USGS
science for a changing world

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

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

Open-File Report 2007–1301

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

COVER PHOTOGRAPH: Clark Fork below Milltown Dam. Photograph by John Lambing, U.S. Geological Survey, taken in May 1989.

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

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

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

Open-File Report 2007–1301

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

U.S. Department of the Interior
DIRK KEMPTHORNE, Secretary

U.S. Geological Survey
Mark D. Myers, Director

U.S. Geological Survey, Reston, Virginia: 2007

For product and ordering information:
World Wide Web: http://www.usgs.gov/pubprod
Telephone: 1-888-ASK-USGS

For more information on the USGS--the Federal source for science about the Earth, its natural and living resources, natural hazards, and the environment:
World Wide Web: http://www.usgs.gov
Telephone: 1-888-ASK-USGS

Suggested citation:
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.

Contents

Figure

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 2006 is the period from October 1, 2005, through September 30, 2006.

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 the report:

FNU	formazin nephelometric units
ICAPES	inductively coupled argon plasma-emission spectroscopy
LRL	laboratory reporting level
LT–MDL	long-term method detection level
NWQL	USGS National Water Quality Laboratory, Denver, Colo.
NTRU	nephelometric turbidity ratio unit
RSD	relative standard deviation
spp.	species
SRM	standard reference material
USGS	U.S. Geological Survey

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

By Kent A. Dodge, Michelle I. Hornberger[1], and Jessica L. Dyke[1]

Abstract

Water, bed sediment, and biota were sampled in streams from Butte to below Milltown Reservoir as part of a long-term monitoring program in the upper Clark Fork basin; additional water-quality samples were collected in the Clark Fork basin from sites near Milltown Reservoir 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-quality samples were collected periodically at 22 sites from October 2005 through September 2006. Bed-sediment and biological samples were collected once at 12 sites during August 2006.

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 2005 through September 2006. Water-quality data include concentrations of selected major ions, trace elements, and suspended sediment. Nutrients also were analyzed in the supplemental water-quality samples. 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 at Milltown Reservoir, six major tributaries enter: Blacktail Creek, Warm Springs Creek, Little Blackfoot River, Flint Creek, Rock Creek, and Blackfoot River. Principal surface-water uses in the 6,000-mi^2 upper Clark Fork basin above Missoula include irrigation, stock watering, light industry, hydroelectric power generation, and habitat for trout fisheries. Current land uses primarily are cattle production, logging, mining, 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 1870 to 1980. Moderate- and small-scale mining also occurred in the basins of most of the major tributaries to the upper Clark Fork. Tailings derived from 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, and in the Warm Springs Ponds and Milltown Reservoir. 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.

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

[1]U.S. Geological Survey, Menlo Park, Calif.

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, 1988, 1989, 1990, 1991; Lambing and others, 1994, 1995; and Dodge and others, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006). 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 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 quality, 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). Of the sites that bracket Milltown Reservoir, three also are part of the long-term monitoring network. The supplemental monitoring provides additional special coverage of constituent concentrations prior to the planned removal of Milltown Dam.

The purpose of this report is to present water-quality data for 22 sites and trace-element data for 12 bed-sediment and biological sites in the Clark Fork basin collected from October 2005 through September 2006. 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 below Milltown Reservoir (fig. 1) are located on the Clark Fork mainstem, 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. Mainstem 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 mainstem. 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 of the sites and daily turbidity data were obtained by continuous turbidity monitors at 4 of the sites. Trace-element data for 12 bed-sediment and 12 biological sites were obtained once annually. Continuous streamflow data were collected at 18 sites in the long-term monitoring network.

Supplemental water-quality samples were collected at six sites from near Milltown Reservoir 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 Milltown Reservoir and also are part of the long-term monitoring network; three additional sites (Bitterroot River near Missoula, Clark Fork at St. Regis, and Flathead River at Perma) are located farther downstream in the basin (fig. 1). The types of data collected and period of record for each type of data for the three additional sites that are not part of the long-term network also are listed in table 1 and shown in figure 1. Supplemental water-quality samples were collected during periods of either high flow or reservoir drawdown 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 2–3 day periods in an attempt to generally coincide with traveltime along the Clark Fork mainstem. 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 6 sites were collected 11 times from April to June 2006 during the rising limb and peak of the annual hydrograph and once in September during drawdown of Milltown Reservoir.

Properties measured onsite and constituents for which water-quality, bed-sediment, and biota samples were analyzed are listed in table 2. Data-quality objectives for analyses of water-quality 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 2006 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 2006 are listed in tables 25 through 27 at the back of the report.

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

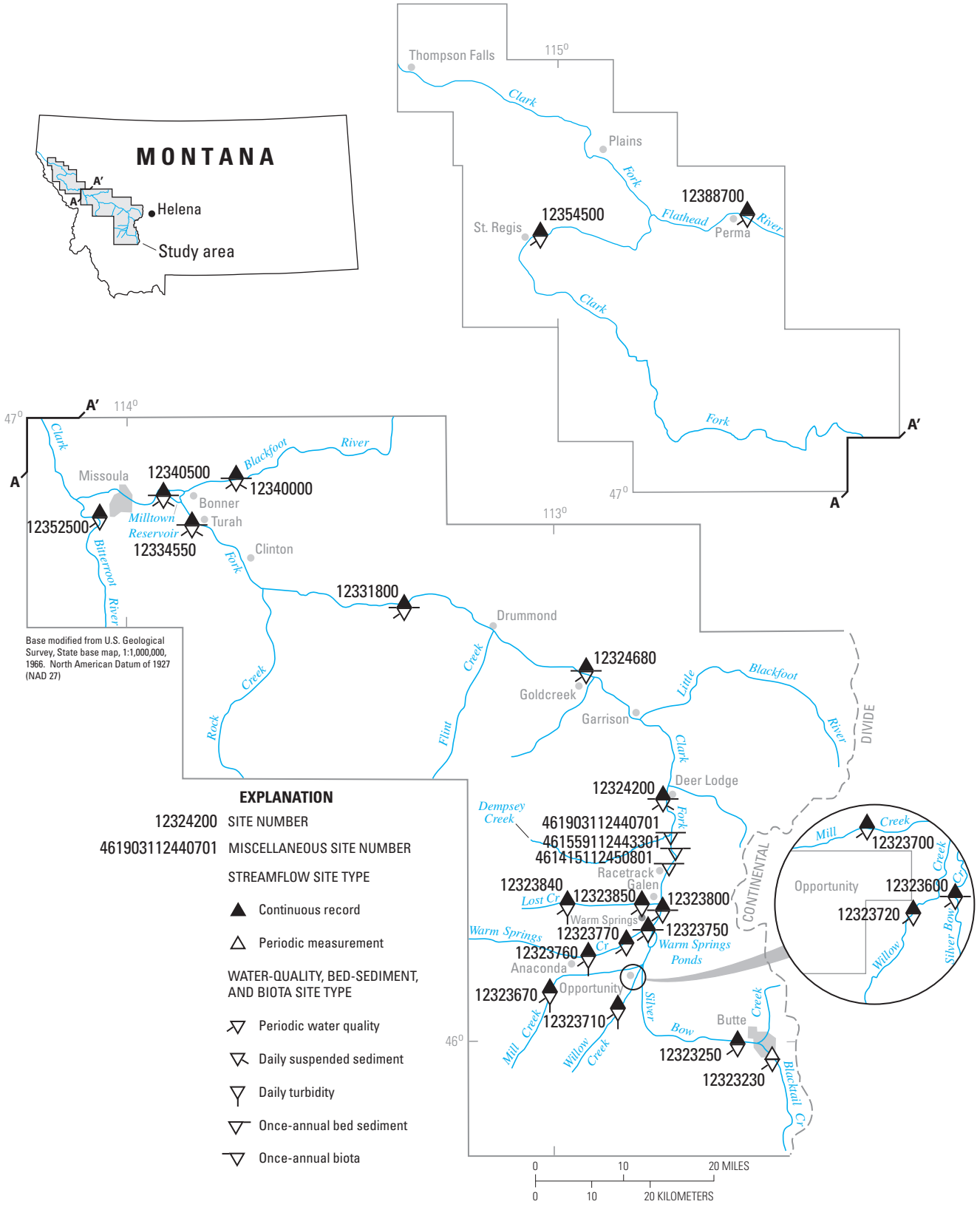


Figure 1. Location of study area in the Clark Fork basin, Montana.

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

[Abbreviations: 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	Net-work	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	08/95, 08/97, 08/99, 08/02, D	08/95, 08/97, 08/99, 08/02, 08/05
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

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	Net-work	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]
461903112440701	Clark Fork at Dempsey Creek diversion, near Racetrack	LT	--	--	--	--	08/96–P	08/96–08/04, D	08/96–P
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 Drum-mond	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
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	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
12340500	Clark Fork above Mis-soula	LT, S	03/29–P	07/86–P4	07/86–04/87, 06/88–01/96, 03/96–03/03, 08/03–P	--	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, with the exception of Clark Fork below Missoula.

[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 only included suspended-sediment data.

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

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

Table 3. Data-quality objectives for analyses of water-quality 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, in percent	Maximum deviation of spike recovery, in percent
Calcium, filtered	0.02 mg/L	20	--
Magnesium, filtered	.008 mg/L	20	--
Nitrogen, unfiltered recoverable	.06 mg/L	20	25
Phosphorus, unfiltered recoverable	.004 mg/L	20	25
Arsenic, filtered	.12 µg/L	20	25
Arsenic, unfiltered recoverable	.12 µg/L	20	25
Cadmium, filtered	.04 µg/L	20	25
Cadmium, unfiltered recoverable	.04 µg/L	20	25
Copper, filtered	.4 µg/L	20	25
Copper, unfiltered recoverable	.6 µg/L	20	25
Iron, filtered	6 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[1]	.2-.6 µg/L	20	25
Zinc, filtered	.6 µg/L	20	25
Zinc, unfiltered recoverable	2 µg/L	20	25
Sediment, suspended, percent finer than 0.062 mm	1 percent	20	--
Sediment, suspended	1 mg/L	20	--

[1]The laboratory reporting level changed during water year 2006.

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. At 19 sites in the upper Clark Fork basin, samples for the long-term monitoring program were collected 6–8 times per year on a schedule designed to describe seasonal and hydrologic variability. At the 3 sites bracketing Milltown Reservoir and at the 3 additional sites downstream from Missoula, 12 supplemental water-quality samples were collected. At the 4 daily suspended-sediment sites, suspended-sediment samples were collected by an observer 2–11 times per week. Continuous turbidity monitors were operated seasonally (May/June–September) at four sites near Anaconda (table 1).

Methods

Water samples were collected from vertical transits throughout the entire stream depth at multiple locations across the stream 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 non-metallic epoxy paint and equipped with nylon or Teflon nozzles.

Instantaneous streamflow at the time of water sampling was determined at all sites, either by direct measurement or from stage-discharge rating tables (Rantz and others, 1982). Onsite measurements of specific conductance, pH, and water temperature were made during collection of periodic water-quality 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).

Water-quality 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 the past. Filtered (0.45-µm pore size) and unfiltered recoverable concentrations of the trace elements (arsenic, cadmium, copper, iron, lead, manganese, and zinc) were determined by the USGS National Water Quality Laboratory (NWQL) in Denver, Colo. Filtered concentrations of calcium and magnesium also were determined to enable calculation of hardness. Concentrations of the nutrients total nitrogen and total phosphorous were determined for the supplemental water-quality samples.

Filtered concentrations of arsenic, cadmium, copper, lead, manganese, and zinc were determined by inductively coupled plasma-mass spectrometry (Faires, 1993; Garbarino, 1999). 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) and then analyzed by inductively coupled plasma-mass spectrometry (Garbarino and Struzeski, 1998). Unfiltered recoverable concentrations of nitrogen and phosphorous were determined from unfiltered samples that were digested with alkaline persulfate and then analyzed by colorimetry (Patton and Kryskalla, 2003).

Water samples also were collected from multiple vertical transits for analysis of suspended sediment whenever periodic water-quality 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 near mid-stream. The samples were analyzed for suspended-sediment concentration and were used to determine daily mean suspended-sediment concentrations according to methods described by Porterfield (1972).

Turbidity data were obtained by continuous turbidity monitors at four tributary sites (table 1) in the upper Clark Fork basin near Anaconda. These monitors were installed in May–June 2006 to provide supporting information on runoff conditions in an area where remediation activities are being conducted. The monitors are operated seasonally, generally from early spring (after ice breakup) through September, although attempts are made to extend the period of operation as weather permits. The monitors record turbidity values at 15–minute intervals, which can be viewed in near 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 for 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 2006 are listed in table 4. Daily mean streamflow, daily mean suspended-sediment concentration, and daily suspended-sediment discharge for water year 2006 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 is 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-quality 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-quality 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-quality samples. Therefore, the total number of quality-control samples represented about 15 percent of the total number of water-quality samples.

In addition to 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 where 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. The laboratory also participates in external evaluation studies and audits with the National Environmental Laboratory Accreditation Program, 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 all sources of variability, replicate stream samples for chemical analysis were obtained in the field by splitting a composite stream sample, and 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 analyses of a single sample selected from the group of samples comprising each analytical run. A separate analysis of the sample was made at the beginning and end of each analytical run to provide information on the reproducibility of laboratory analytical results independent of possible variability caused by field sample collection and processing.

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-quality samples were analyzed. Analyses of these 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 LT-MDL values 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 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):

$$S = \sqrt{\frac{\sum d^2}{2k}} \ , \qquad (1)$$

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*, in percent, is calculated according to the following equation (Taylor, 1987):

$$RSD = \frac{S}{\overline{x}} \times 100 \ , \qquad (2)$$

where

RSD is the relative standard deviation,
S is the standard deviation, and
$\overline{x}$ 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. Data-quality objectives for precision are not directly applicable to field replicates because of the inability to determine whether the variability results from field sample collection and processing or laboratory handling and analysis. However, the precision of analytical results for field replicates is calculated to illustrate overall reproducibility of environmental data that incorporates both field and laboratory sources of variability. The data-quality objective used to indicate acceptable precision of results for field replicates was a maximum *RSD* of 20 percent (table 3). Precision estimates for the analytical results of field replicates were within the 20-percent *RSD* limit for all constituents (table 14).

The precision estimated for each constituent on the basis of analyses of laboratory replicates, which include only laboratory sources of variability, is listed in table 15. Statistics for the precision of analytical results for laboratory replicates are based on 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); thus, the data-quality objectives for precision were met.

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 3:

$$R = \frac{D}{C} \times 100 \,, \tag{3}$$

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 94.9 to 106 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 91.2 to 108 percent. The 95-percent confidence intervals for the mean spike recovery for each constituent for which laboratory-spiked stream samples were analyzed (table 17) did not exceed a 25-percent deviation from an expected 100-percent recovery. No adjustments were made to analytical data based on the mean spike recovery.

High or low bias is indicated if the 95-percent confidence interval does not include 100-percent recovery, thereby indicating a consistent deviation in one direction. All laboratory-spiked deionized-water blank samples (table 16) had confidence intervals for percent recovery that included 100 percent except for unfiltered recoverable iron (101–112 percent). All laboratory-spiked stream samples (table 17) also had confidence intervals for percent recovery that included 100 percent except for unfiltered recoverable copper (91.0–98.6 percent), unfiltered recoverable iron (102–109 percent), and unfiltered recoverable zinc (87.8–94.6 percent). Both the 95-percent confidence interval (91.0–98.6) and mean spike recovery (94.8 percent) for unfiltered recoverable copper in laboratory-spiked stream samples indicate a persistent but minor, low bias. Similarly, the 95-percent confidence interval (87.8–94.6) and mean spike recovery (91.2 percent) for unfiltered recoverable zinc also showed a low bias. In contrast, the respective 95-percent confidence interval (93.8–104 and 90.1–100) and mean spike recovery (98.7 and 94.9 percent) for unfiltered recoverable copper and zinc in laboratory-spiked deionized-water blank sample showed no indication of bias. Thus, it appears that the minor bias in spiked stream samples is not necessarily caused by the analytical method but might be a result of analytical interference from the chemical matrix of the stream sample. For unfiltered recoverable iron in both the laboratory-spiked deionized-water blank sample and the laboratory-spiked stream sample, a slight high bias in the respective 95-percent confidence interval (101–112 and 102–109) and mean spike recovery (106 and 105 percent) was observed. Because the mean spike recoveries for all constituents met data-quality objectives (less than a 25-percent deviation from 100-percent recovery) for both laboratory-spiked deionized-water blank samples and laboratory-spiked stream samples, 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 were 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. Three detections exceeded twice the LRL in two separate samples. Two occurred on May 24, 2006, for filtered copper (1.8 µg/L), which was greater than the LRL of 0.4 µg/L and filtered zinc (3.1 µg/L), which was greater than the LRL of 0.6 µg/L. The third occurred on June 13, 2006, for filtered zinc (1.3 µg/L). Because no trends were indicated in subsequent sampling trips, no adjustments were made to water-quality sample results based on these three 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. Bed-sediment samples were collected once annually at 12 sites (fig. 1, 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 2006 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 using an acid-washed polypropylene scoop. Whenever possible, samples were collected from both sides of the stream. Three composite samples of bed sediment were collected at each site.

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 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 digestion period of as much as 2 weeks, 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 filter 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 using inductively coupled argon plasma-emission spectroscopy *(ICAPES).* 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 2006 are listed in table 19. Liquid-phase concentrations, in µg/mL (which is equivalent to parts per million; ppm), that were analyzed in the reconstituted aliquots of digested bed sediment were converted to solid-phase concentrations, in µg/g, using the following equation:

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

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. Non-metallic sampling and processing equipment was acid-washed and rinsed with deionized water prior to the first sample collection. Nylon-mesh sieves were washed in a laboratory-grade detergent and rinsed with deionized water. All equipment 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 copper, iron, manganese, nickel, and zinc, mean SRM recoveries for the low-concentration standard (SRM 2709) ranged from 89.9 to 99.8 percent of the certified concentrations. Mean recoveries were lower for arsenic and chromium (73.5 and 78.1 percent, respectively) and higher for lead (136.4 percent). Cadmium concentrations were near the minimum reporting level in SRM 2709 and were not reported. The lack of measurable recoveries for cadmium in the SRM likely is the result of analyzing concentrations very close to the liquid-phase detection limit (0.0005 µg/mL) coupled with signal enhancement resulting from matrix interference. 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. Mean SRM recoveries for arsenic, cadmium, copper, iron, lead, manganese, nickel, and zinc for the high-concentration standard (SRM 2711) ranged from 81.6 to 101.6 percent of the certified concentrations. Chromium had a lower recovery (66.1 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 5 percent for most constituents) for the 95-percent confidence interval indicates good reproducibility of multiple analyses of SRM 2711. 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 µg/mL, which is equivalent to parts per million (ppm). 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 12 sites and on the same dates as bed-sediment samples (fig. 1, 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 using 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 *Claasenia sabulosa* were collected where available to represent additional insect taxa that are commonly distributed in the upper Clark Fork basin. In addition, 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. To reduce the possibility of metal loss through intracellular breakdown during depuration, samples were immediately frozen on dry ice in the field between 1999 and 2006. A comparison of immediately frozen

versus depurated samples showed that although no substantial difference occurred for most metals, concentrations of copper in the depurated macroinvertebrate samples were about 20 percent lower 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 ultra-pure deionized water to remove particulate matter and then sorted to their lowest possible taxonomic level. If large numbers of specimens were collected at a site, similar-sized individuals were composited into replicate subsamples. Subsamples were placed in tared scintillation vials and oven-dried at 70°C. Subsamples were weighed to obtain a final dry weight and digested by reflux using concentrated nitric acid (Cain and others, 1992). After digestion, insect samples were evaporated to dryness on a hot plate. The dry residue was reconstituted in 0.6N hydrochloric acid, filtered through a 0.45-μm filter, and analyzed undiluted by ICAPES 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 2006 are listed in table 22. The variability in the number of composite samples among species and among sites reflects differences in insect abundance, with the number of composite samples increasing with the relative abundance of insects. Liquid-phase concentrations, in μg/mL, analyzed in the reconstituted samples were converted to solid-phase concentrations, in μg/g, using equation 4. As with bed sediment, minimum reporting levels may differ among sites as a result of variable sample weights. In general, the smaller the biological-sample weight (a function of insect abundance), the higher the minimum reporting level. Therefore, higher minimum reporting levels do not necessarily imply a higher trace-element concentration in tissue.

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 ultra-pure 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 12 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 99.5 to 110 percent of the certified concentrations for arsenic, cadmium, copper, iron, manganese, nickel, and zinc. A lower mean recovery was measured for lead (85.2 percent). A higher mean recovery was measured for chromium (173 percent), with 7 of the 12 analyses having concentrations less than, or very near, the minimum reporting level. With the exception of chromium and lead, both of which had low certified concentrations (0.77 μg/g and 0.35 μg/g, respectively) in the SRM, the range in variation of the 95-percent confidence interval generally was within 10 percent, thereby indicating good reproducibility of multiple analyses of the SRM. No adjustments were made to trace-element concentrations in biota samples on the basis of 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 μg/mL, which is equivalent to ppm. A procedural blank was prepared and analyzed concurrently with biota samples for each site. Concentrations of trace elements in most procedural blanks were less than the minimum reporting level. In a few instances, concentrations exceeded the limit of detection; however, procedural-blank concentrations were 3 to 4 orders of magnitude lower than those measured in tissue samples. 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 would disproportionately skew the long-term statistics relative to the other sites in the network. Statistical summaries of fine-grained 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 variable 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/twri*9A6/

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: Federal Interagency Sedimentation Project, Vicksburg, Miss., 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 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., 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., 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/*

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/*

Garbarino, J.R., 1999, Methods of analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of dissolved arsenic, boron, lithium, selenium, strontium, thallium, and vanadium using inductively coupled plasma-mass spectrometry: U.S. Geological Survey Open-File Report 99–093, 31 p.

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.

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/*

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 Investigation 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/*

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. 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 2005 through September 2006.

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

12323230—Blacktail Creek at Harrison Avenue, at Butte								
Date	Time	Streamflow, instantaneous (ft^3/s)	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Temperature, water (°C)	Hardness, filtered (mg/L as $CaCO_3$)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)
10/17/2005	0915	4.4	7.6	291	7.0	110	32.9	7.95
03/20/2006	0930	4.9	7.8	299	3.0	130	36.4	9.02
04/17/2006	1000	32	7.7	187	3.0	71	20.3	4.90
05/08/2006	0840	17	7.7	198	5.0	81	23.8	5.35
05/22/2006	0935	13	7.8	240	11.5	94	27.1	6.30
06/08/2006	1550	13	7.8	247	15.5	96	27.9	6.43
07/24/2006	0900	3.1	7.7	338	12.5	140	39.9	9.18
08/23/2006	0950	2.7	7.8	359	10.5	140	40.9	10.2

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)
10/17/2005	2.2	3.0	0.08	E0.04	2.3	4.4	121	426
03/20/2006	1.8	2.8	.06	.05	2.0	6.5	134	692
04/17/2006	5.1	6.4	.05	.06	7.6	10.4	313	806
05/08/2006	4.7	5.3	<.04	E.04	5.4	7.5	193	468
05/22/2006	8.7	10.3	E.04	.04	5.7	7.8	412	828
06/08/2006	8.2	11.4	E.03	.08	5.2	10.9	640	1,640
07/24/2006	2.9	3.5	.05	E.02	1.3	2.0	52	223
08/23/2006	2.1	2.5	E.03	.05	1.2	2.0	32	157

Date	Lead, filtered (µg/L)	Lead, unfiltered recoverable (µg/L)	Manganese, filtered (µg/L)	Manganese, unfiltered recoverable (µg/L)	Zinc, filtered (µg/L)	Zinc, unfiltered recoverable (µg/L)	Sediment, suspended (percent finer than 0.062 mm)	Sediment, suspended (mg/L)	Sediment discharge, suspended (ton/d)
10/17/2005	0.09	0.46	26.5	38.1	2.9	5	85	7	0.08
03/20/2006	.10	1.45	54.0	73.6	3.3	8	89	10	.13
04/17/2006	.37	1.07	24.9	33.5	5.5	6	69	10	.86
05/08/2006	.14	.55	27.7	31.7	2.2	3	83	5	.23
05/22/2006	.23	.72	44.5	52.2	2.9	4	95	4	.14
06/08/2006	.30	1.81	37.5	74.4	3.5	9	90	14	.49
07/24/2006	<.08	.14	52.8	52.7	2.2	2	73	3	.03
08/23/2006	<.08	.10	41.0	41.1	1.8	2	80	2	.01

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2005 through September 2006.—Continued

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

12323250—Silver Bow Creek below Blacktail Creek, at Butte								
Date	Time	Streamflow, instantaneous (ft^3/s)	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Temperature, water (°C)	Hardness, filtered (mg/L as $CaCO_3$)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)
10/17/2005	1010	17	7.7	445	13.0	140	39.7	10.5
03/20/2006	1100	19	7.6	532	4.5	160	46.0	11.1
04/17/2006	1140	54	7.7	326	4.5	110	30.7	7.37
05/08/2006	1000	36	7.7	363	7.0	120	35.0	7.88
05/22/2006	1055	27	7.8	408	13.5	140	39.3	9.15
06/08/2006	1720	34	7.7	414	18.0	140	41.1	9.35
07/24/2006	1020	15	7.6	520	17.0	160	45.3	11.2
08/23/2006	1120	15	7.7	577	16.0	180	51.8	13.1

Date	Arsenic, filtered (µg/L)	Arsenic, unfiltered recoverable (µg/L)	Cadmium, filtered (µg/L)	Cadmium, unfiltered recoverable (µg/L)	Copper, filtered (µg/L)	Copper, unfiltered recoverable (µg/L)	Iron, filtered (µg/L)	Iron, unfiltered recoverable (µg/L)
10/17/2005	4.2	4.9	0.13	0.16	7.7	14.1	35	248
03/20/2006	3.1	4.0	.09	.20	5.2	22.6	53	338
04/17/2006	6.0	7.9	.11	.23	14.4	22.5	219	685
05/08/2006	5.0	6.2	.15	.25	12.0	18.5	123	407
05/22/2006	7.6	9.7	.12	.23	13.4	20.4	194	615
06/08/2006	8.1	11.2	.13	.30	12.7	27.1	187	928
07/24/2006	5.2	5.7	.17	.21	13.9	18.7	24	144
08/23/2006	5.2	5.6	.11	.20	5.8	15.1	31	135

Date	Lead, filtered (µg/L)	Lead, unfiltered recoverable (µg/L)	Manganese, filtered (µg/L)	Manganese, unfiltered recoverable (µg/L)	Zinc, filtered (µg/L)	Zinc, unfiltered recoverable (µg/L)	Sediment, suspended (percent finer than 0.062 mm)	Sediment, suspended (mg/L)	Sediment discharge, suspended (ton/d)
10/17/2005	0.19	1.27	72.7	90.4	36.0	46	77	6	0.28
03/20/2006	.32	2.31	97.9	119	42.4	61	81	11	.56
04/17/2006	.46	3.19	82.7	104	40.2	48	81	12	1.7
05/08/2006	.22	1.34	91.5	94.6	45.8	56	84	7	.68
05/22/2006	.31	2.01	90.1	105	33.4	45	92	8	.58
06/08/2006	.44	4.99	86.7	117	68.8	61	88	15	1.4
07/24/2006	.23	.77	59.8	72.1	47.8	55	91	2	.08
08/23/2006	.17	.64	69.6	81.4	41.8	57	77	4	.16

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2005 through September 2006.—Continued

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

12323600—Silver Bow Creek at Opportunity

Date	Time	Streamflow, instantaneous (ft^3/s)	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Temperature, water (°C)	Hardness, filtered (mg/L as $CaCO_3$)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)
10/18/2005	0735	34	8.2	512	8.0	180	53.3	12.2
03/20/2006	1540	26	8.4	534	6.5	190	54.5	11.8
04/18/2006	0910	113	8.1	353	2.0	120	36.7	8.05
05/09/2006	0915	105	8.2	325	4.0	120	37.6	7.09
05/23/2006	0705	101	8.1	331	9.5	130	40.0	7.16
06/13/2006	1050	114	8.2	348	15.5	130	38.9	7.80
07/25/2006	0830	18	8.3	589	16.5	210	61.5	13.2
08/24/2006	0850	13	8.4	588	11.5	210	60.2	14.0

Date	Arsenic, filtered (µg/L)	Arsenic, unfiltered recoverable (µg/L)	Cadmium, filtered (µg/L)	Cadmium, unfiltered recoverable (µg/L)	Copper, filtered (µg/L)	Copper, unfiltered recoverable (µg/L)	Iron, filtered (µg/L)	Iron, unfiltered recoverable (µg/L)
10/18/2005	11.4	18.9	0.40	1.29	13.7	143	13	972
03/20/2006	11.4	14.9	.53	.87	25.2	78.4	21	628
04/18/2006	11.5	20.7	.85	1.52	57.1	141	152	1,380
05/09/2006	10.4	14.6	.34	.77	22.3	66.0	78	744
05/23/2006	10.3	14.7	.24	.72	15.7	70.8	61	881
06/13/2006	15.0	24.2	.46	1.30	38.9	146	139	1,420
07/25/2006	18.2	20.6	.22	.71	20.8	69.5	22	467
08/24/2006	16.6	19.0	.20	.70	19.3	70.8	28	434

Date	Lead, filtered (µg/L)	Lead, unfiltered recoverable (µg/L)	Manganese, filtered (µg/L)	Manganese, unfiltered recoverable (µg/L)	Zinc, filtered (µg/L)	Zinc, unfiltered recoverable (µg/L)	Sediment, suspended (percent finer than 0.062 mm)	Sediment, suspended (mg/L)	Sediment discharge, suspended (ton/d)
10/18/2005	0.44	30.0	210	346	148	320	92	26	2.4
03/20/2006	.37	14.6	304	340	138	221	84	15	1.1
04/18/2006	1.69	30.6	302	372	274	329	82	38	12
05/09/2006	.76	15.2	167	194	99.3	162	85	20	5.7
05/23/2006	.54	18.0	123	200	62.4	142	87	29	7.9
06/13/2006	2.22	33.4	170	275	98.3	245	84	38	12
07/25/2006	.57	12.4	153	210	42.1	139	81	14	.68
08/24/2006	.55	11.9	132	200	44.1	147	85	16	.56

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2005 through September 2006.—Continued

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

12323670—Mill Creek near Anaconda									
Date	Time	Streamflow, instantaneous (ft^3/s)	Turbidity, unfiltered, lab (NTRU)	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Temperature, water (°C)	Hardness, filtered (mg/L as $CaCO_3$)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)
10/17/2005	1325	13	E0.4	8.3	185	9.5	83	22.2	6.67
03/20/2006	1240	9.1	<2.0	8.5	203	3.0	98	25.9	8.01
04/17/2006	1425	42	5.5	8.1	129	5.0	49	13.7	3.66
05/08/2006	1230	63	2.8	8.1	106	6.0	44	12.5	3.06
05/22/2006	1325	165	2.5	7.9	65	8.0	27	7.87	1.71
06/09/2006	0845	136	<2.0	7.8	63	7.5	27	7.97	1.67
07/24/2006	1240	20	2.4	8.2	147	16.0	65	18.3	4.75
08/23/2006	1335	11	<2.0	8.4	180	15.5	79	21.5	6.09

Date	Arsenic, filtered (µg/L)	Arsenic, unfiltered recoverable (µg/L)	Cadmium, filtered (µg/L)	Cadmium, unfiltered recoverable (µg/L)	Copper, filtered (µg/L)	Copper, unfiltered recoverable (µg/L)	Iron, filtered (µg/L)	Iron, unfiltered recoverable (µg/L)
10/17/2005	15.4	16.6	E0.04	0.05	1.2	1.5	78	128
03/20/2006	10.6	12.0	E.04	.05	.86	1.6	30	125
04/17/2006	27.3	30.1	.05	.10	4.7	6.8	67	291
05/08/2006	22.5	23.0	<.04	.09	3.3	5.1	41	178
05/22/2006	12.3	13.7	E.03	.09	3.2	5.4	30	266
06/09/2006	8.6	9.9	E.03	.08	2.2	4.1	28	184
07/24/2006	23.0	24.2	.05	.08	1.8	3.1	78	173
08/23/2006	21.0	22.6	.04	.06	1.3	2.2	83	159

Date	Lead, filtered (µg/L)	Lead, unfiltered recoverable (µg/L)	Manganese, filtered (µg/L)	Manganese, unfiltered recoverable (µg/L)	Zinc, filtered (µg/L)	Zinc, unfiltered recoverable (µg/L)	Sediment, suspended (percent finer than 0.062 mm)	Sediment, suspended (mg/L)	Sediment discharge, suspended (ton/d)
10/17/2005	0.09	0.20	6.8	11.3	0.78	E1	74	2	0.07
03/20/2006	<.08	.28	6.7	13.8	.80	E1	68	2	.05
04/17/2006	.24	1.07	6.1	16.8	2.4	4	79	8	.91
05/08/2006	.10	1.05	4.3	10.9	1.5	4	53	9	1.5
05/22/2006	.09	1.12	3.6	15.4	1.8	4	39	12	5.3
06/09/2006	.08	.79	3.4	11.1	1.6	3	47	8	2.9
07/24/2006	.18	.63	7.9	14.9	1.0	E2	77	3	.16
08/23/2006	.12	.45	7.8	14.1	.73	E1	80	1	.03

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2005 through September 2006.—Continued

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

12323700—Mill Creek at Opportunity								
Date	Time	Streamflow, instantaneous (ft^3/s)	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Temperature, water (°C)	Hardness, filtered (mg/L as $CaCO_3$)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)
10/17/2005	1550	4.0	8.1	211	11.0	91	25.1	6.89
03/20/2006	1410	1.9	8.1	223	4.5	100	28.0	7.83
04/18/2006	0745	22	8.0	145	1.0	58	16.2	4.34
05/08/2006	1525	24	8.1	120	10.5	49	13.9	3.39
05/22/2006	1510	120	7.8	70	9.5	28	8.30	1.87
06/09/2006	1215	113	7.8	69	9.5	28	8.10	1.77
07/24/2006	1505	3.5	8.2	165	20.0	72	20.4	5.11
08/23/2006	1600	1.5	8.2	199	17.5	86	23.9	6.29

Date	Arsenic, filtered (µg/L)	Arsenic, unfiltered recoverable (µg/L)	Cadmium, filtered (µg/L)	Cadmium, unfiltered recoverable (µg/L)	Copper, filtered (µg/L)	Copper, unfiltered recoverable (µg/L)	Iron, filtered (µg/L)	Iron, unfiltered recoverable (µg/L)
10/17/2005	23.9	25.3	0.07	0.09	1.9	2.5	90	140
03/20/2006	11.4	12.9	.05	.06	1.2	1.7	25	67
04/18/2006	26.8	31.1	.07	.12	4.9	7.1	63	246
05/08/2006	28.6	30.5	E.03	.11	3.9	6.1	38	199
05/22/2006	20.3	28.9	.07	.29	5.8	18.9	36	774
06/09/2006	16.2	19.7	.04	.14	3.5	8.1	33	332
07/24/2006	34.9	35.4	.05	.06	2.4	3.3	72	128
08/23/2006	32.2	34.1	E.03	.06	2.2	2.9	59	110

Date	Lead, filtered (µg/L)	Lead, unfiltered recoverable (µg/L)	Manganese, filtered (µg/L)	Manganese, unfiltered recoverable (µg/L)	Zinc, filtered (µg/L)	Zinc, unfiltered recoverable (µg/L)	Sediment, suspended (percent finer than 0.062 mm)	Sediment, suspended (mg/L)	Sediment discharge, suspended (ton/d)
10/17/2005	0.09	0.15	11.0	12.0	2.8	3	82	2	0.02
03/20/2006	<.08	.07	9.1	10.4	2.7	3	80	1	.01
04/18/2006	.20	.93	4.8	13.1	4.8	6	80	5	.30
05/08/2006	.09	.86	4.8	13.0	2.1	4	78	5	.32
05/22/2006	.17	4.88	4.7	29.1	3.9	14	41	39	13
06/09/2006	.13	1.79	3.2	15.8	2.9	7	43	18	5.5
07/24/2006	.18	.38	9.5	11.8	1.8	2	88	1	.01
08/23/2006	.10	.21	7.7	9.1	1.4	4	86	2	.01

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2005 through September 2006.—Continued

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

12323710—Willow Creek near Anaconda									
Date	Time	Streamflow, instantaneous (ft^3/s)	Turbidity, unfiltered, lab (NTRU)	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Temperature, water (°C)	Hardness, filtered (mg/L as $CaCO_3$)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)
10/17/2005	1200	1.4	E0.8	7.7	115	6.0	41	13.7	1.63
04/17/2006	1315	15	12	7.6	93	3.5	33	11.2	1.25
05/08/2006	1135	18	5.8	7.7	73	4.5	26	8.85	.987
05/22/2006	1215	25	7.1	7.7	66	8.0	22	7.56	.777
06/09/2006	0735	10	2.5	7.8	92	7.5	34	11.8	1.18
07/24/2006	1145	3.0	2.1	7.6	109	15.0	39	13.3	1.40
08/23/2006	1235	1.3	2.1	7.7	111	13.0	39	13.2	1.48

Date	Arsenic, filtered (µg/L)	Arsenic, unfiltered recoverable (µg/L)	Cadmium, filtered (µg/L)	Cadmium, unfiltered recoverable (µg/L)	Copper, filtered (µg/L)	Copper, unfiltered recoverable (µg/L)	Iron, filtered (µg/L)	Iron, unfiltered recoverable (µg/L)
10/17/2005	16.5	17.7	0.04	0.04	1.6	2.1	74	145
04/17/2006	19.2	20.5	E.04	.06	3.9	5.0	154	474
05/08/2006	14.7	15.6	<.04	.04	2.6	3.7	67	337
05/22/2006	14.1	14.6	<.04	.08	2.3	4.1	43	401
06/09/2006	13.3	13.9	E.03	.05	2.0	2.8	52	168
07/24/2006	24.4	25.0	.05	.05	1.4	16.8	80	190
08/23/2006	24.9	25.9	E.02	E.04	1.3	1.9	116	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)
10/17/2005	0.11	0.20	10.2	22.4	1.2	E2	72	3	0.01
04/17/2006	.30	.94	13.4	27.3	2.6	4	78	12	.49
05/08/2006	.12	.67	8.1	15.2	1.9	3	72	8	.39
05/22/2006	.13	1.25	8.2	21.7	1.7	4	76	20	1.4
06/09/2006	.12	.41	14.8	19.9	1.9	E2	82	5	.14
07/24/2006	.15	.43	20.7	33.8	1.2	E2	91	4	.03
08/23/2006	.14	.37	34.5	45.2	1.7	E1	61	4	.01

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2005 through September 2006.—Continued

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

12323720—Willow Creek at Opportunity

Date	Time	Streamflow, instantaneous (ft^3/s)	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Temperature, water (°C)	Hardness, filtered (mg/L as $CaCO_3$)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)
10/17/2005	1620	5.9	8.6	312	13.0	150	41.1	10.3
03/20/2006	1445	4.5	8.2	324	9.5	150	42.8	10.4
04/18/2006	0820	9.1	7.9	247	1.5	100	29.7	6.42
05/08/2006	1600	16	8.2	116	10.0	67	20.5	3.73
05/22/2006	1540	30	8.0	167	14.0	70	21.4	4.14
06/09/2006	1245	25	8.1	304	13.5	140	40.6	9.25
07/24/2006	1540	5.6	8.5	324	17.0	150	42.4	10.5
08/23/2006	1620	5.1	8.2	331	16.5	150	41.0	10.5

Date	Arsenic, filtered (µg/L)	Arsenic, unfiltered recoverable (µg/L)	Cadmium, filtered (µg/L)	Cadmium, unfiltered recoverable (µg/L)	Copper, filtered (µg/L)	Copper, unfiltered recoverable (µg/L)	Iron, filtered (µg/L)	Iron, unfiltered recoverable (µg/L)
10/17/2005	19.9	20.7	E0.04	0.04	3.1	4.6	11	90
03/20/2006	12.1	13.5	E.03	.06	2.0	4.8	11	144
04/18/2006	34.0	38.3	.04	.12	7.9	14.0	88	339
05/08/2006	40.9	43.5	<.04	.10	9.3	16.3	60	282
05/22/2006	64.9	65.7	E.03	.15	12.2	21.7	65	371
06/09/2006	112	117	.07	.11	10.1	14.8	77	199
07/24/2006	33.3	33.4	E.03	E.04	3.5	4.4	8	44
08/23/2006	21.6	22.7	E.02	.06	2.3	5.4	12	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)
10/17/2005	0.10	0.99	8.7	11.6	1.1	4	86	3	0.05
03/20/2006	.08	1.26	51.3	63.8	3.3	7	90	6	.07
04/18/2006	.29	2.09	51.0	56.0	11.7	16	90	11	.27
05/08/2006	.24	2.15	19.2	30.7	5.8	13	95	21	.91
05/22/2006	.38	2.94	20.3	37.3	6.7	17	89	15	1.2
06/09/2006	.29	1.29	23.8	30.0	7.3	10	81	5	.34
07/24/2006	E.05	.34	4.4	7.6	1.2	2	91	1	.02
08/23/2006	.11	1.32	31.2	37.0	1.6	5	84	4	.06

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2005 through September 2006.—Continued

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

12323750—Silver Bow Creek at Warm Springs								
Date	Time	Streamflow, instantaneous (ft^3/s)	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Temperature, water (°C)	Hardness, filtered (mg/L as $CaCO_3$)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)
10/18/2005	0855	51	8.1	584	9.0	240	67.1	17.1
03/20/2006	1625	39	8.8	618	5.0	270	75.7	18.6
04/18/2006	1020	163	8.4	514	6.5	210	60.0	13.7
05/09/2006	1020	145	9.0	432	9.5	180	54.1	11.0
05/23/2006	0825	232	8.4	297	10.0	110	33.9	6.85
06/13/2006	1155	169	8.5	307	15.5	120	35.7	7.37
07/25/2006	0925	38	9.4	482	19.5	210	62.4	13.1
08/24/2006	0945	25	9.3	535	15.0	230	66.7	14.7

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)
10/18/2005	15.3	17.9	0.04	0.06	3.5	4.5	9	165
03/20/2006	9.6	11.6	.06	.10	4.2	7.2	8	223
04/18/2006	13.8	17.7	E.03	.09	5.0	9.5	24	286
05/09/2006	24.4	26.6	<.04	.15	5.9	12.2	24	358
05/23/2006	30.8	34.5	<.04	.15	5.7	13.0	40	472
06/13/2006	29.1	33.0	E.02	.09	3.4	6.9	27	284
07/25/2006	37.5	38.5	E.02	.05	3.1	5.2	6	70
08/24/2006	32.9	35.5	E.02	.04	2.3	4.0	E4	36

Date	Lead, filtered (µg/L)	Lead, unfiltered recoverable (µg/L)	Manganese, filtered (µg/L)	Manganese, unfiltered recoverable (µg/L)	Zinc, filtered (µg/L)	Zinc, unfiltered recoverable (µg/L)	Sediment, suspended (percent finer than 0.062 mm)	Sediment, suspended (mg/L)	Sediment discharge, suspended (ton/d)
10/18/2005	<0.08	0.68	125	177	3.8	6	80	3	0.41
03/20/2006	<.08	1.08	170	224	4.7	11	89	4	.42
04/18/2006	.10	1.50	374	378	8.3	14	83	5	2.2
05/09/2006	E.07	1.85	255	312	4.1	20	82	8	3.1
05/23/2006	.10	2.05	362	446	3.3	14	75	19	12
06/13/2006	.10	1.21	149	179	2.6	7	82	7	3.2
07/25/2006	<.08	.39	23.8	53.5	1.1	4	65	3	.31
08/24/2006	<.08	.15	12.8	24.0	E.59	2	71	1	.07

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2005 through September 2006.—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 near Anaconda									
Date	Time	Streamflow, instantaneous (ft^3/s)	Turbidity, unfiltered, lab (NTRU)	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Temperature, water (°C)	Hardness, filtered (mg/L as $CaCO_3$)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)
10/17/2005	1515	76	E0.6	8.6	254	9.5	130	37.4	8.00
04/17/2006	1605	52	<2.0	8.8	254	7.0	120	36.5	7.98
05/08/2006	1410	76	<2.0	8.6	222	8.0	110	33.4	6.60
06/09/2006	1100	268	<2.0	8.2	126	8.0	60	18.6	3.25
07/24/2006	1425	59	<2.0	8.6	242	16.0	110	34.2	6.96
08/23/2006	1435	60	<2.0	8.7	242	14.5	110	34.3	7.02

Date	Arsenic, filtered (µg/L)	Arsenic, unfiltered recoverable (µg/L)	Cadmium, filtered (µg/L)	Cadmium, unfiltered recoverable (µg/L)	Copper, filtered (µg/L)	Copper, unfiltered recoverable (µg/L)	Iron, filtered (µg/L)	Iron, unfiltered recoverable (µg/L)
10/17/2005	1.9	2.0	E0.03	E0.03	0.68	1.2	10	48
04/17/2006	2.5	2.8	E.02	E.03	1.3	2.4	7	77
05/08/2006	1.8	2.1	<.04	E.03	1.2	2.5	7	73
06/09/2006	1.8	2.3	E.02	.05	1.3	4.1	10	194
07/24/2006	2.5	2.7	<.04	E.03	1.4	2.4	E6	75
08/23/2006	2.2	2.3	<.04	E.02	.68	1.9	E6	75

Date	Lead, filtered (µg/L)	Lead, unfiltered recoverable (µg/L)	Manganese, filtered (µg/L)	Manganese, unfiltered recoverable (µg/L)	Zinc, filtered (µg/L)	Zinc, unfiltered recoverable (µg/L)	Sediment, suspended (percent finer than 0.062 mm)	Sediment, suspended (mg/L)	Sediment discharge, suspended (ton/d)
10/17/2005	<0.08	0.14	<0.2	2.4	E0.47	E1	80	3	0.62
04/17/2006	<.08	.24	.9	3.1	0.71	E2	76	3	.42
05/08/2006	<.08	.23	.7	3.1	E.40	E1	66	4	.82
06/09/2006	<.08	.55	1.1	9.1	1.3	4	51	13	9.4
07/24/2006	E.05	.24	1.2	4.2	1.2	E2	71	4	.64
08/23/2006	<.08	.24	.8	3.7	E.30	E1	68	4	.65

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2005 through September 2006.—Continued

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

12323770—Warm Springs Creek at Warm Springs								
Date	Time	Streamflow, instantaneous (ft^3/s)	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Temperature, water (°C)	Hardness, filtered (mg/L as $CaCO_3$)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)
10/18/2005	0835	37	8.2	356	8.0	170	51.2	10.5
04/18/2006	1000	39	8.4	365	2.5	180	53.4	10.8
05/09/2006	1005	57	8.4	300	4.5	150	44.8	8.38
05/23/2006	0735	183	7.8	156	7.5	73	23.1	3.79
06/13/2006	1020	147	8.1	186	11.5	89	27.6	4.77
07/25/2006	0905	29	8.2	336	14.5	160	50.2	9.07
08/24/2006	0925	40	8.3	321	11.0	150	46.1	8.67

Date	Arsenic, filtered (µg/L)	Arsenic, unfiltered recoverable (µg/L)	Cadmium, filtered (µg/L)	Cadmium, unfiltered recoverable (µg/L)	Copper, filtered (µg/L)	Copper, unfiltered recoverable (µg/L)	Iron, filtered (µg/L)	Iron, unfiltered recoverable (µg/L)
10/18/2005	4.9	5.5	0.04	0.07	2.4	7.4	16	94
04/18/2006	4.0	4.6	E.04	.06	2.6	6.4	11	81
05/09/2006	3.5	4.1	<.04	.05	2.5	8.2	9	99
05/23/2006	3.6	6.2	<.04	.11	3.7	24.7	14	440
06/13/2006	4.2	5.5	E.03	.08	3.2	13.1	12	214
07/25/2006	6.2	6.6	E.02	.05	2.5	6.8	10	68
08/24/2006	4.2	12.8	E.02	.07	1.8	11.1	9	80

Date	Lead, filtered (µg/L)	Lead, unfiltered recoverable (µg/L)	Manganese, filtered (µg/L)	Manganese, unfiltered recoverable (µg/L)	Zinc, filtered (µg/L)	Zinc, unfiltered recoverable (µg/L)	Sediment, suspended (percent finer than 0.062 mm)	Sediment, suspended (mg/L)	Sediment discharge, suspended (ton/d)
10/18/2005	E0.05	0.50	176	222	1.5	3	72	6	0.60
04/18/2006	E.04	.40	164	190	1.9	3	71	4	.42
05/09/2006	<.08	.56	77.6	117	1.6	3	69	5	.77
05/23/2006	<.08	2.34	33.9	110	1.8	10	68	23	11
06/13/2006	E.07	1.13	75.2	119	1.4	5	64	11	4.4
07/25/2006	E.05	.38	124	156	1.1	3	77	2	.16
08/24/2006	<.08	.67	118	53.1	.83	10	67	3	.32

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2005 through September 2006.—Continued

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

12323800—Clark Fork near Galen								
Date	Time	Streamflow, instantaneous (ft^3/s)	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Temperature, water (°C)	Hardness, filtered (mg/L as $CaCO_3$)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)
10/18/2005	1025	85	8.4	480	9.0	220	63.0	14.7
03/21/2006	1120	62	8.4	538	2.5	250	73.3	16.3
04/18/2006	1200	216	8.4	490	6.5	190	55.7	12.8
05/09/2006	1140	204	8.9	401	9.0	170	50.8	10.4
05/23/2006	0935	427	8.2	233	10.5	95	29.1	5.53
06/13/2006	1250	337	8.4	253	15.5	100	31.5	6.28
07/24/2006	1710	53	9.2	407	23.5	180	55.0	11.4
08/24/2006	0755	53	8.5	417	13.5	190	55.6	11.6

Date	Arsenic, filtered (µg/L)	Arsenic, unfiltered recoverable (µg/L)	Cadmium, filtered (µg/L)	Cadmium, unfiltered recoverable (µg/L)	Copper, filtered (µg/L)	Copper, unfiltered recoverable (µg/L)	Iron, filtered (µg/L)	Iron, unfiltered recoverable (µg/L)
10/18/2005	10.5	11.8	0.05	0.06	4.0	6.5	13	118
03/21/2006	6.4	7.9	.05	.10	3.8	9.1	7	184
04/18/2006	11.7	15.7	.04	.11	5.1	12.3	16	297
05/09/2006	18.9	21.0	<.04	.13	5.5	13.6	15	323
05/23/2006	19.5	23.4	<.04	.17	5.8	28.2	29	561
06/13/2006	18.2	21.2	E.02	.11	4.0	14.5	19	300
07/24/2006	24.9	26.1	E.02	.06	4.3	15.6	7	68
08/24/2006	16.8	17.2	E.02	.06	3.1	7.5	6	77

Date	Lead, filtered (µg/L)	Lead, unfiltered recoverable (µg/L)	Manganese, filtered (µg/L)	Manganese, unfiltered recoverable (µg/L)	Zinc, filtered (µg/L)	Zinc, unfiltered recoverable (µg/L)	Sediment, suspended (percent finer than 0.062 mm)	Sediment, suspended (mg/L)	Sediment discharge, suspended (ton/d)
10/18/2005	<0.08	0.51	99.7	130	2.6	5	82	3	0.69
03/21/2006	<.08	.99	169	232	4.8	11	78	4	.67
04/18/2006	.08	1.70	279	333	6.7	15	76	7	4.1
05/09/2006	E.06	1.75	174	251	3.0	17	81	7	3.9
05/23/2006	E.07	3.25	170	296	2.8	18	69	22	25
06/13/2006	E.06	1.66	72.6	135	1.7	10	73	10	9.1
07/24/2006	E.05	.47	29.9	62.8	1.2	4	80	3	.43
08/24/2006	<.08	.51	41.9	88.7	1.1	4	78	3	.43

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2005 through September 2006.—Continued

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

12323840—Lost Creek near Anaconda									
Date	Time	Streamflow, instantaneous (ft^3/s)	Turbidity, unfiltered, lab (NTRU)	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Temperature, water (°C)	Hardness, filtered (mg/L as $CaCO_3$)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)
10/17/2005	1410	2.7	E0.2	8.3	253	10.0	120	37.1	7.11
03/20/2006	1320	3.3	<2.0	8.3	216	2.5	110	32.6	6.82
04/17/2006	1505	4.5	<2.0	8.4	205	5.0	98	29.3	6.01
05/08/2006	1305	5.2	<2.0	8.3	187	7.5	92	28.0	5.41
05/22/2006	1400	9.1	6.6	8.1	136	9.5	62	19.1	3.58
06/09/2006	1020	14	2.6	8.1	168	9.0	79	24.6	4.36
07/24/2006	1325	9.6	3.9	8.3	224	13.5	110	32.6	6.14

Date	Arsenic, filtered (µg/L)	Arsenic, unfiltered recoverable (µg/L)	Cadmium, filtered (µg/L)	Cadmium, unfiltered recoverable (µg/L)	Copper, filtered (µg/L)	Copper, unfiltered recoverable (µg/L)	Iron, filtered (µg/L)	Iron, unfiltered recoverable (µg/L)
10/17/2005	8.7	9.0	0.05	0.04	2.0	2.9	E6	24
03/20/2006	2.4	2.5	E.03	E.03	1.3	2.8	E4	43
04/17/2006	2.9	3.3	E.03	.04	2.0	4.2	7	88
05/08/2006	3.0	3.2	<.04	E.04	1.8	4.1	8	98
05/22/2006	5.7	8.1	E.02	.13	4.1	24.1	16	574
06/09/2006	6.5	7.5	E.02	.07	2.8	9.0	13	266
07/24/2006	5.1	5.8	E.03	.07	1.9	9.9	9	311

Date	Lead, filtered (µg/L)	Lead, unfiltered recoverable (µg/L)	Manganese, filtered (µg/L)	Manganese, unfiltered recoverable (µg/L)	Zinc, filtered (µg/L)	Zinc, unfiltered recoverable (µg/L)	Sediment, suspended (percent finer than 0.062 mm)	Sediment, suspended (mg/L)	Sediment discharge, suspended (ton/d)
10/17/2005	<0.08	0.10	<0.2	1.9	1.1	E2	63	2	0.01
03/20/2006	<.08	.17	.6	1.7	1.0	E2	63	2	.02
04/17/2006	<.08	.38	1.4	3.4	1.0	E2	71	5	.06
05/08/2006	<.08	.40	1.1	3.6	.80	E2	60	6	.08
05/22/2006	.09	2.76	3.5	14.5	2.0	10	66	39	.96
06/09/2006	<.08	1.08	1.4	7.8	1.4	5	38	17	.64
07/24/2006	E.05	1.32	1.5	10.3	.77	4	47	19	.49

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2005 through September 2006.—Continued

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

12323850—Lost Creek near Galen								
Date	Time	Streamflow, instantaneous (ft^3/s)	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Temperature, water (°C)	Hardness, filtered (mg/L as $CaCO_3$)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)
10/18/2005	1000	34	8.2	650	8.5	320	90.6	21.6
03/21/2006	1055	41	8.4	595	3.5	300	89.0	19.7
04/18/2006	1130	36	8.4	666	5.5	340	98.4	23.2
05/09/2006	1110	25	8.5	587	8.0	290	84.1	19.2
05/23/2006	0910	2.0	8.1	645	13.5	260	68.3	21.6
06/13/2006	1230	3.1	8.2	776	19.0	340	93.4	25.5
07/24/2006	1645	1.7	8.4	612	23.0	250	63.4	21.1
08/24/2006	0730	3.6	8.0	655	12.0	280	77.4	22.2

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)
10/18/2005	11.7	12.2	E0.03	E0.04	2.7	3.5	16	45
03/21/2006	10.1	11.3	E.02	.07	1.7	7.9	7	226
04/18/2006	14.5	17.7	E.02	.09	2.7	8.6	9	213
05/09/2006	11.9	12.7	<.04	.04	2.2	4.4	8	68
05/23/2006	23.1	23.2	<.04	E.04	2.9	5.6	30	107
06/13/2006	27.8	30.5	E.03	.04	2.8	6.3	22	77
07/24/2006	12.6	12.8	E.02	.05	1.9	4.7	9	82
08/24/2006	8.5	9.9	<.04	E.04	1.5	3.7	7	38

Date	Lead, filtered (µg/L)	Lead, unfiltered recoverable (µg/L)	Manganese, filtered (µg/L)	Manganese, unfiltered recoverable (µg/L)	Zinc, filtered (µg/L)	Zinc, unfiltered recoverable (µg/L)	Sediment, suspended (percent finer than 0.062 mm)	Sediment, suspended (mg/L)	Sediment discharge, suspended (ton/d)
10/18/2005	<0.08	0.16	6.7	7.3	1.4	2	27	22	2.0
03/21/2006	<.08	.99	17.8	28.9	2.2	6	82	15	1.7
04/18/2006	<.08	.84	21.4	30.2	2.5	5	74	28	2.7
05/09/2006	<.08	.26	13.2	14.5	1.6	2	59	18	1.2
05/23/2006	<.08	.28	54.0	56.5	1.7	2	64	5	.03
06/13/2006	E.04	.20	21.1	25.6	1.2	2	54	19	.16
07/24/2006	E.05	.34	16.0	23.1	E.52	E2	66	13	.06
08/24/2006	<.08	.12	6.2	7.9	.84	E2	35	11	.11

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2005 through September 2006.—Continued

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

12324200—Clark Fork at Deer Lodge								
Date	Time	Streamflow, instantaneous (ft^3/s)	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Temperature, water (°C)	Hardness, filtered (mg/L as $CaCO_3$)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)
10/18/2005	1150	189	8.5	540	10.0	240	69.0	16.4
03/21/2006	1235	165	8.6	530	4.5	250	72.3	16.0
04/18/2006	1315	331	8.4	521	6.5	230	67.3	15.3
05/09/2006	1255	301	8.5	443	9.5	200	58.6	11.9
05/23/2006	1045	403	8.0	277	13.0	110	34.8	6.59
06/13/2006	1400	381	8.2	347	19.0	140	42.5	8.73
07/25/2006	0630	38	8.0	520	16.0	220	66.0	13.5
08/24/2006	1055	44	8.3	530	14.0	220	66.9	13.7

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)
10/18/2005	10.6	12.4	0.04	0.12	5.5	17.8	E3	231
03/21/2006	7.6	9.7	.06	.14	5.3	21.3	23	340
04/18/2006	12.5	19.2	.06	.26	8.3	42.1	10	741
05/09/2006	16.3	20.1	.04	.19	9.0	30.5	7	461
05/23/2006	20.6	31.7	.04	.42	11.1	92.1	26	1,450
06/13/2006	19.8	27.1	.06	.28	10.6	59.6	17	851
07/25/2006	16.7	24.4	.06	.10	8.6	15.3	E6	104
08/24/2006	12.4	--	.04	.06	6.5	--	E6	67

Date	Lead, filtered (µg/L)	Lead, unfiltered recoverable (µg/L)	Manganese, filtered (µg/L)	Manganese, unfiltered recoverable (µg/L)	Zinc, filtered (µg/L)	Zinc, unfiltered recoverable (µg/L)	Sediment, suspended (percent finer than 0.062 mm)	Sediment, suspended (mg/L)	Sediment discharge, suspended (ton/d)
10/18/2005	<0.08	1.65	27.0	74.5	4.0	18	60	23	12
03/21/2006	E.05	2.63	76.9	117	5.6	21	78	13	5.8
04/18/2006	E.08	5.50	69.0	192	8.6	37	68	28	25
05/09/2006	E.05	3.61	54.6	142	4.5	27	79	17	14
05/23/2006	.17	11.8	34.5	286	7.1	70	72	58	63
06/13/2006	.13	7.12	23.3	135	5.0	42	67	35	36
07/25/2006	E.07	.96	52.1	73.1	8.1	14	88	7	.72
08/24/2006	E.04	.33	30.9	162	4.9	--	63	5	.59

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2005 through September 2006.—Continued

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

12324680—Clark Fork at Goldcreek								
Date	Time	Streamflow, instantaneous (ft^3/s)	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Temperature, water (°C)	Hardness, filtered (mg/L as $CaCO_3$)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)
10/18/2005	1310	355	8.6	453	11.0	210	60.3	13.9
03/21/2006	1350	295	8.8	460	5.0	220	64.1	14.0
04/18/2006	1430	854	8.4	367	6.5	160	47.5	10.7
05/09/2006	1430	747	8.6	320	10.0	140	42.0	8.38
05/23/2006	1250	1,010	8.3	256	13.5	110	32.8	6.56
06/13/2006	1535	1,060	8.3	310	19.0	130	39.5	8.19
07/25/2006	1105	132	8.5	416	19.5	180	53.4	11.7
08/24/2006	1305	115	8.7	431	18.0	180	52.7	12.2

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)
10/18/2005	8.3	9.5	E0.03	0.08	4.2	12.0	9	173
03/21/2006	6.8	7.8	.05	.09	4.4	11.5	E4	184
04/18/2006	7.5	11.9	.04	.19	5.8	30.2	29	835
05/09/2006	10.0	11.8	<.04	.16	5.0	19.2	11	411
05/23/2006	13.0	19.4	E.03	.27	7.5	56.3	22	1,100
06/13/2006	12.8	17.8	.04	.23	9.2	49.0	19	880
07/25/2006	10.7	11.2	E.02	.04	4.9	6.4	E4	34
08/24/2006	10.5	10.3	<.04	E.03	4.3	6.1	8	33

Date	Lead, filtered (µg/L)	Lead, unfiltered recoverable (µg/L)	Manganese, filtered (µg/L)	Manganese, unfiltered recoverable (µg/L)	Zinc, filtered (µg/L)	Zinc, unfiltered recoverable (µg/L)	Sediment, suspended (percent finer than 0.062 mm)	Sediment, suspended (mg/L)	Sediment discharge, suspended (ton/d)
10/18/2005	<0.08	1.26	10.7	65.2	1.9	12	88	7	6.7
03/21/2006	E.06	1.16	33.1	58.0	2.9	11	77	8	6.4
04/18/2006	.12	4.40	18.1	113	5.4	34	66	37	85
05/09/2006	<.08	2.27	14.1	80.5	1.9	19	77	17	34
05/23/2006	.14	7.54	12.8	160	4.5	49	75	47	128
06/13/2006	.13	5.69	12.8	103	7.6	39	65	38	109
07/25/2006	<.08	.29	13.2	26.2	1.6	4	81	3	1.1
08/24/2006	<.08	.14	4.1	20.4	.97	3	82	2	.62

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2005 through September 2006.—Continued

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

12331800—Clark Fork near Drummond								
Date	Time	Streamflow, instantaneous (ft^3/s)	pH, onsite (standard units)	Specific conductance, onsite (µS/cm)	Temperature, water (°C)	Hardness, filtered (mg/L as $CaCO_3$)	Calcium, filtered (mg/L)	Magnesium, filtered (mg/L)
10/18/2005	1420	563	8.5	479	12.5	230	63.5	16.4
03/21/2006	1450	443	8.6	475	7.0	230	64.3	15.8
04/18/2006	1600	1,180	8.3	368	7.5	170	47.6	11.3
05/09/2006	1545	1,020	8.4	337	10.5	150	45.2	10.1
05/23/2006	1415	1,150	8.2	294	15.5	130	38.5	8.18
06/14/2006	0730	1,300	8.2	366	17.0	160	46.6	10.6
07/25/2006	1205	232	8.4	522	21.5	240	65.2	17.8
08/24/2006	1410	172	8.5	577	19.5	270	74.1	19.9

Date	Arsenic, filtered (µg/L)	Arsenic, unfiltered recoverable (µg/L)	Cadmium, filtered (µg/L)	Cadmium, unfiltered recoverable (µg/L)	Copper, filtered (µg/L)	Copper, unfiltered recoverable (µg/L)	Iron, filtered (µg/L)	Iron, unfiltered recoverable (µg/L)
10/18/2005	8.3	9.3	E0.04	0.08	3.8	8.8	9	176
03/21/2006	7.3	8.5	.04	.09	3.9	10.8	E4	233
04/18/2006	7.8	13.9	.05	.26	6.4	38.3	30	1,140
05/09/2006	8.9	11.6	<.04	.16	5.2	19.9	9	537
05/23/2006	13.7	19.3	E.04	.31	9.2	58.3	17	1,160
06/14/2006	13.3	20.6	.04	.33	8.8	52.5	15	1,120
07/25/2006	12.2	12.1	E.02	E.04	4.1	6.1	<6	27
08/24/2006	10.2	10.4	<.04	.05	3.3	5.3	<6	30

Date	Lead, filtered (µg/L)	Lead, unfiltered recoverable (µg/L)	Manganese, filtered (µg/L)	Manganese, unfiltered recoverable (µg/L)	Zinc, filtered (µg/L)	Zinc, unfiltered recoverable (µg/L)	Sediment, suspended (percent finer than 0.062 mm)	Sediment, suspended (mg/L)	Sediment discharge, suspended (ton/d)
10/18/2005	<0.08	1.35	7.9	61.4	2.1	12	76	11	17
03/21/2006	E.06	1.78	25.2	59.1	2.9	15	72	14	17
04/18/2006	.18	7.12	15.7	150	7.1	49	65	63	201
05/09/2006	E.04	3.54	12.4	78.2	3.0	25	70	27	74
05/23/2006	.14	8.35	10.7	170	4.8	58	78	55	171
06/14/2006	.13	8.80	8.6	184	5.0	59	74	53	186
07/25/2006	<.08	.21	7.0	15.2	1.5	3	58	8	5.0
08/24/2006	<.08	.22	6.8	19.3	2.2	4	67	7	3.3

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2005 through September 2006.—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)
10/18/2005	1535	824	8.7	394	12.0	180	49.3	13.7	--
03/21/2006	1610	660	8.7	389	6.5	180	52.0	13.3	--
*04/05/2006	1100	1,120	8.2	334	8.0	150	41.3	10.9	0.48
04/19/2006	0820	2,180	8.2	280	5.0	120	35.8	8.53	--
*04/19/2006	0945	2,150	8.2	277	6.0	120	35.6	8.61	.48
*05/02/2006	1130	2,970	8.1	201	7.5	93	26.9	6.35	.44
05/10/2006	0800	2,280	8.1	221	7.5	96	27.6	6.67	--
*05/16/2006	1100	2,680	8.3	180	12.0	82	23.6	5.55	.36
*05/19/2006	0930	4,090	7.9	139	17.0	61	17.3	4.33	.60
**05/24/2006	0750	3,560	7.9	149	10.5	66	18.8	4.62	.38
*05/31/2006	1130	2,240	8.1	213	11.0	93	26.7	6.50	.31
*06/05/2006	1130	2,250	8.4	214	11.5	94	26.8	6.67	.27
**06/13/2006	1100	2,710	8.2	250	15.0	110	30.8	7.64	.49
*06/19/2006	1100	1,740	8.3	268	13.0	120	33.1	8.43	.22
*06/26/2006	1100	1,230	8.4	292	17.0	130	37.6	9.35	.15
07/25/2006	1320	556	8.6	312	20.5	140	37.3	11.0	--
08/24/2006	1525	375	8.7	350	18.0	160	42.0	12.6	--
*09/26/2006	1200	590	8.3	414	12.0	190	54.0	13.6	.23

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)
10/18/2005	--	6.3	6.7	E0.03	0.05	2.9	5.8	E4	112
03/21/2006	--	5.4	6.1	E.03	.06	3.3	7.8	<6	157
*04/05/2006	0.087	4.7	7.5	E.02	.16	4.9	21.4	12	674
04/19/2006	--	5.0	8.2	E.03	.17	4.3	24.1	33	708
*04/19/2006	.073	5.1	7.9	E.03	.14	6.0	21.8	15	664
*05/02/2006	.094	4.7	8.2	<.04	.16	5.6	21.2	22	796
05/10/2006	--	4.5	5.5	<.04	.08	2.8	10.9	15	349
*05/16/2006	.066	4.3	5.6	<.04	.08	3.0	10.3	22	485
*05/19/2006	.116	4.3	6.6	E.03	.17	3.8	22.1	30	1,050
**05/24/2006	.072	4.9	6.8	<.04	.12	4.2	20.0	34	644
*05/31/2006	.047	5.8	6.6	E.03	.10	4.1	13.2	19	344
*06/05/2006	.049	5.1	6.1	E.02	.07	4.5	10.4	18	289
**06/13/2006	.090	9.2	12.9	E.03	.21	8.0	37.4	16	813
*06/19/2006	.030	6.2	4.1	E.02	.13	3.4	14.9	12	500
*06/26/2006	.023	5.8	6.0	E.02	.04	3.0	6.1	9	82
07/25/2006	--	5.3	5.4	<.04	E.03	2.3	3.8	E3	42
08/24/2006	--	5.2	5.2	<.04	E.03	1.8	3.1	E3	33
*09/26/2006	.019	6.7	7.1	<.04	.05	2.5	5.7	E3	96

*Sample collected as part of a supplemental sampling program.

**Supplemental sample collected in conjunction with routine sample for long-term monitoring program.

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2005 through September 2006.—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)
10/18/2005	E0.05	0.73	3.7	31.5	1.2	8	83	7	16
03/21/2006	E.05	1.03	8.0	34.3	2.0	11	77	10	18
*04/05/2006	.22	4.22	9.2	97.4	5.1	35	72	40	121
04/19/2006	.14	4.31	6.8	96.1	5.5	32	76	37	218
*04/19/2006	.20	4.20	6.8	87.3	9.5	30	77	33	192
*05/02/2006	.30	4.67	7.1	95.1	6.3	33	63	53	425
05/10/2006	<.08	1.87	6.6	43.3	2.9	15	72	18	111
*05/16/2006	<.08	1.85	6.2	50.6	2.4	16	63	36	260
*05/19/2006	.12	4.40	8.5	98.9	3.3	33	57	91	1,000
**05/24/2006	.08	2.99	7.9	68.7	3.4	24	63	41	394
*05/31/2006	E.07	1.80	9.7	46.0	3.0	16	69	19	115
*06/05/2006	.22	1.46	6.5	39.5	4.5	13	66	17	103
**06/13/2006	.15	6.06	7.8	105	7.5	43	78	42	307
*06/19/2006	E.06	2.25	8.4	36.1	3.0	29	71	11	52
*06/26/2006	E.05	.41	7.3	17.0	1.9	5	75	4	13
07/25/2006	<.08	.21	4.6	12.4	1.0	3	84	4	6.0
08/24/2006	<.08	.31	3.6	8.9	.97	3	76	3	3.0
*09/26/2006	.09	.63	3.2	27.6	2.3	9	85	6	9.6

*Sample collected as part of a supplemental sampling program.

**Supplemental sample collected in conjunction with routine sample for long-term monitoring program.

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2005 through September 2006.—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)
10/19/2005	0800	489	8.4	272	9.0	140	34.4	13.2	0.10
*04/05/2006	1400	1,760	8.4	202	5.0	99	25.7	8.42	.56
04/19/2006	1050	3,710	8.2	175	5.0	86	22.9	7.08	--
*04/19/2006	1230	3,680	8.5	174	8.5	87	23.0	7.18	.33
*05/02/2006	1330	4,670	8.6	158	7.5	83	22.0	6.88	.24
05/10/2006	0945	3,610	8.3	174	7.5	86	22.5	7.15	--
*05/16/2006	1300	5,020	8.2	156	11.5	81	21.7	6.58	.32
*05/19/2006	1530	8,170	8.2	142	11.0	67	17.9	5.37	.49
**05/24/2006	1020	7,040	8.1	146	10.5	72	19.1	5.85	.23
*05/31/2006	1400	4,210	8.4	175	11.0	87	22.9	7.29	.20
*06/05/2006	1330	4,550	8.4	163	12.0	80	20.7	6.76	.21
*06/13/2006	1300	4,160	8.4	185	14.5	87	22.5	7.46	.16
*06/19/2006	1300	3,110	8.4	185	13.5	89	23.0	7.68	.12
*06/26/2006	1230	2,030	8.2	208	18.0	110	27.4	8.86	.11
07/25/2006	1455	729	8.6	254	22.5	130	31.6	11.8	--
08/25/2006	0800	517	8.5	263	15.5	130	31.9	12.4	--
*09/26/2006	1330	511	8.5	270	20.0	130	33.3	12.1	.11

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)
10/19/2005	0.007	1.1	1.1	<0.04	<0.04	0.52	E0.5	6	35
*04/05/2006	.107	1.0	1.4	<.04	<.04	2.1	2.0	26	600
04/19/2006	--	.86	1.2	<.04	<.04	1.8	3.5	44	387
*04/19/2006	.050	.82	1.1	<.04	<.04	1.7	1.8	19	372
*05/02/2006	.055	.66	1.1	<.04	<.04	.95	1.7	16	375
05/10/2006	--	.72	.96	<.04	<.04	1.3	3.7	12	174
*05/16/2006	.053	.89	1.1	<.04	E.03	.76	1.9	14	525
*05/19/2006	.123	.81	2.2	<.04	<.04	2.1	5.2	13	1,670
**05/24/2006	.049	.78	1.2	<.04	<.04	1.2	4.3	18	626
*05/31/2006	.017	.85	1.1	<.04	<.04	--	1.3	11	242
*06/05/2006	.019	.86	1.0	<.04	<.04	1.2	1.5	10	302
*06/13/2006	.028	.92	1.2	<.04	<.04	2.0	1.4	11	259
*06/19/2006	.017	.92	1.0	<.04	E.03	.64	1.2	10	131
*06/26/2006	.013	.98	1.2	<.04	<.04	.62	.8	11	72
07/25/2006	--	1.2	1.4	<.04	<.04	.45	1.3	E4	36
08/25/2006	--	1.3	1.3	<.04	<.04	E.38	.9	<6	27
*09/26/2006	.005	1.3	1.6	<.04	<.04	.85	E.5	E5	25

*Sample collected as part of a supplemental sampling program.

**Supplemental sample collected in conjunction with routine sample for long-term monitoring program.

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2005 through September 2006.—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)
10/19/2005	<0.08	0.06	1.0	4.2	E0.37	<2	84	2	2.6
*04/05/2006	.18	.68	6.8	39.1	3.3	3	79	39	185
04/19/2006	E.06	.48	3.9	28.2	1.3	3	88	22	220
*04/19/2006	E.07	.43	3.9	28.5	2.0	3	89	21	209
*05/02/2006	<.08	.46	2.8	28.8	1.1	3	83	25	315
05/10/2006	<.08	.27	2.2	15.0	1.0	2	83	13	127
*05/16/2006	<.08	.62	3.4	38.9	.64	3	78	48	651
*05/19/2006	.14	2.30	4.7	97.2	2.3	8	78	168	3,710
**05/24/2006	<.08	.85	2.4	37.3	.67	4	82	57	1,080
*05/31/2006	.29	.37	3.4	18.2	--	E2	86	18	205
*06/05/2006	E.07	.39	2.2	20.0	1.2	2	83	24	295
*06/13/2006	.09	.39	2.0	17.6	--	E2	86	19	213
*06/19/2006	<.08	.18	2.0	10.9	.67	E1	84	9	76
*06/26/2006	E.04	.12	1.9	8.4	.84	<2	80	5	27
07/25/2006	<.08	.06	2.3	8.0	E.46	<2	84	3	5.9
08/25/2006	<.08	E.04	.9	5.1	E.47	<2	69	2	2.8
*09/26/2006	E.07	E.04	1.2	2.8	1.9	<2	79	1	1.4

*Sample collected as part of a supplemental sampling program.

**Supplemental sample collected in conjunction with routine sample for long-term monitoring program.

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2005 through September 2006.—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)
10/19/2005	0945	1,290	8.5	8.4	348	10.0	170	44.2	13.4
03/22/2006	0800	1,180	3.5	8.5	331	5.0	160	43.6	12.4
*04/05/2006	1530	3,060	--	8.4	257	7.0	120	32.4	9.05
04/19/2006	1250	5,710	14	8.2	214	5.5	99	27.4	7.52
*04/19/2006	1430	5,670	--	8.4	211	6.5	99	27.4	7.54
*05/02/2006	1600	7,530	--	8.4	176	8.5	86	23.7	6.45
05/10/2006	1045	5,670	6.9	8.3	194	8.0	91	24.7	7.08
*05/16/2006	1500	7,890	--	8.1	169	13.0	83	22.7	6.39
*05/19/2006	1400	12,300	--	8.1	144	12.5	68	18.4	5.29
**05/24/2006	1145	10,700	28	8.1	149	10.5	71	19.3	5.47
*05/31/2006	1530	6,270	--	8.2	188	12.0	91	24.8	7.09
*06/05/2006	1500	6,920	--	8.3	181	13.0	84	22.4	6.68
**06/13/2006	1430	6,900	18	8.3	213	16.5	99	26.9	7.72
*06/19/2006	1500	4,720	--	8.4	215	14.5	98	26.3	7.85
*06/26/2006	1400	3,050	--	8.3	238	19.0	110	30.2	8.74
07/25/2006	1615	1,320	3.8	8.6	278	22.0	130	33.7	11.3
08/25/2006	0910	873	3.4	8.5	298	17.0	140	36.3	12.3
*09/26/2006	1500	1,090	--	8.4	352	12.0	160	42.1	12.7

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)
10/19/2005	--	--	4.2	6.3	<0.04	0.24	2.2	24.6
03/22/2006	--	--	3.7	4.0	<.04	.07	2.2	7.3
*04/05/2006	0.38	0.060	2.5	3.7	<.04	.07	2.5	8.3
04/19/2006	--	--	2.4	3.7	<.04	.08	2.3	11.5
*04/19/2006	.42	.060	2.5	3.6	<.04	.07	2.5	9.7
*05/02/2006	.36	.063	2.4	4.0	<.04	.09	2.1	10.9
05/10/2006	--	--	2.2	2.9	<.04	.05	1.8	6.5
*05/16/2006	.37	.061	2.1	3.0	--	.06	2.4	8.3
*05/19/2006	.53	.129	2.2	4.3	<.04	.12	2.1	17.8
**05/24/2006	.32	.066	2.2	3.2	<.04	.07	2.2	9.5
*05/31/2006	.22	.029	2.7	3.0	<.04	E.04	2.0	5.3
*06/05/2006	.26	.031	2.5	3.4	<.04	.08	1.9	10.0
**06/13/2006	.47	.102	4.7	8.6	<.04	.35	3.3	42.1
*06/19/2006	.21	.046	3.1	6.6	<.04	.08	1.8	9.9
*06/26/2006	.21	.033	3.2	4.0	<.04	.10	1.6	17.7
07/25/2006	--	--	3.6	4.2	E.03	.11	2.0	14.6
08/25/2006	--	--	3.0	3.3	<.04	.07	1.7	8.1
*09/26/2006	.30	.028	4.8	6.2	<.04	.15	2.0	17.7

*Sample collected as part of a supplemental sampling program.

**Supplemental sample collected in conjunction with routine sample for long-term monitoring program.

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2005 through September 2006.—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)
10/19/2005	8	585	E0.06	3.90	23.8	66.5	1.4	43
03/22/2006	9	189	E.05	.97	27.2	39.8	2.0	11
*04/05/2006	18	418	E.06	1.48	15.8	35.9	2.5	15
04/19/2006	42	555	.11	1.89	15.4	51.8	2.4	15
*04/19/2006	19	512	E.07	1.82	16.8	52.6	2.9	14
*05/02/2006	19	596	E.04	2.37	13.1	57.5	2.0	18
05/10/2006	14	295	<.08	1.11	11.0	29.8	1.3	9
*05/16/2006	16	555	E.06	1.73	10.3	46.8	4.0	14
*05/19/2006	24	1,460	E.07	3.73	11.7	109	1.7	28
**05/24/2006	24	699	E.04	1.85	8.1	51.1	1.5	14
*05/31/2006	14	267	E.04	.80	8.5	27.8	3.3	7
*06/05/2006	13	485	E.06	1.70	15.3	44.2	1.6	18
**06/13/2006	14	1,350	.12	6.89	17.0	99.2	2.6	91
*06/19/2006	12	216	.08	1.25	10.8	31.9	3.2	12
*06/26/2006	12	314	.10	1.60	11.3	28.7	2.0	19
07/25/2006	6	192	.08	1.98	12.8	27.3	1.2	21
08/25/2006	7	155	E.04	.97	9.9	24.0	2.8	12
*09/26/2006	10	436	.13	2.73	21.2	49.0	1.7	36

Date	Sediment, suspended (percent finer than 0.062 mm)	Sediment, suspended (mg/L)	Sediment discharge, suspended (ton/d)
10/19/2005	74	41	143
03/22/2006	83	9	29
*04/05/2006	53	30	248
04/19/2006	86	28	432
*04/19/2006	87	27	413
*05/02/2006	80	36	732
05/10/2006	85	16	245
*05/16/2006	76	40	852
*05/19/2006	74	139	4,620
**05/24/2006	79	56	1,620
*05/31/2006	88	15	254
*06/05/2006	72	38	710
**06/13/2006	39	117	2,180
*06/19/2006	40	47	599
*06/26/2006	61	26	214
07/25/2006	81	12	43
08/25/2006	85	11	26
*09/26/2006	78	27	79

*Sample collected as part of a supplemental sampling program.

**Supplemental sample collected in conjunction with routine sample for long-term monitoring program.

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2005 through September 2006.—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)
04/06/2006	0900	2,200	7.8	95	4.0	40	11.8	2.53	0.58
04/20/2006	0800	3,320	7.7	84	9.0	35	10.4	2.19	.32
05/03/2006	0745	5,930	7.8	58	7.0	24	7.17	1.46	.29
05/17/2006	0800	10,500	7.4	40	11.0	16	4.72	.954	.70
05/19/2006	1130	15,200	7.4	41	11.5	15	4.43	.980	.48
05/24/2006	1530	13,800	7.4	44	11.5	16	4.81	1.04	.28
06/01/2006	0800	6,260	7.6	62	12.0	25	7.44	1.57	.25
06/06/2006	0800	8,970	7.6	48	12.5	19	5.56	1.17	.21
06/14/2006	0700	8,450	7.5	48	15.0	19	5.57	1.19	.17
06/20/2006	0730	5,000	7.7	63	13.5	25	7.32	1.62	.16
06/27/2006	0730	3,290	7.7	70	18.0	28	8.11	1.76	.13
09/27/2006	0800	670	7.8	172	13.5	70	20.4	4.55	.18

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)
04/06/2006	0.099	0.26	0.63	<0.04	<0.04	1.2	1.9	28	1,020
04/20/2006	.036	.28	.44	<.04	<.04	.75	1.1	28	351
05/03/2006	.051	.27	.48	<.04	<.04	--	1.3	34	553
05/17/2006	.121	.27	.62	<.04	E.03	1.4	4.0	60	2,010
05/19/2006	.088	.31	.51	<.04	E.03	1.1	3.2	71	1,460
05/24/2006	.047	.27	.42	<.04	<.04	2.9	2.1	47	741
06/01/2006	.019	.34	.43	<.04	<.04	.69	1.4	40	405
06/06/2006	.021	.29	.39	<.04	<.04	.78	1.4	39	567
06/14/2006	.025	.29	.38	<.04	<.04	1.3	1.1	45	355
06/20/2006	.021	.28	.40	<.04	<.04	.65	.9	43	238
06/27/2006	.015	.32	.36	<.04	<.04	.64	.9	35	133
09/27/2006	.011	.57	.55	E.03	<.04	.78	.7	30	73

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)
04/06/2006	E0.06	0.88	6.4	73.6	2.4	4	76	64	380
04/20/2006	<.08	.27	7.2	22.7	.79	E1	68	16	143
05/03/2006	.27	.49	4.8	27.9	--	3	53	38	608
05/17/2006	E.06	1.89	6.7	75.3	2.1	8	43	226	6,410
05/19/2006	.10	1.57	7.4	52.3	.92	7	38	177	7,260
05/24/2006	.18	.74	6.4	23.3	4.4	3	47	80	2,980
06/01/2006	<.08	.36	8.6	19.0	E.60	E2	60	27	456
06/06/2006	E.04	.48	6.0	18.9	1.6	3	54	41	993
06/14/2006	.08	.32	5.0	14.2	1.4	3	53	29	662
06/20/2006	E.04	.21	7.1	13.3	1.0	E1	69	12	162
06/27/2006	E.04	.12	3.4	7.7	1.1	<2	80	5	44
09/27/2006	<.08	E.05	3.8	10.5	.70	<2	79	2	3.6

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2005 through September 2006.—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)
04/07/2006	0800	11,800	8.2	174	4.0	76	20.9	5.74	1.27
04/21/2006	0830	12,200	8.1	175	4.5	79	21.9	5.84	.38
05/04/2006	0800	18,000	8.4	133	4.0	61	17.2	4.33	.30
05/17/2006	1500	26,900	7.9	104	8.5	47	13.2	3.48	.62
05/20/2006	1030	38,000	8.0	95	8.0	43	12.1	3.05	.57
05/25/2006	1130	32,000	7.9	103	8.5	45	12.5	3.38	.29
06/01/2006	1500	18,100	8.0	144	10.5	62	17.1	4.64	.26
06/06/2006	1500	21,500	8.0	115	11.0	50	13.8	3.75	.24
06/14/2006	1430	20,800	8.0	131	12.0	57	15.7	4.34	.25
06/20/2006	1400	13,600	8.2	152	11.0	65	17.6	5.08	.18
06/27/2006	1400	8,900	8.6	166	15.5	75	20.7	5.79	.18
09/27/2006	1400	2,450	8.4	273	13.0	120	33.0	9.54	.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)
04/07/2006	0.226	1.5	3.8	<0.04	0.19	1.3	23.5	25	2,230
04/21/2006	.050	1.5	2.2	E.03	.05	2.2	6.7	14	399
05/04/2006	.049	1.2	2.0	<.04	.05	1.7	6.0	16	527
05/17/2006	.135	1.2	2.8	<.04	.12	1.4	13.8	20	1,860
05/20/2006	.166	1.3	3.0	<.04	.12	1.9	17.5	28	2,200
05/25/2006	.070	1.1	1.9	<.04	.06	1.6	6.9	21	892
06/01/2006	.029	1.4	1.8	<.04	E.04	1.6	4.2	19	385
06/06/2006	.027	1.2	1.7	<.04	.04	1.6	5.0	17	530
06/14/2006	.057	2.2	3.2	<.04	.10	2.5	13.2	17	648
06/20/2006	.023	1.7	1.9	<.04	E.04	1.3	4.5	18	243
06/27/2006	.011	1.8	1.9	<.04	E.02	1.4	2.4	13	76
09/27/2006	.011	2.3	2.9	<.04	E.03	1.5	3.5	8	68

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)
04/07/2006	E0.06	5.63	4.6	183	1.2	50	80	154	4,910
04/21/2006	E.08	1.13	4.1	36.4	3.3	9	76	23	758
05/04/2006	E.05	1.38	2.4	41.8	2.4	11	60	42	2,040
05/17/2006	<.08	4.18	3.5	100	1.4	28	50	188	13,700
05/20/2006	E.06	4.62	2.0	120	1.5	30	47	282	28,900
05/25/2006	E.06	1.70	3.2	46.4	1.5	11	58	103	8,900
06/01/2006	E.05	.83	6.0	28.1	1.8	6	81	27	1,320
06/06/2006	E.05	1.02	3.1	29.6	1.6	9	65	47	2,730
06/14/2006	.15	2.47	2.5	48.5	2.6	19	70	49	2,750
06/20/2006	E.07	.72	3.9	18.9	1.7	7	82	14	514
06/27/2006	E.06	.29	1.7	8.4	.90	3	83	4	96
09/27/2006	.08	.36	2.9	15.3	1.2	4	82	5	33

Table 4. Water-quality data for the Clark Fork basin, Montana, October 2005 through September 2006.—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)
04/06/2006	1330	9,020	8.3	176	6.5	89	25.5	6.14	0.12
04/20/2006	1300	E15,300	8.3	178	8.0	94	27.1	6.29	.14
05/03/2006	1300	25,500	8.5	174	7.0	91	26.3	6.14	.14
05/17/2006	1200	27,900	8.2	173	12.5	91	26.3	6.16	.12
05/20/2006	0800	32,300	8.3	177	13.0	86	24.4	6.15	.11
05/25/2006	0845	35,800	8.4	179	14.0	88	25.0	6.23	.11
06/01/2006	1130	28,700	8.3	175	13.5	88	25.4	6.10	.13
06/06/2006	1200	25,200	8.3	173	15.5	85	24.2	6.02	.06
06/14/2006	1200	30,000	8.4	171	16.0	85	23.9	6.03	.10
06/20/2006	1100	44,300	8.3	167	13.0	83	23.6	5.87	.12
06/27/2006	1100	20,500	8.3	169	19.0	86	24.8	5.93	.10
09/27/2006	1130	6,180	8.2	176	16.0	85	23.9	6.13	.15

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)
04/06/2006	0.005	0.33	0.39	<0.04	<0.04	0.44	E0.4	<6	67
04/20/2006	.010	.38	.45	<.04	<.04	.86	E.5	<6	76
05/03/2006	.009	.36	.48	<.04	<.04	--	.8	<6	86
05/17/2006	.011	.36	.46	<.04	<.04	.72	.7	<6	121
05/20/2006	.011	.40	.46	<.04	<.04	.80	--	<6	138
05/25/2006	.010	.42	.53	<.04	<.04	.51	E.4	<6	116
06/01/2006	.007	.41	.46	<.04	<.04	.59	E.5	<6	70
06/06/2006	.004	.42	.40	<.04	<.04	.56	E.6	<6	67
06/14/2006	.007	.40	.53	<.04	<.04	.84	.9	<6	153
06/20/2006	.009	.35	.48	<.04	<.04	.54	E.6	<6	152
06/27/2006	.010	.38	.51	<.04	<.04	.87	E.5	<6	57
09/27/2006	.012	.47	.73	<.04	<.04	.68	E.5	<6	36

Date	Lead, filtered (µg/L)	Lead, unfiltered recoverable (µg/L)	Manganese, filtered (µg/L)	Manganese, unfiltered recoverable (µg/L)	Zinc, filtered (µg/L)	Zinc, unfiltered recoverable (µg/L)	Sediment, suspended (percent finer than 0.062 mm)	Sediment, suspended (mg/L)	Sediment discharge, suspended (ton/d)
04/06/2006	<0.08	0.19	1.2	5.3	0.73	<2	83	3	73
04/20/2006	<.08	.09	1.3	5.9	1.6	<2	85	5	E207
05/03/2006	--	.10	.8	5.9	--	<2	69	8	551
05/17/2006	<.08	.13	.9	7.1	<.60	<2	77	10	753
05/20/2006	E.05	.15	.7	7.8	1.4	<2	77	11	959
05/25/2006	<.08	.13	.7	6.8	E.53	<2	75	10	967
06/01/2006	<.08	.07	1.3	5.2	E.58	<2	79	5	387
06/06/2006	<.08	.09	1.2	4.8	.87	<2	80	5	340
06/14/2006	<.08	.20	1.0	8.2	.78	E1	89	11	891
06/20/2006	<.08	.19	.8	8.1	1.3	<2	78	12	1,440
06/27/2006	E.05	.09	.8	4.6	2.0	<2	81	4	221
09/27/2006	E.05	.06	.6	4.1	1.4	<2	85	2	33

Table 5. Daily mean streamflow and suspended-sediment data for Clark Fork at Deer Lodge, Montana, October 2005 through September 2006.

[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	178	19	9.1	205	12	6.6	237	24	15
2	194	17	8.9	216	12	7.0	231	24	15
3	204	17	9.4	228	12	7.4	224	31	19
4	225	17	10	233	12	7.5	237	64	41
5	223	17	10	230	11	6.8	208	106	60
6	215	16	9.3	229	10	6.2	e150	77	31
7	210	16	9.1	227	10	6.1	e100	42	11
8	208	16	9.0	242	10	6.5	e110	36	11
9	212	15	8.6	243	11	7.2	e120	35	11
10	211	15	8.5	234	12	7.6	e140	34	13
11	209	15	8.5	238	16	10	e150	33	13
12	202	15	8.2	236	14	8.9	e150	33	13
13	201	15	8.1	234	12	7.6	e150	32	13
14	196	15	7.9	239	10	6.5	e150	32	13
15	194	16	8.4	228	10	6.2	e170	32	15
16	190	17	8.7	233	10	6.3	e160	31	13
17	189	18	9.2	239	11	7.1	e140	31	12
18	189	19	9.7	238	11	7.1	e120	32	10
19	189	19	9.7	242	12	7.8	e110	37	11
20	188	18	9.1	239	12	7.7	e150	40	16
21	189	17	8.7	235	11	7.0	e170	42	19
22	193	17	8.9	231	10	6.2	e250	44	30
23	195	17	9.0	230	10	6.2	307	47	39
24	195	16	8.4	225	11	6.7	249	70	47
25	198	16	8.6	226	12	7.3	249	94	63
26	205	15	8.3	238	12	7.7	238	40	26
27	208	14	7.9	232	13	8.1	234	25	16
28	210	14	7.9	229	15	9.3	241	21	14
29	212	13	7.4	207	18	10	311	10	8.4
30	207	13	7.3	234	21	13	243	7	4.6
31	206	13	7.2	--	--	--	238	12	7.7
TOTAL	**6,245**	**--**	**269.0**	**6,940**	**--**	**225.6**	**5,937**	**--**	**630.7**
MEAN	**201**	**16**	**8.7**	**231**	**12**	**7.5**	**192**	**39**	**20**
MAX	**225**	**19**	**10**	**243**	**21**	**13**	**311**	**106**	**63**
MIN	**178**	**13**	**7.2**	**205**	**10**	**6.1**	**100**	**7**	**4.6**

Table 5. Daily mean streamflow and suspended-sediment data for Clark Fork at Deer Lodge, Montana, October 2005 through September 2006.—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	234	19	12	192	20	10	215	27	16
2	228	22	14	191	19	9.8	194	23	12
3	224	21	13	191	19	9.8	191	31	16
4	217	20	12	193	21	11	191	30	15
5	209	19	11	191	27	14	180	30	15
6	213	18	10	179	34	16	183	24	12
7	213	18	10	187	37	19	185	26	13
8	215	17	9.9	200	37	20	173	25	12
9	194	17	8.9	194	35	18	171	26	12
10	208	17	9.5	168	34	15	157	31	13
11	216	17	9.9	169	34	16	158	28	12
12	208	18	10	185	33	16	160	35	15
13	200	18	9.7	201	33	18	165	34	15
14	214	19	11	197	32	17	163	30	13
15	210	19	11	e150	31	13	173	37	17
16	192	20	10	e130	30	11	164	30	13
17	198	21	11	e80	28	6.0	167	28	13
18	207	22	12	e110	26	7.7	170	28	13
19	197	21	11	e130	25	8.8	168	27	12
20	186	21	11	e140	26	9.8	167	23	10
21	197	20	11	150	26	11	169	20	9.1
22	183	20	9.9	154	27	11	171	28	13
23	199	19	10	165	27	12	166	23	10
24	191	18	9.3	e170	28	13	169	23	10
25	190	18	9.2	e160	31	13	181	25	12
26	191	18	9.3	188	34	17	191	28	14
27	184	19	9.4	210	36	20	184	30	15
28	169	21	9.6	232	33	21	202	36	20
29	189	22	11	--	--	--	224	26	16
30	197	22	12	--	--	--	235	20	13
31	195	21	11	--	--	--	217	18	11
TOTAL	**6,268**	**--**	**328.6**	**4,807**	**--**	**383.9**	**5,604**	**--**	**412.1**
MEAN	**202**	**19**	**11**	**172**	**29**	**14**	**181**	**27**	**13**
MAX	**234**	**22**	**14**	**232**	**37**	**21**	**235**	**37**	**20**
MIN	**169**	**17**	**8.9**	**80**	**19**	**6.0**	**157**	**18**	**9.1**

Table 5. Daily mean streamflow and suspended-sediment data for Clark Fork at Deer Lodge, Montana, October 2005 through September 2006.—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	187	20	10	348	30	28	248	23	15
2	205	22	12	348	26	24	232	23	14
3	226	20	12	336	21	19	252	27	18
4	208	51	29	321	22	19	299	27	22
5	230	145	90	316	17	15	297	17	14
6	446	328	395	316	18	15	278	17	13
7	465	133	167	312	17	14	240	27	17
8	368	58	58	310	14	12	307	168	139
9	352	49	47	297	15	12	433	214	250
10	333	43	39	289	18	14	547	132	195
11	321	37	32	287	18	14	578	51	80
12	309	39	33	276	18	13	440	36	43
13	314	38	32	270	17	12	385	34	35
14	317	44	38	270	19	14	362	29	28
15	332	41	37	277	22	16	318	23	20
16	338	39	36	304	28	23	287	15	12
17	351	37	35	355	49	47	247	10	6.7
18	333	28	25	412	80	89	224	9	5.4
19	317	24	21	441	92	110	214	9	5.2
20	302	22	18	495	116	155	225	8	4.9
21	297	25	20	518	116	162	209	8	4.5
22	303	30	25	455	78	96	195	8	4.2
23	325	28	25	406	56	61	179	7	3.4
24	326	23	20	385	48	50	158	7	3.0
25	317	22	19	334	41	37	145	7	2.7
26	317	22	19	328	37	33	143	8	3.1
27	309	22	18	335	28	25	135	7	2.6
28	303	21	17	349	29	27	150	5	2.0
29	305	20	16	361	28	27	144	4	1.6
30	325	26	23	318	24	21	164	6	2.7
31	--	--	--	282	25	19	--	--	--
TOTAL	**9,381**	**--**	**1,368**	**10,651**	**--**	**1,223**	**8,035**	**--**	**967.0**
MEAN	**313**	**49**	**46**	**344**	**38**	**39**	**268**	**32**	**32**
MAX	**465**	**328**	**395**	**518**	**116**	**162**	**578**	**214**	**250**
MIN	**187**	**20**	**10**	**270**	**14**	**12**	**135**	**4**	**1.6**

Table 5. Daily mean streamflow and suspended-sediment data for Clark Fork at Deer Lodge, Montana, October 2005 through September 2006.—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	170	7	3.2	45	30	3.6	61	24	4.0
2	161	7	3.0	45	32	3.9	71	20	3.8
3	152	7	2.9	43	33	3.8	78	19	4.0
4	150	9	3.6	47	34	4.3	73	22	4.3
5	150	10	4.0	55	36	5.3	69	27	5.0
6	149	10	4.0	43	38	4.4	65	33	5.8
7	147	17	6.7	40	39	4.2	66	33	5.9
8	135	37	13	44	39	4.6	69	29	5.4
9	118	23	7.3	42	38	4.3	70	22	4.2
10	116	15	4.7	41	37	4.1	70	16	3.0
11	125	14	4.7	37	36	3.6	70	14	2.6
12	123	12	4.0	38	35	3.6	68	14	2.6
13	126	11	3.7	38	34	3.5	70	15	2.8
14	115	9	2.8	36	32	3.1	76	17	3.5
15	102	9	2.5	39	30	3.2	88	18	4.3
16	84	8	1.8	37	28	2.8	114	18	5.5
17	65	9	1.6	45	26	3.2	122	18	5.9
18	60	12	1.9	58	26	4.1	123	18	6.0
19	56	18	2.7	57	29	4.5	113	17	5.2
20	46	21	2.6	55	32	4.8	118	16	5.1
21	41	22	2.4	54	34	5.0	129	16	5.6
22	39	22	2.3	51	23	3.2	138	15	5.6
23	44	24	2.9	46	11	1.4	142	15	5.8
24	43	29	3.4	44	5	.59	139	16	6.0
25	37	12	1.2	46	16	2.0	139	16	6.0
26	35	9	.85	49	23	3.0	152	17	7.0
27	41	13	1.4	52	26	3.7	152	16	6.6
28	43	18	2.1	52	26	3.7	154	16	6.7
29	39	23	2.4	51	26	3.6	149	16	6.4
30	36	27	2.6	51	26	3.6	151	14	5.7
31	36	29	2.8	55	25	3.7	--	--	--
TOTAL	**2,784**	**--**	**105.05**	**1,436**	**--**	**112.39**	**3,099**	**--**	**150.3**
MEAN	**89.8**	**16**	**3.4**	**46.3**	**29**	**3.6**	**103**	**19**	**5.0**
MAX	**170**	**37**	**13**	**58**	**39**	**5.3**	**154**	**33**	**7.0**
MIN	**35**	**7**	**.85**	**36**	**5**	**.59**	**61**	**14**	**2.6**

Total for water year 2006 (unrounded sum of daily values): streamflow–71,187 ft³/s (annual runoff–141,200 acre-ft); suspended-sediment discharge–6,175.64 tons.

Table 6. Daily mean streamflow and suspended-sediment data for Clark Fork at Turah Bridge, near Bonner, Montana, October 2005 through September 2006.

[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	795	12	26	847	8	18	696	4	7.5
2	835	14	32	856	9	21	e720	4	7.8
3	870	14	33	875	8	19	708	7	13
4	943	13	33	884	8	19	717	9	17
5	952	13	33	862	7	16	730	9	18
6	928	12	30	848	7	16	e670	9	16
7	913	11	27	849	7	16	e400	8	8.6
8	884	10	24	879	7	17	e210	8	4.5
9	873	8	19	858	7	16	e250	7	4.7
10	893	8	19	814	6	13	e350	7	6.6
11	882	8	19	841	7	16	e530	9	13
12	875	8	19	870	8	19	e570	11	17
13	860	8	19	866	8	19	e550	11	16
14	841	8	18	864	7	16	e600	10	16
15	836	8	18	854	7	16	e630	8	14
16	830	8	18	801	7	15	e600	6	9.7
17	819	8	18	838	6	14	e570	6	9.2
18	819	8	18	840	6	14	e530	5	7.2
19	806	7	15	822	6	13	e500	7	9.4
20	815	7	15	821	7	16	e470	9	11
21	811	7	15	795	7	15	e570	11	17
22	815	7	15	795	7	15	e650	21	37
23	820	7	15	777	7	15	e750	37	75
24	813	6	13	744	7	14	e1,100	34	101
25	805	6	13	715	7	14	e1,000	27	73
26	802	7	15	786	6	13	925	24	60
27	815	8	18	796	6	13	913	15	37
28	823	8	18	766	6	12	878	12	28
29	821	8	18	712	6	12	938	18	46
30	805	8	17	676	5	9.1	1,080	33	96
31	808	8	17	--	--	--	1,010	20	55
TOTAL	**26,207**	**--**	**627**	**24,551**	**--**	**461.1**	**20,815**	**--**	**851.2**
MEAN	**845**	**9**	**20**	**818**	**7**	**15**	**671**	**13**	**27**
MAX	**952**	**14**	**33**	**884**	**9**	**21**	**1,100**	**37**	**101**
MIN	**795**	**6**	**13**	**676**	**5**	**9.1**	**210**	**4**	**4.5**

Table 6. Daily mean streamflow and suspended-sediment data for Clark Fork at Turah Bridge, near Bonner, Montana, October 2005 through September 2006.—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	980	18	48	727	9	18	1,350	108	394
2	950	18	46	710	8	15	1,190	82	263
3	913	15	37	705	7	13	988	50	133
4	884	13	31	702	6	11	929	27	68
5	832	16	36	706	4	7.6	851	18	41
6	787	16	34	680	5	9.2	773	14	29
7	812	16	35	621	5	8.4	766	13	27
8	818	16	35	644	5	8.7	777	12	25
9	784	16	34	705	5	9.5	752	11	22
10	757	17	35	662	5	8.9	708	8	15
11	907	38	93	581	5	7.8	647	7	12
12	1,020	61	168	565	4	6.1	630	7	12
13	871	24	56	604	4	6.5	632	6	10
14	850	18	41	668	4	7.2	650	6	11
15	927	19	48	632	5	8.5	657	8	14
16	866	16	37	569	7	11	657	7	12
17	797	11	24	e350	8	7.6	646	8	14
18	800	10	22	e280	8	6.0	677	11	20
19	795	10	21	e230	8	5.0	700	11	21
20	754	10	20	e400	8	8.6	679	9	16
21	739	10	20	e470	7	8.9	660	10	18
22	732	8	16	e600	7	11	671	9	16
23	716	8	15	609	6	9.9	684	10	18
24	738	8	16	618	6	10	705	12	23
25	702	9	17	601	6	9.7	739	14	28
26	681	9	17	603	6	9.8	823	22	49
27	707	10	19	659	6	11	906	32	78
28	701	8	15	820	16	35	831	22	49
29	685	7	13	--	--	--	873	22	52
30	701	8	15	--	--	--	967	26	68
31	742	10	20	--	--	--	1,010	31	85
TOTAL	**24,948**	**--**	**1,084**	**16,721**	**--**	**288.9**	**24,528**	**--**	**1,643**
MEAN	**805**	**15**	**35**	**597**	**6**	**10**	**791**	**20**	**53**
MAX	**1,020**	**61**	**168**	**820**	**16**	**35**	**1,350**	**108**	**394**
MIN	**681**	**7**	**13**	**230**	**4**	**5.0**	**630**	**6**	**10**

Table 6. Daily mean streamflow and suspended-sediment data for Clark Fork at Turah Bridge, near Bonner, Montana, October 2005 through September 2006.—Continued

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

Day	Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment	
		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)
	APRIL			MAY			JUNE		
1	1,030	30	83	3,000	80	648	2,090	16	90
2	1,040	27	76	3,020	59	481	1,990	17	91
3	1,010	27	74	2,840	48	368	2,030	17	93
4	1,010	31	85	2,640	36	257	2,170	18	105
5	1,140	44	135	2,500	30	202	2,270	19	116
6	1,800	137	666	2,480	28	187	2,180	20	118
7	2,590	250	1,750	2,530	27	184	2,070	14	78
8	2,300	113	702	2,530	24	164	2,130	16	92
9	2,130	69	397	2,420	25	163	2,540	43	295
10	2,070	59	330	2,280	19	117	2,850	60	462
11	2,000	50	270	2,210	19	113	3,510	146	1,380
12	1,910	46	237	2,210	18	107	3,160	85	725
13	1,930	53	276	2,210	20	119	2,720	45	330
14	2,100	55	312	2,260	22	134	2,420	36	235
15	2,250	62	377	2,440	27	178	2,260	28	171
16	2,430	68	446	2,760	48	358	2,120	22	126
17	2,450	57	377	3,280	95	841	1,980	17	91
18	2,330	52	327	3,790	126	1,290	1,860	14	70
19	2,160	36	210	4,180	114	1,290	1,760	11	52
20	2,040	32	176	4,560	113	1,390	1,730	9	42
21	2,020	33	180	4,550	96	1,180	1,640	8	35
22	2,100	36	204	4,130	69	769	1,540	7	29
23	2,260	43	262	3,740	50	505	1,460	6	24
24	2,380	44	283	3,510	44	417	1,390	7	26
25	2,320	35	219	3,120	37	312	1,320	5	18
26	2,240	32	194	3,030	34	278	1,250	4	14
27	2,190	28	166	2,990	32	258	1,200	4	13
28	2,230	28	169	2,880	30	233	1,170	4	13
29	2,320	30	188	2,750	32	238	1,120	4	12
30	2,600	53	372	2,520	29	197	1,130	4	12
31	--	--	--	2,260	18	110	--	--	--
TOTAL	**60,380**	**--**	**9,543**	**91,620**	**--**	**13,088**	**59,060**	**--**	**4,958**
MEAN	**2,013**	**55**	**318**	**2,955**	**47**	**422**	**1,969**	**24**	**165**
MAX	**2,600**	**250**	**1,750**	**4,560**	**126**	**1,390**	**3,510**	**146**	**1,380**
MIN	**1,010**	**27**	**74**	**2,210**	**18**	**107**	**1,120**	**4**	**12**

Table 6. Daily mean streamflow and suspended-sediment data for Clark Fork at Turah Bridge, near Bonner, Montana, October 2005 through September 2006.—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	1,150	6	19	452	4	4.9	407	3	3.3
2	1,110	7	21	447	4	4.8	401	4	4.3
3	1,070	6	17	437	4	4.7	403	5	5.4
4	1,050	5	14	418	3	3.4	393	8	8.5
5	1,040	4	11	410	3	3.3	382	9	9.3
6	1,060	5	14	411	3	3.3	377	9	9.2
7	1,100	7	21	405	4	4.4	377	10	10
8	1,030	5	14	402	4	4.3	372	10	10
9	965	4	10	416	4	4.5	374	10	10
10	928	4	10	395	4	4.3	387	10	10
11	910	4	9.8	382	4	4.1	389	8	8.4
12	899	4	9.7	379	3	3.1	393	5	5.3
13	916	4	9.9	378	3	3.1	390	3	3.2
14	899	5	12	376	3	3.0	390	3	3.2
15	853	5	12	364	3	2.9	412	3	3.3
16	813	5	11	364	3	2.9	490	7	9.3
17	775	5	10	380	3	3.1	563	8	12
18	736	5	9.9	395	3	3.2	555	7	10
19	692	5	9.3	396	3	3.2	551	6	8.9
20	660	5	8.9	391	4	4.2	550	5	7.4
21	642	4	6.9	379	5	5.1	578	6	9.4
22	627	4	6.8	370	5	5.0	607	9	15
23	604	5	8.2	368	3	3.0	616	9	15
24	580	5	7.8	369	3	3.0	614	9	15
25	563	3	4.6	390	4	4.2	601	9	15
26	537	2	2.9	427	6	6.9	591	8	13
27	511	3	4.1	421	5	5.7	589	9	14
28	488	5	6.6	416	5	5.6	597	12	19
29	471	5	6.4	404	4	4.4	606	13	21
30	459	5	6.2	399	4	4.3	610	13	21
31	453	4	4.9	405	3	3.3	--	--	--
TOTAL	**24,591**	**--**	**318.9**	**12,346**	**--**	**125.2**	**14,565**	**--**	**308.4**
MEAN	**793**	**5**	**10**	**398**	**4**	**4.0**	**486**	**8**	**10**
MAX	**1,150**	**7**	**21**	**452**	**6**	**6.9**	**616**	**13**	**21**
MIN	**453**	**2**	**2.9**	**364**	**3**	**2.9**	**372**	**3**	**3.2**

Total for water year 2006 (unrounded sum of daily values): streamflow–400,332 ft³/s (annual runoff–794,100 acre-ft); suspended-sediment discharge–33,296.7 tons.

Table 7. Daily mean streamflow and suspended-sediment data for Blackfoot River near Bonner, Montana, October 2005 through September 2006.

[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	509	2	2.7	557	2	3.0	418	4	4.5
2	514	2	2.8	584	2	3.2	443	4	4.8
3	518	2	2.8	574	1	1.5	455	3	3.7
4	538	2	2.9	549	1	1.5	412	2	2.2
5	532	2	2.9	528	1	1.4	e420	2	2.3
6	524	2	2.8	532	1	1.4	e440	2	2.4
7	521	2	2.8	527	1	1.4	e180	1	.49
8	516	2	2.8	552	1	1.5	e280	1	.76
9	511	2	2.8	547	1	1.5	e300	1	.81
10	514	2	2.8	529	1	1.4	e380	1	1.0
11	517	2	2.8	539	1	1.5	e400	2	2.2
12	516	2	2.8	549	1	1.5	e400	2	2.2
13	511	2	2.8	552	1	1.5	e420	2	2.3
14	510	2	2.8	576	1	1.6	e470	2	2.5
15	504	2	2.7	544	1	1.5	e430	2	2.3
16	500	1	1.4	536	1	1.4	e420	1	1.1
17	500	1	1.4	535	1	1.4	e400	1	1.1
18	494	1	1.3	520	1	1.4	e370	1	1.0
19	490	2	2.6	514	1	1.4	e358	1	.97
20	493	2	2.7	502	1	1.4	e329	1	.89
21	499	1	1.3	487	1	1.3	e321	1	.87
22	497	1	1.3	484	1	1.3	e373	1	1.0
23	493	2	2.7	480	1	1.3	e351	1	.95
24	488	3	4.0	464	1	1.3	e380	2	2.1
25	482	2	2.6	446	1	1.2	e373	3	3.0
26	478	2	2.6	473	1	1.3	e365	3	3.0
27	492	2	2.7	482	1	1.3	e402	3	3.3
28	498	2	2.7	466	1	1.3	e395	3	3.2
29	490	2	2.6	443	2	2.4	e432	4	4.7
30	487	1	1.3	468	2	2.5	e432	2	2.3
31	492	1	1.3	--	--	--	e458	2	2.5
TOTAL	**15,628**	**--**	**76.5**	**15,539**	**--**	**47.6**	**12,007**	**--**	**66.44**
MEAN	**504**	**2**	**2.5**	**518**	**1**	**1.6**	**387**	**2**	**2.1**
MAX	**538**	**3**	**4.0**	**584**	**2**	**3.2**	**470**	**4**	**4.8**
MIN	**478**	**1**	**1.3**	**443**	**1**	**1.2**	**180**	**1**	**.49**

Table 7. Daily mean streamflow and suspended-sediment data for Blackfoot River near Bonner, Montana, October 2005 through September 2006.—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	e488	2	2.6	504	3	4.1	518	4	5.6
2	e512	2	2.8	503	3	4.1	576	2	3.1
3	e529	2	2.9	505	4	5.5	586	4	6.3
4	e537	2	2.9	499	4	5.4	586	7	11
5	e545	2	2.9	494	4	5.3	561	7	11
6	e545	1	1.5	481	4	5.2	541	6	8.8
7	e542	1	1.5	453	3	3.7	517	4	5.6
8	e538	1	1.5	465	3	3.8	513	4	5.5
9	e530	1	1.4	499	2	2.7	512	4	5.5
10	535	1	1.4	446	2	2.4	492	3	4.0
11	560	2	3.0	397	2	2.1	478	2	2.6
12	561	2	3.0	398	2	2.1	464	2	2.5
13	563	2	3.0	455	2	2.5	449	3	3.6
14	562	2	3.0	491	1	1.3	459	4	5.0
15	571	3	4.6	424	1	1.1	473	2	2.6
16	549	3	4.4	402	1	1.1	453	2	2.4
17	553	2	3.0	337	1	.91	461	3	3.7
18	555	2	3.0	279	1	.75	474	3	3.8
19	537	2	2.9	359	2	1.9	510	4	5.5
20	540	2	2.9	443	2	2.4	509	4	5.5
21	538	2	2.9	495	2	2.7	505	5	6.8
22	528	3	4.3	523	2	2.8	516	6	8.4
23	522	3	4.2	504	2	2.7	551	6	8.9
24	519	3	4.2	497	1	1.3	611	8	13
25	507	3	4.1	524	1	1.4	682	14	26
26	479	2	2.6	505	1	1.4	799	20	43
27	502	2	2.7	484	1	1.3	900	23	56
28	500	2	2.7	502	2	2.7	872	24	57
29	497	2	2.7	--	--	--	908	22	54
30	497	2	2.7	--	--	--	1,080	28	82
31	506	2	2.7	--	--	--	1,160	32	100
TOTAL	**16,447**	**--**	**90.0**	**12,868**	**--**	**74.66**	**18,716**	**--**	**558.7**
MEAN	**531**	**2**	**2.9**	**460**	**2**	**2.7**	**604**	**8**	**18**
MAX	**571**	**3**	**4.6**	**524**	**4**	**5.5**	**1,160**	**32**	**100**
MIN	**479**	**1**	**1.4**	**279**	**1**	**.75**	**449**	**2**	**2.4**

Table 7. Daily mean streamflow and suspended-sediment data for Blackfoot River near Bonner, Montana, October 2005 through September 2006.—Continued

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

Day	Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment	
		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)
		APRIL			MAY			JUNE	
1	1,230	28	93	4,780	38	490	3,920	18	191
2	1,340	29	105	4,660	26	327	3,820	17	175
3	1,370	28	104	4,380	22	260	4,150	23	258
4	1,430	22	85	4,040	17	185	4,480	26	314
5	1,730	36	168	3,830	17	176	4,490	24	291
6	2,830	85	649	3,790	16	164	4,320	22	257
7	3,550	86	824	3,910	14	148	4,150	18	202
8	3,480	60	564	3,940	14	149	4,150	19	213
9	3,390	32	293	3,800	14	144	4,310	20	233
10	3,330	24	216	3,590	13	126	4,440	22	264
11	3,280	20	177	3,460	10	93	4,730	27	345
12	3,210	16	139	3,460	10	93	4,390	22	261
13	3,360	19	172	3,570	13	125	4,150	20	224
14	3,650	23	227	3,740	13	131	4,040	20	218
15	3,960	28	299	4,100	18	199	3,860	17	177
16	4,240	35	401	4,880	46	606	3,720	14	141
17	4,280	36	416	5,990	115	1,860	3,530	12	114
18	4,040	28	305	7,100	141	2,700	3,370	12	109
19	3,700	21	210	7,860	145	3,080	3,130	9	76
20	3,440	19	176	8,180	132	2,920	2,920	9	71
21	3,340	25	225	8,170	117	2,580	2,720	8	59
22	3,560	26	250	7,780	98	2,060	2,540	7	48
23	3,790	24	246	7,280	68	1,340	2,390	7	45
24	3,820	22	227	6,950	57	1,070	2,250	7	43
25	3,720	19	191	6,490	46	806	2,140	7	40
26	3,610	16	156	6,310	44	750	2,030	5	27
27	3,600	15	146	6,120	39	644	1,940	6	31
28	3,670	16	159	5,590	31	468	1,840	7	35
29	3,910	18	190	5,090	26	357	1,750	6	28
30	4,500	38	462	4,680	24	303	1,700	6	28
31	--	--	--	4,220	19	216	--	--	--
TOTAL	**98,360**	**--**	**7,875**	**161,740**	**--**	**24,570**	**101,370**	**--**	**4,518**
MEAN	**3,279**	**30**	**262**	**5,217**	**45**	**793**	**3,379**	**15**	**151**
MAX	**4,500**	**86**	**824**	**8,180**	**145**	**3,080**	**4,730**	**27**	**345**
MIN	**1,230**	**15**	**85**	**3,460**	**10**	**93**	**1,700**	**5**	**27**

Table 7. Daily mean streamflow and suspended-sediment data for Blackfoot River near Bonner, Montana, October 2005 through September 2006.—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	1,630	6	26	651	3	5.3	511	2	2.8
2	1,540	6	25	633	3	5.1	511	2	2.8
3	1,460	6	24	623	3	5.0	510	2	2.8
4	1,410	5	19	606	3	4.9	506	3	4.1
5	1,340	5	18	596	3	4.8	500	3	4.0
6	1,350	5	18	586	3	4.7	488	3	4.0
7	1,400	6	23	577	3	4.7	481	3	3.9
8	1,310	5	18	571	3	4.6	475	3	3.8
9	1,250	5	17	562	3	4.6	469	3	3.8
10	1,180	5	16	557	3	4.5	465	3	3.8
11	1,140	5	15	551	2	3.0	458	2	2.5
12	1,090	5	15	537	2	2.9	462	2	2.5
13	1,080	5	15	535	2	2.9	468	2	2.5
14	1,050	4	11	533	2	2.9	466	2	2.5
15	987	5	13	523	2	2.8	476	2	2.6
16	946	5	13	541	2	2.9	526	2	2.8
17	912	5	12	574	2	3.1	539	2	2.9
18	881	5	12	589	2	3.2	536	2	2.9
19	855	5	12	585	2	3.2	518	2	2.8
20	837	4	9.0	566	2	3.1	522	2	2.8
21	811	4	8.8	547	2	3.0	525	2	2.8
22	783	4	8.5	529	2	2.9	525	2	2.8
23	767	5	10	517	2	2.8	521	2	2.8
24	754	5	10	513	2	2.8	520	2	2.8
25	732	4	7.9	525	2	2.8	511	2	2.8
26	714	2	3.9	558	2	3.0	503	2	2.7
27	704	3	5.7	547	2	3.0	498	2	2.7
28	688	5	9.3	530	2	2.9	488	3	4.0
29	674	4	7.3	514	2	2.8	482	3	3.9
30	666	4	7.2	504	2	2.7	475	3	3.8
31	661	4	7.1	514	2	2.8	--	--	--
TOTAL	**31,602**	**--**	**416.7**	**17,294**	**--**	**109.7**	**14,935**	**--**	**93.7**
MEAN	**1,019**	**5**	**13**	**558**	**2**	**3.5**	**498**	**2**	**3.1**
MAX	**1,630**	**6**	**26**	**651**	**3**	**5.3**	**539**	**3**	**4.1**
MIN	**661**	**2**	**3.9**	**504**	**2**	**2.7**	**458**	**2**	**2.5**

Total for water year 2006 (unrounded sum of daily values): streamflow–516,506 ft³/s (annual runoff–1,024,000 acre-ft); suspended-sediment discharge–38,497.00 tons.

Table 8. Daily mean streamflow and suspended-sediment data for Clark Fork above Missoula, Montana, October 2005 through September 2006.

[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	1,280	4	14	1,390	16	60	1,160	22	69
2	1,290	4	14	1,430	18	69	1,170	23	73
3	1,330	5	18	1,440	24	93	1,150	21	65
4	1,410	5	19	1,430	29	112	e1,100	20	59
5	1,530	6	25	1,390	28	105	e1,130	18	55
6	1,490	6	24	1,380	21	78	e1,100	17	50
7	1,480	7	28	1,370	18	67	e550	15	22
8	1,420	8	31	1,420	22	84	e500	14	19
9	1,390	9	34	1,410	16	61	e530	12	17
10	1,420	13	50	1,350	15	55	e800	11	24
11	1,390	19	71	1,370	14	52	e950	9	23
12	1,400	23	87	1,410	13	49	e1,000	7	19
13	1,380	26	97	1,420	13	50	e1,000	5	14
14	1,360	30	110	1,430	14	54	e1,100	5	15
15	1,350	34	124	1,420	17	65	e1,030	5	14
16	1,330	38	136	1,330	18	65	e1,030	5	14
17	1,310	41	145	1,360	17	62	e1,000	5	14
18	1,300	35	123	1,360	15	55	e900	5	12
19	1,290	38	132	1,330	13	47	e850	5	11
20	1,310	32	113	1,330	12	43	e900	8	19
21	1,300	25	88	1,300	10	35	e1,000	19	51
22	1,300	22	77	1,280	9	31	e1,100	34	101
23	1,310	20	71	1,270	10	34	e1,300	50	176
24	1,290	18	63	1,220	10	33	e1,500	39	158
25	1,280	16	55	1,160	10	31	e1,430	26	100
26	1,270	16	55	1,230	10	33	e1,450	42	164
27	1,290	19	66	1,310	10	35	e1,400	46	174
28	1,320	20	71	1,230	10	33	e1,350	57	208
29	1,310	19	67	1,170	10	32	e1,550	47	197
30	1,290	18	63	1,070	11	32	1,660	27	121
31	1,300	17	60	--	--	--	1,600	17	73
TOTAL	**41,720**	**--**	**2,131**	**40,010**	**--**	**1,655**	**34,290**	**--**	**2,131**
MEAN	**1,346**	**19**	**69**	**1,334**	**15**	**55**	**1,106**	**21**	**69**
MAX	**1,530**	**41**	**145**	**1,440**	**29**	**112**	**1,660**	**57**	**208**
MIN	**1,270**	**4**	**14**	**1,070**	**9**	**31**	**500**	**5**	**11**

Table 8. Daily mean streamflow and suspended-sediment data for Clark Fork above Missoula, Montana, October 2005 through September 2006.—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	1,520	13	53	1,220	6	20	1,730	29	135
2	1,450	64	251	1,200	6	19	1,660	36	161
3	1,440	28	109	1,200	7	23	1,530	19	78
4	1,440	17	66	1,180	5	16	1,480	12	48
5	1,350	11	40	1,180	4	13	1,440	11	43
6	1,230	14	46	1,150	5	16	1,310	8	28
7	1,300	10	35	1,060	4	11	1,260	8	27
8	1,330	10	36	1,050	4	11	1,260	7	24
9	1,290	11	38	1,160	5	16	1,270	6	21
10	1,240	10	33	1,130	4	12	1,240	4	13
11	1,410	11	42	961	4	10	1,060	5	14
12	1,580	19	81	869	4	9.4	1,070	4	12
13	1,430	9	35	972	3	7.9	1,080	5	15
14	1,370	8	30	1,130	3	9.2	1,080	5	15
15	1,490	9	36	1,020	3	8.3	1,110	6	18
16	1,420	29	111	1,010	3	8.2	1,110	6	18
17	1,330	7	25	700	4	7.6	1,100	6	18
18	1,340	6	22	678	5	9.2	1,110	7	21
19	1,340	5	18	737	6	12	1,180	8	25
20	1,300	4	14	925	8	20	1,210	7	23
21	1,280	4	14	1,030	9	25	1,200	8	26
22	1,250	5	17	1,130	8	24	1,220	10	33
23	1,210	4	13	1,160	6	19	1,260	14	48
24	1,230	5	17	1,140	5	15	1,310	13	46
25	1,200	4	13	1,140	4	12	1,400	20	76
26	1,130	3	9.2	1,070	3	8.7	1,590	25	107
27	1,170	3	9.5	1,120	4	12	1,820	30	147
28	1,170	3	9.5	1,220	8	26	1,710	20	92
29	1,200	8	26	--	--	--	1,750	18	85
30	1,140	4	12	--	--	--	2,000	25	135
31	1,220	5	16	--	--	--	2,170	26	152
TOTAL	**40,800**	**--**	**1,277.2**	**29,542**	**--**	**400.5**	**42,720**	**--**	**1,704**
MEAN	**1,316**	**11**	**41**	**1,055**	**5**	**14**	**1,378**	**13**	**55**
MAX	**1,580**	**64**	**251**	**1,220**	**9**	**26**	**2,170**	**36**	**161**
MIN	**1,130**	**3**	**9.2**	**678**	**3**	**7.6**	**1,060**	**4**	**12**

Table 8. Daily mean streamflow and suspended-sediment data for Clark Fork above Missoula, Montana, October 2005 through September 2006.—Continued

[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)
		APRIL			MAY			JUNE	
1	2,170	25	146	7,700	47	977	6,040	16	261
2	2,200	21	125	7,550	40	815	5,800	16	251
3	2,410	30	195	7,150	36	695	6,110	22	363
4	2,370	22	141	6,590	28	498	6,640	33	592
5	2,880	30	233	6,200	23	385	6,730	37	672
6	4,560	65	800	6,060	20	327	6,470	32	559
7	6,110	90	1,480	6,200	21	352	6,170	40	666
8	5,800	68	1,060	6,280	22	373	6,210	66	1,110
9	5,470	49	724	6,070	20	328	6,800	126	2,310
10	5,330	40	576	5,680	17	261	7,260	163	3,200
11	5,210	34	478	5,470	16	236	8,230	216	4,800
12	5,020	32	434	5,430	15	220	7,700	170	3,530
13	5,130	31	429	5,560	16	240	6,940	108	2,020
14	5,600	34	514	5,750	16	248	6,510	89	1,560
15	6,090	40	658	6,270	20	339	6,140	83	1,380
16	6,550	48	849	7,380	39	777	5,840	73	1,150
17	6,650	48	862	9,140	79	1,950	5,480	58	858
18	6,260	40	676	10,800	123	3,590	5,170	57	796
19	5,750	29	450	12,000	139	4,500	4,790	50	647
20	5,320	26	373	12,600	121	4,120	4,550	36	442
21	5,160	25	348	12,700	116	3,980	4,250	35	402
22	5,430	23	337	12,000	92	2,980	3,920	40	423
23	5,870	30	475	11,200	68	2,060	3,670	39	386
24	6,060	31	507	10,700	55	1,590	3,440	38	353
25	5,890	24	382	9,750	48	1,260	3,250	37	325
26	5,720	22	340	9,400	43	1,090	3,070	27	224
27	5,640	24	365	9,280	39	977	2,910	24	189
28	5,690	20	307	8,610	30	697	2,790	26	196
29	6,030	26	423	7,900	27	576	2,650	28	200
30	6,880	33	613	7,290	26	512	2,620	34	241
31	--	--	--	6,490	17	298	--	--	--
TOTAL	**155,250**	**--**	**15,300**	**251,200**	**--**	**37,251**	**158,150**	**--**	**30,106**
MEAN	**5,175**	**35**	**510**	**8,103**	**46**	**1,200**	**5,272**	**61**	**1,000**
MAX	**6,880**	**90**	**1,480**	**12,700**	**139**	**4,500**	**8,230**	**216**	**4,800**
MIN	**2,170**	**20**	**125**	**5,430**	**15**	**220**	**2,620**	**16**	**189**

Table 8. Daily mean streamflow and suspended-sediment data for Clark Fork above Missoula, Montana, October 2005 through September 2006.—Continued

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

Day	Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment		Mean streamflow (ft³/s)	Suspended sediment	
		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)		Mean concentration (mg/L)	Discharge (ton/d)
	JULY			AUGUST			SEPTEMBER		
1	2,590	38	266	1,110	10	30	891	8	19
2	2,470	36	240	1,080	10	29	885	8	19
3	2,350	40	254	1,060	10	29	885	8	19
4	2,290	50	309	1,020	10	28	880	7	17
5	2,200	51	303	992	10	27	866	7	16
6	2,230	44	265	978	11	29	849	7	16
7	2,410	41	267	966	12	31	844	7	16
8	2,290	37	229	959	12	31	833	7	16
9	2,150	31	180	954	13	33	815	7	15
10	2,060	26	145	932	13	33	822	6	13
11	2,010	24	130	910	12	29	818	6	13
12	1,970	22	117	891	10	24	821	6	13
13	1,980	21	112	885	8	19	840	6	14
14	1,970	22	117	894	7	17	830	6	13
15	1,870	26	131	864	7	16	850	6	14
16	1,780	22	106	872	8	19	970	8	21
17	1,720	18	84	936	11	28	1,060	8	23
18	1,650	15	67	963	11	29	1,070	9	26
19	1,590	14	60	963	10	26	1,040	9	25
20	1,540	14	58	938	10	25	1,050	10	28
21	1,490	14	56	918	10	25	1,080	10	29
22	1,450	12	47	887	10	24	1,120	11	33
23	1,400	12	45	871	10	24	1,120	13	39
24	1,360	15	55	863	10	23	1,120	16	48
25	1,330	13	47	877	10	24	1,110	24	72
26	1,280	10	35	954	12	31	1,090	30	88
27	1,250	11	37	945	10	26	1,080	23	67
28	1,200	12	39	923	7	17	1,080	31	90
29	1,160	11	34	894	7	17	1,080	41	120
30	1,140	10	31	877	6	14	1,080	45	131
31	1,120	10	30	885	7	17	--	--	--
TOTAL	**55,300**	**--**	**3,896**	**29,061**	**--**	**774**	**28,879**	**--**	**1,073**
MEAN	**1,784**	**23**	**126**	**937**	**10**	**25**	**963**	**13**	**36**
MAX	**2,590**	**51**	**309**	**1,110**	**13**	**33**	**1,120**	**45**	**131**
MIN	**1,120**	**10**	**30**	**863**	**6**	**14**	**815**	**6**	**13**

Total for water year 2006 (unrounded sum of daily values): streamflow–906,922 ft³/s (annual runoff–1,799,000 acre-ft); suspended-sediment discharge–97,698.7 tons.

Table 9. Seasonal daily maximum, minimum, and mean turbidity at Mill Creek near Anaconda, Montana, June through September 2006.

[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
	JUNE			JULY			AUGUST		
1	--	--	--	4.0	2.0	2.5	2.0	0.5	1.0
2	--	--	--	5.0	1.5	2.0	2.5	.5	1.0
3	--	--	--	4.5	1.5	2.5	1.5	1.0	1.0
4	--	--	--	3.5	1.5	2.0	1.5	.5	1.0
5	--	--	--	3.0	1.0	1.5	3.0	.5	1.0
6	--	--	--	2.5	1.0	1.5	1.5	.5	1.0
7	--	--	--	3.5	1.0	1.5	1.5	.5	1.0
8	--	--	--	2.5	1.0	1.5	3.5	.5	1.0
9	--	--	--	6.5	1.5	2.5	2.5	.5	1.0
10	--	--	--	10	1.5	4.5	2.5	.5	1.0
11	--	--	--	--	--	--	3.5	.5	1.0
12	--	--	--	--	--	--	3.0	1.0	1.0
13	2.5	1.0	1.5	--	--	--	2.5	1.0	1.0
14	2.5	1.0	1.0	--	--	--	2.0	.5	1.0
15	1.5	1.0	1.0	--	--	--	2.5	.5	1.0
16	2.0	1.0	1.0	5.5	1.0	2.0	2.5	.5	1.0
17	2.0	1.0	1.0	3.5	1.0	1.5	4.5	1.0	1.5
18	1.5	1.0	1.0	2.5	1.0	1.5	3.5	.5	1.0
19	3.5	1.0	1.5	3.5	1.0	1.5	2.0	.5	1.0
20	2.0	1.0	1.5	2.5	1.0	1.5	1.5	.5	1.0
21	6.5	1.5	2.5	2.5	1.0	1.5	2.0	.5	1.0
22	6.5	1.5	2.5	4.0	1.0	1.5	1.5	.5	1.0
23	--	--	--	3.0	1.0	1.5	1.5	.5	1.0
24	3.0	1.0	1.5	3.0	1.0	1.5	2.5	.5	1.0
25	5.5	1.0	2.0	3.0	1.0	1.5	3.5	1.0	1.0
26	2.5	1.0	1.5	2.0	1.0	1.0	2.5	.5	1.0
27	3.5	1.5	2.0	3.0	.5	1.0	1.5	.5	1.0
28	4.5	1.0	1.5	2.5	.5	1.0	1.5	.5	1.0
29	7.5	1.0	2.0	2.0	.5	1.0	1.5	.5	1.0
30	5.5	2.0	3.5	1.5	.5	1.0	1.5	1.0	1.0
31	--	--	--	1.5	.5	1.0	1.5	.5	1.0
MONTH[1]	**7.5**	**1.0**	**1.7**	**10**	**.5**	**1.7**	**4.5**	**.5**	**1.0**

Table 9. Seasonal daily maximum, minimum, and mean turbidity at Mill Creek near Anaconda, Montana, June through September 2006.—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
	SEPTEMBER		
1	3.0	0.5	1.0
2	3.5	.5	1.0
3	1.5	.5	1.0
4	2.0	.5	1.0
5	2.5	.5	1.0
6	2.5	1.0	1.0
7	5.5	.5	1.5
8	3.5	.5	1.0
9	5.0	1.0	2.0
10	5.5	1.0	2.5
11	3.0	1.0	1.5
12	2.5	1.0	1.5
13	5.0	1.0	1.5
14	3.0	1.0	2.0
15	5.0	1.5	2.5
16	5.0	1.5	2.5
17	4.0	1.0	1.5
18	5.5	1.0	1.5
19	3.5	1.0	2.0
20	5.5	1.5	3.0
21	4.0	1.5	2.5
22	5.5	1.5	3.0
23	8.0	2.0	3.5
24	8.0	1.0	4.0
25	5.0	1.0	3.5
26	5.5	1.0	1.5
27	2.5	1.0	1.5
28	4.0	.5	1.5
29	1.5	.5	1.0
30	2.0	.5	1.0
31	--	--	--
MONTH[1]	**8.0**	**.5**	**1.9**

[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, June through September 2006.

[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
	JUNE			JULY			AUGUST		
1	--	--	--	10	5.0	6.5	4.0	1.5	2.0
2	--	--	--	8.0	3.5	5.0	5.5	1.5	2.0
3	--	--	--	6.5	3.0	4.0	4.5	1.5	2.0
4	--	--	--	9.5	4.0	4.0	5.0	1.0	2.5
5	--	--	--	9.5	3.0	4.5	6.0	1.5	2.5
6	--	--	--	8.5	2.5	3.5	6.5	1.5	3.0
7	--	--	--	5.5	2.0	3.0	5.5	1.5	2.5
8	--	--	--	7.5	2.0	3.0	5.5	1.5	2.5
9	--	--	--	4.5	2.0	2.5	6.5	2.0	3.5
10	--	--	--	4.0	2.0	2.5	6.0	1.5	3.0
11	--	--	--	--	--	--	7.0	1.5	3.0
12	--	--	--	7.0	2.0	2.5	6.5	1.5	2.5
13	--	--	--	4.5	1.5	2.5	6.0	2.0	3.0
14	--	--	--	4.5	1.5	2.0	6.5	2.0	3.0
15	--	--	--	2.5	1.5	2.0	7.0	2.0	3.0
16	5.0	2.0	2.5	4.0	1.5	2.0	7.0	2.0	3.5
17	5.5	1.5	2.5	5.0	1.5	2.0	5.5	1.5	3.0
18	--	--	--	3.0	1.5	2.0	6.0	1.5	2.5
19	3.0	2.0	2.0	3.5	1.5	2.0	3.5	1.5	2.0
20	4.0	1.5	2.0	3.5	1.0	2.0	4.5	1.0	2.0
21	3.5	1.5	2.0	4.0	1.5	2.0	3.0	1.5	1.5
22	5.0	1.5	2.5	5.0	1.0	2.0	4.0	1.5	2.0
23	5.5	1.5	2.5	6.0	1.0	2.0	3.0	1.0	1.5
24	5.0	1.5	2.5	4.0	1.0	2.0	3.0	1.5	2.0
25	5.0	1.5	2.0	6.5	1.0	2.0	4.0	1.5	2.5
26	4.0	1.0	2.0	3.0	1.0	1.5	4.0	1.5	2.0
27	2.5	1.5	2.0	4.0	1.0	2.0	3.0	1.5	1.5
28	5.0	1.0	2.0	6.5	1.5	2.0	4.5	1.0	2.0
29	3.5	1.0	1.5	4.0	1.0	2.0	2.0	1.5	1.5
30	--	--	--	5.0	1.0	2.0	3.0	1.0	1.5
31	--	--	--	3.5	1.5	2.0	3.5	1.0	2.0
MONTH[1]	**5.5**	**1.0**	**2.2**	**10**	**1.0**	**2.6**	**7.0**	**1.0**	**2.4**

Table 10. Seasonal daily maximum, minimum, and mean turbidity at Willow Creek near Anaconda, Montana, June through September 2006.—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
	SEPTEMBER		
1	6.0	1.5	2.0
2	6.0	1.0	2.0
3	4.5	1.0	1.5
4	4.0	1.0	2.0
5	3.5	1.0	2.0
6	--	--	--
7	2.0	1.0	1.5
8	3.5	1.0	1.5
9	3.5	1.0	2.0
10	4.5	1.0	1.5
11	2.5	1.0	2.0
12	--	--	--
13	--	--	--
14	9.0	1.5	3.0
15	9.0	1.5	3.5
16	5.5	1.5	3.0
17	4.0	1.5	2.5
18	2.5	1.0	1.5
19	3.5	1.5	2.0
20	4.5	1.5	2.0
21	7.0	2.5	3.5
22	--	--	--
23	--	--	--
24	--	--	--
25	--	--	--
26	2.0	1.5	1.5
27	4.5	1.5	2.0
28	3.5	1.5	2.0
29	4.0	1.5	1.5
30	4.0	1.5	2.0
31	--	--	--
MONTH[1]	**9.0**	**1.0**	**2.1**

[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, May through September 2006.

[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	--	--	--	14	2.0	3.0	3.0	2.0	2.5
2	--	--	--	3.0	2.0	2.5	3.0	2.0	2.5
3	--	--	--	5.0	3.0	4.0	34	2.0	3.5
4	--	--	--	6.0	2.0	3.5	4.0	2.0	2.5
5	3.0	2.0	2.5	4.0	2.0	2.5	4.0	2.0	2.5
6	3.0	2.0	2.5	3.0	2.0	2.5	6.0	2.0	3.0
7	5.0	2.0	3.0	5.0	2.0	2.5	3.0	2.0	2.5
8	3.0	2.0	2.5	24	5.0	8.5	3.0	2.0	2.5
9	5.0	2.0	2.5	25	3.0	4.5	4.0	2.0	2.5
10	3.0	2.0	2.0	27	3.0	5.0	16	2.0	3.0
11	3.0	2.0	2.0	4.0	2.0	3.0	5.0	2.0	2.5
12	3.0	2.0	2.5	3.0	2.0	2.5	3.0	2.0	2.5
13	4.0	2.0	3.0	3.0	2.0	2.5	3.0	2.0	2.5
14	6.0	3.0	4.0	3.0	2.0	2.5	3.0	2.0	2.5
15	14	5.0	9.5	3.0	2.0	2.5	6.0	2.0	2.5
16	18	7.0	12	2.0	1.0	2.0	6.0	2.0	2.5
17	26	8.0	15	2.0	1.0	2.0	3.0	1.0	2.5
18	26	8.0	16	3.0	2.0	2.0	3.0	2.0	2.0
19	19	8.0	12	3.0	2.0	2.0	3.0	1.0	2.5
20	22	10	14	2.0	1.0	2.0	3.0	2.0	2.0
21	25	6.0	11	3.0	2.0	2.0	3.0	2.0	2.0
22	7.0	4.0	5.0	3.0	2.0	2.5	3.0	2.0	2.0
23	6.0	3.0	4.5	14	2.0	8.0	3.0	2.0	2.0
24	6.0	3.0	4.5	13	1.0	10	3.0	2.0	2.0
25	4.0	3.0	3.5	3.0	1.0	2.0	4.0	2.0	2.0
26	5.0	3.0	3.5	3.0	1.0	2.0	5.0	2.0	3.0
27	5.0	3.0	3.5	2.0	1.0	2.0	6.0	2.0	2.5
28	22	3.0	4.0	3.0	2.0	2.0	3.0	2.0	2.5
29	6.0	3.0	3.0	21	2.0	3.5	3.0	2.0	2.5
30	4.0	2.0	2.5	18	2.0	4.0	3.0	2.0	2.5
31	14	2.0	3.0	--	--	--	3.0	2.0	2.5
MONTH[1]	**26**	**2.0**	**5.7**	**27**	**1.0**	**3.3**	**34**	**1.0**	**2.5**

Table 11. Seasonal daily maximum, minimum, and mean turbidity at Warm Springs Creek near Anaconda, Montana, May through September 2006.—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	3.0	2.0	2.0	4.0	2.0	2.0
2	3.0	2.0	2.0	4.0	2.0	2.0
3	3.0	2.0	2.0	3.0	2.0	2.0
4	4.0	1.0	2.0	3.0	1.0	2.0
5	3.0	1.0	2.0	2.0	1.0	2.0
6	7.5	2.0	2.0	2.0	2.0	2.0
7	7.0	2.0	3.0	3.0	1.0	2.0
8	3.0	2.0	2.0	3.0	2.0	2.0
9	3.0	2.0	2.0	4.0	1.0	2.0
10	3.0	1.0	2.0	2.0	2.0	2.0
11	4.0	2.0	2.0	3.0	1.0	2.0
12	3.0	2.0	2.0	3.0	1.0	2.0
13	4.0	2.0	2.0	2.0	2.0	2.0
14	3.0	2.0	2.0	3.0	2.0	2.0
15	4.0	2.0	2.0	15	2.0	3.5
16	46	2.0	4.0	5.0	2.0	3.0
17	23	2.0	4.5	3.0	2.0	2.5
18	3.0	2.0	2.5	3.0	2.0	2.0
19	3.0	2.0	2.0	2.0	2.0	2.0
20	3.0	2.0	2.0	3.0	2.0	2.0
21	3.0	2.0	2.5	9.5	2.0	2.0
22	3.0	2.0	2.0	2.0	2.0	2.0
23	3.0	2.0	2.0	2.0	2.0	2.0
24	3.0	2.0	2.0	3.0	2.0	2.0
25	6.0	2.0	3.0	5.0	1.0	2.0
26	5.0	2.0	2.5	3.0	1.0	2.0
27	3.0	2.0	2.0	2.0	1.0	2.0
28	3.0	2.0	2.0	2.0	2.0	2.0
29	3.0	2.0	2.0	3.0	2.0	2.0
30	3.0	2.0	2.0	3.0	2.0	2.0
31	4.0	2.0	2.0	--	--	--
MONTH[1]	**46**	**1.0**	**2.3**	**15**	**1.0**	**2.1**

[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, May through September 2006.

[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	--	--	--	7.5	2.0	2.5	4.0	2.0	2.5
2	--	--	--	12	2.0	3.5	3.0	1.5	2.0
3	--	--	--	6.0	2.0	3.0	4.5	1.5	2.0
4	--	--	--	7.5	2.0	3.0	3.5	1.0	2.0
5	--	--	--	10	2.0	3.5	2.5	1.0	1.5
6	--	--	--	11	2.0	3.5	3.5	1.0	1.5
7	--	--	--	12	2.0	3.0	2.0	1.0	1.0
8	--	--	--	24	5.0	11	3.0	1.0	1.0
9	--	--	--	7.5	3.5	4.5	1.5	1.0	1.0
10	--	--	--	57	4.0	21	7.0	1.0	2.0
11	--	--	--	13	5.0	8.0	--	--	--
12	--	--	--	13	4.0	5.0	3.0	1.0	1.5
13	--	--	--	7.0	3.5	4.5	2.5	1.0	1.0
14	--	--	--	7.0	2.5	3.5	2.5	1.0	1.0
15	--	--	--	5.5	2.0	2.5	2.0	1.0	1.0
16	--	--	--	4.5	1.5	2.5	1.5	.5	1.0
17	--	--	--	6.5	2.0	3.0	1.0	.5	1.0
18	--	--	--	5.0	2.0	2.5	1.0	.5	1.0
19	--	--	--	6.5	1.5	2.5	2.0	.5	1.0
20	--	--	--	5.5	1.5	2.5	1.5	.5	1.0
21	--	--	--	3.0	1.5	2.0	1.5	.5	1.0
22	--	--	--	3.0	1.5	2.0	4.0	.5	1.0
23	--	--	--	3.5	1.5	2.0	23	1.5	6.5
24	12	3.0	5.0	3.0	1.5	2.0	6.0	3.0	4.0
25	8.5	2.5	4.5	5.0	1.5	2.0	4.0	2.0	3.0
26	9.0	3.0	5.0	8.0	1.5	2.5	5.5	2.5	3.0
27	6.5	2.5	4.0	11	1.5	3.0	3.0	2.0	2.5
28	13	2.5	5.0	4.5	1.5	2.0	4.0	2.0	2.5
29	7.5	2.5	3.5	30	1.0	2.0	3.5	2.0	2.5
30	9.5	2.0	3.5	61	3.5	11	6.0	2.0	2.5
31	8.5	2.0	3.0	--	--	--	3.5	1.5	2.5
MONTH[1]	**13**	**2.0**	**4.2**	**61**	**1.0**	**4.2**	**23**	**.5**	**1.9**

Table 12. Seasonal daily maximum, minimum, and mean turbidity at Lost Creek near Anaconda, Montana, May through September 2006.—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	3.0	2.0	2.5	--	--	--
2	3.5	1.5	2.5	--	--	--
3	5.0	2.0	2.5	--	--	--
4	5.5	1.5	2.5	--	--	--
5	2.0	1.0	1.5	--	--	--
6	2.0	1.0	1.0	--	--	--
7	2.0	.5	1.0	--	--	--
8	1.0	.5	.5	1.5	1.0	1.0
9	1.5	.5	1.0	--	--	--
10	1.0	.5	.5	--	--	--
11	1.5	.5	.5	--	--	--
12	1.5	.5	.5	--	--	--
13	--	--	--	--	--	--
14	2.0	.5	1.0	1.0	1.0	1.0
15	--	--	--	1.5	1.0	1.0
16	--	--	--	3.0	1.0	1.5
17	--	--	--	1.0	1.0	1.0
18	--	--	--	1.0	1.0	1.0
19	--	--	--	1.0	1.0	1.0
20	--	--	--	1.0	1.0	1.0
21	--	--	--	1.5	1.0	1.0
22	--	--	--	1.0	1.0	1.0
23	--	--	--	1.5	1.0	1.0
24	--	--	--	--	--	--
25	--	--	--	--	--	--
26	1.0	.5	1.0	1.0	1.0	1.0
27	1.0	.5	1.0	1.0	1.0	1.0
28	--	--	--	1.0	.5	.5
29	--	--	--	--	--	--
30	--	--	--	--	--	--
31	--	--	--	--	--	--
MONTH[1]	**5.5**	**.5**	**1.3**	**3.0**	**.5**	**1.0**

[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 Creek at Opportunity	03/20/2006	1540	190	54.5	11.8	--	--	11.4	14.9
		03/20/2006	1545	180	54.3	11.9	--	--	11.0	14.6
12323670	Mill Creek near Anaconda	06/09/2006	0845	27	7.97	1.67	--	--	8.6	9.9
		06/09/2006	0850	27	8.10	1.70	--	--	8.8	9.8
12323700	Mill Creek at Opportunity	07/24/2006	1505	72	20.4	5.11	--	--	34.9	35.4
		07/24/2006	1510	72	20.3	5.10	--	--	35.2	35.3
12323750	Silver Bow Creek at Warm Springs	04/18/2006	1020	210	60.0	13.7	--	--	13.8	17.7
		04/18/2006	1025	210	60.3	13.8	--	--	14.3	18.2
12323760	Warm Springs Creek near Anaconda	08/23/2006	1435	110	34.3	7.02	--	--	2.2	2.3
		08/23/2006	1440	120	35.3	7.24	--	--	2.2	2.0
12324200	Clark Fork at Deer Lodge	05/09/2006	1255	200	58.6	11.9	--	--	16.3	20.1
		05/09/2006	1300	200	58.5	11.9	--	--	16.4	19.3
12334550	Clark Fork at Turah Bridge, near Bonner	05/24/2006	0750	66	18.8	4.62	0.38	0.072	4.9	6.8
		05/24/2006	0800	65	18.5	4.55	--	--	4.8	6.6
12340000	Blackfoot River near Bonner	05/02/2006	1330	83	22.0	6.88	.24	.055	.66	1.1
		05/02/2006	1335	81	21.6	6.65	.24	.042	.72	1.0
12340500	Clark Fork above Missoula	10/19/2005	0945	170	44.2	13.4	--	--	4.2	6.3
		10/19/2005	0950	170	44.8	13.7	--	--	4.3	6.3
		05/16/2006	1500	83	22.7	6.39	.37	.061	2.1	3.0
		05/16/2006	1510	84	23.0	6.47	.34	.060	2.1	3.1
12354500	Clark Fork at St. Regis	06/01/2006	1500	62	17.1	4.64	.26	.029	1.4	1.8
		06/01/2006	1505	61	16.7	4.58	.26	.025	1.4	1.8
		09/27/2006	1400	120	33.0	9.54	.20	.011	2.3	2.9
		09/27/2006	1405	120	32.1	9.28	.18	.011	2.3	2.6
12388700	Flathead River at Perma	06/20/2006	1100	83	23.6	5.87	.12	.009	.35	.48
		06/20/2006	1105	83	23.5	5.99	.13	.008	.36	.47

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 Creek at Opportunity	03/20/2006	1540	0.53	0.87	25.2	78.4	21	628	0.37
		03/20/2006	1545	.55	.86	25.6	76.8	21	623	.40
12323670	Mill Creek near Anaconda	06/09/2006	0845	E.03	.08	2.2	4.1	28	184	.08
		06/09/2006	0850	E.03	.07	2.4	7.0	29	188	.08
12323700	Mill Creek at Opportunity	07/24/2006	1505	.05	.06	2.4	3.3	72	128	.18
		07/24/2006	1510	.05	.08	2.4	3.2	73	128	.19
12323750	Silver Bow Creek at Warm Springs	04/18/2006	1020	E.03	.09	5.0	9.5	24	286	.10
		04/18/2006	1025	.04	.11	5.0	8.9	24	287	.11
12323760	Warm Springs Creek near Anaconda	08/23/2006	1435	<.04	E.02	.68	1.9	E6	75	<.08
		08/23/2006	1440	<.04	E.03	.76	2.0	E6	74	<.08
12324200	Clark Fork at Deer Lodge	05/09/2006	1255	.04	.19	9.0	30.5	7	461	E.05
		05/09/2006	1300	.05	.17	8.9	29.9	10	447	<.08
12334550	Clark Fork at Turah Bridge, near Bonner	05/24/2006	0750	<.04	.12	4.2	20.0	34	644	.08
		05/24/2006	0800	<.04	.12	4.1	20.3	33	650	.08
12340000	Blackfoot River near Bonner	05/02/2006	1330	<.04	<.04	.95	1.7	16	375	<.08
		05/02/2006	1335	<.04	<.04	.76	1.6	14	360	<.08
12340500	Clark Fork above Missoula	10/19/2005	0945	<.04	.24	2.2	24.6	8	585	E.06
		10/19/2005	0950	<.04	.19	2.1	25.1	9	597	E.07
		05/16/2006	1500	--	.06	2.4	8.3	16	555	E.06
		05/16/2006	1510	--	.07	2.0	8.8	17	575	<.08
12354500	Clark Fork at St. Regis	06/01/2006	1500	<.04	E.04	1.6	4.2	19	385	E.05
		06/01/2006	1505	<.04	E.03	1.5	4.3	18	399	<.08
		09/27/2006	1400	<.04	E.03	1.5	3.5	8	68	.08
		09/27/2006	1405	<.04	E.04	1.7	2.5	9	67	.09
12388700	Flathead River at Perma	06/20/2006	1100	<.04	<.04	.54	E.6	<6	152	<.08
		06/20/2006	1105	<.04	<.04	E.37	E.6	<6	149	<.08

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 Creek at Opportunity	03/20/2006	1540	14.6	304	340	138	221	84	15
		03/20/2006	1545	14.3	296	329	139	219	84	16
12323670	Mill Creek near Anaconda	06/09/2006	0845	.79	3.4	11.1	1.6	3	47	8
		06/09/2006	0850	.75	3.4	11.1	1.6	3	48	7
12323700	Mill Creek at Opportunity	07/24/2006	1505	.38	9.5	11.8	1.8	2	88	1
		07/24/2006	1510	.35	9.7	11.6	1.4	E2	89	1
12323750	Silver Bow Creek at Warm Springs	04/18/2006	1020	1.50	374	378	8.3	14	83	5
		04/18/2006	1025	1.44	361	367	7.7	14	82	5
12323760	Warm Springs Creek near Anaconda	08/23/2006	1435	.24	.8	3.7	E.30	E1	68	4
		08/23/2006	1440	.24	.7	3.7	E.48	E2	69	5
12324200	Clark Fork at Deer Lodge	05/09/2006	1255	3.61	54.6	142	4.5	27	79	17
		05/09/2006	1300	3.31	54.1	141	4.4	27	76	16
12334550	Clark Fork at Turah Bridge, near Bonner	05/24/2006	0750	2.99	7.9	68.7	3.4	24	63	41
		05/24/2006	0800	3.08	8.1	68.7	3.7	24	63	41
12340000	Blackfoot River near Bonner	05/02/2006	1330	.46	2.8	28.8	1.1	3	83	25
		05/02/2006	1335	.45	2.8	28.6	.7	2	83	25
12340500	Clark Fork above Missoula	10/19/2005	0945	3.90	23.8	66.5	1.4	43	74	41
		10/19/2005	0950	3.94	24.5	60.7	1.5	42	79	37
		05/16/2006	1500	1.73	10.3	46.8	4.0	14	76	40
		05/16/2006	1510	1.60	10.2	47.3	3.0	15	77	40
12354500	Clark Fork at St. Regis	06/01/2006	1500	.83	6.0	28.1	1.8	6	81	27
		06/01/2006	1505	.83	6.1	28.6	1.4	6	79	27
		09/27/2006	1400	.36	2.9	15.3	1.2	4	82	5
		09/27/2006	1405	.32	2.9	15.9	1.2	4	82	5
12388700	Flathead River at Perma	06/20/2006	1100	.19	.8	8.1	1.3	<2	78	12
		06/20/2006	1105	.19	.7	8.3	.62	<2	78	13

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], in listed units	Relative standard deviation, in percent	Within limits[2] of data-quality objective
Calcium, filtered, mg/L	13	0.33	1.0	Yes
Magnesium, filtered, mg/L	13	.11	1.4	Yes
Total nitrogen, unfiltered, mg/L	5	.01	5.1	Yes
Total phosphorous, unfiltered, mg/L	5	.00	14	Yes
Arsenic, filtered, µg/L	13	.15	1.9	Yes
Arsenic, unfiltered recoverable, µg/L	13	.22	2.3	Yes
Cadmium, filtered, µg/L	12	.00	7.1	Yes
Cadmium, unfiltered recoverable, µg/L	13	.01	9.2	Yes
Copper, filtered, µg/L	13	.14	3.2	Yes
Copper, unfiltered recoverable, µg/L	13	.72	4.9	Yes
Iron, filtered, µg/L	13	.88	4.3	Yes
Iron, unfiltered recoverable, µg/L	13	6.9	2.0	Yes
Lead, filtered, µg/L	13	.01	8.9	Yes
Lead, unfiltered recoverable, µg/L	13	.09	3.8	Yes
Manganese, filtered, µg/L	13	3.0	4.9	Yes
Manganese, unfiltered recoverable, µg/L	13	3.3	3.7	Yes
Zinc, filtered, µg/L	13	.36	2.8	Yes
Zinc, unfiltered recoverable, µg/L	13	.55	2.0	Yes
Sediment, suspended, percent finer than 0.062 mm	13	1.3	1.7	Yes
Sediment, suspended, mg/L	13	.90	4.9	Yes

[1]Standard deviation is calculated using one-half the 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 field replicate analyses (table 3).

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], in listed units	Relative standard deviation, in percent	Within limits[2] of data-quality objective
Calcium, filtered, mg/L	8	0.33	0.88	Yes
Magnesium, filtered, mg/L	8	.07	.81	Yes
Arsenic, filtered, µg/L	8	.09	.72	Yes
Arsenic, unfiltered recoverable, µg/L	8	.20	1.5	Yes
Cadmium, filtered, µg/L	8	.00	5.1	Yes
Cadmium, unfiltered recoverable, µg/L	8	.01	3.9	Yes
Copper, filtered, µg/L	8	.10	1.6	Yes
Copper, unfiltered recoverable, µg/L	8	.41	1.9	Yes
Iron, filtered, µg/L	8	1.1	4.4	Yes
Iron, unfiltered recoverable, µg/L	8	2.2	.58	Yes
Lead, filtered, µg/L	8	.01	5.3	Yes
Lead, unfiltered recoverable, µg/L	8	.05	1.5	Yes
Manganese, filtered, µg/L	8	6.2	6.4	Yes
Manganese, unfiltered recoverable, µg/L	8	3.1	2.5	Yes
Zinc, filtered, µg/L	8	.47	2.4	Yes
Zinc, unfiltered recoverable, µg/L	8	.40	.97	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, in percent	Mean spike recovery, in percent	Within limits[1] of data-quality objective
Arsenic, filtered, µg/L	4	89.2–101	95.2	Yes
Arsenic, unfiltered recoverable, µg/L	3	94.7–102	98.5	Yes
Cadmium, filtered, µg/L	5	92.6–107	100	Yes
Cadmium, unfiltered recoverable, µg/L	5	94.1–104	98.9	Yes
Copper, filtered, µg/L	5	97.7–107	102	Yes
Copper, unfiltered recoverable, µg/L	5	93.8–104	98.7	Yes
Iron, filtered, µg/L	5	95.4–111	103	Yes
Iron, unfiltered recoverable, µg/L	5	101–112	106	Yes
Lead, filtered, µg/L	5	89.3–109	99	Yes
Lead, unfiltered recoverable, µg/L	5	91.2–105	98	Yes
Manganese, filtered, µg/L	5	95.3–115	105	Yes
Manganese, unfiltered recoverable, µg/L	5	90.7–103	97	Yes
Zinc, filtered, µg/L	5	95.4–115	105	Yes
Zinc, unfiltered recoverable, µg/L	5	90.1–100	94.9	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, in percent	Mean spike recovery, in percent	Within limits[1] of data-quality objective
Arsenic, filtered, µg/L	5	89.0–104	96.5	Yes
Arsenic, unfiltered recoverable, µg/L	5	94.9–103	99.1	Yes
Cadmium, filtered, µg/L	5	99.0–108	104	Yes
Cadmium, unfiltered recoverable, µg/L	5	94.7–104	99.6	Yes
Copper, filtered, µg/L	5	96.7–104	101	Yes
Copper, unfiltered recoverable, µg/L	5	91.0–98.6	94.8	Yes
Iron, filtered, µg/L	5	93.6–110	102	Yes
Iron, unfiltered recoverable, µg/L	5	102–109	105	Yes
Lead, filtered, µg/L	5	94.2–111	102	Yes
Lead, unfiltered recoverable, µg/L	5	92.9–106	100	Yes
Manganese, filtered, µg/L	5	97.9–113	106	Yes
Manganese, unfiltered recoverable, µg/L	5	88.2–102	94.9	Yes
Zinc, filtered, µg/L	5	93.3–123	108	Yes
Zinc, unfiltered recoverable, µg/L	5	87.8–94.6	91.2	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: µg/L, micrograms per liter; µS/cm, microsiemens per centimeter at 25°C; 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)
10/17/2005	1145	5.6	2	<0.02	<0.008	--	--	<0.12	<0.12	<0.04	<0.04
03/16/2006	1000	5.6	2	<.02	<.008	--	--	<.12	<.12	<.04	<.04
04/05/2006	1110	6.8	3	<.02	<.008	<0.06	<0.004	<.12	<.12	<.04	<.04
04/19/2006	1200	5.7	3	<.02	<.008	--	--	<.12	<.12	<.04	<.04
05/08/2006	1400	5.8	2	<.02	<.008	--	--	<.12	<.12	<.04	<.04
05/22/2006	2000	5.7	2	<.02	<.008	--	--	<.12	<.12	<.04	<.04
05/24/2006	1600	5.7	2	.02	<.008	<.06	<.004	<.12	<.12	<.04	<.04
06/06/2006	1130	5.6	2	<.02	<.008	<.06	<.004	<.12	<.12	<.04	<.04
06/13/2006	1630	5.8	1	<.02	<.008	--	--	<.12	<.12	<.04	<.04
06/14/2006	1420	6.2	2	<.02	<.008	<.06	<.004	<.12	<.12	<.04	<.04
07/25/2006	0600	5.7	2	.02	<.008	--	--	<.12	<.12	<.04	<.04
08/24/2006	0600	5.7	2	.02	<.008	--	--	<.12	<.12	<.04	<.04

Date	Copper, filtered (µg/L)	Copper, unfiltered recoverable (µg/L)	Iron, filtered (µg/L)	Iron, unfiltered recoverable (µg/L)	Lead, filtered (µg/L)	Lead, unfiltered recoverable (µg/L)	Manganese, filtered (µg/L)	Manganese, unfiltered recoverable (µg/L)	Zinc, filtered (µg/L)	Zinc, unfiltered recoverable (ug/L)
10/17/2005	<0.4	<0.6	<6	<6	0.08	<0.06	<0.2	<0.2	<0.6	<2
03/16/2006	<.4	<.6	<6	<6	<.08	<.06	<.2	<.2	.7	<2
04/05/2006	.5	<.6	<6	<6	<.08	<.06	<.2	<.6	<.6	<2
04/19/2006	<.4	<.6	<6	<6	<.08	<.06	<.2	<.6	<.6	<2
05/08/2006	<.4	<.6	<6	<6	<.08	<.06	<.2	<.6	<.6	<2
05/22/2006	<.4	<.6	<6	<6	<.08	<.06	<.2	<.6	<.6	<2
05/24/2006	1.8	<.6	<6	<6	.12	<.06	<.2	<.6	3.1	<2
06/06/2006	<.4	<.6	<6	<6	<.08	<.06	<.2	<.6	<.6	<2
06/13/2006	<.4	<.6	<6	<6	<.08	<.06	<.2	<.6	1.3	<2
06/14/2006	<.4	<.6	<6	<6	<.08	<.06	<.2	<.6	<.6	<2
07/25/2006	<.4	<.6	<6	<6	<.08	<.06	<.2	<.6	<.6	<2
08/24/2006	.6	<.6	<6	<6	<.08	<.06	<.2	<.6	<.6	<2

Table 19. Analyses of fine-grained bed sediment, upper Clark Fork basin, Montana, August 2006.

[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, in µg/g								
			Arsenic	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Nickel	Zinc
12323600	Silver Bow Creek at Opportunity	3	119	22.8	25.5	2,480	31,700	470	2,420	12.0	4,950
12323750	Silver Bow Creek at Warm Springs	3	97	4.9	17.8	278	22,100	65	8,960	12.5	666
12323800	Clark Fork near Galen	3	95	5.6	29.5	1,090	27,400	117	11,000	17.5	1,090
461415112450801	Clark Fork below Lost Creek, near Galen	3	111	5.2	24.6	1,280	25,500	134	9,820	13.3	1,160
461559112443301	Clark Fork at county bridge, near Racetrack	3	61	5.9	27.6	1,120	28,100	135	3,400	14.8	1,100
461903112440701	Clark Fork at Demspey Creek diversion, near Racetrack	3	63	6.0	22.7	992	25,000	102	4,420	11.0	1,250
12324200	Clark Fork at Deer Lodge	3	60	4.4	24.5	930	22,800	121	2,960	11.6	1,050
12324680	Clark Fork at Goldcreek	3	23	2.6	21.3	338	15,500	52	1,990	9.0	584
12331800	Clark Fork near Drummond	3	31	3.8	25.2	390	19,500	79	3,520	13.4	848
12334550	Clark Fork at Turah Bridge, near Bonner	3	21	1.9	21.8	237	15,900	47	1,240	10.3	584
12340000	Blackfoot River near Bonner	3	4	.3	23.6	22	19,000	20	303	11.8	63
12340500	Clark Fork above Missoula	3	52	3.5	25.9	551	20,500	66	1,020	12.4	960

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

[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). Symbol: --, recovery could not be determined because all analyses were less than the minimum reporting level]

Constituent	Number of analyses	Dilution ratio	Certified concentration (µg/g)	Mean SRM recovery, in percent	95-percent confidence interval for SRM recovery, in percent
SRM sample 2709					
Arsenic	10	1:10	17.7	73.5	70.9–76.1
Cadmium	10	1:10	.4	--	--
Chromium	10	1:10	130	78.1	76.8–79.4
Copper	10	1:10	35	99.8	98.3–101
Iron	10	1:10	35,000	90.4	88.6–92.1
Lead	10	1:10	19	136.4	134–139
Manganese	10	1:10	538	91.7	90.0–93.5
Nickel	10	1:10	88	89.9	88.8–91.0
Zinc	10	1:10	106	92.4	91.0–93.8
SRM sample 2711					
Arsenic	10	1:10	105	87.7	85.6–89.7
Cadmium	10	1:10	41.7	95.4	93.6–97.3
Chromium	10	1:10	47	66.1	62.6–69.6
Copper	10	1:10	114	101.6	98.9–104
Iron	10	1:10	28,900	83.5	81.6–85.3
Lead	10	1:10	1,160	94.7	93.0–96.5
Manganese	10	1:10	638	81.6	80.1–83.1
Nickel	10	1:10	20.6	84.8	83.3–86.3
Zinc	10	1:10	350	92.9	91.3–94.6

Table 21. Analyses of procedural blanks for bed sediment.

[Dilution ratio is the proportion of initial volume of concentrated nitric acid used as a digesting reagent to final volume of solution after addition of 0.6 N (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, in µg/mL								
			Arsenic	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Nickel	Zinc
12323600	Silver Bow Creek at Opportunity	1:10	<0.005	<0.001	<0.006	<0.006	<0.1	<0.02	<0.01	<0.002	<0.01
12323750	Silver Bow Creek at Warm Springs	1:10	<.005	<.001	<.006	<.006	<.1	<.02	<.01	<.002	<.01
12323800	Clark Fork near Galen	1:10	<.005	<.001	<.006	<.006	<.1	<.02	<.01	<.002	<.01
461415112450801	Clark Fork below Lost Creek, near Galen	1:10	<.005	<.001	<.006	<.006	<.1	<.02	<.01	<.002	<.01
461559112443301	Clark Fork at county bridge, near Racetrack	1:10	<.005	<.001	<.006	<.006	<.1	<.02	<.01	<.002	<.01
461903112440701	Clark Fork at Dempsey Creek diversion, near Racetrack	1:10	<.005	<.001	<.006	<.006	<.1	<.02	<.01	<.002	<.01
12324200	Clark Fork at Deer Lodge	1:10	<.005	<.001	<.006	<.006	<.1	<.02	<.01	<.002	<.01
12324680	Clark Fork at Goldcreek	1:10	<.005	<.001	<.006	<.006	<.1	<.02	<.01	<.002	<.01
12331800	Clark Fork near Drummond	1:20	<.005	<.001	<.006	<.006	<.1	<.02	<.01	<.002	<.01
12334550	Clark Fork at Turah Bridge, near Bonner	1:10	<.005	<.001	<.006	<.006	<.1	<.02	<.01	<.002	<.01
12340000	Blackfoot River near Bonner	1:10	<.005	<.001	<.006	<.006	<.1	<.02	<.01	<.002	<.01
12340500	Clark Fork above Missoula	1:10	<.005	<.001	<.006	<.006	<.1	<.02	<.01	<.002	<.01

Table 22. Analyses of biota, upper Clark Fork basin, Montana, August 2006.

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

Taxon	Number of composite samples	Concentration, in µg/g								
		Arsenic	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Nickel	Zinc
12323600—Silver Bow Creek at Opportunity										
Hydropsyche cockerelli	2	12.3	3.3	2.6	307	2,500	48.5	764	1.9	678
Hydropsyche spp.	1	<1.3	4.2	<2.9	324	2,630	45.9	1,030	2.3	784
12323750—Silver Bow Creek at Warm Springs										
Hydropsyche cockerelli	1	16.9	0.5	1.0	37.2	1,380	4.2	2,360	1.8	191
12323800—Clark Fork near Galen										
Hydropsyche cockerelli	3	14.1	0.9	2.7	132	2,040	11.1	2,200	3.3	187
461415112450801—Clark Fork below Lost Creek, near Galen										
Hydropsyche cockerelli	2	26.6	1.6	3.6	330	3,850	27.5	2,370	2.7	335
Hydropsyche occidentalis	1	20.8	1.4	3.6	219	2,830	19.4	2,980	2.5	308
461559112443301—Clark Fork at county bridge, near Racetrack										
Hydropsyche cockerelli	2	16.4	1.5	2.4	190	2,680	16.8	1,970	2.0	237
Hydropsyche occidentalis	2	15.0	1.3	2.5	138	2,180	14.7	3,020	1.6	245
Hydropsyche spp.	1	12.7	1.5	2.5	124	1,880	15.0	2,370	1.9	220
461903112440701—Clark Fork at Dempsey Creek diversion, near Racetrack										
Hydropsyche cockerelli	2	16.2	1.3	2.8	192	2,030	14.2	2,620	1.9	256
Hydropsyche occidentalis	2	12.3	1.1	1.7	137	1,480	10.6	3,390	1.4	244
12324200—Clark Fork at Deer Lodge										
Hydropsyche cockerelli	1	11.4	1.9	1.9	180	1,860	14.4	1,570	1.5	240
Hydropsyche occidentalis	1	11.7	1.7	2.1	180	1,830	14.7	2,160	1.6	280
12324680—Clark Fork at Goldcreek										
Arctopsyche grandis	4	2.6	1.0	0.6	23.6	228	1.1	933	0.4	156
Claassenia sabulosa	3	1.4	.6	.6	65.2	149	.5	267	.4	265
Hydropsyche cockerelli	2	4.5	1.1	1.2	46.3	576	2.8	1,240	.8	179
Hydropsyche occidentalis	1	5.0	1.1	.8	47.8	690	5.2	1,680	1.0	210

Table 22. Analyses of biota, upper Clark Fork basin, Montana, August 2006.—Continued

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

Taxon	Number of composite samples	Concentration, in µg/g								
		Arsenic	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Nickel	Zinc
12331800—Clark Fork near Drummond										
Arctopsyche grandis	1	2.3	0.8	0.7	19.3	193	1.6	531	0.2	158
Claassenia sabulosa	2	1.5	.4	.8	76.7	147	.8	278	.3	276
Hydropsyche cockerelli	1	4.9	.8	1.6	56.9	740	4.8	975	1.0	183
Hydropsyche occidentalis	2	5.3	.8	1.7	56.5	775	5.6	1,500	1.0	222
12334550—Clark Fork at Turah Bridge, near Bonner										
Arctopsyche grandis	3	4.7	0.7	2.0	41.0	913	3.8	629	1.3	200
Claassenia sabulosa	2	1.3	.7	1.3	66.4	141	.6	138	.3	288
Hydropsyche cockerelli	3	5.0	.6	2.5	54.2	1,230	4.8	670	1.4	195
Hydropsyche occidentalis	1	4.5	.6	2.2	49.4	1,320	4.4	830	1.4	207
12340000—Blackfoot River near Bonner										
Arctopsyche grandis	1	2.2	<0.1	1.6	14.9	907	0.9	578	1.2	145
Claassenia sabulosa	2	1.6	.2	.9	36.7	177	.2	84	.3	242
Hydropsyche cockerelli	1	3.1	<.1	2.5	5.6	1,960	2.3	716	1.9	140
Hydropsyche occidentalis	1	2.4	<.1	3.2	17.1	1,410	1.7	762	1.8	153
12340500—Clark Fork above Missoula										
Arctopsyche grandis	3	3.2	0.5	1.7	37.2	838	4.7	737	0.8	187
Claassenia sabulosa	3	1.6	.4	1.1	57.8	265	1.1	181	.4	279
Hydropsyche cockerelli	3	7.6	.8	3.5	89.5	2,370	10.7	1,200	2.1	256
Hydropsyche occidentalis	1	6.2	.7	3.0	69.2	1,960	11.1	1,600	1.7	258

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

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

Constituent	Number of analyses	Certified concentration (µg/g)	Mean SRM recovery, in percent	95-percent confidence interval for SRM recovery, in percent
SRM sample TORT-2				
Arsenic	12	21.6	101	99.5–102
Cadmium	12	26.7	104	102–106
Chromium	[1]12	.77	173	164–182
Copper	12	106	109	108–110
Iron	12	105	110	107–113
Lead	12	.35	85.2	76.2–94.2
Manganese	12	13.6	102	101–103
Nickel	12	2.5	99.5	97.3–102
Zinc	12	180	106	105–108

[1]Chromium concentrations in seven analyses were less than the liquid-phase minimum reporting level (0.01 µg/mL) and were not used to calculate SRM recovery.

Table 24. Analyses of procedural blanks for biota.

[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, in µg/mL								
			Arsenic	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Nickel	Zinc
12323600	Silver Bow Creek at Opportunity	1:1	<0.004	<0.0003	<0.01	<0.002	0.02	<0.001	<0.001	<0.01	<0.01
12323750	Silver Bow Creek at Warm Springs	1:1	<.004	<.0003	<.01	<.002	<.01	<.001	<.001	<.01	<.01
12323800	Clark Fork near Galen	1:1	<.004	<.0003	<.01	<.002	.03	<.001	<.001	<.01	<.01
461415112450801	Clark Fork below Lost Creek, near Galen	1:1	<.004	<.0003	<.01	<.002	.03	.005	<.001	<.01	<.01
461559112443301	Clark Fork at county bridge, near Racetrack	1:1	<.004	<.0003	<.01	<.002	.04	.006	<.001	<.01	<.01
461903112440701	Clark Fork at Dempsey Creek diversion, near Racetrack	1:1	<.004	<.0003	<.01	<.002	.14	.004	<.001	<.01	<.01
12324200	Clark Fork at Deer Lodge	1:1	<.004	<.0003	<.01	<.002	.02	<.001	<.001	<.01	<.01
12324680	Clark Fork at Goldcreek	1:1	<.004	<.0003	<.01	<.002	<.01	<.001	<.001	<.01	<.01
12331800	Clark Fork near Drummond	1:1	<.004	<.0003	<.01	<.002	<.01	<.001	<.001	<.01	<.01
12334550	Clark Fork at Turah Bridge, near Bonner	1:1	<.004	<.0003	<.01	<.002	<.01	<.001	<.001	<.01	<.01
12340000	Blackfoot River near Bonner	1:1	<.004	<.0003	<.01	<.002	<.01	<.001	<.001	<.01	<.01
12340500	Clark Fork above Missoula	1:1	<.004	<.0003	<.01	<.002	<.01	<.001	<.001	<.01	<.01

Table 25. Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2006.

[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 2006					
Streamflow, instantaneous (ft^3/s)	99	156	1.9	13	7.6
pH, onsite (standard units)	99	8.4	7.3	7.8	7.8
Specific conductance, onsite (µS/cm)	99	412	116	267	271
Temperature, water (°C)	99	17.5	1.5	8.2	8.0
Hardness, filtered (mg/L as $CaCO_3$)	99	150	38	105	110
Calcium, filtered (mg/L)	99	41.8	10.6	30.1	30.9
Magnesium, filtered (mg/L)	99	11.0	2.71	7.3	7.4
Arsenic, filtered (µg/L)	99	13	1	3.8	3.0
Arsenic, unfiltered (µg/L)	99	18	1	[2]5	4
Cadmium, filtered (µg/L)	99	.5	<.04	[2].06	<.1
Cadmium, unfiltered (µg/L)	99	.11	<.04	[2].05	<1
Copper, filtered (µg/L)	99	10	.8	[2]3.8	3.2
Copper, unfiltered (µg/L)	99	52	1.5	7.2	5.9
Iron, filtered (µg/L)	99	640	15	164	150
Iron, unfiltered (µg/L)	99	4,220	139	682	550
Lead, filtered (µg/L)	99	2.8	<.08	[2].21	<.6
Lead, unfiltered (µg/L)	99	47	<1	[2]2.18	.90
Manganese, filtered (µg/L)	99	144	14.2	41.7	37.9
Manganese, unfiltered (µg/L)	99	240	23	59	51
Zinc, filtered (µg/L)	99	11	<1	[2]3.8	2.9
Zinc, unfiltered (µg/L)	99	130	<10	[2]10	4
Sediment, suspended (percent finer than 0.062 mm)	99	97	50	82	83
Sediment, suspended concentration (mg/L)	99	139	2	14	7
Sediment, suspended discharge (ton/d)	99	59	.01	1.2	.14

Table 25. Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2006.—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 2006					
Streamflow, instantaneous (ft^3/s)	107	134	13	28	23
pH, onsite (standard units)	107	8.1	7.2	7.6	7.6
Specific conductance, onsite (µS/cm)	107	691	226	475	482
Temperature, water (°C)	107	20.0	1.0	10.5	9.5
Hardness, filtered (mg/L as $CaCO_3$)	107	220	66	151	150
Calcium, filtered (mg/L)	107	62.7	19.0	42.9	44.0
Magnesium, filtered (mg/L)	107	14.6	4.51	10.6	11.0
Arsenic, filtered (µg/L)	107	13	2.3	6.6	6.4
Arsenic, unfiltered (µg/L)	107	45	3	12	10
Cadmium, filtered (µg/L)	107	6.2	.09	1.28	1.00
Cadmium, unfiltered (µg/L)	107	6	.11	1.71	1.40
Copper, filtered (µg/L)	107	303	3.2	41.2	16.0
Copper, unfiltered (µg/L)	107	550	13.5	96	51
Iron, filtered (µg/L)	107	270	10	[2]84	61
Iron, unfiltered (µg/L)	107	7,400	85	958	640
Lead, filtered (µg/L)	107	2.4	<.5	[2].52	.22
Lead, unfiltered (µg/L)	107	250	.64	15.0	4.80
Manganese, filtered (µg/L)	107	1,700	21.4	407	358
Manganese, unfiltered (µg/L)	107	1,600	26	453	409
Zinc, filtered (µg/L)	107	2,200	26.7	416	303
Zinc, unfiltered (µg/L)	107	2,200	38	502	352
Sediment, suspended (percent finer than 0.062 mm)	106	98	42	84	86
Sediment, suspended concentration (mg/L)	106	405	2	25	11
Sediment, suspended discharge (ton/d)	106	70	.08	3.0	.74

Table 25. Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2006.—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 2006					
Streamflow, instantaneous (ft^3/s)	110	361	13	72	50
pH, onsite (standard units)	109	9.5	7.2	8.4	8.4
Specific conductance, onsite (µS/cm)	109	633	202	418	403
Temperature, water (°C)	109	22.5	0.0	9.3	9.5
Hardness, filtered (mg/L as $CaCO_3$)	109	240	60	150	150
Calcium, filtered (mg/L)	109	71.6	18.5	44.4	43.1
Magnesium, filtered (mg/L)	109	15.0	3.42	9.49	9.04
Arsenic, filtered (µg/L)	109	34	1	11.2	10.3
Arsenic, unfiltered (µg/L)	109	235	11	28	18
Cadmium, filtered (µg/L)	109	41	.1	1.30	.84
Cadmium, unfiltered (µg/L)	109	49	.52	[2]2.33	1.49
Copper, filtered (µg/L)	109	450	13.7	50.0	38.9
Copper, unfiltered (µg/L)	109	3,900	54.3	232	130
Iron, filtered (µg/L)	109	307	3	[2]45	24
Iron, unfiltered (µg/L)	109	24,100	255	1,640	782
Lead, filtered (µg/L)	109	5.1	<.5	[2].77	.30
Lead, unfiltered (µg/L)	109	650	5.38	42.2	15.5
Manganese, filtered (µg/L)	109	9,300	68	493	395
Manganese, unfiltered (µg/L)	109	10,000	117	618	480
Zinc, filtered (µg/L)	109	13,000	27	341	183
Zinc, unfiltered (µg/L)	109	15,000	97	595	392
Sediment, suspended (percent finer than 0.062 mm)	110	95	37	79	82
Sediment, suspended concentration (mg/L)	110	801	5	51	17
Sediment, suspended discharge (ton/d)	110	781	.18	22	2.4

Table 25. Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2006.—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 2006					
Streamflow, instantaneous (ft^3/s)	16	165	7.4	60	24
pH, onsite (standard units)	16	8.6	7.7	8.2	8.2
Specific conductance, onsite (µS/cm)	16	203	56	132	138
Temperature, water (°C)	16	16.0	3.0	8.3	7.8
Hardness, filtered (mg/L as $CaCO_3$)	16	98	24	59	62
Calcium, filtered (mg/L)	16	25.9	7.12	16.2	17.4
Magnesium, filtered (mg/L)	16	8.01	1.45	4.43	4.42
Arsenic, filtered (µg/L)	16	27.3	7.3	15.8	13.8
Arsenic, unfiltered (µg/L)	16	30	9	18	16
Cadmium, filtered (µg/L)	16	.11	<.04	[2].05	.04
Cadmium, unfiltered (µg/L)	16	.18	.05	.08	.08
Copper, filtered (µg/L)	16	4.7	0.9	2.3	2.0
Copper, unfiltered (µg/L)	16	10.3	1.3	4.1	3.6
Iron, filtered (µg/L)	16	89	26	52	42
Iron, unfiltered (µg/L)	16	620	90	222	171
Lead, filtered (µg/L)	16	.24	<.08	[2].13	.10
Lead, unfiltered (µg/L)	16	3.12	.20	.89	.61
Manganese, filtered (µg/L)	16	8.9	3.4	6.0	6.2
Manganese, unfiltered (µg/L)	16	37	7	16	14
Zinc, filtered (µg/L)	16	2.4	.7	1.4	1.2
Zinc, unfiltered (µg/L)	16	8	1	3	2
Sediment, suspended (percent finer than 0.062 mm)	16	81	39	67	74
Sediment, suspended concentration (mg/L)	16	29	1	7	3
Sediment, suspended discharge (ton/d)	16	13	.03	2.2	.16

Table 25. Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2006.—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 2006					
Streamflow, instantaneous (ft^3/s)	32	261	0.43	37	5
pH, onsite (standard units)	32	8.2	7.8	8.0	8.0
Specific conductance, onsite (µS/cm)	32	223	59	149	156
Temperature, water (°C)	32	20	1.0	9.5	9.2
Hardness, filtered (mg/L as $CaCO_3$)	32	100	24	64	68
Calcium, filtered (mg/L)	32	28.0	7.01	17.9	19.3
Magnesium, filtered (mg/L)	32	7.83	1.56	4.64	4.84
Arsenic, filtered (µg/L)	32	37.0	9.0	23.5	23.4
Arsenic, unfiltered (µg/L)	32	50	10	28	28
Cadmium, filtered (µg/L)	32	.10	.03	.07	.07
Cadmium, unfiltered (µg/L)	32	.85	.06	.16	.10
Copper, filtered (µg/L)	32	6.1	1.2	3.2	3.0
Copper, unfiltered (µg/L)	32	38.8	1.7	7.6	4.4
Iron, filtered (µg/L)	32	90	17	52	49
Iron, unfiltered (µg/L)	32	1,960	67	331	138
Lead, filtered (µg/L)	32	.32	<.08	[2].15	.14
Lead, unfiltered (µg/L)	32	12.7	.07	1.72	.42
Manganese, filtered (µg/L)	32	32.8	3.2	9.4	7.6
Manganese, unfiltered (µg/L)	32	113	6	22	13
Zinc, filtered (µg/L)	32	7.7	1.4	3.5	3.2
Zinc, unfiltered (µg/L)	32	41	2	8	5
Sediment, suspended (percent finer than 0.062 mm)	32	90	26	73	80
Sediment, suspended concentration (mg/L)	32	107	1	14	2
Sediment, suspended discharge (ton/d)	32	55	<.01	[2]4.6	.02

Table 25. Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2006.—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 2006					
Streamflow, instantaneous (ft^3/s)	15	39	1.0	11	3.3
pH, onsite (standard units)	15	8.2	7.5	7.7	7.7
Specific conductance, onsite (µS/cm)	15	115	66	97	102
Temperature, water (°C)	15	15.0	.5	7.0	6.0
Hardness, filtered (mg/L as $CaCO_3$)	15	42	22	35	38
Calcium, filtered (mg/L)	15	13.9	7.56	11.9	13.0
Magnesium, filtered (mg/L)	15	1.69	.78	1.30	1.30
Arsenic, filtered (µg/L)	15	24.9	9.9	16.4	14.7
Arsenic, unfiltered (µg/L)	15	27	10	18	16
Cadmium, filtered (µg/L)	15	.05	<.04	[2].03	.03
Cadmium, unfiltered (µg/L)	15	.19	.03	.06	.05
Copper, filtered (µg/L)	15	4.2	1.0	2.2	2.0
Copper, unfiltered (µg/L)	15	16.8	1.5	4.4	3.0
Iron, filtered (µg/L)	15	154	36	74	67
Iron, unfiltered (µg/L)	15	1,260	90	297	190
Lead, filtered (µg/L)	15	.37	.05	.15	.13
Lead, unfiltered (µg/L)	15	4.08	.20	.78	.47
Manganese, filtered (µg/L)	15	34.5	8.1	16.1	14.8
Manganese, unfiltered (µg/L)	15	49	15	28	22
Zinc, filtered (µg/L)	15	3.3	1.1	1.9	1.7
Zinc, unfiltered (µg/L)	15	10	1	3	2
Sediment, suspended (percent finer than 0.062 mm)	15	94	44	76	77
Sediment, suspended concentration (mg/L)	15	93	3	13	5
Sediment, suspended discharge (ton/d)	15	9.8	.01	.90	.05

Table 25. Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2006.—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 2006					
Streamflow, instantaneous (ft^3/s)	32	53	4.5	15	8.7
pH, onsite (standard units)	32	8.6	7.7	8.1	8.1
Specific conductance, onsite (µS/cm)	32	371	116	288	308
Temperature, water (°C)	32	20.5	1.5	10.9	11.5
Hardness, filtered (mg/L as $CaCO_3$)	32	170	67	128	135
Calcium, filtered (mg/L)	32	47.4	20.5	36.8	38.8
Magnesium, filtered (mg/L)	32	12.3	3.73	8.69	9.18
Arsenic, filtered (µg/L)	32	164	11.5	45.6	29.6
Arsenic, unfiltered (µg/L)	32	164	12	48	30
Cadmium, filtered (µg/L)	32	.11	.02	.05	.04
Cadmium, unfiltered (µg/L)	32	.52	.03	.10	.07
Copper, filtered (µg/L)	32	21.4	1.9	6.1	3.8
Copper, unfiltered (µg/L)	32	48.8	2.8	12.1	7.8
Iron, filtered (µg/L)	32	111	7	38	28
Iron, unfiltered (µg/L)	32	1,420	27	239	142
Lead, filtered (µg/L)	32	.52	.04	[2].19	.16
Lead, unfiltered (µg/L)	32	14.4	.27	2.13	1.30
Manganese, filtered (µg/L)	32	51.3	4.1	25.6	20.2
Manganese, unfiltered (µg/L)	32	104	4.7	35	30
Zinc, filtered (µg/L)	32	20	1.1	5.7	4.4
Zinc, unfiltered (µg/L)	32	68	2	12	8
Sediment, suspended (percent finer than 0.062 mm)	32	96	70	87	88
Sediment, suspended concentration (mg/L)	32	84	1	11	5
Sediment, suspended discharge (ton/d)	32	11	.02	.91	.10

Table 25. Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2006.—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 2006					
Streamflow, instantaneous (ft^3/s)	116	662	16	136	88
pH, onsite (standard units)	114	9.4	8.0	8.8	8.8
Specific conductance, onsite (µS/cm)	114	783	249	470	476
Temperature, water (°C)	115	25.0	.5	11.1	11.0
Hardness, filtered (mg/L as $CaCO_3$)	114	310	97	196	200
Calcium, filtered (mg/L)	114	90.4	27.9	56.8	58.3
Magnesium, filtered (mg/L)	114	21.4	5.94	13.1	13.0
Arsenic, filtered (µg/L)	114	60	6.8	22.4	22.6
Arsenic, unfiltered (µg/L)	114	94	10	27	26
Cadmium, filtered (µg/L)	114	.31	<.04	[2].07	<.1
Cadmium, unfiltered (µg/L)	114	.56	<.1	[2].12	<1
Copper, filtered (µg/L)	114	40	1.9	8.9	7
Copper, unfiltered (µg/L)	114	96.8	3.4	17.9	12.6
Iron, filtered (µg/L)	114	93	<5	[2]18	14
Iron, unfiltered (µg/L)	114	3,000	36	348	270
Lead, filtered (µg/L)	114	1.0	<.08	[2].11	<.5
Lead, unfiltered (µg/L)	114	41.8	<1	[2]2.53	1.23
Manganese, filtered (µg/L)	114	875	11.8	130	96
Manganese, unfiltered (µg/L)	114	899	24	195	165
Zinc, filtered (µg/L)	114	73	<1	[2]8.9	4.7
Zinc, unfiltered (µg/L)	114	180	<10	[2]35	20
Sediment, suspended (percent finer than 0.062 mm)	115	97	43	82	84
Sediment, suspended concentration (mg/L)	116	229	1	11	6
Sediment, suspended discharge (ton/d)	116	279	.07	7.4	1.6

Table 25. Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2006.—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 2006					
Streamflow, instantaneous (ft^3/s)	6	268	52	98	68
pH, onsite (standard units)	6	8.8	8.2	8.6	8.6
Specific conductance, onsite (µS/cm)	6	254	126	223	242
Temperature, water (°C)	6	16.0	7.0	10.5	8.8
Hardness, filtered (mg/L as $CaCO_3$)	6	130	60	107	110
Calcium, filtered (mg/L)	6	37.4	18.6	32.4	34.2
Magnesium, filtered (mg/L)	6	8.00	3.25	6.64	6.99
Arsenic, filtered (µg/L)	6	2.5	1.8	2.1	2.0
Arsenic, unfiltered (µg/L)	6	2.8	2.0	2.4	2.3
Cadmium, filtered (µg/L)	6	.03	<.04	--	<.04
Cadmium, unfiltered (µg/L)	6	.05	.02	.03	.03
Copper, filtered (µg/L)	6	1.4	.68	1.1	1.2
Copper, unfiltered (µg/L)	6	4.1	1.2	2.4	2.4
Iron, filtered (µg/L)	6	10	6	8	7
Iron, unfiltered (µg/L)	6	194	48	90	75
Lead, filtered (µg/L)	6	.05	<.08	--	<.08
Lead, unfiltered (µg/L)	6	.55	.14	.27	.24
Manganese, filtered (µg/L)	6	1.2	<.2	[2].9	.8
Manganese, unfiltered (µg/L)	6	9.1	2.4	4.3	3.4
Zinc, filtered (µg/L)	6	1.3	.3	.7	.6
Zinc, unfiltered (µg/L)	6	4	1	2	2
Sediment, suspended (percent finer than 0.062 mm)	6	80	51	69	70
Sediment, suspended concentration (mg/L)	6	13	3	5	4
Sediment, suspended discharge (ton/d)	6	9.4	.42	2.1	.64

Table 25. Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2006.—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 2006					
Streamflow, instantaneous (ft^3/s)	85	420	2.8	91	50
pH, onsite (standard units)	84	8.7	7.4	8.3	8.3
Specific conductance, onsite (µS/cm)	84	795	139	302	312
Temperature, water (°C)	85	20.0	0.0	9.1	9.0
Hardness, filtered (mg/L as $CaCO_3$)	84	420	40	146	150
Calcium, filtered (mg/L)	84	130	10.5	44.7	46.1
Magnesium, filtered (mg/L)	84	22.0	3.29	8.42	8.46
Arsenic, filtered (µg/L)	84	14	2	5.3	4.9
Arsenic, unfiltered (µg/L)	84	27	3	8	6
Cadmium, filtered (µg/L)	84	.1	<.04	[2].04	<.1
Cadmium, unfiltered (µg/L)	84	.41	<.1	[2].08	<1
Copper, filtered (µg/L)	84	16	1	3.6	3.0
Copper, unfiltered (µg/L)	84	108	2.3	19.7	8.4
Iron, filtered (µg/L)	84	30	<5	[2]11	10
Iron, unfiltered (µg/L)	84	1,700	39	303	110
Lead, filtered (µg/L)	84	1.8	<.08	[2].09	<.5
Lead, unfiltered (µg/L)	84	14	<1	[2]1.96	.43
Manganese, filtered (µg/L)	84	570	22.6	134	110
Manganese, unfiltered (µg/L)	84	1,400	53	229	190
Zinc, filtered (µg/L)	84	10	<1	[2]2.2	1.1
Zinc, unfiltered (µg/L)	84	60	<10	[2]10	3
Sediment, suspended (percent finer than 0.062 mm)	85	88	55	72	72
Sediment, suspended concentration (mg/L)	85	106	2	18	8
Sediment, suspended discharge (ton/d)	85	87	.05	8.7	.92

Table 25. Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2006.—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 2006					
Streamflow, instantaneous (ft^3/s)	157	1,050	14	206	124
pH, onsite (standard units)	144	9.2	7.5	8.5	8.6
Specific conductance, onsite (µS/cm)	145	720	197	426	438
Temperature, water (°C)	156	23.5	0.0	10.1	10.0
Hardness, filtered (mg/L as $CaCO_3$)	143	370	81	186	190
Calcium, filtered (mg/L)	143	110	24.2	55.0	57.0
Magnesium, filtered (mg/L)	143	22.0	5.08	11.9	12.0
Arsenic, filtered (µg/L)	143	53	4	15.2	14.0
Arsenic, unfiltered (µg/L)	143	78	3	20	17
Cadmium, filtered (µg/L)	143	1	<.04	[2].06	<1
Cadmium, unfiltered (µg/L)	143	3	<.1	[2].20	<1
Copper, filtered (µg/L)	143	50	2.3	8.7	6.8
Copper, unfiltered (µg/L)	142	240	4.8	29.5	16.6
Iron, filtered (µg/L)	143	110	<3	[2]16	11
Iron, unfiltered (µg/L)	143	9,200	56	508	270
Lead, filtered (µg/L)	143	3	<.08	[2].17	<1
Lead, unfiltered (µg/L)	143	31.0	<1	[2]3.63	1.90
Manganese, filtered (µg/L)	143	460	25.2	116	88.9
Manganese, unfiltered (µg/L)	143	1,400	47	245	193
Zinc, filtered (µg/L)	143	110	<1	[2]10.7	5.7
Zinc, unfiltered (µg/L)	143	360	<10	[2]42	20
Sediment, suspended (percent finer than 0.062 mm)	156	97	41	78	78
Sediment, suspended concentration (mg/L)	157	338	2	19	7
Sediment, suspended discharge (ton/d)	157	459	.12	21	2.3

Table 25. Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2006.—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 2006					
Streamflow, instantaneous (ft^3/s)	15	17	0.97	7.0	4.5
pH, onsite (standard units)	15	8.6	7.4	8.2	8.3
Specific conductance, onsite (µS/cm)	15	253	136	200	211
Temperature, water (°C)	15	14.5	2.5	8.3	8.5
Hardness, filtered (mg/L as $CaCO_3$)	15	120	50	95	100
Calcium, filtered (mg/L)	15	37.1	15.7	29.0	30.3
Magnesium, filtered (mg/L)	15	7.11	2.71	5.56	6.11
Arsenic, filtered (µg/L)	15	156	2.4	15.4	5.6
Arsenic, unfiltered (µg/L)	15	3,860	2	263	6
Cadmium, filtered (µg/L)	15	.90	<.04	[2].09	.03
Cadmium, unfiltered (µg/L)	15	147	.02	9.9	.04
Copper, filtered (µg/L)	15	90.5	1.2	8.4	2.0
Copper, unfiltered (µg/L)	15	29,100	1.7	1,950	4.5
Iron, filtered (µg/L)	15	25	<6	[2]9	8
Iron, unfiltered (µg/L)	15	99,700	20	6,820	98
Lead, filtered (µg/L)	15	.18	<.08	[2].06	<.08
Lead, unfiltered (µg/L)	15	1,290	.10	87	.40
Manganese, filtered (µg/L)	15	42.4	<.2	[2]4.1	1.4
Manganese, unfiltered (µg/L)	15	8,830	1	594	4
Zinc, filtered (µg/L)	15	30.0	.8	3.2	1.2
Zinc, unfiltered (µg/L)	15	7,780	2	522	3
Sediment, suspended (percent finer than 0.062 mm)	15	97	30	64	66
Sediment, suspended concentration (mg/L)	15	58,900	1	3,940	8
Sediment, suspended discharge (ton/d)	15	1,320	<.1	[2]88	.08

Table 25. Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2006.—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 2006					
Streamflow, instantaneous (ft^3/s)	32	59	1.3	19	12
pH, onsite (standard units)	32	8.7	8.0	8.4	8.4
Specific conductance, onsite (µS/cm)	32	934	540	652	636
Temperature, water (°C)	32	26.5	1.5	12.7	11.8
Hardness, filtered (mg/L as $CaCO_3$)	32	450	200	305	300
Calcium, filtered (mg/L)	32	122	48.5	84.9	86.6
Magnesium, filtered (mg/L)	32	35.7	18.0	22.5	21.4
Arsenic, filtered (µg/L)	32	41.8	6.6	15.2	12.6
Arsenic, unfiltered (µg/L)	32	43	6	16	13
Cadmium, filtered (µg/L)	32	.05	<.04	[2].03	.02
Cadmium, unfiltered (µg/L)	32	.11	.02	.05	.04
Copper, filtered (µg/L)	32	6.7	1.5	3	2.8
Copper, unfiltered (µg/L)	32	22.5	3.5	7	6
Iron, filtered (µg/L)	32	61	<6	[2]12	8
Iron, unfiltered (µg/L)	32	280	10	100	76
Lead, filtered (µg/L)	32	.33	<.08	[2].07	<.08
Lead, unfiltered (µg/L)	32	1.30	.04	.39	.29
Manganese, filtered (µg/L)	32	54.0	1.9	13.6	11.1
Manganese, unfiltered (µg/L)	32	56	2	18	14
Zinc, filtered (µg/L)	32	3.8	<1	[2]1.6	1.2
Zinc, unfiltered (µg/L)	32	9	<2	[2]3	2
Sediment, suspended (percent finer than 0.062 mm)	32	86	18	56	60
Sediment, suspended concentration (mg/L)	32	34	2	15	14
Sediment, suspended discharge (ton/d)	32	3.8	.01	.91	.32

Table 25. Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2006.—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 2006					
Streamflow, instantaneous (ft^3/s)	209	1,920	23	288	215
pH, onsite (standard units)	157	8.9	7.4	8.3	8.3
Specific conductance, onsite (µS/cm)	192	642	234	484	506
Temperature, water (°C)	208	23.0	0.0	10.0	10.0
Hardness, filtered (mg/L as $CaCO_3$)	149	280	95	205	220
Calcium, filtered (mg/L)	149	82.0	28.2	60.5	64.0
Magnesium, filtered (mg/L)	149	19	5.9	13.1	13.7
Arsenic, filtered (µg/L)	159	39	6	14.4	13.0
Arsenic, unfiltered (µg/L)	158	215	8	25	17
Cadmium, filtered (µg/L)	159	2	<.1	[2].08	<1
Cadmium, unfiltered (µg/L)	159	5	<.1	[2].44	<1
Copper, filtered (µg/L)	159	120	3.2	11.4	9.0
Copper, unfiltered (µg/L)	157	1,500	8.2	87.6	38.1
Iron, filtered (µg/L)	159	190	<3	[2]15	9
Iron, unfiltered (µg/L)	159	29,000	30	1,620	520
Lead, filtered (µg/L)	159	6	<.08	[2].36	<1
Lead, unfiltered (µg/L)	159	200	<1	[2]11.3	4.00
Manganese, filtered (µg/L)	159	400	1	43.3	34.0
Manganese, unfiltered (µg/L)	159	4,600	12	259	147
Zinc, filtered (µg/L)	159	230	<10	[2]12.8	9.0
Zinc, unfiltered (µg/L)	158	1,700	4	95	43
Sediment, suspended (percent finer than 0.062 mm)	200	99	37	71	72
Sediment, suspended concentration (mg/L)	209	2,250	1	74	22
Sediment, suspended discharge (ton/d)	209	8,690	.24	160	12

Table 25. Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2006.—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 2006					
Streamflow, instantaneous (ft^3/s)	115	3,920	87	731	507
pH, onsite (standard units)	114	8.8	7.9	8.4	8.3
Specific conductance, onsite (µS/cm)	114	510	206	374	394
Temperature, water (°C)	115	23.0	0.0	10.0	10.0
Hardness, filtered (mg/L as $CaCO_3$)	114	230	86	165	170
Calcium, filtered (mg/L)	114	68.0	25.9	48.5	51.2
Magnesium, filtered (mg/L)	114	15.0	5.15	10.5	11.0
Arsenic, filtered (µg/L)	114	20	5.8	10.0	10.0
Arsenic, unfiltered (µg/L)	114	75	7	15	12
Cadmium, filtered (µg/L)	114	.2	<.04	[2].04	<.1
Cadmium, unfiltered (µg/L)	114	2	<.1	[2].18	<1
Copper, filtered (µg/L)	113	36	2.1	6.8	5.6
Copper, unfiltered (µg/L)	113	440	5.2	41.8	23.2
Iron, filtered (µg/L)	114	100	<3	[2]19	12
Iron, unfiltered (µg/L)	114	12,000	27	896	447
Lead, filtered (µg/L)	113	.8	<.08	[2].11	<.5
Lead, unfiltered (µg/L)	113	73	<1	[2]5.81	3.00
Manganese, filtered (µg/L)	114	57.3	4.0	19.3	17.4
Manganese, unfiltered (µg/L)	114	1,100	10	128	90
Zinc, filtered (µg/L)	114	26	<1	[2]6.0	4.0
Zinc, unfiltered (µg/L)	114	510	2	47	30
Sediment, suspended (percent finer than 0.062 mm)	115	94	43	76	78
Sediment, suspended concentration (mg/L)	115	752	2	51	22
Sediment, suspended discharge (ton/d)	115	7,960	.62	224	33

Table 25. Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2006.—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 2006					
Streamflow, instantaneous (ft^3/s)	115	3,860	149	1,010	755
pH, onsite (standard units)	114	8.6	7.8	8.3	8.3
Specific conductance, onsite (µS/cm)	114	630	189	413	433
Temperature, water (°C)	115	22.5	.5	11.0	11.0
Hardness, filtered (mg/L as $CaCO_3$)	114	300	74	187	195
Calcium, filtered (mg/L)	114	83	21	53.6	55.2
Magnesium, filtered (mg/L)	114	22	5.2	12.8	13.1
Arsenic, filtered (µg/L)	114	20	6.6	10.6	10.0
Arsenic, unfiltered (µg/L)	114	62	8	16	13
Cadmium, filtered (µg/L)	114	.30	<.04	[2].05	<.1
Cadmium, unfiltered (µg/L)	114	2	<.1	[2].23	<1
Copper, filtered (µg/L)	112	21	1	6.5	5.0
Copper, unfiltered (µg/L)	112	360	4.6	44.7	22.5
Iron, filtered (µg/L)	114	150	<3	[2]19	9
Iron, unfiltered (µg/L)	113	8,800	20	1,030	468
Lead, filtered (µg/L)	110	1.2	<.08	[2].16	<.60
Lead, unfiltered (µg/L)	110	56	<1	[2]8.00	3.50
Manganese, filtered (µg/L)	114	60.7	4.5	16.7	15.0
Manganese, unfiltered (µg/L)	114	880	8	150	96.3
Zinc, filtered (µg/L)	114	21	<3	[2]6.3	4.6
Zinc, unfiltered (µg/L)	114	490	3	64	34
Sediment, suspended (percent finer than 0.062 mm)	115	92	38	74	74
Sediment, suspended concentration (mg/L)	115	530	2	65	26
Sediment, suspended discharge (ton/d)	115	4,720	1.7	328	49

Table 25. Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2006.—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 2006					
Streamflow, instantaneous (ft^3/s)	212	9,560	296	1,850	1,110
pH, onsite (standard units)	158	8.8	7.4	8.3	8.3
Specific conductance, onsite (µS/cm)	187	483	139	303	315
Temperature, water (°C)	211	22.0	0.0	9.5	9.5
Hardness, filtered (mg/L as $CaCO_3$)	148	210	54	132	135
Calcium, filtered (mg/L)	148	59.0	14.9	37.3	38.0
Magnesium, filtered (mg/L)	148	14.0	3.94	9.51	9.50
Arsenic, filtered (µg/L)	157	17	2.7	6.0	5.2
Arsenic, unfiltered (µg/L)	157	110	3	10	7
Cadmium, filtered (µg/L)	157	.11	<.04	[2].03	<.1
Cadmium, unfiltered (µg/L)	157	4	<.1	[2].27	<1
Copper, filtered (µg/L)	156	25	E1.1	4.9	4.0
Copper, unfiltered (µg/L)	155	500	3	36.6	16.4
Iron, filtered (µg/L)	157	190	<3	[2]24	13
Iron, unfiltered (µg/L)	157	19,000	30	1,090	389
Lead, filtered (µg/L)	153	7	<.08	[2].32	<1
Lead, unfiltered (µg/L)	153	100	<1	[2]7.63	3.00
Manganese, filtered (µg/L)	157	37.4	1.0	8.1	6.8
Manganese, unfiltered (µg/L)	157	2,000	9	129	69
Zinc, filtered (µg/L)	156	39	<3	[2]6.3	4.0
Zinc, unfiltered (µg/L)	157	1,100	<10	[2]64	30
Sediment, suspended (percent finer than 0.062 mm)	201	98	27	73	76
Sediment, suspended concentration (mg/L)	212	1,370	2	59	18
Sediment, suspended discharge (ton/d)	212	34,700	3.0	644	60

Table 25. Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2006.—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 2006					
Streamflow, instantaneous (ft^3/s)	152	13,400	344	2,650	1,310
pH, onsite (standard units)	112	8.7	7.5	8.3	8.3
Specific conductance, onsite (µS/cm)	129	294	131	208	205
Temperature, water (°C)	152	22.5	0.0	9.3	9.5
Hardness, filtered (mg/L as $CaCO_3$)	105	140	55	103	97
Calcium, filtered (mg/L)	105	37	14	26.3	24.8
Magnesium, filtered (mg/L)	105	13.2	4.9	9.11	8.63
Arsenic, filtered (µg/L)	112	2	<1	[2]1.0	1.0
Arsenic, unfiltered (µg/L)	112	4	<1	[2]1	1
Cadmium, filtered (µg/L)	112	1	<.04	--	<.1
Cadmium, unfiltered (µg/L)	112	2	<.04	[2].14	<1
Copper, filtered (µg/L)	110	7	<1	[2]1.5	.9
Copper, unfiltered (µg/L)	109	34	<1	[2]5.4	2.6
Iron, filtered (µg/L)	112	100	<3	[2]18	10
Iron, unfiltered (µg/L)	112	3,600	10	450	195
Lead, filtered (µg/L)	108	8	<.08	[2].45	<.6
Lead, unfiltered (µg/L)	108	25	<.06	[2]2.72	<.05
Manganese, filtered (µg/L)	112	11	<1	[2]2.4	2.0
Manganese, unfiltered (µg/L)	112	180	<10	[2]30	20
Zinc, filtered (µg/L)	112	15	<.6	[2]2.3	<10
Zinc, unfiltered (µg/L)	112	60	<1	[2]6.2	<10
Sediment, suspended (percent finer than 0.062 mm)	150	98	42	80	82
Sediment, suspended concentration (mg/L)	152	271	1	30	8
Sediment, suspended discharge (ton/d)	152	7,670	1.1	526	30

Table 25. Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2006.—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 2006					
Streamflow, instantaneous (ft^3/s)	178	21,600	720	4,390	2,380
pH, onsite (standard units)	135	8.7	7.9	8.3	8.3
Specific conductance, onsite (µS/cm)	155	399	142	254	261
Temperature, water (°C)	175	22.0	0.0	9.5	9.0
Hardness, filtered (mg/L as $CaCO_3$)	135	170	61	117	120
Calcium, filtered (mg/L)	135	46	14	31.6	32.0
Magnesium, filtered (mg/L)	135	13.4	5.28	9.28	9.20
Arsenic, filtered (µg/L)	135	9	1	3.3	3.0
Arsenic, unfiltered (µg/L)	135	69	1	5	4
Cadmium, filtered (µg/L)	135	.2	<.04	[2].03	<.1
Cadmium, unfiltered (µg/L)	135	5	<.1	[2].14	<1
Copper, filtered (µg/L)	134	12.6	.7	2.8	2.0
Copper, unfiltered (µg/L)	133	400	2	16.3	8.0
Iron, filtered (µg/L)	135	200	<3	[2]22	15
Iron, unfiltered (µg/L)	135	13,000	40	592	230
Lead, filtered (µg/L)	130	1.2	<.08	[2].16	<1
Lead, unfiltered (µg/L)	130	78	<1	[2]3.08	1.26
Manganese, filtered (µg/L)	135	230	6.2	17.4	14.2
Manganese, unfiltered (µg/L)	135	1,100	10	64	40
Zinc, filtered (µg/L)	135	16	<1	[2]3.7	2
Zinc, unfiltered (µg/L)	135	1,100	<10	[2]31	13
Sediment, suspended (percent finer than 0.062 mm)	173	99	39	87	90
Sediment, suspended concentration (mg/L)	178	824	2	37	12
Sediment, suspended discharge (ton/d)	178	21,900	5.8	929	74

[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 fine-grained bed-sediment data for the upper Clark Fork basin, Montana, August 1986 through August 2006.

[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. Values for a single sample are arbitrarily listed in the "Mean" column. Values are reported using U.S. Geological Survey rounding standards. Symbols: <, less than the minimum reporting level; --, indicates insufficient data to compute statistic]

Constituent	Number of samples	Maximum	Minimum	Mean	Median
12323600—Silver Bow Creek at Opportunity Period of record for bed-sediment data: 1992–2006					
Arsenic	4	186	119	158	164
Cadmium	15	43.9	22.8	33.2	34.6
Chromium	13	32.4	16.8	24.8	24.8
Copper	15	9,020	2,480	4,770	4,570
Iron	15	41,200	28,200	35,400	34,600
Lead	15	1,030	381	709	788
Manganese	15	9,220	1,680	3,620	2,770
Nickel	14	21.4	12.0	15.1	15.1
Silver	12	20.0	8.3	15.5	15.8
Zinc	15	13,400	4,950	8,220	7,630
12323750—Silver Bow Creek at Warm Springs Period of record for bed-sediment data: 1992–2006					
Arsenic	4	177	97	130	122
Cadmium	15	12.2	4.2	7.5	6.7
Chromium	13	34.1	<15.7	19.2	17.8
Copper	15	769	169	350	278
Iron	15	31,700	15,400	22,200	20,800
Lead	15	100	49	70	68
Manganese	15	17,700	1,470	8,520	8,590
Nickel	14	19.1	9.2	14.6	14.6
Silver	12	4.4	.3	[1]1.9	[1]1.8
Zinc	15	2,220	620	1,020	812
12323770—Warm Springs Creek at Warm Springs Period of record for bed-sediment data: 1995, 1997, 1999, 2002, 2005					
Arsenic	1	--	--	66	--
Cadmium	5	5.8	1.3	3.6	3.9
Chromium	5	33.4	27.5	30.4	30.8
Copper	5	991	779	878	881
Iron	5	22,400	16,800	20,700	21,900
Lead	5	86	67	81	85
Manganese	5	12,100	2,020	7,980	8,790
Nickel	5	21.9	17.6	19.2	19.2
Silver	4	5.1	3.1	3.8	3.5
Zinc	5	421	372	395	396

Table 26. Statistical summary of long-term fine-grained bed-sediment data for the upper Clark Fork basin, Montana, August 1986 through August 2006.—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. Values for a single sample are arbitrarily listed in the "Mean" column. Values are reported using U.S. Geological Survey rounding standards. Symbols: <, less than the minimum reporting level; --, indicates insufficient data to compute statistic]

Constituent	Number of samples	Maximum	Minimum	Mean	Median
12323800—Clark Fork near Galen Period of record for bed-sediment data: 1987, 1991–2006					
Arsenic	4	119	95	108	109
Cadmium	17	20.1	4.0	9.2	7.8
Chromium	13	33.9	19.1	26.4	26.4
Copper	17	2,300	838	1,220	1,110
Iron	17	39,800	22,600	27,800	27,000
Lead	17	235	92	138	133
Manganese	17	17,300	2,780	9,640	11,000
Nickel	14	23.2	13.9	18.1	18.0
Silver	14	7.3	<3.2	[1]4.4	[1]4.5
Zinc	17	3,560	999	1,580	1,170
461415112450801—Clark Fork below Lost Creek, near Galen Period of record for bed-sediment data: 1996–2006					
Arsenic	4	204	92	129	109
Cadmium	11	10.5	5.2	7.6	7.3
Chromium	10	34.5	20.5	27.6	26.6
Copper	11	2,050	1,150	1,490	1,420
Iron	11	32,800	24,400	29,300	30,300
Lead	11	218	127	173	174
Manganese	11	9,820	3,540	6,030	5,750
Nickel	11	19.9	11.7	15.9	16.3
Silver	8	7.8	4.2	6.5	6.7
Zinc	11	1,680	1,120	1,360	1,300
461559112443301—Clark Fork at county bridge, near Racetrack Period of record for bed-sediment data: 1996–2006					
Arsenic	4	101	56	76	73
Cadmium	11	8.7	5.0	6.9	6.4
Chromium	10	33.3	19.0	25.3	26.3
Copper	11	1,610	933	1,190	1,120
Iron	11	31,700	21,200	26,500	28,100
Lead	11	186	103	142	135
Manganese	11	6,310	2,100	3,650	3,400
Nickel	11	18.4	10.3	14.1	14.8
Silver	8	6.1	<3.3	[1]5.0	[1]5.4
Zinc	11	1,550	999	1,200	1,130

Table 26. Statistical summary of long-term fine-grained bed-sediment data for the upper Clark Fork basin, Montana, August 1986 through August 2006.—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. Values for a single sample are arbitrarily listed in the "Mean" column. Values are reported using U.S. Geological Survey rounding standards. Symbols: <, less than the minimum reporting level; --, indicates insufficient data 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: 1996–2006					
Arsenic	4	80	58	68	67
Cadmium	11	10.3	4.3	6.7	6.0
Chromium	10	34.1	16.0	24.5	24.1
Copper	11	1,550	721	1,020	992
Iron	11	33,700	20,600	26,000	25,200
Lead	11	155	92	127	121
Manganese	11	8,370	1,810	4,090	3,910
Nickel	11	16.9	8.7	12.8	12.4
Silver	8	6.2	2.7	4.9	5.0
Zinc	11	1,570	900	1,140	1,080
12324200—Clark Fork at Deer Lodge Period of record for bed-sediment data: 1986–87, 1990–2006					
Arsenic	4	77	49	65	66
Cadmium	19	10.0	3.8	6.5	6.0
Chromium	13	43.9	19.5	29.9	28.4
Copper	19	4,180	683	1,300	1,040
Iron	19	35,300	21,100	27,200	26,100
Lead	19	242	103	149	148
Manganese	19	6,020	1,110	2,740	2,440
Nickel	14	21.1	11.5	15.1	14.3
Silver	16	7.9	2.4	4.7	4.5
Zinc	19	1,730	846	1,230	1,260
12324680—Clark Fork at Goldcreek Period of record for bed-sediment data: 1992–2006					
Arsenic	4	39	23	30	28
Cadmium	15	8.1	2.6	5.0	5.4
Chromium	13	48.9	21.3	31.2	31.6
Copper	15	1,080	338	669	729
Iron	15	30,600	15,500	23,300	23,700
Lead	15	152	52	94	93
Manganese	15	2,610	1,160	1,900	1,840
Nickel	14	18.6	9.0	14.3	14.5
Silver	12	4.8	2.3	3.3	3.2
Zinc	15	1,320	584	951	1,080

Table 26. Statistical summary of long-term fine-grained bed-sediment data for the upper Clark Fork basin, Montana, August 1986 through August 2006.—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. Values for a single sample are arbitrarily listed in the "Mean" column. Values are reported using U.S. Geological Survey rounding standards. Symbols: <, less than the minimum reporting level; --, indicates insufficient data 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, 1991–2006					
Arsenic	4	34	31	32	32
Cadmium	18	7.7	2.6	4.7	4.6
Chromium	13	35.4	17.0	28.3	30.1
Copper	18	747	321	490	480
Iron	18	27,000	16,500	21,400	20,300
Lead	18	135	64	91	89
Manganese	18	3,520	1,150	1,990	1,890
Nickel	14	16.8	10.4	13.7	13.7
Silver	15	4.7	<3.2	[1]3.0	[1]2.9
Zinc	18	1,230	742	983	975
12334550—Clark Fork at Turah Bridge, near Bonner Period of record for bed-sediment data: 1986, 1991–2006					
Arsenic	4	30	19	23	22
Cadmium	17	7.3	1.9	3.9	3.9
Chromium	13	34.7	15.3	24.4	26.7
Copper	17	635	211	356	322
Iron	17	24,400	12,600	18,500	17,300
Lead	17	115	47	69	63
Manganese	17	2,270	671	1,230	1,240
Nickel	14	19.1	8.7	12.7	11.6
Silver	14	3.9	<1.9	[1]2.1	[1]1.9
Zinc	17	1,160	584	832	789
12340000—Blackfoot River near Bonner Period of record for bed-sediment data: 1986–87, 1991, 1993–96, 1998–2001, 2003, 2006					
Arsenic	2	4	2	--	--
Cadmium	13	2.0	<.2	[1]0.6	[1]<0.8
Chromium	9	25.8	15.1	20.9	22.0
Copper	13	27	11	20	21
Iron	13	20,200	12,400	17,000	17,800
Lead	13	20	<13	[1]13	[1]13
Manganese	13	683	298	513	535
Nickel	10	14.3	9.4	11.9	12.2
Silver	12	<1.9	<.3	[1].5	[1]<.6
Zinc	13	73	35	59	61

Table 26. Statistical summary of long-term fine-grained bed-sediment data for the upper Clark Fork basin, Montana, August 1986 through August 2006.—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. Values for a single sample are arbitrarily listed in the "Mean" column. Values are reported using U.S. Geological Survey rounding standards. Symbols: <, less than the minimum reporting level; --, indicates insufficient data to compute statistic]

Constituent	Number of samples	Maximum	Minimum	Mean	Median
12340500—Clark Fork above Missoula Period of record for bed-sediment data: 1997–2006					
Arsenic	4	52	17	30	26
Cadmium	10	5.8	1.5	3.4	3.5
Chromium	9	30.6	19.0	25.1	25.9
Copper	10	551	166	351	304
Iron	10	24,300	18,100	20,300	20,500
Lead	10	78	37	56	57
Manganese	10	1,420	477	981	996
Nickel	10	15.8	10.9	13.1	12.8
Silver	7	2.9	.8	[1]2.0	[1]2.1
Zinc	10	1,090	438	734	706

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

Table 27. Statistical summary of long-term biological data for the upper Clark Fork basin, Montana, August 1986 through August 2006.

[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 data were not collected at some sites. 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, 1997–2006					
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	6	20.4	9.5	13.1	12.0
Cadmium	12	9.7	3.1	5.4	5.0
Chromium	12	8.0	1.0	2.9	1.9
Copper	12	1,090	269	427	365
Iron	12	2,880	689	1,570	1,360
Lead	12	56.7	19.0	31.1	22.7
Manganese	12	3,030	180	937	764
Nickel	12	3.6	.7	2.0	1.9
Zinc	12	1,590	619	904	797
Hydropsyche spp.					
Arsenic	6	23.1	10.7	17.2	18.4
Cadmium	11	11.0	4.2	6.8	5.7
Chromium	11	4.7	.6	2.1	1.5
Copper	11	930	312	572	469
Iron	11	2,630	1,050	1,930	2,100
Lead	11	51.4	21.8	39.6	39.9
Manganese	11	1,340	712	1,080	1,040
Nickel	11	2.5	.7	2.2	2.4
Zinc	11	1,290	784	1,050	1,090

Table 27. Statistical summary of long-term biological data for the upper Clark Fork basin, Montana, August 1986 through August 2006.—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 data were not collected at some sites. 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, 1997–2006					
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: 1992–2006					
Hydropsyche cockerelli					
Arsenic	7	23.6	7.9	15.4	16.9
Cadmium	33	2.1	.2	.7	.5
Chromium	33	4.3	.4	1.0	.8
Copper	33	97.0	16.7	38.5	31.1
Iron	33	1,590	351	789	762
Lead	33	5.7	.3	2.9	2.6
Manganese	33	3,890	491	1,340	1,220
Nickel	33	1.8	.3	.9	.8
Zinc	33	276	115	176	168
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 2006.—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 data were not collected at some sites. 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: 1992–2006					
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					
Arctopsyche grandis					
Arsenic	2	9.8	9.5	9.6	--
Cadmium	6	3.6	1.9	2.7	2.7
Chromium	6	2.9	.8	1.7	1.6
Copper	6	133	78.3	106	100
Iron	6	1,100	684	918	957
Lead	6	5.6	3.0	[1]4.7	[1]5.2
Manganese	6	3,560	1,340	2,560	2,710
Nickel	6	2.8	1.8	[1]2.3	[1]2.3
Zinc	6	222	181	196	196
Hydropsyche occidentalis					
Arsenic	2	13.6	12.7	13.2	--
Cadmium	4	1.2	.7	1.0	1.0
Chromium	4	3.2	.3	2.2	3.2
Copper	4	183	125	156	158
Iron	4	2,070	1,590	1,840	1,840
Lead	4	8.2	6.7	7.4	7.4
Manganese	4	3,190	2,400	2,790	2,770
Nickel	4	3.3	2.0	2.6	2.6
Zinc	4	172	148	160	160

Table 27. Statistical summary of long-term biological data for the upper Clark Fork basin, Montana, August 1986 through August 2006.—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 data were not collected at some sites. 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					
			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, 1991–2006					
			Hydropsyche cockerelli		
Arsenic	6	15.8	13.2	14.2	13.8
Cadmium	31	2.7	.7	1.4	1.5
Chromium	31	4.4	.8	1.9	1.6
Copper	31	181	48.7	103	98.9
Iron	31	2,660	816	1,450	1,350
Lead	31	11.8	1.2	7.9	7.7
Manganese	31	3,620	1,070	2,270	2,290
Nickel	31	6.5	.9	1.8	1.6
Zinc	31	299	136	208	204
			Hydropsyche morosa group		
Arsenic	0	--	--	--	--
Cadmium	5	3.2	2.4	2.5	2.4
Chromium	5	4.6	1.8	2.6	2.2
Copper	5	185	156	173	175
Iron	5	1,890	1,360	1,510	1,430
Lead	5	12.4	7.1	8.5	7.9
Manganese	5	3,960	2,360	3,500	3,860
Nickel	5	3.6	1.9	2.3	2.1
Zinc	5	349	292	309	303

Table 27. Statistical summary of long-term biological data for the upper Clark Fork basin, Montana, August 1986 through August 2006.—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 data were not collected at some sites. 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, 1991–2006					
Hydropsyche occidentalis					
Arsenic	4	16.5	12.5	15.2	16.0
Cadmium	36	1.7	.6	1.1	1.1
Chromium	36	6.6	.4	2.0	1.5
Copper	36	121	49.2	82.3	81.6
Iron	36	1,920	642	1,270	1,220
Lead	36	13.5	1.6	7.0	6.6
Manganese	36	6,170	1,220	2,600	2,260
Nickel	36	3.5	.8	1.6	1.5
Zinc	36	286	168	199	193
Hydropsyche tana					
Arsenic	0	--	--	--	--
Cadmium	1	--	--	1.5	--
Chromium	1	--	--	1.4	--
Copper	1	--	--	92.9	--
Iron	1	--	--	1,340	--
Lead	1	--	--	9.0	--
Manganese	1	--	--	2,160	--
Nickel	1	--	--	2.1	--
Zinc	1	--	--	206	--
Hydropsyche spp.					
Arsenic	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

Table 27. Statistical summary of long-term biological data for the upper Clark Fork basin, Montana, August 1986 through August 2006.—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 data were not collected at some sites. Values are reported using U.S. Geological Survey rounding standards. Abbreviation: spp., one or more similar species. Symbols: <, less than minimum reporting level; --, indicates either too few samples (less than three) or insufficient data to compute statistic, or element not analyzed]

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
461415112450801—Clark Fork below Lost Creek, near Galen Period of record for biological data: 1996–2006					
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	9	27.8	8.8	14.5	11.6
Cadmium	20	2.8	1.1	1.8	1.6
Chromium	20	3.6	.8	2.0	2.0
Copper	20	338	48.8	130	112
Iron	20	4,080	691	1,540	1,180
Lead	20	28.6	4.5	11.5	9.0
Manganese	20	3,160	1,230	1,860	1,700
Nickel	20	2.8	.9	1.3	1.1
Zinc	20	339	151	225	223
Hydropsyche occidentalis					
Arsenic	4	20.8	12.7	15.5	14.3
Cadmium	18	1.8	.9	1.3	1.4
Chromium	18	3.6	1.2	2.0	1.9
Copper	18	219	52.1	110	110
Iron	18	2,830	963	1,460	1,390
Lead	18	19.4	6.6	10.0	9.6
Manganese	18	3,870	1,220	2,290	2,160
Nickel	18	2.5	.9	1.4	1.4
Zinc	18	308	174	232	236

Table 27. Statistical summary of long-term biological data for the upper Clark Fork basin, Montana, August 1986 through August 2006.—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 data were not collected at some sites. 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: 1996–2006					
			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: 1996–2006					
			Claassenia sabulosa		
Arsenic	0	--	--	--	--
Cadmium	1	--	--	0.4	--
Chromium	1	--	--	.3	--
Copper	1	--	--	40.3	--
Iron	1	--	--	113	--
Lead	1	--	--	.8	--
Manganese	1	--	--	172	--
Nickel	1	--	--	.2	--
Zinc	1	--	--	213	--
			Hydropsyche cockerelli		
Arsenic	8	16.5	11.1	13.1	11.9
Cadmium	19	1.9	.8	1.4	1.5
Chromium	19	2.7	.6	1.6	1.2
Copper	19	198	50.0	96.5	91.4
Iron	19	2,720	657	1,140	981
Lead	19	17.2	3.7	7.9	7.2
Manganese	19	2,020	646	1,570	1,830
Nickel	19	2.0	.7	1.1	1.0
Zinc	19	240	139	182	179

Table 27. Statistical summary of long-term biological data for the upper Clark Fork basin, Montana, August 1986 through August 2006.—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 data were not collected at some sites. 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: 1996–2006					
Hydropsyche occidentalis					
Arsenic	4	15.0	13.7	14.5	14.6
Cadmium	17	2.2	.7	1.4	1.3
Chromium	17	3.7	1.1	2.1	2.0
Copper	17	160	59.5	110	124
Iron	17	2,370	1,030	1,590	1,580
Lead	17	14.7	4.3	10.2	10.1
Manganese	17	3,770	1,090	2,180	2,100
Nickel	17	1.9	1.1	1.4	1.3
Zinc	17	255	181	227	229
Hydropsyche spp.					
Arsenic	2	12.7	11.9	--	--
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
461903112440701—Clark Fork at Dempsey Creek diversion, near Racetrack Period of record for biological data: 1996–2006					
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	--

Table 27. Statistical summary of long-term biological data for the upper Clark Fork basin, Montana, August 1986 through August 2006.—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 data were not collected at some sites. 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: 1996–2006					
Hydropsyche cockerelli					
Arsenic	6	18.8	8.0	13.0	12.8
Cadmium	15	1.7	.7	1.2	1.3
Chromium	15	4.0	.5	1.5	1.0
Copper	15	198	60.7	106	87.6
Iron	15	2,310	552	1,100	851
Lead	15	17.7	3.5	7.5	6.3
Manganese	15	2,650	487	1,380	1,230
Nickel	15	2.1	.5	1.1	.9
Zinc	15	275	162	201	182
Hydropsyche occidentalis					
Arsenic	4	24.0	10.2	14.7	12.3
Cadmium	21	1.8	.7	1.2	1.1
Chromium	21	6.2	.8	2.0	1.8
Copper	21	238	74.9	106	90.7
Iron	21	3,390	940	1,500	1,500
Lead	21	21.8	6.1	11.3	11.2
Manganese	21	3,990	826	2,500	2,320
Nickel	21	2.4	1.2	1.5	1.4
Zinc	21	355	211	249	237
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	--

Table 27. Statistical summary of long-term biological data for the upper Clark Fork basin, Montana, August 1986 through August 2006.—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 data were not collected at some sites. Values are reported using U.S. Geological Survey rounding standards. Abbreviation: spp., one or more similar species. Symbols: <, less than minimum reporting level; --, indicates either too few samples (less than three) or insufficient data to compute statistic, or element not analyzed]

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
12324200—Clark Fork at Deer Lodge Period of record for biological data: 1986–87, 1990–2006					
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	5	11.4	5.8	8.1	7.3
Cadmium	28	2.3	.6	1.4	1.3
Chromium	28	3.2	.4	1.6	1.6
Copper	28	180	54.7	97.6	98.0
Iron	28	3,340	490	1,120	1,040
Lead	28	18.1	3.8	9.4	8.9
Manganese	28	1,570	396	873	772
Nickel	28	2.4	.3	1.1	1.0
Zinc	28	391	132	188	185
Hydropsyche occidentalis					
Arsenic	6	12.4	6.6	10.1	10.4
Cadmium	43	2.7	.6	1.3	1.3
Chromium	43	3.6	.6	1.9	1.9
Copper	43	180	49.4	116	112
Iron	43	2,060	557	1,400	1,420
Lead	43	18.6	3.5	11.1	10.8
Manganese	43	2,850	649	1,710	1,730
Nickel	43	12.9	1.0	1.7	1.4
Zinc	43	329	166	241	236

Table 27. Statistical summary of long-term biological data for the upper Clark Fork basin, Montana, August 1986 through August 2006.—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 data were not collected at some sites. 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, 1990–2006					
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: 1992–2006					
Arctopsyche grandis					
Arsenic	17	6.4	1.8	3.8	2.7
Cadmium	46	6.6	.6	1.9	1.7
Chromium	46	3.3	.1	1.3	1.0
Copper	46	129	19.9	42.5	32.3
Iron	46	2,360	195	646	479
Lead	46	10.9	1.0	3.4	3.3
Manganese	46	1,580	436	843	812
Nickel	46	1.8	.2	.7	.6
Zinc	46	326	146	196	179
Claassenia sabulosa					
Arsenic	11	2.1	0.7	1.3	1.4
Cadmium	31	3.5	.1	1.0	.7
Chromium	31	1.6	.2	.6	.5
Copper	31	81.7	33.0	57.4	57.1
Iron	31	567	63.0	189	171
Lead	31	1.8	.4	.9	.8
Manganese	31	320	50.6	151	119
Nickel	31	.7	.1	.3	.3
Zinc	31	351	166	264	261

Table 27. Statistical summary of long-term biological data for the upper Clark Fork basin, Montana, August 1986 through August 2006.—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 data were not collected at some sites. 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: 1992–2006					
Hydropsyche cockerelli					
Arsenic	10	6.1	4.1	5.1	4.8
Cadmium	29	2.6	.5	1.3	1.2
Chromium	29	4.7	.5	2.1	1.9
Copper	29	188	17.1	68.3	55.5
Iron	29	3,250	522	1,110	813
Lead	29	16.2	2.4	6.3	5.2
Manganese	29	1,670	538	935	937
Nickel	29	2.3	.3	1.2	1.0
Zinc	29	249	106	183	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
Hydropsyche occidentalis					
Arsenic	4	5.8	4.7	5.2	5.2
Cadmium	19	1.7	.4	1.2	1.3
Chromium	19	3.9	.4	1.6	1.7
Copper	19	156	26.4	62.0	57.6
Iron	19	2,720	466	1,110	1,040
Lead	19	15.7	2.9	6.8	5.7
Manganese	19	2,210	530	1,230	1,140
Nickel	19	2.5	.8	1.2	1.0
Zinc	19	277	97	196	201

Table 27. Statistical summary of long-term biological data for the upper Clark Fork basin, Montana, August 1986 through August 2006.—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 data were not collected at some sites. Values are reported using U.S. Geological Survey rounding standards. Abbreviation: spp., one or more similar species. Symbols: <, less than minimum reporting level; --, indicates either too few samples (less than three) or insufficient data to compute statistic, or element not analyzed]

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
12331800—Clark Fork near Drummond Period of record for biological data: 1986, 1991–2006					
Arctopsyche grandis					
Arsenic	10	4.4	2.3	3.2	3.2
Cadmium	42	3.8	.4	1.3	1.1
Chromium	42	2.5	.2	1.0	1.0
Copper	42	89.2	16.9	32.1	26.7
Iron	42	1,660	193	560	496
Lead	42	11.8	1.6	4.3	3.9
Manganese	42	2,010	456	831	721
Nickel	42	1.9	.2	.6	.6
Zinc	42	308	140	187	183
Claassenia sabulosa					
Arsenic	8	1.5	0.7	1.2	1.2
Cadmium	44	2.8	.1	1.1	1.0
Chromium	44	3.3	.1	.7	.6
Copper	44	165	18.0	64.1	55.9
Iron	44	387	45.4	157	135
Lead	44	2.9	.2	.9	.8
Manganese	44	410	33.1	167	146
Nickel	44	1.1	.1	[1].3	[1].2
Zinc	44	567	103	273	256
Hydropsyche cockerelli					
Arsenic	7	5.7	3.9	4.5	4.4
Cadmium	36	2.3	.3	1.1	.8
Chromium	36	3.5	.4	1.6	1.5
Copper	36	156	30.0	58.1	50.5
Iron	36	2,500	506	1,140	940
Lead	36	15.0	4.8	8.1	7.0
Manganese	36	1,680	549	977	914
Nickel	36	2.0	.5	1.1	1.0
Zinc	36	248	134	192	185

Table 27. Statistical summary of long-term biological data for the upper Clark Fork basin, Montana, August 1986 through August 2006.—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 data were not collected at some sites. 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, 1991–2006					
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	7	6.9	4.3	5.1	5.1
Cadmium	23	2.0	.4	1.0	1.0
Chromium	23	8.1	.4	2.3	2.1
Copper	23	118	13.3	54.3	55.1
Iron	23	2,060	424	1,210	1,180
Lead	23	14.0	2.9	8.5	8.4
Manganese	23	2,920	619	1,500	1,220
Nickel	23	2.4	.5	1.3	1.2
Zinc	23	293	157	220	221
Hydropsyche spp.					
Arsenic	0	--	--	--	--
Cadmium	1	--	--	2.6	--
Chromium	0	--	--	--	--
Copper	1	--	--	85.0	--
Iron	1	--	--	913	--
Lead	1	--	--	9.1	--
Manganese	0	--	--	--	--
Nickel	0	--	--	--	--
Zinc	1	--	--	260	--

Table 27. Statistical summary of long-term biological data for the upper Clark Fork basin, Montana, August 1986 through August 2006.—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 data were not collected at some sites. Values are reported using U.S. Geological Survey rounding standards. Abbreviation: spp., one or more similar species. Symbols: <, less than minimum reporting level; --, indicates either too few samples (less than three) or insufficient data to compute statistic, or element not analyzed]

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
12334550—Clark Fork at Turah Bridge, near Bonner Period of record for biological data: 1986, 1991–2006					
Arctopsyche grandis					
Arsenic	14	5.0	3.1	4.3	4.4
Cadmium	56	2.7	.4	1.1	.8
Chromium	56	4.1	.5	1.6	1.4
Copper	56	125	20.1	37.3	29.4
Iron	56	2,870	372	915	789
Lead	56	13.2	1.6	4.2	3.4
Manganese	56	902	324	635	641
Nickel	56	2.7	.4	1.1	.9
Zinc	56	276	111	196	196
Claassenia sabulosa					
Arsenic	9	1.9	0.8	1.2	1.1
Cadmium	35	2.5	.1	1.0	.8
Chromium	35	2.0	.2	.7	.6
Copper	35	87.6	37.5	57.5	53.4
Iron	35	340	58.6	117	107
Lead	35	1.6	.2	.6	.6
Manganese	35	215	37.2	88.7	74.6
Nickel	35	.6	.1	.2	.2
Zinc	35	342	144	228	234
Hydropsyche cockerelli					
Arsenic	10	5.1	3.7	4.4	4.5
Cadmium	38	1.8	.3	.8	.7
Chromium	38	8.0	.2	1.9	1.6
Copper	38	118	26.4	47.5	42.4
Iron	38	2,530	566	1,190	1,090
Lead	38	12.1	2.2	5.2	4.9
Manganese	38	805	426	621	624
Nickel	38	2.6	.6	1.2	1.2
Zinc	38	228	119	184	184

Table 27. Statistical summary of long-term biological data for the upper Clark Fork basin, Montana, August 1986 through August 2006.—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 data were not collected at some sites. 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, 1991–2006					
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	7	5.9	3.6	4.3	4.1
Cadmium	27	1.8	.3	.8	.8
Chromium	27	3.2	.6	1.7	1.6
Copper	27	102	27.4	47.5	42.5
Iron	27	2,310	472	1,190	1,130
Lead	27	14.2	3.0	6.3	5.6
Manganese	27	1,600	454	856	758
Nickel	27	3.2	.6	1.2	1.1
Zinc	27	416	145	211	222
Hydropsyche spp.					
Arsenic	0	--	--	--	--
Cadmium	1	--	--	1.3	--
Chromium	1	--	--	2.4	--
Copper	1	--	--	84.1	--
Iron	1	--	--	1,800	--
Lead	1	--	--	<7.8	--
Manganese	1	--	--	537	--
Nickel	1	--	--	1.3	--
Zinc	1	--	--	171	--

Table 27. Statistical summary of long-term biological data for the upper Clark Fork basin, Montana, August 1986 through August 2006.—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 data were not collected at some sites. Values are reported using U.S. Geological Survey rounding standards. Abbreviation: spp., one or more similar species. Symbols: <, less than minimum reporting level; --, indicates either too few samples (less than three) or insufficient data to compute statistic, or element not analyzed]

Constituent	Number of composite samples	Maximum	Minimum	Mean	Median
12340000—Blackfoot River near Bonner Period of record for biological data: 1986–87, 1991, 1993, 1996, 1998, 2000, 2003, 2006					
Arctopsyche grandis					
Arsenic	2	2.8	2.2	--	--
Cadmium	12	.4	.1	0.2	0.2
Chromium	7	1.8	.8	1.3	1.2
Copper	12	14.9	9.9	12.2	12.0
Iron	12	1,230	108	633	625
Lead	12	2.3	.5	1.0	.8
Manganese	7	578	286	429	398
Nickel	7	1.2	.7	1.0	1.0
Zinc	12	145	123	136	137
Claassenia sabulosa					
Arsenic	2	1.7	1.4	--	--
Cadmium	13	.2	.1	0.1	0.1
Chromium	8	1.0	.3	.6	.6
Copper	13	88.5	19.0	43.9	44.0
Iron	13	194	46.2	112	113
Lead	13	.6	.1	.4	.4
Manganese	8	127	26.3	63.8	52.6
Nickel	8	.4	.1	.2	.2
Zinc	13	329	117	214	197
Hydropsyche cockerelli					
Arsenic	1	--	--	3.0	--
Cadmium	1	--	--	<.1	--
Chromium	1	--	--	2.4	--
Copper	1	--	--	5.6	--
Iron	1	--	--	1,960	--
Lead	1	--	--	2.3	--
Manganese	1	--	--	716	--
Nickel	1	--	--	1.9	--
Zinc	1	--	--	140	--

Table 27. Statistical summary of long-term biological data for the upper Clark Fork basin, Montana, August 1986 through August 2006.—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 data were not collected at some sites. 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					
Hydropsyche occidentalis					
Arsenic	2	3.2	2.4	--	--
Cadmium	14	.5	.1	0.2	0.2
Chromium	14	3.2	.8	1.9	1.9
Copper	14	20.6	12.0	14.6	14.4
Iron	14	1,930	1,060	1,410	1,440
Lead	14	1.9	.8	1.4	1.3
Manganese	14	762	414	500	470
Nickel	14	1.8	.9	1.3	1.3
Zinc	14	153	116	136	136
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	--
12340500—Clark Fork above Missoula Period of record for biological data: 1997–2006					
Arctopsyche grandis					
Arsenic	12	4.5	2.1	3.3	3.3
Cadmium	31	1.8	.1	.7	.6
Chromium	31	3.4	.6	1.6	1.5
Copper	31	77.6	19.5	34.1	30.2
Iron	31	2,340	476	955	892
Lead	31	6.8	1.2	3.9	3.8
Manganese	31	1,410	476	930	924
Nickel	31	2.0	.5	1.1	1.0
Zinc	31	260	133	186	184

Table 27. Statistical summary of long-term biological data for the upper Clark Fork basin, Montana, August 1986 through August 2006.—Continued

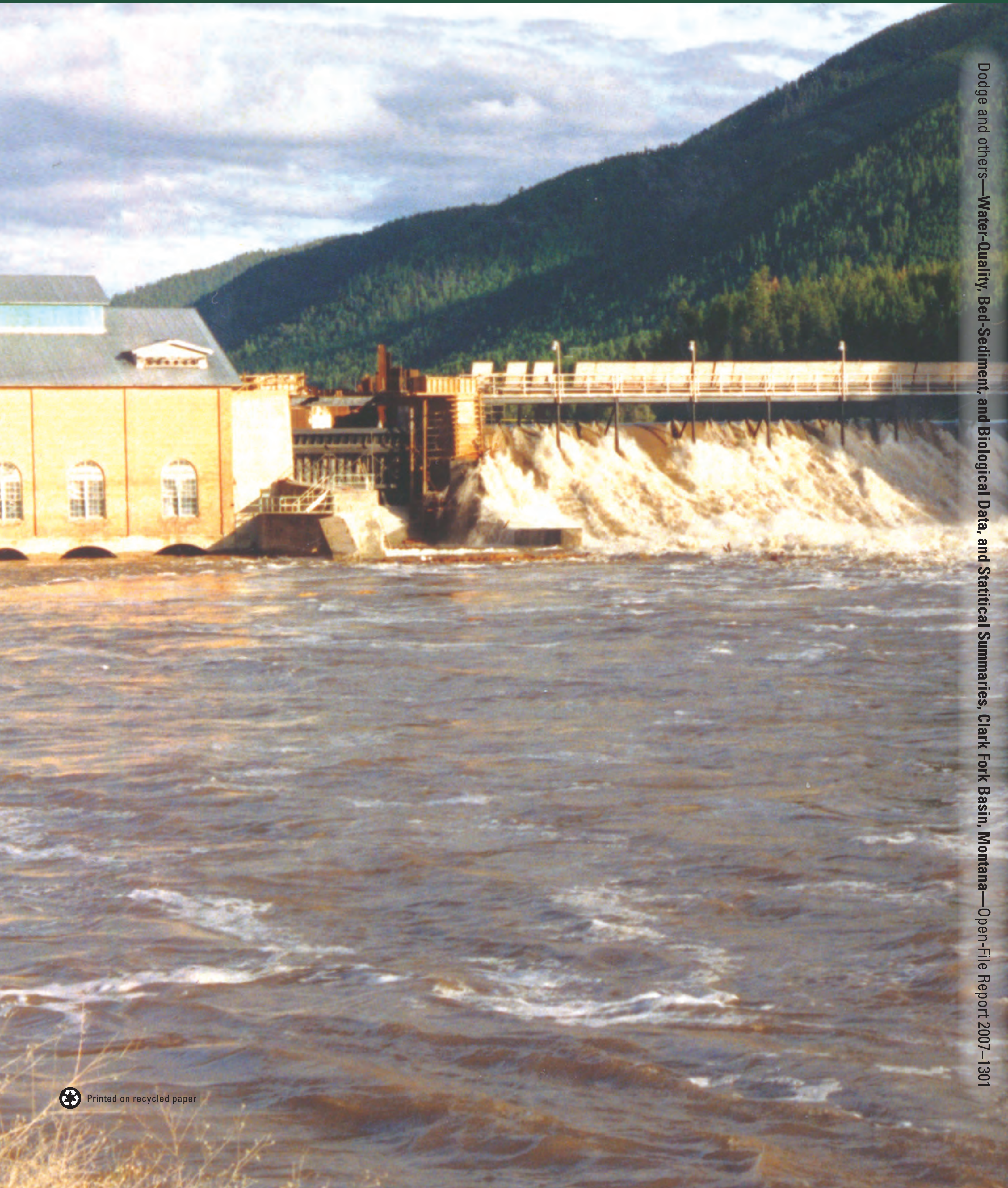
[Concentrations are in micrograms per gram dry weight (µg/g). Number of composite samples represents the total of all individual composite samples collected for every year that the constituent was analyzed. Values for a single sample are arbitrarily listed in the "Mean" column. Because *Hydropsyche* 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 data were not collected at some sites. 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: 1997–2006					
Claassenia sabulosa					
Arsenic	6	1.9	0.7	1.4	1.5
Cadmium	15	2.0	.2	.6	.4
Chromium	15	1.4	.3	.8	.7
Copper	15	71.7	33.0	50.4	46.8
Iron	15	402	95.3	249	246
Lead	15	3.1	.5	1.2	1.1
Manganese	15	683	75.2	238	190
Nickel	15	.5	<.3	[1].4	[1].4
Zinc	15	363	191	271	271
Hydropsyche cockerelli					
Arsenic	9	8.0	3.6	6.1	6.4
Cadmium	18	1.3	.4	.8	.8
Chromium	18	6.0	1.8	3.2	3.2
Copper	18	97.9	29.9	62.2	58.0
Iron	18	3,590	1,400	2,100	2,060
Lead	18	11.8	4.2	7.5	6.6
Manganese	18	1,910	781	1,260	1,210
Nickel	18	2.4	1.4	1.8	1.8
Zinc	18	266	156	210	210
Hydropsyche occidentalis					
Arsenic	4	6.2	3.9	5.6	6.2
Cadmium	10	1.2	.4	.7	.7
Chromium	10	5.5	2.1	3.3	3.0
Copper	10	76.5	30.3	53.9	57.3
Iron	10	2,400	1,450	2,010	2,110
Lead	10	11.1	4.0	7.3	7.2
Manganese	10	2,460	939	1,880	1,950
Nickel	10	2.4	1.6	2.0	2.0
Zinc	10	258	192	232	231

[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.

Prepared by the Helena Publishing Service Center

For additional information contact:
Director, Montana Water Science Center
U.S. Geological Survey
3162 Bozeman Avenue
Helena, Montana 59601
(406) 457-5900
http://mt.water.usgs.gov/



Dodge and others—**Water-Quality, Bed-Sediment, and Biological Data, and Statitical Summaries, Clark Fork Basin, Montana**—Open-File Report 2007–1301