.8	9.5	89	10	0.59
06/18/2012	0.259	1.21	25.3	35.7	5.2	9.1	95	5	0.24
07/16/2012	0.196	0.77	11.7	15.8	2.8	5.1	96	2	0.05
08/13/2012	0.073	0.36	5.49	7.8	<1.4	<3.0	85	1	0.02

Table 4. Water-quality data for the Clark Fork Basin, Montana, October 2011 through September 2012.—Continued

[mg/L, milligrams per liter; ft³/s, cubic feet per second; µS/cm, microsiemens per centimeter at 25 °C; °C, degrees Celsius; $CaCO_3$, calcium carbonate; µg/L, micrograms per liter; <, less than laboratory reporting level; mm, millimeters; ton/d, tons per day; lab, laboratory; NTRU, nephelometric turbidity ratio unit; E, estimated; --, no data]

12323750—Silver Bow Creek at Warm Springs

Date	Time	Streamflow, instantaneous (ft³/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)
11/08/2011	0835	64	8.4	526	1.0	236	68.6	15.6
03/20/2012	0805	132	8.5	487	0.0	202	58.6	13.4
04/10/2012	0905	118	8.8	466	6.0	195	56.5	13.0
05/15/2012	1010	125	9.4	331	12.5	136	38.5	9.62
06/05/2012	0945	246	9.2	272	10.5	108	31.3	7.16
06/19/2012	0900	118	9.2	326	8.5	137	39.8	9.03
07/17/2012	1010	59	9.2	370	17.0	165	47.5	11.2
08/14/2012	0915	40	9.3	469	16.0	204	59.0	13.8

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)
11/08/2011	19.5	22.2	0.059	0.244	3.0	16.4	11.5	418
03/20/2012	10.6	14.7	0.095	0.316	3.7	21.9	25.5	521
04/10/2012	13.2	15.4	0.056	0.161	4.6	11.7	38.5	309
05/15/2012	21.8	22.4	0.033	0.088	5.0	7.8	38.7	223
06/05/2012	21.5	24.2	0.039	0.148	5.0	10.9	34.7	520
06/19/2012	23.5	23.3	0.033	0.082	4.4	7.0	52.6	235
07/17/2012	34.6	33.4	0.028	0.072	2.8	5.3	34.4	204
08/14/2012	37.0	34.4	0.026	0.051	2.6	4.4	7.0	87.8

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)
11/08/2011	0.165	4.18	61.7	127	4.1	28.4	97	9	1.6
03/20/2012	0.179	5.63	175	257	5.2	34.7	84	12	4.3
04/10/2012	0.208	2.93	122	170	3.3	20.0	89	7	2.2
05/15/2012	0.221	1.31	41.6	77.5	1.9	7.7	82	6	2.0
06/05/2012	0.175	2.33	42.8	96.5	1.5	11.5	85	16	11
06/19/2012	0.262	1.20	67.2	97.8	2.2	7.8	95	4	1.3
07/17/2012	0.152	1.07	36.6	102	<1.4	5.7	80	6	0.96
08/14/2012	0.054	0.58	27.1	65.4	<1.4	3.6	73	3	0.32

Table 4. Water-quality data for the Clark Fork Basin, Montana, October 2011 through September 2012.—Continued

[mg/L, milligrams per liter; ft^3/s, cubic feet per second; µS/cm, microsiemens per centimeter at 25 °C; °C, degrees Celsius; $CaCO_3$, calcium carbonate; µg/L, micrograms per liter; <, less than laboratory reporting level; mm, millimeters; ton/d, tons per day; lab, laboratory; NTRU, nephelometric turbidity ratio unit; E, estimated; --, 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)
11/07/2011	1525	108	<2.0	8.5	278	3.0	145	42.8	9.34
04/09/2012	1500	71	<2.0	8.5	274	7.5	138	40.3	9.05
05/14/2012	1500	155	<2.0	8.5	187	10.0	98.8	30.2	5.70
06/04/2012	1445	344	<2.0	8.1	135	9.5	65.5	20.1	3.71
07/16/2012	1445	125	<2.0	8.3	220	12.0	107	31.9	6.59
08/13/2012	1415	81	<2.0	8.5	250	13.0	126	37.4	7.92

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)
11/07/2011	2.2	2.5	0.024	0.017	<0.80	1.2	3.6	31.1
04/09/2012	2.3	2.5	<0.016	<0.016	<0.80	1.3	7.9	49.2
05/14/2012	1.6	2.0	0.019	0.032	1.1	2.2	5.4	122
06/04/2012	1.7	1.8	0.021	0.046	1.3	4.0	5.7	166
07/16/2012	2.4	2.4	0.017	0.036	0.84	2.0	11.0	83.6
08/13/2012	2.5	2.3	0.022	0.016	--	1.8	5.8	60.8

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)
11/07/2011	<0.025	0.11	1.24	1.8	<1.4	<3.0	63	1	0.29
04/09/2012	0.042	0.17	1.74	2.6	<1.4	<3.0	65	3	0.58
05/14/2012	0.032	0.37	1.81	5.4	<1.4	<3.0	53	9	3.8
06/04/2012	<0.025	0.47	1.97	9.2	<1.4	4.2	55	11	10
07/16/2012	<0.025	0.28	1.58	4.7	<1.4	<3.0	74	5	1.7
08/13/2012	0.029	0.17	1.13	2.9	<1.4	<3.0	78	3	0.66

Table 4. Water-quality data for the Clark Fork Basin, Montana, October 2011 through September 2012.—Continued

[mg/L, milligrams per liter; ft³/s, cubic feet per second; µS/cm, microsiemens per centimeter at 25 °C; °C, degrees Celsius; $CaCO_3$, calcium carbonate; µg/L, micrograms per liter; <, less than laboratory reporting level; mm, millimeters; ton/d, tons per day; lab, laboratory; NTRU, nephelometric turbidity ratio unit; E, estimated; --, 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)
11/08/2011	0805	99	8.2	320	1.5	167	49.8	10.2
04/10/2012	0840	69	8.2	352	5.0	182	53.9	11.6
05/15/2012	0945	128	8.1	222	8.0	114	35.2	6.36
06/05/2012	0850	277	7.9	150	8.0	72.2	22.3	4.02
07/17/2012	0940	75	8.2	264	12.0	129	39.2	7.46
08/14/2012	0850	40	8.2	309	12.0	154	46.7	9.07

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)
11/08/2011	3.0	3.6	0.065	0.128	1.1	5.1	8.1	81.4
04/10/2012	3.8	4.1	0.055	0.096	2.0	6.5	18.9	109
05/15/2012	2.9	5.8	0.043	0.125	2.2	30.7	9.7	502
06/05/2012	3.9	10.7	0.037	0.230	3.9	58.3	19.4	1,380
07/17/2012	4.2	4.7	0.047	0.070	2.2	9.5	14.1	167
08/14/2012	4.7	4.7	0.029	0.046	2.1	5.1	9.1	51.7

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)
11/08/2011	<0.025	0.40	57.2	62.6	1.9	<3.0	59	3	0.80
04/10/2012	0.064	0.52	82.5	102	<1.4	6.6	72	5	0.93
05/15/2012	0.042	2.83	46.6	116	1.4	9.8	63	31	11
06/05/2012	0.068	5.87	33.3	259	1.4	26.7	58	86	64
07/17/2012	0.048	0.83	51.8	74.7	2.2	3.9	75	7	1.4
08/14/2012	0.041	0.27	58.0	67.4	<1.4	<3.0	77	2	0.22

Table 4. Water-quality data for the Clark Fork Basin, Montana, October 2011 through September 2012.—Continued

[mg/L, milligrams per liter; ft³/s, cubic feet per second; µS/cm, microsiemens per centimeter at 25 °C; °C, degrees Celsius; $CaCO_3$, calcium carbonate; µg/L, micrograms per liter; <, less than laboratory reporting level; mm, millimeters; ton/d, tons per day; lab, laboratory; NTRU, nephelometric turbidity ratio unit; E, estimated; --, no data]

12323800—Clark Fork near Galen

Date	Time	Streamflow, instantaneous (ft³/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)
11/08/2011	1000	160	8.3	416	1.0	197	58.1	12.6
03/20/2012	0940	181	8.2	438	0.0	186	54.4	12.3
04/10/2012	1025	189	8.5	433	6.0	196	57.6	12.6
05/15/2012	1145	262	9.0	282	11.5	124	36.5	7.94
06/05/2012	1115	523	8.6	210	11.0	89.8	26.9	5.51
06/19/2012	1015	339	8.6	236	8.5	105	31.4	6.37
07/17/2012	1145	143	8.6	321	15.5	146	43.6	9.02
08/14/2012	1050	71	8.7	394	15.0	183	54.1	11.7

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)
11/08/2011	10.2	11.6	0.054	0.199	2.1	10.1	9.6	224
03/20/2012	7.3	10.7	0.079	0.162	3.1	18.7	19.8	431
04/10/2012	10.0	12.2	0.055	0.185	3.6	14.8	22.2	314
05/15/2012	12.9	13.8	0.037	0.109	4.2	17.4	20.0	334
06/05/2012	12.7	16.8	0.030	0.179	5.4	36.1	29.0	860
06/19/2012	10.7	11.2	0.028	0.076	3.3	13.0	21.1	248
07/17/2012	18.4	17.7	0.039	0.098	3.3	9.1	22.8	169
08/14/2012	20.2	19.2	0.036	0.052	3.9	9.0	10.4	94.2

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)
11/08/2011	0.082	1.97	56.4	86.6	3.3	14.5	93	5	2.2
03/20/2012	0.127	4.11	127	178	5.2	18.7	78	13	6.4
04/10/2012	0.132	2.77	106	156	3.5	17.8	82	8	4.1
05/15/2012	0.119	2.17	41.5	87.0	1.4	11.1	70	14	9.9
06/05/2012	0.166	4.76	36.5	110	<1.4	23.4	66	59	83
06/19/2012	0.112	1.52	40.7	66.4	1.5	9.4	67	8	7.3
07/17/2012	0.107	1.05	39.8	73.5	2.1	5.9	75	5	1.9
08/14/2012	0.111	0.98	42.9	65.4	1.4	5.2	86	4	0.77

Table 4. Water-quality data for the Clark Fork Basin, Montana, October 2011 through September 2012.—Continued

[mg/L, milligrams per liter; ft³/s, cubic feet per second; µS/cm, microsiemens per centimeter at 25 °C; °C, degrees Celsius; $CaCO_3$, calcium carbonate; µg/L, micrograms per liter; <, less than laboratory reporting level; mm, millimeters; ton/d, tons per day; lab, laboratory; NTRU, nephelometric turbidity ratio unit; E, estimated; --, 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)
11/07/2011	1445	18	<2.0	8.1	226	0.0	116	34.9	7.14
03/19/2012	1405	8.5	<2.0	8.3	225	2.0	113	33.2	7.40
04/09/2012	1410	10	<2.0	8.1	226	5.5	111	32.8	7.00
05/14/2012	1355	4.9	<2.0	8.0	169	13.0	86.0	26.2	5.00
06/04/2012	1400	21	E3.3	8.0	148	11.0	71.4	21.9	4.04
06/18/2012	1350	16	<2.0	8.1	166	10.0	83.0	25.6	4.65
07/16/2012	1405	9.4	<2.0	8.1	216	12.0	102	31.0	5.91
08/13/2012	1330	13	<2.0	8.2	225	12.0	111	33.4	6.63

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)
11/07/2011	2.2	2.8	0.033	0.027	1.0	4.5	6.7	159
03/19/2012	1.9	2.1	0.023	<0.016	1.0	1.8	10.3	32.5
04/09/2012	1.9	2.2	0.020	0.020	1.3	3.0	7.8	71.9
05/14/2012	4.5	4.2	0.026	0.035	2.9	4.7	11.7	79.8
06/04/2012	4.0	4.4	0.022	0.055	2.2	9.7	7.1	394
06/18/2012	4.5	4.5	0.019	0.034	1.8	4.6	10.5	102
07/16/2012	6.2	6.0	0.029	0.030	1.7	2.7	9.9	58.0
08/13/2012	3.1	3.3	0.021	0.024	0.92	2.6	8.5	96.3

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)
11/07/2011	<0.025	0.57	2.35	6.4	<1.4	<3.0	38	8	0.39
03/19/2012	<0.025	0.12	1.06	1.5	<1.4	<3.0	67	1	0.02
04/09/2012	0.034	0.28	2.06	2.5	<1.4	<3.0	74	7	0.19
05/14/2012	0.039	0.32	2.08	3.5	<1.4	<3.0	68	4	0.05
06/04/2012	0.028	1.45	1.43	10.7	1.5	5.6	40	21	1.2
06/18/2012	0.031	0.42	1.45	4.1	<1.4	<3.0	40	7	0.30
07/16/2012	<0.025	0.21	1.98	3.4	1.4	<3.0	42	2	0.05
08/13/2012	<0.025	0.76	1.68	5.2	<1.4	<3.0	57	5	0.18

Table 4. Water-quality data for the Clark Fork Basin, Montana, October 2011 through September 2012.—Continued

[mg/L, milligrams per liter; ft^3/s, cubic feet per second; µS/cm, microsiemens per centimeter at 25 °C; °C, degrees Celsius; $CaCO_3$, calcium carbonate; µg/L, micrograms per liter; <, less than laboratory reporting level; mm, millimeters; ton/d, tons per day; lab, laboratory; NTRU, nephelometric turbidity ratio unit; E, estimated; --, 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)
11/08/2011	0930	68	8.1	566	1.0	290	85.2	18.8
03/20/2012	0900	60	8.1	607	0.0	306	88.5	20.7
04/10/2012	0950	56	8.2	614	5.0	302	87.9	20.0
05/15/2012	1115	27	8.4	547	11.0	279	81.5	18.4
06/05/2012	1040	25	8.4	621	12.0	319	93.2	20.9
06/19/2012	0940	3.9	8.2	687	9.0	334	94.9	23.5
07/17/2012	1110	5.3	8.2	677	15.5	327	92.3	23.5
08/14/2012	1020	2.9	7.9	608	15.0	254	64.8	22.3

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)
11/08/2011	13.1	13.6	0.036	0.038	1.2	3.6	11.6	97
03/20/2012	16.1	18.9	0.035	0.115	1.6	15.2	27.4	392
04/10/2012	12.5	14.2	0.025	0.082	1.6	8.8	19.4	250
05/15/2012	12.5	13.0	0.021	0.053	1.7	6.8	10.8	183
06/05/2012	12.9	13.4	0.019	0.027	1.7	3.8	6.9	101
06/19/2012	10.1	9.5	0.019	0.023	1.3	2.3	14.0	54.4
07/17/2012	16.6	15.7	0.021	0.028	1.9	3.1	15.5	59.7
08/14/2012	10.4	10.2	0.023	0.023	1.9	3.6	25.1	82.2

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)
11/08/2011	0.032	0.34	12.1	10.9	2.5	4.3	51	9	1.7
03/20/2012	0.094	1.90	22.0	36.3	3.3	10.3	83	21	3.4
04/10/2012	0.074	1.14	19.4	28.0	2.9	6.6	80	15	2.3
05/15/2012	0.056	0.79	15.5	22.1	<1.4	4.3	79	11	0.80
06/05/2012	0.033	0.38	13.3	19.2	<1.4	<3.0	60	11	0.74
06/19/2012	0.029	0.13	23.7	22.7	<1.4	<3.0	22	18	0.19
07/17/2012	0.032	0.19	11.0	11.3	<1.4	<3.0	53	17	0.24
08/14/2012	0.074	0.21	17.8	16.3	<1.4	<3.0	88	10	0.08

Table 4. Water-quality data for the Clark Fork Basin, Montana, October 2011 through September 2012.—Continued

[mg/L, milligrams per liter; ft³/s, cubic feet per second; µS/cm, microsiemens per centimeter at 25 °C; °C, degrees Celsius; $CaCO_3$, calcium carbonate; µg/L, micrograms per liter; <, less than laboratory reporting level; mm, millimeters; ton/d, tons per day; lab, laboratory; NTRU, nephelometric turbidity ratio unit; E, estimated; --, no data]

12324200—Clark Fork at Deer Lodge

Date	Time	Streamflow, instantaneous (ft³/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)
11/08/2011	1105	316	8.2	450	1.0	217	64.5	13.6
03/20/2012	1110	337	8.1	477	1.0	206	60.0	13.5
04/10/2012	1135	326	8.2	468	7.0	215	63.2	13.8
05/15/2012	1310	306	8.3	347	15.0	156	45.8	10.2
06/06/2012	0900	736	7.9	242	10.5	106	31.7	6.53
06/19/2012	1125	425	8.1	257	10.0	111	33.3	6.82
07/17/2012	1330	200	8.3	427	19.0	195	57.4	12.5
08/14/2012	1220	78	8.4	482	17.0	214	63.7	13.3

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)
11/08/2011	9.8	12.4	0.077	0.182	3.6	31.1	9.9	401
03/20/2012	10.1	16.1	0.115	0.235	7.3	49.0	28.1	809
04/10/2012	10.3	14.8	0.080	0.207	7.6	35.4	20.6	607
05/15/2012	12.8	15.4	0.065	0.155	6.8	27.4	21.8	431
06/06/2012	14.1	43.2	0.074	0.784	12.9	220	34.3	4,290
06/19/2012	10.3	12.4	0.062	0.128	6.4	27.1	24.8	440
07/17/2012	19.8	20.4	0.073	0.151	8.1	26.8	25.7	374
08/14/2012	16.0	15.4	0.047	0.058	7.2	12.2	13.0	70

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)
11/08/2011	0.075	3.19	46.0	76.8	7.4	24.6	83	15	13
03/20/2012	0.159	6.78	70.8	133	9.9	39.1	82	32	29
04/10/2012	0.140	4.63	48.8	116	10.7	31.2	82	22	19
05/15/2012	0.160	3.29	26.9	81.4	3.6	21.2	79	15	12
06/06/2012	0.301	32.8	30.0	364	8.0	164	50	218	433
06/19/2012	0.154	3.28	19.3	55.8	5.0	21.6	69	17	20
07/17/2012	0.169	2.91	31.6	87.4	4.1	20.8	80	16	8.6
08/14/2012	0.099	0.65	20.0	35.3	3.6	6.9	90	3	0.63

Table 4. Water-quality data for the Clark Fork Basin, Montana, October 2011 through September 2012.—Continued

[mg/L, milligrams per liter; ft³/s, cubic feet per second; µS/cm, microsiemens per centimeter at 25 °C; °C, degrees Celsius; $CaCO_3$, calcium carbonate; µg/L, micrograms per liter; <, less than laboratory reporting level; mm, millimeters; ton/d, tons per day; lab, laboratory; NTRU, nephelometric turbidity ratio unit; E, estimated; --, no data]

12324400—Clark Fork above Little Blackfoot River, near Garrison

Date	Time	Streamflow, instantaneous (ft³/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)
11/08/2011	1255	360	8.5	449	1.0	218	64.6	13.7
03/20/2012	1245	335	8.2	476	2.0	215	62.6	14.3
04/10/2012	1305	353	8.2	469	8.0	210	61.4	13.8
05/15/2012	1435	267	8.6	364	17.0	164	47.8	10.8
06/06/2012	1040	994	8.0	282	11.0	122	34.7	8.62
06/19/2012	1330	519	8.3	301	12.0	131	37.9	8.88
07/17/2012	1450	189	8.5	449	21.0	205	60.0	13.4
08/14/2012	1330	99	8.5	474	19.0	206	59.6	14.0

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)
11/08/2011	9.8	11.4	0.071	0.144	4.0	18.7	9.2	294
03/20/2012	10.9	16.1	0.111	0.246	8.1	45.6	23.2	787
04/10/2012	10.5	15.7	0.079	0.290	6.5	53.3	38.1	826
05/15/2012	15.0	14.7	0.063	0.115	8.8	24.1	16.3	335
06/06/2012	16.2	41.4	0.082	0.835	16.6	222	39.3	3,860
06/19/2012	11.5	13.7	0.059	0.151	7.9	32.9	17.6	468
07/17/2012	21.9	20.9	0.070	0.087	10.9	17.2	17.6	114
08/14/2012	17.9	17.4	0.039	0.061	7.7	14.4	9.8	111

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)
11/08/2011	0.075	2.22	37.0	69.8	7.7	20.5	82	11	11
03/20/2012	0.155	5.74	64.6	129	8.7	40.5	80	33	30
04/10/2012	0.148	6.43	48.1	136	6.9	43.3	81	33	31
05/15/2012	0.168	2.60	24.1	56.7	2.8	16.8	76	13	9.4
06/06/2012	0.422	32.3	42.4	344	8.8	181	64	205	550
06/19/2012	0.151	3.74	20.3	60.1	4.4	25.2	68	20	28
07/17/2012	0.126	1.05	13.5	39.8	2.6	9.0	79	5	2.6
08/14/2012	0.096	1.02	21.6	59.8	1.9	8.0	79	7	1.9

Table 4. Water-quality data for the Clark Fork Basin, Montana, October 2011 through September 2012.—Continued

[mg/L, milligrams per liter; ft³/s, cubic feet per second; µS/cm, microsiemens per centimeter at 25 °C; °C, degrees Celsius; $CaCO_3$, calcium carbonate; µg/L, micrograms per liter; <, less than laboratory reporting level; mm, millimeters; ton/d, tons per day; lab, laboratory; NTRU, nephelometric turbidity ratio unit; E, estimated; --, 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)
11/08/2011	1400	501	8.7	413	2.0	201	59.5	12.6
03/20/2012	1405	542	8.2	426	2.5	193	56.4	12.7
04/10/2012	1405	704	8.3	377	8.0	169	49.7	11.0
05/15/2012	1530	677	8.5	295	16.0	131	38.8	8.30
06/06/2012	1220	1,730	8.1	257	10.5	117	34.2	7.75
06/19/2012	1500	958	8.4	282	12.0	126	37.0	8.16
07/17/2012	1555	362	8.7	392	21.0	183	54.1	11.7
08/14/2012	1430	179	8.7	417	20.0	194	57.0	12.7

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)
11/08/2011	7.9	9.3	0.027	0.074	2.8	11.5	8.5	200
03/20/2012	8.7	11.8	0.081	0.159	6.2	29.4	21.4	586
04/10/2012	7.2	10.2	0.048	0.150	4.5	27.8	18.9	640
05/15/2012	8.5	9.7	0.033	0.096	4.7	13.2	18.8	358
06/06/2012	11.2	26.1	0.059	0.530	11.0	133	37.5	2,940
06/19/2012	8.4	9.2	0.043	0.098	5.3	18.7	18.3	361
07/17/2012	13.8	12.3	0.043	0.045	6.3	9.2	10.5	74.2
08/14/2012	12.3	11.5	0.029	0.026	5.4	6.7	4.6	49.9

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)
11/08/2011	0.04	1.37	28.0	48.1	2.6	13.4	90	7	9.5
03/20/2012	0.126	3.79	45.1	102	6.1	27.1	82	23	34
04/10/2012	0.112	4.21	26.6	87.1	4.0	25.7	78	26	49
05/15/2012	0.110	1.69	15.5	38.7	2.0	11.4	78	15	27
06/06/2012	0.314	19.9	20.2	244	5.6	113	56	176	822
06/19/2012	0.127	2.19	13.4	40.4	2.9	15.2	68	16	41
07/17/2012	0.061	0.40	8.59	20.9	<1.4	4.3	81	5	4.9
08/14/2012	0.049	0.31	10.3	26.2	<1.4	3.4	85	4	1.9

Table 4. Water-quality data for the Clark Fork Basin, Montana, October 2011 through September 2012.—Continued

[mg/L, milligrams per liter; ft³/s, cubic feet per second; µS/cm, microsiemens per centimeter at 25 °C; °C, degrees Celsius; $CaCO_3$, calcium carbonate; µg/L, micrograms per liter; <, less than laboratory reporting level; mm, millimeters; ton/d, tons per day; lab, laboratory; NTRU, nephelometric turbidity ratio unit; E, estimated; --, no data]

12331800—Clark Fork near Drummond

Date	Time	Streamflow, instantaneous (ft³/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)
11/09/2011	0810	771	8.2	440	2.0	212	61.4	14.3
03/21/2012	0820	791	8.1	444	4.0	206	59.1	14.3
04/11/2012	0830	973	8.2	400	9.0	181	52.0	12.3
05/16/2012	0755	826	8.1	347	14.0	164	47.5	11.1
06/06/2012	1400	2,020	8.1	278	11.5	128	37.2	8.42
06/20/2012	0845	1,130	8.2	334	11.5	154	44.2	10.7
07/18/2012	0810	549	8.1	461	18.0	211	59.7	15.2
08/15/2012	0810	278	8.0	555	18.0	265	74.9	19.0

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)
11/09/2011	7.6	9.0	0.042	0.067	2.3	8.7	67.9	196
03/21/2012	8.0	10.8	0.075	0.137	4.8	24.2	16.8	542
04/11/2012	7.6	10.8	0.049	0.190	4.2	28.8	19.8	774
05/16/2012	9.6	10.8	0.044	0.121	5.1	18.8	9.3	406
06/06/2012	11.1	24.0	0.052	0.442	8.8	97.3	29.7	2,530
06/20/2012	8.8	10.1	0.047	0.118	5.2	18.9	15.8	419
07/18/2012	12.5	11.4	0.029	0.113	5.7	9.1	22.1	55.6
08/15/2012	11.8	11.7	0.027	0.074	2.9	8.3	3.6	158

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)
11/09/2011	0.039	1.47	19.2	49.5	3.9	12.5	86	8	17
03/21/2012	0.111	3.58	37.7	92.3	6.1	27.1	79	25	53
04/11/2012	0.126	4.71	24.2	106	5.2	35.1	76	38	100
05/16/2012	0.107	2.58	14.2	54.8	3.7	20.7	82	18	40
06/06/2012	0.349	19.8	17.2	277	5.2	106	66	146	796
06/20/2012	0.117	2.83	14.7	52.3	3.8	21.4	68	21	64
07/18/2012	0.050	0.73	6.31	16.2	2.4	6.3	78	3	4.4
08/15/2012	0.052	1.12	22.6	134	2.9	12.7	79	17	13

Table 4. Water-quality data for the Clark Fork Basin, Montana, October 2011 through September 2012.—Continued

[mg/L, milligrams per liter; ft³/s, cubic feet per second; µS/cm, microsiemens per centimeter at 25 °C; °C, degrees Celsius; $CaCO_3$, calcium carbonate; µg/L, micrograms per liter; <, less than laboratory reporting level; mm, millimeters; ton/d, tons per day; lab, laboratory; NTRU, nephelometric turbidity ratio unit; E, estimated; --, 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)
11/09/2011	0945	1,130	8.3	369	2.0	180	51.3	12.6
03/21/2012	1025	1,240	8.2	360	3.5	160	44.9	11.5
04/11/2012	1015	1,740	8.2	305	8.0	136	38.7	9.56
05/16/2012	1010	3,130	8.0	160	11.0	72.5	20.3	5.29
06/07/2012	0735	4,820	7.9	185	8.5	85.8	24.3	6.09
06/20/2012	1040	2,800	8.2	215	10.5	97.7	27.6	7.01
07/18/2012	1000	1,120	8.2	284	17.0	126	34.8	9.59
08/15/2012	0940	555	8.1	330	15.5	155	42.6	11.8

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)
11/09/2011	6.0	6.2	0.057	0.056	4.2	5.7	74.2	122
03/21/2012	6.1	7.5	0.069	0.093	3.8	13.8	20.4	351
04/11/2012	5.0	6.6	0.026	0.113	3.2	16.6	22.2	489
05/16/2012	3.2	3.9	0.021	0.069	2.2	8.8	27.7	423
06/07/2012	6.3	11.4	0.034	0.263	5.9	49.7	30.7	1,340
06/20/2012	4.6	5.1	0.024	0.072	3.1	10.0	17.9	254
07/18/2012	5.7	5.3	0.019	0.046	2.7	3.8	12.6	47.7
08/15/2012	5.7	5.7	0.020	0.032	2.1	4.3	8.7	85.7

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)
11/09/2011	0.553	0.80	20.1	27.4	7.7	9.5	88	5	15
03/21/2012	0.098	2.02	17.1	55.8	4.9	17.9	82	16	54
04/11/2012	0.100	2.76	11.3	63.0	3.3	22.7	77	23	108
05/16/2012	0.065	1.67	6.28	41.2	2.8	13.3	52	29	245
06/07/2012	0.230	8.75	6.81	142	4.5	58.1	63	87	1,130
06/20/2012	0.067	1.45	7.10	30.3	2.3	12.6	70	13	98
07/18/2012	<0.025	0.20	4.68	9.5	1.5	3.8	73	3	9.1
08/15/2012	0.033	0.44	6.08	33.6	1.9	6.6	88	7	10

Table 4. Water-quality data for the Clark Fork Basin, Montana, October 2011 through September 2012.—Continued

[mg/L, milligrams per liter; ft³/s, cubic feet per second; µS/cm, microsiemens per centimeter at 25 °C; °C, degrees Celsius; $CaCO_3$, calcium carbonate; µg/L, micrograms per liter; <, less than laboratory reporting level; mm, millimeters; ton/d, tons per day; lab, laboratory; NTRU, nephelometric turbidity ratio unit; E, estimated; --, no data]

12340000—Blackfoot River near Bonner

Date	Time	Streamflow, instantaneous (ft³/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)
11/09/2011	1145	718	8.4	272	3.0	146	37.5	12.7
04/11/2012	1230	2,310	8.3	199	8.0	97.8	25.3	8.44
05/16/2012	1220	6,250	8.0	157	12.5	80.1	20.9	6.74
06/07/2012	0945	7,030	8.0	156	8.5	81.4	21.4	6.82
07/18/2012	1215	1,350	8.5	230	19.0	118	29.7	10.8
08/15/2012	1200	704	8.5	261	16.0	137	33.9	12.6

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)
11/09/2011	1.0	1.4	<0.016	<0.016	<0.80	<0.70	3.3	34.5
04/11/2012	0.97	1.0	<0.016	<0.016	1.1	1.1	54.6	283
05/16/2012	0.81	1.2	<0.016	<0.016	0.81	1.8	18.3	592
06/07/2012	0.78	2.0	<0.016	<0.016	<.80	2.5	20.2	836
07/18/2012	1.2	1.1	<0.016	<0.016	<.80	<.70	7.8	42.6
08/15/2012	1.3	1.2	<0.016	<0.016	<.80	<.70	6.0	30.4

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)
11/09/2011	<0.025	<0.04	1.41	3.0	<1.4	<3.0	76	1	1.9
04/11/2012	0.042	0.26	5.42	21.9	<1.4	<3.0	88	13	81
05/16/2012	0.032	0.66	2.67	33.4	3.2	<3.0	75	52	878
06/07/2012	0.025	0.90	2.35	44.6	<1.4	3.2	75	65	1,230
07/18/2012	<0.025	0.05	2.30	6.1	<1.4	<3.0	87	2	7.3
08/15/2012	<0.025	<0.04	1.68	6.1	<1.4	<3.0	87	2	3.8

Table 4. Water-quality data for the Clark Fork Basin, Montana, October 2011 through September 2012.—Continued

[mg/L, milligrams per liter; ft³/s, cubic feet per second; µS/cm, microsiemens per centimeter at 25 °C; °C, degrees Celsius; $CaCO_3$, calcium carbonate; µg/L, micrograms per liter; <, less than laboratory reporting level; mm, millimeters; ton/d, tons per day; lab, laboratory; NTRU, nephelometric turbidity ratio unit; E, estimated; --, no data]

12340500—Clark Fork above Missoula

Date	Time	Streamflow, instantaneous (ft³/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)
11/09/2011	1330	1,900	8.5	327	3.0	163	44.9	12.5
03/21/2012	1315	E2,300	8.2	308	3.0	144	38.9	11.3
04/11/2012	1430	4,150	8.3	243	9.5	114	30.8	8.88
05/16/2012	1400	9,830	8.1	160	12.0	78.8	21.1	6.32
06/07/2012	1120	11,600	8.0	168	9.0	80.8	21.9	6.37
06/20/2012	1255	7,360	8.2	189	11.5	89.3	24.0	7.12
07/18/2012	1350	2,520	8.5	255	19.5	121	31.2	10.3
08/15/2012	1345	1,340	8.5	284	17.0	141	36.7	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)
11/09/2011	3.8	4.4	0.026	0.029	1.3	3.5	5.4	85.2
03/21/2012	3.9	4.6	0.034	0.051	2.5	7.6	45.6	320
04/11/2012	2.8	3.6	0.019	0.060	1.9	8.0	39.6	408
05/16/2012	1.7	2.4	<0.016	0.040	1.6	4.8	23.6	520
06/07/2012	2.9	5.4	0.018	0.097	3.0	19.3	26.1	954
06/20/2012	2.3	2.6	0.017	0.027	1.7	4.8	16.9	215
07/18/2012	3.3	2.9	<0.016	0.023	1.7	2.1	9.2	47.3
08/15/2012	3.4	3.5	<0.016	<0.016	1.2	1.9	6.9	42.1

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)
11/09/2011	0.031	0.45	8.30	19.9	1.8	5.5	83	3	15
03/21/2012	0.103	1.15	15.3	43.1	3.1	10.6	85	15	93
04/11/2012	0.073	1.35	8.69	41.3	1.4	11.0	75	20	224
05/16/2012	0.093	1.26	6.08	34.3	2.2	7.4	71	46	1,220
06/07/2012	0.108	3.71	5.15	81.7	2.3	24.2	67	78	2,440
06/20/2012	0.051	0.83	5.71	20.6	1.5	6.1	76	12	238
07/18/2012	<0.025	0.13	5.53	10.9	1.6	<3.0	83	2	14
08/15/2012	0.030	0.16	6.81	17.5	<1.4	<3.0	89	3	11

Table 5. Daily mean streamflow and suspended-sediment data for Clark Fork at Deer Lodge, Montana (12324200), October 2011 through September 2012.

[ft^3/s, cubic feet per second; mg/L, milligrams per liter; ton/d, tons per day; --, no data or value not computed; max, maximum; min, minimum; acre-ft, acre-feet]

Day	Mean streamflow (ft^3/s)	Suspended sediment		Mean streamflow (ft^3/s)	Suspended sediment		Mean streamflow (ft^3/s)	Suspended sediment	
		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)
		OCTOBER			NOVEMBER			DECEMBER	
1	198	5	2.7	320	21	18	304	16	13
2	206	7	4.1	314	22	19	307	17	14
3	209	9	5.0	322	24	21	309	17	14
4	218	9	5.6	316	26	22	306	17	14
5	261	10	7.0	325	39	34	262	17	12
6	264	10	7.4	315	27	23	265	16	12
7	267	11	7.8	305	18	15	286	16	12
8	271	11	8.0	317	16	13	295	17	13
9	275	11	8.5	317	17	15	287	18	14
10	278	13	9.6	315	18	15	294	19	15
11	283	14	10	321	18	16	286	20	15
12	282	12	9.5	331	18	16	284	24	18
13	288	11	8.4	329	18	16	271	29	22
14	292	10	8.1	318	18	15	277	38	28
15	316	10	8.8	319	17	15	273	50	37
16	349	13	12	298	17	14	275	53	40
17	355	15	15	328	18	16	284	53	40
18	339	15	14	334	19	17	286	52	40
19	334	14	13	307	18	15	295	51	41
20	333	13	12	314	18	16	289	46	36
21	327	12	11	336	19	18	291	40	31
22	329	11	10	342	19	18	277	33	25
23	319	10	8.9	350	19	18	274	27	20
24	325	11	9.4	348	18	17	300	27	22
25	325	12	10	333	18	16	305	27	23
26	342	13	12	317	18	15	288	28	22
27	343	14	13	326	17	15	283	29	22
28	331	15	13	330	17	15	282	28	21
29	330	16	14	324	16	14	304	26	22
30	326	18	16	324	16	14	301	25	20
31	327	19	17	--	--	--	307	23	19
TOTAL	9,242	--	310.8	9,695	--	511	8,947	--	697
MEAN	**298**	**12**	**10**	**323**	**19**	**17**	**289**	**29**	**22**
MAX	**355**	**19**	**17**	**350**	**39**	**34**	**309**	**53**	**41**
MIN	**198**	**5**	**207**	**298**	**16**	**13**	**262**	**16**	**12**

Table 5. Daily mean streamflow and suspended-sediment data for Clark Fork at Deer Lodge, Montana (12324200), October 2011 through September 2012.—Continued

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

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	280	23	17	260	17	12	253	21	14
2	301	23	18	269	17	12	269	23	17
3	300	22	18	265	17	12	261	26	18
4	294	22	17	254	16	11	269	29	21
5	294	22	17	252	16	11	302	32	26
6	286	21	16	262	16	11	305	32	27
7	267	21	15	261	16	11	267	23	17
8	280	20	15	240	17	11	269	22	16
9	289	21	17	262	19	13	283	21	16
10	282	24	18	257	17	12	298	19	16
11	269	28	20	259	16	11	304	18	15
12	255	32	22	259	14	10	303	16	13
13	273	33	24	258	14	9.8	302	17	13
14	294	33	26	259	14	10	294	17	14
15	290	33	26	250	15	10	290	21	17
16	264	33	23	246	15	10	323	37	33
17	217	27	16	262	16	11	362	46	45
18	248	21	14	255	16	11	387	58	61
19	299	19	15	248	16	11	361	38	37
20	293	18	14	248	17	11	344	39	36
21	289	19	15	257	17	12	333	43	38
22	295	19	15	293	28	23	410	58	65
23	272	20	15	325	32	28	395	49	52
24	256	21	14	283	18	14	378	46	47
25	274	22	16	277	16	12	363	45	44
26	271	23	17	265	17	12	372	44	44
27	257	24	17	265	17	12	377	43	44
28	247	25	16	254	18	12	367	42	42
29	274	23	17	264	19	13	359	40	39
30	279	20	15	--	--	--	365	38	38
31	267	18	13	--	--	--	377	37	38
TOTAL	8,556	--	538	7,609	--	358.8	10,142	--	963
MEAN	**276**	**24**	**17**	**262**	**17**	**12**	**327**	**34**	**31**
MAX	**301**	**33**	**26**	**325**	**32**	**28**	**410**	**58**	**65**
MIN	**217**	**18**	**13**	**240**	**14**	**9.8**	**253**	**16**	**13**

Table 5. Daily mean streamflow and suspended-sediment data for Clark Fork at Deer Lodge, Montana (12324200), October 2011 through September 2012.—Continued

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

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	404	41	45	502	54	74	330	13	12
2	393	44	46	436	39	46	393	32	35
3	381	35	36	419	31	35	587	156	258
4	370	31	31	409	23	26	618	135	227
5	349	30	28	424	25	29	633	195	341
6	337	26	23	386	21	21	781	169	349
7	339	27	25	350	22	21	759	79	163
8	335	30	27	320	22	19	651	57	100
9	331	28	25	307	22	18	647	41	72
10	327	26	23	311	17	14	584	31	49
11	332	28	25	317	16	14	550	29	44
12	374	35	35	306	15	12	464	27	33
13	387	35	37	304	17	14	478	34	44
14	366	30	30	299	17	14	532	40	57
15	350	27	25	307	16	14	489	27	36
16	351	24	23	347	29	28	457	21	26
17	336	23	21	404	47	52	431	19	22
18	332	21	19	430	42	49	431	20	23
19	331	26	23	375	26	27	429	17	20
20	324	34	29	336	18	16	388	14	15
21	319	37	32	304	15	13	348	12	11
22	342	53	49	347	26	25	307	11	9.3
23	364	74	72	442	50	60	282	10	7.7
24	397	37	39	384	27	29	285	7	5.6
25	434	36	42	356	15	14	269	8	5.9
26	481	106	141	349	13	12	252	7	5.1
27	622	242	409	381	17	18	226	6	3.5
28	627	139	237	427	22	25	199	5	2.7
29	572	77	119	406	18	20	181	4	2.1
30	532	60	86	357	13	13	168	4	1.9
31	--	--	--	334	12	11	--	--	--
TOTAL	11,739	--	1,802	11,376	--	783	13,149	--	1,980.8
MEAN	**391**	**49**	**60**	**367**	**24**	**25**	**438**	**41**	**66**
MAX	**627**	**242**	**409**	**502**	**54**	**74**	**781**	**195**	**349**
MIN	**319**	**21**	**19**	**299**	**12**	**11**	**168**	**4**	**1.9**

Table 5. Daily mean streamflow and suspended-sediment data for Clark Fork at Deer Lodge, Montana (12324200), October 2011 through September 2012.—Continued

[ft^3/s, cubic feet per second; mg/L, milligrams per liter; ton/d, tons per day; --, no data or value not computed; max, maximum; min, minimum; acre-ft, acre-feet]

Day	Mean streamflow (ft^3/s)	Suspended sediment		Mean streamflow (ft^3/s)	Suspended sediment		Mean streamflow (ft^3/s)	Suspended sediment	
		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)
		JULY			**AUGUST**			**SEPTEMBER**	
1	167	7	3.2	93	4	1.1	98	12	3.2
2	181	7	3.3	85	5	1.1	97	13	3.5
3	172	6	2.8	84	5	1.1	96	14	3.6
4	169	5	2.4	81	5	1.1	91	14	3.4
5	161	6	2.5	85	5	1.1	84	11	2.4
6	154	6	2.6	83	5	1.1	86	9	2.1
7	146	7	2.7	88	5	1.2	93	10	2.4
8	142	7	2.8	85	5	1.2	100	10	2.7
9	138	8	2.9	83	5	1.2	95	11	2.8
10	133	8	2.7	86	6	1.3	94	12	3.0
11	131	7	2.5	90	6	1.4	95	13	3.3
12	132	7	2.3	85	5	1.2	98	14	3.6
13	123	6	2.0	81	4	0.90	99	13	3.6
14	125	7	2.4	78	3	0.70	101	13	3.5
15	172	16	7.3	80	5	1.0	99	12	3.2
16	181	15	7.2	90	7	1.7	98	11	3.0
17	195	17	8.8	91	8	1.9	100	11	2.9
18	183	16	8.0	85	8	1.8	98	10	2.7
19	167	12	5.4	84	8	1.7	99	10	2.6
20	151	9	3.7	88	8	1.8	103	9	2.5
21	142	7	2.8	82	8	1.7	108	9	2.6
22	130	7	2.5	88	8	1.9	108	9	2.6
23	114	6	2.0	91	8	2.0	113	9	2.7
24	98	6	1.5	86	8	1.8	113	9	2.8
25	96	5	1.3	85	7	1.6	114	10	3.0
26	94	4	1.1	94	10	2.6	122	10	3.4
27	98	4	1.1	95	11	2.7	119	11	3.6
28	118	4	1.3	88	10	2.4	127	12	4.1
29	117	4	1.3	87	10	2.3	127	12	4.1
30	101	4	1.1	89	10	2.4	122	12	3.9
31	95	4	1.1	95	11	2.8	--	--	--
TOTAL	4,326	--	94.6	2,685	--	49.8	3,097	--	92.8
MEAN	**140**	**8**	**3.1**	**86.6**	**7**	**1.6**	**103**	**11**	**3.1**
MAX	**195**	**17**	**8.8**	**95**	**11**	**2.8**	**127**	**14**	**4.1**
MIN	**94**	**4**	**1.1**	**78**	**3**	**0.70**	**84**	**9**	**2.1**

Total for water year 2012 (unrounded sum of daily values): streamflow–100,563 ft^3/s (annual runoff–199,500 acre-ft); suspended-sediment discharge–8,181.6 tons.

Table 6. Daily mean streamflow and suspended-sediment data for Clark Fork at Turah Bridge, near Bonner, Montana (12334550), October 2011 through September 2012.

[ft^3/s, cubic feet per second; mg/L, milligrams per liter; ton/d, tons per day; e, estimated; --, no data or value not computed; max, maximum; min, minimum; acre-ft, acre-feet]

Day	Mean streamflow (ft^3/s)	Suspended sediment		Mean streamflow (ft^3/s)	Suspended sediment		Mean streamflow (ft^3/s)	Suspended sediment	
		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)
	OCTOBER			NOVEMBER			DECEMBER		
1	839	7	16	1,200	9	29	1,070	6	18
2	860	7	16	1,180	8	26	979	6	16
3	870	7	16	1,130	7	23	993	6	16
4	906	8	19	1,160	7	21	988	8	23
5	984	12	31	1,180	6	19	e895	22	59
6	1,070	18	53	1,170	6	18	e905	11	28
7	1,080	16	46	1,110	5	16	e950	8	20
8	1,090	13	37	1,090	5	15	e975	8	21
9	1,070	11	32	1,130	6	17	926	8	20
10	1,050	10	29	1,120	6	18	e920	8	19
11	1,100	11	34	1,110	6	18	e900	7	17
12	1,130	13	40	1,140	7	22	e860	7	16
13	1,130	14	43	1,150	8	25	e840	6	14
14	1,150	14	44	1,160	8	24	880	6	15
15	1,220	14	47	1,140	7	22	955	6	17
16	1,270	15	53	1,070	6	18	968	7	18
17	1,310	16	56	1,030	6	17	988	7	19
18	1,300	14	49	1,130	7	20	969	7	18
19	1,270	12	40	e1,080	7	22	1,000	7	19
20	1,240	10	34	e1,010	8	23	962	7	18
21	1,250	10	34	e1,080	9	26	990	7	19
22	1,230	10	34	1,100	10	30	950	7	19
23	1,240	11	37	1,160	11	34	e830	8	18
24	1,260	12	40	1,160	12	37	e840	11	25
25	1,290	12	40	1,160	12	38	e990	17	43
26	1,270	10	34	1,120	11	34	e1,030	19	52
27	1,240	9	30	1,040	10	29	e990	16	45
28	1,230	8	25	1,130	9	28	e990	15	39
29	1,220	7	23	1,120	8	24	e1,000	14	38
30	1,220	8	25	1,100	7	21	e980	14	37
31	1,210	9	28	--	--	--	e960	14	37
TOTAL	35,599	--	1,085	33,660	--	714	29,473	--	783
MEAN	**1,148**	**11**	**35**	**1,122**	**8**	**24**	**951**	**10**	**25**
MAX	**1,310**	**18**	**56**	**1,200**	**12**	**38**	**1,070**	**22**	**59**
MIN	**839**	**7**	**16**	**1,010**	**5**	**15**	**830**	**6**	**14**

Table 6. Daily mean streamflow and suspended-sediment data for Clark Fork at Turah Bridge, near Bonner, Montana (12334550), October 2011 through September 2012.—Continued

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

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	e950	15	38	995	17	46	876	8	19
2	956	14	36	933	13	33	863	8	19
3	1,010	13	35	914	10	24	890	8	20
4	1,010	12	32	862	7	16	957	13	35
5	977	11	29	815	6	13	1,580	136	608
6	972	11	28	810	6	13	1,800	139	684
7	938	10	26	871	7	16	1,330	69	257
8	899	10	24	832	6	14	1,090	20	60
9	923	10	25	836	5	12	1,040	15	41
10	935	10	25	894	7	16	1,220	21	69
11	922	7	18	880	6	15	1,450	54	213
12	e810	4	10	866	5	12	1,520	49	202
13	e815	3	6.6	861	5	12	1,400	38	143
14	e850	3	6.7	857	5	11	1,320	27	98
15	e890	3	7.1	848	5	10	1,250	22	74
16	e850	3	8.0	813	4	9.4	1,400	32	126
17	e780	4	8.5	825	4	9.0	1,680	54	247
18	e770	4	8.4	853	4	9.8	1,580	36	153
19	e780	4	8.4	836	4	10	1,490	26	105
20	e785	4	8.5	822	5	11	1,320	21	75
21	e920	6	14	831	5	12	1,240	18	60
22	971	11	30	986	24	73	1,270	24	84
23	924	11	27	2,070	245	1,430	1,480	32	128
24	868	9	22	1,340	81	304	1,580	34	145
25	858	8	19	1,120	23	71	1,510	35	141
26	946	7	19	1,030	18	50	1,540	33	137
27	904	7	17	952	15	37	1,620	32	138
28	841	7	16	892	11	27	1,650	34	151
29	866	7	17	858	8	20	1,660	31	139
30	1,170	20	64	--	--	--	1,640	34	150
31	1,220	23	76	--	--	--	1,880	54	276
TOTAL	28,310	--	709.2	27,302	--	2,336.2	43,126	--	4,797
MEAN	**913**	**9**	**23**	**941**	**19**	**81**	**1,391**	**37**	**155**
MAX	**1,220**	**23**	**76**	**2,070**	**245**	**1,430**	**1,880**	**139**	**684**
MIN	**770**	**3**	**6.6**	**810**	**4**	**9.0**	**863**	**8**	**19**

Table 6. Daily mean streamflow and suspended-sediment data for Clark Fork at Turah Bridge, near Bonner, Montana (12334550), October 2011 through September 2012.—Continued

[ft^3/s, cubic feet per second; mg/L, milligrams per liter; ton/d, tons per day; e, estimated; --, no data or value not computed; max, maximum; min, minimum; acre-ft, acre-feet]

Day	Mean streamflow (ft^3/s)	Suspended sediment		Mean streamflow (ft^3/s)	Suspended sediment		Mean streamflow (ft^3/s)	Suspended sediment	
		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)
	APRIL			MAY			JUNE		
1	2,250	91	556	4,010	53	573	2,720	14	103
2	2,270	84	516	3,640	44	434	2,920	19	153
3	2,060	47	260	3,310	37	329	3,310	34	310
4	1,970	38	200	3,110	32	270	3,620	50	492
5	1,920	33	170	3,010	30	245	3,880	58	617
6	1,870	28	140	2,880	29	228	4,710	87	1,110
7	1,820	25	121	2,670	26	186	4,660	81	1,020
8	1,750	22	105	2,550	23	159	3,960	53	575
9	1,700	22	101	2,550	23	158	3,660	37	364
10	1,690	22	99	2,720	32	239	3,540	29	280
11	1,750	26	125	2,820	25	189	3,420	25	234
12	2,070	46	260	2,750	19	143	3,240	24	212
13	2,460	79	526	2,700	18	130	3,240	23	198
14	2,480	75	506	2,730	19	137	3,590	34	331
15	2,420	56	369	2,900	24	187	3,350	26	238
16	2,350	46	292	3,230	36	315	3,110	20	169
17	2,260	37	226	3,690	62	620	3,020	18	146
18	2,220	38	226	3,760	49	494	2,980	17	134
19	2,200	33	197	3,470	32	298	2,920	15	118
20	2,180	35	208	3,120	21	175	2,750	14	101
21	2,280	44	273	2,920	16	129	2,520	13	89
22	2,620	83	592	3,150	22	187	2,350	12	78
23	3,010	145	1,190	3,810	48	494	2,250	10	60
24	3,600	204	2,000	3,380	28	259	2,160	8	47
25	4,580	227	2,790	2,990	20	159	2,070	7	40
26	5,580	196	2,960	2,750	14	106	1,980	7	36
27	7,490	239	4,860	2,720	13	97	1,890	6	30
28	7,440	170	3,470	2,800	15	115	1,770	5	24
29	5,620	95	1,450	2,910	23	178	1,660	5	22
30	4,560	67	824	2,810	16	123	1,560	5	20
31	--	--	--	2,720	14	103	--	--	--
TOTAL	88,470	--	25,612	94,580	--	7,459	88,810	--	7,351
MEAN	**2,949**	**78**	**854**	**3,051**	**28**	**241**	**2,960**	**25**	**245**
MAX	**7,490**	**239**	**4,860**	**4,010**	**62**	**620**	**4,710**	**87**	**1,110**
MIN	**1,690**	**22**	**99**	**2,550**	**13**	**97**	**1,560**	**5**	**20**

Table 6. Daily mean streamflow and suspended-sediment data for Clark Fork at Turah Bridge, near Bonner, Montana (12334550), October 2011 through September 2012.—Continued

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

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	1,490	4	17	747	4	8.2	527	5	6.7
2	1,440	5	19	726	4	7.8	523	4	5.7
3	1,410	4	17	699	4	7.6	520	4	5.3
4	1,350	4	14	675	4	7.3	510	3	4.8
5	1,290	3	12	650	4	7.1	511	3	4.5
6	1,240	3	10	632	4	7.2	528	3	4.4
7	1,200	3	9.7	619	4	7.5	534	4	5.1
8	1,180	3	9.5	610	5	7.8	533	4	5.8
9	1,170	3	9.5	604	5	8.2	536	5	6.6
10	1,160	3	9.4	592	6	9.2	542	5	7.3
11	1,130	3	9.1	584	7	10	539	5	7.3
12	1,080	3	8.5	579	7	11	539	5	7.3
13	1,050	2	7.0	572	8	12	548	5	7.4
14	1,040	2	5.8	556	7	11	555	5	7.4
15	1,050	2	5.7	550	7	10	562	5	7.1
16	1,070	2	5.8	556	7	11	557	4	6.7
17	1,120	4	12	557	7	10	545	4	6.2
18	1,120	5	14	553	7	10	542	4	5.9
19	1,080	3	7.5	544	6	9.5	539	4	6.2
20	1,050	3	8.4	539	6	9.1	545	5	6.7
21	1,020	3	8.3	541	6	8.6	550	5	7.1
22	978	3	8.0	565	5	8.0	550	5	7.3
23	940	3	8.9	568	5	6.9	548	5	7.0
24	906	4	9.2	561	4	5.7	554	4	6.7
25	872	3	6.8	555	3	4.8	564	4	6.4
26	850	2	5.2	555	4	6.0	569	4	6.3
27	840	3	7.1	565	5	7.7	570	5	7.0
28	842	4	9.5	569	6	9.4	576	5	7.9
29	831	5	12	558	7	10	576	6	8.7
30	800	6	12	538	6	8.9	580	6	9.2
31	770	5	10	530	5	7.8	--	--	--
TOTAL	33,369	--	307.9	18,249	--	265.3	16,372	--	198
MEAN	**1,076**	**3**	**9.9**	**589**	**5**	**8.6**	**546**	**4**	**6.6**
MAX	**1,490**	**6**	**19**	**747**	**8**	**12**	**580**	**6**	**9.2**
MIN	**770**	**2**	**5.2**	**530**	**3**	**4.8**	**510**	**3**	**4.4**

Total for water year 2012 (unrounded sum of daily values): streamflow–537,320 ft³/s (annual runoff–1,066,000 acre-ft); suspended-sediment discharge–51,617.6 tons.

Table 7. Daily mean streamflow and suspended-sediment data for Blackfoot River near Bonner, Montana (12340000), October 2011 through September 2012.

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

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	682	4	7.2	766	3	6.1	674	2	3.7
2	688	4	7.4	759	3	5.6	653	2	3.1
3	681	4	7.4	738	2	4.9	636	2	2.6
4	688	4	7.4	735	2	4.4	e620	1	2.1
5	712	4	7.7	741	2	4.1	606	1	1.7
6	730	4	7.9	730	2	3.9	e630	1	1.7
7	744	4	8.0	708	2	3.8	e645	1	1.7
8	748	4	8.0	715	2	3.9	e620	1	1.7
9	742	4	7.6	715	2	3.9	e640	1	1.8
10	732	4	7.1	708	2	3.8	e585	1	2.0
11	737	3	6.7	700	2	3.8	e585	1	2.3
12	746	3	6.4	712	2	3.8	e655	2	2.9
13	739	3	6.1	721	2	4.0	e665	2	3.6
14	731	3	6.5	731	2	4.4	e680	2	4.5
15	764	4	7.3	738	2	5.0	e665	3	5.4
16	783	4	8.0	686	3	5.1	e650	3	6.2
17	783	4	8.4	718	3	5.7	639	4	6.7
18	764	4	8.2	751	3	6.1	611	4	6.2
19	754	4	8.1	707	3	5.7	615	4	5.8
20	746	4	8.1	666	3	5.4	597	3	5.3
21	744	4	8.1	700	3	5.7	608	3	5.0
22	741	4	8.5	712	3	6.3	589	3	4.8
23	757	5	9.2	727	4	6.9	547	3	4.4
24	798	5	10	717	4	7.3	562	4	5.4
25	816	5	11	743	4	7.9	e590	5	7.8
26	795	4	9.6	708	4	7.1	e600	5	8.4
27	767	4	8.2	697	3	6.6	612	5	9.1
28	755	3	7.0	706	3	6.2	e630	6	9.5
29	749	3	6.1	702	3	5.7	e620	6	9.7
30	744	3	6.0	696	3	4.8	e600	5	8.8
31	758	3	6.1	--	--	--	e575	5	7.4
TOTAL	23,118	--	239.3	21,553	--	157.9	19,204	--	151.3
MEAN	**746**	**4**	**7.7**	**718**	**3**	**5.3**	**619**	**3**	**4.9**
MAX	**816**	**5**	**11**	**766**	**4**	**7.9**	**680**	**6**	**9.7**
MIN	**681**	**3**	**6.0**	**666**	**2**	**3.8**	**547**	**1**	**1.7**

Table 7. Daily mean streamflow and suspended-sediment data for Blackfoot River near Bonner, Montana (12340000), October 2011 through September 2012.—Continued

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

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	e565	4	6.4	626	3	5.2	631	7	12
2	e605	4	6.3	604	3	5.7	604	4	6.9
3	e630	4	6.7	599	4	6.4	600	3	4.9
4	e610	4	6.7	584	4	7.0	621	5	7.9
5	e640	4	6.7	533	5	7.1	710	13	24
6	613	4	6.3	535	5	7.2	936	21	53
7	577	4	5.6	578	5	7.8	1,000	24	65
8	587	3	5.4	532	5	7.2	853	20	47
9	587	3	5.1	557	5	7.5	759	17	35
10	586	3	4.7	556	5	7.2	749	16	33
11	566	3	4.1	538	5	6.6	893	18	43
12	506	2	3.2	533	4	6.1	1,040	27	77
13	479	2	2.6	528	4	5.7	1,030	30	83
14	e555	2	2.6	521	4	5.3	958	24	63
15	e550	2	2.2	507	4	4.8	908	20	50
16	e530	1	1.8	505	3	4.5	1,000	24	65
17	e545	1	1.7	515	3	4.2	1,220	32	104
18	e530	1	2.1	503	3	4.1	1,250	30	102
19	526	2	2.6	506	3	4.1	1,150	19	61
20	559	2	3.3	504	3	4.1	1,010	14	37
21	600	3	4.2	513	4	4.9	962	12	30
22	e605	3	5.0	603	6	10	946	11	29
23	e600	4	5.9	723	9	19	1,010	14	39
24	e565	4	6.7	876	16	38	1,110	19	57
25	e605	5	7.4	805	15	32	1,180	23	73
26	e600	5	7.4	722	12	24	1,290	24	83
27	602	4	6.5	678	10	18	1,370	25	94
28	585	3	5.5	619	8	14	1,500	29	117
29	612	3	5.0	612	7	12	1,590	27	117
30	634	3	5.1	--	--	--	1,730	30	139
31	632	3	5.1	--	--	--	2,220	49	294
TOTAL	17,986	--	149.9	17,015	--	289.7	32,830	--	2,045.7
MEAN	**580**	**3**	**4.8**	**587**	**6**	**10**	**1,059**	**20**	**66**
MAX	**640**	**5**	**7.4**	**876**	**16**	**38**	**2,220**	**49**	**294**
MIN	**479**	**1**	**1.7**	**503**	**3**	**4.1**	**600**	**3**	**4.9**

Table 7. Daily mean streamflow and suspended-sediment data for Blackfoot River near Bonner, Montana (12340000), October 2011 through September 2012.—Continued

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

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	2,690	58	421	7,380	47	948	3,660	12	115
2	2,820	41	313	6,540	38	678	3,900	13	135
3	2,750	28	210	5,820	29	461	4,500	20	245
4	2,670	22	161	5,310	27	383	4,830	24	311
5	2,600	17	122	4,970	24	323	5,420	36	500
6	2,530	16	110	4,640	22	275	6,840	80	1,510
7	2,460	15	99	4,270	20	233	6,940	69	1,290
8	2,350	14	87	4,100	20	224	6,080	44	722
9	2,240	12	74	4,240	22	253	5,460	29	428
10	2,190	12	72	e4,920	28	359	5,080	22	300
11	2,320	13	84	5,010	29	396	4,740	20	254
12	2,850	23	177	4,830	24	310	4,360	19	220
13	3,560	39	380	4,760	21	269	4,300	17	203
14	3,800	38	388	4,940	24	325	4,640	19	244
15	3,860	34	351	5,430	33	493	4,670	18	231
16	3,830	30	306	6,110	50	840	4,550	16	197
17	3,690	24	238	7,150	77	1,490	4,480	15	187
18	3,620	24	234	7,410	68	1,360	4,710	17	216
19	3,610	21	204	6,860	48	898	4,670	17	216
20	3,610	21	203	6,170	36	601	4,300	13	155
21	4,010	26	285	5,750	27	425	3,940	12	129
22	4,610	42	530	5,990	31	503	3,730	12	119
23	5,440	62	920	6,500	39	692	3,740	12	117
24	6,860	110	2,070	6,050	30	498	3,930	14	144
25	8,820	165	3,960	5,400	24	362	4,030	13	144
26	10,100	139	3,760	4,810	19	248	3,960	14	145
27	11,700	182	5,790	4,460	17	202	3,760	12	119
28	11,300	132	4,060	4,310	14	167	3,380	10	90
29	9,680	87	2,290	4,110	14	154	3,050	8	68
30	8,240	62	1,390	3,890	13	138	2,850	8	62
31	--	--	--	3,680	13	126	--	--	--
TOTAL	140,810	--	29,289	165,810	--	14,634	134,500	--	8,816
MEAN	**4,694**	**50**	**976**	**5,349**	**30**	**472**	**4,483**	**21**	**294**
MAX	**11,700**	**182**	**5,790**	**7,410**	**77**	**1,490**	**6,940**	**80**	**1,510**
MIN	**2,190**	**12**	**72**	**3,680**	**13**	**126**	**2,850**	**8**	**62**

Table 7. Daily mean streamflow and suspended-sediment data for Blackfoot River near Bonner, Montana (12340000), October 2011 through September 2012.—Continued

[ft^3/s, cubic feet per second; mg/L, milligrams per liter; ton/d, tons per day; e, estimated; --, no data or value not computed; max, maximum; min, minimum; acre-ft, acre-feet]

Day	Mean streamflow (ft^3/s)	Suspended sediment		Mean streamflow (ft^3/s)	Suspended sediment		Mean streamflow (ft^3/s)	Suspended sediment	
		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)
		JULY			**AUGUST**			**SEPTEMBER**	
1	2,730	8	59	875	3	7.0	614	4	6.6
2	2,610	8	57	853	3	6.3	609	4	6.5
3	2,460	9	57	843	2	5.7	607	4	6.1
4	2,320	9	54	833	2	5.1	603	3	5.7
5	2,200	7	40	823	2	4.5	603	3	5.3
6	2,070	5	29	804	2	4.3	593	3	4.8
7	e1,960	4	24	790	2	4.3	591	3	4.8
8	1,880	4	20	783	2	4.2	587	3	4.8
9	1,800	3	17	786	2	4.3	593	3	4.8
10	1,720	3	15	791	2	4.8	591	3	4.8
11	1,660	4	16	786	3	5.3	582	3	4.7
12	1,600	4	17	763	3	5.7	579	3	4.7
13	1,510	3	14	739	3	5.8	573	3	4.6
14	1,470	3	12	715	2	4.8	578	3	4.6
15	1,430	2	9.5	707	2	4.1	579	3	4.2
16	1,430	2	7.9	706	3	4.9	575	2	3.8
17	1,390	2	8.3	702	3	5.6	568	2	3.4
18	1,340	3	12	690	3	5.6	563	2	3.1
19	1,300	3	11	684	3	5.5	557	2	3.4
20	1,260	3	10	679	3	5.5	551	3	3.8
21	1,260	3	10	686	3	5.5	548	3	4.1
22	1,210	3	9.8	693	3	5.2	547	3	4.4
23	1,170	3	9.5	677	3	4.6	544	3	4.4
24	1,110	3	8.7	659	2	4.0	539	3	4.4
25	1,070	2	7.1	660	2	3.7	533	3	4.3
26	1,020	2	5.8	656	2	4.4	535	3	4.3
27	1,000	3	6.9	644	3	5.2	534	3	4.3
28	989	3	7.9	644	4	6.2	535	3	4.3
29	983	3	8.0	637	4	6.8	544	3	4.4
30	929	3	7.5	625	4	6.7	541	3	4.3
31	899	3	7.3	615	4	6.6	--	--	--
TOTAL	47,780	--	578.2	22,548	--	162.2	17,096	--	137.7
MEAN	**1,541**	**4**	**19**	**727**	**3**	**5.2**	**570**	**3**	**4.6**
MAX	**2,730**	**9**	**59**	**875**	**4**	**7.0**	**614**	**4**	**6.6**
MIN	**899**	**2**	**5.8**	**615**	**2**	**3.7**	**533**	**2**	**3.1**

Total for water year 2012 (unrounded sum of daily values): streamflow–660,250 ft^3/s (annual runoff–1,310,000 acre-ft); suspended-sediment discharge–56,650.9 tons.

Table 8. Daily mean streamflow and suspended-sediment data for Clark Fork above Missoula, Montana (12340500), October 2011 through September 2012.

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

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	1,670	5	23	2,010	5	26	1,810	12	61
2	1,690	5	23	1,990	4	22	1,700	15	68
3	1,690	6	25	1,930	4	21	1,680	17	77
4	1,730	7	30	1,940	5	24	1,680	29	134
5	1,830	9	43	1,960	5	26	1,560	31	129
6	1,930	11	56	1,950	4	24	1,550	27	112
7	1,970	9	49	1,880	4	20	1,610	25	107
8	1,980	8	43	1,850	3	17	1,600	22	97
9	1,950	7	39	1,890	3	16	1,560	20	86
10	1,930	7	37	1,870	3	15	1,490	20	81
11	1,970	8	40	1,860	3	16	1,480	23	90
12	2,000	8	43	1,890	4	18	1,530	28	116
13	2,000	8	43	1,920	4	20	1,540	32	135
14	1,980	8	43	1,940	4	20	1,590	28	119
15	2,040	9	51	1,930	3	18	1,660	21	95
16	2,100	10	57	1,820	3	15	1,650	15	65
17	2,140	10	58	1,790	3	15	1,680	8	38
18	2,110	10	54	1,890	4	19	1,630	6	28
19	2,080	9	49	1,800	4	22	1,670	6	25
20	2,040	8	44	1,660	5	23	1,620	5	21
21	2,050	8	44	1,740	6	28	1,660	4	19
22	2,020	8	44	1,850	7	34	1,530	4	16
23	2,040	8	44	1,920	8	40	1,360	4	15
24	2,090	8	45	1,920	9	45	1,350	5	19
25	2,140	8	45	1,950	9	47	1,620	13	56
26	2,110	7	38	1,890	9	45	1,690	13	58
27	2,060	6	31	1,790	8	41	1,630	11	50
28	2,040	4	24	1,880	8	42	e1,650	11	49
29	2,010	4	22	1,870	8	41	e1,650	11	49
30	2,010	4	23	1,850	9	45	e1,630	11	47
31	2,010	5	25	--	--	--	e1,620	10	45
TOTAL	61,410	--	1,235	56,430	--	805	49,680	--	2,107
MEAN	**1,981**	**7**	**40**	**1,881**	**5**	**27**	**1,603**	**16**	**68**
MAX	**2,140**	**11**	**58**	**2,010**	**9**	**47**	**1,810**	**32**	**135**
MIN	**1,670**	**4**	**22**	**1,660**	**3**	**15**	**1,350**	**4**	**15**

Table 8. Daily mean streamflow and suspended-sediment data for Clark Fork above Missoula, Montana (12340500), October 2011 through September 2012.—Continued

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

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	e1,600	10	43	1,680	13	57	1,570	11	45
2	1,650	9	40	1,610	9	38	1,540	10	40
3	1,680	8	37	1,580	7	30	1,560	8	34
4	1,720	7	33	1,480	6	22	1,630	21	96
5	1,680	6	28	1,380	4	16	2,260	92	576
6	1,660	6	25	1,380	4	16	2,710	81	603
7	1,600	5	22	1,520	5	20	2,420	56	375
8	1,570	5	21	1,430	5	19	2,030	20	112
9	1,580	5	21	1,470	5	20	1,880	16	79
10	1,600	5	22	1,530	5	22	1,990	16	89
11	1,570	5	23	1,500	5	19	2,340	35	227
12	1,360	6	21	1,480	4	16	2,580	42	291
13	1,270	6	20	1,470	4	16	2,490	34	230
14	1,430	4	16	1,470	4	15	2,340	28	175
15	1,550	3	12	1,450	4	14	2,220	23	137
16	1,470	2	7.6	1,410	3	13	2,400	28	181
17	1,480	1	4.4	1,430	3	12	2,950	44	352
18	1,380	1	3.7	1,440	3	13	2,900	38	296
19	1,350	1	4.1	1,430	3	14	2,740	24	182
20	1,500	3	13	1,420	4	14	2,430	19	124
21	1,650	6	27	1,430	5	19	e2,300	17	103
22	1,650	8	35	1,630	30	140	e2,260	17	107
23	1,590	7	30	2,750	199	1,540	2,500	20	138
24	1,460	6	24	2,270	62	382	2,740	24	180
25	1,480	5	20	1,990	25	137	2,730	28	206
26	1,640	4	19	1,830	19	94	2,860	30	228
27	1,570	4	17	1,710	14	67	3,030	32	261
28	1,470	4	16	1,600	10	43	3,190	37	322
29	1,540	4	18	1,540	6	27	3,320	38	339
30	1,820	13	67	--	--	--	3,430	38	355
31	1,900	18	90	--	--	--	4,140	73	828
TOTAL	48,470	--	779.8	46,310	--	2,855	77,480	--	7,311
MEAN	**1,564**	**6**	**25**	**1,597**	**16**	**98**	**2,499**	**32**	**236**
MAX	**1,900**	**18**	**90**	**2,750**	**199**	**1,540**	**4,140**	**92**	**828**
MIN	**1,270**	**1**	**3.7**	**1,380**	**3**	**12**	**1,540**	**8**	**34**

Table 8. Daily mean streamflow and suspended-sediment data for Clark Fork above Missoula, Montana (12340500), October 2011 through September 2012.—Continued

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

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	5,090	103	1,410	11,800	56	1,800	6,670	12	207
2	5,320	88	1,260	10,700	41	1,200	7,060	14	276
3	5,000	73	982	9,560	32	838	8,000	24	515
4	4,800	43	557	8,820	28	675	8,710	33	765
5	4,670	33	415	8,370	27	605	9,400	40	1,020
6	4,540	26	323	7,960	24	519	11,300	83	2,570
7	4,420	23	279	7,380	22	443	11,500	76	2,360
8	4,200	20	231	7,070	22	415	10,300	48	1,340
9	4,040	21	224	7,170	21	399	9,370	31	777
10	3,970	23	249	7,910	24	512	8,920	25	598
11	4,130	22	250	8,240	24	531	8,470	23	526
12	4,990	40	546	8,000	21	447	7,930	19	408
13	6,250	94	1,600	7,850	20	424	7,780	18	372
14	6,610	75	1,330	8,050	22	488	8,540	24	544
15	6,600	56	1,000	8,640	29	677	8,380	20	445
16	6,470	50	875	9,680	44	1,170	8,000	18	380
17	6,200	37	622	11,000	72	2,170	7,820	15	322
18	6,050	32	519	11,400	65	1,990	7,960	15	322
19	6,010	27	444	10,600	45	1,290	7,920	15	314
20	5,980	28	446	9,570	30	786	7,400	13	257
21	6,470	34	607	8,940	24	574	6,800	13	237
22	7,430	61	1,230	9,350	26	650	6,360	12	213
23	8,630	97	2,290	10,500	41	1,150	6,210	10	175
24	10,500	169	4,830	9,750	30	783	6,300	11	188
25	13,100	245	8,660	8,680	19	453	6,320	12	200
26	14,900	194	7,780	7,860	16	336	6,150	11	181
27	17,400	250	11,800	7,470	14	279	5,850	10	154
28	17,600	185	8,870	7,390	16	324	5,310	8	117
29	15,200	109	4,510	7,320	15	298	4,840	8	105
30	13,100	70	2,470	7,020	14	262	4,520	8	95
31	--	--	--	6,720	12	219	--	--	--
TOTAL	229,670	--	66,609	270,770	--	22,707	230,090	--	15,983
MEAN	**7,656**	**78**	**2,220**	**8,735**	**29**	**732**	**7,670**	**22**	**533**
MAX	**17,600**	**250**	**11,800**	**11,800**	**72**	**2,170**	**11,500**	**83**	**2,570**
MIN	**3,970**	**20**	**224**	**6,720**	**12**	**219**	**4,520**	**8**	**95**

Table 8. Daily mean streamflow and suspended-sediment data for Clark Fork above Missoula, Montana (12340500), October 2011 through September 2012.—Continued

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

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	4,300	7	80	1,710	3	14	1,210	4	14
2	4,130	6	68	1,660	3	15	1,190	4	13
3	3,940	6	64	1,630	3	15	1,180	4	13
4	3,740	6	60	1,600	4	16	1,170	4	13
5	3,570	5	53	1,570	4	17	1,170	4	13
6	3,380	5	46	1,530	4	16	1,170	4	13
7	3,230	5	39	1,500	4	14	1,180	4	13
8	3,110	4	34	1,480	3	13	1,170	4	13
9	3,030	4	33	1,480	3	12	1,170	4	13
10	2,930	4	31	1,470	3	13	1,170	4	13
11	2,860	3	27	1,450	4	14	1,160	4	13
12	2,760	3	23	1,420	4	14	1,160	4	12
13	2,640	3	21	1,390	4	15	1,160	4	13
14	2,580	3	21	1,350	3	13	1,170	4	13
15	2,540	3	21	1,340	3	11	1,180	4	13
16	2,560	3	21	1,340	4	13	1,170	4	13
17	2,560	4	24	1,340	4	14	1,150	4	12
18	2,520	4	27	1,330	4	13	1,150	4	12
19	2,440	2	13	1,300	3	12	1,140	4	12
20	2,360	2	13	1,290	3	11	1,140	4	12
21	2,340	2	16	1,300	3	11	1,140	4	12
22	2,260	3	18	1,320	3	11	1,140	4	12
23	2,170	3	18	1,320	3	11	1,130	4	12
24	2,090	3	16	1,290	3	10	1,130	4	12
25	2,020	2	13	1,290	3	11	1,130	4	12
26	1,940	2	11	1,270	3	12	1,140	4	12
27	1,910	3	13	1,270	4	14	1,140	4	12
28	1,900	3	16	1,270	5	16	1,150	4	12
29	1,890	4	18	1,260	5	17	1,150	4	12
30	1,810	4	19	1,230	5	16	1,150	4	12
31	1,750	3	16	1,210	4	15	--	--	--
TOTAL	83,260	--	893	43,210	--	419	34,760	--	376
MEAN	**2,686**	**4**	**29**	**1,394**	**4**	**14**	**1,159**	**4**	**13**
MAX	**4,300**	**7**	**80**	**1,710**	**5**	**17**	**1,210**	**4**	**14**
MIN	**1,750**	**2**	**11**	**1,210**	**3**	**10**	**1,130**	**4**	**12**

Total for water year 2012 (unrounded sum of daily values): streamflow–1,231,540 ft³/s (annual runoff–2,443,000 acre-ft); suspended-sediment discharge–122,079.8 tons.

Table 9. Seasonal daily maximum, minimum, and mean turbidity, with monthly summary statistics at Mill Creek near Anaconda (12323670), Montana, April through September 2012.

[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); --, no data]

Day	Maximum	Minimum	Mean	Maximum	Minimum	Mean	Maximum	Minimum	Mean
	APRIL			MAY			JUNE		
1	--	--	--	5.5	4.5	5.0	7.0	4.0	5.0
2	--	--	--	5.5	4.0	4.5	22	5.0	9.0
3	7.5	5.0	6.0	5.5	4.0	4.5	26	5.5	11
4	7.0	5.0	5.5	5.0	4.0	4.5	9.5	5.0	7.0
5	6.5	4.5	5.5	4.5	3.5	4.0	18	6.0	10
6	5.5	4.5	5.0	4.5	3.5	4.0	--	--	--
7	5.5	4.0	5.0	4.5	3.0	4.0	--	--	--
8	5.0	4.0	4.5	4.5	3.0	3.5	--	--	--
9	5.5	3.5	4.0	5.0	2.5	3.5	5.0	3.5	4.0
10	5.0	3.5	4.5	5.0	2.5	4.0	4.5	3.5	4.0
11	8.0	4.0	5.0	4.5	2.5	4.0	4.5	3.5	3.5
12	8.0	5.5	6.5	4.5	2.0	3.5	4.5	3.0	3.5
13	8.5	5.0	6.5	5.0	3.0	4.0	6.0	3.0	4.0
14	7.0	4.5	5.5	6.5	2.5	4.0	4.5	3.0	3.5
15	6.5	5.0	5.5	7.0	3.5	5.0	4.0	3.0	3.0
16	6.5	5.0	5.5	9.5	4.0	6.0	5.0	2.5	3.0
17	6.0	4.5	5.0	10	4.5	6.5	4.0	2.0	3.0
18	6.0	5.0	5.5	5.5	3.5	4.5	4.5	2.0	3.0
19	6.5	4.5	5.0	5.0	3.5	4.0	4.0	2.0	3.0
20	8.0	3.5	5.0	4.5	3.5	4.0	4.5	2.5	3.5
21	18	5.5	7.5	5.5	3.5	4.0	5.5	3.5	4.5
22	--	--	--	12	5.0	8.0	--	--	--
23	--	--	--	6.5	3.5	4.5	--	--	--
24	28	8.5	14	4.5	3.0	3.5	--	--	--
25	17	7.0	10	4.5	3.0	3.5	13	3.5	6.5
26	33	9.5	17	4.0	3.0	3.5	--	--	--
27	24	8.0	12	4.0	3.0	3.5	9.5	1.5	4.0
28	9.0	6.0	7.0	4.5	3.5	3.5	2.5	1.0	1.5
29	8.0	5.5	6.0	5.0	3.5	4.0	3.5	1.5	2.5
30	6.5	5.0	5.5	5.0	3.5	4.0	3.5	2.0	2.5
31	--	--	--	5.0	3.5	4.0	--	--	--
MONTH[1]	**33**	**3.5**	**6.7**	**12**	**2.0**	**4.3**	**26**	**1.0**	**4.5**

Table 9. Seasonal daily maximum, minimum, and mean turbidity, with monthly summary statistics at Mill Creek near Anaconda (12323670), Montana, April through September 2012.—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); --, no data]

Day	Maximum	Minimum	Mean	Maximum	Minimum	Mean	Maximum	Minimum	Mean
	JULY			AUGUST			SEPTEMBER		
1	3.5	2.0	2.5	2.5	1.0	1.5	4.0	3.0	3.5
2	3.5	2.0	2.5	2.0	1.0	1.5	4.0	3.0	3.5
3	3.5	2.0	2.5	2.5	1.0	1.5	--	--	--
4	3.0	2.0	2.5	2.5	1.0	2.0	--	--	--
5	4.0	2.0	2.5	3.0	0.5	2.0	--	--	--
6	3.0	1.5	2.0	--	--	--	--	--	--
7	3.0	1.5	2.0	--	--	--	--	--	--
8	3.0	1.5	2.0	2.5	1.0	1.5	--	--	--
9	3.5	1.5	2.0	3.0	1.0	2.0	--	--	--
10	3.0	2.0	2.5	4.0	1.0	2.5	--	--	--
11	3.5	2.0	2.5	--	--	--	--	--	--
12	3.0	1.5	2.0	--	--	--	--	--	--
13	3.5	1.5	2.5	--	--	--	--	--	--
14	6.0	0.5	2.5	2.5	1.0	1.5	--	--	--
15	--	--	--	2.5	1.5	2.0	--	--	--
16	--	--	--	3.0	1.0	2.0	--	--	--
17	--	--	--	2.5	1.0	1.5	--	--	--
18	4.5	3.0	3.5	3.0	1.0	2.0	--	--	--
19	5.0	3.0	3.5	2.5	1.5	2.0	--	--	--
20	4.5	2.5	3.0	3.0	1.5	2.0	--	--	--
21	4.0	2.5	3.0	3.5	2.0	2.5	3.5	2.5	3.0
22	3.5	2.5	3.0	3.5	2.0	2.5	3.5	2.5	3.0
23	3.5	2.5	3.0	3.0	1.5	2.0	4.0	2.5	3.0
24	4.0	2.0	3.0	3.0	1.5	2.0	4.0	2.5	3.0
25	4.0	2.5	3.0	2.5	1.5	2.0	3.5	2.0	2.5
26	3.5	2.0	3.0	3.0	2.0	2.5	3.5	1.5	2.0
27	62	2.5	13	3.0	2.0	2.0	2.0	1.5	1.5
28	12	3.0	5.5	2.5	1.5	2.0	2.5	1.5	2.0
29	3.5	2.0	2.5	2.5	1.5	2.0	2.5	1.5	2.0
30	3.0	2.0	2.5	2.5	1.5	2.0	2.5	1.5	2.0
31	2.5	1.5	2.0	4.0	2.0	3.0	--	--	--
MONTH[1]	**62**	**.5**	**3.1**	**4.0**	**0.5**	**2.0**	**4.0**	**1.5**	**2.6**

[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 (12323710), April through September 2012.

[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); --, no data]

Day	Maximum	Minimum	Mean	Maximum	Minimum	Mean	Maximum	Minimum	Mean
	APRIL			MAY			JUNE		
1	--	--	--	11	9.5	10	11	9.0	10
2	13	10	11	10	9.0	9.5	11	9.0	9.5
3	12	9.0	10	10	9.0	9.0	10	8.0	9.0
4	12	9.0	9.5	10	8.0	9.0	9.0	7.5	8.5
5	10	8.5	9.0	9.5	8.0	8.5	11	7.0	8.0
6	10	7.5	9.0	--	--	--	9.5	7.0	8.0
7	14	8.0	9.5	--	--	--	8.0	6.5	7.0
8	9.5	7.5	8.5	--	--	--	7.5	6.0	6.5
9	9.5	7.0	8.0	8.5	7.0	7.5	7.0	5.5	6.5
10	9.5	7.0	7.5	7.5	6.5	7.0	7.0	5.5	6.0
11	13	7.5	9.0	8.0	6.5	7.0	6.5	5.0	5.5
12	16	11	13	8.0	6.5	7.0	6.5	5.0	5.5
13	16	12	13	7.0	6.0	6.5	6.5	5.0	5.5
14	14	11	12	7.0	6.0	6.5	6.5	4.5	5.5
15	13	11	12	7.0	5.5	6.0	7.0	4.5	5.0
16	12	10	11	7.5	5.5	6.0	6.0	4.5	5.0
17	19	11	12	7.0	6.0	6.5	6.5	4.5	5.0
18	13	10	11	8.5	6.0	6.5	6.5	4.0	5.0
19	12	10	11	7.5	6.0	6.5	6.0	4.0	4.5
20	18	9.5	11	7.0	5.5	6.0	5.5	4.0	4.5
21	21	11	14	7.0	5.0	6.0	6.5	4.0	4.5
22	22	13	16	7.5	5.0	5.5	6.5	4.0	5.0
23	32	14	20	6.0	5.0	5.5	6.0	4.0	4.5
24	26	18	21	6.0	5.0	5.5	6.0	4.0	4.5
25	22	16	18	6.5	5.0	5.5	6.5	4.0	5.0
26	55	15	25	7.0	5.0	5.5	--	--	--
27	34	16	20	6.5	5.5	5.5	--	--	--
28	17	13	14	7.0	5.0	5.5	--	--	--
29	13	11	12	9.0	5.5	6.5	--	--	--
30	11	9.0	10	10	8.0	9.0	5.5	4.0	4.5
31	--	--	--	11	9.0	9.5	--	--	--
MONTH[1]	**55**	**7.0**	**13**	**11**	**5.0**	**6.9**	**11**	**4.0**	**6.1**

Table 10. Seasonal daily maximum, minimum, and mean turbidity, with monthly summary statistics at Willow Creek near Anaconda, Montana (12323710), April through September 2012.—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); --, no data]

Day	Maximum	Minimum	Mean	Maximum	Minimum	Mean	Maximum	Minimum	Mean
	JULY			AUGUST			SEPTEMBER		
1	5.5	4.0	4.5	9.0	5.0	6.0	6.0	5.0	5.5
2	6.0	4.0	4.5	10	5.0	6.5	8.5	5.0	6.0
3	5.5	4.0	4.5	9.5	5.0	6.5	7.0	4.5	5.0
4	5.5	3.5	4.5	9.0	4.5	6.0	8.0	4.5	5.0
5	6.5	3.5	4.5	10	5.5	7.5	6.5	5.0	5.5
6	5.5	3.5	4.0	20	5.5	9.0	6.0	5.0	5.5
7	5.5	3.5	4.0	10	5.5	7.5	6.0	4.5	5.0
8	5.0	4.0	4.5	10	5.0	7.5	6.0	4.5	5.0
9	5.5	4.0	4.5	11	5.0	7.5	8.0	4.5	5.0
10	6.0	3.5	4.5	9.0	5.0	6.0	6.0	4.5	5.0
11	6.5	3.5	4.5	10	4.5	6.0	10	5.0	6.5
12	5.5	3.5	4.5	8.0	4.5	5.5	12	4.5	7.0
13	5.5	4.0	4.5	9.0	4.5	6.0	17	5.0	7.0
14	10	4.0	5.0	8.5	4.5	5.5	--	--	--
15	1,280	8.5	200	8.5	5.0	6.0	--	--	--
16	26	11	15	12	5.0	6.5	--	--	--
17	14	7.5	10	12	5.5	7.5	--	--	--
18	13	6.5	8.5	9.5	5.0	8.0	--	--	--
19	13	6.0	8.0	14	6.0	8.5	--	--	--
20	10	6.0	7.5	22	5.0	10	--	--	--
21	10	5.5	6.5	9.5	3.5	5.5	4.0	3.0	3.0
22	8.5	5.0	6.5	41	5.5	16	4.0	3.0	3.5
23	9.5	5.0	6.0	13	5.5	9.0	3.5	3.0	3.0
24	9.0	4.5	6.0	9.5	5.0	6.0	3.5	3.0	3.0
25	8.0	4.5	5.5	12	5.5	7.0	3.5	3.0	3.0
26	8.0	4.0	5.5	12	5.5	7.0	3.5	2.5	3.0
27	12	4.5	6.5	28	5.5	10	3.5	2.5	3.0
28	9.5	4.0	5.5	8.5	5.0	6.0	3.0	2.5	3.0
29	8.0	4.5	5.5	8.5	5.0	6.0	3.0	2.5	2.5
30	7.5	4.5	5.5	6.5	4.5	5.0	3.0	2.5	2.5
31	8.5	4.5	6.0	7.0	5.0	5.5	--	--	--
MONTH[1]	**1,280**	**3.5**	**12**	**41**	**3.5**	**7.2**	**17.0**	**2.5**	**4.5**

[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 (12323760), April through September 2012.

[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); --, no data]

Day	Maximum	Minimum	Mean	Maximum	Minimum	Mean	Maximum	Minimum	Mean
	APRIL			MAY			JUNE		
1	--	--	--	--	--	--	7.5	5.0	5.5
2	4.5	3.5	4.0	--	--	--	59	5.5	9.5
3	11	3.5	4.5	--	--	--	28	6.0	12
4	5.0	3.5	4.0	11	3.5	4.0	10	4.5	6.5
5	--	--	--	5.5	2.5	3.5	39	7.5	15
6	--	--	--	4.0	3.0	3.5	24	6.0	9.0
7	--	--	--	4.0	3.0	3.5	7.0	5.0	5.5
8	--	--	--	4.0	3.0	3.5	6.5	4.5	5.5
9	--	--	--	4.0	3.5	4.0	8.0	4.0	5.0
10	4.5	3.5	4.0	5.5	3.5	4.5	6.5	4.5	5.0
11	5.0	3.5	4.0	5.5	3.5	4.0	6.0	4.0	4.5
12	--	--	--	4.5	3.5	4.0	5.5	4.0	4.5
13	--	--	--	7.5	3.5	4.5	10	4.5	6.5
14	5.0	3.5	4.0	6.5	4.5	5.0	8.0	4.5	5.5
15	10	4.5	6.5	--	--	--	6.0	4.5	5.0
16	10	3.5	8.0	--	--	--	6.0	4.5	5.0
17	4.0	3.0	3.5	--	--	--	6.5	4.0	5.0
18	4.5	3.5	3.5	7.5	5.0	6.0	5.5	4.5	5.0
19	4.5	3.0	3.5	7.5	4.5	5.5	7.0	4.0	4.5
20	4.5	3.5	4.0	6.5	4.5	5.5	6.0	4.0	4.5
21	5.0	4.0	4.5	7.5	4.5	5.5	8.0	4.0	5.0
22	6.0	4.5	5.0	15	6.0	10	8.5	4.0	5.0
23	8.0	4.5	5.5	11	5.5	7.0	8.5	4.5	6.0
24	--	--	--	7.0	5.0	5.5	10	4.5	6.5
25	18	5.0	9.5	13	5.0	6.0	13	5.0	7.5
26	73	8.0	26	6.5	4.5	5.5	21	4.0	7.5
27	27	6.5	14	6.5	4.5	5.0	8.5	4.0	5.0
28	11	5.0	6.0	6.0	4.5	5.0	15	4.0	5.0
29	6.5	4.5	5.5	6.0	4.0	5.0	12	4.0	5.0
30	5.5	4.5	5.5	5.5	4.0	5.0	5.5	3.5	4.0
31	--	--	--	6.5	4.0	4.5	--	--	--
MONTH[1]	**73**	**3.0**	**6.4**	**15**	**2.5**	**5.0**	**59**	**3.5**	**6.2**

Table 11. Seasonal daily maximum, minimum, and mean turbidity, with monthly summary statistics at Warm Springs Creek near Anaconda, Montana (12323760), April through September 2012.—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); --, no data]

Day	Maximum	Minimum	Mean	Maximum	Minimum	Mean	Maximum	Minimum	Mean
	JULY			AUGUST			SEPTEMBER		
1	21	3.5	4.5	3.5	3.0	3.5	3.0	2.5	2.5
2	21	4.0	6.0	3.5	3.0	3.5	3.0	2.5	2.5
3	13	3.5	5.5	3.5	3.0	3.0	3.0	2.5	3.0
4	6.5	4.0	4.5	3.5	3.0	3.0	3.0	2.5	3.0
5	9.5	3.5	4.5	3.5	3.0	3.0	3.0	2.5	3.0
6	7.0	3.5	4.5	3.5	3.0	3.5	3.5	2.5	3.0
7	8.5	4.0	5.5	4.0	3.0	3.5	3.5	2.5	3.0
8	17	4.0	8.0	4.0	3.0	3.5	3.0	2.0	3.0
9	18	3.0	8.0	5.0	3.0	3.5	3.5	2.5	3.0
10	7.0	2.5	3.0	4.0	3.0	3.5	3.5	2.5	3.0
11	8.5	2.5	3.5	4.0	3.0	3.5	3.0	2.5	3.0
12	4.0	2.5	3.0	3.5	3.0	3.5	3.0	2.5	2.5
13	4.0	2.5	3.0	4.0	3.0	3.5	3.0	2.5	2.5
14	81	2.5	7.0	3.5	3.0	3.5	3.0	2.5	2.5
15	18	3.0	4.5	3.5	3.0	3.5	3.5	2.0	2.5
16	6.0	3.0	3.5	3.5	3.0	3.5	3.0	2.5	2.5
17	26	3.0	5.0	4.0	3.0	3.5	3.0	2.5	2.5
18	7.0	3.5	4.5	3.5	3.0	3.5	3.0	2.5	2.5
19	5.0	3.5	4.0	4.0	3.0	3.5	3.0	2.5	2.5
20	5.0	3.0	3.5	8.0	3.0	3.5	3.0	2.5	2.5
21	8.5	3.0	3.5	3.5	2.5	3.0	3.0	2.5	2.5
22	5.0	3.0	3.5	6.0	3.0	3.5	3.0	2.5	2.5
23	5.5	3.0	3.5	3.5	2.5	3.0	3.0	2.5	2.5
24	6.5	3.0	4.0	3.5	2.5	3.0	3.0	2.5	2.5
25	4.5	3.0	4.0	3.5	2.5	3.0	3.0	2.5	2.5
26	4.5	3.0	3.5	3.5	2.5	3.0	3.0	2.5	2.5
27	6.5	3.0	3.5	3.5	2.5	3.0	3.0	2.0	2.5
28	4.5	3.0	3.5	3.5	2.5	3.0	3.0	2.5	2.5
29	5.0	3.0	3.5	3.5	2.5	3.0	3.0	2.0	2.5
30	3.5	3.0	3.5	3.0	2.5	2.5	2.5	2.0	2.5
31	5.0	3.0	3.5	3.0	2.5	2.5	--	--	--
MONTH[1]	**81**	**2.5**	**4.4**	**8.0**	**2.5**	**3.3**	**3.5**	**2.0**	**2.6**

[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 (12323840), April through September 2012.

[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); --, no data; <, less than]

Day	Maximum	Minimum	Mean	Maximum	Minimum	Mean	Maximum	Minimum	Mean
	APRIL			MAY			JUNE		
1	--	--	--	7.5	4.0	5.5	20	20	17
2	120	2.0	14	8.0	4.0	5.0	40	20	21
3	6.0	3.0	4.0	20	3.0	5.0	85	30	34
4	8.5	3.0	4.5	9.0	3.0	5.0	70	30	41
5	6.5	2.0	3.5	7.0	3.0	4.0	66	30	48
6	4.5	2.0	3.0	4.0	2.0	3.5	--	--	--
7	20	2.0	5.0	6.0	2.0	3.5	--	--	--
8	5.0	2.0	3.0	10	2.0	4.5	--	--	--
9	4.0	2.0	3.0	6.0	2.0	4.0	9.0	4.0	5.5
10	5.0	2.0	3.0	5.5	2.0	3.5	7.5	4.0	4.5
11	5.0	2.0	3.5	6.5	2.0	3.0	6.5	3.0	4.5
12	6.5	3.0	4.5	5.0	2.0	2.5	6.0	3.0	4.0
13	5.0	2.0	3.5	5.5	2.0	3.0	25	4.0	7.0
14	4.5	2.0	3.0	9.5	2.0	4.0	6.0	3.0	4.0
15	4.5	2.0	3.0	9.0	2.0	4.5	5.0	2.0	3.5
16	4.5	2.0	3.0	16	4.0	6.5	5.5	2.0	3.5
17	4.0	2.0	2.5	20	5.0	9.0	5.5	3.0	3.5
18	5.5	2.0	3.0	8.0	4.0	5.0	5.5	3.0	3.5
19	4.0	2.0	3.0	5.5	3.0	4.0	4.5	2.0	3.0
20	6.0	2.0	3.0	7.0	2.0	3.5	4.0	2.0	3.0
21	7.0	4.0	5.0	8.5	3.0	4.5	4.5	2.0	3.0
22	11	4.0	6.5	18	6.0	10	4.0	2.0	3.0
23	12	5.0	8.0	19	10	14	6.0	2.0	3.0
24	18	6.0	10	16	10	13	4.5	2.0	3.0
25	27	7.0	14	15	10	12	7.5	2.0	3.5
26	55	10	21	20	10	14	4.0	2.0	2.5
27	30	9.0	18	16	10	13	3.5	2.0	2.5
28	11	7.0	8.5	16	10	12	5.0	2.0	2.5
29	9.0	6.0	7.0	21	10	14	3.0	2.0	2.5
30	7.5	4.0	5.5	20	10	15	3.5	2.0	2.0
31	--	--	--	17	10	14	--	--	--
MONTH[1]	120	2.0	6.2	21	2.0	7.2	85	2.0	8.8

Table 12. Seasonal daily maximum, minimum, and mean turbidity, with monthly summary statistics at Lost Creek near Anaconda, Montana (12323840), April through September 2012.—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); --, no data; <, less than]

Day	Maximum	Minimum	Mean	Maximum	Minimum	Mean	Maximum	Minimum	Mean
		JULY			AUGUST			SEPTEMBER	
1	4.0	2.0	2.5	1.5	0.5	1.0	1.5	0.5	0.5
2	2.5	1.0	2.0	2.0	1.0	1.0	1.0	0.5	0.5
3	3.0	2.0	2.0	4.5	1.0	1.5	1.0	0.5	0.5
4	3.0	2.0	2.0	4.5	1.0	1.5	1.5	0.5	0.5
5	5.0	2.0	2.0	5.5	1.0	1.5	1.5	0.5	0.5
6	3.5	2.0	2.0	2.5	1.0	1.5	1.0	<0.5	0.5
7	2.5	2.0	1.5	2.0	0.5	1.0	1.5	0.5	0.5
8	2.5	1.0	1.5	2.0	1.0	1.0	1.0	0.5	0.5
9	2.5	2.0	1.5	39	1.0	4.0	1.5	0.5	0.5
10	3.5	2.0	2.0	7.0	2.0	3.5	1.5	0.5	1.0
11	3.0	1.0	1.5	3.5	2.0	2.0	1.5	0.5	1.0
12	3.0	2.0	1.5	2.5	2.0	2.0	1.5	0.5	1.0
13	3.0	1.0	1.5	3.0	2.0	2.0	1.5	0.5	1.0
14	5.5	1.0	1.5	2.5	2.0	2.0	1.5	0.5	1.0
15	7.5	2.0	3.0	2.5	2.0	2.0	1.0	0.5	0.5
16	5.0	2.0	2.0	2.0	2.0	1.5	1.5	0.5	0.5
17	2.5	1.0	1.5	3.0	2.0	1.5	1.0	0.5	0.5
18	2.0	1.0	1.5	2.5	2.0	1.5	1.0	0.5	0.5
19	2.5	2.0	1.5	4.5	2.0	1.5	16	0.5	1.5
20	1.5	1.0	1.5	2.5	1.0	1.5	4.0	0.5	1.0
21	1.5	1.0	1.5	3.5	1.0	1.5	1.0	0.5	0.5
22	1.5	1.0	1.5	2.5	0.5	1.0	0.5	0.5	0.5
23	2.0	1.0	1.5	2.0	0.5	1.0	1.0	0.5	0.5
24	1.5	1.0	1.0	1.5	0.5	1.0	1.0	0.5	0.5
25	2.0	1.0	1.5	1.5	0.5	1.0	5.0	0.5	1.0
26	1.5	1.0	1.0	1.5	0.5	0.5	0.5	0.5	0.5
27	1.5	1.0	1.0	1.5	0.5	0.5	1.0	0.5	0.5
28	1.5	1.0	1.0	1.5	0.5	0.5	1.0	0.5	0.5
29	2.0	1.0	1.0	1.5	0.5	0.5	1.0	0.5	0.5
30	1.5	1.0	1.0	1.0	0.5	0.5	1.0	0.5	0.5
31	1.5	1.0	1.0	1.5	0.5	0.5	--	--	--
MONTH[1]	7.5	1.0	1.6	39	0.5	1.4	16	0.5	0.7

[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.

[mg/L, milligrams per liter; µg/L, micrograms per liter; $CaCO_3$, calcium carbonate; mm, millimeter; <, 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	08/13/2012	1515	85.5	23.9	6.28	24.8	22.9	0.038
		08/13/2012	1520	86.6	24.1	6.39	24.6	23.5	0.035
12323750	Silver Bow Creek at Warm Springs	07/17/2012	1010	165	47.5	11.2	34.6	33.4	0.028
		07/17/2012	1015	167	48.2	11.2	34.7	33.7	0.029
12323840	Lost Creek near Anaconda	04/09/2012	1410	111	32.8	7.00	1.9	2.2	0.020
		04/09/2012	1415	112	33.3	7.05	1.9	2.1	0.021
12324200	Clark Fork at Deer Lodge	05/15/2012	1310	156	45.8	10.2	12.8	15.4	0.065
		05/15/2012	1315	161	47.6	10.3	13.3	15.1	0.064
12324400	Clark Fork above Little Blackfoot, near Garrison	03/20/2012	1245	215	62.6	14.3	10.9	16.1	0.111
		03/20/2012	1250	212	61.8	14.1	11.0	16.0	0.112
12324680	Clark Fork at Goldcreek	11/08/2011	1400	201	59.5	12.6	7.9	9.3	0.027
		11/08/2011	1405	200	59.2	12.7	8.0	9.0	0.030
12334550	Clark Fork at Turah Bridge, near Bonner	06/07/2012	0735	85.8	24.3	6.09	6.3	11.4	0.034
		06/07/2012	0740	82.7	23.6	5.80	6.3	12.1	0.034
12340500	Clark Fork above Missoula	06/20/2012	1255	89.3	24.0	7.12	2.3	2.6	0.017
		06/20/2012	1300	104	28.9	7.76	2.4	2.6	0.017

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

[mg/L, milligrams per liter; µg/L, micrograms per liter; $CaCO_3$, calcium carbonate; mm, millimeter; <, 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	08/13/2012	1515	0.034	2.4	2.1	42.3	74.8	0.117	0.20
		08/13/2012	1520	0.038	2.0	2.2	44.6	70.3	0.110	0.19
12323750	Silver Bow Creek at Warm Springs	07/17/2012	1010	0.072	2.8	5.3	34.4	204	0.152	1.07
		07/17/2012	1015	0.069	2.9	5.4	32.4	209	0.155	1.09
12323840	Lost Creek near Anaconda	04/09/2012	1410	0.020	1.3	3.0	7.8	71.9	0.034	0.28
		04/09/2012	1415	0.025	1.2	3.2	7.9	86.1	<0.025	0.44
12324200	Clark Fork at Deer Lodge	05/15/2012	1310	0.155	6.8	27.4	21.8	431	0.160	3.29
		05/15/2012	1315	0.144	7.1	25.6	21.4	428	0.161	3.07
12324400	Clark Fork above Little Blackfoot, near Garrison	03/20/2012	1245	0.246	8.1	45.6	23.2	787	0.155	5.74
		03/20/2012	1250	0.228	8.0	43.2	19.7	761	0.160	5.50
12324680	Clark Fork at Goldcreek	11/08/2011	1400	0.074	2.8	11.5	8.5	200	0.040	1.37
		11/08/2011	1405	0.075	2.8	11.3	4.4	193	0.040	1.32
12334550	Clark Fork at Turah Bridge, near Bonner	06/07/2012	0735	0.263	5.9	49.7	30.7	1,340	0.230	8.75
		06/07/2012	0740	0.294	5.9	52.7	34.1	1,410	0.240	9.13
12340500	Clark Fork above Missoula	06/20/2012	1255	0.027	1.7	4.8	16.9	215	0.051	0.83
		06/20/2012	1300	0.029	1.6	4.4	14.4	203	0.037	0.64

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

[mg/L, milligrams per liter; µg/L, micrograms per liter; $CaCO_3$, calcium carbonate; mm, millimeter; <, 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	08/13/2012	1515	7.51	6.6	<1.4	<3.0	91	1
		08/13/2012	1520	7.25	6.7	<1.4	<3.0	88	1
12323750	Silver Bow Creek at Warm Springs	07/17/2012	1010	36.6	102	<1.4	5.7	80	6
		07/17/2012	1015	37.4	102	<1.4	6.7	78	6
12323840	Lost Creek near Anaconda	04/09/2012	1410	2.06	2.5	<1.4	<3.0	74	7
		04/09/2012	1415	2.06	3.2	<1.4	<3.0	64	5
12324200	Clark Fork at Deer Lodge	05/15/2012	1310	26.9	81.4	3.6	21.2	79	15
		05/15/2012	1315	29.6	66.4	3.8	18.7	77	16
12324400	Clark Fork above Little Blackfoot, near Garrison	03/20/2012	1245	64.6	129	8.7	40.5	80	33
		03/20/2012	1250	63.8	125	8.7	38.2	82	33
12324680	Clark Fork at Goldcreek	11/08/2011	1400	28.0	48.1	2.6	13.4	90	7
		11/08/2011	1405	26.4	46.7	2.6	11.6	89	6
12334550	Clark Fork at Turah Bridge, near Bonner	06/07/2012	0735	6.81	142	4.5	58.1	63	87
		06/07/2012	0740	7.39	159	4.6	69.8	63	87
12340500	Clark Fork above Missoula	06/20/2012	1255	5.71	20.6	1.5	6.1	76	12
		06/20/2012	1300	6.62	19.9	<1.4	5.5	77	13

Table 14. Precision of analyses of field replicates for water samples, Clark Fork Basin, Montana.

[mg/L, milligrams per liter; µg/L, micrograms 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	1.4	3.3	Yes
Magnesium, filtered, mg/L	8	0.19	2.0	Yes
Arsenic, filtered, µg/L	8	0.14	1.1	Yes
Arsenic, unfiltered recoverable, µg/L	8	0.27	1.9	Yes
Cadmium, filtered, µg/L	8	0.00	2.8	Yes
Cadmium, unfiltered recoverable, µg/L	8	0.01	8.5	Yes
Copper, filtered, µg/L	8	0.13	3.4	Yes
Copper, unfiltered recoverable, µg/L	8	1.1	5.7	Yes
Iron, filtered, µg/L	8	1.9	8.2	Yes
Iron, unfiltered recoverable, µg/L	8	19	4.6	Yes
Lead, filtered, µg/L	8	0.01	6.3	Yes
Lead, unfiltered recoverable, µg/L	8	0.14	5.2	Yes
Manganese, filtered, µg/L	8	0.88	3.9	Yes
Manganese, unfiltered recoverable, µg/L	8	5.8	8.7	Yes
Zinc, filtered, µg/L	8	0.21	7.3	Yes
Zinc, unfiltered recoverable, µg/L	8	3.1	16	Yes
Sediment, suspended, percent finer than 0.062 mm	8	2.8	3.5	Yes
Sediment, suspended, mg/L	8	0.66	3.2	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.

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

Constituent and reporting unit	Number of replicate pairs	Standard deviation[1] (listed units)	Relative standard deviation (percent)	Within limits[1] of data-quality objective
Calcium, filtered, mg/L	8	0.54	1.3	Yes
Magnesium, filtered, mg/L	8	0.10	1.0	Yes
Arsenic, filtered, µg/L	8	0.15	1.2	Yes
Arsenic, unfiltered recoverable, µg/L	8	0.36	2.5	Yes
Cadmium, filtered, µg/L	8	0.00	5.9	Yes
Cadmium, unfiltered recoverable, µg/L	8	0.01	9.3	Yes
Copper, filtered, µg/L	8	0.13	3.3	Yes
Copper, unfiltered recoverable, µg/L	8	0.59	3.2	Yes
Iron, filtered, µg/L	8	2.0	8.5	Yes
Iron, unfiltered recoverable, µg/L	8	1.5	0.36	Yes
Lead, filtered, µg/L	8	0.00	2.2	Yes
Lead, unfiltered recoverable, µg/L	8	0.02	0.67	Yes
Manganese, filtered, µg/L	8	0.25	1.1	Yes
Manganese, unfiltered recoverable, µg/L	8	0.90	1.4	Yes
Zinc, filtered, µg/L	8	0.17	5.7	Yes
Zinc, unfiltered recoverable, µg/L	8	0.29	1.5	Yes

[1]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.

[µg/L, micrograms per liter]

Constituent and reporting unit	Number of samples	95-percent confidence interval for spike recovery (percent)	Mean spike recovery (percent)	Within limits[1] of data-quality objective
Arsenic, filtered, µg/L	5	90.4–106	98.1	Yes
Arsenic, unfiltered recoverable, µg/L	5	94.3–108	101	Yes
Cadmium, filtered, µg/L	5	93.2–112	102	Yes
Cadmium, unfiltered recoverable, µg/L	5	95.1–108	101	Yes
Copper, filtered, µg/L	5	93.1–104	98.4	Yes
Copper, unfiltered recoverable, µg/L	5	92.5–107	100	Yes
Iron, filtered, µg/L	5	102–108	105	Yes
Iron, unfiltered recoverable, µg/L	5	96.2–117	106	Yes
Lead, filtered, µg/L	5	96.8–106	102	Yes
Lead, unfiltered recoverable, µg/L	5	98.4–107	103	Yes
Manganese, filtered, µg/L	5	101–110	105	Yes
Manganese, unfiltered recoverable, µg/L	5	95.4–106	101	Yes
Zinc, filtered, µg/L	5	96.5–109	103	Yes
Zinc, unfiltered recoverable, µg/L	5	94.9–106	100	Yes

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

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

[µg/L, micrograms per liter]

Constituent and reporting unit	Number of samples	95-percent confidence interval for spike recovery (percent)	Mean spike recovery (percent)	Within limits[1] of data-quality objective
Arsenic, filtered, µg/L	5	101–106	104	Yes
Arsenic, unfiltered recoverable, µg/L	5	91.8–103	97.5	Yes
Cadmium, filtered, µg/L	5	104–110	107	Yes
Cadmium, unfiltered recoverable, µg/L	5	91.9–106	98.8	Yes
Copper, filtered, µg/L	5	90.9–97.0	94.0	Yes
Copper, unfiltered recoverable, µg/L	5	87.2–101	93.9	Yes
Iron, filtered, µg/L	5	102–114	108	Yes
Iron, unfiltered recoverable, µg/L	5	98.6–102	100	Yes
Lead, filtered, µg/L	5	97.9–107	102	Yes
Lead, unfiltered recoverable, µg/L	5	96.3–105	101	Yes
Manganese, filtered, µg/L	5	97.7–104	101	Yes
Manganese, unfiltered recoverable, µg/L	5	88.0–103	95.5	Yes
Zinc, filtered, µg/L	5	95.2–109	102	Yes
Zinc, unfiltered recoverable, µg/L	5	82.4–97.2	89.8	Yes

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

Table 18. Analyses of field blanks for water samples.

[mg/L, milligrams per liter; µg/L, micrograms per liter; µS/cm, microsiemens per centimeter at 25 degrees Celsius; <, 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)
11/07/2011	1250	5.4	2	<0.022	<0.011	<0.03	<0.28	<0.016	<0.016
03/15/2012	0900	5.6	2	<0.022	<0.011	<0.03	<0.28	<0.016	<0.016
04/11/2012	1425	5.5	2	<0.022	<0.011	<0.03	<0.28	<0.016	<0.016
05/14/2012	1350	5.5	2	<0.022	<0.011	<0.03	<0.28	<0.016	<0.016
06/06/2012	0855	5.6	1	<0.022	<0.011	<0.03	<0.28	<0.016	<0.016
06/20/2012	0800	5.6	2	<0.022	<0.011	<0.03	<0.28	<0.016	<0.016
07/17/2012	1140	5.6	2	<0.022	<0.011	<0.03	<0.28	<0.016	<0.016
08/14/2012	0900	5.6	2	<0.022	<0.011	<0.03	<0.28	<0.016	<0.016

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)
11/07/2011	<0.80	<0.70	<3.2	<4.6	<0.025	<0.04	0.51	<0.4	<1.4	<3.0
03/15/2012	<0.80	<0.70	<3.2	<4.6	<0.025	<0.04	<0.13	<0.4	<1.4	<3.0
04/11/2012	<0.80	<0.70	<3.2	<4.6	<0.025	<0.04	0.43	<0.4	<1.4	<3.0
05/14/2012	<0.80	<0.70	<3.2	<4.6	<0.025	<0.04	0.46	<0.4	<1.4	<3.0
06/06/2012	<0.80	<0.70	<3.2	<4.6	<0.025	<0.04	0.15	<0.4	<1.4	<3.0
06/20/2012	<0.80	<0.70	4.2	<4.6	<0.025	<0.04	0.57	<0.4	<1.4	<3.0
07/17/2012	<0.80	<0.70	<3.2	<4.6	<0.025	<0.04	0.57	<0.4	<1.4	<3.0
08/14/2012	<0.80	<0.70	<3.2	<4.6	<0.025	<0.04	0.38	<0.4	<1.4	<3.0

Table 19. Bed-sediment data for the Clark Fork Basin, Montana, August 2012.

[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 replicate aliquot analyses from each composite sample. 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	36	5.9	48.0	522	32,900	121	1,570	18.1	1,490
12323750	Silver Bow Creek at Warm Springs	3	90	7.0	40.9	302	26,400	63	4,380	13.2	640
12323800	Clark Fork near Galen	3	99	5.3	43.8	1,150	27,700	106	3,440	23.2	827
461415112450801	Clark Fork below Lost Creek, near Galen	3	90	5.5	38.0	1,330	25,600	123	4,070	16.4	977
461559112443301	Clark Fork at county bridge, near Racetrack	3	90	5.0	43.2	1,270	26,800	125	3,060	14.5	1,010
461903112440701	Clark Fork at Dempsey Creek diversion, near Racetrack	3	66	5.0	39.2	1,020	27,600	109	3,060	11.9	962
12324200	Clark Fork at Deer Lodge	3	70	4.9	40.8	1,100	26,100	112	1,830	12.9	996
12324400	Clark Fork above Little Blackfoot River, near Garrison	3	50	4.5	39.0	855	23,500	102	3,560	12.5	977
12324680	Clark Fork at Goldcreek	3	34	2.5	27.7	388	16,300	52	1,860	9.0	531
12331800	Clark Fork near Drummond	3	19	2.0	16.9	220	15,900	29	1,350	5.9	478
12334550	Clark Fork at Turah Bridge, near Bonner	3	19	1.2	30.7	219	16,400	41	893	10.3	489
12340000	Blackfoot River near Bonner	3	4	0.04	25.4	18	15,900	10	695	10.2	61
12340500	Clark Fork above Missoula	3	12	1.0	30.2	129	17,900	25	852	11.3	346

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. SRM, standard reference material (agricultural soils); µg/g, micrograms per gram of dry sample weight]

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	56.9	54.0–59.8
Cadmium	10	1:10	0.371	21.4	18.1–24.7
Chromium	10	1:10	130	77.5	73.6–81.3
Copper	10	1:10	33.9	82.1	77.1–87.1
Iron	10	1:10	33,600	85.0	80.7–89.3
Lead	10	1:10	17.3	60.0	56.5–63.5
Manganese	10	1:10	529	84.9	80.1–89.8
Nickel	10	1:10	85	82.3	78.4–86.2
Zinc	10	1:10	103	95.2	89.8–101
SRM sample 2711a					
Arsenic	10	1:10	107	78.4	70.1–86.7
Cadmium	10	1:10	54.1	90.8	80.7–101
Chromium	10	1:10	52	86.1	78.2–94.1
Copper	10	1:10	1,410	100	90.9–110
Iron	10	1:10	28,200	84.4	77.5–91.3
Lead	10	1:10	1,400	87.1	78.3–95.9
Manganese	10	1:10	675	79.7	72.6–86.8
Nickel	10	1:10	21.7	83.4	74.5–92.4
Zinc	10	1:10	414	94.0	83.6–104

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. µg/mL, micrograms per milliliter; <, 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	<0.0003	<0.003	<0.003	<0.03	<0.003	<0.001	<0.005	<0.01
12323750	Silver Bow Creek at Warm Springs	1:10	<0.004	<0.0003	<0.003	<0.003	<0.03	<0.003	<0.001	<0.005	<0.01
12323800	Clark Fork near Galen	1:10	<0.004	<0.0003	<0.003	<0.003	<0.03	<0.003	<0.001	<0.005	<0.01
461415112450801	Clark Fork below Lost Creek, near Galen	1:10	<0.004	<0.0003	<0.003	<0.003	<0.03	<0.003	<0.001	<0.005	<0.01
461559112443301	Clark Fork at county bridge, near Racetrack	1:10	<0.004	<0.0003	<0.003	<0.003	<0.03	<0.003	<0.001	<0.005	<0.01
461903112440701	Clark Fork at Dempsey Creek diversion, near Racetrack	1:10	<0.004	<0.0003	<0.003	<0.003	<0.03	<0.003	<0.001	<0.005	<0.01
12324200	Clark Fork at Deer Lodge	1:10	<0.004	<0.0003	<0.003	<0.003	<0.03	<0.003	<0.001	<0.005	<0.01
12324400	Clark Fork above Little Blackfoot River, near Garrison	1:10	<0.004	<0.0003	<0.003	<0.003	<0.03	<0.003	<0.001	<0.005	<0.01
12324680	Clark Fork at Goldcreek	1:10	<0.004	<0.0003	<0.003	<0.003	<0.03	<0.003	<0.001	<0.005	<0.01
12331800	Clark Fork near Drummond	1:10	<0.004	<0.0003	<0.003	<0.003	<0.03	<0.003	<0.001	<0.005	<0.01
12334550	Clark Fork at Turah Bridge, near Bonner	1:10	<0.004	<0.0003	<0.003	<0.003	<0.03	<0.003	<0.001	<0.005	<0.01
12340000	Blackfoot River near Bonner	1:10	<0.004	<0.0003	<0.003	<0.003	<0.03	<0.003	<0.001	<0.005	<0.01
12340500	Clark Fork above Missoula	1:10	<0.004	<0.0003	<0.003	<0.003	<0.03	<0.003	<0.001	<0.005	<0.01

Table 22. Biological data for the Clark Fork Basin, Montana, August 2012.

[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. All tissues were analyzed undiluted (dilution ratio 1:1). µg/g, micrograms per gram of dry sample weight; spp., species; <, 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	3	6.0	3.7	3.6	120	2,750	17.3	611	2.6	559
12323750–Silver Bow Creek at Warm Springs										
Hydropsyche cockerelli	2	11.5	0.5	1.2	38.3	1,100	5.2	902	1.1	201
12323800–Clark Fork near Galen										
Hydropsyche occidentalis	3	13.6	1.2	2.8	143	2,160	12.1	1,630	2.0	204
461415112450801–Clark Fork below Lost Creek, near Galen										
Hydropsyche cockerelli	3	18.3	2.2	3.8	224	2,890	21.9	1,720	2.4	278
461559112443301--Clark Fork at county bridge, near Racetrack										
Arctopsyche grandis	1	13.0	1.2	1.9	101	1,410	13.2	2,480	1.4	260
Hydropsyche cockerelli	2	18.0	2.1	2.9	165	2,460	18.6	1,700	1.9	275
Hydropsyche occidentalis	2	11.9	1.3	1.8	101	1,450	11.1	1,750	1.1	217
Hydropsyche spp.	1	5.7	2.4	0.9	68.1	787	6.8	1,170	1.0	229
461903112440701–Clark Fork at Dempsey Creek diversion, near Racetrack										
Arctopsyche grandis	1	17.5	3.6	3.4	196	2,800	17.6	2,060	2.5	380
Claassenia sabulosa	1	1.6	0.9	0.2	58.6	173	0.9	372	0.2	168
Hydropsyche cockerelli	1	13.3	1.5	2.4	149	1,890	14.4	1,570	1.7	285
Hydropsyche occidentalis	2	10.0	1.0	1.7	108	1,470	8.6	1,210	1.0	200
12324200–Clark Fork at Deer Lodge										
Arctopsyche grandis	3	11.4	3.6	2.2	144	1,730	13.3	1,420	1.5	294
Hydropsyche cockerelli	1	17.1	2.3	4.3	241	3,160	24.9	1,410	2.2	335
Hydropsyche occidentalis	1	8.9	1.1	1.9	121	1,500	11.2	937	1.0	214
12324400–Clark Fork above Little Blackfoot River, near Garrison										
Arctopsyche grandis	3	7.7	4.0	1.7	132	1,260	10.6	1,870	1.6	296
Hydropsyche occidentalis	2	8.3	2.0	1.6	145	1,210	11.4	2,070	1.5	251
12324680–Clark Fork at Goldcreek										
Arctopsyche grandis	3	7.5	1.8	1.4	64.5	886	4.9	1,130	1.3	222
Claassenia sabulosa	2	0.5	0.6	0.2	60.5	165	0.7	177	0.3	211
Hydropsyche cockerelli	1	7.3	1.4	1.8	73.6	1,210	6.0	1,000	1.3	180
Hydropsyche occidentalis	2	4.9	0.9	1.3	54.6	882	4.8	822	1.0	178

Table 22. Biological data for the Clark Fork Basin, Montana, August 2012.—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. All tissues were analyzed undiluted (dilution ratio 1:1). µg/g, micrograms per gram of dry sample weight; spp., species; <, 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	3	5.9	1.0	0.5	33.9	390	3.1	619	0.6	209
Claassenia sabulosa	2	0.7	0.7	0.2	54.4	130	0.6	102	0.2	274
Hydropsyche cockerelli	2	7.2	0.9	1.2	47.1	779	5.2	749	0.8	168
Hydropsyche occidentalis	1	4.3	0.5	0.6	41.0	444	3.3	477	0.6	153
12334550–Clark Fork at Turah Bridge, near Bonner										
Arctopsyche grandis	2	4.3	1.7	0.7	23.8	491	3.4	584	0.8	238
Claassenia sabulosa	2	0.2	0.7	0.2	44.8	133	0.5	117	0.2	218
Hydropsyche cockerelli	2	4.6	1.2	1.2	32.8	799	3.9	563	0.8	189
Hydropsyche occidentalis	2	3.2	1.0	1.0	32.0	690	3.2	478	0.7	181
12340000–Blackfoot River near Bonner										
Arctopsyche grandis	1	2.1	0.2	0.7	10.3	409	0.8	302	1.0	106
Claassenia sabulosa	1	<1.0	0.2	<0.8	44.1	143	0.4	61	0.4	399
Hydropsyche cockerelli	1	2.1	0.3	1.6	16.1	1,120	1.5	468	1.4	165
Hydropsyche occidentalis	2	1.6	0.2	1.4	15.6	983	1.2	443	1.2	154
12340500–Clark Fork above Missoula										
Arctopsyche grandis	3	1.5	1.2	0.5	15.9	351	1.4	726	0.4	196
Claassenia sabulosa	3	0.2	0.8	0.1	42.0	97	0.3	112	0.2	223
Hydropsyche cockerelli	1	2.4	0.8	1.0	24.4	830	2.5	786	0.9	177
Hydropsyche occidentalis	2	2.3	0.7	0.9	25.5	784	2.3	755	0.8	188

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

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

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	96.7	95.6–97.9
Cadmium	12	26.7	89.0	87.1–90.9
Chromium	12	0.77	95.6	70.4–121
Copper	12	106	88.8	87.9–89.8
Iron	12	105	95.0	93.3–97.5
Lead	12	0.35	129	115–143
Manganese	12	13.6	91.3	89.6–93.0
Nickel	12	2.5	79.8	76.0–83.5
Zinc	12	180	102	98.3–106

Table 24. Analyses of procedural blanks for biota samples.

[Procedural blanks were not diluted prior to analyses. µg/mL, micrograms per milliliter; <, 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	<0.002	<0.002	<0.001	<0.03	<0.002	<0.003	<0.003	<0.004
12323750	Silver Bow Creek at Warm Springs	1:1	<0.003	<0.002	<0.002	<0.001	<0.03	<0.002	<0.003	<0.003	<0.004
12323800	Clark Fork near Galen	1:1	<0.003	<0.002	<0.002	<0.001	<0.03	<0.002	<0.003	<0.003	<0.004
461415112450801	Clark Fork below Lost Creek, near Galen	1:1	<0.003	<0.002	<0.002	<0.001	<0.03	<0.002	<0.003	<0.003	<0.004
461559112443301	Clark Fork at county bridge, near Racetrack	1:1	<0.003	<0.002	<0.002	<0.001	<0.03	<0.002	<0.003	<0.003	<0.004
461903112440701	Clark Fork at Dempsey Creek diversion, near Racetrack	1:1	<0.003	<0.002	<0.002	<0.001	<0.03	<0.002	<0.003	<0.003	<0.004
12324200	Clark Fork at Deer Lodge	1:1	<0.003	<0.002	<0.002	<0.001	<0.03	<0.002	<0.003	<0.003	<0.004
12324400	Clark Fork above Little Blackfoot River, near Garrison	1:1	<0.003	<0.002	<0.002	<0.001	<0.03	<0.002	<0.003	<0.003	<0.004
12324680	Clark Fork at Goldcreek	1:1	<0.003	<0.002	<0.002	<0.001	<0.03	<0.002	<0.003	<0.003	<0.004
12331800	Clark Fork near Drummond	1:1	<0.003	<0.002	<0.002	<0.001	<0.03	<0.002	<0.003	<0.003	<0.004
12334550	Clark Fork at Turah Bridge, near Bonner	1:1	<0.003	<0.002	<0.002	<0.001	<0.03	<0.002	<0.003	<0.003	<0.004
12340000	Blackfoot River near Bonner	1:1	<0.003	<0.002	<0.002	<0.001	<0.03	<0.002	<0.003	<0.003	<0.004
12340500	Clark Fork above Missoula	1:1	<0.003	<0.002	<0.002	<0.001	<0.03	<0.002	<0.003	<0.003	<0.004

Table 25. Statistical summary of long-term water-quality data for the Clark Fork Basin, Montana, March 1985 through September 2012.

[ft^3/s, cubic feet per second; µS/cm, microsiemens per centimeter at 25 °C; °C, degrees Celsius; mg/L, milligrams per liter; $CaCO_3$, calcium carbonate; µg/L, micrograms per liter; <, less than laboratory reporting level[1]; mm, millimeter; ton/d, tons per day]

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 2012					
Streamflow, instantaneous (ft^3/s)	147	156	1.9	16	9.3
pH, onsite (standard units)	147	8.4	7.3	7.7	7.7
Specific conductance, onsite (µS/cm)	147	412	116	261	262
Temperature, water (°C)	147	17.5	1.0	8.0	8.5
Hardness, filtered (mg/L as $CaCO_3$)	147	146	37.7	103	106
Calcium, filtered (mg/L)	147	41.8	10.6	29.5	30.0
Magnesium, filtered (mg/L)	147	11.0	2.71	7.17	7.20
Arsenic, filtered (µg/L)	146	13.0	1.0	4.2	3.6
Arsenic, unfiltered recoverable (µg/L)	147	18.0	1.0	[2]5.5	4.7
Cadmium, filtered (µg/L)	145	0.50	<0.04	[2]0.05	0.02
Cadmium, unfiltered recoverable (µg/L)	147	0.11	<0.01	[2]0.04	<1
Copper, filtered (µg/L)	146	10.0	<1.0	[2]3.6	3.1
Copper, unfiltered recoverable (µg/L)	147	52.0	1.5	6.6	5.0
Iron, filtered (µg/L)	147	640	15	193	175
Iron, unfiltered recoverable (µg/L)	147	4,220	139	679	600
Lead, filtered (µg/L)	147	2.80	<0.08	[2]0.20	0.04
Lead, unfiltered recoverable (µg/L)	147	47.0	<1.00	[2]1.72	0.67
Manganese, filtered (µg/L)	147	144	14.2	44.0	37.8
Manganese, unfiltered recoverable (µg/L)	147	240	23.5	61.7	52.0
Zinc, filtered (µg/L)	145	11	<1.0	[2]3.4	2.7
Zinc, unfiltered recoverable (µg/L)	147	130	<3.0	[2]8.3	4.0
Sediment, suspended (percent finer than 0.062 mm)	147	97	50	82	83
Sediment, suspended concentration (mg/L)	147	139	1	12	7
Sediment, suspended discharge (ton/d)	147	59	0.01	1.0	0.18

Table 25. Statistical summary of long-term water-quality data for the Clark Fork Basin, Montana, March 1985 through September 2012.—Continued

[ft^3/s, cubic feet per second; µS/cm, microsiemens per centimeter at 25 °C; °C, degrees Celsius; mg/L, milligrams per liter; $CaCO_3$, calcium carbonate; µg/L, micrograms per liter; <, less than laboratory reporting level[1]; mm, millimeter; ton/d, tons per day]

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 2012					
Streamflow, instantaneous (ft^3/s)	155	202	13	31	25
pH, onsite (standard units)	155	8.2	7.2	7.6	7.6
Specific conductance, onsite (µS/cm)	155	691	209	458	465
Temperature, water (°C)	155	20.0	1.0	10.3	10.0
Hardness, filtered (mg/L as $CaCO_3$)	155	217	66.0	147	150
Calcium, filtered (mg/L)	155	62.7	19.0	41.9	42.4
Magnesium, filtered (mg/L)	155	14.6	4.51	10.3	10.5
Arsenic, filtered (µg/L)	155	13.4	2.3	6.2	6.0
Arsenic, unfiltered recoverable (µg/L)	155	45.0	3.0	10.0	8.9
Cadmium, filtered (µg/L)	155	6.2	0.04	0.91	0.25
Cadmium, unfiltered recoverable (µg/L)	155	6.0	0.08	1.23	0.70
Copper, filtered (µg/L)	155	303	2.9	30.9	12.7
Copper, unfiltered recoverable (µg/L)	155	550	8.9	71.2	25.5
Iron, filtered (µg/L)	155	292	9.6	96.7	78.5
Iron, unfiltered recoverable (µg/L)	155	7,400	85	823	552
Lead, filtered (µg/L)	155	2.4	<0.5	[2]0.44	0.24
Lead, unfiltered recoverable (µg/L)	155	250	0.61	11.0	2.85
Manganese, filtered (µg/L)	155	1,700	21.4	305	178
Manganese, unfiltered recoverable (µg/L)	155	1,600	25.9	347	212
Zinc, filtered (µg/L)	155	2,200	5.3	296	118
Zinc, unfiltered recoverable (µg/L)	155	2,200	20.5	359	186
Sediment, suspended (percent finer than 0.062 mm)	154	98	42	84	85
Sediment, suspended concentration (mg/L)	154	405	2	20	10
Sediment, suspended discharge (ton/d)	154	70	0.08	2.4	0.68

Table 25. Statistical summary of long-term water-quality data for the Clark Fork Basin, Montana, March 1985 through September 2012.—Continued

[ft^3/s, cubic feet per second; µS/cm, microsiemens per centimeter at 25 °C; °C, degrees Celsius; mg/L, milligrams per liter; $CaCO_3$, calcium carbonate; µg/L, micrograms per liter; <, less than laboratory reporting level[1]; mm, millimeter; ton/d, tons per day]

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 2012					
Streamflow, instantaneous (ft^3/s)	156	648	13	80	54
pH, onsite (standard units)	157	9.5	7.2	8.4	8.3
Specific conductance, onsite (µS/cm)	157	633	202	412	403
Temperature, water (°C)	157	22.5	0.0	9.4	9.5
Hardness, filtered (mg/L as $CaCO_3$)	157	240	60.2	148	146
Calcium, filtered (mg/L)	157	71.6	18.5	43.8	43.8
Magnesium, filtered (mg/L)	157	15.0	3.42	9.38	9.04
Arsenic, filtered (µg/L)	157	34.0	1.0	10.8	10.1
Arsenic, unfiltered recoverable (µg/L)	157	235	7.8	23.9	16.0
Cadmium, filtered (µg/L)	156	41.0	<0.1	[2]1.01	0.56
Cadmium, unfiltered recoverable (µg/L)	157	49.0	0.34	[2]1.84	1.10
Copper, filtered (µg/L)	155	450	11.2	41.5	31.5
Copper, unfiltered recoverable (µg/L)	157	3,900	23.6	181	97
Iron, filtered (µg/L)	157	307	<3	[2]49.4	27.5
Iron, unfiltered recoverable (µg/L)	156	24,100	196	1,530	780
Lead, filtered (µg/L)	157	5.1	<0.5	[2]0.68	0.33
Lead, unfiltered recoverable (µg/L)	157	650	1.81	34.2	14.7
Manganese, filtered (µg/L)	157	9,300	30.3	379	282
Manganese, unfiltered recoverable (µg/L)	157	10,000	69.8	497	387
Zinc, filtered (µg/L)	156	13,000	11.2	261	130
Zinc, unfiltered recoverable (µg/L)	157	15,000	52.6	461	260
Sediment, suspended (percent finer than 0.062 mm)	158	95	37	78	82
Sediment, suspended concentration (mg/L)	158	801	5	50	20
Sediment, suspended discharge (ton/d)	156	781	0.18	22	3.0

Table 25. Statistical summary of long-term water-quality data for the Clark Fork Basin, Montana, March 1985 through September 2012.—Continued

[ft^3/s, cubic feet per second; µS/cm, microsiemens per centimeter at 25 °C; °C, degrees Celsius; mg/L, milligrams per liter; $CaCO_3$, calcium carbonate; µg/L, micrograms per liter; <, less than laboratory reporting level[1]; mm, millimeter; ton/d, tons per day]

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 2012					
Streamflow, instantaneous (ft^3/s)	63	309	7.4	65	33
pH, onsite (standard units)	64	8.6	7.5	8.0	8.0
Specific conductance, onsite (µS/cm)	64	213	56	132	132
Temperature, water (°C)	64	17.0	0.0	8.3	8.0
Hardness, filtered (mg/L as $CaCO_3$)	64	98.0	23.7	57.4	57.1
Calcium, filtered (mg/L)	64	26.7	7.00	15.9	16.0
Magnesium, filtered (mg/L)	64	8.01	1.45	4.31	4.18
Arsenic, filtered (µg/L)	64	32.9	7.3	16.5	15.2
Arsenic, unfiltered recoverable (µg/L)	64	34.8	7.8	17.8	16.5
Cadmium, filtered (µg/L)	63	0.11	0.02	[2]0.04	0.04
Cadmium, unfiltered recoverable (µg/L)	64	0.19	0.03	0.08	0.07
Copper, filtered (µg/L)	64	5.1	0.72	2.2	2.0
Copper, unfiltered recoverable (µg/L)	64	10.6	1.3	3.9	3.2
Iron, filtered (µg/L)	64	125	21	46.3	40.8
Iron, unfiltered recoverable (µg/L)	64	619	77.8	198	159
Lead, filtered (µg/L)	64	0.24	0.02	[2]0.12	0.11
Lead, unfiltered recoverable (µg/L)	64	3.12	0.15	0.76	0.58
Manganese, filtered (µg/L)	64	12.0	3.1	5.9	5.7
Manganese, unfiltered recoverable (µg/L)	64	36.6	7.4	13.8	12.2
Zinc, filtered (µg/L)	64	4.0	<1.4	[2]1.6	1.4
Zinc, unfiltered recoverable (µg/L)	64	9.2	1.0	[2]3.0	2.4
Sediment, suspended (percent finer than 0.062 mm)	64	84	28	63	66
Sediment, suspended concentration (mg/L)	64	29	1	6	4
Sediment, suspended discharge (ton/d)	63	13	0.02	2.1	0.36

Table 25. Statistical summary of long-term water-quality data for the Clark Fork Basin, Montana, March 1985 through September 2012.—Continued

[ft^3/s, cubic feet per second; µS/cm, microsiemens per centimeter at 25 °C; °C, degrees Celsius; mg/L, milligrams per liter; $CaCO_3$, calcium carbonate; µg/L, micrograms per liter; <, less than laboratory reporting level[1]; mm, millimeter; ton/d, tons per day]

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 2012					
Streamflow, instantaneous (ft^3/s)	79	261	0.43	39	12
pH, onsite (standard units)	80	8.3	7.5	8.0	8.0
Specific conductance, onsite (µS/cm)	80	239	59	148	152
Temperature, water (°C)	80	20.0	-1.0	9.2	9.0
Hardness, filtered (mg/L as $CaCO_3$)	80	112	24.0	63.1	65.0
Calcium, filtered (mg/L)	80	31.0	7.01	17.7	18.2
Magnesium, filtered (mg/L)	80	8.44	1.56	4.60	4.67
Arsenic, filtered (µg/L)	80	55.1	9.0	21.8	20.3
Arsenic, unfiltered recoverable (µg/L)	80	53.5	10.0	24.7	23.0
Cadmium, filtered (µg/L)	80	0.13	0.02	0.06	0.06
Cadmium, unfiltered recoverable (µg/L)	80	0.86	0.03	0.14	0.10
Copper, filtered (µg/L)	80	6.1	1.0	2.9	2.5
Copper, unfiltered recoverable (µg/L)	80	38.8	1.5	6.5	4.1
Iron, filtered (µg/L)	80	94	15.9	46.7	42.2
Iron, unfiltered recoverable (µg/L)	80	1,960	44	301	145
Lead, filtered (µg/L)	80	0.35	<0.08	[2]0.14	0.13
Lead, unfiltered recoverable (µg/L)	80	12.7	0.07	1.46	0.45
Manganese, filtered (µg/L)	80	32.8	2.1	7.1	5.4
Manganese, unfiltered recoverable (µg/L)	80	113	3.2	18.6	12.4
Zinc, filtered (µg/L)	79	7.7	<1.4	[2]2.9	2.8
Zinc, unfiltered recoverable (µg/L)	80	41	1.7	6.5	4.5
Sediment, suspended (percent finer than 0.062 mm)	80	91	26	69	72
Sediment, suspended concentration (mg/L)	80	107	1	12	2
Sediment, suspended discharge (ton/d)	79	55	<0.01	[2]3.6	0.09

Table 25. Statistical summary of long-term water-quality data for the Clark Fork Basin, Montana, March 1985 through September 2012.—Continued

[ft^3/s, cubic feet per second; µS/cm, microsiemens per centimeter at 25 °C; °C, degrees Celsius; mg/L, milligrams per liter; $CaCO_3$, calcium carbonate; µg/L, micrograms per liter; <, less than laboratory reporting level[1]; mm, millimeter; ton/d, tons per day]

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 2012					
Streamflow, instantaneous (ft^3/s)	57	114	1.0	16	7.7
pH, onsite (standard units)	58	8.2	7.5	7.7	7.7
Specific conductance, onsite (µS/cm)	58	151	66	104	108
Temperature, water (°C)	58	15.5	0.0	7.0	7.0
Hardness, filtered (mg/L as $CaCO_3$)	58	56.3	22.1	37.7	38.6
Calcium, filtered (mg/L)	58	18.3	7.56	12.6	13.0
Magnesium, filtered (mg/L)	58	2.60	0.78	1.51	1.46
Arsenic, filtered (µg/L)	58	25.7	9.9	16.0	15.0
Arsenic, unfiltered recoverable (µg/L)	58	27.0	9.8	17.0	15.4
Cadmium, filtered (µg/L)	56	0.05	<0.04	[2]0.03	0.03
Cadmium, unfiltered recoverable (µg/L)	58	0.33	<0.04	[2]0.06	0.05
Copper, filtered (µg/L)	58	4.2	0.90	2.1	2.0
Copper, unfiltered recoverable (µg/L)	58	16.8	1.0	3.9	3.1
Iron, filtered (µg/L)	58	277	28	84.9	68.2
Iron, unfiltered recoverable (µg/L)	58	2,380	85.7	375	227
Lead, filtered (µg/L)	58	0.37	0.03	[2]0.15	0.15
Lead, unfiltered recoverable (µg/L)	58	7.96	0.10	0.94	0.49
Manganese, filtered (µg/L)	58	34.5	6.0	14.8	13.3
Manganese, unfiltered recoverable (µg/L)	58	99.9	12.8	27.3	24.0
Zinc, filtered (µg/L)	58	3.3	0.65	[2]1.7	1.6
Zinc, unfiltered recoverable (µg/L)	58	17.8	<2.0	[2]3.3	2.0
Sediment, suspended (percent finer than 0.062 mm)	58	95	25	73	78
Sediment, suspended concentration (mg/L)	58	195	1	18	5
Sediment, suspended discharge (ton/d)	57	50	<0.01	[2]2.5	0.10

Table 25. Statistical summary of long-term water-quality data for the Clark Fork Basin, Montana, March 1985 through September 2012.—Continued

[ft^3/s, cubic feet per second; µS/cm, microsiemens per centimeter at 25 °C; °C, degrees Celsius; mg/L, milligrams per liter; $CaCO_3$, calcium carbonate; µg/L, micrograms per liter; <, less than laboratory reporting level[1]; mm, millimeter; ton/d, tons per day]

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 2012					
Streamflow, instantaneous (ft^3/s)	80	116	4.5	18	9.4
pH, onsite (standard units)	80	9.0	7.7	8.1	8.1
Specific conductance, onsite (µS/cm)	80	371	116	270	289
Temperature, water (°C)	80	20.5	1.5	11.3	11.5
Hardness, filtered (mg/L as $CaCO_3$)	80	169	58.5	117	126
Calcium, filtered (mg/L)	80	47.4	18.1	34.1	36.4
Magnesium, filtered (mg/L)	80	12.3	3.24	7.75	8.22
Arsenic, filtered (µg/L)	80	164	10.9	39.9	29.6
Arsenic, unfiltered recoverable (µg/L)	80	164	12.0	42.4	32.3
Cadmium, filtered (µg/L)	80	0.12	<0.04	[2]0.04	0.04
Cadmium, unfiltered recoverable (µg/L)	80	0.52	0.02	0.11	0.08
Copper, filtered (µg/L)	80	21.4	1.1	5.4	3.6
Copper, unfiltered recoverable (µg/L)	80	48.8	2.8	11.4	7.8
Iron, filtered (µg/L)	80	274	6.1	51.3	44.5
Iron, unfiltered recoverable (µg/L)	80	1,670	27	296	220
Lead, filtered (µg/L)	80	0.89	0.04	[2]0.23	0.19
Lead, unfiltered recoverable (µg/L)	80	14.4	0.27	2.33	1.53
Manganese, filtered (µg/L)	80	200	3.3	32.5	24.8
Manganese, unfiltered recoverable (µg/L)	80	228	4.7	46.0	36.4
Zinc, filtered (µg/L)	80	19.8	<1.4	[2]5.1	3.8
Zinc, unfiltered recoverable (µg/L)	80	68	1.1	12.6	9.2
Sediment, suspended (percent finer than 0.062 mm)	80	97	54	85	88
Sediment, suspended concentration (mg/L)	80	87	1	12	6
Sediment, suspended discharge (ton/d)	80	11	0.02	1.0	0.16

Table 25. Statistical summary of long-term water-quality data for the Clark Fork Basin, Montana, March 1985 through September 2012.—Continued

[ft^3/s, cubic feet per second; µS/cm, microsiemens per centimeter at 25 °C; °C, degrees Celsius; mg/L, milligrams per liter; $CaCO_3$, calcium carbonate; µg/L, micrograms per liter; <, less than laboratory reporting level[1]; mm, millimeter; ton/d, tons per day]

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 2012					
Streamflow, instantaneous (ft^3/s)	164	1,030	16	143	92
pH, onsite (standard units)	162	9.6	8.0	8.8	8.8
Specific conductance, onsite (µS/cm)	162	783	182	461	474
Temperature, water (°C)	163	25.0	0.0	10.5	10.5
Hardness, filtered (mg/L as $CaCO_3$)	162	314	74.9	191	195
Calcium, filtered (mg/L)	162	90.4	22.5	55.8	57.3
Magnesium, filtered (mg/L)	162	21.4	4.52	12.7	13.0
Arsenic, filtered (µg/L)	162	60.0	6.8	23.1	23.0
Arsenic, unfiltered recoverable (µg/L)	162	94.0	10.0	26.7	26.0
Cadmium, filtered (µg/L)	162	0.31	<0.04	[2]0.06	0.03
Cadmium, unfiltered recoverable (µg/L)	162	0.56	<0.1	[2]0.12	0.06
Copper, filtered (µg/L)	162	40.0	1.7	7.8	5.5
Copper, unfiltered recoverable (µg/L)	162	96.8	2.4	15.6	11.1
Iron, filtered (µg/L)	162	93	<5	[2]19.0	15.1
Iron, unfiltered recoverable (µg/L)	162	3,000	35.8	321	247
Lead, filtered (µg/L)	162	1.0	<0.08	[2]0.13	<1.0
Lead, unfiltered recoverable (µg/L)	162	41.8	<1.00	[2]2.31	1.27
Manganese, filtered (µg/L)	162	875	11.8	116	77.6
Manganese, unfiltered recoverable (µg/L)	162	899	24.0	175	138
Zinc, filtered (µg/L)	162	73	<1.0	[2]7.1	3.8
Zinc, unfiltered recoverable (µg/L)	162	180	2.0	[2]29.4	17.5
Sediment, suspended (percent finer than 0.062 mm)	163	98	43	82	85
Sediment, suspended concentration (mg/L)	164	229	1	10	6
Sediment, suspended discharge (ton/d)	164	279	0.07	6.2	1.5

Table 25. Statistical summary of long-term water-quality data for the Clark Fork Basin, Montana, March 1985 through September 2012.—Continued

[ft^3/s, cubic feet per second; µS/cm, microsiemens per centimeter at 25 °C; °C, degrees Celsius; mg/L, milligrams per liter; $CaCO_3$, calcium carbonate; µg/L, micrograms per liter; <, less than laboratory reporting level[1]; mm, millimeter; ton/d, tons per day]

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 2012					
Streamflow, instantaneous (ft^3/s)	42	573	41	148	100
pH, onsite (standard units)	42	8.8	7.8	8.5	8.5
Specific conductance, onsite (µS/cm)	42	278	125	218	230
Temperature, water (°C)	42	16.0	3.0	9.0	8.8
Hardness, filtered (mg/L as $CaCO_3$)	42	145	58.5	106	110
Calcium, filtered (mg/L)	42	42.8	18.5	31.9	33.2
Magnesium, filtered (mg/L)	42	9.34	2.96	6.48	6.72
Arsenic, filtered (µg/L)	42	3.9	1.6	2.3	2.2
Arsenic, unfiltered recoverable (µg/L)	42	5.6	1.8	2.8	2.5
Cadmium, filtered (µg/L)	42	0.05	<0.02	[2]0.02	0.02
Cadmium, unfiltered recoverable (µg/L)	42	0.14	<0.02	[2]0.04	0.03
Copper, filtered (µg/L)	41	6.4	<0.80	[2]1.2	0.88
Copper, unfiltered recoverable (µg/L)	42	28.0	1.1	[2]3.6	2.1
Iron, filtered (µg/L)	42	22.4	<6	[2]7.5	5.8
Iron, unfiltered recoverable (µg/L)	42	1,000	27	133	76.0
Lead, filtered (µg/L)	42	0.11	<0.01	[2]0.03	<0.12
Lead, unfiltered recoverable (µg/L)	42	3.51	0.07	0.46	0.26
Manganese, filtered (µg/L)	42	2.9	<0.1	[2]1.3	1.1
Manganese, unfiltered recoverable (µg/L)	42	45.2	1.2	6.4	4.2
Zinc, filtered (µg/L)	42	5.6	<1.4	[2]1.1	<2.8
Zinc, unfiltered recoverable (µg/L)	42	20.1	<2.0	[2]3.4	1.7
Sediment, suspended (percent finer than 0.062 mm)	42	83	32	64	65
Sediment, suspended concentration (mg/L)	42	65	1	8	4
Sediment, suspended discharge (ton/d)	42	68	0.13	5.0	1.3

Table 25. Statistical summary of long-term water-quality data for the Clark Fork Basin, Montana, March 1985 through September 2012.—Continued

[ft^3/s, cubic feet per second; µS/cm, microsiemens per centimeter at 25 °C; °C, degrees Celsius; mg/L, milligrams per liter; $CaCO_3$, calcium carbonate; µg/L, micrograms per liter; <, less than laboratory reporting level[1]; mm, millimeter; ton/d, tons per day]

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 2012					
Streamflow, instantaneous (ft^3/s)	121	420	2.8	100	57
pH, onsite (standard units)	120	8.7	7.4	8.3	8.2
Specific conductance, onsite (µS/cm)	120	795	139	290	296
Temperature, water (°C)	121	20.0	0.0	8.5	8.0
Hardness, filtered (mg/L as $CaCO_3$)	120	415	39.8	141	144
Calcium, filtered (mg/L)	120	130	10.5	43.0	43.7
Magnesium, filtered (mg/L)	120	22.0	3.29	8.13	8.06
Arsenic, filtered (µg/L)	120	14.0	2.0	5.0	4.4
Arsenic, unfiltered recoverable (µg/L)	120	27.0	3.0	7.3	5.8
Cadmium, filtered (µg/L)	120	0.10	<0.04	[2]0.04	0.02
Cadmium, unfiltered recoverable (µg/L)	120	0.41	<0.05	[2]0.08	0.03
Copper, filtered (µg/L)	120	16.0	1.0	3.2	2.7
Copper, unfiltered recoverable (µg/L)	120	147	2.3	19.6	9.0
Iron, filtered (µg/L)	120	30	<5	[2]11.5	10.0
Iron, unfiltered recoverable (µg/L)	120	2,110	39	315	121
Lead, filtered (µg/L)	120	1.8	<0.025	[2]0.07	<0.6
Lead, unfiltered recoverable (µg/L)	120	14.0	<1.00	[2]1.92	0.56
Manganese, filtered (µg/L)	120	570	18.8	113	82.9
Manganese, unfiltered recoverable (µg/L)	120	1,400	37.0	198	156
Zinc, filtered (µg/L)	119	10	<1.0	[2]2.0	1.4
Zinc, unfiltered recoverable (µg/L)	120	60	<2.4	[2]9.2	3.0
Sediment, suspended (percent finer than 0.062 mm)	121	88	43	70	71
Sediment, suspended concentration (mg/L)	121	127	1	18	8
Sediment, suspended discharge (ton/d)	121	87	0.05	8.7	1.1

Table 25. Statistical summary of long-term water-quality data for the Clark Fork Basin, Montana, March 1985 through September 2012.—Continued

[ft^3/s, cubic feet per second; µS/cm, microsiemens per centimeter at 25 °C; °C, degrees Celsius; mg/L, milligrams per liter; $CaCO_3$, calcium carbonate; µg/L, micrograms per liter; <, less than laboratory reporting level[1]; mm, millimeter; ton/d, tons per day]

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 2012					
Streamflow, instantaneous (ft^3/s)	205	1,380	14	226	143
pH, onsite (standard units)	192	9.2	7.5	8.5	8.6
Specific conductance, onsite (µS/cm)	193	720	182	410	417
Temperature, water (°C)	204	23.5	0.0	9.8	10.0
Hardness, filtered (mg/L as $CaCO_3$)	191	365	76.4	179	186
Calcium, filtered (mg/L)	191	110	23.2	53.0	55.0
Magnesium, filtered (mg/L)	191	22.0	4.44	11.3	11.7
Arsenic, filtered (µg/L)	191	53.0	4.0	15.1	14.4
Arsenic, unfiltered recoverable (µg/L)	191	78.0	3.0	19.2	17.0
Cadmium, filtered (µg/L)	191	1.0	<0.04	[2]0.06	0.02
Cadmium, unfiltered recoverable (µg/L)	191	3.0	<0.1	[2]0.18	0.06
Copper, filtered (µg/L)	191	50.0	1.7	7.7	5.8
Copper, unfiltered recoverable (µg/L)	190	240	4.1	27.0	15.4
Iron, filtered (µg/L)	191	110	<3	[2]15.9	12.0
Iron, unfiltered recoverable (µg/L)	191	9,200	56	471	270
Lead, filtered (µg/L)	191	3.00	<0.08	[2]0.15	<1.00
Lead, unfiltered recoverable (µg/L)	191	31.0	<1.00	[2]3.38	1.90
Manganese, filtered (µg/L)	191	460	24.0	103	74.2
Manganese, unfiltered recoverable (µg/L)	191	1,400	47.3	216	170
Zinc, filtered (µg/L)	191	110	<1.0	[2]8.6	4.0
Zinc, unfiltered recoverable (µg/L)	191	360	<10.0	[2]35.5	20.0
Sediment, suspended (percent finer than 0.062 mm)	204	97	32	76	77
Sediment, suspended concentration (mg/L)	205	338	1	18	8
Sediment, suspended discharge (ton/d)	205	459	0.12	21	2.9

Table 25. Statistical summary of long-term water-quality data for the Clark Fork Basin, Montana, March 1985 through September 2012.—Continued

[ft^3/s, cubic feet per second; µS/cm, microsiemens per centimeter at 25 °C; °C, degrees Celsius; mg/L, milligrams per liter; $CaCO_3$, calcium carbonate; µg/L, micrograms per liter; <, less than laboratory reporting level[1]; mm, millimeter; ton/d, tons per day]

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 2012					
Streamflow, instantaneous (ft^3/s)	63	73	0.37	13	8.7
pH, onsite (standard units)	63	8.6	7.4	8.2	8.2
Specific conductance, onsite (µS/cm)	63	253	121	197	211
Temperature, water (°C)	63	17.0	0.0	8.0	8.0
Hardness, filtered (mg/L as $CaCO_3$)	63	122	50.4	94.0	98.8
Calcium, filtered (mg/L)	63	37.1	15.7	28.5	30.0
Magnesium, filtered (mg/L)	63	7.40	2.71	5.53	5.87
Arsenic, filtered (µg/L)	63	156	1.8	6.7	3.2
Arsenic, unfiltered recoverable (µg/L)	63	3,860	2.0	66.1	3.8
Cadmium, filtered (µg/L)	62	0.90	<0.02	[2]0.04	0.02
Cadmium, unfiltered recoverable (µg/L)	63	147	0.01	[2]2.4	0.04
Copper, filtered (µg/L)	63	90.5	0.80	3.4	1.7
Copper, unfiltered recoverable (µg/L)	63	29,100	1.3	468	4.5
Iron, filtered (µg/L)	63	27	<6	[2]10.0	8.8
Iron, unfiltered recoverable (µg/L)	63	99,700	22	1,780	109
Lead, filtered (µg/L)	63	0.18	<0.02	[2]0.04	0.02
Lead, unfiltered recoverable (µg/L)	63	1,290	0.08	21.3	0.45
Manganese, filtered (µg/L)	63	42.4	<0.2	[2]2.0	1.2
Manganese, unfiltered recoverable (µg/L)	63	8,830	1.2	147	4.6
Zinc, filtered (µg/L)	62	30.0	<1.4	[2]1.7	1.0
Zinc, unfiltered recoverable (µg/L)	62	7,780	<2	[2]129	2.2
Sediment, suspended (percent finer than 0.062 mm)	63	97	22	57	58
Sediment, suspended concentration (mg/L)	63	58,900	1	948	6
Sediment, suspended discharge (ton/d)	63	1,320	<0.01	[2]22	0.13

Table 25. Statistical summary of long-term water-quality data for the Clark Fork Basin, Montana, March 1985 through September 2012.—Continued

[ft^3/s, cubic feet per second; µS/cm, microsiemens per centimeter at 25 °C; °C, degrees Celsius; mg/L, milligrams per liter; $CaCO_3$, calcium carbonate; µg/L, micrograms per liter; <, less than laboratory reporting level[1]; mm, millimeter; ton/d, tons per day]

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 2012					
Streamflow, instantaneous (ft^3/s)	80	71	1.3	24	18
pH, onsite (standard units)	80	8.7	7.9	8.3	8.3
Specific conductance, onsite (µS/cm)	80	934	540	642	629
Temperature, water (°C)	80	26.5	0.0	10.3	9.8
Hardness, filtered (mg/L as $CaCO_3$)	80	451	203	301	299
Calcium, filtered (mg/L)	80	122	48.5	85.2	85.6
Magnesium, filtered (mg/L)	80	35.7	17.3	21.5	20.8
Arsenic, filtered (µg/L)	80	41.8	6.0	14.3	12.6
Arsenic, unfiltered recoverable (µg/L)	80	43.0	6.0	15.1	13.8
Cadmium, filtered (µg/L)	79	0.05	<0.04	[2]0.03	0.02
Cadmium, unfiltered recoverable (µg/L)	80	0.12	0.01	[2]0.04	0.04
Copper, filtered (µg/L)	80	6.7	0.99	2.3	2.0
Copper, unfiltered recoverable (µg/L)	80	22.5	1.6	5.4	4.4
Iron, filtered (µg/L)	80	61.1	<6	[2]13.2	10.4
Iron, unfiltered recoverable (µg/L)	80	392	14	105	80.0
Lead, filtered (µg/L)	79	0.33	<0.06	[2]0.05	0.02
Lead, unfiltered recoverable (µg/L)	80	1.90	0.04	0.38	0.27
Manganese, filtered (µg/L)	80	54.0	1.9	15.5	13.9
Manganese, unfiltered recoverable (µg/L)	80	56.5	2.2	20.5	19.0
Zinc, filtered (µg/L)	79	3.8	<1.0	[2]1.5	1.2
Zinc, unfiltered recoverable (µg/L)	80	10.3	<2	[2]3.0	2.0
Sediment, suspended (percent finer than 0.062 mm)	80	88	18	58	60
Sediment, suspended concentration (mg/L)	80	79	2	16	15
Sediment, suspended discharge (ton/d)	80	4.2	0.01	1.0	0.60

Table 25. Statistical summary of long-term water-quality data for the Clark Fork Basin, Montana, March 1985 through September 2012.—Continued

[ft^3/s, cubic feet per second; µS/cm, microsiemens per centimeter at 25 °C; °C, degrees Celsius; mg/L, milligrams per liter; $CaCO_3$, calcium carbonate; µg/L, micrograms per liter; <, less than laboratory reporting level[1]; mm, millimeter; ton/d, tons per day]

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 2012					
Streamflow, instantaneous (ft^3/s)	257	2,000	23	311	229
pH, onsite (standard units)	205	8.9	7.4	8.3	8.3
Specific conductance, onsite (µS/cm)	240	642	228	468	495
Temperature, water (°C)	256	23.0	0.0	9.9	10.0
Hardness, filtered (mg/L as $CaCO_3$)	197	282	94.9	198	208
Calcium, filtered (mg/L)	197	82.0	28.2	58.5	61.0
Magnesium, filtered (mg/L)	197	18.7	5.53	12.6	13.2
Arsenic, filtered (µg/L)	207	39.0	6.0	14.5	13.5
Arsenic, unfiltered recoverable (µg/L)	206	215	4.8	23.8	17.2
Cadmium, filtered (µg/L)	206	2.0	<0.10	[2]0.08	<1.0
Cadmium, unfiltered recoverable (µg/L)	206	5.0	<0.10	[2]0.40	0.10
Copper, filtered (µg/L)	207	120	3.2	10.8	8.0
Copper, unfiltered recoverable (µg/L)	205	1,500	8.2	79.2	36.0
Iron, filtered (µg/L)	207	190	<3	[2]15.1	9.4
Iron, unfiltered recoverable (µg/L)	207	29,000	27	1,430	514
Lead, filtered (µg/L)	207	6.00	<0.08	[2]0.30	<1.00
Lead, unfiltered recoverable (µg/L)	207	200	0.33	[2]10.5	4.63
Manganese, filtered (µg/L)	207	400	1.0	41.2	33.0
Manganese, unfiltered recoverable (µg/L)	207	4,600	11.9	227	130
Zinc, filtered (µg/L)	207	230	<10.0	[2]11.5	8.0
Zinc, unfiltered recoverable (µg/L)	205	1,700	4	82.5	40.0
Sediment, suspended (percent finer than 0.062 mm)	248	99	31	71	72
Sediment, suspended concentration (mg/L)	257	2,250	1	68	22
Sediment, suspended discharge (ton/d)	257	8,690	0.18	143	12

Table 25. Statistical summary of long-term water-quality data for the Clark Fork Basin, Montana, March 1985 through September 2012.—Continued

[ft^3/s, cubic feet per second; µS/cm, microsiemens per centimeter at 25 °C; °C, degrees Celsius; mg/L, milligrams per liter; $CaCO_3$, calcium carbonate; µg/L, micrograms per liter; <, less than laboratory reporting level[1]; mm, millimeter; ton/d, tons per day]

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 2012					
Streamflow, instantaneous (ft^3/s)	31	2,310	99	565	353
pH, onsite (standard units)	31	8.8	7.9	8.3	8.3
Specific conductance, onsite (µS/cm)	31	494	249	395	432
Temperature, water (°C)	31	21.0	1.0	10.9	12.0
Hardness, filtered (mg/L as $CaCO_3$)	31	221	104	173	192
Calcium, filtered (mg/L)	31	64.6	31.8	50.8	56.2
Magnesium, filtered (mg/L)	31	14.8	5.93	11.1	12.0
Arsenic, filtered (µg/L)	31	36.7	9.2	15.8	16.1
Arsenic, unfiltered recoverable (µg/L)	31	46.0	11.4	23.3	19.9
Cadmium, filtered (µg/L)	31	0.23	0.04	0.08	0.08
Cadmium, unfiltered recoverable (µg/L)	31	0.84	0.06	0.31	0.23
Copper, filtered (µg/L)	31	40.6	4.0	10.7	8.8
Copper, unfiltered recoverable (µg/L)	31	222	12.4	70.4	45.6
Iron, filtered (µg/L)	31	43.2	4.5	17.1	15.0
Iron, unfiltered recoverable (µg/L)	31	3,860	111	1,060	632
Lead, filtered (µg/L)	31	0.42	0.04	0.16	0.13
Lead, unfiltered recoverable (µg/L)	31	32.3	0.90	9.4	5.74
Manganese, filtered (µg/L)	31	64.6	13.5	29.0	24.1
Manganese, unfiltered recoverable (µg/L)	31	344	39.8	135	118
Zinc, filtered (µg/L)	31	37.1	1.9	7.1	6.0
Zinc, unfiltered recoverable (µg/L)	31	181	8.0	57.8	38.4
Sediment, suspended (percent finer than 0.062 mm)	31	85	42	68	70
Sediment, suspended concentration (mg/L)	31	205	5	54	30
Sediment, suspended discharge (ton/d)	31	550	1.9	118	28

Table 25. Statistical summary of long-term water-quality data for the Clark Fork Basin, Montana, March 1985 through September 2012.—Continued

[ft^3/s, cubic feet per second; µS/cm, microsiemens per centimeter at 25 °C; °C, degrees Celsius; mg/L, milligrams per liter; $CaCO_3$, calcium carbonate; µg/L, micrograms per liter; <, less than laboratory reporting level[1]; mm, millimeter; ton/d, tons per day]

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 2012					
Streamflow, instantaneous (ft^3/s)	163	4,450	87	794	529
pH, onsite (standard units)	162	8.9	7.9	8.4	8.3
Specific conductance, onsite (µS/cm)	162	510	206	366	380
Temperature, water (°C)	163	23.0	0.0	10.1	10.5
Hardness, filtered (mg/L as $CaCO_3$)	162	232	85.8	161	169
Calcium, filtered (mg/L)	162	68.0	25.9	47.5	49.8
Magnesium, filtered (mg/L)	162	15.0	5.15	10.3	10.6
Arsenic, filtered (µg/L)	162	22.5	5.8	10.1	10.0
Arsenic, unfiltered recoverable (µg/L)	162	75.0	7.0	14.8	12.0
Cadmium, filtered (µg/L)	162	0.2	<0.04	[2]0.04	<0.10
Cadmium, unfiltered recoverable (µg/L)	162	2	<0.10	[2]0.18	0.07
Copper, filtered (µg/L)	161	36.0	2.1	6.7	5.4
Copper, unfiltered recoverable (µg/L)	161	440	5.2	40.0	23.4
Iron, filtered (µg/L)	162	100	<3	[2]19.3	12.0
Iron, unfiltered recoverable (µg/L)	162	12,000	27	858	426
Lead, filtered (µg/L)	160	0.6	<0.08	[2]0.12	<1.00
Lead, unfiltered recoverable (µg/L)	161	73.0	0.14	[2]5.57	3.00
Manganese, filtered (µg/L)	162	57.3	4.0	19.0	17.0
Manganese, unfiltered recoverable (µg/L)	162	1,100	10.5	118	86.4
Zinc, filtered (µg/L)	162	26	<1.0	[2]5.5	4.0
Zinc, unfiltered recoverable (µg/L)	162	510	2	42.9	30.0
Sediment, suspended (percent finer than 0.062 mm)	163	94	43	74	78
Sediment, suspended concentration (mg/L)	163	752	1	49	21
Sediment, suspended discharge (ton/d)	163	7,960	0.55	211	33

Table 25. Statistical summary of long-term water-quality data for the Clark Fork Basin, Montana, March 1985 through September 2012.—Continued

[ft^3/s, cubic feet per second; µS/cm, microsiemens per centimeter at 25 °C; °C, degrees Celsius; mg/L, milligrams per liter; $CaCO_3$, calcium carbonate; µg/L, micrograms per liter; <, less than laboratory reporting level[1]; mm, millimeter; ton/d, tons per day]

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 2012					
Streamflow, instantaneous (ft^3/s)	163	5,540	149	1,090	799
pH, onsite (standard units)	162	8.7	7.8	8.3	8.3
Specific conductance, onsite (µS/cm)	162	630	189	405	417
Temperature, water (°C)	163	22.5	0.5	10.9	11.0
Hardness, filtered (mg/L as $CaCO_3$)	162	298	73.9	182	189
Calcium, filtered (mg/L)	162	83.0	21.0	52.3	54.3
Magnesium, filtered (mg/L)	162	22.0	5.2	12.5	12.8
Arsenic, filtered (µg/L)	162	23.9	3.2	10.6	10.0
Arsenic, unfiltered recoverable (µg/L)	162	62	8	16.1	13.0
Cadmium, filtered (µg/L)	161	0.30	<0.04	[2]0.05	0.02
Cadmium, unfiltered recoverable (µg/L)	162	2.0	<0.10	[2]0.23	0.08
Copper, filtered (µg/L)	159	21.0	1.0	6.5	5.0
Copper, unfiltered recoverable (µg/L)	160	360	4.6	42.5	22.7
Iron, filtered (µg/L)	162	150	<3	[2]19.0	9.2
Iron, unfiltered recoverable (µg/L)	161	8,800	19.7	995	472
Lead, filtered (µg/L)	158	1.2	<0.08	[2]0.17	<1.0
Lead, unfiltered recoverable (µg/L)	158	56.0	<1.00	[2]7.60	3.54
Manganese, filtered (µg/L)	161	60.7	3.3	16.7	14.9
Manganese, unfiltered recoverable (µg/L)	162	880	8.0	144	94.2
Zinc, filtered (µg/L)	162	21.0	<3	[2]5.9	4.3
Zinc, unfiltered recoverable (µg/L)	162	490	2.9	58.5	30.5
Sediment, suspended (percent finer than 0.062 mm)	163	92	38	73	74
Sediment, suspended concentration (mg/L)	163	530	2	62	26
Sediment, suspended discharge (ton/d)	163	4,720	1.7	323	53

Table 25. Statistical summary of long-term water-quality data for the Clark Fork Basin, Montana, March 1985 through September 2012.—Continued

[ft^3/s, cubic feet per second; µS/cm, microsiemens per centimeter at 25 °C; °C, degrees Celsius; mg/L, milligrams per liter; $CaCO_3$, calcium carbonate; µg/L, micrograms per liter; <, less than laboratory reporting level[1]; mm, millimeter; ton/d, tons per day]

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 2012					
Streamflow, instantaneous (ft^3/s)	260	10,600	296	1,980	1,160
pH, onsite (standard units)	206	8.8	7.4	8.2	8.2
Specific conductance, onsite (µS/cm)	235	483	139	298	312
Temperature, water (°C)	259	22.0	0.0	9.5	10.0
Hardness, filtered (mg/L as $CaCO_3$)	196	205	53.6	130	132
Calcium, filtered (mg/L)	196	59.0	14.9	36.7	37.2
Magnesium, filtered (mg/L)	196	14.0	3.94	9.36	9.40
Arsenic, filtered (µg/L)	205	17.0	2.7	6.1	5.6
Arsenic, unfiltered recoverable (µg/L)	205	110	3.0	9.7	7.0
Cadmium, filtered (µg/L)	204	0.10	<0.04	[2]0.04	<1
Cadmium, unfiltered recoverable (µg/L)	205	4.00	<0.01	[2]0.24	0.03
Copper, filtered (µg/L)	204	25.0	1.1	4.8	3.8
Copper, unfiltered recoverable (µg/L)	203	500	2.7	33.0	16.0
Iron, filtered (µg/L)	205	190	<3	[2]23.7	14.0
Iron, unfiltered recoverable (µg/L)	205	19,000	32.6	980	380
Lead, filtered (µg/L)	201	7.00	<0.02	[2]0.27	<1.00
Lead, unfiltered recoverable (µg/L)	201	100	<1.00	[2]6.69	2.76
Manganese, filtered (µg/L)	205	37.4	<1.0	[2]8.4	7.0
Manganese, unfiltered recoverable (µg/L)	205	2,000	8.9	117	60.1
Zinc, filtered (µg/L)	203	39	<3.0	[2]5.7	4.0
Zinc, unfiltered recoverable (µg/L)	205	1,100	2.9	[2]56.2	30.0
Sediment, suspended (percent finer than 0.062 mm)	249	98	27	73	75
Sediment, suspended concentration (mg/L)	260	1,370	2	55	18
Sediment, suspended discharge (ton/d)	260	34,700	3.0	627	61

Table 25. Statistical summary of long-term water-quality data for the Clark Fork Basin, Montana, March 1985 through September 2012.—Continued

[ft^3/s, cubic feet per second; µS/cm, microsiemens per centimeter at 25 °C; °C, degrees Celsius; mg/L, milligrams per liter; $CaCO_3$, calcium carbonate; µg/L, micrograms per liter; <, less than laboratory reporting level[1]; mm, millimeter; ton/d, tons per day]

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 2012					
Streamflow, instantaneous (ft^3/s)	190	13,400	344	2,800	1,360
pH, onsite (standard units)	150	8.7	7.5	8.3	8.3
Specific conductance, onsite (µS/cm)	167	294	131	208	204
Temperature, water (°C)	190	22.5	0.0	9.6	9.5
Hardness, filtered (mg/L as $CaCO_3$)	142	146	55.1	104	98.6
Calcium, filtered (mg/L)	142	37.7	14.0	26.5	25.4
Magnesium, filtered (mg/L)	142	13.2	4.90	9.15	8.66
Arsenic, filtered (µg/L)	149	2.0	<1.0	[2]0.97	0.97
Arsenic, unfiltered recoverable (µg/L)	150	4.0	<1.0	[2]1.3	1.0
Cadmium, filtered (µg/L)	148	1.00	<0.02	[2]0.02	<0.10
Cadmium, unfiltered recoverable (µg/L)	150	2.00	<0.01	[2]0.09	<1.00
Copper, filtered (µg/L)	146	7.0	<0.80	[2]1.3	0.77
Copper, unfiltered recoverable (µg/L)	147	34.0	<0.70	[2]4.5	2.0
Iron, filtered (µg/L)	149	100	<3	[2]17.4	10.0
Iron, unfiltered recoverable (µg/L)	150	3,600	13.9	415	195
Lead, filtered (µg/L)	144	8.00	<0.01	[2]0.31	<0.60
Lead, unfiltered recoverable (µg/L)	146	25.0	<0.04	[2]2.13	0.08
Manganese, filtered (µg/L)	149	11.0	<1.0	[2]2.4	2.0
Manganese, unfiltered recoverable (µg/L)	150	180	<10.0	[2]28.5	18.6
Zinc, filtered (µg/L)	148	15.0	<0.60	[2]2.0	<3.0
Zinc, unfiltered recoverable (µg/L)	150	60.0	<1.0	[2]5.2	<10.0
Sediment, suspended (percent finer than 0.062 mm)	188	98	42	80	82
Sediment, suspended concentration (mg/L)	190	271	1	29	8
Sediment, suspended discharge (ton/d)	190	7,670	1.1	528	31

Table 25. Statistical summary of long-term water-quality data for the Clark Fork Basin, Montana, March 1985 through September 2012.—Continued

[ft^3/s, cubic feet per second; µS/cm, microsiemens per centimeter at 25 °C; °C, degrees Celsius; mg/L, milligrams per liter; $CaCO_3$, calcium carbonate; µg/L, micrograms per liter; <, less than laboratory reporting level[1]; mm, millimeter; ton/d, tons per day]

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 2012					
Streamflow, instantaneous (ft^3/s)	225	22,900	720	4,660	2,470
pH, onsite (standard units)	183	8.8	7.9	8.3	8.3
Specific conductance, onsite (µS/cm)	203	399	142	252	261
Temperature, water (°C)	223	22.0	0.0	9.6	9.5
Hardness, filtered (mg/L as $CaCO_3$)	183	168	60.5	116	118
Calcium, filtered (mg/L)	183	46.0	14.0	31.4	31.6
Magnesium, filtered (mg/L)	183	13.4	5.28	9.20	9.20
Arsenic, filtered (µg/L)	183	9.0	1.0	3.5	3.2
Arsenic, unfiltered recoverable (µg/L)	183	69.0	1.0	5.4	4.0
Cadmium, filtered (µg/L)	182	0.20	<0.02	[2]0.03	<0.10
Cadmium, unfiltered recoverable (µg/L)	183	5.0	<0.01	[2]0.16	<1.0
Copper, filtered (µg/L)	182	12.6	0.7	2.8	2.2
Copper, unfiltered recoverable (µg/L)	181	400	1.9	19.5	8.5
Iron, filtered (µg/L)	183	200	<3	[2]21.9	15.1
Iron, unfiltered recoverable (µg/L)	183	13,000	42.1	633	260
Lead, filtered (µg/L)	176	1.20	<0.02	[2]0.14	<1.00
Lead, unfiltered recoverable (µg/L)	178	78.0	<1.00	[2]3.45	1.57
Manganese, filtered (µg/L)	183	230	5.2	15.8	13.6
Manganese, unfiltered recoverable (µg/L)	183	1,100	10.0	65.4	40.0
Zinc, filtered (µg/L)	182	16.0	<1.0	[2]3.5	2.3
Zinc, unfiltered recoverable (µg/L)	183	1,100	<3.0	[2]33.2	15
Sediment, suspended (percent finer than 0.062 mm)	221	99	14	82	88
Sediment, suspended concentration (mg/L)	226	950	2	44	12
Sediment, suspended discharge (ton/d)	225	21,900	5.8	1,120	97

[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 when the mean indicates that a censored value was used in the mean calculation, 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 2012.

[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. <, 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: 1992–2012					
Arsenic	10	186	34	111	121
Cadmium	21	43.9	5.9	27.5	27.1
Chromium	19	50.7	16.8	30.5	27.6
Copper	21	9,020	522	3,860	4,220
Iron	21	45,300	28,200	35,400	34,300
Lead	21	1,030	121	593	563
Manganese	21	9,220	1,160	3,190	2,590
Nickel	20	21.4	12.0	14.9	14.6
Silver	12	20.0	8.3	15.5	15.8
Zinc	21	13,400	1,490	6,720	6,880
12323750--Silver Bow Creek at Warm Springs Period of record for bed-sediment data: 1992–2012					
Arsenic	10	177	67	110	100
Cadmium	21	12.2	4.2	7.1	6.6
Chromium	19	46.8	<15.7	[1]24.8	[1]23.6
Copper	21	769	169	347	296
Iron	21	32,500	15,400	23,600	22,100
Lead	21	100	49	71	70
Manganese	21	17,700	1,470	7,510	7,230
Nickel	20	20.0	9.2	14.9	14.7
Silver	12	4.4	0.3	[1]1.9	[1]1.8
Zinc	21	2,220	554	915	726
12323770--Warm Springs Creek at Warm Springs Period of record for bed-sediment data: 1995, 1997, 1999, 2002, 2005, 2008, 2011					
Arsenic	3	66	34	51	52
Cadmium	7	5.8	1.2	3.2	3.3
Chromium	7	39.3	27.5	32.1	31.5
Copper	7	1,060	496	849	881
Iron	7	26,600	16,800	21,400	21,900
Lead	7	86	42	75	82
Manganese	7	12,100	555	6,890	7,780
Nickel	7	25.5	14.5	19.4	19.2
Silver	4	5.1	3.1	3.8	3.5
Zinc	7	453	237	381	396

Table 26. Statistical summary of long-term bed-sediment data for the Clark Fork Basin, Montana, August 1986 through August 2012.—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. <, 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, 1991–2012					
Arsenic	10	119	73	99	97
Cadmium	23	20.1	3.8	8.1	7.1
Chromium	19	44.6	19.1	30.2	29.5
Copper	23	2,300	838	1,190	1,110
Iron	23	39,800	22,600	27,700	27,000
Lead	23	235	92	131	128
Manganese	23	17,300	1,530	8,910	8,540
Nickel	20	23.2	13.9	18.8	18.6
Silver	14	7.3	<3.2	[1]4.4	[1]4.5
Zinc	23	3,560	721	1,390	1,130
461415112450801--Clark Fork below Lost Creek, near Galen Period of record for bed-sediment data: 1996–2012					
Arsenic	10	204	90	116	108
Cadmium	17	10.0	4.8	6.9	6.5
Chromium	16	42.4	20.5	30.9	31.9
Copper	17	2,050	1,150	1,490	1,440
Iron	17	32,800	24,400	29,100	29,600
Lead	17	218	123	163	167
Manganese	17	9,820	1,430	5,390	5,570
Nickel	17	19.9	11.7	16.1	16.4
Silver	8	7.8	4.2	6.5	6.7
Zinc	17	1,680	930	1,280	1,280
461559112443301--Clark Fork at county bridge, near Racetrack Period of record for bed-sediment data: 1996–2012					
Arsenic	10	132	56	91	90
Cadmium	17	8.7	5.0	6.5	6.3
Chromium	16	45.2	19.0	30.1	29.6
Copper	17	1,810	933	1,290	1,310
Iron	17	31,700	21,200	27,400	28,100
Lead	17	186	103	144	143
Manganese	17	6,310	1,600	3,270	3,060
Nickel	17	18.4	10.3	14.5	14.8
Silver	8	6.1	<3.3	[1]5.0	[1]5.4
Zinc	17	1,550	999	1,190	1,170

Table 26. Statistical summary of long-term bed-sediment data for the Clark Fork Basin, Montana, August 1986 through August 2012.—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. <, 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: 1996–2012					
Arsenic	10	100	58	78	76
Cadmium	17	10.3	4.1	6.2	5.7
Chromium	16	39.2	16.0	28.4	27.6
Copper	17	1,580	721	1,100	1,090
Iron	17	33,700	20,600	27,000	27,100
Lead	17	155	92	129	132
Manganese	17	8,370	1,200	3,800	3,080
Nickel	17	16.9	8.7	12.9	12.7
Silver	8	6.2	2.7	4.9	5.0
Zinc	17	1,570	900	1,120	1,080
12324200--Clark Fork at Deer Lodge Period of record for bed-sediment data: 1986–87, 1990–2012					
Arsenic	10	102	49	73	70
Cadmium	25	10.0	3.5	6.0	5.1
Chromium	19	50.7	19.5	32.7	32.5
Copper	25	4,180	683	1,250	1,070
Iron	25	35,300	21,100	27,300	26,100
Lead	25	242	103	144	142
Manganese	25	6,020	1,070	2,610	2,440
Nickel	20	21.1	11.5	14.8	13.9
Silver	16	7.9	2.4	4.7	4.5
Zinc	25	1,730	844	1,180	1,140
12324400--Clark Fork above Little Blackfoot River, near Garrison Period of record for bed-sediment data: 2009-2012					
Arsenic	4	91	50	76	82
Cadmium	4	5.5	4.2	4.7	4.6
Chromium	4	52.8	39.0	46.0	46.0
Copper	4	1,290	855	1,170	1,270
Iron	4	32,400	23,500	28,100	28,200
Lead	4	145	102	133	142
Manganese	4	3,560	1,150	2,300	2,260
Nickel	4	17.2	12.5	14.6	14.4
Silver	0	--	--	--	--
Zinc	4	1,240	977	1,100	1,100

Table 26. Statistical summary of long-term bed-sediment data for the Clark Fork Basin, Montana, August 1986 through August 2012.—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. <, 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: 1992–2012					
Arsenic	10	62	23	42	37
Cadmium	21	8.1	2.5	4.5	4.0
Chromium	19	55.3	21.3	33.8	31.9
Copper	21	1,080	338	683	729
Iron	21	32,100	15,500	23,700	24,300
Lead	21	152	52	95	93
Manganese	21	2,610	977	1,810	1,840
Nickel	20	18.6	9.0	14.0	14.3
Silver	12	4.8	2.3	3.3	3.2
Zinc	21	1,320	531	910	904
12331800--Clark Fork near Drummond Period of record for bed-sediment data: 1986–87, 1991–2012					
Arsenic	10	66	19	38	33
Cadmium	24	7.7	1.7	4.2	4.2
Chromium	19	41.9	16.9	29.1	31.3
Copper	24	747	220	470	464
Iron	24	43,700	15,900	24,500	23,200
Lead	24	135	29	86	84
Manganese	24	4,820	832	2,050	1,890
Nickel	20	16.8	5.9	13.0	13.6
Silver	15	4.7	<3.2	[1]3.0	[1]2.9
Zinc	24	1,230	478	927	948
12334550--Clark Fork at Turah Bridge, near Bonner Period of record for bed-sediment data: 1986, 1991–2012					
Arsenic	10	43	19	28	27
Cadmium	23	7.3	1.2	3.4	3.4
Chromium	19	42.5	15.3	27.4	29.0
Copper	23	635	211	351	323
Iron	23	25,900	12,600	19,400	17,300
Lead	23	115	41	67	65
Manganese	23	2,340	671	1,290	1,240
Nickel	20	19.1	6.9	12.4	11.6
Silver	14	3.9	<1.9	[1]2.1	[1]1.9
Zinc	23	1,160	489	794	786

Table 26. Statistical summary of long-term bed-sediment data for the Clark Fork Basin, Montana, August 1986 through August 2012.—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. <, 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, 2006–12					
Arsenic	8	6	<0.2	[1]3	[1]3
Cadmium	19	2.0	0.04	[1]0.5	[1]0.3
Chromium	15	35.2	15.1	23.1	23.7
Copper	19	27	11	20	21
Iron	19	23,000	12,400	17,600	18,100
Lead	19	20	<13	[1]13	[1]12
Manganese	19	746	298	539	544
Nickel	16	14.3	6.0	11.2	11.7
Silver	12	<1.9	<0.3	[1]0.5	[1]<0.6
Zinc	19	82	35	61	61
12340500--Clark Fork above Missoula Period of record for bed-sediment data: 1997–2012					
Arsenic	10	54	12	32	30
Cadmium	16	5.8	1.0	3.0	2.8
Chromium	15	40.7	19.0	27.9	29.5
Copper	16	551	129	354	340
Iron	16	27,000	17,900	20,900	20,500
Lead	16	78	25	54	55
Manganese	16	2,250	477	1,070	1,000
Nickel	16	15.8	7.6	12.7	12.8
Silver	7	2.9	0.8	[1]2.0	[1]2.1
Zinc	16	1,090	346	716	706

[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 2012.

[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. spp., one or more similar species; <, 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, 1997–2012					
Brachycentrus spp.					
Arsenic	0	--	--	--	--
Cadmium	5	12.5	5.8	10.1	11.6
Chromium	5	5.9	0.7	2.1	0.9
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	<0.1	[1]1.3	[1]1.6
Zinc	5	995	629	803	815
Hydropsyche cockerelli					
Arsenic	17	33.3	5.4	14.0	12.3
Cadmium	23	9.7	3.1	5.5	5.0
Chromium	23	25.5	1.0	4.3	3.1
Copper	23	1,090	115	386	373
Iron	23	6,150	689	2,660	2,330
Lead	23	74.3	16.6	37.3	38.5
Manganese	23	3,030	180	997	847
Nickel	23	3.6	0.7	2.5	2.5
Zinc	23	1,590	540	873	801
Hydropsyche spp.					
Arsenic	13	23.1	6.1	12.6	10.7
Cadmium	18	11.0	2.0	5.5	5.1
Chromium	18	4.7	0.6	2.5	2.9
Copper	18	930	80.7	443	385
Iron	18	3,250	1,050	2,180	2,170
Lead	18	237	19.3	46.5	36.5
Manganese	18	1,340	612	1,000	1,040
Nickel	18	2.7	0.7	2.0	2.3
Zinc	18	1,290	388	879	893
Hydropsyche tana					
Arsenic	0	--	--	--	--
Cadmium	6	9.2	4.8	6.8	6.9
Chromium	6	11.5	0.9	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	0.7	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 2012.—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. spp., one or more similar species; <, 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: 1992–2012			
		Claassenia sabulosa			
Arsenic	1	--	--	1.8	--
Cadmium	1	--	--	1.1	--
Chromium	1	--	--	2.8	--
Copper	1	--	--	47.6	--
Iron	1	--	--	151	--
Lead	1	--	--	0.6	--
Manganese	1	--	--	98.1	--
Nickel	1	--	--	0.5	--
Zinc	1	--	--	400	--
		Hydropsyche cockerelli			
Arsenic	17	23.6	7.9	12.8	10.7
Cadmium	43	2.1	0.2	0.6	0.5
Chromium	43	4.3	0.4	1.1	0.8
Copper	43	97.0	16.7	36.9	31.1
Iron	43	1,650	351	823	762
Lead	43	6.0	0.3	3.2	2.9
Manganese	43	3,890	491	1,250	971
Nickel	43	1.8	0.3	0.9	0.8
Zinc	43	276	115	176	169
		Hydropsyche occidentalis			
Arsenic	8	31.0	10.5	19.1	16.8
Cadmium	23	1.6	0.2	.6	0.4
Chromium	23	6.8	0.3	1.7	1.0
Copper	23	48.9	11.0	33.4	32.8
Iron	23	2,960	372	1,230	998
Lead	23	8.2	<1.7	14.1	13.8
Manganese	23	6,940	996	2,420	1,940
Nickel	23	2.7	0.7	1.5	1.4
Zinc	23	220	140	180	181
		Hydropsyche spp.			
Arsenic	1	--	--	14.0	--
Cadmium	5	2.3	0.4	1.0	0.6
Chromium	5	2.5	0.5	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	<0.4	[1]1.0	[1]0.8
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 2012.—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. spp., one or more similar species; <, 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, 2011					
Arctopsyche grandis					
Arsenic	4	9.8	7.9	9.2	9.5
Cadmium	8	3.6	0.4	2.5	2.7
Chromium	8	4.2	0.8	2.3	2.4
Copper	8	133	53.2	102	100
Iron	8	1,350	684	970	969
Lead	8	7.2	3.0	[1]5.2	[1]5.2
Manganese	8	3,560	738	2,320	2,380
Nickel	8	3.5	1.1	[1]2.3	[1]2.3
Zinc	8	267	181	205	196
Hesperoperla spp.					
Arsenic	1	--	--	1.2	--
Cadmium	1	--	--	1.0	--
Chromium	1	--	--	2.0	--
Copper	1	--	--	64.9	--
Iron	1	--	--	456	--
Lead	1	--	--	1.9	--
Manganese	1	--	--	202	--
Nickel	1	--	--	0.6	--
Zinc	1	--	--	573	--
Hydropsyche occidentalis					
Arsenic	3	13.6	12.7	13.2	13.3
Cadmium	5	1.3	0.7	1.0	1.2
Chromium	5	8.6	0.3	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	0.8	--
Chromium	2	1.6	1.4	1.5	--
Copper	2	95.9	94.8	95.4	--
Iron	2	1,220	1,150	1,180	--
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 2012.—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. spp., one or more similar species; <, 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, 1991–2012					
Claassenia sabulosa					
Arsenic	1	--	--	2.0	--
Cadmium	1	--	--	0.2	--
Chromium	1	--	--	1.5	--
Copper	1	--	--	54.7	--
Iron	1	--	--	242	--
Lead	1	--	--	1.0	--
Manganese	1	--	--	323	--
Nickel	1	--	--	0.5	--
Zinc	1	--	--	237	--
Hydropsyche cockerelli					
Arsenic	9	16.9	13.2	14.4	14.0
Cadmium	34	2.7	0.7	1.5	1.5
Chromium	34	9.6	0.8	2.2	1.7
Copper	34	181	48.7	105	104
Iron	34	2,660	816	1,470	1,430
Lead	34	17.1	1.2	8.3	7.9
Manganese	34	3,620	1,070	2,290	2,250
Nickel	34	6.5	0.9	1.8	1.6
Zinc	34	363	136	214	208
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
Hydropsyche occidentalis					
Arsenic	18	17.0	9.1	13.9	14.3
Cadmium	50	1.6	0.6	1.1	1.2
Chromium	50	6.6	0.4	2.1	1.8
Copper	50	151	49.2	93.4	89.8
Iron	50	2,590	642	1,490	1,400
Lead	50	13.5	1.6	8.0	8.0
Manganese	50	6,170	653	2,480	2,030
Nickel	50	3.5	0.8	1.8	1.6
Zinc	50	286	168	204	200

Table 27. Statistical summary of long-term biological data for the Clark Fork Basin, Montana, August 1986 through August 2012.—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. spp., one or more similar species; <, 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, 1991–2012					
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	0.7	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	0.9	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 2012.—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. spp., one or more similar species; <, 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: 1996–2012					
Claassenia sabulosa					
Arsenic	1	--	--	1.5	--
Cadmium	2	0.4	0.3	0.4	--
Chromium	2	1.9	0.4	1.2	--
Copper	2	70.1	67.1	68.6	--
Iron	2	209	189	199	--
Lead	2	1.2	0.7	1.0	--
Manganese	2	238	90.4	164	--
Nickel	2	0.2	<0.2	[1]0.2	--
Zinc	2	245	208	226	--
Hydropsyche cockerelli					
Arsenic	14	27.8	8.8	15.2	11.8
Cadmium	22	2.8	1.1	1.8	1.8
Chromium	22	4.0	0.8	2.2	2.2
Copper	22	338	48.8	145	119
Iron	22	4,080	691	1,700	1,240
Lead	22	28.6	4.5	12.9	10.2
Manganese	22	3,160	1,230	1,830	1,720
Nickel	22	2.8	0.9	1.5	1.3
Zinc	22	339	151	234	231
Hydropsyche occidentalis					
Arsenic	9	20.9	12.7	15.8	15.0
Cadmium	23	1.9	0.9	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	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	0.9	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	0.9	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 2012.—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. spp., one or more similar species; <, 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—Continued Period of record for biological data: 1996–2012					
Rhyacophila spp.					
Arsenic	2	5.2	3.5	4.4	--
Cadmium	2	4.3	3.9	4.1	--
Chromium	2	1.1	1.0	1.0	--
Copper	2	93.1	73.7	83.4	--
Iron	2	346	324	335	--
Lead	2	5.9	4.8	5.4	--
Manganese	2	320	192	256	--
Nickel	2	0.3	0.3	0.3	--
Zinc	2	411	301	356	--

Table 27. Statistical summary of long-term biological data for the Clark Fork Basin, Montana, August 1986 through August 2012.—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. spp., one or more similar species; <, 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: 1996–2012**					
Arctopsyche grandis					
Arsenic	1	--	--	13.0	--
Cadmium	1	--	--	1.2	--
Chromium	1	--	--	1.9	--
Copper	1	--	--	101	--
Iron	1	--	--	1,410	--
Lead	1	--	--	13.2	--
Manganese	1	--	--	2,480	--
Nickel	1	--	--	1.4	--
Zinc	1	--	--	260	--
Claassenia sabulosa					
Arsenic	0	--	--	--	--
Cadmium	1	--	--	0.4	--
Chromium	1	--	--	0.3	--
Copper	1	--	--	40.3	--
Iron	1	--	--	113	--
Lead	1	--	--	0.8	--
Manganese	1	--	--	172	--
Nickel	1	--	--	0.2	--
Zinc	1	--	--	213	--
Hydropsyche cockerelli					
Arsenic	12	20.2	11.1	14.7	14.9
Cadmium	23	2.1	0.8	1.5	1.5
Chromium	23	3.0	0.6	1.8	1.4
Copper	23	198	50.0	108	99.5
Iron	23	3,330	657	1,370	1020
Lead	23	18.7	3.7	9.6	7.7
Manganese	23	2,360	646	1,630	1,830
Nickel	23	2.0	0.7	1.2	1.1
Zinc	23	302	139	200	187
Hydropsyche occidentalis					
Arsenic	14	16.8	9.2	13.1	12.8
Cadmium	27	2.3	0.7	1.4	1.4
Chromium	27	3.7	1.1	2.2	2.0
Copper	27	164	59.5	117	124
Iron	27	3,690	1,030	1,680	1,590
Lead	27	15.7	4.3	10.9	10.7
Manganese	27	3,770	660	1,970	1,810
Nickel	27	2.3	1.1	1.5	1.3
Zinc	27	361	181	232	224

Table 27. Statistical summary of long-term biological data for the Clark Fork Basin, Montana, August 1986 through August 2012.—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. spp., one or more similar species; <, 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—Continued **Period of record for biological data: 1996–2012**					
Hydropsyche spp.					
Arsenic	6	12.8	5.7	9.6	9.8
Cadmium	8	2.4	1.0	1.6	1.5
Chromium	8	3.9	0.7	1.6	1.0
Copper	8	144	68.1	97	84.0
Iron	8	1,880	787	1,220	1,170
Lead	8	15.0	5.7	8.8	7.1
Manganese	8	2,370	886	1,320	1,150
Nickel	8	2.0	0.7	1.3	1.2
Zinc	8	229	151	193	194

Table 27. Statistical summary of long-term biological data for the Clark Fork Basin, Montana, August 1986 through August 2012.—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. spp., one or more similar species; <, 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: 1996–2012					
Arctopsyche grandis					
Arsenic	2	17.5	11.8	14.6	--
Cadmium	3	7.1	1.7	4.1	3.6
Chromium	3	12.9	<2.4	[1]17.4	[1]18.1
Copper	3	196	30.8	126	151
Iron	3	2,800	340	1,550	1,500
Lead	3	17.6	<14.5	[1]12.4	[1]12.4
Manganese	3	2,060	510	1,260	1,190
Nickel	3	2.5	1.0	1.9	2.3
Zinc	3	489	86.8	319	380
Claassenia sabulosa					
Arsenic	2	3.1	1.6	2.4	--
Cadmium	2	2.4	0.9	1.6	--
Chromium	2	1.7	0.2	0.9	--
Copper	2	73.4	58.6	66.0	--
Iron	2	297	173	235	--
Lead	2	1.9	0.9	1.4	--
Manganese	2	372	115	244	--
Nickel	2	0.4	0.2	0.3	--
Zinc	2	330	168	249	--
Hydropsyche cockerelli					
Arsenic	10	18.8	8.0	13.0	11.8
Cadmium	19	2.0	0.7	1.3	1.3
Chromium	19	4.0	0.5	1.6	1.3
Copper	19	247	60.7	115	92.0
Iron	19	3,010	552	1,230	971
Lead	19	21.9	3.5	9.0	7.9
Manganese	19	2,650	487	1,380	1,230
Nickel	19	2.5	0.5	1.2	1.0
Zinc	19	285	162	212	192
Hydropsyche occidentalis					
Arsenic	17	24.0	9.8	15.0	15.8
Cadmium	34	2.4	0.7	1.3	1.3
Chromium	34	6.2	0.8	2.2	1.9
Copper	34	345	74.9	129	111
Iron	34	3,390	940	1,760	1,550
Lead	34	21.8	6.1	12.7	11.6
Manganese	34	4,460	826	2,340	2,220
Nickel	34	2.4	1.0	1.6	1.5
Zinc	34	386	197	262	241

Table 27. Statistical summary of long-term biological data for the Clark Fork Basin, Montana, August 1986 through August 2012.—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. spp., one or more similar species; <, 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: 1996–2012					
Hydropsyche spp.					
Arsenic	2	6.5	6.4	6.4	--
Cadmium	4	1.7	0.9	1.3	1.3
Chromium	4	2.1	0.8	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	0.6	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 2012.—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. spp., one or more similar species; <, 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, 1990–2012					
Arctopsyche grandis					
Arsenic	5	13.3	5.8	9.7	10.1
Cadmium	7	4.7	<4.2	[1]3.5	[1]3.4
Chromium	7	4.7	1.0	[1]2.4	[1]2.0
Copper	7	183	34.9	101	90.5
Iron	7	2,320	537	1,190	1,090
Lead	7	17.4	3.8	[1]10.7	[1]11.2
Manganese	7	1,620	380	1,050	1,010
Nickel	7	1.9	<1.3	[1]1.3	[1]1.2
Zinc	7	370	140	269	279
Hydropsyche cockerelli					
Arsenic	7	17.1	5.8	9.4	8.3
Cadmium	30	3.5	0.6	1.5	1.3
Chromium	30	4.3	0.4	1.7	1.7
Copper	30	241	54.7	103	100
Iron	30	3,340	490	1,190	1,050
Lead	30	24.9	3.8	10.0	9.1
Manganese	30	1,570	396	899	859
Nickel	30	2.4	0.3	1.2	1.0
Zinc	30	391	132	195	188
Hydropsyche occidentalis					
Arsenic	19	21.1	6.6	11.5	10.6
Cadmium	56	3.4	0.6	1.4	1.3
Chromium	56	3.7	0.6	2.0	1.9
Copper	56	222	49.4	124	119
Iron	56	3,240	558	1,510	1,490
Lead	56	20.1	3.5	11.9	11.7
Manganese	56	2,850	649	1,610	1,660
Nickel	56	12.9	1.0	1.7	1.4
Zinc	56	346	166	245	237
Hydropsyche spp.					
Arsenic	1	--	--	6.0	--
Cadmium	4	2.6	1.6	2.2	2.3
Chromium	1	--	--	0.8	--
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	--	--	0.9	--
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 2012.—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. spp., one or more similar species; <, 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: 2009–12					
Arctopsyche grandis					
Arsenic	6	16.6	5.5	8.5	7.4
Cadmium	6	4.9	3.2	3.9	3.8
Chromium	6	4.6	<2.2	[1]2.3	[1]1.9
Copper	6	209	65.7	126	128
Iron	6	2,580	694	1,310	1,200
Lead	6	18.0	6.6	10.8	10.1
Manganese	6	1,940	940	1,420	1,370
Nickel	6	2.2	0.7	1.4	1.6
Zinc	6	378	253	300	291
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	8	14.7	7.8	10.5	9.9
Cadmium	8	2.5	1.3	2.1	2.2
Chromium	8	3.6	0.7	2.1	1.9
Copper	8	182	98.2	138	143
Iron	8	2,390	1,190	1,710	1,600
Lead	8	17.9	11.1	14.0	12.9
Manganese	8	2,100	975	1,490	1,410
Nickel	8	1.9	1.0	1.5	1.5
Zinc	8	299	223	256	253
Hydropsyche spp.					
Arsenic	1	--	--	13.6	--
Cadmium	1	--	--	1.7	--
Chromium	1	--	--	4.3	--
Copper	1	--	--	187	--
Iron	1	--	--	2,570	--
Lead	1	--	--	18.5	--
Manganese	1	--	--	919	--
Nickel	1	--	--	1.8	--
Zinc	1	--	--	296	--

Table 27. Statistical summary of long-term biological data for the Clark Fork Basin, Montana, August 1986 through August 2012.—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. spp., one or more similar species; <, 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: 1992–2012**					
Arctopsyche grandis					
Arsenic	34	17.0	1.8	5.3	5.1
Cadmium	63	6.6	0.6	2.0	1.8
Chromium	63	5.3	0.1	1.4	1.1
Copper	63	232	19.9	52.8	39.9
Iron	63	3,070	195	788	610
Lead	63	16.9	1.0	4.2	3.5
Manganese	63	1,580	436	883	871
Nickel	63	3.1	0.2	0.8	0.7
Zinc	63	326	146	206	189
Claassenia sabulosa					
Arsenic	25	2.5	0.4	1.4	1.5
Cadmium	45	3.5	0.1	1.0	0.7
Chromium	45	1.6	0.2	0.6	0.5
Copper	45	84.9	33.0	59.4	58.3
Iron	45	640	63.0	200	171
Lead	45	2.8	0.4	1.0	0.8
Manganese	45	320	50.6	152	142
Nickel	45	0.7	0.1	0.3	0.3
Zinc	45	364	166	264	258
Hydropsyche cockerelli					
Arsenic	17	9.8	4.1	6.0	5.7
Cadmium	36	4.2	0.5	1.5	1.3
Chromium	36	4.7	0.5	2.0	1.9
Copper	36	188	17.1	73.6	58.5
Iron	36	3,250	522	1,160	942
Lead	36	17.6	2.4	6.7	5.3
Manganese	36	1,710	538	1,000	981
Nickel	36	3.5	0.3	1.2	1.1
Zinc	36	359	106	192	185
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	0.9	1.2	1.2
Zinc	4	190	137	167	170

Table 27. Statistical summary of long-term biological data for the Clark Fork Basin, Montana, August 1986 through August 2012.—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. spp., one or more similar species; <, 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: 1992–2012					
Hydropsyche occidentalis					
Arsenic	14	11.5	4.4	6.7	5.9
Cadmium	29	2.3	0.4	1.3	1.3
Chromium	29	3.9	0.4	1.8	1.7
Copper	29	170	26.4	72.8	62.4
Iron	29	2,720	466	1,230	1,120
Lead	29	15.7	2.9	7.4	6.0
Manganese	29	2,210	530	1,200	1,140
Nickel	29	2.5	0.8	1.2	1.0
Zinc	29	276	97.0	200	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	1,160	--
Nickel	2	0.8	0.8	0.8	--
Zinc	2	210	196	203	--

Table 27. Statistical summary of long-term biological data for the Clark Fork Basin, Montana, August 1986 through August 2012.—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. spp., one or more similar species; <, 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, 1991–2012					
Arctopsyche grandis					
Arsenic	26	8.2	2.3	4.3	4.0
Cadmium	58	3.8	0.4	1.5	1.2
Chromium	58	4.2	0.2	1.1	1.0
Copper	58	103	16.9	35.5	30.0
Iron	58	1,720	193	630	529
Lead	58	11.8	1.6	4.8	4.0
Manganese	58	2,010	456	838	747
Nickel	58	1.9	0.2	0.7	0.6
Zinc	58	314	140	201	190
Claassenia sabulosa					
Arsenic	21	1.9	0.6	1.2	1.2
Cadmium	57	2.8	0.1	1.1	1.0
Chromium	57	3.3	0.2	0.7	0.6
Copper	57	165	18.0	64.9	61.3
Iron	57	449	45.4	175	146
Lead	57	2.9	0.2	1.0	0.8
Manganese	57	748	33.1	183	147
Nickel	57	1.1	0.1	[1]0.3	[1]0.2
Zinc	57	567	103	276	265
Hydropsyche cockerelli					
Arsenic	15	7.2	3.9	5.6	5.7
Cadmium	44	4.5	0.3	1.2	.9
Chromium	44	3.5	0.4	1.6	1.4
Copper	44	156	30.0	59.0	51.7
Iron	44	2,500	506	1,170	976
Lead	44	15.0	4.7	8.4	7.5
Manganese	44	1,680	549	994	926
Nickel	44	2.0	0.5	1.1	1.1
Zinc	44	322	134	195	187
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

Table 27. Statistical summary of long-term biological data for the Clark Fork Basin, Montana, August 1986 through August 2012.—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. spp., one or more similar species; <, 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, 1991–2012					
Hydropsyche occidentalis					
Arsenic	16	7.7	4.3	5.6	5.4
Cadmium	32	2.0	0.4	1.0	1.0
Chromium	32	8.1	0.4	2.2	2.1
Copper	32	118	13.3	58.0	55.5
Iron	32	2,060	424	1,230	1,190
Lead	32	14.0	3.0	8.6	8.7
Manganese	32	2,920	477	1,400	1,210
Nickel	32	2.4	0.5	1.3	1.2
Zinc	32	293	153	219	221
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 2012.—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. spp., one or more similar species; <, 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, 1991–2012					
Arctopsyche grandis					
Arsenic	29	7.2	3.1	4.5	4.5
Cadmium	71	2.7	0.4	1.2	1.1
Chromium	71	4.1	0.5	1.6	1.5
Copper	71	125	17.6	38.0	32.0
Iron	71	2,870	372	929	790
Lead	71	13.2	1.6	4.4	3.7
Manganese	71	902	324	648	660
Nickel	71	2.6	0.4	1.1	0.9
Zinc	71	282	111	202	198
Claassenia sabulosa					
Arsenic	21	1.9	0.2	1.1	1.0
Cadmium	47	2.5	0.1	1.0	0.8
Chromium	47	2.0	0.2	0.7	0.6
Copper	47	95.1	37.5	59.6	56.8
Iron	47	378	58.6	134	114
Lead	47	1.6	0.2	0.7	0.6
Manganese	47	229	37.2	103	90.2
Nickel	47	0.6	0.04	0.2	0.2
Zinc	47	342	144	230	235
Hydropsyche cockerelli					
Arsenic	21	9.8	3.7	4.9	4.8
Cadmium	49	2.2	0.3	0.9	0.7
Chromium	49	14.2	0.2	2.2	1.6
Copper	49	126	26.4	49.8	44.2
Iron	49	3,180	566	1,240	1,140
Lead	49	19.7	2.2	5.6	5.1
Manganese	49	848	426	643	658
Nickel	49	2.7	0.6	1.3	1.2
Zinc	49	332	119	190	194
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	--

Table 27. Statistical summary of long-term biological data for the Clark Fork Basin, Montana, August 1986 through August 2012.—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. spp., one or more similar species; <, 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, 1991–2012					
Hydropsyche occidentalis					
Arsenic	18	7.3	2.9	4.6	4.2
Cadmium	38	1.8	0.3	1.0	0.9
Chromium	38	5.0	0.6	1.9	1.7
Copper	38	102	27.4	49.5	45.1
Iron	38	2,590	472	1,260	1,150
Lead	38	14.2	2.8	6.4	5.6
Manganese	38	1,600	454	846	791
Nickel	38	3.2	0.6	1.2	1.2
Zinc	38	416	145	212	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 2012.—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. spp., one or more similar species; <, 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, 2006–12					
Arctopsyche grandis					
Arsenic	8	4.6	1.6	2.7	2.2
Cadmium	18	0.5	0.1	0.3	0.2
Chromium	13	6.9	0.5	2.2	1.3
Copper	18	18.0	9.9	13.0	12.4
Iron	18	1,880	108	720	757
Lead	18	2.3	0.5	1.1	0.9
Manganese	13	633	286	471	476
Nickel	13	3.7	0.7	1.4	1.2
Zinc	18	156	106	139	138
Claassenia sabulosa					
Arsenic	11	3.0	0.1	1.0	0.7
Cadmium	22	0.2	0.1	0.1	0.2
Chromium	17	5.2	0.3	1.0	0.7
Copper	22	88.5	19.0	43.8	44.0
Iron	22	317	46.2	147	140
Lead	22	0.8	0.1	0.3	0.2
Manganese	17	133	26.3	80.3	73.4
Nickel	17	1.1	0.1	0.3	0.3
Zinc	22	399	117	230	207
Hydropsyche cockerelli					
Arsenic	6	4.2	2.1	3.0	3.1
Cadmium	6	0.6	<.1	[1]0.4	[1]0.3
Chromium	6	3.8	1.6	3.0	3.0
Copper	6	16.2	5.6	13.8	15.2
Iron	6	2,390	1,120	1,780	1,800
Lead	6	2.3	1.5	2.0	2.0
Manganese	6	814	428	613	626
Nickel	6	4.6	1.4	2.4	1.9
Zinc	6	165	140	149	145
Hydropsyche occidentalis					
Arsenic	12	3.8	1.2	2.2	2.0
Cadmium	24	0.5	0.1	0.2	0.2
Chromium	24	5.8	0.8	2.1	1.9
Copper	24	20.6	12.0	15.6	15.3
Iron	24	2,090	927	1,480	1,490
Lead	24	2.0	0.8	1.4	1.5
Manganese	24	798	414	522	460
Nickel	24	4.9	0.9	1.6	1.4
Zinc	24	163	116	140	143

Table 27. Statistical summary of long-term biological data for the Clark Fork Basin, Montana, August 1986 through August 2012.—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. spp., one or more similar species; <, 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, 2006–12					
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 2012.—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. spp., one or more similar species; <, 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: 1997–2012					
Arctopsyche grandis					
Arsenic	26	7.2	1.2	3.8	3.8
Cadmium	45	2.3	0.1	1.0	0.8
Chromium	45	4.2	0.4	1.7	1.6
Copper	45	81.2	13.7	39.7	35.8
Iron	45	2,340	302	1,050	908
Lead	45	8.8	1.1	4.2	4.1
Manganese	45	1,410	476	898	872
Nickel	45	2.1	0.3	1.2	1.0
Zinc	45	272	133	200	198
Claassenia sabulosa					
Arsenic	18	1.9	0.1	1.2	1.2
Cadmium	27	2.0	0.2	0.8	0.6
Chromium	27	1.4	0.1	0.7	0.8
Copper	27	81.1	25.8	52.5	51.0
Iron	27	402	82.0	220	227
Lead	27	3.1	0.2	1.0	0.8
Manganese	27	683	57.8	196	146
Nickel	27	0.5	0.2	[1]0.3	[1]0.3
Zinc	27	363	191	268	271
Hydropsyche cockerelli					
Arsenic	17	8.9	2.4	6.3	6.6
Cadmium	26	2.0	0.4	1.0	1.0
Chromium	26	6.0	1.0	3.0	3.2
Copper	26	99.7	24.4	66.8	69.2
Iron	26	3,590	830	2,120	2,120
Lead	26	12.1	2.5	7.8	7.4
Manganese	26	1,910	764	1,230	1,210
Nickel	26	2.4	0.9	1.8	1.8
Zinc	26	266	156	221	223
Hydropsyche occidentalis					
Arsenic	11	7.4	2.2	5.2	5.8
Cadmium	17	1.5	0.4	0.8	0.7
Chromium	17	5.5	0.7	2.9	3.0
Copper	17	80.7	25.3	55.2	59.3
Iron	17	2,540	690	1,930	2,110
Lead	17	11.4	2.1	6.8	6.9
Manganese	17	2,470	717	1,510	1,590
Nickel	17	2.4	0.7	1.8	1.8
Zinc	17	278	183	227	229

[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.

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