USGS
science for a changing world

Prepared in cooperation with the U.S. Environmental Protection Agency

Water-Quality, Bed-Sediment, and Biological Data (October 2007 through September 2008) and Statistical Summaries of Long-Term Data for Streams in the Clark Fork Basin, Montana

Open-File Report 2009–1178

"The forces of man and nature combined... to allow the Clark Fork and Blackfoot rivers to flow freely for the first time in a century."
—John Cramer, Missoulian

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

Cover.

Photograph: Soon after workers breached Milltown Dam, the Clark Fork River carved a new channel through the clean fill by the northern end of the radial gate and spillway at the Milltown Reservoir Superfund site near Bonner, Montana. Photograph by Kurt Wilson, Missoulian, taken March 28, 2008.

Text: From John Cramer, "Into the Breach—Clark Fork and Blackfoot Rivers Punch Through Milltown Dam," Missoulian, March 29, 2008.

Water-Quality, Bed-Sediment, and Biological Data (October 2007 through September 2008) and Statistical Summaries of Long-Term Data for Streams in the Clark Fork Basin, Montana

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

Prepared in cooperation with the U.S. Environmental Protection Agency

Open-File Report 2009–1178

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

U.S. Department of the Interior
KEN SALAZAR, Secretary

U.S. Geological Survey
Suzette M. Kimball, Acting Director

U.S. Geological Survey, Reston, Virginia: 2009

For more information on the USGS—the Federal source for science about the Earth, its natural and living resources, natural hazards, and the environment, visit *http://www.usgs.gov* or call 1-888-ASK-USGS

For an overview of USGS information products, including maps, imagery, and publications, visit *http://www.usgs.gov/pubprod*

To order this and other USGS information products, visit *http://store.usgs.gov*

Suggested citation:
Dodge, K.A., Hornberger, M.I., and Dyke, J.L., 2009, Water-quality, bed-sediment, and biological data (October 2007 through September 2008) and statistical summaries of long-term data for streams in the Clark Fork basin, Montana: U.S. Geological Survey Open-File Report 2009–1178, 139 p.

Contents

Figures

Tables

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

Multiply	By	To obtain
acre-foot (acre-ft)	1,233	cubic meter (m^3)
cubic foot per second (ft^3/s)	0.02832	cubic meter per second (m^3/s)
gallon (gal)	3.785	liter (L)
gallon (gal)	3,785	milliliter (mL)
inch (in.)	25.4	millimeter (mm)
inch (in.)	25,400	micrometer (µm)
mile (mi)	1.609	kilometer (km)
ounce (oz)	28.35	gram (g)
part per million (ppm)	1	microgram per gram (µg/g)
square mile (mi^2)	2.59	square kilometer (km^2)
ton	907.2	kilogram
ton per day (ton/d)	907.2	kilogram per day (kg/d)

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

$$°F = (1.8 \times °C) + 32$$

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

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

Water-year definition:

Water year is the 12-month period from October 1 through September 30 of the following calendar year. The water year is designated by the calendar year in which it ends. For example, water year 2008 is the period from October 1, 2007, through September 30, 2008.

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
nm	nanometer
ppm	part per million

Acronyms used in this report:

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

Water-Quality, Bed-Sediment, and Biological Data (October 2007 through September 2008) and Statistical Summaries of Long-Term Data for Streams in the Clark Fork Basin, Montana

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

Abstract

Water, bed sediment, and biota were sampled in streams from Butte to near Missoula as part of a long-term monitoring program in the upper Clark Fork basin; additional water samples were collected in the Clark Fork basin from sites near Missoula downstream to near the confluence of the Clark Fork and Flathead River as part of a supplemental sampling program. The sampling programs were conducted in cooperation with the U.S. Environmental Protection Agency to characterize aquatic resources in the Clark Fork basin of western Montana, with emphasis on trace elements associated with historic mining and smelting activities. Sampling sites were located on the Clark Fork and selected tributaries. Water samples were collected periodically at 23 sites from October 2007 through September 2008. Bed-sediment and biota samples were collected once at 13 sites during August 2008.

This report presents the analytical results and quality-assurance data for water-quality, bed-sediment, and biota samples collected at all long-term and supplemental monitoring sites from October 2007 through September 2008. Water-quality data include concentrations of selected major ions, trace elements, and suspended sediment. Turbidity was analyzed for water samples collected at sites where seasonal daily values of turbidity were being determined and at Clark Fork above Missoula. Nutrients also were analyzed at all the supplemental water-quality sites, except for Clark Fork Bypass, near Bonner. Daily values of suspended-sediment concentration and suspended-sediment discharge were determined for four sites, and seasonal daily values of turbidity 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 long-term water-quality, bed-sediment, and biological data for sites in the upper Clark Fork basin are provided for the period of record since 1985.

Introduction

The Clark Fork originates near Warm Springs in western Montana at the confluence of Silver Bow and Warm Springs Creeks (fig. 1). Along the 148-mi reach of stream from Silver Bow Creek in Butte to the Clark Fork near Missoula, six major tributaries enter: Blacktail Creek, Warm Springs Creek, Little Blackfoot River, Flint Creek, Rock Creek, and Blackfoot River. Principal surface-water uses in the 6,000-mi^2 upper Clark Fork basin above Missoula include irrigation, stock watering, small-scale industry, hydroelectric power generation, and habitat for trout fisheries. Current land uses primarily are cattle production, logging, mining, residential development, and recreation. Large-scale mining and smelting were prevalent land uses in the upper basin for more than 100 years but are now either discontinued or substantially smaller in scale.

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

Concern about the potential toxicity of trace elements to aquatic biota and human health has resulted in a comprehensive effort by State, Federal, and private entities to

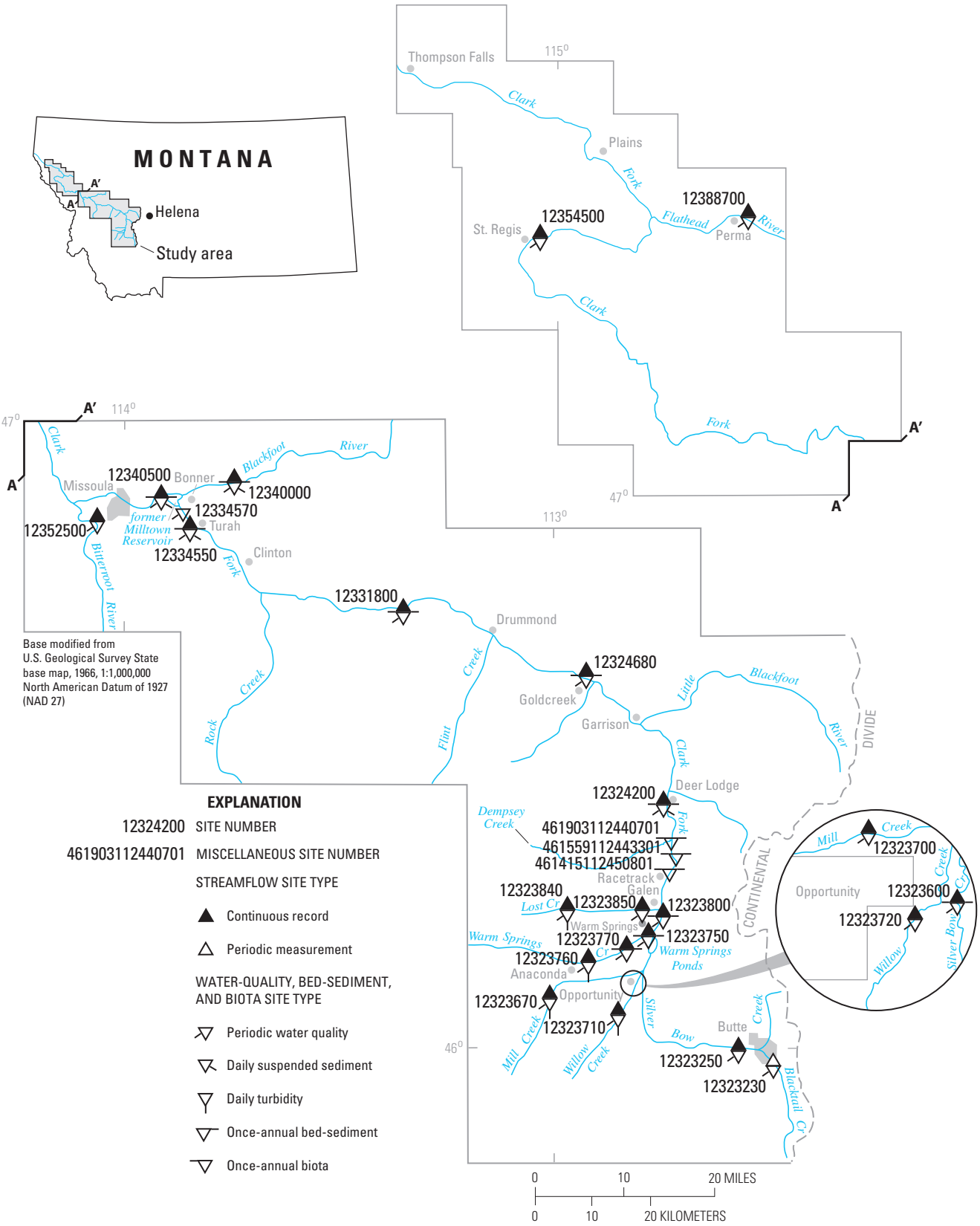

Figure 1. Location of study area in the Clark Fork basin, Montana.

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 2008). 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 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 long-term 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. In April 2006, a supplemental water-quality sampling program was initiated at six sites for the part of the Clark Fork basin from near Milltown Reservoir to near the confluence of the Clark Fork and Flathead River (fig. 1 and table 1). In March 2008, an additional site was added on the temporary bypass channel that is being used to redirect the Clark Fork around the cleanup area. Of the sites that bracket the former location of Milltown Reservoir, three also are part of the long-term monitoring network. The supplemental monitoring provides additional spatial coverage of constituent concentrations before and after the removal of Milltown Dam, which was breached on March 28, 2008.

The purpose of this report is to present water-quality data for 23 sites and bed-sediment and biological data for 13 sites in the Clark Fork basin collected from October 2007 through September 2008. Quality-assurance data are presented for water-quality, bed-sediment, and biota samples. Statistical summaries also are provided for long-term water-quality, bed-sediment, and biological data collected since 1985.

Sampling Locations and Types of Data

Sampling sites for the long-term monitoring program in the upper Clark Fork basin from Butte to near Missoula (fig. 1) are located on the Clark Fork main stem (including Silver Bow Creek), three major tributaries (Blacktail Creek, Warm Springs Creek, and Blackfoot River), and three smaller tributaries (Mill Creek, Willow Creek, and Lost Creek). The sites, types of data collected, and period of record for each type of data are listed in table 1. Main-stem sampling sites were selected to divide the upper Clark Fork into reaches of relatively uniform length, with each reach encompassing either a major tributary or depositional environment (Warm Springs Ponds and 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. In the long-term monitoring program, water-quality data were obtained periodically at 19 sites; daily suspended-sediment data were obtained at 4 sites and daily turbidity data were obtained by continuous turbidity monitors at 4 sites. Bed-sediment and biological data for 13 sites were obtained once annually. Continuous streamflow data were collected at 18 sites in the long-term monitoring network.

Supplemental water samples were collected at seven sites from near the former Milltown Reservoir location to near the confluence of the Clark Fork and Flathead River (fig. 1). Of those sites, three (Clark Fork at Turah Bridge, near Bonner; Blackfoot River near Bonner; and Clark Fork above Missoula) bracket the former Milltown Reservoir and also are part of the long-term monitoring network; one additional site (Clark Fork Bypass, near Bonner) is located on the temporary bypass channel, within the Milltown Reservoir cleanup site, that diverts the Clark Fork around the cleanup work area; and three additional sites (Bitterroot River near Missoula, Clark Fork at St. Regis, and Flathead River at Perma) are farther downstream in the basin. The types of data collected and period of record for each type of data for the four additional sites that are not part of the long-term network also are listed in table 1 and shown in figure 1. Supplemental water samples generally were collected during periods of high flow, which included the period when Milltown Dam was first breached, to characterize conditions when the potential for scour of bottom sediments from Milltown Reservoir was greatest. The sites were sampled in a downstream progression during 2-day periods that generally coincided with traveltime along the Clark Fork main stem. The water-quality and streamflow data for each sampling episode can be used to calculate instantaneous constituent loads to identify the relative contributions of load from different source areas. Supplemental samples from the 7 sites were collected 15–17 times. One sample was collected on March 28, the day Milltown Dam was first breached.

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 properties; laboratory analyses of water-quality, bed-sediment, and biota samples; and quality-assurance data for water year 2008 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 2008 are listed in tables 25 through 27 at the back of the report.

Quality assurance of data was maintained through the use of documented procedures designed to provide environmentally representative data. Acceptable performance of the procedures was verified with quality-control samples that were

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

[Abbreviations: LT, site is part of long-term monitoring network; S, site is part of supplemental monitoring network; P, present; D, discontinued. Symbol: --, no data]

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

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

[Abbreviations: LT, site is part of long-term monitoring network; S, site is part of supplemental monitoring network; P, present; D, discontinued. Symbol: --, no data]

Station number (fig. 1)	Station name	Network	Continuous-record streamflow	Periodic water quality[1]	Daily suspended sediment	Daily turbidity (seasonal)	Fine-grained bed sediment[2]	Bulk bed sediment[2,3]	Biota[2]
12324200	Clark Fork at Deer Lodge	LT	10/78–P	03/85–P	03/85–08/86, 04/87–03/03, 08/03–P	--	08/86–08/87, 08/90–P	08/93–08/04, D	08/86–08/87, 08/90–P
12324680	Clark Fork at Goldcreek	LT	10/77-P	03/93–P	--	--	07/92–P	08/93–08/04, D	07/92–P
12331800	Clark Fork near Drummond	LT	04/93–P	03/93–P	--	--	08/86, 08/87, 08/91–P	08/93–08/04, D	08/86, 08/91–P
12334550	Clark Fork at Turah Bridge, near Bonner	LT, S	03/85–P	03/85–P	03/85–03/03, 08/03–P	--	08/86, 08/91–P	08/93–08/04, D	08/86, 08/91–P
12334570	Clark Fork Bypass, near Bonner	S	--	03/08–P	--	--	--	--	--
12340000	Blackfoot River near Bonner	LT, S	10/39–P	03/85–P	07/86–04/87, 06/88–09/95, 10/05–P	--	08/86–08/87, 08/91, 08/93–96, 08/98–01, 09/03, 08/06–P	08/93, 08/94, 08/99–01, 09/03, D	08/86–08/87, 08/91, 08/93, 08/96, 08/98, 09/00, 09/03, 08/06–P
12340500	Clark Fork above Missoula	LT, S	03/29–P	07/86–P[4]	07/86–04/87, 06/88–01/96, 03/96–03/03, 08/03–P	04/07–09/07	08/97–P	08/97–08/04, D	08/97–P
12352500	Bitterroot River near Missoula	S	07/1898–11/1901, 05/1903–12/1904, 07/89–P	05/97–P	--	--	--	--	--
12354500	Clark Fork at St. Regis	S	10/10–P	04/06–P	--	--	--	--	--
12388700	Flathead River at Perma	S	10/83–P	10/70–09/73, 10/96–09/03, 04/06–P	--	--	--	--	--

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

[2]Laboratory analyses for trace elements.

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

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

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

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

collected systematically to provide a measure of the accuracy, precision, and bias of the environmental data, and to identify problems associated with sampling, processing, or analysis.

Water-Quality Data

Water-quality data consist of onsite measurements of selected stream properties and concentrations of chemical and physical constituents analyzed in periodically collected stream samples. Routine water samples for the long-term monitoring program were collected at 19 sites in the upper Clark Fork basin 6–8 times per year on a schedule designed to describe seasonal and hydrologic variability. Supplemental water samples were collected 15–17 times at the 7 supplemental monitoring sites (which include 3 long-term monitoring sites) in the lower part of the basin. At the 4 daily suspended-sediment sites, suspended-sediment samples were collected by an observer 1–14 times per week, depending on season and flow conditions. Continuous turbidity monitors were operated seasonally (October 2007 and March/April–September 2008) at four sites near Anaconda to determine daily values (table 1).

Methods

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

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

Composited water samples were analyzed for the constituents listed in table 2. The terms “filtered” and “unfiltered recoverable” replace the terms “dissolved” and “total recoverable,” respectively, which were used in past reports from this project. Filtered (0.45-µm pore size) and unfiltered recoverable concentrations of the trace elements (arsenic, cadmium, copper, iron, lead, manganese, and zinc), filtered concentrations of calcium and magnesium, and unfiltered concentrations of nitrogen and phosphorous were determined by the USGS National Water Quality Laboratory (NWQL) in Denver, Colo.

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

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

Constituent	Data-quality objectives		
	Detectability	Precision	Bias
	Laboratory reporting level	Maximum relative standard deviation of replicate analyses (percent)	Maximum deviation of spike recovery (percent)
Calcium, filtered	0.04 mg/L	20	--
Magnesium, filtered	.02 mg/L	20	--
Nitrogen, unfiltered recoverable	.06 mg/L	20	25
Phosphorus, unfiltered recoverable	.008 mg/L	20	25
Arsenic, filtered	.06 µg/L	20	25
Arsenic, unfiltered recoverable	.60 µg/L	20	25
Cadmium, filtered	.04 µg/L	20	25
Cadmium, unfiltered recoverable	.01 µg/L	20	25
Copper, filtered	1.0 µg/L	20	25
Copper, unfiltered recoverable	1.2 µg/L	20	25
Iron, filtered	8 µg/L	20	25
Iron, unfiltered recoverable	6 µg/L	20	25
Lead, filtered	.08 µg/L	20	25
Lead, unfiltered recoverable	.06 µg/L	20	25
Manganese, filtered	.2 µg/L	20	25
Manganese, unfiltered recoverable	.8 µg/L	20	25
Zinc, filtered	1.8 µg/L	20	25
Zinc, unfiltered recoverable	2.0 µg/L	20	25
Sediment, suspended, percent finer than 0.062 mm	1 percent	20	--
Sediment, suspended	1 mg/L	20	--

Concentrations of calcium and magnesium were determined to enable calculation of hardness, while concentrations of nitrogen and phosphorous were determined for the supplemental water samples, except for samples collected at Clark Fork Bypass, near Bonner.

Filtered concentrations of arsenic, cadmium, copper, lead, manganese, and zinc were determined by inductively coupled plasma-mass spectrometry (Faires, 1993; Garbarino and others, 2006). Filtered concentrations of calcium, magnesium, and iron were determined by inductively coupled plasma-atomic emission spectrometry (Fishman, 1993). Unfiltered recoverable concentrations of trace elements were determined from unfiltered samples that were first digested with dilute hydrochloric acid (Hoffman and others, 1996). For cadmium, iron, lead, and manganese, the digested samples were analyzed by inductively coupled plasma-mass spectrometry by using the method described by Garbarino and Struzeski (1998). For arsenic, copper, and zinc, the digested samples were analyzed by inductively coupled plasma-mass spectrometry by using the method described by Garbarino and others (2006). Unfiltered recoverable concentrations of nitrogen and phosphorous were determined from unfiltered samples that were digested with persulfate and then analyzed by colorimetry. Unfiltered recoverable nitrogen was analyzed by using methods described by Patton and Kryskalla (2003), and unfiltered phosphorus was analyzed by using methods described by U.S. Environmental Protection Agency (1993).

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

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

analyzed for suspended-sediment concentration and were used to determine daily mean suspended-sediment concentrations according to methods described by Porterfield (1972).

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

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

where

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

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

Results

Water-quality data for samples collected periodically during water year 2008 are listed in table 4. Daily mean streamflow, daily mean suspended-sediment concentration, and daily suspended-sediment discharge for water year 2008 at the four daily suspended-sediment sites are listed in tables 5 through 8 along with monthly summary statistics and annual totals for streamflow and suspended-sediment discharge. Daily maximum, minimum, and mean turbidity at four sites are listed in tables 9 through 12 along with monthly summary statistics.

Quality Assurance

Quality-assurance procedures used for the collection and field processing of water samples are described by Ward and Harr (1990), Horowitz and others (1994), Edwards and Glysson (1999), Lambing (2006), and the U.S. Geological Survey (variously dated). Standard procedures used by the NWQL for internal sample handling and quality assurance are described by Friedman and Erdmann (1982), Jones (1987), and Pritt and Raese (1995). Quality-assurance procedures used by the Montana Sediment Laboratory are described by Dodge and Lambing (2006). Standard procedures used for the calibration, measurement, and quality assurance of turbidity monitors are described by Anderson (2004).

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

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

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

Precision of analytical results for field replicates is affected by numerous sources of variability within the field and laboratory environments, including sample collection, sample processing, and sample analysis. To provide data on overall precision for samples exposed to both field and laboratory sources of variability, replicate stream samples for chemical analysis were obtained in the field by splitting a composite

stream sample. Replicate stream samples for suspended-sediment analysis were obtained in the field by concurrently collecting two independent cross-sectional samples. Analyses of these field replicates indicate the reproducibility of environmental data that are affected by the combined variability potentially introduced by field and laboratory processes.

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

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

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

All water samples were handled in accordance with chain-of-custody procedures that provide documentation of sample identity, shipment, receipt, and laboratory handling. All routine and quality-control samples submitted from a sampling episode were stored in a secure area of the NWQL and analyzed as a discrete sample group, independent of other samples submitted to the NWQL. Therefore, the quality-control data apply solely to the analytical results for stream samples reported herein and provide a direct measure of data quality for this monitoring program.

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

The NWQL uses a statistically based convention for establishing minimum laboratory reporting levels (LRLs) for analytical results and for reporting low-concentration data (Childress and others, 1999). Quality-control data are collected by the NWQL on a continuing basis to determine long-term method detection levels (LT–MDLs) and LRLs. These values are reevaluated each year and, consequently, can change from year to year. The methods used to determine the LRLs are designed to limit the possible occurrence of a false positive or false negative error to 1 percent or less. Accordingly, concentrations are reported as less than the LRL for samples in which the analyte was either not detected or did not pass identification criteria. Analytes that are detected at concentrations between the LT–MDL and the LRL and that pass identification criteria are reported as estimated concentrations. Estimated concentrations are noted with a remark code of "E." These data need to be used with the understanding that their uncertainty is greater than that of data reported without the "E" remark code.

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

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

where

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

Precision also can be expressed as a relative standard deviation (*RSD*), in percent, which is computed from the standard deviation and the mean concentration for all the replicate

analyses. Expressing precision relative to a mean concentration standardizes comparison of precision among individual constituents. The *RSD* is calculated according to the following equation (Taylor, 1987):

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

where

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

Paired analyses of field replicates are listed in table 13. The overall precision estimated for each constituent on the basis of analyses of field replicates, which include both field and laboratory sources of variability, is listed in table 14. The data-quality objective used to indicate acceptable precision of results for field replicates was a maximum *RSD* of 20 percent (table 3). Precision estimates for the analytical results of field replicates were within the 20-percent *RSD* limit for all constituents, except unfiltered recoverable iron (table 14). The *RSD* for this constituent was 30 percent and resulted from poor replicate comparison from a sample collected on May 5, 2008, at Clark Fork above Missoula when suspended-sediment concentrations were relatively high. When this 1 replicate pair was excluded, the other 11 replicate pairs had a *RSD* for unfiltered recoverable iron of 6.6 percent.

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

Recovery efficiency for analyses of constituents is determined by analyses of an unspiked sample and a spiked aliquot of the same sample. The data-quality objective for acceptable spike recovery of trace elements in water samples was a maximum deviation of 25 percent from a theoretical 100-percent recovery of added constituent (table 3). At the laboratory, a spiked deionized-water blank sample and a spiked aliquot of a stream sample were prepared and analyzed along with the original unspiked sample. The differences between the spiked and unspiked sample concentrations were determined and used to compute recovery, in percent, according to equation 4:

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

where

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

If the spike recovery of a trace element was outside a range of 75 to 125 percent, the instrument was recalibrated and the entire sample set and all spiked samples were reanalyzed for that particular trace element until recoveries were improved to the extent possible. Recovery efficiency for individual trace elements in laboratory-spiked deionized-water blank samples and in laboratory-spiked stream samples is listed in tables 16 and 17, respectively. The mean spike recovery for deionized-water blank samples spiked with trace elements (table 16) ranged from 97.9 to 105 percent. The 95-percent confidence intervals (Taylor, 1987) for the mean spike recovery for each constituent for which deionized-water blank samples were analyzed (table 16) did not exceed a 25-percent deviation from an expected 100-percent recovery. The mean spike recovery for spiked stream samples (table 17) ranged from 92.8 to 106 percent. The 95-percent confidence intervals for mean spike recoveries (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 in one direction. All laboratory-spiked deionized-water blank samples (table 16) had confidence intervals for percent recovery that included 100 percent. All laboratory-spiked stream samples (table 17) also had confidence intervals for percent recovery that included 100 percent except for unfiltered recoverable copper (86.4–99.1 percent) and unfiltered recoverable zinc (93.1–98.2 percent). Both the 95-percent confidence interval and mean spike recovery for these constituents indicate a persistent but minor, low bias. Because the mean spike recoveries for all constituents 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 the entire process of sample collection, field processing, and laboratory analysis is presumably free of contamination. If detectable concentrations in field blanks were equal to or greater than twice the LRL, the concentrations were noted during data review. Analytical results from the field blank for the next sample set were evaluated for a consistent trend that could indicate systematic contamination. Sporadic, infrequent exceedances of twice the LRL probably represented random contamination or instrument calibration error that was not

persistent in the process and was not likely to cause positive bias in a long-term record of analytical results. However, if concentrations for a particular constituent exceeded twice the LRL in field blanks from two consecutive field trips, blank samples were collected from individual components of the processing sequence and were submitted for analysis to identify the source of contamination.

Trace-element concentrations in field blanks (table 18) were almost always less than the LRL. Two detections exceeded the LRL in two separate samples for filtered zinc, which had a LRL of 1.8 µg/L. One occurred on May 28, 2008 (4.0 µg/L), and one occurred on June 11, 2008 (3.6 µg/L). Because no trends were indicated in subsequent sampling trips, no adjustments were made to water-quality sample results on the basis of these two detections.

Bed-Sediment Data

Bed-sediment data for the long-term monitoring program in the upper Clark Fork basin consist of analyses of trace-element concentrations in the fine-grained (<0.064 mm) fraction of bed-sediment samples. Collection of bulk bed sediment (fine-grained plus coarse-grained fractions) was discontinued in 2005; therefore, no bulk bed-sediment analytical results or statistical summaries are presented in this report. Bed-sediment samples were collected once annually at 13 sites (fig. 1 and table 1) during low, stable flow conditions at about the same time of year (typically August) as previous samples to facilitate data comparisons among years. One site, Warm Springs Creek at Warm Springs, is sampled once every 3 years rather than once annually.

Methods

Fine-grained bed-sediment samples were collected in August 2008 using protocols described by E.V. Axtmann (U.S. Geological Survey, written commun., 1994). Samples were collected from the surfaces of streambed deposits in low-velocity areas near the edge of the stream by using an acid-washed polypropylene scoop. Whenever possible, samples were collected from both sides of the stream.

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

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

Results

Concentrations of trace elements measured in samples of fine-grained bed sediment collected during August 2008 are listed in table 19. Liquid-phase concentrations, in micrograms per milliliter (which is equivalent to parts per million; ppm), that were analyzed in the reconstituted aliquots of digested bed sediment were converted to solid-phase concentrations, in micrograms per gram (µg/g), by using the following equation:

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

The reported solid-phase concentrations listed in table 19 are the means of all analyses for replicate aliquots from each composite bed-sediment sample collected at the site. Because the conversion from liquid-phase to solid-phase concentration is dependent on both the dilution ratio and the dry weight of the sample, minimum reporting levels for some trace elements might differ among stations and among years.

Quality Assurance

The protocols for field collection and processing of bed-sediment samples are designed to prevent contamination from metal sources. Nonmetallic sampling and processing equipment was acid-washed and rinsed with deionized water prior to the first sample collection. Nylon-mesh sieves were washed in a laboratory-grade detergent and rinsed with deionized

water. All equipment received a final rinse onsite with stream water. Sampling equipment used at more than one site was rinsed between sites with stream water. Separate sieves were used at each site and, therefore, did not require between-site cleaning. Bed-sediment samples were collected sequentially at sites along an increasing concentration gradient to minimize effects from potential site-to-site carryover contamination.

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

SRMs are commercially prepared materials that have certified concentrations of trace elements. Analyses of SRMs are used to indicate the ability of the method to accurately measure a known quantity of a constituent. Multiple analyses of the 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 generally similar to those occurring in the bed sediment of streams in the upper Clark Fork basin. The digestion process used to analyze bed-sediment samples is not a "total" digestion (does not liberate elements associated with crystalline lattices); therefore, 100-percent recovery may not be achieved for elements strongly bound to the sediment. The percent recovery of trace elements for SRM analyses that use less than a total digestion is useful to indicate which trace elements display strong sediment-binding characteristics in the SRM and whether analytical recovery is consistent between multiple sets of analyses.

Although data-quality objectives have not been established for bed sediment, percent recoveries for individual trace elements (table 20) illustrate analytical performance. For iron, manganese, nickel, and zinc, mean SRM recoveries for the low-concentration standard (SRM 2709) ranged from 94.9 to 106.4 percent of the certified concentrations. Mean recoveries were low for chromium and copper (81.1 and 78.5 percent, respectively), even lower for arsenic and lead (63.0 and 55.4 percent, respectively), and higher for cadmium (134.0 percent). The generally small range of variation (less than 5 percent for most constituents) for the 95-percent confidence interval indicates good reproducibility of multiple analyses of SRM 2709. The range of variation for the 95-percent confidence interval for copper was slightly higher (about 12 percent). Mean SRM recoveries for arsenic, cadmium, copper, iron, lead, manganese, nickel, and zinc for the high-concentration standard (SRM 2711) ranged from 87.1 to 104.4 percent of the certified concentrations. Chromium again had a lower recovery (71.7 percent) for the high-concentration standard, possibly because of the strong binding nature of this element to sediment. The generally small range of variation (less than 11 percent for most constituents) for the 95-percent confidence interval indicates good reproducibility of multiple analyses of SRM 2711. The range of variation for the 95-percent confidence interval for chromium was higher (about 16 percent). 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, which is equivalent to parts per million. A procedural blank was prepared and analyzed concurrently with bed-sediment samples for each site. Concentrations of trace elements in all procedural blanks were less than the minimum reporting level; thus, no contamination bias was indicated and no adjustments to the data were necessary.

Biological Data

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

Methods

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

Two caddisfly species of the genus *Hydropsyche* (*Hydropsyche cockerelli* and *Hydropsyche occidentalis)* were targeted for collection in this study because of their occurrence at most sites. *Hydropsyche tana* were collected in a few instances. *Hydropsyche* species (spp.) that could not be positively

identified were considered to belong to the *morosa* group and are categorized as *Hydropsyche* spp. or *Hydropsyche morosa* group (in previous reports). The caddisfly *Arctopsyche grandis* and the stonefly *Claassenia sabulosa* were collected where available to represent additional insect taxa that are commonly distributed in the upper Clark Fork basin. In addition, specimens from the caddisfly group *Brachycentrus* spp. was sometimes collected when targeted taxa were not available.

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

Insect samples were processed and analyzed at the USGS National Research Program Ecology and Contaminants Project laboratory in Menlo Park, Calif. Insects were thawed and rinsed with ultrapure deionized water to remove particulate matter and then sorted to their lowest possible taxonomic level. If large numbers of specimens were collected at a site, similar-sized individuals were composited into replicate subsamples. Subsamples were placed in tared scintillation vials and ovendried 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-sized filter, and analyzed undiluted by ICP–OES for arsenic, cadmium, chromium, copper, iron, lead, manganese, nickel, and zinc. The smallest concentration of a constituent that can be reliably reported for analyses of biota is termed the minimum reporting level.

Results

Concentrations of trace elements in whole-body tissue of aquatic insects collected during August 2008 are listed in table 22. The variability in the number of composite samples among species and among sites reflects differences in insect abundance, with the number of composite samples increasing with the relative abundance of insects. Liquid-phase concentrations, in micrograms per milliliter, analyzed in the reconstituted samples were converted to solid-phase concentrations, in micrograms per gram, by using equation 5. All tissue samples were analyzed undiluted (dilution ratio 1:1). As with minimum reporting levels for trace elements in bed sediment, minimum reporting levels for trace elements in insects may differ among sites as a result of varied sample weights. In general, the smaller the biological-sample weight (primarily a function of insect abundance), the higher the minimum reporting level. Therefore, higher minimum reporting levels do not necessarily imply a higher trace-element concentration in tissue.

Quality Assurance

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

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

Recovery efficiency for trace-element analyses of the SRM for biota is listed in table 23. Data-quality objectives have not been established for analytical recovery in biota, but percent recoveries are shown to illustrate analytical performance. Mean SRM recoveries ranged from 97.7 to 107 percent for arsenic, cadmium, copper, iron, manganese, nickel and zinc. Higher mean recoveries were measured for chromium (169 percent) and lead (139 percent). With the exception of chromium and lead, both of which had low certified concentrations in the SRM (0.77 µg/g and 0.35 µg/g, respectively), the range of variation of the 95-percent confidence interval was within 10 percent, indicating reasonable recoveries in the SRM. No adjustments were made to the biota samples on the basis of trace-element recovery efficiencies.

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

Statistical Summaries of Data

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

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

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

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

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

References Cited

Anderson, C.W., 2004, Turbidity (version 2.0): U.S. Geological Survey Techniques of Water-Resources Investigations, book 9, chap. A6, section 6.7, 64 p; available at *http://pubs.water.usgs.gov/twri9A6/*.

Andrews, E.D., 1987, Longitudinal dispersion of trace metals in the Clark Fork River, Montana, *in* Averett, R.C., and McKnight, D.M., eds., Chemical quality of water and the hydrologic cycle: Chelsea, Mich., Lewis Publishers, p. 179–191.

Axtmann, E.V., Cain, D.J., and Luoma, S.N., 1997, Effect of tributary inflows on the distribution of trace metals in fine-grained sediment and benthic insects of the Clark Fork River, Montana: Environmental Science and Technology, v. 31, no. 3, p. 750–758.

Axtmann, E.V., and Luoma, S.N., 1991, Large scale distribution of metal contamination in the fine-grained sediment of the Clark Fork River, Montana: Applied Geochemistry, v. 6, no. 6, p. 75–88.

Cain, D.J., Luoma, S.N., and Axtmann, E.V., 1995, Influence of gut content in immature aquatic insects on assessments of environmental metal contamination: Canadian Journal of Fisheries and Aquatic Sciences, v. 52, no. 12, p. 2,736–2,746.

Cain, D.J., Luoma, S.N., Carter, J.L., and Ferd, S.V., 1992, Aquatic insects as bioindicators of trace element contamination in cobble-bottom rivers and streams: Canadian Journal of Fisheries and Aquatic Sciences, v. 49, no. 10, p. 2,141–2,154.

Childress, C.T., Foreman, W.T., Connor, B.F., and Maloney, T.J., 1999, New reporting procedures based on long-term method detection levels and some considerations for interpretations of water-quality data provided by the U.S. Geological Survey National Water Quality Laboratory: U.S. Geological Survey Open-File Report 99–193, 19 p.

Davis, B.E., 2005, A guide to the proper selection and use of federally approved sediment and water-quality samplers: U.S. Geological Survey Open-File Report 2005–1087, 20 p.

Dodge, K.A., Hornberger, M.I., and Axtmann, E.V., 1996, Water-quality, bed-sediment, and biological data (October 1994 through September 1995) and statistical summaries of data for streams in the upper Clark Fork basin, Montana: U.S. Geological Survey Open-File Report 96–432, 109 p.

Dodge, K.A., Hornberger, M.I., and Axtmann, E.V., 1997, Water-quality, bed-sediment, and biological data (October 1995 through September 1996) and statistical summaries of data for streams in the upper Clark Fork basin, Montana: U.S. Geological Survey Open-File Report 97–552, 91 p.

Dodge, K.A., Hornberger, M.I., and Axtmann, E.V., 1998, Water-quality, bed-sediment, and biological data (October 1996 through September 1997) and statistical summaries of data for streams in the upper Clark Fork basin, Montana: U.S. Geological Survey Open-File Report 98–407, 102 p.

Dodge, K.A., Hornberger, M.I., and Bouse, R.M., 1999, Water-quality, bed-sediment, and biological data (October 1997 through September 1998) and statistical summaries of data for streams in the upper Clark Fork basin, Montana: U.S. Geological Survey Open-File Report 99–251, 102 p.

Dodge, K.A., Hornberger, M.I., and David, C.P.C., 2000, Water-quality, bed-sediment, and biological data (October 1998 through September 1999) and statistical summaries of data for streams in the upper Clark Fork basin, Montana: U.S. Geological Survey Open-File Report 00–370, 102 p.

Dodge, K.A., Hornberger, M.I., and David, C.P.C., 2001, Water-quality, bed-sediment, and biological data (October 1999 through September 2000) and statistical summaries of data for streams in the upper Clark Fork basin, Montana: U.S. Geological Survey Open-File Report 01–379, 95 p.

Dodge, K.A., Hornberger, M.I., and David, C.P.C., 2002, Water-quality, bed-sediment, and biological data (October 2000 through September 2001) and statistical summaries of data for streams in the upper Clark Fork basin, Montana: U.S. Geological Survey Open-File Report 02–358, 94 p.

Dodge, K.A., Hornberger, M.I., and Dyke, J.L., 2005, Water-quality, bed-sediment, and biological data (October 2003 through September 2004) and statistical summaries of data for streams in the upper Clark Fork basin, Montana: U.S. Geological Survey Open-File Report 2005–1356, 124 p.

Dodge, K.A., Hornberger, M.I., and Dyke, J.L., 2006, Water-quality, bed-sediment, and biological data (October 2004 through September 2005) and statistical summaries of data for streams in the upper Clark Fork basin, Montana: U.S. Geological Survey Open-File Report 2006–1266, 109 p.

Dodge, K.A., Hornberger, M.I., and Dyke, J.L., 2007, Water-quality, bed-sediment, and biological data (October 2005 through September 2006) and statistical summaries of long-term data for streams in the Clark Fork basin, Montana: U.S. Geological Survey Open-File Report 2007–1301, 124 p.

Dodge, K.A., Hornberger, M.I., and Dyke, J.L., 2008, Water-quality, bed-sediment, and biological data (October 2006 through September 2007) and statistical summaries of long-term data for streams in the Clark Fork basin, Montana: U.S. Geological Survey Open-File Report 2008–1318, 132 p.

Dodge, K.A., Hornberger, M.I., and Lavigne, I.R., 2003, Water-quality, bed-sediment, and biological data (October 2001 through September 2002) and statistical summaries of data for streams in the upper Clark Fork basin, Montana: U.S. Geological Survey Open-File Report 03–356, 95 p.

Dodge, K.A., Hornberger, M.I., and Lavigne, I.R., 2004, Water-quality, bed-sediment, and biological data (October 2002 through September 2003) and statistical summaries of data for streams in the upper Clark Fork basin, Montana: U.S. Geological Survey Open-File Report 2004–1340, 107 p.

Dodge, K.A., and Lambing, J.H., 2006, Quality-assurance plan for the analysis of suspended sediment by the U.S. Geological Survey in Montana: U.S. Geological Survey Open-File Report 2006–1242, 25 p.; available at *http://pubs.water.usgs.gov/ofr2006–1242/*.

Edwards, T.K., and Glysson, G.D., 1999, Field methods for measurement of fluvial sediment: U.S. Geological Survey Techniques of Water-Resources Investigations, book 3, chap. C2, 89 p.; available at *http://pubs.usgs.gov/twri/twri3-c2/*.

Faires, L.M., 1993, Methods of analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of metals in water by inductively coupled plasma-mass spectrometry: U.S. Geological Survey Open-File Report 92–634, 28 p.

Fishman, M.J., ed., 1993, Methods of analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of inorganic and organic constituents in water and fluvial sediments: U.S. Geological Survey Open-File Report 93–125, 217 p.

Friedman, L.C., and Erdmann, D.E., 1982, Quality assurance practices for the chemical and biological analyses of water and fluvial sediments: U.S. Geological Survey Techniques of Water-Resources Investigations, book 5, chap. A6, 181 p.; available at *http://pubs.usgs.gov/twri/twri5a6/*.

Garbarino, J.R., and Struzeski, T.M., 1998, Methods of analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of elements in whole-water digests using inductively coupled plasma-optical emission spectrometry and inductively coupled plasma-mass spectrometry: U.S. Geological Survey Open-File Report 98–165, 101 p.

Garbarino, J.R., Kanagy, L.K., and Cree, M.E., 2006, Determination of elements in natural-water, biota, sediment, and soil samples using collision/reaction cell inductively coupled plasma-mass spectrometry: U.S. Geological Survey Techniques and Methods, book 5, sec. B, chap. 1, 88 p.

Guy, H.P., 1969, Laboratory theory and methods for sediment analysis: U.S. Geological Survey Techniques of Water-Resources Investigations, book 5, chap. C1, 58 p.; available at *http://pubs.usgs.gov/twri/twri5c1/*.

Helsel, D.R., and Cohn, T.A., 1988, Estimation of descriptive statistics for multiply censored water quality data: Water Resources Research, v. 24, no. 12, p. 1,997–2,004.

Hoffman, G.L., Fishman, M.J., and Garbarino, J.R., 1996, Methods of analysis by the U.S. Geological Survey National Water Quality Laboratory—In-bottle acid digestion of whole-water samples: U.S. Geological Survey Open-File Report 96–225, 28 p.

Hornberger, M.I., Lambing, J.H., Luoma, S.N., and Axtmann, E.V., 1997, Spatial and temporal trends of trace metals in surface water, bed sediment, and biota of the upper Clark Fork basin, Montana, 1985–95: U.S. Geological Survey Open-File Report 97–669, 84 p.

Horowitz, A.J., Demas, C.R., Fitzgerald, K.K., Miller, T.L., and Rickert, D.A., 1994, U.S. Geological Survey protocol for the collection and processing of surface-water samples for the subsequent determination of inorganic constituents in filtered water: U.S. Geological Survey Open-File Report 94–539, 57 p.

Jones, B.E., 1987, Quality control manual of the U.S. Geological Survey's National Water Quality Laboratory: U.S. Geological Survey Open-File Report 87–457, 17 p.

Lambing, J.H., 1987, Water-quality data for the Clark Fork and selected tributaries from Deer Lodge to Milltown, Montana, March 1985 through June 1986: U.S. Geological Survey Open-File Report 87–110, 48 p.

Lambing, J.H., 1988, Water-quality data (July 1986 through September 1987) and statistical summaries (March 1985 through September 1987) for the Clark Fork and selected tributaries from Deer Lodge to Missoula, Montana: U.S. Geological Survey Open-File Report 88–308, 55 p.

Lambing, J.H., 1989, Water-quality data (October 1987 through September 1988) and statistical summaries (March 1985 through September 1988) for the Clark Fork and selected tributaries from Galen to Missoula, Montana: U.S. Geological Survey Open-File Report 89–229, 51 p.

Lambing, J.H., 1990, Water-quality data (October 1988 through September 1989) and statistical summaries (March 1985 through September 1989) for the Clark Fork and selected tributaries from Galen to Missoula, Montana: U.S. Geological Survey Open-File Report 90–168, 68 p.

Lambing, J.H., 1991, Water-quality and transport characteristics of suspended sediment and trace elements in streamflow of the upper Clark Fork basin from Galen to Missoula, Montana, 1985–90: U.S. Geological Survey Water-Resources Investigations Report 91–4139, 73 p.

Lambing, J.H., comp., 2006, Quality-assurance plan for water-quality activities of the U.S. Geological Survey Montana Water Science Center: U.S. Geological Survey Open-File Report 2006–1275, 39 p.; available at *http://pubs.usgs.gov/of/2006/1275/*.

Lambing, J.H., Hornberger, M.I., Axtmann, E.V., and Dodge, K.A., 1995, Water-quality, bed-sediment, and biological data (October 1993 through September 1994) and statistical summaries of data for streams in the upper Clark Fork basin, Montana: U.S. Geological Survey Open-File Report 95–429, 104 p.

Lambing, J.H., Hornberger, M.I., Axtmann, E.V., and Pope, D.A., 1994, Water-quality, bed-sediment, and biological data (October 1992 through September 1993) and statistical summaries of water-quality data (March 1985 through September 1993) for streams in the upper Clark Fork basin, Montana: U.S. Geological Survey Open-File Report 94–375, 85 p.

Luoma, S.N., and Bryan, G.W., 1981, A statistical assessment of the form of trace metals in oxidized estuarine sediments employing chemical extractants: Science of the Total Environment, v. 17, no. 17, p. 167–196.

Maloney. T.J., ed., 2005, Quality management system, U.S. Geological Survey National Water Quality Laboratory: U.S. Geological Survey Open-File Report 2005–1263, version 1.3, November 9, 2005, chapters and appendices [variously paged].

Patton, C.J., and Kryskalla, J.R., 2003, Methods of analysis by the U.S. Geological Survey National Water Quality Laboratory—Evaluation of alkaline persulfate digestion as an alternative to Kjeldahl digestion for determination of total and dissolved nitrogen and phosphorous in water: U.S. Geological Survey Water-Resources Investigations Report 03–4174, 33 p.

Porterfield, George, 1972, Computation of fluvial-sediment discharge: U.S. Geological Survey Techniques of Water-Resources Investigations, book 3, chap. C3, 66 p.; available at *http://pubs.usgs.gov/twri/twri3-c3/*.

Pritt, J.W., and Raese, J.W., eds., 1995, Quality assurance/quality control manual—National Water Quality Laboratory: U.S. Geological Survey Open-File Report 95–443, 35 p.

Rantz, S.E., and others, 1982, Measurement and computation of streamflow: U.S. Geological Survey Water-Supply Paper 2175, 2 v., 631 p.

Taylor, J.K., 1987, Quality assurance of chemical measurements: Chelsea, Mich., Lewis Publishers, 328 p.

U.S. Environmental Protection Agency, 1993, Method 365.1—Determination of phosphorus by semi-automated colorimetry: Environmental Monitoring Systems Laboratory, Office of Research and Development, Cincinnati, Ohio, 17 p.; accessible at *http://www.epa.gov/waterscience/methods/method/files/365_1.pdf*

U.S. Environmental Protection Agency, 2004, Milltown Reservoir Sediments Operational Unit of the Milltown Reservoir/Clark Fork River Superfund Site—Record of Decision, Part 2: Decision Summary, 141 p.; accessible at *http://www.epa.gov/region8/superfund/mt/milltown/mrsrod.html*

U.S. Geological Survey, variously dated, National field manual for the collection of water-quality data: U.S. Geological Survey Techniques of Water-Resources Investigations, book 9, chaps. A1–A9; available at *http://pubs.usgs.gov/twri/*.

Wagner, R.J., Boulger, R.W., Oblinger, C.J., and Smith, B.A., 2006, Guidelines and standard procedures for continuous water-quality monitors—Station operation, record computation, and data reporting: U.S. Geological Survey Techniques and Methods 1–D3, 51 p., 8 attachments; available at *http://pubs.usgs.gov/tm/2006/tm1D3/*.

Ward, J.R., and Harr, C.A., eds., 1990, Methods for collection and processing of surface-water and bed-material samples for physical and chemical analyses: U.S. Geological Survey Open-File Report 90–140, 71 p.

Data

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2007 through September 2008.

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

12323230--Blacktail Creek at Harrison Avenue, at Butte

Date	Time	Streamflow, instantaneous (ft^3/s)	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Temperature, water (°C)	Hardness, filtered (mg/L as $CaCO_3$)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)
11/06/2007	0730	6.4	7.6	287	3.5	110	32.2	7.83
03/04/2008	0720	4.8	7.6	319	2.0	120	33.3	8.77
04/07/2008	0850	5.4	7.6	304	2.5	110	32.0	7.99
05/05/2008	0855	19	7.7	212	5.5	83	23.4	5.89
06/03/2008	0720	48	7.6	181	9.5	68	19.2	4.76
06/18/2008	0715	45	7.6	181	12.0	70	20.0	4.83
07/07/2008	0825	17	7.8	230	13.0	91	26.2	6.33
08/18/2008	0900	4.4	7.7	331	10.5	130	36.0	8.90

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)
11/06/2007	1.9	2.8	E0.02	0.03	1.4	4.2	93	484
03/04/2008	1.6	1.9	E.02	.02	1.3	1.7	135	288
04/07/2008	1.7	2.3	E.02	.03	1.2	2.3	121	422
05/05/2008	5.3	6.7	<.04	.03	7.0	15.7	420	813
06/03/2008	6.8	8.0	E.03	.03	6.7	11.1	193	600
06/18/2008	8.6	10.0	E.03	.04	6.7	9.2	229	630
07/07/2008	7.7	10.4	<.04	.03	3.4	5.0	317	747
08/18/2008	2.7	3.5	<.04	<.01	1.2	1.7	48	226

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)
11/06/2007	E0.05	0.55	32.5	45.1	2.6	4.4	88	4	0.07
03/04/2008	E.04	.21	46.8	51.4	3.0	3.3	80	2	.03
04/07/2008	E.04	.40	59.1	66.1	2.4	3.5	88	5	.07
05/05/2008	.24	.82	29.3	61.1	3.5	4.0	79	7	.36
06/03/2008	.18	1.01	21.2	35.9	3.1	5.3	63	12	1.6
06/18/2008	.17	.72	31.2	46.1	3.7	4.8	69	10	1.2
07/07/2008	.12	.57	23.8	47.1	1.9	3.5	87	6	.28
08/18/2008	.11	.14	36.9	46.4	2.8	2.5	91	2	.02

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2007 through September 2008.—Continued

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

12323250--Silver Bow Creek below Blacktail Creek, at Butte

Date	Time	Streamflow, instantaneous (ft^3/s)	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Temperature, water (°C)	Hardness, filtered (mg/L as $CaCO_3$)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)
11/06/2007	0855	22	7.5	516	6.5	150	43.7	10.4
03/03/2008	1525	19	7.7	575	5.5	170	45.1	13.9
04/07/2008	1125	21	7.7	535	6.0	160	44.7	11.5
05/05/2008	1010	37	7.6	378	7.0	120	35.3	8.87
06/02/2008	1535	67	7.8	272	13.0	94	27.0	6.53
06/17/2008	1525	73	7.7	277	16.5	95	27.3	6.58
07/07/2008	0945	35	7.7	410	14.0	140	39.0	9.19
08/18/2008	1020	15	7.7	588	16.0	170	50.8	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)
11/06/2007	3.2	4.2	0.11	0.15	8.6	35.1	29	257
03/03/2008	3.0	4.1	.10	.15	11.7	18.1	28	376
04/07/2008	3.0	4.3	.10	.14	9.8	19.8	30	399
05/05/2008	4.8	6.2	.05	.11	10.9	21.3	216	605
06/02/2008	7.8	9.2	.06	.13	9.2	16.6	145	657
06/17/2008	9.3	10.8	.06	.10	8.4	14.8	142	530
07/07/2008	6.8	9.2	.10	.13	14.0	22.1	115	548
08/18/2008	4.5	5.1	.08	.09	8.5	11.7	24	125

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)
11/06/2007	0.27	1.53	76.5	104	51.2	56.1	86	5	0.30
03/03/2008	.16	2.10	113	136	37.8	46.4	88	10	.51
04/07/2008	.16	2.00	118	136	37.7	49.8	90	12	.68
05/05/2008	.27	1.69	78.3	109	24.0	31.9	83	9	.90
06/02/2008	.31	2.85	47.2	90.6	16.0	29.1	70	14	2.5
06/17/2008	.30	2.15	55.4	86.6	18.3	31.1	72	10	2.0
07/07/2008	.25	2.05	95.4	127	29.7	42.3	90	8	.76
08/18/2008	.23	1.03	31.9	52.4	37.5	42.9	88	2	.08

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2007 through September 2008.—Continued

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

12323600--Silver Bow Creek at Opportunity

Date	Time	Streamflow, instantaneous (ft^3/s)	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Temperature, water (°C)	Hardness, filtered (mg/L as $CaCO_3$)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)
11/05/2007	1415	33	9.0	503	6.5	170	50.5	11.0
03/03/2008	1410	E27	8.2	544	0.0	180	49.3	12.9
04/08/2008	0745	32	8.0	535	1.0	170	48.5	11.4
05/06/2008	0805	82	7.9	331	6.0	110	34.0	7.25
06/02/2008	1410	209	8.1	261	12.0	98	29.8	5.59
06/18/2008	0920	211	8.2	252	11.0	91	27.1	5.57
07/07/2008	1730	71	9.3	350	20.5	130	38.2	8.00
08/19/2008	0740	16	8.1	572	14.5	200	57.4	12.8

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)
11/05/2007	7.6	9.5	0.33	0.55	19.5	55.6	14	380
03/03/2008	7.6	14.0	.64	1.21	28.6	106	21	1,150
04/08/2008	8.3	10.3	.76	.97	26.0	50.6	26	414
05/06/2008	8.3	13.1	.30	.68	18.8	64.9	76	853
06/02/2008	10.1	17.4	.34	.79	31.7	94.7	83	1,360
06/18/2008	15.0	18.1	.30	.56	30.4	65.2	134	753
07/07/2008	12.7	15.9	.17	.38	19.7	45.4	38	469
08/19/2008	13.1	15.2	.44	.65	22.3	46.3	18	240

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)
11/05/2007	0.28	7.51	80.7	121	53.6	119	85	8	0.71
03/03/2008	.27	24.1	288	418	173	268	78	36	E2.6
04/08/2008	.28	7.18	344	387	206	249	88	12	1.0
05/06/2008	.51	16.3	138	224	96.0	168	85	30	6.6
06/02/2008	.96	23.9	77.8	183	75.7	162	64	37	21
06/18/2008	1.02	12.2	74.1	120	80.2	126	77	21	12
07/07/2008	.30	7.36	56.6	110	11.2	69.7	85	12	2.3
08/19/2008	.33	5.69	70.7	126	67.3	110	85	7	.30

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2007 through September 2008.—Continued

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

12323670--Mill Creek near Anaconda

Date	Time	Streamflow, instantaneous (ft^3/s)	Turbidity, unfiltered, lab (NTRU)	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Temperature, water (°C)	Hardness, filtered (mg/L as $CaCO_3$)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)
11/05/2007	1040	12	<2.0	8.2	184	3.5	83	22.4	6.56
03/04/2008	0920	E8.5	<2.0	8.1	196	0.0	87	23.2	7.08
04/07/2008	1315	8.8	<2.0	8.2	203	4.5	88	23.4	7.11
05/05/2008	1355	38	3.8	8.0	129	9.5	50	14.0	3.73
06/02/2008	1100	161	2.4	7.8	80	7.5	30	8.55	2.07
06/17/2008	1215	134	E1.4	7.9	87	10.0	33	9.57	2.30
07/07/2008	1415	90	2.5	7.9	83	12.5	35	10.1	2.31
08/18/2008	1355	18	E1.4	8.3	156	16.0	70	19.1	5.33

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)
11/05/2007	15.2	16.3	0.04	0.05	1.2	1.8	54	105
03/04/2008	10.4	12.2	E.03	.06	E.98	1.8	21	120
04/07/2008	12.6	14.2	.05	.06	E.98	1.4	23	99
05/05/2008	26.5	29.9	E.03	.10	4.0	6.9	52	255
06/02/2008	18.6	20.3	.04	.08	3.6	5.9	40	236
06/17/2008	19.8	20.8	.05	.07	3.1	4.6	29	163
07/07/2008	12.8	15.3	E.03	.05	1.7	2.9	31	171
08/18/2008	17.7	20.7	E.02	.09	1.4	2.5	67	168

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)
11/05/2007	0.08	0.21	6.0	8.5	E1.5	E1.8	80	1	0.03
03/04/2008	<.08	.44	6.5	13.5	E.91	2.6	71	2	E.05
04/07/2008	E.04	.34	7.0	11.3	E.94	E1.5	76	2	.05
05/05/2008	.13	1.09	5.0	16.9	E1.5	3.8	79	6	.62
06/02/2008	.13	1.08	3.6	12.1	2.4	4.3	57	8	3.5
06/17/2008	.10	.73	3.9	10.3	1.9	3.7	36	6	2.2
07/07/2008	.08	.59	5.4	11.4	E1.1	2.6	69	6	1.5
08/18/2008	.14	.52	6.0	15.5	E1.3	E1.8	66	3	.15

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2007 through September 2008.—Continued

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

12323700--Mill Creek at Opportunity

Date	Time	Streamflow, instantaneous (ft^3/s)	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Temperature, water (°C)	Hardness, filtered (mg/L as $CaCO_3$)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)
11/05/2007	1250	1.5	7.9	206	5.0	89	24.6	6.66
03/03/2008	1300	E4.0	8.0	230	0.0	97	26.4	7.44
04/07/2008	1530	2.5	8.0	223	6.0	95	26.0	7.26
05/05/2008	1615	6.0	7.9	150	12.5	60	16.8	4.51
06/02/2008	1320	97	7.9	86	10.0	33	9.27	2.29
06/17/2008	1355	62	8.0	95	13.0	38	10.8	2.57
07/07/2008	1630	64	7.9	90	15.0	37	10.7	2.45
08/18/2008	1625	1.7	8.1	178	19.5	75	20.9	5.58

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)
11/05/2007	17.7	18.6	0.08	0.09	2.1	2.5	49	82
03/03/2008	12.8	15.0	.06	.09	1.3	1.8	42	114
04/07/2008	14.4	16.1	.05	.04	1.5	1.5	16	44
05/05/2008	28.3	31.3	.05	.09	4.2	5.6	32	126
06/02/2008	27.2	31.3	.07	.17	5.2	9.8	40	324
06/17/2008	28.4	30.3	.07	.14	4.0	7.0	33	210
07/07/2008	23.7	29.0	.06	.12	2.7	5.9	45	223
08/18/2008	28.6	31.0	.04	.05	2.4	2.8	61	108

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)
11/05/2007	0.10	0.20	8.1	7.8	4.9	4.7	89	1	<0.01
03/03/2008	<.08	.21	28.5	32.3	4.3	5.4	46	1	E.01
04/07/2008	<.08	.08	3.8	4.2	2.2	2.5	57	1	.01
05/05/2008	.09	.46	4.5	8.2	2.7	4.0	32	5	.08
06/02/2008	.16	1.84	3.8	17.8	3.7	8.3	43	14	3.7
06/17/2008	.13	1.26	4.3	15.7	3.0	6.4	51	7	1.2
07/07/2008	.14	1.16	7.1	16.6	2.2	5.2	59	8	1.4
08/18/2008	.12	.23	6.9	10.3	E1.7	E2.0	71	1	<.01

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2007 through September 2008.—Continued

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

12323710--Willow Creek near Anaconda

Date	Time	Streamflow, instantaneous (ft^3/s)	Turbidity, unfiltered, lab (NTRU)	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Temperature, water (°C)	Hardness, filtered (mg/L as $CaCO_3$)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)
11/05/2007	0940	1.6	<2.0	7.8	119	0.5	43	14.4	1.68
05/05/2008	1305	13	13	7.6	104	6.0	38	12.5	1.57
06/02/2008	0950	62	7.1	7.6	75	6.0	25	8.33	1.02
06/17/2008	1115	28	5.3	7.8	89	7.5	32	10.6	1.21
07/07/2008	1325	7.7	7.4	8.0	108	12.0	39	13.0	1.53
08/18/2008	1305	2.9	E1.5	7.9	112	13.0	38	12.9	1.47

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)
11/05/2007	9.9	10.3	E0.02	0.03	E0.90	3.1	49	98
05/05/2008	19.2	21.7	<.04	.10	3.2	5.7	277	712
06/02/2008	15.1	16.6	E.04	.08	2.9	5.2	132	657
06/17/2008	14.9	15.4	E.03	.05	2.4	3.4	85	352
07/07/2008	14.2	17.6	.04	.09	1.7	3.4	43	448
08/18/2008	14.0	15.4	<.04	.02	E.98	1.5	54	123

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)
11/05/2007	E0.05	0.10	19.4	24.3	2.0	E1.4	88	1	<0.01
05/05/2008	.21	1.82	13.8	46.3	2.0	5.7	77	26	.91
06/02/2008	.18	1.76	6.2	23.8	2.5	5.8	25	61	10
06/17/2008	.17	.95	9.8	18.3	2.6	4.0	31	22	1.7
07/07/2008	.09	1.11	17.4	29.0	E1.1	3.6	92	25	.52
08/18/2008	E.05	.19	12.5	18.9	E1.3	<2.0	87	2	.02

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2007 through September 2008.—Continued

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

12323720--Willow Creek at Opportunity

Date	Time	Streamflow, instantaneous (ft^3/s)	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Temperature, water (°C)	Hardness, filtered (mg/L as $CaCO_3$)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)
11/05/2007	1345	5.9	8.9	292	8.5	130	36.4	8.62
03/03/2008	1330	4.7	8.2	326	4.0	140	38.9	9.61
04/07/2008	1610	4.5	8.0	326	9.0	140	38.7	9.39
05/05/2008	1645	14	8.0	214	13.0	83	24.9	5.11
06/02/2008	1345	70	7.9	213	14.0	88	25.7	5.70
06/17/2008	1420	44	8.0	227	17.0	98	28.9	6.18
07/07/2008	1705	17	8.1	270	19.5	120	33.9	7.77
08/18/2008	1650	6.8	8.6	314	19.0	140	40.0	9.42

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)
11/05/2007	14.2	16.7	<0.04	0.03	1.4	3.4	E7	108
03/03/2008	12.2	14.0	E.03	.06	1.9	4.3	37	169
04/07/2008	10.9	15.1	E.03	.10	1.2	8.5	15	362
05/05/2008	33.6	40.5	<.04	.13	6.1	16.8	74	508
06/02/2008	98.5	104	.06	.16	11.3	22.6	65	468
06/17/2008	80.2	80.6	.07	.14	7.7	15.2	54	321
07/07/2008	67.1	76.6	.05	.08	5.9	9.3	53	194
08/18/2008	29.0	31.6	<.04	.02	2.9	4.6	8	90

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)
11/05/2007	E0.07	0.88	12.9	17.2	<1.8	3.6	95	2	0.03
03/03/2008	.16	1.30	50.8	57.3	3.2	6.5	89	5	.06
04/07/2008	.13	3.67	82.2	98.6	2.7	13.2	92	13	.16
05/05/2008	.30	3.93	48.5	77.7	4.0	17.7	89	19	.72
06/02/2008	.31	4.17	15.6	35.9	9.5	23.2	55	29	5.5
06/17/2008	.27	2.54	17.7	30.6	7.6	16.5	59	16	1.9
07/07/2008	.19	1.08	17.4	27.8	4.8	8.9	84	4	.18
08/18/2008	E.07	.83	5.1	13.6	E1.2	2.9	90	3	.06

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2007 through September 2008.—Continued

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

12323750--Silver Bow Creek at Warm Springs

Date	Time	Streamflow, instantaneous (ft^3/s)	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Temperature, water (°C)	Hardness, filtered (mg/L as $CaCO_3$)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)
11/05/2007	1525	59	8.8	643	6.0	260	75.3	17.4
03/03/2008	1100	47	8.6	644	2.0	260	73.5	17.9
04/08/2008	0850	46	8.9	545	2.0	210	57.3	16.2
05/06/2008	0900	99	9.2	519	10.5	200	58.3	14.1
06/03/2008	1035	351	8.6	368	10.0	140	43.0	8.23
06/18/2008	1000	355	9.4	346	13.0	140	45.2	7.46
07/08/2008	0750	130	8.2	323	12.5	130	40.4	7.67
08/19/2008	0835	37	8.9	485	17.0	210	61.4	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)
11/05/2007	18.5	20.9	0.06	0.09	2.8	4.5	<8	138
03/03/2008	12.6	15.7	.11	.17	4.8	7.7	10	258
04/08/2008	11.6	14.1	.09	.12	3.4	6.4	9	229
05/06/2008	19.2	23.3	<.04	.08	3.4	7.9	20	288
06/03/2008	40.1	42.2	E.03	.12	5.0	12	25	264
06/18/2008	34.9	36.5	.07	.16	10.6	16.6	22	217
07/08/2008	35.5	39.7	E.03	.08	3.0	6.7	38	235
08/19/2008	45.2	49.5	<.04	.05	2.6	4.4	8	122

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)
11/05/2007	0.20	0.54	64.0	125	2.8	5.1	61	3	0.48
03/03/2008	<.08	1.02	148	220	6.1	13.6	81	5	.63
04/08/2008	.09	1.37	87.8	163	3.9	13.0	86	6	.75
05/06/2008	.09	1.79	238	373	E1.6	11.6	76	6	1.6
06/03/2008	.12	1.94	160	191	3.4	15.4	89	6	5.7
06/18/2008	.17	2.03	61.3	99.0	3.5	19.8	86	5	4.8
07/08/2008	.13	1.24	185	234	2.6	7.6	89	6	2.1
08/19/2008	.09	.78	52.1	110	E1.4	5.0	74	3	.30

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2007 through September 2008.—Continued

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

12323760--Warm Springs Creek near Anaconda

Date	Time	Streamflow, instantaneous (ft^3/s)	Turbidity, unfiltered, lab (NTRU)	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Temperature, water (°C)	Hardness, filtered (mg/L as $CaCO_3$)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)
11/05/2007	1220	61	<2.0	8.6	259	5.5	120	35.7	7.85
04/07/2008	1450	43	<2.0	8.6	271	6.0	130	37.1	8.57
05/05/2008	1440	59	<2.0	8.7	251	10.5	120	35.7	7.86
06/03/2008	0915	268	2.3	8.3	140	5.0	65	20.0	3.52
07/07/2008	1535	239	5.5	8.3	161	11.5	75	23.0	4.23
08/18/2008	1510	79	E1.1	8.5	241	14.0	120	36.2	7.71

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)
11/05/2007	2.0	2.1	<0.04	0.02	<1.0	1.6	<8	28
04/07/2008	2.0	2.3	E.02	.02	E.59	1.2	<8	54
05/05/2008	2.2	2.5	<.04	.02	E.88	2.2	E6	86
06/03/2008	1.9	2.5	E.03	.04	1.4	3.5	11	192
07/07/2008	2.3	2.9	E.02	.03	1.2	2.7	8	118
08/18/2008	2.3	2.6	<.04	E.01	E.75	1.6	E6	66

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)
11/05/2007	<0.08	0.08	0.5	1.2	<1.8	<2.0	69	1	0.16
04/07/2008	<.08	.23	.7	2.1	<1.8	E1.0	67	3	.35
05/05/2008	<.08	.28	.9	3.7	<1.8	E1.5	61	4	.64
06/03/2008	.11	.52	1.9	9.6	2.8	4.7	53	12	8.7
07/07/2008	<.08	.29	2.9	7.1	E1.2	3.8	65	6	3.9
08/18/2008	<.08	.26	1.1	4.7	<1.8	E1.7	56	6	1.3

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2007 through September 2008.—Continued

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

12323770--Warm Springs Creek at Warm Springs

Date	Time	Streamflow, instantaneous (ft^3/s)	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Temperature, water (°C)	Hardness, filtered (mg/L as $CaCO_3$)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)
11/05/2007	1510	40	8.5	332	5.5	160	47.5	9.33
04/08/2008	0830	30	8.2	365	2.0	170	50.9	10.7
05/06/2008	0840	45	8.1	318	7.0	150	45.4	9.13
06/03/2008	1005	201	8.1	166	5.5	73	22.9	3.95
07/08/2008	0720	183	8.0	190	10.0	88	27.1	4.92
08/19/2008	0815	38	8.2	308	13.0	140	43.0	8.49

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)
11/05/2007	3.7	4.2	E0.03	0.03	1.6	4.5	E6	54
04/08/2008	3.4	4.1	.04	.04	1.7	4.9	E6	72
05/06/2008	4.0	5.2	<.04	.05	2.1	10.3	8	149
06/03/2008	3.4	5.2	E.03	.06	3.0	16.4	12	291
07/08/2008	4.5	6.1	E.03	.06	2.2	12.8	16	224
08/19/2008	5.3	6.1	<.04	.04	2.1	6.1	12	87

Date	Lead, filtered (µg/L)	Lead, unfiltered recoverable (µg/L)	Manganese, filtered (µg/L)	Manganese, unfiltered recoverable (µg/L)	Zinc, filtered (µg/L)	Zinc, unfiltered recoverable (µg/L)	Sediment, suspended (percent finer than 0.062 mm)	Sediment, suspended (mg/L)	Sediment discharge, suspended (ton/d)
11/05/2007	<0.08	0.21	103	125	E1.1	E1.2	43	1	0.11
04/08/2008	<.08	.37	146	170	E1.5	2.6	48	13	1.1
05/06/2008	<.08	.88	83.3	174	E1.0	4.1	70	6	.73
06/03/2008	E.05	1.66	38.7	97.6	E1.5	7.6	62	16	8.7
07/08/2008	<.08	1.06	47.4	78.9	1.9	6.0	73	10	4.9
08/19/2008	E.06	.48	72.0	123	E1.2	2.8	70	3	.31

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2007 through September 2008.—Continued

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

12323800--Clark Fork near Galen								
Date	Time	Streamflow, instantaneous (ft^3/s)	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Temperature, water (°C)	Hardness, filtered (mg/L as $CaCO_3$)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)
11/06/2007	1205	93	8.6	511	4.0	220	65.5	14.4
03/03/2008	1000	77	8.4	526	0.0	220	65.1	14.9
04/08/2008	1030	83	8.5	486	3.0	200	55.5	14.0
05/06/2008	1015	170	8.9	461	10.0	190	55.4	12.8
06/03/2008	1210	590	8.4	307	10.0	120	37.4	6.91
06/18/2008	1135	595	9.1	279	12.5	120	37.5	6.25
07/10/2008	0825	258	8.1	257	13.0	110	34.6	6.50
08/19/2008	0950	56	8.6	397	15.5	180	53.1	11.0

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)
11/06/2007	11.1	12.5	0.04	0.05	2.5	4.1	E4	80
03/03/2008	8.7	10.8	.07	.13	3.7	10.7	E7	194
04/08/2008	8.5	10.4	.06	.10	3.1	7.7	E7	198
05/06/2008	14.8	18.2	E.02	.10	3.4	13.1	15	338
06/03/2008	26.9	30.9	E.03	.16	5.8	26.9	17	486
06/18/2008	23.3	25.9	.04	.15	8.2	26.3	15	421
07/10/2008	17.4	20.5	E.04	.09	3.3	13.3	23	258
08/19/2008	23.9	26.7	<.04	.06	3.3	10.0	E7	148

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)
11/06/2007	<0.08	0.36	59.4	96	E1.7	3.7	67	1	0.25
03/03/2008	<.08	1.09	130	194	5.2	11.9	66	4	.83
04/08/2008	E.04	1.18	107	170	2.6	10.6	80	6	1.3
05/06/2008	E.06	2.02	158	304	E1.3	12.8	68	12	5.5
06/03/2008	.09	3.40	98.9	197	3.3	22.4	65	20	32
06/18/2008	.10	3.04	42.0	127	1.9	22.2	55	20	32
07/10/2008	E.07	1.67	82.2	143	2.4	9.9	73	9	6.3
08/19/2008	E.06	1.19	54.9	129	E1.3	7.3	82	4	.60

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2007 through September 2008.—Continued

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

12323840--Lost Creek near Anaconda

Date	Time	Streamflow, instantaneous (ft^3/s)	Turbidity, unfiltered, lab (NTRU)	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Temperature, water (°C)	Hardness, filtered (mg/L as $CaCO_3$)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)
11/05/2007	1120	4.3	<2.0	8.3	242	4.5	120	35.0	7.22
03/03/2008	1150	1.8	E1.7	8.3	226	1.0	110	31.4	6.67
04/07/2008	1400	3.5	<2.0	8.2	221	4.0	100	30.3	6.44
05/05/2008	1515	5.7	E1.3	8.2	212	9.5	100	30.2	6.25
06/02/2008	1135	13	5.4	8.1	153	9.0	69	21.1	3.95
06/17/2008	1300	28	3.9	8.1	159	10.5	72	22.4	3.98
07/07/2008	1450	14	2.5	8.2	188	12.0	86	26.6	4.84
08/18/2008	1430	8.7	E1.2	8.3	225	13.0	110	31.9	6.32

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)
11/05/2007	3.9	3.9	E0.03	0.02	1.1	2.1	E6	38
03/03/2008	2.7	3.2	E.02	.03	1.2	3.7	<8	92
04/07/2008	2.4	2.8	E.02	.04	1.2	4.3	E7	68
05/05/2008	2.9	3.3	<.04	.03	1.5	4.4	9	131
06/02/2008	5.0	6.5	E.03	.07	3.0	12.2	14	399
06/17/2008	7.3	8.3	E.03	.07	3.2	11.5	15	425
07/07/2008	7.1	7.8	E.03	.03	1.9	3.8	11	91
08/18/2008	3.4	3.6	<.04	E.01	1.1	2.5	E5	65

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)
11/05/2007	<0.08	0.15	0.7	1.5	E1.3	E1.8	67	1	0.01
03/03/2008	<.08	.42	.5	3.2	<1.8	2.2	69	4	.02
04/07/2008	<.08	.33	.9	2.4	<1.8	E1.8	76	3	.03
05/05/2008	<.08	.51	1.0	4.6	<1.8	2.1	62	3	.05
06/02/2008	E.06	1.61	2.0	12.1	E1.5	6.3	61	19	.67
06/17/2008	E.05	1.67	1.8	13.2	E1.5	6.3	50	27	2.0
07/07/2008	<.08	.32	2.0	4.6	E1.1	2.4	48	4	.15
08/18/2008	<.08	.33	1.0	4.6	E.92	E1.4	47	3	.07

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2007 through September 2008.—Continued

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

12323850--Lost Creek near Galen								
Date	Time	Streamflow, instantaneous (ft^3/s)	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Temperature, water (°C)	Hardness, filtered (mg/L as $CaCO_3$)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)
11/06/2007	1135	48	8.3	590	3.5	280	81.0	17.8
03/03/2008	0930	41	8.2	622	0.0	290	84.5	19.3
04/08/2008	1000	41	8.2	618	2.5	290	83.5	19.1
05/06/2008	0950	15	8.2	654	9.0	310	91.3	21.0
06/03/2008	1135	6.7	8.4	772	11.0	360	101	25.4
06/18/2008	1100	7.4	8.4	672	13.0	300	87.9	20.5
07/10/2008	0805	2.0	8.0	634	14.0	260	66.4	21.8
08/19/2008	0930	2.4	8.1	658	14.5	280	74.3	23.2

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)
11/06/2007	10.2	10.7	<0.04	0.02	1.3	2.5	E5	45
03/03/2008	8.4	9.7	<.04	.05	1.2	3.7	E8	134
04/08/2008	9.5	11.5	E.03	.05	1.1	4.4	E6	154
05/06/2008	12.7	14.5	<.04	.03	1.5	4.4	11	118
06/03/2008	16.6	17.2	E.02	.02	2.1	3.3	16	81
06/18/2008	14.2	15.0	<.04	.02	1.8	2.8	11	62
07/10/2008	11.2	12.1	E.03	.02	1.9	3.0	12	55
08/19/2008	14.8	15.6	E.02	.01	2.1	3.1	10	40

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)	Sediment discharge, suspended (ton/d)
11/06/2007	<0.08	0.14	3.4	4.8	E1.7	E2.0	64	17	2.2
03/03/2008	<.08	.48	14.4	23.5	2.4	4.0	75	4	.44
04/08/2008	<.08	.65	20.6	29.4	1.8	3.7	36	31	3.4
05/06/2008	<.08	.42	29.9	40.5	E1.4	2.6	23	19	.77
06/03/2008	<.08	.14	21.2	25.2	<1.8	E1.2	28	46	.83
06/18/2008	<.08	.13	14.9	19.8	<1.8	<2.0	44	22	.44
07/10/2008	.08	.18	16.8	23.5	E1.2	E1.1	75	25	.14
08/19/2008	<.08	.12	7.0	10.7	E1.0	<2.0	77	2	.01

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2007 through September 2008.—Continued

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

12324200--Clark Fork at Deer Lodge

Date	Time	Streamflow, instantaneous (ft^3/s)	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Temperature, water (°C)	Hardness, filtered (mg/L as $CaCO_3$)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)
11/06/2007	1305	220	8.6	534	4.0	240	70.1	15.0
03/04/2008	1045	196	8.3	525	2.0	230	66.4	14.8
04/08/2008	1145	182	8.3	518	5.0	220	63.2	14.4
05/06/2008	1115	232	8.2	498	10.0	210	61.3	13.9
06/04/2008	0910	669	8.1	348	11.0	140	42.3	8.28
06/18/2008	1250	647	8.7	309	14.5	130	39.3	7.21
07/10/2008	0930	337	8.2	309	15.0	130	40.0	7.70
08/19/2008	1100	67	8.4	476	17.0	200	60.4	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)
11/06/2007	9.5	11.8	E0.03	0.10	3.8	14.1	E4	180
03/04/2008	8.5	12.9	.06	.21	4.4	31.9	E7	548
04/08/2008	8.9	11.6	.07	.14	4.9	20.0	E4	325
05/06/2008	14.6	19.1	.05	.17	6.0	31.9	9	499
06/04/2008	25.8	42.0	.07	.50	14.2	130	20	1,940
06/18/2008	23.9	31.4	.05	.30	11.4	70.1	17	1,040
07/10/2008	17.4	21.6	.06	.14	6.9	29.2	16	410
08/19/2008	17.6	19.2	E.03	.02	6.9	11.0	E4	54

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)	Sediment discharge, suspended (ton/d)
11/06/2007	<0.08	1.60	31.3	68.4	4.5	14.5	73	5	3.0
03/04/2008	E.04	4.52	51.8	136	8.3	32.2	76	21	11
04/08/2008	E.05	2.75	74.8	129	5.8	21.1	72	18	8.8
05/06/2008	E.07	4.36	66.8	186	4.1	28.1	77	21	13
06/04/2008	.18	42.9	27.4	328	10.6	95.0	37	135	244
06/18/2008	.16	9.07	23.9	160	4.0	54.6	56	49	86
07/10/2008	E.08	3.30	37.2	93.7	5.6	24.3	71	15	14
08/19/2008	E.05	.55	4.0	21.5	3.5	6.1	68	1	.18

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2007 through September 2008.—Continued

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

12324680--Clark Fork at Goldcreek

Date	Time	Streamflow, instantaneous (ft^3/s)	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Temperature, water (°C)	Hardness, filtered (mg/L as $CaCO_3$)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)
11/06/2007	1420	355	8.5	472	5.0	210	61.8	13.0
03/04/2008	1240	299	8.5	469	2.5	200	59.0	13.4
04/08/2008	1330	295	8.4	463	6.5	200	57.0	13.0
05/08/2008	0805	661	8.1	365	7.0	150	44.9	10.2
06/04/2008	1115	1,670	8.1	262	10.0	110	31.8	6.44
06/17/2008	0915	2,050	8.2	246	12.5	100	30.5	6.32
07/08/2008	1640	854	8.5	292	19.0	120	37.3	7.67
08/19/2008	1240	188	8.6	391	19.0	170	50.0	10.8

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)
11/06/2007	7.8	9.2	E0.03	0.06	3.2	8.7	<8	118
03/04/2008	7.4	10.3	.04	.16	4.1	25.1	<8	425
04/08/2008	7.5	9.4	.06	.11	4.9	14.8	E5	246
05/08/2008	9.1	14.3	<.04	.23	4.3	42.9	20	976
06/04/2008	13.6	20.3	E.03	.27	7.4	59.9	25	1,240
06/17/2008	12.3	17.2	.04	.22	7.6	45.5	34	1,090
07/08/2008	12.9	15.6	.04	.11	6.0	21.4	12	371
08/19/2008	11.6	12.5	<.04	.03	5.0	7.2	<8	79

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)
11/06/2007	<0.08	0.84	14.4	49.9	2.8	9.5	83	4	3.8
03/04/2008	<.08	3.29	24.2	99.8	5.3	24.6	81	17	14
04/08/2008	E.04	1.88	39.3	85.8	3.1	16.2	83	11	8.8
05/08/2008	.09	6.13	17.0	172	3.5	41.9	79	45	80
06/04/2008	.17	8.30	10.3	172	5.6	53.5	49	86	388
06/17/2008	.26	7.10	11.8	127	6.1	42.8	57	62	343
07/08/2008	E.07	2.51	21.1	63.3	2.4	17.3	74	15	35
08/19/2008	<.08	.39	8.4	34.1	E1.4	4.3	65	4	2.0

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2007 through September 2008.—Continued

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

12331800--Clark Fork near Drummond								
Date	Time	Streamflow, instantaneous (ft^3/s)	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Temperature, water (°C)	Hardness, filtered (mg/L as $CaCO_3$)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)
11/06/2007	1530	568	8.5	475	6.0	220	62.5	15.0
03/04/2008	1345	465	8.5	480	4.0	210	59.6	14.9
04/09/2008	0915	465	8.3	479	6.0	200	57.7	14.4
05/08/2008	0910	867	8.1	363	8.5	160	44.7	11.1
06/04/2008	1305	2,210	8.1	280	11.0	120	33.9	7.50
06/17/2008	0740	2,740	8.1	274	13.5	120	34.5	7.71
07/09/2008	1455	1,130	8.4	357	19.0	160	45.1	10.4
08/19/2008	1340	270	8.5	499	19.5	210	59.8	15.5

Date	Arsenic, filtered (µg/L)	Arsenic, unfiltered recoverable (µg/L)	Cadmium, filtered (µg/L)	Cadmium, unfiltered recoverable (µg/L)	Copper, filtered (µg/L)	Copper, unfiltered recoverable (µg/L)	Iron, filtered (µg/L)	Iron, unfiltered recoverable (µg/L)
11/06/2007	7.8	8.1	E0.02	0.03	2.6	6.3	<8	115
03/04/2008	7.3	9.6	E.04	.13	3.6	16.7	<8	376
04/09/2008	7.7	9.8	E.04	.13	3.8	15.2	<8	333
05/08/2008	9.0	17.3	<.04	.25	4.0	37.4	28	1,200
06/04/2008	13.2	20.5	.05	.30	8.3	55.8	27	1,280
06/17/2008	13.8	19.8	.05	.29	9.1	52.0	29	1,260
07/09/2008	13.5	16.9	.07	.14	7.1	23.1	E8	431
08/19/2008	11.2	12.1	E.03	.02	4.3	5.7	<8	74

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)
11/06/2007	<0.08	0.83	9.8	36.9	2.4	6.9	77	4	6.1
03/04/2008	<.08	3.08	23.5	88.8	4.3	20.9	80	19	24
04/09/2008	E.05	2.73	26.2	87.5	4.1	21.9	72	23	29
05/08/2008	.15	10.5	11.9	219	3.8	56.4	81	64	150
06/04/2008	.21	10.2	11.5	191	6.9	66.3	66	78	465
06/17/2008	.26	9.29	13.3	168	7.5	66.2	65	72	533
07/09/2008	.23	3.61	26.9	83.8	4.0	24.4	71	19	58
08/19/2008	<.08	.32	6.2	21.6	2.3	4.3	68	3	2.2

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2007 through September 2008.—Continued

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

12334550--Clark Fork at Turah Bridge, near Bonner									
Date	Time	Streamflow, instantaneous (ft^3/s)	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Temperature, water (°C)	Hardness, filtered (mg/L as $CaCO_3$)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)	Total nitrogen, unfiltered, (mg/L)
11/07/2007	0800	818	8.3	393	4.5	180	51.2	13.1	--
03/04/2008	1455	703	8.8	390	4.0	170	48.1	12.6	--
*03/10/2008	1045	753	8.3	394	3.5	190	53.3	13.3	0.27
*03/24/2008	0930	738	8.1	401	4.5	180	52.1	13.3	.29
*03/28/2008	0800	731	8.3	394	1.5	180	52.0	13.1	.19
*03/31/2008	1000	683	8.5	383	3.0	190	54.4	13.5	.24
*04/08/2008	1015	697	8.2	379	5.0	170	48.1	12.8	.27
04/09/2008	1020	697	8.3	394	5.0	170	47.1	12.4	--
*04/16/2008	1130	1,470	8.2	242	5.5	100	29.3	7.61	1.31
*04/22/2008	1020	1,170	8.2	310	3.5	140	38.9	10.3	.37
*04/29/2008	1000	1,510	8.2	301	9.0	130	36.8	9.52	.50
*05/05/2008	1100	1,780	8.4	239	6.5	110	30.0	7.88	.41
05/08/2008	1100	2,450	8.0	208	7.5	89	24.9	6.58	--
*05/12/2008	1020	2,230	8.1	216	6.5	97	27.0	7.09	.33
*05/19/2008	1030	4,620	7.9	136	11.0	59	16.6	4.31	.98
*05/23/2008	1030	5,180	8.1	139	6.5	62	17.5	4.42	.50
*05/27/2008	1100	5,270	8.1	167	9.0	74	21.1	5.25	.53
*06/02/2008	1030	5,150	8.1	165	10.0	70	19.9	4.94	.40
06/04/2008	1515	5,270	8.0	170	10.0	71	20.3	4.96	--
*06/10/2008	1015	4,980	8.2	200	9.0	85	24.2	5.90	.31
06/16/2008	1045	5,270	8.1	191	11.5	80	22.8	5.60	--
*06/24/2008	1000	4,950	8.1	177	9.0	78	22.2	5.35	.30
07/09/2008	0730	2,340	8.2	250	15.5	110	31.4	7.66	--
08/19/2008	1455	616	8.7	318	18.5	140	38.1	10.8	--

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2007 through September 2008.—Continued

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

12334550--Clark Fork at Turah Bridge, near Bonner—Continued									
Date	Total phosphorous, unfiltered, (mg/L)	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)
11/07/2007	--	5.4	6.0	<0.04	0.04	1.8	4.8	<8	87
03/04/2008	--	5.5	6.5	E.02	.07	3.1	8.1	<8	154
*03/10/2008	0.033	5.3	6.6	E.02	.08	3.2	9.4	8	201
*03/24/2008	.035	5.8	6.8	E.02	.07	3.4	9.4	10	210
*03/28/2008	.013	5.6	6.2	E.03	.07	3.1	8.5	9	174
*03/31/2008	.027	5.4	6.2	E.03	.06	4.6	8.1	E8	159
*04/08/2008	.030	5.6	6.3	E.03	.09	3.4	8.2	10	189
04/09/2008	--	5.3	6.7	E.04	.09	2.9	8.7	<8	194
*04/16/2008	.224	7.5	19.1	E.03	.41	4.3	46.5	33	2,120
*04/22/2008	.042	4.6	6.6	E.03	.09	2.6	11.1	15	382
*04/29/2008	.059	5.8	8.8	E.03	.17	3.6	21.6	20	748
*05/05/2008	.048	4.7	6.6	<.04	.10	2.7	12.8	28	506
05/08/2008	--	4.1	7.3	<.04	.14	2.3	18.9	53	840
*05/12/2008	.040	4.3	6.1	<.04	.07	2.2	10.5	22	392
*05/19/2008	.204	3.8	9.9	<.04	.22	3.1	37.2	49	1,880
*05/23/2008	.108	4.8	8.5	E.02	.23	4.0	30.6	45	999
*05/27/2008	.111	6.5	11.1	E.03	.21	6.2	35.5	46	1,190
*06/02/2008	.073	6.1	9.1	E.04	.14	4.7	24.0	32	778
06/04/2008	--	6.3	9.9	E.04	.17	5.4	32.5	37	927
*06/10/2008	.089	8.1	11.3	.05	.16	6.5	27.9	27	868
06/16/2008	--	7.4	10.2	.04	.17	5.9	25.4	37	733
*06/24/2008	.062	8.2	10.3	E.04	.11	5.8	20.1	26	626
07/09/2008	--	7.8	9.6	.04	.10	4.0	13.4	16	346
08/19/2008	--	5.4	6.0	<.04	<.01	2.2	3.2	<8	40

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2007 through September 2008.—Continued

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

12334550--Clark Fork at Turah Bridge, near Bonner—Continued									
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)
11/07/2007	<0.08	0.56	2.9	20.9	3.6	8.1	85	4	8.8
03/04/2008	<.08	1.22	7.4	39.5	E1.7	10.8	84	9	17
*03/10/2008	E.08	1.62	9.9	53.4	3.5	14.4	88	14	28
*03/24/2008	.12	1.57	10.7	58.5	4.3	16.3	82	14	28
*03/28/2008	.09	1.38	9.0	47.2	4.1	14.2	86	9	18
*03/31/2008	.20	1.28	10.2	46.8	4.7	13.8	88	10	18
*04/08/2008	.14	1.53	9.3	49.8	3.6	14.2	86	11	21
04/09/2008	.12	1.59	10.1	52.0	8.8	14.7	88	10	19
*04/16/2008	.23	16.9	8.2	338	5.0	87.0	90	122	484
*04/22/2008	.10	2.69	7.4	64.1	5.8	18.3	83	16	51
*04/29/2008	.15	5.19	9.4	109	4.1	36.6	74	44	179
*05/05/2008	.11	3.12	6.8	68.8	2.7	22.1	74	28	135
05/08/2008	.12	4.86	8.7	110	2.6	34.8	74	50	331
*05/12/2008	E.07	2.35	5.7	58.2	2.5	17.4	73	21	126
*05/19/2008	.12	7.71	10.9	184	2.9	52.5	63	151	1,880
*05/23/2008	.21	6.19	7.1	129	4.9	41.7	65	69	965
*05/27/2008	.24	6.22	9.0	150	10.5	50.4	68	79	1,120
*06/02/2008	.15	4.01	9.6	103	5.1	35.5	64	58	806
06/04/2008	.18	5.42	9.9	108	5.1	39.9	62	64	911
*06/10/2008	.15	4.77	11.4	103	7.3	39.2	65	57	766
06/16/2008	.19	4.26	12.5	85.2	6.0	37.5	63	50	711
*06/24/2008	.14	3.30	15.4	73.2	4.9	26.4	72	34	454
07/09/2008	.15	2.56	15.6	57.5	3.1	17.4	65	21	133
08/19/2008	<.08	.17	3.6	12.3	E.98	2.9	64	3	5.0

*Sample collected as part of a supplemental sampling program.

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2007 through September 2008.—Continued

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

12334570--Clark Fork Bypass, 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)
*03/24/2008	1100	E738	8.0	398	--	190	52.9	13.3
*03/28/2008	0930	E731	8.5	390	2.0	190	52.8	13.2
*03/31/2008	1230	E683	8.4	382	--	190	52.4	13.3
*04/08/2008	1200	E697	8.4	377	6.0	170	47.3	12.6
*04/16/2008	1300	E1,470	8.0	246	5.0	100	29.4	7.56
*04/22/2008	1210	E1,170	8.1	310	4.0	140	39.0	10.3
*04/29/2008	1200	E1,510	8.1	300	10.5	130	36.6	9.63
*05/05/2008	1230	E1,780	8.2	239	--	110	30.2	7.85
*05/12/2008	1140	E2,230	8.2	219	6.5	99	27.6	7.19
*05/19/2008	1230	E4,620	7.8	140	11.5	61	17.1	4.36
*05/23/2008	1200	E5,180	7.9	143	7.0	64	18.0	4.54
*05/27/2008	1300	E5,270	8.0	170	9.5	76	21.7	5.35
*06/02/2008	1200	E5,150	8.0	168	10.0	72	20.6	5.05
*06/10/2008	1210	E4,980	8.3	202	7.0	87	24.8	6.02
*06/16/2008	1315	E5,270	8.1	192	13.0	81	23.1	5.67
*06/24/2008	1130	E4,950	8.0	180	4.0	80	23.0	5.53
*07/09/2008	0915	E2,340	8.2	251	15.0	110	30.9	7.64

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)
*03/24/2008	5.8	9.0	E0.04	0.16	3.3	19.4	10	640
*03/28/2008	5.6	6.6	E.03	.07	3.4	10.6	12	234
*03/31/2008	5.5	7.9	E.02	.24	3.1	19.4	9	505
*04/08/2008	5.6	6.9	E.03	.10	3.0	10.2	11	228
*04/16/2008	7.7	40.2	.04	2.81	5.4	155	32	4,550
*04/22/2008	4.8	9.2	E.04	.29	2.6	46.5	17	1,020
*04/29/2008	5.9	11.8	E.04	.36	3.7	50.8	20	1,270
*05/05/2008	4.8	9.1	E.02	.39	3.0	37.3	19	849
*05/12/2008	4.5	12.2	<.04	.58	2.6	66.5	27	1,430
*05/19/2008	5.4	98.5	.18	10.8	12.2	1,120	79	24,800
*05/23/2008	5.4	33.2	.06	1.70	8.9	289	57	4,940
*05/27/2008	6.8	20.3	.06	.91	7.6	124	49	2,690
*06/02/2008	6.3	14.4	.04	.57	5.6	70.6	44	2,690
*06/10/2008	7.9	15.5	.04	.45	6.9	58.1	24	1,990
*06/16/2008	7.6	12.2	.05	.31	6.6	38.4	39	1,120
*06/24/2008	8.2	12.7	.04	.27	5.9	42.8	25	1,360
*07/09/2008	7.8	10.2	E.04	.11	4.1	17.8	16	399

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2007 through September 2008.—Continued

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

12334570--Clark Fork Bypass, near Bonner—Continued									
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)
*03/24/2008	0.10	3.51	16.3	84.6	5.1	48.4	35	74	E147
*03/28/2008	.11	1.74	17.9	57.6	5.7	20.7	64	16	E32
*03/31/2008	.11	3.25	16.9	76.2	4.2	47.0	29	51	E94
*04/08/2008	.11	1.83	13.7	54.1	4.1	19.7	36	31	E58
*04/16/2008	.26	35.8	19.8	641	11.7	436	27	518	E2,060
*04/22/2008	.12	7.94	11.8	107	5.2	109	22	132	E417
*04/29/2008	.14	9.32	14.1	157	5.2	92.1	26	188	E766
*05/05/2008	.13	7.20	10.9	96.1	3.9	89.3	34	82	E394
*05/12/2008	.09	11.0	17.6	127	4.1	118	28	144	E867
*05/19/2008	.54	183	49.0	2,240	44.5	3,290	9	3,780	E47,200
*05/23/2008	.31	36.5	34.0	422	18.9	476	27	669	E9,360
*05/27/2008	.28	18.4	22.1	325	15.7	223	29	366	E5,210
*06/02/2008	.14	12.5	15.7	204	7.1	168	21	241	E3,350
*06/10/2008	.12	9.74	16.8	168	7.4	130	23	203	E2,730
*06/16/2008	.19	6.45	18.3	140	6.9	80.1	35	116	E1,650
*06/24/2008	.14	6.96	21.1	117	6.0	80.0	22	178	E2,380
*07/09/2008	.08	2.54	20.1	66.7	3.7	25.0	49	33	E208

*Sample collected as part of a supplemental sampling program.

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2007 through September 2008.—Continued

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

12340000--Blackfoot River near Bonner									
Date	Time	Streamflow, instantaneous (ft^3/s)	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Temperature, water (°C)	Hardness, filtered (mg/L as $CaCO_3$)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)	Total nitrogen, unfiltered, (mg/L)
11/07/2008	0930	472	8.4	278	3.5	140	35.9	12.4	--
*03/10/2008	1230	450	8.2	258	3.0	140	35.5	12.3	0.15
*03/24/2008	1330	494	8.3	263	4.5	140	35.1	12.0	.20
*03/28/2008	1530	467	8.7	263	4.5	130	34.5	11.7	.16
*03/31/2008	1100	450	8.3	256	3.5	140	35.1	12.1	.14
*04/08/2008	1400	478	8.4	257	6.0	130	32.1	11.7	.17
04/09/2008	1135	500	8.4	268	5.0	130	31.7	11.5	--
*04/16/2008	1445	1,030	8.4	218	6.5	110	27.5	9.28	.40
*04/22/2008	1340	1,160	8.4	200	5.5	99	25.6	8.55	.24
*04/29/2008	1330	1,490	8.5	181	10.0	88	22.9	7.62	.35
*05/05/2008	1400	2,800	8.3	155	9.0	77	20.0	6.57	.36
05/08/2008	1325	4,070	8.0	150	8.0	73	18.9	6.16	--
*05/12/2008	1350	3,700	8.4	152	7.0	78	20.1	6.64	.24
*05/19/2008	1430	9,410	8.1	129	10.0	65	17.6	5.15	.89
*05/23/2008	1330	8,210	8.2	144	7.5	73	19.3	6.05	.27
*05/27/2008	1400	8,040	8.2	165	8.5	83	21.7	7.05	.40
*06/02/2008	1330	7,700	8.2	158	10.0	77	20.2	6.45	.23
06/05/2008	0745	6,710	8.2	167	9.0	78	20.5	6.47	--
*06/10/2008	1530	5,030	8.5	180	8.0	88	22.9	7.43	.20
06/16/2008	1500	5,150	8.3	175	12.5	84	21.9	7.13	--
*06/24/2008	1330	5,480	8.2	162	11.0	80	21.2	6.69	.16
07/09/2008	1120	2,640	8.4	198	15.5	96	25.0	8.24	--
08/19/2008	1620	667	8.7	258	19.0	130	31.5	11.8	--

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2007 through September 2008.—Continued

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

12340000--Blackfoot River near Bonner—Continued									
Date	Total phos-phorous, unfiltered, (mg/L)	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)
11/07/2008	--	1.0	1.2	<0.04	<0.01	<1.0	<1.2	E5	25
*03/10/2008	0.011	.95	1.1	<.04	<.01	E.69	<1.2	10	63
*03/24/2008	.015	1.2	1.4	<.04	<.01	E.81	<1.2	14	100
*03/28/2008	.011	1.2	1.4	<.04	<.01	E.86	<1.2	10	71
*03/31/2008	.010	1.1	1.3	<.04	<.01	E.59	E1.1	10	62
*04/08/2008	.013	1.2	1.1	<.04	<.01	E.80	<1.2	10	73
04/09/2008	--	1.1	1.2	<.04	<.01	<1.0	<1.2	E7	81
*04/16/2008	.048	1.2	1.6	<.04	<.01	E.72	E.85	20	328
*04/22/2008	.021	.83	.93	<.04	<.01	<1.0	<1.2	12	157
*04/29/2008	.023	.88	1.1	<.04	<.01	E.71	E.82	23	244
*05/05/2008	.035	.66	1.0	<.04	<.01	E.63	E.95	24	327
05/08/2008	--	.67	1.1	<.04	E.01	1.1	3.2	40	414
*05/12/2008	.018	.70	.84	<.04	<.01	E.61	E.90	21	202
*05/19/2008	.247	.86	3.4	<.04	.05	1.1	9.5	38	3,240
*05/23/2008	.060	.73	1.4	<.04	.04	E.79	3.4	20	841
*05/27/2008	.099	1.1	2.5	<.04	.03	1.6	5.8	36	1,580
*06/02/2008	.042	.89	1.5	<.04	E.01	E.87	2.7	12	735
06/05/2008	--	.83	1.4	<.04	.02	1.3	3.4	17	497
*06/10/2008	.049	.96	1.5	<.04	<.01	E.80	2.0	15	586
06/16/2008	--	.91	1.2	<.04	E.01	1.2	3.8	13	366
*06/24/2008	.024	.86	1.1	<.04	<.01	E.55	E1.1	9	326
07/09/2008	--	.96	1.1	<.04	E.01	E.75	2.0	E7	126
08/19/2008	--	1.2	1.3	<.04	<.01	E.52	<1.2	<8	24

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2007 through September 2008.—Continued

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

12340000--Blackfoot River near Bonner—Continued									
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)
11/07/2008	<0.08	<0.06	0.8	2.0	<1.8	E1.0	78	1	1.3
*03/10/2008	E.04	.06	2.5	5.7	<1.8	<2.0	88	3	3.6
*03/24/2008	E.06	.11	2.7	6.2	--	<2.0	85	3	4.0
*03/28/2008	E.06	E.05	2.3	5.1	<1.8	<2.0	86	2	2.5
*03/31/2008	<.08	.06	2.7	5.4	<1.8	<2.0	84	3	3.6
*04/08/2008	E.04	.07	2.8	6.5	<1.8	<2.0	79	3	3.9
04/09/2008	<.08	.06	3.1	7.3	<1.8	<2.0	82	5	6.8
*04/16/2008	.08	.37	3.3	29.3	E.95	E1.6	85	19	53
*04/22/2008	<.08	.15	2.3	14.5	<1.8	<2.0	86	7	22
*04/29/2008	<.08	.23	3.1	25.0	<1.8	E1.4	83	15	60
*05/05/2008	<.08	.34	3.2	40.1	2.0	E2.0	73	23	174
05/08/2008	<.08	.50	3.3	48.1	<1.8	2.7	79	33	363
*05/12/2008	<.08	.26	2.3	22.8	E1.0	E1.5	81	13	130
*05/19/2008	E.06	4.67	5.0	217	<1.8	15.8	79	302	7,670
*05/23/2008	<.08	1.19	2.4	56.5	E.91	5.3	80	77	1,710
*05/27/2008	.10	2.78	4.0	97.1	3.9	10.9	89	128	2,780
*06/02/2008	<.08	.98	2.7	48.4	<1.8	4.7	82	69	1,430
06/05/2008	<.08	.80	2.4	34.0	E.97	4.9	81	47	851
*06/10/2008	<.08	.80	5.9	34.7	E1.2	3.5	89	28	380
06/16/2008	E.05	.92	2.6	23.5	2.2	3.7	83	33	459
*06/24/2008	<.08	.37	2.3	20.4	E1.2	2.1	79	26	385
07/09/2008	<.08	.34	1.8	12.6	E.95	E1.8	83	8	57
08/19/2008	<.08	<.06	1.5	5.2	<1.8	<2.0	74	1	1.8

*Sample collected as part of a supplemental sampling program.

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2007 through September 2008.—Continued

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

12340500--Clark Fork above Missoula									
Date	Time	Streamflow, instantaneous (ft^3/s)	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)
11/07/2007	1100	1,270	E1.9	8.4	347	4.0	160	44.6	12.4
03/05/2008	0910	1,160	E1.6	8.3	333	1.5	130	36.1	9.00
*03/10/2008	1400	1,170	--	8.2	342	5.0	170	45.9	12.9
*03/24/2008	1530	1,180	--	8.4	340	7.0	170	45.2	12.7
*03/28/2008	1350	1,560	--	8.4	343	3.0	160	43.9	12.5
*03/31/2008	1500	1,100	--	8.2	328	4.5	160	44.5	12.5
*04/08/2008	1600	1,160	--	8.2	328	7.5	150	41.0	12.2
04/09/2008	1400	1,170	14	8.3	339	6.5	150	39.9	11.8
*04/16/2008	1600	2,510	--	8.3	234	6.0	110	29.1	8.31
*04/22/2008	1510	2,350	--	8.3	257	5.0	120	32.5	9.18
*04/29/2008	1530	3,170	--	8.3	239	11.0	110	29.7	8.42
*05/05/2008	1515	4,640	--	8.3	186	13.0	89	24.0	7.05
05/08/2008	1530	6,580	66	8.0	172	9.0	78	21.0	6.26
*05/12/2008	1500	6,090	--	8.3	176	8.0	86	23.0	6.86
*05/19/2008	1530	14,800	--	8.0	133	11.5	63	17.4	4.86
*05/23/2008	1515	14,400	--	8.2	145	8.0	70	18.8	5.46
*05/27/2008	1600	14,100	--	8.1	167	10.0	76	20.4	5.99
*06/02/2008	1445	13,300	--	8.2	162	11.0	75	20.3	5.83
06/05/2008	0945	12,900	25	8.1	172	9.0	75	20.6	5.81
*06/10/2008	1700	10,500	--	8.3	192	9.0	88	24.1	6.75
06/16/2008	1630	10,800	17	8.2	183	13.5	83	22.6	6.35
*06/24/2008	1530	10,500	--	8.3	170	17.0	79	21.8	6.06
07/09/2008	1240	4,970	2.9	8.3	225	17.0	100	28.1	7.92
08/19/2008	1740	1,270	E1.2	8.8	279	20.0	130	33.6	10.9

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2007 through September 2008.—Continued

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

Date	Total nitrogen, unfiltered, (mg/L)	Total phosphorous, unfiltered, (mg/L)	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)
12340500--Clark Fork above Missoula—Continued								
11/07/2007	--	--	3.9	4.9	<0.04	0.07	1.4	8.5
03/05/2008	--	--	3.7	4.7	E.03	.07	2.2	9.5
*03/10/2008	0.23	0.028	3.8	4.9	<.04	.07	2.3	8.9
*03/24/2008	.26	.036	6.3	9.2	E.03	.07	7.0	11.1
*03/28/2008	.19	.011	4.0	9.3	<.04	.34	1.8	37.8
*03/31/2008	.39	.103	6.4	19.7	E.04	1.67	4.2	303
*04/08/2008	.34	.078	5.9	11.5	E.03	.69	3.6	126
04/09/2008	--	--	5.6	10.4	E.03	.54	3.5	102
*04/16/2008	1.00	.195	6.0	20.8	E.03	1.17	4.9	182
*04/22/2008	.39	.089	4.1	9.9	E.02	.59	2.5	104
*04/29/2008	.58	.153	5.0	16.4	E.03	1.11	4.1	205
*05/05/2008	.59	.270	5.2	22.5	E.03	1.72	4.5	349
05/08/2008	--	--	4.6	26.9	<.04	1.93	5.0	386
*05/12/2008	.35	.132	3.5	10.1	<.04	.51	2.4	95.8
*05/19/2008	1.19	.543	3.6	26.0	<.04	2.05	5.2	308
*05/23/2008	.45	.206	2.8	13.0	<.04	.74	3.9	107
*05/27/2008	.45	.131	3.3	9.2	E.03	.37	4.1	66.6
*06/02/2008	.35	.076	3.2	6.1	E.03	.19	3.0	29.9
06/05/2008	--	--	3.8	9.0	E.03	.29	4.0	46.0
*06/10/2008	.26	.080	4.7	7.7	E.03	.20	3.9	29.5
06/16/2008	--	--	4.6	8.9	E.04	.31	4.7	38.4
*06/24/2008	.24	.063	4.7	7.2	<.04	.14	3.4	24.9
07/09/2008	--	--	4.4	5.7	E.03	.07	2.7	10.3
08/19/2008	--	--	3.6	4.0	<.04	<.01	1.5	2.5

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2007 through September 2008.—Continued

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

12340500--Clark Fork above Missoula—Continued								
Date	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)
11/07/2007	E7	155	E0.04	1.15	18.0	37.8	3.1	15.7
03/05/2008	<8	185	E.05	1.79	19.3	45.4	4.0	13.8
*03/10/2008	12	210	E.06	1.42	18.9	46.8	3.8	14.8
*03/24/2008	13	565	.45	1.87	20.2	56.4	7.4	19.9
*03/28/2008	14	2,150	E.07	7.35	32.3	153	3.1	94.9
*03/31/2008	26	2,200	.64	42.5	33.6	180	6.4	404
*04/08/2008	17	1,370	.40	20.5	20.6	98.0	3.6	170
04/09/2008	8	923	.26	15.8	19.0	78.1	4.2	130
*04/16/2008	30	2,750	.33	32.0	20.9	280	5.5	258
*04/22/2008	16	1,500	.21	16.1	13.4	98.7	3.4	143
*04/29/2008	25	3,180	.41	30.6	17.3	200	7.3	289
*05/05/2008	36	6,490	.87	53.5	14.6	274	4.2	444
05/08/2008	74	5,980	--	54.0	21.0	314	4.7	495
*05/12/2008	33	2,200	.31	14.9	12.6	116	2.4	134
*05/19/2008	71	9,620	.45	45.6	30.2	589	6.8	541
*05/23/2008	37	3,150	.18	15.5	14.5	200	5.9	184
*05/27/2008	40	2,070	.17	9.45	12.8	168	5.5	100
*06/02/2008	25	1,300	.12	5.06	9.5	97.1	5.5	55.6
06/05/2008	34	1,500	.20	7.62	11.7	131	5.2	81.4
*06/10/2008	18	943	.08	5.02	10.9	89.4	5.0	50.1
06/16/2008	27	999	.19	5.66	12.4	95.1	4.8	67.4
*06/24/2008	18	808	.11	3.95	13.7	69.5	3.9	42.0
07/09/2008	10	296	.08	1.55	13.8	39.8	2.6	14.8
08/19/2008	<8	51	<.08	.18	9.2	20.0	<1.8	3.3

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2007 through September 2008.—Continued

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

12340500--Clark Fork above Missoula—Continued			
Date	Sediment, suspended (percent finer than 0.062 mm)	Sediment, suspended (mg/L)	Sediment discharge, suspended (ton/d)
11/07/2007	67	7	24
03/05/2008	74	9	28
*03/10/2008	73	13	41
*03/24/2008	84	27	86
*03/28/2008	80	180	758
*03/31/2008	84	127	377
*04/08/2008	84	87	272
04/09/2008	82	58	183
*04/16/2008	55	247	1,670
*04/22/2008	39	147	933
*04/29/2008	36	325	2,780
*05/05/2008	25	557	6,980
05/08/2008	19	950	16,900
*05/12/2008	20	333	5,480
*05/19/2008	36	1,060	42,400
*05/23/2008	37	334	13,000
*05/27/2008	48	272	10,400
*06/02/2008	47	146	5,240
06/05/2008	47	150	5,220
*06/10/2008	53	80	2,270
06/16/2008	54	89	2,600
*06/24/2008	54	68	1,930
07/09/2008	69	20	268
08/19/2008	75	3	10

*Sample collected as part of a supplemental sampling program.

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2007 through September 2008.—Continued

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

12352500--Bitterroot River near Missoula									
Date	Time	Streamflow, instantaneous (ft^3/s)	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Temperature, water (°C)	Hardness, filtered (mg/L as $CaCO_3$)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)	Total nitrogen, unfiltered, (mg/L)
03/10/2008	1600	833	8.2	147	8.0	65	18.9	4.45	0.27
03/25/2008	0800	889	7.6	146	4.0	61	17.9	3.98	.27
04/01/2008	0730	833	7.8	141	3.5	63	18.7	4.09	.25
04/09/2008	0730	786	7.9	144	5.0	60	17.6	4.03	.25
04/17/2008	0715	1,920	7.7	91	6.0	35	10.5	2.25	.44
04/23/2008	0705	1,700	7.4	100	6.5	40	11.8	2.52	.26
04/30/2008	0715	2,580	7.8	87	9.5	35	10.2	2.20	.61
05/06/2008	0730	3,560	7.6	72	9.0	28	8.21	1.81	.43
05/13/2008	0720	4,040	7.9	72	8.0	27	7.97	1.81	.24
05/20/2008	0730	17,200	7.2	43	11.0	15	4.42	1.06	.60
05/24/2008	0745	12,400	7.5	55	7.0	21	6.13	1.40	.29
05/28/2008	0800	9,830	7.5	54	11.0	21	6.11	1.32	.25
06/03/2008	0745	12,600	7.4	46	9.5	18	5.25	1.15	.21
06/11/2008	0730	8,540	7.7	60	8.0	23	6.79	1.50	.16
06/25/2008	0730	12,000	7.5	55	13.5	20	5.80	1.29	.20

Date	Total phosphorous, unfiltered, (mg/L)	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)
03/10/2008	0.019	0.36	E0.45	<0.04	<0.01	E0.71	<1.2	35	124
03/25/2008	.023	.36	E.45	<.04	<.01	--	<1.2	32	184
04/01/2008	.017	.33	E.43	<.04	<.01	E.96	E.70	31	133
04/09/2008	.018	.36	E.46	<.04	E.01	E.53	<1.2	36	148
04/17/2008	.050	.29	E.54	<.04	.02	E.71	1.4	37	565
04/23/2008	.023	.31	E.40	<.04	<.01	E.55	E.81	28	286
04/30/2008	.055	.31	E.57	<.04	E.01	E.62	1.6	44	794
05/06/2008	.051	.28	E.59	<.04	E.01	E.58	1.6	50	848
05/13/2008	.024	.29	E.40	<.04	<.01	E.61	E.94	38	308
05/20/2008	.143	.35	.70	<.04	.02	1.5	4.7	132	1,960
05/24/2008	.046	.31	E.47	E.03	.02	1.2	2.7	82	635
05/28/2008	.035	.30	E.43	<.04	<.01	1.0	1.6	66	522
06/03/2008	.029	.31	E.55	<.04	<.01	E.91	1.8	57	693
06/11/2008	.032	.35	E.48	<.04	<.01	E.89	E1.2	55	435
06/25/2008	.030	.32	E.42	<.04	E.01	E.73	E1.1	53	486

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2007 through September 2008.—Continued

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

12352500--Bitterroot River near Missoula—Continued									
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)
03/10/2008	E0.04	0.12	1.4	20.6	<1.8	<2.0	78	5	11
03/25/2008	.13	.20	9.1	28.1	--	<2.0	80	9	22
04/01/2008	E.07	.07	8.8	22.3	E1.0	<2.0	80	6	13
04/09/2008	<.08	.12	9.2	26.1	<1.8	<2.0	81	7	15
04/17/2008	E.06	.51	4.2	44.9	E1.2	2.8	76	31	161
04/23/2008	<.08	.25	5.7	25.0	<1.8	E1.5	73	12	55
04/30/2008	E.04	.65	4.3	62.8	<1.8	3.6	59	61	425
05/06/2008	<.08	.77	3.3	60.7	<1.8	4.2	61	48	461
05/13/2008	<.08	.30	4.4	19.6	<1.8	2.2	56	15	164
05/20/2008	.16	1.89	8.3	69.5	2.2	8.7	30	257	11,900
05/24/2008	.14	.73	6.2	25.5	2.4	3.8	46	68	2,280
05/28/2008	E.07	.51	5.9	22.1	E1.2	2.8	34	68	1,800
06/03/2008	E.06	.74	5.7	25.0	<1.8	5.1	38	81	2,750
06/11/2008	E.05	.38	7.2	19.1	1.9	E2.0	63	27	623
06/25/2008	E.05	.43	6.1	18.4	E.95	2.1	39	59	1,900

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2007 through September 2008.—Continued

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

12354500--Clark Fork at St. Regis									
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)	Total nitrogen, unfiltered, (mg/L)
03/11/2008	1000	2,830	8.3	265	5.5	120	32.8	9.15	0.31
03/25/2008	1400	3,000	8.3	246	5.5	110	31.4	8.40	.27
04/01/2008	1330	2,850	8.1	254	4.5	120	33.1	8.79	.32
04/09/2008	1400	2,810	8.0	262	7.0	110	30.2	8.39	.30
04/17/2008	1400	5,980	8.2	195	7.0	82	22.7	6.11	.87
04/23/2008	1250	5,670	8.0	200	6.0	83	22.9	6.31	.38
04/30/2008	1315	7,580	8.3	192	4.5	81	22.2	6.11	.45
05/06/2008	1230	11,400	8.0	152	5.0	66	18.2	5.00	.52
05/13/2008	1315	13,800	8.2	141	5.0	64	17.7	4.82	.44
05/20/2008	1300	42,300	7.9	88	5.5	40	11.3	2.78	.88
05/24/2008	1230	36,000	8.0	110	6.0	50	13.8	3.69	.39
05/28/2008	1300	31,600	8.0	127	7.0	59	16.4	4.46	.41
06/03/2008	1230	34,500	8.1	114	7.0	49	13.7	3.67	.30
06/11/2008	1315	24,800	8.2	141	5.5	61	17.0	4.59	.21
06/25/2008	1215	29,300	8.0	113	10.5	50	13.9	3.71	.22

Date	Total phosphorous, unfiltered, (mg/L)	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)
03/11/2008	0.020	1.9	2.3	<0.04	0.03	2.4	3.1	13	113
03/25/2008	.020	2.4	2.8	<.04	.02	5.2	3.9	13	122
04/01/2008	.025	4.9	7.2	E.02	.20	4.8	47.8	16	368
04/09/2008	.030	3.5	4.5	<.04	.12	5.2	24.4	13	233
04/17/2008	.116	5.1	11.8	E.03	.74	4.7	127	27	1,540
04/23/2008	.049	2.6	4.4	<.04	.24	2.9	42.4	15	554
04/30/2008	.046	2.9	5.1	<.04	.27	3.5	52.4	25	753
05/06/2008	.073	3.3	7.7	<.04	.54	4.2	106	24	1,280
05/13/2008	.051	2.7	5.2	<.04	.27	3.2	48.9	31	763
05/20/2008	.265	2.5	9.2	<.04	.65	4.9	106	64	4,420
05/24/2008	.099	1.9	4.8	E.04	.28	3.8	36.1	41	1,560
05/28/2008	.100	2.3	5.2	E.02	.20	3.7	30.6	30	1,610
06/03/2008	.076	1.8	3.6	E.03	.13	2.7	18.6	26	1,340
06/11/2008	.058	2.6	4.2	E.02	.13	3.0	16.5	24	809
06/25/2008	.057	2.3	3.2	<.04	.08	2.6	11.4	28	807

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2007 through September 2008.—Continued

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

12354500--Clark Fork at St. Regis—Continued									
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)
03/11/2008	0.08	0.51	10.4	38.3	3.6	6.5	86	8	61
03/25/2008	.34	.52	6.9	30.6	3.8	6.4	88	7	57
04/01/2008	.37	6.48	8.4	41.2	5.5	51.3	95	15	115
04/09/2008	.26	3.36	6.5	38.8	3.7	25.7	91	12	91
04/17/2008	.35	19.2	4.0	162	4.6	167	92	98	1,580
04/23/2008	.17	6.29	4.4	55.8	3.6	54.7	90	28	429
04/30/2008	.24	7.81	4.3	74.7	3.4	65.8	86	50	1,020
05/06/2008	.29	15.4	3.7	110	3.8	134	81	85	2,630
05/13/2008	.23	7.15	3.4	60.0	4.3	65.2	76	49	1,830
05/20/2008	.31	17.1	4.1	254	4.2	173	54	464	53,000
05/24/2008	.16	5.70	4.9	95.7	4.3	58.8	60	156	15,200
05/28/2008	.13	5.26	4.3	102	3.5	54.1	56	172	14,700
06/03/2008	.09	3.50	4.3	79.0	2.7	36.1	44	170	15,800
06/11/2008	.11	2.82	5.9	60.1	3.7	28.0	65	68	4,550
06/25/2008	.09	2.03	4.0	48.1	3.2	19.9	49	91	7,190

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2007 through September 2008.—Continued

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

12388700--Flathead River at Perma									
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)	Total nitrogen, unfiltered, (mg/L)
03/11/2008	1200	7,430	7.9	178	5.5	97	27.5	6.93	0.12
03/25/2008	1130	6,210	7.9	183	5.0	93	26.6	6.43	.10
04/01/2008	1030	6,020	7.9	175	4.5	95	27.2	6.57	.11
04/09/2008	1100	5,840	8.0	177	6.5	88	25.0	6.29	.12
04/17/2008	1200	E5,750	8.3	177	9.0	88	25.1	6.26	.12
04/23/2008	1030	E6,710	8.0	182	6.5	90	25.5	6.35	.11
04/30/2008	1100	E7,900	8.2	180	8.0	91	26.1	6.40	.12
05/06/2008	1030	9,450	8.2	175	10.5	89	25.5	6.26	.13
05/13/2008	1030	13,800	8.5	172	9.5	90	25.7	6.35	.14
05/20/2008	1100	18,900	8.2	170	13.0	86	24.4	6.03	.14
05/24/2008	1030	29,800	8.3	173	9.5	90	25.6	6.36	.13
05/28/2008	1000	37,800	8.3	174	10.0	86	24.6	6.08	.14
06/03/2008	1030	40,400	8.2	171	11.0	85	24.2	5.98	.11
06/11/2008	1100	36,900	8.4	171	8.5	84	23.8	5.87	.11
06/25/2008	1030	37,400	8.4	169	15.5	86	24.5	6.01	.12

Date	Total phosphorous, unfiltered, (mg/L)	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)
03/11/2008	E0.005	0.35	E0.43	<0.04	<0.01	<1.0	<1.2	E8	36
03/25/2008	E.004	.38	E.46	<.04	<.01	1.1	<1.2	<8	39
04/01/2008	E.006	.39	E.46	<.04	<.01	<1.0	E.60	<8	30
04/09/2008	E.005	.41	E.39	<.04	<.01	E.74	<1.2	<8	37
04/17/2008	E.007	.40	E.52	<.04	<.01	E.88	<1.2	<8	46
04/23/2008	E.006	.35	E.41	<.04	<.01	<1.0	<1.2	<8	82
04/30/2008	E.005	.39	E.42	<.04	<.01	<1.0	<1.2	E4	76
05/06/2008	E.006	.43	E.45	<.04	E.01	<1.0	5.4	<8	74
05/13/2008	E.007	.39	E.45	<.04	<.01	<1.0	<1.2	<8	98
05/20/2008	.011	.41	E.49	<.04	<.01	<1.0	<1.2	E5	178
05/24/2008	.017	.40	E.57	<.04	<.01	<1.0	1.8	<8	253
05/28/2008	.014	.41	E.54	<.04	<.01	E.61	11.9	<8	199
06/03/2008	.010	.42	E.53	<.04	<.01	<1.0	<1.2	<8	136
06/11/2008	.010	.39	E.57	E.03	<.01	E.58	E.62	E5	143
06/25/2008	E.007	.38	E.43	<.04	<.01	<1.0	<1.2	<8	109

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2007 through September 2008.—Continued

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

12388700--Flathead River at Perma—Continued									
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)
03/11/2008	<0.08	0.06	1.4	3.4	<1.8	<2.0	70	1	20
03/25/2008	E.06	<.06	1.3	3.4	<1.8	<2.0	80	3	50
04/01/2008	<.08	<.06	1.2	3.2	<1.8	<2.0	85	2	33
04/09/2008	<.08	E.04	1.2	3.8	<1.8	<2.0	82	2	32
04/17/2008	E.05	.10	1.4	5.0	2.4	<2.0	77	4	E62
04/23/2008	<.08	.11	1.1	5.3	<1.8	<2.0	87	4	E72
04/30/2008	<.08	.09	1.2	5.6	1.9	<2.0	85	5	E107
05/06/2008	<.08	.13	1.1	5.9	<1.8	<2.0	76	4	102
05/13/2008	<.08	.12	.9	6.8	<1.8	<2.0	74	8	298
05/20/2008	<.08	.22	1.2	11.0	<1.8	E1.3	85	14	714
05/24/2008	<.08	.31	.8	14.3	<1.8	E1.6	76	24	1,930
05/28/2008	<.08	.21	.8	10.2	2.3	E1.3	71	16	1,630
06/03/2008	<.08	.15	.7	7.9	<1.8	E1.3	74	10	1,090
06/11/2008	E.04	.18	.7	7.8	--	E1.1	79	11	1,100
06/25/2008	<.08	.11	.8	5.9	<1.8	<2.0	78	9	909

Table 5. Daily mean streamflow and suspended-sediment data for Clark Fork at Deer Lodge, Montana, October 2007 through September 2008.

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

Day	Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment	
		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)
		OCTOBER			NOVEMBER			DECEMBER	
1	184	7	3.5	230	12	7.5	216	19	11
2	183	8	4.0	222	11	6.6	213	15	8.6
3	181	10	4.9	221	10	6.0	217	13	7.6
4	186	11	5.5	228	9	5.5	262	12	8.5
5	204	12	6.6	223	7	4.2	272	12	8.8
6	223	13	7.8	222	6	3.6	255	12	8.3
7	224	14	8.5	223	6	3.6	239	11	7.1
8	237	14	9.0	220	9	5.3	224	11	6.7
9	223	14	8.4	221	13	7.8	213	12	6.9
10	217	11	6.4	228	15	9.2	203	12	6.6
11	217	8	4.7	231	16	10	e200	12	6.5
12	212	7	4.0	234	16	10	202	12	6.5
13	205	6	3.3	236	15	9.6	223	14	8.4
14	203	8	4.4	229	16	9.9	216	17	9.9
15	211	10	5.7	232	20	13	212	18	10
16	215	11	6.4	212	24	14	204	18	9.9
17	228	11	6.8	215	29	17	206	17	9.5
18	231	10	6.2	221	30	18	203	16	8.8
19	229	10	6.2	242	29	19	209	16	9.0
20	235	10	6.3	239	28	18	216	15	8.7
21	231	9	5.6	217	25	15	218	18	11
22	242	9	5.9	e210	20	11	208	28	16
23	234	8	5.1	e205	16	8.9	216	34	20
24	239	7	4.5	206	13	7.2	220	32	19
25	226	8	4.9	210	12	6.8	210	26	15
26	213	9	5.2	221	15	9.0	186	22	11
27	218	10	5.9	216	20	12	e170	19	8.7
28	229	12	7.4	204	24	13	e170	20	9.2
29	236	12	7.6	205	26	14	e180	21	10
30	237	12	7.7	212	24	14	e180	22	11
31	231	12	7.5	--	--	--	e170	23	11
TOTAL	**6,784**	**--**	**185.9**	**6,635**	**--**	**308.7**	**6,533**	**--**	**309.2**
MEAN	**219**	**10**	**6.0**	**221**	**17**	**10**	**211**	**18**	**10**
MAX	**242**	**14**	**9.0**	**242**	**30**	**19**	**272**	**34**	**20**
MIN	**181**	**6**	**3.3**	**204**	**6**	**3.6**	**170**	**11**	**6.5**

Table 5. Daily mean streamflow and suspended-sediment data for Clark Fork at Deer Lodge, Montana, October 2007 through September 2008.—Continued

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

Day	Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment	
		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)
	JANUARY			FEBRUARY			MARCH		
1	e160	24	10	185	32	16	206	26	14
2	e170	26	12	e190	31	16	197	30	16
3	e180	28	14	e190	30	15	194	30	16
4	e190	29	15	182	29	14	196	25	13
5	210	30	17	182	28	14	193	32	17
6	214	30	17	e180	28	14	193	25	13
7	201	28	15	e180	30	15	197	24	13
8	186	26	13	182	32	16	200	28	15
9	182	23	11	188	35	18	202	26	14
10	209	20	11	203	37	20	207	28	16
11	204	18	9.9	208	39	22	214	25	14
12	204	15	8.3	200	41	22	212	22	13
13	205	17	9.4	203	43	24	211	26	15
14	221	24	14	193	40	21	212	33	19
15	204	30	17	191	34	18	213	32	18
16	203	35	19	193	28	15	207	26	15
17	207	36	20	193	26	14	206	24	13
18	197	34	18	190	25	13	208	18	10
19	197	34	18	188	25	13	212	18	10
20	e150	33	13	190	25	13	213	17	9.8
21	e100	32	8.6	188	25	13	210	18	10
22	e110	28	8.3	189	24	12	203	16	8.8
23	e130	24	8.4	187	24	12	202	17	9.3
24	e150	22	8.9	187	23	12	212	14	8.0
25	e170	22	10	191	23	12	202	16	8.7
26	e190	21	11	191	23	12	197	17	9.0
27	e220	21	12	190	24	12	199	15	8.1
28	e210	20	11	193	24	13	189	21	11
29	e200	21	11	201	24	13	197	31	16
30	200	26	14	--	--	--	190	14	7.2
31	e200	30	16	--	--	--	194	14	7.3
TOTAL	**5,774**	**--**	**400.8**	**5,528**	**--**	**444**	**6,288**	**--**	**387.2**
MEAN	**186**	**26**	**13**	**191**	**29**	**15**	**203**	**23**	**12**
MAX	**221**	**36**	**20**	**208**	**43**	**24**	**214**	**33**	**19**
MIN	**100**	**15**	**8.3**	**180**	**23**	**12**	**189**	**14**	**7.2**

Table 5. Daily mean streamflow and suspended-sediment data for Clark Fork at Deer Lodge, Montana, October 2007 through September 2008.—Continued

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

Day	Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment	
		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)
	APRIL			MAY			JUNE		
1	189	13	6.6	237	17	11	579	76	119
2	185	14	7.0	218	22	13	648	98	171
3	187	13	6.6	213	25	14	658	101	179
4	191	14	7.2	224	54	33	766	222	459
5	194	17	8.9	227	35	21	957	205	530
6	189	18	9.2	232	22	14	828	99	221
7	184	20	9.9	262	17	12	777	85	178
8	182	19	9.3	305	20	16	733	67	133
9	182	14	6.9	289	15	12	703	62	118
10	185	22	11	276	12	8.9	733	62	123
11	186	17	8.5	269	19	14	757	48	98
12	186	15	7.5	256	18	12	748	46	93
13	195	17	9.0	244	21	14	670	46	83
14	206	22	12	237	17	11	631	50	85
15	208	22	12	237	12	7.7	614	59	98
16	195	16	8.4	220	13	7.7	630	51	87
17	190	16	8.2	234	17	11	608	52	85
18	224	22	13	277	67	50	645	50	87
19	237	36	23	369	177	176	668	58	105
20	235	37	23	455	208	256	688	58	108
21	240	32	21	529	134	191	691	62	116
22	240	27	17	530	82	117	729	66	130
23	246	41	27	513	125	173	874	92	217
24	266	47	34	493	88	117	895	72	174
25	285	31	24	559	112	169	733	51	101
26	277	25	19	544	108	159	699	42	79
27	252	26	18	551	96	143	639	39	67
28	243	22	14	552	95	142	577	39	61
29	243	20	13	557	76	114	562	34	52
30	253	18	12	560	71	107	571	37	57
31	--	--	--	568	76	117	--	--	--
TOTAL	**6,475**	**--**	**406.2**	**11,237**	**--**	**2,263.3**	**21,011**	**--**	**4,214**
MEAN	**216**	**22**	**14**	**362**	**60**	**73**	**700**	**71**	**140**
MAX	**285**	**47**	**34**	**568**	**208**	**256**	**957**	**222**	**530**
MIN	**182**	**13**	**6.6**	**213**	**12**	**7.7**	**562**	**34**	**52**

Table 5. Daily mean streamflow and suspended-sediment data for Clark Fork at Deer Lodge, Montana, October 2007 through September 2008.—Continued

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

Day	Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment	
		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)
	JULY			AUGUST			SEPTEMBER		
1	614	37	61	80	1	0.22	215	47	27
2	653	35	62	77	1	.21	264	92	66
3	628	28	47	80	1	.22	220	38	23
4	543	21	31	83	2	.45	194	15	7.9
5	630	32	54	74	2	.40	177	10	4.8
6	569	32	49	67	2	.36	183	7	3.5
7	479	27	35	64	2	.35	191	7	3.6
8	419	22	25	69	3	.56	190	6	3.1
9	371	18	18	76	4	.82	186	6	3.0
10	337	13	12	73	4	.79	182	6	2.9
11	294	10	7.9	72	3	.58	196	6	3.2
12	271	9	6.6	66	2	.36	209	6	3.4
13	242	8	5.2	65	2	.35	204	6	3.3
14	217	7	4.1	69	2	.37	199	6	3.2
15	204	5	2.8	67	3	.54	194	6	3.1
16	203	4	2.2	68	4	.73	186	8	4.0
17	194	3	1.6	70	4	.76	179	11	5.3
18	183	4	2.0	70	3	.57	165	12	5.3
19	182	5	2.5	71	2	.38	164	13	5.8
20	169	6	2.7	82	3	.66	164	13	5.8
21	162	6	2.6	95	13	3.3	168	13	5.9
22	155	6	2.5	126	22	7.5	179	13	6.3
23	184	6	3.0	136	17	6.2	176	13	6.2
24	166	6	2.7	138	10	3.7	177	12	5.7
25	149	5	2.0	147	8	3.2	172	12	5.6
26	142	5	1.9	125	9	3.0	161	12	5.2
27	131	5	1.8	110	9	2.7	159	11	4.7
28	118	5	1.6	109	10	2.9	155	10	4.2
29	109	4	1.2	118	10	3.2	156	8	3.4
30	101	3	.82	127	10	3.4	170	7	3.2
31	86	1	.23	120	10	3.2	--	--	--
TOTAL	**8,905**	**--**	**451.95**	**2,794**	**--**	**51.98**	**5,535**	**--**	**237.6**
MEAN	**287**	**12**	**15**	**90.1**	**6**	**1.7**	**184**	**14**	**7.9**
MAX	**653**	**37**	**62**	**147**	**22**	**7.5**	**264**	**92**	**66**
MIN	**86**	**1**	**.23**	**64**	**1**	**.21**	**155**	**6**	**2.9**

Total for water year 2008 (unrounded sum of daily values): streamflow–93,499 ft³/s (annual runoff–185,500 acre-ft); suspended-sediment discharge–9,660.83 tons.

Table 6. Daily mean streamflow and suspended-sediment data for Clark Fork at Turah Bridge, near Bonner, Montana, October 2007 through September 2008.

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

Day	Mean streamflow (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	798	6	13	852	5	12	e720	4	7.8
2	829	8	18	845	6	14	e700	4	7.6
3	845	10	23	829	6	13	759	4	8.2
4	841	10	23	829	6	13	912	11	27
5	840	10	23	829	6	13	1,050	21	60
6	872	11	26	821	4	8.9	1,050	22	62
7	881	12	29	816	3	6.6	944	15	38
8	873	12	28	816	4	8.8	850	10	23
9	873	11	26	815	6	13	816	9	20
10	872	11	26	813	6	13	822	8	18
11	888	10	24	818	6	13	826	7	16
12	890	10	24	818	6	13	804	6	13
13	869	10	23	821	6	13	758	5	10
14	852	10	23	830	6	13	758	4	8.2
15	840	10	23	792	6	13	744	5	10
16	838	10	23	811	6	13	744	7	14
17	863	10	23	816	7	15	734	9	18
18	880	9	21	846	8	18	744	9	18
19	905	8	20	932	11	28	778	8	17
20	952	10	26	928	9	23	804	7	15
21	965	8	21	865	6	14	772	6	13
22	931	8	20	742	5	10	691	6	11
23	917	8	20	e650	6	11	702	6	11
24	909	8	20	e550	6	8.9	781	8	17
25	909	8	20	e600	6	9.7	765	7	14
26	905	7	17	e650	5	8.8	714	5	9.6
27	886	7	17	703	5	9.5	691	5	9.3
28	869	6	14	830	4	9.0	708	6	11
29	867	6	14	809	3	6.6	704	6	11
30	870	5	12	764	4	8.3	700	6	11
31	864	5	12	--	--	--	690	8	15
TOTAL	**27,193**	**--**	**652**	**23,840**	**--**	**373.1**	**24,235**	**--**	**543.7**
MEAN	**877**	**9**	**21**	**795**	**6**	**12**	**782**	**8**	**18**
MAX	**965**	**12**	**29**	**932**	**11**	**28**	**1,050**	**22**	**62**
MIN	**798**	**5**	**12**	**550**	**3**	**6.6**	**690**	**4**	**7.6**

Table 6. Daily mean streamflow and suspended-sediment data for Clark Fork at Turah Bridge, near Bonner, Montana, October 2007 through September 2008.—Continued

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

Day	Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment	
		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)
	JANUARY			FEBRUARY			MARCH		
1	e620	11	18	652	4	7.0	734	16	32
2	e550	9	13	617	4	6.7	748	12	24
3	e600	7	11	613	4	6.6	715	11	21
4	742	6	12	643	4	6.9	711	10	19
5	809	6	13	644	4	7.0	724	7	14
6	733	5	9.9	649	3	5.3	701	7	13
7	732	5	9.9	651	4	7.0	700	10	19
8	774	4	8.4	651	4	7.0	704	10	19
9	766	4	8.3	649	4	7.0	723	13	25
10	766	8	17	677	4	7.3	753	16	33
11	757	13	27	713	4	7.7	776	14	29
12	739	18	36	717	5	9.7	813	15	33
13	735	19	38	736	7	14	816	17	37
14	684	15	28	724	5	9.8	810	16	35
15	691	8	15	704	5	9.5	809	15	33
16	641	4	6.9	716	5	9.7	800	13	28
17	530	3	4.3	723	6	12	786	12	25
18	612	3	5.0	696	6	11	781	15	32
19	673	4	7.3	667	6	11	795	17	36
20	681	4	7.4	668	6	11	803	15	33
21	e550	4	5.9	678	6	11	798	13	28
22	e350	4	3.8	688	5	9.3	779	12	25
23	e400	5	5.4	698	6	11	744	16	32
24	e400	5	5.4	706	7	13	764	15	31
25	e450	5	6.1	716	9	17	793	12	26
26	e500	6	8.1	710	10	19	776	12	25
27	e600	6	9.7	704	11	21	771	14	29
28	e650	6	11	712	14	27	734	13	26
29	e620	7	12	724	17	33	722	9	18
30	e630	6	10	--	--	--	720	10	19
31	651	4	7.0	--	--	--	697	10	19
TOTAL	**19,636**	**--**	**379.8**	**19,846**	**--**	**334.5**	**23,500**	**--**	**818**
MEAN	**633**	**7**	**12**	**684**	**6**	**12**	**758**	**13**	**26**
MAX	**809**	**19**	**38**	**736**	**17**	**33**	**816**	**17**	**37**
MIN	**350**	**3**	**3.8**	**613**	**3**	**5.3**	**697**	**7**	**13**

Table 6. Daily mean streamflow and suspended-sediment data for Clark Fork at Turah Bridge, near Bonner, Montana, October 2007 through September 2008.—Continued

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

Day	Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment	
		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)
	APRIL			MAY			JUNE		
1	718	10	19	1,750	41	194	5,070	55	753
2	686	8	15	1,600	28	121	5,270	60	854
3	681	7	13	1,550	24	100	5,430	86	1,260
4	696	11	21	1,630	25	110	5,270	70	996
5	731	12	24	1,780	31	149	5,710	123	1,900
6	726	11	22	2,020	48	262	5,610	126	1,910
7	708	10	19	2,300	60	373	5,450	93	1,370
8	714	11	21	2,470	57	380	5,200	68	955
9	714	11	21	2,490	52	350	5,080	60	823
10	723	12	23	2,350	39	247	4,960	58	777
11	729	13	26	2,240	32	194	5,220	58	817
12	736	17	34	2,210	24	143	5,240	60	849
13	811	20	44	2,130	23	132	5,340	73	1,050
14	1,010	57	155	2,110	20	114	5,320	64	919
15	1,510	174	709	2,280	23	142	5,280	54	770
16	1,490	135	543	2,630	47	334	5,290	59	843
17	1,210	44	144	3,130	77	651	5,320	76	1,090
18	1,170	37	117	3,730	104	1,050	5,420	48	702
19	1,310	42	149	4,750	160	2,050	5,380	46	668
20	1,330	31	111	5,500	168	2,490	5,180	42	587
21	1,170	19	60	5,770	145	2,270	5,020	37	501
22	1,140	19	58	5,680	106	1,630	5,130	36	499
23	1,130	25	76	5,210	69	971	5,170	39	544
24	1,160	24	75	4,940	62	827	4,980	37	498
25	1,160	20	63	5,100	76	1,050	4,580	38	470
26	1,150	18	56	5,480	103	1,520	4,120	33	367
27	1,120	18	54	5,300	79	1,130	3,850	31	322
28	1,200	22	71	5,070	62	849	3,590	31	300
29	1,510	41	167	5,050	61	832	3,400	29	266
30	1,800	59	287	5,070	62	849	3,280	30	266
31	--	--	--	5,120	60	829	--	--	--
TOTAL	**30,943**	**--**	**3,197**	**108,440**	**--**	**22,343**	**149,160**	**--**	**23,926**
MEAN	**1,031**	**31**	**107**	**3,498**	**63**	**721**	**4,972**	**57**	**798**
MAX	**1,800**	**174**	**709**	**5,770**	**168**	**2,490**	**5,710**	**126**	**1,910**
MIN	**681**	**7**	**13**	**1,550**	**20**	**100**	**3,280**	**29**	**266**

Table 6. Daily mean streamflow and suspended-sediment data for Clark Fork at Turah Bridge, near Bonner, Montana, October 2007 through September 2008.—Continued

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

Day	Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment	
		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)
	JULY			AUGUST			SEPTEMBER		
1	3,280	28	248	932	4	10	1,010	19	52
2	3,730	42	423	881	4	9.5	1,350	36	131
3	3,850	46	478	868	4	9.4	1,250	15	51
4	3,350	36	326	857	3	6.9	1,150	12	37
5	3,150	33	281	842	3	6.8	1,090	11	32
6	3,110	32	269	809	3	6.6	1,060	11	31
7	2,770	26	194	784	3	6.4	1,060	10	29
8	2,470	23	153	766	3	6.2	1,050	10	28
9	2,230	20	120	756	3	6.1	1,040	10	28
10	2,070	17	95	764	3	6.2	1,030	10	28
11	1,900	13	67	751	3	6.1	1,050	9	26
12	1,800	10	49	709	3	5.7	1,050	9	26
13	1,700	8	37	689	3	5.6	1,080	9	26
14	1,600	8	35	662	3	5.4	994	9	24
15	1,540	7	29	647	3	5.2	968	9	24
16	1,540	6	25	634	4	6.8	961	8	21
17	1,520	6	25	622	4	6.7	958	8	21
18	1,490	5	20	613	3	5.0	935	8	20
19	1,450	5	20	604	3	4.9	914	8	20
20	1,410	5	19	645	3	5.2	895	9	22
21	1,350	5	18	756	4	8.2	925	9	22
22	1,310	5	18	849	6	14	963	9	23
23	1,360	5	18	856	8	18	977	9	24
24	1,370	5	18	799	6	13	956	9	23
25	1,290	4	14	762	6	12	949	9	23
26	1,180	4	13	757	6	12	937	9	23
27	1,120	4	12	762	6	12	915	9	22
28	1,070	4	12	755	6	12	895	8	19
29	1,040	4	11	742	6	12	879	7	17
30	1,020	4	11	719	7	14	868	7	16
31	977	4	11	772	8	17	--	--	--
TOTAL	**59,047**	**--**	**3,069**	**23,364**	**--**	**274.9**	**30,159**	**--**	**889**
MEAN	**1,905**	**14**	**99**	**754**	**4**	**8.9**	**1,005**	**10**	**30**
MAX	**3,850**	**46**	**478**	**932**	**8**	**18**	**1,350**	**36**	**131**
MIN	**977**	**4**	**11**	**604**	**3**	**4.9**	**868**	**7**	**16**

Total for water year 2008 (unrounded sum of daily values): streamflow–93,499 ft³/s (annual runoff–185,500 acre-ft); suspended-sediment discharge–9,660.83 tons.

Table 7. Daily mean streamflow and suspended-sediment data for Blackfoot River near Bonner, Montana, October 2007 through September 2008.

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

Day	Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment	
		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)
	OCTOBER			NOVEMBER			DECEMBER		
1	478	2	2.6	473	1	1.3	e440	2	2.4
2	483	2	2.6	472	1	1.3	e430	2	2.3
3	483	2	2.6	469	2	2.5	e550	2	3.0
4	477	2	2.6	472	2	2.5	e620	3	5.0
5	478	2	2.6	469	2	2.5	e600	3	4.9
6	485	3	3.9	471	1	1.3	e570	3	4.6
7	480	3	3.9	469	1	1.3	e530	3	4.3
8	478	3	3.9	467	2	2.5	e500	3	4.0
9	473	3	3.8	467	4	5.0	e480	2	2.6
10	472	3	3.8	467	2	2.5	e460	3	3.7
11	478	3	3.9	467	1	1.3	e450	3	3.6
12	489	3	4.0	467	1	1.3	e460	4	5.0
13	492	3	4.0	480	1	1.3	e480	4	5.2
14	480	3	3.9	489	1	1.3	e470	4	5.1
15	473	3	3.8	501	2	2.7	e450	4	4.9
16	472	2	2.5	514	2	2.8	e440	3	3.6
17	477	2	2.6	538	3	4.4	e430	2	2.3
18	480	2	2.6	574	3	4.6	e450	2	2.4
19	504	2	2.7	602	3	4.9	e470	2	2.5
20	512	2	2.8	593	3	4.8	e450	2	2.4
21	507	2	2.7	534	3	4.3	e420	2	2.3
22	498	2	2.7	486	2	2.6	e430	2	2.3
23	493	2	2.7	e450	1	1.2	e450	2	2.4
24	487	2	2.6	e400	1	1.1	e460	2	2.5
25	484	2	2.6	e420	1	1.1	e430	2	2.3
26	480	2	2.6	e450	1	1.2	e420	2	2.3
27	478	2	2.6	e470	1	1.3	e410	2	2.2
28	480	1	1.3	e500	2	2.7	e400	3	3.2
29	477	1	1.3	e480	2	2.6	e410	4	4.4
30	478	1	1.3	e460	2	2.5	e420	3	3.4
31	474	1	1.3	--	--	--	e430	2	2.3
TOTAL	**14,980**	**--**	**88.8**	**14,571**	**--**	**72.7**	**14,410**	**--**	**103.4**
MEAN	**483**	**2**	**2.9**	**486**	**2**	**2.4**	**465**	**3**	**3.3**
MAX	**512**	**3**	**4.0**	**602**	**4**	**5.0**	**620**	**4**	**5.2**
MIN	**472**	**1**	**1.3**	**400**	**1**	**1.1**	**400**	**2**	**2.2**

Table 7. Daily mean streamflow and suspended-sediment data for Blackfoot River near Bonner, Montana, October 2007 through September 2008.—Continued

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

Day	Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment	
		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)
		JANUARY			FEBRUARY			MARCH	
1	e400	1	1.1	e390	1	1.1	453	3	3.7
2	e370	1	1.0	e390	1	1.1	450	3	3.6
3	e350	1	.95	e380	1	1.0	442	3	3.6
4	e450	2	2.4	e380	1	1.0	448	2	2.4
5	e500	2	2.7	e380	2	2.1	444	3	3.6
6	e480	2	2.6	e390	2	2.1	444	3	3.6
7	e450	2	2.4	e400	2	2.2	444	4	4.8
8	e430	2	2.3	e410	2	2.2	439	3	3.6
9	e420	2	2.3	e420	2	2.3	440	2	2.4
10	e420	1	1.1	e440	2	2.4	450	3	3.6
11	e450	2	2.4	e470	3	3.8	466	4	5.0
12	e480	5	6.5	e500	2	2.7	475	4	5.1
13	e470	7	8.9	e480	2	2.6	479	4	5.2
14	e450	4	4.9	e460	2	2.5	489	5	6.6
15	e430	2	2.3	e450	3	3.6	495	6	8.0
16	e400	1	1.1	e440	2	2.4	496	4	5.4
17	e370	1	1.0	e420	1	1.1	490	3	4.0
18	e380	1	1.0	e400	1	1.1	488	5	6.6
19	e400	1	1.1	e390	1	1.1	500	6	8.1
20	e350	1	.95	e380	1	1.0	514	5	6.9
21	e280	1	.76	e390	2	2.1	517	4	5.6
22	e250	1	.68	e400	2	2.2	497	3	4.0
23	e270	1	.73	e400	2	2.2	482	3	3.9
24	e280	1	.76	e410	2	2.2	492	3	4.0
25	e300	1	.81	425	2	2.3	494	3	4.0
26	e330	1	.89	417	1	1.1	493	3	4.0
27	e400	1	1.1	418	2	2.3	495	3	4.0
28	e450	1	1.2	429	3	3.5	477	2	2.6
29	e420	1	1.1	445	2	2.4	478	3	3.9
30	e400	1	1.1	--	--	--	460	3	3.7
31	e400	1	1.1	--	--	--	459	3	3.7
TOTAL	**12,230**	**--**	**59.23**	**12,104**	**--**	**59.7**	**14,690**	**--**	**139.2**
MEAN	**395**	**2**	**1.9**	**417**	**2**	**2.1**	**474**	**3**	**4.5**
MAX	**500**	**7**	**8.9**	**500**	**3**	**3.8**	**517**	**6**	**8.1**
MIN	**250**	**1**	**.68**	**380**	**1**	**1.0**	**439**	**2**	**2.4**

Table 7. Daily mean streamflow and suspended-sediment data for Blackfoot River near Bonner, Montana, October 2007 through September 2008.—Continued

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

Day	Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment	
		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)
	APRIL			MAY			JUNE		
1	452	3	3.7	2,130	27	155	7,390	69	1,380
2	444	4	4.8	2,080	17	95	7,600	68	1,400
3	440	4	4.8	2,130	15	86	7,610	68	1,400
4	447	4	4.8	2,370	16	102	7,200	55	1,070
5	464	4	5.0	2,740	23	170	6,620	45	804
6	469	3	3.8	3,230	32	279	6,240	40	674
7	469	4	5.1	3,740	35	353	5,940	38	609
8	480	3	3.9	4,040	33	360	5,570	34	511
9	504	4	5.4	4,090	29	320	5,210	31	436
10	534	5	7.2	3,960	22	235	5,010	28	379
11	553	5	7.5	3,810	20	206	4,920	26	345
12	575	6	9.3	3,690	14	139	4,790	24	310
13	653	10	18	3,520	14	133	4,650	26	326
14	790	16	34	3,510	12	114	4,590	26	322
15	968	25	65	3,670	12	119	4,760	28	360
16	1,020	21	58	4,300	20	232	5,040	32	435
17	1,010	19	52	5,390	66	960	5,270	33	470
18	1,050	20	57	6,810	116	2,110	5,530	37	552
19	1,160	14	44	8,810	228	5,420	5,630	38	578
20	1,230	13	43	9,790	202	5,340	5,550	35	524
21	1,200	10	32	10,100	171	4,660	5,400	30	437
22	1,170	9	28	9,490	126	3,230	5,470	30	443
23	1,150	10	31	8,330	82	1,840	5,650	32	488
24	1,140	9	28	7,700	75	1,560	5,440	29	426
25	1,110	10	30	7,740	93	1,940	5,120	24	332
26	1,100	7	21	7,820	108	2,280	4,790	21	272
27	1,100	7	21	7,950	127	2,730	4,500	19	231
28	1,190	9	29	7,860	120	2,550	4,240	17	195
29	1,490	15	60	7,560	84	1,710	4,030	16	174
30	1,910	28	144	7,250	67	1,310	3,910	15	158
31	--	--	--	7,210	64	1,250	--	--	--
TOTAL	**26,272**	**--**	**860.3**	**172,820**	**--**	**41,988**	**163,670**	**--**	**16,041**
MEAN	**876**	**10**	**29**	**5,575**	**67**	**1,350**	**5,456**	**34**	**535**
MAX	**1,910**	**28**	**144**	**10,100**	**228**	**5,420**	**7,610**	**69**	**1,400**
MIN	**440**	**3**	**3.7**	**2,080**	**12**	**86**	**3,910**	**15**	**158**

Table 7. Daily mean streamflow and suspended-sediment data for Blackfoot River near Bonner, Montana, October 2007 through September 2008.—Continued

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

Day	Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment	
		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)
		JULY			AUGUST			SEPTEMBER	
1	3,840	16	166	959	3	7.8	876	6	14
2	4,060	25	274	937	3	7.6	989	6	16
3	4,010	26	282	925	3	7.5	963	5	13
4	3,660	22	217	912	4	9.8	891	5	12
5	3,420	19	175	882	4	9.5	851	5	11
6	3,220	17	148	853	3	6.9	834	4	9.0
7	3,010	16	130	820	3	6.6	829	3	6.7
8	2,800	14	106	796	3	6.4	818	3	6.6
9	2,650	9	64	800	3	6.5	801	2	4.3
10	2,490	6	40	823	3	6.7	787	2	4.2
11	2,350	6	38	812	3	6.6	801	2	4.3
12	2,200	6	36	787	2	4.2	785	2	4.2
13	2,060	6	33	764	2	4.1	759	3	6.1
14	1,940	6	31	748	2	4.0	740	2	4.0
15	1,800	6	29	737	3	6.0	727	2	3.9
16	1,720	5	23	715	3	5.8	714	2	3.9
17	1,630	5	22	694	3	5.6	705	2	3.8
18	1,530	5	21	676	2	3.7	691	2	3.7
19	1,470	5	20	667	2	3.6	674	2	3.6
20	1,410	4	15	684	2	3.7	662	3	5.4
21	1,350	4	15	758	2	4.1	660	3	5.3
22	1,280	4	14	812	2	4.4	695	3	5.6
23	1,280	4	14	804	2	4.3	725	4	7.8
24	1,250	4	14	768	3	6.2	703	3	5.7
25	1,190	4	13	727	3	5.9	689	3	5.6
26	1,150	4	12	716	3	5.8	676	2	3.7
27	1,110	3	9.0	709	3	5.7	660	2	3.6
28	1,060	3	8.6	708	3	5.7	656	2	3.5
29	1,040	3	8.4	709	3	5.7	652	3	5.3
30	1,010	3	8.2	703	3	5.7	649	3	5.3
31	983	3	8.0	737	2	4.0	--	--	--
TOTAL	**63,973**	**--**	**1,994.2**	**24,142**	**--**	**180.1**	**22,662**	**--**	**191.1**
MEAN	**2,064**	**8**	**64**	**779**	**3**	**5.8**	**755**	**3**	**6.4**
MAX	**4,060**	**26**	**282**	**959**	**4**	**9.8**	**989**	**6**	**16**
MIN	**983**	**3**	**8.0**	**667**	**2**	**3.6**	**649**	**2**	**3.5**

Total for water year 2008 (unrounded sum of daily values): streamflow–556,524 ft³/s (annual runoff–1,104,000 acre-ft); suspended-sediment discharge–61,777.73 tons.

Table 8. Daily mean streamflow and suspended-sediment data for Clark Fork above Missoula, Montana, October 2007 through September 2008.

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

Day	Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment	
		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)
	OCTOBER			NOVEMBER			DECEMBER		
1	1,250	14	47	1,300	9	32	e1,100	14	42
2	1,270	14	48	1,290	9	31	e1,000	44	119
3	1,310	14	50	1,270	9	31	e1,200	114	369
4	1,310	14	50	1,270	11	38	1,490	158	636
5	1,300	14	49	1,260	11	37	1,710	151	697
6	1,340	16	58	1,260	10	34	1,660	112	502
7	1,370	18	67	1,250	9	30	1,480	68	272
8	1,340	16	58	1,250	21	71	1,330	29	104
9	1,330	15	54	1,250	29	98	1,180	8	25
10	1,330	14	50	1,240	27	90	e1,150	10	31
11	1,350	13	47	1,250	26	88	e1,150	13	40
12	1,370	12	44	1,250	24	81	e1,100	16	48
13	1,350	12	44	1,260	21	71	e1,200	19	62
14	1,320	12	43	1,290	20	70	1,290	22	77
15	1,300	12	42	1,250	20	68	1,250	22	74
16	1,290	12	42	1,280	19	66	1,200	20	65
17	1,320	12	43	1,320	18	64	1,160	17	53
18	1,340	13	47	1,380	18	67	1,170	15	47
19	1,370	14	52	1,490	17	68	1,220	13	43
20	1,430	15	58	1,490	16	64	1,280	11	38
21	1,460	15	59	1,390	16	60	1,210	10	33
22	1,410	15	57	1,170	16	51	1,050	9	26
23	1,380	15	56	e1,000	18	49	1,080	10	29
24	1,370	15	55	e900	24	58	1,230	10	33
25	1,370	15	55	948	28	72	1,210	10	33
26	1,360	13	48	1,080	29	85	1,130	9	27
27	1,350	12	44	1,130	32	98	1,100	8	24
28	1,320	10	36	1,300	46	161	1,050	8	23
29	1,320	8	29	e1,250	63	213	1,080	7	20
30	1,320	8	29	e1,200	33	107	1,090	7	21
31	1,320	8	29	--	--	--	1,110	10	30
TOTAL	**41,570**	**--**	**1,490**	**37,268**	**--**	**2,153**	**37,660**	**--**	**3,643**
MEAN	**1,341**	**13**	**48**	**1,242**	**22**	**72**	**1,215**	**31**	**118**
MAX	**1,460**	**18**	**67**	**1,490**	**63**	**213**	**1,710**	**158**	**697**
MIN	**1,250**	**8**	**29**	**900**	**9**	**30**	**1,000**	**7**	**20**

Table 8. Daily mean streamflow and suspended-sediment data for Clark Fork above Missoula, Montana, October 2007 through September 2008.

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

Day	Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment	
		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)
	JANUARY			FEBRUARY			MARCH		
1	e1,050	10	28	e1,000	171	462	1,150	16	50
2	e900	10	24	e1,000	205	554	1,170	14	44
3	e800	10	22	e1,000	237	640	1,140	11	34
4	e1,200	10	32	e1,000	271	732	1,130	10	31
5	1,480	10	40	e1,000	305	824	1,140	10	31
6	1,300	10	35	e1,050	337	955	1,120	11	33
7	1,140	8	25	e1,050	369	1,050	1,120	10	30
8	1,070	4	12	e1,050	400	1,130	1,120	10	30
9	1,100	2	5.9	e1,050	388	1,100	1,130	11	34
10	1,090	2	5.9	e1,100	183	544	1,170	13	41
11	1,200	6	19	e1,150	47	146	1,200	15	49
12	1,290	23	80	e1,200	24	78	1,250	18	61
13	1,270	41	141	1,200	19	62	1,270	19	65
14	1,170	28	88	1,170	14	44	1,270	20	69
15	1,120	23	70	1,130	10	31	1,280	16	55
16	1,020	67	185	1,150	11	34	1,270	18	62
17	874	26	61	1,150	13	40	1,250	16	54
18	980	56	148	1,100	12	36	1,200	15	49
19	1,110	70	210	1,050	11	31	1,230	16	53
20	e1,000	31	84	1,030	10	28	1,280	18	62
21	e700	6	11	1,050	9	26	1,290	17	59
22	e600	4	6.5	1,060	9	26	1,250	13	44
23	e650	4	7.0	1,080	9	26	1,190	15	48
24	e700	3	5.7	1,100	9	27	1,210	21	69
25	e800	3	6.5	1,120	9	27	1,250	35	118
26	e900	6	15	1,100	10	30	1,230	30	100
27	e1,100	22	65	1,100	12	36	1,230	11	37
28	e1,200	65	211	1,110	14	42	1,310	220	778
29	e1,100	104	309	1,140	14	43	1,190	572	1,840
30	e1,050	126	357	--	--	--	1,160	260	814
31	e1,000	148	400	--	--	--	1,130	140	427
TOTAL	**31,964**	**--**	**2,709.5**	**31,490**	**--**	**8,804**	**37,330**	**--**	**5,271**
MEAN	**1,031**	**30**	**87**	**1,086**	**108**	**304**	**1,204**	**52**	**170**
MAX	**1,480**	**148**	**400**	**1,200**	**400**	**1,130**	**1,310**	**572**	**1,840**
MIN	**600**	**2**	**5.7**	**1,000**	**9**	**26**	**1,120**	**10**	**30**

Table 8. Daily mean streamflow and suspended-sediment data for Clark Fork above Missoula, Montana, October 2007 through September 2008.

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

Day	Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment	
		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)
		APRIL			MAY			JUNE	
1	1,140	115	354	3,910	637	6,720	12,900	144	5,020
2	1,110	100	300	3,710	511	5,120	13,300	148	5,350
3	1,090	85	250	3,690	358	3,570	13,500	145	5,360
4	1,110	83	249	3,970	435	4,660	13,000	126	4,460
5	1,160	83	260	4,510	560	6,820	13,000	147	5,200
6	1,170	78	246	5,190	588	8,240	12,800	160	5,570
7	1,150	65	202	5,980	660	10,700	12,200	127	4,220
8	1,160	81	254	6,520	704	12,400	11,400	136	4,190
9	1,180	61	194	6,670	560	10,100	10,800	98	2,860
10	1,220	62	204	6,480	424	7,420	10,500	81	2,300
11	1,250	65	219	6,220	336	5,640	10,600	81	2,320
12	1,270	66	226	6,080	272	4,470	10,500	76	2,150
13	1,400	100	378	5,820	224	3,520	10,600	86	2,460
14	1,710	216	997	5,760	255	3,970	10,400	72	2,020
15	2,440	317	2,090	6,050	288	4,700	10,400	62	1,740
16	2,610	314	2,210	6,920	504	9,420	10,700	74	2,140
17	2,250	216	1,310	8,460	760	17,400	10,900	92	2,710
18	2,210	167	996	10,400	785	22,000	11,100	95	2,870
19	2,480	202	1,350	13,800	955	35,600	11,200	92	2,810
20	2,630	294	2,090	16,200	1,060	46,400	10,900	74	2,200
21	2,410	188	1,220	16,800	685	31,100	10,600	63	1,800
22	2,320	142	889	16,400	408	18,200	10,600	60	1,720
23	2,270	185	1,130	14,600	345	13,700	10,900	75	2,210
24	2,270	167	1,020	13,600	312	11,500	10,600	65	1,860
25	2,250	159	966	13,600	262	9,620	9,880	46	1,230
26	2,220	156	935	14,100	317	12,200	9,180	46	1,140
27	2,180	184	1,080	14,100	258	9,820	8,570	48	1,110
28	2,330	196	1,230	13,700	230	8,570	8,080	43	938
29	2,970	329	2,640	13,300	190	6,820	7,650	48	991
30	3,720	630	6,330	12,900	164	5,760	7,380	45	897
31	--	--	--	12,800	161	5,610	--	--	--
TOTAL	**56,680**	**--**	**31,819**	**292,240**	**--**	**361,770**	**324,140**	**--**	**81,846**
MEAN	**1,889**	**170**	**1,060**	**9,427**	**458**	**11,700**	**10,800**	**88**	**2,730**
MAX	**3,720**	**630**	**6,330**	**16,800**	**1,060**	**46,400**	**13,500**	**160**	**5,570**
MIN	**1,090**	**61**	**194**	**3,690**	**161**	**3,520**	**7,380**	**43**	**897**

Table 8. Daily mean streamflow and suspended-sediment data for Clark Fork above Missoula, Montana, October 2007 through September 2008.

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

Day	Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment	
		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)
		JULY			AUGUST			SEPTEMBER	
1	7,270	39	766	1,900	5	26	1,830	12	59
2	7,860	88	1,870	1,830	4	20	2,350	28	178
3	8,090	66	1,440	1,790	4	19	2,240	10	60
4	7,170	38	736	1,770	4	19	2,060	8	44
5	6,660	28	503	1,730	4	19	1,940	8	42
6	6,460	30	523	1,670	3	14	1,900	7	36
7	5,920	32	511	1,610	3	13	1,880	7	36
8	5,400	29	423	1,560	3	13	1,860	7	35
9	4,990	21	283	1,540	3	12	1,820	6	29
10	4,650	19	239	1,570	3	13	1,800	6	29
11	4,310	19	221	1,550	4	17	1,830	6	30
12	4,030	16	174	1,480	4	16	1,810	6	29
13	3,810	13	134	1,440	4	16	1,770	6	29
14	3,590	12	116	1,410	4	15	1,740	6	28
15	3,370	12	109	1,380	4	15	1,710	6	28
16	3,250	11	97	1,350	4	15	1,680	6	27
17	3,150	10	85	1,320	4	14	1,670	6	27
18	2,990	8	65	1,290	4	14	1,630	6	26
19	2,860	7	54	1,260	3	10	1,590	6	26
20	2,760	7	52	1,320	3	11	1,560	7	29
21	2,640	7	50	1,510	4	16	1,580	7	30
22	2,520	6	41	1,660	6	27	1,660	7	31
23	2,570	6	42	1,670	7	32	1,710	7	32
24	2,580	6	42	1,580	5	21	1,670	7	32
25	2,430	7	46	1,490	4	16	1,650	6	27
26	2,300	6	37	1,480	4	16	1,610	6	26
27	2,210	5	30	1,470	4	16	1,580	6	26
28	2,120	5	29	1,460	4	16	1,550	5	21
29	2,060	5	28	1,450	4	16	1,540	5	21
30	2,020	5	27	1,420	5	19	1,510	5	20
31	1,960	5	26	1,500	5	20	--	--	--
TOTAL	**124,000**	**--**	**8,799**	**47,460**	**--**	**526**	**52,730**	**--**	**1,093**
MEAN	**4,000**	**18**	**284**	**1,531**	**4**	**17**	**1,758**	**7**	**36**
MAX	**8,090**	**88**	**1,870**	**1,900**	**7**	**32**	**2,350**	**28**	**178**
MIN	**1,960**	**5**	**26**	**1,260**	**3**	**10**	**1,510**	**5**	**20**

Total for water year 2008 (unrounded sum of daily values): streamflow–1,114,532 ft³/s (annual runoff–2,211,000 acre-ft); suspended-sediment discharge–509,923.5 tons.

Table 9. Seasonal daily maximum, minimum, and mean turbidity at Mill Creek near Anaconda, Montana, October 2007 and March through September 2008.

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

Day	Maximum	Minimum	Mean	Maximum	Minimum	Mean	Maximum	Minimum	Mean
	OCTOBER			MARCH			APRIL		
1	2.5	1.0	1.5	--	--	--	4.0	2.5	3.0
2	1.5	1.0	1.5	--	--	--	7.0	2.5	4.0
3	2.0	1.5	1.5	--	--	--	7.0	4.0	5.0
4	2.0	1.0	1.5	--	--	--	6.5	4.5	5.0
5	2.5	1.5	2.0	--	--	--	7.0	4.0	5.0
6	3.0	1.5	2.0	--	--	--	8.5	4.0	4.5
7	2.5	1.5	2.0	--	--	--	9.0	4.5	6.0
8	2.5	1.5	2.0	--	--	--	9.0	5.5	6.5
9	2.5	1.5	2.0	--	--	--	7.5	4.5	5.0
10	2.5	1.0	1.5	--	--	--	11	5.0	6.0
11	2.0	1.0	1.5	--	--	--	15	6.5	9.5
12	--	--	2.0	--	--	--	18	3.5	10
13	--	--	--	--	--	--	15	4.0	7.0
14	--	--	--	--	--	--	20	5.5	11
15	--	--	--	--	--	--	14	8.0	10
16	--	--	--	--	--	--	8.5	6.0	7.5
17	--	--	--	--	--	--	8.0	4.5	6.0
18	--	--	--	--	--	--	11	5.5	7.5
19	--	--	--	--	--	5.0	11	6.5	7.5
20	--	--	--	5.0	4.5	4.5	14	3.5	7.0
21	--	--	--	5.5	4.0	4.5	10	4.0	5.5
22	--	--	--	6.5	3.5	4.5	8.0	4.5	5.5
23	--	--	--	6.5	3.0	4.0	9.0	5.0	6.5
24	--	--	--	4.0	3.0	3.0	12	4.5	5.0
25	--	--	--	4.0	2.5	3.0	6.0	4.0	5.0
26	--	--	--	4.0	2.5	3.0	5.0	4.0	4.5
27	--	--	--	4.5	2.0	3.0	8.0	4.5	5.0
28	--	--	--	6.0	2.5	3.0	24	6.5	10
29	--	--	--	5.0	3.0	3.5	29	10	16
30	--	--	--	5.0	3.0	3.5	24	8.0	11
31	--	--	--	7.0	2.5	3.0	--	--	--
MONTH[1]	**3.0**	**1.0**	**1.8**	**7.0**	**2.0**	**3.7**	**29**	**2.5**	**6.9**

Table 9. Seasonal daily maximum, minimum, and mean turbidity at Mill Creek near Anaconda, Montana, October 2007 and March through September 2008.—Continued

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

Day	Maximum	Minimum	Mean	Maximum	Minimum	Mean	Maximum	Minimum	Mean
		MAY			JUNE			JULY	
1	17	8.5	12	7.5	5.5	6.0	--	--	--
2	20	4.0	11	8.0	5.0	6.0	--	--	--
3	7.5	4.0	5.0	7.5	5.0	5.5	--	--	--
4	7.5	4.0	5.0	11	5.5	7.0	--	--	--
5	14	4.5	7.5	6.5	5.0	5.5	--	--	--
6	14	6.5	9.5	7.0	5.0	5.5	--	--	--
7	13	7.5	9.5	6.0	5.0	5.5	--	--	--
8	10	6.0	7.5	7.0	5.0	5.5	--	--	--
9	8.5	6.0	7.0	8.0	4.5	5.5	--	--	--
10	10	5.5	7.5	6.5	5.5	6.0	--	--	--
11	13	5.5	8.5	7.5	6.0	6.5	--	--	--
12	10	6.0	8.0	7.0	5.5	6.0	--	--	--
13	10	4.5	7.0	6.5	5.0	6.0	--	--	--
14	16	7.0	10	8.0	5.0	6.0	--	--	--
15	20	7.5	12	6.5	5.0	5.5	--	--	--
16	30	9.5	18	7.5	4.5	5.5	8.5	2.5	4.5
17	30	12	21	6.5	4.5	5.5	6.5	2.5	4.0
18	29	14	19	8.0	4.5	5.5	8.0	2.0	3.5
19	30	16	21	6.5	4.5	5.5	4.0	1.5	2.5
20	30	16	22	8.0	5.5	6.5	3.5	1.5	2.0
21	18	10	13	13	5.5	7.0	3.0	1.5	2.0
22	11	8.0	9.5	19	10	13	4.5	2.0	3.0
23	11	7.5	8.5	21	8.0	12	3.5	1.5	2.0
24	14	7.0	8.5	11	6.5	7.5	4.5	1.5	2.0
25	10	7.0	7.5	8.5	5.5	6.5	3.0	1.5	2.0
26	9.0	7.0	7.5	8.5	5.0	6.0	3.5	2.0	2.5
27	9.0	6.5	7.5	8.0	5.0	5.5	3.5	2.0	2.5
28	9.5	6.5	7.0	6.5	5.0	5.5	5.0	1.5	2.5
29	8.0	6.0	6.5	9.0	5.5	6.5	3.0	1.0	2.0
30	8.0	5.5	6.5	--	--	--	3.5	1.5	2.0
31	7.5	5.5	6.0	--	--	--	3.5	1.5	2.0
MONTH[1]	**30**	**4.0**	**10**	**21**	**4.5**	**6.4**	**8.5**	**1.0**	**2.6**

Table 9. Seasonal daily maximum, minimum, and mean turbidity at Mill Creek near Anaconda, Montana, October 2007 and March through September 2008.—Continued

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

Day	Maximum	Minimum	Mean	Maximum	Minimum	Mean
	AUGUST			SEPTEMBER		
1	3.5	1.5	2.5	18	4.5	7.0
2	3.5	1.5	2.0	8.0	4.0	5.0
3	4.0	2.0	2.5	6.5	3.5	4.5
4	3.5	2.0	2.5	6.5	5.0	5.5
5	5.5	2.0	2.5	6.0	4.0	5.0
6	4.0	2.0	2.5	5.5	3.5	4.5
7	4.5	2.0	3.0	5.0	3.0	4.0
8	4.5	2.0	2.5	6.0	3.0	4.0
9	3.5	1.5	2.5	4.5	3.0	3.5
10	3.0	2.0	2.5	6.0	3.5	4.0
11	3.0	2.0	2.5	5.5	3.5	4.5
12	3.5	2.0	2.5	7.0	3.0	4.0
13	3.5	2.0	2.5	4.5	3.0	3.5
14	5.5	2.5	3.0	4.5	2.5	3.5
15	5.5	2.5	3.5	6.0	3.0	3.5
16	4.5	2.5	3.5	4.5	3.0	3.5
17	5.0	3.0	4.0	7.0	3.0	4.0
18	5.5	3.5	4.5	4.5	3.0	3.5
19	8.5	4.0	5.5	4.5	2.5	3.5
20	7.0	3.5	5.0	--	--	--
21	7.0	3.5	4.5	--	--	--
22	4.5	3.0	3.5	--	--	--
23	4.5	3.5	3.5	--	--	--
24	6.0	3.5	4.5	--	--	--
25	6.0	4.0	4.5	--	--	--
26	5.5	3.0	4.0	--	--	--
27	4.5	2.5	3.0	--	--	--
28	5.0	2.5	3.5	--	--	--
29	8.5	3.0	4.0	--	--	--
30	5.0	3.0	4.0	--	--	--
31	13	3.0	4.5	--	--	--
MONTH[1]	**13**	**1.5**	**3.4**	**18**	**2.5**	**4.2**

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

Table 10. Seasonal daily maximum, minimum, and mean turbidity at Willow Creek near Anaconda, Montana, October 2007 and April through September 2008.

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

Day	Maximum	Minimum	Mean	Maximum	Minimum	Mean	Maximum	Minimum	Mean
		OCTOBER			APRIL			MAY	
1	4.0	1.0	2.0	--	--	--	33	18	22
2	3.5	1.5	2.0	--	--	--	28	16	19
3	7.0	1.5	2.5	--	--	--	31	17	20
4	5.0	1.5	2.0	--	--	--	--	--	--
5	7.0	1.5	2.0	--	--	--	--	--	--
6	6.0	1.5	2.0	--	--	--	--	--	--
7	5.0	1.0	2.0	--	--	--	--	--	--
8	5.5	1.5	2.0	--	--	--	--	--	--
9	4.0	1.0	2.0	--	--	--	--	--	--
10	3.5	1.0	1.5	--	--	--	--	--	--
11	4.0	1.0	1.5	--	--	--	--	--	--
12	--	--	--	--	--	--	--	--	--
13	--	--	--	--	--	--	--	--	--
14	--	--	--	--	--	--	--	--	--
15	--	--	--	--	--	--	--	--	--
16	--	--	--	21	10	12	--	--	--
17	--	--	--	12	9.0	10	--	--	--
18	--	--	--	17	8.0	11	--	--	--
19	--	--	--	19	10	12	--	--	--
20	--	--	--	26	10	14	43	9.0	19
21	--	--	--	33	8.5	15	39	9.5	21
22	--	--	--	31	8.5	14	58	22	39
23	--	--	--	13	9.0	10	--	--	--
24	--	--	--	15	8.5	10	--	--	--
25	--	--	--	10	7.5	8.5	--	--	--
26	--	--	--	12	8.0	9.5	--	--	--
27	--	--	--	13	8.0	9.0	--	--	--
28	--	--	--	38	9.5	16	--	--	--
29	--	--	--	--	--	--	--	--	--
30	--	--	--	--	--	--	--	--	--
31	--	--	--	--	--	--	--	--	--
MONTH[1]	**7.0**	**1.0**	**2.0**	**38**	**7.5**	**12**	**58**	**9.0**	**23**

Table 10. Seasonal daily maximum, minimum, and mean turbidity at Willow Creek near Anaconda, Montana, October 2007 and April through September 2008.—Continued

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

Day	Maximum	Minimum	Mean	Maximum	Minimum	Mean	Maximum	Minimum	Mean
	JUNE			JULY			AUGUST		
1	--	--	--	5.0	3.0	3.5	7.0	3.5	4.0
2	--	--	--	5.0	3.0	3.5	9.0	3.5	5.0
3	--	--	--	9.0	3.0	4.0	11	4.5	5.5
4	--	--	--	--	--	--	16	4.0	5.5
5	--	--	--	--	--	--	12	4.5	6.0
6	--	--	--	--	--	--	--	--	--
7	--	--	--	--	--	--	--	--	--
8	--	--	--	14	9.0	11	--	--	--
9	--	--	--	13	8.0	10	--	--	--
10	12	8.0	9.0	14	6.5	8.5	--	--	--
11	14	7.5	9.0	9.5	6.0	7.5	--	--	--
12	11	7.0	8.0	11	5.5	7.0	--	--	--
13	52	7.5	16	8.0	5.5	6.5	--	--	--
14	16	8.5	10	8.5	5.0	5.5	--	--	--
15	12	7.5	8.5	7.5	4.0	5.5	--	--	--
16	10	6.5	8.0	7.0	4.0	5.0	--	--	--
17	12	6.5	7.5	9.5	4.0	4.5	--	--	--
18	8.0	5.5	6.5	7.0	3.5	4.5	--	--	--
19	7.5	5.0	6.0	6.0	3.5	4.0	--	--	--
20	9.0	5.0	6.0	8.0	3.0	4.0	--	--	--
21	8.5	4.5	5.5	7.5	3.0	4.0	--	--	--
22	6.0	4.5	5.0	88	3.0	9.0	--	--	--
23	8.0	4.0	5.0	73	4.0	9.0	--	--	--
24	6.5	4.0	4.5	9.0	3.5	5.0	--	--	--
25	6.0	3.5	4.5	9.0	4.5	5.5	--	--	--
26	6.5	3.5	4.5	--	--	--	4.0	1.5	2.5
27	6.0	3.5	4.5	--	--	--	4.0	2.0	2.5
28	7.5	3.5	4.5	--	--	--	4.0	2.0	2.5
29	6.0	3.5	4.0	--	--	--	4.0	1.5	2.5
30	5.5	3.0	4.0	8.0	3.5	4.5	4.0	1.5	2.5
31	--	--	--	8.0	3.0	4.5	--	--	--
MONTH[1]	**52**	**3.0**	**6.7**	**88**	**3.0**	**5.9**	**16**	**1.5**	**3.8**

Table 10. Seasonal daily maximum, minimum, and mean turbidity at Willow Creek near Anaconda, Montana, October 2007 and April through September 2008.—Continued

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

Day	Maximum	Minimum	Mean
	SEPTEMBER		
1	--	--	--
2	--	--	--
3	--	--	--
4	--	--	--
5	4.0	1.5	2.0
6	2.5	1.5	2.0
7	3.5	1.5	2.0
8	2.5	1.5	2.0
9	3.0	1.5	2.0
10	3.0	2.0	2.0
11	2.5	1.5	2.0
12	2.5	1.5	2.0
13	2.0	1.5	1.5
14	2.5	1.5	2.0
15	3.0	1.5	2.0
16	3.0	2.0	2.5
17	3.0	2.0	2.5
18	2.5	1.5	2.0
19	2.5	1.5	2.0
20	2.5	1.5	2.0
21	2.0	1.5	2.0
22	2.0	1.5	1.5
23	2.0	1.5	1.5
24	2.0	1.5	1.5
25	2.0	1.5	1.5
26	2.5	1.5	2.0
27	2.5	1.5	2.0
28	2.5	1.5	1.5
29	5.0	1.5	2.0
30	6.0	1.5	2.0
31	--	--	--
MONTH[1]	**6.0**	**1.5**	**1.9**

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

Table 11. Seasonal daily maximum, minimum, and mean turbidity at Warm Springs Creek near Anaconda, Montana, October 2007 and March through September 2008.

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

Day	Maximum	Minimum	Mean	Maximum	Minimum	Mean	Maximum	Minimum	Mean
	OCTOBER			MARCH			APRIL		
1	1.0	0.5	1.0	--	--	--	2.0	0.5	1.5
2	--	--	--	--	--	--	3.5	1.0	1.5
3	--	--	--	--	--	--	2.0	1.0	1.5
4	--	--	--	--	--	--	4.0	.5	1.5
5	3.0	.5	.5	--	--	--	2.5	.5	1.5
6	--	--	--	--	--	--	2.5	1.0	1.5
7	--	--	--	--	--	--	2.0	.5	1.0
8	--	--	--	--	--	--	2.0	.5	1.0
9	--	--	--	--	--	--	3.0	1.0	2.0
10	4.0	.5	1.5	--	--	--	6.0	2.0	3.0
11	3.0	.5	.5	--	--	--	5.0	2.5	3.5
12	--	--	.5	--	--	--	--	--	3.0
13	--	--	--	--	--	--	--	--	--
14	--	--	--	--	--	--	--	--	--
15	--	--	--	--	--	--	--	--	3.0
16	--	--	--	--	--	--	6.0	2.5	4.0
17	--	--	--	--	--	--	5.5	2.0	3.5
18	--	--	--	--	--	--	--	--	--
19	--	--	--	--	--	--	--	--	--
20	--	--	--	3.5	1.0	2.0	--	--	2.5
21	--	--	--	1.5	.5	1.0	7.5	1.0	4.0
22	--	--	--	2.5	1.0	1.0	6.0	1.0	2.0
23	--	--	--	3.0	.5	1.5	--	--	--
24	--	--	--	4.0	1.0	1.5	6.0	1.5	3.5
25	--	--	--	2.5	.5	1.0	6.0	1.0	2.5
26	--	--	--	2.0	.5	1.0	6.5	.5	2.5
27	--	--	--	2.5	1.0	1.0	--	--	--
28	--	--	--	--	--	2.0	--	--	--
29	--	--	--	--	--	1.5	8.0	2.0	4.0
30	--	--	--	--	--	2.5	--	--	--
31	--	--	--	--	--	1.5	--	--	--
MONTH[1]	**4.0**	**.5**	**.8**	**4.0**	**.5**	**1.5**	**8.0**	**.5**	**2.5**

Table 11. Seasonal daily maximum, minimum, and mean turbidity at Warm Springs Creek near Anaconda, Montana, October 2007 and March through September 2008.—Continued

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

Day	Maximum	Minimum	Mean	Maximum	Minimum	Mean	Maximum	Minimum	Mean
		MAY			JUNE			JULY	
1	--	--	--	6.0	3.5	4.5	3.5	2.0	2.5
2	--	--	--	7.5	4.0	5.5	4.0	2.0	2.5
3	--	--	--	5.5	2.5	3.5	3.0	1.5	2.0
4	--	--	2.0	17	3.0	5.0	4.5	1.5	2.0
5	5.0	1.0	2.5	4.5	2.0	3.0	3.0	1.5	2.0
6	--	--	3.0	3.5	2.0	3.0	4.5	1.5	2.0
7	--	--	--	3.0	2.0	2.5	6.5	1.5	2.0
8	--	--	--	2.5	1.5	2.0	2.5	1.0	1.5
9	--	--	--	4.5	1.5	2.0	2.5	1.0	1.5
10	--	--	--	3.5	1.5	2.0	2.5	1.0	1.5
11	--	--	2.0	4.5	2.0	2.5	3.0	1.0	1.5
12	4.5	1.5	2.0	4.0	1.5	2.0	2.0	.5	1.5
13	3.0	1.0	2.0	4.0	1.5	2.0	2.0	.5	1.0
14	4.0	1.5	2.0	3.5	1.5	2.5	2.0	.5	1.0
15	7.5	1.5	3.0	3.5	1.5	2.5	2.0	.5	1.0
16	16	4.5	8.0	4.0	2.0	3.0	1.5	.5	1.0
17	22	5.5	12	9.5	4.0	6.0	2.0	.5	1.0
18	57	10	28	15	5.0	8.5	2.5	.5	1.5
19	64	14	34	11	5.0	7.5	2.5	1.5	2.0
20	35	11	19	8.5	4.0	6.0	3.5	1.5	2.0
21	24	7.5	14	15	5.0	8.0	3.0	1.5	2.0
22	9.5	4.5	6.5	26	12	18	36	1.5	3.0
23	9.5	4.0	5.0	29	7.0	17	5.5	1.5	2.5
24	6.5	3.0	4.0	10	5.0	7.0	3.5	1.5	2.0
25	6.0	2.5	4.0	14	3.5	7.0	2.5	1.5	2.0
26	3.5	2.5	3.0	5.5	3.0	4.0	3.0	1.5	2.0
27	4.0	2.0	3.0	5.0	2.5	3.5	3.0	1.5	2.0
28	4.0	2.0	2.5	5.0	2.0	3.0	4.5	1.5	2.0
29	4.0	2.0	2.5	4.0	2.0	3.0	5.0	1.5	2.0
30	5.0	2.5	3.5	4.5	2.0	3.0	3.5	1.5	2.0
31	4.5	2.5	3.5	--	--	--	3.0	1.5	2.0
MONTH[1]	**6.4**	**1.0**	**7.1**	**29**	**1.5**	**5.0**	**36**	**.5**	**1.8**

Table 11. Seasonal daily maximum, minimum, and mean turbidity at Warm Springs Creek near Anaconda, Montana, October 2007 and March through September 2008. —Continued

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

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

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

Table 12. Seasonal daily maximum, minimum, and mean turbidity at Lost Creek near Anaconda, Montana, October 2007 and March through September 2008.

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

Day	Maximum	Minimum	Mean	Maximum	Minimum	Mean	Maximum	Minimum	Mean
	OCTOBER			MARCH			APRIL		
1	3.0	2.5	2.5	--	--	--	19	3.0	6.5
2	3.0	2.0	2.5	--	--	--	37	3.0	8.5
3	2.5	2.0	2.5	--	--	--	22	3.5	5.5
4	3.0	2.0	2.5	--	--	--	7.0	3.5	4.0
5	3.0	2.0	2.5	--	--	--	4.0	3.0	3.5
6	2.5	2.5	2.5	--	--	--	8.0	3.5	4.0
7	3.0	2.0	2.5	--	--	--	5.5	3.0	3.5
8	2.5	2.0	2.5	--	--	--	7.0	3.0	3.5
9	2.5	2.0	2.0	--	--	--	5.5	3.0	3.5
10	2.5	2.0	2.0	--	--	--	5.0	3.0	3.5
11	2.5	2.0	2.0	--	--	--	5.0	3.0	3.5
12	--	--	2.5	--	--	--	9.5	3.0	4.5
13	--	--	--	--	--	--	16	3.0	6.0
14	--	--	--	--	--	--	11	3.0	6.0
15	--	--	--	--	--	--	10	3.5	5.0
16	--	--	--	--	--	--	7.0	3.0	4.0
17	--	--	--	--	--	--	6.0	2.5	3.5
18	--	--	--	--	--	--	5.0	3.0	3.5
19	--	--	--	--	--	3.5	36	3.0	7.0
20	--	--	--	6.0	3.0	3.5	54	4.5	25
21	--	--	--	5.0	3.0	3.5	24	3.0	7.0
22	--	--	--	22	3.0	5.0	21	3.0	6.0
23	--	--	--	10	3.5	5.0	6.5	3.0	4.5
24	--	--	--	6.0	3.0	4.0	21	3.5	6.0
25	--	--	--	7.0	3.0	4.0	5.0	3.0	3.5
26	--	--	--	8.5	3.5	4.0	9.0	3.0	3.5
27	--	--	--	6.5	3.0	4.0	10	3.0	4.0
28	--	--	--	18	3.0	6.0	6.5	2.5	4.0
29	--	--	--	17	3.5	5.5	8.0	3.5	5.0
30	--	--	--	21	3.0	5.0	10	4.0	5.5
31	--	--	--	7.0	3.0	4.0	--	--	--
MONTH[1]	**3.0**	**2.0**	**2.4**	**22**	**3.0**	**4.4**	**54**	**2.5**	**5.4**

Table 12. Seasonal daily maximum, minimum, and mean turbidity at Lost Creek near Anaconda, Montana, October 2007 and March through September 2008.—Continued

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

Day	Maximum	Minimum	Mean	Maximum	Minimum	Mean	Maximum	Minimum	Mean
		MAY			JUNE			JULY	
1	6.5	3.0	4.0	12	6.0	9.0	9.0	3.5	4.5
2	5.0	3.0	4.0	15	6.0	9.5	8.0	3.5	5.0
3	4.5	3.0	3.5	13	5.5	8.0	8.0	3.0	4.5
4	10	3.5	5.0	27	7.0	12	32	3.0	6.0
5	5.5	3.0	4.0	11	5.0	7.0	8.5	3.0	4.0
6	8.5	4.0	5.0	9.5	5.0	6.5	4.5	2.5	3.5
7	13	5.0	8.0	7.0	4.5	5.5	4.5	2.5	3.0
8	11	3.5	5.5	8.5	3.5	5.5	5.0	2.0	3.0
9	8.0	3.5	5.0	9.0	4.5	5.5	4.0	2.0	2.5
10	5.0	3.0	4.0	8.0	4.5	5.5	3.5	2.0	2.5
11	5.0	3.0	4.0	9.0	4.5	6.0	3.0	2.0	2.5
12	5.0	3.0	4.0	8.0	4.0	5.5	3.0	1.5	2.5
13	4.5	3.0	3.5	9.0	4.0	5.5	5.0	1.5	2.5
14	4.5	3.0	4.0	12	5.0	7.5	4.5	1.5	2.5
15	7.0	4.0	5.0	18	6.5	11	3.0	1.5	2.5
16	12	4.5	7.5	17	7.5	11	4.5	1.5	2.5
17	23	5.5	11	16	8.0	11	4.0	1.0	2.0
18	37	7.5	11	17	8.5	12	4.0	1.5	2.0
19	52	11	28	14	8.0	11	4.0	2.0	2.5
20	50	11	21	15	7.0	10	5.0	2.5	3.0
21	23	14	18	19	7.0	11	3.5	2.0	2.5
22	15	8.0	10	19	9.5	13	6.0	2.5	3.0
23	21	6.5	8.5	19	8.5	12	4.0	2.0	2.5
24	9.5	4.5	7.0	11	6.5	8.5	3.5	2.0	2.5
25	30	5.5	8.5	9.5	5.5	7.0	4.0	2.0	2.5
26	11	4.5	6.5	8.0	4.5	6.5	5.0	1.5	2.5
27	6.5	4.0	5.0	9.0	4.5	6.0	3.5	1.5	2.0
28	7.5	4.0	5.0	6.5	4.0	5.0	3.5	1.5	2.0
29	6.0	4.0	5.0	6.5	4.0	5.0	2.5	1.5	2.0
30	12	4.5	6.5	6.0	4.0	4.5	3.5	1.5	2.0
31	10	4.5	6.0	--	--	--	3.0	1.5	2.0
MONTH[1]	**52**	**3.0**	**7.5**	**27**	**3.5**	**8.1**	**32**	**1.0**	**2.9**

Table 12. Seasonal daily maximum, minimum, and mean turbidity at Lost Creek near Anaconda, Montana, October 2007 and March through September 2008.—Continued

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

Day	Maximum	Minimum	Mean	Maximum	Minimum	Mean
	AUGUST			SEPTEMBER		
1	4.5	1.5	2.0	99	3.5	11
2	43	2.5	6.5	5.5	2.0	3.0
3	5.0	3.0	3.5	4.0	2.0	2.5
4	4.5	2.5	3.5	4.0	2.5	2.5
5	4.5	2.5	3.0	3.5	2.5	2.5
6	5.5	2.5	3.0	96	2.5	13
7	5.0	2.5	3.0	8.0	4.0	5.0
8	5.5	2.5	3.5	4.0	3.0	3.5
9	6.0	2.5	3.5	5.5	3.0	3.5
10	5.0	2.5	3.0	4.0	3.0	3.0
11	4.5	2.5	3.0	4.0	3.0	3.0
12	6.5	2.5	3.0	3.5	2.5	3.0
13	4.5	2.5	3.0	4.0	2.5	3.0
14	5.5	2.5	3.0	8.0	2.5	3.0
15	4.5	2.5	3.5	3.5	2.0	2.5
16	4.0	2.5	3.5	3.5	2.0	2.5
17	6.0	3.0	3.5	3.5	2.0	2.5
18	4.0	2.5	3.0	3.5	2.0	2.5
19	10	3.0	3.5	5.5	2.0	2.5
20	--	--	10	3.0	2.0	2.5
21	17	4.5	6.5	3.0	2.0	2.5
22	9.5	3.5	5.0	3.5	2.5	2.5
23	6.0	3.5	4.5	3.5	2.5	3.0
24	5.0	3.0	4.0	4.0	2.0	2.5
25	5.0	1.5	3.0	3.0	2.0	2.5
26	4.0	2.0	2.5	3.0	2.0	2.5
27	3.5	2.0	2.5	3.0	2.0	2.5
28	3.0	2.0	2.5	3.5	2.0	2.5
29	3.0	1.5	2.5	5.0	2.0	3.0
30	5.5	1.5	2.0	5.5	2.5	3.0
31	4.0	2.0	2.5	--	--	--
MONTH[1]	**43**	**1.5**	**3.6**	**99**	**2.0**	**3.4**

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

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

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

Site number (fig. 1)	Site name	Date	Time	Hardness, filtered (mg/L as $CaCO_3$)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)	Total nitrogen, unfiltered (mg/L)	Total phosphorous, unfiltered (mg/L)	Arsenic, filtered (µg/L)	Arsenic, unfiltered recoverable (µg/L)
12323600	Silver Bow at Opportunity	03/03/2008	1410	180	49.3	12.9	--	--	7.6	14.0
		03/03/2008	1415	170	48.7	12.8	--	--	7.5	13.8
12323670	Mill Creek near Anaconda	06/17/2008	1215	33	9.6	2.30	--	--	19.8	20.8
		06/17/2008	1220	35	10.2	2.34	--	--	19.7	20.5
12323700	Mill Creek at Opportunity	07/07/2008	1630	37	10.7	2.45	--	--	23.7	29.0
		07/07/2008	1635	38	10.9	2.51	--	--	24.0	28.4
12323750	Silver Bow Creek at Warm Springs	04/08/2008	0850	210	57.3	16.2	--	--	11.6	14.1
		04/08/2008	0855	210	56.1	15.9	--	--	11.8	14.4
12323760	Warm Springs Creek near Anaconda	08/18/2008	1510	120	36.2	7.71	--	--	2.3	2.6
		08/18/2008	1515	120	34.7	7.35	--	--	2.3	2.6
12324200	Clark Fork at Deer Lodge	05/06/2008	1115	210	61.3	13.9	--	--	14.6	19.1
		05/06/2008	1120	210	62.0	14.1	--	--	14.5	19.7
12334550	Clark Fork at Turah Bridge, near Bonner	05/23/2008	1030	62	17.5	4.42	0.50	0.108	4.8	8.5
		05/23/2008	1035	62	17.4	4.45	.49	.101	4.7	8.3
		06/04/2008	1515	71	20.3	4.96	--	--	6.3	9.9
		06/04/2008	1520	71	20.2	4.93	--	--	6.4	10.4
12340000	Blackfoot River near Bonner	06/24/2008	1330	80	21.2	6.69	.16	.024	.86	1.1
		06/24/2008	1335	81	21.2	6.72	.15	.025	.85	1.1
12340500	Clark Fork above Missoula	11/07/2007	1100	160	44.6	12.4	--	--	3.9	4.9
		11/07/2007	1105	160	44.0	12.7	--	--	3.9	4.6
		05/05/2008	1515	89	24.0	7.05	.59	.270	5.2	22.5
		05/05/2008	1525	87	23.4	6.87	.56	.370	5.1	20.1
12354500	Clark Fork at St. Regis	05/20/2008	1300	40	11.3	2.78	.88	.265	2.5	9.2
		05/20/2008	1305	40	11.4	2.80	.84	.260	2.5	9.2

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

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

Site number (fig. 1)	Site name	Date	Time	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)	Lead, filtered (µg/L)
12323600	Silver Bow at Opportunity	03/03/2008	1410	0.64	1.21	28.6	106	21	1,150	0.27
		03/03/2008	1415	.67	1.15	28.9	112	22	1,160	.28
12323670	Mill Creek near Anaconda	06/17/2008	1215	.05	.07	3.1	4.6	29	163	.10
		06/17/2008	1220	.05	.08	3.1	4.7	30	168	.10
12323700	Mill Creek at Opportunity	07/07/2008	1630	.06	.12	2.7	5.9	45	223	.14
		07/07/2008	1635	.06	.12	3.9	5.8	45	215	.14
12323750	Silver Bow Creek at Warm Springs	04/08/2008	0850	.09	.12	3.4	6.4	9	229	.09
		04/08/2008	0855	.07	.13	3.6	6.4	9	232	E.07
12323760	Warm Springs Creek near Anaconda	08/18/2008	1510	<.04	E.01	E.75	1.6	E6	66	<.08
		08/18/2008	1515	<.04	E.01	1.2	1.7	E5	74	E.06
12324200	Clark Fork at Deer Lodge	05/06/2008	1115	.05	.17	6.0	31.9	9	499	E.07
		05/06/2008	1120	.05	.17	5.9	32.4	10	509	E.07
12334550	Clark Fork at Turah Bridge, near Bonner	05/23/2008	1030	E.02	.23	4.0	30.6	45	999	.21
		05/23/2008	1035	E.02	.19	3.9	29.5	46	970	.20
		06/04/2008	1515	E.04	.17	5.4	32.5	37	927	.18
		06/04/2008	1520	E.04	.17	5.5	32.2	38	914	.18
12340000	Blackfoot River near Bonner	06/24/2008	1330	<.04	<.01	E.55	E1.1	9	326	<.08
		06/24/2008	1335	<.04	<.01	E.58	E1.0	9	293	<.08
12340500	Clark Fork above Missoula	11/07/2007	1100	<.04	.07	1.4	8.5	E7	155	E.04
		11/07/2007	1105	<.04	.07	1.4	6.9	E6	153	E.04
		05/05/2008	1515	E.03	1.72	4.5	349	36	6,490	.87
		05/05/2008	1525	E.03	1.58	5.1	326	44	4,720	1.05
12354500	Clark Fork at St. Regis	05/20/2008	1300	<.04	.65	4.9	106	64	4,420	.31
		05/20/2008	1305	<.04	.67	4.8	104	62	4,170	.29

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

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

Site number (fig. 1)	Site name	Date	Time	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)
12323600	Silver Bow at Opportunity	03/03/2008	1410	24.1	288	418	173	268	78	36
		03/03/2008	1415	24.2	287	416	175	275	77	36
12323670	Mill Creek near Anaconda	06/17/2008	1215	.73	3.9	10.3	1.9	4	36	6
		06/17/2008	1220	.75	3.8	10.7	2.0	5	42	5
12323700	Mill Creek at Opportunity	07/07/2008	1630	1.16	7.1	16.6	2.2	5	59	8
		07/07/2008	1635	1.32	7.2	17.5	2.9	6	62	7
12323750	Silver Bow Creek at Warm Springs	04/08/2008	0850	1.37	87.8	163	3.9	13	86	6
		04/08/2008	0855	1.40	86.7	182	2.6	12	87	5
12323760	Warm Springs Creek near Anaconda	08/18/2008	1510	.26	1.1	4.7	<1.8	E2	56	6
		08/18/2008	1515	.32	1.1	4.7	<1.8	2	21	23
12324200	Clark Fork at Deer Lodge	05/06/2008	1115	4.36	66.8	186	4.1	28	77	21
		05/06/2008	1120	4.20	68.0	187	4.0	28	76	22
12334550	Clark Fork at Turah Bridge, near Bonner	05/23/2008	1030	6.19	7.1	129	4.9	42	65	69
		05/23/2008	1035	5.21	7.0	134	3.7	42	66	69
		06/04/2008	1515	5.42	9.9	108	5.1	40	62	64
		06/04/2008	1520	5.16	9.8	105	5.1	39	64	62
12340000	Blackfoot River near Bonner	06/24/2008	1330	.37	2.3	20.4	E1.2	2	79	26
		06/24/2008	1335	.35	2.3	19.1	E1.1	E2	74	30
12340500	Clark Fork above Missoula	11/07/2007	1100	1.15	18.0	37.8	3.1	16	67	7
		11/07/2007	1105	.99	18.7	36.5	3.2	14	66	8
		05/05/2008	1515	53.5	14.6	274	4.2	444	25	557
		05/05/2008	1525	49.1	13.9	228	5.1	402	24	583
12354500	Clark Fork at St. Regis	05/20/2008	1300	17.1	4.1	254	4.2	173	54	464
		05/20/2008	1305	17.3	4.0	249	4.1	169	51	475

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

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

Constituent and reporting unit	Number of replicate pairs	Standard deviation[1] (listed units)	Relative standard deviation (percent)	Within limits[2] of data-quality objective
Calcium, filtered, mg/L	12	0.49	1.6	Yes
Magnesium, filtered, mg/L	12	.13	1.7	Yes
Total nitrogen, unfiltered, mg/L	4	.02	3.5	Yes
Total phosphorous, unfiltered, mg/L	4	.04	20	Yes
Arsenic, filtered, µg/L	12	.09	1.0	Yes
Arsenic, unfiltered recoverable, µg/L	12	.54	4.2	Yes
Cadmium, filtered, µg/L	12	.01	8.3	Yes
Cadmium, unfiltered recoverable, µg/L	12	.03	8.8	Yes
Copper, filtered, µg/L	12	.30	5.4	Yes
Copper, unfiltered recoverable, µg/L	12	4.9	8.7	Yes
Iron, filtered, µg/L	12	1.8	6.6	Yes
Iron, unfiltered recoverable, µg/L	12	365	30	No[3]
Lead, filtered, µg/L	12	.04	18	Yes
Lead, unfiltered recoverable, µg/L	12	.92	9.8	Yes
Manganese, filtered, µg/L	12	.44	1.0	Yes
Manganese, unfiltered recoverable, µg/L	12	10	7.7	Yes
Zinc, filtered, µg/L	12	.59	3.4	Yes
Zinc, unfiltered recoverable, µg/L	12	8.7	10	Yes
Sediment, suspended, percent finer than 0.062 mm	12	7.4	12	Yes
Sediment, suspended, mg/L	12	6.8	6.3	Yes

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

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

[3]Exceedance of data-quality objective resulted from a poor comparison between one replicate sample pair collected on May 5, 2008, at Clark Fork above Missoula when suspended-sediment concentrations were relatively high. When this one replicate pair was excluded, the other 11 replicate pairs had an acceptable relative standard deviation for unfiltered recoverable iron of 6.6 percent.

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

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

Constituent and reporting unit	Number of replicate pairs	Standard deviation[1] (listed units)	Relative standard deviation (percent)	Within limits[2] of data-quality objective
Calcium, filtered, mg/L	8	0.23	0.65	Yes
Magnesium, filtered, mg/L	8	.06	.70	Yes
Arsenic, filtered, µg/L	8	.12	1.1	Yes
Arsenic, unfiltered recoverable, µg/L	8	.17	1.2	Yes
Cadmium, filtered, µg/L	8	.01	3.9	Yes
Cadmium, unfiltered recoverable, µg/L	8	.01	5.9	Yes
Copper, filtered, µg/L	8	.21	3.2	Yes
Copper, unfiltered recoverable, µg/L	8	.89	3.5	Yes
Iron, filtered, µg/L	8	.79	3.9	Yes
Iron, unfiltered recoverable, µg/L	8	3.8	.94	Yes
Lead, filtered, µg/L	8	.01	9.7	Yes
Lead, unfiltered recoverable, µg/L	8	.15	3.2	Yes
Manganese, filtered, µg/L	8	.78	1.3	Yes
Manganese, unfiltered recoverable, µg/L	8	1.7	1.5	Yes
Zinc, filtered, µg/L	8	.16	.66	Yes
Zinc, unfiltered recoverable, µg/L	8	5.0	11	Yes

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

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

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

[Abbreviation: µg/L, micrograms per liter]

Constituent and reporting unit	Number of samples	95-percent confidence interval for spike recovery (percent)	Mean spike recovery (percent)	Within limits[1] of data-quality objective
Arsenic, filtered, µg/L	5	89.2–117	103	Yes
Arsenic, unfiltered recoverable, µg/L	5	93.9–110	102	Yes
Cadmium, filtered, µg/L	5	88.2–116	102	Yes
Cadmium, unfiltered recoverable, µg/L	5	91.9–110	101	Yes
Copper, filtered, µg/L	5	88.0–121	105	Yes
Copper, unfiltered recoverable, µg/L	5	87.2–109	97.9	Yes
Iron, filtered, µg/L	5	95.9–110	103	Yes
Iron, unfiltered recoverable, µg/L	5	96.5–106	101	Yes
Lead, filtered, µg/L	5	89.0–112	101	Yes
Lead, unfiltered recoverable, µg/L	5	98.0–105	101	Yes
Manganese, filtered, µg/L	5	92.9–111	102	Yes
Manganese, unfiltered recoverable, µg/L	5	92.5–112	102	Yes
Zinc, filtered, µg/L	5	87.9–112	99.8	Yes
Zinc, unfiltered recoverable, µg/L	5	96.0–111	103	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, upper Clark Fork basin, Montana.

[Abbreviation: 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	90.2–110	100	Yes
Arsenic, unfiltered recoverable, µg/L	5	98.5–104	101	Yes
Cadmium, filtered, µg/L	5	91.0–112	101	Yes
Cadmium, unfiltered recoverable, µg/L	5	93.6–100	97.0	Yes
Copper, filtered, µg/L	5	92.0–106	98.9	Yes
Copper, unfiltered recoverable, µg/L	5	86.4–99.1	92.8	Yes
Iron, filtered, µg/L	5	94.1–117	105	Yes
Iron, unfiltered recoverable, µg/L	5	92.0–107	99.4	Yes
Lead, filtered, µg/L	5	91.3–109	100	Yes
Lead, unfiltered recoverable, µg/L	5	99.5–106	103	Yes
Manganese, filtered, µg/L	5	90.3–108	98.9	Yes
Manganese, unfiltered recoverable, µg/L	5	92.5–104	98.4	Yes
Zinc, filtered, µg/L	5	88.1–124	106	Yes
Zinc, unfiltered recoverable, µg/L	5	93.1–98.2	95.7	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.

[Abbreviations: E, estimated; µg/L, micrograms per liter; µS/cm, microsiemens per centimeter at 25 degrees Celsius; mg/L, milligrams per liter. Symbols: <, less than laboratory reporting level; --, no data]

Date	Time	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)	Total nitrogen, unfiltered, (mg/L)	Total phosphorous, unfiltered, (mg/L)	Arsenic, filtered (µg/L)	Arsenic, unfiltered recoverable (µg/L)	Cadmium, filtered (µg/L)	Cadmium, unfiltered recoverable (µg/L)
11/20/2007	2000	5.6	2	<0.04	<0.020	--	--	<0.06	<0.60	<0.04	<0.01
02/28/2008	1200	5.6	2	<.04	<.020	--	--	<.06	<.60	<.04	<.01
03/25/2008	1340	6.0	3	<.04	<.020	<0.06	<0.008	<.06	<.60	<.04	<.01
04/09/2008	1145	5.5	2	<.04	<.020	--	--	<.06	<.60	<.04	<.01
04/17/2008	1100	7.0	3	<.04	<.020	<.06	<.008	<.06	<.60	<.04	<.01
05/08/2008	1500	5.2	2	E.02	<.020	--	--	<.06	<.60	<.04	<.01
05/12/2008	1150	6.0	2	<.04	<.020	<.06	<.008	<.06	<.60	<.04	<.01
05/28/2008	0700	6.7	2	E.04	<.020	<.06	<.008	<.06	<.60	<.04	<.01
06/04/2008	0600	5.6	2	<.04	<.020	--	--	<.06	<.60	<.04	<.01
06/11/2008	0740	6.5	1	E.03	<.020	<.06	<.008	<.06	<.60	<.04	<.01
06/17/2008	2000	5.5	2	<.04	<.020	--	--	<.06	<.60	<.04	<.01
07/08/2008	1330	5.5	1	<.04	<.020	--	--	<.06	<.60	<.04	<.01
08/19/2008	1930	5.5	2	<.04	<.020	--	--	<.06	<.60	<.04	<.01

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 (ug/L)
11/20/2007	<1.0	<1.2	<8	<6	<0.08	<0.06	<0.2	<0.8	<1.8	<2.0
02/28/2008	<1.0	<1.2	<8	<6	<.08	<.06	<.2	<.8	<1.8	<2.0
03/25/2008	<1.0	<1.2	<8	<6	<.08	<.06	<.2	<.8	<1.8	<2.0
04/09/2008	<1.0	<1.2	<8	<6	<.08	<.06	<.2	<.8	<1.8	<2.0
04/17/2008	<1.0	<1.2	<8	<6	<.08	<.06	<.2	<.8	<1.8	<2.0
05/08/2008	<1.0	<1.2	<8	<6	<.08	<.06	<.2	<.8	<1.8	<2.0
05/12/2008	<1.0	<1.2	<8	<6	<.08	<.06	<.2	<.8	<1.8	E1.1
05/28/2008	<1.0	<1.2	<8	6	<.08	<.06	<.2	<.8	4.0	<2.0
06/04/2008	<1.0	<1.2	<8	E6	<.08	<.06	<.2	<.8	<1.8	<2.0
06/11/2008	<1.0	<1.2	<8	<6	<.08	<.06	<.2	<.8	3.6	<2.0
06/17/2008	<1.0	<1.2	<8	<6	<.08	<.06	<.2	<.8	<1.8	<2.0
07/08/2008	<1.0	<1.2	<8	<6	<.08	<.06	<.2	<.8	<1.8	<2.0
08/19/2008	<1.0	<1.2	<8	<6	<.08	<.06	<.2	<.8	<1.8	<2.0

Table 19. Bed-sediment data for the upper Clark Fork basin, Montana, August 2008.

[Trace-element concentrations in bed sediment were determined for the fine-grained fraction (material less than 0.064 millimeter in diameter). Reported concentrations are the mean of all analyses for replicate aliquots from each composite sample. Abbreviation: µg/g, micrograms per gram of dry sample weight]

Site number (fig. 1)	Site name	Number of composite samples	Concentration (µg/g)								
			Arsenic	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Nickel	Zinc
12323600	Silver Bow Creek at Opportunity	3	153	26.0	38.6	2,930	45,300	503	3,530	14.8	5,010
12323750	Silver Bow Creek at Warm Springs	3	67	5.8	33.2	367	28,100	78	3,920	14.4	688
12323770	Warm Springs Creek at Warm Springs	3	52	3.3	39.3	1,060	26,600	79	7,780	25.5	453
12323800	Clark Fork near Galen	3	114	6.1	35.7	1,170	30,100	116	12,100	22.7	1,090
461415112450801	Clark Fork below Lost Creek, near Galen	3	123	6.8	33.5	1,730	32,600	152	5,980	18.5	1,360
461559112443301	Clark Fork at county bridge, near Racetrack	3	90	6.3	32.2	1,540	31,300	143	3,330	14.5	1,250
461903112440701	Clark Fork at Demspey Creek diversion, near Racetrack	3	91	6.9	32.9	1,580	31,500	152	3,330	15.3	1,370
12324200	Clark Fork at Deer Lodge	3	69	4.5	27.2	1,090	24,100	127	2,730	12.5	1,050
12324680	Clark Fork at Goldcreek	3	44	3.5	36.4	675	26,600	93	2,170	15.4	869
12331800	Clark Fork near Drummond	3	45	4.5	31.3	460	39,200	81	4,820	13.9	1,000
12334550	Clark Fork at Turah Bridge, near Bonner	3	32	2.7	32.8	346	24,600	65	1,580	6.9	759
12340000	Blackfoot River near Bonner	3	6	.4	28.5	22	23,000	13	746	6.0	82
12340500	Clark Fork above Missoula	3	54	2.8	33.0	475	27,000	57	2,250	7.6	839

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

[Dilution ratio is the proportion of initial volume of concentrated nitric acid used as a digesting reagent to final volume of solution after addition of 0.6N (normal) hydrochloric acid used for reconstituting dried residue. Abbreviations: µg/g, micrograms per gram of dry sample weight; SRM, standard reference material (agricultural soils)]

Constituent	Number of analyses	Dilution ratio	Certified concentration (µg/g)	Mean SRM recovery (percent)	95-percent confidence interval for SRM recovery (percent)
SRM sample 2709					
Arsenic	10	1:10	17.7	63.0	60.7–65.3
Cadmium	10	1:10	.4	134.0	132–136
Chromium	10	1:10	130	81.1	76.7–85.6
Copper	10	1:10	35	78.5	72.2–84.7
Iron	10	1:10	35,000	103.2	100–106
Lead	10	1:10	19	55.4	52.9–57.8
Manganese	10	1:10	538	106.4	104–109
Nickel	10	1:10	88	94.9	93.4–96.5
Zinc	10	1:10	106	100.3	98.4–102
SRM sample 2711					
Arsenic	10	1:10	105	93.2	89.4–97.0
Cadmium	10	1:10	41.7	104.4	99.3–109
Chromium	10	1:10	47	71.7	63.6–79.7
Copper	10	1:10	114	104.1	100–108
Iron	10	1:10	28,900	94.6	89.3–100
Lead	10	1:10	1,160	102.1	97.1–107
Manganese	10	1:10	638	95.0	89.6–100
Nickel	10	1:10	20.6	87.1	83.8–90.4
Zinc	10	1:10	350	101.7	97.7–106

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

[Dilution ratio is the proportion of initial volume of concentrated nitric acid used as a digesting reagent to final volume of solution after addition of 0.6N (normal) hydrochloric acid used for reconstituting dried residue. Abbreviation: µg/mL, micrograms per milliliter. Symbol: <, less than minimum reporting level for liquid-phase concentration, in µg/mL]

Site number (fig. 1)	Site name	Dilution ratio	Trace-element concentration (µg/mL)								
			Arsenic	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Nickel	Zinc
12323600	Silver Bow Creek at Opportunity	1:10	<0.004	<0.0002	<0.02	<0.02	<0.02	<0.002	<0.004	<0.0009	<0.005
12323750	Silver Bow Creek at Warm Springs	1:10	<.004	<.0002	<.02	<.02	<.02	<.002	<.004	<.0009	<.005
12323770	Warm Springs Creek at Warm Springs	1:10	<.004	<.0002	<.02	<.02	<.02	<.002	<.004	<.0009	<.005
12323800	Clark Fork near Galen	1:10	<.004	<.0002	<.02	<.02	<.02	<.002	<.004	<.0009	<.005
461415112450801	Clark Fork below Lost Creek, near Galen	1:10	<.004	<.0002	<.02	<.02	<.02	<.002	<.004	<.0009	<.005
461559112443301	Clark Fork at county bridge, near Racetrack	1:10	<.004	<.0002	<.02	<.02	<.02	<.002	<.004	<.0009	<.005
461903112440701	Clark Fork at Dempsey Creek diversion, near Racetrack	1:10	<.004	<.0002	<.02	<.02	<.02	<.002	<.004	<.0009	<.005
12324200	Clark Fork at Deer Lodge	1:10	<.004	<.0002	<.02	<.02	<.02	<.002	<.004	<.0009	<.005
12324680	Clark Fork at Goldcreek	1:10	<.004	<.0002	<.02	<.02	<.02	<.002	<.004	<.0009	<.005
12331800	Clark Fork near Drummond	1:10	<.004	<.0002	<.02	<.02	<.02	<.002	<.004	<.0009	<.005
12334550	Clark Fork at Turah Bridge, near Bonner	1:10	<.004	<.0002	<.02	<.02	<.02	<.002	<.004	<.0009	<.005
12340000	Blackfoot River near Bonner	1:10	<.004	<.0002	<.02	<.02	<.02	<.002	<.004	<.0009	<.005
12340500	Clark Fork above Missoula	1:10	<.004	<.0002	<.02	<.02	<.02	<.002	<.004	<.0009	<.005

Table 22. Biological data for the upper Clark Fork basin, Montana, August 2008.

[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 bioaccumulation samples composed of two or more composite samples are the means of all analyses. Abbreviations: µg/g, micrograms per gram of dry sample weight; spp., species]

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	2	16.5	6.9	4.1	506	4,180	66.2	1,170	3.0	1,010
Hydropsyche spp.	1	13.0	4.7	3.0	333	3,250	237	1,060	2.4	809
12323750--Silver Bow Creek at Warm Springs										
Hydropsyche cockerelli	3	8.5	0.4	1.4	26.6	656	3.5	930	0.6	162
12323770--Warm Springs Creek at Warm Springs										
Arctopsyche grandis	1	9.6	3.0	2.8	126	1,350	7.2	2,480	3.5	267
Hydropsyche occidentalis	1	13.3	1.3	8.6	165	2,360	12.6	2,880	4.5	204
12323800--Clark Fork near Galen										
Hydropsyche cockerelli	2	13.8	1.6	2.6	127	1,740	10.1	2,030	2.0	246
Hydropsyche occidentalis	1	12.8	1.2	2.0	79.0	1,390	9.0	2,630	1.6	201
461415112450801--Clark Fork below Lost Creek, near Galen										
Hydropsyche cockerelli	1	17.5	1.8	3.0	225	2,000	17.5	1,750	2.2	288
461559112443301--Clark Fork at county bridge, near Racetrack										
Hydropsyche cockerelli	2	17.8	1.9	2.6	154	2,480	15.9	2,190	1.9	297
461903112440701--Clark Fork at Dempsey Creek diversion, near Racetrack										
Hydropsyche cockerelli	2	10.3	1.9	1.6	99.9	1,050	10.5	1,350	1.0	230
Hydropsyche occidentalis	1	13.1	2.4	2.9	113	1,510	13.5	2,730	1.3	278
12324200--Clark Fork at Deer Lodge										
Hydropsyche cockerelli	1	8.3	3.5	2.3	114	1,240	12.2	1,050	1.1	247
Hydropsyche occidentalis	2	8.5	3.1	2.1	114	1,130	12.1	1,550	1.1	263

Table 22. Biological data for the upper Clark Fork basin, Montana, August 2008.—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 bioaccumulation samples composed of two or more composite samples are the means of all analyses. Abbreviations: µg/g, micrograms per gram of dry sample weight; spp., species]

Taxon	Number of composite samples	Concentration (µg/g)								
		Arsenic	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Nickel	Zinc
12324680--Clark Fork at Goldcreek										
Arctopsyche grandis	3	4.0	1.6	0.9	36.8	710	2.8	820	0.8	185
Claassenia sabulosa	2	.9	.8	.6	62.8	139	.7	162	.2	231
Hydropsyche cockerelli	2	7.2	2.2	1.7	95.1	1,190	7.1	1,440	1.4	234
Hydropsyche occidentalis	1	6.7	2.3	1.7	92.2	1,270	8.1	1,700	1.5	258
12331800--Clark Fork near Drummond										
Arctopsyche grandis	3	3.4	1.3	0.7	28.9	472	4.5	857	0.6	207
Claassenia sabulosa	2	1.1	1.5	.5	75.5	144	.9	172	.2	239
Hydropsyche cockerelli	2	6.3	1.4	1.7	62.3	1,240	9.6	1,400	1.2	224
Hydropsyche occidentalis	1	6.4	1.5	3.0	65.9	1,360	10.7	1,680	1.3	277
12334550--Clark Fork at Turah Bridge, near Bonner										
Arctopsyche grandis	3	4.7	1.5	1.9	35.4	860	3.9	717	1.1	218
Claassenia sabulosa	2	.7	1.2	.9	66.6	89.7	.4	80.3	.2	224
Hydropsyche cockerelli	2	5.1	1.0	2.9	55.3	1,450	5.7	683	1.4	201
Hydropsyche occidentalis	2	4.3	.9	2.6	48.3	1,480	5.6	862	1.4	217
12340000--Blackfoot River near Bonner										
Arctopsyche grandis	1	2.2	0.4	4.1	13.7	664	1.0	633	1.0	156
Claassenia sabulosa	2	.5	.2	1.0	45.3	223	.3	111	.3	234
Hydropsyche cockerelli	1	2.4	.3	3.6	16.2	1,990	2.1	814	1.8	140
Hydropsyche occidentalis	1	1.9	.3	3.0	16.5	1,630	2.0	798	1.5	163
12340500--Clark Fork above Missoula										
Arctopsyche grandis	2	3.9	1.4	2.1	57.6	1,290	4.5	890	1.4	243
Claassenia sabulosa	2	1.3	1.1	.7	55.3	191	.8	201	.4	288
Hydropsyche cockerelli	2	6.9	1.1	3.7	79.7	2,380	7.2	1,380	2.0	251
Hydropsyche occidentalis	1	6.5	1.1	3.3	71.2	2,540	7.7	1,740	1.9	278

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

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

Constituent	Number of analyses	Certified concentration (µg/g)	Mean SRM recovery (percent)	95-percent confidence interval for SRM recovery (percent)
		SRM sample TORT-2		
Arsenic	12	21.6	98.4	97.5–99.4
Cadmium	12	26.7	100	99.2–102
Chromium	12	.77	169	133–205
Copper	12	106	100	98.9–102
Iron	12	105	98.6	96.1–101
Lead	12	.35	139	132–145
Manganese	12	13.6	99.3	97.5–101
Nickel	12	2.5	97.7	92.9–102
Zinc	12	180	107	106–108

Table 24. Analyses of procedural blanks for biota samples.

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

Site number (fig. 1)	Site name	Dilution ratio	Trace-element concentration (µg/mL)								
			Arsenic	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Nickel	Zinc
12323600	Silver Bow Creek at Opportunity	1:1	<0.001	<0.001	<0.01	<0.008	<0.05	<0.001	<0.001	<0.001	<0.03
12323750	Silver Bow Creek at Warm Springs	1:1	<.001	<.001	<.01	<.008	<.05	<.001	<.001	<.001	<.03
12323770	Warm Springs Creek at Warm Springs	1:1	<.001	<.001	<.01	<.008	<.05	<.001	<.001	<.001	<.03
12323800	Clark Fork near Galen	1:1	<.001	<.001	<.01	<.008	<.05	<.001	<.001	<.001	<.03
461415112450801	Clark Fork below Lost Creek, near Galen	1:1	<.001	<.001	<.01	<.008	<.05	<.001	<.001	<.001	<.03
461559112443301	Clark Fork at county bridge, near Racetrack	1:1	<.001	<.001	<.01	<.008	<.05	<.001	<.001	<.001	<.03
461903112440701	Clark Fork at Dempsey Creek diversion, near Racetrack	1:1	<.001	<.001	<.01	<.008	<.05	<.001	<.001	<.001	<.03
12324200	Clark Fork at Deer Lodge	1:1	<.001	<.001	<.01	<.008	<.05	<.001	<.001	<.001	<.03
12324680	Clark Fork at Goldcreek	1:1	<.001	<.001	<.01	<.008	<.05	<.001	<.001	<.001	<.03
12331800	Clark Fork near Drummond	1:1	<.001	<.001	<.01	<.008	<.05	<.001	<.001	<.001	<.03
12334550	Clark Fork at Turah Bridge, near Bonner	1:1	<.001	<.001	<.01	<.008	<.05	<.001	<.001	<.001	<.03
12340000	Blackfoot River near Bonner	1:1	<.001	<.001	<.01	<.008	<.05	<.001	<.001	<.001	<.03
12340500	Clark Fork above Missoula	1:1	<.001	<.001	<.01	<.008	<.05	<.001	<.001	<.001	<.03

Table 25. Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2008.

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

Property or constituent and reporting unit	Number of samples	Maximum	Minimum	Mean	Median
12323230--Blacktail Creek at Harrison Avenue, at Butte Period of record for water-quality data: March 1993–August 1995, December 1996–August 2003, December 2004–September 2008					
Streamflow, instantaneous (ft^3/s)	115	156	1.9	14	7.6
pH, onsite (standard units)	115	8.4	7.3	7.8	7.8
Specific conductance, onsite (µS/cm)	115	412	116	266	271
Temperature, water (°C)	115	17.5	1.5	8.2	8.0
Hardness, filtered (mg/L as $CaCO_3$)	115	150	38	105	110
Calcium, filtered (mg/L)	115	41.8	10.6	30.0	30.9
Magnesium, filtered (mg/L)	115	11.0	2.71	7.27	7.37
Arsenic, filtered (µg/L)	114	13	1	3.9	3.0
Arsenic, unfiltered (µg/L)	115	18	E1	[2]5.3	4
Cadmium, filtered (µg/L)	113	.5	<.04	[2].05	<.1
Cadmium, unfiltered (µg/L)	115	.11	<.01	[2].04	<1
Copper, filtered (µg/L)	114	10.0	<1.0	[2]3.7	3.2
Copper, unfiltered (µg/L)	115	52.0	1.5	6.9	5.5
Iron, filtered (µg/L)	115	640	15	168	150
Iron, unfiltered (µg/L)	115	4,220	139	658	550
Lead, filtered (µg/L)	115	2.80	<.08	[2].20	<1.00
Lead, unfiltered (µg/L)	115	47.0	<1.00	[2]1.96	.62
Manganese, filtered (µg/L)	115	144	14.2	41.2	37.6
Manganese, unfiltered (µg/L)	115	240	23.5	57.6	50.1
Zinc, filtered (µg/L)	114	11	<1.0	[2]3.6	2.8
Zinc, unfiltered (µg/L)	115	130	<10	[2]9.0	4
Sediment, suspended (percent finer than 0.062 mm)	115	97	50	82	83
Sediment, suspended concentration (mg/L)	115	139	1	13	7
Sediment, suspended discharge (ton/d)	115	59	.01	1.1	.14

Table 25. Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2008.—Continued

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

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 2008					
Streamflow, instantaneous (ft^3/s)	123	134	13	28	23
pH, onsite (standard units)	123	8.1	7.2	7.6	7.6
Specific conductance, onsite (µS/cm)	123	691	226	473	482
Temperature, water (°C)	123	20.0	1.0	10.5	9.5
Hardness, filtered (mg/L as $CaCO_3$)	123	220	66	150	150
Calcium, filtered (mg/L)	123	62.7	19.0	42.6	44.0
Magnesium, filtered (mg/L)	123	14.6	4.51	10.5	11.0
Arsenic, filtered (µg/L)	123	13	2.3	6.4	6.2
Arsenic, unfiltered (µg/L)	123	45	3	10.9	9.2
Cadmium, filtered (µg/L)	123	6.2	.05	1.12	.87
Cadmium, unfiltered (µg/L)	123	6.0	.09	1.51	1.20
Copper, filtered (µg/L)	123	303	3.2	37.2	14.3
Copper, unfiltered (µg/L)	123	550	10.5	86.0	36.0
Iron, filtered (µg/L)	123	270	10	84.7	61
Iron, unfiltered (µg/L)	123	7,400	85	887	583
Lead, filtered (µg/L)	123	2.4	<.5	[2].48	.23
Lead, unfiltered (µg/L)	123	250	.64	13.3	3.88
Manganese, filtered (µg/L)	123	1,700	21.4	365	297
Manganese, unfiltered (µg/L)	123	1,600	25.9	408	352
Zinc, filtered (µg/L)	123	2,200	16.0	367	248
Zinc, unfiltered (µg/L)	123	2,200	29.1	443	292
Sediment, suspended (percent finer than 0.062 mm)	122	98	42	84	86
Sediment, suspended concentration (mg/L)	122	405	2	23	10
Sediment, suspended discharge (ton/d)	122	70	.08	2.7	.68

Table 25. Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2008.—Continued

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

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 2008					
Streamflow, instantaneous (ft^3/s)	126	361	13	71	50
pH, onsite (standard units)	125	9.5	7.2	8.4	8.3
Specific conductance, onsite (µS/cm)	125	633	202	420	403
Temperature, water (°C)	125	22.5	0.0	9.3	9.5
Hardness, filtered (mg/L as $CaCO_3$)	125	240	60	150	150
Calcium, filtered (mg/L)	125	71.6	18.5	44.5	43.8
Magnesium, filtered (mg/L)	125	15.0	3.42	9.54	9.04
Arsenic, filtered (µg/L)	125	34	1	11.1	10.3
Arsenic, unfiltered (µg/L)	125	235	9.5	26.3	17.0
Cadmium, filtered (µg/L)	124	41.0	<.1	[2]1.19	.76
Cadmium, unfiltered (µg/L)	125	49.0	.38	[2]2.13	1.30
Copper, filtered (µg/L)	124	450	13.7	46.7	36.0
Copper, unfiltered (µg/L)	125	3,900	31.1	210	107
Iron, filtered (µg/L)	125	307	<3	[2]45	25
Iron, unfiltered (µg/L)	124	24,100	240	1,520	775
Lead, filtered (µg/L)	125	5.1	<.5	[2].73	.31
Lead, unfiltered (µg/L)	125	650	5.38	38.4	15.0
Manganese, filtered (µg/L)	125	9,300	56.6	449	352
Manganese, unfiltered (µg/L)	125	10,000	110	567	446
Zinc, filtered (µg/L)	124	13,000	11.2	312	172
Zinc, unfiltered (µg/L)	125	15,000	69.7	540	324
Sediment, suspended (percent finer than 0.062 mm)	126	95	37	79	83
Sediment, suspended concentration (mg/L)	126	801	5	47	17
Sediment, suspended discharge (ton/d)	126	781	.18	19	2.4

Table 25. Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2008.—Continued

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

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 2008					
Streamflow, instantaneous (ft^3/s)	32	165	7.4	56	21
pH, onsite (standard units)	32	8.6	7.7	8.1	8.1
Specific conductance, onsite (µS/cm)	32	203	56	135	142
Temperature, water (°C)	32	17.0	0.0	8.4	8.0
Hardness, filtered (mg/L as $CaCO_3$)	32	98	24	59	64
Calcium, filtered (mg/L)	32	25.9	7.12	16.2	17.7
Magnesium, filtered (mg/L)	32	8.01	1.45	4.47	4.73
Arsenic, filtered (µg/L)	32	30.3	7.3	16.5	16.2
Arsenic, unfiltered (µg/L)	32	30.1	9	18.2	17.6
Cadmium, filtered (µg/L)	31	.11	<.04	[2].04	.04
Cadmium, unfiltered (µg/L)	32	.18	.04	.08	.07
Copper, filtered (µg/L)	32	4.7	.79	2.2	1.8
Copper, unfiltered (µg/L)	32	10.3	1.3	3.8	3.2
Iron, filtered (µg/L)	32	125	21	50	41
Iron, unfiltered (µg/L)	32	619	89	190	167
Lead, filtered (µg/L)	32	.24	<.08	[2].12	.10
Lead, unfiltered (µg/L)	32	3.12	.19	.74	.59
Manganese, filtered (µg/L)	32	8.9	3.4	5.8	6.0
Manganese, unfiltered (µg/L)	32	36.6	7.4	14.0	11.8
Zinc, filtered (µg/L)	32	2.4	.73	1.4	1.2
Zinc, unfiltered (µg/L)	32	8	1	2.8	2.5
Sediment, suspended (percent finer than 0.062 mm)	32	81	36	67	70
Sediment, suspended concentration (mg/L)	32	29	1	6	3
Sediment, suspended discharge (ton/d)	32	13	.02	1.5	.16

Table 25. Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2008.—Continued

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

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 2008					
Streamflow, instantaneous (ft^3/s)	48	261	0.43	34	5.8
pH, onsite (standard units)	48	8.2	7.8	8.0	8.0
Specific conductance, onsite (µS/cm)	48	230	59	150	162
Temperature, water (°C)	48	20.0	0.0	9.6	9.5
Hardness, filtered (mg/L as $CaCO_3$)	48	100	24	64	70
Calcium, filtered (mg/L)	48	28.0	7.01	17.9	19.3
Magnesium, filtered (mg/L)	48	7.83	1.56	4.67	5.11
Arsenic, filtered (µg/L)	48	55.1	9.0	23.6	23.0
Arsenic, unfiltered (µg/L)	48	53.5	10	27.1	27.8
Cadmium, filtered (µg/L)	48	.13	.02	.06	.07
Cadmium, unfiltered (µg/L)	48	.85	.04	.15	.10
Copper, filtered (µg/L)	48	6.1	1.1	3.1	2.7
Copper, unfiltered (µg/L)	48	38.8	1.5	6.8	4.2
Iron, filtered (µg/L)	48	94	16	49	43
Iron, unfiltered (µg/L)	48	1,960	44	287	135
Lead, filtered (µg/L)	48	.32	<.08	[2].14	.13
Lead, unfiltered (µg/L)	48	12.7	.07	1.43	.42
Manganese, filtered (µg/L)	48	32.8	2.2	8.5	6.6
Manganese, unfiltered (µg/L)	48	113	3.5	19.2	13.0
Zinc, filtered (µg/L)	48	7.7	1.3	3.2	3.0
Zinc, unfiltered (µg/L)	48	41	1.9	6.8	5
Sediment, suspended (percent finer than 0.062 mm)	48	90	26	69	77
Sediment, suspended concentration (mg/L)	48	107	1	12	2
Sediment, suspended discharge (ton/d)	48	55	<.01	[2]3.5	.02

Table 25. Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2008.—Continued

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

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 2008					
Streamflow, instantaneous (ft^3/s)	28	62	1.0	12	6.6
pH, onsite (standard units)	28	8.2	7.5	7.8	7.8
Specific conductance, onsite (µS/cm)	28	119	66	98	103
Temperature, water (°C)	28	15.5	.5	7.6	7.5
Hardness, filtered (mg/L as $CaCO_3$)	28	43	22	35	38
Calcium, filtered (mg/L)	28	14.4	7.56	11.9	12.8
Magnesium, filtered (mg/L)	28	1.69	.78	1.33	1.39
Arsenic, filtered (µg/L)	28	24.9	9.9	15.4	14.2
Arsenic, unfiltered (µg/L)	28	27.0	10	16.6	15.4
Cadmium, filtered (µg/L)	27	.05	<.04	[2].03	.03
Cadmium, unfiltered (µg/L)	28	.19	.02	.06	.05
Copper, filtered (µg/L)	28	4.2	.90	2.0	1.9
Copper, unfiltered (µg/L)	28	16.8	1.0	3.8	3.2
Iron, filtered (µg/L)	28	277	36	79	67
Iron, unfiltered (µg/L)	28	1,260	93	308	216
Lead, filtered (µg/L)	28	.37	.05	.14	.12
Lead, unfiltered (µg/L)	28	4.08	.10	.76	.48
Manganese, filtered (µg/L)	28	34.5	6.2	15.1	13.6
Manganese, unfiltered (µg/L)	28	49.1	15.1	26.3	22.6
Zinc, filtered (µg/L)	28	3.3	.65	1.7	1.7
Zinc, unfiltered (µg/L)	28	10	1	2.8	2
Sediment, suspended (percent finer than 0.062 mm)	28	94	25	73	78
Sediment, suspended concentration (mg/L)	28	93	1	14	5
Sediment, suspended discharge (ton/d)	28	10	<.01	[2]1.0	.12

Table 25. Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2008.—Continued

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

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 2008					
Streamflow, instantaneous (ft^3/s)	48	70	4.5	16	7.8
pH, onsite (standard units)	48	8.9	7.7	8.2	8.1
Specific conductance, onsite (µS/cm)	48	371	116	283	306
Temperature, water (°C)	48	20.5	1.5	11.5	12.0
Hardness, filtered (mg/L as $CaCO_3$)	48	170	67	125	130
Calcium, filtered (mg/L)	48	47.4	20.5	35.9	38.2
Magnesium, filtered (mg/L)	48	12.3	3.73	8.39	9.08
Arsenic, filtered (µg/L)	48	164	10.9	43.5	31.0
Arsenic, unfiltered (µg/L)	48	164	12	46.3	32.5
Cadmium, filtered (µg/L)	48	.11	<.04	[2].04	.04
Cadmium, unfiltered (µg/L)	48	.52	.02	.10	.07
Copper, filtered (µg/L)	48	21.4	1.1	5.6	3.3
Copper, unfiltered (µg/L)	48	48.8	2.8	11.5	8.2
Iron, filtered (µg/L)	48	111	7	39	32
Iron, unfiltered (µg/L)	48	1,420	27	251	196
Lead, filtered (µg/L)	48	.52	E.04	[2].20	.17
Lead, unfiltered (µg/L)	48	14.4	.27	2.18	1.49
Manganese, filtered (µg/L)	48	82.2	4.1	27.9	20.2
Manganese, unfiltered (µg/L)	48	104	4.7	38.3	30.6
Zinc, filtered (µg/L)	48	19.8	.84	5.1	3.9
Zinc, unfiltered (µg/L)	48	68	2	12.1	9.5
Sediment, suspended (percent finer than 0.062 mm)	48	96	55	85	88
Sediment, suspended concentration (mg/L)	48	84	1	11	5
Sediment, suspended discharge (ton/d)	48	11	.02	.85	.14

Table 25. Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2008.—Continued

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

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 2008					
Streamflow, instantaneous (ft^3/s)	132	662	16	134	87
pH, onsite (standard units)	130	9.4	8.0	8.8	8.8
Specific conductance, onsite (µS/cm)	130	783	249	473	481
Temperature, water (°C)	131	25.0	.5	10.9	11.0
Hardness, filtered (mg/L as $CaCO_3$)	130	310	97	196	200
Calcium, filtered (mg/L)	130	90.4	27.9	57.1	58.4
Magnesium, filtered (mg/L)	130	21.4	5.94	13.1	13.3
Arsenic, filtered (µg/L)	130	60	6.8	22.7	22.6
Arsenic, unfiltered (µg/L)	130	94	10	26.8	26.3
Cadmium, filtered (µg/L)	130	.31	<.04	[2].06	.02
Cadmium, unfiltered (µg/L)	130	.56	<.1	[2].12	<1
Copper, filtered (µg/L)	130	40.0	1.7	8.3	6.4
Copper, unfiltered (µg/L)	130	96.8	2.4	16.7	12.0
Iron, filtered (µg/L)	130	93	<5	[2]17	14
Iron, unfiltered (µg/L)	130	3,000	36	333	258
Lead, filtered (µg/L)	130	1.0	<.08	[2].11	<.6
Lead, unfiltered (µg/L)	130	41.8	<1	[2]2.38	1.24
Manganese, filtered (µg/L)	130	875	11.8	128	96.3
Manganese, unfiltered (µg/L)	130	899	24.0	192	162
Zinc, filtered (µg/L)	130	73	<1.0	[2]8.1	4.1
Zinc, unfiltered (µg/L)	130	180	<10	[2]32.3	20
Sediment, suspended (percent finer than 0.062 mm)	131	97	43	82	85
Sediment, suspended concentration (mg/L)	132	229	1	11	6
Sediment, suspended discharge (ton/d)	132	279	.07	6.8	1.5

Table 25. Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2008.—Continued

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

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 2008					
Streamflow, instantaneous (ft^3/s)	18	391	41	118	70
pH, onsite (standard units)	18	8.8	8.1	8.5	8.6
Specific conductance, onsite (µS/cm)	18	271	126	221	242
Temperature, water (°C)	18	16.0	4.5	9.3	8.2
Hardness, filtered (mg/L as $CaCO_3$)	18	130	60	106	115
Calcium, filtered (mg/L)	18	38.6	18.6	31.8	35.0
Magnesium, filtered (mg/L)	18	8.57	3.25	6.61	7.36
Arsenic, filtered (µg/L)	18	2.8	1.8	2.2	2.2
Arsenic, unfiltered (µg/L)	18	3.2	2.0	2.5	2.5
Cadmium, filtered (µg/L)	18	.03	<.04	[2].02	<.04
Cadmium, unfiltered (µg/L)	18	.07	.01	.03	.03
Copper, filtered (µg/L)	18	1.4	<1.0	[2].98	.87
Copper, unfiltered (µg/L)	18	4.7	1.1	2.3	2.2
Iron, filtered (µg/L)	18	13	<6	[2]8	6
Iron, unfiltered (µg/L)	18	237	28	95	75
Lead, filtered (µg/L)	18	.11	<.08	--	<.08
Lead, unfiltered (µg/L)	18	.62	.08	.29	.25
Manganese, filtered (µg/L)	18	2.9	<.2	[2]1.1	.9
Manganese, unfiltered (µg/L)	18	11.3	1.2	4.7	3.9
Zinc, filtered (µg/L)	18	2.8	<1.8	[2].97	.54
Zinc, unfiltered (µg/L)	18	5.5	<2	[2]2.2	2
Sediment, suspended (percent finer than 0.062 mm)	18	80	51	64	66
Sediment, suspended concentration (mg/L)	18	17	1	6	4
Sediment, suspended discharge (ton/d)	18	18	.016	2.8	.64

Table 25. Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2008.—Continued

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

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 2008					
Streamflow, instantaneous (ft^3/s)	97	420	2.8	91	48
pH, onsite (standard units)	96	8.7	7.4	8.3	8.3
Specific conductance, onsite (µS/cm)	96	795	139	299	312
Temperature, water (°C)	97	20.0	0.0	8.9	9.0
Hardness, filtered (mg/L as $CaCO_3$)	96	420	40	145	150
Calcium, filtered (mg/L)	96	130	10.5	44.2	46.0
Magnesium, filtered (mg/L)	96	22.0	3.29	8.34	8.51
Arsenic, filtered (µg/L)	96	14	2	5.2	4.6
Arsenic, unfiltered (µg/L)	96	27	3	7.4	6
Cadmium, filtered (µg/L)	96	E.1	<.04	[2].03	<.1
Cadmium, unfiltered (µg/L)	96	.41	<.1	[2].07	<1.0
Copper, filtered (µg/L)	96	16.0	1.0	3.4	3.0
Copper, unfiltered (µg/L)	96	108	2.3	18.5	8.2
Iron, filtered (µg/L)	96	30	<5	[2]11	10
Iron, unfiltered (µg/L)	96	1,700	39	285	110
Lead, filtered (µg/L)	96	1.8	<.08	[2].09	<.5
Lead, unfiltered (µg/L)	96	14.0	<1.0	[2]1.82	.43
Manganese, filtered (µg/L)	96	570	22.6	129	98.5
Manganese, unfiltered (µg/L)	96	1,400	53.1	218	174
Zinc, filtered (µg/L)	96	10	<1.0	[2]2.1	1.1
Zinc, unfiltered (µg/L)	96	60	<10	[2]8.9	3
Sediment, suspended (percent finer than 0.062 mm)	97	88	43	71	71
Sediment, suspended concentration (mg/L)	97	106	1	17	7
Sediment, suspended discharge (ton/d)	97	87	.05	8.0	.92

Table 25. Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2008.—Continued

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

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 2008					
Streamflow, instantaneous (ft^3/s)	173	1,050	14	207	123
pH, onsite (standard units)	160	9.2	7.5	8.5	8.6
Specific conductance, onsite (µS/cm)	161	720	197	424	435
Temperature, water (°C)	172	23.5	0.0	10.0	10.0
Hardness, filtered (mg/L as $CaCO_3$)	159	370	81	185	190
Calcium, filtered (mg/L)	159	110	24.2	54.6	55.8
Magnesium, filtered (mg/L)	159	22.0	5.08	11.8	12.0
Arsenic, filtered (µg/L)	159	53	4	15.2	14.0
Arsenic, unfiltered (µg/L)	159	78	3	19.6	17.0
Cadmium, filtered (µg/L)	159	1.0	<.04	[2].06	<1
Cadmium, unfiltered (µg/L)	159	3	<.1	[2].19	<1
Copper, filtered (µg/L)	159	50	1.7	8.2	6.2
Copper, unfiltered (µg/L)	158	240	4.1	28.1	15.8
Iron, filtered (µg/L)	159	110	<3	[2]15	11
Iron, unfiltered (µg/L)	159	9,200	56	487	270
Lead, filtered (µg/L)	159	3	<.08	[2].15	<1
Lead, unfiltered (µg/L)	159	31.0	<1.0	[2]3.45	1.83
Manganese, filtered (µg/L)	159	460	25.2	113	88.9
Manganese, unfiltered (µg/L)	159	1,400	47.3	237	180
Zinc, filtered (µg/L)	159	110	<1.0	[2]9.8	5.0
Zinc, unfiltered (µg/L)	159	360	<10	[2]39.1	20.0
Sediment, suspended (percent finer than 0.062 mm)	172	97	41	77	78
Sediment, suspended concentration (mg/L)	173	338	1	18	7
Sediment, suspended discharge (ton/d)	173	459	.12	20	2.3

Table 25. Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2008.—Continued

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

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 2008					
Streamflow, instantaneous (ft^3/s)	31	28	0.37	7.4	5.2
pH, onsite (standard units)	31	8.6	7.4	8.3	8.3
Specific conductance, onsite (µS/cm)	31	253	136	205	213
Temperature, water (°C)	31	17.0	1.0	8.5	9.0
Hardness, filtered (mg/L as $CaCO_3$)	31	120	50	96	100
Calcium, filtered (mg/L)	31	37.1	15.7	29.3	30.3
Magnesium, filtered (mg/L)	31	7.22	2.71	5.71	6.16
Arsenic, filtered (µg/L)	31	156	2.4	10.2	5.0
Arsenic, unfiltered (µg/L)	31	3,860	2	130	5.7
Cadmium, filtered (µg/L)	30	.90	<.04	[2].06	.03
Cadmium, unfiltered (µg/L)	31	147	.01	4.8	.04
Copper, filtered (µg/L)	31	90.5	1.1	5.0	1.9
Copper, unfiltered (µg/L)	31	29,100	1.7	945	4.4
Iron, filtered (µg/L)	31	25	<6	[2]9	8
Iron, unfiltered (µg/L)	31	99,700	22	3,370	92
Lead, filtered (µg/L)	31	.18	<.08	[2].06	<.12
Lead, unfiltered (µg/L)	31	1,290	.10	42.3	.40
Manganese, filtered (µg/L)	31	42.4	<.2	[2]2.6	1.1
Manganese, unfiltered (µg/L)	31	8,830	1.2	290	4.6
Zinc, filtered (µg/L)	31	30.0	<1.8	[2]2.2	1.1
Zinc, unfiltered (µg/L)	31	7,780	1.0	254	3.0
Sediment, suspended (percent finer than 0.062 mm)	31	97	30	61	62
Sediment, suspended concentration (mg/L)	31	58,900	1	1,910	4
Sediment, suspended discharge (ton/d)	31	1,320	<.01	[2]43	.07

Table 25. Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2008.—Continued

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

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 2008					
Streamflow, instantaneous (ft^3/s)	48	59	1.3	20	12
pH, onsite (standard units)	48	8.7	8.0	8.4	8.4
Specific conductance, onsite (µS/cm)	48	934	540	650	634
Temperature, water (°C)	48	26.5	0.0	11.5	11.2
Hardness, filtered (mg/L as $CaCO_3$)	48	450	200	299	300
Calcium, filtered (mg/L)	48	122	48.5	83.8	84.9
Magnesium, filtered (mg/L)	48	35.7	17.8	21.9	21.1
Arsenic, filtered (µg/L)	48	41.8	6	14.1	12.2
Arsenic, unfiltered (µg/L)	48	43	6	14.7	12.8
Cadmium, filtered (µg/L)	47	.05	<.04	[2].03	.02
Cadmium, unfiltered (µg/L)	48	.11	.01	.05	.04
Copper, filtered (µg/L)	48	6.7	.99	2.6	2.6
Copper, unfiltered (µg/L)	48	22.5	1.6	6.0	4.5
Iron, filtered (µg/L)	48	61	<6	[2]12	8
Iron, unfiltered (µg/L)	48	293	14	100	76.5
Lead, filtered (µg/L)	47	.33	<.08	[2].06	<.08
Lead, unfiltered (µg/L)	48	1.30	.04	.36	.26
Manganese, filtered (µg/L)	48	54.0	1.9	14.2	13.1
Manganese, unfiltered (µg/L)	48	56.5	2.2	18.7	14.8
Zinc, filtered (µg/L)	48	3.8	<1.0	[2]1.5	1.2
Zinc, unfiltered (µg/L)	48	9	<2	[2]3.0	2.0
Sediment, suspended (percent finer than 0.062 mm)	48	86	18	56	60
Sediment, suspended concentration (mg/L)	48	46	2	16	16
Sediment, suspended discharge (ton/d)	48	4.2	.01	1.0	.37

Table 25. Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2008.—Continued

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

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 2008					
Streamflow, instantaneous (ft^3/s)	225	1,920	23	287	217
pH, onsite (standard units)	173	8.9	7.4	8.3	8.3
Specific conductance, onsite (µS/cm)	208	642	234	481	504
Temperature, water (°C)	224	23.0	0.0	10.0	10.0
Hardness, filtered (mg/L as $CaCO_3$)	165	280	95	204	220
Calcium, filtered (mg/L)	165	82.0	28.2	60.1	63.8
Magnesium, filtered (mg/L)	165	18.7	5.9	13.0	13.7
Arsenic, filtered (µg/L)	175	39	6.0	14.4	13.0
Arsenic, unfiltered (µg/L)	175	215	4.8	24.2	17.1
Cadmium, filtered (µg/L)	174	2	<.1	[2].08	<1
Cadmium, unfiltered (µg/L)	175	5	<.1	[2].42	<1
Copper, filtered (µg/L)	175	120	3.2	11.0	8.3
Copper, unfiltered (µg/L)	173	1,500	8.2	82.8	37.0
Iron, filtered (µg/L)	175	190	<3	[2]14	9
Iron, unfiltered (µg/L)	175	29,000	27	1,520	510
Lead, filtered (µg/L)	175	6	<.08	[2].33	<1
Lead, unfiltered (µg/L)	175	200	.33	[2]10.9	4.60
Manganese, filtered (µg/L)	175	400	1.0	42.9	33.9
Manganese, unfiltered (µg/L)	175	4,600	11.9	246	140
Zinc, filtered (µg/L)	175	230	<10	[2]12.1	8.3
Zinc, unfiltered (µg/L)	174	1,700	4	89.2	40
Sediment, suspended (percent finer than 0.062 mm)	216	99	37	71	73
Sediment, suspended concentration (mg/L)	225	2,250	1	71	22
Sediment, suspended discharge (ton/d)	225	8,690	.18	151	11

Table 25. Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2008.—Continued

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

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 2008					
Streamflow, instantaneous (ft^3/s)	131	3,920	87	728	505
pH, onsite (standard units)	130	8.9	7.9	8.4	8.3
Specific conductance, onsite (µS/cm)	130	510	206	374	392
Temperature, water (°C)	131	23.0	0.0	10.0	10.0
Hardness, filtered (mg/L as $CaCO_3$)	130	230	86	164	170
Calcium, filtered (mg/L)	130	68.0	25.9	48.4	51.0
Magnesium, filtered (mg/L)	130	15.0	5.15	10.5	11.0
Arsenic, filtered (µg/L)	130	20	5.8	10.0	10.0
Arsenic, unfiltered (µg/L)	130	75	7	14.8	12
Cadmium, filtered (µg/L)	130	.2	<.04	[2].04	<.1
Cadmium, unfiltered (µg/L)	130	2.0	<.1	[2].17	.03
Copper, filtered (µg/L)	129	36.0	2.1	6.6	5.4
Copper, unfiltered (µg/L)	129	440	5.2	39.9	23.0
Iron, filtered (µg/L)	130	100	<3	[2]18	11
Iron, unfiltered (µg/L)	130	12,000	27	848	422
Lead, filtered (µg/L)	129	.6	<.08	[2].10	<.5
Lead, unfiltered (µg/L)	129	73.0	.14	[2]5.54	2.80
Manganese, filtered (µg/L)	130	57.3	4.0	19.1	17.2
Manganese, unfiltered (µg/L)	130	1,100	10.5	123	86.4
Zinc, filtered (µg/L)	130	26	<1.0	[2]5.6	3.5
Zinc, unfiltered (µg/L)	130	510	2	44.5	30
Sediment, suspended (percent finer than 0.062 mm)	131	94	43	75	78
Sediment, suspended concentration (mg/L)	131	752	1	48	21
Sediment, suspended discharge (ton/d)	131	7,960	.55	208	27

Table 25. Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2008.—Continued

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

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 2008					
Streamflow, instantaneous (ft^3/s)	131	3,860	149	1,020	749
pH, onsite (standard units)	130	8.7	7.8	8.3	8.3
Specific conductance, onsite (µS/cm)	130	630	189	413	433
Temperature, water (°C)	131	22.5	.5	11.0	11.0
Hardness, filtered (mg/L as $CaCO_3$)	130	300	74	186	195
Calcium, filtered (mg/L)	130	83.0	21.0	53.3	55.2
Magnesium, filtered (mg/L)	130	22.0	5.2	12.8	13.1
Arsenic, filtered (µg/L)	130	20	6.6	10.6	10.0
Arsenic, unfiltered (µg/L)	130	62	8	16.2	13.0
Cadmium, filtered (µg/L)	130	.30	<.04	[2].05	<.1
Cadmium, unfiltered (µg/L)	130	2.0	<.1	[2].22	.04
Copper, filtered (µg/L)	128	21.0	1.0	6.4	5.0
Copper, unfiltered (µg/L)	128	360	4.6	43.0	22.0
Iron, filtered (µg/L)	130	150	<3	[2]18	8
Iron, unfiltered (µg/L)	129	8,800	20	994	457
Lead, filtered (µg/L)	126	1.2	<.08	[2].16	<.60
Lead, unfiltered (µg/L)	126	56.0	<1.00	[2]7.71	3.50
Manganese, filtered (µg/L)	130	60.7	3.3	16.7	14.6
Manganese, unfiltered (µg/L)	130	880	8.0	147	93.6
Zinc, filtered (µg/L)	130	21	<3	[2]6.0	4.2
Zinc, unfiltered (µg/L)	130	490	2.9	61.2	31.0
Sediment, suspended (percent finer than 0.062 mm)	131	92	38	74	74
Sediment, suspended concentration (mg/L)	131	530	2	63	26
Sediment, suspended discharge (ton/d)	131	4,720	1.7	321	49

Table 25. Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2008.—Continued

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

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 2008					
Streamflow, instantaneous (ft^3/s)	228	9,560	296	1,860	1,110
pH, onsite (standard units)	174	8.8	7.4	8.3	8.3
Specific conductance, onsite (µS/cm)	203	483	139	302	315
Temperature, water (°C)	227	22.0	0.0	9.6	9.5
Hardness, filtered (mg/L as $CaCO_3$)	164	200	54	132	130
Calcium, filtered (mg/L)	164	59.0	14.9	37.2	37.8
Magnesium, filtered (mg/L)	164	14.0	3.94	9.50	9.50
Arsenic, filtered (µg/L)	173	17	2.7	6.0	5.4
Arsenic, unfiltered (µg/L)	173	110	3	9.8	7.0
Cadmium, filtered (µg/L)	173	.10	<.04	[2].03	<.1
Cadmium, unfiltered (µg/L)	173	4	<.01	[2].26	<1
Copper, filtered (µg/L)	172	25	E1.1	4.8	3.9
Copper, unfiltered (µg/L)	171	500	2.7	34.7	15.5
Iron, filtered (µg/L)	173	190	<3	[2]23	13
Iron, unfiltered (µg/L)	173	19,000	33	1,030	370
Lead, filtered (µg/L)	169	7	<.08	[2].30	<1
Lead, unfiltered (µg/L)	169	100	<1.00	[2]7.18	3.00
Manganese, filtered (µg/L)	173	37.4	<1.0	[2]8.1	7.0
Manganese, unfiltered (µg/L)	173	2,000	8.9	123	60
Zinc, filtered (µg/L)	172	39	<3	[2]6.0	4.0
Zinc, unfiltered (µg/L)	173	1,100	<10	[2]60	30
Sediment, suspended (percent finer than 0.062 mm)	217	98	27	73	75
Sediment, suspended concentration (mg/L)	228	1,370	2	57	18
Sediment, suspended discharge (ton/d)	228	34,700	3.0	620	60

Table 25. Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2008.—Continued

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

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 2008					
Streamflow, instantaneous (ft^3/s)	165	13,400	344	2,640	1,310
pH, onsite (standard units)	125	8.7	7.5	8.3	8.3
Specific conductance, onsite (µS/cm)	142	294	131	208	204
Temperature, water (°C)	165	22.5	0.0	9.4	9.5
Hardness, filtered (mg/L as $CaCO_3$)	118	140	55	103	98
Calcium, filtered (mg/L)	118	37.0	14.0	26.4	25.2
Magnesium, filtered (mg/L)	118	13.2	4.90	9.12	8.66
Arsenic, filtered (µg/L)	125	2	<1	[2].97	.98
Arsenic, unfiltered (µg/L)	125	4	<1	[2]1.2	1
Cadmium, filtered (µg/L)	125	1	<.04	--	<.1
Cadmium, unfiltered (µg/L)	125	2	<.01	[2].10	<1
Copper, filtered (µg/L)	123	7.0	<1.0	[2]1.4	.8
Copper, unfiltered (µg/L)	122	34	<1.0	[2]5.0	2.2
Iron, filtered (µg/L)	125	100	<3	[2]17	10
Iron, unfiltered (µg/L)	125	3,600	14	423	190
Lead, filtered (µg/L)	121	8	<.08	[2].41	<.6
Lead, unfiltered (µg/L)	121	25.0	<.06	[2]2.47	.06
Manganese, filtered (µg/L)	125	11.0	<1	[2]2.4	2.0
Manganese, unfiltered (µg/L)	125	180	<10	[2]28.9	18.6
Zinc, filtered (µg/L)	125	15	<.60	[2]2.2	<20
Zinc, unfiltered (µg/L)	125	60	<1	[2]5.8	<10
Sediment, suspended (percent finer than 0.062 mm)	163	98	42	80	82
Sediment, suspended concentration (mg/L)	165	271	1	28	8
Sediment, suspended discharge (ton/d)	165	7,670	1.1	499	30

Table 25. Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2008.—Continued

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

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 2008					
Streamflow, instantaneous (ft^3/s)	194	21,600	720	4,380	2,380
pH, onsite (standard units)	151	8.8	7.9	8.3	8.3
Specific conductance, onsite (µS/cm)	171	399	142	254	261
Temperature, water (°C)	191	22.0	0.0	9.5	9.0
Hardness, filtered (mg/L as $CaCO_3$)	151	170	60	117	120
Calcium, filtered (mg/L)	151	46.0	14.0	31.5	32.0
Magnesium, filtered (mg/L)	151	13.4	5.28	9.26	9.20
Arsenic, filtered (µg/L)	151	9	1	3.4	3.0
Arsenic, unfiltered (µg/L)	151	69	E1	5.4	4
Cadmium, filtered (µg/L)	151	.2	<.04	[2].03	<.1
Cadmium, unfiltered (µg/L)	151	5.0	<.01	[2].17	<1
Copper, filtered (µg/L)	150	12.6	E.7	2.8	2.0
Copper, unfiltered (µg/L)	149	400	2.0	19.9	8.1
Iron, filtered (µg/L)	151	200	<3	[2]21	14
Iron, unfiltered (µg/L)	151	13,000	43	633	234
Lead, filtered (µg/L)	145	1.2	<.08	[2].15	<1
Lead, unfiltered (µg/L)	146	78.0	<1.00	[2]3.56	1.55
Manganese, filtered (µg/L)	151	230	6.2	17.1	14.2
Manganese, unfiltered (µg/L)	151	1,100	10	65.7	40
Zinc, filtered (µg/L)	151	16	<1.0	[2]3.7	2.3
Zinc, unfiltered (µg/L)	151	1,100	<10	[2]34.8	15
Sediment, suspended (percent finer than 0.062 mm)	189	99	14	84	89
Sediment, suspended concentration (mg/L)	194	950	2	43	12
Sediment, suspended discharge (ton/d)	194	21,900	5.8	1,020	82

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

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

Table 26. Statistical summary of long-term bed-sediment data for the upper Clark Fork basin, Montana, August 1986 through August 2008.

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

Constituent	Number of samples	Maximum	Minimum	Mean	Median
12323600--Silver Bow Creek at Opportunity Period of record for bed-sediment data: 1992–2008					
Arsenic	6	186	119	152	158
Cadmium	17	43.9	22.8	32.3	30.1
Chromium	15	38.6	16.8	25.8	25.5
Copper	17	9,020	2,480	4,560	4,560
Iron	17	45,300	28,200	35,900	34,600
Lead	17	1,030	381	682	752
Manganese	17	9,220	1,680	3,580	2,900
Nickel	16	21.4	12.0	15.0	14.8
Silver	12	20.0	8.3	15.5	15.8
Zinc	17	13,400	4,950	7,880	7,130
12323750--Silver Bow Creek at Warm Springs Period of record for bed-sediment data: 1992–2008					
Arsenic	6	177	67	116	106
Cadmium	17	12.2	4.2	7.3	6.6
Chromium	15	34.1	<15.7	[1]20.5	[1]19.5
Copper	17	769	169	348	286
Iron	17	31,700	15,400	22,700	21,700
Lead	17	100	49	71	73
Manganese	17	17,700	1,470	8,170	8,150
Nickel	16	19.1	9.2	14.7	14.6
Silver	12	4.4	.3	[1]1.9	[1]1.8
Zinc	17	2,220	620	976	728
12323770--Warm Springs Creek at Warm Springs Period of record for bed-sediment data: 1995, 1997, 1999, 2002, 2005, 2008					
Arsenic	2	66	52	59	--
Cadmium	6	5.8	1.3	3.6	3.6
Chromium	6	39.3	27.5	31.9	31.1
Copper	6	1,060	779	908	887
Iron	6	26,600	16,800	21,700	21,900
Lead	6	86	67	81	83
Manganese	6	12,100	2,020	7,950	8,280
Nickel	6	25.5	17.6	20.2	19.4
Silver	4	5.1	3.1	3.8	3.5
Zinc	6	453	372	405	405

Table 26. Statistical summary of long-term bed-sediment data for the upper Clark Fork basin, Montana, August 1986 through August 2008.—Continued

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

Constituent	Number of samples	Maximum	Minimum	Mean	Median
12323800--Clark Fork near Galen Period of record for bed-sediment data: 1987, 1991–2008					
Arsenic	6	119	87	106	109
Cadmium	19	20.1	4.0	8.9	7.6
Chromium	15	35.7	19.1	27.1	26.4
Copper	19	2,300	838	1,210	1,110
Iron	19	39,800	22,600	27,800	27,000
Lead	19	235	92	136	131
Manganese	19	17,300	2,780	10,200	11,900
Nickel	16	23.2	13.9	18.5	18.3
Silver	14	7.3	<3.2	[1]4.4	[1]4.5
Zinc	19	3,560	999	1,520	1,160
461415112450801--Clark Fork below Lost Creek, near Galen Period of record for bed-sediment data: 1996–2008					
Arsenic	6	204	92	124	110
Cadmium	13	10.5	5.2	7.4	6.8
Chromium	12	34.5	20.5	28.0	27.3
Copper	13	2,050	1,150	1,510	1,440
Iron	13	32,800	24,400	29,600	30,800
Lead	13	218	127	171	170
Manganese	13	9,820	3,540	6,170	5,890
Nickel	13	19.9	11.7	16.0	16.3
Silver	8	7.8	4.2	6.5	6.7
Zinc	13	1,680	1,120	1,360	1,360
461559112443301--Clark Fork at county bridge, near Racetrack Period of record for bed-sediment data: 1996–2008					
Arsenic	6	101	56	79	83
Cadmium	13	8.7	5.0	6.8	6.4
Chromium	12	33.3	19.0	25.7	26.3
Copper	13	1,610	933	1,220	1,240
Iron	13	31,700	21,200	26,800	28,100
Lead	13	186	103	142	142
Manganese	13	6,310	2,100	3,570	3,330
Nickel	13	18.4	10.3	14.0	14.5
Silver	8	6.1	<3.3	[1]5.0	[1]5.4
Zinc	13	1,550	999	1,210	1,170

Table 26. Statistical summary of long-term bed-sediment data for the upper Clark Fork basin, Montana, August 1986 through August 2008.—Continued

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

Constituent	Number of samples	Maximum	Minimum	Mean	Median
461903112440701--Clark Fork at Dempsey Creek diversion, near Racetrack Period of record for bed-sediment data: 1996–2008					
Arsenic	6	91	58	75	75
Cadmium	13	10.3	4.3	6.6	6.0
Chromium	12	34.1	16.0	25.1	24.8
Copper	13	1,580	721	1,070	1,030
Iron	13	33,700	20,600	26,500	25,300
Lead	13	155	92	129	130
Manganese	13	8,370	1,810	4,300	3,910
Nickel	13	16.9	8.7	13.0	12.7
Silver	8	6.2	2.7	4.9	5.0
Zinc	13	1,570	900	1,160	1,160
12324200--Clark Fork at Deer Lodge Period of record for bed-sediment data: 1986–87, 1990–2008					
Arsenic	6	77	49	65	66
Cadmium	21	10.0	3.8	6.3	5.6
Chromium	15	43.9	19.5	29.4	28.2
Copper	21	4,180	683	1,270	1,040
Iron	21	35,300	21,100	26,900	26,100
Lead	21	242	103	147	146
Manganese	21	6,020	1,110	2,780	2,460
Nickel	16	21.1	11.5	14.8	13.3
Silver	16	7.9	2.4	4.7	4.5
Zinc	21	1,730	846	1,220	1,230
12324680--Clark Fork at Goldcreek Period of record for bed-sediment data: 1992–2008					
Arsenic	6	44	23	33	34
Cadmium	17	8.1	2.6	4.8	4.9
Chromium	15	48.9	21.3	31.1	31.6
Copper	17	1,080	338	658	675
Iron	17	30,600	15,500	23,200	23,700
Lead	17	152	52	93	93
Manganese	17	2,610	1,160	1,880	1,840
Nickel	16	18.6	9.0	14.1	14.5
Silver	12	4.8	2.3	3.3	3.2
Zinc	17	1,320	584	930	1,070

Table 26. Statistical summary of long-term bed-sediment data for the upper Clark Fork basin, Montana, August 1986 through August 2008.—Continued

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

Constituent	Number of samples	Maximum	Minimum	Mean	Median
12331800--Clark Fork near Drummond Period of record for bed-sediment data: 1986–87, 1991–2008					
Arsenic	6	45	31	34	32
Cadmium	20	7.7	2.6	4.6	4.4
Chromium	15	35.4	17.0	27.9	30.1
Copper	20	747	303	479	470
Iron	20	39,200	16,500	22,500	21,800
Lead	20	135	59	89	84
Manganese	20	4,820	1,150	2,160	1,900
Nickel	16	16.8	9.3	13.4	13.7
Silver	15	4.7	<3.2	[1]3.0	[1]2.9
Zinc	20	1,230	673	968	975
12334550--Clark Fork at Turah Bridge, near Bonner Period of record for bed-sediment data: 1986, 1991–2008					
Arsenic	6	32	19	25	23
Cadmium	19	7.3	1.9	3.7	3.6
Chromium	15	34.7	15.3	24.5	26.7
Copper	19	635	211	350	322
Iron	19	24,600	12,600	18,700	17,300
Lead	19	115	47	68	63
Manganese	19	2,270	671	1,270	1,260
Nickel	16	19.1	6.9	12.2	11.4
Silver	14	3.9	<1.9	[1]2.1	[1]1.9
Zinc	19	1,160	584	818	786
12340000--Blackfoot River near Bonner Period of record for bed-sediment data: 1986–87, 1991, 1993–96, 1998–2001, 2003, 2006–08					
Arsenic	4	6	2	4	3
Cadmium	15	2.0	<.2	[1].6	[1].4
Chromium	11	28.5	15.1	21.6	22.0
Copper	15	27	11	20	21
Iron	15	23,000	12,400	17,600	18,100
Lead	15	20	<13	[1]13	[1]13
Manganese	15	746	298	531	542
Nickel	12	14.3	6.0	11.4	11.8
Silver	12	<1.9	<.3	[1].5	[1]<.6
Zinc	15	82	35	61	63

Table 26. Statistical summary of long-term bed-sediment data for the upper Clark Fork basin, Montana, August 1986 through August 2008.—Continued

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

Constituent	Number of samples	Maximum	Minimum	Mean	Median
12340500--Clark Fork above Missoula Period of record for bed-sediment data: 1997–2008					
Arsenic	6	54	17	36	34
Cadmium	12	5.8	1.5	3.4	3.5
Chromium	11	33.0	19.0	25.9	26.2
Copper	12	551	166	373	368
Iron	12	27,000	18,100	21,000	20,600
Lead	12	78	37	57	58
Manganese	12	2,250	477	1,100	1,070
Nickel	12	15.8	7.6	12.6	12.8
Silver	7	2.9	.8	[1]2.0	[1]2.1
Zinc	12	1,090	438	764	777

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

Table 27. Statistical summary of long-term biological data for the upper Clark Fork basin, Montana, August 1986 through August 2008.

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

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
12323600--Silver Bow Creek at Opportunity Period of record for biological data: 1992, 1994–95, 1997–2008					
		Brachycentrus spp.			
Arsenic	0	--	--	--	--
Cadmium	5	12.5	5.8	10.1	11.6
Chromium	5	5.9	.7	2.1	.9
Copper	5	846	235	587	592
Iron	5	1,190	335	617	469
Lead	5	21.5	7.4	13.7	13.8
Manganese	5	817	231	515	503
Nickel	5	2.1	<.1	[1]1.3	[1]1.6
Zinc	5	995	629	803	815
		Hydropsyche cockerelli			
Arsenic	10	20.4	9.5	13.5	12.7
Cadmium	16	9.7	3.1	5.7	5.4
Chromium	16	8.0	1.0	3.0	2.6
Copper	16	1,090	269	440	410
Iron	16	4,950	689	1,970	1,890
Lead	16	68.3	19.0	36.5	39.0
Manganese	16	3,030	180	1,030	975
Nickel	16	3.6	.7	2.2	2.1
Zinc	16	1,590	619	913	868
		Hydropsyche spp.			
Arsenic	8	23.1	10.7	15.7	15.1
Cadmium	13	11.0	4.2	6.6	5.7
Chromium	13	4.7	.6	2.3	2.8
Copper	13	930	312	547	469
Iron	13	3,250	1,050	2,050	2,110
Lead	13	237	21.8	55.0	40.4
Manganese	13	1,340	712	1,090	1,060
Nickel	13	2.7	.7	2.2	2.4
Zinc	13	1,290	784	1,020	1,080

Table 27. Statistical summary of long-term biological data for the upper Clark Fork basin, Montana, August 1986 through August 2008.—Continued

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

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
12323600--Silver Bow Creek at Opportunity—Continued Period of record for biological data: 1992, 1994–95, 1997–2008					
Hydropsyche tana					
Arsenic	0	--	--	--	--
Cadmium	6	9.2	4.8	6.8	6.9
Chromium	6	11.5	.9	4.5	1.8
Copper	6	456	10.5	236	298
Iron	6	1,520	875	1,100	1,050
Lead	6	21.0	15.6	18.6	18.3
Manganese	6	969	307	634	675
Nickel	6	1.8	.7	1.4	1.6
Zinc	6	1,070	760	961	1,020
12323750--Silver Bow Creek at Warm Springs Period of record for biological data: 1992–2008					
Hydropsyche cockerelli					
Arsenic	11	23.6	7.9	13.5	13.3
Cadmium	37	2.1	.2	.6	.5
Chromium	37	4.3	.4	1.1	.8
Copper	37	97.0	16.7	37.4	29.9
Iron	37	1,590	351	785	761
Lead	37	5.7	.3	3.0	2.9
Manganese	37	3,890	491	1,320	1,110
Nickel	37	1.8	.3	.9	.8
Zinc	37	276	115	174	167
Hydropsyche occidentalis					
Arsenic	5	31.0	10.5	21.0	25.6
Cadmium	20	1.6	.2	.6	.4
Chromium	20	6.8	.3	1.7	1.0
Copper	20	48.9	11.0	32.4	30.8
Iron	20	2,960	372	1,190	971
Lead	20	8.2	<1.7	[1]3.8	[1]3.5
Manganese	20	6,940	1,200	2,560	2,150
Nickel	20	2.7	.7	1.5	1.5
Zinc	20	220	140	178	179

Table 27. Statistical summary of long-term biological data for the upper Clark Fork basin, Montana, August 1986 through August 2008.—Continued

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

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
12323750--Silver Bow Creek at Warm Springs—Continued Period of record for biological data: 1992–2008					
			Hydropsyche spp.		
Arsenic	0	--	--	--	--
Cadmium	4	2.3	0.4	1.1	0.9
Chromium	4	1.4	.5	1.0	1.2
Copper	4	47.6	34.9	40.9	40.6
Iron	4	773	561	680	693
Lead	4	5.1	1.9	3.9	4.7
Manganese	4	1,100	443	725	678
Nickel	4	1.9	<.4	[1].8	[1].5
Zinc	4	285	141	195	177
12323770--Warm Springs Creek at Warm Springs Period of record for biological data: 1995, 1997, 1999, 2002, 2005, 2008					
			Arctopsyche grandis		
Arsenic	3	9.8	9.5	9.6	9.6
Cadmium	7	3.6	1.9	2.8	3.0
Chromium	7	2.9	.8	2.0	1.8
Copper	7	133	78.3	109	102
Iron	7	1,350	684	980	1,040
Lead	7	7.2	3.0	[1]5.2	[1]5.3
Manganese	7	3,560	1,340	2,540	2,480
Nickel	7	3.5	1.8	[1]2.5	[1]2.3
Zinc	7	267	181	206	197
			Hydropsyche occidentalis		
Arsenic	3	13.6	12.7	13.2	13.3
Cadmium	5	1.3	.7	1.0	1.2
Chromium	5	8.6	.3	3.8	3.2
Copper	5	183	125	158	165
Iron	5	2,360	1,590	1,940	1,950
Lead	5	12.6	6.7	8.5	7.7
Manganese	5	3,190	2,400	2,800	2,880
Nickel	5	4.5	2.0	3.0	3.0
Zinc	5	204	148	169	166

Table 27. Statistical summary of long-term biological data for the upper Clark Fork basin, Montana, August 1986 through August 2008.—Continued

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

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
12323770--Warm Springs Creek at Warm Springs—Continued Period of record for biological data: 1995, 1997, 1999, 2002, 2005, 2008					
			Hydropsyche spp.		
Arsenic	0	--	--	--	--
Cadmium	2	1.1	0.6	0.9	--
Chromium	2	1.6	1.4	1.5	--
Copper	2	95.9	94.8	95.3	--
Iron	2	1,220	1,150	1,190	--
Lead	2	5.9	5.2	5.6	--
Manganese	2	3,390	956	2,170	--
Nickel	2	2.0	1.8	1.9	--
Zinc	2	129	125	127	--
12323800--Clark Fork near Galen Period of record for biological data: 1987, 1991–2008					
			Claassenia sabulosa		
Arsenic	1	--	--	2.0	--
Cadmium	1	--	--	.2	--
Chromium	1	--	--	1.5	--
Copper	1	--	--	54.7	--
Iron	1	--	--	242	--
Lead	1	--	--	1.0	--
Manganese	1	--	--	323	--
Nickel	1	--	--	.5	--
Zinc	1	--	--	237	--
			Hydropsyche cockerelli		
Arsenic	8	15.8	13.2	14.1	13.8
Cadmium	33	2.7	.7	1.5	1.5
Chromium	33	4.4	.8	1.9	1.7
Copper	33	181	48.7	105	102
Iron	33	2,660	816	1,470	1,400
Lead	33	11.8	1.2	8.1	7.8
Manganese	33	3,620	1,070	2,250	2,200
Nickel	33	6.5	.9	1.8	1.6
Zinc	33	299	136	210	205

Table 27. Statistical summary of long-term biological data for the upper Clark Fork basin, Montana, August 1986 through August 2008.—Continued

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

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
12323800--Clark Fork near Galen—Continued Period of record for biological data: 1987, 1991–2008					
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	8	16.5	12.5	14.6	14.8
Cadmium	40	1.7	.6	1.1	1.1
Chromium	40	6.6	.4	2.0	1.6
Copper	40	121	49.2	83.3	82.8
Iron	40	1,920	642	1,300	1,270
Lead	40	13.5	1.6	7.3	6.9
Manganese	40	6,170	1,220	2,760	2,310
Nickel	40	3.5	.8	1.6	1.6
Zinc	40	286	168	202	197
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	--

Table 27. Statistical summary of long-term biological data for the upper Clark Fork basin, Montana, August 1986 through August 2008.—Continued

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

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
12323800--Clark Fork near Galen—Continued Period of record for biological data: 1987, 1991–2008					
		Hydropsyche spp.			
Arsenic	2	15.7	14.5	15.1	--
Cadmium	6	3.5	.8	2.3	2.8
Chromium	2	2.4	2.2	2.3	--
Copper	6	154	78.4	126	143
Iron	6	1,540	1,190	1,360	1,360
Lead	6	13.5	5.9	10.4	10.9
Manganese	2	4,760	4,400	4,580	--
Nickel	2	1.8	1.5	1.6	--
Zinc	6	329	218	280	291
461415112450801--Clark Fork below Lost Creek, near Galen Period of record for biological data: 1996–2008					
		Claassenia sabulosa			
Arsenic	1	--	--	1.5	--
Cadmium	2	0.4	0.3	.4	--
Chromium	2	1.9	.4	1.2	--
Copper	2	70.1	67.1	68.6	--
Iron	2	209	189	199	--
Lead	2	1.2	.7	1.0	--
Manganese	2	238	90.4	164	--
Nickel	2	.2	<.2	[1].1	--
Zinc	2	245	208	226	--
		Hydropsyche cockerelli			
Arsenic	11	27.8	8.8	14.3	11.6
Cadmium	22	2.8	1.1	1.8	1.6
Chromium	22	3.6	.8	2.0	2.0
Copper	22	338	48.8	134	113
Iron	22	4,080	691	1,530	1,180
Lead	22	28.6	4.5	11.6	9.0
Manganese	22	3,160	1,230	1,850	1,720
Nickel	22	2.8	.9	1.4	1.2
Zinc	22	339	151	228	223

Table 27. Statistical summary of long-term biological data for the upper Clark Fork basin, Montana, August 1986 through August 2008.—Continued

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

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
461415112450801--Clark Fork below Lost Creek, near Galen—Continued Period of record for biological data: 1996–2008					
Hydropsyche occidentalis					
Arsenic	8	20.8	12.7	15.5	14.6
Cadmium	22	1.9	.9	1.4	1.4
Chromium	22	3.6	1.2	2.1	2.0
Copper	22	219	52.1	113	118
Iron	22	2,830	963	1,600	1,500
Lead	22	19.4	6.6	10.7	10.6
Manganese	22	4,150	1,220	2,570	2,240
Nickel	22	2.5	.9	1.5	1.5
Zinc	22	308	174	242	242
Hydropsyche spp.					
Arsenic	1	--	--	12.0	--
Cadmium	5	1.8	1.2	1.5	1.4
Chromium	5	2.4	.9	1.5	1.5
Copper	5	122	45.1	91.8	103
Iron	5	1,410	533	1,110	1,200
Lead	5	20.5	4.1	10.0	8.7
Manganese	5	1,980	799	1,440	1,230
Nickel	5	2.8	1.0	1.6	1.4
Zinc	5	225	143	179	179
461559112443301--Clark Fork at county bridge, near Racetrack Period of record for biological data: 1996–2008					
Claassenia sabulosa					
Arsenic	0	--	--	--	--
Cadmium	1	--	--	0.4	--
Chromium	1	--	--	.3	--
Copper	1	--	--	40.3	--
Iron	1	--	--	113	--
Lead	1	--	--	.8	--
Manganese	1	--	--	172	--
Nickel	1	--	--	.2	--
Zinc	1	--	--	213	--

Table 27. Statistical summary of long-term biological data for the upper Clark Fork basin, Montana, August 1986 through August 2008.—Continued

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

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
461559112443301--Clark Fork at county bridge, near Racetrack—Continued Period of record for biological data: 1996–2008					
Hydropsyche cockerelli					
Arsenic	10	20.2	11.1	14.1	13.1
Cadmium	21	2.0	.8	1.5	1.5
Chromium	21	2.8	.6	1.7	1.4
Copper	21	198	50.0	102	98.2
Iron	21	3,330	657	1,270	992
Lead	21	17.2	3.7	8.7	7.5
Manganese	21	2,360	646	1,630	1,900
Nickel	21	2.0	.7	1.2	1.0
Zinc	21	302	139	193	186
Hydropsyche occidentalis					
Arsenic	6	16.8	11.6	14.4	14.6
Cadmium	19	2.3	.7	1.4	1.4
Chromium	19	3.6	1.1	2.2	2.0
Copper	19	160	59.5	112	124
Iron	19	3,690	1,030	1,700	1,600
Lead	19	14.7	4.3	10.5	10.3
Manganese	19	3,770	1,090	2,260	2,130
Nickel	19	2.3	1.1	1.4	1.3
Zinc	19	361	181	233	229
Hydropsyche spp.					
Arsenic	2	12.7	11.9	12.3	--
Cadmium	4	2.4	1.0	1.6	1.5
Chromium	4	2.5	.7	1.5	1.4
Copper	4	124	82.9	101	99.2
Iron	4	1,880	1,140	1,380	1,240
Lead	4	15.0	5.7	9.4	8.5
Manganese	4	2,370	910	1,500	1,360
Nickel	4	1.9	1.1	1.4	1.3
Zinc	4	220	151	190	194

Table 27. Statistical summary of long-term biological data for the upper Clark Fork basin, Montana, August 1986 through August 2008.—Continued

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

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
461903112440701--Clark Fork at Dempsey Creek diversion, near Racetrack Period of record for biological data: 1996–2008					
Arctopsyche grandis					
Arsenic	0	--	--	--	--
Cadmium	1	--	--	1.7	--
Chromium	1	--	--	<2.4	--
Copper	1	--	--	30.8	--
Iron	1	--	--	340	--
Lead	1	--	--	<14.5	--
Manganese	1	--	--	510	--
Nickel	1	--	--	1.0	--
Zinc	1	--	--	87	--
Hydropsyche cockerelli					
Arsenic	8	18.8	8.0	12.3	10.3
Cadmium	17	2.0	.7	1.3	1.3
Chromium	17	4.0	.5	1.5	1.3
Copper	17	198	60.7	105	88.5
Iron	17	2,310	552	1,090	875
Lead	17	17.7	3.5	7.9	6.8
Manganese	17	2,650	487	1,380	1,230
Nickel	17	2.1	.5	1.1	1.0
Zinc	17	275	162	204	188
Hydropsyche occidentalis					
Arsenic	8	24.0	10.2	15.0	14.4
Cadmium	25	2.4	.7	1.3	1.2
Chromium	25	6.2	.8	2.1	1.9
Copper	25	238	74.9	110	91.4
Iron	25	3,390	940	1,570	1,500
Lead	25	21.8	6.1	11.7	11.4
Manganese	25	4,460	826	2,730	2,420
Nickel	25	2.4	1.2	1.5	1.5
Zinc	25	386	211	266	240

Table 27. Statistical summary of long-term biological data for the upper Clark Fork basin, Montana, August 1986 through August 2008.—Continued

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

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
461903112440701--Clark Fork at Dempsey Creek diversion, near Racetrack—Continued Period of record for biological data: 1996–2008					
		Hydropsyche spp.			
Arsenic	0	--	--	--	--
Cadmium	2	1.7	1.6	1.6	--
Chromium	2	2.1	1.4	1.8	--
Copper	2	140	104	122	--
Iron	2	1,610	1,070	1,340	--
Lead	2	13.2	10.5	11.8	--
Manganese	2	1,150	638	892	--
Nickel	2	1.6	1.6	1.6	--
Zinc	2	212	191	202	--
12324200--Clark Fork at Deer Lodge Period of record for biological data: 1986–87, 1990–2008					
		Arctopsyche grandis			
Arsenic	0	--	--	--	--
Cadmium	2	2.4	<4.2	[1]2.2	--
Chromium	2	1.0	<1.3	[1].8	--
Copper	2	69.1	34.9	52.0	--
Iron	2	676	537	606	--
Lead	2	<7.8	3.8	[1]3.8	--
Manganese	2	727	380	554	--
Nickel	2	<1.7	<1.3	[1]--	--
Zinc	2	178	140	159	--
		Hydropsyche cockerelli			
Arsenic	6	11.4	5.8	8.2	7.8
Cadmium	29	3.5	.6	1.4	1.3
Chromium	29	3.2	.4	1.6	1.7
Copper	29	180	54.7	98.2	98.2
Iron	29	3,340	490	1,120	1,040
Lead	29	18.1	3.8	9.5	8.9
Manganese	29	1,570	396	879	815
Nickel	29	2.4	.3	1.1	1.0
Zinc	29	391	132	190	185

Table 27. Statistical summary of long-term biological data for the upper Clark Fork basin, Montana, August 1986 through August 2008.—Continued

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

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
12324200--Clark Fork at Deer Lodge—Continued Period of record for biological data: 1986–87, 1990–2008					
Hydropsyche occidentalis					
Arsenic	10	12.4	6.6	9.8	9.4
Cadmium	47	3.4	.6	1.4	1.3
Chromium	47	3.6	.6	1.9	1.9
Copper	47	180	49.4	117	112
Iron	47	2,060	557	1,390	1,420
Lead	47	18.6	3.5	11.2	11.2
Manganese	47	2,850	649	1,740	1,730
Nickel	47	12.9	1.0	1.7	1.4
Zinc	47	346	166	246	238
Hydropsyche spp.					
Arsenic	0	--	--	--	--
Cadmium	3	2.6	2.0	2.4	2.5
Chromium	0	--	--	--	--
Copper	3	222	175	191	177
Iron	3	2,220	1,850	2,010	1,950
Lead	3	16.7	15.0	16.1	16.7
Manganese	0	--	--	--	--
Nickel	0	--	--	--	--
Zinc	3	298	197	257	276
12324680--Clark Fork at Goldcreek Period of record for biological data: 1992–2008					
Arctopsyche grandis					
Arsenic	22	6.4	1.8	3.7	3.1
Cadmium	51	6.6	.6	1.9	1.6
Chromium	51	3.3	.1	1.2	1.0
Copper	51	129	19.9	41.6	32.0
Iron	51	2,360	195	635	482
Lead	51	10.9	1.0	3.3	3.0
Manganese	51	1,580	436	846	842
Nickel	51	1.8	.2	.7	.6
Zinc	51	326	146	194	180

Table 27. Statistical summary of long-term biological data for the upper Clark Fork basin, Montana, August 1986 through August 2008.—Continued

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

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
12324680--Clark Fork at Goldcreek—Continued Period of record for biological data: 1992–2008					
Claassenia sabulosa					
Arsenic	15	2.1	0.4	1.3	1.4
Cadmium	35	3.5	.1	1.0	.7
Chromium	35	1.6	.2	.6	.5
Copper	35	81.7	33.0	57.9	57.1
Iron	35	567	63.0	184	158
Lead	35	1.8	.4	.9	.8
Manganese	35	320	50.6	155	142
Nickel	35	.7	.1	.3	.3
Zinc	35	351	166	263	258
Hydropsyche cockerelli					
Arsenic	14	8.2	4.1	5.4	5.3
Cadmium	33	2.6	.5	1.3	1.2
Chromium	33	4.7	.5	2.0	1.9
Copper	33	188	17.1	69.2	57.6
Iron	33	3,250	522	1,090	813
Lead	33	16.2	2.4	6.2	5.2
Manganese	33	1,710	538	986	954
Nickel	33	2.3	.3	1.2	1.0
Zinc	33	269	106	186	184
Hydropsyche morosa group					
Arsenic	0	--	--	--	--
Cadmium	4	1.7	1.1	1.4	1.4
Chromium	4	1.4	1.3	1.4	1.4
Copper	4	72.9	43.8	60.5	62.7
Iron	4	1,320	612	1,050	1,130
Lead	4	6.9	2.4	4.6	4.6
Manganese	4	1,030	538	804	822
Nickel	4	1.4	.9	1.2	1.2
Zinc	4	190	137	167	170

Table 27. Statistical summary of long-term biological data for the upper Clark Fork basin, Montana, August 1986 through August 2008.—Continued

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

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
12324680--Clark Fork at Goldcreek—Continued Period of record for biological data: 1992–2008					
Hydropsyche occidentalis					
Arsenic	6	6.7	4.7	5.4	5.2
Cadmium	21	2.3	.4	1.3	1.3
Chromium	21	3.9	.4	1.6	1.7
Copper	21	156	26.4	63.0	57.6
Iron	21	2,720	466	1,100	1,040
Lead	21	15.7	2.9	6.7	5.7
Manganese	21	2,210	530	1,270	1,280
Nickel	21	2.5	.8	1.2	1.0
Zinc	21	277	97.0	199	203
12331800--Clark Fork near Drummond Period of record for biological data: 1986, 1991–2008					
Arctopsyche grandis					
Arsenic	14	4.4	2.3	3.3	3.4
Cadmium	46	3.8	.4	1.3	1.1
Chromium	46	2.5	.2	.9	1.0
Copper	46	89.2	16.9	31.9	27.6
Iron	46	1,660	193	552	493
Lead	46	11.8	1.6	4.3	3.9
Manganese	46	2,010	456	835	733
Nickel	46	1.9	.2	.6	.6
Zinc	46	308	140	188	183
Claassenia sabulosa					
Arsenic	13	1.8	0.7	1.2	1.2
Cadmium	49	2.8	.1	1.0	.9
Chromium	49	3.3	.2	.7	.6
Copper	49	165	18.0	65.2	60.6
Iron	49	387	45.4	161	141
Lead	49	2.9	.2	1.0	.8
Manganese	49	748	33.1	190	153
Nickel	49	1.1	.1	[1].3	[1].2
Zinc	49	567	103	274	261

Table 27. Statistical summary of long-term biological data for the upper Clark Fork basin, Montana, August 1986 through August 2008.—Continued

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

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
12331800--Clark Fork near Drummond—Continued Period of record for biological data: 1986, 1991–2008					
Hydropsyche cockerelli					
Arsenic	10	6.4	3.9	5.0	4.7
Cadmium	39	2.3	.3	1.1	.8
Chromium	39	3.5	.4	1.6	1.6
Copper	39	156	30.0	58.2	51.1
Iron	39	2,500	506	1,140	969
Lead	39	15.0	4.8	8.1	7.4
Manganese	39	1,680	549	1,000	924
Nickel	39	2.0	.5	1.1	1.1
Zinc	39	248	134	193	186
Hydropsyche morosa group					
Arsenic	0	--	--	--	--
Cadmium	6	1.3	1.1	1.2	1.2
Chromium	6	2.8	1.9	2.3	2.2
Copper	6	57.4	50.2	55.2	55.8
Iron	6	1,730	1,370	1,570	1,600
Lead	6	10.8	7.0	8.9	9.0
Manganese	6	1,940	1,260	1,610	1,610
Nickel	6	1.7	1.3	1.5	1.5
Zinc	6	250	227	239	240
Hydropsyche occidentalis					
Arsenic	10	6.9	4.3	5.2	5.1
Cadmium	26	2.0	.4	1.0	1.0
Chromium	26	8.1	.4	2.2	2.1
Copper	26	118	13.3	55.0	55.1
Iron	26	2,060	424	1,200	1,180
Lead	26	14.0	3.0	8.4	8.0
Manganese	26	2,920	619	1,490	1,220
Nickel	26	2.4	.5	1.3	1.2
Zinc	26	293	157	221	214

Table 27. Statistical summary of long-term biological data for the upper Clark Fork basin, Montana, August 1986 through August 2008.—Continued

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

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
12331800--Clark Fork near Drummond—Continued Period of record for biological data: 1986, 1991–2008					
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	--
12334550--Clark Fork at Turah Bridge, near Bonner Period of record for biological data: 1986, 1991–2008					
Arctopsyche grandis					
Arsenic	19	5.1	3.1	4.4	4.4
Cadmium	61	2.7	.4	1.1	.8
Chromium	61	4.1	.5	1.6	1.5
Copper	61	125	20.1	37.1	31.5
Iron	61	2,870	372	906	790
Lead	61	13.2	1.6	4.2	3.4
Manganese	61	902	324	642	660
Nickel	61	2.6	.4	1.1	.9
Zinc	61	276	111	197	196
Claassenia sabulosa					
Arsenic	13	1.9	0.5	1.1	1.1
Cadmium	39	2.5	.1	.9	.8
Chromium	39	2.0	.2	.7	.6
Copper	39	95.1	37.5	59.3	55.0
Iron	39	340	58.6	120	107
Lead	39	1.6	.2	.6	.6
Manganese	39	229	37.2	94.6	79.4
Nickel	39	.6	.04	.2	.2
Zinc	39	342	144	230	235

Table 27. Statistical summary of long-term biological data for the upper Clark Fork basin, Montana, August 1986 through August 2008.—Continued

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

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
12334550--Clark Fork at Turah Bridge, near Bonner—Continued Period of record for biological data: 1986, 1991–2008					
Hydropsyche cockerelli					
Arsenic	14	5.2	3.7	4.6	4.8
Cadmium	42	1.8	.3	.8	.7
Chromium	42	8.0	.2	2.0	1.6
Copper	42	118	26.4	48.0	43.9
Iron	42	2,530	566	1,200	1,100
Lead	42	12.1	2.2	5.2	5.0
Manganese	42	805	426	632	656
Nickel	42	2.6	.6	1.2	1.2
Zinc	42	228	119	186	191
Hydropsyche morosa group					
Arsenic	0	--	--	--	--
Cadmium	2	1.3	1.1	1.2	--
Chromium	2	4.6	2.4	3.5	--
Copper	2	84.1	26.8	55.4	--
Iron	2	1,800	986	1,390	--
Lead	2	6.6	<7.8	[1]5.2	--
Manganese	2	1,320	537	928	--
Nickel	2	1.7	1.3	1.5	--
Zinc	2	231	171	201	--
Hydropsyche occidentalis					
Arsenic	10	5.9	3.6	4.3	4.2
Cadmium	30	1.8	.3	.8	.8
Chromium	30	3.2	.6	1.8	1.6
Copper	30	102	27.4	47.5	43.9
Iron	30	2,310	472	1,200	1,130
Lead	30	14.2	3.0	6.2	5.6
Manganese	30	1,600	454	858	769
Nickel	30	3.2	.6	1.2	1.2
Zinc	30	416	145	212	220

Table 27. Statistical summary of long-term biological data for the upper Clark Fork basin, Montana, August 1986 through August 2008.—Continued

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

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
12334550--Clark Fork at Turah Bridge, near Bonner—Continued Period of record for biological data: 1986, 1991–2008					
			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	--
12340000--Blackfoot River near Bonner Period of record for biological data: 1986–87, 1991, 1993, 1996, 1998, 2000, 2003, 2006–08					
			Arctopsyche grandis		
Arsenic	4	4.6	2.2	2.9	2.5
Cadmium	14	.4	.1	.2	.2
Chromium	9	6.9	.8	2.3	1.4
Copper	14	16.2	9.9	12.6	12.2
Iron	14	1,230	108	649	664
Lead	14	2.3	.5	1.1	.9
Manganese	9	633	286	472	476
Nickel	9	3.7	.7	1.3	1.0
Zinc	14	156	123	138	138
			Claassenia sabulosa		
Arsenic	5	3.0	0.3	1.4	1.4
Cadmium	16	.2	.1	.1	.1
Chromium	11	5.2	.3	1.1	.7
Copper	16	88.5	19.0	43.4	42.5
Iron	16	265	46.2	132	120
Lead	16	.8	.1	.4	.3
Manganese	11	133	26.3	78.6	72.2
Nickel	11	1.1	.1	.3	.3
Zinc	16	328	117	221	203

Table 27. Statistical summary of long-term biological data for the upper Clark Fork basin, Montana, August 1986 through August 2008.—Continued

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

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
12340000--Blackfoot River near Bonner—Continued					
Period of record for biological data: 1986–87, 1991, 1993, 1996, 1998, 2000, 2003, 2006–08					
Hydropsyche cockerelli					
Arsenic	3	3.1	2.4	2.9	3.0
Cadmium	3	.4	<.1	[1].3	[1].3
Chromium	3	3.8	2.4	3.3	3.6
Copper	3	16.2	5.6	12.4	15.5
Iron	3	1,990	1,640	1,860	1,960
Lead	3	2.3	2.0	2.1	2.1
Manganese	3	814	637	723	716
Nickel	3	4.6	1.8	2.8	1.9
Zinc	3	142	140	141	140
Hydropsyche occidentalis					
Arsenic	4	3.8	1.9	2.8	2.8
Cadmium	16	.5	.1	.2	.2
Chromium	16	5.8	.8	2.2	1.9
Copper	16	20.6	12.0	14.9	14.6
Iron	16	1,930	1,060	1,450	1,480
Lead	16	2.0	.8	1.4	1.6
Manganese	16	798	414	532	492
Nickel	16	4.9	.9	1.6	1.4
Zinc	16	163	116	139	143
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 upper Clark Fork basin, Montana, August 1986 through August 2008.—Continued

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

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
12340500--Clark Fork above Missoula Period of record for biological data: 1997–2008					
Arctopsyche grandis					
Arsenic	16	4.7	2.1	3.5	3.5
Cadmium	35	1.8	.1	.7	.6
Chromium	35	3.4	.6	1.6	1.5
Copper	35	77.6	19.5	36.1	34.9
Iron	35	2,340	476	968	892
Lead	35	6.8	1.2	4.0	3.8
Manganese	35	1,410	476	938	929
Nickel	35	2.0	.5	1.1	1.0
Zinc	35	260	133	191	192
Claassenia sabulosa					
Arsenic	10	1.9	0.7	1.4	1.5
Cadmium	19	2.0	.2	.7	.4
Chromium	19	1.4	.3	.8	.8
Copper	19	71.7	33.0	51.7	47.3
Iron	19	402	95.3	245	246
Lead	19	3.1	.5	1.2	1.1
Manganese	19	683	75.2	232	190
Nickel	19	.5	<.3	[1].4	[1].4
Zinc	19	363	191	280	271
Hydropsyche cockerelli					
Arsenic	13	8.0	3.6	6.2	6.5
Cadmium	22	1.3	.4	.9	1.0
Chromium	22	6.0	1.8	3.1	3.2
Copper	22	97.9	29.9	65.2	61.1
Iron	22	3,590	1,400	2,110	2,060
Lead	22	11.8	4.2	7.7	7.4
Manganese	22	1,910	781	1,300	1,280
Nickel	22	2.4	1.4	1.8	1.8
Zinc	22	266	156	218	219

Table 27. Statistical summary of long-term biological data for the upper Clark Fork basin, Montana, August 1986 through August 2008.—Continued

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

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
12340500--Clark Fork above Missoula—Continued Period of record for biological data: 1997–2008					
Hydropsyche occidentalis					
Arsenic	5	6.5	3.9	5.8	6.2
Cadmium	11	1.2	.4	.8	.7
Chromium	11	5.5	2.0	3.4	3.1
Copper	11	76.5	30.3	55.4	58.6
Iron	11	2,540	1,450	2,060	2,210
Lead	11	11.1	4.0	7.3	7.4
Manganese	11	2,460	939	1,870	1,930
Nickel	11	2.4	1.6	2.0	2.0
Zinc	11	278	192	236	232

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

Publishing support provided by:
Helena Publishing Service Center

For more information concerning this publication, contact:
Director, USGS Montana Water Science Center
3162 Bozeman Ave.
Helena, MT 59601
(406) 457–5900

Or visit the Montana Water Science Center Web site at:
http://mt.water.usgs.gov

ISBN 978-1-4113-2549-4