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# Water-Quality, Bed-Sediment, and Biological Data (October 2008 through September 2009) and Statistical Summaries of Long-Term Data for Streams in the Clark Fork Basin, Montana

Open-File Report 2010–1267

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

**Cover.** Artist's rendition of the Clark Fork and Blackfoot River's confluence near Bonner, Montana, after completion of the Milltown Reservoir sediment remediation project. Image provided by Diana Hammer, U.S. Environmental Protection Agency, November 24, 2009.

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

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## 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 2009 is the period from October 1, 2008, through September 30, 2009.

## 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 | microsiemen per centimeter at 25 degrees Celsius |
| mg/L | milligram per liter |
| nm | nanometer |
| ppm | part per million |

## Acronyms used in the report:

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

# Water-Quality, Bed-Sediment, and Biological Data (October 2008 through September 2009) and Statistical Summaries of Long-Term Data for Streams in the Clark Fork Basin, Montana

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## Abstract

Water, bed sediment, and biota were sampled in streams from Butte to near Missoula, Montana, as part of a long-term monitoring program in the upper Clark Fork basin; additional water samples were collected in the Clark Fork basin from sites near Missoula downstream to near the confluence of the Clark Fork and Flathead River as part of a supplemental sampling program. The sampling programs were conducted by the U.S. Geological Survey in cooperation with the U.S. Environmental Protection Agency to characterize aquatic resources in the Clark Fork basin of western Montana, with emphasis on trace elements associated with historic mining and smelting activities. Sampling sites were located on the Clark Fork and selected tributaries. Water samples were collected periodically at 24 sites from October 2008 through September 2009. Bed-sediment and biota samples were collected once at 13 sites during August 2009.

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 2008 through September 2009. Water-quality data include concentrations of selected major ions, trace elements, and suspended sediment. Turbidity was analyzed for water samples collected at the four sites where seasonal daily values of turbidity were being determined as well as at Clark Fork above Missoula. Nutrients also were analyzed at all the supplemental water-quality sites, except for Clark Fork Bypass, near Bonner. Daily values of suspended-sediment concentration and suspended-sediment discharge were determined for four sites. Bed-sediment data include trace-element concentrations in the fine-grained fraction. Biological data include trace-element concentrations in whole-body tissue of aquatic benthic insects. Statistical summaries of long-term water-quality, bed-sediment, and biological data for sites in the upper Clark Fork basin are provided for the period of record since 1985.

## Introduction

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

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

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

characterize the aquatic resources in the upper Clark Fork basin to guide and monitor remedial cleanup activities. A long-term database was considered necessary to detect trends over time in order to evaluate the effectiveness of remediation. Water-quality data have been collected by the U.S. Geological Survey (USGS) at selected sites in the upper Clark Fork basin since 1985 (Lambing, 1987 through 1991; Lambing and others, 1994, 1995; Dodge and others, 1996 through 2009). Trace-element data for bed-sediment and biota (aquatic benthic insects) have been collected intermittently at selected sites since 1986 as part of studies on contamination of bed-sediment-quality and bioaccumulation of metals conducted by the USGS National Research Program (Axtmann and Luoma, 1991; Cain and others, 1992, 1995; Axtmann and others, 1997; Hornberger and others, 1997).

In March 1993, an expanded long-term monitoring program for water, bed-sediment, and biota in the upper basin was implemented by the USGS in cooperation with the U.S. Environmental Protection Agency to systematically quantify the seasonal and annual variability in selected constituents. In April 2006, a supplemental water-quality sampling program was initiated at six sites for the part of the Clark Fork basin from near Milltown Reservoir to near the confluence of the Clark Fork and Flathead River (fig. 1 and table 1). In March 2008, an additional site was added on the temporary bypass channel that is being used to redirect the Clark Fork around the cleanup area. Of the sites that bracket the former location of Milltown Reservoir, three also are part of the long-term monitoring network. The supplemental monitoring provides additional spatial coverage of constituent concentrations before and after the removal of Milltown Dam (at former Milltown Reservoir), which was breached on March 28, 2008.

The purpose of this report is to present water-quality data for 24 sites and bed-sediment and biological data for 13 sites in the Clark Fork basin collected from October 2008 through September 2009. Quality-assurance data are presented for water-quality, bed-sediment, and biota samples. Statistical summaries also are provided for long-term water-quality, bed-sediment, and biological data collected since 1985.

## Sampling Locations and Types of Data

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

Supplemental water samples were collected at seven sites from near the former Milltown Reservoir location to near the confluence of the Clark Fork and Flathead River (fig. 1). Of those sites, three (Clark Fork at Turah Bridge, near Bonner; Blackfoot River near Bonner; and Clark Fork above Missoula) bracket the former Milltown Reservoir and also are part of the long-term monitoring network. One additional site (Clark Fork Bypass, near Bonner) is located on the temporary bypass channel, within the Milltown Reservoir cleanup site, that diverts the Clark Fork around the cleanup work area. Three additional sites (Bitterroot River near Missoula, Clark Fork at St. Regis, and Flathead River at Perma) are farther downstream in the basin. The types of data collected and period of record for each type of data for the four additional sites that are not part of the long-term network also are listed in table 1 and shown in figure 1. Supplemental water samples generally were collected during periods of high flow, which included the period when Milltown Dam was first breached, to characterize conditions when the potential for scour of bottom sediments from Milltown Reservoir was greatest. The sites were sampled in a downstream progression during 2-day periods that generally coincided with travel time of select water-quality constituents carried in solution along the Clark Fork main stem. The water-quality and streamflow data for each sampling episode can be used to calculate instantaneous constituent loads to identify the relative contributions of load from different source areas. Supplemental samples from the 7 sites were collected 17–21 times.

Properties measured onsite and constituents for which water, bed-sediment, and biota samples were analyzed are listed in table 2. Data-quality objectives for analyses of water samples are listed in table 3. Results of onsite measurements of properties; laboratory analyses of water-quality, bed-sediment, and biota samples; and quality-assurance data for water year 2009 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 2009 are listed in tables 25 through 27 at the back of the report.

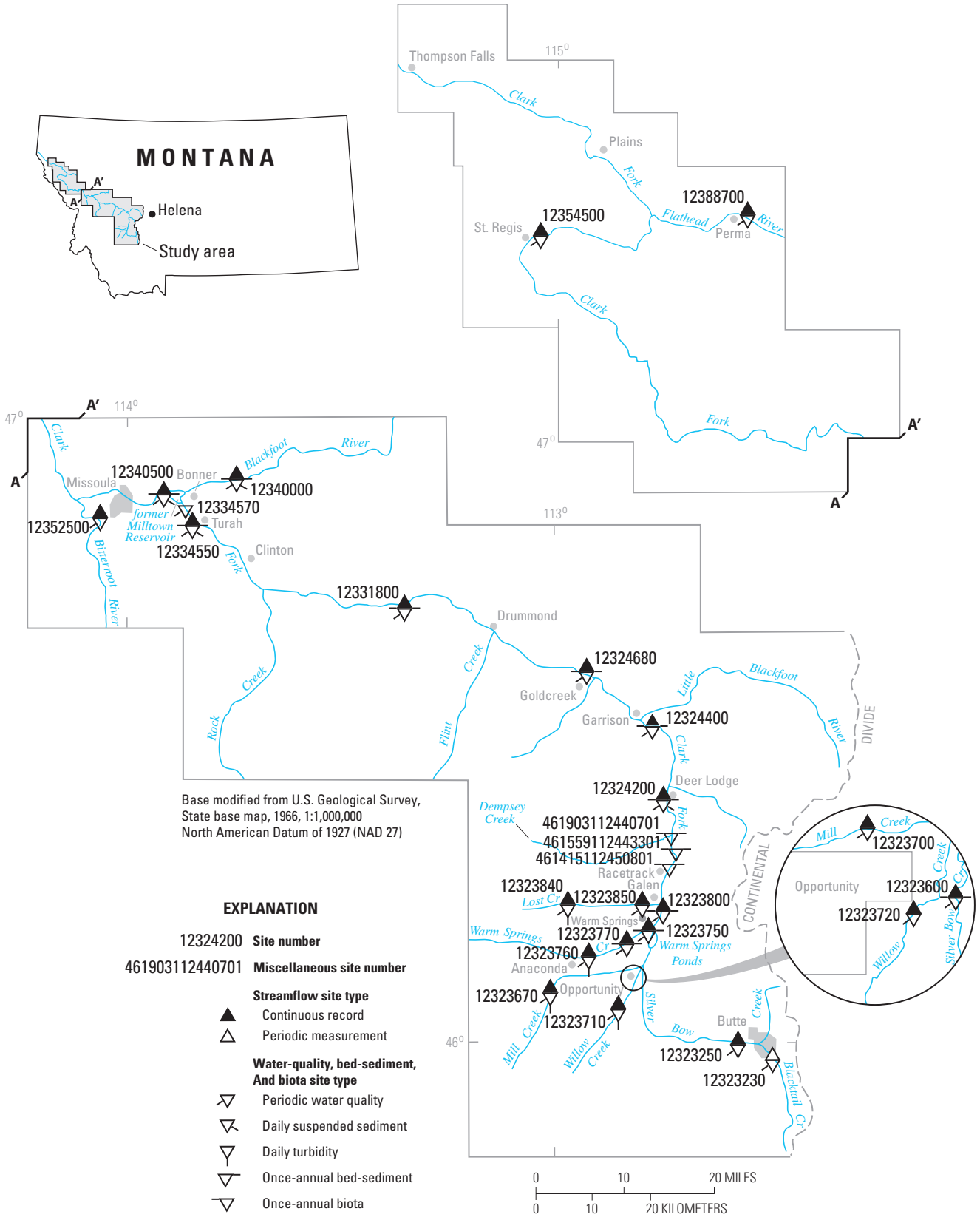


**Figure 1.** Location of study area in the Clark Fork basin, Montana.

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

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

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

| Station number (fig. 1) | Station name | Network | Continuous-record streamflow | Periodic water quality[1] | Daily suspended sediment | Daily turbidity (seasonal) | Fine-grained bed sediment[2] | Bulk bed sediment[2,3] | Biota[2] |
|---|---|---|---|---|---|---|---|---|---|
| 12324400 | Clark Fork above Little Blackfoot River, near Garrison | LT | 02/09–P | 03/09–P | -- | -- | 08/09–P | -- | 08/09–P |
| 12324680 | Clark Fork at Goldcreek | LT | 10/77-P | 03/93–P | -- | -- | 07/92–P | 08/93–08/04, D | 07/92–P |
| 12331800 | Clark Fork near Drummond | LT | 04/93–P | 03/93–P | -- | -- | 08/86, 08/87, 08/91–P | 08/93–08/04, D | 08/86, 08/91–P |
| 12334550 | Clark Fork at Turah Bridge, near Bonner | LT, S | 03/85–P | 03/85–P | 03/85–03/03, 08/03–P | -- | 08/86, 08/91–P | 08/93–08/04, D | 08/86, 08/91–P |
| 12334570 | Clark Fork Bypass, near Bonner | S | -- | 03/08–P | -- | -- | -- | -- | -- |
| 12340000 | Blackfoot River near Bonner | LT, S | 10/39–P | 03/85–P | 07/86–04/87, 06/88–09/95, 10/05–P | -- | 08/86–08/87, 08/91, 08/93–96, 08/98–01, 09/03, 08/06–P | 08/93, 08/94, 08/99–01, 09/03, D | 08/86–08/87, 08/91, 08/93, 08/96, 08/98, 09/00, 09/03,08/06–P |
| 12340500 | Clark Fork above Missoula | LT, S | 03/29–P | 07/86–P[4] | 07/86–04/87, 06/88–01/96, 03/96–03/03, 08/03–P | 04/07–09/07 | 08/97–P | 08/97–08/04, D | 08/97–P |
| 12352500 | Bitterroot River near Missoula | S | 07/1898–11/1901, 05/1903–12/1904, 07/89–P | 05/97–P | -- | -- | -- | -- | -- |
| 12354500 | Clark Fork at St. Regis | S | 10/10–P | 04/06–P | -- | -- | -- | -- | -- |
| 12388700 | Flathead River at Perma | S | 10/83–P | 10/70–09/73, 10/96–09/03, 04/06–P | -- | -- | -- | -- | -- |

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

[2]Laboratory analyses for trace elements.

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

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

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

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

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

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

| Constituent | Data-quality objectives | | |
|---|---|---|---|
| | Detectability | Precision | Bias |
| | Laboratory reporting level | Maximum relative standard deviation of replicate analyses (percent) | Maximum deviation of spike recovery (percent) |
| Calcium, filtered | 0.02 mg/L | 20 | -- |
| Magnesium, filtered | .012 mg/L | 20 | -- |
| Nitrogen, unfiltered recoverable | .10 mg/L | 20 | 25 |
| Phosphorus, unfiltered recoverable | .008 mg/L | 20 | 25 |
| Arsenic, filtered | .06 µg/L | 20 | 25 |
| Arsenic, unfiltered recoverable | .20 µg/L | 20 | 25 |
| Cadmium, filtered | .02 µg/L | 20 | 25 |
| Cadmium, unfiltered recoverable | .06 µg/L | 20 | 25 |
| Copper, filtered | 1.0 µg/L | 20 | 25 |
| Copper, unfiltered recoverable | 4.0 µg/L | 20 | 25 |
| Iron, filtered | 4 µg/L | 20 | 25 |
| Iron, unfiltered recoverable | 14 µg/L | 20 | 25 |
| Lead, filtered | .06 µg/L | 20 | 25 |
| Lead, unfiltered recoverable | .10 µg/L | 20 | 25 |
| Manganese, filtered | .2 µg/L | 20 | 25 |
| Manganese, unfiltered recoverable | .4 µg/L | 20 | 25 |
| Zinc, filtered | 2.0 µg/L | 20 | 25 |
| Zinc, unfiltered recoverable | 2.0 µg/L | 20 | 25 |
| Sediment, suspended, percent finer than 0.062 mm | 1 percent | 20 | -- |
| Sediment, suspended | 1 mg/L | 20 | -- |

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

# Water-Quality Data

Water-quality data consist of onsite measurements of selected stream properties and concentrations of chemical and physical constituents analyzed in periodically collected stream samples. Routine water samples for the long-term monitoring program were collected at 20 sites in the upper Clark Fork basin 6–8 times per year on a schedule designed to describe seasonal and hydrologic variability. Supplemental water samples were collected 17–21 times at the 7 supplemental monitoring sites (which include 3 long-term monitoring sites) in the lower part of the basin. At the 4 daily suspended-sediment sites, suspended-sediment samples were collected by an observer 2–14 times per week, depending on season and flow conditions. Continuous turbidity monitors were operated seasonally (April/June–September 2009) at four sites near Anaconda to determine daily values (table 1).

## Methods

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

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

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

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

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

Suspended-sediment samples for the four daily suspended-sediment sites (table 1) were collected by local contract observers using the depth-integration method at a single vertical transit near midstream. The samples were analyzed for suspended-sediment concentration and were used to determine daily mean suspended-sediment concentrations according to methods described by Porterfield (1972).

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

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

where

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

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

## Results

Water-quality data for samples collected periodically during water year 2009 are listed in table 4. Daily mean streamflow, daily mean suspended-sediment concentration, and daily suspended-sediment discharge for water year 2009 at the four daily suspended-sediment sites are listed in tables 5 through 8 along with monthly summary statistics and annual totals for streamflow and suspended-sediment discharge. Daily maximum, minimum, and mean turbidity at four sites are listed in tables 9 through 12 along with monthly summary statistics.

## Quality Assurance

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

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

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

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

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

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

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

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

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

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

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

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

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

where

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

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

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

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. The data-quality objective used to indicate acceptable precision of results for field replicates was a maximum *RSD* of 20 percent (table 3). Precision estimates for the analytical results of field replicates were within the 20-percent *RSD* limit for all constituents, except unfiltered recoverable copper, lead, and manganese (table 14). The *RSD* for these constituents ranged from 22 to 46 percent and resulted from poor replicate comparison from a sample collected on May 19, 2009, at Clark Fork at Deer Lodge when suspended-sediment concentrations were relatively high. When this 1 replicate pair was excluded, the other 13 replicate pairs had a *RSD* for unfiltered recoverable copper of 5.1 percent, unfiltered recoverable lead of 12 percent, and unfiltered recoverable manganese of 6.2 percent.

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

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

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

where

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

If the spike recovery of a trace element was outside a range of 75 to 125 percent, the instrument was recalibrated and the entire sample set and all spiked samples were reanalyzed for that particular trace element until recoveries were improved to the extent possible. Recovery efficiency for individual trace elements in laboratory-spiked deionized-water blank samples and in laboratory-spiked stream samples is listed in tables 16 and 17, respectively. The mean spike recovery for deionized-water blank samples spiked with trace elements (table 16) ranged from 93.3 to 111 percent. The 95-percent confidence intervals (Taylor, 1987) for the mean spike recovery for each constituent for which deionized-water blank samples were analyzed (table 16) did not exceed a 25-percent deviation from an expected 100-percent recovery, except for unfiltered recoverable iron (78.8–130 percent). The exceedance of this data quality objective resulted from using a low-concentration spiked solution (20 µg) on a constituent (unfiltered recoverable iron) with a high laboratory reporting level (+/- 14 µg/L). The mean spike recovery for spiked stream samples (table 17) ranged from 89.8 to 114 percent. The 95-percent confidence intervals for the mean spike recovery for each constituent for which streamwater samples were analyzed (table 17) did not exceed a 25-percent deviation from an expected 100-percent recovery. No adjustments were made to analytical data on the basis of the mean spike recovery.

High or low bias is indicated if the 95-percent confidence interval does not include 100-percent recovery, thereby indicating a consistent deviation in one direction. All laboratory-spiked deionized-water blank samples (table 16) had confidence intervals for percent recovery that included 100 percent except for unfiltered recoverable arsenic (94.9–99.1 percent), unfiltered recoverable copper (94.0–97.0), filtered manganese (103–106 percent), filtered zinc (104–118 percent), and unfiltered recoverable zinc (85.5–98.1 percent). All laboratory-spiked stream samples (table 17) also had confidence intervals for percent recovery that included 100 percent except for filtered cadmium (101–112 percent), unfiltered recoverable cadmium (89.5–99.8 percent), unfiltered recoverable copper (87.8–95.0 percent), filtered zinc (104–124 percent), and unfiltered recoverable zinc (80.4–99.2 percent). Because the mean spike recoveries for all constituents of laboratory-spiked stream samples met data-quality objectives (less than a 25-percent deviation from 100-percent recovery), no adjustments were made to analytical results for stream samples on the basis of spike recoveries.

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

Trace-element concentrations in field blanks (table 18) were almost always less than the LRL. Two detections exceeded the LRL in one sample for unfiltered recoverable lead (0.16 µg/L) and unfiltered recoverable zinc (2.7 µg/L), which had LRLs of 0.10 µg/L and 2.0 µg/L respectively. Because no trends were indicated in subsequent sampling trips, no adjustments were made to water-quality sample results on the basis of these two detections.

# Bed-Sediment Data

Bed-sediment data for the long-term monitoring program in the upper Clark Fork basin consist of analyses of trace-element concentrations in the fine-grained (<0.063 mm) fraction of bed-sediment samples. Collection of bulk bed-sediment (fine-grained plus coarse-grained fractions) was discontinued in 2005; therefore, no bulk bed-sediment analytical results or statistical summaries are presented in this report. Bed-sediment samples are collected once annually at 13 sites (fig. 1 and table 1) during low, stable flow conditions at about the same time of year (typically August) as previous samples 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 2009 using protocols described by E.V. Axtmann (U.S. Geological Survey, written commun., 1994). Samples were collected from the surfaces of streambed deposits in low-velocity areas near the edge of the stream by using an acid-washed polypropylene scoop. Whenever possible, samples were collected from both sides of the stream.

Individual samples of bed sediment were collected by scooping material from the surfaces of three to five randomly selected deposits along pool or low-velocity areas. The three to five individual samples were combined to form a single composite sample. This collection process was repeated three times to obtain three composite samples. Each composite sample was wet-sieved onsite through a 0.063-mm polyester-mesh sieve using ambient stream water. The fraction of bed sediment in each composite sample that was finer than 0.063 mm was transferred to an acid-washed 500-mL polyethylene bottle and transported on ice to the laboratory.

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

## Results

Concentrations of trace elements measured in samples of fine-grained bed-sediment collected during August 2009 are listed in table 19. Liquid-phase concentrations, in micrograms per milliliter (which is equivalent to parts per million; ppm), that were analyzed in the reconstituted aliquots of digested bed-sediment were converted to solid-phase concentrations, in micrograms per gram (µg/g), by using the following equation:

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

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

## Quality Assurance

The protocols for field collection and processing of bed-sediment samples are designed to prevent contamination from metal sources. Nonmetallic sampling and processing equipment was acid-washed and rinsed with deionized water prior to the first sample collection. Polyester-mesh sieves were washed in a laboratory-grade detergent and rinsed with deionized water. All equipment received a final rinse onsite with stream water. Sampling equipment used at more than one site was rinsed between sites with stream water. Separate sieves were used at each site and, therefore, did not require between-site cleaning. Bed-sediment samples were collected sequentially at sites along an increasing concentration gradient to minimize effects from potential site-to-site carryover contamination.

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

SRMs are commercially prepared materials that have certified concentrations of trace elements. Analyses of SRMs are used to indicate the ability of the method to accurately measure a known quantity of a constituent. Multiple analyses of SRMs are made to derive a mean and 95-percent confidence interval for recovery. Recovery efficiency for trace-element analyses of SRMs for bed-sediment is listed in table 20. 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 cadmium, chromium, copper, iron, manganese, nickel, and zinc, mean SRM recoveries for the low-concentration standard (SRM 2709) ranged from 89.6 to 106.1 percent of the certified concentrations. Mean recoveries were low for arsenic and lead (36.5 and 51.0 percent, respectively). The generally small range of variation (less than 11 percent for most constituents) for the 95-percent confidence interval indicates good reproducibility of multiple analyses of SRM 2709. The range of variation for the 95-percent confidence interval for chromium and copper were slightly higher (about 12 and 14 percent, respectively). Mean SRM recoveries for cadmium, chromium, copper, iron, lead, manganese, and zinc for the high-concentration standard (SRM 2711) ranged from 96.4 to 107.5 percent of the certified concentrations. Arsenic and nickel recoveries were slightly lower (86.5 and 84.9 percent, respectively). The generally small range of variation (less than 11 percent for most constituents) for the 95-percent confidence interval indicates good reproducibility of multiple analyses of SRM 2711. No adjustments were made to trace-element concentrations in bed-sediment samples on the basis of recovery efficiencies.

Procedural blanks for bed-sediment samples consisted of the same reagents used for sample digestion and reconstitution. Concentrated nitric acid used for sample digestion was heated and evaporated to dryness. After evaporation, 0.6N hydrochloric acid was added to reconstitute the dry residue. Procedural blanks, therefore, represent the same chemical matrix and exposure to analytical materials and handling as the reagents used to digest and reconstitute bed-sediment samples. Analytical results of procedural blanks for bed-sediment (table 21) are reported as a liquid-phase concentration, in micrograms per milliliter, which is equivalent to parts per million. A procedural blank was prepared and analyzed concurrently with bed-sediment samples for each site. Concentrations of trace elements in all procedural blanks were less than the minimum reporting level; thus, no contamination bias was indicated and no adjustments to the data were necessary.

# Biological Data

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

## Methods

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

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

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

Insect samples were processed and analyzed at the USGS National Research Program Ecology and Contaminants Project laboratory in Menlo Park, Calif. Insects were thawed and rinsed with ultrapure deionized water to remove particulate matter and then sorted to their lowest possible taxonomic level. If large numbers of specimens were collected at a site, similar-sized individuals were composited into replicate subsamples. Subsamples were placed in tared scintillation vials and oven-dried at 70°C. Subsamples were weighed to obtain a final dry weight and digested by reflux using concentrated nitric acid (Cain and others, 1992). After digestion, insect samples were evaporated to dryness on a hot plate. The dry residue was reconstituted in 0.6N hydrochloric acid, filtered through a 0.45-µm pore-size filter, and analyzed undiluted by ICP–OES for arsenic, cadmium, chromium, copper, iron, lead, manganese, nickel, and zinc. The smallest concentration of a constituent that can be reliably reported for analyses of biota is termed the minimum reporting level.

## Results

Concentrations of trace elements in whole-body tissue of aquatic insects collected during August 2009 are listed in table 22. The variability in the number of composite samples among species and among sites reflects differences in insect abundance, with the number of composite samples increasing with the relative abundance of insects. Liquid-phase concentrations, in micrograms per milliliter, analyzed in the reconstituted samples were converted to solid-phase concentrations, in micrograms per gram, by using equation 5. All tissue samples were analyzed undiluted (dilution ratio 1:1). As with minimum reporting levels for trace elements in bed-sediment, minimum reporting levels for trace elements in insects may differ among sites as a result of varied sample weights. In general, the smaller the biological-sample weight (primarily a function of insect abundance), the higher the minimum reporting level. Therefore, higher minimum reporting levels do not necessarily imply a higher trace-element concentration in tissue.

## Quality Assurance

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

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

Recovery efficiency for trace-element analyses of the SRM for biota is listed in table 23. Data-quality objectives have not been established for analytical recovery in biota, but percent recoveries are shown to illustrate analytical performance. Mean SRM recoveries ranged from 95.1 to 120 percent for all constituents. With the exception of chromium and lead, both of which had low certified concentrations in the SRM (0.77 µg/g and 0.35 µg/g, respectively), the range of variation of the 95-percent confidence interval was within 10 percent, indicating reasonable recoveries in the SRM. No adjustments were made to the biota samples on the basis of trace-element recovery efficiencies.

Procedural blanks for biota consisted of the same reagents used to digest and reconstitute tissue of aquatic insects and were analyzed undiluted. Analytical results of procedural blanks for biota (table 24) are reported as a liquid-phase concentration, in micrograms per milliliter, which is equivalent to parts per million. A procedural blank was prepared and analyzed concurrently with biota samples for each site. Concentrations of trace elements in all procedural

blanks were less than the minimum reporting level; therefore, no adjustments to the data were necessary.

## Statistical Summaries of Data

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

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

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

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

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

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# Data

**Table 4.** Water-quality data for the Clark Fork basin, Montana, October 2008 through September 2009.

[Abbreviations: $ft^3/s$, cubic feet per second; °C, degrees Celsius; E, estimated; lab, laboratory; µg/L, microgram per liter; µS/cm, microsiemen per centimeter at 25°C; mg/L, milligram per liter; mm, millimeter; NTRU, nephelometric turbidity ratio unit; ton/d, ton 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) |
|---|---|---|---|---|---|---|---|---|
| 10/20/2008 | 0915 | 11 | 7.6 | 248 | 5.0 | 100 | 28.9 | 7.15 |
| 03/22/2009 | 1045 | 18 | 7.5 | 230 | 2.0 | 82 | 22.3 | 6.53 |
| 04/27/2009 | 0910 | 18 | 7.6 | 222 | 3.5 | 86 | 24.4 | 6.08 |
| 05/18/2009 | 0850 | 26 | 7.6 | 198 | 10.0 | 79 | 22.5 | 5.40 |
| 06/01/2009 | 0915 | 18 | 7.7 | 212 | 11.0 | 87 | 25.4 | 5.85 |
| 06/22/2009 | 0915 | 31 | 7.6 | 210 | 11.0 | 87 | 25.2 | 5.92 |
| 07/13/2009 | 0900 | 14 | 7.6 | 233 | 13.0 | 91 | 26.7 | 5.96 |
| 08/17/2009 | 0855 | 9.7 | 7.6 | 271 | 9.0 | 110 | 32.5 | 7.29 |

| 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) |
|---|---|---|---|---|---|---|---|---|
| 10/20/2008 | 3.0 | 3.3 | 0.02 | <0.06 | 2.7 | E3.2 | 117 | 382 |
| 03/22/2009 | 3.5 | 4.5 | .03 | E.04 | 3.9 | 6.4 | 311 | 835 |
| 04/27/2009 | 3.9 | 4.5 | .04 | <.06 | 2.9 | 4.3 | 334 | 626 |
| 05/18/2009 | 4.9 | 5.7 | .04 | <.06 | 4.2 | 6.6 | 271 | 690 |
| 06/01/2009 | 7.3 | 9.0 | .03 | <.06 | 3.7 | 6.6 | 362 | 887 |
| 06/22/2009 | 8.5 | 9.9 | .04 | <.06 | 5.2 | 8.1 | 480 | 1,110 |
| 07/13/2009 | 6.4 | 7.9 | .03 | E.04 | 3.2 | 4.1 | 382 | 819 |
| 08/17/2009 | 4.1 | 5.3 | .04 | E.03 | 2.2 | E3.4 | 221 | 479 |

| 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) |
|---|---|---|---|---|---|---|---|---|---|
| 10/20/2008 | 0.09 | 0.36 | 23.0 | 30.2 | 2.3 | 2.8 | 87 | 3 | 0.09 |
| 03/22/2009 | .19 | .99 | 98.8 | 127 | 2.9 | 5.7 | 67 | 13 | .63 |
| 04/27/2009 | .19 | .55 | 29.0 | 44.5 | 2.1 | 2.9 | 75 | 5 | .24 |
| 05/18/2009 | .19 | .81 | 30.5 | 52.0 | 2.0 | 3.5 | 81 | 10 | .70 |
| 06/01/2009 | .21 | .82 | 41.4 | 68.8 | 2.4 | 3.6 | 79 | 10 | .49 |
| 06/22/2009 | .22 | .92 | 29.9 | 57.3 | 3.1 | 4.7 | 70 | 12 | 1.0 |
| 07/13/2009 | .20 | .67 | 23.3 | 47.4 | 2.8 | 4.0 | 79 | 7 | .26 |
| 08/17/2009 | .08 | .25 | 25.6 | 29.6 | E1.3 | 2.5 | 89 | 2 | .05 |

**Table 4.** Water-quality data for the Clark Fork basin, Montana, October 2008 through September 2009.—Continued

[Abbreviations: $ft^3/s$, cubic feet per second; °C, degrees Celsius; E, estimated; lab, laboratory; µg/L, microgram per liter; µS/cm, microsiemen per centimeter at 25°C; mg/L, milligram per liter; mm, millimeter; NTRU, nephelometric turbidity ratio unit; ton/d, ton 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) |
|---|---|---|---|---|---|---|---|---|
| 10/20/2008 | 1045 | 25 | 7.8 | 434 | 7.0 | 150 | 45.3 | 10.1 |
| 03/22/2009 | 1225 | 36 | 7.6 | 375 | 4.5 | 120 | 33.5 | 9.29 |
| 04/27/2009 | 1040 | 34 | 7.6 | 399 | 5.0 | 120 | 36.0 | 8.50 |
| 05/18/2009 | 1015 | 42 | 7.6 | 326 | 11.0 | 110 | 31.9 | 7.53 |
| 06/01/2009 | 1030 | 34 | 7.6 | 359 | 12.0 | 120 | 34.0 | 7.72 |
| 06/22/2009 | 1035 | 54 | 7.6 | 313 | 11.5 | 110 | 33.2 | 7.71 |
| 07/13/2009 | 1025 | 27 | 7.6 | 408 | 14.0 | 130 | 37.4 | 8.18 |
| 08/17/2009 | 1015 | 24 | 7.7 | 479 | 11.0 | 170 | 49.4 | 11.5 |

| Date | Arsenic, filtered (µg/L) | Arsenic, unfiltered recoverable (µg/L) | Cadmium, filtered (µg/L) | Cadmium, unfiltered recoverable (µg/L) | Copper, filtered (µg/L) | Copper, unfiltered recoverable (µg/L) | Iron, filtered (µg/L) | Iron, unfiltered recoverable (µg/L) |
|---|---|---|---|---|---|---|---|---|
| 10/20/2008 | 3.6 | 3.9 | 0.10 | 0.14 | 5.9 | 9.5 | 49 | 300 |
| 03/22/2009 | 5.2 | 7.0 | .10 | .20 | 9.1 | 20.0 | 195 | 861 |
| 04/27/2009 | 3.9 | 4.9 | .09 | .10 | 7.4 | 12.7 | 175 | 483 |
| 05/18/2009 | 5.2 | 5.9 | .06 | .13 | 8.0 | 13.7 | 186 | 550 |
| 06/01/2009 | 6.2 | 8.1 | .06 | .09 | 8.0 | 14.1 | 181 | 598 |
| 06/22/2009 | 8.6 | 10.5 | .19 | .25 | 18.3 | 31.4 | 267 | 870 |
| 07/13/2009 | 6.3 | 7.5 | .10 | .19 | 15.2 | 16.8 | 149 | 468 |
| 08/17/2009 | 5.2 | 6.3 | .10 | .14 | 7.9 | 10.6 | 62 | 276 |

| 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) |
|---|---|---|---|---|---|---|---|---|---|
| 10/20/2008 | 0.17 | 1.61 | 68.8 | 90.7 | 28.5 | 36.8 | 85 | 5 | 0.34 |
| 03/22/2009 | .41 | 4.64 | 118 | 162 | 31.7 | 50.8 | 82 | 18 | 1.7 |
| 04/27/2009 | .23 | 1.35 | 71.0 | 105 | 26.8 | 32.9 | 80 | 6 | .55 |
| 05/18/2009 | .26 | 1.71 | 61.3 | 93.8 | 24.2 | 28.8 | 82 | 9 | 1.0 |
| 06/01/2009 | .29 | 1.64 | 62.3 | 97.5 | 21.0 | 30.5 | 90 | 8 | .73 |
| 06/22/2009 | .34 | 3.32 | 68.2 | 115 | 59.4 | 81.4 | 87 | 13 | 1.9 |
| 07/13/2009 | .33 | 1.88 | 73.6 | 112 | 32.8 | 42.9 | 88 | 6 | .44 |
| 08/17/2009 | .17 | 1.19 | 61.6 | 75.6 | 33.7 | 33.7 | 83 | 2 | .13 |

**Table 4.** Water-quality data for the Clark Fork basin, Montana, October 2008 through September 2009.—Continued

[Abbreviations: $ft^3/s$, cubic feet per second; °C, degrees Celsius; E, estimated; lab, laboratory; µg/L, microgram per liter; µS/cm, microsiemen per centimeter at 25°C; mg/L, milligram per liter; mm, millimeter; NTRU, nephelometric turbidity ratio unit; ton/d, ton 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) |
| 10/20/2008 | 1650 | 44 | 8.9 | 443 | 10.0 | 160 | 47.7 | 10.1 |
| 03/23/2009 | 0955 | 97 | 7.9 | 317 | 1.0 | 100 | 28.2 | 7.05 |
| 04/27/2009 | 1710 | 89 | 8.3 | 329 | 6.0 | 120 | 34.7 | 7.17 |
| 05/18/2009 | 1635 | 173 | 8.5 | 265 | 15.0 | 100 | 30.7 | 5.67 |
| 06/02/2009 | 0715 | 222 | 7.9 | 248 | 6.5 | 99 | 31.1 | 5.25 |
| 06/22/2009 | 1605 | 173 | 8.5 | 296 | 8.0 | 110 | 33.2 | 6.58 |
| 07/13/2009 | 1640 | 88 | 8.9 | 349 | 16.5 | 120 | 37.1 | 7.18 |
| 08/17/2009 | 1635 | 45 | 8.9 | 444 | 18.0 | 170 | 49.9 | 10.6 |

| Date | Arsenic, filtered (µg/L) | Arsenic, unfiltered recoverable (µg/L) | Cadmium, filtered (µg/L) | Cadmium, unfiltered recoverable (µg/L) | Copper, filtered (µg/L) | Copper, unfiltered recoverable (µg/L) | Iron, filtered (µg/L) | Iron, unfiltered recoverable (µg/L) |
|---|---|---|---|---|---|---|---|---|
| 10/20/2008 | 8.0 | 9.9 | 0.26 | 0.49 | 14.4 | 40.6 | 11 | 381 |
| 03/23/2009 | 13.7 | 21.2 | .91 | 1.11 | 38.5 | 106 | 248 | 2,560 |
| 04/27/2009 | 7.8 | 11.3 | .29 | .55 | 18.3 | 51.0 | 72 | 814 |
| 05/18/2009 | 10.7 | 18.3 | .21 | .67 | 24.2 | 88.4 | 78 | 1,380 |
| 06/02/2009 | 8.3 | 12.4 | .19 | .45 | 22.7 | 46.1 | 72 | 800 |
| 06/22/2009 | 11.0 | 14.7 | .21 | .53 | 20.4 | 58.6 | 111 | 877 |
| 07/13/2009 | 11.4 | 15.1 | .28 | .73 | 30.8 | 87.8 | 35 | 762 |
| 08/17/2009 | 10.0 | 12.3 | .26 | .54 | 20.0 | 44.3 | 15 | 544 |

| 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) |
|---|---|---|---|---|---|---|---|---|---|
| 10/20/2008 | 0.29 | 8.96 | 49.7 | 115 | 35.5 | 99.0 | 84 | 13 | 1.5 |
| 03/23/2009 | 1.33 | 27.7 | 249 | 462 | 136 | 252 | 87 | 88 | 23 |
| 04/27/2009 | .38 | 10.5 | 137 | 231 | 64.7 | 128 | 83 | 24 | 5.8 |
| 05/18/2009 | .80 | 30.1 | 69.2 | 206 | 27.7 | 142 | 72 | 56 | 26 |
| 06/02/2009 | .36 | 11.9 | 57.6 | 137 | 49.8 | 101 | 79 | 30 | 18 |
| 06/22/2009 | .74 | 12.4 | 89.1 | 180 | 45.9 | 121 | 80 | 30 | 14 |
| 07/13/2009 | .41 | 14.7 | 98.0 | 210 | 31.8 | 147 | 85 | 30 | 7.1 |
| 08/17/2009 | .21 | 7.07 | 52.1 | 122 | 24.7 | 87.2 | 91 | 18 | 2.2 |

**Table 4.** Water-quality data for the Clark Fork basin, Montana, October 2008 through September 2009.—Continued

[Abbreviations: $ft^3/s$, cubic feet per second; °C, degrees Celsius; E, estimated; lab, laboratory; µg/L, microgram per liter; µS/cm, microsiemen per centimeter at 25°C; mg/L, milligram per liter; mm, millimeter; NTRU, nephelometric turbidity ratio unit; ton/d, ton 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) |
| 10/20/2008 | 1310 | 15 | <2.0 | 8.1 | 158 | 6.5 | 72 | 19.7 | 5.44 |
| 03/22/2009 | 1520 | 16 | E2.0 | 8.1 | 175 | 4.0 | 70 | 18.7 | 5.79 |
| 04/27/2009 | 1315 | 38 | E3.8 | 8.0 | 129 | 6.0 | 52 | 14.7 | 3.85 |
| 05/18/2009 | 1250 | 101 | 21 | 8.0 | 98 | 10.0 | 38 | 10.9 | 2.63 |
| 06/01/2009 | 1350 | 213 | E4.2 | 7.8 | 63 | 6.5 | 24 | 7.00 | 1.60 |
| 06/22/2009 | 1315 | 136 | E1.2 | 7.8 | 77 | 8.5 | 31 | 8.88 | 2.08 |
| 07/13/2009 | 1305 | 75 | E2.0 | 8.0 | 95 | 12.0 | 39 | 11.4 | 2.50 |
| 08/17/2009 | 1135 | 25 | E1.4 | 8.0 | 137 | 9.5 | 62 | 17.6 | 4.36 |

| 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) |
|---|---|---|---|---|---|---|---|---|
| 10/20/2008 | 13.9 | 13.4 | 0.05 | E0.04 | 2.2 | <4.0 | 51 | 105 |
| 03/22/2009 | 28.0 | 30.6 | .11 | .15 | 3.6 | 4.9 | 54 | 148 |
| 04/27/2009 | 24.5 | 24.8 | .06 | .09 | 3.4 | 4.6 | 56 | 207 |
| 05/18/2009 | 32.9 | 34.8 | .07 | .19 | 5.0 | 10.6 | 74 | 592 |
| 06/01/2009 | 15.3 | 17.7 | .05 | .12 | 5.1 | 7.1 | 35 | 353 |
| 06/22/2009 | 13.5 | 14.1 | .04 | E.04 | 2.2 | E3.8 | 27 | 111 |
| 07/13/2009 | 16.3 | 17.5 | .04 | .10 | 2.1 | E3.5 | 39 | 162 |
| 08/17/2009 | 15.9 | 17.5 | .04 | .07 | 1.7 | E2.2 | 65 | 142 |

| 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) |
|---|---|---|---|---|---|---|---|---|---|
| 10/20/2008 | 0.19 | 0.32 | 5.6 | 8.3 | 2.1 | E1.6 | 31 | 2 | 0.08 |
| 03/22/2009 | .17 | .62 | 11.0 | 16.3 | 4.0 | 4.8 | 69 | 2 | .09 |
| 04/27/2009 | .20 | .68 | 4.0 | 12.7 | 2.0 | 3.5 | 71 | 4 | .41 |
| 05/18/2009 | .23 | 3.01 | 5.4 | 33.1 | 2.2 | 9.2 | 65 | 25 | 6.8 |
| 06/01/2009 | .12 | 1.54 | 3.7 | 23.1 | 2.3 | 5.9 | 43 | 22 | 13 |
| 06/22/2009 | .10 | .47 | 3.9 | 8.6 | E1.9 | 3.1 | 28 | 4 | 1.5 |
| 07/13/2009 | .12 | .62 | 6.8 | 13.7 | E1.3 | 2.7 | 57 | 5 | 1.0 |
| 08/17/2009 | .12 | .44 | 7.9 | 13.3 | E1.4 | E1.5 | 61 | 2 | .14 |

**Table 4.** Water-quality data for the Clark Fork basin, Montana, October 2008 through September 2009.—Continued

[Abbreviations: $ft^3/s$, cubic feet per second; °C, degrees Celsius; E, estimated; lab, laboratory; µg/L, microgram per liter; µS/cm, microsiemen per centimeter at 25°C; mg/L, milligram per liter; mm, millimeter; NTRU, nephelometric turbidity ratio unit; ton/d, ton 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) |
|---|---|---|---|---|---|---|---|---|
| 10/20/2008 | 1520 | 5.0 | 7.9 | 182 | 8.0 | 80 | 22.3 | 5.94 |
| 03/23/2009 | 0820 | 12 | 8.0 | 194 | 1.5 | 79 | 21.2 | 6.31 |
| 04/27/2009 | 1550 | 17 | 8.0 | 141 | 7.0 | 57 | 16.0 | 4.15 |
| 05/18/2009 | 1515 | 46 | 7.9 | 106 | 14.0 | 41 | 11.8 | 2.92 |
| 06/01/2009 | 1650 | 158 | 7.7 | 68 | 7.0 | 26 | 7.36 | 1.74 |
| 06/22/2009 | 1505 | 83 | 7.8 | 84 | 9.5 | 35 | 10.3 | 2.27 |
| 07/13/2009 | 1535 | 47 | 8.0 | 105 | 15.0 | 42 | 12.2 | 2.70 |
| 08/17/2009 | 1500 | 8.0 | 8.0 | 156 | 13.0 | 70 | 20.0 | 4.78 |

| 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) |
|---|---|---|---|---|---|---|---|---|
| 10/20/2008 | 23.4 | 24.2 | 0.07 | 0.06 | 2.1 | E3.2 | 56 | 96 |
| 03/23/2009 | 23.1 | 26.4 | .06 | .09 | 3.2 | 4.7 | 64 | 168 |
| 04/27/2009 | 26.9 | 28.2 | .07 | .08 | 4.1 | 5.6 | 56 | 200 |
| 05/18/2009 | 32.3 | 42.2 | .08 | .38 | 5.3 | 17.9 | 56 | 885 |
| 06/01/2009 | 20.4 | 28.1 | .07 | .25 | 5.3 | 18.4 | 38 | 939 |
| 06/22/2009 | 18.4 | 20.4 | .06 | .12 | 2.9 | 7.0 | 36 | 242 |
| 07/13/2009 | 20.6 | 23.9 | .05 | .17 | 2.5 | 7.0 | 49 | 317 |
| 08/17/2009 | 19.3 | 20.1 | .04 | .09 | 1.7 | E2.3 | 68 | 134 |

| Date | Lead, filtered (µg/L) | Lead, unfiltered recoverable (µg/L) | Manganese, filtered (µg/L) | Manganese, unfiltered recoverable (µg/L) | Zinc, filtered (µg/L) | Zinc, unfiltered recoverable (µg/L) | Sediment, suspended (percent finer than 0.062 mm) | Sediment, suspended (mg/L) | Sediment discharge, suspended (ton/d) |
|---|---|---|---|---|---|---|---|---|---|
| 10/20/2008 | 0.11 | 0.26 | 5.1 | 6.5 | 2.5 | 3.0 | 80 | 1 | 0.01 |
| 03/23/2009 | .15 | .60 | 3.2 | 9.3 | 2.5 | 4.3 | 58 | 3 | .10 |
| 04/27/2009 | .19 | .78 | 3.6 | 11.7 | 2.5 | 3.8 | 76 | 5 | .23 |
| 05/18/2009 | .29 | 5.67 | 7.9 | 65.3 | 2.8 | 17.4 | 65 | 39 | 4.8 |
| 06/01/2009 | .19 | 5.00 | 5.1 | 37.6 | 3.6 | 15.2 | 48 | 58 | 25 |
| 06/22/2009 | .13 | 1.81 | 5.5 | 16.8 | 2.4 | 5.7 | 39 | 10 | 2.2 |
| 07/13/2009 | .16 | 1.75 | 7.2 | 25.1 | E1.7 | 5.7 | 56 | 12 | 1.5 |
| 08/17/2009 | .14 | .33 | 6.7 | 10.2 | E1.5 | E1.7 | 77 | 1 | .02 |

**Table 4.** Water-quality data for the Clark Fork basin, Montana, October 2008 through September 2009.—Continued

[Abbreviations: $ft^3/s$, cubic feet per second; °C, degrees Celsius; E, estimated; lab, laboratory; µg/L, microgram per liter; µS/cm, microsiemen per centimeter at 25°C; mg/L, milligram per liter; mm, millimeter; NTRU, nephelometric turbidity ratio unit; ton/d, ton 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) |
| 10/20/2008 | 1210 | 2.9 | <2.0 | 7.9 | 122 | 4.5 | 45 | 15.2 | 1.83 |
| 03/22/2009 | 1415 | 3.2 | E7.0 | 7.8 | 145 | 2.0 | 51 | 16.5 | 2.49 |
| 04/27/2009 | 1215 | 8.9 | E12 | 7.7 | 116 | 3.5 | 42 | 13.9 | 1.79 |
| 05/18/2009 | 1150 | 65 | 39 | 7.6 | 81 | 6.5 | 27 | 9.09 | 1.16 |
| 06/01/2009 | 1235 | 75 | E7.7 | 7.6 | 72 | 6.0 | 24 | 8.01 | .95 |
| 06/22/2009 | 1215 | 16 | E2.8 | 7.7 | 101 | 8.0 | 39 | 12.9 | 1.50 |
| 07/13/2009 | 1210 | 9.6 | E6.0 | 7.7 | 112 | 11.0 | 41 | 13.7 | 1.59 |
| 08/17/2009 | 1320 | 3.8 | E1.4 | 7.8 | 125 | 10.5 | 47 | 15.6 | 1.89 |

| Date | Arsenic, filtered (µg/L) | Arsenic, unfiltered recoverable (µg/L) | Cadmium, filtered (µg/L) | Cadmium, unfiltered recoverable (µg/L) | Copper, filtered (µg/L) | Copper, unfiltered recoverable (µg/L) | Iron, filtered (µg/L) | Iron, unfiltered recoverable (µg/L) |
|---|---|---|---|---|---|---|---|---|
| 10/20/2008 | 10.7 | 9.8 | 0.03 | <0.06 | 1.2 | <4.0 | 54 | 100 |
| 03/22/2009 | 12.3 | 14.4 | .03 | E.05 | 1.5 | E3.0 | 65 | 416 |
| 04/27/2009 | 17.6 | 19.2 | .03 | E.05 | 2.6 | 4.1 | 229 | 506 |
| 05/18/2009 | 19.8 | 25.4 | .05 | .33 | 4.2 | 15.3 | 126 | 2,380 |
| 06/01/2009 | 14.4 | 16.2 | .04 | .09 | 2.9 | 5.4 | 51 | 664 |
| 06/22/2009 | 13.8 | 14.1 | .03 | E.04 | 2.1 | E3.4 | 46 | 150 |
| 07/13/2009 | 17.1 | 17.9 | .04 | .07 | 2.2 | E3.1 | 58 | 236 |
| 08/17/2009 | 20.1 | 20.1 | .04 | .08 | 2.3 | E2.7 | 79 | 149 |

| 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) |
|---|---|---|---|---|---|---|---|---|---|
| 10/20/2008 | 0.07 | 0.13 | 17.1 | 19.5 | <2.0 | <2.0 | 80 | 1 | 0.01 |
| 03/22/2009 | .07 | .81 | 22.3 | 34.8 | E1.2 | 4.6 | 88 | 9 | .08 |
| 04/27/2009 | .27 | 1.13 | 10.8 | 24.6 | E1.9 | 3.7 | 69 | 14 | .34 |
| 05/18/2009 | .31 | 7.96 | 11.4 | 99.9 | 2.5 | 17.8 | 46 | 195 | 34 |
| 06/01/2009 | .16 | 2.00 | 6.0 | 24.7 | E1.9 | 5.7 | 29 | 57 | 12 |
| 06/22/2009 | .10 | .40 | 12.2 | 18.2 | E1.8 | 2.2 | 46 | 6 | .26 |
| 07/13/2009 | .12 | .58 | 19.7 | 27.3 | E1.5 | 2.5 | 87 | 8 | .21 |
| 08/17/2009 | .15 | .32 | 20.5 | 26.0 | E1.5 | E1.6 | 82 | 3 | .03 |

**Table 4.** Water-quality data for the Clark Fork basin, Montana, October 2008 through September 2009.—Continued

[Abbreviations: $ft^3/s$, cubic feet per second; °C, degrees Celsius; E, estimated; lab, laboratory; µg/L, microgram per liter; µS/cm, microsiemen per centimeter at 25°C; mg/L, milligram per liter; mm, millimeter; NTRU, nephelometric turbidity ratio unit; ton/d, ton 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) |
| 10/20/2008 | 1615 | 6.2 | 8.7 | 288 | 10.5 | 130 | 36.8 | 8.34 |
| 03/23/2009 | 0900 | 8.7 | 7.7 | 341 | 2.0 | 130 | 37.2 | 9.98 |
| 04/27/2009 | 1630 | 12 | 7.9 | 226 | 7.0 | 93 | 27.9 | 5.67 |
| 05/18/2009 | 1550 | 44 | 7.8 | 164 | 17.0 | 65 | 20.1 | 3.52 |
| 06/01/2009 | 1730 | 60 | 7.7 | 156 | 10.0 | 66 | 20.3 | 3.77 |
| 06/22/2009 | 1535 | 39 | 7.9 | 279 | 13.0 | 120 | 36.4 | 7.99 |
| 07/13/2009 | 1615 | 18 | 8.3 | 248 | 16.0 | 100 | 30.9 | 6.29 |
| 08/17/2009 | 1605 | 17 | 8.3 | 290 | 16.0 | 130 | 38.5 | 8.01 |

| 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) |
|---|---|---|---|---|---|---|---|---|
| 10/20/2008 | 19.3 | 19.6 | 0.03 | <0.06 | 2.7 | E3.0 | 10 | 51 |
| 03/23/2009 | 68.3 | 70.3 | .12 | .20 | 10.9 | 15.8 | 179 | 322 |
| 04/27/2009 | 21.7 | 25.1 | .03 | .07 | 3.6 | 8.3 | 69 | 330 |
| 05/18/2009 | 53.7 | 60.0 | .07 | .36 | 12.9 | 40.4 | 114 | 1,130 |
| 06/01/2009 | 64.1 | 67.4 | .07 | .14 | 9.6 | 18.8 | 73 | 318 |
| 06/22/2009 | 86.5 | 87.4 | .09 | .16 | 9.3 | 15.9 | 100 | 297 |
| 07/13/2009 | 41.3 | 42.9 | .04 | .10 | 5.2 | 7.5 | 86 | 214 |
| 08/17/2009 | 38.0 | 38.5 | .03 | .06 | 3.4 | 4.5 | 21 | 94 |

| 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) |
|---|---|---|---|---|---|---|---|---|---|
| 10/20/2008 | 0.11 | 0.48 | 4.1 | 5.3 | <2.0 | E1.1 | 73 | 1 | 0.02 |
| 03/23/2009 | .46 | 1.79 | 200 | 228 | 17.7 | 21.4 | 83 | 7 | .16 |
| 04/27/2009 | .22 | 2.02 | 31.5 | 53.4 | 3.4 | 9.9 | 91 | 8 | .26 |
| 05/18/2009 | .58 | 11.7 | 41.6 | 109 | 7.9 | 46.0 | 73 | 63 | 7.5 |
| 06/01/2009 | .31 | 2.56 | 16.9 | 33.8 | 7.7 | 16.7 | 55 | 17 | 2.8 |
| 06/22/2009 | .30 | 1.81 | 35.9 | 63.4 | 10.6 | 17.2 | 73 | 5 | .53 |
| 07/13/2009 | .36 | 1.03 | 10.4 | 16.0 | 2.5 | 5.1 | 96 | 2 | .10 |
| 08/17/2009 | .10 | .58 | 6.5 | 11.8 | E1.6 | 2.7 | 86 | 2 | .09 |

**Table 4.** Water-quality data for the Clark Fork basin, Montana, October 2008 through September 2009.—Continued

[Abbreviations: $ft^3/s$, cubic feet per second; °C, degrees Celsius; E, estimated; lab, laboratory; µg/L, microgram per liter; µS/cm, microsiemen per centimeter at 25°C; mg/L, milligram per liter; mm, millimeter; NTRU, nephelometric turbidity ratio unit; ton/d, ton 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) |
|---|---|---|---|---|---|---|---|---|
| 10/21/2008 | 0925 | 47 | 8.4 | 555 | 5.5 | 230 | 67.8 | 15.2 |
| 03/23/2009 | 1040 | 101 | 8.9 | 515 | 3.5 | 190 | 53.9 | 13.9 |
| 04/28/2009 | 0850 | 195 | 8.2 | 523 | 6.0 | 210 | 61.2 | 12.9 |
| 05/19/2009 | 0810 | 252 | 8.6 | 352 | 11.0 | 140 | 42.5 | 8.24 |
| 06/02/2009 | 0850 | 481 | 8.8 | 282 | 8.5 | 120 | 36.7 | 6.04 |
| 06/23/2009 | 0730 | 303 | 8.9 | 309 | 9.0 | 130 | 39.6 | 7.04 |
| 07/14/2009 | 0810 | 118 | 9.2 | 305 | 12.0 | 120 | 37.9 | 7.19 |
| 08/18/2009 | 0800 | 65 | 9.6 | 391 | 13.5 | 170 | 51.8 | 10.8 |

| Date | Arsenic, filtered (µg/L) | Arsenic, unfiltered recoverable (µg/L) | Cadmium, filtered (µg/L) | Cadmium, unfiltered recoverable (µg/L) | Copper, filtered (µg/L) | Copper, unfiltered recoverable (µg/L) | Iron, filtered (µg/L) | Iron, unfiltered recoverable (µg/L) |
|---|---|---|---|---|---|---|---|---|
| 10/21/2008 | 24.7 | 26.0 | 0.04 | 0.07 | 3.5 | 6.3 | 8 | 172 |
| 03/23/2009 | 19.2 | 21.2 | .07 | .12 | 5.5 | 8.8 | 36 | 204 |
| 04/28/2009 | 17.3 | 19.6 | .04 | .12 | 4.4 | 10.2 | 19 | 274 |
| 05/19/2009 | 32.0 | 41.9 | .04 | .43 | 6.8 | 29.0 | 43 | 1,200 |
| 06/02/2009 | 33.3 | 35.5 | .05 | .12 | 8.7 | 16.2 | 32 | 246 |
| 06/23/2009 | 28.6 | 29.4 | .05 | .07 | 6.8 | 11.7 | 26 | 184 |
| 07/14/2009 | 30.1 | 30.7 | .03 | .11 | 4.1 | 7.3 | 41 | 196 |
| 08/18/2009 | 46.5 | 45.1 | .02 | E.06 | 3.3 | 4.5 | 19 | 92 |

| 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) |
|---|---|---|---|---|---|---|---|---|---|
| 10/21/2008 | 0.09 | 1.47 | 50.8 | 84.8 | 3.5 | 8.7 | 69 | 3 | 0.38 |
| 03/23/2009 | .16 | 1.47 | 63.2 | 92.3 | 4.3 | 11.6 | 79 | 4 | 1.1 |
| 04/28/2009 | .14 | 1.95 | 166 | 210 | 6.0 | 19.4 | 90 | 5 | 2.6 |
| 05/19/2009 | .23 | 8.76 | 65.7 | 185 | 3.1 | 36.8 | 82 | 47 | 32 |
| 06/02/2009 | .19 | 1.79 | 50.4 | 84.7 | 4.0 | 16.7 | 76 | 8 | 10 |
| 06/23/2009 | .14 | 1.24 | 35.4 | 59.1 | 4.4 | 10.9 | 64 | 5 | 4.1 |
| 07/14/2009 | .16 | .98 | 32.9 | 60.9 | E1.9 | 6.5 | 81 | 4 | 1.3 |
| 08/18/2009 | .09 | .52 | 34.8 | 55.8 | E1.6 | 3.7 | 90 | 1 | .18 |

**Table 4.** Water-quality data for the Clark Fork basin, Montana, October 2008 through September 2009.—Continued

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

| 12323760--Warm Springs Creek near Anaconda | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Date | Time | Streamflow, instantaneous ($ft^3/s$) | Turbidity, unfiltered, lab (NTRU) | pH, onsite (standard units) | Specific conductance, onsite (µS/cm) | Temperature, water (°C) | Hardness, filtered (mg/L as $CaCO_3$) | Calcium, filtered (mg/L) | Magnesium, filtered (mg/L) |
| 10/20/2008 | 1440 | 92 | <2.0 | 8.5 | 239 | 7.5 | 120 | 35.7 | 7.39 |
| 04/27/2009 | 1440 | 70 | E1.4 | 8.7 | 251 | 6.0 | 130 | 37.5 | 7.86 |
| 05/18/2009 | 1410 | 134 | E4.8 | 8.6 | 210 | 10.5 | 110 | 32.4 | 6.06 |
| 06/01/2009 | 1555 | 573 | E6.7 | 8.0 | 125 | 6.5 | 59 | 18.5 | 2.96 |
| 07/13/2009 | 1430 | 215 | E1.7 | 8.4 | 176 | 11.0 | 81 | 24.9 | 4.45 |
| 08/17/2009 | 1420 | 122 | E1.1 | 8.4 | 223 | 10.5 | 110 | 33.1 | 6.13 |

| 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) |
|---|---|---|---|---|---|---|---|---|
| 10/20/2008 | 2.2 | 2.4 | 0.02 | <0.06 | E0.68 | <4.0 | E2 | 37 |
| 04/27/2009 | 2.0 | 2.1 | E.02 | <.06 | E.86 | <4.0 | 6 | 63 |
| 05/18/2009 | 2.1 | 3.0 | .03 | .07 | 1.6 | 8.1 | 10 | 375 |
| 06/01/2009 | 3.8 | 5.6 | .03 | .07 | 2.0 | 14.0 | 13 | 543 |
| 07/13/2009 | 3.0 | 3.2 | E.02 | E.04 | 2.2 | E2.4 | 6 | 88 |
| 08/17/2009 | 1.9 | 2.5 | .02 | .06 | E.63 | <4.0 | 5 | 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) |
|---|---|---|---|---|---|---|---|---|---|
| 10/20/2008 | 0.08 | 0.16 | 0.7 | 2.1 | <2.0 | <2.0 | 80 | 3 | 0.75 |
| 04/27/2009 | E.03 | .16 | .8 | 2.7 | <2.0 | <2.0 | 66 | 3 | .57 |
| 05/18/2009 | E.05 | 1.33 | 2.0 | 16.7 | <2.0 | 7.2 | 62 | 21 | 7.6 |
| 06/01/2009 | E.05 | 3.51 | 2.2 | 22.0 | 2.1 | 19.9 | 32 | 44 | 68 |
| 07/13/2009 | <.06 | .28 | 2.0 | 6.2 | <2.0 | 3.5 | 61 | 5 | 2.9 |
| 08/17/2009 | <.06 | .27 | 1.2 | 4.8 | <2.0 | E1.8 | 57 | 4 | 1.3 |

**Table 4.** Water-quality data for the Clark Fork basin, Montana, October 2008 through September 2009.—Continued

[Abbreviations: $ft^3/s$, cubic feet per second; °C, degrees Celsius; E, estimated; lab, laboratory; µg/L, microgram per liter; µS/cm, microsiemen per centimeter at 25°C; mg/L, milligram per liter; mm, millimeter; NTRU, nephelometric turbidity ratio unit; ton/d, ton 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) |
| 10/21/2008 | 0850 | 73 | 8.1 | 286 | 5.0 | 140 | 43.0 | 8.39 |
| 04/28/2009 | 0800 | 64 | 8.1 | 296 | 3.0 | 150 | 44.1 | 8.62 |
| 05/19/2009 | 0745 | 157 | 8.0 | 214 | 8.0 | 100 | 32.3 | 5.76 |
| 06/02/2009 | 0800 | 362 | 7.9 | 157 | 5.5 | 73 | 23.0 | 3.75 |
| 07/14/2009 | 0740 | 174 | 8.0 | 201 | 9.5 | 91 | 28.3 | 4.87 |
| 08/18/2009 | 0725 | 103 | 8.2 | 263 | 10.0 | 130 | 39.3 | 7.01 |

| 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) |
|---|---|---|---|---|---|---|---|---|
| 10/21/2008 | 3.4 | 4.1 | 0.04 | <0.06 | 1.8 | 7.0 | 15 | 116 |
| 04/28/2009 | 3.0 | 4.2 | .03 | E.05 | 1.8 | 14.0 | 9 | 190 |
| 05/19/2009 | 5.8 | 18.0 | .04 | .40 | 4.4 | 147 | 21 | 2,110 |
| 06/02/2009 | 7.2 | 11.2 | .03 | .12 | 5.6 | 33.4 | 17 | 525 |
| 07/14/2009 | 3.9 | 5.6 | .02 | .09 | 1.8 | 16.2 | 11 | 282 |
| 08/18/2009 | 3.6 | 5.2 | .03 | .08 | 2.7 | 11.0 | 11 | 198 |

| 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) |
|---|---|---|---|---|---|---|---|---|---|
| 10/21/2008 | 0.06 | 0.75 | 102 | 142 | E1.5 | 3.5 | 62 | 5 | 0.99 |
| 04/28/2009 | E.05 | 1.17 | 91.2 | 168 | E1.6 | 4.6 | 73 | 8 | 1.4 |
| 05/19/2009 | .10 | 13.8 | 78.8 | 528 | E1.9 | 48.2 | 67 | 127 | 54 |
| 06/02/2009 | .07 | 2.81 | 24.2 | 89.9 | 2.7 | 14.1 | 70 | 27 | 26 |
| 07/14/2009 | E.03 | 1.43 | 44.0 | 83.5 | E1.9 | 8.2 | 62 | 13 | 6.1 |
| 08/18/2009 | E.04 | 1.10 | 66.1 | 94.5 | E1.5 | 4.6 | 65 | 10 | 2.8 |

**Table 4.** Water-quality data for the Clark Fork basin, Montana, October 2008 through September 2009.—Continued

[Abbreviations: $ft^3/s$, cubic feet per second; °C, degrees Celsius; E, estimated; lab, laboratory; µg/L, microgram per liter; µS/cm, microsiemen per centimeter at 25°C; mg/L, milligram per liter; mm, millimeter; NTRU, nephelometric turbidity ratio unit; ton/d, ton 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) |
| 10/21/2008 | 1100 | 136 | 8.3 | 406 | 5.0 | 180 | 54.2 | 11.3 |
| 03/23/2009 | 1215 | 162 | 8.6 | 451 | 4.0 | 180 | 52.8 | 12.6 |
| 04/28/2009 | 1015 | 252 | 8.2 | 467 | 5.0 | 200 | 59.6 | 12.0 |
| 05/19/2009 | 0930 | 415 | 8.3 | 303 | 11.0 | 130 | 39.3 | 7.44 |
| 06/02/2009 | 1020 | 875 | 8.4 | 228 | 9.0 | 98 | 30.9 | 5.11 |
| 06/23/2009 | 0855 | 615 | 8.6 | 236 | 9.0 | 100 | 32.4 | 5.74 |
| 07/14/2009 | 0935 | 295 | 8.6 | 248 | 12.0 | 110 | 32.4 | 5.90 |
| 08/18/2009 | 0915 | 175 | 8.8 | 327 | 12.0 | 150 | 46.3 | 8.59 |

| 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) |
|---|---|---|---|---|---|---|---|---|
| 10/21/2008 | 12.1 | 13.0 | 0.04 | E0.04 | 3.0 | 7.0 | 13 | 132 |
| 03/23/2009 | 15.3 | 18.2 | .07 | .11 | 5.3 | 13.9 | 26 | 287 |
| 04/28/2009 | 13.4 | 16.5 | .04 | .14 | 4.2 | 15.4 | 14 | 368 |
| 05/19/2009 | 22.6 | 38.7 | .04 | .52 | 7.3 | 94.2 | 29 | 1,880 |
| 06/02/2009 | 22.2 | 26.2 | .06 | .16 | 8.8 | 33.9 | 24 | 522 |
| 06/23/2009 | 16.9 | 18.3 | .04 | .09 | 5.3 | 19.4 | 20 | 295 |
| 07/14/2009 | 14.7 | 15.8 | .03 | .09 | 3.4 | 14.2 | 21 | 246 |
| 08/18/2009 | 20.4 | 20.4 | .03 | .07 | 3.1 | 9.1 | 12 | 145 |

| 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) |
|---|---|---|---|---|---|---|---|---|---|
| 10/21/2008 | 0.07 | 1.03 | 71.2 | 104 | 3.2 | 6.4 | 74 | 4 | 1.5 |
| 03/23/2009 | .13 | 1.93 | 65.0 | 123 | 3.3 | 13.1 | 67 | 12 | 5.2 |
| 04/28/2009 | .10 | 2.49 | 117 | 190 | 5.3 | 19.8 | 55 | 13 | 8.8 |
| 05/19/2009 | .18 | 18.4 | 70.7 | 389 | 2.6 | 64.6 | 67 | 97 | 109 |
| 06/02/2009 | .14 | 3.79 | 33.7 | 109 | 5.5 | 26.2 | 53 | 26 | 61 |
| 06/23/2009 | .09 | 2.12 | 30.7 | 74.8 | 2.6 | 13.9 | 40 | 15 | 25 |
| 07/14/2009 | .08 | 1.43 | 37.2 | 78.7 | E1.7 | 8.9 | 72 | 10 | 8.0 |
| 08/18/2009 | .07 | .98 | 38.6 | 77.2 | E1.4 | 6.2 | 71 | 5 | 2.4 |

**Table 4.** Water-quality data for the Clark Fork basin, Montana, October 2008 through September 2009.—Continued

[Abbreviations: $ft^3/s$, cubic feet per second; °C, degrees Celsius; E, estimated; lab, laboratory; µg/L, microgram per liter; µS/cm, microsiemen per centimeter at 25°C; mg/L, milligram per liter; mm, millimeter; NTRU, nephelometric turbidity ratio unit; ton/d, ton 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) |
| 10/20/2008 | 1350 | 6.4 | <2.0 | 8.2 | 226 | 7.0 | 110 | 33.4 | 6.67 |
| 03/22/2009 | 1605 | 5.5 | E1.5 | 8.2 | 209 | 4.0 | 99 | 28.8 | 6.47 |
| 04/27/2009 | 1355 | 8.2 | E3.1 | 8.2 | 198 | 5.0 | 96 | 29.0 | 5.67 |
| 05/18/2009 | 1330 | 11 | E11 | 8.2 | 164 | 11.0 | 78 | 23.9 | 4.39 |
| 06/01/2009 | 1445 | 54 | E15 | 8.0 | 121 | 7.0 | 58 | 18.1 | 3.02 |
| 06/22/2009 | 1400 | 35 | E2.2 | 8.0 | 155 | 8.0 | 74 | 23.2 | 3.94 |
| 07/13/2009 | 1345 | 14 | E1.5 | 8.2 | 198 | 11.0 | 91 | 28.3 | 4.85 |
| 08/17/2009 | 1215 | 17 | E1.5 | 8.2 | 211 | 8.0 | 100 | 32.4 | 5.78 |

| 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) |
|---|---|---|---|---|---|---|---|---|
| 10/20/2008 | 3.7 | 3.4 | 0.03 | <0.06 | 1.4 | <4.0 | 7 | 30 |
| 03/22/2009 | 3.2 | 3.5 | .03 | E.03 | 2.2 | 4.6 | 12 | 91 |
| 04/27/2009 | 2.1 | 2.4 | .02 | <.06 | 1.2 | 4.8 | 9 | 158 |
| 05/18/2009 | 3.0 | 4.6 | .03 | .09 | 2.7 | 16.7 | 14 | 526 |
| 06/01/2009 | 5.9 | 9.6 | .03 | .16 | 3.2 | 28.3 | 22 | 1,370 |
| 06/22/2009 | 5.5 | 5.9 | .02 | <.06 | 3.4 | 5.9 | 14 | 202 |
| 07/13/2009 | 5.4 | 5.3 | E.02 | E.05 | 1.9 | 4.5 | 10 | 110 |
| 08/17/2009 | 2.7 | 3.3 | E.02 | E.04 | 1.5 | E3.8 | 9 | 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) |
|---|---|---|---|---|---|---|---|---|---|
| 10/20/2008 | E0.05 | 0.16 | 0.7 | 1.5 | 2.2 | <2.0 | 50 | 1 | 0.02 |
| 03/22/2009 | E.03 | .42 | 1.0 | 3.8 | <2.0 | 2.2 | 75 | 5 | .07 |
| 04/27/2009 | E.05 | .63 | .9 | 5.9 | <2.0 | 2.2 | 59 | 6 | .13 |
| 05/18/2009 | .06 | 2.60 | 2.0 | 21.0 | E1.0 | 7.6 | 66 | 30 | .89 |
| 06/01/2009 | .09 | 6.82 | 2.5 | 40.9 | E1.2 | 18.1 | 22 | 143 | 21 |
| 06/22/2009 | E.04 | .75 | 1.4 | 6.8 | E1.2 | 3.3 | 26 | 19 | 1.8 |
| 07/13/2009 | <.06 | .46 | 2.0 | 5.3 | <2.0 | 2.5 | 37 | 6 | .23 |
| 08/17/2009 | <.06 | .45 | 1.2 | 4.5 | E1.5 | E1.5 | 43 | 5 | .23 |

**Table 4.** Water-quality data for the Clark Fork basin, Montana, October 2008 through September 2009.—Continued

[Abbreviations: $ft^3/s$, cubic feet per second; °C, degrees Celsius; E, estimated; lab, laboratory; µg/L, microgram per liter; µS/cm, microsiemen per centimeter at 25°C; mg/L, milligram per liter; mm, millimeter; NTRU, nephelometric turbidity ratio unit; ton/d, ton 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) |
| 10/21/2008 | 1020 | 45 | 8.2 | 629 | 5.0 | 320 | 94.6 | 20.6 |
| 03/23/2009 | 1135 | 56 | 8.2 | 618 | 3.5 | 290 | 83.1 | 19.2 |
| 04/28/2009 | 0940 | 43 | 8.2 | 629 | 3.0 | 300 | 85.2 | 20.5 |
| 05/19/2009 | 0900 | 19 | 8.2 | 644 | 12.0 | 310 | 89.2 | 20.7 |
| 06/02/2009 | 0940 | 11 | 8.2 | 578 | 9.0 | 270 | 80.1 | 17.3 |
| 06/23/2009 | 0810 | 11 | 8.1 | 691 | 9.0 | 340 | 97.2 | 23.0 |
| 07/14/2009 | 0910 | 2.6 | 8.0 | 674 | 12.0 | 280 | 72.9 | 23.2 |
| 08/18/2009 | 0850 | 27 | 8.1 | 618 | 12.0 | 300 | 88.1 | 20.2 |

| 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) |
|---|---|---|---|---|---|---|---|---|
| 10/21/2008 | 13.6 | 14.1 | 0.03 | <0.06 | 2.0 | E3.1 | 13 | 47 |
| 03/23/2009 | 20.2 | 22.2 | .03 | E.06 | 2.4 | 6.9 | 24 | 174 |
| 04/28/2009 | 10.9 | 11.9 | .02 | E.04 | 1.3 | 4.5 | 11 | 142 |
| 05/19/2009 | 16.3 | 17.2 | .03 | <.06 | 2.4 | 5.2 | 15 | 102 |
| 06/02/2009 | 13.5 | 14.1 | E.02 | <.06 | 1.7 | E3.8 | 15 | 60 |
| 06/23/2009 | 19.6 | 19.8 | .03 | <.06 | 3.1 | E3.8 | 24 | 64 |
| 07/14/2009 | 11.5 | 11.8 | E.02 | <.06 | 1.9 | E3.1 | 20 | 56 |
| 08/18/2009 | 20.5 | 21.0 | E.02 | E.04 | 2.5 | E3.9 | 13 | 60 |

| 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) |
|---|---|---|---|---|---|---|---|---|---|
| 10/21/2008 | E0.04 | 0.15 | 7.5 | 9.1 | E1.5 | E1.7 | 40 | 8 | 0.97 |
| 03/23/2009 | E.06 | .64 | 21.0 | 33.1 | E1.6 | 4.3 | 72 | 8 | 1.2 |
| 04/28/2009 | E.05 | .50 | 17.3 | 30.6 | E1.3 | 2.9 | 46 | 19 | 2.2 |
| 05/19/2009 | E.05 | .40 | 33.6 | 46.5 | E1.5 | 2.8 | 61 | 19 | .97 |
| 06/02/2009 | E.03 | .19 | 13.1 | 18.0 | E1.1 | E1.5 | 59 | 5 | .15 |
| 06/23/2009 | E.03 | .14 | 13.6 | 17.9 | E1.5 | E1.3 | 65 | 9 | .27 |
| 07/14/2009 | <.06 | .11 | 17.8 | 18.9 | E1.8 | E1.3 | 64 | 3 | .02 |
| 08/18/2009 | E.03 | .19 | 9.8 | 14.0 | E1.6 | E1.4 | 72 | 2 | .15 |

**Table 4.** Water-quality data for the Clark Fork basin, Montana, October 2008 through September 2009.—Continued

[Abbreviations: $ft^3/s$, cubic feet per second; °C, degrees Celsius; E, estimated; lab, laboratory; µg/L, microgram per liter; µS/cm, microsiemen per centimeter at 25°C; mg/L, milligram per liter; mm, millimeter; NTRU, nephelometric turbidity ratio unit; ton/d, ton 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) |
| 10/21/2008 | 1200 | 291 | 8.2 | 442 | 5.5 | 200 | 57.9 | 12.3 |
| 03/24/2009 | 1025 | 306 | 8.2 | 479 | 2.5 | 190 | 56.7 | 12.9 |
| 04/28/2009 | 1120 | 386 | 8.1 | 479 | 5.0 | 200 | 58.5 | 12.8 |
| 05/19/2009 | 1045 | 526 | 8.0 | 354 | 14.0 | 150 | 45.6 | 9.03 |
| 06/02/2009 | 1155 | 1,130 | 8.1 | 245 | 9.5 | 100 | 31.8 | 5.53 |
| 06/23/2009 | 1025 | 996 | 8.1 | 266 | 10.0 | 110 | 34.9 | 6.54 |
| 07/14/2009 | 1030 | 425 | 8.0 | 330 | 13.5 | 140 | 41.2 | 7.82 |
| 08/18/2009 | 1020 | 250 | 8.3 | 416 | 13.5 | 190 | 56.4 | 11.7 |

| Date | Arsenic, filtered (µg/L) | Arsenic, unfiltered recoverable (µg/L) | Cadmium, filtered (µg/L) | Cadmium, unfiltered recoverable (µg/L) | Copper, filtered (µg/L) | Copper, unfiltered recoverable (µg/L) | Iron, filtered (µg/L) | Iron, unfiltered recoverable (µg/L) |
|---|---|---|---|---|---|---|---|---|
| 10/21/2008 | 10.8 | 13.2 | 0.04 | 0.11 | 4.7 | 22.5 | 9 | 329 |
| 03/24/2009 | 12.2 | 19.1 | .08 | .24 | 7.6 | 53.1 | 20 | 915 |
| 04/28/2009 | 12.6 | 21.2 | .07 | .26 | 7.3 | 65.6 | 16 | 1,040 |
| 05/19/2009 | 17.8 | -- | .07 | -- | 12.1 | 101 | 21 | 3,220 |
| 06/02/2009 | 21.7 | 37.8 | .12 | .55 | 18.8 | 129 | 33 | 1,680 |
| 06/23/2009 | 17.2 | 24.4 | .08 | .24 | 12.0 | 65.6 | 27 | 922 |
| 07/14/2009 | 16.1 | 21.1 | .06 | .22 | 9.0 | 47.1 | 22 | 663 |
| 08/18/2009 | 19.4 | 21.2 | .05 | .13 | 6.8 | 24.2 | 10 | 334 |

| 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) |
|---|---|---|---|---|---|---|---|---|---|
| 10/21/2008 | 0.07 | 2.81 | 24.2 | 75.6 | 5.9 | 21.3 | 59 | 15 | 12 |
| 03/24/2009 | .12 | 7.20 | 34.6 | 133 | 7.0 | 43.0 | 64 | 41 | 34 |
| 04/28/2009 | .12 | 8.28 | 24.5 | 170 | 7.6 | 52.7 | 58 | 45 | 47 |
| 05/19/2009 | .18 | 13.0 | 33.9 | 192 | 6.5 | -- | 58 | 142 | 202 |
| 06/02/2009 | .32 | 17.1 | 29.9 | 207 | 19.2 | 109 | 57 | 84 | 256 |
| 06/23/2009 | .19 | 8.43 | 21.9 | 110 | 9.4 | 49.2 | 49 | 51 | 137 |
| 07/14/2009 | .14 | 5.51 | 20.1 | 101 | 5.9 | 33.9 | 71 | 29 | 33 |
| 08/18/2009 | .09 | 3.09 | 21.8 | 75.5 | 6.9 | 18.8 | 77 | 13 | 8.8 |

**Table 4.** Water-quality data for the Clark Fork basin, Montana, October 2008 through September 2009.—Continued

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

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

| Date | Time | Streamflow, instantaneous ($ft^3/s$) | pH, onsite (standard units) | Specific conductance, onsite (µS/cm) | Temperature, water (°C) | Hardness, filtered (mg/L as $CaCO_3$) | Calcium, filtered (mg/L) | Magnesium, filtered (mg/L) |
|---|---|---|---|---|---|---|---|---|
| 03/24/2009 | 1155 | 345 | 8.3 | 471 | 3.0 | 190 | 56.2 | 13.2 |
| 04/28/2009 | 1315 | 467 | 8.2 | 462 | 5.0 | 190 | 56.4 | 12.5 |
| 05/19/2009 | 1245 | 664 | 8.1 | 339 | 14.0 | 140 | 42.7 | 8.65 |
| 06/02/2009 | 1410 | 1,380 | 8.1 | 253 | 10.0 | 100 | 31.8 | 5.93 |
| 06/23/2009 | 1240 | 1,210 | 8.2 | 298 | 12.0 | 130 | 39.2 | 8.32 |
| 07/14/2009 | 1250 | 514 | 8.2 | 353 | 14.5 | 150 | 44.1 | 10.0 |
| 08/18/2009 | 1220 | 296 | 8.5 | 432 | 15.5 | 200 | 58.5 | 12.6 |

| Date | Arsenic, filtered (µg/L) | Arsenic, unfiltered recoverable (µg/L) | Cadmium, filtered (µg/L) | Cadmium, unfiltered recoverable (µg/L) | Copper, filtered (µg/L) | Copper, unfiltered recoverable (µg/L) | Iron, filtered (µg/L) | Iron, unfiltered recoverable (µg/L) |
|---|---|---|---|---|---|---|---|---|
| 03/24/2009 | 12.9 | 19.9 | 0.08 | 0.38 | 9.1 | 59.4 | 18 | 1,090 |
| 04/28/2009 | 12.6 | 20.2 | .06 | .27 | 7.7 | 65.9 | 10 | 1,150 |
| 05/19/2009 | 16.5 | 39.1 | .08 | .75 | 11.7 | 197 | 15 | 3,190 |
| 06/02/2009 | 21.6 | 43.5 | .11 | .61 | 20.2 | 182 | 33 | 2,140 |
| 06/23/2009 | 18.4 | 27.7 | .10 | .34 | 15.7 | 87.6 | 28 | 1,180 |
| 07/14/2009 | 16.1 | 21.9 | .07 | .25 | 11.1 | 61.5 | 16 | 632 |
| 08/18/2009 | 19.8 | 21.6 | .06 | .17 | 14.1 | 27.4 | 7 | 364 |

| Date | Lead, filtered (µg/L) | Lead, unfiltered recoverable (µg/L) | Manganese, filtered (µg/L) | Manganese, unfiltered recoverable (µg/L) | Zinc, filtered (µg/L) | Zinc, unfiltered recoverable (µg/L) | Sediment, suspended (percent finer than 0.062 mm) | Sediment, suspended (mg/L) | Sediment discharge, suspended (ton/d) |
|---|---|---|---|---|---|---|---|---|---|
| 03/24/2009 | 0.14 | 7.75 | 34.1 | 148 | 6.8 | 65.1 | 66 | 49 | 46 |
| 04/28/2009 | .11 | 8.59 | 15.6 | 159 | 7.2 | 56.3 | 56 | 58 | 73 |
| 05/19/2009 | .17 | 29.4 | 28.8 | 309 | 6.0 | 152 | 60 | 179 | 321 |
| 06/02/2009 | .39 | 22.2 | 22.6 | 246 | 15.9 | 142 | 56 | 115 | 428 |
| 06/23/2009 | .22 | 12.3 | 19.1 | 131 | 9.7 | 70.2 | 42 | 81 | 265 |
| 07/14/2009 | .11 | 13.5 | 18.5 | 140 | 5.8 | 38.4 | 70 | 30 | 42 |
| 08/18/2009 | .10 | 3.34 | 19.9 | 92.0 | 4.3 | 21.4 | 76 | 13 | 10 |

**Table 4.** Water-quality data for the Clark Fork basin, Montana, October 2008 through September 2009.—Continued

[Abbreviations: $ft^3/s$, cubic feet per second; °C, degrees Celsius; E, estimated; lab, laboratory; µg/L, microgram per liter; µS/cm, microsiemen per centimeter at 25°C; mg/L, milligram per liter; mm, millimeter; NTRU, nephelometric turbidity ratio unit; ton/d, ton 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) |
| 10/21/2008 | 1400 | 483 | 8.5 | 397 | 6.0 | 180 | 52.9 | 11.3 |
| 03/25/2009 | 0955 | 575 | 8.2 | 383 | 3.0 | 160 | 45.9 | 10.4 |
| 04/28/2009 | 1430 | 1,040 | 8.2 | 334 | 4.5 | 140 | 42.4 | 9.39 |
| 05/19/2009 | 1415 | 1,640 | 8.1 | 237 | 12.5 | 100 | 29.8 | 6.23 |
| 06/02/2009 | 1520 | 2,300 | 8.1 | 221 | 10.0 | 94 | 28.8 | 5.40 |
| 06/23/2009 | 1505 | 1,610 | 8.3 | 280 | 13.5 | 120 | 36.2 | 7.37 |
| 07/14/2009 | 1345 | 823 | 8.3 | 333 | 14.0 | 140 | 42.8 | 8.10 |
| 08/18/2009 | 1315 | 519 | 8.5 | 368 | 16.0 | 170 | 50.6 | 10.3 |

| Date | Arsenic, filtered (µg/L) | Arsenic, unfiltered recoverable (µg/L) | Cadmium, filtered (µg/L) | Cadmium, unfiltered recoverable (µg/L) | Copper, filtered (µg/L) | Copper, unfiltered recoverable (µg/L) | Iron, filtered (µg/L) | Iron, unfiltered recoverable (µg/L) |
|---|---|---|---|---|---|---|---|---|
| 10/21/2008 | 8.7 | 10.3 | 0.03 | 0.08 | 3.8 | 19.8 | 6 | 300 |
| 03/25/2009 | 8.3 | 11.8 | .06 | .15 | 6.7 | 31.4 | 33 | 734 |
| 04/28/2009 | 7.7 | 12.1 | .04 | .15 | 5.4 | 35.7 | 42 | 901 |
| 05/19/2009 | 9.5 | 22.6 | .05 | .43 | 7.8 | 89.2 | 59 | 3,020 |
| 06/02/2009 | 14.4 | 25.4 | .07 | .42 | 13.1 | 96.0 | 38 | 1,700 |
| 06/23/2009 | 13.8 | 20.4 | .08 | .24 | 13.8 | 66.1 | 24 | 1,020 |
| 07/14/2009 | 11.8 | 13.8 | .05 | .14 | 7.8 | 28.5 | 12 | 410 |
| 08/18/2009 | 12.8 | 14.1 | .04 | .10 | 5.1 | 14.3 | 6 | 249 |

| 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) |
|---|---|---|---|---|---|---|---|---|---|
| 10/21/2008 | -- | 2.44 | 10.2 | 81.0 | 2.4 | 17.4 | 84 | 11 | 14 |
| 03/25/2009 | 0.12 | 4.60 | 23.2 | 88.5 | 5.2 | 28.2 | 70 | 33 | 51 |
| 04/28/2009 | .17 | 5.35 | 10.3 | 92.3 | 4.5 | 33.0 | 64 | 44 | 124 |
| 05/19/2009 | .25 | 18.3 | 15.2 | 241 | 4.1 | 85.0 | 56 | 196 | 868 |
| 06/02/2009 | .31 | 13.1 | 25.5 | 181 | 9.4 | 86.2 | 59 | 90 | 559 |
| 06/23/2009 | .17 | 8.51 | 16.5 | 101 | 6.8 | 50.4 | 49 | 57 | 248 |
| 07/14/2009 | .09 | 3.00 | 13.8 | 69.6 | 4.2 | 21.6 | 77 | 19 | 42 |
| 08/18/2009 | .07 | 1.71 | 11.1 | 58.6 | 2.6 | 12.6 | 68 | 10 | 14 |

**Table 4.** Water-quality data for the Clark Fork basin, Montana, October 2008 through September 2009.—Continued

[Abbreviations: $ft^3/s$, cubic feet per second; °C, degrees Celsius; E, estimated; lab, laboratory; µg/L, microgram per liter; µS/cm, microsiemen per centimeter at 25°C; mg/L, milligram per liter; mm, millimeter; NTRU, nephelometric turbidity ratio unit; ton/d, ton 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) |
| 10/21/2008 | 1520 | 766 | 8.4 | 416 | 8.0 | 190 | 55.3 | 13.1 |
| 03/25/2009 | 0830 | 943 | 8.1 | 406 | 4.0 | 170 | 49.9 | 11.8 |
| 04/28/2009 | 1620 | 1,500 | 8.2 | 333 | 5.0 | 140 | 41.8 | 9.76 |
| 05/19/2009 | 1600 | 1,860 | 8.1 | 269 | 15.5 | 120 | 33.7 | 7.51 |
| 06/02/2009 | 1650 | 3,350 | 8.1 | 236 | 11.0 | 100 | 30.6 | 6.07 |
| 06/23/2009 | 1630 | 2,550 | 8.2 | 308 | 14.0 | 140 | 40.5 | 8.84 |
| 07/14/2009 | 1505 | 1,050 | 8.3 | 372 | 15.0 | 170 | 47.3 | 11.8 |
| 08/18/2009 | 1420 | 801 | 8.4 | 413 | 16.5 | 190 | 54.8 | 12.9 |

| 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) |
|---|---|---|---|---|---|---|---|---|
| 10/21/2008 | 8.4 | 10.1 | 0.03 | 0.08 | 3.4 | 13.7 | 8 | 323 |
| 03/25/2009 | 8.6 | 13.9 | .06 | .23 | 6.9 | 40.8 | 28 | 1,140 |
| 04/28/2009 | 7.1 | 13.6 | .04 | .22 | 5.1 | 38.3 | 41 | 1,180 |
| 05/19/2009 | 9.8 | 24.6 | .05 | .48 | 8.2 | 87.7 | 30 | 2,530 |
| 06/02/2009 | 15.2 | 25.4 | .08 | .43 | 14.3 | 83.3 | 36 | 1,640 |
| 06/23/2009 | 13.6 | 21.1 | .09 | .27 | 12.3 | 57.1 | 23 | 1,240 |
| 07/14/2009 | 11.6 | 13.1 | .04 | .13 | 5.3 | 15.9 | 8 | 321 |
| 08/18/2009 | 11.6 | 13.2 | .04 | .10 | 4.3 | 11.7 | 9 | 303 |

| 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) |
|---|---|---|---|---|---|---|---|---|---|
| 10/21/2008 | 0.07 | 2.88 | 9.5 | 81.2 | 3.1 | 17.9 | 82 | 13 | 27 |
| 03/25/2009 | .15 | 6.95 | 17.6 | 134 | 5.8 | 49.0 | 66 | 59 | 150 |
| 04/28/2009 | .21 | 8.17 | 8.5 | 152 | 4.6 | 49.1 | 55 | 70 | 284 |
| 05/19/2009 | .22 | 20.9 | 15.2 | 323 | 4.3 | 113 | 60 | 179 | 899 |
| 06/02/2009 | .35 | 12.9 | 20.9 | 202 | 9.4 | 89.8 | 60 | 95 | 859 |
| 06/23/2009 | .20 | 10.1 | 17.0 | 152 | 5.9 | 63.4 | 50 | 76 | 523 |
| 07/14/2009 | .08 | 2.77 | 14.4 | 74.8 | 3.2 | 18.9 | 81 | 17 | 48 |
| 08/18/2009 | .06 | 2.44 | 11.4 | 69.4 | 2.6 | 14.8 | 67 | 17 | 37 |

**Table 4.** Water-quality data for the Clark Fork basin, Montana, October 2008 through September 2009.—Continued

[Abbreviations: $ft^3/s$, cubic feet per second; °C, degrees Celsius; E, estimated; lab, laboratory; µg/L, microgram per liter; µS/cm, microsiemen per centimeter at 25°C; mg/L, milligram per liter; mm, millimeter; NTRU, nephelometric turbidity ratio unit; ton/d, ton 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) |
| 10/22/2008 | 0855 | 1,150 | 8.1 | 345 | 4.5 | 160 | 44.1 | 11.3 | -- |
| *03/02/2009 | 1000 | 970 | 8.3 | 353 | 3.0 | 170 | 47.8 | 12.3 | 0.25 |
| *03/16/2009 | 1130 | 1,030 | 8.4 | 337 | 3.5 | 150 | 43.2 | 10.6 | .24 |
| 03/24/2009 | 1420 | 1,670 | 8.2 | 287 | 5.0 | 120 | 32.8 | 8.76 | -- |
| *03/25/2009 | 1030 | 1,480 | 8.4 | 309 | 4.0 | 140 | 37.9 | 10.1 | .54 |
| *03/27/2009 | 0900 | 1,180 | 8.4 | 331 | 2.5 | 150 | 42.0 | 10.8 | .36 |
| *03/31/2009 | 0915 | 1,100 | 8.4 | 336 | 4.0 | 160 | 44.5 | 11.3 | .25 |
| *04/06/2009 | 1030 | 1,160 | 8.0 | 350 | 5.5 | 170 | 46.6 | 12.2 | .27 |
| *04/14/2009 | 1000 | 2,930 | 8.1 | 225 | 5.0 | 100 | 28.6 | 7.65 | .78 |
| *04/21/2009 | 1020 | 2,990 | 7.9 | 221 | 8.5 | 96 | 26.8 | 7.18 | .63 |
| *04/27/2009 | 1100 | 3,670 | 8.3 | 231 | 6.0 | 110 | 30.4 | 7.54 | .47 |
| 04/29/2009 | 0800 | 3,120 | 8.1 | 251 | 4.5 | 110 | 30.6 | 7.79 | -- |
| *05/04/2009 | 1045 | 2,660 | 8.3 | 246 | 8.5 | 110 | 31.9 | 8.15 | .32 |
| *05/11/2009 | 1030 | 3,460 | 8.3 | 230 | 8.0 | 100 | 28.9 | 7.56 | .27 |
| *05/18/2009 | 0930 | 4,430 | 8.1 | 193 | 11.0 | 91 | 25.7 | 6.42 | .39 |
| 05/20/2009 | 0745 | 7,560 | 7.9 | 143 | 10.0 | 63 | 17.9 | 4.45 | -- |
| *05/22/2009 | 0930 | 6,680 | 8.0 | E152 | 9.0 | 69 | 19.8 | 4.82 | .53 |
| *05/26/2009 | 1130 | 7,310 | 8.0 | 150 | 10.5 | 68 | 19.7 | 4.63 | .56 |
| *05/31/2009 | 1100 | 7,380 | 7.9 | 143 | 12.0 | 64 | 18.7 | 4.29 | .37 |
| 06/03/2009 | 0745 | 6,270 | 7.9 | 161 | 9.0 | 71 | 20.8 | 4.63 | -- |
| *06/04/2009 | 1200 | 5,480 | 8.0 | 170 | 12.0 | 76 | 22.2 | 5.04 | .34 |
| *06/08/2009 | 1000 | 5,330 | 8.1 | 187 | 9.5 | 84 | 24.2 | 5.59 | .30 |
| *06/15/2009 | 1030 | 3,210 | 8.2 | 205 | 13.0 | 96 | 27.6 | 6.42 | .24 |
| *06/23/2009 | 1000 | 4,370 | 8.2 | 218 | 10.0 | 100 | 29.6 | 6.98 | .36 |
| 06/24/2009 | 0755 | 3,810 | 8.1 | 234 | 12.0 | 110 | 30.7 | 7.18 | -- |
| 07/15/2009 | 0755 | 1,870 | 8.2 | 279 | 14.0 | 120 | 34.3 | 7.99 | -- |
| 08/19/2009 | 0800 | 1,160 | 8.2 | 330 | 15.0 | 150 | 42.8 | 10.3 | -- |

**Table 4.** Water-quality data for the Clark Fork basin, Montana, October 2008 through September 2009.—Continued

[Abbreviations: ft³/s, cubic feet per second; °C, degrees Celsius; E, estimated; lab, laboratory; µg/L, microgram per liter; µS/cm, microsiemen per centimeter at 25°C; mg/L, milligram per liter; mm, millimeter; NTRU, nephelometric turbidity ratio unit; ton/d, ton per day. Symbols: <, less than laboratory reporting level; --, no data]

| 12334550--Clark Fork at Turah Bridge, near Bonner—Continued | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Date | Total phosphorous, unfiltered, (mg/L) | Arsenic, filtered (µg/L) | Arsenic, unfiltered recoverable (µg/L) | Cadmium, filtered (µg/L) | Cadmium, unfiltered recoverable (µg/L) | Copper, filtered (µg/L) | Copper, unfiltered recoverable (µg/L) | Iron, filtered (µg/L) | Iron, unfiltered recoverable (µg/L) |
| 10/22/2008 | -- | 5.8 | 6.7 | 0.03 | E0.05 | 2.4 | 7.9 | 4 | 195 |
| *03/02/2009 | 0.035 | 5.3 | 6.1 | .06 | .09 | 4.5 | 11.7 | 64 | 280 |
| *03/16/2009 | .032 | 4.7 | 6.1 | .05 | .08 | 2.9 | 11.2 | 8 | 274 |
| 03/24/2009 | -- | 6.7 | 11.7 | .04 | .26 | 7.7 | 40.0 | 48 | 1,370 |
| *03/25/2009 | .113 | 6.5 | 9.0 | .05 | .15 | 6.5 | 26.0 | 24 | 778 |
| *03/27/2009 | .134 | 5.4 | 7.3 | .03 | .10 | 3.7 | 14.5 | 13 | 424 |
| *03/31/2009 | .048 | 5.2 | 6.3 | .03 | .08 | 3.1 | 12.4 | 7 | 319 |
| *04/06/2009 | .141 | 5.6 | 6.7 | .03 | .07 | 3.8 | 11.6 | 10 | 267 |
| *04/14/2009 | .170 | 5.9 | 13.7 | .02 | .29 | 6.0 | 49.2 | 34 | 2,130 |
| *04/21/2009 | .121 | 5.3 | 10.0 | .05 | .24 | 5.0 | 38.5 | 26 | 1,550 |
| *04/27/2009 | .078 | 5.6 | 8.7 | .03 | .16 | 4.7 | 26.3 | 30 | 784 |
| 04/29/2009 | -- | 4.6 | 7.7 | .03 | .13 | 3.7 | 21.6 | 43 | 662 |
| *05/04/2009 | .056 | 4.8 | 7.3 | .03 | .12 | 3.3 | 19.8 | 21 | 582 |
| *05/11/2009 | .055 | 5.4 | -- | .03 | -- | 3.9 | -- | 28 | -- |
| *05/18/2009 | .071 | 4.8 | 7.1 | .03 | .13 | 3.5 | 21.9 | 24 | 856 |
| 05/20/2009 | -- | 5.1 | 12.3 | .04 | .40 | 5.4 | 58.3 | 82 | 2,560 |
| *05/22/2009 | .119 | 6.7 | 11.2 | .04 | .26 | 7.2 | 45.4 | 32 | 1,520 |
| *05/26/2009 | .129 | 8.1 | 14.5 | .05 | .35 | 9.2 | 61.5 | 36 | 1,840 |
| *05/31/2009 | .091 | 8.1 | 11.8 | .06 | .25 | 7.6 | 41.6 | 28 | 1,210 |
| 06/03/2009 | -- | 8.3 | 12.4 | .05 | .23 | 8.0 | 41.1 | 41 | 1,020 |
| *06/04/2009 | .074 | 8.4 | 11.9 | .05 | .20 | 7.3 | 36.7 | 25 | 880 |
| *06/08/2009 | .070 | 8.5 | 10.8 | .05 | .17 | 7.7 | 33.4 | 26 | 798 |
| *06/15/2009 | .060 | 7.1 | 9.0 | .04 | .12 | 4.8 | 22.2 | 20 | 507 |
| *06/23/2009 | .088 | 8.5 | 12.6 | .05 | .17 | 7.9 | 37.0 | 29 | 970 |
| 06/24/2009 | -- | 8.4 | 11.6 | .05 | .13 | 7.7 | 28.6 | 26 | 638 |
| 07/15/2009 | -- | 6.7 | 7.6 | .04 | .10 | 3.7 | 9.7 | 10 | 206 |
| 08/19/2009 | -- | 8.1 | 9.1 | .05 | .09 | 3.1 | 10.3 | 6 | 271 |

**Table 4.** Water-quality data for the Clark Fork basin, Montana, October 2008 through September 2009.—Continued

[Abbreviations: $ft^3/s$, cubic feet per second; °C, degrees Celsius; E, estimated; lab, laboratory; µg/L, microgram per liter; µS/cm, microsiemen per centimeter at 25°C; mg/L, milligram per liter; mm, millimeter; NTRU, nephelometric turbidity ratio unit; ton/d, ton 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) |
| 10/22/2008 | E0.05 | 1.59 | 3.5 | 50.2 | 2.6 | 12.1 | 82 | 9 | 28 |
| *03/02/2009 | .47 | 2.12 | 14.3 | 47.6 | 6.8 | 18.1 | 89 | 15 | 39 |
| *03/16/2009 | .07 | 1.96 | 8.6 | 45.8 | 3.7 | 17.7 | 82 | 15 | 42 |
| 03/24/2009 | .20 | 7.62 | 11.1 | 146 | 5.3 | 52.5 | 81 | 69 | 311 |
| *03/25/2009 | .24 | 4.61 | 9.5 | 91.6 | 6.5 | 33.8 | 82 | 39 | 156 |
| *03/27/2009 | .09 | 2.52 | 11.4 | 56.8 | 6.2 | 21.1 | 84 | 19 | 61 |
| *03/31/2009 | .06 | 2.04 | 11.1 | 48.3 | 5.7 | 21.6 | 83 | 14 | 42 |
| *04/06/2009 | .10 | 1.79 | 9.8 | 42.7 | 3.4 | 14.7 | 81 | 13 | 41 |
| *04/14/2009 | .15 | 10.8 | 7.4 | 207 | 4.8 | 72.2 | 74 | 99 | 783 |
| *04/21/2009 | .15 | 8.32 | 8.5 | 155 | 5.0 | 57.2 | 70 | 90 | 727 |
| *04/27/2009 | .16 | 5.21 | 8.3 | 96.7 | 6.3 | 48.2 | 73 | 46 | 456 |
| 04/29/2009 | .16 | 3.89 | 6.2 | 80.2 | 4.8 | 26.9 | 74 | 33 | 278 |
| *05/04/2009 | .10 | 3.75 | 5.7 | 72.5 | 5.7 | 27.9 | 68 | 34 | 244 |
| *05/11/2009 | .12 | -- | 5.5 | -- | 3.4 | -- | 69 | 30 | 280 |
| *05/18/2009 | .11 | 4.58 | 7.6 | 83.9 | 2.8 | 32.8 | 55 | 59 | 706 |
| 05/20/2009 | .25 | 13.5 | 13.4 | 249 | 5.1 | 94.8 | 54 | 211 | 4,310 |
| *05/22/2009 | .22 | 8.91 | 8.4 | 164 | 6.0 | 63.3 | 64 | 106 | 1,910 |
| *05/26/2009 | .22 | 11.2 | 15.0 | 199 | 8.8 | 90.1 | 65 | 136 | 2,680 |
| *05/31/2009 | .16 | 6.92 | 13.1 | 135 | 6.9 | 61.6 | 67 | 87 | 1,730 |
| 06/03/2009 | .22 | 6.45 | 18.2 | 121 | 6.9 | 49.8 | 65 | 66 | 1,120 |
| *06/04/2009 | .15 | 5.47 | 21.7 | 105 | 6.4 | 44.7 | 66 | 59 | 873 |
| *06/08/2009 | .15 | 5.38 | 16.3 | 92.9 | 5.7 | 36.9 | 67 | 50 | 720 |
| *06/15/2009 | .09 | 3.26 | 10.8 | 63.3 | 3.9 | 26.4 | 64 | 33 | 286 |
| *06/23/2009 | .13 | 6.61 | 12.0 | 117 | 5.3 | 46.9 | 58 | 63 | 743 |
| 06/24/2009 | .13 | 4.47 | 10.0 | 78.0 | 4.8 | 31.4 | 65 | 40 | 411 |
| 07/15/2009 | .06 | 1.52 | 7.6 | 39.1 | 2.7 | 12.1 | 75 | 11 | 56 |
| 08/19/2009 | .08 | 2.02 | 9.0 | 60.1 | 4.4 | 14.5 | 75 | 16 | 50 |

*Sample collected as part of a supplemental sampling program.

**Table 4.** Water-quality data for the Clark Fork basin, Montana, October 2008 through September 2009.—Continued

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

| 12334570--Clark Fork Bypass, near Bonner | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Date | Time | Streamflow, instantaneous ($ft^3/s$) | pH, onsite (standard units) | Specific conductance, onsite (µS/cm) | Temperature, water (°C) | Hardness, filtered (mg/L as $CaCO_3$) | Calcium, filtered (mg/L) | Magnesium, filtered (mg/L) |
| *03/02/2009 | 1230 | E970 | 8.6 | 351 | 4.5 | 160 | 46.3 | 11.9 |
| *03/16/2009 | 1315 | E1,030 | 8.4 | 337 | 4.0 | 160 | 44.5 | 10.8 |
| *03/25/2009 | 1300 | E1,480 | 8.4 | 309 | 3.0 | 140 | 39.3 | 10.4 |
| *03/27/2009 | 1130 | E1,180 | 8.4 | 331 | 2.0 | 150 | 42.1 | 10.8 |
| *03/31/2009 | 1140 | E1,100 | 8.3 | 336 | 4.0 | 160 | 44.2 | 11.3 |
| *04/06/2009 | 1200 | E1,160 | 8.1 | 349 | 6.0 | 160 | 45.2 | 12.0 |
| *04/14/2009 | 1230 | E2,930 | 8.0 | 228 | 5.5 | 100 | 28.4 | 7.63 |
| *04/21/2009 | 1210 | E2,990 | 7.9 | 223 | 9.5 | 97 | 27.0 | 7.24 |
| *04/27/2009 | 1230 | E3,670 | 8.2 | 233 | 6.0 | 110 | 30.2 | 7.51 |
| *05/04/2009 | 1230 | E2,660 | 8.3 | 247 | 12.0 | 110 | 32.2 | 8.23 |
| *05/11/2009 | 1200 | E3,460 | 8.4 | 230 | 9.0 | 110 | 29.6 | 7.71 |
| *05/18/2009 | 1215 | E4,430 | 8.1 | 193 | 11.5 | 88 | 25.1 | 6.25 |
| *05/22/2009 | 1130 | E6,680 | 8.0 | 154 | 9.5 | 69 | 19.6 | 4.77 |
| *05/26/2009 | 1345 | E7,310 | 8.0 | 152 | 11.0 | 69 | 19.9 | 4.64 |
| *05/31/2009 | 0900 | E7,380 | 8.0 | 146 | 12.0 | 66 | 19.1 | 4.37 |
| *06/04/2009 | 1435 | E5,480 | 8.0 | 176 | 15.0 | 77 | 22.6 | 5.08 |
| *06/08/2009 | 1130 | E5,330 | 8.1 | 190 | 9.0 | 83 | 24.0 | 5.57 |
| *06/15/2009 | 1230 | E3,210 | 8.3 | 207 | 13.5 | 95 | 27.6 | 6.42 |
| *06/23/2009 | 1400 | E4,370 | 8.3 | 222 | 12.5 | 100 | 29.9 | 6.96 |
| *07/15/2009 | 0950 | E1,870 | 8.2 | 280 | 15.0 | 130 | 36.7 | 8.44 |
| *08/19/2009 | 0945 | E1,160 | 8.2 | 326 | 16.0 | 150 | 41.5 | 10.4 |

| Date | Arsenic, filtered (µg/L) | Arsenic, unfiltered recoverable (µg/L) | Cadmium, filtered (µg/L) | Cadmium, unfiltered recoverable (µg/L) | Copper, filtered (µg/L) | Copper, unfiltered recoverable (µg/L) | Iron, filtered (µg/L) | Iron, unfiltered recoverable (µg/L) |
|---|---|---|---|---|---|---|---|---|
| *03/02/2009 | 5.0 | 6.1 | 0.04 | 0.08 | 2.9 | 11.5 | 7 | 249 |
| *03/16/2009 | 4.7 | 6.0 | .04 | .09 | 2.8 | 12.5 | 8 | 298 |
| *03/25/2009 | 6.3 | 9.6 | .04 | .18 | 6.2 | 30.3 | 28 | 902 |
| *03/27/2009 | 5.4 | 7.4 | .04 | .13 | 3.6 | 17.5 | 14 | 484 |
| *03/31/2009 | 5.2 | 6.3 | .03 | .09 | 3.2 | 13.8 | 7 | 357 |
| *04/06/2009 | 5.7 | 6.7 | .03 | .07 | 3.7 | 11.8 | 10 | 280 |
| *04/14/2009 | 6.5 | 13.2 | .05 | .31 | 6.8 | 56.5 | 34 | 1,880 |
| *04/21/2009 | 5.3 | 10.7 | .06 | .32 | 5.0 | 44.5 | 31 | 1,740 |
| *04/27/2009 | 5.6 | 10.3 | .05 | .26 | 4.8 | 41.8 | 29 | 1,020 |
| *05/04/2009 | 4.8 | 7.9 | .03 | .19 | 4.2 | 28.8 | 24 | 738 |
| *05/11/2009 | 5.6 | 7.3 | .03 | .13 | 3.9 | 19.1 | 33 | 539 |
| *05/18/2009 | 5.1 | 10.7 | .03 | .56 | 3.9 | 60.8 | 30 | 1,410 |
| *05/22/2009 | 6.9 | 15.8 | .06 | .62 | 8.1 | 104 | 35 | 2,420 |
| *05/26/2009 | 8.6 | 20.5 | .07 | 1.09 | 10.5 | 164 | 37 | 3,050 |
| *05/31/2009 | 8.2 | 14.1 | .06 | .48 | 8.4 | 66.5 | 30 | 1,750 |
| *06/04/2009 | 8.6 | 14.8 | .07 | .41 | 7.9 | 66.4 | 26 | 1,340 |
| *06/08/2009 | 8.5 | 13.0 | .07 | .29 | 7.4 | 49.9 | 27 | 1,090 |
| *06/15/2009 | 7.5 | 9.5 | .05 | .19 | 5.3 | 27.9 | 19 | 686 |
| *06/23/2009 | 8.8 | 13.4 | .06 | .24 | 8.2 | 44.0 | 24 | 1,160 |
| *07/15/2009 | 7.6 | 7.8 | .04 | .09 | 4.4 | 12.3 | 16 | 220 |
| *08/19/2009 | 7.7 | 9.0 | .04 | .10 | 3.5 | 11.1 | 6 | 261 |

**Table 4.** Water-quality data for the Clark Fork basin, Montana, October 2008 through September 2009.—Continued

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

| 12334570--Clark Fork Bypass, near Bonner—Continued | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Date | Lead, filtered (µg/L) | Lead, unfiltered recoverable (µg/L) | Manganese, filtered (µg/L) | Manganese, unfiltered recoverable (µg/L) | Zinc, filtered (µg/L) | Zinc, unfiltered recover-able (µg/L) | Sediment, suspended (percent finer than 0.062 mm) | Sediment, suspended (mg/L) | Sediment discharge, suspended (ton/d) |
| *03/02/2009 | E0.06 | 1.86 | 8.7 | 43.7 | 2.8 | 16.5 | 80 | 13 | E34 |
| *03/16/2009 | .07 | 2.06 | 9.8 | 46.6 | 4.4 | 19.4 | 71 | 18 | E50 |
| *03/25/2009 | .13 | 5.32 | 12.8 | 95.0 | 6.9 | 39.5 | 55 | 65 | E260 |
| *03/27/2009 | .09 | 2.77 | 14.0 | 57.2 | 6.1 | 23.9 | 67 | 25 | E80 |
| *03/31/2009 | .07 | 2.05 | 13.4 | 50.2 | 6.4 | 23.5 | 68 | 19 | E56 |
| *04/06/2009 | .10 | 1.76 | 11.4 | 42.3 | 3.6 | 15.2 | 62 | 17 | E53 |
| *04/14/2009 | .19 | 10.9 | 14.2 | 214 | 6.5 | 83.4 | 61 | 128 | E1,010 |
| *04/21/2009 | .18 | 9.30 | 12.2 | 171 | 8.3 | 74.9 | 54 | 126 | E1,020 |
| *04/27/2009 | .17 | 7.70 | 12.2 | 121 | 10.3 | 70.8 | 47 | 86 | E852 |
| *05/04/2009 | .15 | 4.76 | 8.1 | 82.9 | 6.9 | 40.0 | 49 | 55 | E395 |
| *05/11/2009 | .12 | 3.47 | 15.1 | 69.7 | 3.9 | 27.4 | 55 | 38 | E355 |
| *05/18/2009 | .15 | 9.46 | 17.4 | 247 | 3.7 | 149 | 52 | 93 | E1,110 |
| *05/22/2009 | .24 | 17.2 | 18.5 | 232 | 8.2 | 150 | 44 | 214 | E3,860 |
| *05/26/2009 | .27 | 17.4 | 21.8 | 533 | 10.0 | 229 | 51 | 227 | E4,480 |
| *05/31/2009 | .18 | 10.6 | 16.4 | 192 | 9.4 | 120 | 46 | 157 | E3,130 |
| *06/04/2009 | .17 | 9.84 | 26.5 | 159 | 9.6 | 115 | 34 | 183 | E2,710 |
| *06/08/2009 | .17 | 7.83 | 22.5 | 127 | 7.7 | 75.1 | 36 | 110 | E1,580 |
| *06/15/2009 | .10 | 4.40 | 16.0 | 83.8 | 5.2 | 45.1 | 30 | 70 | E607 |
| *06/23/2009 | .12 | 7.19 | 18.3 | 163 | 6.8 | 76.0 | 43 | 87 | E1,030 |
| *07/15/2009 | .11 | 1.33 | 18.7 | 47.8 | 4.4 | 16.7 | 41 | 20 | E101 |
| *08/19/2009 | .06 | 1.87 | 12.4 | 57.9 | 3.3 | 15.9 | 58 | 18 | E56 |

*Sample collected as part of a supplemental sampling program.

**Table 4.** Water-quality data for the Clark Fork basin, Montana, October 2008 through September 2009.—Continued

[Abbreviations: $ft^3/s$, cubic feet per second; °C, degrees Celsius; E, estimated; lab, laboratory; µg/L, microgram per liter; µS/cm, microsiemen per centimeter at 25°C; mg/L, milligram per liter; mm, millimeter; NTRU, nephelometric turbidity ratio unit; ton/d, ton 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) |
| 10/22/2008 | 1010 | 634 | 8.3 | 271 | 4.5 | 140 | 34.8 | 12.1 | -- |
| *03/02/2009 | 1400 | 654 | 8.6 | 251 | 3.0 | 130 | 33.9 | 11.2 | 0.20 |
| *03/16/2009 | 1500 | 641 | 8.6 | 237 | 3.0 | 120 | 31.7 | 10.3 | E.09 |
| *03/25/2009 | 1430 | 1,350 | 8.5 | 221 | 4.0 | 100 | 25.8 | 9.30 | .52 |
| *03/27/2009 | 1245 | 1,140 | 8.4 | 218 | 2.0 | 110 | 27.2 | 9.84 | .33 |
| *03/31/2009 | 1400 | 1,100 | 8.5 | 222 | 3.5 | 110 | 28.6 | 9.83 | .28 |
| *04/06/2009 | 1400 | 1,100 | 8.3 | 238 | 6.5 | 120 | 29.8 | 10.7 | .30 |
| *04/14/2009 | 1440 | 3,420 | 8.2 | 182 | 5.0 | 89 | 22.7 | 7.90 | .55 |
| *04/21/2009 | 1410 | 4,410 | 8.0 | 168 | 10.0 | 82 | 20.9 | 7.10 | .45 |
| *04/27/2009 | 1430 | 4,950 | 8.2 | 170 | 6.5 | 86 | 22.4 | 7.38 | .32 |
| 04/29/2009 | 1010 | 4,100 | 8.1 | 181 | 4.5 | 86 | 22.3 | 7.49 | -- |
| *05/04/2009 | 1400 | 3,220 | 8.4 | 243 | 8.0 | 93 | 23.7 | 8.23 | .22 |
| *05/11/2009 | 1400 | 4,070 | 8.4 | 181 | 8.5 | 93 | 23.9 | 8.04 | .18 |
| *05/18/2009 | 1415 | 5,380 | 8.2 | 169 | 11.0 | 89 | 23.4 | 7.40 | .26 |
| 05/20/2009 | 0940 | 9,320 | 8.0 | 148 | 9.5 | 76 | 20.2 | 6.17 | -- |
| *05/22/2009 | 1330 | 8,170 | 8.1 | 166 | E9.0 | 87 | 23.0 | 7.18 | .30 |
| *05/26/2009 | 1745 | 9,180 | 8.2 | 158 | 11.0 | 81 | 21.5 | 6.54 | .21 |
| *05/31/2009 | 1300 | 9,790 | 8.1 | 152 | 15.0 | 79 | 21.2 | 6.34 | .23 |
| 06/03/2009 | 0940 | 7,590 | 8.1 | 165 | 10.0 | 82 | 22.1 | 6.53 | -- |
| *06/04/2009 | 1600 | 6,630 | 8.1 | 169 | 13.0 | 85 | 22.8 | 6.89 | .17 |
| *06/08/2009 | 1315 | 5,200 | 8.3 | 175 | 9.0 | 88 | 23.4 | 7.24 | .13 |
| *06/15/2009 | 1500 | 3,800 | 8.5 | 178 | 12.5 | 92 | 24.4 | 7.61 | .12 |
| *06/23/2009 | 1530 | 3,450 | 8.6 | 191 | 12.5 | 100 | 26.4 | 8.47 | .10 |
| 07/15/2009 | 1130 | 1,570 | 8.4 | 236 | 15.5 | 120 | 30.0 | 11.0 | -- |
| 08/19/2009 | 1110 | 816 | 8.5 | 261 | 17.0 | 130 | 33.9 | 11.8 | -- |

**Table 4.** Water-quality data for the Clark Fork basin, Montana, October 2008 through September 2009.—Continued

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

| 12340000--Blackfoot River near Bonner—Continued | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Date | Total phosphorous, unfiltered, (mg/L) | Arsenic, filtered (µg/L) | Arsenic, unfiltered recoverable (µg/L) | Cadmium, filtered (µg/L) | Cadmium, unfiltered recoverable (µg/L) | Copper, filtered (µg/L) | Copper, unfiltered recoverable (µg/L) | Iron, filtered (µg/L) | Iron, unfiltered recoverable (µg/L) |
| 10/22/2008 | -- | 1.0 | 1.1 | <0.02 | <0.06 | <1.0 | <4.0 | E3 | 28 |
| *03/02/2009 | 0.020 | 1.1 | 1.2 | <.02 | <.06 | E.52 | <4.0 | 14 | 77 |
| *03/16/2009 | .018 | .96 | 1.1 | <.02 | <.06 | <1.0 | <4.0 | 15 | 83 |
| *03/25/2009 | .127 | 1.5 | 1.7 | E.01 | -- | E.82 | E2.0 | 34 | 460 |
| *03/27/2009 | .063 | 1.2 | 1.3 | <.02 | <.06 | E.67 | <4.0 | 24 | 282 |
| *03/31/2009 | .041 | 1.0 | 1.1 | <.02 | <.06 | E.58 | <4.0 | 17 | 232 |
| *04/06/2009 | .037 | 1.2 | 1.3 | <.02 | <.06 | E.69 | <4.0 | 18 | 230 |
| *04/14/2009 | .078 | 1.3 | 1.5 | <.02 | <.06 | E.79 | E2.2 | 36 | 714 |
| *04/21/2009 | .067 | 1.0 | 1.3 | <.02 | <.06 | E.86 | E2.5 | 33 | 742 |
| *04/27/2009 | .037 | .97 | 1.3 | <.02 | <.06 | E.88 | <4.0 | 24 | 376 |
| 04/29/2009 | -- | .84 | 1.1 | E.01 | <.06 | E.80 | E2.3 | 34 | 340 |
| *05/04/2009 | .028 | .90 | 1.0 | E.01 | <.06 | E.79 | <4.0 | 17 | 233 |
| *05/11/2009 | .027 | .90 | 1.1 | <.02 | <.06 | E.81 | <4.0 | 20 | 263 |
| *05/18/2009 | .044 | .85 | 1.3 | <.02 | <.06 | E.73 | E2.2 | 17 | 542 |
| 05/20/2009 | -- | .84 | 2.6 | <.02 | E.04 | 1.1 | 8.5 | 42 | 2,200 |
| *05/22/2009 | .067 | .98 | 1.7 | <.02 | <.06 | E.97 | E3.8 | 15 | 1,030 |
| *05/26/2009 | .060 | .96 | 1.6 | <.02 | <.06 | E.73 | E3.3 | 15 | 972 |
| *05/31/2009 | .060 | .95 | 1.8 | <.02 | <.06 | E.83 | E3.6 | 20 | 1,020 |
| 06/03/2009 | -- | .95 | 1.4 | E.01 | <.06 | E.93 | E3.7 | 17 | 519 |
| *06/04/2009 | .030 | .96 | 1.3 | <.02 | <.06 | E.74 | <4.0 | 18 | 408 |
| *06/08/2009 | .024 | .89 | 1.0 | <.02 | <.06 | E.65 | <4.0 | 16 | 305 |
| *06/15/2009 | .021 | .88 | 1.1 | <.02 | <.06 | E.58 | <4.0 | 9 | 200 |
| *06/23/2009 | .018 | 1.0 | 1.1 | <.02 | <.06 | E.50 | <4.0 | 10 | 155 |
| 07/15/2009 | -- | 1.1 | 1.1 | <.02 | <.06 | E.59 | <4.0 | 5 | 49 |
| 08/19/2009 | -- | 1.2 | 1.8 | <.02 | <.06 | <1.0 | <4.0 | E3 | 29 |

**Table 4.** Water-quality data for the Clark Fork basin, Montana, October 2008 through September 2009.—Continued

[Abbreviations: ft³/s, cubic feet per second; °C, degrees Celsius; E, estimated; lab, laboratory; µg/L, microgram per liter; µS/cm, microsiemen per centimeter at 25°C; mg/L, milligram per liter; mm, millimeter; NTRU, nephelometric turbidity ratio unit; ton/d, ton 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) |
| 10/22/2008 | <0.06 | <0.10 | 1.0 | 3.1 | <2.0 | <2.0 | 75 | 2 | 3.4 |
| *03/02/2009 | .07 | E.09 | 2.4 | 6.8 | <2.0 | <2.0 | 82 | 2 | 3.5 |
| *03/16/2009 | <.06 | .11 | 2.9 | 7.5 | E1.9 | E1.6 | 61 | 5 | 8.7 |
| *03/25/2009 | E.03 | .47 | 12.2 | 37.5 | 2.8 | 4.0 | 87 | 20 | 73 |
| *03/27/2009 | <.06 | .28 | 5.6 | 22.2 | E1.1 | E1.6 | 90 | 8 | 25 |
| *03/31/2009 | <.06 | .26 | 3.5 | 14.9 | 4.6 | 4.8 | 90 | 7 | 21 |
| *04/06/2009 | <.06 | .25 | 3.9 | 15.3 | E1.2 | E1.3 | 85 | 8 | 24 |
| *04/14/2009 | E.03 | .69 | 4.7 | 56.9 | 3.1 | 3.5 | 87 | 42 | 388 |
| *04/21/2009 | E.04 | .85 | 5.8 | 61.2 | <2.0 | 3.7 | 81 | 57 | 679 |
| *04/27/2009 | E.03 | .54 | 3.4 | 30.2 | 2.4 | -- | 86 | 28 | 374 |
| 04/29/2009 | E.05 | .44 | 2.7 | 25.9 | <2.0 | E1.7 | 88 | 20 | 221 |
| *05/04/2009 | E.03 | .30 | 2.4 | 18.2 | 3.6 | 3.0 | 88 | 14 | 122 |
| *05/11/2009 | <.06 | .38 | 2.0 | 18.2 | <2.0 | 2.6 | 86 | 19 | 209 |
| *05/18/2009 | E.03 | .76 | 3.6 | 39.6 | 2.0 | 3.4 | 78 | 62 | 901 |
| 05/20/2009 | .07 | 3.61 | 3.3 | 150 | E1.1 | 11.7 | 78 | 228 | 5,740 |
| *05/22/2009 | E.03 | 1.55 | 3.2 | 65.2 | <2.0 | 5.8 | 82 | 95 | 2,100 |
| *05/26/2009 | <.06 | 1.40 | 3.8 | 62.1 | <2.0 | 5.3 | 78 | 88 | 2,180 |
| *05/31/2009 | <.06 | 1.39 | 3.1 | 62.6 | <2.0 | 5.2 | 75 | 99 | 2,620 |
| 06/03/2009 | <.06 | .76 | 3.2 | 36.5 | E1.0 | 3.5 | 79 | 48 | 984 |
| *06/04/2009 | <.06 | .59 | 4.1 | 28.4 | E1.3 | 3.0 | 83 | 37 | 662 |
| *06/08/2009 | E.03 | .51 | 3.4 | 22.2 | 2.6 | 4.2 | 83 | 26 | 365 |
| *06/15/2009 | <.06 | .32 | 1.9 | 15.8 | <2.0 | 2.1 | 83 | 16 | 164 |
| *06/23/2009 | <.06 | .20 | 2.1 | 12.0 | <2.0 | E1.2 | 83 | 9 | 84 |
| 07/15/2009 | <.06 | .10 | 1.7 | 6.7 | E1.1 | <2.0 | 83 | 3 | 13 |
| 08/19/2009 | <.06 | E.06 | 1.3 | 4.6 | <2.0 | <2.0 | 72 | 2 | 4.4 |

*Sample collected as part of a supplemental sampling program.

**Table 4.** Water-quality data for the Clark Fork basin, Montana, October 2008 through September 2009.—Continued

[Abbreviations: $ft^3/s$, cubic feet per second; °C, degrees Celsius; E, estimated; lab, laboratory; µg/L, microgram per liter; µS/cm, microsiemen per centimeter at 25°C; mg/L, milligram per liter; mm, millimeter; NTRU, nephelometric turbidity ratio unit; ton/d, ton 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) |
| 10/22/2008 | 1145 | 1,750 | 2.3 | 8.4 | 317 | 5.0 | 150 | 41.1 | 11.6 |
| *03/02/2009 | 1530 | 1,650 | -- | 8.7 | 310 | 4.5 | 150 | 41.0 | 11.7 |
| *03/16/2009 | 1630 | 1,720 | -- | 8.6 | 297 | 3.5 | 140 | 39.2 | 10.5 |
| 03/24/2009 | 1620 | 3,320 | 30 | 7.9 | 251 | 4.5 | 110 | 28.5 | 8.56 |
| *03/25/2009 | 1630 | 2,880 | -- | 8.4 | 269 | 4.5 | 120 | 32.9 | 9.86 |
| *03/27/2009 | 1600 | 2,350 | -- | 8.5 | 278 | 3.5 | 130 | 34.7 | 10.3 |
| *03/31/2009 | 1600 | 2,240 | -- | 8.5 | 279 | 4.0 | 130 | 35.6 | 10.3 |
| *04/06/2009 | 1530 | 2,270 | -- | 8.3 | 293 | 8.0 | 140 | 38.0 | 11.3 |
| *04/14/2009 | 1630 | 6,520 | -- | 8.2 | 206 | 6.0 | 97 | 25.9 | 7.94 |
| *04/21/2009 | 1610 | 7,620 | -- | 8.1 | 190 | 10.0 | 87 | 23.1 | 7.05 |
| *04/27/2009 | 1600 | 8,350 | -- | 8.2 | 194 | 7.0 | 90 | 24.2 | 7.20 |
| 04/29/2009 | 1230 | 7,160 | E14 | 8.0 | 210 | 4.5 | 96 | 25.7 | 7.76 |
| *05/04/2009 | 1525 | 5,990 | -- | 8.2 | 244 | 8.0 | 100 | 28.2 | 8.28 |
| *05/11/2009 | 1530 | 7,140 | -- | 8.4 | 201 | 9.5 | 100 | 26.8 | 8.04 |
| *05/18/2009 | 1615 | 9,230 | -- | 8.3 | 176 | 12.5 | 89 | 24.3 | 6.95 |
| 05/20/2009 | 1120 | 15,400 | 100 | 8.0 | 148 | 9.5 | 71 | 19.4 | 5.44 |
| *05/22/2009 | 1500 | 14,500 | -- | 8.1 | 161 | 10.0 | 79 | 21.4 | 6.08 |
| *05/26/2009 | 1530 | 17,300 | -- | 8.1 | 155 | 11.0 | 74 | 20.5 | 5.61 |
| *05/31/2009 | 1515 | 17,400 | -- | 8.1 | 148 | 12.5 | 73 | 20.2 | 5.42 |
| 06/03/2009 | 1110 | 14,000 | 27 | 8.0 | 165 | 10.0 | 77 | 21.6 | 5.68 |
| *06/04/2009 | 1730 | 12,300 | -- | 8.1 | 172 | 13.0 | 82 | 22.6 | 6.07 |
| *06/08/2009 | 1500 | 10,400 | -- | 8.2 | 182 | 10.0 | 85 | 23.4 | 6.34 |
| *06/15/2009 | 1700 | 7,220 | -- | 8.3 | 192 | 14.0 | 94 | 25.9 | 7.05 |
| *06/23/2009 | 1745 | 7,800 | -- | 8.3 | 208 | 13.5 | 100 | 28.6 | 7.71 |
| 06/24/2009 | 0940 | 7,120 | E9.7 | 8.2 | 218 | 12.5 | 100 | 28.8 | 7.69 |
| 07/15/2009 | 1325 | 3,680 | E2.8 | 8.3 | 261 | 16.0 | 130 | 33.7 | 10.2 |
| 08/19/2009 | 1300 | 2,070 | E2.4 | 8.5 | 301 | 17.0 | 140 | 39.0 | 11.1 |

**Table 4.** Water-quality data for the Clark Fork basin, Montana, October 2008 through September 2009.—Continued

[Abbreviations: ft³/s, cubic feet per second; °C, degrees Celsius; E, estimated; lab, laboratory; µg/L, microgram per liter; µS/cm, microsiemen per centimeter at 25°C; mg/L, milligram per liter; mm, millimeter; NTRU, nephelometric turbidity ratio unit; ton/d, ton per day. Symbols: <, less than laboratory reporting level; --, no data]

| 12340500--Clark Fork above Missoula—Continued | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 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) |
| 10/22/2008 | -- | -- | 4.2 | 4.7 | 0.03 | E0.03 | 2.0 | 6.2 |
| *03/02/2009 | 0.22 | 0.028 | 3.6 | 4.4 | .02 | E.05 | 2.2 | 7.8 |
| *03/16/2009 | .13 | .032 | 3.4 | 4.5 | .02 | .07 | 2.9 | 10.6 |
| 03/24/2009 | -- | -- | 4.5 | 7.7 | .04 | .18 | 5.6 | 31.1 |
| *03/25/2009 | .51 | .115 | 4.2 | 6.1 | .03 | .13 | 3.9 | 21.4 |
| *03/27/2009 | .53 | .118 | 4.4 | 14.2 | .04 | .50 | 3.5 | 79.7 |
| *03/31/2009 | .30 | .051 | 3.9 | 5.9 | .02 | .12 | 2.4 | 20.7 |
| *04/06/2009 | .28 | .032 | 3.7 | 4.5 | E.02 | E.06 | 2.7 | 9.6 |
| *04/14/2009 | .72 | .128 | 3.5 | 7.9 | .02 | .19 | 3.5 | 33.9 |
| *04/21/2009 | .55 | .104 | 2.5 | 6.3 | E.02 | .18 | 2.6 | 29.1 |
| *04/27/2009 | .37 | .062 | 2.8 | 4.8 | .04 | .13 | 3.2 | 20.8 |
| 04/29/2009 | -- | -- | 2.4 | 3.9 | .02 | E.06 | 2.6 | 14.8 |
| *05/04/2009 | .29 | .045 | 2.9 | 4.0 | .03 | .09 | 2.5 | 13.1 |
| *05/11/2009 | .17 | .041 | 2.9 | 3.8 | E.02 | E.06 | 2.2 | 9.1 |
| *05/18/2009 | .21 | .081 | 2.8 | 5.6 | E.02 | .21 | 2.5 | 33.4 |
| 05/20/2009 | -- | -- | 3.0 | 11.4 | .03 | .55 | 4.3 | 81.4 |
| *05/22/2009 | .42 | .107 | 3.7 | 7.4 | .02 | .26 | 4.4 | 39.3 |
| *05/26/2009 | .35 | .117 | 4.6 | 9.2 | .04 | .36 | 5.6 | 53.4 |
| *05/31/2009 | .19 | .090 | 4.0 | 7.6 | .03 | .30 | 4.2 | 34.9 |
| 06/03/2009 | -- | -- | 4.3 | 7.6 | .04 | .20 | 4.9 | 31.9 |
| *06/04/2009 | .24 | .059 | 4.5 | 7.2 | .04 | .23 | 4.3 | 29.7 |
| *06/08/2009 | .21 | .051 | 4.6 | 6.3 | .04 | .13 | 4.1 | 21.5 |
| *06/15/2009 | .20 | .043 | 4.0 | 5.2 | .02 | .08 | 3.0 | 13.7 |
| *06/23/2009 | .27 | .054 | 5.5 | 7.5 | .04 | .11 | 5.2 | 20.9 |
| 06/24/2009 | -- | -- | 5.2 | 7.1 | .04 | .11 | 5.0 | 20.7 |
| 07/15/2009 | -- | -- | 4.4 | 4.9 | .02 | .07 | 2.7 | 6.7 |
| 08/19/2009 | -- | -- | 5.4 | 6.1 | .02 | .07 | 2.3 | 5.8 |

**Table 4.** Water-quality data for the Clark Fork basin, Montana, October 2008 through September 2009.—Continued

[Abbreviations: $ft^3/s$, cubic feet per second; °C, degrees Celsius; E, estimated; lab, laboratory; µg/L, microgram per liter; µS/cm, microsiemen per centimeter at 25°C; mg/L, milligram per liter; mm, millimeter; NTRU, nephelometric turbidity ratio unit; ton/d, ton 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) |
| 10/22/2008 | 7 | 140 | 0.07 | 1.27 | 11.0 | 39.5 | 2.4 | 8.7 |
| *03/02/2009 | 13 | 192 | E.05 | 1.24 | 9.0 | 32.1 | E1.3 | 10.8 |
| *03/16/2009 | 12 | 270 | E.05 | 1.62 | 8.6 | 35.6 | 4.1 | 16.3 |
| 03/24/2009 | 106 | 1,300 | .26 | 5.67 | 19.2 | 117 | 4.9 | 40.3 |
| *03/25/2009 | 26 | 742 | .10 | 3.31 | 12.4 | 71.3 | 5.1 | 28.5 |
| *03/27/2009 | 16 | 1,800 | .10 | 12.7 | 77.5 | 198 | 8.3 | 114 |
| *03/31/2009 | 12 | 448 | .07 | 3.23 | 12.3 | 45.1 | 8.1 | 36.9 |
| *04/06/2009 | 14 | 285 | .07 | 1.43 | 11.6 | 35.7 | 2.7 | 13.3 |
| *04/14/2009 | 41 | 1,660 | .13 | 6.44 | 9.4 | 138 | 8.0 | 55.2 |
| *04/21/2009 | 35 | 1,530 | .09 | 6.14 | 9.2 | 122 | 5.9 | 49.8 |
| *04/27/2009 | 27 | 748 | .11 | 3.52 | 8.8 | 68.9 | -- | 29.9 |
| 04/29/2009 | 41 | 501 | .15 | 2.96 | 5.9 | 50.2 | 2.9 | 17.0 |
| *05/04/2009 | 19 | 441 | .07 | 2.30 | 6.3 | 48.4 | 6.0 | 19.6 |
| *05/11/2009 | 16 | 365 | .07 | 1.65 | 5.8 | 35.5 | 2.2 | 12.8 |
| *05/18/2009 | 23 | 1,070 | .11 | 5.90 | 11.2 | 93.0 | 2.5 | 47.0 |
| 05/20/2009 | 64 | 3,650 | .22 | 15.8 | 14.7 | 300 | 4.5 | 139 |
| *05/22/2009 | 22 | 1,580 | .11 | 7.51 | 11.4 | 131 | 3.8 | 61.2 |
| *05/26/2009 | 24 | 1,940 | .14 | 9.36 | 14.2 | 164 | 6.0 | 96.8 |
| *05/31/2009 | 19 | 1,420 | .07 | 6.31 | 9.7 | 124 | 3.4 | 61.4 |
| 06/03/2009 | 28 | 970 | .15 | 4.66 | 13.8 | 104 | 5.4 | 57.7 |
| *06/04/2009 | 19 | 863 | .10 | 4.55 | 16.0 | 90.7 | 5.6 | 51.4 |
| *06/08/2009 | 20 | 659 | .10 | 3.36 | 13.3 | 70.1 | 5.7 | 32.7 |
| *06/15/2009 | 16 | 390 | .07 | 2.08 | 9.5 | 43.6 | 2.8 | 20.0 |
| *06/23/2009 | 20 | 573 | .10 | 3.36 | 11.6 | 71.3 | 3.8 | 30.5 |
| 06/24/2009 | 17 | 480 | .12 | 3.12 | 9.4 | 58.2 | 3.8 | 26.5 |
| 07/15/2009 | 8 | 138 | E.05 | .78 | 8.5 | 28.9 | E1.7 | 8.1 |
| 08/19/2009 | 6 | 140 | E.04 | .88 | 9.3 | 33.9 | E1.6 | 7.7 |

**Table 4.** Water-quality data for the Clark Fork basin, Montana, October 2008 through September 2009.—Continued

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

| 12340500--Clark Fork above Missoula—Continued | | | |
|---|---|---|---|
| Date | Sediment, suspended (percent finer than 0.062 mm) | Sediment, suspended (mg/L) | Sediment discharge, suspended (ton/d) |
| 10/22/2008 | 82 | 7 | 33 |
| *03/02/2009 | 82 | 13 | 58 |
| *03/16/2009 | 75 | 16 | 74 |
| 03/24/2009 | 76 | 71 | 636 |
| *03/25/2009 | 75 | 38 | 295 |
| *03/27/2009 | 77 | 94 | 596 |
| *03/31/2009 | 68 | 25 | 151 |
| *04/06/2009 | 73 | 14 | 86 |
| *04/14/2009 | 58 | 108 | 1,900 |
| *04/21/2009 | 52 | 126 | 2,590 |
| *04/27/2009 | 64 | 56 | 1,260 |
| 04/29/2009 | 64 | 36 | 696 |
| *05/04/2009 | 68 | 29 | 469 |
| *05/11/2009 | 65 | 33 | 636 |
| *05/18/2009 | 50 | 111 | 2,770 |
| 05/20/2009 | 46 | 422 | 17,500 |
| *05/22/2009 | 49 | 183 | 7,160 |
| *05/26/2009 | 59 | 171 | 7,990 |
| *05/31/2009 | 55 | 152 | 7,140 |
| 06/03/2009 | 64 | 83 | 3,140 |
| *06/04/2009 | 59 | 82 | 2,720 |
| *06/08/2009 | 61 | 56 | 1,570 |
| *06/15/2009 | 56 | 34 | 663 |
| *06/23/2009 | 59 | 40 | 842 |
| 06/24/2009 | 51 | 26 | 500 |
| 07/15/2009 | 68 | 7 | 70 |
| 08/19/2009 | 73 | 9 | 50 |

*Sample collected as part of a supplemental sampling program.

**Table 4.** Water-quality data for the Clark Fork basin, Montana, October 2008 through September 2009.—Continued

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

| 12352500--Bitterroot River near Missoula | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Date | Time | Streamflow, instantaneous ($ft^3/s$) | pH, onsite (standard units) | Specific conductance, onsite (µS/cm) | Temperature, water (°C) | Hardness, filtered (mg/L as $CaCO_3$) | Calcium, filtered (mg/L) | Magnesium, filtered (mg/L) | Total nitrogen, unfiltered, (mg/L) |
| 03/03/2009 | 0800 | 1,000 | 7.8 | 135 | 3.5 | 59 | 16.9 | 3.99 | 0.19 |
| 03/17/2009 | 0830 | 1,020 | 7.6 | 129 | 2.0 | 59 | 17.1 | 3.90 | .14 |
| 03/26/2009 | 0830 | 1,300 | 8.1 | 110 | 3.5 | 45 | 13.1 | 3.10 | .18 |
| 04/01/2009 | 0830 | 1,210 | 7.7 | 114 | 4.0 | 49 | 14.3 | 3.25 | .17 |
| 04/07/2009 | 0745 | 1,180 | 7.9 | 127 | 6.5 | 54 | 15.5 | 3.69 | .23 |
| 04/15/2009 | 0830 | 2,700 | 7.8 | 88 | 5.0 | 36 | 10.6 | 2.41 | .30 |
| 04/22/2009 | 0800 | 4,540 | 7.5 | 68 | 9.5 | 27 | 7.95 | 1.74 | .52 |
| 04/28/2009 | 0800 | 3,870 | 7.7 | 73 | 7.0 | 30 | 8.72 | 1.91 | .21 |
| 05/05/2009 | 0800 | 3,490 | 7.8 | 76 | 8.0 | 32 | 9.47 | 2.07 | .16 |
| 05/12/2009 | 0730 | 4,560 | 7.7 | 71 | 9.5 | 29 | 8.41 | 1.92 | .17 |
| 05/19/2009 | 0730 | 9,260 | 7.5 | 47 | 10.5 | 18 | 5.49 | 1.15 | .41 |
| 05/27/2009 | 0745 | 15,900 | 7.5 | 49 | 11.0 | 19 | 5.57 | 1.19 | .20 |
| 06/01/2009 | 0800 | 17,800 | 7.3 | 43 | 10.5 | 17 | 5.03 | 1.10 | .22 |
| 06/05/2009 | 0800 | 12,200 | 7.4 | 48 | 11.0 | 19 | 5.59 | 1.22 | .21 |
| 06/09/2009 | 0800 | 9,260 | 7.6 | 60 | 10.0 | 23 | 6.75 | 1.50 | .19 |
| 06/16/2009 | 0830 | 9,310 | 7.6 | 49 | 14.0 | 19 | 5.62 | 1.24 | .21 |
| 06/24/2009 | 0800 | 6,720 | 7.7 | 64 | 12.0 | 27 | 7.73 | 1.75 | .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) |
|---|---|---|---|---|---|---|---|---|---|
| 03/03/2009 | 0.015 | 0.34 | 0.41 | <0.02 | <0.06 | E0.52 | <4.0 | 28 | 129 |
| 03/17/2009 | .013 | .31 | .37 | <.02 | <.06 | E.67 | <4.0 | 29 | 116 |
| 03/26/2009 | .018 | .30 | .34 | <.02 | <.06 | E.57 | <4.0 | 36 | 159 |
| 04/01/2009 | .013 | .30 | .33 | <.02 | <.06 | <1.0 | <4.0 | 34 | 140 |
| 04/07/2009 | .017 | .33 | .41 | <.02 | <.06 | <1.0 | <4.0 | 32 | 157 |
| 04/15/2009 | .030 | .26 | .40 | <.02 | <.06 | <1.0 | <4.0 | 43 | 456 |
| 04/22/2009 | .069 | .49 | .66 | E.01 | <.06 | E.70 | E2.4 | 62 | 1,650 |
| 04/28/2009 | .026 | .31 | .41 | E.02 | <.06 | E.77 | <4.0 | 73 | 346 |
| 05/05/2009 | .022 | .31 | .32 | <.02 | E.04 | E.66 | <4.0 | 52 | 338 |
| 05/12/2009 | .024 | .28 | .38 | <.02 | <.06 | E.75 | <4.0 | 48 | 286 |
| 05/19/2009 | .124 | .31 | .83 | <.02 | <.06 | E.87 | E3.9 | 74 | 2,310 |
| 05/27/2009 | .037 | .31 | .51 | <.02 | <.06 | 1.9 | E2.2 | 52 | 785 |
| 06/01/2009 | .059 | .34 | .47 | <.02 | <.06 | 1.0 | E2.0 | 66 | 780 |
| 06/05/2009 | .028 | .31 | .39 | <.02 | <.06 | E.82 | <4.0 | 55 | 490 |
| 06/09/2009 | .027 | .34 | .44 | <.02 | <.06 | E.90 | <4.0 | 56 | 543 |
| 06/16/2009 | .039 | .28 | .37 | <.02 | <.06 | E.76 | <4.0 | 57 | 572 |
| 06/24/2009 | .023 | .34 | .50 | <.02 | <.06 | E.78 | <4.0 | 59 | 283 |

**Table 4.** Water-quality data for the Clark Fork basin, Montana, October 2008 through September 2009.—Continued

[Abbreviations: ft³/s, cubic feet per second; °C, degrees Celsius; E, estimated; lab, laboratory; µg/L, microgram per liter; µS/cm, microsiemen per centimeter at 25°C; mg/L, milligram per liter; mm, millimeter; NTRU, nephelometric turbidity ratio unit; ton/d, ton per day. Symbols: <, less than laboratory reporting level; --, no data]

| 12352500--Bitterroot River near Missoula—Continued | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Date | Lead, filtered (µg/L) | Lead, unfiltered recoverable (µg/L) | Manganese, filtered (µg/L) | Manganese, unfiltered recoverable (µg/L) | Zinc, filtered (µg/L) | Zinc, unfiltered recoverable (µg/L) | Sediment, suspended (percent finer than 0.062 mm) | Sediment, suspended (mg/L) | Sediment discharge, suspended (ton/d) |
| 03/03/2009 | E0.04 | 0.12 | 9.1 | 19.2 | <2.0 | <2.0 | 75 | 6 | 16 |
| 03/17/2009 | <.06 | .19 | 8.4 | 17.5 | E1.0 | 4.3 | 74 | 5 | 14 |
| 03/26/2009 | E.03 | .15 | 7.3 | 16.7 | E1.9 | <2.0 | 77 | 6 | 21 |
| 04/01/2009 | <.06 | E.09 | 7.9 | 16.2 | 3.1 | 9.0 | 71 | 5 | 16 |
| 04/07/2009 | <.06 | .11 | 7.5 | 23.1 | E1.0 | E1.4 | 72 | 7 | 22 |
| 04/15/2009 | E.04 | .35 | 4.5 | 25.1 | 5.4 | 6.7 | 76 | 21 | 153 |
| 04/22/2009 | .07 | 1.32 | 3.9 | 72.6 | 8.5 | 5.8 | 60 | 98 | 1,200 |
| 04/28/2009 | .09 | .40 | 6.0 | 18.5 | 6.5 | -- | 76 | 15 | 157 |
| 05/05/2009 | E.05 | .36 | 4.0 | 17.3 | 3.3 | 2.8 | 72 | 17 | 160 |
| 05/12/2009 | E.04 | .31 | 3.3 | 12.6 | <2.0 | 2.0 | 56 | 19 | 234 |
| 05/19/2009 | .10 | 2.37 | 5.1 | 98.7 | <2.0 | 9.9 | 44 | 233 | 5,830 |
| 05/27/2009 | .08 | .93 | 3.8 | 26.2 | E1.4 | 3.6 | 35 | 99 | 4,250 |
| 06/01/2009 | .09 | .88 | 4.7 | 27.2 | <2.0 | 3.8 | 37 | 93 | 4,470 |
| 06/05/2009 | .07 | .54 | 7.1 | 21.2 | E1.2 | 2.3 | 41 | 60 | 1,980 |
| 06/09/2009 | E.06 | .60 | 10.4 | 26.9 | E1.1 | 3.0 | 54 | 41 | 1,030 |
| 06/16/2009 | E.05 | .58 | 5.7 | 22.9 | E1.5 | 2.7 | 57 | 46 | 1,160 |
| 06/24/2009 | E.05 | .26 | 6.5 | 15.7 | E1.1 | E1.8 | 58 | 17 | 308 |

**Table 4.** Water-quality data for the Clark Fork basin, Montana, October 2008 through September 2009.—Continued

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

| 12354500--Clark Fork at St. Regis | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Date | Time | Stream-flow, instanta-neous ($ft^3/s$) | pH, onsite (standard units) | Specific conduct-ance, onsite (µS/cm) | Temper-ature, water (°C) | Hardness, filtered (mg/L as $CaCO_3$) | Calcium, filtered (mg/L) | Mag-nesium, filtered (mg/L) | Total nitrogen, unfiltered, (mg/L) |
| 03/03/2009 | 1400 | 3,610 | 8.3 | 251 | 5.0 | 110 | 31.1 | 8.71 | 0.22 |
| 03/17/2009 | 1415 | 3,650 | 8.3 | 234 | 6.0 | 110 | 30.1 | 8.25 | .14 |
| 03/26/2009 | 1530 | 5,670 | 8.3 | 209 | 5.5 | 91 | 24.7 | 7.21 | .51 |
| 04/01/2009 | 1615 | 4,780 | 8.3 | 221 | 5.0 | 100 | 27.9 | 7.89 | .28 |
| 04/07/2009 | 1330 | 4,760 | 8.3 | 230 | 7.5 | 110 | 28.7 | 8.28 | .23 |
| 04/15/2009 | 1500 | 11,700 | 8.1 | 163 | 5.0 | 73 | 19.9 | 5.77 | .60 |
| 04/22/2009 | 1455 | 16,700 | 7.9 | 147 | 7.5 | 64 | 17.3 | 5.00 | .57 |
| 04/28/2009 | 1330 | 15,200 | 8.1 | 159 | 4.5 | 73 | 19.8 | 5.68 | .38 |
| 05/05/2009 | 1250 | 12,000 | 8.2 | 166 | 6.0 | 75 | 20.5 | 5.79 | .26 |
| 05/12/2009 | 1330 | 15,200 | 8.3 | 154 | 6.0 | 72 | 19.5 | 5.68 | .19 |
| 05/19/2009 | 1330 | 25,200 | 8.1 | 121 | 6.5 | 56 | 15.7 | 4.20 | .47 |
| 05/27/2009 | 1430 | 40,500 | 8.0 | 106 | 9.0 | 47 | 13.3 | 3.47 | .28 |
| 06/01/2009 | 1430 | 42,600 | 7.9 | 100 | 11.0 | 46 | 12.9 | 3.39 | .27 |
| 06/05/2009 | 1430 | 30,600 | 7.9 | 115 | 10.0 | 51 | 14.4 | 3.73 | .23 |
| 06/09/2009 | 1300 | 24,800 | 8.0 | 127 | 9.0 | 57 | 16.1 | 4.16 | .21 |
| 06/16/2009 | 1430 | 20,200 | 8.1 | 121 | 12.0 | 55 | 15.6 | 4.00 | .20 |
| 06/24/2009 | 1330 | 17,700 | 8.1 | 142 | 12.5 | 67 | 18.5 | 4.97 | .17 |

| Date | Total phos-phorous, unfiltered, (mg/L) | Arsenic, filtered (µg/L) | Arsenic, unfiltered recoverable (µg/L) | Cadmium, filtered (µg/L) | Cadmium, unfiltered recover-able (µg/L) | Copper, filtered (µg/L) | Copper, unfiltered recoverable (µg/L) | Iron, filtered (µg/L) | Iron, unfiltered recoverable (µg/L) |
|---|---|---|---|---|---|---|---|---|---|
| 03/03/2009 | 0.023 | 2.0 | 2.3 | 0.03 | E0.04 | 1.8 | E3.8 | 15 | 110 |
| 03/17/2009 | .016 | 1.8 | 2.0 | E.01 | <.06 | 1.5 | E3.2 | 13 | 110 |
| 03/26/2009 | .104 | 2.9 | 4.0 | E.01 | .08 | 3.9 | 13.2 | 24 | 562 |
| 04/01/2009 | .039 | 3.0 | 3.6 | <.02 | E.04 | 2.3 | 8.9 | 9 | 267 |
| 04/07/2009 | .026 | 2.2 | 2.6 | E.02 | <.06 | 1.9 | 5.5 | 12 | 210 |
| 04/15/2009 | .100 | 2.6 | 5.5 | E.01 | .18 | 3.2 | 27.2 | 27 | 1,250 |
| 04/22/2009 | .104 | 1.9 | 4.6 | .02 | .18 | 2.3 | 26.5 | 32 | 1,640 |
| 04/28/2009 | .052 | 2.1 | 3.0 | .03 | .08 | 2.7 | 13.0 | 21 | 596 |
| 05/05/2009 | .033 | 1.7 | 2.2 | E.02 | E.05 | 1.7 | 8.2 | 18 | 367 |
| 05/12/2009 | .029 | 1.7 | 2.1 | .03 | E.05 | 2.2 | 6.1 | 23 | 325 |
| 05/19/2009 | .086 | 1.5 | 3.7 | E.01 | .13 | 2.2 | 20.7 | 22 | 1,700 |
| 05/27/2009 | .100 | 2.5 | 4.6 | .02 | .15 | 3.9 | 25.0 | 29 | 1,760 |
| 06/01/2009 | .097 | 2.3 | 4.0 | .02 | .13 | 3.5 | 17.8 | 26 | 1,530 |
| 06/05/2009 | .051 | 2.3 | 3.7 | .02 | .09 | 3.1 | 14.3 | 27 | 879 |
| 06/09/2009 | .047 | 2.4 | 3.4 | .03 | .07 | 2.7 | 11.9 | 25 | 701 |
| 06/16/2009 | .048 | 1.9 | 2.5 | E.02 | E.05 | 2.0 | 8.7 | 20 | 570 |
| 06/24/2009 | .035 | 2.6 | 3.1 | E.02 | <.06 | 2.9 | 7.9 | 25 | 405 |

**Table 4.** Water-quality data for the Clark Fork basin, Montana, October 2008 through September 2009.—Continued

[Abbreviations: ft³/s, cubic feet per second; °C, degrees Celsius; E, estimated; lab, laboratory; µg/L, microgram per liter; µS/cm, microsiemen per centimeter at 25°C; mg/L, milligram per liter; mm, millimeter; NTRU, nephelometric turbidity ratio unit; ton/d, ton per day. Symbols: <, less than laboratory reporting level; --, no data]

| 12354500--Clark Fork at St. Regis—Continued | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Date | Lead, filtered (µg/L) | Lead, unfiltered recoverable (µg/L) | Manganese, filtered (µg/L) | Manganese, unfiltered recoverable (µg/L) | Zinc, filtered (µg/L) | Zinc, unfiltered recoverable (µg/L) | Sediment, suspended (percent finer than 0.062 mm) | Sediment, suspended (mg/L) | Sediment discharge, suspended (ton/d) |
| 03/03/2009 | E0.05 | 0.52 | 8.6 | 25.1 | E1.4 | 5.8 | 83 | 6 | 58 |
| 03/17/2009 | E.05 | .44 | 6.9 | 25.0 | 2.8 | 14.9 | 78 | 7 | 69 |
| 03/26/2009 | .11 | 2.33 | 6.2 | 61.8 | 3.2 | 18.8 | 87 | 29 | 444 |
| 04/01/2009 | .07 | 2.31 | 6.7 | 34.0 | 2.7 | 11.3 | 87 | 11 | 142 |
| 04/07/2009 | E.06 | .86 | 5.9 | 31.7 | E1.7 | 8.0 | 83 | 10 | 129 |
| 04/15/2009 | .21 | 5.18 | 3.4 | 124 | 5.1 | 38.9 | 79 | 71 | 2,240 |
| 04/22/2009 | .12 | 5.97 | 5.1 | 135 | 3.1 | 47.5 | 65 | 132 | 5,950 |
| 04/28/2009 | .09 | 2.36 | 3.5 | 56.0 | 4.9 | 20.1 | 76 | 40 | 1,640 |
| 05/05/2009 | .09 | 1.38 | 2.7 | 34.2 | 3.0 | 15.3 | 79 | 20 | 648 |
| 05/12/2009 | .10 | 1.09 | 2.7 | 26.2 | 2.1 | 9.8 | 62 | 30 | 1,230 |
| 05/19/2009 | .10 | 4.94 | 2.6 | 102 | E1.9 | 37.2 | 43 | 203 | 13,800 |
| 05/27/2009 | .13 | 5.22 | 4.2 | 105 | 2.7 | 45.6 | 41 | 222 | 24,300 |
| 06/01/2009 | .09 | 4.03 | 4.0 | 90.8 | 2.3 | 33.6 | 50 | 170 | 19,600 |
| 06/05/2009 | .10 | 2.64 | 6.0 | 60.1 | 3.2 | 23.9 | 63 | 86 | 7,110 |
| 06/09/2009 | .08 | 2.25 | 7.7 | 53.4 | 3.8 | 20.3 | 65 | 60 | 4,020 |
| 06/16/2009 | .06 | 1.60 | 2.8 | 38.1 | E1.5 | 12.8 | 67 | 52 | 2,840 |
| 06/24/2009 | .07 | 1.34 | 3.6 | 30.7 | 2.1 | 10.5 | 68 | 29 | 1,390 |

**Table 4.** Water-quality data for the Clark Fork basin, Montana, October 2008 through September 2009.—Continued

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

| 12388700--Flathead River at Perma | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Date | Time | Streamflow, instantaneous ($ft^3/s$) | pH, onsite (standard units) | Specific conductance, onsite (µS/cm) | Temperature, water (°C) | Hardness, filtered (mg/L as $CaCO_3$) | Calcium, filtered (mg/L) | Magnesium, filtered (mg/L) | Total nitrogen, unfiltered, (mg/L) |
| 03/03/2009 | 1100 | 8,690 | 8.3 | 175 | 2.5 | 89 | 25.1 | 6.43 | 0.10 |
| 03/17/2009 | 1200 | 6,690 | 8.1 | 180 | 3.0 | 94 | 26.7 | 6.69 | .11 |
| 03/26/2009 | 1200 | 6,780 | 8.4 | 174 | 5.0 | 88 | 24.5 | 6.54 | .17 |
| 04/01/2009 | 1300 | 6,560 | 8.3 | 178 | 5.0 | 94 | 26.3 | 6.74 | .31 |
| 04/07/2009 | 1100 | 6,460 | 8.3 | 176 | 7.5 | 88 | 24.8 | 6.45 | .12 |
| 04/15/2009 | 1230 | 6,760 | 8.3 | 179 | 8.5 | 87 | 24.4 | 6.30 | .14 |
| 04/22/2009 | 1210 | 7,500 | 8.2 | 179 | 13.0 | 88 | 24.7 | 6.42 | .13 |
| 04/28/2009 | 1130 | 11,900 | 8.3 | 174 | 7.0 | 93 | 26.6 | 6.44 | .12 |
| 05/05/2009 | 1600 | 12,000 | 8.4 | 175 | 13.0 | 91 | 25.8 | 6.47 | E.08 |
| 05/12/2009 | 1100 | 13,800 | 8.4 | 172 | 8.5 | 92 | 26.2 | 6.48 | E.09 |
| 05/19/2009 | 1100 | 13,800 | 8.2 | 172 | 11.5 | 89 | 25.5 | 6.07 | .15 |
| 05/27/2009 | 1130 | 15,900 | 8.3 | 170 | 14.0 | 90 | 25.9 | 6.20 | E.09 |
| 06/01/2009 | 1130 | 17,100 | 8.3 | 169 | 17.0 | 87 | 25.1 | 5.99 | .12 |
| 06/05/2009 | 1200 | 22,000 | 8.3 | 177 | 15.0 | 90 | 25.9 | 6.06 | .12 |
| 06/09/2009 | 1100 | 22,000 | 8.4 | 178 | 13.0 | 88 | 25.3 | 6.02 | E.09 |
| 06/16/2009 | 1200 | 21,400 | 8.3 | 170 | 17.0 | 90 | 25.8 | 6.07 | E.10 |
| 06/24/2009 | 1115 | 24,200 | 8.4 | 170 | 15.5 | 92 | 26.5 | 6.26 | E.09 |

| Date | Total phosphorous, unfiltered, (mg/L) | Arsenic, filtered (µg/L) | Arsenic, unfiltered recoverable (µg/L) | Cadmium, filtered (µg/L) | Cadmium, unfiltered recoverable (µg/L) | Copper, filtered (µg/L) | Copper, unfiltered recoverable (µg/L) | Iron, filtered (µg/L) | Iron, unfiltered recoverable (µg/L) |
|---|---|---|---|---|---|---|---|---|---|
| 03/03/2009 | E0.004 | 0.37 | 0.47 | E0.01 | <0.06 | <1.0 | <4.0 | <4 | 33 |
| 03/17/2009 | E.006 | .39 | .45 | <.02 | <.06 | <1.0 | <4.0 | 7 | 78 |
| 03/26/2009 | .008 | .40 | .45 | <.02 | <.06 | E.77 | <4.0 | 6 | 57 |
| 04/01/2009 | <.008 | .39 | .41 | <.02 | <.06 | E.98 | <4.0 | <4 | 61 |
| 04/07/2009 | E.007 | .38 | .40 | <.02 | <.06 | E.78 | <4.0 | E3 | 46 |
| 04/15/2009 | E.006 | .39 | .44 | <.02 | <.06 | <1.0 | <4.0 | <4 | 72 |
| 04/22/2009 | .009 | .46 | .45 | <.02 | <.06 | <1.0 | <4.0 | 10 | 92 |
| 04/28/2009 | .011 | .48 | .49 | <.02 | <.06 | <1.0 | <4.0 | E4 | 142 |
| 05/05/2009 | E.007 | .42 | .44 | <.02 | <.06 | <1.0 | <4.0 | E3 | 89 |
| 05/12/2009 | E.004 | .42 | .44 | <.02 | <.06 | <1.0 | <4.0 | E3 | 68 |
| 05/19/2009 | .008 | .43 | .44 | <.02 | <.06 | <1.0 | <4.0 | E3 | 99 |
| 05/27/2009 | E.007 | .43 | .45 | <.02 | <.06 | E.81 | <4.0 | E3 | 109 |
| 06/01/2009 | .013 | .48 | .50 | <.02 | <.06 | <1.0 | <4.0 | E3 | 164 |
| 06/05/2009 | .008 | .42 | .50 | <.02 | <.06 | <1.0 | <4.0 | <4 | 119 |
| 06/09/2009 | E.008 | .43 | .40 | <.02 | <.06 | E.71 | <4.0 | E2 | 102 |
| 06/16/2009 | .008 | .43 | .45 | <.02 | <.06 | <1.0 | <4.0 | <4 | 118 |
| 06/24/2009 | .009 | .39 | .37 | <.02 | <.06 | <1.0 | <4.0 | <4 | 87 |

**Table 4.** Water-quality data for the Clark Fork basin, Montana, October 2008 through September 2009.—Continued

[Abbreviations: ft³/s, cubic feet per second; °C, degrees Celsius; E, estimated; lab, laboratory; µg/L, microgram per liter; µS/cm, microsiemen per centimeter at 25°C; mg/L, milligram per liter; mm, millimeter; NTRU, nephelometric turbidity ratio unit; ton/d, ton per day. Symbols: <, less than laboratory reporting level; --, no data]

| 12388700--Flathead River at Perma—Continued | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Date | Lead, filtered (µg/L) | Lead, unfiltered recoverable (µg/L) | Manganese, filtered (µg/L) | Manganese, unfiltered recoverable (µg/L) | Zinc, filtered (µg/L) | Zinc, unfiltered recoverable (µg/L) | Sediment, suspended (percent finer than 0.062 mm) | Sediment, suspended (mg/L) | Sediment discharge, suspended (ton/d) |
| 03/03/2009 | <0.06 | <0.10 | 1.1 | 3.1 | <2.0 | <2.0 | 68 | 1 | 23 |
| 03/17/2009 | <.06 | .10 | 1.2 | 4.3 | E1.5 | 4.5 | 91 | 3 | 54 |
| 03/26/2009 | .06 | E.09 | 1.4 | 3.7 | <2.0 | <2.0 | 85 | 2 | 37 |
| 04/01/2009 | <.06 | E.08 | 1.2 | 3.6 | 2.8 | 2.4 | 90 | 2 | 35 |
| 04/07/2009 | E.03 | <.10 | 1.4 | 3.9 | <2.0 | <2.0 | 81 | 2 | 35 |
| 04/15/2009 | <.06 | E.07 | 1.2 | 5.1 | E1.2 | E1.2 | 86 | 4 | 73 |
| 04/22/2009 | <.06 | .17 | 1.7 | 7.6 | <2.0 | <2.0 | 88 | 6 | 122 |
| 04/28/2009 | <.06 | .20 | 1.0 | 9.0 | -- | -- | 89 | 10 | 321 |
| 05/05/2009 | <.06 | .14 | 1.0 | 5.8 | 3.0 | 3.0 | 84 | 5 | 162 |
| 05/12/2009 | <.06 | .13 | .9 | 4.6 | <2.0 | E1.1 | 79 | 8 | 298 |
| 05/19/2009 | <.06 | .14 | 1.1 | 7.0 | E1.3 | <2.0 | 81 | 6 | 224 |
| 05/27/2009 | <.06 | .15 | 1.3 | 7.9 | <2.0 | E1.0 | 89 | 9 | 386 |
| 06/01/2009 | <.06 | .24 | 1.4 | 11.3 | <2.0 | E1.1 | 92 | 13 | 600 |
| 06/05/2009 | <.06 | .16 | 1.0 | 8.5 | E1.2 | <2.0 | 78 | 11 | 653 |
| 06/09/2009 | <.06 | .16 | .8 | 7.4 | <2.0 | <2.0 | 75 | 8 | 475 |
| 06/16/2009 | <.06 | .17 | .9 | 8.2 | <2.0 | <2.0 | 80 | 8 | 462 |
| 06/24/2009 | <.06 | .12 | .7 | 5.9 | E1.0 | <2.0 | 75 | 5 | 327 |

**Table 5.** Daily mean streamflow and suspended-sediment data for Clark Fork at Deer Lodge, Montana, October 2008 through September 2009.

[Abbreviations: acre-ft, acre-feet; $ft^3/s$, cubic feet per second; e, estimated; max, maximum; mg/L, milligram per liter; min, minimum; ton/d, ton 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 | 6 | 2.9 | 268 | 13 | 9.4 | 289 | 20 | 16 |
| 2 | 180 | 7 | 3.4 | 277 | 14 | 10 | 290 | 22 | 17 |
| 3 | 183 | 8 | 4.0 | 288 | 13 | 10 | 285 | 22 | 17 |
| 4 | 209 | 10 | 5.6 | 287 | 13 | 10 | 254 | 21 | 14 |
| 5 | 220 | 12 | 7.1 | 293 | 13 | 10 | 251 | 18 | 12 |
| 6 | 218 | 13 | 7.7 | 297 | 12 | 9.6 | 290 | 15 | 12 |
| 7 | 212 | 14 | 8.0 | 305 | 12 | 9.9 | 289 | 14 | 11 |
| 8 | 220 | 15 | 8.9 | 323 | 12 | 10 | 283 | 14 | 11 |
| 9 | 230 | 15 | 9.3 | 318 | 11 | 9.4 | 270 | 15 | 11 |
| 10 | 247 | 14 | 9.3 | 309 | 11 | 9.2 | 269 | 16 | 12 |
| 11 | 251 | 13 | 8.8 | 296 | 10 | 8.0 | 264 | 16 | 11 |
| 12 | 255 | 13 | 9.0 | 287 | 10 | 7.7 | 239 | 14 | 9.0 |
| 13 | 268 | 13 | 9.4 | 339 | 14 | 13 | 237 | 11 | 7.0 |
| 14 | 279 | 13 | 9.8 | 360 | 20 | 19 | e90 | 8 | 1.9 |
| 15 | 272 | 13 | 9.5 | 323 | 18 | 16 | e80 | 8 | 1.7 |
| 16 | 278 | 13 | 9.8 | 318 | 17 | 15 | e80 | 9 | 1.9 |
| 17 | 273 | 13 | 9.6 | 303 | 16 | 13 | e100 | 10 | 2.7 |
| 18 | 278 | 13 | 9.8 | 298 | 15 | 12 | e130 | 12 | 4.2 |
| 19 | 277 | 14 | 10 | 291 | 15 | 12 | e150 | 14 | 5.7 |
| 20 | 277 | 14 | 10 | 286 | 14 | 11 | e140 | 15 | 5.7 |
| 21 | 288 | 13 | 10 | 290 | 13 | 10 | e130 | 17 | 6.0 |
| 22 | 283 | 13 | 9.9 | 280 | 13 | 9.8 | e140 | 19 | 7.2 |
| 23 | 276 | 13 | 9.7 | 269 | 13 | 9.4 | e150 | 20 | 8.1 |
| 24 | 279 | 13 | 9.8 | 252 | 13 | 8.8 | e160 | 19 | 8.2 |
| 25 | 285 | 13 | 10 | 256 | 12 | 8.3 | e160 | 19 | 8.2 |
| 26 | 280 | 13 | 9.8 | 262 | 12 | 8.5 | e170 | 18 | 8.3 |
| 27 | 273 | 13 | 9.6 | 256 | 12 | 8.3 | e170 | 17 | 7.8 |
| 28 | 268 | 13 | 9.4 | 261 | 13 | 9.2 | 188 | 17 | 8.6 |
| 29 | 266 | 13 | 9.3 | 275 | 15 | 11 | 209 | 19 | 11 |
| 30 | 268 | 13 | 9.4 | 284 | 18 | 14 | e220 | 23 | 14 |
| 31 | 275 | 13 | 9.7 | -- | -- | -- | 249 | 24 | 16 |
| **TOTAL** | **7,846** | **--** | **268.5** | **8,751** | **--** | **321.5** | **6,226** | **--** | **287.2** |
| **MEAN** | **253** | **13** | **8.7** | **292** | **14** | **11** | **201** | **16** | **9.3** |
| **MAX** | **288** | **15** | **10.0** | **360** | **20** | **19** | **290** | **24** | **17** |
| **MIN** | **178** | **6** | **2.9** | **252** | **10** | **7.7** | **80** | **8** | **1.7** |

**Table 5.** Daily mean streamflow and suspended-sediment data for Clark Fork at Deer Lodge, Montana, October 2008 through September 2009.—Continued

[Abbreviations: acre-ft, acre-feet; ft³/s, cubic feet per second; e, estimated; max, maximum; mg/L, milligram per liter; min, minimum; ton/d, ton 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 | 261 | 23 | 16 | e230 | 38 | 24 | 253 | 25 | 17 |
| 2 | 285 | 18 | 14 | 237 | 38 | 24 | 259 | 25 | 17 |
| 3 | e250 | 14 | 9.4 | 241 | 38 | 25 | 280 | 18 | 14 |
| 4 | e220 | 11 | 6.5 | e240 | 38 | 25 | 265 | 42 | 30 |
| 5 | e200 | 11 | 5.9 | e240 | 38 | 25 | 254 | 26 | 18 |
| 6 | 236 | 10 | 6.4 | 238 | 38 | 24 | 247 | 32 | 21 |
| 7 | 296 | 16 | 13 | 237 | 44 | 28 | 242 | 28 | 18 |
| 8 | 431 | 47 | 55 | 233 | 53 | 33 | 251 | 30 | 20 |
| 9 | 385 | 47 | 49 | 237 | 57 | 36 | 230 | 34 | 21 |
| 10 | 316 | 42 | 36 | 235 | 50 | 32 | 224 | 30 | 18 |
| 11 | 303 | 52 | 43 | 225 | 39 | 24 | 220 | 28 | 17 |
| 12 | 302 | 69 | 56 | 231 | 29 | 18 | 228 | 28 | 17 |
| 13 | 309 | 74 | 62 | 225 | 23 | 14 | 225 | 30 | 18 |
| 14 | 285 | 64 | 49 | 221 | 23 | 14 | 230 | 30 | 19 |
| 15 | 283 | 51 | 39 | 229 | 27 | 17 | 235 | 28 | 18 |
| 16 | 280 | 41 | 31 | 230 | 31 | 19 | 245 | 25 | 17 |
| 17 | 272 | 38 | 28 | 228 | 32 | 20 | 239 | 39 | 25 |
| 18 | 265 | 43 | 31 | 228 | 30 | 18 | 238 | 38 | 24 |
| 19 | 270 | 51 | 37 | 227 | 29 | 18 | 245 | 52 | 34 |
| 20 | 281 | 55 | 42 | 229 | 27 | 17 | 271 | 80 | 59 |
| 21 | 280 | 47 | 36 | 226 | 25 | 15 | 295 | 67 | 53 |
| 22 | 270 | 34 | 25 | 227 | 25 | 15 | 325 | 55 | 48 |
| 23 | e250 | 22 | 15 | 241 | 28 | 18 | 324 | 42 | 37 |
| 24 | e200 | 14 | 7.6 | 264 | 32 | 23 | 303 | 45 | 37 |
| 25 | e170 | 17 | 7.8 | 260 | 35 | 25 | 270 | 35 | 26 |
| 26 | e150 | 25 | 10 | 249 | 35 | 24 | 232 | 27 | 17 |
| 27 | e160 | 33 | 14 | 245 | 30 | 20 | 237 | 37 | 24 |
| 28 | e200 | 37 | 20 | 231 | 27 | 17 | 243 | 28 | 18 |
| 29 | 217 | 38 | 22 | -- | -- | -- | 247 | 25 | 17 |
| 30 | 234 | 38 | 24 | -- | -- | -- | 214 | 43 | 25 |
| 31 | 257 | 38 | 26 | -- | -- | -- | 243 | 42 | 28 |
| **TOTAL** | **8,118** | **--** | **836.6** | **6,584** | **--** | **612** | **7,814** | **--** | **772** |
| **MEAN** | **262** | **36** | **27** | **235** | **34** | **22** | **252** | **36** | **25** |
| **MAX** | **431** | **74** | **62** | **264** | **57** | **36** | **325** | **80** | **59** |
| **MIN** | **150** | **10** | **5.9** | **221** | **23** | **14** | **214** | **18** | **14** |

**Table 5.** Daily mean streamflow and suspended-sediment data for Clark Fork at Deer Lodge, Montana, October 2008 through September 2009.—Continued

[Abbreviations: acre-ft, acre-feet; ft³/s, cubic feet per second; e, estimated; max, maximum; mg/L, milligram per liter; min, minimum; ton/d, ton 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 | 229 | 40 | 25 | 305 | 37 | 30 | 1,140 | 98 | 302 |
| 2 | 235 | 36 | 23 | 307 | 45 | 37 | 1,130 | 85 | 259 |
| 3 | 253 | 28 | 19 | 310 | 38 | 32 | 1,010 | 74 | 202 |
| 4 | 265 | 35 | 25 | 343 | 47 | 44 | 863 | 71 | 165 |
| 5 | 273 | 45 | 33 | 337 | 46 | 42 | 844 | 84 | 191 |
| 6 | 302 | 63 | 51 | 352 | 46 | 44 | 967 | 78 | 204 |
| 7 | 313 | 54 | 46 | 378 | 68 | 69 | 1,040 | 60 | 168 |
| 8 | 321 | 49 | 42 | 402 | 49 | 53 | 905 | 55 | 134 |
| 9 | 324 | 47 | 41 | 410 | 36 | 40 | 822 | 53 | 118 |
| 10 | 305 | 45 | 37 | 384 | 41 | 43 | 731 | 48 | 95 |
| 11 | 300 | 56 | 45 | 373 | 44 | 44 | 651 | 48 | 84 |
| 12 | 297 | 93 | 75 | 394 | 47 | 50 | 598 | 54 | 87 |
| 13 | 306 | 77 | 64 | 433 | 51 | 60 | 573 | 50 | 77 |
| 14 | 348 | 74 | 70 | 410 | 49 | 54 | 564 | 46 | 70 |
| 15 | 350 | 36 | 34 | 407 | 42 | 46 | 642 | 67 | 116 |
| 16 | 317 | 28 | 24 | 402 | 38 | 41 | 783 | 82 | 173 |
| 17 | 245 | 30 | 20 | 407 | 42 | 46 | 852 | 64 | 147 |
| 18 | 245 | 38 | 25 | 438 | 63 | 75 | 973 | 58 | 152 |
| 19 | 257 | 62 | 43 | 530 | 185 | 265 | 958 | 73 | 189 |
| 20 | 277 | 104 | 78 | 683 | 190 | 350 | 927 | 61 | 153 |
| 21 | 309 | 102 | 85 | 719 | 156 | 303 | 997 | 42 | 113 |
| 22 | 377 | 95 | 97 | 694 | 250 | 468 | 1,020 | 47 | 129 |
| 23 | 453 | 110 | 135 | 678 | 310 | 567 | 975 | 49 | 129 |
| 24 | 457 | 84 | 104 | 762 | 141 | 290 | 792 | 41 | 88 |
| 25 | 458 | 62 | 77 | 997 | 250 | 673 | 711 | 41 | 79 |
| 26 | 423 | 62 | 71 | 1,050 | 225 | 638 | 718 | 36 | 70 |
| 27 | 387 | 42 | 44 | 1,010 | 139 | 379 | 655 | 34 | 60 |
| 28 | 386 | 39 | 41 | 993 | 116 | 311 | 585 | 32 | 51 |
| 29 | 384 | 27 | 28 | 1,010 | 106 | 289 | 532 | 28 | 40 |
| 30 | 310 | 33 | 28 | 1,050 | 108 | 306 | 473 | 27 | 34 |
| 31 | -- | -- | -- | 1,090 | 109 | 321 | -- | -- | -- |
| **TOTAL** | **9,706** | **--** | **1,530** | **18,058** | **--** | **6,010** | **24,431** | **--** | **3,879** |
| **MEAN** | **324** | **57** | **51** | **583** | **100** | **194** | **814** | **56** | **129** |
| **MAX** | **458** | **110** | **135** | **1,090** | **310** | **673** | **1,140** | **98** | **302** |
| **MIN** | **229** | **27** | **19** | **305** | **36** | **30** | **473** | **27** | **34** |

**Table 5.** Daily mean streamflow and suspended-sediment data for Clark Fork at Deer Lodge, Montana, October 2008 through September 2009.—Continued

[Abbreviations: acre-ft, acre-feet; ft³/s, cubic feet per second; e, estimated; max, maximum; mg/L, milligram per liter; min, minimum; ton/d, ton 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 | 457 | 23 | 28 | 204 | 12 | 6.6 | 198 | 4 | 2.1 |
| 2 | 428 | 21 | 24 | 189 | 12 | 6.1 | 185 | 4 | 2.0 |
| 3 | 429 | 19 | 22 | 166 | 10 | 4.5 | 181 | 4 | 2.0 |
| 4 | 409 | 18 | 20 | 152 | 9 | 3.7 | 168 | 5 | 2.3 |
| 5 | 391 | 16 | 17 | 142 | 8 | 3.1 | 145 | 5 | 2.0 |
| 6 | 378 | 15 | 15 | 157 | 7 | 3.0 | 148 | 5 | 2.0 |
| 7 | 374 | 17 | 17 | 206 | 8 | 4.4 | 146 | 5 | 2.0 |
| 8 | 349 | 18 | 17 | 247 | 11 | 7.3 | 152 | 5 | 2.1 |
| 9 | 363 | 19 | 19 | 231 | 8 | 5.0 | 151 | 5 | 2.0 |
| 10 | 346 | 18 | 17 | 217 | 6 | 3.5 | 144 | 5 | 1.9 |
| 11 | 323 | 18 | 16 | 208 | 5 | 2.8 | 150 | 5 | 2.0 |
| 12 | 305 | 18 | 15 | 195 | 5 | 2.6 | 151 | 5 | 2.0 |
| 13 | 358 | 26 | 25 | 187 | 7 | 3.5 | 150 | 5 | 2.0 |
| 14 | 417 | 28 | 32 | 199 | 8 | 4.3 | 149 | 6 | 2.4 |
| 15 | 395 | 16 | 17 | 230 | 9 | 5.6 | 143 | 6 | 2.3 |
| 16 | 354 | 13 | 12 | 237 | 10 | 6.4 | 143 | 6 | 2.3 |
| 17 | 332 | 12 | 11 | 250 | 14 | 9.4 | 143 | 7 | 2.7 |
| 18 | 314 | 11 | 9.3 | 249 | 10 | 6.7 | 145 | 7 | 2.7 |
| 19 | 296 | 10 | 8.0 | 220 | 3 | 1.8 | 142 | 7 | 2.7 |
| 20 | 276 | 9 | 6.7 | 199 | 4 | 2.1 | 179 | 7 | 3.4 |
| 21 | 262 | 8 | 5.7 | 185 | 5 | 2.5 | 158 | 7 | 3.0 |
| 22 | 246 | 8 | 5.3 | 177 | 8 | 3.8 | 140 | 8 | 3.0 |
| 23 | 234 | 8 | 5.1 | 170 | 10 | 4.6 | 139 | 8 | 3.0 |
| 24 | 218 | 10 | 5.9 | 183 | 9 | 4.4 | 136 | 8 | 2.9 |
| 25 | 212 | 13 | 7.4 | 179 | 8 | 3.9 | 142 | 9 | 3.5 |
| 26 | 214 | 17 | 9.8 | 175 | 7 | 3.3 | 162 | 9 | 3.9 |
| 27 | 251 | 19 | 13 | 170 | 6 | 2.8 | 157 | 9 | 3.8 |
| 28 | 253 | 16 | 11 | 163 | 6 | 2.6 | 163 | 9 | 4.0 |
| 29 | 250 | 12 | 8.1 | 157 | 5 | 2.1 | 164 | 9 | 4.0 |
| 30 | 230 | 12 | 7.5 | 157 | 4 | 1.7 | 211 | 12 | 6.8 |
| 31 | 207 | 12 | 6.7 | 164 | 4 | 1.8 | -- | -- | -- |
| **TOTAL** | **9,871** | **--** | **433.5** | **5,965** | **--** | **125.9** | **4,685** | **--** | **82.8** |
| **MEAN** | **318** | **15** | **14** | **192** | **8** | **4.1** | **156** | **7** | **2.8** |
| **MAX** | **457** | **28** | **32** | **250** | **14** | **9.4** | **211** | **12** | **6.8** |
| **MIN** | **207** | **8** | **5.1** | **142** | **3** | **1.7** | **136** | **4** | **1.9** |

Total for water year 2009 (unrounded sum of daily values): streamflow–118,055 ft³/s (annual runoff–234,200 acre-ft); suspended-sediment discharge–15,159 tons.

**Table 6.** Daily mean streamflow and suspended-sediment data for Clark Fork at Turah Bridge, near Bonner, Montana, October 2008 through September 2009.

[Abbreviations: acre-ft, acre-feet; ft³/s, cubic feet per second; e, estimated; max, maximum; mg/L, milligram per liter; min, minimum; ton/d, ton 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 | 866 | 7 | 16 | 1,070 | 7 | 20 | 1,220 | 7 | 23 |
| 2 | 870 | 8 | 19 | 1,090 | 7 | 21 | 1,240 | 7 | 23 |
| 3 | 881 | 8 | 19 | 1,190 | 8 | 26 | 1,240 | 7 | 23 |
| 4 | 896 | 9 | 22 | 1,250 | 11 | 37 | 1,150 | 6 | 19 |
| 5 | 942 | 10 | 25 | 1,210 | 9 | 29 | 1,040 | 4 | 11 |
| 6 | 957 | 9 | 23 | 1,180 | 7 | 22 | 1,150 | 6 | 19 |
| 7 | 959 | 8 | 21 | 1,160 | 7 | 22 | 1,210 | 7 | 23 |
| 8 | 960 | 8 | 21 | 1,270 | 12 | 41 | 1,200 | 7 | 23 |
| 9 | 968 | 7 | 18 | 1,320 | 15 | 53 | 1,170 | 6 | 19 |
| 10 | 990 | 6 | 16 | 1,300 | 16 | 56 | 1,150 | 5 | 16 |
| 11 | 1,000 | 6 | 16 | 1,270 | 16 | 55 | 1,150 | 5 | 16 |
| 12 | 1,020 | 6 | 17 | 1,260 | 18 | 61 | 1,100 | 5 | 15 |
| 13 | 1,030 | 6 | 17 | 1,590 | 27 | 116 | 1,070 | 4 | 12 |
| 14 | 1,050 | 7 | 20 | 1,970 | 45 | 239 | e600 | 4 | 6.5 |
| 15 | 1,080 | 7 | 20 | 1,710 | 22 | 102 | e350 | 3 | 2.8 |
| 16 | 1,080 | 8 | 23 | 1,610 | 16 | 70 | e300 | 2 | 1.6 |
| 17 | 1,080 | 8 | 23 | 1,550 | 10 | 42 | e350 | 2 | 1.9 |
| 18 | 1,080 | 9 | 26 | 1,490 | 9 | 36 | e450 | 2 | 2.4 |
| 19 | 1,100 | 9 | 27 | 1,440 | 9 | 35 | e550 | 2 | 3.0 |
| 20 | 1,110 | 9 | 27 | 1,400 | 8 | 30 | e620 | 1 | 1.7 |
| 21 | 1,150 | 9 | 28 | 1,390 | 8 | 30 | e660 | 1 | 1.8 |
| 22 | 1,150 | 9 | 28 | 1,350 | 7 | 26 | e720 | 1 | 1.9 |
| 23 | 1,120 | 9 | 27 | 1,290 | 6 | 21 | e760 | 2 | 4.1 |
| 24 | 1,110 | 9 | 27 | 1,240 | 6 | 20 | e780 | 4 | 8.4 |
| 25 | 1,110 | 8 | 24 | 1,160 | 5 | 16 | e820 | 8 | 18 |
| 26 | 1,100 | 8 | 24 | 1,210 | 6 | 20 | e860 | 10 | 23 |
| 27 | 1,090 | 8 | 24 | 1,190 | 6 | 19 | e900 | 12 | 29 |
| 28 | 1,080 | 8 | 23 | 1,140 | 6 | 18 | e960 | 13 | 34 |
| 29 | 1,070 | 7 | 20 | 1,200 | 7 | 23 | e980 | 12 | 32 |
| 30 | 1,070 | 7 | 20 | 1,210 | 7 | 23 | e960 | 10 | 26 |
| 31 | 1,070 | 7 | 20 | -- | -- | -- | e920 | 9 | 22 |
| **TOTAL** | **32,039** | **--** | **681** | **39,710** | **--** | **1,329** | **27,630** | **--** | **462.1** |
| **MEAN** | **1,034** | **8** | **22** | **1,324** | **11** | **44** | **891** | **6** | **15** |
| **MAX** | **1,150** | **10** | **28** | **1,970** | **45** | **239** | **1,240** | **13** | **34** |
| **MIN** | **866** | **6** | **16** | **1,070** | **5** | **16** | **300** | **1** | **1.6** |

**Table 6.** Daily mean streamflow and suspended-sediment data for Clark Fork at Turah Bridge, near Bonner, Montana, October 2008 through September 2009.—Continued

[Abbreviations: acre-ft, acre-feet; ft³/s, cubic feet per second; e, estimated; max, maximum; mg/L, milligram per liter; min, minimum; ton/d, ton 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 | e940 | 8 | 20 | 890 | 4 | 9.6 | 918 | 10 | 25 |
| 2 | e960 | 8 | 21 | 874 | 4 | 9.4 | 980 | 15 | 40 |
| 3 | e900 | 6 | 15 | 918 | 4 | 9.9 | 1,080 | 19 | 55 |
| 4 | e820 | 7 | 15 | 901 | 3 | 7.3 | 1,200 | 28 | 91 |
| 5 | e750 | 7 | 14 | 897 | 3 | 7.3 | 1,100 | 25 | 74 |
| 6 | e850 | 8 | 18 | 920 | 3 | 7.5 | 1,030 | 16 | 44 |
| 7 | 991 | 9 | 24 | 929 | 3 | 7.5 | 966 | 11 | 29 |
| 8 | 1,090 | 13 | 38 | 910 | 3 | 7.4 | 961 | 10 | 26 |
| 9 | 1,430 | 46 | 178 | 907 | 3 | 7.3 | 934 | 10 | 25 |
| 10 | 1,440 | 33 | 128 | 913 | 3 | 7.4 | 861 | 10 | 23 |
| 11 | 1,280 | 15 | 52 | 884 | 3 | 7.2 | 873 | 10 | 24 |
| 12 | 1,210 | 13 | 42 | 878 | 4 | 9.5 | 882 | 10 | 24 |
| 13 | 1,200 | 13 | 42 | 862 | 4 | 9.3 | 884 | 9 | 21 |
| 14 | 1,200 | 16 | 52 | 837 | 4 | 9.0 | 922 | 10 | 25 |
| 15 | 1,210 | 20 | 65 | 829 | 4 | 9.0 | 946 | 14 | 36 |
| 16 | 1,190 | 20 | 64 | 846 | 4 | 9.1 | 1,040 | 18 | 51 |
| 17 | 1,110 | 16 | 48 | 885 | 5 | 12 | 997 | 14 | 38 |
| 18 | 1,030 | 12 | 33 | 906 | 8 | 20 | 960 | 12 | 31 |
| 19 | 973 | 7 | 18 | 912 | 14 | 34 | 972 | 12 | 31 |
| 20 | 942 | 4 | 10 | 934 | 20 | 50 | 1,130 | 40 | 122 |
| 21 | 961 | 3 | 7.8 | 917 | 26 | 64 | 1,450 | 114 | 446 |
| 22 | 969 | 4 | 10 | 893 | 30 | 72 | 1,710 | 137 | 633 |
| 23 | 992 | 4 | 11 | 923 | 34 | 85 | 2,080 | 190 | 1,070 |
| 24 | 945 | 4 | 10 | 1,080 | 46 | 134 | 1,690 | 85 | 388 |
| 25 | 920 | 4 | 9.9 | 1,300 | 101 | 355 | 1,470 | 41 | 163 |
| 26 | 803 | 3 | 6.5 | 1,170 | 46 | 145 | 1,320 | 28 | 100 |
| 27 | 629 | 4 | 6.8 | 1,030 | 20 | 56 | 1,190 | 21 | 67 |
| 28 | 734 | 6 | 12 | 928 | 14 | 35 | 1,180 | 22 | 70 |
| 29 | 811 | 6 | 13 | -- | -- | -- | 1,230 | 24 | 80 |
| 30 | 853 | 5 | 12 | -- | -- | -- | 1,200 | 17 | 55 |
| 31 | 899 | 5 | 12 | -- | -- | -- | 1,130 | 15 | 46 |
| **TOTAL** | **31,032** | **--** | **1,008** | **26,073** | **--** | **1,195.7** | **35,286** | **--** | **3,953** |
| **MEAN** | **1,001** | **11** | **33** | **931** | **15** | **43** | **1,138** | **32** | **128** |
| **MAX** | **1,440** | **46** | **178** | **1,300** | **101** | **355** | **2,080** | **190** | **1,070** |
| **MIN** | **629** | **3** | **6.5** | **829** | **3** | **7.2** | **861** | **9** | **21** |

**Table 6.** Daily mean streamflow and suspended-sediment data for Clark Fork at Turah Bridge, near Bonner, Montana, October 2008 through September 2009.—Continued

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

| Day | Mean streamflow (ft³/s) | Suspended sediment | | Mean streamflow (ft³/s) | Suspended sediment | | Mean streamflow (ft³/s) | Suspended sediment | |
|---|---|---|---|---|---|---|---|---|---|
| | | Mean concentration (mg/L) | Discharge (ton/d) | | Mean concentration (mg/L) | Discharge (ton/d) | | Mean concentration (mg/L) | Discharge (ton/d) |
| | | APRIL | | | MAY | | | JUNE | |
| 1 | 1,140 | 16 | 49 | 2,580 | 30 | 209 | 7,390 | 88 | 1,760 |
| 2 | 1,120 | 18 | 54 | 2,430 | 27 | 177 | 6,930 | 77 | 1,440 |
| 3 | 1,130 | 17 | 52 | 2,430 | 26 | 171 | 6,290 | 66 | 1,120 |
| 4 | 1,140 | 14 | 43 | 2,820 | 35 | 266 | 5,670 | 60 | 919 |
| 5 | 1,160 | 16 | 50 | 3,130 | 45 | 380 | 5,360 | 52 | 753 |
| 6 | 1,190 | 15 | 48 | 3,470 | 48 | 450 | 5,400 | 53 | 773 |
| 7 | 1,320 | 33 | 118 | 3,730 | 52 | 524 | 5,560 | 53 | 796 |
| 8 | 1,580 | 57 | 243 | 3,700 | 43 | 430 | 5,170 | 50 | 698 |
| 9 | 1,850 | 96 | 480 | 3,520 | 34 | 323 | 4,830 | 48 | 626 |
| 10 | 2,130 | 101 | 581 | 3,400 | 32 | 294 | 4,370 | 43 | 507 |
| 11 | 2,270 | 84 | 515 | 3,390 | 30 | 275 | 3,840 | 39 | 404 |
| 12 | 2,670 | 113 | 815 | 3,600 | 33 | 321 | 3,400 | 35 | 321 |
| 13 | 3,100 | 129 | 1,080 | 3,850 | 38 | 395 | 3,120 | 28 | 236 |
| 14 | 2,980 | 96 | 772 | 3,680 | 36 | 358 | 3,030 | 27 | 221 |
| 15 | 2,380 | 62 | 398 | 3,580 | 30 | 290 | 3,270 | 35 | 309 |
| 16 | 2,040 | 44 | 242 | 3,510 | 30 | 284 | 3,750 | 49 | 496 |
| 17 | 1,880 | 36 | 183 | 3,700 | 36 | 360 | 3,810 | 47 | 483 |
| 18 | 1,880 | 44 | 223 | 4,640 | 70 | 877 | 3,840 | 43 | 446 |
| 19 | 2,070 | 59 | 330 | 6,630 | 192 | 3,440 | 3,710 | 40 | 401 |
| 20 | 2,320 | 77 | 482 | 7,660 | 231 | 4,780 | 3,550 | 33 | 316 |
| 21 | 3,020 | 99 | 807 | 7,430 | 181 | 3,630 | 3,490 | 31 | 292 |
| 22 | 4,010 | 147 | 1,590 | 6,840 | 108 | 1,990 | 3,940 | 51 | 543 |
| 23 | 5,160 | 193 | 2,690 | 6,510 | 86 | 1,510 | 4,280 | 58 | 670 |
| 24 | 5,380 | 137 | 1,990 | 6,880 | 86 | 1,600 | 3,640 | 37 | 364 |
| 25 | 4,710 | 77 | 979 | 7,900 | 170 | 3,630 | 3,100 | 29 | 243 |
| 26 | 4,190 | 57 | 645 | 7,720 | 136 | 2,830 | 2,800 | 26 | 197 |
| 27 | 3,740 | 46 | 465 | 7,060 | 101 | 1,930 | 2,660 | 23 | 165 |
| 28 | 3,350 | 39 | 353 | 6,640 | 78 | 1,400 | 2,420 | 22 | 144 |
| 29 | 3,080 | 33 | 274 | 7,010 | 83 | 1,570 | 2,180 | 21 | 124 |
| 30 | 2,810 | 31 | 235 | 7,330 | 97 | 1,920 | 2,030 | 18 | 99 |
| 31 | -- | -- | -- | 7,330 | 89 | 1,760 | -- | -- | -- |
| **TOTAL** | **76,800** | **--** | **16,786** | **154,100** | **--** | **38,374** | **122,830** | **--** | **15,866** |
| **MEAN** | **2,560** | **66** | **560** | **4,971** | **75** | **1,240** | **4,094** | **43** | **529** |
| **MAX** | **5,380** | **193** | **2,690** | **7,900** | **231** | **4,780** | **7,390** | **88** | **1,760** |
| **MIN** | **1,120** | **14** | **43** | **2,430** | **26** | **171** | **2,030** | **18** | **99** |

**Table 6.** Daily mean streamflow and suspended-sediment data for Clark Fork at Turah Bridge, near Bonner, Montana, October 2008 through September 2009.—Continued

[Abbreviations: acre-ft, acre-feet; ft³/s, cubic feet per second; e, estimated; max, maximum; mg/L, milligram per liter; min, minimum; ton/d, ton 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 | 1,930 | 16 | 83 | 1,150 | 9 | 28 | 874 | 8 | 19 |
| 2 | 1,860 | 14 | 70 | 1,110 | 9 | 27 | 867 | 8 | 19 |
| 3 | 1,750 | 12 | 57 | 1,060 | 8 | 23 | 845 | 7 | 16 |
| 4 | 1,700 | 10 | 46 | 1,020 | 8 | 22 | 822 | 6 | 13 |
| 5 | 1,640 | 9 | 40 | 985 | 8 | 21 | 811 | 6 | 13 |
| 6 | 1,650 | 8 | 36 | 998 | 8 | 22 | 806 | 5 | 11 |
| 7 | 1,670 | 8 | 36 | 1,230 | 13 | 43 | 795 | 5 | 11 |
| 8 | 1,720 | 8 | 37 | 1,670 | 69 | 311 | 786 | 5 | 11 |
| 9 | 1,720 | 9 | 42 | 1,480 | 30 | 120 | 782 | 4 | 8.4 |
| 10 | 1,680 | 8 | 36 | 1,320 | 20 | 71 | 782 | 4 | 8.4 |
| 11 | 1,600 | 7 | 30 | 1,220 | 17 | 56 | 778 | 5 | 11 |
| 12 | 1,530 | 7 | 29 | 1,140 | 15 | 46 | 769 | 6 | 12 |
| 13 | 1,580 | 7 | 30 | 1,100 | 13 | 39 | 773 | 6 | 13 |
| 14 | 1,780 | 8 | 38 | 1,120 | 12 | 36 | 775 | 6 | 13 |
| 15 | 1,850 | 11 | 55 | 1,160 | 12 | 38 | 764 | 7 | 14 |
| 16 | 1,710 | 10 | 46 | 1,190 | 12 | 39 | 750 | 7 | 14 |
| 17 | 1,580 | 8 | 34 | 1,210 | 13 | 42 | 739 | 7 | 14 |
| 18 | 1,500 | 8 | 32 | 1,190 | 16 | 51 | 736 | 7 | 14 |
| 19 | 1,440 | 8 | 31 | 1,140 | 16 | 49 | 737 | 6 | 12 |
| 20 | 1,380 | 7 | 26 | 1,090 | 14 | 41 | 740 | 6 | 12 |
| 21 | 1,320 | 6 | 21 | 1,040 | 13 | 37 | 752 | 6 | 12 |
| 22 | 1,260 | 6 | 20 | 990 | 12 | 32 | 771 | 6 | 12 |
| 23 | 1,210 | 6 | 20 | 969 | 11 | 29 | 763 | 6 | 12 |
| 24 | 1,160 | 6 | 19 | 952 | 10 | 26 | 757 | 6 | 12 |
| 25 | 1,120 | 6 | 18 | 943 | 9 | 23 | 745 | 6 | 12 |
| 26 | 1,100 | 6 | 18 | 919 | 8 | 20 | 738 | 5 | 10 |
| 27 | 1,220 | 10 | 33 | 900 | 7 | 17 | 742 | 6 | 12 |
| 28 | 1,470 | 19 | 75 | 877 | 6 | 14 | 742 | 6 | 12 |
| 29 | 1,400 | 14 | 53 | 855 | 6 | 14 | 753 | 6 | 12 |
| 30 | 1,310 | 10 | 35 | 845 | 7 | 16 | 770 | 6 | 12 |
| 31 | 1,220 | 8 | 26 | 853 | 8 | 18 | -- | -- | -- |
| **TOTAL** | **47,060** | **--** | **1,172** | **33,726** | **--** | **1,371** | **23,264** | **--** | **376.8** |
| **MEAN** | **1,518** | **9** | **38** | **1,088** | **14** | **44** | **775** | **6** | **13** |
| **MAX** | **1,930** | **19** | **83** | **1,670** | **69** | **311** | **874** | **8** | **19** |
| **MIN** | **1,100** | **6** | **18** | **845** | **6** | **14** | **736** | **4** | **8.4** |

Total for water year 2009 (unrounded sum of daily values): streamflow–649,550 ft³/s (annual runoff–1,288,000 acre-ft); suspended-sediment discharge–82,574.6 tons.

**Table 7.** Daily mean streamflow and suspended-sediment data for Blackfoot River near Bonner, Montana, October 2008 through September 2009.

[Abbreviations: acre-ft, acre-feet; ft³/s, cubic feet per second; e, estimated; max, maximum; mg/L, milligram per liter; min, minimum; ton/d, ton 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 | 647 | 2 | 3.5 | 596 | 1 | 1.6 | 850 | 1 | 2.3 |
| 2 | 642 | 2 | 3.5 | 603 | 1 | 1.6 | 874 | 1 | 2.4 |
| 3 | 635 | 3 | 5.1 | 634 | 1 | 1.7 | 912 | 1 | 2.5 |
| 4 | 645 | 3 | 5.2 | 646 | 1 | 1.7 | 842 | 1 | 2.3 |
| 5 | 650 | 3 | 5.3 | 652 | 1 | 1.8 | 805 | 1 | 2.2 |
| 6 | 642 | 3 | 5.2 | 636 | 1 | 1.7 | 857 | 1 | 2.3 |
| 7 | 635 | 3 | 5.1 | 641 | 1 | 1.7 | 830 | 1 | 2.2 |
| 8 | 632 | 2 | 3.4 | 675 | 1 | 1.8 | 833 | 1 | 2.2 |
| 9 | 628 | 2 | 3.4 | 681 | 1 | 1.8 | 818 | 1 | 2.2 |
| 10 | 622 | 2 | 3.4 | 670 | 1 | 1.8 | 806 | 1 | 2.2 |
| 11 | 620 | 2 | 3.3 | 658 | 1 | 1.8 | 799 | 1 | 2.2 |
| 12 | 624 | 2 | 3.4 | 696 | 3 | 5.6 | 758 | 1 | 2.0 |
| 13 | 626 | 1 | 1.7 | 1,170 | 22 | 69 | e700 | 1 | 1.9 |
| 14 | 625 | 1 | 1.7 | 1,590 | 21 | 90 | e450 | 1 | 1.2 |
| 15 | 626 | 2 | 3.4 | 1,510 | 10 | 41 | e330 | 1 | .89 |
| 16 | 621 | 2 | 3.4 | 1,440 | 7 | 27 | e300 | 1 | .81 |
| 17 | 614 | 2 | 3.3 | 1,360 | 6 | 22 | e320 | 1 | .86 |
| 18 | 611 | 2 | 3.3 | 1,290 | 5 | 17 | e500 | 1 | 1.4 |
| 19 | 618 | 2 | 3.3 | 1,220 | 4 | 13 | e550 | 1 | 1.5 |
| 20 | 616 | 2 | 3.3 | 1,160 | 3 | 9.4 | e500 | 1 | 1.4 |
| 21 | 629 | 2 | 3.4 | 1,120 | 2 | 6.0 | e550 | 1 | 1.5 |
| 22 | 633 | 2 | 3.4 | 1,080 | 2 | 5.8 | e550 | 1 | 1.5 |
| 23 | 627 | 2 | 3.4 | 1,030 | 1 | 2.8 | e600 | 1 | 1.6 |
| 24 | 617 | 2 | 3.3 | 978 | 1 | 2.6 | e600 | 2 | 3.2 |
| 25 | 615 | 2 | 3.3 | 928 | 1 | 2.5 | e600 | 2 | 3.2 |
| 26 | 609 | 2 | 3.3 | 921 | 1 | 2.5 | e650 | 2 | 3.5 |
| 27 | 603 | 2 | 3.3 | 897 | 2 | 4.8 | e650 | 2 | 3.5 |
| 28 | 602 | 1 | 1.6 | 866 | 2 | 4.7 | e700 | 2 | 3.8 |
| 29 | 602 | 1 | 1.6 | 871 | 2 | 4.7 | e720 | 2 | 3.9 |
| 30 | 602 | 1 | 1.6 | 861 | 2 | 4.6 | e700 | 2 | 3.8 |
| 31 | 598 | 1 | 1.6 | -- | -- | -- | e700 | 2 | 3.8 |
| **TOTAL** | **19,316** | **--** | **103** | **28,080** | **--** | **354** | **20,654** | **--** | **70.26** |
| **MEAN** | **623** | **2** | **3.3** | **936** | **4** | **12** | **666** | **1** | **2.3** |
| **MAX** | **650** | **3** | **5.3** | **1,590** | **22** | **90** | **912** | **2** | **3.9** |
| **MIN** | **598** | **1** | **1.6** | **596** | **1** | **1.6** | **300** | **1** | **.81** |

**Table 7.** Daily mean streamflow and suspended-sediment data for Blackfoot River near Bonner, Montana, October 2008 through September 2009.—Continued

[Abbreviations: acre-ft, acre-feet; ft³/s, cubic feet per second; e, estimated; max, maximum; mg/L, milligram per liter; min, minimum; ton/d, ton 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 | e700 | 2 | 3.8 | e740 | 3 | 6.0 | 597 | 2 | 3.2 |
| 2 | e700 | 1 | 1.9 | e740 | 3 | 6.0 | 607 | 2 | 3.3 |
| 3 | e650 | 1 | 1.8 | e720 | 3 | 5.8 | 617 | 3 | 5.0 |
| 4 | e600 | 1 | 1.6 | e700 | 3 | 5.7 | 641 | 4 | 6.9 |
| 5 | e650 | 1 | 1.8 | e680 | 3 | 5.5 | 708 | 5 | 9.6 |
| 6 | e750 | 1 | 2.0 | e700 | 3 | 5.7 | 703 | 4 | 7.6 |
| 7 | e900 | 2 | 4.9 | e650 | 3 | 5.3 | 644 | 3 | 5.2 |
| 8 | 1,140 | 4 | 12 | e620 | 4 | 6.7 | 650 | 2 | 3.5 |
| 9 | 1,280 | 5 | 17 | e620 | 4 | 6.7 | 592 | 2 | 3.2 |
| 10 | 1,150 | 4 | 12 | e600 | 4 | 6.5 | 549 | 1 | 1.5 |
| 11 | 1,070 | 4 | 12 | e600 | 4 | 6.5 | 516 | 1 | 1.4 |
| 12 | 1,010 | 4 | 11 | e590 | 3 | 4.8 | 562 | 2 | 3.0 |
| 13 | 981 | 4 | 11 | e580 | 3 | 4.7 | 601 | 2 | 3.2 |
| 14 | 953 | 3 | 7.7 | e570 | 3 | 4.6 | 617 | 3 | 5.0 |
| 15 | 937 | 3 | 7.6 | e580 | 3 | 4.7 | 616 | 4 | 6.7 |
| 16 | 905 | 2 | 4.9 | 581 | 3 | 4.7 | 635 | 6 | 10 |
| 17 | 893 | 2 | 4.8 | 586 | 3 | 4.7 | 648 | 2 | 3.5 |
| 18 | e880 | 2 | 4.8 | 587 | 3 | 4.8 | 668 | 3 | 5.4 |
| 19 | e850 | 2 | 4.6 | 591 | 4 | 6.4 | 705 | 6 | 11 |
| 20 | e820 | 3 | 6.6 | 583 | 5 | 7.9 | 824 | 11 | 24 |
| 21 | e800 | 3 | 6.5 | 573 | 6 | 9.3 | 1,120 | 25 | 76 |
| 22 | e850 | 2 | 4.6 | 567 | 6 | 9.2 | 1,610 | 68 | 296 |
| 23 | e800 | 2 | 4.3 | 577 | 6 | 9.3 | 1,880 | 94 | 477 |
| 24 | e750 | 2 | 4.0 | 599 | 6 | 9.7 | 1,600 | 50 | 216 |
| 25 | e700 | 2 | 3.8 | 631 | 6 | 10 | 1,360 | 23 | 84 |
| 26 | e600 | 2 | 3.2 | 662 | 6 | 11 | 1,220 | 14 | 46 |
| 27 | e550 | 1 | 1.5 | 643 | 4 | 6.9 | 1,150 | 9 | 28 |
| 28 | e600 | 1 | 1.6 | 590 | 3 | 4.8 | 1,170 | 14 | 44 |
| 29 | e700 | 1 | 1.9 | -- | -- | -- | 1,230 | 14 | 46 |
| 30 | e760 | 2 | 4.1 | -- | -- | -- | 1,160 | 9 | 28 |
| 31 | e780 | 3 | 6.3 | -- | -- | -- | 1,110 | 7 | 21 |
| **TOTAL** | **25,709** | **--** | **175.6** | **17,460** | **--** | **183.9** | **27,310** | **--** | **1,484.2** |
| **MEAN** | **829** | **2** | **5.7** | **624** | **4** | **6.6** | **881** | **13** | **48** |
| **MAX** | **1,280** | **5** | **17** | **740** | **6** | **11** | **1,880** | **94** | **477** |
| **MIN** | **550** | **1** | **1.5** | **567** | **3** | **4.6** | **516** | **1** | **1.4** |

**Table 7.** Daily mean streamflow and suspended-sediment data for Blackfoot River near Bonner, Montana, October 2008 through September 2009.—Continued

[Abbreviations: acre-ft, acre-feet; ft³/s, cubic feet per second; e, estimated; max, maximum; mg/L, milligram per liter; min, minimum; ton/d, ton 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 | 1,090 | 8 | 24 | 3,450 | 15 | 140 | 9,610 | 82 | 2,130 |
| 2 | 1,070 | 10 | 29 | 3,250 | 15 | 132 | 8,650 | 63 | 1,470 |
| 3 | 1,070 | 10 | 29 | 3,140 | 15 | 127 | 7,490 | 48 | 971 |
| 4 | 1,080 | 7 | 20 | 3,200 | 15 | 130 | 6,650 | 39 | 700 |
| 5 | 1,090 | 9 | 26 | 3,430 | 19 | 176 | 6,260 | 35 | 592 |
| 6 | 1,100 | 9 | 27 | 3,860 | 24 | 250 | 6,130 | 37 | 612 |
| 7 | 1,230 | 13 | 43 | 4,090 | 25 | 276 | 5,800 | 30 | 470 |
| 8 | 1,460 | 21 | 83 | 4,150 | 24 | 269 | 5,230 | 26 | 367 |
| 9 | 1,660 | 30 | 134 | 4,070 | 25 | 275 | 4,780 | 24 | 310 |
| 10 | 1,900 | 36 | 185 | 4,020 | 22 | 239 | 4,290 | 22 | 255 |
| 11 | 2,150 | 40 | 232 | 4,040 | 20 | 218 | 3,910 | 17 | 179 |
| 12 | 2,570 | 51 | 354 | 4,160 | 20 | 225 | 3,640 | 16 | 157 |
| 13 | 3,060 | 54 | 446 | 4,200 | 20 | 227 | 3,480 | 15 | 141 |
| 14 | 3,430 | 50 | 463 | 4,150 | 21 | 235 | 3,540 | 14 | 134 |
| 15 | 3,530 | 43 | 410 | 4,110 | 22 | 244 | 3,750 | 16 | 162 |
| 16 | 3,360 | 45 | 408 | 4,080 | 20 | 220 | 3,930 | 19 | 202 |
| 17 | 3,130 | 24 | 203 | 4,220 | 20 | 228 | 3,950 | 18 | 192 |
| 18 | 3,040 | 23 | 189 | 5,090 | 41 | 563 | 3,860 | 15 | 156 |
| 19 | 3,170 | 23 | 197 | 7,120 | 135 | 2,600 | 3,710 | 14 | 140 |
| 20 | 3,530 | 26 | 248 | 9,150 | 192 | 4,740 | 3,560 | 12 | 115 |
| 21 | 4,300 | 51 | 592 | 8,780 | 131 | 3,110 | 3,450 | 11 | 102 |
| 22 | 5,590 | 96 | 1,450 | 8,110 | 98 | 2,150 | 3,450 | 12 | 112 |
| 23 | 6,980 | 116 | 2,190 | 7,630 | 74 | 1,520 | 3,480 | 12 | 113 |
| 24 | 7,020 | 93 | 1,760 | 8,080 | 80 | 1,750 | 3,190 | 10 | 86 |
| 25 | 6,330 | 58 | 991 | 9,240 | 112 | 2,790 | 3,000 | 11 | 89 |
| 26 | 5,630 | 39 | 593 | 9,200 | 93 | 2,310 | 2,900 | 11 | 86 |
| 27 | 5,010 | 30 | 406 | 9,210 | 83 | 2,060 | 2,770 | 9 | 67 |
| 28 | 4,480 | 26 | 314 | 9,300 | 80 | 2,010 | 2,630 | 10 | 71 |
| 29 | 4,080 | 20 | 220 | 9,410 | 78 | 1,980 | 2,520 | 10 | 68 |
| 30 | 3,740 | 17 | 172 | 9,430 | 85 | 2,160 | 2,430 | 8 | 52 |
| 31 | -- | -- | -- | 9,590 | 89 | 2,300 | -- | -- | -- |
| **TOTAL** | **96,880** | **--** | **12,438** | **184,960** | **--** | **35,654** | **132,040** | **--** | **10,301** |
| **MEAN** | **3,229** | **36** | **415** | **5,966** | **55** | **1,150** | **4,401** | **22** | **343** |
| **MAX** | **7,020** | **116** | **2,190** | **9,590** | **192** | **4,740** | **9,610** | **82** | **2,130** |
| **MIN** | **1,070** | **7** | **20** | **3,140** | **15** | **127** | **2,430** | **8** | **52** |

**Table 7.** Daily mean streamflow and suspended-sediment data for Blackfoot River near Bonner, Montana, October 2008 through September 2009.—Continued

[Abbreviations: acre-ft, acre-feet; $ft^3/s$, cubic feet per second; e, estimated; max, maximum; mg/L, milligram per liter; min, minimum; ton/d, ton 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) |
| | | JULY | | | AUGUST | | | SEPTEMBER | |
| 1 | 2,330 | 8 | 50 | 987 | 4 | 11 | 624 | 2 | 3.4 |
| 2 | 2,210 | 8 | 48 | 941 | 4 | 10 | 620 | 2 | 3.3 |
| 3 | 2,110 | 8 | 46 | 895 | 4 | 9.7 | 597 | 2 | 3.2 |
| 4 | 2,010 | 8 | 43 | 855 | 3 | 6.9 | 578 | 1 | 1.6 |
| 5 | 1,940 | 8 | 42 | 824 | 3 | 6.7 | 568 | 1 | 1.5 |
| 6 | 1,850 | 8 | 40 | 830 | 3 | 6.7 | 591 | 1 | 1.6 |
| 7 | 1,830 | 8 | 40 | 968 | 4 | 10 | 602 | 2 | 3.3 |
| 8 | 1,800 | 7 | 34 | 1,060 | 4 | 11 | 597 | 2 | 3.2 |
| 9 | 1,760 | 6 | 29 | 1,020 | 4 | 11 | 595 | 2 | 3.2 |
| 10 | 1,670 | 6 | 27 | 974 | 5 | 13 | 592 | 2 | 3.2 |
| 11 | 1,570 | 6 | 25 | 946 | 4 | 10 | 580 | 2 | 3.1 |
| 12 | 1,500 | 6 | 24 | 918 | 3 | 7.4 | 571 | 2 | 3.1 |
| 13 | 1,470 | 6 | 24 | 894 | 2 | 4.8 | 565 | 2 | 3.1 |
| 14 | 1,550 | 6 | 25 | 901 | 2 | 4.9 | 551 | 2 | 3.0 |
| 15 | 1,570 | 5 | 21 | 914 | 2 | 4.9 | 539 | 2 | 2.9 |
| 16 | 1,480 | 3 | 12 | 887 | 2 | 4.8 | 532 | 2 | 2.9 |
| 17 | 1,390 | 4 | 15 | 875 | 2 | 4.7 | 525 | 2 | 2.8 |
| 18 | 1,310 | 4 | 14 | 850 | 2 | 4.6 | 521 | 2 | 2.8 |
| 19 | 1,250 | 3 | 10 | 824 | 2 | 4.4 | 521 | 2 | 2.8 |
| 20 | 1,190 | 4 | 13 | 776 | 2 | 4.2 | 513 | 2 | 2.8 |
| 21 | 1,110 | 4 | 12 | 740 | 2 | 4.0 | 511 | 2 | 2.8 |
| 22 | 1,060 | 3 | 8.6 | 724 | 2 | 3.9 | 517 | 2 | 2.8 |
| 23 | 1,030 | 3 | 8.3 | 709 | 3 | 5.7 | 515 | 2 | 2.8 |
| 24 | 1,010 | 3 | 8.2 | 698 | 3 | 5.7 | 509 | 2 | 2.7 |
| 25 | 997 | 3 | 8.1 | 679 | 3 | 5.5 | 501 | 3 | 4.1 |
| 26 | 967 | 3 | 7.8 | 661 | 3 | 5.4 | 497 | 3 | 4.0 |
| 27 | 1,080 | 5 | 15 | 651 | 2 | 3.5 | 494 | 3 | 4.0 |
| 28 | 1,180 | 8 | 25 | 635 | 2 | 3.4 | 494 | 3 | 4.0 |
| 29 | 1,120 | 5 | 15 | 622 | 2 | 3.4 | 495 | 3 | 4.0 |
| 30 | 1,090 | 4 | 12 | 621 | 2 | 3.4 | 497 | 2 | 2.7 |
| 31 | 1,020 | 4 | 11 | 618 | 2 | 3.3 | -- | -- | -- |
| **TOTAL** | **45,454** | **--** | **713** | **25,497** | **--** | **197.9** | **16,412** | **--** | **90.7** |
| **MEAN** | **1,466** | **5** | **23** | **822** | **3** | **6.4** | **547** | **2** | **3.0** |
| **MAX** | **2,330** | **8** | **50** | **1,060** | **5** | **13** | **624** | **3** | **4.1** |
| **MIN** | **967** | **3** | **7.8** | **618** | **2** | **3.3** | **494** | **1** | **1.5** |

Total for water year 2009 (unrounded sum of daily values): streamflow–639,772 $ft^3/s$ (annual runoff–1,269,000 acre-ft); suspended-sediment discharge–61,765.56 tons.

**Table 8.** Daily mean streamflow and suspended-sediment data for Clark Fork above Missoula, Montana, October 2008 through September 2009.

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

| Day | Mean streamflow (ft³/s) | Suspended sediment | | Mean streamflow (ft³/s) | Suspended sediment | | Mean streamflow (ft³/s) | Suspended sediment | |
|---|---|---|---|---|---|---|---|---|---|
| | | Mean concentration (mg/L) | Discharge (ton/d) | | Mean concentration (mg/L) | Discharge (ton/d) | | Mean concentration (mg/L) | Discharge (ton/d) |
| | OCTOBER | | | NOVEMBER | | | DECEMBER | | |
| 1 | 1,500 | 4 | 16 | 1,680 | 4 | 18 | 2,100 | 6 | 34 |
| 2 | 1,500 | 4 | 16 | 1,710 | 5 | 23 | 2,140 | 5 | 29 |
| 3 | 1,500 | 5 | 20 | 1,820 | 7 | 34 | 2,190 | 5 | 30 |
| 4 | 1,530 | 6 | 25 | 1,890 | 8 | 41 | 2,050 | 4 | 22 |
| 5 | 1,580 | 6 | 26 | 1,870 | 8 | 40 | 1,870 | 4 | 20 |
| 6 | 1,590 | 6 | 26 | 1,830 | 8 | 40 | 2,010 | 3 | 16 |
| 7 | 1,590 | 5 | 21 | 1,810 | 8 | 39 | 2,060 | 3 | 17 |
| 8 | 1,580 | 4 | 17 | 1,950 | 11 | 58 | 2,060 | 3 | 17 |
| 9 | 1,590 | 4 | 17 | 2,010 | 12 | 65 | 2,020 | 3 | 16 |
| 10 | 1,610 | 4 | 17 | 1,990 | 12 | 64 | 1,980 | 3 | 16 |
| 11 | 1,630 | 4 | 18 | 1,950 | 12 | 63 | 1,980 | 4 | 21 |
| 12 | 1,650 | 4 | 18 | 1,960 | 12 | 64 | 1,910 | 5 | 26 |
| 13 | 1,660 | 4 | 18 | 2,670 | 30 | 216 | 1,850 | 6 | 30 |
| 14 | 1,680 | 4 | 18 | 3,600 | 49 | 476 | e1,200 | 5 | 16 |
| 15 | 1,710 | 4 | 18 | 3,290 | 23 | 204 | e700 | 4 | 7.6 |
| 16 | 1,710 | 5 | 23 | 3,100 | 14 | 117 | e620 | 3 | 5.0 |
| 17 | 1,710 | 6 | 28 | 2,950 | 12 | 96 | e750 | 2 | 4.0 |
| 18 | 1,700 | 6 | 28 | 2,810 | 10 | 76 | e1,000 | 2 | 5.4 |
| 19 | 1,730 | 6 | 28 | 2,690 | 8 | 58 | e1,200 | 5 | 16 |
| 20 | 1,740 | 6 | 28 | 2,590 | 7 | 49 | e1,200 | 10 | 32 |
| 21 | 1,780 | 6 | 29 | 2,530 | 6 | 41 | e1,250 | 17 | 57 |
| 22 | 1,780 | 6 | 29 | 2,470 | 6 | 40 | e1,300 | 25 | 88 |
| 23 | 1,760 | 6 | 29 | 2,360 | 5 | 32 | e1,400 | 33 | 125 |
| 24 | 1,740 | 5 | 23 | 2,270 | 4 | 25 | e1,500 | 40 | 162 |
| 25 | 1,720 | 4 | 19 | 2,120 | 4 | 23 | e1,550 | 42 | 176 |
| 26 | 1,720 | 4 | 19 | 2,150 | 3 | 17 | e1,600 | 38 | 164 |
| 27 | 1,700 | 4 | 18 | 2,130 | 3 | 17 | e1,650 | 30 | 134 |
| 28 | 1,690 | 4 | 18 | 2,040 | 3 | 17 | e1,700 | 23 | 106 |
| 29 | 1,700 | 4 | 18 | 2,090 | 4 | 23 | e1,750 | 22 | 104 |
| 30 | 1,690 | 4 | 18 | 2,100 | 5 | 28 | e1,700 | 30 | 138 |
| 31 | 1,680 | 4 | 18 | -- | -- | -- | e1,700 | 28 | 129 |
| **TOTAL** | **51,450** | **--** | **664** | **68,430** | **--** | **2,104** | **49,990** | **--** | **1,763** |
| **MEAN** | **1,160** | **5** | **21** | **2,281** | **10** | **70** | **1,613** | **13** | **57** |
| **MAX** | **1,780** | **6** | **29** | **3,600** | **49** | **476** | **2,190** | **42** | **176** |
| **MIN** | **1,500** | **4** | **16** | **1,680** | **3** | **17** | **620** | **2** | **4.0** |

**Table 8.** Daily mean streamflow and suspended-sediment data for Clark Fork above Missoula, Montana, October 2008 through September 2009.—Continued

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

| Day | Mean streamflow (ft³/s) | Suspended sediment | | Mean streamflow (ft³/s) | Suspended sediment | | Mean streamflow (ft³/s) | Suspended sediment | |
|---|---|---|---|---|---|---|---|---|---|
| | | Mean concentration (mg/L) | Discharge (ton/d) | | Mean concentration (mg/L) | Discharge (ton/d) | | Mean concentration (mg/L) | Discharge (ton/d) |
| | JANUARY | | | FEBRUARY | | | MARCH | | |
| 1 | e1,700 | 24 | 110 | e1750 | 6 | 28 | 1,520 | 8 | 33 |
| 2 | e1,750 | 21 | 99 | e1700 | 6 | 28 | 1,600 | 12 | 52 |
| 3 | e1,700 | 21 | 96 | e1650 | 6 | 27 | 1,700 | 14 | 64 |
| 4 | e1,550 | 23 | 96 | e1600 | 6 | 26 | 1,880 | 22 | 112 |
| 5 | e1,600 | 24 | 104 | 1,600 | 6 | 26 | 1,850 | 18 | 90 |
| 6 | e1,800 | 24 | 117 | 1,590 | 6 | 26 | 1,780 | 13 | 62 |
| 7 | e2,000 | 33 | 178 | 1,580 | 6 | 26 | 1,640 | 8 | 35 |
| 8 | e2,300 | 60 | 373 | 1,520 | 6 | 25 | 1,630 | 8 | 35 |
| 9 | e2,800 | 96 | 726 | 1,530 | 6 | 25 | 1,560 | 9 | 38 |
| 10 | e2,750 | 93 | 691 | 1,510 | 6 | 24 | 1,420 | 8 | 31 |
| 11 | e2,600 | 119 | 835 | 1,480 | 5 | 20 | 1,370 | 8 | 30 |
| 12 | e2,350 | 56 | 355 | 1,470 | 5 | 20 | 1,390 | 8 | 30 |
| 13 | e2,300 | 24 | 149 | 1,430 | 4 | 15 | 1,460 | 9 | 35 |
| 14 | e2,250 | 21 | 128 | 1,390 | 4 | 15 | 1,510 | 9 | 37 |
| 15 | 2,250 | 19 | 115 | 1,390 | 4 | 15 | 1,550 | 10 | 42 |
| 16 | 2,190 | 16 | 95 | 1,410 | 5 | 19 | 1,680 | 14 | 64 |
| 17 | 2,030 | 13 | 71 | 1,450 | 5 | 20 | 1,650 | 12 | 53 |
| 18 | 1,920 | 12 | 62 | 1,490 | 5 | 20 | 1,610 | 11 | 48 |
| 19 | 1,760 | 10 | 48 | 1,500 | 8 | 32 | 1,650 | 9 | 40 |
| 20 | 1,590 | 8 | 34 | 1,520 | 11 | 45 | 1,900 | 15 | 77 |
| 21 | 1,580 | 7 | 30 | 1,490 | 12 | 48 | 2,520 | 78 | 531 |
| 22 | e1,800 | 6 | 29 | 1,450 | 13 | 51 | 3,290 | 118 | 1,050 |
| 23 | e1,850 | 8 | 40 | 1,490 | 14 | 56 | 4,070 | 146 | 1,600 |
| 24 | e1,750 | 22 | 104 | 1,670 | 22 | 99 | 3,460 | 87 | 813 |
| 25 | e1,700 | 40 | 184 | 1,960 | 59 | 312 | 2,900 | 43 | 337 |
| 26 | e1,500 | 27 | 109 | 1,880 | 36 | 183 | 2,600 | 26 | 183 |
| 27 | e1,200 | 9 | 29 | 1,710 | 16 | 74 | 2,350 | 29 | 184 |
| 28 | e1,400 | 4 | 15 | 1,540 | 10 | 42 | 2,340 | 21 | 133 |
| 29 | e1,600 | 3 | 13 | -- | -- | -- | 2,470 | 22 | 147 |
| 30 | e1,700 | 3 | 14 | -- | -- | -- | 2,400 | 39 | 253 |
| 31 | e1,800 | 5 | 24 | -- | -- | -- | 2,240 | 30 | 181 |
| **TOTAL** | **59,070** | **--** | **5,073** | **43,750** | **--** | **1,347** | **62,990** | **--** | **6,420** |
| **MEAN** | **1,905** | **27** | **164** | **1,562** | **11** | **48** | **2,032** | **28** | **207** |
| **MAX** | **2,800** | **119** | **835** | **1,960** | **59** | **312** | **4,070** | **146** | **1,600** |
| **MIN** | **1,200** | **3** | **13** | **1,390** | **4** | **15** | **1,370** | **8** | **30** |

**Table 8.** Daily mean streamflow and suspended-sediment data for Clark Fork above Missoula, Montana, October 2008 through September 2009.—Continued

[Abbreviations: acre-ft, acre-feet; ft³/s, cubic feet per second; e, estimated; max, maximum; mg/L, milligram per liter; min, minimum; ton/d, ton 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 | 2,250 | 17 | 103 | 6,140 | 28 | 464 | 17,300 | 116 | 5,420 |
| 2 | 2,190 | 15 | 89 | 5,800 | 26 | 407 | 16,000 | 95 | 4,100 |
| 3 | 2,200 | 14 | 83 | 5,670 | 29 | 444 | 14,000 | 82 | 3,100 |
| 4 | 2,230 | 15 | 90 | 5,930 | 30 | 480 | 12,400 | 81 | 2,710 |
| 5 | 2,250 | 15 | 91 | 6,400 | 39 | 674 | 11,700 | 82 | 2,590 |
| 6 | 2,270 | 16 | 98 | 7,060 | 47 | 896 | 11,500 | 76 | 2,360 |
| 7 | 2,520 | 22 | 150 | 7,490 | 53 | 1,070 | 11,400 | 62 | 1,910 |
| 8 | 3,070 | 51 | 423 | 7,570 | 46 | 940 | 10,500 | 53 | 1,500 |
| 9 | 3,610 | 81 | 790 | 7,330 | 40 | 792 | 9,690 | 54 | 1,410 |
| 10 | 4,240 | 103 | 1,180 | 7,170 | 32 | 619 | 8,750 | 45 | 1,060 |
| 11 | 4,550 | 102 | 1,250 | 7,140 | 32 | 617 | 7,830 | 37 | 782 |
| 12 | 5,230 | 130 | 1,840 | 7,380 | 35 | 697 | 7,160 | 30 | 580 |
| 13 | 6,060 | 140 | 2,290 | 7,650 | 37 | 764 | 6,770 | 26 | 475 |
| 14 | 6,490 | 127 | 2,230 | 7,510 | 35 | 710 | 6,740 | 26 | 473 |
| 15 | 6,240 | 74 | 1,250 | 7,380 | 30 | 598 | 7,100 | 32 | 613 |
| 16 | 5,760 | 38 | 591 | 7,300 | 29 | 572 | 7,680 | 43 | 892 |
| 17 | 5,310 | 39 | 559 | 7,470 | 33 | 666 | 7,860 | 46 | 976 |
| 18 | 5,150 | 40 | 556 | 8,720 | 85 | 2,000 | 7,800 | 40 | 842 |
| 19 | 5,490 | 50 | 741 | 11,800 | 274 | 8,730 | 7,640 | 37 | 763 |
| 20 | 6,070 | 62 | 1,020 | 15,300 | 394 | 16,300 | 7,370 | 29 | 577 |
| 21 | 7,360 | 115 | 2,290 | 15,800 | 255 | 10,900 | 7,210 | 26 | 506 |
| 22 | 9,250 | 230 | 5,740 | 14,600 | 170 | 6,700 | 7,470 | 42 | 847 |
| 23 | 11,200 | 300 | 9,070 | 13,700 | 121 | 4,480 | 7,900 | 51 | 1,090 |
| 24 | 11,500 | 205 | 6,370 | 14,300 | 129 | 4,980 | 7,080 | 29 | 554 |
| 25 | 10,300 | 113 | 3,140 | 16,800 | 205 | 9,300 | 6,400 | 23 | 397 |
| 26 | 9,340 | 76 | 1,920 | 17,300 | 185 | 8,640 | 6,000 | 23 | 373 |
| 27 | 8,490 | 60 | 1,380 | 16,900 | 141 | 6,430 | 5,750 | 18 | 279 |
| 28 | 7,740 | 46 | 961 | 16,800 | 134 | 6,080 | 5,400 | 18 | 262 |
| 29 | 7,160 | 37 | 715 | 16,800 | 124 | 5,620 | 5,080 | 16 | 219 |
| 30 | 6,630 | 30 | 537 | 17,100 | 126 | 5,820 | 4,830 | 14 | 183 |
| 31 | -- | -- | -- | 17,300 | 130 | 6,070 | -- | -- | -- |
| **TOTAL** | **172,150** | **--** | **47,547** | **331,610** | **--** | **113,460** | **260,310** | **--** | **37,843** |
| **MEAN** | **5,738** | **79** | **1,580** | **10,700** | **99** | **3,660** | **8,677** | **45** | **1,260** |
| **MAX** | **11,500** | **300** | **9,070** | **17,300** | **394** | **16,300** | **17,300** | **116** | **5,420** |
| **MIN** | **2,190** | **14** | **83** | **5,670** | **26** | **407** | **4,830** | **14** | **183** |

**Table 8.** Daily mean streamflow and suspended-sediment data for Clark Fork above Missoula, Montana, October 2008 through September 2009.—Continued

[Abbreviations: acre-ft, acre-feet; ft³/s, cubic feet per second; e, estimated; max, maximum; mg/L, milligram per liter; min, minimum; ton/d, ton 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 | 4,620 | 12 | 150 | 2,270 | 7 | 43 | 1,500 | 7 | 28 |
| 2 | 4,420 | 11 | 131 | 2,170 | 7 | 41 | 1,490 | 6 | 24 |
| 3 | 4,180 | 11 | 124 | 2,050 | 7 | 39 | 1,440 | 6 | 23 |
| 4 | 4,000 | 10 | 108 | 1,940 | 7 | 37 | 1,390 | 6 | 23 |
| 5 | 3,870 | 9 | 94 | 1,860 | 8 | 40 | 1,360 | 5 | 18 |
| 6 | 3,770 | 8 | 81 | 1,870 | 9 | 45 | 1,370 | 5 | 18 |
| 7 | 3,750 | 8 | 81 | 2,240 | 12 | 73 | 1,370 | 5 | 18 |
| 8 | 3,760 | 7 | 71 | 2,880 | 57 | 443 | 1,350 | 4 | 15 |
| 9 | 3,750 | 7 | 71 | 2,680 | 23 | 166 | 1,330 | 4 | 14 |
| 10 | 3,620 | 6 | 59 | 2,440 | 17 | 112 | 1,330 | 4 | 14 |
| 11 | 3,450 | 6 | 56 | 2,290 | 11 | 68 | 1,320 | 4 | 14 |
| 12 | 3,280 | 6 | 53 | 2,160 | 8 | 47 | 1,300 | 5 | 18 |
| 13 | 3,270 | 7 | 62 | 2,090 | 8 | 45 | 1,290 | 5 | 17 |
| 14 | 3,540 | 10 | 96 | 2,090 | 8 | 45 | 1,280 | 5 | 17 |
| 15 | 3,650 | 7 | 69 | 2,150 | 8 | 46 | 1,260 | 6 | 20 |
| 16 | 3,450 | 5 | 47 | 2,180 | 8 | 47 | 1,240 | 6 | 20 |
| 17 | 3,210 | 5 | 43 | 2,190 | 8 | 47 | 1,210 | 6 | 20 |
| 18 | 3,030 | 5 | 41 | 2,140 | 9 | 52 | 1,200 | 6 | 19 |
| 19 | 2,900 | 5 | 39 | 2,070 | 9 | 50 | 1,200 | 6 | 19 |
| 20 | 2,780 | 5 | 38 | 1,950 | 8 | 42 | 1,190 | 5 | 16 |
| 21 | 2,650 | 4 | 29 | 1,860 | 8 | 40 | 1,210 | 5 | 16 |
| 22 | 2,530 | 5 | 34 | 1,770 | 7 | 33 | 1,240 | 5 | 17 |
| 23 | 2,430 | 5 | 33 | 1,720 | 7 | 33 | 1,240 | 5 | 17 |
| 24 | 2,360 | 5 | 32 | 1,690 | 7 | 32 | 1,220 | 5 | 16 |
| 25 | 2,300 | 4 | 25 | 1,660 | 6 | 27 | 1,190 | 6 | 19 |
| 26 | 2,240 | 4 | 24 | 1,600 | 6 | 26 | 1,180 | 6 | 19 |
| 27 | 2,440 | 6 | 40 | 1,560 | 6 | 25 | 1,170 | 5 | 16 |
| 28 | 2,850 | 13 | 100 | 1,520 | 5 | 21 | 1,180 | 5 | 16 |
| 29 | 2,730 | 13 | 96 | 1,470 | 5 | 20 | 1,190 | 5 | 16 |
| 30 | 2,600 | 12 | 84 | 1,450 | 6 | 23 | 1,210 | 5 | 16 |
| 31 | 2,410 | 8 | 52 | 1,460 | 6 | 24 | -- | -- | -- |
| **TOTAL** | **99,840** | **--** | **2,063** | **61,470** | **--** | **1,832** | **38,450** | **--** | **543** |
| **MEAN** | **3,221** | **7** | **67** | **1,983** | **10** | **59** | **1,282** | **5** | **18** |
| **MAX** | **4,620** | **13** | **150** | **2,880** | **57** | **443** | **1,500** | **7** | **28** |
| **MIN** | **2,240** | **4** | **24** | **1,450** | **5** | **20** | **1,170** | **4** | **14** |

Total for water year 2009 (unrounded sum of daily values): streamflow–1,299,510 ft³/s (annual runoff–2,578,000 acre-ft); suspended-sediment discharge–220,659 tons.

**Table 9.** Seasonal daily maximum, minimum, and mean turbidity at Mill Creek near Anaconda, Montana, April through September 2009.

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

| Day | Maximum | Minimum | Mean | Maximum | Minimum | Mean | Maximum | Minimum | Mean |
|---|---|---|---|---|---|---|---|---|---|
| | APRIL | | | MAY | | | JUNE | | |
| 1 | -- | -- | -- | 6.5 | 3.5 | 4.0 | 14 | 5.5 | 8.5 |
| 2 | -- | -- | -- | 6.5 | 3.5 | 4.5 | 8.5 | 4.5 | 5.5 |
| 3 | -- | -- | -- | 10 | 3.5 | 5.0 | 6.0 | 4.0 | 4.5 |
| 4 | -- | -- | -- | 9.5 | 4.0 | 6.0 | 5.0 | 3.5 | 4.0 |
| 5 | -- | -- | -- | 9.5 | 5.0 | 6.5 | 5.5 | 3.0 | 4.0 |
| 6 | -- | -- | -- | 8.5 | 5.5 | 7.0 | 8.5 | 3.5 | 5.0 |
| 7 | -- | -- | -- | 8.5 | 6.5 | 7.0 | 4.5 | 2.5 | 3.5 |
| 8 | -- | -- | -- | 10 | 5.5 | 6.5 | 7.0 | 2.5 | 3.5 |
| 9 | -- | -- | -- | 7.5 | 5.0 | 6.0 | 4.5 | 2.5 | 3.0 |
| 10 | -- | -- | -- | 8.0 | 5.0 | 6.0 | 5.5 | 2.5 | 3.0 |
| 11 | -- | -- | -- | 8.5 | 5.0 | 6.0 | 5.5 | 2.5 | 3.0 |
| 12 | -- | -- | -- | 8.5 | 6.0 | 7.0 | 5.0 | 2.5 | 3.0 |
| 13 | 8.5 | 5.5 | 6.5 | 6.5 | 5.0 | 5.5 | 4.0 | 2.5 | 3.0 |
| 14 | 7.0 | 4.5 | 5.5 | 8.0 | 4.5 | 5.5 | 4.5 | 3.0 | 3.5 |
| 15 | 6.0 | 4.0 | 4.5 | 7.0 | 4.5 | 5.0 | 5.0 | 3.0 | 3.5 |
| 16 | 5.0 | 3.5 | 4.0 | 9.0 | 4.5 | 6.0 | 5.5 | 3.0 | 4.0 |
| 17 | 4.5 | 3.5 | 4.0 | 26 | 6.0 | 9.5 | 5.5 | 3.5 | 4.5 |
| 18 | 6.0 | 3.0 | 4.0 | 30 | 11 | 16 | 5.5 | 3.0 | 4.0 |
| 19 | 7.0 | 3.5 | 4.5 | 30 | 15 | 21 | 4.0 | 2.5 | 3.0 |
| 20 | 21 | 4.0 | 8.5 | 31 | 10 | 17 | 4.0 | 3.0 | 3.5 |
| 21 | 29 | 7.5 | 14 | 12 | 7.0 | 8.5 | 4.5 | 2.5 | 3.5 |
| 22 | 29 | 9.5 | 17 | 8.0 | 5.5 | 6.0 | 5.0 | 2.5 | 3.5 |
| 23 | 26 | 8.5 | 12 | 8.0 | 4.5 | 5.5 | 7.0 | 2.5 | 3.5 |
| 24 | 9.5 | 6.5 | 7.5 | 31 | 6.5 | 14 | 3.5 | 2.5 | 3.0 |
| 25 | 8.0 | 5.5 | 6.5 | 31 | 12 | 17 | 4.5 | 2.5 | 3.0 |
| 26 | 6.5 | 4.5 | 5.5 | 20 | 7.0 | 13 | 5.0 | 2.5 | 3.5 |
| 27 | 6.0 | 4.0 | 4.5 | 16 | 5.5 | 9.5 | 6.0 | 2.5 | 3.0 |
| 28 | 5.0 | 4.0 | 4.0 | 22 | 5.0 | 12 | 4.0 | 2.5 | 3.0 |
| 29 | 5.0 | 4.0 | 4.0 | 11 | 5.0 | 7.5 | 4.5 | 2.5 | 3.0 |
| 30 | 4.5 | 3.5 | 4.0 | 20 | 6.5 | 10 | 5.0 | 2.5 | 3.0 |
| 31 | -- | -- | -- | 24 | 9.0 | 15 | -- | -- | -- |
| **MONTH**[1] | **29** | **3.0** | **6.7** | **31** | **3.5** | **8.9** | **14** | **2.5** | **3.7** |

**Table 9.** Seasonal daily maximum, minimum, and mean turbidity at Mill Creek near Anaconda, Montana, April through September 2009.—Continued

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

| Day | Maximum | Minimum | Mean | Maximum | Minimum | Mean | Maximum | Minimum | Mean |
|---|---|---|---|---|---|---|---|---|---|
| | JULY | | | AUGUST | | | SEPTEMBER | | |
| 1 | 11 | 2.5 | 5.0 | 5.5 | 2.0 | 3.0 | 3.5 | 2.0 | 3.0 |
| 2 | 7.5 | 2.5 | 4.5 | 4.5 | 2.0 | 3.0 | 4.0 | 2.0 | 3.0 |
| 3 | 8.5 | 2.5 | 4.5 | 5.0 | 2.0 | 3.0 | 4.0 | 2.0 | 3.0 |
| 4 | 8.0 | 2.5 | 3.5 | 4.0 | 2.0 | 3.0 | 4.0 | 2.0 | 3.0 |
| 5 | 6.0 | 2.5 | 3.5 | 4.5 | 2.5 | 3.0 | 4.5 | 2.5 | 3.0 |
| 6 | 6.5 | 2.0 | 3.5 | 4.5 | 2.5 | 3.0 | 5.0 | 2.0 | 3.0 |
| 7 | 7.5 | 2.0 | 3.5 | 9.0 | 3.0 | 5.0 | 4.0 | 2.0 | 3.0 |
| 8 | 5.5 | 2.0 | 3.0 | 4.0 | 2.5 | 3.5 | 4.0 | 2.0 | 3.0 |
| 9 | 7.0 | 2.0 | 3.5 | 4.5 | 2.5 | 3.0 | 4.5 | 2.5 | 3.0 |
| 10 | 6.0 | 1.5 | 3.0 | 4.0 | 2.5 | 3.0 | 4.5 | 2.5 | 3.0 |
| 11 | 5.5 | 1.5 | 2.5 | 4.0 | 2.5 | 3.0 | 4.5 | 2.5 | 3.0 |
| 12 | 4.5 | 1.5 | 2.5 | 4.0 | 2.0 | 3.0 | 4.0 | 2.5 | 3.0 |
| 13 | 5.5 | 2.0 | 3.0 | 3.5 | 2.0 | 2.5 | -- | -- | -- |
| 14 | 3.5 | 1.5 | 2.0 | 3.5 | 2.5 | 3.0 | -- | -- | -- |
| 15 | 4.5 | 1.5 | 2.5 | 4.0 | 2.5 | 3.0 | -- | -- | -- |
| 16 | 6.0 | 1.5 | 3.0 | 4.5 | 2.5 | 3.0 | 4.5 | 2.5 | 3.5 |
| 17 | 6.5 | 2.0 | 4.0 | 4.0 | 2.0 | 2.5 | 4.5 | 2.0 | 3.0 |
| 18 | 7.0 | 1.5 | 4.0 | 3.5 | 2.0 | 2.5 | 3.5 | 2.0 | 3.0 |
| 19 | 6.0 | 1.0 | 3.0 | 3.5 | 2.0 | 2.5 | 4.0 | 2.0 | 3.0 |
| 20 | 4.5 | 1.5 | 2.0 | 4.0 | 2.0 | 2.5 | 4.5 | 2.5 | 3.0 |
| 21 | 6.5 | 1.5 | 3.0 | 3.5 | 2.0 | 2.5 | 4.5 | 2.0 | 3.0 |
| 22 | 5.5 | 1.5 | 3.5 | 4.0 | 2.0 | 2.5 | 4.0 | 2.0 | 2.5 |
| 23 | 4.5 | 1.5 | 2.5 | 19 | 2.0 | 4.0 | 3.5 | 2.5 | 2.5 |
| 24 | 4.0 | 1.5 | 2.5 | 6.0 | 2.5 | 3.5 | 4.0 | 2.0 | 2.5 |
| 25 | 4.5 | 2.5 | 3.0 | 4.0 | 2.0 | 3.0 | 3.5 | 2.5 | 3.0 |
| 26 | 4.5 | 2.5 | 3.0 | 4.0 | 2.0 | 3.0 | 3.5 | 2.0 | 2.5 |
| 27 | 5.0 | 2.5 | 3.5 | 4.0 | 2.0 | 3.0 | 3.5 | 2.0 | 2.5 |
| 28 | 5.0 | 2.5 | 3.5 | 4.0 | 2.0 | 3.0 | 3.0 | 2.0 | 2.5 |
| 29 | 5.0 | 2.5 | 3.5 | 4.0 | 2.0 | 2.5 | 4.0 | 2.0 | 2.5 |
| 30 | 6.0 | 2.5 | 3.5 | 4.0 | 2.0 | 3.0 | -- | -- | 3.0 |
| 31 | 5.5 | 2.5 | 3.5 | 5.5 | 2.5 | 3.5 | -- | -- | -- |
| **MONTH**[1] | **11** | **1.0** | **3.3** | **19** | **2.0** | **3.0** | **5.0** | **2.0** | **2.9** |

[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 2009.

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

| Day | Maximum | Minimum | Mean | Maximum | Minimum | Mean | Maximum | Minimum | Mean |
|---|---|---|---|---|---|---|---|---|---|
| | JUNE | | | JULY | | | AUGUST | | |
| 1 | -- | -- | -- | 8.5 | 4.0 | 5.0 | 6.5 | 4.0 | 5.0 |
| 2 | -- | -- | -- | 6.5 | 4.0 | 4.5 | 9.0 | 4.0 | 5.0 |
| 3 | -- | -- | -- | 6.0 | 3.5 | 4.5 | 7.5 | 4.0 | 4.5 |
| 4 | -- | -- | -- | 7.5 | 3.0 | 3.5 | 9.5 | 4.0 | 5.0 |
| 5 | -- | -- | -- | 13 | 3.0 | 5.5 | 6.5 | 4.0 | 4.5 |
| 6 | -- | -- | -- | 16 | 4.0 | 7.5 | 6.0 | 4.0 | 4.5 |
| 7 | -- | -- | -- | 10 | 5.5 | 7.5 | 37 | 4.5 | 14 |
| 8 | -- | -- | -- | 9.0 | 4.5 | 6.0 | 7.0 | 4.5 | 5.5 |
| 9 | -- | -- | -- | 5.5 | 3.5 | 4.5 | 6.0 | 4.0 | 4.5 |
| 10 | -- | -- | -- | 5.5 | 3.5 | 4.5 | 5.5 | 3.5 | 4.5 |
| 11 | 8.5 | 6.5 | 8.0 | 6.0 | 4.0 | 4.5 | 5.5 | 3.5 | 4.5 |
| 12 | 9.5 | 6.0 | 7.5 | 12 | 4.0 | 4.5 | 6.5 | 3.5 | 4.0 |
| 13 | 8.5 | 6.0 | 7.0 | 110 | 5.0 | 17 | 8.0 | 3.5 | 4.0 |
| 14 | 9.0 | 6.0 | 6.5 | 7.5 | 4.0 | 5.0 | 5.5 | 4.0 | 4.5 |
| 15 | 9.5 | 6.0 | 7.0 | 6.5 | 4.0 | 5.0 | 8.0 | 3.0 | 4.5 |
| 16 | 9.5 | 5.5 | 6.5 | 7.5 | 4.0 | 4.5 | 9.0 | 2.5 | 4.5 |
| 17 | 8.5 | 5.5 | 6.5 | 9.5 | 3.5 | 4.5 | 4.0 | 2.5 | 3.0 |
| 18 | 9.0 | 5.5 | 6.0 | 8.5 | 4.0 | 4.5 | 5.0 | 3.0 | 3.5 |
| 19 | 7.0 | 5.0 | 6.0 | 6.5 | 4.0 | 4.5 | 5.0 | 3.0 | 3.5 |
| 20 | 9.0 | 5.5 | 6.5 | 7.5 | 4.0 | 5.0 | 8.0 | 3.5 | 4.5 |
| 21 | 9.0 | 5.0 | 6.0 | 7.0 | 4.0 | 5.0 | 8.0 | 4.0 | 5.0 |
| 22 | 10 | 5.0 | 6.5 | 9.0 | 4.5 | 5.5 | 5.5 | 4.0 | 4.5 |
| 23 | 10 | 5.0 | 6.5 | 8.0 | 5.0 | 6.0 | 6.5 | 4.0 | 5.0 |
| 24 | 8.0 | 5.0 | 6.0 | 7.0 | 4.5 | 5.5 | 8.5 | 3.5 | 4.5 |
| 25 | 9.5 | 5.0 | 6.5 | 6.5 | 4.0 | 4.5 | -- | -- | -- |
| 26 | 9.0 | 4.5 | 6.0 | 8.5 | 4.0 | 5.0 | -- | -- | -- |
| 27 | 8.0 | 4.5 | 5.5 | 8.5 | 4.0 | 5.0 | -- | -- | -- |
| 28 | 7.0 | 4.0 | 5.0 | 5.5 | 4.0 | 4.5 | -- | -- | -- |
| 29 | 7.0 | 4.0 | 5.0 | 7.0 | 3.5 | 4.5 | -- | -- | -- |
| 30 | 9.5 | 4.0 | 5.0 | 5.0 | 4.0 | 4.5 | -- | -- | -- |
| 31 | -- | -- | -- | 5.5 | 4.0 | 4.5 | -- | -- | -- |
| **MONTH**[1] | **10** | **4.0** | **6.3** | **110** | **3.0** | **5.4** | **37** | **2.5** | **4.9** |

**Table 10.** Seasonal daily maximum, minimum, and mean turbidity at Willow Creek near Anaconda, Montana, June through September 2009.—Continued

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

| Day | Maximum | Minimum | Mean |
|---|---|---|---|
| | SEPTEMBER | | |
| 1 | -- | -- | -- |
| 2 | -- | -- | -- |
| 3 | 4.0 | 2.5 | 3.0 |
| 4 | 4.0 | 3.0 | 3.0 |
| 5 | 5.5 | 3.0 | 3.5 |
| 6 | 3.5 | 3.0 | 3.0 |
| 7 | 4.0 | 3.0 | 3.0 |
| 8 | 4.5 | 3.0 | 3.0 |
| 9 | 4.0 | 3.0 | 3.5 |
| 10 | 5.0 | 3.0 | 3.5 |
| 11 | 5.5 | 3.0 | 3.5 |
| 12 | 5.0 | 3.0 | 3.5 |
| 13 | 4.5 | 3.0 | 3.5 |
| 14 | 4.5 | 3.0 | 3.5 |
| 15 | 5.5 | 3.0 | 3.5 |
| 16 | 8.0 | 3.0 | 3.5 |
| 17 | 7.0 | 3.0 | 3.5 |
| 18 | 5.5 | 3.0 | 3.5 |
| 19 | 9.0 | 3.0 | 3.5 |
| 20 | 7.5 | 3.0 | 4.0 |
| 21 | 8.5 | 3.0 | 4.5 |
| 22 | 7.0 | 3.0 | 4.0 |
| 23 | 4.5 | 3.0 | 3.5 |
| 24 | 8.5 | 3.5 | 4.0 |
| 25 | 6.0 | 3.0 | 3.5 |
| 26 | 5.0 | 3.0 | 3.5 |
| 27 | 4.0 | 2.5 | 3.0 |
| 28 | 3.5 | 2.5 | 2.5 |
| 29 | 4.0 | 2.5 | 2.5 |
| 30 | 9.0 | 2.5 | 4.0 |
| 31 | -- | -- | -- |
| **MONTH**[1] | **9.0** | **2.5** | **3.4** |

[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, April through September 2009.

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

| Day | Maximum | Minimum | Mean | Maximum | Minimum | Mean | Maximum | Minimum | Mean |
|---|---|---|---|---|---|---|---|---|---|
| | APRIL | | | MAY | | | JUNE | | |
| 1 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 2 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 3 | -- | -- | -- | 21 | 3.5 | 4.5 | -- | -- | -- |
| 4 | -- | -- | -- | 21 | 3.5 | 5.5 | -- | -- | -- |
| 5 | -- | -- | -- | 7.0 | 3.5 | 4.5 | -- | -- | -- |
| 6 | -- | -- | -- | 5.5 | 3.0 | 4.0 | -- | -- | -- |
| 7 | -- | -- | -- | 4.5 | 3.5 | 4.0 | -- | -- | -- |
| 8 | -- | -- | -- | 6.0 | 3.0 | 3.5 | -- | -- | -- |
| 9 | -- | -- | -- | 4.0 | 3.0 | 3.5 | -- | -- | -- |
| 10 | -- | -- | -- | 6.0 | 3.0 | 3.5 | -- | -- | -- |
| 11 | -- | -- | -- | 5.0 | 3.0 | 3.5 | -- | -- | -- |
| 12 | -- | -- | -- | 9.0 | 3.5 | 4.5 | 4.5 | 3.0 | 4.0 |
| 13 | -- | -- | -- | 6.0 | 3.0 | 4.0 | 5.5 | 3.0 | 4.0 |
| 14 | 5.0 | 4.0 | 4.0 | 8.5 | 3.0 | 4.0 | 9.0 | 3.5 | 4.5 |
| 15 | 9.0 | 4.0 | 4.5 | 14 | 3.5 | 5.0 | 8.5 | 4.5 | 6.0 |
| 16 | 9.5 | 4.0 | 5.5 | 8.0 | 3.5 | 5.0 | 7.5 | 4.5 | 6.0 |
| 17 | 5.0 | 3.5 | 4.0 | 11 | 3.5 | 5.0 | 7.5 | 5.0 | 6.0 |
| 18 | 5.5 | 3.0 | 4.0 | -- | -- | -- | 7.5 | 4.5 | 6.0 |
| 19 | 6.0 | 3.5 | 4.0 | -- | -- | -- | 7.0 | 4.0 | 4.5 |
| 20 | 7.0 | 4.0 | 5.0 | 37 | 13 | 22 | 6.0 | 4.0 | 4.5 |
| 21 | -- | -- | -- | 22 | 6.0 | 8.5 | 6.0 | 3.5 | 4.0 |
| 22 | -- | -- | -- | 9.5 | 5.0 | 6.0 | 7.0 | 3.5 | 4.5 |
| 23 | -- | -- | -- | 10 | 5.0 | 7.0 | 5.5 | 3.5 | 4.0 |
| 24 | -- | -- | -- | 36 | 9.0 | 21 | 4.5 | 3.0 | 3.5 |
| 25 | -- | -- | -- | 32 | 11 | 15 | 4.5 | 3.0 | 3.5 |
| 26 | -- | -- | -- | 16 | 7.0 | 10 | 6.0 | 3.0 | 4.0 |
| 27 | -- | -- | -- | 10 | 6.5 | 8.0 | 5.0 | 3.0 | 3.5 |
| 28 | -- | -- | -- | 12 | 7.0 | 9.5 | 4.5 | 3.0 | 3.5 |
| 29 | -- | -- | -- | 21 | 10 | 14 | 4.0 | 2.5 | 3.0 |
| 30 | -- | -- | -- | -- | -- | -- | 4.0 | 2.5 | 3.0 |
| 31 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| **MONTH**[1] | **9.5** | **3.0** | **4.4** | **37** | **3.0** | **7.4** | **9.0** | **2.5** | **4.3** |

**Table 11.** Seasonal daily maximum, minimum, and mean turbidity at Warm Springs Creek near Anaconda, Montana, April through September 2009.—Continued

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

| Day | Maximum | Minimum | Mean | Maximum | Minimum | Mean | Maximum | Minimum | Mean |
|---|---|---|---|---|---|---|---|---|---|
| | JULY | | | AUGUST | | | SEPTEMBER | | |
| 1 | 4.5 | 2.5 | 3.0 | 7.0 | 4.0 | 4.5 | 5.5 | 4.0 | 4.5 |
| 2 | 7.0 | 3.0 | 3.5 | 8.0 | 4.0 | 5.0 | 6.5 | 4.0 | 5.0 |
| 3 | 5.0 | 2.5 | 3.0 | 9.5 | 4.0 | 4.5 | 6.0 | 4.0 | 5.0 |
| 4 | 3.5 | 2.5 | 3.0 | 11 | 3.5 | 5.0 | 5.5 | 4.0 | 4.5 |
| 5 | 4.0 | 2.5 | 3.0 | 18 | 4.0 | 7.0 | 7.0 | 4.5 | 5.0 |
| 6 | 3.5 | 2.5 | 3.0 | 18 | 5.0 | 10 | 6.0 | 4.0 | 4.5 |
| 7 | 4.5 | 2.5 | 3.0 | 21 | 5.5 | 11 | 5.0 | 4.0 | 4.5 |
| 8 | 4.5 | 2.5 | 3.0 | 9.5 | 4.5 | 6.5 | 5.0 | 4.0 | 4.5 |
| 9 | 3.5 | 2.5 | 3.0 | 6.0 | 4.0 | 5.0 | 6.0 | 4.0 | 4.5 |
| 10 | 3.5 | 2.5 | 3.0 | 6.5 | 4.0 | 4.5 | 5.0 | 4.0 | 4.5 |
| 11 | 5.0 | 2.5 | 3.0 | 5.0 | 4.0 | 4.5 | 5.0 | 4.0 | 4.5 |
| 12 | 32 | 2.5 | 3.5 | 9.5 | 4.0 | 5.0 | 5.0 | 4.0 | 4.5 |
| 13 | 16 | 3.0 | 4.0 | 6.5 | 4.0 | 4.5 | 5.0 | 4.0 | 4.5 |
| 14 | 4.0 | 2.5 | 3.0 | 5.5 | 4.0 | 5.0 | 5.0 | 4.0 | 4.5 |
| 15 | 4.0 | 2.5 | 3.5 | 10 | 4.0 | 5.0 | 5.5 | 4.0 | 4.5 |
| 16 | 4.5 | 3.0 | 3.5 | 8.0 | 4.5 | 5.0 | 5.0 | 3.5 | 4.0 |
| 17 | 6.0 | 2.5 | 3.5 | 9.0 | 4.0 | 5.0 | 4.5 | 4.0 | 4.5 |
| 18 | 4.0 | 2.0 | 2.5 | 30 | 6.0 | 9.0 | 5.5 | 3.5 | 4.0 |
| 19 | 3.5 | 2.5 | 3.0 | 8.5 | 4.0 | 6.0 | 4.5 | 4.0 | 4.5 |
| 20 | 3.0 | 2.0 | 2.5 | 9.5 | 4.0 | 7.0 | 5.0 | 4.0 | 4.5 |
| 21 | 3.5 | 2.0 | 2.5 | 9.0 | 3.5 | 5.0 | 5.0 | 4.0 | 4.5 |
| 22 | 5.5 | 2.0 | 2.5 | 5.5 | 4.0 | 4.5 | 5.5 | 4.0 | 4.5 |
| 23 | 4.0 | 2.0 | 2.5 | 7.5 | 4.0 | 5.0 | 5.5 | 4.0 | 4.5 |
| 24 | 7.0 | 1.5 | 3.5 | 7.0 | 4.0 | 5.5 | 5.0 | 4.0 | 4.5 |
| 25 | 9.5 | 3.5 | 5.0 | 6.5 | 4.5 | 5.5 | 8.5 | 4.5 | 5.5 |
| 26 | 9.5 | 4.0 | 5.5 | 5.5 | 4.0 | 4.5 | 6.5 | 4.5 | 5.0 |
| 27 | 24 | 4.5 | 8.0 | 5.0 | 4.0 | 4.5 | 9.0 | 5.0 | 6.0 |
| 28 | 76 | 4.0 | 7.5 | 5.5 | 4.0 | 4.5 | 9.0 | 4.5 | 5.5 |
| 29 | 6.5 | 4.0 | 5.0 | 5.0 | 4.0 | 4.5 | 8.5 | 3.5 | 4.5 |
| 30 | 5.0 | 4.0 | 4.5 | 5.5 | 4.0 | 4.5 | 9.0 | 4.5 | 5.5 |
| 31 | 5.0 | 4.0 | 4.5 | 12 | 4.5 | 5.5 | -- | -- | -- |
| **MONTH**[1] | **76** | **1.5** | **3.7** | **30** | **3.5** | **5.6** | **9.0** | **3.5** | **4.7** |

[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, April through September 2009.

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

| Day | Maximum | Minimum | Mean | Maximum | Minimum | Mean | Maximum | Minimum | Mean |
|---|---|---|---|---|---|---|---|---|---|
| | APRIL | | | MAY | | | JUNE | | |
| 1 | -- | -- | -- | 6.5 | 3.0 | 4.0 | 48 | 15 | 27 |
| 2 | -- | -- | -- | 7.0 | 3.0 | 4.0 | 22 | 12 | 15 |
| 3 | -- | -- | -- | 8.0 | 3.5 | 4.5 | 14 | 9.0 | 11 |
| 4 | -- | -- | -- | 8.5 | 4.0 | 5.5 | 17 | 8.5 | 10 |
| 5 | -- | -- | -- | 8.0 | 4.0 | 5.0 | 12 | 6.5 | 9.0 |
| 6 | -- | -- | -- | 7.0 | 3.0 | 4.5 | 18 | 7.0 | 10 |
| 7 | -- | -- | -- | 5.0 | 2.5 | 3.5 | 10 | 5.0 | 7.0 |
| 8 | -- | -- | -- | 4.5 | 2.5 | 3.5 | 10 | 5.0 | 6.5 |
| 9 | -- | -- | -- | 5.5 | 2.5 | 3.5 | 10 | 5.0 | 6.0 |
| 10 | -- | -- | -- | 6.0 | 2.5 | 3.5 | 10 | 4.5 | 6.5 |
| 11 | -- | -- | -- | 6.5 | 3.0 | 4.0 | 7.5 | 3.5 | 5.0 |
| 12 | -- | -- | -- | 8.5 | 4.5 | 6.0 | 7.0 | 3.0 | 4.5 |
| 13 | -- | -- | -- | 6.5 | 3.5 | 5.0 | 8.5 | 2.5 | 4.0 |
| 14 | 6.0 | 2.5 | 3.5 | 7.0 | 3.5 | 5.0 | 14 | 2.5 | 5.0 |
| 15 | 6.0 | 2.5 | 3.0 | 9.0 | 3.5 | 6.0 | 34 | 5.0 | 12 |
| 16 | 6.5 | 2.5 | 3.5 | 10 | 4.0 | 6.0 | 9.0 | 3.5 | 5.5 |
| 17 | 8.5 | 2.5 | 4.0 | 10 | 4.5 | 6.0 | 30 | 3.5 | 5.5 |
| 18 | 9.0 | 3.5 | 5.5 | 38 | 7.0 | 15 | 9.5 | 3.0 | 5.0 |
| 19 | 6.5 | 3.0 | 4.5 | 45 | 20 | 31 | 9.0 | 2.5 | 4.5 |
| 20 | 9.0 | 3.0 | 4.5 | 45 | 13 | 24 | 8.0 | 3.0 | 4.5 |
| 21 | 17 | 5.5 | 8.0 | 20 | 8.0 | 11 | 8.5 | 2.0 | 4.0 |
| 22 | 19 | 7.5 | 11 | 12 | 5.5 | 7.5 | 10 | 2.5 | 4.5 |
| 23 | 22 | 7.0 | 13 | 9.5 | 4.5 | 6.5 | 9.0 | 2.5 | 3.5 |
| 24 | 8.5 | 5.0 | 6.0 | 41 | 8.0 | 17 | 8.5 | 2.0 | 3.5 |
| 25 | 7.5 | 3.5 | 5.0 | 39 | 12 | 19 | 7.5 | 2.0 | 3.5 |
| 26 | 8.5 | 3.5 | 5.0 | 18 | 7.5 | 11 | 6.0 | 1.5 | 3.0 |
| 27 | 7.0 | 3.5 | 4.5 | 25 | 7.5 | 12 | 6.5 | 1.5 | 2.5 |
| 28 | 5.0 | 3.5 | 4.0 | 32 | 9.5 | 17 | 8.0 | 1.5 | 3.0 |
| 29 | 19 | 3.5 | 5.5 | 49 | 12 | 23 | 5.5 | 1.5 | 2.5 |
| 30 | 7.0 | 3.5 | 4.0 | 59 | 16 | 29 | 6.0 | 1.5 | 2.5 |
| 31 | -- | -- | -- | 52 | 14 | 24 | -- | -- | -- |
| **MONTH**[1] | **22** | **2.5** | **5.6** | **59** | **2.5** | **11** | **48** | **1.5** | **6.5** |

**Table 12.** Seasonal daily maximum, minimum, and mean turbidity at Lost Creek near Anaconda, Montana, April through September 2009.—Continued

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

| Day | Maximum | Minimum | Mean | Maximum | Minimum | Mean | Maximum | Minimum | Mean |
|---|---|---|---|---|---|---|---|---|---|
| | JULY | | | AUGUST | | | SEPTEMBER | | |
| 1 | 5.5 | 1.5 | 2.5 | 3.5 | 1.0 | 1.5 | 2.0 | 0.5 | 1.0 |
| 2 | 8.0 | 1.5 | 3.0 | 2.0 | .5 | 1.0 | 2.0 | .5 | 1.0 |
| 3 | 5.5 | 1.5 | 2.0 | 8.0 | .5 | 1.5 | 2.0 | .5 | 1.0 |
| 4 | 4.5 | 1.0 | 2.5 | 4.5 | 1.5 | 2.5 | 2.0 | .5 | 1.0 |
| 5 | 6.0 | 1.0 | 2.5 | 4.0 | 1.0 | 2.0 | 1.5 | .5 | 1.0 |
| 6 | 5.5 | 1.5 | 2.5 | 61 | 1.5 | 5.5 | 6.0 | .5 | 1.5 |
| 7 | 6.5 | 1.5 | 2.5 | 31 | 7.0 | 13 | 2.0 | .5 | 1.0 |
| 8 | 7.5 | 1.0 | 2.5 | 7.0 | 3.0 | 4.0 | 1.5 | .5 | 1.0 |
| 9 | 5.0 | .5 | 2.0 | 38 | 2.5 | 6.0 | 1.0 | <.5 | .5 |
| 10 | 5.5 | 1.0 | 2.0 | 5.0 | 2.5 | 3.5 | 1.0 | <.5 | .5 |
| 11 | 5.5 | .5 | 2.0 | 4.0 | 2.5 | 3.0 | 2.0 | <.5 | .5 |
| 12 | 5.5 | 1.0 | 2.0 | 3.5 | 2.0 | 2.5 | 1.0 | <.5 | .5 |
| 13 | 5.5 | 1.0 | 2.5 | 6.0 | 2.0 | 3.0 | 1.0 | <.5 | .5 |
| 14 | 3.5 | 1.0 | 1.5 | 4.0 | 2.0 | 3.0 | -- | -- | -- |
| 15 | 4.0 | 1.0 | 2.0 | 5.5 | 2.0 | 3.0 | -- | -- | -- |
| 16 | 7.0 | 1.0 | 2.0 | 3.5 | 1.5 | 2.0 | -- | -- | -- |
| 17 | 4.5 | 1.0 | 2.0 | 3.5 | 1.5 | 2.0 | 3.0 | <.5 | 2.0 |
| 18 | 5.5 | 1.0 | 2.0 | 3.0 | 1.5 | 2.0 | 3.0 | <.5 | 2.0 |
| 19 | 5.0 | .5 | 2.0 | 4.5 | 1.5 | 2.0 | 3.5 | <.5 | 2.0 |
| 20 | 4.0 | .5 | 1.5 | 4.0 | 1.5 | 2.5 | 3.0 | .5 | 1.0 |
| 21 | 3.0 | .5 | 1.5 | 5.0 | 1.5 | 2.5 | 2.0 | <.5 | .5 |
| 22 | 4.0 | .5 | 1.5 | 5.5 | 1.5 | 2.0 | 5.5 | <.5 | 1.0 |
| 23 | 5.5 | .5 | 1.5 | 5.0 | 1.5 | 2.5 | 1.5 | <.5 | .5 |
| 24 | 3.0 | .5 | 1.0 | 3.0 | 1.0 | 2.0 | 4.5 | .5 | 1.5 |
| 25 | 5.5 | .5 | 1.5 | 3.5 | 1.0 | 2.0 | 4.5 | 1.0 | 2.5 |
| 26 | 58 | .5 | 7.0 | 2.5 | 1.0 | 1.5 | 4.5 | 1.0 | 3.0 |
| 27 | 8.0 | 2.0 | 3.5 | 3.0 | 1.0 | 1.5 | 5.0 | 1.0 | 2.5 |
| 28 | 3.0 | 1.5 | 2.0 | 3.0 | 1.0 | 1.5 | 2.0 | .5 | 1.5 |
| 29 | 3.0 | 1.0 | 1.5 | 14 | 1.5 | 2.5 | 4.5 | .5 | 2.0 |
| 30 | 2.5 | 1.0 | 1.5 | 4.0 | 1.0 | 1.5 | -- | -- | -- |
| 31 | 3.0 | .5 | 1.5 | 8.5 | 1.0 | 2.0 | -- | -- | -- |
| **MONTH**[1] | **58** | **.5** | **2.2** | **61** | **.5** | **2.8** | **6.0** | **.5** | **1.3** |

[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, microgram per liter; mg/L, milligram 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) |
|---|---|---|---|---|---|---|---|---|---|---|
| 12323700 | Mill Creek at Opportunity | 08/17/2009 | 1500 | 70 | 20.0 | 4.78 | -- | -- | 19.3 | 20.1 |
| | | 08/17/2009 | 1505 | 71 | 20.5 | 4.89 | -- | -- | 21.2 | 20.1 |
| 12323750 | Silver Bow Creek at Warm Springs | 07/14/2009 | 0810 | 120 | 37.9 | 7.19 | -- | -- | 30.1 | 30.7 |
| | | 07/14/2009 | 0815 | 120 | 37.7 | 7.18 | -- | -- | 32.0 | 31.2 |
| 12323840 | Lost Creek near Anaconda | 04/27/2009 | 1355 | 96 | 29.0 | 5.67 | -- | -- | 2.1 | 2.4 |
| | | 04/27/2009 | 1400 | 98 | 30.1 | 5.62 | -- | -- | 2.1 | 2.3 |
| 12324200 | Clark Fork at Deer Lodge | 05/19/2009 | 1045 | 150 | 45.6 | 9.03 | -- | -- | 17.8 | -- |
| | | 05/19/2009 | 1050 | 150 | 45.6 | 9.06 | -- | -- | 19.1 | 38.1 |
| 12324400 | Clark Fork above Little Blackfoot, near Garrison | 03/24/2009 | 1155 | 190 | 56.2 | 13.2 | -- | -- | 12.9 | 19.9 |
| | | 03/24/2009 | 1200 | 200 | 58.4 | 13.4 | -- | -- | 13.0 | 19.6 |
| 12324680 | Clark Fork at Goldcreek | 10/21/2008 | 1400 | 180 | 52.9 | 11.3 | -- | -- | 8.7 | 10.3 |
| | | 10/21/2008 | 1405 | 180 | 54.2 | 11.4 | -- | -- | 8.9 | 9.2 |
| 12334550 | Clark Fork at Turah Bridge, near Bonner | 05/18/2009 | 0930 | 91 | 25.7 | 6.42 | 0.39 | 0.071 | 4.8 | 7.1 |
| | | 05/18/2009 | 0940 | 90 | 25.5 | 6.34 | .33 | .073 | 4.8 | -- |
| | | 06/03/2009 | 0745 | 71 | 20.8 | 4.63 | -- | -- | 8.3 | 12.4 |
| | | 06/03/2009 | 0750 | 71 | 20.9 | 4.64 | -- | -- | 8.0 | 11.8 |
| 12334570 | Clark Fork Bypass near Bonner | 06/15/2009 | 1230 | 95 | 27.6 | 6.42 | -- | -- | 7.5 | 9.5 |
| | | 06/15/2009 | 1235 | 96 | 27.7 | 6.42 | -- | -- | 7.7 | 9.6 |
| 12340000 | Blackfoot River near Bonner | 05/31/2009 | 1300 | 79 | 21.2 | 6.34 | .23 | .060 | .95 | 1.8 |
| | | 05/31/2009 | 1310 | 80 | 21.3 | 6.40 | .23 | .062 | .91 | 1.7 |
| 12340500 | Clark Fork above Missoula | 04/27/2009 | 1600 | 90 | 24.2 | 7.20 | .37 | .062 | 2.8 | 4.8 |
| | | 04/27/2009 | 1605 | 98 | 27.2 | 7.40 | .38 | .065 | 2.8 | 5.0 |
| | | 06/23/2009 | 1745 | 100 | 28.6 | 7.71 | .27 | .054 | 5.5 | 7.5 |
| | | 06/23/2009 | 1755 | 100 | 28.1 | 7.53 | .22 | .059 | 5.5 | 7.7 |
| | | 06/24/2009 | 0940 | 100 | 28.8 | 7.69 | -- | -- | 5.2 | 7.1 |
| | | 06/24/2009 | 0945 | 110 | 29.2 | 7.87 | -- | -- | 5.1 | 6.9 |
| 12352500 | Bitterroot River near Missoula | 06/09/2009 | 0800 | 23 | 6.75 | 1.50 | .19 | .027 | .34 | .44 |
| | | 06/09/2009 | 0805 | 23 | 6.73 | 1.50 | .19 | .029 | .36 | .45 |
| 12354500 | Clark Fork at St. Regis | 05/27/2009 | 1430 | 47 | 13.3 | 3.47 | .28 | .100 | 2.5 | 4.6 |
| | | 05/27/2009 | 1440 | 49 | 13.7 | 3.51 | .32 | .105 | 2.5 | 4.7 |

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

[Abbreviations: E, estimated; µg/L, microgram per liter; mg/L, milligram 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) |
|---|---|---|---|---|---|---|---|---|---|---|
| 12323700 | Mill Creek at Opportunity | 08/17/2009 | 1500 | 0.04 | 0.09 | 1.7 | E2.3 | 68 | 134 | 0.14 |
| | | 08/17/2009 | 1505 | <.02 | E.06 | 1.1 | E2.3 | 70 | 129 | .07 |
| 12323750 | Silver Bow Creek at Warm Springs | 07/14/2009 | 0810 | .03 | .11 | 4.1 | 7.3 | 41 | 196 | .16 |
| | | 07/14/2009 | 0815 | .02 | .08 | 4.4 | 7.5 | 41 | 195 | .16 |
| 12323840 | Lost Creek near Anaconda | 04/27/2009 | 1355 | .02 | <.06 | 1.2 | 4.8 | 9 | 158 | E.05 |
| | | 04/27/2009 | 1400 | .02 | <.06 | 1.5 | E3.9 | 7 | 117 | E.04 |
| 12324200 | Clark Fork at Deer Lodge | 05/19/2009 | 1045 | .07 | -- | 12.1 | 101 | 21 | 3,220 | .18 |
| | | 05/19/2009 | 1050 | .08 | .57 | 13.9 | 161 | 22 | 2,600 | .20 |
| 12324400 | Clark Fork above Little Blackfoot, near Garrison | 03/24/2009 | 1155 | .08 | .38 | 9.1 | 59.4 | 18 | 1,090 | .14 |
| | | 03/24/2009 | 1200 | .09 | .28 | 9.4 | 58.5 | 19 | 1,090 | .13 |
| 12324680 | Clark Fork at Goldcreek | 10/21/2008 | 1400 | .03 | .08 | 3.8 | 19.8 | 6 | 300 | -- |
| | | 10/21/2008 | 1405 | .04 | .10 | 3.6 | 16.5 | E4 | 290 | E.06 |
| 12334550 | Clark Fork at Turah Bridge, near Bonner | 05/18/2009 | 0930 | .03 | .13 | 3.5 | 21.9 | 24 | 856 | .11 |
| | | 05/18/2009 | 0940 | .03 | -- | 3.7 | -- | 24 | -- | .11 |
| | | 06/03/2009 | 0745 | .05 | .23 | 8.0 | 41.1 | 41 | 1,020 | .22 |
| | | 06/03/2009 | 0750 | .05 | .21 | 8.0 | 40.2 | 42 | 1,010 | .22 |
| 12334570 | Clark Fork Bypass near Bonner | 06/15/2009 | 1230 | .05 | .19 | 5.3 | 27.9 | 19 | 686 | .10 |
| | | 06/15/2009 | 1235 | .05 | .18 | 5.7 | 30.4 | 21 | 769 | .13 |
| 12340000 | Blackfoot River near Bonner | 05/31/2009 | 1300 | <.02 | <.06 | E.83 | E3.6 | 20 | 1,020 | <.06 |
| | | 05/31/2009 | 1310 | <.02 | <.06 | E.74 | E3.2 | 14 | 957 | <.06 |
| 12340500 | Clark Fork above Missoula | 04/27/2009 | 1600 | .04 | .13 | 3.2 | 20.8 | 27 | 748 | .11 |
| | | 04/27/2009 | 1605 | .02 | .13 | 2.7 | 21.2 | 22 | 751 | .08 |
| | | 06/23/2009 | 1745 | .04 | .11 | 5.2 | 20.9 | 20 | 573 | .10 |
| | | 06/23/2009 | 1755 | .04 | .12 | 5.1 | 23.2 | 19 | 624 | .09 |
| | | 06/24/2009 | 0940 | .04 | .11 | 5.0 | 20.7 | 17 | 480 | .12 |
| | | 06/24/2009 | 0945 | .04 | .15 | 5.2 | 21.6 | 18 | 487 | .12 |
| 12352500 | Bitterroot River near Missoula | 06/09/2009 | 0800 | <.02 | <.06 | E.90 | <4.0 | 56 | 543 | E.06 |
| | | 06/09/2009 | 0805 | <.02 | <.06 | 1.1 | <4.0 | 57 | 530 | E.05 |
| 12354500 | Clark Fork at St. Regis | 05/27/2009 | 1430 | .02 | .15 | 3.9 | 25.0 | 29 | 1,760 | .13 |
| | | 05/27/2009 | 1440 | E.02 | .16 | 3.8 | 25.6 | 29 | 1,700 | .14 |

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

[Abbreviations: E, estimated; µg/L, microgram per liter; mg/L, milligram 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) |
|---|---|---|---|---|---|---|---|---|---|---|
| 12323700 | Mill Creek at Opportunity | 08/17/2009 | 1500 | 0.33 | 6.7 | 10.2 | E1.5 | E1.7 | 77 | 1 |
| | | 08/17/2009 | 1505 | .33 | 2.6 | 10.4 | <2.0 | E1.9 | 79 | 1 |
| 12323750 | Silver Bow Creek at Warm Springs | 07/14/2009 | 0810 | .98 | 32.9 | 60.9 | E1.9 | 6.5 | 81 | 4 |
| | | 07/14/2009 | 0815 | 1.00 | 33.1 | 62.0 | 2.6 | 6.7 | 82 | 5 |
| 12323840 | Lost Creek near Anaconda | 04/27/2009 | 1355 | .63 | .9 | 5.9 | <2.0 | 2.2 | 59 | 6 |
| | | 04/27/2009 | 1400 | .50 | .9 | 4.8 | <2.0 | E1.9 | 56 | 5 |
| 12324200 | Clark Fork at Deer Lodge | 05/19/2009 | 1045 | 13.0 | 33.9 | 192 | 6.5 | -- | 58 | 142 |
| | | 05/19/2009 | 1050 | 23.2 | 36.1 | 284 | 7.2 | 119 | 57 | 146 |
| 12324400 | Clark Fork above Little Blackfoot, near Garrison | 03/24/2009 | 1155 | 7.75 | 34.1 | 148 | 6.8 | 65.1 | 66 | 49 |
| | | 03/24/2009 | 1200 | 7.76 | 34.4 | 136 | 6.8 | 50.7 | 67 | 48 |
| 12324680 | Clark Fork at Goldcreek | 10/21/2008 | 1400 | 2.44 | 10.2 | 81.0 | 2.4 | 17.4 | 84 | 11 |
| | | 10/21/2008 | 1405 | 2.45 | 9.8 | 81.5 | 2.7 | 17.5 | 83 | 10 |
| 12334550 | Clark Fork at Turah Bridge, near Bonner | 05/18/2009 | 0930 | 4.58 | 7.6 | 83.9 | 2.8 | 32.8 | 55 | 59 |
| | | 05/18/2009 | 0940 | -- | 7.5 | -- | 2.8 | -- | 57 | 60 |
| | | 06/03/2009 | 0745 | 6.45 | 18.2 | 121 | 6.9 | 49.8 | 65 | 66 |
| | | 06/03/2009 | 0750 | 6.33 | 18.3 | 111 | 6.8 | 49.0 | 64 | 69 |
| 12334570 | Clark Fork Bypass near Bonner | 06/15/2009 | 1230 | 4.40 | 16.0 | 83.8 | 5.2 | 45.1 | 30 | 70 |
| | | 06/15/2009 | 1235 | 4.80 | 16.0 | 84.8 | 5.5 | 46.2 | 41 | 60 |
| 12340000 | Blackfoot River near Bonner | 05/31/2009 | 1300 | 1.39 | 3.1 | 62.6 | <2.0 | 5.2 | 75 | 99 |
| | | 05/31/2009 | 1310 | 1.35 | 3.2 | 59.8 | <2.0 | 4.8 | 76 | 97 |
| 12340500 | Clark Fork above Missoula | 04/27/2009 | 1600 | 3.52 | 8.8 | 68.9 | -- | 29.9 | 64 | 56 |
| | | 04/27/2009 | 1605 | 3.67 | 8.8 | 70.6 | 4.9 | 31.6 | 60 | 61 |
| | | 06/23/2009 | 1745 | 3.36 | 11.6 | 71.3 | 3.8 | 30.5 | 59 | 40 |
| | | 06/23/2009 | 1755 | 3.39 | 11.6 | 72.0 | 3.2 | 35.5 | 55 | 43 |
| | | 06/24/2009 | 0940 | 3.12 | 9.4 | 58.2 | 3.8 | 26.5 | 51 | 26 |
| | | 06/24/2009 | 0945 | 3.50 | 9.2 | 57.2 | 3.6 | 28.3 | 56 | 29 |
| 12352500 | Bitterroot River near Missoula | 06/09/2009 | 0800 | .60 | 10.4 | 26.9 | E1.1 | 3.0 | 54 | 41 |
| | | 06/09/2009 | 0805 | .61 | 10.6 | 27.2 | E1.4 | 3.2 | 55 | 40 |
| 12354500 | Clark Fork at St. Regis | 05/27/2009 | 1430 | 5.22 | 4.2 | 105 | 2.7 | 45.6 | 41 | 222 |
| | | 05/27/2009 | 1440 | 7.04 | 4.2 | 120 | 3.5 | 46.0 | 44 | 209 |

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

[Abbreviations: µg/L, microgram per liter; mg/L, milligram per liter; mm, millimeter]

| Constituent and reporting unit | Number of replicate pairs | Standard deviation[1] (listed units) | Relative standard deviation (percent) | Within limits[2] of data-quality objective |
|---|---|---|---|---|
| Calcium, filtered, mg/L | 15 | 0.77 | 2.6 | Yes |
| Magnesium, filtered, mg/L | 15 | .08 | 1.1 | Yes |
| Total nitrogen, unfiltered, mg/L | 6 | .03 | 9.0 | Yes |
| Total phosphorous, unfiltered, mg/L | 6 | .00 | 3.8 | Yes |
| Arsenic, filtered, µg/L | 15 | .55 | 6.3 | Yes |
| Arsenic, unfiltered recoverable, µg/L | 13 | .28 | 2.8 | Yes |
| Cadmium, filtered, µg/L | 15 | .01 | 21 | Yes[3] |
| Cadmium, unfiltered recoverable, µg/L | 13 | .02 | 19 | Yes |
| Copper, filtered, µg/L | 15 | .39 | 8.4 | Yes |
| Copper, unfiltered recoverable, µg/L | 14 | 11 | 41 | No[4] |
| Iron, filtered, µg/L | 15 | 1.7 | 6.0 | Yes |
| Iron, unfiltered recoverable, µg/L | 14 | 120 | 15 | Yes |
| Lead, filtered, µg/L | 14 | .02 | 14 | Yes |
| Lead, unfiltered recoverable, µg/L | 14 | 2.0 | 46 | No[4] |
| Manganese, filtered, µg/L | 15 | .86 | 6.2 | Yes |
| Manganese, unfiltered recoverable, µg/L | 14 | 18 | 22 | No[4] |
| Zinc, filtered, µg/L | 14 | .30 | 8.8 | Yes |
| Zinc, unfiltered recoverable, µg/L | 13 | 3.0 | 12 | Yes |
| Sediment, suspended, percent finer than 0.062 mm | 15 | 2.7 | 4.3 | Yes |
| Sediment, suspended, mg/L | 15 | 3.4 | 5.7 | Yes |

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

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

[3]Exceedance of data-quality objective resulted from a statistical artifact of calculating the difference between one replicate sample pair for which one value was twice the laboratory reporting level and one was censored. Because analytical variation, in percent, can be large at very low concentrations, the precision estimate may not be representative of analytical performance at detectable concentrations. When this one replicate pair was excluded, the other 14 replicate pairs had an acceptable relative standard deviation for filtered cadmium of 14 percent.

[4]Exceedance of data-quality objective resulted from a poor comparison between one replicate pair collected on May 19, 2009, at Clark Fork at Deer Lodge during high-flow conditions. When this one replicate pair was excluded, the other thirteen replicate pairs had an acceptable relative standard deviation for unfiltered copper of 5.1 percent, unfiltered lead of 12 percent, and unfiltered manganese of 6.2 percent.

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

[Abbreviations: µg/L, microgram per liter; mg/L, milligram per liter]

| Constituent and reporting unit | Number of replicate pairs | Standard deviation[1] (listed units) | Relative standard deviation, (percent) | Within limits[2] of data-quality objective |
|---|---|---|---|---|
| Calcium, filtered, mg/L | 8 | 0.51 | 1.4 | Yes |
| Magnesium, filtered, mg/L | 8 | .12 | 1.5 | Yes |
| Arsenic, filtered, µg/L | 8 | .53 | 3.9 | Yes |
| Arsenic, unfiltered recoverable, µg/L | 8 | .46 | 2.6 | Yes |
| Cadmium, filtered, µg/L | 8 | .01 | 16 | Yes |
| Cadmium, unfiltered recoverable, µg/L | 8 | .02 | 11 | Yes |
| Copper, filtered, µg/L | 8 | .20 | 3.5 | Yes |
| Copper, unfiltered recoverable, µg/L | 8 | 1.4 | 3.6 | Yes |
| Iron, filtered, µg/L | 8 | .48 | 1.7 | Yes |
| Iron, unfiltered recoverable, µg/L | 8 | 7.3 | .99 | Yes |
| Lead, filtered, µg/L | 8 | .01 | 11 | Yes |
| Lead, unfiltered recoverable, µg/L | 8 | .08 | 1.5 | Yes |
| Manganese, filtered, µg/L | 8 | .14 | .74 | Yes |
| Manganese, unfiltered recoverable, µg/L | 8 | .44 | .47 | Yes |
| Zinc, filtered, µg/L | 8 | .26 | 6.1 | Yes |
| Zinc, unfiltered recoverable, µg/L | 8 | 1.5 | 4.3 | 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, microgram per liter]

| Constituent and reporting unit | Number of samples | 95-percent confidence interval for spike recovery (percent) | Mean spike recovery (percent) | Within limits[1] of data-quality objective |
|---|---|---|---|---|
| Arsenic, filtered, µg/L | 5 | 92.3–110 | 101 | Yes |
| Arsenic, unfiltered recoverable, µg/L | 5 | 94.9–99.1 | 97.0 | Yes |
| Cadmium, filtered, µg/L | 5 | 97.4–107 | 102 | Yes |
| Cadmium, unfiltered recoverable, µg/L | 5 | 93.6–101 | 97.2 | Yes |
| Copper, filtered, µg/L | 5 | 92.0–113 | 102 | Yes |
| Copper, unfiltered recoverable, µg/L | 5 | 94.0–97.0 | 96.0 | Yes |
| Iron, filtered, µg/L | 5 | 91.4–112 | 102 | Yes |
| Iron, unfiltered recoverable, µg/L | 5 | 78.8–130 | 104 | No[2] |
| Lead, filtered, µg/L | 5 | 96.0–107 | 102 | Yes |
| Lead, unfiltered recoverable, µg/L | 5 | 96.1–101 | 98.4 | Yes |
| Manganese, filtered, µg/L | 5 | 103–106 | 105 | Yes |
| Manganese, unfiltered recoverable, µg/L | 5 | 94.6–105 | 99.7 | Yes |
| Zinc, filtered, µg/L | 5 | 104–118 | 111 | Yes |
| Zinc, unfiltered recoverable, µg/L | 5 | 88.5–98.1 | 93.3 | Yes |

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

[2]Exceedance of data quality objective resulted from using a low-concentration spiked solution (20 µg) on a constituent (iron, unfiltered recoverable) with a high laboratory reporting level (+/- 14 µg/L).

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

[Abbreviation: µg/L, microgram per liter]

| Constituent and reporting unit | Number of samples | 95-percent confidence interval for spike recovery (percent) | Mean spike recovery (percent) | Within limits[1] of data-quality objective |
|---|---|---|---|---|
| Arsenic, filtered, µg/L | 5 | 97.7–114 | 106 | Yes |
| Arsenic, unfiltered recoverable, µg/L | 5 | 89.6–111 | 100 | Yes |
| Cadmium, filtered, µg/L | 5 | 101–112 | 106 | Yes |
| Cadmium, unfiltered recoverable, µg/L | 5 | 89.5–99.8 | 94.7 | Yes |
| Copper, filtered, µg/L | 5 | 91.2–101 | 96.2 | Yes |
| Copper, unfiltered recoverable, µg/L | 5 | 87.8–95.0 | 91.4 | Yes |
| Iron, filtered, µg/L | 5 | 89.7–124 | 107 | Yes |
| Iron, unfiltered recoverable, µg/L | 5 | 86.9–118 | 102 | Yes |
| Lead, filtered, µg/L | 5 | 97.0–103 | 100 | Yes |
| Lead, unfiltered recoverable, µg/L | 5 | 98.8–101 | 100 | Yes |
| Manganese, filtered, µg/L | 5 | 88.0–106 | 97.0 | Yes |
| Manganese, unfiltered recoverable, µg/L | 5 | 81.7–104 | 92.8 | Yes |
| Zinc, filtered, µg/L | 5 | 104–124 | 114 | Yes |
| Zinc, unfiltered recoverable, µg/L | 5 | 80.4–99.2 | 89.8 | Yes |

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

**Table 18.** Analyses of field blanks for water samples.

[Abbreviations: E, estimated; µg/L, microgram per liter; µS/cm, microsiemen per centimeter at 25 degrees Celsius; mg/L, milligram 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) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10/20/2008 | 1830 | 5.4 | 2 | E0.01 | <0.012 | -- | -- | <0.06 | <0.20 | <0.02 | <0.06 |
| 03/02/2009 | 1100 | 5.6 | 2 | E.01 | <.012 | <0.10 | <0.008 | <.06 | <.20 | <.02 | <.06 |
| 03/20/2009 | 1400 | 5.5 | 2 | E.01 | <.012 | -- | -- | <.06 | <.20 | <.02 | <.06 |
| 03/26/2009 | 1500 | 6.0 | 2 | E.01 | <.012 | <.10 | <.008 | <.06 | <.20 | <.02 | <.06 |
| 04/15/2009 | 0840 | 6.1 | 1 | <.02 | <.012 | <.10 | <.008 | <.06 | <.20 | <.02 | <.06 |
| 04/29/2009 | 1200 | 5.5 | 2 | <.02 | <.012 | -- | -- | <.06 | <.20 | <.02 | <.06 |
| 05/11/2009 | 1535 | 5.5 | 3 | E.02 | <.012 | <.10 | <.008 | <.06 | <.20 | <.02 | <.06 |
| 05/18/2009 | 2100 | 5.6 | 2 | E.01 | <.012 | -- | -- | <.06 | <.20 | <.02 | <.06 |
| 06/02/2009 | 2100 | 5.4 | 2 | E.01 | <.012 | -- | -- | <.06 | <.20 | <.02 | <.06 |
| 06/23/2009 | 1900 | 5.6 | 2 | E.02 | <.012 | -- | -- | <.06 | <.20 | <.02 | <.06 |
| 07/14/2009 | 1025 | 5.7 | 2 | E.01 | <.012 | -- | -- | <.06 | <.20 | <.02 | <.06 |
| 08/17/2009 | 2200 | 5.6 | 2 | E.01 | <.012 | -- | -- | <.06 | <.20 | <.02 | <.06 |

| Date | Copper, filtered (µg/L) | Copper, unfiltered recoverable (µg/L) | Iron, filtered (µg/L) | Iron, unfiltered recoverable (µg/L) | Lead, filtered (µg/L) | Lead, unfiltered recoverable (µg/L) | Manganese, filtered (µg/L) | Manganese, unfiltered recoverable (µg/L) | Zinc, filtered (µg/L) | Zinc, unfiltered recoverable (µg/L) |
|---|---|---|---|---|---|---|---|---|---|---|
| 10/20/2008 | <1.0 | <4.0 | <4 | <14 | <0.06 | <0.10 | <0.2 | <0.4 | <2.0 | <2.0 |
| 03/02/2009 | <1.0 | <4.0 | <4 | <14 | <.06 | <.10 | <.2 | <.4 | <2.0 | <2.0 |
| 03/20/2009 | <1.0 | <4.0 | <4 | <14 | <.06 | <.10 | <.2 | <.4 | <2.0 | <2.0 |
| 03/26/2009 | <1.0 | <4.0 | <4 | <14 | <.06 | <.10 | <.2 | <.4 | <2.0 | <2.0 |
| 04/15/2009 | <1.0 | <4.0 | <4 | <14 | <.06 | <.10 | <.2 | <.4 | <2.0 | <2.0 |
| 04/29/2009 | <1.0 | <4.0 | <4 | <14 | <.06 | <.10 | <.2 | <.4 | <2.0 | <2.0 |
| 05/11/2009 | <1.0 | <4.0 | <4 | <14 | <.06 | .16 | <.2 | E.3 | <2.0 | 2.7 |
| 05/18/2009 | <1.0 | <4.0 | <4 | <14 | <.06 | <.10 | <.2 | <.4 | <2.0 | <2.0 |
| 06/02/2009 | <1.0 | <4.0 | <4 | E13 | <.06 | <.10 | <.2 | <.4 | <2.0 | <2.0 |
| 06/23/2009 | <1.0 | <4.0 | <4 | <14 | <.06 | <.10 | <.2 | <.4 | <2.0 | <2.0 |
| 07/14/2009 | <1.0 | <4.0 | <4 | <14 | <.06 | <.10 | <.2 | <.4 | <2.0 | <2.0 |
| 08/17/2009 | <1.0 | <4.0 | <4 | <14 | <.06 | <.10 | <.2 | <.4 | <2.0 | <2.0 |

**Table 19.** Bed-sediment data for the upper Clark Fork basin, Montana, August 2009.

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

| Site number (fig. 1) | Site name | Number of composite samples | Concentration (µg/g) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Arsenic | Cadmium | Chromium | Copper | Iron | Lead | Manganese | Nickel | Zinc |
| 12323600 | Silver Bow Creek at Opportunity | 3 | 59 | 7.5 | 50.0 | 1,040 | 32,700 | 267 | 1,730 | 13.5 | 2,130 |
| 12323750 | Silver Bow Creek at Warm Springs | 3 | 87 | 5.2 | 41.4 | 306 | 27,000 | 70 | 3,640 | 15.8 | 554 |
| 12323800 | Clark Fork near Galen | 3 | 86 | 4.2 | 44.6 | 1,080 | 29,200 | 106 | 4,900 | 21.0 | 819 |
| 461415112450801 | Clark Fork below Lost Creek, near Galen | 3 | 95 | 5.2 | 42.4 | 1,410 | 29,600 | 136 | 3,470 | 17.5 | 1,060 |
| 461559112443301 | Clark Fork at county bridge, near Racetrack | 3 | 96 | 5.9 | 45.2 | 1,480 | 31,700 | 148 | 2,720 | 16.5 | 1,180 |
| 461903112440701 | Clark Fork at Dempsey Creek diversion, near Racetrack | 3 | 100 | 5.0 | 39.2 | 1,330 | 30,400 | 137 | 3,080 | 14.2 | 1,080 |
| 12324200 | Clark Fork at Deer Lodge | 3 | 102 | 4.7 | 50.7 | 1,270 | 33,400 | 142 | 2,680 | 16.8 | 1,050 |
| 12324400 | Clark Fork above Little Blackfoot River, near Garrison | 3 | 83 | 5.5 | 52.8 | 1,270 | 32,400 | 140 | 2,950 | 17.2 | 1,240 |
| 12324680 | Clark Fork at Goldcreek | 3 | 61 | 4.2 | 55.3 | 958 | 32,100 | 124 | 1,860 | 17.5 | 985 |
| 12331800 | Clark Fork near Drummond | 3 | 66 | 3.1 | 41.9 | 443 | 43,700 | 92 | 1,800 | 13.7 | 794 |
| 12334550 | Clark Fork at Turah Bridge, near Bonner | 3 | 43 | 2.8 | 42.5 | 363 | 25,900 | 74 | 2,340 | 14.8 | 722 |
| 12340000 | Blackfoot River near Bonner | 3 | <.2 | .1 | 35.2 | 21 | 20,800 | 10 | 667 | 12.3 | 70 |
| 12340500 | Clark Fork above Missoula | 3 | 33 | 2.8 | 40.7 | 421 | 24,900 | 65 | 1,410 | 15.0 | 846 |

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

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

| Constituent | Number of analyses | Dilution ratio | Certified concentration (µg/g) | Mean SRM recovery (percent) | 95-percent confidence interval for SRM recovery (percent) |
|---|---|---|---|---|---|
| | | | SRM sample 2709 | | |
| Arsenic | 10 | 1:10 | 17.7 | 36.5 | 35.8–37.2 |
| Cadmium | 10 | 1:10 | .4 | 91.7 | 88.3–95.1 |
| Chromium | 10 | 1:10 | 130 | 90.5 | 84.6–96.4 |
| Copper | 10 | 1:10 | 35 | 89.6 | 82.5–96.6 |
| Iron | 10 | 1:10 | 35,000 | 103.5 | 98.3–109 |
| Lead | 10 | 1:10 | 19 | 51.0 | 49.8–52.2 |
| Manganese | 10 | 1:10 | 538 | 106.1 | 101–111 |
| Nickel | 10 | 1:10 | 88 | 91.5 | 88.5–94.4 |
| Zinc | 10 | 1:10 | 106 | 99.6 | 95.8–104 |
| | | | SRM sample 2711 | | |
| Arsenic | 10 | 1:10 | 105 | 86.5 | 83.5–89.5 |
| Cadmium | 10 | 1:10 | 41.7 | 99.6 | 96.2–103 |
| Chromium | 10 | 1:10 | 47 | 100.3 | 94.9–106 |
| Copper | 10 | 1:10 | 114 | 107.5 | 104–111 |
| Iron | 10 | 1:10 | 28,900 | 98.3 | 94.5–102 |
| Lead | 10 | 1:10 | 1,160 | 98.1 | 95.0–101 |
| Manganese | 10 | 1:10 | 638 | 96.4 | 92.9–99.8 |
| Nickel | 10 | 1:10 | 20.6 | 84.9 | 82.0–87.8 |
| Zinc | 10 | 1:10 | 350 | 98.7 | 95.2–102 |

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

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

| Site number (fig. 1) | Site name | Dilution ratio | Trace-element concentration (µg/mL) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Arsenic | Cadmium | Chromium | Copper | Iron | Lead | Manganese | Nickel | Zinc |
| 12323600 | Silver Bow Creek at Opportunity | 1:10 | <0.002 | <0.0002 | <0.04 | <0.03 | <0.04 | <0.002 | <0.009 | <0.0004 | <0.005 |
| 12323750 | Silver Bow Creek at Warm Springs | 1:10 | <.002 | <.0002 | <.04 | <.03 | <.04 | <.002 | <.009 | <.0004 | <.005 |
| 12323800 | Clark Fork near Galen | 1:10 | <.002 | <.0002 | <.04 | <.03 | <.04 | <.002 | <.009 | <.0004 | <.005 |
| 461415112450801 | Clark Fork below Lost Creek, near Galen | 1:10 | <.002 | <.0002 | <.04 | <.03 | <.04 | <.002 | <.009 | <.0004 | <.005 |
| 461559112443301 | Clark Fork at county bridge, near Racetrack | 1:10 | <.002 | <.0002 | <.04 | <.03 | <.04 | <.002 | <.009 | <.0004 | <.005 |
| 461903112440701 | Clark Fork at Dempsey Creek diversion, near Racetrack | 1:10 | <.002 | <.0002 | <.04 | <.03 | <.04 | <.002 | <.009 | <.0004 | <.005 |
| 12324200 | Clark Fork at Deer Lodge | 1:10 | <.002 | <.0002 | <.04 | <.03 | <.04 | <.002 | <.009 | <.0004 | <.005 |
| 12324400 | Clark Fork above Little Blackfoot River, near Garrison | 1:10 | <.002 | <.0002 | <.04 | <.03 | <.04 | <.002 | <.009 | <.0004 | <.005 |
| 12324680 | Clark Fork at Goldcreek | 1:10 | <.002 | <.0002 | <.04 | <.03 | <.04 | <.002 | <.009 | <.0004 | <.005 |
| 12331800 | Clark Fork near Drummond | 1:10 | <.002 | <.0002 | <.04 | <.03 | <.04 | <.002 | <.009 | <.0004 | <.005 |
| 12334550 | Clark Fork at Turah Bridge, near Bonner | 1:10 | <.002 | <.0002 | <.04 | <.03 | <.04 | <.002 | <.009 | <.0004 | <.005 |
| 12340000 | Blackfoot River near Bonner | 1:10 | <.002 | <.0002 | <.04 | <.03 | <.04 | <.002 | <.009 | <.0004 | <.005 |
| 12340500 | Clark Fork above Missoula | 1:10 | <.002 | <.0002 | <.04 | <.03 | <.04 | <.002 | <.009 | <.0004 | <.005 |

**Table 22.** Biological data for the upper Clark Fork basin, Montana, August 2009.

[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, microgram per gram of dry sample weight; spp., species. Symbol: <, less than minimum reporting level for solid-phase concentration, in µg/g]

| Taxon | Number of composite samples | Concentration (µg/g) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Arsenic | Cadmium | Chromium | Copper | Iron | Lead | Manganese | Nickel | Zinc |
| **12323600--Silver Bow Creek at Opportunity** | | | | | | | | | | |
| *Hydropsyche cockerelli* | 2 | 25.9 | 4.4 | 4.3 | 358 | 5,160 | 55.9 | 1,180 | 3.2 | 786 |
| *Hydropsyche* spp. | 1 | 9.8 | 3.0 | 3.5 | 223 | 2,230 | 27.2 | 1,080 | 2.1 | 607 |
| **12323750--Silver Bow Creek at Warm Springs** | | | | | | | | | | |
| *Claassenia sabulosa* | 1 | 1.8 | 1.1 | 2.8 | 47.6 | 151 | 0.6 | 98.1 | 0.5 | 400 |
| *Hydropsyche cockerelli* | 2 | 9.3 | .4 | 1.0 | 24.4 | 851 | 2.9 | 738 | .8 | 169 |
| *Hydropsyche occidentalis* | 1 | 18.0 | .6 | 2.0 | 33.2 | 1,380 | 5.1 | 1,750 | 1.3 | 191 |
| *Hydropsyche* spp. | 1 | 14.0 | .5 | 2.5 | 35.9 | 1,100 | 4.2 | 1,190 | 1.0 | 159 |
| **12323800--Clark Fork near Galen** | | | | | | | | | | |
| *Hydropsyche occidentalis* | 3 | 16.7 | 1.3 | 2.1 | 144 | 2,440 | 11.9 | 1,860 | 3.2 | 225 |
| *Hydropsyche* spp. | 1 | 14.2 | 1.3 | 1.9 | 126 | 2,110 | 10.6 | 1,520 | 2.7 | 197 |
| **461415112450801--Clark Fork below Lost Creek, near Galen** | | | | | | | | | | |
| *Hydropsyche occidentalis* | 1 | 20.9 | 1.5 | 2.5 | 208 | 2,760 | 17.3 | 1,820 | 3.0 | 277 |
| *Hydropsyche* spp. | 1 | 14.5 | 1.3 | .9 | 153 | 1,810 | 13.2 | 1,380 | 2.3 | 228 |
| **461559112443301--Clark Fork at county bridge, near Racetrack** | | | | | | | | | | |
| *Hydropsyche occidentalis* | 2 | 15.5 | 2.0 | 2.8 | 161 | 2,060 | 15.4 | 1,680 | 2.3 | 269 |
| *Hydropsyche* spp. | 1 | 12.8 | 1.6 | 3.9 | 144 | 1,610 | 13.4 | 1,400 | 2.0 | 228 |
| **461903112440701--Clark Fork at Dempsey Creek diversion, near Racetrack** | | | | | | | | | | |
| *Arctopsyche grandis* | 1 | 11.8 | 7.1 | 12.9 | 151 | 1,500 | 12.4 | 1,190 | 2.3 | 489 |
| *Claassenia sabulosa* | 1 | 3.1 | 2.4 | 1.7 | 73.4 | 297 | 1.9 | 115 | .4 | 330 |
| *Hydropsyche cockerelli* | 1 | 18.0 | 2.0 | 3.7 | 247 | 3,010 | 21.9 | 1,120 | 2.5 | 279 |
| *Hydropsyche occidentalis* | 2 | 16.5 | 1.6 | 2.0 | 186 | 2,300 | 17.7 | 1,650 | 2.0 | 260 |
| **12324200--Clark Fork at Deer Lodge** | | | | | | | | | | |
| *Arctopsyche grandis* | 1 | 8.3 | 3.1 | 4.7 | 90.5 | 844 | 9.5 | 1,010 | 1.1 | 315 |
| *Hydropsyche occidentalis* | 3 | 12.1 | 2.0 | 2.0 | 149 | 1,890 | 15.8 | 1,350 | 1.6 | 235 |
| **12324400--Clark Fork above Little Blackfoot River, near Garrison** | | | | | | | | | | |
| *Arctopsyche grandis* | 1 | 6.0 | 3.2 | 1.9 | 65.7 | 694 | 6.6 | 990 | 0.7 | 253 |
| *Hydropsyche cockerelli* | 1 | 11.1 | 4.0 | 3.4 | 158 | 2,150 | 18.8 | 1,500 | 1.7 | 284 |
| *Hydropsyche occidentalis* | 2 | 12.9 | 2.5 | 1.3 | 141 | 1,940 | 17.6 | 1,580 | 1.7 | 265 |

**Table 22.** Biological data for the upper Clark Fork basin, Montana, August 2009.—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, microgram per gram of dry sample weight; spp., species. Symbol: <, less than minimum reporting level for solid-phase concentration, in µg/g]

| Taxon | Number of composite samples | Concentration (µg/g) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Arsenic | Cadmium | Chromium | Copper | Iron | Lead | Manganese | Nickel | Zinc |
| **12324680--Clark Fork at Goldcreek** | | | | | | | | | | |
| *Arctopsyche grandis* | 3 | 6.1 | 2.7 | 1.4 | 66.4 | 1,140 | 6.2 | 1,060 | 1.1 | 244 |
| *Claassenia sabulosa* | 3 | 1.3 | 1.5 | .4 | 65.8 | 183 | .8 | 138 | .3 | 254 |
| *Hydropsyche cockerelli* | 1 | 9.8 | 2.4 | 3.3 | 133 | 2,240 | 13.7 | 1,200 | 1.9 | 248 |
| *Hydropsyche occidentalis* | 2 | 7.8 | 1.7 | 2.9 | 98.9 | 1,790 | 10.3 | 1,330 | 1.6 | 222 |
| **12331800--Clark Fork near Drummond** | | | | | | | | | | |
| *Arctopsyche grandis* | 3 | 5.0 | 1.9 | 2.3 | 39.6 | 1,070 | 7.7 | 924 | 0.8 | 246 |
| *Claassenia sabulosa* | 2 | 1.1 | 1.4 | .5 | 57.9 | 248 | 1.1 | 122 | .3 | 276 |
| *Hydropsyche cockerelli* | 2 | 6.9 | 1.2 | 1.5 | 62.4 | 1,770 | 12.9 | 999 | 1.3 | 209 |
| *Hydropsyche occidentalis* | 1 | 6.0 | 1.3 | 3.2 | 54.7 | 1,660 | 12.0 | 1,110 | 1.3 | 222 |
| **12334550--Clark Fork at Turah Bridge, near Bonner** | | | | | | | | | | |
| *Arctopsyche grandis* | 3 | 5.3 | 1.6 | 1.2 | 39.7 | 1,130 | 6.1 | 727 | 1.1 | 214 |
| *Claassenia sabulosa* | 2 | 1.1 | 2.3 | .4 | 78.3 | 268 | 1.1 | 176 | .3 | 234 |
| *Hydropsyche cockerelli* | 2 | 5.8 | 1.2 | 2.2 | 59.2 | 1,730 | 8.8 | 814 | 1.6 | 202 |
| *Hydropsyche occidentalis* | 2 | 5.6 | 1.5 | 3.5 | 59.1 | 1,720 | 9.7 | 1,040 | 1.6 | 234 |
| **12340000--Blackfoot River near Bonner** | | | | | | | | | | |
| *Arctopsyche grandis* | 1 | 1.6 | 0.3 | 0.5 | 13.2 | 761 | 0.9 | 528 | 1.3 | 156 |
| *Claassenia sabulosa* | 2 | .5 | .2 | <1.6 | 44.7 | 180 | .2 | 114 | .3 | 236 |
| *Hydropsyche cockerelli* | 1 | 3.1 | .3 | 2.4 | 14.3 | 2,390 | 2.3 | 615 | 2.5 | 148 |
| *Hydropsyche occidentalis* | 2 | 2.2 | .3 | 2.2 | 17.4 | 2,010 | 1.8 | 686 | 2.0 | 150 |
| **12340500--Clark Fork above Missoula** | | | | | | | | | | |
| *Arctopsyche grandis* | 3 | 6.1 | 2.0 | 2.8 | 67.5 | 1,780 | 7.6 | 833 | 1.7 | 246 |
| *Claassenia sabulosa* | 1 | .5 | 1.5 | <2.9 | 52.0 | 189 | .7 | 57.8 | .3 | 295 |
| *Hydropsyche cockerelli* | 2 | 8.7 | 1.4 | 3.4 | 99.3 | 2,810 | 11.6 | 939 | 2.4 | 258 |
| *Hydropsyche occidentalis* | 1 | 7.4 | 1.4 | 3.0 | 80.7 | 2,470 | 11.4 | 1,180 | 2.1 | 271 |

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

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

| Constituent | Number of analyses | Certified concentration (µg/g) | Mean SRM recovery (percent) | 95-percent confidence interval for SRM recovery (percent) |
|---|---|---|---|---|
| | | SRM sample TORT-2 | | |
| Arsenic | 12 | 21.6 | 99.4 | 98.7–100 |
| Cadmium | 12 | 26.7 | 96.0 | 94.6–96.5 |
| Chromium | 12 | .77 | 120 | 92.2–148 |
| Copper | 12 | 106 | 103 | 102–103 |
| Iron | 12 | 105 | 102 | 99.2–105 |
| Lead | 12 | .35 | 116 | 106–127 |
| Manganese | 12 | 13.6 | 102 | 100–104 |
| Nickel | 12 | 2.5 | 95.1 | 93.9–96.3 |
| Zinc | 12 | 180 | 105 | 104–106 |

**Table 24.** Analyses of procedural blanks for biota samples.

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

| Site number (fig. 1) | Site name | Dilution ratio | Trace-element concentration (µg/mL) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Arsenic | Cadmium | Chromium | Copper | Iron | Lead | Manganese | Nickel | Zinc |
| 12323600 | Silver Bow Creek at Opportunity | 1:1 | <0.001 | <0.0003 | <0.023 | <0.034 | <0.06 | <0.006 | <0.001 | <0.001 | <0.001 |
| 12323750 | Silver Bow Creek at Warm Springs | 1:1 | <.001 | <.0003 | <.023 | <.034 | <.06 | <.006 | <.001 | <.001 | <.001 |
| 12323800 | Clark Fork near Galen | 1:1 | <.001 | <.0003 | <.023 | <.034 | <.06 | <.006 | <.001 | <.001 | <.001 |
| 461415112450801 | Clark Fork below Lost Creek, near Galen | 1:1 | <.001 | <.0003 | <.023 | <.034 | <.06 | <.006 | <.001 | <.001 | <.001 |
| 461559112443301 | Clark Fork at county bridge, near Racetrack | 1:1 | <.001 | <.0003 | <.023 | <.034 | <.06 | <.006 | <.001 | <.001 | <.001 |
| 461903112440701 | Clark Fork at Dempsey Creek diversion, near Racetrack | 1:1 | <.001 | <.0003 | <.023 | <.034 | <.06 | <.006 | <.001 | <.001 | <.001 |
| 12324200 | Clark Fork at Deer Lodge | 1:1 | <.001 | <.0003 | <.023 | <.034 | <.06 | <.006 | <.001 | <.001 | <.001 |
| 12324400 | Clark Fork above Little Blackfoot River, near Garrison | 1:1 | <.001 | <.0003 | <.023 | <.034 | <.06 | <.006 | <.001 | <.001 | <.001 |
| 12324680 | Clark Fork at Goldcreek | 1:1 | <.001 | <.0003 | <.023 | <.034 | <.06 | <.006 | <.001 | <.001 | <.001 |
| 12331800 | Clark Fork near Drummond | 1:1 | <.001 | <.0003 | <.023 | <.034 | <.06 | <.006 | <.001 | <.001 | <.001 |
| 12334550 | Clark Fork at Turah Bridge, near Bonner | 1:1 | <.001 | <.0003 | <.023 | <.034 | <.06 | <.006 | <.001 | <.001 | <.001 |
| 12340000 | Blackfoot River near Bonner | 1:1 | <.001 | <.0003 | <.023 | <.034 | <.06 | <.006 | <.001 | <.001 | <.001 |
| 12340500 | Clark Fork above Missoula | 1:1 | <.001 | <.0003 | <.023 | <.034 | <.06 | <.006 | <.001 | <.001 | <.001 |

**Table 25.** Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2009.

[Abbreviations: $ft^3/s$, cubic feet per second; °C, degrees Celsius; µg/L, microgram per liter; µS/cm, microsiemen per centimeter at 25°C; mg/L, milligram per liter; mm, millimeter; ton/d, ton per day. Symbols: <, less than laboratory reporting level[1]]

| Property or constituent and reporting unit | Number of samples | Maximum | Minimum | Mean | Median |
|---|---|---|---|---|---|
| **12323230--Blacktail Creek at Harrison Avenue, at Butte** | | | | | |
| **Period of record for water-quality data: March 1993–August 1995, December 1996–August 2003, December 2004–September 2009** | | | | | |
| Streamflow, instantaneous ($ft^3/s$) | 123 | 156 | 1.9 | 14 | 8.4 |
| pH, onsite (standard units) | 123 | 8.4 | 7.3 | 7.8 | 7.8 |
| Specific conductance, onsite (µS/cm) | 123 | 412 | 116 | 264 | 262 |
| Temperature, water (°C) | 123 | 17.5 | 1.5 | 8.2 | 8.5 |
| Hardness, filtered (mg/L as $CaCO_3$) | 123 | 150 | 38 | 104 | 110 |
| Calcium, filtered (mg/L) | 123 | 41.8 | 10.6 | 29.7 | 30.4 |
| Magnesium, filtered (mg/L) | 123 | 11.0 | 2.71 | 7.21 | 7.29 |
| Arsenic, filtered (µg/L) | 122 | 13 | 1 | 4.0 | 3.0 |
| Arsenic, unfiltered recoverable (µg/L) | 123 | 18 | 1 | [2]5.4 | 4.4 |
| Cadmium, filtered (µg/L) | 121 | .5 | <.04 | [2].05 | <.1 |
| Cadmium, unfiltered recoverable (µg/L) | 123 | .11 | <.01 | [2].04 | <1 |
| Copper, filtered (µg/L) | 122 | 10.0 | <1.0 | [2]3.7 | 3.2 |
| Copper, unfiltered recoverable (µg/L) | 123 | 52.0 | 1.5 | 6.8 | 5.5 |
| Iron, filtered (µg/L) | 123 | 640 | 15 | 178 | 160 |
| Iron, unfiltered recoverable (µg/L) | 123 | 4,220 | 139 | 662 | 555 |
| Lead, filtered (µg/L) | 123 | 2.80 | <.08 | [2].20 | <1.00 |
| Lead, unfiltered recoverable (µg/L) | 123 | 47.0 | <1.00 | [2]1.89 | .67 |
| Manganese, filtered (µg/L) | 123 | 144 | 14.2 | 40.9 | 37.5 |
| Manganese, unfiltered recoverable (µg/L) | 123 | 240 | 23.5 | 57.5 | 50.1 |
| Zinc, filtered (µg/L) | 122 | 11 | <1.0 | [2]3.5 | 2.8 |
| Zinc, unfiltered recoverable (µg/L) | 123 | 130 | <10 | [2]8.7 | 4 |
| Sediment, suspended (percent finer than 0.062 mm) | 123 | 97 | 50 | 82 | 83 |
| Sediment, suspended concentration (mg/L) | 123 | 139 | 1 | 12 | 7 |
| Sediment, suspended discharge (ton/d) | 123 | 59 | .01 | 1.1 | .16 |

**Table 25.** Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2009.—Continued

[Abbreviations: $ft^3/s$, cubic feet per second; °C, degrees Celsius; µg/L, microgram per liter; µS/cm, microsiemen per centimeter at 25°C; mg/L, milligram per liter; mm, millimeter; ton/d, ton per day. Symbols: <, less than laboratory reporting level[1]]

| Property or constituent and reporting unit | Number of samples | Maximum | Minimum | Mean | Median |
|---|---|---|---|---|---|
| **12323250--Silver Bow Creek below Blacktail Creek, at Butte<br>Period of record for water-quality data: March 1993–August 1995, December 1996–September 2009** | | | | | |
| Streamflow, instantaneous ($ft^3/s$) | 131 | 134 | 13 | 29 | 24 |
| pH, onsite (standard units) | 131 | 8.1 | 7.2 | 7.6 | 7.6 |
| Specific conductance, onsite (µS/cm) | 131 | 691 | 226 | 467 | 478 |
| Temperature, water (°C) | 131 | 20.0 | 1.0 | 10.4 | 9.5 |
| Hardness, filtered (mg/L as $CaCO_3$) | 131 | 220 | 66 | 148 | 150 |
| Calcium, filtered (mg/L) | 131 | 62.7 | 19.0 | 42.3 | 43.5 |
| Magnesium, filtered (mg/L) | 131 | 14.6 | 4.51 | 10.4 | 10.8 |
| Arsenic, filtered (µg/L) | 131 | 13 | 2.3 | 6.3 | 6.0 |
| Arsenic, unfiltered recoverable (µg/L) | 131 | 45 | 3 | 10.6 | 9.0 |
| Cadmium, filtered (µg/L) | 131 | 6.2 | .05 | 1.06 | .80 |
| Cadmium, unfiltered recoverable (µg/L) | 131 | 6.0 | .09 | 1.43 | 1.10 |
| Copper, filtered (µg/L) | 131 | 303 | 3.2 | 35.5 | 14.1 |
| Copper, unfiltered recoverable (µg/L) | 131 | 550 | 9.5 | 81.8 | 32.3 |
| Iron, filtered (µg/L) | 131 | 270 | 10 | 89.2 | 65.0 |
| Iron, unfiltered recoverable (µg/L) | 131 | 7,400 | 85 | 866 | 573 |
| Lead, filtered (µg/L) | 131 | 2.4 | <.5 | [2].47 | .23 |
| Lead, unfiltered recoverable (µg/L) | 131 | 250 | .64 | 12.6 | 3.32 |
| Manganese, filtered (µg/L) | 131 | 1,700 | 21.4 | 347 | 270 |
| Manganese, unfiltered recoverable (µg/L) | 131 | 1,600 | 25.9 | 390 | 326 |
| Zinc, filtered (µg/L) | 131 | 2,200 | 16.0 | 346 | 240 |
| Zinc, unfiltered recoverable (µg/L) | 131 | 2,200 | 28.8 | 418 | 265 |
| Sediment, suspended (percent finer than 0.062 mm) | 130 | 98 | 42 | 84 | 86 |
| Sediment, suspended concentration (mg/L) | 130 | 405 | 2 | 22 | 10 |
| Sediment, suspended discharge (ton/d) | 130 | 70 | .08 | 2.6 | .68 |

**Table 25.** Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2009.—Continued

[Abbreviations: $ft^3/s$, cubic feet per second; °C, degrees Celsius; µg/L, microgram per liter; µS/cm, microsiemen per centimeter at 25°C; mg/L, milligram per liter; mm, millimeter; ton/d, ton per day. Symbols: <, less than laboratory reporting level[1]]

| Property or constituent and reporting unit | Number of samples | Maximum | Minimum | Mean | Median |
|---|---|---|---|---|---|
| **12323600--Silver Bow Creek at Opportunity** | | | | | |
| **Period of record for water-quality data: March 1993–August 1995, December 1996–September 2009** | | | | | |
| Streamflow, instantaneous ($ft^3/s$) | 134 | 361 | 13 | 74 | 51 |
| pH, onsite (standard units) | 133 | 9.5 | 7.2 | 8.4 | 8.3 |
| Specific conductance, onsite (µS/cm) | 133 | 633 | 202 | 415 | 400 |
| Temperature, water (°C) | 133 | 22.5 | 0.0 | 9.4 | 9.5 |
| Hardness, filtered (mg/L as $CaCO_3$) | 133 | 240 | 60 | 149 | 140 |
| Calcium, filtered (mg/L) | 133 | 71.6 | 18.5 | 44.0 | 43.0 |
| Magnesium, filtered (mg/L) | 133 | 15.0 | 3.42 | 9.41 | 9.01 |
| Arsenic, filtered (µg/L) | 133 | 34 | 1 | 11.1 | 10.3 |
| Arsenic, unfiltered recoverable (µg/L) | 133 | 235 | 9.5 | 25.6 | 17.0 |
| Cadmium, filtered (µg/L) | 132 | 41.0 | <.1 | [2]1.14 | .70 |
| Cadmium, unfiltered recoverable (µg/L) | 133 | 49.0 | .38 | [2]2.04 | 1.29 |
| Copper, filtered (µg/L) | 132 | 450 | 13.7 | 45.3 | 35.0 |
| Copper, unfiltered recoverable (µg/L) | 133 | 3,900 | 31.1 | 201 | 102 |
| Iron, filtered (µg/L) | 133 | 307 | <3 | [2]47 | 26 |
| Iron, unfiltered recoverable (µg/L) | 132 | 24,100 | 240 | 1,490 | 780 |
| Lead, filtered (µg/L) | 133 | 5.1 | <.5 | [2].72 | .33 |
| Lead, unfiltered recoverable (µg/L) | 133 | 650 | 5.38 | 37.0 | 15.0 |
| Manganese, filtered (µg/L) | 133 | 9,300 | 49.7 | 428 | 343 |
| Manganese, unfiltered recoverable (µg/L) | 133 | 10,000 | 110 | 545 | 430 |
| Zinc, filtered (µg/L) | 132 | 13,000 | 11.2 | 296 | 152 |
| Zinc, unfiltered recoverable (µg/L) | 133 | 15,000 | 69.7 | 516 | 301 |
| Sediment, suspended (percent finer than 0.062 mm) | 134 | 95 | 37 | 79 | 83 |
| Sediment, suspended concentration (mg/L) | 134 | 801 | 5 | 47 | 18 |
| Sediment, suspended discharge (ton/d) | 134 | 781 | .18 | 19 | 2.4 |

**Table 25.** Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2009.—Continued

[Abbreviations: $ft^3/s$, cubic feet per second; °C, degrees Celsius; µg/L, microgram per liter; µS/cm, microsiemen per centimeter at 25°C; mg/L, milligram per liter; mm, millimeter; ton/d, ton per day. Symbols: <, less than laboratory reporting level[1]]

| Property or constituent and reporting unit | Number of samples | Maximum | Minimum | Mean | Median |
|---|---|---|---|---|---|
| **12323670--Mill Creek near Anaconda<br>Period of record for water-quality data: December 2004–September 2009** | | | | | |
| Streamflow, instantaneous ($ft^3/s$) | 40 | 213 | 7.4 | 60 | 26 |
| pH, onsite (standard units) | 40 | 8.6 | 7.7 | 8.1 | 8.1 |
| Specific conductance, onsite (µS/cm) | 40 | 203 | 56 | 131 | 133 |
| Temperature, water (°C) | 40 | 17.0 | 0.0 | 8.3 | 8.0 |
| Hardness, filtered (mg/L as $CaCO_3$) | 40 | 98 | 24 | 57 | 60 |
| Calcium, filtered (mg/L) | 40 | 25.9 | 7.00 | 15.7 | 16.8 |
| Magnesium, filtered (mg/L) | 40 | 8.01 | 1.45 | 4.28 | 4.22 |
| Arsenic, filtered (µg/L) | 40 | 32.9 | 7.3 | 17.2 | 16.1 |
| Arsenic, unfiltered recoverable (µg/L) | 40 | 34.8 | 9.0 | 18.8 | 17.6 |
| Cadmium, filtered (µg/L) | 39 | .11 | <.04 | [2].05 | .04 |
| Cadmium, unfiltered recoverable (µg/L) | 40 | .19 | .04 | .08 | .07 |
| Copper, filtered (µg/L) | 40 | 5.1 | .79 | 2.4 | 2.2 |
| Copper, unfiltered recoverable (µg/L) | 40 | 10.6 | 1.3 | 4.1 | 3.6 |
| Iron, filtered (µg/L) | 40 | 125 | 21 | 50 | 42 |
| Iron, unfiltered recoverable (µg/L) | 40 | 619 | 89 | 198 | 164 |
| Lead, filtered (µg/L) | 40 | .24 | <.08 | [2].13 | .11 |
| Lead, unfiltered recoverable (µg/L) | 40 | 3.12 | .19 | .79 | .59 |
| Manganese, filtered (µg/L) | 40 | 11 | 3.4 | 5.9 | 6.0 |
| Manganese, unfiltered recoverable (µg/L) | 40 | 36.6 | 7.4 | 14.4 | 12.6 |
| Zinc, filtered (µg/L) | 40 | 4.0 | .73 | 1.5 | 1.4 |
| Zinc, unfiltered recoverable (µg/L) | 40 | 9.2 | 1.0 | 3.0 | 2.6 |
| Sediment, suspended (percent finer than 0.062 mm) | 40 | 81 | 28 | 64 | 68 |
| Sediment, suspended concentration (mg/L) | 40 | 29 | 1 | 6 | 3 |
| Sediment, suspended discharge (ton/d) | 40 | 13 | .02 | 1.8 | .17 |

**Table 25.** Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2009.—Continued

[Abbreviations: $ft^3/s$, cubic feet per second; °C, degrees Celsius; µg/L, microgram per liter; µS/cm, microsiemen per centimeter at 25°C; mg/L, milligram per liter; mm, millimeter; ton/d, ton per day. Symbols: <, less than laboratory reporting level[1]]

| Property or constituent and reporting unit | Number of samples | Maximum | Minimum | Mean | Median |
|---|---|---|---|---|---|
| **12323700--Mill Creek at Opportunity<br>Period of record for water-quality data: March 2003–September 2009** | | | | | |
| Streamflow, instantaneous ($ft^3/s$) | 56 | 261 | 0.43 | 36 | 8.8 |
| pH, onsite (standard units) | 56 | 8.2 | 7.7 | 8.0 | 8.0 |
| Specific conductance, onsite (µS/cm) | 56 | 230 | 59 | 147 | 153 |
| Temperature, water (°C) | 56 | 20.0 | 0.0 | 9.6 | 9.5 |
| Hardness, filtered (mg/L as $CaCO_3$) | 56 | 100 | 24 | 63 | 67 |
| Calcium, filtered (mg/L) | 56 | 28.0 | 7.01 | 17.5 | 18.8 |
| Magnesium, filtered (mg/L) | 56 | 7.83 | 1.56 | 4.56 | 4.67 |
| Arsenic, filtered (µg/L) | 56 | 55.1 | 9.0 | 23.6 | 23.0 |
| Arsenic, unfiltered recoverable (µg/L) | 56 | 53.5 | 10 | 27.0 | 27.1 |
| Cadmium, filtered (µg/L) | 56 | .13 | .02 | .06 | .07 |
| Cadmium, unfiltered recoverable (µg/L) | 56 | .85 | .04 | .15 | .10 |
| Copper, filtered (µg/L) | 56 | 6.1 | 1.1 | 3.1 | 2.8 |
| Copper, unfiltered recoverable (µg/L) | 56 | 38.8 | 1.5 | 7.0 | 4.6 |
| Iron, filtered (µg/L) | 56 | 94 | 16 | 50 | 45 |
| Iron, unfiltered recoverable (µg/L) | 56 | 1,960 | 44 | 300 | 145 |
| Lead, filtered (µg/L) | 56 | .32 | <.08 | [2].14 | .14 |
| Lead, unfiltered recoverable (µg/L) | 56 | 12.7 | .07 | 1.51 | .44 |
| Manganese, filtered (µg/L) | 56 | 32.8 | 2.2 | 8.0 | 6.0 |
| Manganese, unfiltered recoverable (µg/L) | 56 | 113 | 3.5 | 19.7 | 13.0 |
| Zinc, filtered (µg/L) | 56 | 7.7 | 1.3 | 3.1 | 2.8 |
| Zinc, unfiltered recoverable (µg/L) | 56 | 41 | 1.7 | 6.9 | 5.0 |
| Sediment, suspended (percent finer than 0.062 mm) | 56 | 90 | 26 | 68 | 76 |
| Sediment, suspended concentration (mg/L) | 56 | 107 | 1 | 12 | 2 |
| Sediment, suspended discharge (ton/d) | 56 | 55 | <.01 | [2]3.6 | .04 |

**Table 25.** Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2009.—Continued

[Abbreviations: $ft^3/s$, cubic feet per second; °C, degrees Celsius; µg/L, microgram per liter; µS/cm, microsiemen per centimeter at 25°C; mg/L, milligram per liter; mm, millimeter; ton/d, ton per day. Symbols: <, less than laboratory reporting level[1]]

| Property or constituent and reporting unit | Number of samples | Maximum | Minimum | Mean | Median |
|---|---|---|---|---|---|
| **12323710--Willow Creek near Anaconda<br>Period of record for water-quality data: December 2004–September 2009** | | | | | |
| Streamflow, instantaneous ($ft^3/s$) | 36 | 75 | 1.0 | 14 | 8.3 |
| pH, onsite (standard units) | 36 | 8.2 | 7.5 | 7.7 | 7.7 |
| Specific conductance, onsite (µS/cm) | 36 | 145 | 66 | 101 | 106 |
| Temperature, water (°C) | 36 | 15.5 | .5 | 7.3 | 7.0 |
| Hardness, filtered (mg/L as $CaCO_3$) | 36 | 51 | 22 | 36 | 38 |
| Calcium, filtered (mg/L) | 36 | 16.5 | 7.56 | 12.2 | 12.9 |
| Magnesium, filtered (mg/L) | 36 | 2.49 | .78 | 1.40 | 1.41 |
| Arsenic, filtered (µg/L) | 36 | 24.9 | 9.9 | 15.5 | 14.3 |
| Arsenic, unfiltered recoverable (µg/L) | 36 | 27.0 | 9.8 | 16.7 | 15.4 |
| Cadmium, filtered (µg/L) | 35 | .05 | <.04 | [2].03 | .03 |
| Cadmium, unfiltered recoverable (µg/L) | 36 | .33 | .02 | .07 | .05 |
| Copper, filtered (µg/L) | 36 | 4.2 | .90 | 2.1 | 2.0 |
| Copper, unfiltered recoverable (µg/L) | 36 | 16.8 | 1.0 | 4.1 | 3.3 |
| Iron, filtered (µg/L) | 36 | 277 | 36 | 81 | 66 |
| Iron, unfiltered recoverable (µg/L) | 36 | 2,380 | 93 | 367 | 231 |
| Lead, filtered (µg/L) | 36 | .37 | .05 | .14 | .12 |
| Lead, unfiltered recoverable (µg/L) | 36 | 7.96 | .10 | .96 | .52 |
| Manganese, filtered (µg/L) | 36 | 34.5 | 6.0 | 15.1 | 13.6 |
| Manganese, unfiltered recoverable (µg/L) | 36 | 99.9 | 15.1 | 28.1 | 24.0 |
| Zinc, filtered (µg/L) | 36 | 3.3 | .65 | 1.7 | 1.7 |
| Zinc, unfiltered recoverable (µg/L) | 36 | 17.8 | <2.0 | [2]3.3 | 2.0 |
| Sediment, suspended (percent finer than 0.062 mm) | 36 | 94 | 25 | 72 | 78 |
| Sediment, suspended concentration (mg/L) | 36 | 195 | 1 | 19 | 6 |
| Sediment, suspended discharge (ton/d) | 36 | 34 | <.01 | [2]2.1 | .14 |

**Table 25.** Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2009.—Continued

[Abbreviations: $ft^3/s$, cubic feet per second; °C, degrees Celsius; µg/L, microgram per liter; µS/cm, microsiemen per centimeter at 25°C; mg/L, milligram per liter; mm, millimeter; ton/d, ton per day. Symbols: <, less than laboratory reporting level[1]]

| Property or constituent and reporting unit | Number of samples | Maximum | Minimum | Mean | Median |
|---|---|---|---|---|---|
| **12323720--Willow Creek at Opportunity<br>Period of record for water-quality data: March 2003–September 2009** | | | | | |
| Streamflow, instantaneous ($ft^3/s$) | 56 | 70 | 4.5 | 17 | 9.4 |
| pH, onsite (standard units) | 56 | 8.9 | 7.7 | 8.1 | 8.1 |
| Specific conductance, onsite (µS/cm) | 56 | 371 | 116 | 278 | 301 |
| Temperature, water (°C) | 56 | 20.5 | 1.5 | 11.5 | 12.0 |
| Hardness, filtered (mg/L as $CaCO_3$) | 56 | 170 | 65 | 122 | 130 |
| Calcium, filtered (mg/L) | 56 | 47.4 | 20.1 | 35.2 | 37.0 |
| Magnesium, filtered (mg/L) | 56 | 12.3 | 3.52 | 8.15 | 9.00 |
| Arsenic, filtered (µg/L) | 56 | 164 | 10.9 | 44.3 | 33.4 |
| Arsenic, unfiltered recoverable (µg/L) | 56 | 164 | 12 | 47.1 | 36.6 |
| Cadmium, filtered (µg/L) | 56 | .12 | <.04 | [2].05 | .04 |
| Cadmium, unfiltered recoverable (µg/L) | 56 | .52 | .02 | .10 | .07 |
| Copper, filtered (µg/L) | 56 | 21.4 | 1.1 | 5.8 | 3.9 |
| Copper, unfiltered recoverable (µg/L) | 56 | 48.8 | 2.8 | 11.9 | 8.4 |
| Iron, filtered (µg/L) | 56 | 179 | 7 | 45 | 36 |
| Iron, unfiltered recoverable (µg/L) | 56 | 1,420 | 27 | 265 | 208 |
| Lead, filtered (µg/L) | 56 | .58 | .04 | [2].21 | .19 |
| Lead, unfiltered recoverable (µg/L) | 56 | 14.4 | .27 | 2.26 | 1.58 |
| Manganese, filtered (µg/L) | 56 | 200 | 4.1 | 30.1 | 20.2 |
| Manganese, unfiltered recoverable (µg/L) | 56 | 228 | 4.7 | 42.1 | 32.2 |
| Zinc, filtered (µg/L) | 56 | 19.8 | .84 | 5.3 | 3.9 |
| Zinc, unfiltered recoverable (µg/L) | 56 | 68 | 1.1 | 12.5 | 10.0 |
| Sediment, suspended (percent finer than 0.062 mm) | 56 | 96 | 55 | 84 | 86 |
| Sediment, suspended concentration (mg/L) | 56 | 84 | 1 | 11 | 5 |
| Sediment, suspended discharge (ton/d) | 56 | 11 | .02 | .93 | .16 |

**Table 25.** Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2009.—Continued

[Abbreviations: $ft^3/s$, cubic feet per second; °C, degrees Celsius; µg/L, microgram per liter; µS/cm, microsiemen per centimeter at 25°C; mg/L, milligram per liter; mm, millimeter; ton/d, ton per day. Symbols: <, less than laboratory reporting level[1]]

| Property or constituent and reporting unit | Number of samples | Maximum | Minimum | Mean | Median |
|---|---|---|---|---|---|
| **12323750--Silver Bow Creek at Warm Springs<br>Period of record for water-quality data: March 1993–September 2009** | | | | | |
| Streamflow, instantaneous ($ft^3/s$) | 140 | 662 | 16 | 137 | 88 |
| pH, onsite (standard units) | 138 | 9.6 | 8.0 | 8.8 | 8.8 |
| Specific conductance, onsite (µS/cm) | 138 | 783 | 249 | 469 | 478 |
| Temperature, water (°C) | 139 | 25.0 | .5 | 10.8 | 10.5 |
| Hardness, filtered (mg/L as $CaCO_3$) | 138 | 310 | 97 | 195 | 200 |
| Calcium, filtered (mg/L) | 138 | 90.4 | 27.9 | 56.6 | 57.6 |
| Magnesium, filtered (mg/L) | 138 | 21.4 | 5.94 | 12.9 | 13.0 |
| Arsenic, filtered (µg/L) | 138 | 60 | 6.8 | 23.1 | 23.0 |
| Arsenic, unfiltered recoverable (µg/L) | 138 | 94 | 10 | 27.1 | 26.8 |
| Cadmium, filtered (µg/L) | 138 | .31 | <.04 | [2].06 | .03 |
| Cadmium, unfiltered recoverable (µg/L) | 138 | .56 | <.1 | [2].12 | .04 |
| Copper, filtered (µg/L) | 138 | 40.0 | 1.7 | 8.1 | 6.2 |
| Copper, unfiltered recoverable (µg/L) | 138 | 96.8 | 2.4 | 16.4 | 11.6 |
| Iron, filtered (µg/L) | 138 | 93 | <5 | [2]18 | 15 |
| Iron, unfiltered recoverable (µg/L) | 138 | 3,000 | 36 | 332 | 252 |
| Lead, filtered (µg/L) | 138 | 1.0 | <.08 | [2].12 | <.6 |
| Lead, unfiltered recoverable (µg/L) | 138 | 41.8 | <1 | [2]2.38 | 1.24 |
| Manganese, filtered (µg/L) | 138 | 875 | 11.8 | 125 | 90.4 |
| Manganese, unfiltered recoverable (µg/L) | 138 | 899 | 24.0 | 187 | 160 |
| Zinc, filtered (µg/L) | 138 | 73 | <1.0 | [2]7.9 | 4.0 |
| Zinc, unfiltered recoverable (µg/L) | 138 | 180 | <10 | [2]31.2 | 18 |
| Sediment, suspended (percent finer than 0.062 mm) | 139 | 97 | 43 | 82 | 84 |
| Sediment, suspended concentration (mg/L) | 140 | 229 | 1 | 11 | 6 |
| Sediment, suspended discharge (ton/d) | 140 | 279 | .07 | 6.7 | 1.5 |

**Table 25.** Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2009.—Continued

[Abbreviations: $ft^3/s$, cubic feet per second; °C, degrees Celsius; µg/L, microgram per liter; µS/cm, microsiemen per centimeter at 25°C; mg/L, milligram per liter; mm, millimeter; ton/d, ton per day. Symbols: <, less than laboratory reporting level[1]]

| Property or constituent and reporting unit | Number of samples | Maximum | Minimum | Mean | Median |
|---|---|---|---|---|---|
| **12323760--Warm Springs Creek near Anaconda<br>Period of record for water-quality data: October 2005–September 2009** | | | | | |
| Streamflow, instantaneous ($ft^3/s$) | 24 | 573 | 41 | 139 | 78 |
| pH, onsite (standard units) | 24 | 8.8 | 8.0 | 8.5 | 8.6 |
| Specific conductance, onsite (µS/cm) | 24 | 271 | 125 | 217 | 240 |
| Temperature, water (°C) | 24 | 16.0 | 4.5 | 9.2 | 8.2 |
| Hardness, filtered (mg/L as $CaCO_3$) | 24 | 130 | 59 | 105 | 110 |
| Calcium, filtered (mg/L) | 24 | 38.6 | 18.5 | 31.4 | 34.2 |
| Magnesium, filtered (mg/L) | 24 | 8.57 | 2.96 | 6.41 | 6.99 |
| Arsenic, filtered (µg/L) | 24 | 3.8 | 1.8 | 2.3 | 2.2 |
| Arsenic, unfiltered recoverable (µg/L) | 24 | 5.6 | 2.0 | 2.7 | 2.5 |
| Cadmium, filtered (µg/L) | 24 | .03 | <.04 | [2].02 | .02 |
| Cadmium, unfiltered recoverable (µg/L) | 24 | .07 | <.06 | [2].04 | .03 |
| Copper, filtered (µg/L) | 24 | 2.2 | .57 | [2]1.1 | .94 |
| Copper, unfiltered recoverable (µg/L) | 24 | 14.0 | 1.1 | [2]3.0 | 2.1 |
| Iron, filtered (µg/L) | 24 | 13 | <6 | [2]7 | 6 |
| Iron, unfiltered recoverable (µg/L) | 24 | 543 | 28 | 121 | 75 |
| Lead, filtered (µg/L) | 24 | .11 | <.06 | [2].05 | <.08 |
| Lead, unfiltered recoverable (µg/L) | 24 | 3.51 | .08 | .46 | .26 |
| Manganese, filtered (µg/L) | 24 | 2.9 | <.2 | [2]1.2 | .9 |
| Manganese, unfiltered recoverable (µg/L) | 24 | 22.0 | 1.2 | 5.8 | 4.2 |
| Zinc, filtered (µg/L) | 24 | 2.8 | <1.8 | [2].99 | .47 |
| Zinc, unfiltered recoverable (µg/L) | 24 | 19.9 | <2 | [2]3.1 | 1.8 |
| Sediment, suspended (percent finer than 0.062 mm) | 24 | 80 | 32 | 63 | 66 |
| Sediment, suspended concentration (mg/L) | 24 | 44 | 1 | 7 | 4 |
| Sediment, suspended discharge (ton/d) | 24 | 68 | .16 | 5.5 | .78 |

**Table 25.** Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2009.—Continued

[Abbreviations: $ft^3/s$, cubic feet per second; °C, degrees Celsius; µg/L, microgram per liter; µS/cm, microsiemen per centimeter at 25°C; mg/L, milligram per liter; mm, millimeter; ton/d, ton per day. Symbols: <, less than laboratory reporting level[1]]

| Property or constituent and reporting unit | Number of samples | Maximum | Minimum | Mean | Median |
|---|---|---|---|---|---|
| **12323770--Warm Springs Creek at Warm Springs<br>Period of record for water-quality data: March 1993–September 2009** | | | | | |
| Streamflow, instantaneous ($ft^3/s$) | 103 | 420 | 2.8 | 95 | 53 |
| pH, onsite (standard units) | 102 | 8.7 | 7.4 | 8.3 | 8.3 |
| Specific conductance, onsite (µS/cm) | 102 | 795 | 139 | 296 | 304 |
| Temperature, water (°C) | 103 | 20.0 | 0.0 | 8.8 | 8.5 |
| Hardness, filtered (mg/L as $CaCO_3$) | 102 | 420 | 40 | 143 | 150 |
| Calcium, filtered (mg/L) | 102 | 130 | 10.5 | 43.7 | 45.0 |
| Magnesium, filtered (mg/L) | 102 | 22.0 | 3.29 | 8.23 | 8.38 |
| Arsenic, filtered (µg/L) | 102 | 14 | 2 | 5.1 | 4.6 |
| Arsenic, unfiltered recoverable (µg/L) | 102 | 27 | 3 | 7.5 | 6.0 |
| Cadmium, filtered (µg/L) | 102 | .1 | <.04 | [2].03 | <.1 |
| Cadmium, unfiltered recoverable (µg/L) | 102 | .41 | <.06 | [2].08 | <1.0 |
| Copper, filtered (µg/L) | 102 | 16.0 | 1.0 | 3.4 | 3.0 |
| Copper, unfiltered recoverable (µg/L) | 102 | 147 | 2.3 | 19.7 | 8.6 |
| Iron, filtered (µg/L) | 102 | 30 | <5 | [2]11 | 10 |
| Iron, unfiltered recoverable (µg/L) | 102 | 2,110 | 39 | 302 | 112 |
| Lead, filtered (µg/L) | 102 | 1.8 | <.08 | [2].08 | <.5 |
| Lead, unfiltered recoverable (µg/L) | 102 | 14.0 | <1.0 | [2]1.92 | .50 |
| Manganese, filtered (µg/L) | 102 | 570 | 22.6 | 125 | 95.7 |
| Manganese, unfiltered recoverable (µg/L) | 102 | 1,400 | 53.1 | 216 | 170 |
| Zinc, filtered (µg/L) | 102 | 10 | <1.0 | [2]2.1 | 1.2 |
| Zinc, unfiltered recoverable (µg/L) | 102 | 60 | <10 | [2]9.2 | 3.0 |
| Sediment, suspended (percent finer than 0.062 mm) | 103 | 88 | 43 | 71 | 71 |
| Sediment, suspended concentration (mg/L) | 103 | 127 | 1 | 18 | 8 |
| Sediment, suspended discharge (ton/d) | 103 | 87 | .05 | 8.4 | .99 |

**Table 25.** Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2009.—Continued

[Abbreviations: $ft^3/s$, cubic feet per second; °C, degrees Celsius; µg/L, microgram per liter; µS/cm, microsiemen per centimeter at 25°C; mg/L, milligram per liter; mm, millimeter; ton/d, ton per day. Symbols: <, less than laboratory reporting level[1]]

| Property or constituent and reporting unit | Number of samples | Maximum | Minimum | Mean | Median |
|---|---|---|---|---|---|
| **12323800--Clark Fork near Galen<br>Period of record for water-quality data: July 1988–September 2009** | | | | | |
| Streamflow, instantaneous ($ft^3/s$) | 181 | 1,050 | 14 | 214 | 129 |
| pH, onsite (standard units) | 168 | 9.2 | 7.5 | 8.5 | 8.6 |
| Specific conductance, onsite (µS/cm) | 169 | 720 | 197 | 420 | 430 |
| Temperature, water (°C) | 180 | 23.5 | 0.0 | 9.9 | 10.0 |
| Hardness, filtered (mg/L as $CaCO_3$) | 167 | 370 | 81 | 183 | 190 |
| Calcium, filtered (mg/L) | 167 | 110 | 24.2 | 54.1 | 55.5 |
| Magnesium, filtered (mg/L) | 167 | 22.0 | 5.08 | 11.6 | 12.0 |
| Arsenic, filtered (µg/L) | 167 | 53 | 4 | 15.3 | 14.4 |
| Arsenic, unfiltered recoverable (µg/L) | 167 | 78 | 3 | 19.7 | 17.0 |
| Cadmium, filtered (µg/L) | 167 | 1.0 | <.04 | [2].06 | <1 |
| Cadmium, unfiltered recoverable (µg/L) | 167 | 3 | <.1 | [2].19 | <1 |
| Copper, filtered (µg/L) | 167 | 50 | 1.7 | 8.1 | 6.0 |
| Copper, unfiltered recoverable (µg/L) | 166 | 240 | 4.1 | 28.0 | 15.6 |
| Iron, filtered (µg/L) | 167 | 110 | <3 | [2]16 | 12 |
| Iron, unfiltered recoverable (µg/L) | 167 | 9,200 | 56 | 486 | 270 |
| Lead, filtered (µg/L) | 167 | 3 | <.08 | [2].15 | <1 |
| Lead, unfiltered recoverable (µg/L) | 167 | 31.0 | <1.0 | [2]3.48 | 1.86 |
| Manganese, filtered (µg/L) | 167 | 460 | 25.2 | 111 | 82.2 |
| Manganese, unfiltered recoverable (µg/L) | 167 | 1,400 | 47.3 | 233 | 180 |
| Zinc, filtered (µg/L) | 167 | 110 | <1.0 | [2]9.5 | 5.0 |
| Zinc, unfiltered recoverable (µg/L) | 167 | 360 | <10 | [2]38.2 | 20.0 |
| Sediment, suspended (percent finer than 0.062 mm) | 180 | 97 | 40 | 77 | 78 |
| Sediment, suspended concentration (mg/L) | 181 | 338 | 1 | 18 | 8 |
| Sediment, suspended discharge (ton/d) | 181 | 459 | .12 | 21 | 2.4 |

**Table 25.** Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2009.—Continued

[Abbreviations: $ft^3/s$, cubic feet per second; °C, degrees Celsius; µg/L, microgram per liter; µS/cm, microsiemen per centimeter at 25°C; mg/L, milligram per liter; mm, millimeter; ton/d, ton per day. Symbols: <, less than laboratory reporting level[1]]

| Property or constituent and reporting unit | Number of samples | Maximum | Minimum | Mean | Median |
|---|---|---|---|---|---|
| **12323840--Lost Creek near Anaconda<br>Period of record for water-quality data: December 2004–September 2009** | | | | | |
| Streamflow, instantaneous ($ft^3/s$) | 39 | 54 | 0.37 | 9.8 | 6.4 |
| pH, onsite (standard units) | 39 | 8.6 | 7.4 | 8.2 | 8.2 |
| Specific conductance, onsite (µS/cm) | 39 | 253 | 121 | 201 | 211 |
| Temperature, water (°C) | 39 | 17.0 | 1.0 | 8.3 | 8.5 |
| Hardness, filtered (mg/L as $CaCO_3$) | 39 | 120 | 50 | 95 | 100 |
| Calcium, filtered (mg/L) | 39 | 37.1 | 15.7 | 28.8 | 30.0 |
| Magnesium, filtered (mg/L) | 39 | 7.22 | 2.71 | 5.58 | 6.11 |
| Arsenic, filtered (µg/L) | 39 | 156 | 2.1 | 9.0 | 4.1 |
| Arsenic, unfiltered recoverable (µg/L) | 39 | 3,860 | 2 | 104 | 4.6 |
| Cadmium, filtered (µg/L) | 38 | .90 | <.04 | [2].05 | .03 |
| Cadmium, unfiltered recoverable (µg/L) | 39 | 147 | .01 | 3.8 | .04 |
| Copper, filtered (µg/L) | 39 | 90.5 | 1.1 | 4.5 | 1.9 |
| Copper, unfiltered recoverable (µg/L) | 39 | 29,100 | 1.7 | 753 | 4.5 |
| Iron, filtered (µg/L) | 39 | 25 | <6 | [2]10 | 9 |
| Iron, unfiltered recoverable (µg/L) | 39 | 99,700 | 22 | 2,740 | 109 |
| Lead, filtered (µg/L) | 39 | .18 | <.06 | [2].06 | <.12 |
| Lead, unfiltered recoverable (µg/L) | 39 | 1,290 | .10 | 33.9 | .45 |
| Manganese, filtered (µg/L) | 39 | 42.4 | <.2 | [2]2.3 | 1.2 |
| Manganese, unfiltered recoverable (µg/L) | 39 | 8,830 | 1.2 | 233 | 4.6 |
| Zinc, filtered (µg/L) | 39 | 30.0 | <1.8 | [2]2.0 | 1.1 |
| Zinc, unfiltered recoverable (µg/L) | 39 | 7,780 | 1.0 | 203 | 2.5 |
| Sediment, suspended (percent finer than 0.062 mm) | 39 | 97 | 22 | 58 | 61 |
| Sediment, suspended concentration (mg/L) | 39 | 58,900 | 1 | 1,520 | 5 |
| Sediment, suspended discharge (ton/d) | 39 | 1,320 | <.01 | [2]35 | .08 |

**Table 25.** Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2009.—Continued

[Abbreviations: $ft^3/s$, cubic feet per second; °C, degrees Celsius; µg/L, microgram per liter; µS/cm, microsiemen per centimeter at 25°C; mg/L, milligram per liter; mm, millimeter; ton/d, ton per day. Symbols: <, less than laboratory reporting level[1]]

| Property or constituent and reporting unit | Number of samples | Maximum | Minimum | Mean | Median |
|---|---|---|---|---|---|
| **12323850--Lost Creek near Galen<br>Period of record for water-quality data: March 2003–September 2009** | | | | | |
| Streamflow, instantaneous ($ft^3/s$) | 56 | 59 | 1.3 | 21 | 14 |
| pH, onsite (standard units) | 56 | 8.7 | 8.0 | 8.3 | 8.4 |
| Specific conductance, onsite (µS/cm) | 56 | 934 | 540 | 648 | 631 |
| Temperature, water (°C) | 56 | 26.5 | 0.0 | 11.0 | 10.5 |
| Hardness, filtered (mg/L as $CaCO_3$) | 56 | 450 | 200 | 300 | 300 |
| Calcium, filtered (mg/L) | 56 | 122 | 48.5 | 84.2 | 85.2 |
| Magnesium, filtered (mg/L) | 56 | 35.7 | 17.3 | 21.7 | 21.0 |
| Arsenic, filtered (µg/L) | 56 | 41.8 | 6 | 14.3 | 12.6 |
| Arsenic, unfiltered recoverable (µg/L) | 56 | 43 | 6 | 15.0 | 14.0 |
| Cadmium, filtered (µg/L) | 55 | .05 | <.04 | [2].03 | .02 |
| Cadmium, unfiltered recoverable (µg/L) | 56 | .11 | .01 | [2].04 | .04 |
| Copper, filtered (µg/L) | 56 | 6.7 | .99 | 2.5 | 2.5 |
| Copper, unfiltered recoverable (µg/L) | 56 | 22.5 | 1.6 | 5.8 | 4.4 |
| Iron, filtered (µg/L) | 56 | 61 | <6 | [2]12 | 10 |
| Iron, unfiltered recoverable (µg/L) | 56 | 293 | 14 | 98 | 74 |
| Lead, filtered (µg/L) | 55 | .33 | <.06 | [2].06 | <.08 |
| Lead, unfiltered recoverable (µg/L) | 56 | 1.30 | .04 | .35 | .24 |
| Manganese, filtered (µg/L) | 56 | 54.0 | 1.9 | 14.5 | 13.4 |
| Manganese, unfiltered recoverable (µg/L) | 56 | 56.5 | 2.2 | 19.4 | 17.6 |
| Zinc, filtered (µg/L) | 56 | 3.8 | <1.0 | [2]1.5 | 1.3 |
| Zinc, unfiltered recoverable (µg/L) | 56 | 9 | <2 | [2]2.9 | 2.0 |
| Sediment, suspended (percent finer than 0.062 mm) | 56 | 86 | 18 | 56 | 60 |
| Sediment, suspended concentration (mg/L) | 56 | 46 | 2 | 15 | 14 |
| Sediment, suspended discharge (ton/d) | 56 | 4.2 | .01 | .96 | .37 |

**Table 25.** Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2009.—Continued

[Abbreviations: $ft^3/s$, cubic feet per second; °C, degrees Celsius; µg/L, microgram per liter; µS/cm, microsiemen per centimeter at 25°C; mg/L, milligram per liter; mm, millimeter; ton/d, ton per day. Symbols: <, less than laboratory reporting level[1]]

| Property or constituent and reporting unit | Number of samples | Maximum | Minimum | Mean | Median |
|---|---|---|---|---|---|
| **12324200--Clark Fork at Deer Lodge<br>Period of record for water-quality data: March 1985–September 2009** | | | | | |
| Streamflow, instantaneous ($ft^3/s$) | 233 | 1,920 | 23 | 296 | 220 |
| pH, onsite (standard units) | 181 | 8.9 | 7.4 | 8.3 | 8.3 |
| Specific conductance, onsite (µS/cm) | 216 | 642 | 234 | 477 | 500 |
| Temperature, water (°C) | 232 | 23.0 | 0.0 | 10.0 | 10.0 |
| Hardness, filtered (mg/L as $CaCO_3$) | 173 | 280 | 95 | 202 | 210 |
| Calcium, filtered (mg/L) | 173 | 82.0 | 28.2 | 59.5 | 62.0 |
| Magnesium, filtered (mg/L) | 173 | 18.7 | 5.53 | 12.8 | 13.5 |
| Arsenic, filtered (µg/L) | 183 | 39 | 6.0 | 14.5 | 13.5 |
| Arsenic, unfiltered recoverable (µg/L) | 182 | 215 | 4.8 | 24.1 | 18.0 |
| Cadmium, filtered (µg/L) | 182 | 2 | <.1 | [2].08 | <1 |
| Cadmium, unfiltered recoverable (µg/L) | 182 | 5 | <.1 | [2].41 | .05 |
| Copper, filtered (µg/L) | 183 | 120 | 3.2 | 11.0 | 8.3 |
| Copper, unfiltered recoverable (µg/L) | 181 | 1,500 | 8.2 | 81.9 | 38.0 |
| Iron, filtered (µg/L) | 183 | 190 | <3 | [2]15 | 9 |
| Iron, unfiltered recoverable (µg/L) | 183 | 29,000 | 27 | 1,500 | 520 |
| Lead, filtered (µg/L) | 183 | 6 | <.08 | [2].32 | <1 |
| Lead, unfiltered recoverable (µg/L) | 183 | 200 | .33 | [2]10.8 | 4.70 |
| Manganese, filtered (µg/L) | 183 | 400 | 1.0 | 42.1 | 33.5 |
| Manganese, unfiltered recoverable (µg/L) | 183 | 4,600 | 11.9 | 241 | 136 |
| Zinc, filtered (µg/L) | 183 | 230 | <10 | [2]12.0 | 8.1 |
| Zinc, unfiltered recoverable (µg/L) | 181 | 1,700 | 4 | 87.5 | 40.0 |
| Sediment, suspended (percent finer than 0.062 mm) | 224 | 99 | 37 | 71 | 72 |
| Sediment, suspended concentration (mg/L) | 223 | 2,250 | 1 | 70 | 22 |
| Sediment, suspended discharge (ton/d) | 223 | 8,690 | .18 | 149 | 12 |

**Table 25.** Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2009.—Continued

[Abbreviations: $ft^3/s$, cubic feet per second; °C, degrees Celsius; µg/L, microgram per liter; µS/cm, microsiemen per centimeter at 25°C; mg/L, milligram per liter; mm, millimeter; ton/d, ton per day. Symbols: <, less than laboratory reporting level[1]]

| Property or constituent and reporting unit | Number of samples | Maximum | Minimum | Mean | Median |
|---|---|---|---|---|---|
| **12324400--Clark Fork above Little Blackfoot River, near Garrison Period of record for water-quality data: March 2009–September 2009** | | | | | |
| Streamflow, instantaneous ($ft^3/s$) | 7 | 1,380 | 296 | 697 | 514 |
| pH, onsite (standard units) | 7 | 8.5 | 8.1 | 8.2 | 8.2 |
| Specific conductance, onsite (µS/cm) | 7 | 471 | 253 | 373 | 353 |
| Temperature, water (°C) | 7 | 15.5 | 3.0 | 10.6 | 12.0 |
| Hardness, filtered (mg/L as $CaCO_3$) | 7 | 200 | 100 | 157 | 150 |
| Calcium, filtered (mg/L) | 7 | 58.5 | 31.8 | 47.0 | 44.1 |
| Magnesium, filtered (mg/L) | 7 | 13.2 | 5.93 | 10.2 | 10.0 |
| Arsenic, filtered (µg/L) | 7 | 21.6 | 12.6 | 16.8 | 16.5 |
| Arsenic, unfiltered recoverable (µg/L) | 7 | 43.5 | 19.9 | 27.7 | 21.9 |
| Cadmium, filtered (µg/L) | 7 | .11 | .06 | .08 | .08 |
| Cadmium, unfiltered recoverable (µg/L) | 7 | .75 | .17 | .40 | .34 |
| Copper, filtered (µg/L) | 7 | 20.2 | 7.7 | 12.8 | 11.7 |
| Copper, unfiltered recoverable (µg/L) | 7 | 197 | 27.4 | 97.3 | 65.9 |
| Iron, filtered (µg/L) | 7 | 33 | 7 | 18 | 16 |
| Iron, unfiltered recoverable (µg/L) | 7 | 3,190 | 364 | 1,390 | 1,150 |
| Lead, filtered (µg/L) | 7 | .39 | .10 | .18 | .14 |
| Lead, unfiltered recoverable (µg/L) | 7 | 29.4 | 3.34 | 13.9 | 12.3 |
| Manganese, filtered (µg/L) | 7 | 34.1 | 15.6 | 22.7 | 19.9 |
| Manganese, unfiltered recoverable (µg/L) | 7 | 309 | 92.0 | 175 | 148 |
| Zinc, filtered (µg/L) | 7 | 15.9 | 4.3 | 8.0 | 6.8 |
| Zinc, unfiltered recoverable (µg/L) | 7 | 152 | 21.4 | 77.9 | 65.1 |
| Sediment, suspended (percent finer than 0.062 mm) | 7 | 76 | 42 | 61 | 60 |
| Sediment, suspended concentration (mg/L) | 7 | 179 | 13 | 75 | 58 |
| Sediment, suspended discharge (ton/d) | 7 | 428 | 10 | 169 | 73 |

**Table 25.** Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2009.—Continued

[Abbreviations: $ft^3/s$, cubic feet per second; °C, degrees Celsius; µg/L, microgram per liter; µS/cm, microsiemen per centimeter at 25°C; mg/L, milligram per liter; mm, millimeter; ton/d, ton per day. Symbols: <, less than laboratory reporting level[1]]

| Property or constituent and reporting unit | Number of samples | Maximum | Minimum | Mean | Median |
|---|---|---|---|---|---|
| **12324680--Clark Fork at Goldcreek<br>Period of record for water-quality data: March 1993–September 2009** | | | | | |
| Streamflow, instantaneous ($ft^3/s$) | 139 | 3,920 | 87 | 751 | 513 |
| pH, onsite (standard units) | 138 | 8.9 | 7.9 | 8.4 | 8.3 |
| Specific conductance, onsite (µS/cm) | 138 | 510 | 206 | 370 | 384 |
| Temperature, water (°C) | 139 | 23.0 | 0.0 | 10.0 | 10.0 |
| Hardness, filtered (mg/L as $CaCO_3$) | 138 | 230 | 86 | 162 | 170 |
| Calcium, filtered (mg/L) | 138 | 68.0 | 25.9 | 47.9 | 50.1 |
| Magnesium, filtered (mg/L) | 138 | 15.0 | 5.15 | 10.4 | 10.8 |
| Arsenic, filtered (µg/L) | 138 | 20 | 5.8 | 10.1 | 10.0 |
| Arsenic, unfiltered recoverable (µg/L) | 138 | 75 | 7 | 14.9 | 12.0 |
| Cadmium, filtered (µg/L) | 138 | .2 | <.04 | [2].04 | <.1 |
| Cadmium, unfiltered recoverable (µg/L) | 138 | 2 | <.1 | [2].18 | .04 |
| Copper, filtered (µg/L) | 137 | 36.0 | 2.1 | 6.7 | 5.4 |
| Copper, unfiltered recoverable (µg/L) | 137 | 440 | 5.2 | 40.3 | 24.5 |
| Iron, filtered (µg/L) | 138 | 100 | <3 | [2]19 | 12 |
| Iron, unfiltered recoverable (µg/L) | 138 | 12,000 | 27 | 859 | 426 |
| Lead, filtered (µg/L) | 136 | .6 | <.08 | [2].11 | <.5 |
| Lead, unfiltered recoverable (µg/L) | 137 | 73.0 | .14 | [2]5.63 | 3.00 |
| Manganese, filtered (µg/L) | 138 | 57.3 | 4.0 | 18.9 | 17.0 |
| Manganese, unfiltered recoverable (µg/L) | 138 | 1,100 | 10.5 | 123 | 87.7 |
| Zinc, filtered (µg/L) | 138 | 26 | <1.0 | [2]5.6 | 4.0 |
| Zinc, unfiltered recoverable (µg/L) | 138 | 510 | 2 | 44.3 | 30.0 |
| Sediment, suspended (percent finer than 0.062 mm) | 139 | 94 | 43 | 75 | 78 |
| Sediment, suspended concentration (mg/L) | 139 | 752 | 1 | 49 | 21 |
| Sediment, suspended discharge (ton/d) | 139 | 7,960 | .55 | 210 | 33 |

**Table 25.** Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2009.—Continued

[Abbreviations: $ft^3/s$, cubic feet per second; °C, degrees Celsius; µg/L, microgram per liter; µS/cm, microsiemen per centimeter at 25°C; mg/L, milligram per liter; mm, millimeter; ton/d, ton per day. Symbols: <, less than laboratory reporting level[1]]

| Property or constituent and reporting unit | Number of samples | Maximum | Minimum | Mean | Median |
|---|---|---|---|---|---|
| **12331800--Clark Fork near Drummond<br>Period of record for water-quality data: March 1993–September 2009** | | | | | |
| Streamflow, instantaneous ($ft^3/s$) | 139 | 3,860 | 149 | 1,050 | 768 |
| pH, onsite (standard units) | 138 | 8.7 | 7.8 | 8.3 | 8.3 |
| Specific conductance, onsite (µS/cm) | 138 | 630 | 189 | 409 | 420 |
| Temperature, water (°C) | 139 | 22.5 | .5 | 11.0 | 11.0 |
| Hardness, filtered (mg/L as $CaCO_3$) | 138 | 300 | 74 | 184 | 190 |
| Calcium, filtered (mg/L) | 138 | 83.0 | 21.0 | 52.8 | 54.8 |
| Magnesium, filtered (mg/L) | 138 | 22.0 | 5.2 | 12.6 | 13.0 |
| Arsenic, filtered (µg/L) | 138 | 20 | 6.6 | 10.6 | 10.0 |
| Arsenic, unfiltered recoverable (µg/L) | 138 | 62 | 8 | 16.3 | 13.0 |
| Cadmium, filtered (µg/L) | 138 | .30 | <.04 | [2].05 | <.1 |
| Cadmium, unfiltered recoverable (µg/L) | 138 | 2.0 | <.1 | [2].23 | .04 |
| Copper, filtered (µg/L) | 136 | 21.0 | 1.0 | 6.5 | 5.0 |
| Copper, unfiltered recoverable (µg/L) | 136 | 360 | 4.6 | 43.0 | 22.5 |
| Iron, filtered (µg/L) | 138 | 150 | <3 | [2]18 | 9 |
| Iron, unfiltered recoverable (µg/L) | 137 | 8,800 | 20 | 999 | 468 |
| Lead, filtered (µg/L) | 134 | 1.2 | <.08 | [2].16 | <1.0 |
| Lead, unfiltered recoverable (µg/L) | 134 | 56.0 | <1.00 | [2]7.75 | 3.54 |
| Manganese, filtered (µg/L) | 138 | 60.7 | 3.3 | 16.6 | 14.6 |
| Manganese, unfiltered recoverable (µg/L) | 138 | 880 | 8.0 | 147 | 96.0 |
| Zinc, filtered (µg/L) | 138 | 21 | <3 | [2]6.0 | 4.2 |
| Zinc, unfiltered recoverable (µg/L) | 138 | 490 | 2.9 | 60.6 | 31.9 |
| Sediment, suspended (percent finer than 0.062 mm) | 139 | 92 | 38 | 73 | 74 |
| Sediment, suspended concentration (mg/L) | 139 | 530 | 2 | 63 | 26 |
| Sediment, suspended discharge (ton/d) | 139 | 4,720 | 1.7 | 323 | 52 |

**Table 25.** Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2009.—Continued

[Abbreviations: $ft^3/s$, cubic feet per second; °C, degrees Celsius; µg/L, microgram per liter; µS/cm, microsiemen per centimeter at 25°C; mg/L, milligram per liter; mm, millimeter; ton/d, ton per day. Symbols: <, less than laboratory reporting level[1]]

| Property or constituent and reporting unit | Number of samples | Maximum | Minimum | Mean | Median |
|---|---|---|---|---|---|
| **12334550--Clark Fork at Turah Bridge, near Bonner<br>Period of record for water-quality data: March 1985–September 2009** | | | | | |
| Streamflow, instantaneous ($ft^3/s$) | 236 | 9,560 | 296 | 1,910 | 1,150 |
| pH, onsite (standard units) | 182 | 8.8 | 7.4 | 8.3 | 8.3 |
| Specific conductance, onsite (µS/cm) | 211 | 483 | 139 | 301 | 313 |
| Temperature, water (°C) | 235 | 22.0 | 0.0 | 9.5 | 9.5 |
| Hardness, filtered (mg/L as $CaCO_3$) | 172 | 200 | 54 | 131 | 130 |
| Calcium, filtered (mg/L) | 172 | 59.0 | 14.9 | 36.9 | 37.2 |
| Magnesium, filtered (mg/L) | 172 | 14.0 | 3.94 | 9.42 | 9.39 |
| Arsenic, filtered (µg/L) | 181 | 17 | 2.7 | 6.1 | 5.4 |
| Arsenic, unfiltered recoverable (µg/L) | 181 | 110 | 3 | 9.8 | 7.0 |
| Cadmium, filtered (µg/L) | 181 | .10 | <.04 | [2].03 | <.1 |
| Cadmium, unfiltered recoverable (µg/L) | 181 | 4 | <.01 | [2].26 | <1 |
| Copper, filtered (µg/L) | 180 | 25 | 1.1 | 4.8 | 3.9 |
| Copper, unfiltered recoverable (µg/L) | 179 | 500 | 2.7 | 34.4 | 16.0 |
| Iron, filtered (µg/L) | 181 | 190 | <3 | [2]24 | 13 |
| Iron, unfiltered recoverable (µg/L) | 181 | 19,000 | 33 | 1,020 | 380 |
| Lead, filtered (µg/L) | 177 | 7 | <.08 | [2].30 | <1 |
| Lead, unfiltered recoverable (µg/L) | 177 | 100 | <1.00 | [2]7.09 | 3.00 |
| Manganese, filtered (µg/L) | 181 | 37.4 | <1.0 | [2]8.2 | 7.0 |
| Manganese, unfiltered recoverable (µg/L) | 181 | 2,000 | 8.9 | 123 | 60.1 |
| Zinc, filtered (µg/L) | 180 | 39 | <3 | [2]6.0 | 4.0 |
| Zinc, unfiltered recoverable (µg/L) | 181 | 1,100 | <10 | [2]59 | 30 |
| Sediment, suspended (percent finer than 0.062 mm) | 225 | 98 | 27 | 73 | 75 |
| Sediment, suspended concentration (mg/L) | 236 | 1,370 | 2 | 57 | 18 |
| Sediment, suspended discharge (ton/d) | 236 | 34,700 | 3.0 | 626 | 60 |

**Table 25.** Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2009.—Continued

[Abbreviations: $ft^3/s$, cubic feet per second; °C, degrees Celsius; µg/L, microgram per liter; µS/cm, microsiemen per centimeter at 25°C; mg/L, milligram per liter; mm, millimeter; ton/d, ton per day. Symbols: <, less than laboratory reporting level[1]]

| Property or constituent and reporting unit | Number of samples | Maximum | Minimum | Mean | Median |
|---|---|---|---|---|---|
| **12340000--Blackfoot River near Bonner<br>Period of record for water-quality data: March 1985–September 2009** | | | | | |
| Streamflow, instantaneous ($ft^3/s$) | 171 | 13,400 | 344 | 2,690 | 1,330 |
| pH, onsite (standard units) | 131 | 8.7 | 7.5 | 8.3 | 8.3 |
| Specific conductance, onsite (µS/cm) | 148 | 294 | 131 | 208 | 204 |
| Temperature, water (°C) | 171 | 22.5 | 0.0 | 9.5 | 9.5 |
| Hardness, filtered (mg/L as $CaCO_3$) | 124 | 140 | 55 | 103 | 98 |
| Calcium, filtered (mg/L) | 124 | 37.0 | 14.0 | 26.4 | 25.2 |
| Magnesium, filtered (mg/L) | 124 | 13.2 | 4.90 | 9.12 | 8.66 |
| Arsenic, filtered (µg/L) | 131 | 2 | <1 | [2].97 | .98 |
| Arsenic, unfiltered recoverable (µg/L) | 131 | 4 | <1 | [2]1.2 | 1 |
| Cadmium, filtered (µg/L) | 131 | 1 | <.02 | [2].03 | <.1 |
| Cadmium, unfiltered recoverable (µg/L) | 131 | 2 | <.01 | [2].10 | <1 |
| Copper, filtered (µg/L) | 129 | 7.0 | <1.0 | [2]1.4 | .8 |
| Copper, unfiltered recoverable (µg/L) | 128 | 34 | <1.0 | [2]4.9 | 2.2 |
| Iron, filtered (µg/L) | 131 | 100 | <3 | [2]17 | 10 |
| Iron, unfiltered recoverable (µg/L) | 131 | 3,600 | 14 | 428 | 190 |
| Lead, filtered (µg/L) | 127 | 8 | <.06 | [2].39 | <.6 |
| Lead, unfiltered recoverable (µg/L) | 127 | 25.0 | <.06 | [2]2.39 | .07 |
| Manganese, filtered (µg/L) | 131 | 11.0 | <1 | [2]2.4 | 2.0 |
| Manganese, unfiltered recoverable (µg/L) | 131 | 180 | <10 | [2]29.3 | 18.6 |
| Zinc, filtered (µg/L) | 131 | 15 | <.60 | [2]2.1 | <20 |
| Zinc, unfiltered recoverable (µg/L) | 131 | 60 | <1 | [2]5.6 | <10 |
| Sediment, suspended (percent finer than 0.062 mm) | 169 | 98 | 42 | 80 | 82 |
| Sediment, suspended concentration (mg/L) | 171 | 271 | 1 | 29 | 8 |
| Sediment, suspended discharge (ton/d) | 171 | 7,670 | 1.1 | 522 | 30 |

**Table 25.** Statistical summary of long-term water-quality data for the upper Clark Fork basin, Montana, March 1985 through September 2009.—Continued

[Abbreviations: $ft^3/s$, cubic feet per second; °C, degrees Celsius; µg/L, microgram per liter; µS/cm, microsiemen per centimeter at 25°C; mg/L, milligram per liter; mm, millimeter; ton/d, ton per day. Symbols: <, less than laboratory reporting level[1]]

| Property or constituent and reporting unit | Number of samples | Maximum | Minimum | Mean | Median |
|---|---|---|---|---|---|
| **12340500--Clark Fork above Missoula<br>Period of record for water-quality data: July 1986–September 2009** | | | | | |
| Streamflow, instantaneous ($ft^3/s$) | 202 | 21,600 | 720 | 4,480 | 2,430 |
| pH, onsite (standard units) | 159 | 8.8 | 7.9 | 8.3 | 8.3 |
| Specific conductance, onsite (µS/cm) | 179 | 399 | 142 | 253 | 261 |
| Temperature, water (°C) | 199 | 22.0 | 0.0 | 9.5 | 9.5 |
| Hardness, filtered (mg/L as $CaCO_3$) | 159 | 170 | 60 | 117 | 120 |
| Calcium, filtered (mg/L) | 159 | 46.0 | 14.0 | 31.4 | 31.7 |
| Magnesium, filtered (mg/L) | 159 | 13.4 | 5.28 | 9.22 | 9.20 |
| Arsenic, filtered (µg/L) | 159 | 9 | 1 | 3.4 | 3.0 |
| Arsenic, unfiltered recoverable (µg/L) | 159 | 69 | 1 | 5.5 | 4 |
| Cadmium, filtered (µg/L) | 159 | .2 | <.04 | [2].03 | <.1 |
| Cadmium, unfiltered recoverable (µg/L) | 159 | 5.0 | <.01 | [2].17 | <1 |
| Copper, filtered (µg/L) | 158 | 12.6 | .7 | 2.9 | 2.2 |
| Copper, unfiltered recoverable (µg/L) | 157 | 400 | 2.0 | 20.1 | 8.5 |
| Iron, filtered (µg/L) | 159 | 200 | <3 | [2]22 | 15 |
| Iron, unfiltered recoverable (µg/L) | 159 | 13,000 | 43 | 647 | 244 |
| Lead, filtered (µg/L) | 153 | 1.2 | <.08 | [2].16 | <1 |
| Lead, unfiltered recoverable (µg/L) | 154 | 78.0 | <1.00 | [2]3.61 | 1.60 |
| Manganese, filtered (µg/L) | 159 | 230 | 5.9 | 16.8 | 14.1 |
| Manganese, unfiltered recoverable (µg/L) | 159 | 1,100 | 10 | 66.9 | 40 |
| Zinc, filtered (µg/L) | 159 | 16 | <1.0 | [2]3.7 | 2.3 |
| Zinc, unfiltered recoverable (µg/L) | 159 | 1,100 | <10 | [2]35.0 | 15 |
| Sediment, suspended (percent finer than 0.062 mm) | 197 | 99 | 14 | 83 | 89 |
| Sediment, suspended concentration (mg/L) | 202 | 950 | 2 | 44 | 12 |
| Sediment, suspended discharge (ton/d) | 202 | 21,900 | 5.8 | 1,090 | 84 |

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

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

**Table 26.** Statistical summary of long-term bed-sediment data for the upper Clark Fork basin, Montana, August 1986 through August 2009.

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

| Constituent | Number of samples | Maximum | Minimum | Mean | Median |
|---|---|---|---|---|---|
| **12323600--Silver Bow Creek at Opportunity<br>Period of record for bed-sediment data: 1992–2009** | | | | | |
| Arsenic | 7 | 186 | 59 | 138 | 153 |
| Cadmium | 18 | 43.9 | 7.5 | 30.9 | 29.7 |
| Chromium | 16 | 50.0 | 16.8 | 27.3 | 25.7 |
| Copper | 18 | 9,020 | 1,040 | 4,370 | 4,530 |
| Iron | 18 | 45,300 | 28,200 | 35,700 | 34,500 |
| Lead | 18 | 1,030 | 267 | 659 | 667 |
| Manganese | 18 | 9,220 | 1,680 | 3,470 | 2,840 |
| Nickel | 17 | 21.4 | 12.0 | 14.9 | 14.8 |
| Silver | 12 | 20.0 | 8.3 | 15.5 | 15.8 |
| Zinc | 18 | 13,400 | 2,130 | 7,560 | 7,060 |
| **12323750--Silver Bow Creek at Warm Springs<br>Period of record for bed-sediment data: 1992–2009** | | | | | |
| Arsenic | 7 | 177 | 67 | 112 | 103 |
| Cadmium | 18 | 12.2 | 4.2 | 7.2 | 6.5 |
| Chromium | 16 | 41.4 | <15.7 | [1]21.8 | [1]21.2 |
| Copper | 18 | 769 | 169 | 345 | 290 |
| Iron | 18 | 31,700 | 15,400 | 22,900 | 21,900 |
| Lead | 18 | 100 | 49 | 71 | 72 |
| Manganese | 18 | 17,700 | 1,470 | 7,920 | 7,690 |
| Nickel | 17 | 19.1 | 9.2 | 14.7 | 14.6 |
| Silver | 12 | 4.4 | .3 | [1]1.9 | [1]1.8 |
| Zinc | 18 | 2,220 | 554 | 952 | 727 |
| **12323770--Warm Springs Creek at Warm Springs<br>Period of record for bed-sediment data: 1995, 1997, 1999, 2002, 2005, 2008** | | | | | |
| Arsenic | 2 | 66 | 52 | 59 | -- |
| Cadmium | 6 | 5.8 | 1.3 | 3.6 | 3.6 |
| Chromium | 6 | 39.3 | 27.5 | 31.9 | 31.1 |
| Copper | 6 | 1,060 | 779 | 908 | 886 |
| Iron | 6 | 26,600 | 16,800 | 21,700 | 21,900 |
| Lead | 6 | 86 | 67 | 81 | 83 |
| Manganese | 6 | 12,100 | 2,020 | 7,950 | 8,280 |
| Nickel | 6 | 25.5 | 17.6 | 20.2 | 19.4 |
| Silver | 4 | 5.1 | 3.1 | 3.8 | 3.5 |
| Zinc | 6 | 453 | 372 | 405 | 405 |

**Table 26.** Statistical summary of long-term bed-sediment data for the upper Clark Fork basin, Montana, August 1986 through August 2009.—Continued

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

| Constituent | Number of samples | Maximum | Minimum | Mean | Median |
|---|---|---|---|---|---|
| **12323800--Clark Fork near Galen<br>Period of record for bed-sediment data: 1987, 1991–2009** | | | | | |
| Arsenic | 7 | 119 | 86 | 103 | 107 |
| Cadmium | 20 | 20.1 | 4.0 | 8.6 | 7.5 |
| Chromium | 16 | 44.6 | 19.1 | 28.2 | 26.7 |
| Copper | 20 | 2,300 | 838 | 1,200 | 1,110 |
| Iron | 20 | 39,800 | 22,600 | 27,900 | 27,200 |
| Lead | 20 | 235 | 92 | 134 | 130 |
| Manganese | 20 | 17,300 | 2,780 | 9,910 | 11,400 |
| Nickel | 17 | 23.2 | 13.9 | 18.7 | 18.3 |
| Silver | 14 | 7.3 | <3.2 | [1]4.4 | [1]4.5 |
| Zinc | 20 | 3,560 | 819 | 1,490 | 1,150 |
| **461415112450801--Clark Fork below Lost Creek, near Galen<br>Period of record for bed-sediment data: 1996–2009** | | | | | |
| Arsenic | 7 | 204 | 92 | 120 | 109 |
| Cadmium | 14 | 10.5 | 5.2 | 7.2 | 6.8 |
| Chromium | 13 | 42.4 | 20.5 | 29.2 | 27.5 |
| Copper | 14 | 2,050 | 1,150 | 1,500 | 1,430 |
| Iron | 14 | 32,800 | 24,400 | 29,600 | 30,500 |
| Lead | 14 | 218 | 127 | 168 | 169 |
| Manganese | 14 | 9,820 | 3,470 | 5,980 | 5,820 |
| Nickel | 14 | 19.9 | 11.7 | 16.1 | 16.4 |
| Silver | 8 | 7.8 | 4.2 | 6.5 | 6.7 |
| Zinc | 14 | 1,680 | 1,060 | 1,340 | 1,330 |
| **461559112443301--Clark Fork at county bridge, near Racetrack<br>Period of record for bed-sediment data: 1996–2009** | | | | | |
| Arsenic | 7 | 101 | 56 | 81 | 86 |
| Cadmium | 14 | 8.7 | 5.0 | 6.7 | 6.4 |
| Chromium | 13 | 45.2 | 19.0 | 27.2 | 27.6 |
| Copper | 14 | 1,610 | 933 | 1,240 | 1,280 |
| Iron | 14 | 31,700 | 21,200 | 27,100 | 28,100 |
| Lead | 14 | 186 | 103 | 143 | 143 |
| Manganese | 14 | 6,310 | 2,100 | 3,510 | 3,230 |
| Nickel | 14 | 18.4 | 10.3 | 14.2 | 14.7 |
| Silver | 8 | 6.1 | <3.3 | [1]5.0 | [1]5.4 |
| Zinc | 14 | 1,550 | 999 | 1,210 | 1,180 |

**Table 26.** Statistical summary of long-term bed-sediment data for the upper Clark Fork basin, Montana, August 1986 through August 2009.—Continued

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

| Constituent | Number of samples | Maximum | Minimum | Mean | Median |
|---|---|---|---|---|---|
| **461903112440701--Clark Fork at Dempsey Creek diversion, near Racetrack<br>Period of record for bed-sediment data: 1996–2009** | | | | | |
| Arsenic | 7 | 100 | 58 | 79 | 80 |
| Cadmium | 14 | 10.3 | 4.3 | 6.5 | 5.9 |
| Chromium | 13 | 39.2 | 16.0 | 26.2 | 25.6 |
| Copper | 14 | 1,580 | 721 | 1,090 | 1,060 |
| Iron | 14 | 33,700 | 20,600 | 26,800 | 26,200 |
| Lead | 14 | 155 | 92 | 129 | 131 |
| Manganese | 14 | 8,370 | 1,810 | 4,220 | 3,620 |
| Nickel | 14 | 16.9 | 8.7 | 13.1 | 12.8 |
| Silver | 8 | 6.2 | 2.7 | 4.9 | 5.0 |
| Zinc | 14 | 1,570 | 900 | 1,150 | 1,120 |
| **12324200--Clark Fork at Deer Lodge<br>Period of record for bed-sediment data: 1986–87, 1990–2009** | | | | | |
| Arsenic | 7 | 102 | 49 | 70 | 69 |
| Cadmium | 22 | 10.0 | 3.8 | 6.2 | 5.5 |
| Chromium | 16 | 50.7 | 19.5 | 30.8 | 28.3 |
| Copper | 22 | 4,180 | 683 | 1,270 | 1,060 |
| Iron | 22 | 35,300 | 21,100 | 27,200 | 26,100 |
| Lead | 22 | 242 | 103 | 146 | 144 |
| Manganese | 22 | 6,020 | 1,110 | 2,780 | 2,470 |
| Nickel | 17 | 21.1 | 11.5 | 14.9 | 13.6 |
| Silver | 16 | 7.9 | 2.4 | 4.7 | 4.5 |
| Zinc | 22 | 1,730 | 846 | 1,210 | 1,190 |
| **12324400--Clark Fork above Little Blackfoot River, near Garrison<br>Period of record for bed-sediment data: 2009** | | | | | |
| Arsenic | 1 | -- | -- | 83 | -- |
| Cadmium | 1 | -- | -- | 5.5 | -- |
| Chromium | 1 | -- | -- | 52.8 | -- |
| Copper | 1 | -- | -- | 1,270 | -- |
| Iron | 1 | -- | -- | 32,400 | -- |
| Lead | 1 | -- | -- | 140 | -- |
| Manganese | 1 | -- | -- | 2,950 | -- |
| Nickel | 1 | -- | -- | 17.2 | -- |
| Silver | 0 | -- | -- | -- | -- |
| Zinc | 1 | -- | -- | 1,240 | -- |

**Table 26.** Statistical summary of long-term bed-sediment data for the upper Clark Fork basin, Montana, August 1986 through August 2009.—Continued

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

| Constituent | Number of samples | Maximum | Minimum | Mean | Median |
|---|---|---|---|---|---|
| **12324680--Clark Fork at Goldcreek<br>Period of record for bed-sediment data: 1992–2009** | | | | | |
| Arsenic | 7 | 61 | 23 | 37 | 36 |
| Cadmium | 18 | 8.1 | 2.6 | 4.7 | 4.6 |
| Chromium | 16 | 55.3 | 21.3 | 32.6 | 31.8 |
| Copper | 18 | 1,080 | 338 | 675 | 702 |
| Iron | 18 | 32,100 | 15,500 | 23,700 | 24,000 |
| Lead | 18 | 152 | 52 | 95 | 93 |
| Manganese | 18 | 2,610 | 1,160 | 1,880 | 1,840 |
| Nickel | 17 | 18.6 | 9.0 | 14.3 | 15.0 |
| Silver | 12 | 4.8 | 2.3 | 3.3 | 3.2 |
| Zinc | 18 | 1,320 | 584 | 933 | 1,030 |
| **12331800--Clark Fork near Drummond<br>Period of record for bed-sediment data: 1986–87, 1991–2009** | | | | | |
| Arsenic | 7 | 66 | 31 | 39 | 33 |
| Cadmium | 21 | 7.7 | 2.6 | 4.5 | 4.3 |
| Chromium | 16 | 41.9 | 17.0 | 28.7 | 30.7 |
| Copper | 21 | 747 | 303 | 477 | 469 |
| Iron | 21 | 43,700 | 16,500 | 23,500 | 23,200 |
| Lead | 21 | 135 | 59 | 89 | 85 |
| Manganese | 21 | 4,820 | 1,150 | 2,150 | 1,890 |
| Nickel | 17 | 16.8 | 9.3 | 13.4 | 13.7 |
| Silver | 15 | 4.7 | <3.2 | [1]3.0 | [1]2.9 |
| Zinc | 21 | 1,230 | 673 | 960 | 948 |
| **12334550--Clark Fork at Turah Bridge, near Bonner<br>Period of record for bed-sediment data: 1986, 1991–2009** | | | | | |
| Arsenic | 7 | 43 | 19 | 27 | 25 |
| Cadmium | 20 | 7.3 | 1.9 | 3.7 | 3.6 |
| Chromium | 16 | 42.5 | 15.3 | 25.6 | 27.2 |
| Copper | 20 | 635 | 211 | 350 | 322 |
| Iron | 20 | 25,900 | 12,600 | 19,100 | 17,300 |
| Lead | 20 | 115 | 47 | 68 | 64 |
| Manganese | 20 | 2,340 | 671 | 1,320 | 1,300 |
| Nickel | 17 | 19.1 | 6.9 | 12.4 | 11.5 |
| Silver | 14 | 3.9 | <1.9 | [1]2.1 | [1]1.9 |
| Zinc | 20 | 1,160 | 584 | 813 | 786 |

**Table 26.** Statistical summary of long-term bed-sediment data for the upper Clark Fork basin, Montana, August 1986 through August 2009.—Continued

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

| Constituent | Number of samples | Maximum | Minimum | Mean | Median |
|---|---|---|---|---|---|
| **12340000--Blackfoot River near Bonner<br>Period of record for bed-sediment data: 1986–87, 1991, 1993–96, 1998–2001, 2003, 2006–09** | | | | | |
| Arsenic | 5 | 6 | <0.2 | [1]3 | [1]3 |
| Cadmium | 16 | 2.0 | <.2 | [1].6 | [1].4 |
| Chromium | 12 | 35.2 | 15.1 | 22.7 | 22.8 |
| Copper | 16 | 27 | 11 | 20 | 21 |
| Iron | 16 | 23,000 | 12,400 | 17,800 | 18,200 |
| Lead | 16 | 20 | <13 | [1]13 | [1]13 |
| Manganese | 16 | 746 | 298 | 539 | 543 |
| Nickel | 13 | 14.3 | 6.0 | 11.5 | 11.8 |
| Silver | 12 | <1.9 | <.3 | [1].5 | [1]<.6 |
| Zinc | 16 | 82 | 35 | 62 | 63 |
| **12340500--Clark Fork above Missoula<br>Period of record for bed-sediment data: 1997–2009** | | | | | |
| Arsenic | 7 | 54 | 17 | 35 | 33 |
| Cadmium | 13 | 5.8 | 1.5 | 3.4 | 3.4 |
| Chromium | 12 | 40.7 | 19.0 | 27.2 | 27.3 |
| Copper | 13 | 551 | 166 | 377 | 411 |
| Iron | 13 | 27,000 | 18,100 | 21,300 | 20,700 |
| Lead | 13 | 78 | 37 | 57 | 60 |
| Manganese | 13 | 2,250 | 477 | 1,120 | 1,120 |
| Nickel | 13 | 15.8 | 7.6 | 12.8 | 13.0 |
| Silver | 7 | 2.9 | .8 | [1]2.0 | [1]2.1 |
| Zinc | 13 | 1,090 | 438 | 771 | 839 |

[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 2009.

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

| Constituent | Number of composite samples | Maximum | Minimum | Mean | Median |
|---|---|---|---|---|---|
| **12323600--Silver Bow Creek at Opportunity<br>Period of record for biological data: 1992, 1994–95, 1997–2009** | | | | | |
| *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 | 12 | 33.3 | 9.5 | 15.6 | 13.6 |
| Cadmium | 18 | 9.7 | 3.1 | 5.5 | 5.1 |
| Chromium | 18 | 8.0 | 1.0 | 3.2 | 2.8 |
| Copper | 18 | 1,090 | 269 | 431 | 378 |
| Iron | 18 | 5,890 | 689 | 2,320 | 2,030 |
| Lead | 18 | 68.3 | 19.0 | 38.7 | 39.8 |
| Manganese | 18 | 3,030 | 180 | 1,040 | 1,120 |
| Nickel | 18 | 3.6 | .7 | 2.3 | 2.3 |
| Zinc | 18 | 1,590 | 619 | 899 | 835 |
| *Hydropsyche* spp. | | | | | |
| Arsenic | 9 | 23.1 | 9.8 | 15.0 | 14.1 |
| Cadmium | 14 | 11.0 | 3.0 | 6.3 | 5.5 |
| Chromium | 14 | 4.7 | .6 | 2.4 | 2.9 |
| Copper | 14 | 930 | 223 | 523 | 462 |
| Iron | 14 | 3,250 | 1,050 | 2,060 | 2,120 |
| Lead | 14 | 237 | 21.8 | 53.0 | 40.1 |
| Manganese | 14 | 1,340 | 712 | 1,090 | 1,070 |
| Nickel | 14 | 2.7 | .7 | 2.2 | 2.4 |
| Zinc | 14 | 1,290 | 607 | 986 | 1,070 |
| *Hydropsyche tana* | | | | | |
| Arsenic | 0 | -- | -- | -- | -- |
| Cadmium | 6 | 9.2 | 4.8 | 6.8 | 6.9 |
| Chromium | 6 | 11.5 | .9 | 4.5 | 1.8 |
| Copper | 6 | 456 | 10.5 | 236 | 298 |
| Iron | 6 | 1,520 | 875 | 1,100 | 1,050 |
| Lead | 6 | 21.0 | 15.6 | 18.6 | 18.3 |
| Manganese | 6 | 969 | 307 | 634 | 675 |
| Nickel | 6 | 1.8 | .7 | 1.4 | 1.6 |
| Zinc | 6 | 1,070 | 760 | 961 | 1,020 |

**Table 27.** Statistical summary of long-term biological data for the upper Clark Fork basin, Montana, August 1986 through August 2009.—Continued

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

| Constituent | Number of composite samples | Maximum | Minimum | Mean | Median |
|---|---|---|---|---|---|
| **12323750--Silver Bow Creek at Warm Springs Period of record for biological data: 1992–2009** | | | | | |
| *Claassenia sabulosa* | | | | | |
| Arsenic | 1 | -- | -- | 1.8 | -- |
| Cadmium | 1 | -- | -- | 1.1 | -- |
| Chromium | 1 | -- | -- | 2.8 | -- |
| Copper | 1 | -- | -- | 47.6 | -- |
| Iron | 1 | -- | -- | 151 | -- |
| Lead | 1 | -- | -- | .6 | -- |
| Manganese | 1 | -- | -- | 98.1 | -- |
| Nickel | 1 | -- | -- | .5 | -- |
| Zinc | 1 | -- | -- | 400 | -- |
| *Hydropsyche cockerelli* | | | | | |
| Arsenic | 13 | 23.6 | 7.9 | 12.9 | 10.4 |
| Cadmium | 39 | 2.1 | .2 | .6 | .5 |
| Chromium | 39 | 4.3 | .4 | 1.1 | .8 |
| Copper | 39 | 97.0 | 16.7 | 36.7 | 29.9 |
| Iron | 39 | 1,590 | 351 | 788 | 761 |
| Lead | 39 | 5.7 | .3 | 3.0 | 2.9 |
| Manganese | 39 | 3,890 | 491 | 1,290 | 1,010 |
| Nickel | 39 | 1.8 | .3 | .9 | .8 |
| Zinc | 39 | 276 | 115 | 174 | 167 |
| *Hydropsyche occidentalis* | | | | | |
| Arsenic | 6 | 31.0 | 10.5 | 20.5 | 21.8 |
| Cadmium | 21 | 1.6 | .2 | .6 | .4 |
| Chromium | 21 | 6.8 | .3 | 1.7 | 1.0 |
| Copper | 21 | 48.9 | 11.0 | 32.4 | 31.2 |
| Iron | 21 | 2,960 | 372 | 1,200 | 980 |
| Lead | 21 | 8.2 | <1.7 | [1]3.9 | [1]3.6 |
| Manganese | 21 | 6,940 | 1,200 | 2,530 | 2,140 |
| Nickel | 21 | 2.7 | .7 | 1.5 | 1.4 |
| Zinc | 21 | 220 | 140 | 179 | 181 |
| *Hydropsyche* spp. | | | | | |
| Arsenic | 1 | -- | -- | 14.0 | -- |
| Cadmium | 5 | 2.3 | 0.4 | 1.0 | 0.6 |
| Chromium | 5 | 2.5 | .5 | 1.4 | 1.3 |
| Copper | 5 | 47.6 | 34.9 | 39.9 | 40.4 |
| Iron | 5 | 1,100 | 561 | 763 | 767 |
| Lead | 5 | 5.1 | 1.9 | 4.0 | 4.5 |
| Manganese | 5 | 1,190 | 443 | 817 | 804 |
| Nickel | 5 | 1.9 | <.4 | [1]1.0 | [1].8 |
| Zinc | 5 | 284 | 141 | 188 | 162 |

**Table 27.** Statistical summary of long-term biological data for the upper Clark Fork basin, Montana, August 1986 through August 2009.—Continued

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

| Constituent | Number of composite samples | Maximum | Minimum | Mean | Median |
|---|---|---|---|---|---|
| **12323770--Warm Springs Creek at Warm Springs** | | | | | |
| **Period of record for biological data: 1995, 1997, 1999, 2002, 2005, 2008** | | | | | |
| *Arctopsyche grandis* | | | | | |
| Arsenic | 3 | 9.8 | 9.5 | 9.6 | 9.6 |
| Cadmium | 7 | 3.6 | 1.9 | 2.8 | 3.0 |
| Chromium | 7 | 2.9 | .8 | 2.0 | 1.8 |
| Copper | 7 | 133 | 78.3 | 109 | 102 |
| Iron | 7 | 1,350 | 684 | 980 | 1,040 |
| Lead | 7 | 7.2 | 3.0 | [1]5.2 | [1]5.3 |
| Manganese | 7 | 3,560 | 1,340 | 2,540 | 2,480 |
| Nickel | 7 | 3.5 | 1.8 | [1]2.5 | [1]2.3 |
| Zinc | 7 | 267 | 181 | 206 | 197 |
| *Hydropsyche occidentalis* | | | | | |
| Arsenic | 3 | 13.6 | 12.7 | 13.2 | 13.3 |
| Cadmium | 5 | 1.3 | .7 | 1.0 | 1.2 |
| Chromium | 5 | 8.6 | .3 | 3.8 | 3.2 |
| Copper | 5 | 183 | 125 | 158 | 165 |
| Iron | 5 | 2,360 | 1,590 | 1,940 | 1,950 |
| Lead | 5 | 12.6 | 6.7 | 8.5 | 7.7 |
| Manganese | 5 | 3,190 | 2,400 | 2,800 | 2,880 |
| Nickel | 5 | 4.5 | 2.0 | 3.0 | 3.0 |
| Zinc | 5 | 204 | 148 | 169 | 166 |
| *Hydropsyche* spp. | | | | | |
| Arsenic | 0 | -- | -- | -- | -- |
| Cadmium | 2 | 1.1 | 0.6 | 0.9 | -- |
| Chromium | 2 | 1.6 | 1.4 | 1.5 | -- |
| Copper | 2 | 95.9 | 94.8 | 95.3 | -- |
| Iron | 2 | 1,220 | 1,150 | 1,190 | -- |
| Lead | 2 | 5.9 | 5.2 | 5.6 | -- |
| Manganese | 2 | 3,390 | 956 | 2,170 | -- |
| Nickel | 2 | 2.0 | 1.8 | 1.9 | -- |
| Zinc | 2 | 129 | 125 | 127 | -- |

**Table 27.** Statistical summary of long-term biological data for the upper Clark Fork basin, Montana, August 1986 through August 2009.—Continued

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

| Constituent | Number of composite samples | Maximum | Minimum | Mean | Median |
|---|---|---|---|---|---|
| **12323800--Clark Fork near Galen** | | | | | |
| **Period of record for biological data: 1987, 1991–2009** | | | | | |
| *Claassenia sabulosa* | | | | | |
| Arsenic | 1 | -- | -- | 2.0 | -- |
| Cadmium | 1 | -- | -- | .2 | -- |
| Chromium | 1 | -- | -- | 1.5 | -- |
| Copper | 1 | -- | -- | 54.7 | -- |
| Iron | 1 | -- | -- | 242 | -- |
| Lead | 1 | -- | -- | 1.0 | -- |
| Manganese | 1 | -- | -- | 323 | -- |
| Nickel | 1 | -- | -- | .5 | -- |
| Zinc | 1 | -- | -- | 237 | -- |
| *Hydropsyche cockerelli* | | | | | |
| Arsenic | 8 | 15.8 | 13.2 | 14.1 | 13.8 |
| Cadmium | 33 | 2.7 | .7 | 1.5 | 1.5 |
| Chromium | 33 | 4.4 | .8 | 1.9 | 1.7 |
| Copper | 33 | 181 | 48.7 | 105 | 102 |
| Iron | 33 | 2,660 | 816 | 1,470 | 1,400 |
| Lead | 33 | 11.8 | 1.2 | 8.1 | 7.8 |
| Manganese | 33 | 3,620 | 1,070 | 2,250 | 2,200 |
| Nickel | 33 | 6.5 | .9 | 1.8 | 1.6 |
| Zinc | 33 | 299 | 136 | 210 | 205 |
| *Hydropsyche morosa* group | | | | | |
| Arsenic | 0 | -- | -- | -- | -- |
| Cadmium | 5 | 3.2 | 2.4 | 2.5 | 2.4 |
| Chromium | 5 | 4.6 | 1.8 | 2.6 | 2.2 |
| Copper | 5 | 185 | 156 | 173 | 175 |
| Iron | 5 | 1,890 | 1,360 | 1,510 | 1,430 |
| Lead | 5 | 12.4 | 7.1 | 8.5 | 7.9 |
| Manganese | 5 | 3,960 | 2,360 | 3,500 | 3,860 |
| Nickel | 5 | 3.6 | 1.9 | 2.3 | 2.1 |
| Zinc | 5 | 349 | 292 | 309 | 303 |

**Table 27.** Statistical summary of long-term biological data for the upper Clark Fork basin, Montana, August 1986 through August 2009.—Continued

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

| Constituent | Number of composite samples | Maximum | Minimum | Mean | Median |
|---|---|---|---|---|---|
| **12323800--Clark Fork near Galen—Continued** | | | | | |
| **Period of record for biological data: 1987, 1991–2009** | | | | | |
| *Hydropsyche occidentalis* | | | | | |
| Arsenic | 11 | 17.0 | 12.5 | 15.2 | 15.9 |
| Cadmium | 43 | 1.7 | .6 | 1.1 | 1.2 |
| Chromium | 43 | 6.6 | .4 | 2.0 | 1.7 |
| Copper | 43 | 151 | 49.2 | 87.5 | 83.8 |
| Iron | 43 | 2,590 | 642 | 1,380 | 1,300 |
| Lead | 43 | 13.5 | 1.6 | 7.6 | 7.3 |
| Manganese | 43 | 6,170 | 1,220 | 2,700 | 2,280 |
| Nickel | 43 | 3.5 | .8 | 1.7 | 1.6 |
| Zinc | 43 | 286 | 168 | 203 | 198 |
| *Hydropsyche tana* | | | | | |
| Arsenic | 0 | -- | -- | -- | -- |
| Cadmium | 1 | -- | -- | 1.5 | -- |
| Chromium | 1 | -- | -- | 1.4 | -- |
| Copper | 1 | -- | -- | 92.9 | -- |
| Iron | 1 | -- | -- | 1,340 | -- |
| Lead | 1 | -- | -- | 9.0 | -- |
| Manganese | 1 | -- | -- | 2,160 | -- |
| Nickel | 1 | -- | -- | 2.1 | -- |
| Zinc | 1 | -- | -- | 206 | -- |
| *Hydropsyche* spp. | | | | | |
| Arsenic | 3 | 15.7 | 14.2 | 14.8 | 14.5 |
| Cadmium | 7 | 3.5 | .8 | 2.1 | 2.6 |
| Chromium | 3 | 2.4 | 1.9 | 2.2 | 2.2 |
| Copper | 7 | 154 | 78.4 | 126 | 135 |
| Iron | 7 | 2,110 | 1,190 | 1,460 | 1,430 |
| Lead | 7 | 13.5 | 5.9 | 10.4 | 10.6 |
| Manganese | 3 | 4,760 | 1,520 | 3,560 | 4,400 |
| Nickel | 3 | 2.7 | 1.5 | 2.0 | 1.8 |
| Zinc | 7 | 329 | 197 | 268 | 279 |

**Table 27.** Statistical summary of long-term biological data for the upper Clark Fork basin, Montana, August 1986 through August 2009.—Continued

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

| Constituent | Number of composite samples | Maximum | Minimum | Mean | Median |
|---|---|---|---|---|---|
| **461415112450801--Clark Fork below Lost Creek, near Galen<br>Period of record for biological data: 1996–2009** | | | | | |
| *Claassenia sabulosa* | | | | | |
| Arsenic | 1 | -- | -- | 1.5 | -- |
| Cadmium | 2 | 0.4 | 0.3 | .4 | -- |
| Chromium | 2 | 1.9 | .4 | 1.2 | -- |
| Copper | 2 | 70.1 | 67.1 | 68.6 | -- |
| Iron | 2 | 209 | 189 | 199 | -- |
| Lead | 2 | 1.2 | .7 | 1.0 | -- |
| Manganese | 2 | 238 | 90.4 | 164 | -- |
| Nickel | 2 | .2 | <.2 | [1].1 | -- |
| Zinc | 2 | 245 | 208 | 226 | -- |
| *Hydropsyche cockerelli* | | | | | |
| Arsenic | 11 | 27.8 | 8.8 | 14.3 | 11.6 |
| Cadmium | 22 | 2.8 | 1.1 | 1.8 | 1.6 |
| Chromium | 22 | 3.6 | .8 | 2.0 | 2.0 |
| Copper | 22 | 338 | 48.8 | 134 | 113 |
| Iron | 22 | 4,080 | 691 | 1,530 | 1,180 |
| Lead | 22 | 28.6 | 4.5 | 11.6 | 9.0 |
| Manganese | 22 | 3,160 | 1,230 | 1,850 | 1,720 |
| Nickel | 22 | 2.8 | .9 | 1.4 | 1.2 |
| Zinc | 22 | 339 | 151 | 228 | 223 |
| *Hydropsyche occidentalis* | | | | | |
| Arsenic | 9 | 20.9 | 12.7 | 15.8 | 15.0 |
| Cadmium | 23 | 1.9 | .9 | 1.4 | 1.4 |
| Chromium | 23 | 3.6 | 1.2 | 2.1 | 2.0 |
| Copper | 23 | 219 | 52.1 | 117 | 119 |
| Iron | 23 | 2,830 | 963 | 1,650 | 1,510 |
| Lead | 23 | 19.4 | 6.6 | 11.0 | 10.7 |
| Manganese | 23 | 4,150 | 1,220 | 2,540 | 2,190 |
| Nickel | 23 | 3.0 | .9 | 1.6 | 1.5 |
| Zinc | 23 | 308 | 174 | 243 | 245 |
| *Hydropsyche* spp. | | | | | |
| Arsenic | 2 | 14.5 | 12.0 | 13.2 | -- |
| Cadmium | 6 | 1.8 | 1.2 | 1.4 | 1.4 |
| Chromium | 6 | 2.4 | .9 | 1.4 | 1.3 |
| Copper | 6 | 153 | 45.1 | 102 | 112 |
| Iron | 6 | 1,810 | 533 | 1,220 | 1,270 |
| Lead | 6 | 20.5 | 4.1 | 10.6 | 9.2 |
| Manganese | 6 | 1,980 | 799 | 1,430 | 1,310 |
| Nickel | 6 | 2.8 | 1.0 | 1.8 | 1.4 |
| Zinc | 6 | 228 | 143 | 187 | 183 |

**Table 27.** Statistical summary of long-term biological data for the upper Clark Fork basin, Montana, August 1986 through August 2009.—Continued

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

| Constituent | Number of composite samples | Maximum | Minimum | Mean | Median |
|---|---|---|---|---|---|
| **461559112443301--Clark Fork at county bridge, near Racetrack Period of record for biological data: 1996–2009** | | | | | |
| *Claassenia sabulosa* | | | | | |
| Arsenic | 0 | -- | -- | -- | -- |
| Cadmium | 1 | -- | -- | 0.4 | -- |
| Chromium | 1 | -- | -- | .3 | -- |
| Copper | 1 | -- | -- | 40.3 | -- |
| Iron | 1 | -- | -- | 113 | -- |
| Lead | 1 | -- | -- | .8 | -- |
| Manganese | 1 | -- | -- | 172 | -- |
| Nickel | 1 | -- | -- | .2 | -- |
| Zinc | 1 | -- | -- | 213 | -- |
| *Hydropsyche cockerelli* | | | | | |
| Arsenic | 10 | 20.2 | 11.1 | 14.1 | 13.1 |
| Cadmium | 21 | 2.0 | .8 | 1.5 | 1.5 |
| Chromium | 21 | 2.8 | .6 | 1.7 | 1.4 |
| Copper | 21 | 198 | 50.0 | 102 | 98.2 |
| Iron | 21 | 3,330 | 657 | 1,270 | 992 |
| Lead | 21 | 17.2 | 3.7 | 8.7 | 7.5 |
| Manganese | 21 | 2,360 | 646 | 1,630 | 1,900 |
| Nickel | 21 | 2.0 | .7 | 1.2 | 1.0 |
| Zinc | 21 | 302 | 139 | 193 | 186 |
| *Hydropsyche occidentalis* | | | | | |
| Arsenic | 8 | 16.8 | 11.6 | 14.7 | 14.9 |
| Cadmium | 21 | 2.3 | .7 | 1.5 | 1.4 |
| Chromium | 21 | 3.6 | 1.1 | 2.2 | 2.2 |
| Copper | 21 | 164 | 59.5 | 117 | 134 |
| Iron | 21 | 3,690 | 1,030 | 1,730 | 1,620 |
| Lead | 21 | 15.7 | 4.3 | 11.0 | 10.7 |
| Manganese | 21 | 3,770 | 1,090 | 2,200 | 2,100 |
| Nickel | 21 | 2.3 | 1.1 | 1.5 | 1.3 |
| Zinc | 21 | 361 | 181 | 237 | 230 |
| *Hydropsyche* spp. | | | | | |
| Arsenic | 3 | 12.8 | 11.9 | 12.5 | 12.7 |
| Cadmium | 5 | 2.4 | 1.0 | 1.6 | 1.5 |
| Chromium | 5 | 3.9 | .7 | 2.0 | 1.7 |
| Copper | 5 | 144 | 82.9 | 110 | 113 |
| Iron | 5 | 1,880 | 1,140 | 1,430 | 1,290 |
| Lead | 5 | 15.0 | 5.7 | 10.2 | 9.6 |
| Manganese | 5 | 2,370 | 910 | 1,480 | 1,400 |
| Nickel | 5 | 2.0 | 1.1 | 1.5 | 1.4 |
| Zinc | 5 | 228 | 151 | 197 | 208 |

**Table 27.** Statistical summary of long-term biological data for the upper Clark Fork basin, Montana, August 1986 through August 2009.—Continued

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

| Constituent | Number of composite samples | Maximum | Minimum | Mean | Median |
|---|---|---|---|---|---|
| **461903112440701--Clark Fork at Dempsey Creek diversion, near Racetrack Period of record for biological data: 1996–2009** | | | | | |
| *Arctopsyche grandis* | | | | | |
| Arsenic | 1 | -- | -- | 11.8 | -- |
| Cadmium | 2 | 7.1 | 1.7 | 4.4 | -- |
| Chromium | 2 | 12.9 | <2.4 | [1]7.0 | -- |
| Copper | 2 | 151 | 30.8 | 91.0 | -- |
| Iron | 2 | 1,500 | 340 | 922 | -- |
| Lead | 2 | 12.4 | <14.5 | [1]9.8 | -- |
| Manganese | 2 | 1,190 | 510 | 852 | -- |
| Nickel | 2 | 2.3 | 1.0 | 1.7 | -- |
| Zinc | 2 | 489 | 86.8 | 288 | -- |
| *Claassenia sabulosa* | | | | | |
| Arsenic | 1 | -- | -- | 3.1 | -- |
| Cadmium | 1 | -- | -- | 2.4 | -- |
| Chromium | 1 | -- | -- | 1.7 | -- |
| Copper | 1 | -- | -- | 73.4 | -- |
| Iron | 1 | -- | -- | 297 | -- |
| Lead | 1 | -- | -- | 1.9 | -- |
| Manganese | 1 | -- | -- | 115 | -- |
| Nickel | 1 | -- | -- | .4 | -- |
| Zinc | 1 | -- | -- | 330 | -- |
| *Hydropsyche cockerelli* | | | | | |
| Arsenic | 9 | 18.8 | 8.0 | 13.0 | 10.4 |
| Cadmium | 18 | 2.0 | .7 | 1.3 | 1.3 |
| Chromium | 18 | 4.0 | .5 | 1.6 | 1.3 |
| Copper | 18 | 247 | 60.7 | 113 | 90.2 |
| Iron | 18 | 3,010 | 552 | 1,200 | 923 |
| Lead | 18 | 21.9 | 3.5 | 8.7 | 7.3 |
| Manganese | 18 | 2,650 | 487 | 1,370 | 1,230 |
| Nickel | 18 | 2.5 | .5 | 1.2 | 1.0 |
| Zinc | 18 | 279 | 162 | 208 | 190 |

**Table 27.** Statistical summary of long-term biological data for the upper Clark Fork basin, Montana, August 1986 through August 2009.—Continued

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

| Constituent | Number of composite samples | Maximum | Minimum | Mean | Median |
|---|---|---|---|---|---|
| **461903112440701--Clark Fork at Dempsey Creek diversion, near Racetrack—Continued Period of record for biological data: 1996–2009** | | | | | |
| *Hydropsyche occidentalis* | | | | | |
| Arsenic | 10 | 24.0 | 10.2 | 15.3 | 15.9 |
| Cadmium | 27 | 2.4 | .7 | 1.3 | 1.2 |
| Chromium | 27 | 6.2 | .8 | 2.1 | 1.9 |
| Copper | 27 | 238 | 74.9 | 116 | 92.5 |
| Iron | 27 | 3,390 | 940 | 1,620 | 1,510 |
| Lead | 27 | 27.0 | 6.1 | 12.1 | 11.4 |
| Manganese | 27 | 4,460 | 826 | 2,650 | 2,320 |
| Nickel | 27 | 2.4 | 1.2 | 1.6 | 1.5 |
| Zinc | 27 | 386 | 211 | 265 | 249 |
| *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 2009.—Continued

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

| Constituent | Number of composite samples | Maximum | Minimum | Mean | Median |
|---|---|---|---|---|---|
| **12324200--Clark Fork at Deer Lodge<br>Period of record for biological data: 1986–87, 1990–2009** | | | | | |
| *Arctopsyche grandis* | | | | | |
| Arsenic | 1 | -- | -- | 8.3 | -- |
| Cadmium | 3 | 3.1 | <4.2 | [1]2.5 | [1]2.4 |
| Chromium | 3 | 4.7 | <1.3 | [1]2.1 | [1]1.0 |
| Copper | 3 | 90.5 | 34.9 | 64.8 | 69.1 |
| Iron | 3 | 844 | 537 | 686 | 676 |
| Lead | 3 | 9.5 | 3.8 | [1]5.7 | [1]<7.8 |
| Manganese | 3 | 1,010 | 380 | 706 | 727 |
| Nickel | 3 | 1.1 | <1.3 | [1].9 | [1]<1.7 |
| Zinc | 3 | 315 | 140 | 211 | 178.0 |
| *Hydropsyche cockerelli* | | | | | |
| Arsenic | 6 | 11.4 | 5.8 | 8.2 | 7.8 |
| Cadmium | 29 | 3.5 | .6 | 1.4 | 1.3 |
| Chromium | 29 | 3.2 | .4 | 1.6 | 1.7 |
| Copper | 29 | 180 | 54.7 | 98.2 | 98.2 |
| Iron | 29 | 3,340 | 490 | 1,120 | 1,040 |
| Lead | 29 | 18.1 | 3.8 | 9.5 | 8.9 |
| Manganese | 29 | 1,570 | 396 | 879 | 815 |
| Nickel | 29 | 2.4 | .3 | 1.1 | 1.0 |
| Zinc | 29 | 391 | 132 | 190 | 185 |
| *Hydropsyche occidentalis* | | | | | |
| Arsenic | 13 | 12.7 | 6.6 | 10.3 | 10.6 |
| Cadmium | 50 | 3.4 | .6 | 1.4 | 1.3 |
| Chromium | 50 | 3.6 | .6 | 1.9 | 1.9 |
| Copper | 50 | 180 | 49.4 | 119 | 113 |
| Iron | 50 | 2,060 | 557 | 1,420 | 1,420 |
| Lead | 50 | 18.6 | 3.5 | 11.5 | 11.4 |
| Manganese | 50 | 2,850 | 649 | 1,710 | 1,720 |
| Nickel | 50 | 12.9 | 1.0 | 1.7 | 1.4 |
| Zinc | 50 | 346 | 166 | 245 | 237 |
| *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 |

**Table 27.** Statistical summary of long-term biological data for the upper Clark Fork basin, Montana, August 1986 through August 2009.—Continued

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

| Constituent | Number of composite samples | Maximum | Minimum | Mean | Median |
|---|---|---|---|---|---|
| **12324400--Clark Fork above Little Blackfoot River, near Garrison** | | | | | |
| **Period of record for biological data: 2009** | | | | | |
| *Arctopsyche grandis* | | | | | |
| Arsenic | 1 | -- | -- | 6.0 | -- |
| Cadmium | 1 | -- | -- | 3.2 | -- |
| Chromium | 1 | -- | -- | 1.9 | -- |
| Copper | 1 | -- | -- | 65.7 | -- |
| Iron | 1 | -- | -- | 694 | -- |
| Lead | 1 | -- | -- | 6.6 | -- |
| Manganese | 1 | -- | -- | 990 | -- |
| Nickel | 1 | -- | -- | .7 | -- |
| Zinc | 1 | -- | -- | 253 | -- |
| *Hydropsyche cockerelli* | | | | | |
| Arsenic | 1 | -- | -- | 11.1 | -- |
| Cadmium | 1 | -- | -- | 4.0 | -- |
| Chromium | 1 | -- | -- | 3.4 | -- |
| Copper | 1 | -- | -- | 158 | -- |
| Iron | 1 | -- | -- | 2,150 | -- |
| Lead | 1 | -- | -- | 18.8 | -- |
| Manganese | 1 | -- | -- | 1,500 | -- |
| Nickel | 1 | -- | -- | 1.7 | -- |
| Zinc | 1 | -- | -- | 284 | -- |
| *Hydropsyche occidentalis* | | | | | |
| Arsenic | 2 | 14.7 | 11.1 | 12.9 | -- |
| Cadmium | 2 | 2.5 | 2.5 | 2.5 | -- |
| Chromium | 2 | 2.0 | .7 | 1.3 | -- |
| Copper | 2 | 144 | 138 | 141 | -- |
| Iron | 2 | 2,000 | 1,890 | 1,940 | -- |
| Lead | 2 | 17.9 | 17.4 | 17.6 | -- |
| Manganese | 2 | 1,610 | 1,560 | 1,580 | -- |
| Nickel | 2 | 1.7 | 1.6 | 1.7 | -- |
| Zinc | 2 | 265 | 264 | 265 | -- |

**Table 27.** Statistical summary of long-term biological data for the upper Clark Fork basin, Montana, August 1986 through August 2009.—Continued

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

| Constituent | Number of composite samples | Maximum | Minimum | Mean | Median |
|---|---|---|---|---|---|
| **12324680--Clark Fork at Goldcreek<br>Period of record for biological data: 1992–2009** | | | | | |
| *Arctopsyche grandis* | | | | | |
| Arsenic | 25 | 6.9 | 1.8 | 4.0 | 3.3 |
| Cadmium | 54 | 6.6 | .6 | 1.9 | 1.7 |
| Chromium | 54 | 3.3 | .1 | 1.2 | 1.0 |
| Copper | 54 | 129 | 19.9 | 43.0 | 33.0 |
| Iron | 54 | 2,360 | 195 | 663 | 488 |
| Lead | 54 | 10.9 | 1.0 | 3.4 | 3.3 |
| Manganese | 54 | 1,580 | 436 | 858 | 860 |
| Nickel | 54 | 1.8 | .2 | .7 | .6 |
| Zinc | 54 | 326 | 146 | 197 | 181 |
| *Claassenia sabulosa* | | | | | |
| Arsenic | 18 | 2.1 | 0.4 | 1.3 | 1.4 |
| Cadmium | 38 | 3.5 | .1 | 1.0 | .7 |
| Chromium | 38 | 1.6 | .2 | .5 | .5 |
| Copper | 38 | 81.7 | 33.0 | 58.6 | 58.0 |
| Iron | 38 | 567 | 63.0 | 183 | 161 |
| Lead | 38 | 1.8 | .4 | .9 | .8 |
| Manganese | 38 | 320 | 50.6 | 153 | 132 |
| Nickel | 38 | .7 | .1 | .3 | .3 |
| Zinc | 38 | 351 | 166 | 262 | 258 |
| *Hydropsyche cockerelli* | | | | | |
| Arsenic | 15 | 9.8 | 4.1 | 5.7 | 5.6 |
| Cadmium | 34 | 2.6 | .5 | 1.4 | 1.2 |
| Chromium | 34 | 4.7 | .5 | 2.0 | 1.9 |
| Copper | 34 | 188 | 17.1 | 71.1 | 58.0 |
| Iron | 34 | 3,250 | 522 | 1,120 | 872 |
| Lead | 34 | 16.2 | 2.4 | 6.4 | 5.3 |
| Manganese | 34 | 1,710 | 538 | 993 | 959 |
| Nickel | 34 | 2.3 | .3 | 1.2 | 1.0 |
| Zinc | 34 | 269 | 106 | 188 | 185 |

**Table 27.** Statistical summary of long-term biological data for the upper Clark Fork basin, Montana, August 1986 through August 2009.—Continued

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

| Constituent | Number of composite samples | Maximum | Minimum | Mean | Median |
|---|---|---|---|---|---|
| **12324680--Clark Fork at Goldcreek—Continued Period of record for biological data: 1992–2009** | | | | | |
| *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 | 8 | 8.1 | 4.7 | 6.0 | 5.6 |
| Cadmium | 23 | 2.3 | .4 | 1.3 | 1.3 |
| Chromium | 23 | 3.9 | .4 | 1.7 | 1.7 |
| Copper | 23 | 156 | 26.4 | 66.1 | 58.3 |
| Iron | 23 | 2,720 | 466 | 1,160 | 1,100 |
| Lead | 23 | 15.7 | 2.9 | 7.0 | 6.0 |
| Manganese | 23 | 2,210 | 530 | 1,280 | 1,290 |
| Nickel | 23 | 2.5 | .8 | 1.2 | 1.1 |
| Zinc | 23 | 277 | 97.0 | 201 | 204 |

**Table 27.** Statistical summary of long-term biological data for the upper Clark Fork basin, Montana, August 1986 through August 2009.—Continued

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

| Constituent | Number of composite samples | Maximum | Minimum | Mean | Median |
|---|---|---|---|---|---|
| **12331800--Clark Fork near Drummond** | | | | | |
| **Period of record for biological data: 1986, 1991–2009** | | | | | |
| *Arctopsyche grandis* | | | | | |
| Arsenic | 17 | 5.3 | 2.3 | 3.6 | 3.6 |
| Cadmium | 49 | 3.8 | .4 | 1.3 | 1.1 |
| Chromium | 49 | 3.3 | .2 | 1.0 | 1.0 |
| Copper | 49 | 89.2 | 16.9 | 32.4 | 28.1 |
| Iron | 49 | 1,660 | 193 | 584 | 511 |
| Lead | 49 | 11.8 | 1.6 | 4.5 | 3.9 |
| Manganese | 49 | 2,010 | 456 | 841 | 740 |
| Nickel | 49 | 1.9 | .2 | .7 | .6 |
| Zinc | 49 | 308 | 140 | 192 | 186 |
| *Claassenia sabulosa* | | | | | |
| Arsenic | 15 | 1.8 | 0.7 | 1.2 | 1.2 |
| Cadmium | 51 | 2.8 | .1 | 1.0 | 1.0 |
| Chromium | 51 | 3.3 | .1 | .7 | .6 |
| Copper | 51 | 165 | 18.0 | 64.9 | 60.6 |
| Iron | 51 | 387 | 45.4 | 164 | 145 |
| Lead | 51 | 2.9 | .2 | 1.0 | .9 |
| Manganese | 51 | 748 | 33.1 | 187 | 150 |
| Nickel | 51 | 1.1 | .1 | [1].3 | [1].2 |
| Zinc | 51 | 567 | 103 | 274 | 261 |
| *Hydropsyche cockerelli* | | | | | |
| Arsenic | 12 | 7.1 | 3.9 | 5.3 | 5.1 |
| Cadmium | 41 | 2.3 | .3 | 1.1 | .9 |
| Chromium | 41 | 3.5 | .4 | 1.6 | 1.6 |
| Copper | 41 | 156 | 30.0 | 58.4 | 52.3 |
| Iron | 41 | 2,500 | 506 | 1,170 | 984 |
| Lead | 41 | 15.0 | 4.7 | 8.4 | 7.7 |
| Manganese | 41 | 1,680 | 549 | 1,000 | 929 |
| Nickel | 41 | 2.0 | .5 | 1.1 | 1.1 |
| Zinc | 41 | 248 | 134 | 194 | 187 |

**Table 27.** Statistical summary of long-term biological data for the upper Clark Fork basin, Montana, August 1986 through August 2009.—Continued

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

| Constituent | Number of composite samples | Maximum | Minimum | Mean | Median |
|---|---|---|---|---|---|
| **12331800--Clark Fork near Drummond—Continued** | | | | | |
| **Period of record for biological data: 1986, 1991–2009** | | | | | |
| *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 | 11 | 6.9 | 4.3 | 5.3 | 5.1 |
| Cadmium | 27 | 2.0 | .4 | 1.0 | 1.0 |
| Chromium | 27 | 8.1 | .4 | 2.3 | 2.1 |
| Copper | 27 | 118 | 13.3 | 55.0 | 55.1 |
| Iron | 27 | 2,060 | 424 | 1,220 | 1,180 |
| Lead | 27 | 14.0 | 2.9 | 8.5 | 8.4 |
| Manganese | 27 | 2,920 | 619 | 1,470 | 1,220 |
| Nickel | 27 | 2.4 | .5 | 1.3 | 1.2 |
| Zinc | 27 | 293 | 157 | 221 | 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 2009.—Continued

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

| Constituent | Number of composite samples | Maximum | Minimum | Mean | Median |
|---|---|---|---|---|---|
| **12334550--Clark Fork at Turah Bridge, near Bonner Period of record for biological data: 1986, 1991–2009** | | | | | |
| *Arctopsyche grandis* | | | | | |
| Arsenic | 22 | 6.1 | 3.1 | 4.5 | 4.5 |
| Cadmium | 64 | 2.7 | .4 | 1.2 | .9 |
| Chromium | 64 | 4.1 | .5 | 1.6 | 1.4 |
| Copper | 64 | 125 | 20.1 | 37.2 | 31.9 |
| Iron | 64 | 2,870 | 372 | 916 | 792 |
| Lead | 64 | 13.2 | 1.6 | 4.3 | 3.7 |
| Manganese | 64 | 902 | 324 | 646 | 661 |
| Nickel | 64 | 2.6 | .4 | 1.1 | .9 |
| Zinc | 64 | 276 | 111 | 198 | 197 |
| *Claassenia sabulosa* | | | | | |
| Arsenic | 15 | 1.9 | 0.5 | 1.1 | 1.1 |
| Cadmium | 41 | 2.5 | .1 | 1.0 | .8 |
| Chromium | 41 | 2.0 | .2 | .7 | .6 |
| Copper | 41 | 95.1 | 37.5 | 60.2 | 56.7 |
| Iron | 41 | 340 | 58.6 | 127 | 112 |
| Lead | 41 | 1.6 | .2 | .7 | .6 |
| Manganese | 41 | 229 | 37.2 | 98.5 | 80.4 |
| Nickel | 41 | .6 | .04 | .2 | .2 |
| Zinc | 41 | 342 | 144 | 231 | 235 |
| *Hydropsyche cockerelli* | | | | | |
| Arsenic | 16 | 6.0 | 3.7 | 4.7 | 4.9 |
| Cadmium | 44 | 1.8 | .3 | .8 | .7 |
| Chromium | 44 | 8.0 | .2 | 2.0 | 1.7 |
| Copper | 44 | 118 | 26.4 | 48.5 | 44.1 |
| Iron | 44 | 2,530 | 566 | 1,220 | 1,120 |
| Lead | 44 | 12.1 | 2.2 | 5.4 | 5.0 |
| Manganese | 44 | 831 | 426 | 640 | 657 |
| Nickel | 44 | 2.6 | .6 | 1.3 | 1.3 |
| Zinc | 44 | 228 | 119 | 186 | 193 |

**Table 27.** Statistical summary of long-term biological data for the upper Clark Fork basin, Montana, August 1986 through August 2009.—Continued

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

| Constituent | Number of composite samples | Maximum | Minimum | Mean | Median |
|---|---|---|---|---|---|
| **12334550--Clark Fork at Turah Bridge, near Bonner—Continued** | | | | | |
| **Period of record for biological data: 1986, 1991–2009** | | | | | |
| *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 | 12 | 5.9 | 3.6 | 4.5 | 4.3 |
| Cadmium | 32 | 1.8 | .3 | .9 | .9 |
| Chromium | 32 | 5.0 | .6 | 1.9 | 1.7 |
| Copper | 32 | 102 | 27.4 | 48.2 | 44.8 |
| Iron | 32 | 2,310 | 472 | 1,230 | 1,150 |
| Lead | 32 | 14.2 | 3.0 | 6.4 | 5.6 |
| Manganese | 32 | 1,600 | 454 | 869 | 800 |
| Nickel | 32 | 3.2 | .6 | 1.3 | 1.2 |
| Zinc | 32 | 416 | 145 | 213 | 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 2009.—Continued

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

| Constituent | Number of composite samples | Maximum | Minimum | Mean | Median |
|---|---|---|---|---|---|
| **12340000--Blackfoot River near Bonner** | | | | | |
| **Period of record for biological data: 1986–87, 1991, 1993, 1996, 1998, 2000, 2003, 2006–09** | | | | | |
| *Arctopsyche grandis* | | | | | |
| Arsenic | 5 | 4.6 | 1.6 | 2.7 | 2.2 |
| Cadmium | 15 | .4 | .1 | .2 | .2 |
| Chromium | 10 | 6.9 | .5 | 2.1 | 1.3 |
| Copper | 15 | 16.2 | 9.9 | 12.6 | 12.4 |
| Iron | 15 | 1,230 | 108 | 657 | 713 |
| Lead | 15 | 2.3 | .5 | 1.1 | .9 |
| Manganese | 10 | 633 | 286 | 477 | 496 |
| Nickel | 10 | 3.7 | .7 | 1.3 | 1.1 |
| Zinc | 15 | 156 | 123 | 140 | 138 |
| *Claassenia sabulosa* | | | | | |
| Arsenic | 7 | 3.0 | 0.3 | 1.3 | 1.1 |
| Cadmium | 18 | .2 | .1 | .1 | .1 |
| Chromium | 13 | 5.2 | .3 | 1.0 | .7 |
| Copper | 18 | 88.5 | 19.0 | 43.5 | 42.5 |
| Iron | 18 | 265 | 46.2 | 138 | 131 |
| Lead | 18 | .8 | .1 | .4 | .3 |
| Manganese | 13 | 133 | 26.3 | 84.0 | 95.5 |
| Nickel | 13 | 1.1 | .1 | .3 | .3 |
| Zinc | 18 | 328 | 117 | 223 | 203 |
| *Hydropsyche cockerelli* | | | | | |
| Arsenic | 4 | 3.1 | 2.4 | 2.9 | 3.1 |
| Cadmium | 4 | .4 | <.1 | [1].3 | [1].3 |
| Chromium | 4 | 3.8 | 2.4 | 3.1 | 3.0 |
| Copper | 4 | 16.2 | 5.6 | 12.9 | 14.9 |
| Iron | 4 | 2,390 | 1,640 | 2,000 | 1,980 |
| Lead | 4 | 2.3 | 2.0 | 2.2 | 2.2 |
| Manganese | 4 | 814 | 615 | 696 | 677 |
| Nickel | 4 | 4.6 | 1.8 | 2.7 | 2.2 |
| Zinc | 4 | 148 | 140 | 143 | 141 |

**Table 27.** Statistical summary of long-term biological data for the upper Clark Fork basin, Montana, August 1986 through August 2009.—Continued

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

| Constituent | Number of composite samples | Maximum | Minimum | Mean | Median |
|---|---|---|---|---|---|
| **12340000--Blackfoot River near Bonner—Continued** | | | | | |
| **Period of record for biological data: 1986–87, 1991, 1993, 1996, 1998, 2000, 2003, 2006–09** | | | | | |
| *Hydropsyche occidentalis* | | | | | |
| Arsenic | 6 | 3.8 | 1.9 | 2.6 | 2.4 |
| Cadmium | 18 | .5 | .1 | .2 | .2 |
| Chromium | 18 | 5.8 | .8 | 2.2 | 1.9 |
| Copper | 18 | 20.6 | 12.0 | 15.2 | 14.7 |
| Iron | 18 | 2,080 | 1,060 | 1,520 | 1,500 |
| Lead | 18 | 2.0 | .8 | 1.5 | 1.6 |
| Manganese | 18 | 798 | 414 | 549 | 512 |
| Nickel | 18 | 4.9 | .9 | 1.6 | 1.4 |
| Zinc | 18 | 163 | 116 | 140 | 144 |
| *Hydropsyche* spp. | | | | | |
| Arsenic | 0 | -- | -- | -- | -- |
| Cadmium | 1 | -- | -- | 0.6 | -- |
| Chromium | 1 | -- | -- | 1.6 | -- |
| Copper | 1 | -- | -- | 13.9 | -- |
| Iron | 1 | -- | -- | 1,140 | -- |
| Lead | 1 | -- | -- | 2.9 | -- |
| Manganese | 1 | -- | -- | 525 | -- |
| Nickel | 1 | -- | -- | 2.8 | -- |
| Zinc | 1 | -- | -- | 132 | -- |

**Table 27.** Statistical summary of long-term biological data for the upper Clark Fork basin, Montana, August 1986 through August 2009.—Continued

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

| Constituent | Number of composite samples | Maximum | Minimum | Mean | Median |
|---|---|---|---|---|---|
| **12340500--Clark Fork above Missoula<br>Period of record for biological data: 1997–2009** | | | | | |
| *Arctopsyche grandis* | | | | | |
| Arsenic | 19 | 7.2 | 2.1 | 3.9 | 3.6 |
| Cadmium | 38 | 2.2 | .1 | .8 | .6 |
| Chromium | 38 | 4.2 | .6 | 1.7 | 1.6 |
| Copper | 38 | 81.0 | 19.5 | 38.6 | 35.5 |
| Iron | 38 | 2,340 | 476 | 1,030 | 902 |
| Lead | 38 | 8.9 | 1.2 | 4.2 | 4.0 |
| Manganese | 38 | 1,410 | 476 | 929 | 919 |
| Nickel | 38 | 2.1 | .5 | 1.2 | 1.0 |
| Zinc | 38 | 272 | 133 | 195 | 195 |
| *Claassenia sabulosa* | | | | | |
| Arsenic | 11 | 1.9 | 0.5 | 1.4 | 1.5 |
| Cadmium | 20 | 2.0 | .2 | .7 | .4 |
| Chromium | 20 | 1.4 | .3 | .8 | .8 |
| Copper | 20 | 71.7 | 33.0 | 51.7 | 49.1 |
| Iron | 20 | 402 | 95.3 | 242 | 241 |
| Lead | 20 | 3.1 | .5 | 1.2 | 1.1 |
| Manganese | 20 | 683 | 57.8 | 223 | 180 |
| Nickel | 20 | .5 | <.3 | [1].4 | [1].4 |
| Zinc | 20 | 363 | 191 | 280 | 272 |
| *Hydropsyche cockerelli* | | | | | |
| Arsenic | 15 | 8.9 | 3.6 | 6.5 | 6.6 |
| Cadmium | 24 | 1.4 | .4 | .9 | 1.0 |
| Chromium | 24 | 6.0 | 1.8 | 3.2 | 3.3 |
| Copper | 24 | 99.7 | 29.9 | 68.1 | 69.2 |
| Iron | 24 | 3,590 | 1,400 | 2,170 | 2,120 |
| Lead | 24 | 12.1 | 4.2 | 8.1 | 7.4 |
| Manganese | 24 | 1,910 | 781 | 1,260 | 1,240 |
| Nickel | 24 | 2.4 | 1.4 | 1.9 | 1.9 |
| Zinc | 24 | 266 | 156 | 221 | 223 |
| *Hydropsyche occidentalis* | | | | | |
| Arsenic | 6 | 7.4 | 3.9 | 6.1 | 6.2 |
| Cadmium | 12 | 1.4 | .4 | .8 | .7 |
| Chromium | 12 | 5.5 | 2.1 | 3.3 | 3.0 |
| Copper | 12 | 80.7 | 30.3 | 57.6 | 59.0 |
| Iron | 12 | 2,540 | 1,450 | 2,100 | 2,220 |
| Lead | 12 | 11.4 | 4.0 | 7.6 | 7.5 |
| Manganese | 12 | 2,460 | 939 | 1,810 | 1,830 |
| Nickel | 12 | 2.4 | 1.6 | 2.0 | 2.0 |
| Zinc | 12 | 278 | 192 | 239 | 242 |

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

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