In cooperation with the U.S Department of Agriculture Forest Service

Water-Quality, Bed-Sediment, and Biological Data, for Streams in the Upper Prickly Pear Creek Watershed, Montana, 2001

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U.S. Department of the Interior
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CONVERSION FACTORS, DATUM, ABBREVIATED UNITS, AND ACRONYMS

Multiply	By	To obtain
cubic foot per second (ft^3/s)	0.028317	cubic meter per second (m^3/s)
foot (ft)	0.3048	meter (m)
inch (in.)	25.4	millimeter (mm)
mile (mi)	1.609	kilometer

Temperature can be converted to degrees Celsius (^oC) or degrees Fahrenheit (^oF) by the following equations:

$$^oC = 5/9\ (^oF - 32)$$
$$^oF = 9/5\ (^oC) + 32$$

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

Abbreviated units used in this report:

µL	microliter
µg/L	micrograms per liter
µm	micrometer (micron)
µS/cm	microsiemens per centimeter at 25 degrees Celsius
meq/L	milliequivalents per liter
mg/L	milligrams per liter
mm	millimeter
m	meter
ft	foot
nm	nanometer

Acronyms used in this report:

HCl	Hydrochloric acid
HNO_3	Nitric acid
$HClO_4$	Perchloric acid
HF	Hydrofluoric acid
H_2O_2	Hydrogen peroxide
M	molar
ICP-AES	Inductively coupled plasma-atomic emission spectroscopy

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INTRODUCTION

The upper Prickly Pear Creek watershed encompasses the upstream 15 miles of Prickly Pear Creek, south of Helena, Montana (fig. 1). The headwaters of Prickly Pear Creek and its tributaries (Beavertown Creek, Clancy Creek, Dutchman Creek, Golconda Creek, Lump Gulch, Spring Creek, and Warm Springs Creek) are primarily in the Helena National Forest, whereas the central part of the watershed primarily is within either Bureau of Land Management (BLM) or privately owned property. Three mining districts are present in the upper Prickly Pear Creek watershed: Alhambra, Clancy, and Colorado. Numerous prospects, adits, tailings piles, mills, dredge piles, and mines (mostly inactive) are located throughout the watershed. These districts contain polymetallic (Ag, Au, Cu, Pb, Zn) vein deposits and precious-metal (Au-Ag) vein and disseminated deposits that were exploited beginning in the 1860's. Placer Au deposits in the major streams were extensively mined in the late 1800's and early 1900's.

As part of a cooperative effort with Federal land management agencies, the U.S. Geological Survey (USGS) is currently using an integrated approach to investigate two mining impacted watersheds in the western United States (the Animas River in Colorado and the Boulder River in Montana). These studies provide the USDA Forest Service and BLM scientific data for implementing informed land-management decisions regarding cleanup of abandoned mine lands within each watershed. A similar integrated-science approach will be used to characterize the upper Prickly Pear Creek watershed with respect to water and streambed sediment chemistry, aquatic biota, and geologic framework. This integrated database presents data that will be used to identify important pathways of metals movement and biological impacts, thereby guiding resource-management decisions of land-managers in several publications that are in preparation. Watershed-level characterization in terms of water quality, streambed sediment chemistry, and fish health will facilitate determinations of whether removal of contaminated materials or other cleanup activities are necessary, planning of short- and long-term restoration efforts, and development of a monitoring plan to document cleanup effectiveness.

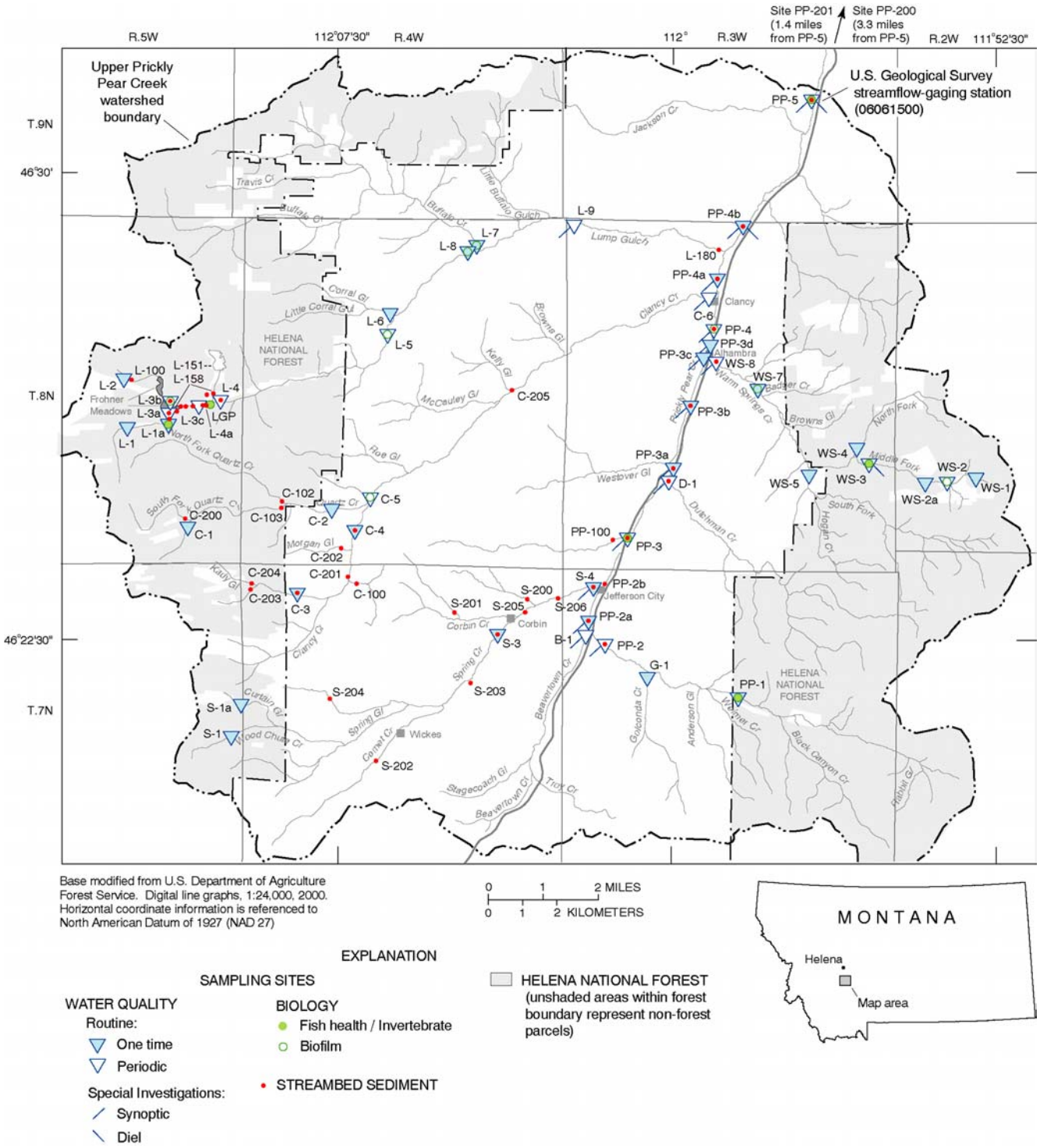
PURPOSE AND SCOPE

This report contains water-quality, biological, and bed-sediment data from samples collected during 2001 and is the second Open-File report for the upper Prickly Pear Creek watershed characterization. Data collected during 2000 and a summary of the geology, mineral deposits, and previous work is summarized in the first Open-File report for the upper Prickly Pear Creek watershed characterization (Klein and others, 2001).

Data presented in this report were collected during 2001 for the following purposes: 1) to determine temporal variations in water quality, streambed sediment, and biology (metal residue in biofilm, fish tissue, and benthic macroinvertebrates, and fish health) at sites that were sampled in 2000, 2) to supplement data obtained during 2000 at newly established sites, 3) to monitor short-term (diel) variations in water quality at selected sites, 4) to determine metal loads in upper Prickly Pear Creek at mainstem sites, and 5) to assess the fate of mining-related contaminants in a small unnamed reservoir in upper Lump Gulch. This report is organized into three sections containing 1) water-quality data, 2) streambed and lakebed sediment data, and 3) biological data. Each section contains its respective data tables.

Water-quality samples also were collected by the USGS for two site-specific studies in the watershed. A metal-loading study was conducted during June 21-27, 2001, on the Middle Fork Warm Springs Creek and a comprehensive study of the hydrogeology, water quality, and mine waste, soil, and streambed geochemistry of the Frohner Meadows area was conducted by the USGS during 2001 and 2002. The data and results from these studies are planned for separate reports

Figure 1. Map showing location of the upper Prickly Pear Creek watershed and sampling sites, Montana, 2001



WATER-QUALITY DATA FOR STREAMS IN THE UPPER PRICKLY PEAR CREEK WATERSHED, MONTANA, 2001

By Joanna N. Thamke and David A. Nimick

INTRODUCTION

This section of the report presents water-quality and associated hydrologic data that were collected by the USGS in the upper Prickly Pear Creek watershed during the period March through August 2001. Data presented in this section of the report include measurements of streamflow, water quality, and quality assurance.

SITE IDENTIFICATION

A site number is used as the primary identification for sampling sites (fig. 1, table 1). The alpha-numeric identification allows for ease of cross reference between tables and figures. The alpha characters denote the first letters of the stream or watershed name. The numeric characters denote the downstream sequence, beginning at the most upstream site. A final alpha character (a, b, c, or d) in some of the site numbers denotes the sequence that the sites were added to the original site list.

Table 1. Sampling sites in the upper Prickly Pear Creek watershed, Montana, 2001

Site number (fig. 1)	Site description	Latitude	Longitude	Site Type						
				Water Quality				Biology		Streambed sediment
				Routine		Special Investigations				
				One time	Periodic	Synoptic	Diel	Fish health, invertebrate	Biofilm	
B-1	Beavertown Creek above Prickly Pear Creek, near Jefferson City, Mont.	462234	1120150		X	X				
C-1	Unnamed tributary above South Fork Quartz Creek, near Jefferson City, Mont.	462417	1121057	X						
C-2	Quartz Creek above Clancy Creek, near Jefferson City, Mont.	462429	1120804	X						
C-3	Kady Gulch above Clancy Creek, near Jefferson City, Mont.	462308	1120829	X						X
C-4	Clancy Creek above Quartz Creek, near Jefferson City, Mont.	462408	1120710	X						X
C-5	Clancy Creek below Quartz Creek, near Jefferson City, Mont.	462440	1120650		X				X	
C-6	Clancy Creek at Clancy, Mont.	462757	1115908		X	X				
C-100	Unnamed tributary below Gregory Mountain, near Jefferson City, Mont.	462320	1120707							X

Site number (fig. 1)	Site description	Latitude	Longitude	Site Type						
				Water Quality				Biology		Streambed sediment
				Routine		Special Investigations				
				One time	Periodic	Synoptic	Diel	Fish health, invertebrate	Biofilm	
C-102	North Fork Quartz Creek above South Fork Quartz Creek, near Jefferson City, Mont.	462437	1120851							X
C-103	South Fork Quartz Creek above North Fork Quartz Creek, near Jefferson City, Mont.	462430	1120857							X
C-200	South Fork Quartz Creek above unnamed tributary, near Jefferson City, Mont.	462419	1121103							X
C-201	Clancy Creek below Gregory Mine, near Jefferson City, Mont.	462332	1120716							X
C-202	Morgan Gulch above Clancy Creek, near Jefferson City, Mont.	462352	1120717							X
C-203	Unnamed tributary above Kady Gulch, near Jefferson City, Mont.	462316	1120925							X
C-204	Kady Gulch above unnamed tributary, near Jefferson City, Mont.	462318	1120926							X
C-205	Clancy Creek below Kelly Gulch, near Clancy, Mont.	462624	1120339							X
D-1	Dutchman Creek above Prickly Pear Creek, near Jefferson City, Mont.	462500	1115959		X	X				X
G-1	Golconda Creek above Prickly Pear Creek, near Jefferson City, Mont.	462156	1120023	X						
LGP	Unnamed reservoir below Park Lake, near Clancy, Mont.	462611	1121021					X	X	
L-1	Lump Gulch above meadows, near Clancy, Mont.	462545	1121222	X						
L-1a	Lump Gulch above Frohner Meadows tributary 1, near Clancy, Mont.	462602	1121121	X				X	X	
L-2	Lump Gulch above Nellie Grant Mill, near Clancy, Mont.	462629	1121223	X						
L-3a	Lump Gulch tributary 1 below Frohner Meadow, near Clancy, Mont.	462603	1121121		X					X
L-3b	Lump Gulch tributary 2 below Frohner Meadows, near Clancy, Mont.	462612	1121116		X				X	X
L-3c	Lump Gulch above Park Lake, near Clancy, Mont.	462607	1121036		X					
L-4	Lump Gulch below Park Lake, near Clancy, Mont.	462612	1121020		X					X

Site number (fig. 1)	Site description	Latitude	Longitude	Site Type						
				Water Quality				Biology		Streambed sediment
				Routine		Special Investigations				
				One time	Periodic	Synoptic	Diel	Fish health, invertebrate	Biofilm	
L-4a	Lump Gulch 200 feet above unnamed reservoir, near Clancy, Mont.	462607	1121018							X
L-5	Lump Gulch above Corral Gulch, near Clancy, Mont.	462727	1120624		X				X	
L-6	Corral Gulch above Lump Gulch, near Clancy, Mont.	462737	1120619	X						
L-7	Lump Gulch above Buffalo Creek, near Clancy, Mont.	462839	1120430	X					X	
L-8	Buffalo Creek above Lump Gulch, near Clancy, Mont.	462843	1120427	X					X	
L-9	Lump Gulch below Little Buffalo Gulch, near Clancy, Mont.	462905	1120216		X	X				
L-100	Lump Gulch east of Frohner mine, near Clancy, Mont.	462634	1121158							X
L-151	Lump Gulch south of Frohner Meadows, near Clancy, Mont.	462602	1121122							X
L-152	Unnamed tributary west, below Park Lake, near Clancy, Mont.	462618	1121021							X
L-153	Unnamed tributary east, below Park Lake, near Clancy, Mont.	462612	1121027							X
L-154	Lump Gulch 1,100 feet above unnamed reservoir, near Clancy, Mont.	462607	1121039							X
L-155	Lump Gulch 1,700 feet above unnamed reservoir, near Clancy, Mont.	462607	1121050							X
L-156	Lump Gulch 2,400 feet above unnamed reservoir, near Clancy, Mont.	462611	1121104							X
L-157	Lump Gulch 800 feet below Frohner Meadows, near Clancy, Mont.	462606	1121112							X
L-158	Lump Gulch 600 feet below Frohner Meadows, near Clancy, Mont.	462612	1121109							X
L-180	Lump Gulch above Prickly Pear Creek, near Clancy, Mont.	462843	1115858							X
PP-1	Prickly Pear Creek above Golconda Creek, near Jefferson City, Mont.	462133	1115812	X				X	X	
PP-2	Prickly Pear Creek above Beavertown Creek, near Jefferson City, Mont.	462227	1120126		X	X				X
PP-2a	Prickly Pear Creek above Spring Creek, near Jefferson City, Mont.	462241	1120148	X		X				X

Site number (fig. 1)	Site description	Latitude	Longitude	Site Type						
				Water Quality				Biology		Streambed sediment
				Routine		Special Investigations				
				One time	Periodic	Synoptic	Diel	Fish health, invertebrate	Biofilm	
PP-2b	Prickly Pear Creek below Spring Creek	462322	1120126							X
PP-3	Prickly Pear Creek near Jefferson City, Mont.	462407	1120052		X	X		X	X	X
PP-3a	Prickly Pear Creek above Westover Gulch, near Alhambra, Mont.	462512	1115953	X		X				X
PP-3b	Prickly Pear Creek above Warm Springs Creek, near Alhambra, Mont.	462613	1115928	X		X				X
PP-3c	Prickly Pear Creek above Warm Springs Creek, at Alhambra, Mont.	462704	1115910	X		X				
PP-3d	Prickly Pear Creek below Warm Springs Creek, at Alhambra, Mont.	462702	1115907	X		X				
PP-4	Prickly Pear Creek at Alhambra RV Park, near Clancy, Mont.	462718	1115903		X	X			X	X
PP-4a	Prickly Pear Creek below Clancy Creek, at Clancy, Mont.	462807	1115856	X		X				X
PP-4b	Prickly Pear Creek above Strawberry Creek, near Clancy, Mont.	462904	1115818	X		X	X			X
PP-5	Prickly Pear Creek near Clancy, Mont.	463109	1115645		X	X	X	X	X	X
PP-100	Unnamed tributary to Prickly Pear Creek, one mile north of Jefferson City, Mont.	462407	1120111							X
PP-200	Prickly Pear Creek above McClellan Creek, below Montana City, Mont. (not shown on fig. 1)	463315	1115434							X
PP-201	Prickly Pear Creek above Montana City, Mont. (not shown on fig. 1)	463203	1115606							X
S-1	Wood Chute Creek above Spring Creek, near Jefferson City, Mont.	462052	1121000	X						
S-1a	Curtain Gulch above Wood Chute Creek, near Jefferson City, Mont.	462122	1120943	X						
S-3	Spring Creek above Prickly Pear Creek, near Jefferson City, Mont.	462235	1120348	X						X
S-4	Spring Creek at Jefferson City, Mont.	462320	1120138	X		X				X
S-200	Unnamed tributary above Spring Creek, near Jefferson City, Mont.	465603	1120304							X
S-201	Corbin Creek above Corbin, Mont.	462251	1120341							X

Site number (fig. 1)	Site description	Latitude	Longitude	Site Type						
				Water Quality				Biology		Streambed sediment
				Routine		Special Investigations				
				One time	Periodic	Synoptic	Diel	Fish health, invertebrate	Biofilm	
S-202	Comet Creek above Spring Creek, near Jefferson City, Mont.	462034	1120633							X
S-203	Iron Ore Gulch above Spring Creek, near Jefferson City, Mont.	462142	1120435							X
S-204	Unnamed tributary below Washington Mine, near Jefferson City, Mont.	462129	1120739							X
S-205	Spring Creek below Corbin Creek, near Jefferson City, Mont.	462259	1120311							X
S-206	Spring Creek near Corbin Flats, near Jefferson City, Mont.	462308	1120227							X
WS-1	Middle Fork Warm Springs Creek above mines, near Clancy, Mont.	462510	1115302	X						
WS-2	Middle Fork Warm Springs Creek below mines, near Clancy, Mont.	462502	1115338		X				X	
WS-2a	Middle Fork Warm Springs Creek below tailings, near Clancy, Mont.	462504	1115349	X						
WS-3	Middle Fork Warm Springs Creek near Clancy, Mont.	462521	1115540		X		X	X	X	
WS-4	North Fork Warm Springs Creek above Warm Springs Creek, near Clancy, Mont.	462529	1115544	X						
WS-5	South Fork Warm Springs Creek near Clancy, Mont.	462511	1115644	X						
WS-7	Warm Springs Creek above Prickly Pear Creek, near Clancy, Mont.	462633	1115801	X					X	
WS-8	Warm Springs Creek at Alhambra, Mont.	462700	1115900		X	X				X

[1]Continuous-record streamflow.

WATER-QUALITY DATA

Water-quality samples were collected at 45 sites located throughout the upper Prickly Pear Creek watershed during March through August 2001 (fig. 1). Samples were collected once at 28 sites and periodically at 17 sites (table 1). Seventeen of the 45 sites were sampled synoptically by the USGS on July 26 and 27 to determine principal sources of metal loads to upper Prickly Pear Creek. Water-quality data for routine (one-time or periodic) and synoptic water samples (collected within a short period of time) include field parameters (streamflow, specific conductance, pH, and water temperature), hardness, and concentrations of selected trace elements and suspended sediment (table 2). Data for synoptic samples also include a comprehensive analysis of major-ion and trace-element concentrations (table 3).

Water-quality samples were collected at least hourly for diel (24-hour) investigations of water quality at three sites (PP-4b, PP-5, and WS-3) during March-July 2001 (fig. 1, tables 4-7). The sites were located along Prickly Pear and Middle Fork Warm Springs Creeks to characterize diel cycles in metal concentrations. Hourly samples were collected for about 33-47 hours at each site to describe 1-2 diel cycles. One diel sampling episode was conducted at sites PP-4b and WS-3; four diel sampling episodes were conducted at site PP-5.

Sampling and Processing Methods

Routine and Synoptic Water-Quality Samples

Composite water samples for measurements of physical properties and analyses of chemical constituents and suspended sediment were collected from multiple verticals across the stream using depth- and width-integration methods described by Wilde and others (1998). These methods provide an instantaneous mean discharge-weighted sample that is representative of the entire stream. Sampling equipment consisted of standard USGS depth-integrating suspended samplers (DH-81 and DH-48), which are constructed of plastic or coated with non-metallic epoxy paint, and equipped with a $^{5}/_{16}$-in. nylon nozzle. Grab samples were collected when streamflow was too low to allow use of the depth-integrated sampler.

Field measurements of specific conductance, pH, and water temperature were made during sample collection. Samples were processed and prepared for laboratory analysis according to procedures described by Wilde and others (1998). Routine and synoptic samples for dissolved constituents were filtered using a 0.45-µm pore-size capsule filter. Instantaneous streamflow at the time of sample collection was determined by direct measurement, estimation, or stage-discharge rating (Rantz and others, 1982).

Diel Water-Quality Samples

An automatic pumping sampler was used to collect diel samples. Samples typically were collected hourly during each diel sampling episode, although some samples were collected every 30 minutes. All hoses and polyethylene collection bottles used with the automatic sampler were cleaned and acid rinsed between sampling episodes. Hoses and bottles were rinsed with stream water by the automatic pumping sampler pre-rinse program before sample collection. The intake for the automatic sampler was positioned 2 to 6 in. above the streambed in a riffle where the stream

velocity was sufficient to ensure downstream flushing of rinse water expelled by the sampler prior to collection of the sample. Collection bottles were removed from the automatic sampler within several hours of collection and taken to a field laboratory, where they were processed (split into aliquots, measured for onsite parameters, filtered and preserved) according to procedures described by Wilde and others (1998). During diel sampling on July 25-27, 2001, at sites PP-4b and PP-5, collection bottles were removed and processed within one hour to minimize changes in concentrations of arsenic and iron species. Diel samples for dissolved constituents were filtered through 0.1-µm pore-size capsule or plate filters. Aliquots for analysis of arsenic and iron species were stored chilled in opaque sample bottles after preservation with hydrochloric acid. Aliquots for analysis of cations and other trace elements were preserved with nitric acid. Aliquots for analysis of major anions were not preserved.

Water temperature, specific conductance, and dissolved oxygen were measured hourly (or more frequently) with a multi-parameter instrument submerged in the stream in an area of slow-moving water near the intake of the pumping sampler. Stream pH was measured either with the instream multi-parameter instrument or with a laboratory pH meter using water samples that were manually collected from the stream and immediately analyzed. In some instances, both types of pH measurements were made to provide comparisons of results. Streamflow for site PP-5 was determined from data for USGS streamflow-gaging station 06061500. Streamflow for site PP-4b was estimated from hourly stage data and a stage-discharge relation developed from periodic current-meter measurements (Rantz and others 1982). Streamflow for site WS-3 was determined by continuous tracer injection (T.E. Cleasby, U.S. Geological Survey, unpub. data, 2001).

Laboratory Analysis

Routine and Synoptic Water-Quality Samples

Trace elements selected for analysis of routine samples were similar to those analyzed for another abandoned mine lands study in the Boulder River watershed, Montana, and include total-recoverable and dissolved concentrations of arsenic, cadmium, copper, lead, and zinc. Trace elements that consistently had concentrations less than the minimum reporting level in the Boulder River watershed (Nimick and Cleasby, 2000) were not analyzed. Analysis of an extensive suite of trace elements in water samples collected from five sites in the upper Prickly Pear Creek watershed in October 2000 confirmed non-detectable concentrations for the omitted elements (Klein and others, 2001, table 3).

All routine water-quality samples and selected replicate synoptic samples were analyzed by the USGS National Water Quality Laboratory (NWQL) in Denver, Colo., according to methods described by Fishman and Freidman (1989), Faires (1993), Fishman (1993), Hoffman and others (1996), Garbarino and Struzeski (1998), Garbarino (1999), and Jones and Garbarino (1999). Routine samples were analyzed for hardness and concentrations of selected trace elements (table 2). Selected replicate synoptic samples were analyzed for total-recoverable concentrations of selected trace elements.

Seventeen of the 45 sites were sampled synoptically (all samples collected in a short period of time) on July 26-27, 2001 (tables 2 and 3). These samples were analyzed by the USGS laboratory in Boulder, Colo. Concentrations of major cations and trace elements were determined using inductively coupled plasma-optical emission

spectrometry. Major cations were analyzed using the radial view while the axial view was used for trace elements. Total recoverable concentrations of arsenic were measured by a flow-injection analysis system for the generation of arsine and detection using atomic absorption spectrometry (McCleskey and others, 2001). Cadmium, copper, and lead concentrations were measured by graphite furnace atomic absorption spectrometry using a $Pd/Mg(NO_3)_2$ matrix modifier, an atomization temperature of 1,900°C, transverse heated graphite atomizer, and Zeeman-effect and continuum-source background corrections. Concentrations of major anions were determined using an ion chromatograph (Brinton and others, 1995). Samples were analyzed using 10-µL and 50-µL sample loops. For samples that contained measured concentrations of anions and cations, the data were checked using the program WATEQ4F (Ball and Nordstrom, 1991) for adequate charge balance.

Water samples for suspended-sediment concentration and the percentage of suspended sediment finer than 0.062-mm diameter (silt size and smaller) were analyzed by the USGS Montana District sediment laboratory in Helena, Mont., according to gravimetric methods described by Guy (1969) and Lambing and Dodge (1993).

Diel Water-Quality Samples

Diel water-quality samples collected in March and April 2001 at site PP-5 were analyzed for dissolved Zn by inductively coupled plasma-mass spectrometry (Garbarino and Taylor, 1996) by the NWQL (table 4). Diel water-quality samples collected in July 2001 at site PP-4b and PP-5 (tables 5 and 6) were analyzed by the USGS laboratory in Boulder, Colo. In addition to the analytical methods described for the synoptic water-quality samples, iron concentrations were determined using a modification of the FerroZine colorimetric method (Stookey, 1970). Alkalinity was determined by auto-titration using standardized H_2SO_4 (Barringer and Johnsson, 1996). Diel water-quality samples collected in June 2001 at site WS-3 were analyzed by the USGS laboratory in Boulder, Colo. (table 7).

Quality-Assurance Data

Data-collection and analytical procedures used during this study incorporated practices designed to control, verify, and assess the quality of sample data. Quality-assurance procedures used for the collection and field processing of water-quality samples are described by Knapton and Nimick (1991) and Wilde and others (1998). 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). The Montana District sediment laboratory uses quality-assurance procedures described by Lambing and Dodge (1993).

The USGS laboratory in Boulder, Colo. ensured that all reagents were of purity at least equal to the reagent-grade standards of the American Chemical Society. Double distilled water and re-distilled acids were used in all preparations. USGS standard reference water samples were used as independent standards to ensure accuracy. A stream sample was analyzed numerous times to monitor precision during and between analytical runs. Each sample was analyzed in at least duplicate for major cations and trace metals. Samples were diluted as necessary to bring the analyte concentration within the optimal range of the method.

Replicate samples for this study are two or more samples considered to be essentially identical in composition. Replicate samples were obtained in the field by splitting a single composite sample into two or more subsamples, which then were analyzed separately. Analyses of field replicates are noted in tables 2, 3, 5, and 6.

A blank sample of deionized water was routinely 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. A field blank is an aliquot of deionized water, which is certified as trace-element free and is processed through the sampling equipment used to collect stream samples. The blank is then subjected to the same processing (filtration, preservation, transportation, and laboratory handling) as stream samples. The blank sample was analyzed for the same constituents as those of stream samples to identify whether any detectable concentrations exist. Analytical results for field blanks are noted in tables 2, 3, 5, and 6.

The NWQL collects quality-control data on a continuing basis to evaluate selected analytical methods to determine laboratory reporting levels (LRL). Accordingly, concentrations are reported as <LRL for samples in which the analyte was either not detected or could not be reliably identified. Analytes that are detected at concentrations less than LRL and that pass identification criteria are reported with an estimated concentration. Estimated concentrations are noted in data tables with a remark code of "E." Those data should be used with the understanding that their uncertainty of quantification is greater than that of data reported without the "E" remark code.

Table 2. Water-quality data for routine and synoptic water samples collected from streams in the upper Prickly Pear Creek watershed, Montana, 2001.

[Samples analyzed by the U.S. Geological Survey. Analytical data are reported to a maximum of three significant figures to provide sufficient resolution for detecting small differences between samples closely spaced in time or distance. Abbreviations: B, blank sample; Boulder, USGS laboratory in Boulder, Colo.; E, estimated; ft^3/s, cubic feet per second; °C, degrees Celsius; □g/L, micrograms per liter; □S/cm, microsiemens per centimeter at 25°C; mg/L, milligrams per liter; mm, millimeters; NWQL, USGS National Water Quality Laboratory in Denver, Colo.; QA, quality assurance; R, replicate sample; su, standard units. Symbols: <, less than minimum reporting level; --, no data].

Site number	QA sample type	Labora-tory	Date	Time	Stream-flow (ft^3/s)	Specific con-ductance, field (µS/cm)	pH, field (su)	Temp-erature, water (°C)	Hard-ness (mg/L)	Calcium, dissolved (mg/L)	Magne-sium, dissolved (mg/L)	Sediment, suspended (mg/L)	Sediment, suspended, diameter (percent finer than 0.062 mm)	Arsenic, total recov-erable (µg/L)
B-1		NWQL	20010510	1240	0.95	338	7.9	10.0	137	39.7	9.16	4	71	<2
B-1		Boulder	20010726	0945	0.22	372	7.7	11.5	183	53.2	12.2	--	--	0.600
C-1		NWQL	20010510	1430	0.65	88	7.3	2.8	35	11.1	1.78	26	36	E1.80
C-2		NWQL	20010509	1315	6.04	102	--	5.0	43	13.6	2.32	16	43	E1.44
C-3		NWQL	20010509	1025	0.78	134	8.5	3.5	51	16.3	2.46	5	59	<2
C-4		NWQL	20010509	1130	0.28	258	8.0	8.5	105	32.2	6.08	2	73	22.6
C-5		NWQL	20010405	1330	0.78	215	8.2	4.0	97	29.0	5.96	3	52	4.99
C-5		NWQL	20010509	1400	6.63	120	7.8	7.0	50	15.4	2.83	10	77	3.65
C-5	B	NWQL	20010510	0700	--	2	5.6	--	--	E0.01	<0.008	--	--	<6
C-6		NWQL	20010510	1700	6.9	180	8.0	10.0	75	22.1	4.89	26	40	6.49
C-6		Boulder	20010726	1430	0.83	243	7.8	16.5	110	31.8	7.57	--	--	7.03
C-6	R	NWQL	20010726	1435	0.83	243	7.8	16.5	--	--	--	--	--	7.50
D-1		NWQL	20010510	0800	5.44	71	7.8	2.5	28	8.28	1.67	10	60	E0.905
D-1		Boulder	20010726	1120	1.2	90	7.5	16.0	38	11.5	2.31	--	--	0.535
G-1		NWQL	20010510	1145	1.63	83	7.8	4.0	32	10.4	1.52	3	64	<2
L-1		NWQL	20010510	1000	1.5	39	8.7	0.0	15	4.98	0.68	23	59	3.21
L-1a		NWQL	20010801	1215	0.37	68	7.6	9.0	28	8.95	1.31	2	40	1.94
L-2		NWQL	20010509	1100	0.18	51	7.8	7.6	20	6.69	0.85	5	69	2.06
L-3a		NWQL	20010510	1100	0.26	88	6.3	4.5	29	9.35	1.38	2	94	7.37
L-3a		NWQL	20010801	1130	0.004	94	7.7	8.5	33	10.8	1.52	2	79	11.2
L-3b		NWQL	20010315	1130	0.060	193	7.5	0.1	72	23.6	3.19	--	--	16.7
L-3b		NWQL	20010510	1120	0.78	100	6.3	5.0	32	10.4	1.42	3	88	14.4
L-3b	R	NWQL	20010510	1121	0.78	100	6.3	5.0	32	10.3	1.41	--	--	14.8
L-3b		NWQL	20010801	0950	0.23	121	8.2	10.0	42	13.6	1.91	3	55	33.5
L-3c		NWQL	20010509	1245	4.1	64	6.8	7.0	23	7.30	1.11	11	71	4.45
L-3c		NWQL	20010801	1515	0.38	92	7.7	15.5	35	11.2	1.79	3	85	5.23
L-4		NWQL	20010509	130	1.3	70	6.7	4.0	25	8.05	1.29	13	63	5.53
L-4		NWQL	20010801	14003	1.52	88	8.0	13.5	33	10.1	1.87	4	60	3.95
L-5		NWQL	20010405	1530	2.02	149	7.9	--	61	18.2	3.78	7	59	E1.47
L-5		NWQL	20010510	0915	7.81	94	8.2	4.5	35	10.8	2.07	4	81	E1.88

Table 2. Water-quality data for routine and synoptic water samples collected from streams in the upper Prickly Pear Creek watershed, Montana, 2001 (Continued).

Site number	QA sample type	Labora-tory	Date	Time	Arsenic, dis solved (µg/L)	Cad-mium, total recov-erable (µg/L)	Cad-mium, dis-solved (µg/L)	Cop-per, total recov-erable (µg/L)	Cop-per, dis-solved (µg/L)	Lead, total recov-erable (µg/L)	Lead, dis-solved (µg/L)	Molyb-denum, total recov-erable (µg/L)	Zinc, total recov-erable (µg/L)	Zinc, dis-solved (µg/L)
B-1		NWQL	20010510	1240	0.342	0.119	0.077	4.36	3.50	<1	<0.08	7.79	42.8	36.4
B-1		Boulder	20010726	0945	0.486	0.138	0.087	5.69	3.50	0.170	<0.1	--	42.9	22.6
C-1		NWQL	20010510	1430	0.943	0.370	0.173	2.87	2.17	5.24	0.301	--	71.0	50.8
C-2		NWQL	20010509	1315	0.725	0.140	E0.035	2.31	1.59	2.19	0.143	--	24.4	9.38
C-3		NWQL	20010509	1025	0.589	0.076	E0.028	0.951	0.838	1.17	<0.08	--	19.9	13.5
C-4		NWQL	20010509	1130	20.2	1.36	1.35	1.97	4.31	<1	0.087	--	319	324
C-5		NWQL	20010405	1330	3.67	0.126	0.078	1.97	1.24	1.50	0.083	--	24.1	20.1
C-5		NWQL	20010509	1400	2.04	0.190	0.060	2.69	1.82	2.70	0.171	--	29.4	14.7
C-5	B	NWQL	20010510	0700	<0.4	<0.04	<0.07	<0.6	E0.3	<1	<0.2	--	<1	2
C-6		NWQL	20010510	1700	4.74	0.223	0.083	3.80	2.19	4.28	0.138	--	40.6	16.8
C-6		Boulder	20010726	1430	5.93	0.089	<0.05	1.95	1.99	0.529	<0.1	--	10.3	8.50
C-6	R	NWQL	20010726	1435	--	0.072	--	3.56	--	<1	--	--	12.4	--
D-1		NWQL	20010510	0800	0.993	<0.04	<0.04	1.85	1.47	<1	<0.08	--	<1	<1
D-1		Boulder	20010726	1120	0.447	<0.05	<0.05	1.73	1.69	<0.1	<0.1	--	<1	1.10
G-1		NWQL	20010510	1145	0.749	0.168	0.146	1.52	1.34	3.17	1.04	--	27.1	26.2
L-1		NWQL	20010510	1000	1.76	0.114	0.073	3.96	3.06	2.14	0.227	--	12.7	11.8
L-1a		NWQL	20010801	1215	1.06	E0.029	<0.04	1.54	1.29	<1	<0.08	--	4.95	2.26
L-2		NWQL	20010509	1100	1.39	E0.023	<0.04	3.15	2.10	<1	0.108	--	2.77	1.23
L-3a		NWQL	20010510	1100	4.44	6.66	6.33	7.29	6.86	2.39	0.848	--	1,630	1,660
L-3a		NWQL	20010801	1130	3.24	5.21	4.58	6.87	5.09	1.57	E0.067	--	1,360	1,190
L-3b		NWQL	20010315	1130	4.84	15.6	15.5	10.3	5.28	9.34	2.36	--	4,720	4,810
L-3b		NWQL	20010510	1120	8.01	13.1	13.3	11.4	10.5	7.14	2.41	0.255	2,510	2,590
L-3b	R	NWQL	20010510	1121	7.57	13.1	12.8	12.6	10.3	7.66	2.57	--	2,540	2,580
L-3b		NWQL	20010801	0950	10.5	4.99	4.13	6.48	3.25	7.83	1.53	--	1,190	1,070
L-3c		NWQL	20010509	1245	2.27	2.61	2.49	5.67	4.28	2.29	0.440	--	706	688
L-3c		NWQL	20010801	1515	1.90	1.24	0.950	2.26	1.56	<1	E0.063	--	318	279
L-4		NWQL	20010509	1330	1.97	2.58	1.74	5.17	3.54	2.79	0.345	--	631	532
L-4		NWQL	20010801	1400	2.33	0.794	0.156	1.89	1.30	<1	0.106	--	144	63.0
L-5		NWQL	20010405	1530	0.521	0.183	0.068	1.34	0.765	<1	<0.08	--	89.6	59.9
L-5		NWQL	20010510	0915	1.11	0.307	0.228	2.66	2.22	<1	0.149	--	222	209

Table 2. Water-quality data for routine and synoptic water samples collected from streams in the upper Prickly Pear Creek watershed, Montana, 2001 (Continued).

Site number	QA sample type	Labora-tory	Date	Time	Stream-flow (ft^3/s)	Specific con-ductance, field (µS/cm)	pH, field (su)	Temp-erature, water (^oC)	Hard-ness (mg/L)	Calcium, dissolved (mg/L)	Magne-sium, dissolved (mg/L)	Sediment, suspended (mg/L)	Sediment, suspended, diameter (percent finer than 0.062 mm)	Arsenic, total recov-erable (µg/L)
L-6		NWQL	20010510	1000	1.07	146	7.7	5.0	47	13.8	3.10	3	66	<2
L-7		NWQL	20010510	1100	7.93	106	7.4	6.0	39	11.9	2.35	3	74	E1.37
L-7	R	NWQL	20010510	1105	7.93	--	--	--	39	11.8	2.36	--	--	E1.21
L-8		NWQL	20010510	1045	3.85	201	7.7	6.5	68	20.0	4.47	6	81	<2
L-9		NWQL	20010510	1215	11.9	147	7.7	9.0	53	15.7	3.32	5	69	E0.925
L-9		Boulder	20010726	1520	1.37	139	7.6	20.0	60	17.7	3.87	--	--	0.681
L-9	B	Boulder	20010726	1525	--	--	--	--	--	<0.05	<0.06	--	--	<0.1
PP-1		NWQL	20010510	0915	9.44	69	8.1	2.5	29	9.07	1.45	2	68	<2
PP-2		NWQL	20010510	1040	13.2	82	7.9	5.0	33	10.4	1.67	4	50	<2
PP-2		NWQL	20010514	1130	22.2	61	7.9	7.5	25	8.00	1.26	15	60	E1.63
PP-2		Boulder	20010726	0815	8.06	82.9	7.4	9.5	38	12.1	1.95	--	--	0.427
PP-2a		Boulder	20010726	0740	8.54	98.8	7.4	9.5	45	14.1	2.44	--	--	0.517
PP-2a	R	Boulder	20010726	0741	8.54	98.8	7.4	9.5	46	14.2	2.45	--	--	0.519
PP-2a	R	NWQL	20010726	0741	8.54	98.8	7.4	9.5	--	--	--	--	--	<2
PP-3		NWQL	20010405	0945	1.03	208	8.0	1.5	84	25.6	4.90	2	61	2.00
PP-3	R	NWQL	20010405	0950	1.03	208	8.0	1.5	84	25.7	4.90	--	--	1.90
PP-3		NWQL	20010510	1315	8.88	173	7.5	7.5	66	20.0	4.04	1	86	E1.71
PP-3		NWQL	20010514	1220	22.4	109	7.7	9.5	43	13.0	2.59	8	76	2.29
PP-3		Boulder	20010726	0600	5.66	244	7.0	10.5	91	27.8	5.25	--	--	1.97
PP-3	R	NWQL	20010726	0605	5.66	244	7.0	10.5	--	--	--	--	--	2.46
PP-3a		Boulder	20010726	0608	13.3	222	7.8	9.5	92	27.4	5.72	--	--	1.67
PP-3b		Boulder	20010726	0645	12.2	225	7.9	9.5	92	27.4	5.74	--	--	1.95
PP-3c		Boulder	20010727	0730	12.7	243	8.0	11.0	92	27.4	5.78	--	--	1.99
PP-3d		Boulder	20010727	0910	14.8	226	7.8	9.5	86	25.4	5.41	--	--	4.92
PP-4		NWQL	20010510	1500	25.9	190	8.0	10.0	67	19.7	4.20	8	73	6.12
PP-4		NWQL	20010514	1310	50.9	137	7.9	11.5	48	14.3	2.91	33	60	7.91
PP-4		Boulder	20010726	0715	15.4	247	8.0	11.0	86	25.5	5.49	--	--	4.53
PP-4	R	Boulder	20010726	0720	15.4	--	--	--	87	25.7	5.48	--	--	4.80
PP-4		Boulder	20010727	0930	14.8	243	8.0	12.0	86	25.4	5.41	--	--	4.82
PP-4a		Boulder	20010726	0525	17.3	256	7.9	11.9	90	26.5	5.79	--	--	4.80
PP-4b		Boulder	20010726	0600	17.2	256	7.9	12.0	91	26.7	5.99	--	--	4.98
PP-5		NWQL	20010405	0900	14	313	7.7	0.0	114	33.1	7.66	5	75	3.94
PP-5		NWQL	20010510	1345	49	190	8.2	10.5	69	20.3	4.47	16	55	5.41
PP-5	R	NWQL	20010510	1350	49	190	8.2	10.5	69	20.2	4.47	13	65	5.32
PP-5		NWQL	20010514	1415	84	145	8.0	13.0	53	15.7	3.31	48	54	8.77

Table 2. Water-quality data for routine and synoptic water samples collected from streams in the upper Prickly Pear Creek watershed, Montana, 2001 (Continued).

Site number	QA sample type	Labora-tory	Date	Time	Arsenic, dis-solved (µg/L)	Cad-mium, total recov-erable (µg/L)	Cad-mium, dis-solved (µg/L)	Cop-per, total recov-erable (µg/L)	Cop-per, dis-solved (µg/L)	Lead, total recov-erable (µg/L)	Lead, dis-solved (µg/L)	Molyb-denum, total recov-erable (µg/L)	Zinc, total recov-erable (µg/L)	Zinc, dis-solved (µg/L)
L-6		NWQL	20010510	1000	0.374	<0.04	<0.04	2.63	2.39	<1	<0.08	--	1.30	1.22
L-7		NWQL	20010510	1100	0.913	0.181	0.113	2.55	2.20	<1	0.099	--	129	120
L-7	R	NWQL	20010510	1105	0.937	0.158	0.118	2.47	2.15	<1	0.098	--	128	118
L-8		NWQL	20010510	1045	0.376	0.049	0.037	6.99	5.47	<1	E0.045	10.2	5.0	4.14
L-9		NWQL	20010510	1215	0.675	0.099	0.063	3.78	3.06	<1	E0.055	--	58.0	49.8
L-9		Boulder	20010726	1520	0.565	0.077	<0.05	2.50	2.54	<0.1	0.228	--	21.5	18.7
L-9	B	Boulder	20010726	1525	<0.1	<0.05	<0.05	<0.5	<0.5	<0.1	<0.1	--	2.3	2.4
PP-1		NWQL	20010510	0915	0.769	E0.023	E0.028	1.41	1.39	<1	E0.060	--	2.28	1.92
PP-2		NWQL	20010510	1040	0.646	0.048	0.042	1.45	1.35	<1	0.160	--	5.96	5.21
PP-2		NWQL	20010514	1130	1.22	0.089	E0.024	3.15	1.80	1.88	0.114	--	10.1	4.96
PP-2		Boulder	20010726	0815	0.227	<0.05	<0.05	1.69	1.05	0.957	<0.1	--	9.60	6.1
PP-2a		Boulder	20010726	0740	0.310	0.114	0.108	2.08	0.964	0.864	<0.1	--	8.70	6.6
PP-2a	R	Boulder	20010726	0741	0.395	0.074	0.094	2.02	0.879	0.565	<0.1	--	8.50	6.6
PP-2a	R	NWQL	20010726	0741	--	0.066	--	3.29	--	<1	--	--	13.2	--
PP-3		NWQL	20010405	0945	1.41	0.254	0.248	1.86	1.69	<1	E0.053	--	125	130
PP-3	R	NWQL	20010405	0950	1.43	0.245	0.259	1.91	1.76	<1	E0.059	--	127	132
PP-3		NWQL	20010510	1315	1.73	0.379	0.380	3.74	2.85	<1	0.108	--	173	196
PP-3		NWQL	20010514	1220	1.69	0.300	0.176	4.96	2.70	6.10	0.261	--	100	85.0
PP-3		Boulder	20010726	0600	1.73	0.685	0.768	2.60	2.56	1.79	0.197	--	249	243
PP-3	R	NWQL	20010726	0605	--	0.461	--	2.86	--	1.17	--	--	235	--
PP-3a		Boulder	20010726	0608	1.59	0.561	0.659	1.20	1.91	<0.1	<0.1	--	89.7	88.8
PP-3b		Boulder	20010726	0645	1.68	0.632	0.520	2.10	2.45	1.57	<0.1	--	192	183
PP-3c		Boulder	20010727	0730	1.79	0.644	0.682	2.87	2.24	1.58	<0.1	--	193	184
PP-3d		Boulder	20010727	0910	4.25	0.473	0.429	3.42	2.25	3.32	0.157	--	138	128
PP-4		NWQL	20010510	1500	4.33	0.301	0.181	3.37	2.08	4.17	0.253	--	82.9	69.6
PP-4		NWQL	20010514	1310	3.80	0.453	0.105	7.74	2.68	19.2	0.809	--	101	54.1
PP-4		Boulder	20010726	0715	3.65	0.563	0.496	2.96	2.52	2.23	<0.1	--	164	154
PP-4	R	Boulder	20010726	0720	3.74	0.586	0.516	2.99	2.27	2.39	0.346	--	163	151
PP-4		Boulder	20010727	0930	4.34	0.479	0.430	2.68	2.63	2.08	0.328	--	130	122
PP-4a		Boulder	20010726	0525	3.74	0.538	0.463	2.71	2.59	1.82	0.181	--	156	146
PP-4b		Boulder	20010726	0600	4.00	0.254	0.254	3.06	2.45	2.73	0.446	--	122	110
PP-5		NWQL	20010405	0900	2.71	0.224	0.180	2.61	1.99	1.90	0.133	--	81.3	75.7
PP-5		NWQL	20010510	1345	3.78	0.258	0.093	4.09	2.55	6.86	0.291	--	61.0	34.6
PP-5	R	NWQL	20010510	1350	3.74	0.274	0.093	4.11	2.53	5.58	0.303	--	62.0	34.8
PP-5		NWQL	20010514	1415	4.01	0.540	0.067	9.00	2.77	19.9	0.718	--	106	35.7

Table 2. Water-quality data for routine and synoptic water samples collected from streams in the upper Prickly Pear Creek watershed, Montana, 2001 (Continued).

Site number	QA sample type	Lab-oratory	Date	Time	Stream-flow (ft^3/s)	Specific con-ductance, field (µS/cm)	pH, field (su)	Temp-erature, water (^oC)	Hard-ness (mg/L)	Calcium, dissolved (mg/L)	Magne-sium, dissolved (mg/L)	Sediment, suspended (mg/L)	Sediment, suspended, diameter (percent finer than 0.062 mm)	Arsenic, total recov-erable (µg/L)
PP-5		NWQL	20010516	1045	73	152	7.6	7.5	57	16.9	3.58	31	41	6.54
PP-5		Boulder	20010726	0700	17.7	266	8.1	12.7	94	27.5	6.17	--	--	5.01
PP-5	B	Boulder	20010726	0705	--	--	--	--	--	<0.05	<0.06	--	--	<0.1
PP-5		NWQL	20010822	0945	8.6	239	8.2	12.5	104	30.1	7.03	2	83	5.82
S-1		NWQL	20010511	1620	0.02	125	8.1	11.0	55	16.0	3.57	6	62	5.39
S-1a		NWQL	20010511	1815	0.17	275	7.1	6.0	111	34.1	6.30	57	85	23.3
S-3		NWQL	20010511	1115	2.2	676	7.8	8.0	307	96.9	15.7	--	--	4.77
S-4		Boulder	20010726	1030	0.75	627	7.8	12.5	324	103	16.4	--	--	5.01
S-4	R	NWQL	20010726	1035	0.75	627	7.8	12.5	--	--	--	--	--	6.96
WS-1		NWQL	20010511	1000	0.16	98	7.7	3.0	39	11.8	2.35	9	72	E1.49
WS-2		NWQL	20010509	1120	1.47	150	7.7	4.5	60	17.3	4.15	8	62	25.1
WS-2		NWQL	20010627	1045	0.75	192	7.9	10.5	67	18.7	4.90	--	--	15.6
WS-2a		NWQL	20010509	1300	1.14	152	7.8	6.0	61	17.4	4.15	23	81	64.3
WS-3		NWQL	20010405	1130	1.05	208	8.0	0.0	91	26.0	6.32	21	65	74.3
WS-3		NWQL	20010509	1015	1.84	151	7.8	3.5	61	17.5	4.17	7	90	34.5
WS-3		NWQL	20010627	0905	1.06	185	8.0	10.5	66	18.9	4.54	--	--	33.7
WS-4		NWQL	20010509	0930	1.33	110	8.0	4.5	41	12.1	2.72	5	87	E1.51
WS-5		NWQL	20010509	0820	5.36	67	7.7	3.0	26	8.07	1.41	2	60	E1.21
WS-7		NWQL	20010509	0710	10.3	103	7.8	3.5	41	12.1	2.55	7	75	12.5
WS-8		NWQL	20010510	1410	8.88	168	7.9	11.5	46	13.5	2.97	5	83	11.0
WS-8		Boulder	20010726	1210	2.89	275	7.8	19.5	60	17.4	3.95	--	--	14.2
WS-8		Boulder	20010727	0650	3.1	308	7.8	16.0	59	17.1	3.94	--	--	15.3

Table 2. Water-quality data for routine and synoptic water samples collected from streams in the upper Prickly Pear Creek watershed, Montana, 2001 (Continued)

Site number	QA sample type	Laboratory	Date	Time	Arsenic, dissolved (µg/L)	Cadmium, total recoverable (µg/L)	Cadmium, dissolved (µg/L)	Copper, total recoverable (µg/L)	Copper, dissolved (µg/L)	Lead, total recoverable (µg/L)	Lead, dissolved (µg/L)	Molybdenum, total recoverable (µg/L)	Zinc, total recoverable (µg/L)	Zinc, dissolved (µg/L)
PP-5		NWQL	20010516	1045	--	0.287	--	5.88	--	11.4	--	--	89.5	--
PP-5		Boulder	20010726	0700	4.24	0.241	0.159	3.60	2.31	2.52	0.764	--	71.5	62.5
PP-5	B	Boulder	20010726	0705	<0.1	<0.05	<0.05	<0.5	<0.5	<0.1	<0.1	--	<1	<1
PP-5		NWQL	20010822	0945	--	0.112	--	2.12	--	2.4	--	--	44.6	--
S-1		NWQL	20010511	1620	5.73	<0.04	<0.04	E0.307	E0.217	<1	<0.08	--	<1	<1
S-1a		NWQL	20010511	1815	3.20	19.3	18.2	924	262	147	1.70	--	2,330	2,290
S-3		NWQL	20010511	1115	3.34	1.35	1.14	2.90	2.24	3.88	0.110	1.41	78.6	84.4
S-4		Boulder	20010726	1030	5.01	1.30	1.30	4.04	3.23	8.08	0.446	--	154	139
S-4	R	NWQL	20010726	1035	--	1.02	--	4.03	--	7.94	--	--	155	--
WS-1		NWQL	20010511	1000	1.03	<0.04	<0.04	1.03	0.826	<1	0.351	--	1.48	<1
WS-2		NWQL	20010509	1120	10.3	2.95	2.59	4.37	1.73	5.46	0.308	--	590	586
WS-2		NWQL	20010627	1045	9.72	1.34	1.16	2.89	1.73	<1	E0.052	--	302	240
WS-2a		NWQL	20010509	1300	13.0	2.84	2.19	6.32	2.84	14.5	0.268	--	579	515
WS-3		NWQL	20010405	1130	30.9	0.805	0.349	5.28	1.70	16.5	E0.053	--	224	145
WS-3		NWQL	20010509	1015	20.0	1.63	1.39	4.33	2.96	5.62	0.185	--	468	455
WS-3		NWQL	20010627	0905	25.0	0.785	0.705	2.56	1.82	2.43	0.112	--	250	241
WS-4		NWQL	20010509	0930	1.04	E0.018	<0.04	2.75	2.05	<1	E0.045	--	2.45	<1
WS-5		NWQL	20010509	0820	0.965	<0.04	<0.04	1.29	1.26	<1	E0.043	--	<1	<1
WS-7		NWQL	20010509	0710	6.84	0.303	0.171	2.48	1.77	2.09	E0.074	--	89.9	77.6
WS-8		NWQL	20010510	1410	8.59	0.149	0.114	2.02	1.58	1.29	0.105	--	50.0	44.6
WS-8		Boulder	20010726	1210	13.0	0.102	<0.05	0.102	1.89	1.49	0.455	--	21.2	16.1
WS-8		Boulder	20010727	0650	11.9	0.091	0.083	0.091	0.783	0.592	0.120	--	20.8	18.5

Table 3. Concentrations of additional constituents at synoptic water-quality sites in the upper Prickly Pear Creek watershed, Montana, July 26-27, 2001.

[Samples analyzed by the U.S. Geological Survey laboratory, Boulder, Colo. Analytical data are reported to a maximum of three significant figures to provide sufficient resolution for detecting small differences between samples closely spaced in time or distance. Abbreviations: B, blank sample; mg/L, milligrams per liter; µg/L, micrograms per liter; QA, quality assurance; R, replicate sample. Symbol: <, less than].

Site number	QA sample type	Date	Time	Calcium, total recoverable (mg/L)	Magnesium, total recoverable (mg/L)	Sodium, total recoverable (mg/L)	Sodium, dissolved (mg/L)	Potassium, total recoverable (mg/L)	Potassium, dissolved (mg/L)	Sulfate, dissolved (mg/L as SO_4)	Chloride, dissolved (mg/L)	Fluoride, dissolved (mg/L)	Silica, total recoverable (mg/L as SiO_2)	Silica, dissolved (mg/L as SiO_2)	Nitrate, dissolved (mg/L as NO_3)
B-1		20010726	0945	53.6	12.2	14.2	14.2	3.34	3.25	85.4	10.1	0.41	31.6	31.6	0.73
C-6		20010726	1430	33.1	7.87	9.11	8.64	1.35	2.37	39.6	1.80	<0.4	18.8	17.7	2.05
D-1		20010726	1120	11.5	2.37	4.88	4.75	1.11	1.07	9.38	0.893	<0.4	20.1	19.5	2.22
L-9		20010726	1520	17.8	3.87	6.32	6.25	1.73	1.72	21.8	1.52	<0.4	19.6	18.9	2.08
L-9	B	20010726	1525	<0.05	<0.06	<0.04	<0.04	0.002	0.016	<0.8	<0.4	<0.4	<0.01	<0.01	<0.5
PP-2		20010726	0815	12.2	2.04	3.31	3.20	0.892	0.872	8.70	0.782	<0.4	16.5	15.7	0.84
PP-2a		20010726	0740	14.1	2.55	3.75	3.63	1.01	0.987	12.3	1.10	<0.4	17.2	16.6	0.65
PP-2a	R	20010726	0741	14.2	2.55	3.80	3.64	1.01	1.00	12.4	1.11	<0.4	17.4	16.6	0.68
PP-3		20010726	0600	27.9	5.43	6.43	6.26	1.60	1.57	49.9	1.97	<0.4	19.5	19.0	<0.5
PP-3a		20010726	0608	26.9	5.76	6.88	6.85	1.74	1.71	49.8	2.24	<0.4	21.4	21.3	0.72
PP-3b		20010726	0645	27.1	5.78	6.77	6.74	1.69	1.68	48.9	2.55	<0.4	20.6	19.8	0.72
PP-3c		20010727	0730	27.6	5.93	7.07	6.83	1.78	1.72	49.4	2.47	<0.4	20.6	20.0	1.26
PP-3d		20010727	0910	25.7	5.59	15.2	14.6	2.15	2.05	44.0	2.71	<0.4	22.3	21.3	0.51
PP-4		20010726	0715	25.9	5.63	15.3	15.0	2.17	2.14	45.8	2.72	<0.4	23.3	21.6	0.74
PP-4	R	20010726	0720	25.8	5.57	15.3	15.0	2.20	2.14	45.4	2.75	<0.4	22.3	21.7	0.63
PP-4		20010727	0930	25.5	5.47	15.3	15.2	2.18	2.12	45.1	2.67	<0.4	22.1	21.5	0.59
PP-4a		20010726	0525	26.7	5.92	15.6	15.2	2.33	2.23	45.3	2.86	<0.4	22.2	21.3	0.74
PP-4b		20010726	0600	26.6	6.06	15.3	15.0	2.39	2.32	43.3	3.01	<0.4	22.0	21.1	0.72
PP-5		20010726	0700	27.5	6.26	15.5	15.3	2.51	2.42	43.3	3.43	<0.4	21.6	20.8	0.66
PP-5	B	20010726	0705	<0.05	<0.06	<0.04	<0.04	<0.002	<0.002	<0.8	<0.4	<0.4	<0.01	<0.01	<0.5
S-4		20010726	1030	106	16.8	17.3	16.7	2.92	2.67	270	4.88	0.12	21.2	20.3	2.09
WS-8		20010726	1210	17.6	4.00	44.0	43.5	3.56	3.41	32.1	2.86	1.24	26.8	26.8	<0.5
WS-8		20010727	0650	17.4	4.00	44.1	43.2	3.61	3.45	31.9	2.92	1.28	28.4	27.0	<0.5

Table 3. Concentrations of additional constituents at synoptic water-quality sites in the upper Prickly Pear Creek watershed, Montana, July 26-27, 2001 (Continued).

Site number	QA sample type	Date	Time	Alumi-num, total recov-erable (µg/L)	Alumi-num, dis-solved (µg/L)	Barium, total recov-erable (µg/L)	Barium, dis-solved (µg/L)	Beryl-lium, total recov-erable (µg/L)	Beryl-lium, dis-solved (µg/L)	Boron, total recov-erable (µg/L)	Boron, dis-solved (µg/L)	Cobalt, total recov-erable (µg/L)	Cobalt, dis-solved (µg/L)	Chro-mium, total recov-erable (µg/L)	Chro-mium, dis-solved (µg/L)	Iron, total recov-erable (µg/L)	Iron, dis-solved (µg/L)
B-1		20010726	0945	<80	<80	23.1	21.1	<0.1	<0.1	29.1	32.2	<1	<1	<1	<1	614	75.1
C-6		20010726	1430	<80	<80	34.9	33.0	<.1	<.1	23.8	24.0	<1	<1	<1	<1	47.1	<9
D-1		20010726	1120	<80	<80	14.5	14.1	<.1	<.1	18.6	19.6	<1	<1	<1	<1	85.8	41.2
L-9		20010726	1520	<80	<80	26.1	25.5	<.1	<.1	19.9	17.7	<1	<1	<1	<1	148	76.8
L-9	B	20010726	1525	<80	<80	<0.5	<0.5	<.1	<.1	13.0	12	<1	<1	<1	<1	<9	<9
PP-2		20010726	0815	<80	<80	7.30	6.70	<.1	<.1	23.4	23.0	<1	<1	1.1	<1	74.4	12.0
PP-2a		20010726	0740	<80	<80	8.20	7.50	<.1	<.1	4.30	4.50	<1	<1	<1	<1	156	36.6
PP-2a	R	20010726	0741	<80	<80	8.40	7.50	<.1	<.1	24.8	4.40	<1	<1	<1	<1	147	36.2
PP-3		20010726	0600	<80	<80	14.9	14.7	<.1	<.1	7.00	7.30	<1	<1	<1	<1	36.1	<9
PP-3a		20010726	0608	<80	<80	21.6	21.5	<.1	<.1	8.70	8.30	<1	<1	<1	<1	<9	<9
PP-3b		20010726	0645	<80	<80	22.2	21.9	<.1	<.1	8.80	8.50	<1	<1	<1	<1	66.6	11.5
PP-3c		20010727	0730	<80	<80	23.3	22.7	<.1	<.1	22.5	22.1	2.8	<1	<1	<1	55.3	15.1
PP-3d		20010727	0910	<80	<80	24.5	23.7	<.1	<.1	32.2	31.7	2.2	<1	<1	<1	112	22.8
PP-4		20010726	0715	<80	<80	24.8	24.1	<.1	<.1	19.7	19.2	<1	<1	<1	<1	75.5	19.7
PP-4	R	20010726	0720	<80	<80	23.8	24.3	<.1	<.1	19.9	19.3	<1	<1	<1	<1	75.3	19.6
PP-4		20010727	0930	<80	<80	24.0	23.4	<.1	<.1	31.2	32.4	<1	<1	<1	<1	83.3	23.5
PP-4a		20010726	0525	<80	<80	26.3	25.9	<.1	<.1	21.4	20.2	<1	<1	<1	<1	70.7	22.5
PP-4b		20010726	0600	<80	<80	28.0	27.3	<.1	<.1	20.9	19.9	<1	<1	<1	<1	151	59.3
PP-5		20010726	0700	<80	<80	27.8	26.9	<.1	<.1	21.8	21.8	<1	<1	<1	<1	115	44.3
PP-5	B	20010726	0705	<80	<80	<0.5	<0.5	<.1	<.1	<3	<3	<1	<1	<1	<1	<9	<9
S-4		20010726	1030	<80	<80	41.4	40.1	0.10	<.1	28.0	29.4	<1	<1	<1	<1	53.8	<9
WS-8		20010726	1210	91.0	<80	28.3	27.3	0.21	0.20	67.5	68.5	<1	<1	<1	<1	167	50.7
WS-8		20010727	0650	84.3	<80	28.2	27.2	<.14	0.1	69.6	68.7	<1	<1	<1	<1	167	51.1

Table 3. Concentrations of additional constituents at synoptic water-quality sites in the upper Prickly Pear Creek watershed, Montana, July 26-27, 2001 (Continued).

Site number	QA sample type	Date	Time	Lead, total recov-erable (µg/L)	Lead, dis-solved (µg/L)	Lithium, total recov-erable (µg/L)	Lithium, dissolved (µg/L)	Man-ganese, total recov-erable (µg/L)	Nickel, total recov-erable (µg/L)	Nickel, dissolved (µg/L)	Seleniu m, total recov-erable (µg/L)	Seleniu m, dissolved (µg/L)	Strontium, total recov-erable (µg/L)	Stron-tium, dis-solved (µg/L)	Vana-dium, total recov-erable (µg/L)	Vana-dium, dis-solved (µg/L)
B-1		20010726	0945	0.170	<0.1	8.1	<8	116	<2	<2	<50	<50	331	327	<1	<1
C-6		20010726	1430	0.529	<0.1	<8	8.3	7.4	<2	<2	<50	<50	247	234	1.1	1.0
D-1		20010726	1120	<0.1	<0.1	<8	<8	4.1	<2	<2	<50	<50	97.4	95.7	1.6	1.8
L-9		20010726	1520	<0.1	0.228	<8	<8	24.4	<2	<2	<50	<50	154	150	<1	<1
L-9	B	20010726	1525	<0.1	<0.1	<8	<8	<1	<2	<2	<50	<50	<1	<1	<1	<1
PP-2		20010726	0815	0.957	<0.1	<8	<8	3.8	<2	<2	<50	<50	84.8	83.7	<1	1.1
PP-2a		20010726	0740	0.864	<0.1	<8	<8	20.3	<2	<2	<50	<50	96.7	95.7	<1	<1
PP-2a	R	20010726	0741	0.879	<0.1	<8	<8	18.0	<2	<2	<50	<50	98.5	97.0	1.0	<1
PP-3		20010726	0600	1.79	0.197	<8	<8	19.1	<2	<2	<50	<50	223	223	<1	<1
PP-3a		20010726	0608	<0.1	<0.1	<8	<8	<1	<2	<2	<50	<50	220	218	<1	1.1
PP-3b		20010726	0645	1.57	<0.1	<8	<8	22.4	<2	<2	<50	<50	213	216	<1	<1
PP-3c		20010727	0730	1.58	<0.1	<8	<8	31.5	<2	<2	<50	<50	219	214	<1	1.0
PP-3d		20010727	0910	3.32	0.157	22.4	21.2	35.3	<2	<2	<50	<50	245	239	1.0	<1
PP-4		20010726	0715	2.23	<0.1	22.7	22.2	38.2	<2	<2	<50	<50	248	245	<1	1.0
PP-4	R	20010726	0720	2.39	0.346	22.3	21.7	38.4	2.30	<2	<50	<50	247	246	<1	<1
PP-4		20010727	0930	2.08	0.328	22.8	21.7	33.1	<2	<2	<50	<50	246	240	1.0	1.2
PP-4a		20010726	0525	1.82	0.181	22.7	21.6	38.8	<2	<2	<50	<50	252	248	<1	<1
PP-4b		20010726	0600	2.73	0.446	22.2	21.1	65.7	<2	<2	<50	<50	252	246	<1	<1
PP-5		20010726	0700	2.52	0.764	23.2	21.7	42.4	<2	<2	<50	<50	253	248	<1	<1
PP-5	B	20010726	0705	<0.1	<0.1	<8	<8	<1	<2	<2	<50	<50	<1	<1	<1	<1
S-4		20010726	1030	8.08	0.446	12.3	11.5	29.8	<2	<2	<50	<50	1,030	1,010	<1	<1
WS-8		20010726	1210	1.49	0.455	91.0	85.7	19.9	<2	<2	<50	<50	332	324	1.3	<1
WS-8		20010727	0650	0.592	0.200	91.3	86.6	19.9	<2	<2	<50	<50	331	325	1.1	1.1

Table 4. Water-quality data for diel investigations in Prickly Pear Creek at site PP-5, Montana, March-April 2001.

[Samples analyzed by the U.S. Geological Survey National Water Quality Laboratory, Denver, Colo. Analytical data are reported to a maximum of three significant figures to provide sufficient resolution for detecting small differences between samples closely spaced in time or distance. Similarly, field measurements from electronic recorders have not been rounded to illustrate the pattern of relative change between measurements. Abbreviations: ft^3/s, cubic feet per second; ºC, degrees Celsius; mg/L, micrograms per liter; □S/cm, microsiemens per centimeterat 25ºC; mg/L, milligrams per liter; su, standard units. Symbol: --, no data]

Date and time	Streamflow, instantaneous (ft^3/s)	Specific conductance, field (µS/cm)	pH, field (su)	Temp-erature, water (ºC)	Dissolved oxygen, field (mg/L)	Zinc, dissolved (µg/L)
		March 13-14, 2001				
3/13/01 3:00	14.5	--	7.90	2.90	--	74.2
3/13/01 4:00	14.5	--	7.91	2.81	--	76.5
3/13/01 5:00	14.1	--	7.91	2.74	--	78.8
3/13/01 6:00	14.1	--	7.91	2.68	--	81.1
3/13/01 7:00	14.1	--	7.91	2.64	--	81.3
3/13/01 8:00	14.1	--	7.91	2.65	--	82.8
3/13/01 9:00	13.8	--	7.91	2.86	--	82.4
3/13/01 10:00	13.4	--	7.91	3.13	--	81.3
3/13/01 11:00	13.8	--	7.90	3.45	--	78.2
3/13/01 12:00	13.8	--	7.90	3.83	--	74.9
3/13/01 13:00	13.8	--	7.92	4.16	--	70.8
3/13/01 14:00	14.1	--	7.91	4.99	--	65.8
3/13/01 15:00	14.5	--	7.93	5.91	--	59.5
3/13/01 16:00	15.3	--	7.95	5.76	--	53.5
3/13/01 17:00	15.6	--	7.97	5.51	--	48.1
3/13/01 18:00	16.0	--	7.98	5.24	--	43.7
3/13/01 19:00	16.9	--	7.99	4.98	--	40.0
3/13/01 20:00	16.9	--	7.98	4.73	--	40.2
3/13/01 21:00	17.3	--	7.97	4.34	--	44.2
3/13/01 22:00	17.3	--	7.95	3.97	--	42.6
3/13/01 23:00	17.7	--	7.93	3.41	--	50.5
3/14/01 0:00	17.7	--	7.91	3.22	--	54.8
3/14/01 1:00	17.7	--	7.90	2.91	--	61.4
3/14/01 2:00	17.3	--	7.90	2.66	--	69.0
3/14/01 3:00	16.4	--	7.89	2.42	--	76.0
3/14/01 4:00	16.0	--	7.89	2.11	--	80.0
3/14/01 5:00	16.0	--	7.89	1.84	--	82.3
3/14/01 6:00	15.6	--	7.88	1.63	--	85.8
3/14/01 7:00	15.3	--	7.89	1.51	--	84.4
3/14/01 8:00	15.3	--	7.88	1.46	--	85.5
3/14/01 9:00	14.5	--	7.89	1.39	--	85.6
3/14/01 11:00	14.9	--	7.89	0.80	--	84.0
3/14/01 12:00	14.9	--	7.86	1.36	--	80.2
3/14/01 13:00	14.9	--	7.87	1.85	--	75.8
3/14/01 14:00	14.5	--	7.88	2.56	--	71.2
3/14/01 15:00	14.1	--	7.92	3.25	--	66.5
3/14/01 16:00	14.5	--	7.94	3.56	--	61.7
3/14/01 17:00	14.5	--	7.97	3.69	--	55.2
3/14/01 18:00	14.5	--	7.98	3.66	--	50.8
3/14/01 19:00	14.1	--	7.98	3.39	--	46.3
3/14/01 20:00	14.1	--	7.97	3.05	--	44.0
		March 22-23, 2001				
3/22/01 11:00	13.0	--	--	--	--	--
3/22/01 11:20	--	--	7.85	3.40	--	68.4

Table 4. Water-quality data for diel investigations in Prickly Pear Creek at site PP-5, Montana, March-April 2001 (Continued).

Date and time	Streamflow, instantaneous (ft^3/s)	Specific conductance, field (µS/cm)	pH, field (su)	Temp-erature, water (°C)	Dissolved oxygen, field (mg/L)	Zinc, dissolved (µg/L)
March 22-23, 2001 (Continued)						
3/22/01 12:00	13.4	--	7.84	4.24	--	65.7
3/22/01 13:00	16.0	--	7.90	6.00	--	57.9
3/22/01 14:00	17.7	--	8.01	7.37	--	50.9
3/22/01 15:00	20.4	--	8.08	8.18	--	40.9
3/22/01 16:00	24.2	--	8.12	8.34	--	31.4
3/22/01 17:00	24.8	--	8.18	8.00	--	24.8
3/22/01 18:00	24.2	--	8.24	7.81	--	21.0
3/22/01 19:00	23.7	--	8.20	7.20	--	21.0
3/22/01 20:00	23.2	--	8.11	6.40	--	22.8
3/22/01 21:00	21.8	--	8.02	5.35	--	28.1
3/22/01 22:00	21.8	--	7.96	4.57	--	31.9
3/22/01 23:00	21.3	--	7.93	4.04	--	37.2
3/23/01 0:00	20.4	--	7.92	3.58	--	41.6
3/23/01 1:00	18.1	--	7.91	3.12	--	48.0
3/23/01 2:00	17.3	--	7.90	2.63	--	53.0
3/23/01 3:00	16.0	--	7.89	2.13	--	57.6
3/23/01 7:00	14.9	--	7.86	1.15	--	70.9
3/23/01 8:00	14.9	--	7.86	1.06	--	66.7
3/23/01 9:00	14.5	--	7.88	1.11	--	67.8
3/23/01 10:00	14.1	--	7.89	1.42	--	65.3
3/23/01 11:00	13.8	--	7.90	2.39	--	62.2
3/23/01 12:00	14.1	--	7.93	3.98	--	56.5
3/23/01 13:00	16.0	--	7.97	5.42	--	49.1
3/23/01 14:00	19.9	--	8.02	6.56	--	44.6
3/23/01 15:00	21.3	--	8.07	7.10	--	35.4
3/23/01 16:00	23.2	--	8.08	7.06	--	30.4
3/23/01 17:00	24.8	--	8.12	6.53	--	24.3
3/23/01 18:00	23.2	--	8.16	6.02	--	21.4
3/23/01 19:00	22.2	--	8.12	5.31	--	--
3/23/01 20:00	20.8	--	8.05	4.59	--	--
April 26-27, 2001						
4/26/01 10:15	--	--	8.00	--	--	41.3
4/26/01 10:30	48.7	226	8.00	7.62	10.58	--
4/26/01 11:00	48.7	227	8.04	8.46	10.47	37.5
4/26/01 12:00	47.2	229	8.11	10.17	10.12	31.1
4/26/01 13:00	46.4	231	8.13	11.79	9.76	25.7
4/26/01 14:00	46.4	235	8.10	12.21	9.48	19.2
4/26/01 15:00	44.9	235	8.21	12.58	9.41	17.2
4/26/01 16:00	44.2	236	8.23	13.19	9.16	18.3
4/26/01 17:00	43.4	236	8.15	13.35	8.92	16.3
4/26/01 18:00	42.7	237	8.12	13.30	8.83	15.8
4/26/01 19:00	42.7	238	8.00	12.88	8.68	15.8
4/26/01 20:00	44.2	237	7.89	12.36	8.64	18.0
4/26/01 21:00	46.4	234	7.84	11.74	8.71	22.3
4/26/01 22:00	49.5	233	7.80	11.02	8.96	30.5
4/26/01 23:00	51.9	232	7.76	10.27	9.14	33.3
4/27/01 0:00	55.2	226	7.71	9.38	9.38	35.2
4/27/01 1:00	57.8	219	7.71	8.48	9.62	36.8

Table 4. Water-quality data for diel investigations in Prickly Pear Creek at site PP-5, Montana, March-April 2001(Continued).

Date and time	Streamflow, instantaneous (ft^3/s)	Specific conductance, field (µS/cm)	pH, field (su)	Temp-erature, water (^oC)	Dissolved oxygen, field (mg/L)	Zinc, dissolved (µg/L)
April 26-27, 2001 (Continued)						
4/27/01 2:00	58.6	214	7.65	7.63	9.85	39.9
4/27/01 3:00	60.3	205	7.72	6.93	10.00	40.3
4/27/01 4:00	61.2	204	7.72	6.43	10.14	41.4
4/27/01 5:00	61.2	203	7.71	6.03	10.28	42.0
4/27/01 6:00	61.2	206	7.70	5.75	10.42	43.6
4/27/01 7:00	60.3	203	7.71	5.61	10.54	42.7
4/27/01 8:00	59.5	203	7.74	5.78	10.61	40.9
4/27/01 9:00	58.6	203	7.88	6.48	10.52	41.7
4/27/01 10:00	57.8	205	7.97	7.61	10.41	37.7
4/27/01 11:00	57.8	206	8.04	9.01	10.21	31.4
4/27/01 12:00	56.0	206	8.15	10.81	9.67	27.6
4/27/01 13:00	55.2	208	8.16	12.12	9.18	21.0
4/27/01 14:00	54.4	208	8.12	12.39	9.00	22.3
4/27/01 15:00	53.5	208	8.02	12.09	8.85	19.0
4/27/01 16:00	52.7	210	8.05	12.51	9.01	20.4
4/27/01 17:00	51.9	208	8.10	12.54	8.99	18.6
4/27/01 18:00	51.9	209	8.07	12.35	8.91	22.7
4/27/01 19:00	53.5	209	7.96	11.94	8.80	21.7
4/27/01 20:00	56.0	208	7.86	11.36	8.78	23.6
4/27/01 21:00	58.6	206	7.81	10.67	8.77	27.6
4/27/01 22:00	62.9	203	7.75	9.90	9.06	32.4

Table 5. Water-quality data for diel investigations in Prickly Pear Creek at site PP-4b, Montana, July 25-27, 2001.

[Samples analyzed by the U.S. Geological Survey laboratory, Boulder, Colo. Analytical data are reported to a maximum of three significant figures to provide sufficient resolution for detecting small differences between samples closely spaced in time or distance. Similarly, field measurements from electronicrecorders have not been rounded to illustrate the pattern of relative change between measurements. Abbreviations: B, blank sample; ft^3/s, cubic feet per second; °C, degrees Celsius, µg/L, micrograms per liter; µS/cm, microsiemens per centimeter at 25°C; mg/L, milligrams per liter; su, standard units; QA, qualityassurance; R, replicate sample. Symbol: <, less than; --, no data].

Date and time	QA sample type	Stream-flow, instan-taneous (ft^3/s)	Specific conduct-ance, field (µS/cm)	pH, field (su)	Tempera-ture, water (°C)	Dis-solved oxygen, field (mg/L)	Cal-cium, dis-solved (mg/L)	Magne-sium, dissolved (mg/L)	Sodium, dis-solved (mg/L)	Potas-sium, dis-solved (mg/L)	Alka-linity, lab (mg/L as $CaCO_3$)	Sulfate, dis-solved (mg as SO_4)	Chloride, dissolved (mg/L)	Fluo-ride, dis-solved (mg/L)	Silica, dis-solved (mg/L as SiO_2)	Nitrate, dissolved (mg/L as NO_3)
7/25/2001 12:00		19.4	239	8.30	15.94	9.22	26.9	5.99	14.5	2.20	85.7	42.9	2.83	0.43	21.5	0.63
7/25/2001 13:00		19.0	238	8.38	17.75	8.96	26.7	6.02	14.5	2.22	85.1	42.6	2.87	0.42	21.2	0.61
7/25/2001 14:00		18.6	238	8.45	19.39	8.62	26.8	5.88	14.3	2.22	84.7	43.0	2.93	0.45	21.2	0.46
7/25/2001 15:00		18.2	238	8.33	20.73	8.35	26.8	5.93	14.4	2.27	84.1	41.5	2.90	0.45	21.5	0.57
7/25/2001 16:00		18.2	239	8.33	21.72	8.07	26.7	5.87	14.4	2.24	84.0	43.6	2.92	0.45	21.4	0.64
7/25/2001 17:00		17.4	240	8.31	21.61	7.83	26.9	5.91	14.5	2.30	84.5	43.7	2.85	0.43	21.3	0.63
7/25/2001 18:00		17.4	241	8.29	21.22	7.84	27.0	5.85	14.6	2.35	83.5	43.4	2.88	0.44	21.2	1.18
7/25/2001 19:00		17.4	243	8.24	20.71	7.82	27.0	5.71	14.4	2.35	85.5	43.9	2.94	0.45	21.7	0.52
7/25/2001 20:00		17.4	244	8.20	20.01	7.71	27.5	6.02	14.9	2.34	86.2	43.8	2.95	0.42	21.5	0.52
7/25/2001 21:00		17.4	245	8.14	19.08	7.74	27.6	6.03	15.1	2.36	87.0	44.1	2.95	0.41	21.9	0.67
7/25/2001 22:00		17.0	246	8.13	18.12	7.85	27.2	6.08	15.1	2.38	88.1	43.4	3.00	0.44	21.5	0.80
7/25/2001 23:00		17.0	246	8.14	17.07	8.06	27.6	6.06	15.2	2.35	89.0	44.0	3.00	0.44	21.9	0.71
7/25/2001 23:00	R	--	--	--	--	--	27.0	6.06	14.8	2.37	88.2	42.7	2.94	0.42	21.2	0.98
7/26/2001 0:00		17.0	246	8.14	16.18	8.22	27.3	6.00	15.1	2.37	89.1	44.5	2.94	0.43	22.0	0.73
7/26/2001 1:00		17.0	247	8.14	15.42	8.38	27.5	6.12	15.4	2.34	89.8	44.2	3.04	0.43	21.9	0.72
7/26/2001 2:00		17.4	246	8.14	14.69	8.55	27.7	6.02	15.3	2.39	90.1	44.5	3.10	0.46	21.6	0.88
7/26/2001 3:00		17.8	246	8.12	14.09	8.75	27.7	6.00	15.4	2.34	89.7	44.6	2.97	0.41	21.5	0.84
7/26/2001 4:00		17.8	245	8.10	13.40	8.85	27.6	6.03	15.4	2.34	89.3	44.2	3.05	0.43	21.3	0.87
7/26/2001 5:00		17.8	244	8.12	12.79	9.00	26.8	5.84	15.2	2.26	89.6	43.3	3.07	0.47	20.8	0.83
7/26/2001 6:00		17.8	243	8.16	12.29	9.16	27.4	5.94	15.2	2.35	89.4	44.2	2.96	0.41	21.9	0.80
7/26/2001 7:00		17.8	242	8.18	11.92	9.29	27.4	5.87	15.4	2.28	89.2	44.4	2.95	0.42	21.7	0.78
7/26/2001 8:00		18.2	242	8.21	11.91	9.54	27.4	5.82	15.2	2.29	88.9	44.2	2.93	0.44	21.6	0.80

Table 5. Water-quality data for diel investigations in Prickly Pear Creek at site PP-4b, Montana, July 25-27, 2001 (Continued).

[Samples analyzed by the U.S. Geological Survey laboratory, Boulder, Colo. Analytical data are reported to a maximum of three significant figures to provide sufficient resolution for detecting small differences between samples closely spaced in time or distance. Similarly, field measurements from electronic recorders have not been rounded to illustrate the pattern of relative change between measurements. Abbreviations: B, blank sample; ft^3/s, cubic feet per second; °C, degrees Celsius, µg/L, micrograms per liter; µS/cm, microsiemens per centimeter at 25°C; mg/L, milligrams per liter; su, standard units; QA, quality assurance; R, replicate sample. Symbol: <, less than; --, no data].

Date and time	QA sample type	Aluminum, total recoverable (µg/L)	Aluminum, dissolved (µg/L)	Arsenic, total recoverable (µg/L)	Arsenic, $As^{+3} + As^{+5}$, dissolved (µg/L)	Arsenic, As^{+3}, dissolved (µg/L)	Barium, dissolved (µg/L)	Beryllium, dissolved (µg/L)	Boron, dissolved (µg/L)	Cadmium, total recoverable (µg/L)	Cadmium, dissolved (µg/L)	Chromium, dissolved (µg/L)	Cobalt, dissolved (µg/L)	Copper, total recoverable (µg/L)	Copper, dissolved (µg/L)	Iron, total recoverable (µg/L)
7/25/2001 12:00		<80	<80	<50	3.03	0.61	25.8	<0.1	19.4	<1	<1	<1	<1	2.22	2.12	151
7/25/2001 13:00		<80	<80	<50	4.58	<0.5	25.1	<0.1	19.4	<1	<1	<1	<1	2.46	1.85	147
7/25/2001 14:00		<80	<80	<50	4.97	<0.5	25.2	<0.1	19.1	<1	<1	<1	<1	2.59	2.00	149
7/25/2001 15:00		<80	<80	<50	5.21	<0.5	24.8	<0.1	19.4	<1	<1	<1	<1	2.62	2.44	149
7/25/2001 16:00		<80	<80	<50	5.40	<0.5	24.4	<0.1	19.4	<1	<1	<1	<1	2.61	2.28	146
7/25/2001 17:00		<80	<80	<50	5.60	0.56	24.8	<0.1	19.6	<1	<1	<1	<1	2.59	2.17	140
7/25/2001 18:00		<80	<80	<50	5.69	0.77	24.8	<0.1	20.4	<1	<1	<1	<1	2.67	2.41	145
7/25/2001 19:00		<80	<80	<50	5.80	0.60	25.3	<0.1	20.6	<1	<1	<1	<1	2.72	1.79	152
7/25/2001 20:00		<80	<80	<50	5.06	0.54	25.7	<0.1	20.7	<1	<1	<1	<1	2.84	2.21	145
7/25/2001 21:00		<80	<80	<50	5.42	0.97	26.2	<0.1	21.5	<1	<1	<1	<1	3.13	1.78	160
7/25/2001 22:00		<80	<80	<50	5.42	0.82	27.3	<0.1	21.0	<1	<1	<1	<1	3.21	1.57	213
7/25/2001 23:00		<80	<80	<50	5.03	<0.5	27.6	<0.1	20.5	<1	<1	<1	<1	2.68	2.55	188
7/25/2001 23:00	R	<80	<80	<50	4.95	<0.5	27.9	<0.1	20.2	<1	<1	<1	<1	2.69	2.28	256
7/26/2001 0:00		<80	<80	<50	4.84	<0.5	27.7	<0.1	20.0	<1	<1	<1	<1	2.62	1.77	183
7/26/2001 1:00		<80	<80	<50	4.66	<0.5	27.9	<0.1	20.0	<1	<1	<1	<1	2.63	1.87	165
7/26/2001 2:00		<80	<80	<50	4.51	<0.5	27.5	<0.1	20.5	<1	<1	<1	<1	2.93	1.74	159
7/26/2001 3:00		<80	<80	<50	4.47	<0.5	27.0	<0.1	19.6	<1	<1	<1	<1	2.89	1.68	159
7/26/2001 4:00		<80	<80	<50	4.55	<0.5	27.5	<0.1	19.7	<1	<1	<1	<1	2.60	1.90	164
7/26/2001 5:00		<80	<80	<50	4.36	<0.5	27.0	<0.1	20.8	<1	<1	<1	<1	2.53	1.80	145
7/26/2001 6:00		<80	<80	<50	4.00	<0.5	27.7	<0.1	19.7	<1	<1	<1	<1	2.80	1.98	157
7/26/2001 7:00		<80	<80	<50	4.45	0.53	27.1	<0.1	18.8	<1	<1	<1	<1	2.64	3.60	168
7/26/2001 8:00		<80	<80	<50	4.45	<0.5	26.7	<0.1	19.6	<1	<1	<1	<1	2.30	1.85	157

Table 5. Water-quality data for diel investigations in Prickly Pear Creek at site PP-4b, Montana, July 25-27, 2001 (Continued).

[Samples analyzed by the U.S. Geological Survey laboratory, Boulder, Colo. Analytical data are reported to a maximum of three significant figures to provide sufficient resolution for detecting small differences between samples closely spaced in time or distance. Similarly, field measurements from electronic recorders have not been rounded to illustrate the pattern of relative change between measurements. Abbreviations: B, blank sample; ft^3/s, cubic feet per second; °C, degrees Celsius, µg/L, micrograms per liter; µS/cm, microsiemens per centimeter at 25°C; mg/L, milligrams per liter; su, standard units; QA, quality assurance; R, replicate sample. Symbol: <, less than; --, no data].

Date and time	QA sample type	Iron, $Fe^{+2} + Fe^{+3}$, dissolved (µg/L)	Iron, Fe^{+2}, dissolved (µg/L)	Lead, total recoverable (µg/L)	Lead, dissolved (µg/L)	Lithium, dissolved (µg/L)	Manganese, total recoverable (µg/L)	Manganese, dissolved (µg/L)	Nickel, total recoverable (µg/L)	Nickel, dissolved (µg/L)	Selenium, total recoverable (µg/L)	Selenium, dissolved (µg/L)	Strontium, total recoverable (µg/L)	Strontium, dissolved (µg/L)	Vanadium, total recoverable (µg/L)	Vanadium, dissolved (µg/L)	Zinc, total recoverable (µg/L)	Zinc, dissolved (µg/L)
7/25/2001 12:00		45.6	26.5	<8	<8	20.1	48.6	41.5	<2	<2	<50	<50	241	239	<1	<1	72.5	62.6
7/25/2001 13:00		39.9	25.6	<8	<8	19.8	45.9	37.2	<2	<2	<50	<50	237	238	<1	<1	61.7	49.5
7/25/2001 14:00		37.8	29.7	<8	<8	20.4	44.8	36.2	<2	<2	<50	<50	239	240	<1	<1	54.0	43.0
7/25/2001 15:00		36.8	24.6	<8	<8	20.2	42.9	33.9	<2	<2	<50	<50	243	239	1.0	<1	46.5	34.8
7/25/2001 16:00		33.8	24.1	<8	<8	20.2	42.1	32.5	<2	<2	<50	<50	239	237	1.1	<1	42.4	29.9
7/25/2001 17:00		34.8	29.7	<8	<8	20.8	40.9	33.0	<2	<2	<50	<50	237	241	1.0	<1	40.0	28.0
7/25/2001 18:00		32.3	28.1	<8	<8	21.4	42.9	34.6	<2	<2	<50	<50	242	243	1.1	<1	41.8	30.6
7/25/2001 19:00		35.9	29.9	<8	<8	21.7	45.6	36.9	<2	<2	<50	<50	243	243	<1	<1	44.6	31.0
7/25/2001 20:00		35.7	34.9	<8	<8	21.6	48.5	39.5	<2	<2	<50	<50	246	245	1.2	<1	48.1	35.5
7/25/2001 21:00		40.8	34.2	<8	<8	21.8	52.2	43.7	<2	<2	<50	<50	248	247	1.0	<1	56.8	43.8
7/25/2001 22:00		44.2	36.9	<8	<8	22.2	70.2	48.4	<2	<2	<50	<50	250	248	1.0	<1	72.2	51.9
7/25/2001 23:00		42.7	39.7	<8	<8	21.7	63.4	51.7	2.1	<2	<50	<50	248	252	<1	<1	76.5	62.2
7/25/2001 23:00	R	43.3	32.5	<8	<8	21.0	73.5	51.0	<2	<2	<50	<50	255	248	1.2	<1	85.7	61.8
7/26/2001 0:00		43.0	34.6	<8	<8	21.2	65.6	53.6	<2	<2	<50	<50	250	249	<1	<1	85.3	71.4
7/26/2001 1:00		44.3	32.1	<8	<8	22.5	65.1	55.3	<2	<2	<50	<50	250	250	<1	<1	92.4	80.1
7/26/2001 2:00		42.8	30.4	<8	<8	22.9	64.7	55.5	<2	<2	<50	<50	248	252	<1	<1	98.3	90.0
7/26/2001 3:00		41.5	29.0	<8	<8	22.5	66.4	55.8	<2	<2	<50	<50	247	249	<1	<1	106	94.7
7/26/2001 4:00		42.7	31.1	<8	<8	23.0	67.7	56.3	<2	<2	<50	<50	249	249	<1	<1	112	101
7/26/2001 5:00		43.1	18.7	<8	<8	21.5	64.8	54.7	<2	<2	<50	<50	246	249	<1	<1	112	100
7/26/2001 6:00		46.9	11.1	<8	<8	23.1	67.3	56.5	<2	<2	<50	<50	246	250	<1	<1	113	107
7/26/2001 7:00		44.9	23.9	<8	<8	22.5	66.1	56.5	<2	<2	<50	<50	247	248	<1	<1	116	107
7/26/2001 8:00		48.1	32.2	<8	<8	22.6	64.3	54.8	<2	<2	<50	<50	251	248	<1	<1	115	106

Table 5. Water-quality data for diel investigations in Prickly Pear Creek at site PP-4b, Montana, July 25-27, 2001(Continued).

Date and time	QA sample type	Stream-flow, instan-taneous (ft^3/s)	Specific conduct-ance, field (µS/cm)	pH, field (su)	Tempera-ture, water (^oC)	Dis-solved oxygen, field (mg/L)	Cal-cium, dis-solved (mg/L)	Magne-sium, dissolved (mg/L)	Sodium, dis-solved (mg/L)	Potas-sium, dis-solved (mg/L)	Alka-linity, lab (mg/L as $CaCO_3$)	Sulfate, dis-solved (mg as SO_4)	Chloride, dissolved (mg/L)	Fluo-ride, dis-solved (mg/L)	Silica, dis-solved (mg/L as SiO_2)	Nitrate, dissolved (mg/L as NO_3)
7/26/2001 8:30	B	--	--	--	--	--	<0.05	<0.06	<0.04	<0.002	<0.5	<0.8	0.60	0.10	<0.01	0.06
7/26/2001 9:00		18.2	242	8.25	12.34	9.64	27.3	6.03	15.3	2.30	88.6	43.6	2.94	0.41	21.6	0.66
7/26/2001 10:00		18.2	242	8.27	13.11	9.63	27.4	6.01	15.0	2.22	88.3	44.4	2.89	0.40	21.5	0.75
7/26/2001 11:00		17.8	242	8.31	14.34	9.41	26.6	6.07	15.2	2.26	87.5	43.8	2.89	0.42	21.1	0.74
7/26/2001 12:00		17.8	243	8.33	15.91	9.21	26.7	6.00	15.1	2.31	87.2	42.3	2.90	0.41	21.1	0.62
7/26/2001 13:00		17.4	242	8.36	17.47	8.91	26.5	5.98	14.9	2.24	86.7	42.6	2.88	0.42	20.9	0.54
7/26/2001 14:00		17.4	243	8.38	19.23	8.49	26.5	5.95	15.0	2.28	86.1	42.6	2.98	0.43	21.2	0.49
7/26/2001 15:00		17.4	243	8.39	20.67	8.13	26.6	5.99	15.1	2.31	86.0	43.0	2.90	0.43	21.2	0.45
7/26/2001 15:00	R	--	--	--	--	--	26.3	5.94	14.8	2.30	86.3	43.2	2.92	0.45	21.3	0.07
7/26/2001 16:00		--	244	8.39	21.00	7.87	26.5	5.84	15.0	2.34	85.9	42.9	2.89	0.42	21.0	0.30
7/26/2001 16:30		17.4	244	8.39	21.25	7.76	26.4	5.88	14.9	2.34	86.1	43.5	2.93	0.44	21.0	0.30
7/26/2001 17:00		--	245	8.37	21.47	7.73	26.8	5.98	15.1	2.32	85.7	43.3	2.90	0.42	21.2	0.34
7/26/2001 17:30		17.0	245	8.36	21.19	7.57	26.6	5.94	14.9	2.33	86.3	43.6	2.95	0.42	21.3	0.36
7/26/2001 18:00		--	246	8.35	21.07	7.55	26.9	5.98	15.2	2.33	86.4	43.4	2.90	0.44	21.3	0.28
7/26/2001 18:30		17.0	246	8.31	20.94	7.61	26.9	5.91	15.0	2.33	86.5	44.3	2.97	0.43	21.0	0.46
7/26/2001 19:00		--	247	8.30	20.81	7.53	27.3	5.99	15.2	2.37	86.8	43.7	2.98	0.45	21.3	0.54
7/26/2001 19:30		16.2	248	8.26	20.61	7.50	27.2	5.87	15.3	2.39	87.1	43.7	2.96	0.42	21.4	0.41
7/26/2001 20:00		16.2	248	8.20	20.37	7.49	26.9	6.00	15.3	2.37	87.9	44.4	3.08	0.44	21.1	0.41
7/26/2001 21:00		16.2	249	8.17	19.55	7.40	27.5	5.98	15.4	2.37	88.6	43.4	3.10	0.45	21.3	0.57
7/26/2001 22:00		16.2	250	8.14	18.62	7.51	27.3	5.98	15.5	2.36	89.6	43.0	3.07	0.45	21.2	0.56
7/26/2001 23:00		16.2	251	8.14	17.64	7.64	27.9	6.11	15.9	2.43	90.2	42.8	3.19	0.49	21.6	0.59
7/27/2001 0:00		16.2	250	8.13	16.69	7.85	27.7	6.12	15.6	2.34	90.1	42.6	3.10	0.45	21.6	0.67
7/27/2001 1:00		17.0	249	8.14	15.76	8.05	27.7	6.15	15.9	2.39	90.4	42.6	3.02	0.44	21.5	0.61
7/27/2001 2:00		17.0	248	8.14	14.88	8.24	27.6	6.14	15.7	2.37	90.4	41.9	2.99	0.45	21.5	0.69
7/27/2001 3:00		17.4	247	8.14	14.05	8.39	27.5	6.12	15.5	2.37	89.7	41.5	3.06	0.49	21.5	0.75
7/27/2001 4:00		17.4	245	8.14	13.35	8.56	27.5	6.12	15.5	2.35	89.7	41.4	2.97	0.44	21.4	0.61

Table 5. Water-quality data for diel investigations in Prickly Pear Creek at site PP-4b, Montana, July 25-27, 2001 (Continued).

Date and time	QA sample type	Aluminum, total recoverable (µg/L)	Aluminum, dissolved (µg/L)	Arsenic, total recoverable (µg/L)	Arsenic, As^{+3} + As^{+5}, dissolved (µg/L)	Arsenic, As^{+3}, dissolved (µg/L)	Barium, dissolved (µg/L)	Beryllium, dissolved (µg/L)	Boron, dissolved (µg/L)	Cadmium, total recoverable (µg/L)	Cadmium, dissolved (µg/L)	Chromium, dissolved (µg/L)	Cobalt, dissolved (µg/L)	Copper, total recoverable (µg/L)	Copper, dissolved (µg/L)	Iron, total recoverable (µg/L)
7/26/2001 8:30	B	<80	<80	<50	<0.1	<0.5	<0.5	<0.1	<3	<1	<1	<1	<1	<0.5	<0.5	<9
7/26/2001 9:00		<80	<80	<50	4.48	<0.5	26.6	<0.1	19.0	<1	<1	<1	<1	2.42	1.93	148
7/26/2001 10:00		<80	<80	<50	4.32	<0.5	26.1	<0.1	18.5	<1	<1	<1	<1	2.15	2.20	138
7/26/2001 11:00		<80	<80	<50	3.50	<0.5	25.6	<0.1	19.6	<1	<1	<1	<1	1.90	2.03	138
7/26/2001 12:00		<80	<80	<50	4.67	<0.5	25.8	<0.1	19.3	<1	<1	<1	<1	2.03	1.78	137
7/26/2001 13:00		<80	<80	<50	4.78	<0.5	25.2	<0.1	19.0	<1	<1	<1	<1	2.16	1.96	135
7/26/2001 14:00		<80	<80	<50	4.96	<0.5	25.2	<0.1	19.1	<1	<1	<1	<1	2.63	1.93	133
7/26/2001 15:00		<80	<80	<50	5.39	<0.5	24.7	<0.1	19.2	<1	<1	<1	<1	2.32	2.24	140
7/26/2001 15:00	R	<80	<80	<50	5.30	<0.5	24.9	<0.1	19.5	<1	<1	<1	<1	2.38	1.88	136
7/26/2001 16:00		<80	<80	<50	5.49	<0.5	24.6	<0.1	19.5	<1	<1	<1	<1	2.22	1.99	139
7/26/2001 16:30		<80	<80	<50	--	--	24.3	<0.1	19.6	<1	<1	<1	<1	2.54	2.15	146
7/26/2001 17:00		<80	<80	<50	5.99	<0.5	24.7	<0.1	18.9	<1	<1	<1	<1	2.34	2.22	152
7/26/2001 17:30		<80	<80	<50	--	--	24.6	<0.1	19.2	<1	<1	<1	<1	2.61	2.01	153
7/26/2001 18:00		<80	<80	<50	5.84	<0.5	25.1	<0.1	19.0	<1	<1	<1	<1	2.51	2.30	135
7/26/2001 18:30		<80	<80	<50	--	--	25.4	<0.1	19.0	<1	<1	<1	<1	2.42	2.20	138
7/26/2001 19:00		<80	<80	<50	6.11	<0.5	25.0	<0.1	19.1	<1	<1	<1	<1	2.43	2.17	138
7/26/2001 19:30		<80	<80	<50	6.03	<0.5	25.5	<0.1	19.6	<1	<1	<1	<1	2.16	2.12	141
7/26/2001 20:00		<80	<80	<50	5.36	0.93	25.6	<0.1	19.4	<1	<1	<1	<1	2.55	2.23	145
7/26/2001 21:00		<80	<80	<50	--	--	26.1	<0.1	19.6	<1	<1	<1	<1	2.64	2.12	159
7/26/2001 22:00		<80	<80	<50	4.34	<0.5	26.8	<0.1	20.2	<1	<1	<1	<1	2.87	2.59	149
7/26/2001 23:00		<80	<80	<50	5.00	0.57	27.6	<0.1	20.2	<1	<1	<1	<1	3.05	2.40	157
7/27/2001 0:00		<80	<80	<50	4.65	0.58	27.9	<0.1	20.3	<1	<1	<1	<1	2.32	1.95	143
7/27/2001 1:00		<80	<80	<50	4.55	0.50	28.2	<0.1	20.2	<1	<1	<1	<1	2.65	2.39	146
7/27/2001 2:00		<80	<80	<50	4.25	<0.5	28.2	<0.1	20.3	<1	<1	<1	<1	2.22	2.44	147
7/27/2001 3:00		<80	<80	<50	4.15	<0.5	28.0	<0.1	20.4	<1	<1	<1	<1	3.11	2.07	140
7/27/2001 4:00		<80	<80	<50	4.09	<0.5	27.9	<0.1	20.0	<1	<1	<1	<1	2.48	2.19	149

Table 5. Water-quality data for diel investigations in Prickly Pear Creek at site PP-4b, Montana, July 25-27, 2001 (Continued).

Date and time	QA sample type	Iron, Fe^{+2} + Fe^{+3}, dissolved (µg/L)	Iron, Fe^{+2}, dissolved (µg/L)	Lead, total recoverable (µg/L)	Lead, dissolved (µg/L)	Lithium, dissolved (µg/L)	Manganese, total recoverable (µg/L)	Manganese, dissolved (µg/L)	Nickel, total recoverable (µg/L)	Nickel, dissolved (µg/L)	Selenium, total recoverable (µg/L)	Selenium, dissolved (µg/L)	Strontium, total recoverable (µg/L)	Strontium, dissolved (µg/L)	Vanadium, total recoverable (µg/L)	Vanadium, dissolved (µg/L)	Zinc, total recoverable (µg/L)	Zinc, dissolved (µg/L)
7/26/2001 8:30	B	<2	<2	<8	<8	<8	<1	<1	<2	<2	<50	<50	<1	<1	<1	<1	<1	<1
7/26/2001 9:00		47.5	30.1	<8	<8	22.3	60.1	51.6	<2	<2	<50	<50	246	246	<1	<1	106	98.8
7/26/2001 10:00		47.2	23.8	<8	<8	22.0	56.6	49.0	<2	<2	<50	<50	246	246	<1	<1	96.6	89.7
7/26/2001 11:00		44.8	20.7	<8	<8	21.0	52.9	45.9	<2	<2	<50	<50	247	242	<1	<1	85.0	73.3
7/26/2001 12:00		43.2	25.7	<8	<8	21.5	51.4	42.8	<2	<2	<50	<50	249	246	<1	<1	76.0	62.8
7/26/2001 13:00		42.4	28.8	<8	<8	21.1	47.3	39.4	<2	<2	<50	<50	247	245	<1	<1	63.4	51.6
7/26/2001 14:00		39.4	20.9	<8	<8	21.1	47.7	36.9	<2	<2	<50	<50	245	244	<1	<1	55.0	41.8
7/26/2001 15:00		36.1	21.8	<8	<8	21.1	42.9	34.6	<2	<2	<50	<50	246	244	<1	<1	46.8	35.5
7/26/2001 15:00	R	36.8	24.5	<8	<8	20.8	43.2	34.3	<2	<2	<50	<50	245	242	<1	<1	46.0	33.4
7/26/2001 16:00		36.7	13.7	<8	<8	21.3	41.7	33.6	<2	<2	<50	<50	245	245	<1	<1	44.9	30.7
7/26/2001 16:30		42.9	--	<8	<8	21.3	43.1	33.1	<2	<2	<50	<50	245	242	1.1	<1	44.6	30.3
7/26/2001 17:00		36.5	35.8	<8	<8	21.6	44.2	34.0	<2	<2	<50	<50	246	242	1.3	<1	45.4	29.3
7/26/2001 17:30		42.4	--	<8	<8	22.0	44.8	34.5	<2	<2	<50	<50	243	242	1.3	<1	44.9	29.6
7/26/2001 18:00		36.8	35.4	<8	<8	21.5	43.5	34.3	<2	<2	<50	<50	242	247	1.2	<1	44.7	29.2
7/26/2001 18:30		45.7	--	<8	<8	22.2	44.4	35.7	<2	<2	<50	<50	244	248	1.3	<1	44.5	31.5
7/26/2001 19:00		40.5	40.1	<8	<8	22.4	46.1	36.7	<2	<2	<50	<50	245	249	1.1	1.1	45.4	32.2
7/26/2001 19:30		40.1	39.5	<8	<8	22.2	47.3	37.7	<2	<2	<50	<50	245	247	1.1	<1	46.2	33.6
7/26/2001 20:00		43.9	43.4	<8	<8	22.3	47.2	38.5	<2	<2	<50	<50	248	248	1.3	<1	47.4	35.0
7/26/2001 21:00		46.9	--	<8	<8	22.5	52.6	42.7	<2	<2	<50	<50	249	248	<1	<1	56.7	40.9
7/26/2001 22:00		35.8	33.6	<8	<8	22.7	54.0	45.7	<2	<2	<50	<50	252	249	<1	<1	62.0	49.7
7/26/2001 23:00		43.8	42.4	<8	<8	23.5	58.5	49.9	<2	<2	<50	<50	251	252	1.3	<1	73.9	61.9
7/27/2001 0:00		45.8	45.1	<8	<8	23.1	59.3	53.4	<2	<2	<50	<50	253	253	1.0	<1	80.7	68.0
7/27/2001 1:00		44.6	42.6	<8	<8	23.0	61.7	53.3	<2	<2	<50	<50	252	252	<1	<1	90.6	81.1
7/27/2001 2:00		44.5	41.3	<8	<8	23.7	62.7	54.5	<2	<2	<50	<50	252	255	<1	<1	100	88.9
7/27/2001 3:00		41.8	39.2	<8	<8	23.2	63.3	55.7	<2	<2	<50	<50	249	252	<1	<1	110	97.9
7/27/2001 4:00		47.1	44.1	<8	<8	22.9	65.1	56.7	<2	<2	<50	<50	250	253	<1	<1	117	103

Table 5. Water-quality data for diel investigations in Prickly Pear Creek at site PP-4b, Montana, July 25-27, 2001(Continued).

Date and time	QA sample type	Stream-flow, instan-taneous (ft^3/s)	Specific conduct-ance, field (µS/cm)	pH, field (su)	Tempera-ture, water (ºC)	Dis-solved oxygen, field (mg/L)	Cal-cium, dis-solved (mg/L)	Magne-sium, dissolved (mg/L)	Sodium, dis-solved (mg/L)	Potas-sium, dis-solved (mg/L)	Alka-linity, lab (mg/L as $CaCO_3$)	Sulfate, dis-solved (mg as SO_4)	Chloride, dissolved (mg/L)	Fluo-ride, dis-solved (mg/L)	Silica, dis-solved (mg/L as SiO_2)	Nitrate, dissolved (mg/L as NO_3)
7/27/2001 5:00		--	244	8.14	12.71	8.66	27.5	6.10	15.5	2.35	89.3	41.8	2.99	0.45	21.5	0.67
7/27/2001 5:30		17.4	244	8.14	12.42	8.72	27.0	5.93	15.0	2.31	88.0	41.1	2.92	0.42	21.4	0.60
7/27/2001 6:00		--	244	8.15	12.16	8.92	26.9	5.91	14.9	2.32	89.7	42.2	3.05	0.47	21.2	0.62
7/27/2001 6:30		17.8	244	8.16	11.90	9.12	27.1	6.01	15.2	2.34	88.3	41.8	2.96	0.42	21.7	0.67
7/27/2001 7:00		--	244	8.17	11.72	9.25	26.9	6.01	15.0	2.32	88.7	42.3	2.95	0.43	21.1	0.69
7/27/2001 7:30		17.8	243	8.18	11.63	9.41	27.0	5.95	14.9	2.27	88.2	42.1	2.95	0.42	21.2	0.62
7/27/2001 8:00		--	243	8.19	11.64	9.52	27.1	5.98	15.3	2.32	89.5	42.6	3.04	0.43	20.8	0.67
7/27/2001 8:30		18.2	242	8.21	11.78	9.60	26.6	5.83	14.9	2.34	88.5	41.7	2.95	0.44	21.2	0.57
7/27/2001 9:00		17.8	242	8.24	12.03	9.66	26.6	6.11	15.0	2.31	89.1	42.0	2.97	0.42	21.2	0.65
7/27/2001 10:00		--	242	--	12.91	9.61	26.5	6.06	15.1	2.27	89.1	42.4	2.95	0.46	21.4	0.67

Table 6. Water-quality data for diel investigations in Prickly Pear Creek at site PP-5, Montana, July 25-27, 2001.

[Samples analyzed by the U.S. Geological Survey laboratory, Boulder, Colo. Analytical data are reported to a maximum of three significant figures to provide sufficient resolution for detecting small differences between samples closely spaced in time or distance. Similarly, field measurements from electronic recorders have not been rounded to illustrate the pattern of relative change between measurements. Abbreviations: B, blank sample; ft^3/s, cubic feet per second; °C, degrees Celsius, µg/L, micrograms per liter; µS/cm, microsiemens per centimeter at 25°C; mg/L, milligrams per liter; su, standard units; QA, quality assurance; R, replicate sample. Symbol: <, less than; --, no data].

Date and time	QA sample type	Stream-flow, instan-taneous (ft^3/s)	Spe-cific conduct-ance, field (µS/cm)	pH, field (su)	Tem-pera-ture, water (°C)	Dis-solved oxygen, field (mg/L)	Cal-cium, dis-solved (mg/L)	Magne-sium, dissolved (mg/L)	So-dium, dis-solved (mg/L)	Potas-sium, dis-solved (mg/L)	Alka-linity, lab (mg/L as $CaCO_3$)	Sulfate, dis-solved (mg as SO_4)	Chlo-ride, dis-solved (mg/L)	Fluo-ride, dis-solved (mg/L)	Silica, dis-solved (mg/L as SiO_2)	Nitrate, dis-solved (mg/L as NO_3)
7/25/2001 12:07		19.4	244	8.34	16.60	9.01	27.1	6.43	15.0	2.30	89.8	42.7	3.26	0.39	21.2	0.68
7/25/2001 13:00		19.4	245	8.41	18.48	8.77	27.2	6.40	14.8	2.30	89.1	42.4	3.26	0.36	21.2	0.56
7/25/2001 14:00		19.0	246	8.46	20.17	8.54	27.1	6.41	14.8	2.34	88.8	41.6	3.35	0.38	21.2	0.49
7/25/2001 14:01	R	--	--	--	--	--	27.1	6.35	14.7	2.30	89.4	42.9	3.32	0.44	21.2	0.37
7/25/2001 15:00		19.0	246	8.48	21.54	8.22	27.2	6.39	14.8	2.35	88.2	42.6	3.32	0.42	21.4	0.62
7/25/2001 16:00		18.1	246	8.50	22.14	7.99	27.0	6.36	14.8	2.35	87.8	41.8	3.40	0.35	21.1	0.43
7/25/2001 17:00		18.6	246	8.49	21.99	7.76	27.1	6.34	14.8	2.38	87.8	43.5	3.27	0.35	21.2	0.40
7/25/2001 18:00		17.7	246	8.44	21.65	7.63	26.9	6.37	15.0	2.39	88.0	42.9	3.28	0.36	21.3	0.37
7/25/2001 19:00		17.7	246	8.29	21.09	7.39	26.8	6.38	14.9	2.43	88.2	43.8	3.36	0.38	21.4	0.37
7/25/2001 20:00		17.3	247	8.26	20.53	7.41	27.2	6.41	15.2	2.43	88.6	43.5	3.44	0.43	21.4	0.46
7/25/2001 21:00		17.3	248	8.17	20.01	7.38	26.9	6.33	15.0	2.45	88.7	43.6	3.36	0.43	21.4	0.46
7/25/2001 22:00		17.3	245	8.09	19.30	7.39	27.4	6.51	15.2	2.45	89.6	44.6	3.43	0.46	21.2	0.46
7/25/2001 23:00		16.9	--	8.05	18.46	7.48	27.6	6.53	15.2	2.45	90.1	44.5	3.40	0.44	21.3	0.55
7/26/2001 0:00		16.9	254	8.07	17.67	7.61	27.5	6.54	15.3	2.47	91.0	44.5	3.44	0.40	21.3	0.53
7/26/2001 1:00		16.9	252	8.05	17.03	7.75	27.7	6.59	15.3	2.49	91.7	43.8	3.41	0.45	21.4	0.50
7/26/2001 2:00		17.3	252	8.05	16.43	7.89	27.9	6.52	15.7	2.51	92.2	43.3	3.49	0.46	21.1	0.62
7/26/2001 3:00		16.5	253	8.04	15.94	8.05	27.9	6.69	15.7	2.48	92.7	44.7	3.51	0.37	21.2	0.71
7/26/2001 4:00		17.3	253	8.01	15.31	8.16	27.8	6.65	15.7	2.46	93.0	44.5	3.58	0.45	21.4	0.68
7/26/2001 5:00		16.9	253	8.02	14.63	8.37	28.0	6.66	15.7	2.44	93.2	44.5	3.48	0.47	21.4	0.71
7/26/2001 6:00		17.3	253	8.01	13.95	8.48	28.0	6.65	15.8	2.45	93.2	44.4	3.47	0.38	21.2	0.74
7/26/2001 7:00		17.7	252	8.00	13.32	8.76	27.9	6.66	15.8	2.44	93.4	43.5	3.30	0.31	21.4	0.85
7/26/2001 8:00		17.3	251	8.06	12.86	8.97	27.8	6.58	15.9	2.40	93.0	42.9	3.30	0.32	21.3	0.63

Table 6. Water-quality data for diel investigations in Prickly Pear Creek at site PP-5, Montana, July 25-27, 2001 (Continued).

Date and time	QA sample type	Aluminum, total recoverable (µg/L)	Aluminum, dissolved (µg/L)	Arsenic, total recoverable (µg/L)	Arsenic, total, dissolved (µg/L)	Arsenic, As^{+3}, dissolved (µg/L)	Barium, dissolved (µg/L)	Beryllium, dissolved (µg/L)	Boron, dissolved (µg/L)	Cadmium, total recoverable (µg/L)	Cadmium, dissolved (µg/L)	Chromium, dissolved (µg/L)	Cobalt, dissolved (µg/L)	Copper, total recoverable (µg/L)	Copper, dissolved (µg/L)	Iron, total recoverable (µg/L)
7/25/2001 12:07		<80	<80	<50	4.56	<0.5	24.8	<0.1	19.8	<1	<1	<1	1.30	2.71	2.44	116
7/25/2001 13:00		<80	<80	<50	4.74	<0.5	24.5	<0.1	20.2	<1	<1	<1	<1	3.23	2.34	126
7/25/2001 14:00		<80	<80	<50	4.87	<0.5	24.7	<0.1	20.2	<1	<1	<1	<1	2.80	2.15	122
7/25/2001 14:01	R	<80	<80	<50	4.90	<0.5	24.7	<0.1	20.0	<1	<1	<1	<1	3.15	2.24	131
7/25/2001 15:00		<80	<80	<50	4.93	<0.5	24.4	<0.1	20.2	<1	<1	<1	<1	3.09	2.38	121
7/25/2001 16:00		<80	<80	<50	5.13	<0.5	23.8	<0.1	20.0	<1	<1	<1	<1	2.77	2.15	122
7/25/2001 17:00		<80	<80	<50	5.42	0.81	24.1	<0.1	20.2	<1	<1	<1	<1	2.73	2.54	123
7/25/2001 18:00		<80	<80	<50	5.52	0.58	25.6	<0.1	20.4	<1	<1	<1	2.1	2.89	2.40	118
7/25/2001 19:00		<80	<80	<50	5.55	<0.5	26.0	<0.1	20.4	<1	<1	<1	1.1	2.81	2.71	121
7/25/2001 20:00		<80	<80	<50	5.61	<0.5	25.6	<0.1	20.8	<1	<1	<1	1.2	2.76	2.27	119
7/25/2001 21:00		<80	<80	<50	5.54	<0.5	26.6	<0.1	21.1	<1	<1	<1	1.4	2.10	2.48	123
7/25/2001 22:00		<80	<80	<50	5.42	<0.5	27.5	<0.1	21.7	<1	<1	<1	1.7	3.07	2.57	128
7/25/2001 23:00		<80	<80	<50	5.31	1.28	27.9	<0.1	21.6	<1	<1	<1	2.2	2.94	2.49	130
7/26/2001 0:00		<80	<80	<50	5.35	0.92	27.8	<0.1	21.8	<1	<1	<1	<1	3.12	3.15	174
7/26/2001 1:00		<80	<80	<50	5.04	0.98	28.3	<0.1	21.7	<1	<1	<1	<1	2.99	2.79	157
7/26/2001 2:00		<80	<80	<50	4.97	1.35	28.5	<0.1	21.5	<1	<1	<1	<1	2.80	2.63	167
7/26/2001 3:00		<80	<80	<50	5.04	1.73	29.1	<0.1	21.9	<1	<1	<1	2.2	2.86	2.42	167
7/26/2001 4:00		<80	<80	<50	4.79	0.77	28.7	<0.1	21.3	<1	<1	<1	<1	2.59	2.49	143
7/26/2001 5:00		<80	<80	<50	4.65	1.42	29.0	<0.1	21.8	<1	<1	<1	<1	2.42	2.35	127
7/26/2001 6:00		<80	<80	<50	4.68	1.13	28.6	<0.1	21.9	<1	<1	<1	<1	2.50	2.63	123
7/26/2001 7:00		<80	<80	<50	4.49	<0.5	28.4	<0.1	21.9	<1	<1	<1	1.0	2.42	1.97	119
7/26/2001 8:00		<80	<80	<50	4.23	<0.5	28.2	<0.1	20.9	<1	<1	<1	1.0	2.66	2.22	133

Table 6. Water-quality data for diel investigations in Prickly Pear Creek at site PP-5, Montana, July 25-27, 2001 (Continued).

Date and time	QA sample type	Iron, total, dissolved (µg/L)	Iron, Fe^{+2}, dissolved (µg/L)	Lead, total recoverable (µg/L)	Lead, dissolved (µg/L)	Lithium, dissolved (µg/L)	Manganese, total recoverable (µg/L)	Manganese, dissolved (µg/L)	Nickel, total recoverable (µg/L)	Nickel, dissolved (µg/L)	Selenium, total recoverable (µg/L)	Selenium, dissolved (µg/L)	Strontium, total recoverable (µg/L)	Strontium, dissolved (µg/L)	Vanadium, total recoverable (µg/L)	Vanadium, dissolved (µg/L)	Zinc, total recoverable (µg/L)	Zinc, dissolved (µg/L)
7/25/2001 12:07		25.0	22.9	<8	<8	20.6	38.6	26.6	<2	<2	<50	<50	243	239	<1	<1	55.8	42.8
7/25/2001 13:00		25.3	22.3	<8	<8	20.2	38.2	25.3	<2	<2	<50	<50	245	239	<1	<1	51.4	27.1
7/25/2001 14:00		18.0	17.1	<8	<8	20.5	37.2	23.4	<2	<2	<50	<50	244	241	1.0	<1	45.3	20.3
7/25/2001 14:01	R	18.0	17.8	<8	<8	20.1	38.1	23.6	<2	<2	<50	<50	245	241	<1	<1	45.5	20.9
7/25/2001 15:00		15.1	14.2	<8	<8	20.6	37.2	22.2	<2	<2	<50	<50	244	242	<1	<1	43.1	16.5
7/25/2001 16:00		15.6	15.6	<8	<8	20.4	35.4	20.9	<2	<2	<50	<50	244	238	1.2	<1	40.1	13.2
7/25/2001 17:00		15.3	14.7	<8	<8	20.4	34.6	20.8	2.1	<2	<50	<50	243	240	<1	<1	37.9	13.1
7/25/2001 18:00		22.4	20.7	<8	<8	20.6	34.6	20.8	<2	<2	<50	<50	243	239	<1	<1	38.8	14.3
7/25/2001 19:00		15.2	14.4	<8	<8	20.3	36.6	21.5	<2	<2	<50	<50	243	242	1.0	<1	40.8	15.6
7/25/2001 20:00		16.9	16.4	<8	<8	20.5	36.7	22.9	<2	<2	<50	<50	245	243	<1	<1	42.1	19.0
7/25/2001 21:00		19.4	19.4	<8	<8	20.7	39.0	23.9	<2	<2	<50	<50	245	243	1.2	<1	50.2	24.9
7/25/2001 22:00		15.6	13.6	<8	<8	20.7	40.7	25.7	<2	<2	<50	<50	247	245	<1	<1	52.4	29.2
7/25/2001 23:00		24.6	23.1	<8	<8	20.8	41.4	26.3	<2	<2	<50	<50	250	246	1.1	<1	54.9	30.6
7/26/2001 0:00		25.4	24.8	<8	<8	21.4	49.9	31.5	<2	<2	<50	<50	251	249	<1	<1	62.1	34.2
7/26/2001 1:00		27.1	26.8	<8	<8	21.5	47.5	30.0	2.0	<2	<50	<50	254	252	<1	<1	64.8	37.3
7/26/2001 2:00		31.3	30.4	<8	<8	21.9	47.9	30.7	<2	<2	<50	<50	254	253	<1	<1	67.8	41.2
7/26/2001 3:00		30.8	28.2	<8	<8	21.6	49.3	33.4	<2	<2	<50	<50	254	253	<1	<1	69.8	40.6
7/26/2001 4:00		31.0	30.5	<8	<8	21.9	45.9	32.2	<2	<2	<50	<50	251	251	<1	<1	68.7	45.1
7/26/2001 5:00		31.6	29.5	<8	<8	21.9	45.1	30.3	<2	<2	<50	<50	255	254	<1	<1	68.4	47.1
7/26/2001 6:00		31.6	29.7	<8	<8	22.2	43.8	30.8	<2	<2	<50	<50	251	251	<1	<1	73.5	51.5
7/26/2001 7:00		31.8	29.2	<8	<8	22.2	42.8	30.9	<2	<2	<50	<50	250	253	<1	<1	72.9	52.1
7/26/2001 8:00		30.7	28.5	<8	<8	22.3	43.6	31.8	<2	<2	<50	<50	251	251	<1	<1	75.3	52.4

Table 6. Water-quality data for diel investigations in Prickly Pear Creek at site PP-5, Montana, July 25-27, 2001 (Continued).

Date and time	QA sample type	Stream-flow, instan-taneous (ft^3/s)	Spe-cific conduct-ance, field (µS/cm)	pH, field (su)	Tem-pera-ture, water (^oC)	Dis-solved oxygen, field (mg/L)	Cal-cium, dis-solved (mg/L)	Magne-sium, dissolved (mg/L)	So-dium, dis-solved (mg/L)	Potas-sium, dis-solved (mg/L)	Alka-linity, lab (mg/L as $CaCO_3$)	Sulfate, dis-solved (mg as SO_4)	Chlo-ride, dis-solved (mg/L)	Fluo-ride, dis-solved (mg/L)	Silica, dis-solved (mg/L as SiO_2)	Nitrate, dis-solved (mg/L as NO_3)
7/26/2001 9:00		17.3	250	8.22	13.04	9.22	27.6	6.61	15.7	2.42	92.4	43.0	3.31	0.32	21.6	0.75
7/26/2001 10:00		17.7	249	8.27	13.85	9.30	27.3	6.41	15.6	2.42	--	--	--	--	21.3	--
7/26/2001 10:01	R	--	--	--	--	--	27.1	6.60	16.1	2.45	92.1	43.0	3.33	0.34	21.9	0.59
7/26/2001 11:00		17.7	249	8.34	15.12	9.19	27.5	6.37	15.6	2.42	91.6	42.6	3.37	0.34	21.5	0.72
7/26/2001 12:00		17.7	250	8.39	16.76	8.96	27.3	6.25	15.6	2.40	91.1	43.4	3.39	0.34	21.4	0.66
7/26/2001 12:20	B	--	--	--	--	--	<0.05	<0.06	<0.04	<0.002	<1	<1	<0.5	<0.2	<0.01	<0.5
7/26/2001 13:00		17.7	250	8.43	18.63	8.71	26.9	6.20	15.6	2.40	91.0	42.5	3.33	0.39	21.0	0.52
7/26/2001 14:00		17.3	251	8.49	20.21	7.97	26.7	6.16	15.4	2.36	90.8	43.4	3.34	0.34	21.2	0.50
7/26/2001 15:00		17.0	252	8.50	21.55	8.19	27.0	6.04	15.2	2.39	--	--	--	--	21.3	--
7/26/2001 15:30		17.3	246	8.51	21.95	8.06	27.1	6.12	15.4	2.39	90.4	43.8	3.34	0.34	21.3	0.35
7/26/2001 16:00		16.9	253	8.51	22.07	7.91	27.1	6.12	15.4	2.41	89.9	43.6	3.42	0.40	21.2	0.35
7/26/2001 16:30		17.3	252	8.50	21.88	7.74	27.2	6.14	15.1	2.40	89.5	43.5	3.38	0.41	21.3	0.38
7/26/2001 17:00		17.3	252	8.49	22.00	7.66	26.9	6.03	15.4	2.39	89.8	43.6	3.33	0.35	21.3	0.47
7/26/2001 17:30		16.9	252	8.47	22.00	7.46	27.0	6.02	15.4	2.40	89.6	43.9	3.53	0.40	21.4	0.35
7/26/2001 18:00		16.9	251	8.44	22.02	7.12	26.7	6.08	15.4	2.41	89.5	44.1	3.26	0.39	21.1	0.31
7/26/2001 18:30		16.9	252	8.42	21.79	7.44	26.6	6.02	15.2	2.40	89.7	43.3	3.54	0.34	21.1	0.35
7/26/2001 19:00		16.9	252	8.40	21.72	7.40	27.0	6.04	15.4	2.43	89.5	43.6	3.38	0.40	21.1	0.35
7/26/2001 19:30		16.5	252	8.38	21.51	7.35	27.0	6.02	15.4	2.44	90.0	44.0	3.37	0.33	21.0	0.22
7/26/2001 20:00		16.1	252	8.33	21.27	7.28	27.0	6.08	15.3	2.45	90.1	44.4	3.41	0.34	21.1	0.03
7/26/2001 21:00		16.1	253	8.17	20.49	7.24	27.4	6.31	15.7	2.49	90.1	44.3	3.41	0.34	21.5	0.41
7/26/2001 22:00		16.1	254	8.08	19.73	7.19	27.7	6.25	15.4	2.48	90.6	43.4	3.66	0.30	21.6	0.47
7/26/2001 23:00		16.1	255	8.02	18.92	7.41	27.0	6.26	15.5	2.43	91.5	43.9	3.42	0.32	21.0	0.50
7/27/2001 0:00		16.1	256	8.01	18.20	7.44	27.7	6.38	15.8	2.45	92.1	43.6	3.43	0.33	21.0	0.57
7/27/2001 1:00		16.5	256	8.04	17.50	7.68	27.9	6.43	15.7	2.50	93.1	44.4	3.62	0.38	21.1	0.46
7/27/2001 2:00		16.5	257	8.06	16.73	7.77	28.1	6.49	16.2	2.52	93.3	44.0	3.49	0.38	21.3	0.60
7/27/2001 3:00		16.5	255	8.06	15.99	7.91	28.2	6.49	16.2	2.52	--	--	--	--	21.4	--

Table 6. Water-quality data for diel investigations in Prickly Pear Creek at site PP-5, Montana, July 25-27, 2001 (Continued).

Date and time	QA sample type	Aluminum, total recoverable (µg/L)	Aluminum, dissolved (µg/L)	Arsenic, total recoverable (µg/L)	Arsenic, total, dissolved (µg/L)	Arsenic, As^{+3}, dissolved (µg/L)	Barium, dissolved (µg/L)	Beryllium, dissolved (µg/L)	Boron, dissolved (µg/L)	Cadmium, total recoverable (µg/L)	Cadmium, dissolved (µg/L)	Chromium, dissolved (µg/L)	Cobalt, dissolved (µg/L)	Copper, total recoverable (µg/L)	Copper, dissolved (µg/L)	Iron, total recoverable (µg/L)
7/26/2001 9:00		<80	<80	<50	4.37	0.60	27.4	<0.1	21.3	<1	<1	<1	1.2	2.30	2.22	106
7/26/2001 10:00		<80	<80	<50	4.32	2.01	26.4	<0.1	21.7	<1	<1	<1	<1	2.40	2.12	119
7/26/2001 10:01	R	--	<80	--	4.40	<0.5	25.6	<0.1	21.5	--	<1	<1	<1	--	2.04	--
7/26/2001 11:00		<80	<80	<50	4.58	0.66	26.4	<0.1	21.3	<1	<1	<1	<1	2.41	2.19	114
7/26/2001 12:00		<80	<80	<50	4.77	0.72	25.2	<0.1	21.1	<1	<1	<1	<1	2.53	1.93	113
7/26/2001 12:20	B	<80	<80	<50	<0.1	<0.5	<0.5	<0.1	<3	<1	<1	<1	<1	1.23	0.63	<9
7/26/2001 13:00		<80	<80	<50	4.83	0.80	24.5	<0.1	20.6	<1	<1	<1	<1	2.48	2.22	121
7/26/2001 14:00		<80	<80	<50	4.85	0.52	24.5	<0.1	20.9	<1	<1	<1	<1	2.83	2.04	118
7/26/2001 15:00		<80	<80	<50	4.93	1.00	24.2	<0.1	20.8	<1	<1	<1	<1	3.08	2.21	117
7/26/2001 15:30		<80	<80	<50	5.38	<0.5	24.2	<0.1	20.9	<1	<1	<1	<1	2.69	2.23	118
7/26/2001 16:00		<80	<80	<50	5.49	<0.5	24.4	<0.1	20.7	<1	<1	<1	<1	2.88	2.22	128
7/26/2001 16:30		<80	<80	<50	5.46	1.34	23.9	<0.1	21.1	<1	<1	<1	<1	2.77	2.15	147
7/26/2001 17:00		<80	<80	<50	5.22	<0.5	24.0	<0.1	20.5	<1	<1	<1	<1	2.49	2.66	118
7/26/2001 17:30		<80	<80	<50	5.58	0.62	24.7	<0.1	20.6	<1	<1	<1	<1	3.06	2.25	146
7/26/2001 18:00		<80	<80	<50	5.70	<0.5	24.5	<0.1	20.9	<1	<1	<1	<1	2.96	2.12	127
7/26/2001 18:30		<80	<80	<50	5.62	<0.5	24.3	<0.1	20.6	<1	<1	<1	<1	3.01	2.18	137
7/26/2001 19:00		<80	<80	<50	5.62	1.15	24.8	<0.1	20.7	<1	<1	<1	<1	2.93	2.25	128
7/26/2001 19:30		<80	<80	<50	5.78	0.87	24.8	<0.1	20.3	<1	<1	<1	<1	2.78	2.15	126
7/26/2001 20:00		<80	<80	<50	5.70	0.68	24.6	<0.1	20.9	<1	<1	<1	<1	2.62	2.14	117
7/26/2001 21:00		<80	<80	<50	5.47	0.56	25.6	<0.1	21.8	<1	<1	<1	<1	3.12	2.27	120
7/26/2001 22:00		<80	<80	<50	5.44	1.24	25.8	<0.1	21.9	<1	<1	<1	<1	3.50	2.59	143
7/26/2001 23:00		83.4	<80	<50	5.32	0.73	26.5	<0.1	22.1	<1	<1	<1	<1	3.29	2.35	163
7/27/2001 0:00		<80	<80	<50	5.24	1.07	27.0	<0.1	22.2	<1	<1	<1	<1	2.92	2.25	113
7/27/2001 1:00		<80	<80	<50	5.18	<0.5	27.5	<0.1	22.0	<1	<1	<1	<1	3.40	2.12	164
7/27/2001 2:00		<80	<80	<50	5.03	0.78	27.8	<0.1	21.9	<1	<1	<1	<1	3.38	2.25	154
7/27/2001 3:00		--	<80	--	4.92	1.02	27.5	<0.1	22.4	--	<1	<1	<1	--	2.36	--

Table 6. Water-quality data for diel investigations in Prickly Pear Creek at site PP-5, Montana, July 25-27, 2001 (Continued).

Date and time	QA sample type	Iron, total, dissolved (µg/L)	Iron, Fe^{+2}, dissolved (µg/L)	Lead, total recoverable (µg/L)	Lead, dissolved (µg/L)	Lithium, dissolved (µg/L)	Manganese, total recoverable (µg/L)	Manganese, dissolved (µg/L)	Nickel, total recoverable (µg/L)	Nickel, dissolved (µg/L)	Selenium, total recoverable (µg/L)	Selenium, dissolved (µg/L)	Strontium, total recoverable (µg/L)	Strontium, dissolved (µg/L)	Vanadium, total recoverable (µg/L)	Vanadium, dissolved (µg/L)	Zinc, total recoverable (µg/L)	Zinc, dissolved (µg/L)
7/26/2001 9:00		27.5	27.7	<8	<8	22.6	40.2	30.4	<2	<2	<50	<50	250	252	<1	<1	68.1	49.4
7/26/2001 10:00		28.2	--	<8	<8	22.0	42.7	29.9	<2	<2	<50	<50	249	248	<1	<1	64.7	50.0
7/26/2001 10:01	R	27.0	24.6	--	<8	22.6	--	25.4	--	<2	--	<50	--	250	--	<1	--	--
7/26/2001 11:00		27.3	25.9	<8	<8	21.7	40.8	28.4	2.4	<2	<50	<50	252	249	<1	<1	69.6	44.7
7/26/2001 12:00		24.0	23.3	<8	<8	21.8	39.0	27.2	<2	<2	<50	<50	251	249	<1	<1	54.7	39.9
7/26/2001 12:20	B	<2	<2	<8	<8	<8	<1	<1	<2	<2	<50	<50	<1	<1	<1	<1	<5	<5
7/26/2001 13:00		20.8	19.6	<8	<8	21.3	38.3	25.3	<2	<2	<50	<50	250	245	<1	<1	52.3	33.5
7/26/2001 14:00		21.3	19.9	<8	<8	21.6	36.9	23.4	<2	<2	<50	<50	249	244	<1	<1	46.5	30.4
7/26/2001 15:00		15.7	14.8	<8	<8	21.7	35.4	22.1	<2	<2	<50	<50	247	242	<1	<1	43.2	24.3
7/26/2001 15:30		18.1	18.3	<8	<8	21.8	35.4	22.0	<2	<2	<50	<50	248	244	<1	<1	41.4	22.4
7/26/2001 16:00		18.4	17.9	<8	<8	22.0	38.3	22.4	<2	<2	<50	<50	250	245	1.1	1.0	42.2	22.9
7/26/2001 16:30		19.1	16.7	<8	<8	21.5	42.6	24.4	<2	<2	<50	<50	252	244	1.1	1.1	44.5	21.5
7/26/2001 17:00		16.7	16.2	<8	<8	21.3	35.5	22.0	<2	<2	<50	<50	253	243	1.1	1.0	42.4	24.0
7/26/2001 17:30		18.1	16.6	<8	<8	21.7	40.9	24.3	<2	<2	<50	<50	251	244	1.2	<1	45.1	22.4
7/26/2001 18:00		15.7	15.2	<8	<8	21.4	36.8	21.5	<2	<2	<50	<50	253	243	1.3	<1	44.0	20.6
7/26/2001 18:30		16.2	15.2	<8	<8	21.4	40.4	21.7	<2	<2	<50	<50	252	241	1.2	1.2	43.7	21.5
7/26/2001 19:00		18.0	17.4	<8	<8	21.7	37.3	21.8	<2	<2	<50	<50	253	245	<1	<1	42.2	22.8
7/26/2001 19:30		18.7	17.9	<8	<8	21.7	38.1	22.4	<2	<2	<50	<50	250	245	1.2	1.2	41.6	22.7
7/26/2001 20:00		18.1	16.0	<8	<8	21.7	35.8	21.8	<2	<2	<50	<50	251	247	1.3	<1	45.4	25.2
7/26/2001 21:00		20.9	19.4	<8	<8	21.7	37.2	23.3	<2	<2	<50	<50	252	248	1.3	1.1	47.2	30.6
7/26/2001 22:00		19.8	19.6	<8	<8	21.2	41.9	25.9	<2	<2	<50	<50	255	250	1.2	<1	55.1	35.6
7/26/2001 23:00		23.5	23.0	<8	<8	21.7	44.8	29.1	<2	<2	<50	<50	255	249	1.4	<1	61.5	38.7
7/27/2001 0:00		23.8	24.7	<8	<8	21.8	39.8	29.0	<2	<2	<50	<50	256	252	1.4	<1	60.2	42.7
7/27/2001 1:00		28.6	28.6	<8	<8	21.8	51.4	35.3	<2	<2	<50	<50	260	253	1.4	<1	69.0	45.4
7/27/2001 2:00		28.5	25.0	<8	<8	22.5	49.3	30.7	<2	<2	<50	<50	261	256	1.0	<1	80.6	49.1
7/27/2001 3:00		28.8	26.7	--	<8	22.8	--	29.7	--	<2	--	<50	--	253	--	<1	--	51.2

Table 6. Water-quality data for diel investigations in Prickly Pear Creek at site PP-5, Montana, July 25-27, 2001 (Continued).

Date and time	QA sample type	Stream-flow, instan-taneous (ft^3/s)	Spe-cific conduct-ance, field (µS/cm)	pH, field (su)	Tem-pera-ture, water (^oC)	Dis-solved oxygen, field (mg/L)	Cal-cium, dis-solved (mg/L)	Magne-sium, dissolved (mg/L)	So-dium, dis-solved (mg/L)	Potas-sium, dis-solved (mg/L)	Alka-linity, lab (mg/L as $CaCO_3$)	Sulfate, dis-solved (mg as SO_4)	Chlo-ride, dis-solved (mg/L)	Fluo-ride, dis-solved (mg/L)	Silica, dis-solved (mg/L as SiO_2)	Nitrate, dis-solved (mg/L as NO_3)
7/27/2001 4:00		16.9	256	8.06	15.23	8.10	--	--	--	--	93.8	44.0	3.40	0.39	--	0.62
7/27/2001 5:00		16.5	255	8.05	14.51	8.30	--	--	--	--	94.3	43.7	3.45	0.32	--	0.70
7/27/2001 5:30		16.9	254	8.04	14.14	8.34	--	--	--	--	93.9	43.4	3.48	0.33	--	0.60
7/27/2001 6:00		16.5	255	8.04	13.82	8.45	--	--	--	--	94.3	43.6	3.54	0.39	--	0.60
7/27/2001 6:30		16.5	254	8.05	13.47	8.59	--	--	--	--	94.0	44.3	3.48	0.37	--	0.65
7/27/2001 7:00		16.9	254	8.07	13.15	8.69	--	--	--	--	93.9	43.8	3.46	0.37	--	0.66
7/27/2001 7:30		16.9	253	8.08	12.87	8.81	--	--	--	--	93.6	43.1	3.38	0.36	--	0.62
7/27/2001 8:00		16.9	250	8.08	12.65	8.97	--	--	--	--	93.5	42.7	3.50	0.32	--	0.66
7/27/2001 8:30		17.3	250	8.11	12.57	9.07	--	--	--	--	93.5	42.4	3.34	0.36	--	0.45
7/27/2001 8:31	R	--	--	--	--	--	--	--	--	--	93.2	43.7	3.47	0.34	--	0.53
7/27/2001 9:00		17.7	248	8.11	12.76	9.28	--	--	--	--	92.7	42.5	3.41	0.34	--	0.53
7/27/2001 9:30		17.3	250	8.16	13.17	9.23	28.0	6.56	15.6	2.39	93.0	42.9	3.61	0.34	21.3	0.53
7/27/2001 10:00		17.3	250	8.17	13.68	9.25	--	--	--	--	93.1	43.1	3.40	0.36	--	0.55
7/27/2001 11:00		17.7	250	8.24	15.10	9.17	27.9	6.62	15.9	2.42	92.7	42.7	3.41	0.36	21.4	0.52

Table 6. Water-quality data for diel investigations in Prickly Pear Creek at site PP-5, Montana, July 25-27, 2001 (Continued)

Date and time	QA sample type	Aluminum, total recoverable (µg/L)	Aluminum, dissolved (µg/L)	Arsenic, total recoverable (µg/L)	Arsenic, total, dissolved (µg/L)	Arsenic, As^{+3}, dissolved (µg/L)	Barium, dissolved (µg/L)	Beryllium, dissolved (µg/L)	Boron, dissolved (µg/L)	Cadmium, total recoverable (µg/L)	Cadmium, dissolved (µg/L)	Chromium, dissolved (µg/L)	Cobalt, dissolved (µg/L)	Copper, total recoverable (µg/L)	Copper, dissolved (µg/L)	Iron, total recoverable (µg/L)
7/27/2001 4:00		--	--	--	4.75	0.88	--	--	--	--	--	--	--	--	--	--
7/27/2001 5:00		--	--	--	4.58	0.65	--	--	--	--	--	--	--	--	--	--
7/27/2001 5:30		--	--	--	4.78	0.91	--	--	--	--	--	--	--	--	--	--
7/27/2001 6:00		--	--	--	4.63	<0.5	--	--	--	--	--	--	--	--	--	--
7/27/2001 6:30		--	--	--	4.46	<0.5	--	--	--	--	--	--	--	--	--	--
7/27/2001 7:00		--	--	--	4.44	0.95	--	--	--	--	--	--	--	--	--	--
7/27/2001 7:30		--	--	--	4.67	<0.5	--	--	--	--	--	--	--	--	--	--
7/27/2001 8:00		--	--	--	4.54	<0.5	--	--	--	--	--	--	--	--	--	--
7/27/2001 8:30		--	--	--	4.25	<0.5	--	--	--	--	--	--	--	--	--	--
7/27/2001 8:31	R	--	--	--	4.26	<0.5	--	--	--	--	--	--	--	--	--	--
7/27/2001 9:00		--	--	--	4.47	<0.5	--	--	--	--	--	--	--	--	--	--
7/27/2001 9:30		<80	<80	<50	4.36	0.75	25.1	<0.1	21.3	<1	<1	<1	1.8	2.46	2.14	116
7/27/2001 10:00		--	--	--	4.50	<0.5	--	--	--	--	--	--	--	--	--	--
7/27/2001 11:00		<80	<80	<50	4.50	<0.5	25.2	<0.1	21.9	<1	<1	<1	<1	2.64	2.23	111

Table 6. Water-quality data for diel investigations in Prickly Pear Creek at site PP-5, Montana, July 25-27, 2001 (Continued)

Date and time	QA sample type	Iron, total, dissolved (µg/L)	Iron, Fe^{+2}, dissolved (µg/L)	Lead, total recoverable (µg/L)	Lead, dissolved (µg/L)	Lithium, dissolved (µg/L)	Manganese, total recoverable (µg/L)	Manganese, dissolved (µg/L)	Nickel, total recoverable (µg/L)	Nickel, dissolved (µg/L)	Selenium, total recoverable (µg/L)	Selenium, dissolved (µg/L)	Strontium, total recoverable (µg/L)	Strontium, dissolved (µg/L)	Vanadium, total recoverable (µg/L)	Vanadium, dissolved (µg/L)	Zinc, total recoverable (µg/L)	Zinc, dissolved (µg/L)
7/27/2001 4:00		28.8	27.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/27/2001 5:00		29.4	26.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/27/2001 5:30		30.6	28.7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/27/2001 6:00		30.0	28.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/27/2001 6:30		29.9	29.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/27/2001 7:00		30.1	28.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/27/2001 7:30		30.3	28.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/27/2001 8:00		29.3	27.7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/27/2001 8:30		29.3	29.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/27/2001 8:31	R	30.5	27.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/27/2001 9:00		29.0	27.8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/27/2001 9:30		24.8	21.8	<8	<8	22.3	41.7	28.9	<2	<2	<50	<50	253	245	1.2	<1	67.8	67.4
7/27/2001 10:00		26.6	23.7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/27/2001 11:00		24.0	21.2	<8	<8	22.1	40.0	28.1	<2	<2	<50	<50	252	247	1.2	<1	63.5	62.2

Table 7. Water-quality data for diel investigations in Middle Fork Warm Springs Creek at site WS-3, Montana, June 26-27, 2001.

[Samples analyzed by the U.S. Geological Survey National Water Quality Laboratory, Denver, Colo. Analytical data are reported to a maximum of three significant figures to provide sufficient resolution for detecting small differences between samples closely spaced in time or distance. Similarly, field measurements from electronic recorders have not been rounded to illustrate the pattern of relative change between measurements. Abbreviations: ft^3/s, cubic feet per second; °C, degrees Celsius; □g/L, micrograms per liter; □S/cm, microsiemens per centimeter at 25°C; su, standard units. Symbol: --, no data].

Date and time	Streamflow, instantaneous (ft^3/s)	Specific conductance, field (µS/cm)	pH, field (su)	Temperature, water (°C)	Arsenic, dissolved (µg/L)	Cadmium, dissolved (µg/L)	Nickel, dissolved (µg/L)	Zinc, dissolved (µg/L)
6/26/2001 4:00	--	177	7.79	10.66	26.0	0.681	0.165	221
6/26/2001 5:00	1.20	177	7.80	10.38	26.0	0.675	0.165	227
6/26/2001 6:00	1.17	177	7.81	9.95	26.0	0.644	0.131	226
6/26/2001 7:00	1.17	177	7.82	9.65	25.8	0.637	0.141	228
6/26/2001 8:00	1.11	176	7.84	9.53	25.5	0.649	0.166	218
6/26/2001 9:00	1.13	176	7.88	9.74	25.1	0.664	0.121	210
6/26/2001 10:00	1.12	176	7.90	10.34	25.4	0.623	0.163	201
6/26/2001 11:00	1.11	176	7.91	11.27	25.8	0.628	0.229	194
6/26/2001 12:00	1.12	176	7.95	11.63	26.1	0.606	0.156	190
6/26/2001 13:00	1.10	176	7.90	11.51	26.0	0.591	0.153	190
6/26/2001 14:00	1.10	176	7.90	11.63	26.5	0.615	0.201	194
6/26/2001 15:00	1.12	176	7.93	12.04	26.6	0.544	0.177	186
6/26/2001 16:00	1.11	176	7.96	12.67	27.0	0.556	0.183	175
6/26/2001 17:00	1.18	177	7.96	12.94	26.7	0.564	0.176	175
6/26/2001 18:00	1.21	177	7.92	12.88	27.0	0.582	0.258	172
6/26/2001 19:00	1.15	178	7.89	12.77	27.3	0.562	0.165	184
6/26/2001 20:00	1.10	179	7.86	12.56	27.4	0.656	0.176	220
6/26/2001 21:00	--	179	7.84	12.42	26.3	0.654	0.245	217
6/26/2001 22:00	1.16	179	7.80	12.23	26.2	0.648	0.141	224
6/26/2001 23:00	1.12	180	7.80	12.00	26.0	0.637	0.171	207
6/27/2001 0:00	1.13	180	7.79	11.80	25.6	0.666	0.142	224
6/27/2001 1:00	1.13	181	7.80	11.74	26.1	0.664	0.149	223
6/27/2001 2:00	1.13	181	7.78	11.60	25.9	0.681	0.183	228
6/27/2001 3:00	1.13	181	7.78	11.48	25.7	0.654	0.097	231
6/27/2001 4:00	1.12	181	7.76	11.33	25.6	0.654	0.184	225
6/27/2001 5:00	1.11	181	7.77	11.13	25.5	0.749	0.147	220
6/27/2001 6:00	1.14	181	7.79	10.87	26.0	0.676	0.308	229
6/27/2001 7:00	1.14	181	7.80	10.65	26.3	0.664	--	211
6/27/2001 8:00	1.17	180	7.80	10.55	26.0	0.649	0.158	216
6/27/2001 9:00	1.18	180	7.84	10.76	26.0	0.616	0.137	200
6/27/2001 10:00	1.15	180	7.87	11.41	25.8	0.619	0.193	193
6/27/2001 11:00	1.16	181	7.91	12.37	26.3	0.606	0.141	180
6/27/2001 12:00	1.16	181	7.93	13.49	26.8	0.580	0.080	170
6/27/2001 13:00	1.16	181	7.95	15.13	27.3	0.561	0.248	146
6/27/2001 14:00	1.19	182	7.97	16.21	28.1	0.569	0.130	156
6/27/2001 15:00	1.18	182	7.96	16.70	28.8	0.570	0.096	155
6/27/2001 16:00	1.12	182	7.94	16.51	27.8	0.549	0.189	145
6/27/2001 17:00	1.13	182	7.92	15.54	29.0	0.552	0.087	162
6/27/2001 18:00	1.13	183	7.93	15.30	28.8	0.573	0.161	164
6/27/2001 19:00	1.14	183	7.91	15.16	29.0	0.572	0.146	173
6/27/2001 20:00	1.14	183	7.88	14.97	29.3	0.616	0.140	188

BED SEDIMENT DATA FOR STREAMS IN THE UPPER PRICKLY PEAR CREEK WATERSHED, MONTANA, 2001

By Terry L. Klein and David L. Fey

INTRODUCTION

This section of the report presents the descriptions of sample sites and geochemical data for streambed and lakebed sediment samples collected by the USGS during July 2001. The locations of 35 streambed sediment sites are shown in figure 1. Samples were collected at these 35 sites to supplement data collected in October 2000 (Klein and others, 2001) and to characterize temporal geochemical variation by re-sampling at select October 2000 sites. Field duplicate samples were collected during October 2000 and July 2001 at fourteen sites and are indicated with the suffix "r" in tables 8, 9, and 11.

Chemical concentrations in streambed and lakebed sediments represent: 1) the composition of the underlying bedrock and glacial debris at and above the sample site 2) input from natural or cultural sources, for example naturally outcropping mineral deposits, or abandoned or active mines and mills. These sediments present a time-integrated view of the chemical input from these sources. Stream water chemistry is related to the composition of the underlying sediment through a variety of chemical solubility relationships, most of them governed by the pH (acidity) and Eh (oxidation potential) of the water. One of the most important sources of metal in water is metal loosely held in colloidal sediment material and grain coatings such as manganese and iron oxy-hydroxides. Streambed and lakebed sediment composition is also important because it may directly affect the health and metal content of benthic fauna, which are a primary food source for fish.

The locations of 35 streambed sediment sites from the July 2001 sample-collection program are shown in figure 1. Samples were collected at these 35 sites to supplement data from the October 2000 sample-collection program (Klein and others, 2001) and to determine temporal geochemical variation by re-sampling at select October 2000 sites. Samples were collected during October 2000 and July 2001 at fourteen sites and are indicated with the suffix "r" in tables 8, 9, and 11.

Each streambed sediment sample collected during July 2001 was analyzed using two different digestion methods (see below). These same methods were also used for streambed sediment samples collected in the watershed during 2000 (Klein and others, 2001). A four acid total-digestion method was used to determine the amount of metal within mineral grains that comprise the sediment and metal present in grain coatings. A dilute acid-peroxide partial-digestion method was used to determine the amount of loosely held metals (leachable) that are present mainly in grain coatings and colloidal material.

Lakebed sediment cores were collected from a small reservoir in the upper part of Lump Gulch, about 0.5 miles below the outlet of Frohner Meadows (fig.1). A total of 6 sites were selected to determine the extent of metal accumulation in the reservoir. The locations of the 6 sample sites are shown in figure 2.

SAMPLE AND ANALYTICAL PROTOCOL

Sample Locations

A summary of field observations and locations of streambed sediment samples is given in table 8. Site locations from the July 2001 sampling program were determined with a Global Positioning System (GPS) onsite using a NAD 27 datum and subsequently transferred into a Geographic Information Systems (GIS) layer. Digital raster graphics (DRG) topographic maps were registered to the GIS layer and the GPS locations were checked against the topography for

accuracy. Several GPS site locations were revised upon comparison with the DRG topographic maps.

All samples were collected within the upper Prickly Pear Creek watershed, except for two sites downstream from the USGS streamflow gaging station 06061500 (fig. 1). Sample sites are located on the Chessman Reservoir, Clancy, Jefferson City, Wickes, East Helena, Elkhorn, and Mount Thompson, Montana USGS 1:24,000 topographic maps.

Streambed Sediments

A composited streambed sediment sample was collected from the active alluvial channel at each site by combining 10 to 20 individual sub-sites within 15 m (50 ft.) of the plotted site. Each composite sample was sieved onsite through a 2 mm (10-mesh) stainless steel screen, and the less than 2 mm fraction was retained. These site locations and field measurements are shown in table 8.

Streambed sediment samples were air-dried at ambient room temperature (25^{o}C) and sieved to less than 80-mesh (<0.18 mm) prior to laboratory analyses. Streambed sediment data are in tables 9 and 11.

Lakebed Sediments

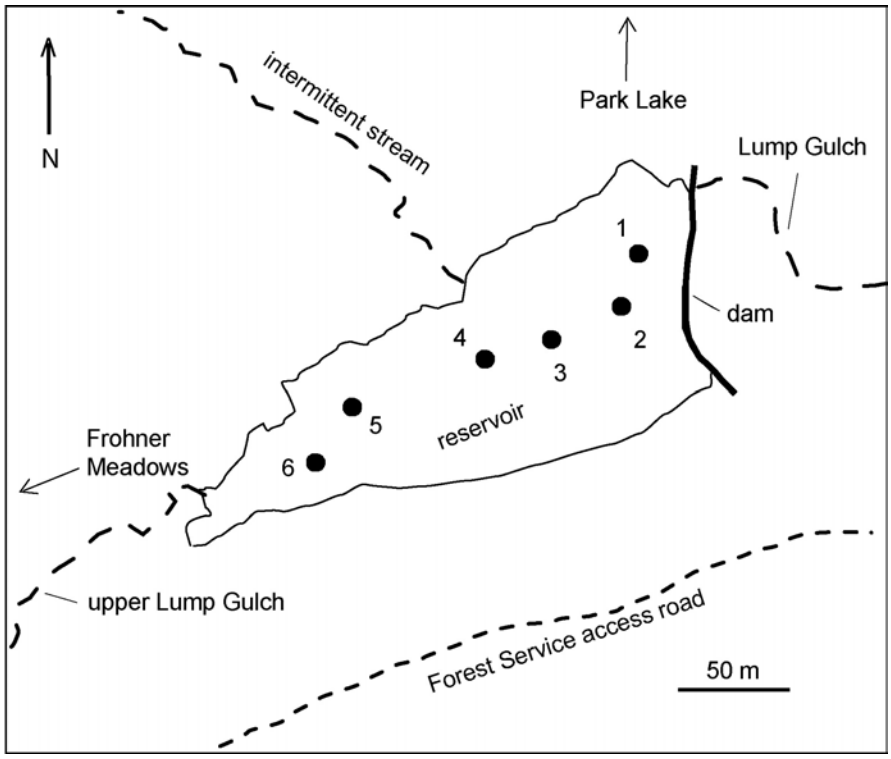
A total of 6 lakebed sediment cores were collected from an unnamed reservoir in upper Lump Gulch (fig. 2). The cores were collected with a free-falling coring apparatus operated from a floating platform. Sample locations were determined with a GPS onsite using a NAD27 datum. Cores were described in the laboratory and subintervals were sampled. The material was air-dried at ambient room temperature (25^{o}C) and sieved to less than 80-mesh (<0.18 mm). The sieved material was then pulverized to less than 100-mesh (<0.23mm) before laboratory analysis. Cores from sites 1-4 and site 6 were chemically analyzed. Lakebed site locations and sediment data are in table 10.

SAMPLE ANALYSIS

Total digestion

Streambed and lakebed sediment samples were digested with a mixed-acid procedure consisting of HCl, HNO_3, $HClO_4$, and HF. Results are reported for 34 elements analyzed by inductively coupled plasma-atomic emission spectroscopy (ICP-AES) (Crock and others, 1983; Briggs, 1996). This procedure is effective in completely dissolving most minerals, including silicates, oxides and sulfides; and partially dissolving resistant or refractory minerals such as zircon, chromite, and some tin oxides. Previous investigations using a variety of materials support the completeness of the total digestion (Church and others, 1987; Wilson and others, 1994). Limits of determination for the total digestion method are given in table 5 of Fey and others (1999a). A statistical summary of mean values, standard deviations, and median values for four National Institute of Standards and Technology (NIST) standard reference materials (SRM-2704, SRM-2709, SRM-2710, and SRM-2711) analyzed with samples from the Boulder River watershed Abandoned Mine Lands Initiative study is contained in table 6 of Fey and others, (1999a). Comparisons with certified values for these standards (NIST, 1993a, 1993b, 1993c and 1993d) are also in Fey and others, (1999a). Streambed and lakebed sediment data for the upper Prickly Pear Creek watershed using the total digestion method are shown in tables 9 and 10, respectively.

Figure 2. Sketch map showing approximate locations of lakebed sediment sample sites in an unnamed reservoir in upper Lump Gulch. Location of reservoir is shown in fig.1 as site LGP.



Partial digestion

Partial-digestion extraction method was used to determine concentrations of trace elements bound within different mineral phases (Chao, 1984). The streambed sediments were subjected to a partial-digestion extraction consisting of warm (50^0 C) 2M HCl-1 percent H_2O_2 for three hours with continuous agitation; the leachates were subsequently analyzed by ICP-AES for 32 elements. This partial digestion extraction releases trace elements associated with hydrous amorphous iron- and manganese-oxide mineral coatings and colloidal particles (Appendix III of Church and others, 1993; Church and others, 1997). Mineral coatings, such as those observed in the study area, can contain a significant percentage of the trace elements in a sample (Church and others, 1997; Fey and Church, 1998; Fey and others, 1999b; 2000). Analytical limits of determination for the partial-digestion extraction method are also in table 5 of Fey and others (1999a). A statistical summary of mean values, standard deviations, and median values obtained using the partial digestion method for the same four National Institute of Standards and Technology standard reference materials (SRM-2704, SRM-2709, SRM-2710, and SRM-2711) is in table 8 of Fey and others (1999a). Streambed sediment data for the upper Prickly Pear Creek watershed using the partial digestion method are shown in table 11.

Field measurements of water samples

Conductivity and pH of stream water samples were measured onsite using temperature-compensated instruments calibrated daily with solutions of the appropriate range. The results, expressed as micro-siemens/centimeter (μS/cm) and standard pH units are in table 8. Sediment sample sites located on streams that were not flowing are noted in table 8.

Table 8. Streambed sediment site locations and field measurements of water samples in the upper Prickly Pear Creek watershed, Montana, July 2001.

[Samples collected during July 2001 by David Fey and Paul Wigton, USGS. Latitude and longitude were determined with a Global Positioning System using a horizontal NAD27 datum. Replicate samples collected at a site during October, 2000 and July, 2001 are marked with 'r' in the site number.]

Site No	sample description	latitude (N)	longitude (W)	pH	conductivity µS/cm	date
C-3r	sand and gravel	46.38556	-112.14139	6.92	121	7/22/2001
C-4r	cobbles, gravel	46.40222	-112.11944	7.21	210	7/22/2001
C-100r	sand	46.38889	-112.11861	3.10	1140	7/22/2001
C-102r	sand and gravel	46.41028	-112.1475	7.36	100	7/20/2001
C-103r	sand and gravel	46.40833	-112.14917	7.44	140	7/20/2001
C-200	cobbles, gravel, sand	46.40517	-112.18416	6.98	113	7/20/2001
C-201	sand	46.39225	-112.12103	7.1	202	7/22/2001
C-202	sand and gravel	46.39779	-112.12126	7.44	420	7/22/2001
C-203	cobbles, gravel	46.38768	-112.15697	7.15	123	7/22/2001
C-204	cobbles, gravel	46.38824	-112.15729	no	flow	7/22/2001
C-205	sand and gravel	46.44012	-112.06093	7.48	238	7/23/2001
D-1r	sand and gravel	46.41669	-111.99973	7.17	84	7/23/2001
L-3br	sand	46.43667	-112.18790	6.15	97	7/13/2001
L-4r	sand	46.43684	-112.17223	6.97	75	7/13/2001
L-4ar	sand	46.43541	-112.17673	6.96	69	7/13/2001
L-100r	sand	46.44302	-112.19855	6.26	66	7/15/2001
L-150 (L-3a)[1]	sand	46.43411	-112.48955	6.00	81	7/13/2001
L-151	sand	46.43395	-112.18934	6.25	53	7/13/2001
L-152	sand and silt	46.43847	-112.17259	6.58	78	7/13/2001
L-153	sand and gravel	46.43676	-112.17419	no	flow	7/13/2001
L-154	sand and gravel	46.43531	-112.17749	7.17	67	7/13/2001
L-155	sand and gravel	46.43524	-112.18047	7.17	67	7/13/2001
L-156	sand and gravel	46.43628	-112.18438	6.90	67	7/13/2001
L-157	sand and gravel	46.43504	-112.18664	7.07	56	7/13/2001
L-158	sand and gravel	46.43665	-112.18594	6.84	96	7/13/2001
L-159	sand	46.43664	-112.19405	6.56	121	7/14/2001
L-160	fine organic material and peat	46.43623	-112.19144	6.48	123	7/14/2001
L-161	sand and gravel	46.43842	-112.19408	6.60	206	7/14/2001
L-162	sand and gravel	46.44163	-112.20333	6.04	70	7/15/2001
L-163	sand	46.44323	-112.19746	6.20	69	7/15/2001
L-164	sand	46.44292	-112.19551	6.45	69	7/15/2001
L-165	sand	46.44229	-112.19487	6.51	73	7/15/2001
L-166	sand	46.44073	-112.19516	6.39	99	7/15/2001
L-167	sand	46.44072	-112.19659	6.41	520	7/15/2001
L-168	sand	46.43932	-112.19451	5.30	111	7/15/2001
L-180	sand	46.47858	-111.98283	7.59	167	7/20/2001
PP-2a	sand	46.37832	-112.02994	7.26	101	7/22/2001
PP-2b	sand and silt	46.38956	-112.02402	7.27	105	7/22/2001
PP-3r	sand and gravel	46.40194	-112.01444	6.85	150	7/22/2001
PP-3a	sand and gravel	46.42062	-111.99789	7.05	186	7/23/2001
PP-3b	sand and gravel	46.43714	-111.99146	7.88	180	7/20/2001
PP-4r	sand and gravel	46.45500	-111.98413	7.42	192	7/20/2001
PP-4a	sand and gravel	46.4687	-111.98222	7.67	198	7/20/2001
PP-4b	sand and gravel	46.48451	-111.97166	7.68	200	7/20/2001
PP-5r	sand and gravel	46.51917	-111.94611	7.88	202	7/20/2001
PP-100	sand	46.40194	-112.01977	no	flow	7/22/2001
PP-200	sand	46.55427	-111.90940	7.79	223	7/20/2001

Table 8. Field numbers, site descriptions, sample descriptions, latitude and longitude, and field measurements of streambed sediment localities. (Continued)

Field No	sample description	latitude (N)	longitude (W)	pH	conductivity	date
PP-201	sand	46.53427	-111.93513	7.69	214	7/20/2001
S-3r	sand and gravel	46.37632	-112.06323	7.26	665	7/22/2001
S-4r	sand and gravel	46.38887	-112.02716	no	flow	7/22/2001
S-200	sand	46.38414	-112.05098	no	flow	7/22/2001
S-201	sand	46.38083	-112.06126	no	flow	7/22/2001
S-202	sand	46.34276	-112.10922	no	flow	7/22/2001
S-203	sand	46.36168	-112.07643	no	flow	7/22/2001
S-204	sandy fluvial tailings	46.35799	-112.12746	6.97	556	7/23/2001
S-205	sand	46.38300	-112.05305	7.22	475	7/23/2001
S-206	sand	46.38560	-112.04090	no	flow	7/23/2001
WS-8	sand and gravel	46.45002	-111.98438	7.67	237	7/20/2001

[1] same location as site L-3a in table 1.

Table 9. Streambed sediment data using the mixed-acid total digestion method for the upper Prickly Pear Creek watershed, Montana, July 2001.

[Analyzed by David Fey, USGS. The following elements with their detection limits (ppm) in parenthesis were analyzed but not detected: gold (8), bismuth (10), europium (2), holmium (4), tantalum (40), uranium (100). < is less than the value indicated, 'r' in the site number indicates that samples were collected at this site during October 2000 and July 2001. Major element data expressed in weight percent; trace element data expressed in ppm (parts per million), dry weight basis.]

Site No.	Al %	Ca %	Fe %	K %	Mg %	Na %	P %	Ti %	Ag ppm	As ppm	Ba ppm	Be ppm	Cd ppm	Ce ppm	Co ppm	Cr ppm	Cu ppm	Ga ppm
C-3r	7.6	1.4	5.8	3.0	0.70	1.0	0.12	0.42	< 2	44	770	2	9	88	13	49	32	20
C-4r	7.4	1.4	7.4	2.6	0.70	1.2	0.15	0.29	11	1,400	790	3	36	91	24	77	590	22
C-100r	6.6	0.64	3.1	2.6	0.42	1.5	0.09	0.21	4	210	850	2	3	43	3	37	87	15
C-102r	7.7	1.8	11	2.0	0.55	2.4	0.14	0.29	< 2	16	700	2	6	110	30	83	15	21
C-103r	7.7	2.1	5.6	2.4	0.72	1.7	0.14	0.36	< 2	42	860	2	13	97	12	28	51	21
C-200	8.5	2.0	5.1	2.2	0.56	2.7	0.12	0.34	< 2	23	710	2	6	120	9	47	26	21
C-201	7.1	0.92	4.6	2.4	0.55	0.92	0.15	0.14	14	1,900	740	5	77	110	19	35	1900	24
C-202	7.1	2.0	14	2.0	0.54	2.1	0.22	0.38	9	160	750	2	10	150	35	110	74	27
C-203	7.8	1.2	5.0	3.2	0.68	0.90	0.12	0.36	< 2	51	770	2	7	80	13	39	34	20
C-204	7.3	1.9	8.9	2.4	1.0	1.2	0.13	0.65	< 2	31	710	2	39	110	21	86	220	24
C-205	7.6	2.7	5.6	2.6	1.1	1.6	0.15	0.50	< 2	15	610	2	4	88	22	57	38	18
D-1r	7.3	2.6	11	1.9	0.71	2.4	0.16	0.52	< 2	< 10	610	2	6	200	26	74	29	20
L-3br	8.6	1.4	4.9	1.9	0.25	2.8	0.09	0.11	< 2	640	1,000	3	90	55	77	4	140	24
L-4ar	8.8	1.7	2.3	2.2	0.29	2.9	0.06	0.16	< 2	37	880	2	14	64	< 1	10	22	22
L-4r	7.4	1.7	3.4	1.9	0.45	2.2	0.12	0.18	< 2	72	870	2	37	71	4	14	52	18
L-100r	7.6	0.98	4.8	1.9	0.25	1.8	0.05	0.09	25	3,200	400	2	57	42	84	6	300	27
L-150	8.9	1.7	3.5	2.3	0.23	3.0	0.07	0.11	< 2	260	1,300	2	42	72	14	7	52	24
L-151	9.2	1.7	3.6	2.4	0.25	2.9	0.08	0.16	< 2	20	860	2	3	78	< 1	21	9	22
L-152	8.1	1.7	0.99	2.4	0.27	2.6	0.07	0.15	< 2	15	870	2	2	65	< 1	6	16	19
L-153	8.3	1.5	4.1	1.9	0.82	1.6	0.11	0.31	< 2	47	700	2	12	78	8	39	74	21
L-154	8.6	1.6	3.9	2.1	0.35	2.9	0.08	0.19	< 2	58	900	2	32	95	6	19	37	23
L-155	8.6	1.6	4.6	2.1	0.43	2.5	0.10	0.16	< 2	130	1,000	2	52	90	35	18	52	24
L-156	9.0	1.7	4.7	2.0	0.49	2.8	0.09	0.23	< 2	86	800	2	20	73	8	36	65	22
L-157	9.1	1.7	5.0	2.3	0.29	3.1	0.10	0.18	< 2	26	840	2	6	98	3	31	15	23
L-158	9.5	1.7	5.1	2.0	0.43	2.8	0.11	0.17	< 2	340	990	3	58	86	64	14	98	27
L-159	8.6	1.3	2.9	1.9	0.24	2.6	0.05	0.11	2	900	860	2	44	45	25	6	160	22
L-160	7.6	1.4	5.7	1.7	0.20	2.4	0.09	0.08	3	2,500	940	3	80	50	240	2	280	21
L-161	8.9	1.2	4.2	2.4	0.44	2.6	0.07	0.17	2	790	830	2	58	48	44	16	130	22
L-162	7.5	0.82	3.3	2.2	0.25	1.6	0.05	0.10	34	3,300	720	2	22	36	44	5	190	23
L-163	8.2	1.1	5.1	2.0	0.27	2.0	0.06	0.10	24	3,300	820	3	53	46	99	4	280	26
L-164	9.2	1.4	2.9	2.2	0.28	2.7	0.06	0.15	6	1,000	900	2	10	64	4	12	130	25
L-165	9.8	1.6	3.0	2.2	0.33	3.0	0.06	0.17	12	2,100	900	2	15	54	12	8	220	26
L-166	8.0	1.1	2.7	2.0	0.27	2.2	0.05	0.12	20	2,000	710	2	19	34	< 1	6	300	21

Table 9. Streambed sediment data using the total digestion method for the upper Prickly Pear Creek watershed, Montana, July 2001. (Continued)

Field No.	La ppm	Li ppm	Mn ppm	Mo ppm	Nb ppm	Nd ppm	Ni ppm	Pb ppm	Sc ppm	Sn ppm	Sr ppm	Th ppm	V ppm	Y ppm	Yb ppm	Zn ppm
C-3r	52	17	4,600	4	24	32	19	200	11	< 5	290	26	170	21	2	1,100
C-4r	54	21	7,900	4	< 4	37	30	1,300	12	6	290	17	220	30	3	5,800
C-100r	25	18	440	2	38	20	10	330	6	15	320	10	70	12	1	310
C-102r	63	18	620	< 2	44	47	15	29	9	< 5	460	32	340	25	3	89
C-103r	59	20	8,200	3	< 4	36	19	160	12	< 5	390	22	120	27	3	2,200
C-200	76	20	900	2	53	49	12	64	9	< 5	550	23	160	26	3	390
C-201	81	21	19,000	4	< 4	44	42	2,200	10	7	250	9	88	65	5	9,800
C-202	86	15	920	3	37	59	18	130	11	6	430	44	450	29	4	600
C-203	47	18	6,100	5	13	28	19	270	11	< 5	280	21	130	19	2	1,000
C-204	61	21	8,000	4	8	43	34	230	16	< 5	270	37	320	41	4	4,000
C-205	50	24	1,100	2	50	37	19	34	15	< 5	340	24	200	28	3	130
D-1r	120	13	730	5	82	80	14	19	14	7	460	170	340	49	6	54
L-3br	37	25	10,000	5	< 4	20	17	320	5	< 5	620	10	42	20	2	5,600
L-4ar	40	18	890	2	44	25	7	56	4	< 5	650	17	50	12	2	1,100
L-4r	44	28	4,300	5	15	31	14	58	8	< 5	470	15	58	27	3	2,800
L-100r	23	49	18,000	7	< 4	6	19	3,800	4	5	420	5	40	17	2	4,400
L-150r	45	15	9,000	11	< 4	23	13	130	4	< 5	680	11	49	15	2	3,200
L-151	49	20	570	3	48	32	7	37	4	< 5	640	24	100	14	2	120
L-152	41	18	680	2	46	25	5	31	4	< 5	560	15	23	18	2	180
L-153	43	46	1,600	3	43	34	20	110	13	< 5	350	29	110	30	3	1,500
L-154	60	21	2,700	3	34	36	11	70	6	< 5	600	20	87	19	2	2,500
L-155	58	26	8,300	5	< 4	33	18	110	7	< 5	540	18	86	25	3	5,200
L-156	47	27	1,400	3	44	31	12	110	7	< 5	600	26	120	19	2	1,800
L-157	63	20	530	3	45	37	8	57	5	< 5	630	26	140	16	2	470
L-158	54	30	8,900	6	< 4	30	16	220	7	< 5	670	16	90	20	2	4,700
L-159	32	27	3,000	4	22	21	10	1,200	4	< 5	560	12	27	20	2	2,400
L-160	36	23	12,000	9	< 4	22	20	1,300	5	< 5	520	7	29	31	3	6,600
L-161	31	30	4,000	4	19	18	12	720	6	< 5	520	29	79	16	2	2,600
L-162	21	58	10,000	6	< 4	9	11	5,400	4	< 5	370	11	39	12	1	2,000
L-163	27	55	17,000	6	< 4	10	19	3,700	5	6	470	8	46	18	2	4,300
L-164	40	32	2,000	8	36	25	8	1,500	4	< 5	610	13	62	12	1	830
L-165	36	40	2,400	4	38	23	9	2,000	5	< 5	650	14	47	15	2	1,400
L-166	22	36	750	3	36	16	7	2,400	4	7	470	9	34	11	1	1,800

Table 9. Streambed sediment data using the total digestion method for the upper Prickly Pear Creek watershed, Montana, July 2001. (Continued)

Field No.	Al %	Ca %	Fe %	K %	Mg %	Na %	P %	Ti %	Ag ppm	As ppm	Ba ppm	Be ppm	Cd ppm	Ce ppm	Co ppm	Cr ppm	Cu ppm	Ga ppm
L-167	9.0	1.9	4.2	2.3	0.66	2.2	0.11	0.26	< 2	410	690	3	24	82	34	14	180	22
L-168	7.4	1.1	1.8	1.7	0.23	2.2	0.04	0.11	< 2	580	710	2	19	39	11	4	100	19
L-180	6.9	2.8	17	1.8	0.83	2.2	0.19	0.40	< 2	14	590	2	10	140	61	120	13	24
PP-2a	7.7	3.1	5.8	2.6	1.3	2.2	0.16	0.48	< 2	15	580	2	5	150	12	84	39	18
PP-2b	6.1	1.4	4.0	2.0	0.72	1.0	0.11	0.22	19	340	580	2	25	62	6	31	500	19
PP-3a	7.1	2.4	9.8	2.1	0.77	2.2	0.16	0.50	2	59	630	2	8	200	23	75	89	20
PP-3b	7.4	2.5	7.8	2.2	0.89	2.1	0.17	0.45	8	170	620	2	22	170	19	56	230	20
PP-3r	6.5	1.7	5.6	2.2	0.77	1.4	0.14	0.32	13	360	570	2	15	83	12	46	440	19
PP-4a	6.6	2.4	14	2.0	0.70	2.0	0.17	0.58	3	120	640	2	13	220	32	100	120	22
PP-4b	7.2	2.6	9.5	2.1	0.69	2.3	0.15	0.41	< 2	43	610	2	8	180	20	68	63	22
PP-4r	8.0	2.5	5.2	2.4	0.94	2.2	0.16	0.38	6	120	620	2	12	110	14	38	170	21
PP-5r	7.2	2.7	12	2.0	0.86	2.2	0.21	0.48	2	45	600	2	9	160	41	120	54	21
PP-100	8.1	2.1	6.6	2.1	0.63	2.0	0.18	0.28	< 2	14	730	2	5	110	19	54	92	21
PP-200	7.6	3.9	7.5	2.2	1.3	2.2	0.20	0.48	< 2	49	580	2	6	170	16	80	54	16
PP-201	7.5	2.9	5.9	2.2	0.94	2.2	0.15	0.38	< 2	31	580	2	5	110	12	61	45	18
S-3r	7.6	1.6	4.6	2.7	0.46	2.0	0.10	0.27	6	300	870	2	11	69	6	35	260	20
S-4r	5.6	1.3	6.2	2.0	0.51	0.95	0.12	0.22	38	720	620	2	41	82	8	43	940	24
S-200	7.9	2.1	6.3	2.3	1.4	1.3	0.21	0.49	< 2	52	600	2	8	98	33	47	180	21
S-201	8.9	2.6	3.5	3.0	1.1	2.3	0.16	0.38	< 2	27	790	2	4	79	12	22	180	20
S-202	8.2	1.6	1.6	2.6	0.46	2.3	0.08	0.17	< 2	42	960	2	4	33	< 1	21	66	21
S-203	7.5	0.85	5.2	3.2	0.42	1.4	0.12	0.17	< 2	38	790	2	4	46	5	20	280	17
S-204	5.0	0.60	13	2.0	0.42	0.51	0.07	0.16	19	12,000	170	< 1	30	26	60	25	220	16
S-205	8.1	1.6	5.4	2.8	0.92	1.6	0.11	0.31	3	89	920	2	12	72	15	52	190	21
S-206	7.8	1.7	4.7	2.4	0.94	1.5	0.13	0.33	4	120	740	2	13	74	19	55	240	19
WS-8	7.7	2.8	4.4	2.2	0.89	2.4	0.17	0.37	< 2	40	460	3	4	120	8	29	25	18

Table 9. Streambed sediment data using the total digestion method for the upper Prickly Pear Creek watershed, Montana, July 2001. (Continued)

Field No.	La ppm	Li ppm	Mn ppm	Mo ppm	Nb ppm	Nd ppm	Ni ppm	Pb ppm	Sc ppm	Sn ppm	Sr ppm	Th ppm	V ppm	Y ppm	Yb ppm	Zn ppm
L-167	50	28	2,800	22	47	32	12	490	10	< 5	440	29	95	26	3	3,500
L-168	26	22	1,200	3	32	17	6	500	4	< 5	500	8	24	12	1	1,600
L-180	80	14	790	3	46	68	19	9	16	5	410	110	550	44	6	130
PP-2a	86	15	1,200	3	75	60	21	98	17	< 5	420	54	170	43	5	280
PP-2b	35	27	10,000	6	< 4	21	19	2,800	9	8	250	17	82	22	2	3,800
PP-3a	120	16	1,800	4	64	74	15	390	14	5	430	180	310	44	5	570
PP-3b	98	20	2,600	4	53	66	15	610	15	8	430	120	230	43	5	3,000
PP-3r	48	25	6,900	7	4	31	17	1,800	11	9	310	34	150	26	3	2,600
PP-4a	130	15	2,200	4	63	79	17	360	14	8	360	140	440	48	6	1,200
PP-4b	110	13	1,600	3	63	69	14	150	13	5	430	95	300	43	5	640
PP-4r	68	25	3,000	4	46	44	15	560	14	< 5	450	49	140	32	4	1,900
PP-5r	92	18	1,700	4	64	65	19	220	15	< 5	420	82	380	44	5	680
PP-100	66	33	600	3	47	42	16	71	10	5	440	41	200	25	3	180
PP-200	100	18	1,700	3	76	70	17	170	16	< 5	450	72	240	49	6	600
PP-201	60	18	1,700	2	50	45	14	180	13	10	420	46	180	34	4	630
S-3r	40	18	1,300	4	42	28	13	890	8	< 5	480	13	110	14	2	1,700
S-4r	47	26	19,000	5	< 4	21	17	4,900	8	7	250	16	140	24	3	6,900
S-200	52	40	1,900	4	42	41	25	370	20	5	280	30	180	32	4	930
S-201	44	26	930	4	61	36	16	95	15	< 5	520	18	90	27	3	240
S-202	20	30	570	< 2	43	15	9	260	5	< 5	620	6	31	10	1	240
S-203	29	12	240	78	36	21	9	110	8	6	350	16	81	10	1	130
S-204	14	19	2,400	2	< 4	16	22	2,900	10	12	160	7	82	7	< 1	4,400
S-205	38	24	3,000	5	22	29	19	520	12	< 5	430	14	130	19	2	1,300
S-206	42	26	3,200	5	24	30	24	590	12	5	380	15	120	22	2	1,600
WS-8	70	20	660	3	72	51	10	44	14	6	410	78	130	40	5	260

Table 10. Lakebed sediment site locations and data using the mixed-acid total digestion method for upper Prickly Pear Creek watershed, Montana, July 2001.

[Samples were collected by David Fey, Terry Klein and Paul Wigton, USGS and analyzed by David Fey. Depths are measured from top of recovered core and are not corrected for compaction. The following elements with their detection limits (ppm) in parenthesis were analyzed but not detected: gold (8), bismuth (10), tantalum (40), uranium (100). < is less than the value indicated. Major elements expressed in weight percent; trace elements expressed in ppm (parts per million), dry weight basis.]

core no.	sample no.	latitude (N)	longitude (W)	total length (cm)	starting depth (cm)	ending depth (cm)	unit thickness (cm)	sub-interval	sampled	description	Al %	Ca %	Fe %	K %	Mg %	Na %	P %	Ti %
1		46.4365	112.1742	16														
					0	9	9			lake weed with clay-silt infilling								
					9	16	7			very organic meadow soil; dark brown highly peat-rich								
	RES-1a									*entire core sampled at 1.3 cm intervals*	6.47	1.15	3.83	1.38	0.53	0.99	0.11	0.23
	RES-1b										7.45	0.97	3.88	1.63	0.54	1.43	0.09	0.25
	RES-1c										8.09	1.12	3.28	1.84	0.55	1.80	0.08	0.26
	RES-1d										8.12	1.05	3.42	1.78	0.55	1.69	0.09	0.30
	RES-1e										7.98	0.99	3.06	1.75	0.50	1.60	0.09	0.25
	RES-1f										8.06	1.14	2.05	2.02	0.37	2.09	0.06	0.20
	RES-1g										9.13	1.28	1.85	2.26	0.40	2.32	0.06	0.20
	RES-1h										9.53	1.28	2.01	2.12	0.49	2.22	0.06	0.24
	RES-1i										9.29	1.28	1.83	2.17	0.45	2.32	0.05	0.25
	RES-1j										8.79	1.19	1.50	2.35	0.38	2.22	0.04	0.21
	RES-1k										8.90	1.21	1.61	2.29	0.41	2.21	0.04	0.22
	RES-1l										8.69	1.22	1.43	2.38	0.38	2.29	0.04	0.20
2		46.4370	112.1731	23														
	RES-2a				0	6	6	a	complete interval	medium brown clay and silt, prismatic structure	7.59	1.08	3.89	1.55	0.62	1.18	0.07	0.27
	RES-2b,c				6	10.5	4.5	b, c	composite	stem-rich zone overlies very fibrous dark brown clay and silt; occasional leaf and stem pieces	6.79	1.25	3.59	1.33	0.58	1.09	0.08	0.24
	RES-2d				10.5	14	3.5	d	silt and clay only	two fine, moderately well sorted, angular and subangular tan sand partings separated by 1.5 cm, medium brown clay and silt (as above)	7.40	1.40	2.57	1.73	0.50	1.86	0.07	0.22
	RES-2e				14	18	4	e		dark brown clay and silt, no structure, occasional leaf and stem pieces	6.25	1.07	4.53	1.32	0.52	1.00	0.08	0.21
	RES-2f				18	18.5	0.5	f	composite of all sand intervals	moderately well sorted tan sand	7.90	1.60	2.06	2.11	0.42	2.49	0.06	0.20
	RES-2g				18.5	23	4.5	g	complete interval	dark brown clay and silt, prismatic structure	6.91	1.34	3.11	1.54	0.53	1.48	0.08	0.22
3		46.4367	112.1736	11														
	RES-3				0	4.5	4.5	a	composite of entire core	organic-rich clay, iron oxide (from post-core oxidation); lake weed roots	8.75	1.29	2.52	1.90	0.48	2.17	0.06	0.24
					4.5	11	6.5	b		medium brown silt and clay								

Table 10. Core descriptions and locations, and the total digestion ICP-AES results from lakebed sediments collected July 2001 from the upper Lump Gulch (Continued).

core no.	sample no.	Ag ppm	As ppm	Ba ppm	Be ppm	Cd ppm	Ce ppm	Co ppm	Cr ppm	Cu ppm	Eu ppm	Ga ppm	Ho ppm	La ppm	Li ppm	Mn ppm	Mo ppm	Nb ppm	Nd ppm	Ni ppm	Pb ppm	Sc ppm	Sn ppm	Sr ppm	Th ppm	V ppm	Y ppm	Yb ppm	Zn ppm
1																													
	RES-1a	2	202	478	1.8	54	66	21	17	102	1.1	16	1.1	41	40	1,083	5	18	34	17	165	9	5	239	18	62	31	3	7,537
	RES-1b	2	181	690	2.0	38	72	18	17	101	1.1	19	1.2	45	41	893	3	20	37	15	189	9	2	299	19	66	31	3	4,412
	RES-1c	1	144	797	2.0	25	73	15	15	89	1.2	21	1.2	45	39	748	2	23	35	12	166	9	4	373	18	64	30	3	2,419
	RES-1d	1	158	813	2.1	28	80	17	17	106	1.3	21	1.2	50	41	773	3	28	40	13	157	10	4	351	18	67	34	3	2,472
	RES-1e	1	137	785	2.1	28	77	12	16	103	1.3	21	1.3	48	41	730	2	25	38	12	145	9	4	334	18	63	33	3	2,219
	RES-1f	1	62	887	2.0	14	68	3	12	55	1.2	20	1.0	42	32	446	2	27	32	9	85	6	1	442	15	47	25	2	1,364
	RES-1g	1	14	954	2.2	7	85	<2	13	44	1.5	23	1.2	51	37	473	1	28	41	8	67	7	3	489	16	49	32	3	720
	RES-1h	1	9	901	2.2	4	76	<2	16	36	1.3	24	1.1	47	44	487	1	29	36	9	70	9	3	475	17	56	28	3	401
	RES-1i	1	11	920	2.0	4	69	<2	14	34	1.2	23	1.2	42	40	426	0	30	31	8	60	8	2	480	18	51	24	3	398
	RES-1j	1	16	964	2.0	3	59	<2	13	31	1.1	22	0.8	36	34	344	1	28	27	8	59	6	3	475	13	43	20	2	258
	RES-1k	1	15	935	2.1	4	70	<2	16	42	1.2	23	1.3	44	35	380	1	30	33	9	63	7	2	480	14	49	24	2	258
	RES-1l	1	13	950	2.1	3	65	<2	13	45	1.2	22	0.9	40	32	367	2	28	29	9	60	6	4	484	12	44	22	2	246
2																													
	RES-2a	2	149	230	1.8	26	71	24	21	116	1.0	20	1.0	44	51	978	6	23	35	17	185	10	3	264	20	75	32	3	3,149
	RES-2b,c	2	205	260	1.7	27	74	25	22	141	1.0	17	1.2	44	49	1,177	10	18	36	17	136	10	4	262	21	74	34	3	2,500
	RES-2d	1	101	661	1.8	17	77	6	17	90	1.0	19	1.1	44	38	823	3	23	33	11	112	8	3	405	19	63	29	3	1,292
	RES-2e	2	288	532	1.9	40	73	33	18	155	1.1	16	1.1	44	42	2,464	4	11	36	17	183	10	3	243	19	72	35	3	3,367
	RES-2f	1	64	807	1.8	12	66	6	10	51	0.8	19	0.9	37	27	555	3	26	27	9	78	6	2	522	15	43	20	2	1,072
	RES-2g	1	164	439	1.8	27	73	23	18	115	0.9	17	1.2	43	41	1,511	4	19	32	14	120	9	0	338	18	65	30	3	2,425
3																													
	RES-3	1	78	818	2.0	14	75	5	16	72	1.1	22	1.1	47	39	504	3	25	35	11	115	8	1	458	17	60	27	3	1,339

Table 10. Core descriptions and locations, and the total digestion ICP-AES results from lakebed sediments collected July 2001 from the upper Lump Gulch. (Continued)

core no.	sample no.	latitude (N)	longitude (W)	total length (cm)	starting depth (cm)	ending depth (cm)	unit thickness (cm)	sub-interval	sampled	description	Al %	Ca %	Fe %	K %	Mg %	Na %	P %	Ti %
4		46.4367	112.1736	13														
	RES-4 comp								composite of entire core		8.33	1.10	2.90	1.74	0.55	1.75	0.06	0.25
	RES-4a				0	0.5	0.5	a	complete interval	organic-rich clay, iron oxide (from post-core oxidation); lake weed roots	8.20	1.21	3.04	1.78	0.55	1.94	0.08	0.24
	RES-4b				0.5	8	7.5	b	complete interval	medium brown clay and silt, prismatic structure	9.06	1.25	2.26	2.08	0.49	2.13	0.06	0.26
	RES-4c				8	13	5	c	complete interval	medium brown clay and silt	8.64	1.25	1.80	2.07	0.42	2.29	0.05	0.22
5	**not sampled**	46.4371	112.1730	13	0	8	8			organic-rich clay, lake weed roots								
					8	13	5			poorly sorted silt; fine grained, light brown quartz sand, sparse coarse sand								
6		46.4364	112.1744	17														
	RES-6 comp								Composite of entire core		8.42	1.46	2.65	1.86	0.53	2.00	0.06	0.26
	RES-6a				0	0.2	0.2	a	complete interval	organic-rich clay, iron oxide (from post-core oxidation); lake weed roots	7.42	1.25	5.61	1.57	0.52	1.64	0.20	0.21
	RES-6b				0.2	15	14.8	b	complete interval	medium brown silt and clay, unstructured	8.44	1.32	2.77	1.87	0.54	2.02	0.08	0.24
	RES-6c				15	17	2	c	complete interval	poorly sorted silt, fine grained, light brown quartz sand, sparse coarse sand	8.42	1.47	2.16	1.87	0.51	2.22	0.05	0.23

Table 10. Core descriptions and locations, and the total digestion ICP-AES results from lakebed sediments collected July 2001 from the upper Lump Gulch. (Continued)

core no.	sample no.	Ag ppm	As ppm	Ba ppm	Be ppm	Cd ppm	Ce ppm	Co ppm	Cr ppm	Cu ppm	Eu ppm	Ga ppm	Ho ppm	La ppm	Li ppm	Mn ppm	Mo ppm	Nb ppm	Nd ppm	Ni ppm	Pb ppm	Sc ppm	Sn ppm	Sr ppm	Th ppm	V ppm	Y ppm	Yb ppm	Zn ppm
4																													
	RES-4 comp	1	115	749	1.9	20	73	12	17	94	1.1	21	1.2	45	44	510	2	27	34	12	146	9	5	369	18	66	28	3	1,879
	RES-4a	1	98	638	1.9	20	68	11	16	89	1.0	21	1.1	42	40	522	2	25	33	13	150	9	4	405	17	62	27	3	2,099
	RES-4b	2	96	867	2.2	20	75	4	15	113	1.3	22	1.2	46	43	456	1	31	35	10	233	8	6	439	16	60	29	3	1,980
	RES-4c	1	21	851	2.0	11	68	<2	13	50	1.2	22	1.0	41	32	392	0	27	30	8	122	7	2	464	15	52	23	2	704
5	not sampled																												
6																													
	RES-6 comp	1	114	765	2.2	35	73	15	15	122	1.3	22	1.3	46	41	278	2	26	37	12	167	8	3	424	17	62	30	3	2,836
	RES-6-a	1	175	381	2.0	50	64	20	12	105	0.9	18	1.2	42	39	693	1	19	35	14	154	9	4	347	16	61	29	3	4,243
	RES-6b	1	111	806	1.9	25	67	10	15	86	1.0	21	1.0	42	40	391	2	26	32	12	163	8	2	417	16	61	27	2	2,245
	RES-6c	1	99	761	2.2	32	68	14	13	130	1.3	21	1.0	44	38	228	2	29	34	11	166	8	1	468	17	57	29	3	2,528

Table 11. Streambed sediment data using the partial digestion method for the upper Prickly Pear Creek watershed, Montana, July 2001.

Analyzed by David Fey, USGS. All values in ppm. < is less than the indicated value.

Site No.	Al	Ca	Fe	K	Mg	Na	P	Si	Ti	Ag	As	B	Ba	Be	Cd	Co	Cr	Cu	Li	Mn	Mo	Ni	Pb	Sb	Sr	V	Zn
C-3r	3,700	4,000	12,000	860	2,000	64	870	1,100	110	< 1	20	< 3	130	0.6	5.9	7.4	3	21	3.3	4,000	2	9.3	130	< 3	30	14	880
C-4r	5,500	4,300	16,000	1,000	2,200	72	1,100	1,400	< 30	10	710	< 3	140	1	30	14	3.9	450	4.0	7,100	< 1	19	1,000	< 3	38	15	5,200
C-100r	2,500	1,400	6,700	560	1,300	63	620	800	40	2	120	< 3	45	< 0.6	1	4.0	3.5	35	3	240	< 1	3.0	200	< 3	9.4	6.6	160
C-102r	3,700	3,700	9,400	1,100	2,300	81	1,100	1,100	320	< 1	11	< 3	70	< 0.6	< 1	6.9	3.4	11	5.6	420	< 1	4.2	24	< 3	15	18	58
C-103r	3,400	5,000	20,000	570	1,800	51	940	1,500	110	< 1	34	< 3	230	< 0.6	8.6	10	1	28	3.3	6,000	< 1	10	100	< 3	42	16	1,500
C-200	2,900	3,100	8,200	350	1,200	65	850	860	110	< 1	10	< 3	61	< 0.6	2	5.3	3.0	15	3.7	450	< 1	3.7	34	< 3	21	12	240
C-201	5,400	2,600	12,000	440	900	38	710	1,400	< 30	8.9	920	< 3	120	2	46	11	2	970	3	12,000	< 1	22	1,100	< 3	29	5.8	6,300
C-202	2,800	4,700	7,700	1,100	2,100	63	2,000	1,200	270	1	60	< 3	64	< 0.6	3	5.9	3.4	37	4.3	600	1	4.2	120	< 3	16	16	530
C-203	4,400	4,600	15,000	1,100	2,200	71	870	1,300	100	< 1	28	< 3	160	1	4.9	8.8	3	20	4.1	5,700	2	10	200	< 3	42	16	920
C-204	5,600	4,100	12,000	970	2,300	40	820	1,100	72	1	12	< 3	150	0.8	27	4.7	4.7	140	4.0	6,000	< 1	17	130	< 3	30	22	3,000
C-205	4,800	8,600	10,000	2,000	3,800	100	1,000	1,100	480	< 1	10	3.6	110	< 0.6	< 1	9.5	4.9	23	7.2	680	< 1	7.8	15	< 3	33	19	71
D-1r	2,000	3,100	5,300	680	1,400	80	1,200	970	230	< 1	< 6	< 3	43	< 0.6	< 1	4.2	2	8.8	3.1	140	1	2	6	< 3	23	14	19
L3br	3,200	2,100	30,000	230	630	40	600	950	< 30	1	460	3.1	270	1	73	61	< 0.6	93	2	8,600	2	12	220	< 3	30	11	4,600
L-4ar	2,100	1,700	7,700	330	1,100	38	430	840	87	< 1	26	< 3	67	< 0.6	11	6.5	< 0.6	14	3	720	< 1	3	26	< 3	15	7.1	910
L-4r	3,500	3,700	14,000	400	1,400	49	690	880	86	< 1	39	< 3	200	< 0.6	28	8.2	0.8	31	4.8	3,200	1	7.1	28	< 3	41	12	2,000
L-100r	5,200	1,900	23,000	330	470	30	280	1,100	< 30	19	2,100	< 3	210	1	46	83	< 0.6	200	3.2	16,000	3.1	14	2,900	< 3	37	5.7	3,500
L-150	2,200	2,100	20,000	300	880	40	620	1,200	< 30	< 1	230	< 3	390	< 0.6	40	26	< 0.6	47	3.0	8,800	8.1	8.5	120	< 3	29	9.9	3,100
L-151	2,300	2,400	6,900	280	880	63	600	840	50	< 1	9	< 3	92	< 0.6	< 1	4.8	1	8.0	3.0	460	< 1	2	18	< 3	19	7.7	85
L-152	2,000	1,900	3,600	180	710	47	460	730	120	< 1	7	< 3	68	< 0.6	1	2	0.9	10	3.0	490	< 1	2	12	< 3	17	4.3	120
L-153	7,600	4,600	15,000	1,300	3,500	59	630	1,500	190	1	26	< 3	160	0.6	9.5	11	6.1	41	8.7	1,400	< 1	8.5	77	< 3	53	34	1,300
L-154	3,000	2,500	12,000	490	1,500	44	630	1,000	86	< 1	44	< 3	130	< 0.6	27	13	0.9	29	3.9	2,300	< 1	5.7	46	< 3	24	12	2,200
L-155	3,800	3,000	18,000	540	1,400	45	560	960	30	< 1	83	< 3	320	0.6	38	28	0.9	32	4.6	6,500	1	9.7	71	< 3	34	15	3,900
L-156	3,300	2,800	12,000	540	1,600	69	630	1,000	98	< 1	66	< 3	120	< 0.6	15	13	2	31	4.7	1,100	< 1	4.2	73	< 3	26	12	1,400
L-157	2,000	2,100	6,900	290	870	55	610	800	61	< 1	11	< 3	70	< 0.6	3	3.3	0.9	8.7	3.0	350	< 1	2	27	< 3	15	7.4	310
L-158	4,800	3,400	44,000	180	490	63	560	1,200	< 30	2	2,100	4.6	97	2	76	180	< 0.6	220	2	11,000	3.6	16	1,000	< 3	36	10	5,900
L-159	3,200	2,000	18,000	160	480	41	360	940	< 30	2	720	< 3	110	0.9	38	35	< 0.6	120	2	2,700	1	5.8	960	< 3	30	4.9	2,000
L-160	3,600	4,800	5,900	710	3,100	200	180	610	< 30	< 1	< 6	5.8	130	< 0.6	< 1	4.6	14	7.3	7.1	190	< 1	22	3	< 3	30	12	46
L-161	3,000	1,800	12,000	550	1,100	34	420	960	34	2	510	< 3	100	0.6	43	32	< 0.6	79	3.7	3,200	1	5.0	480	< 3	20	6.6	2,000
L-162	3,000	1,200	15,000	330	360	< 30	250	880	< 30	17	2,100	< 3	100	0.7	16	44	< 0.6	120	2	8,000	2	6.4	3,500	< 3	21	3.7	1,400
L-163	4,100	1,600	19,000	310	460	30	260	830	< 30	15	1,600	< 3	170	0.9	33	59	< 0.6	140	3.0	12,000	2	11	2,200	< 3	29	4.7	2,600
L-164	2,100	1,300	5,800	280	610	46	330	840	< 30	5.0	600	< 3	53	< 0.6	6.1	6.8	< 0.6	74	2	1,400	1	2	940	< 3	16	6.6	480
L-165	2,900	2,100	11,000	320	650	66	360	900	< 30	8.0	1,400	< 3	95	< 0.6	9.1	15	< 0.6	110	3.0	1,900	1	3	1,300	< 3	28	7.8	760
L-166	2,900	1,400	13,000	280	580	40	350	930	< 30	16	1,500	< 3	56	< 0.6	13	8.6	< 0.6	200	2	610	2	2	1,800	< 3	19	6.2	990
L-167	5,100	3,300	15,000	1,900	2,400	85	880	1,400	100	1	290	< 3	110	1	24	45	1	140	5.6	3,000	6.2	6.5	420	< 3	38	22	3,700
L-168	3,600	2,200	16,000	330	1,000	68	390	1,100	< 30	2	730	< 3	110	0.9	26	32	< 0.6	130	3.4	1,700	2	5.3	600	< 3	30	7.8	2,000
L-180	1,900	3,300	6,600	820	1,300	82	1,300	810	230	< 1	< 6	< 3	52	< 0.6	< 1	4.2	3.0	7.2	3.3	160	< 1	2	4	< 3	11	16	68

Table 11. Streambed sediment data using the partial digestion method for the upper Prickly Pear Creek watershed, Montana, July 2001. (Continued)

Field No.	Al	Ca	Fe	K	Mg	Na	P	Si	Ti	Ag	As	B	Ba	Be	Cd	Co	Cr	Cu	Li	Mn	Mo	Ni	Pb	Sb	Sr	V	Zn
PP-2a	2,500	3,300	5,900	750	2,100	63	1,100	960	270	< 1	7	< 3	37	< 0.6	1	3.5	4.3	18	4.0	380	< 1	4.1	52	< 3	20	12	160
PP-2b	3,500	4,400	15,000	1,000	2,300	64	680	1,500	< 30	16	160	< 3	140	< 0.6	19	5.4	4.6	310	3.9	8,900	< 1	11	2,000	< 3	41	20	2,900
PP-3a	2,700	4,100	7,500	980	2,000	80	1,600	1,200	230	2	36	< 3	60	< 0.6	3	5.5	3.2	53	4.1	1,200	2	3.8	350	< 3	27	17	500
PP-3b	2,200	3,400	6,600	930	1,800	59	1,300	990	210	3.8	31	< 3	57	< 0.6	4.0	3.9	2	48	3.8	1,700	1	3.4	400	< 3	18	13	700
PP-3r	3,000	3,100	11,000	1,100	2,000	64	920	1,100	94	8.9	110	< 3	85	< 0.6	8.8	4.5	3.6	160	4.1	5,200	2	6.8	1,200	< 3	23	15	1,800
PP-4a	1,900	3,600	7,100	760	1,500	85	1,400	970	190	2	37	< 3	58	< 0.6	3.0	4.8	3	37	3.1	1,400	< 1	3.1	250	< 3	17	14	610
PP-4b	1,800	3,300	5,600	670	1,200	110	1,300	980	170	1	19	< 3	53	< 0.6	2	3.6	2	20	3	1,000	< 1	2	110	< 3	15	12	420
PP-4r	2,700	3,400	7,300	1,100	2,000	68	1,100	1,100	280	3.0	33	< 3	79	< 0.6	4.2	5.0	2	55	5.0	2,000	< 1	4.3	340	< 3	23	13	880
PP-5r	2,200	3,800	6,800	910	1,600	73	1,400	880	240	1	20	< 3	63	< 0.6	2	3.5	3.6	23	4.2	900	< 1	5.2	140	< 3	15	14	450
PP-100	3,100	5,700	8,400	1,500	2,100	63	1,100	1,000	200	< 1	9	3.4	140	< 0.6	2	6.0	3.2	45	4.8	350	< 1	5.0	44	< 3	37	14	98
PP-200	2,500	11,000	6,200	960	4,200	100	1,600	980	230	< 1	22	< 3	62	< 0.6	1	3.8	3.0	19	4.6	960	< 1	3.9	110	< 3	21	12	430
PP-201	2,400	5,200	6,000	1,000	2,400	86	1,200	1,000	270	1	15	< 3	59	< 0.6	2	4.9	3	24	4.4	1,000	< 1	3.9	120	< 3	21	12	460
S-3r	2,100	2,500	8,000	720	1,400	87	800	1,000	66	2	150	< 3	55	< 0.6	7.6	5.4	3	73	2	960	< 1	6.1	500	< 3	24	10	630
S-4r	2,400	4,600	16,000	700	1,500	57	820	1,600	< 30	27	310	< 3	180	0.6	31	< 0.6	1	430	2	17,000	3	8.8	3,900	8.2	46	8.7	5,400
S-200	5,300	4,800	14,000	2,800	4,000	56	1,000	1,200	480	2	21	< 3	140	< 0.6	3.2	14	4.5	74	9.3	1,100	< 1	8.6	210	< 3	23	28	360
S-201	5,000	3,400	11,000	2,800	4,100	87	1,100	1,500	640	< 1	14	< 3	110	< 0.6	1	11	4.1	96	8.9	570	< 1	6.3	60	< 3	15	24	170
S-202	3,500	2,900	4,400	1,400	1,200	68	460	880	150	< 1	25	< 3	89	< 0.6	2	3.8	4.3	37	2	380	< 1	3.3	170	< 3	38	5.4	150
S-203	2,200	440	15,000	530	650	60	500	780	< 30	< 1	7	< 3	56	< 0.6	< 1	4.3	0.8	93	1	94	23	2	45	< 3	8.3	9.5	39
S-204	1,400	2,200	30,000	560	900	59	370	750	< 30	9.9	4,100	3.8	57	< 0.6	8.5	11	2	80	1	1,800	1	4.0	1,600	< 3	19	5.8	1,500
S-205	4,400	3,500	11,000	1,500	3,800	110	780	1,300	140	2	36	< 3	120	< 0.6	7.5	11	5.4	94	4.8	2,300	1	8.9	360	< 3	42	17	950
S-206	5,000	5,000	12,000	1,600	3,600	120	810	1,100	160	3.0	48	< 3	130	< 0.6	8.7	10	14	120	5.4	2,600	< 1	13	410	< 3	45	18	1,200
WS-8	2,400	4,000	5,800	1,000	2,000	110	1,400	1,000	310	< 1	27	< 3	50	0.7	1	4.7	2	9.8	4.8	200	< 1	3	24	< 3	25	12	200

BIOLOGICAL DATA FOR STREAMS IN THE UPPER PRICKLY PEAR CREEK WATERSHED, MONTANA, 2001

By Aïda M. Farag and David D. Harper

INTRODUCTION

This section presents biological data that were collected in the upper Prickly Pear watershed during August 2001. Data presented in this section include measurements of metal residues in biofilm (*aufwuchs*), benthic macroinvertebrates, and fish tissues, histological analysis, results from lipid peroxidation bio-assays, metallothionein tissue concentrations, and biomass estimates.

Site numbers for biological sampling were similar to the alpha-numeric system used for water quality and sediment sampling efforts. The alpha character denotes the first letter of the stream name and the numeric characters denote the downstream sequence, beginning at the most upstream site (fig.1). Because multiple biological samples were collected from identical sites, additional numeric designations refer to the individual samples.

BIOLOGICAL DATA

Biological samples were collected from 14 sites (fig.1). Biofilm was collected from 14 sites, benthic macroinvertebrates were collected from 6 sites, and fish tissues were collected from 5 sites. As, Cd, Cu, Pb, and Zn were measured in all samples and reported as µg/g dry weight (table 12). Metal residue data for aquatic vegetation, biofilm, benthic macroinvertebrates, individual fish tissues; results of histological analysis; lipid peroxidation data, metallothionein data, and trout population and biomass assessment data are also reported in table 12.

Methods

Sampling methods were similar to those described by Farag et al. (1998). Rocks along the shore were removed from the water and the rock surface was scraped gently with acid-washed plastic utensils. The biofilm was placed directly in acid-washed plastic vials. For benthic macroinvertebrates, an area of approximately 6 m^2 was overturned upstream of a 3-mm mesh net. Benthic macroinvertebrates were removed with plastic or stainless steel forceps and placed in acid-washed vials. The benthic macroinvertebrates were rinsed with stream water to remove debris, but they were not allowed time to depurate (purge the contents of the gut). Without depuration, the metal concentrations in the invertebrates represent the "dose" of metals received by fish. Fish were collected by electrofishing; fish were pithed and lengths and weights were recorded. Individual fish were placed in plastic bags for whole fish analyses of metals. Fillet, gills, livers, and pyloric caeca were removed from additional fish and each tissue type was placed in an acid-washed plastic vial. In the laboratory, the fillet, gills, livers, and pyloric caeca of approximately three fish from each sample site were combined for a composite sample of each tissue type. The chemical element content of all samples was measured by atomic absorption spectroscopy with a graphite furnace or flame source. The tissues were dried at 58^{o}C for 48 hours and digested with 30% nitric acid at 76 ^{o}C for 48 hours. Quality control was monitored for all chemical analyses. Instrument calibration was verified by analyzing certified calibration solutions during each instrumental run. These external

reference standards were generally within 80% to 120% of the nominal concentrations. All of the sample spikes for tissues were within 80% to 120% recovery, except when the tissues were heterogeneous (biofilm and pyloric caeca). Digestion blanks were analyzed to detect potential contamination during the digestion procedure. In all cases, the average concentration of the digestion blanks was less than 2 times the instrument detection limit; therefore, we did not adjust the tissue concentrations.

Histological samples were collected, preserved in Davidson's fixative, and transferred to alcohol. Tissues were dehydrated and embedded in paraffin, sectioned to 5 μm, stained with hemotoxylion & eosin and examined by light microscopy. Slides were examined with no knowledge of site or species. Cellular and tissue alterations were graded on a scale of 0-5; 0 = none, 1 = minimal, = 2 = mild, 3 = moderate, 4 = moderately severe, 5 = severe.

The products of lipid peroxidation were measured using a fluorometric assay to measure the relative intensity of fluorophores formed during lipid peroxidation (Dillard and Tappel 1984; Fletcher and others, 1973; Farag and others, 1995). Frozen tissue was combined with chloroform, methanol and water, homogenized, vortexed and centrifuged. After removing the chloroform layer, fluorescence was measured at a wavelength of 435 nm emission during excitation at 340 and 360 nm.

Metallothionein concentrations were determined using a double–antibody radioammunoassay developed for fish tissues (Hogstrand et. al. 1994). Trout population and biomass data were collected and analyzed using using the three pass removal method (Zippen 1958).

Table 12. Biological data for streams in the upper Prickly Pear Creek watershed, Montana, 2001. (Includes data for biofilm, benthic macroinvertebrates; individual fish tissues; results of histological analysis; lipid peroxidation data; metallothionein data and trout population and biomass data)

[All measurements are as µg/g dry weight. BIO= biofilm, FIL=filet, INV=benthic macroinvertebrates, CAECA=pyloric caeca, WF = Whole Fish, WSC= Westslope Cutthroat, GI=gastrointestinal, N/A= no data or not analyzed (in lipid peroxidation part of table), - =not computed (histological analysis). < = less than the value listed to right. Cellular and tissue alterations were graded on a scale of 0-5; 0 = none, 1 = minimal, 2 = mild, 3 = moderate, 4 = moderately severe, 5 = severe. Lipid peroxidation measured at wavelengths of 340 and 360 µm.]

Biofilm, and Benthic Macroinvertebrates

Site ID	Date	Sample ID	Type	µg As/g	µg Cd/g	µg Cu/g	µg Pb/g	µg Zn/g
PP-1	8/24/01	PP1-INV-1	INV	1.14	2.00	32.1	0.37	229
PP-1	8/24/01	PP1-INV-2	INV	1.63	2.55	28.1	1.46	254
PP-1	8/24/01	PP1-INV-3	INV	1.28	2.37	26.9	0.71	262
PP-1	8/24/01	PP1-INV-4	INV	1.31	2.36	27.6	1.680	259
PP-1	8/24/01	PP1-BIO-1	BIO	8.50	0.76	20.7	10.6	111
PP-1	8/24/01	PP1-BIO-2	BIO	7.08	0.48	19.1	9.78	96
PP-1	8/24/01	PP1-BIO-3	BIO	5.45	0.36	11.0	3.89	66
PP-1	8/24/01	PP1-BIO-4	BIO	8.32	0.86	20.8	6.01	111
PP-3	8/24/01	PP3-INV-1	INV	17.0	5.43	79.7	121	1,340
PP-3	8/24/01	PP3-INV-2	INV	6.92	2.62	52.7	67.9	785
PP-3	8/24/01	PP3-INV-3	INV	15.6	4.43	51.1	85.3	1050
PP-3	8/24/01	PP3-INV-4	INV	19.8	4.81	80.8	126	970
PP-3	8/24/01	PP3-BIO-1	BIO	257	274	1,030	1880	50,100
PP-3	8/24/01	PP3-BIO-2	BIO	275	477	1,754	1740	87,700
PP-3	8/24/01	PP3-BIO-3	BIO	267	478	1,584	1630	96,400
PP-3	8/24/01	PP3-BIO-4	BIO	316	489	1,610	2020	99,700
PP-4	8/27/01	PP4-BIO-1	BIO	64	20.3	126	640	4,400
PP-4	8/27/01	PP4-BIO-2	BIO	85.5	20.4	130	589	4,550
PP-4	8/27/01	PP4-BIO-3	BIO	64.77	20.1	134	652	4,600
PP-4	8/27/01	PP4-BIO-4	BIO	449	10.6	90.2	446	2,8002
PP-5	8/24/01	PP5-INV-1	INV	7.42	2.30	58.3	19.9	761
PP-5	8/24/01	PP5-INV-2	INV	10.6	2.30	47.2	36.8	762
PP-5	8/24/01	PP5-INV-3	INV	8.55	1.94	51.3	23.0	673
PP-5	8/24/01	PP5-INV-4	INV	9.22	2.42	58.3	32.1	792
PP-5	8/24/01	PP5-BIO-1	BIO	110	22.9	96.4	356	5,360
PP-5	8/24/01	PP5-BIO-2	BIO	66.8	10.3	88.6	359	2,310
PP-5	8/24/01	PP5-BIO-3	BIO	64.5	11.8	88.8	383	2,690
PP-5	8/24/01	PP5-BIO-4	BIO	60.4	7.80	75.7	352	1,820
C-5	8/27/01	C5-BIO-1	BIO	162	17.4	69.7	96.2	2,270
C-5	8/27/01	C5-BIO-2	BIO	134	11.3	55.1	138.6	1,420
C-5	8/27/01	C5-BIO-3	BIO	278	47.7	239	84.8	17,800
C-5	8/27/01	C5-BIO-4	BIO	158	15.6	63.1	44.3	6,070
L-1a	8/23/01	L1A-INV-1	INV	3.87	4.17	29.9	6.98	907
L-1a	8/23/01	L1A-INV-2	INV	9.73	7.40	33.5	9.81	1,140
L-1a	8/23/01	L1A-INV-3	INV	10.0	3.95	24.1	2.60	793
L-1a	8/23/01	L1A-INV-4	INV	7.22	4.26	27.1	5.57	1,040
L-1a	8/23/01	L1A-BIO-1	BIO	141	20.7	55.9	32.5	1,860
L-1a	8/23/01	L1A-BIO-2	BIO	28.0	1.27	17.7	21.5	184
L-1a	8/23/01	L1A-BIO-3	BIO	38.8	3.12	24.4	15.2	410
L-1a	8/23/01	L1A-BIO-4	BIO	26.4	1.63	23.5	27.9	234
L-3b	8/23/01	L3-B	BIO	1940	463	226	619	49,800
L-3b	8/23/01	L3-B	BIO	1490	586	245	547	61,600
L-3b	8/23/01	L3-B	BIO	1,110	1,018	330	371	87,200
L-3b	8/23/01	L3-B	BIO	1,460	870	355	732	79,300
L-5	8/27/01	L5-BIO-1	BIO	0.89	15.6	42.5	36.4	4,120
L-5	8/27/01	L5-BIO-2	BIO	4.40	4.9	19.4	10.8	1,800
L-5	8/27/01	L5-BIO-3	BIO	1.38	11.3	22.5	7.19	2,790
L-5	8/27/01	L5-BIO-4	BIO	4.31	13.1	35.8	31.1	3,550

Biofilm, and Benthic Macroinvertebrates (Continued)

Site ID	Date	Sample ID	Type	µg As/g	µg Cd/g	µg Cu/g	µg Pb/g	µg Zn/g
L-7	8/27/01	L7-BIO-1	BIO	8.52	0.62	78.8	11.4	123
L-7	8/27/01	L7-BIO-2	BIO	12.9	10.8	158.5	2.89	1,350
L-7	8/27/01	L7-BIO-3	BIO	9.90	0.59	69.1	4.71	104
L-7	8/27/01	L7-BIO-4	BIO	8.40	0.55	70.2	7.92	111
L-8	8/27/01	L8-BIO-1	BIO	19.3	3.01	19.7	15.3	969
L-8	8/27/01	L8-BIO-2	BIO	26.6	8.40	33.6	22.0	1,970
L-8	8/27/01	L8-BIO-3	BIO	21.5	5.62	29.5	18.0	1,670
L-8	8/27/01	L8-BIO-4	BIO	25.0	7.65	41.3	25.6	2,320
ULGP	8/26/01	ULG-BIO-1	BIO	19.3	8.71	19.1	38.0	2,030
ULGP	8/26/01	ULG-BIO-2	BIO	39.6	21.6	38.8	93.8	3,385
ULGP	8/26/01	ULG-BIO-3	BIO	17.0	7.67	19.0	36.1	1,680
ULGP	8/26/01	ULG-BIO-4	BIO	55.9	23.4	40.6	61.2	4,530
ULGP	8/26/01	ULG-INV-1	INV	6.83	4.17	29.9	6.98	907
ULGP	8/26/01	ULG-INV-2	INV	12.7	7.40	33.5	9.81	1140
ULGP	8/26/01	ULG-INV-3	INV	5.57	3.95	24.1	2.60	793
ULGP	8/26/01	ULG-INV-4	INV	8.02	4.26	27.2	5.57	1040
WS-7	8/27/01	WS7-BIO-1	BIO	64.0	6.46	13.8	8.22	1,210
WS-7	8/27/01	WS7-BIO-2	BIO	85.5	7.06	18.2	13.1	1,300
WS-7	8/27/01	WS7-BIO-3	BIO	64.7	1.29	12.4	25.2	366
WS-7	8/27/01	WS7-BIO-4	BIO	449	4.38	30.1	60.0	1,130
WS-2	8/27/01	WS2-BIO-1	BIO	1,130	126	186	666	13,500
WS-2	8/27/01	WS2-BIO-2	BIO	1,180	101	88.4	176	14,600
WS-2	8/27/01	WS2-BIO-3	BIO	564	67.7	133	96.1	4,750
WS-2	8/27/01	WS2-BIO-4	BIO	1,260	25.7	93.8	203	4,620
WS-3	8/27/01	WS3-INV-1	INV	46.0	5.95	48.2	17.8	788
WS-3	8/27/01	WS3-INV-2	INV	29.7	4.95	43.3	16.2	1,130
WS-3	8/27/01	WS3-INV-3	INV	34.5	4.41	42.9	13.0	842
WS-3	8/27/01	WS3-INV-4	INV	30.9	3.53	37.3	12.7	766
WS-3	8/27/01	WS3-BIO-1	BIO	1,440	13.6	106	660	6,640
WS-3	8/27/01	WS3-BIO-2	BIO	1,300	18.7	87.5	553	5,800
WS-3	8/27/01	WS3-BIO-3	BIO	927	27.2	71.5	396	5,590
WS-3	8/27/01	WS3-BIO-4	BIO	248	58.6	102	106	3,870

Individual fish tissues

Site ID	Date	Species	Sex	L(mm)	wt(gm)	Type	Sample Id	µg As/g	µg Cd/g	µg Cu/g	µg Pb/g	µg Zn/g
PP-1	8/29/01	BROOK	F	185	82	LIVER	MT-PP1-LIV1	0.24	2.95	58.1	<1.9	110.0
PP-1	8/29/01	BROOK	M	222	130	LIVER						
PP-1	8/29/01	BROOK	F	200	82	LIVER	MT-PP1-LIV2	0.19	2.31	27.6	<2.0	128
PP-1	8/29/01	BROOK	M	180	63	LIVER						
PP-1	8/29/01	BROOK	F	190	70	LIVER	MT-PP1-LIV3	0.22	2.21	24.6	<1.9	115
PP-1	8/29/01	BROOK	M	188	86	LIVER						
PP-1	8/29/01	BROOK	M	168	60	LIVER						
PP-1	8/29/01	BROOK	F	206	93	LIVER	MT-PP1-LIV4	0.20	2.45	32.9	<1.9	98.8
PP-1	8/29/01	BROOK	M	174	51	LIVER						
PP-1	8/29/01	BROOK	M	194	84	LIVER	MT-PP1-LIV5	0.34	1.52	38.1	<1.9	102
PP-1	8/29/01	BROOK	F	199	77	LIVER						
PP-1	8/29/01	BROOK	F	176	60	LIVER	MT-PP1-LIV6	0.37	1.88	21.0	<1.9	90.9
PP-1	8/29/01	BROOK	-	205	95	LIVER						
PP-1	8/29/01	BROOK	M	200	103	LIVER	MT-PP1-LIV7	0.19	4.88	66.6	<1.9	124
PP-1	8/29/01	BROOK	M	210	121	LIVER						
PP-1	8/29/01	BROOK	F	185	82	GILL	MT-PP1-GIL1	0.25	1.57	2.56	0.87	108
PP-1	8/29/01	BROOK	M	222	130	GILL						
PP-1	8/29/01	BROOK	F	200	82	GILL	MT-PP1-GIL2	0.15	1.86	3.18	<0.79	111
PP-1	8/29/01	BROOK	M	180	63	GILL						
PP-1	8/29/01	BROOK	F	190	70	GILL						
PP-1	8/29/01	BROOK	M	188	86	GILL	MT-PP1-GIL3	0.20	1.54	2.48	1.20	106
PP-1	8/29/01	BROOK	M	168	60	GILL						
PP-1	8/29/01	BROOK	F	206	93	GILL	MT-PP1-GIL4	0.16	1.43	3.37	<0.80	111
PP-1	8/29/01	BROOK	M	174	51	GILL						
PP-1	8/29/01	BROOK	M	194	84	GILL	MT-PP1-GIL5	0.40	1.14	3.10	<0.82	103
PP-1	8/29/01	BROOK	F	199	77	GILL						
PP-1	8/29/01	BROOK	F	176	60	GILL	MT-PP1-GIL6	0.34	1.22	2.52	<0.82	98.9
PP-1	8/29/01	BROOK	-	205	95	GILL						
PP-1	8/29/01	BROOK	M	200	103	GILL	MT-PP1-GIL7	0.21	1.59	3.02	<0.78	118
PP-1	8/29/01	BROOK	M	210	121	GILL						
PP-1	8/29/01	BROOK	F	185	82	CAECA	MT-PP1-PYC1	0.90	0.72	1.84	<1.16	134
PP-1	8/29/01	BROOK	M	222	130	CAECA						
PP-1	8/29/01	BROOK	F	200	82	CAECA	MT-PP1-PYC2	0.39	1.00	3.76	<1.39	293
PP-1	8/29/01	BROOK	M	180	63	CAECA						

Individual fish tissues (Continued)

Site ID	Date	Species	Sex	L(mm)	wt(gm)	Type	Sample Id	µg As/g	µg Cd/g	µg Cu/g	µg Pb/g	µg Zn/g
PP-1	8/29/01	BROOK	F	190	70	CAECA	MT-PP1-PYC3	0.38	0.78	2.35	<1.26	189
PP-1	8/29/01	BROOK	M	188	86	CAECA						
PP-1	8/29/01	BROOK	M	168	60	CAECA						
PP-1	8/29/01	BROOK	F	206	93	CAECA	MT-PP1-PYC4	0.39	0.97	4.02	<1.24	204
PP-1	8/29/01	BROOK	M	174	51	CAECA						
PP-1	8/29/01	BROOK	M	194	84	CAECA	MT-PP1-PYC5	0.61	1.71	5.30	<1.24	341
PP-1	8/29/01	BROOK	F	199	77	CAECA						
PP-1	8/29/01	BROOK	F	176	60	CAECA	MT-PP1-PYC6	0.72	1.98	5.23	<1,24	256
PP-1	8/29/01	BROOK	-	205	95	CAECA						
PP-1	8/29/01	BROOK	M	200	103	CAECA	MT-PP1-PYC7	0.26	0.65	2.11	<1.17	181.7
PP-1	8/29/01	BROOK	M	210	121	CAECA						
PP-1	8/29/01	BROOK	F	185	82	FILLET	MT-PP1-FIL1	1.65	<0.27	<2.10	<1.10	14.4
PP-1	8/29/01	BROOK	M	222	130	FILLET						
PP-1	8/29/01	BROOK	F	200	82	FILLET	MT-PP1-FIL2	2.13	<0.28	<2.14	<1.13	18.6
PP-1	8/29/01	BROOK	M	180	63	FILLET						
PP-1	8/29/01	BROOK	F	190	70	FILLET	MT-PP1-FIL3	2.55	<0.28	<2.16	<1.14	19.2
PP-1	8/29/01	BROOK	M	188	86	FILLET						
PP-1	8/29/01	BROOK	M	168	60	FILLET						
PP-1	8/29/01	BROOK	F	206	93	FILLET	MT-PP1-FIL4	2.01	<0.28	<2.11	<1.11	19.3
PP-1	8/29/01	BROOK	M	174	51	FILLET						
PP-1	8/29/01	BROOK	M	194	84	FILLET	MT-PP1-FIL5	3.07	<0.28	<2.12	<1.12	20.1
PP-1	8/29/01	BROOK	F	199	77	FILLET						
PP-1	8/29/01	BROOK	F	176	60	FILLET	MT-PP1-FIL6	3.07	<0.28	<2.135	<1.12	18.9
PP-1	8/29/01	BROOK	-	205	95	FILLET						
PP-1	8/29/01	BROOK	M	200	103	FILLET	MT-PP1-FIL7	2.04	<0.28	<2.09	<1.10	17.8
PP-1	8/29/01	BROOK	M	210	121	FILLET						
PP-1	8/29/01	BROOK	F	185	82	WL. FISH	MT-PP1-WF1	0.63	0.27	2.52	<0.58	100
PP-1	8/29/01	BROOK	F	200	82	WL. FISH	MT-PP1-WF2	0.72	0.23	2.57	<0.59	104
PP-1	8/29/01	BROOK	F	190	70	WL. FISH	MT-PP1-WF3	1.09	0.34	3.27	<0.59	116
PP-1	8/29/01	BROOK	M	168	60	WL. FISH	MT-PP1-WF4	1.33	0.35	3.01	<0.60	134
PP-1	8/29/01	BROOK	M	194	84	WL. FISH	MT-PP1-WF5	1.81	0.23	2.56	<0.59	107.2
PP-3	8/28/01	BROOK	F	164	43	LIVER						
PP-3	8/28/01	BROOK	M	167	39	LIVER	MT-PP3-LIV1	0.34	4.33	182	2.50	207
PP-3	8/28/01	BROOK	M	134	20	LIVER						
PP-3	8/28/01	BROOK	M	167	43	LIVER						
PP-3	8/28/01	BROOK	M	151	32	LIVER	MT-PP3-LIV2	0.20	4.29	213	2.24	222

Individual fish tissues (Continued)

Site ID	Date	Species	Sex	L(mm)	wt(gm)	Type	Sample Id	µg As/g	µg Cd/g	µg Cu/g	µg Pb/g	µg Zn/g
PP-3	8/28/01	BROOK	F	139	28	LIVER						
PP-3	8/28/01	BROOK	F	140	22	LIVER						
PP-3	8/28/01	BROOK	M	163	39	LIVER	MT-PP3-LIV3	0.45	7.04	345	4.26	307
PP-3	8/28/01	BROOK	M	169	46	LIVER						
PP-3	8/28/01	BROOK	M	190	76	LIVER	MT-PP3-LIV4	0.24	7.18	252	5.34	231
PP-3	8/28/01	BROOK	M	150	32	LIVER						
PP-3	8/28/01	BROOK	F	153	43	LIVER						
PP-3	8/28/01	BROOK	F	147	28	LIVER	MT-PP3-LIV5	0.32	6.12	199	3.24	200
PP-3	8/28/01	BROOK	M	151	29	LIVER						
PP-3	8/28/01	BROOK	F	243	140	LIVER	MT-PP3-LIV6	0.55	17.11	269	9.02	286
PP-3	8/28/01	RAINBOW	F	247	140	LIVER	MT-PP3-LIV7	0.64	16.82	885	<1.95	229
PP-3	8/28/01	RAINBOW	M	268	194	LIVER	MT-PP3-LIV8	1.94	7.50	165	<2.2	139
PP-3	8/28/01	RAINBOW	M	265	176	LIVER	MT-PP3-LIV9	0.50	22.6	670	<1.97	173
PP-3	8/28/01	RAINBOW	F	302	222	LIVER	MT-PP3-LIV10	0.37	49.4	608	2.54	307
PP-3	8/28/01	RAINBOW	F	302	258	LIVER	MT-PP3-LIV11	1.19	8.86	942	2.44	180
PP-3	8/28/01	BROOK	F	164	43	GILL						
PP-3	8/28/01	BROOK	M	167	39	GILL	MT-PP3-GIL1	0.47	19.4	3.97	4.02	229
PP-3	8/28/01	BROOK	M	134	20	GILL						
PP-3	8/28/01	BROOK	M	167	43	GILL						
PP-3	8/28/01	BROOK	M	151	32	GILL	MT-PP3-GIL2	0.48	19.3	3.77	6.23	314
PP-3	8/28/01	BROOK	F	139	28	GILL						
PP-3	8/28/01	BROOK	F	140	22	GILL						
PP-3	8/28/01	BROOK	M	163	39	GILL	MT-PP3-GIL3	0.35	21.1	4.14	5.01	295
PP-3	8/28/01	BROOK	M	169	46	GILL						
PP-3	8/28/01	BROOK	M	190	76	GILL	MT-PP3-GIL4	0.34	13.9	3.93	8.59	316
PP-3	8/28/01	BROOK	M	150	32	GILL						
PP-3	8/28/01	BROOK	F	153	43	GILL						
PP-3	8/28/01	BROOK	F	147	28	GILL	MT-PP3-GIL5	0.20	19.9	5.79	2.74	227
PP-3	8/28/01	BROOK	M	151	29	GILL						
PP-3	8/28/01	BROOK	F	243	140	GILL	MT-PP3-GIL6	0.67	5.71	5.14	17.5	257
PP-3	8/28/01	RAINBOW	F	247	140	GILL	MT-PP3-GIL7	0.18	16.5	3.10	3.48	8,580
PP-3	8/28/01	RAINBOW	M	268	194	GILL	MT-PP3-GIL8	0.15	7.95	2.72	6.82	2,290
PP-3	8/28/01	RAINBOW	M	265	176	GILL	MT-PP3-GIL9	0.21	26.7	3.21	6.65	2,720
PP-3	8/28/01	RAINBOW	F	302	222	GILL	MT-PP3-GIL10	0.14	11.9	2.94	11.6	6,800
PP-3	8/28/01	RAINBOW	F	302	258	GILL	MT-PP3-GIL11	0.31	8.54	3.88	5.79	1,580
PP-3	8/28/01	BROOK	F	164	43	CAECA						

Individual fish tissues (Continued)

Site ID	Date	Species	Sex	L(mm)	wt(gm)	Type	Sample Id	µg As/g	µg Cd/g	µg Cu/g	µg Pb/g	µg Zn/g
PP-3	8/28/01	BROOK	M	167	39	CAECA	MT-PP3-PYC1	1.20	3.72	7.89	10.47	307
PP-3	8/28/01	BROOK	M	134	20	CAECA						
PP-3	8/28/01	BROOK	M	167	43	CAECA						
PP-3	8/28/01	BROOK	M	151	32	CAECA	MT-PP3-PYC2	1.33	3.87	11.3	12.0	219
PP-3	8/28/01	BROOK	F	139	28	CAECA						
PP-3	8/28/01	BROOK	F	140	22	CAECA						
PP-3	8/28/01	BROOK	M	163	39	CAECA	MT-PP3-PYC3	2.13	8.13	16.54	21.7	490
PP-3	8/28/01	BROOK	M	169	46	CAECA						
PP-3	8/28/01	BROOK	M	190	76	CAECA	MT-PP3-PYC4	1.80	7.10	18.3	27.8	543
PP-3	8/28/01	BROOK	M	150	32	CAECA						
PP-3	8/28/01	BROOK	F	153	43	CAECA						
PP-3	8/28/01	BROOK	F	147	28	CAECA	MT-PP3-PYC5	1.19	3.90	9.66	6.89	288
PP-3	8/28/01	BROOK	M	151	29	CAECA						
PP-3	8/28/01	BROOK	F	243	140	CAECA	MT-PP3-PYC6	1.59	17.5	11.6	37.6	434
PP-3	8/28/01	RAINBOW	F	247	140	CAECA	MT-PP3-PYC7	0.62	4.07	5.90	3.61	881
PP-3	8/28/01	RAINBOW	M	268	194	CAECA	MT-PP3-PYC8	0.82	11.06	15.7	5.84	829
PP-3	8/28/01	RAINBOW	M	265	176	CAECA	MT-PP3-PYC9	4.58	5.29	17.1	15.6	1,170
PP-3	8/28/01	RAINBOW	F	302	222	CAECA	MT-PP3-PYC10	1.08	5.59	26.2	6.86	1,650
PP-3	8/28/01	RAINBOW	F	302	258	CAECA	MT-PP3-PYC11	1.18	3.42	6.77	7.59	500
PP-3	8/28/01	BROOK	F	164	43	FILLET						
PP-3	8/28/01	BROOK	M	167	39	FILLET	MT-PP3-FIL1	0.46	<0.28	<2.20	<1.12	34.1
PP-3	8/28/01	BROOK	M	134	20	FILLET						
PP-3	8/28/01	BROOK	M	167	43	FILLET						
PP-3	8/28/01	BROOK	M	151	32	FILLET	MT-PP3-FIL2	0.46	<0.29	<2.23	<1.17	32.3
PP-3	8/28/01	BROOK	F	139	28	FILLET						
PP-3	8/28/01	BROOK	F	140	22	FILLET						
PP-3	8/28/01	BROOK	M	163	39	FILLET	MT-PP3-FIL3	0.59	<0.28	<2.16	<1.14	38.3
PP-3	8/28/01	BROOK	M	169	46	FILLET						
PP-3	8/28/01	BROOK	M	190	76	FILLET	MT-PP3-FIL4	0.40	<0.27	<2.09	<1.10	41.0
PP-3	8/28/01	BROOK	M	150	32	FILLET						
PP-3	8/28/01	BROOK	F	153	43	FILLET						
PP-3	8/28/01	BROOK	F	147	28	FILLET	MT-PP3-FIL5	0.38	<0.28	<2.18	<1.15	35.1
PP-3	8/28/01	BROOK	M	151	29	FILLET						
PP-3	8/28/01	BROOK	F	243	140	FILLET	MT-PP3-FIL6	0.69	<0.28	<2.15	<1.13	54.8
PP-3	8/28/01	RAINBOW	F	247	140	FILLET	MT-PP3-FIL7	0.20	<0.28	<2.14	<1.12	24.9

Individual fish tissues (Continued)

Site ID	Date	Species	Sex	L(mm)	wt(gm)	Type	Sample Id	µg As/g	µg Cd/g	µg Cu/g	µg Pb/g	µg Zn/g
PP-3	8/28/01	RAINBOW	M	268	194	FILLET	MT-PP3-FIL8	0.25	<0.28	<2.15	<1.13	29.0
PP-3	8/28/01	RAINBOW	M	265	176	FILLET	MT-PP3-FIL9	0.29	<0.29	<2.10	<1.11	32.9
PP-3	8/28/01	RAINBOW	F	302	222	FILLET	MT-PP3-FIL10	0.12	<0.28	<2.18	<1.15	32.1
PP-3	8/28/01	RAINBOW	F	302	258	FILLET	MT-PP3-FIL11	0.56	<0.28	<2.13	<1.12	17.6
PP-3	8/28/01	BROOK	-	92	8	WL. FISH	MT-PP3-WF1	1.01	0.57	5.30	5.90	370
PP-3	8/28/01	BROOK	-	92	7	WL. FISH	MT-PP3-WF2	0.39	0.48	4.24	1.18	271
PP-3	8/28/01	BROOK	-	90	6	WL. FISH	MT-PP3-WF3	0.77	0.89	8.32	3.59	446
PP-3	8/28/01	BROOK	-	95	9	WL. FISH	MT-PP3-WF4	0.81	0.82	6.28	2.50	381
PP-3	8/28/01	BROOK	-	94	8	WL. FISH	MT-PP3-WF5	0.66	0.49	5.75	1.67	239
PP-3	8/28/01	RAINBOW	-	139	24	WL. FISH	MT-PP3-WF6	0.35	0.31	4.61	2.23	427
PP-3	8/28/01	RAINBOW	-	125	17	WL. FISH	MT-PP3-WF7	1.49	0.87	6.18	10.9	435
PP-3	8/28/01	RAINBOW	-	165	41	WL. FISH	MT-PP3-WF8	0.68	0.68	6.91	3.68	308
PP-3	8/28/01	RAINBOW	-	133	22	WL. FISH	MT-PP3-WF9	0.64	0.52	4.37	2.01	275
PP-3	8/28/01	RAINBOW	-	213	96	WL. FISH	MT-PP3-WF10	2.70	0.85	9.32	17.0	318
PP-5	8/28/01	RAINBOW	M	153	37	LIVER						
PP-5	8/28/01	RAINBOW	M	167	42	LIVER	MT-PP5-LIV1	2.51	2.40	291	13.9	190
PP-5	8/28/01	RAINBOW	M	154	36	LIVER						
PP-5	8/28/01	RAINBOW	F	155	34	LIVER	MT-PP5-LIV2	0.95	4.20	548	<1.90	205
PP-5	8/28/01	RAINBOW	M	220	106	LIVER						
PP-5	8/28/01	RAINBOW	M	222	99	LIVER	MT-PP5-LIV3	2.44	2.47	206	3.37	162
PP-5	8/28/01	RAINBOW	F	161	43	LIVER						
PP-5	8/28/01	RAINBOW	M	195	76	LIVER	MT-PP5-LIV4	2.22	3.01	454	3.89	198
PP-5	8/28/01	RAINBOW	F	167	46	LIVER						
PP-5	8/28/01	RAINBOW	M	185	64	LIVER	MT-PP5-LIV5	2.89	3.08	176	<2.84	216
PP-5	8/28/01	RAINBOW	F	174	49	LIVER						
PP-5	8/28/01	RAINBOW	M	173	50	LIVER	MT-PP5-LIV6	1.87	2.83	211	4.76	159
PP-5	8/28/01	RAINBOW	M	154	60	LIVER						
PP-5	8/28/01	RAINBOW	M	182	60	LIVER	MT-PP5-LIV7	3.77	2.811	466	<2.79	165
PP-5	8/28/01	RAINBOW	F	168	46	LIVER						
PP-5	8/28/01	RAINBOW	M	153	37	GILL						
PP-5	8/28/01	RAINBOW	M	167	42	GILL	MT-PP5-GIL1	0.50	5.69	3.77	3.86	665
PP-5	8/28/01	RAINBOW	M	154	36	GILL						
PP-5	8/28/01	RAINBOW	F	155	34	GILL	MT-PP5-GIL2	0.41	3.74	4.85	3.68	1380
PP-5	8/28/01	RAINBOW	M	220	106	GILL						
PP-5	8/28/01	RAINBOW	M	222	99	GILL	MT-PP5-GIL3	0.37	6.44	4.17	9.75	1140

Individual fish tissues (Continued)

Site ID	Date	Species	Sex	L(mm)	wt(gm)	Type	Sample Id	µg As/g	µg Cd/g	µg Cu/g	µg Pb/g	µg Zn/g
PP-5	8/28/01	RAINBOW	F	161	43	GILL						
PP-5	8/28/01	RAINBOW	M	195	76	GILL	MT-PP5-GIL4	0.59	5.36	3.28	<2.68	1184
PP-5	8/28/01	RAINBOW	F	167	46	GILL						
PP-5	8/28/01	RAINBOW	M	185	64	GILL	MT-PP5-GIL5	0.39	4.73	5.22	5.00	837
PP-5	8/28/01	RAINBOW	F	174	49	GILL						
PP-5	8/28/01	RAINBOW	M	173	50	GILL	MT-PP5-GIL6	0.47	7.25	3.08	4.23	829
PP-5	8/28/01	RAINBOW	M	154	60	GILL						
PP-5	8/28/01	RAINBOW	M	182	60	GILL	MT-PP5-LIV7	0.55	8.44	3.25	6.18	237
PP-5	8/28/01	RAINBOW	F	168	46	GILL						
PP-5	8/28/01	RAINBOW	M	153	37	CAECA						
PP-5	8/28/01	RAINBOW	M	167	42	CAECA	MT-PP5-PYC1	3.19	2.29	11.5	8.64	536
PP-5	8/28/01	RAINBOW	M	154	36	CAECA						
PP-5	8/28/01	RAINBOW	F	155	34	CAECA	MT-PP5-PYC2	2.48	2.13	8.73	4.64	571
PP-5	8/28/01	RAINBOW	M	220	106	CAECA						
PP-5	8/28/01	RAINBOW	M	222	99	CAECA	MT-PP5-PYC3	3.29	2.00	9.37	12.6	827
PP-5	8/28/01	RAINBOW	F	161	43	CAECA						
PP-5	8/28/01	RAINBOW	M	195	76	CAECA	MT-PP5-PYC4	3.95	2.11	9.44	12.4	734
PP-5	8/28/01	RAINBOW	F	167	46	CAECA						
PP-5	8/28/01	RAINBOW	M	185	64	CAECA	MT-PP5-PYC5	4.98	2.68	9.67	8.45	856
PP-5	8/28/01	RAINBOW	F	174	49	CAECA						
PP-5	8/28/01	RAINBOW	M	173	50	CAECA	MT-PP5-PYC6	3.49	3.94	10.42	4.80	580
PP-5	8/28/01	RAINBOW	M	154	60	CAECA						
PP-5	8/28/01	RAINBOW	M	182	60	CAECA	MT-PP5-PYC7	3.97	2.99	17.29	7.31	943
PP-5	8/28/01	RAINBOW	F	168	46	CAECA						
PP-5	8/28/01	RAINBOW	M	153	37	FILLET						
PP-5	8/28/01	RAINBOW	M	167	42	FILLET	MT-PP5-FIL1	0.36	<0.28	<2.15	2.30	38.1
PP-5	8/28/01	RAINBOW	M	154	36	FILLET						
PP-5	8/28/01	RAINBOW	F	155	34	FILLET	MT-PP5-FIL2	0.38	<0.28	<2.11	<1.11	36.6
PP-5	8/28/01	RAINBOW	M	220	106	FILLET						
PP-5	8/28/01	RAINBOW	M	222	99	FILLET	MT-PP5-FIL3	0.41	<0.28	<2.18	<1.15	35.4
PP-5	8/28/01	RAINBOW	F	161	43	FILLET						
PP-5	8/28/01	RAINBOW	M	195	76	FILLET	MT-PP5-FIL4	0.33	1.62	<2.20	<1.16	36.8
PP-5	8/28/01	RAINBOW	F	167	46	FILLET						
PP-5	8/28/01	RAINBOW	M	185	64	FILLET	MT-PP5-FIL5	0.47	<0.28	<2.14	<1.12	44.0
PP-5	8/28/01	RAINBOW	F	174	49	FILLET						
PP-5	8/28/01	RAINBOW	M	173	50	FILLET	MT-PP5-FIL6	1.51	0.61	4.21	3.11	294

Individual fish tissues (Continued)

Site ID	Date	Species	Sex	L(mm)	wt(gm)	Type	Sample Id	µg As/g	µg Cd/g	µg Cu/g	µg Pb/g	µg Zn/g
PP-5	8/28/01	RAINBOW	M	154	60	FILLET						
PP-5	8/28/01	RAINBOW	M	182	60	FILLET	MT-PP5-FIL7	0.45	<0.28	<2.17	<1.14	58.1
PP-5	8/28/01	RAINBOW	F	168	46	FILLET						
PP-5	8/28/01	RAINBOW	-	153	37	WL. FISH	MT-PP5-WF1	1.16	2.66	4.33	1.59	632
PP-5	8/28/01	RAINBOW	-	167	42	WL. FISH	MT-PP5-WF2	1.77	2.68	7.40	7.77	742
PP-5	8/28/01	RAINBOW	-	154	36	WL. FISH	MT-PP5-WF3	1.51	1.71	4.04	1.50	537
PP-5	8/28/01	RAINBOW	-	155	34	WL. FISH	MT-PP5-WF4	0.71	1.61	7.72	4.07	629
PP-5	8/28/01	RAINBOW	-	220	106	WL. FISH	MT-PP5-WF5	0.86	1.50	5.63	1.27	333
ULGP	8/29/01	WSC	M	420	747	LIVER	MT-ULG-LIV1	3.22	9.91	339	<1.90	157
ULGP	8/29/01	WSC	M	302	248	LIVER	MT-ULG-LIV2	3.64	5.59	35.4	<1.93	139
ULGP	8/29/01	WSC	M	312	270	LIVER	MT-ULG-LIV3	3.60	3.91	173	<1.90	254
ULGP	8/29/01	WSC	M	294	253	LIVER	MT-ULG-LIV4	3.53	3.76	242	<1.92	136
ULGP	8/29/01	WSC	M	263	174	LIVER	MT-ULG-LIV5	3.26	2.44	220	<1.93	187
ULGP	8/29/01	WSC	M	260	177	LIVER	MT-ULG-LIV6	3.22	1.50	91.4	<1.90	138
ULGP	8/29/01	WSC	M	420	747	GILL	MT-ULG-GILL1	0.29	30.7	3.11	<2.18	949
ULGP	8/29/01	WSC	M	302	248	GILL	MT-ULG-GILL2	0.41	16.4	3.51	<2.04	828
ULGP	8/29/01	WSC	M	312	270	GILL	MT-ULG-GILL3	0.25	31.2	3.25	<1.96	717
ULGP	8/29/01	WSC	M	294	253	GILL	MT-ULG-GILL4	0.81	27.4	3.22	<2.71	470
ULGP	8/29/01	WSC	M	263	174	GILL	MT-ULG-GILL5	0.68	39.3	3.99	<2.03	494
ULGP	8/29/01	WSC	M	260	177	GILL	MT-ULG-GILL6	0.39	27.2	4.07	<2.46	751
ULGP	8/29/01	WSC	M	420	747	CAECA	MT-ULG-PYC1	2.61	0.56	0.91	0.78	221
ULGP	8/29/01	WSC	M	302	248	CAECA	MT-ULG-PYC2	3.49	0.55	1.01	<1.23	239
ULGP	8/29/01	WSC	M	312	270	CAECA	MT-ULG-PYC3	4.64	1.26	7.07	<1.25	937
ULGP	8/29/01	WSC	M	294	253	CAECA	MT-ULG-PYC4	4.10	0.91	7.31	<1.23	608
ULGP	8/29/01	WSC	M	263	174	CAECA	MT-ULG-PYC5	3.71	1.27	4.89	<1.30	443
ULGP	8/29/01	WSC	M	260	177	CAECA	MT-ULG-PYC6	6.53	0.79	4.64	<1.25	649
ULGP	8/29/01	WSC	M	420	747	FILLET	MT-ULG-FIL1	0.22	<0.28	<2.13	<1.12	23.4
ULGP	8/29/01	WSC	M	302	248	FILLET	MT-ULG-FIL2	0.49	<0.28	2.28	<1.13	39.6
ULGP	8/29/01	WSC	M	312	270	FILLET	MT-ULG-FIL3	0.25	<0.28	<2.13	<1.12	24.7
ULGP	8/29/01	WSC	M	294	253	FILLET	MT-ULG-FIL4	0.17	<0.28	<2.16	<1.14	28.3
ULGP	8/29/01	WSC	M	263	174	FILLET	MT-ULG-FIL5	0.38	<0.28	<2.11	<1.11	26.7
ULGP	8/29/01	WSC	M	260	177	FILLET	MT-ULG-FIL6	0.26	<0.28	<2.11	<1.11	27.2
ULGP	8/29/01	WSC	-	186	58	WL. FISH	MT-ULG-WF 1	1.03	0.98	4.07	<0.59	298
ULGP	8/29/01	WSC	-	313	277	WL. FISH	MT-ULG-WF 2	0.49	0.84	3.26	<0.59	200

Individual fish tissues (Continued)

Site ID	Date	Species	Sex	L(mm)	wt(gm)	Type	Sample Id	µg As/g	µg Cd/g	µg Cu/g	µg Pb/g	µg Zn/g
ULGP	8/29/01	WSC	-	370	422	WL. FISH	MT-ULG-WF 3	0.22	1.03	10.7	<0.59	248
WS-3	8/27/01	BROOK	M	127	23	LIVER						
WS-3	8/27/01	BROOK	-	93	10	LIVER						
WS-3	8/27/01	BROOK	F	111	12	LIVER	MT-WS3-LIV1	2.31	13.58	169	<2.87	246
WS-3	8/27/01	BROOK	F	114	15	LIVER						
WS-3	8/27/01	BROOK	-	100	9	LIVER						
WS-3	8/27/01	BROOK	F	114	17	LIVER						
WS-3	8/27/01	BROOK	F	142	28	LIVER						
WS-3	8/27/01	BROOK	M	115	14	LIVER						
WS-3	8/27/01	BROOK	-	97	8	LIVER	MT-WS3-LIV2	2.67	8.46	137	<2.25	231
WS-3	8/27/01	BROOK	M	110	14	LIVER						
WS-3	8/27/01	BROOK	M	112	13	LIVER						
WS-3	8/27/01	BROOK	-	105	9	LIVER						
WS-3	8/27/01	BROOK	M	120	19	LIVER						
WS-3	8/27/01	BROOK	M	132	26	LIVER						
WS-3	8/27/01	BROOK	F	100	9	LIVER	MT-WS3-LIV3	5.14	9.58	149	5.10	218
WS-3	8/27/01	BROOK	-	105	9	LIVER						
WS-3	8/27/01	BROOK	M	102	10	LIVER						
WS-3	8/27/01	BROOK	-	108	12	LIVER						
WS-3	8/27/01	BROOK	-	111	13	LIVER						
WS-3	8/27/01	BROOK	M	125	20	LIVER						
WS-3	8/27/01	BROOK	M	112	12	LIVER	MT-WS3-LIV4	3.62	9.79	190	5.66	274
WS-3	8/27/01	BROOK	-	109	10	LIVER						
WS-3	8/27/01	BROOK	M	110	13	LIVER						
WS-3	8/27/01	BROOK	-	98	9	LIVER						
WS-3	8/27/01	BROOK	-	105	9	LIVER						
WS-3	8/27/01	BROOK	M	127	23	GILL						
WS-3	8/27/01	BROOK	-	93	10	GILL						
WS-3	8/27/01	BROOK	F	111	12	GILL	MT-WS3-GIL1	2.31	29.8	4.36	<3.92	382
WS-3	8/27/01	BROOK	F	114	15	GILL						
WS-3	8/27/01	BROOK	-	100	9	GILL						
WS-3	8/27/01	BROOK	F	114	17	GILL						
WS-3	8/27/01	BROOK	F	142	28	GILL						
WS-3	8/27/01	BROOK	M	115	14	GILL						
WS-3	8/27/01	BROOK	-	97	8	GILL	MT-WS3-GIL2	6.70	28.6	4.37	<2.82	344
WS-3	8/27/01	BROOK	M	110	14	GILL						
WS-3	8/27/01	BROOK	M	112	13	GILL						
WS-3	8/27/01	BROOK	-	105	9	GILL						

Individual fish tissues (Continued)

Site ID	Date	Species	Sex	L(mm)	wt(gm)	Type	Sample Id	µg As/g	µg Cd/g	µg Cu/g	µg Pb/g	µg Zn/g
WS-3	8/27/01	BROOK	M	120	19	GILL						
WS-3	8/27/01	BROOK	M	132	26	GILL						
WS-3	8/27/01	BROOK	F	100	9	GILL	MT-WS3-GIL3	4.06	27.0	4.77	<2.84	290.2
WS-3	8/27/01	BROOK	-	105	9	GILL						
WS-3	8/27/01	BROOK	M	102	10	GILL						
WS-3	8/27/01	BROOK	-	108	12	GILL						
WS-3	8/27/01	BROOK	-	111	13	GILL						
WS-3	8/27/01	BROOK	M	125	20	GILL						
WS-3	8/27/01	BROOK	M	112	12	GILL	MT-WS3-GIL4	3.61	24.2	4.35	<2.71	297
WS-3	8/27/01	BROOK	-	109	10	GILL						
WS-3	8/27/01	BROOK	M	110	13	GILL						
WS-3	8/27/01	BROOK	-	105	9	GILL						
WS-3	8/27/01	BROOK	-	98	9	GILL						
WS-3	8/27/01	BROOK	M	127	23	CAECA						
WS-3	8/27/01	BROOK	-	93	10	CAECA						
WS-3	8/27/01	BROOK	F	111	12	CAECA	MT-WS3-PYC1	31.1	6.20	8.57	3.97	337
WS-3	8/27/01	BROOK	F	114	15	CAECA						
WS-3	8/27/01	BROOK	-	100	9	CAECA						
WS-3	8/27/01	BROOK	F	114	17	CAECA						
WS-3	8/27/01	BROOK	F	142	28	CAECA						
WS-3	8/27/01	BROOK	M	115	14	CAECA						
WS-3	8/27/01	BROOK	-	97	8	CAECA	MT-WS3-PYC2	20.9	7.04	9.84	<3.39	369
WS-3	8/27/01	BROOK	M	110	14	CAECA						
WS-3	8/27/01	BROOK	M	112	13	CAECA						
WS-3	8/27/01	BROOK	-	105	9	CAECA						
WS-3	8/27/01	BROOK	M	120	19	CAECA						
WS-3	8/27/01	BROOK	M	132	26	CAECA						
WS-3	8/27/01	BROOK	F	100	9	CAECA	MT-WS3-PYC3	22.6	4.70	7.52	<3.54	331
WS-3	8/27/01	BROOK	-	105	9	CAECA						
WS-3	8/27/01	BROOK	M	102	10	CAECA						
WS-3	8/27/01	BROOK	-	108	12	CAECA						
WS-3	8/27/01	BROOK	-	111	13	CAECA						
WS-3	8/27/01	BROOK	M	125	20	CAECA						
WS-3	8/27/01	BROOK	M	112	12	CAECA	MT-WS3-PYC4	27.3	6.54	6.12	<4.20	395
WS-3	8/27/01	BROOK	-	109	10	CAECA						
WS-3	8/27/01	BROOK	M	110	13	CAECA						
WS-3	8/27/01	BROOK	-	105	9	CAECA						
WS-3	8/27/01	BROOK	-	98	97	CAECA						
WS-3	8/27/01	BROOK	M	127	23	CAECA						

Individual fish tissues (Continued)

Site ID	Date	Species	Sex	L(mm)	wt(gm)	Type	Sample Id	µg As/g	µg Cd/g	µg Cu/g	µg Pb/g	µg Zn/g
WS-3	8/27/01	BROOK	-	93	10	FILET						
WS-3	8/27/01	BROOK	F	111	12	FILET	MT-WS3-FIL1	2.02	<0.28	2.13	<1.12	47.4
WS-3	8/27/01	BROOK	F	114	15	FILET						
WS-3	8/27/01	BROOK	-	100	9	FILET						
WS-3	8/27/01	BROOK	F	114	17	FILET						
WS-3	8/27/01	BROOK	F	142	28	FILET						
WS-3	8/27/01	BROOK	M	115	14	FILET						
WS-3	8/27/01	BROOK	-	97	8	FILET	MT-WS3-FIL2	1.87	<0.28	<2.13	<1.12	41.8
WS-3	8/27/01	BROOK	M	110	14	FILET						
WS-3	8/27/01	BROOK	M	112	13	FILET						
WS-3	8/27/01	BROOK	-	105	9	FILET						
WS-3	8/27/01	BROOK	M	120	19	FILET						
WS-3	8/27/01	BROOK	M	132	26	FILET						
WS-3	8/27/01	BROOK	F	100	9	FILET	MT-WS3-FIL3	1.69	<0.28	<2.16	<1.14	47.8
WS-3	8/27/01	BROOK	-	105	9	FILET						
WS-3	8/27/01	BROOK	M	102	10	FILET						
WS-3	8/27/01	BROOK	-	108	12	FILET						
WS-3	8/27/01	BROOK	-	111	13	FILET						
WS-3	8/27/01	BROOK	M	125	20	FILET						
WS-3	8/27/01	BROOK	M	112	12	FILET	MT-WS3-FIL4	1.97	<0.28	<2.10	<1.12	58.9
WS-3	8/27/01	BROOK	-	109	10	FILET						
WS-3	8/27/01	BROOK	M	110	13	FILET						
WS-3	8/27/01	BROOK	-	105	9	FILET						
WS-3	8/27/01	BROOK	-	98	9	FILET						
WS-3	8/27/01	BROOK	-	92	6	WL. FISH	MT-WS3-WF1	7.94	2.66	4.33	1.59	632
WS-3	8/27/01	BROOK	-	94	8	WL. FISH	MT-WS3-WF2	17.0	2.68	7.40	7.77	742
WS-3	8/27/01	BROOK	-	94	7	WL. FISH	MT-WS3-WF3	7.86	1.71	4.04	1.50	537
WS-3	8/27/01	BROOK	-	135	23	WL. FISH	MT-WS3-WF4	17.2	1.61	7.72	4.07	629
WS-3	8/27/01	BROOK	-	146	34	WL. FISH	MT-WS3-WF5	3.83	1.50	5.63	1.27	333

Histological analysis

Site ID (n)	Species	Tissue	Glycogen Vacuolation	Scattered Degeneration Hepatocytes	Focal Inflammation	Nuclear Vacuolation	Karryorrhetic Nuclei	Hepatomegally	Hyper-cellularity	Melano-macraphage Centers	Comments
PP-1 (n=15)	Brook	Gill									Mostly normal
PP-1 (n=15)	Brook	Liver	+2	+3 (9 of 15 fish)	+2 (9 of 15 fish)	+2 (3 of 15 fish)					
PP-1 (n=15	Brook	Kidney								+3	Regenerating tubules +2
PP-1 (n=15)	Brook	Spleen								+2	
PP-1 (n=15)	Brook	G.I.	-								Contained feed;migrating lymphocytes epithelia +2; rodlet cells
PP-1 (n=15)	Brook	Skel. Muscle	-								Focal areas of fatty infiltration
PP-1	Brook	General Condition	5 fish scored 0 for glycogen Vacuolation, highly variable, more than any other group.								
PP-3 (n=15)	Brook	Gill	-								Mostly normal
PP-3 (n=15)	Brook	Liver	0	+3	+2.5	+2	(5 fish)	+3 (2 of 15 fish)	+4		
PP-3 (n=15)	Brook	Kidney	-							+3.5	Hypertrophy tubule epithelia;1 fish Degenerate tubule epithelia
PP-3 (n=15)	Brook	Spleen	-							+3	
PP-3 (n=15)	Brook	G.I.	-								Empty to packed with feed, migrating lymphocytes mucosal epithelia +2.5
PP-3 (n=15)	Brook	Skel. Muscle	-								Scattered degeneration and fatty inflitration
PP-3	Brook	General Condition	Kidney contains sloughed cells and calcification +2, focal inflammation, hypercellular glomeruli. Atrophy (moderately severe hypercellularity) liver and kidney; starvation and contaminant burden. Chronic cell turnover (melanomacrophage centers) moderate in spleen and somewhat more severe in kidney.								
PP-3 (n=5)	Rainbow	Gill	-								Mostly normal
PP-3 (n=5)	Rainbow	Liver	0	+3					+4	+3	Vasculitus +3, scat. foci granulomatous infl.; Increase in bile ducts & inflammation

Histological analysis (Continued)

Site ID (n)	Species	Tissue	Glycogen Vacuolation	Scattered Degeneration Hepatocytes	Focal Inflammation	Nuclear Vacuolation	Karryorrhetic Nuclei	Hepatomegally	Hyper-cellularity	Melano-macraphage Centers	Comments
PP-3 (n=5)	Rainbow	Kidney								+5	Erythrophagia +3; dystrophic calcification Tubule lumen +2 hypercellular glomeruli
PP-3 (n=5)	Rainbow	Spleen								+4	Few erythrocytes
PP-3 (n=5)	Rainbow	G.I.									Empty to some feed; migrating lymphocytes mucosal epithelia +3
PP-3 (n=5)	Rainbow	Skel. Muscle									Scattered degeneration +2
PP-3 (n=5)	Rainbow	General	Increased mucous cells in the skin (several layers thick) The most severe changes seen in this group. Interstitial tissue in kidney almost solid black from accumulation of melanomacrophage centers. Only group with moderate to moderately severe melanomacrophage centers in liver and spleen, and with cholangitis (inflammation of the bile ducts).								
PP-5 (n=15)	Rainbow	Gill	-	-	-	-	-	-	-		mostly normal, three fish with aneurisms +2
PP-5 (n=15)	Rainbow	Liver	0	+3.5					+3		Few fish – hepatomegaly, focal necrosis
PP-5 (n=15)	Rainbow	Kidney								+3	Hypertrophy tubule epithelia; sclerotic Glomeruli.
PP-5 (n=15)	Rainbow	Spleen								2.5	Distinct nodes
PP-5 (n=15)	Rainbow	G.I.									Increased mucous
PP-5 (n=15)	Rainbow	Skel. Muscle									Mostly normal
PP-5 (n=15)	Rainbow	General condition	Moderate changes in liver, kidney and spleen. Few fish showed increase in bile ducts.								
ULGP (n=6)	Cutthroat	Gill	-	-	-	-	-	-	-		Mostly normal, mild scattered fusion of lamellae.
ULGP (n=6)	Cutthroat	Liver	+20	+3		+2			+3	+2	Hepatomegally, liquifactive necrosis, inflam. Diffusely scattered to widespread.
ULGP (n=6)	Cutthroat	Kidney								+2.5	Regenerating tubules +2;sclerotic glomeruli +3;erythrophagia +2;cont. gen. condition
ULGP (n=6)	Cutthroat	Spleen								+2	

Histological analysis (Continued)

Site ID (n)	Species	Tissue	Glycogen Vacuolation	Scattered Degeneration Hepatocytes	Focal Inflammation	Nuclear Vacuolation	Karryorrhetic Nuclei	Hepatomegally	Hyper-cellularity	Melano-macraphage Centers	Comments
ULGP (n=6)	Cutthroat	G.I.									Little to no feed; migrating lymphocytes mucosal epithelia +2.5
ULGP (n=6)	Cutthroat	Skel. Muscle									Mostly normal, scattered degeneration +2
ULGP (n=6)	Cutthroat	General comments	Mild accumulation of melanomacraphage centers in liver; mild to moderate in kidney, mild in spleen. Hematipoietic centers proliferation moderately severe. Mild-moderate degenerative changes in tubules.								
WS-3 (n=25)	Brook	Gill	-	-	-	-	-	-	-		Mostly normal
WS-3 (n=25)	Brook	Liver	0	+3		+2		+3	+2		Cystic change + 2;focal inflammation
WS-3 (n=25)	Brook	Kidney								+3	Hyperplasia hematopoietic tissue +3, hyper-trophy, degeneration and sloughing
WS-3 (n=25)	Brook	Spleen								+2	
WS-3 (n=25)	Brook	G.I.									Few with feed; migrating lymphocytes mucosal epithelia +3
WS-3 (n=25)	Brook	Skel. Muscle									
WS-3 (n=25)	Brook	General condition	In the liver, hyperplasia hematopoietic tissue +3, hyper- trophy, degeneration and sloughing (early calcification) tubule epithelia +3, regenerating tubules +3.								

Lipid Peroxidation

Site ID	Date	Species	Sex	Length (mm)	Weight (gm)	Tissue	Sample ID	340 μm	360 μm
PP-1	8/29/01	BROOK	F	185	82	LIVER	MT-PP1-LIV1	243.7	144.5
PP-1	8/29/01	BROOK	M	222	130	LIVER			
PP-1	8/29/01	BROOK	F	200	82	LIVER	MT-PP1-LIV2	270.9	167.4
PP-1	8/29/01	BROOK	M	180	63	LIVER			
PP-1	8/29/01	BROOK	F	190	70	LIVER	MT-PP1-LIV3	231.9	134.6
PP-1	8/29/01	BROOK	M	188	86	LIVER			
PP-1	8/29/01	BROOK	M	168	60	LIVER			
PP-1	8/29/01	BROOK	F	206	93	LIVER	MT-PP1-LIV4	267	154.8
PP-1	8/29/01	BROOK	M	174	51	LIVER			
PP-1	8/29/01	BROOK	M	194	84	LIVER	MT-PP1-LIV5	310.8	213.2
PP-1	8/29/01	BROOK	F	199	77	LIVER			
PP-1	8/29/01	BROOK	F	176	60	LIVER	MT-PP1-LIV6	205.4	110.6
PP-1	8/29/01	BROOK	-	205	95	LIVER			
PP-1	8/29/01	BROOK	M	200	103	LIVER	MT-PP1-LIV7	275.4	193.8
PP-1	8/29/01	BROOK	M	210	121	LIVER			
PP-1	8/29/01	BROOK	F	185	82	GILL	MT-PP1-GIL1	26.10	24.73
PP-1	8/29/01	BROOK	M	222	130	GILL			
PP-1	8/29/01	BROOK	F	200	82	GILL	MT-PP1-GIL2	16.96	15.51
PP-1	8/29/01	BROOK	M	180	63	GILL			
PP-1	8/29/01	BROOK	M	188	86	GILL	MT-PP1-GIL3	50.47	59.41
PP-1	8/29/01	BROOK	M	168	60	GILL			
PP-1	8/29/01	BROOK	F	206	93	GILL	MT-PP1-GIL4	27.51	22.56
PP-1	8/29/01	BROOK	M	174	51	GILL			
PP-1	8/29/01	BROOK	M	194	84	GILL	MT-PP1-GIL5	29.94	28.73
PP-1	8/29/01	BROOK	F	199	77	GILL			
PP-1	8/29/01	BROOK	F	176	60	GILL	MT-PP1-GIL6	124.9	159.1
PP-1	8/29/01	BROOK	-	205	95	GILL			
PP-1	8/29/01	BROOK	M	200	103	GILL	MT-PP1-GIL7	32.39	33.40
PP-1	8/29/01	BROOK	M	210	121	GILL			
PP-1	8/29/01	BROOK	F	185	82	CAECA	MT-PP1-PYC1	329.6	279.5
PP-1	8/29/01	BROOK	M	222	130	CAECA			
PP-1	8/29/01	BROOK	F	200	82	CAECA	MT-PP1-PYC2	320.8	315.3
PP-1	8/29/01	BROOK	M	180	63	CAECA			
PP-1	8/29/01	BROOK	F	190	70	CAECA	MT-PP1-PYC3	314.7	273.3
PP-1	8/29/01	BROOK	M	188	86	CAECA			
PP-1	8/29/01	BROOK	M	168	60	CAECA			
PP-1	8/29/01	BROOK	F	206	93	CAECA	MT-PP1-PYC4	310.8	273.3
PP-1	8/29/01	BROOK	M	174	51	CAECA			
PP-1	8/29/01	BROOK	M	194	84	CAECA	MT-PP1-PYC5	370.2	299.8
PP-1	8/29/01	BROOK	F	199	77	CAECA			
PP-1	8/29/01	BROOK	F	176	60	CAECA	MT-PP1-PYC6	231.2	290.5
PP-1	8/29/01	BROOK	-	205	95	CAECA			
PP-1	8/29/01	BROOK	M	200	103	CAECA	MT-PP1-PYC7	329.6	238.8
PP-1	8/29/01	BROOK	M	210	121	CAECA			
PP-1	8/29/01	BROOK	F	185	82	FILLET	MT-PP1-FIL1	36.76	32.03
PP-1	8/29/01	BROOK	M	222	130	FILLET			
PP-1	8/29/01	BROOK	F	200	82	FILLET	MT-PP1-FIL2	21.59	18.71
PP-1	8/29/01	BROOK	M	180	63	FILLET			
PP-1	8/29/01	BROOK	F	190	70	FILLET	MT-PP1-FIL3	15.95	12.28
PP-1	8/29/01	BROOK	M	188	86	FILLET			
PP-1	8/29/01	BROOK	M	168	60	FILLET			
PP-1	8/29/01	BROOK	F	206	93	FILLET	MT-PP1-FIL4	19.25	18.03
PP-1	8/29/01	BROOK	M	174	51	FILLET			

Lipid Peroxidation (Continued)

Site ID	Date	Species	Sex	Length (mm)	Weight (gm)	Tissue	Sample ID	340 µm	360 µm
PP-1	8/29/01	BROOK	M	194	84	FILLET	MT-PP1-FIL5	33.72	28.88
PP-1	8/29/01	BROOK	F	199	77	FILLET			
PP-1	8/29/01	BROOK	F	176	60	FILLET	MT-PP1-FIL6	25.55	19.72
PP-1	8/29/01	BROOK	-	205	95	FILLET			
PP-1	8/29/01	BROOK	M	200	103	FILLET	MT-PP1-FIL7	57.73	68.38
PP-1	8/29/01	BROOK	M	210	121	FILLET			
PP-1	8/29/01	BROOK	F	185	82	WL. FISH	MT-PP1-WF1	N/A	N/A
PP-1	8/29/01	BROOK	F	200	82	WL. FISH	MT-PP1-WF2	N/A	N/A
PP-1	8/29/01	BROOK	F	190	70	WL. FISH	MT-PP1-WF3	N/A	N/A
PP-1	8/29/01	BROOK	M	168	60	WL. FISH	MT-PP1-WF4	N/A	N/A
PP-1	8/29/01	BROOK	M	194	84	WL. FISH	MT-PP1-WF5	N/A	N/A
PP-3	8/28/01	BROOK	F	164	43	LIVER			
PP-3	8/28/01	BROOK	M	167	39	LIVER	MT-PP3-LIV1	187.1	142.8
PP-3	8/28/01	BROOK	M	134	20	LIVER			
PP-3	8/28/01	BROOK	M	167	43	LIVER			
PP-3	8/28/01	BROOK	M	151	32	LIVER	MT-PP3-LIV2	186.6	137.7
PP-3	8/28/01	BROOK	F	139	28	LIVER			
PP-3	8/28/01	BROOK	F	140	22	LIVER			
PP-3	8/28/01	BROOK	M	163	39	LIVER	MT-PP3-LIV3	165.7	131.1
PP-3	8/28/01	BROOK	M	169	46	LIVER			
PP-3	8/28/01	BROOK	M	190	76	LIVER	MT-PP3-LIV4	240.1	154.8
PP-3	8/28/01	BROOK	M	150	32	LIVER			
PP-3	8/28/01	BROOK	F	153	43	LIVER			
PP-3	8/28/01	BROOK	F	147	28	LIVER	MT-PP3-LIV5	250.1	169.5
PP-3	8/28/01	BROOK	M	151	29	LIVER			
PP-3	8/28/01	BROOK	F	243	140	LIVER	MT-PP3-LIV6	257.1	162.7
PP-3	8/28/01	RAINBOW	F	247	140	LIVER	MT-PP3-LIV7	120.4	93.10
PP-3	8/28/01	RAINBOW	M	268	194	LIVER	MT-PP3-LIV8	81.32	66.44
PP-3	8/28/01	RAINBOW	M	265	176	LIVER	MT-PP3-LIV9	142.0	94.63
PP-3	8/28/01	RAINBOW	F	302	222	LIVER	MT-PP3-LIV10	61.59	57.07
PP-3	8/28/01	RAINBOW	F	302	258	LIVER	MT-PP3-LIV11	182.4	116.4
PP-3	8/28/01	BROOK	F	164	43	GILL			
PP-3	8/28/01	BROOK	M	167	39	GILL	MT-PP3-GIL1	22.21	20.68
PP-3	8/28/01	BROOK	M	134	20	GILL			
PP-3	8/28/01	BROOK	M	167	43	GILL			
PP-3	8/28/01	BROOK	M	151	32	GILL	MT-PP3-GIL2	25.74	23.77
PP-3	8/28/01	BROOK	F	139	28	GILL			
PP-3	8/28/01	BROOK	F	140	22	GILL			
PP-3	8/28/01	BROOK	M	163	39	GILL	MT-PP3-GIL3	36.01	33.05
PP-3	8/28/01	BROOK	M	169	46	GILL			
PP-3	8/28/01	BROOK	M	190	76	GILL	MT-PP3-GIL4	20.25	19.88
PP-3	8/28/01	BROOK	M	150	32	GILL			
PP-3	8/28/01	BROOK	F	153	43	GILL			
PP-3	8/28/01	BROOK	F	147	28	GILL	MT-PP3-GIL5	42.87	49.32
PP-3	8/28/01	BROOK	M	151	29	GILL			
PP-3	8/28/01	BROOK	F	243	140	GILL	MT-PP3-GIL6	36.31	32.46
PP-3	8/28/01	RAINBOW	F	247	140	GILL	MT-PP3-GIL7	49.12	45.24
PP-3	8/28/01	RAINBOW	M	268	194	GILL	MT-PP3-GIL8	22.85	20.72
PP-3	8/28/01	RAINBOW	M	265	176	GILL	MT-PP3-GIL9	24.20	23.10
PP-3	8/28/01	RAINBOW	F	302	222	GILL	MT-PP3-GIL10	30.17	29.33
PP-3	8/28/01	RAINBOW	F	302	258	GILL	MT-PP3-GIL11	24.94	22.23
PP-3	8/28/01	BROOK	F	164	43	CAECA			
PP-3	8/28/01	BROOK	M	167	39	CAECA	MT-PP3-PYC1	333.7	294.8

Lipid Peroxidation (Continued)

Site ID	Date	Species	Sex	Length	Weight	Tissue	Sample ID	340 µm	360 µm
PP-3	8/28/01	BROOK	M	134	20	CAECA			
PP-3	8/28/01	BROOK	M	167	43	CAECA			
PP-3	8/28/01	BROOK	M	151	32	CAECA	MT-PP3-PYC2	333.7	294.8
PP-3	8/28/01	BROOK	F	139	28	CAECA			
PP-3	8/28/01	BROOK	F	140	22	CAECA			
PP-3	8/28/01	BROOK	M	163	39	CAECA	MT-PP3-PYC3	357.4	295.3
PP-3	8/28/01	BROOK	M	169	46	CAECA			
PP-3	8/28/01	BROOK	M	190	76	CAECA	MT-PP3-PYC4	361.5	290.9
PP-3	8/28/01	BROOK	M	150	32	CAECA			
PP-3	8/28/01	BROOK	F	153	43	CAECA			
PP-3	8/28/01	BROOK	F	147	28	CAECA	MT-PP3-PYC5	328.7	264.1
PP-3	8/28/01	BROOK	M	151	29	CAECA			
PP-3	8/28/01	BROOK	F	243	140	CAECA	MT-PP3-PYC6	290.7	242.8
PP-3	8/28/01	RAINBOW	F	247	140	CAECA	MT-PP3-PYC7	55.06	79.45
PP-3	8/28/01	RAINBOW	M	268	194	CAECA	MT-PP3-PYC8	23.95	38.06
PP-3	8/28/01	RAINBOW	M	265	176	CAECA	MT-PP3-PYC9	64.16	38.98
PP-3	8/28/01	RAINBOW	F	302	222	CAECA	MT-PP3-PYC10	114.9	133.4
PP-3	8/28/01	RAINBOW	F	302	258	CAECA	MT-PP3-PYC11	147.0	117.7
PP-3	8/28/01	BROOK	F	164	43	FILLET			
PP-3	8/28/01	BROOK	M	167	39	FILLET	MT-PP-3-FIL1	19.95	16.82
PP-3	8/28/01	BROOK	M	134	20	FILLET			
PP-3	8/28/01	BROOK	M	167	43	FILLET			
PP-3	8/28/01	BROOK	M	151	32	FILLET	MT-PP-3-FIL2	12.80	11.04
PP*3	8/28/01	BROOK	F	139	28	FILLET			
PP-3	8/28/01	BROOK	F	140	22	FILLET			
PP-3	8/28/01	BROOK	M	163	39	FILLET	MT-PP3-FIL3	13.37	11.78
PP-3	8/28/01	BROOK	M	169	46	FILLET			
PP-3	8/28/01	BROOK	M	190	76	FILLET	MT-PP3-FIL4	19.79	17.52
PP-3	8/28/01	BROOK	M	150	32	FILLET			
PP-3	8/28/01	BROOK	F	153	43	FILLET			
PP-3	8/28/01	BROOK	F	147	28	FILLET	MT-PP3-FIL5	17.5	16.98
PP-3	8/28/01	BROOK	M	151	29	FILLET			
PP-3	8/28/01	BROOK	F	243	140	FILLET	MT-PP3-FIL6	30.55	31.17
PP-3	8/28/01	RAINBOW	F	247	140	FILLET	MT-PP3-FIL7	16.64	16.19
PP-3	8/28/01	RAINBOW	M	268	194	FILLET	MT-PP3-FIL8	15.33	15.14
PP-3	8/28/01	RAINBOW	M	265	176	FILLET	MT-PP3-FIL9	23.03	24.14
PP-3	8/28/01	RAINBOW	F	302	222	FILLET	MT-PP3-FIL10	20.35	16.73
PP-3	8/28/01	RAINBOW	F	302	258	FILLET	MT-PP3-FIL11	18.82	16.63
PP-3	8/28/01	BROOK	-	92	8	WL. FISH	MT-PP3-WF1	N/A	N/A
PP-3	8/28/01	BROOK	-	92	7	WL. FISH	MT-PP3-WF2	N/A	N/A
PP-3	8/28/01	BROOK	-	90	6	WL. FISH	MT-PP3-WF3	N/A	N/A
PP-3	8/28/01	BROOK	-	95	9	WL. FISH	MT-PP3-WF4	N/A	N/A
PP-3	8/28/01	BROOK	-	94	8	WL. FISH	MT-PP3-WF5	N/A	N/A
PP-3	8/28/01	RAINBOW	-	139	24	WL. FISH	MT-PP3-WF6	N/A	N/A
PP-3	8/28/01	RAINBOW	-	125	17	WL. FISH	MT-PP3-WF7	N/A	N/A
PP-3	8/28/01	RAINBOW	-	165	41	WL. FISH	MT-PP3-WF8	N/A	N/A
PP-3	8/28/01	RAINBOW	-	133	22	WL. FISH	MT-PP3-WF9	N/A	N/A
PP-3	8/28/01	RAINBOW	-	213	96	WL. FISH	MT-PP3-WF10	N/A	N/A
PP-5	8/28/01	RAINBOW	M	153	37	LIVER			
PP-5	8/28/01	RAINBOW	M	167	42	LIVER	MT-PP5-LIV1	190.3	132.2
PP-5	8/28/01	RAINBOW	M	154	36	LIVER			
PP-5	8/28/01	RAINBOW	F	155	34	LIVER	MT-PP5-LIV2	158.8	104.1

Lipid Peroxidation (Continued)

Site ID	Date	Species	Sex	Length	Weight	Tissue	Sample ID	340 µm	360 µm
PP-5	8/28/01	RAINBOW	M	220	106	LIVER			
PP-5	8/28/01	RAINBOW	M	222	99	LIVER	MT-PP5-LIV3	161.3	99.42
PP-5	8/28/01	RAINBOW	F	161	43	LIVER			
PP-5	8/28/01	RAINBOW	M	195	76	LIVER	MT-PP5-LIV4	170.3	105.7
PP-5	8/28/01	RAINBOW	F	167	46	LIVER			
PP-5	8/28/01	RAINBOW	M	185	64	LIVER	MT-PP5-LIV5	156.1	100.7
PP-5	8/28/01	RAINBOW	F	174	49	LIVER			
PP-5	8/28/01	RAINBOW	M	173	50	LIVER	MT-PP5-LIV6	128.5	82.68
PP-5	8/28/01	RAINBOW	M	154	60	LIVER			
PP-5	8/28/01	RAINBOW	M	182	60	LIVER	MT-PP5-LIV7	180.9	128.3
PP-5	8/28/01	RAINBOW	F	168	46	LIVER			
PP-5	8/28/01	RAINBOW	M	153	37	GILL			
PP-5	8/28/01	RAINBOW	M	167	42	GILL	MT-PP5-GIL1	20.35	19.27
PP-5	8/28/01	RAINBOW	M	154	36	GILL			
PP-5	8/28/01	RAINBOW	F	155	34	GILL	MT-PP5-GIL2	47.05	43.47
PP-5	8/28/01	RAINBOW	M	220	106	GILL			
PP-5	8/28/01	RAINBOW	M	222	99	GILL	MT-PP5-GIL3	26.03	24.69
PP-5	8/28/01	RAINBOW	F	161	43	GILL			
PP-5	8/28/01	RAINBOW	M	195	76	GILL	MT-PP5-GIL4	26.42	24.73
PP-5	8/28/01	RAINBOW	F	167	46	GILL			
PP-5	8/28/01	RAINBOW	M	185	64	GILL	MT-PP5-GIL5	18.06	17.17
PP-5	8/28/01	RAINBOW	F	174	49	GILL			
PP-5	8/28/01	RAINBOW	M	173	50	GILL	MT-PP5-GIL6	19.15	17.66
PP-5	8/28/01	RAINBOW	M	154	60	GILL			
PP-5	8/28/01	RAINBOW	M	182	60	GILL	MT-PP5-LIV7	25.01	23.19
PP-5	8/28/01	RAINBOW	F	168	46	GILL			
PP-5	8/28/01	RAINBOW	M	153	37	CAECA			
PP-5	8/28/01	RAINBOW	M	167	42	CAECA	MT-PP5-PYC1	201.0	125.1
PP-5	8/28/01	RAINBOW	M	154	36	CAECA			
PP-5	8/28/01	RAINBOW	F	155	34	CAECA	MT-PP5-PYC2	156.1	110.5
PP-5	8/28/01	RAINBOW	M	220	106	CAECA			
PP-5	8/28/01	RAINBOW	M	222	99	CAECA	MT-PP5-PYC3	216.4	129.2
PP-5	8/28/01	RAINBOW	F	161	43	CAECA			
PP-5	8/28/01	RAINBOW	M	195	76	CAECA	MT-PP5-PYC4	N/A	N/A
PP-5	8/28/01	RAINBOW	F	167	46	CAECA			
PP-5	8/28/01	RAINBOW	M	185	64	CAECA	MT-PP5-PYC5	209.1	129.8
PP-5	8/28/01	RAINBOW	F	174	49	CAECA			
PP-5	8/28/01	RAINBOW	M	173	50	CAECA	MT-PP5-PYC6	151.9	91.27
PP-5	8/28/01	RAINBOW	M	154	60	CAECA			
PP-5	8/28/01	RAINBOW	M	182	60	CAECA	MT-PP5-PYC7	201.7	119.4
PP-5	8/28/01	RAINBOW	F	168	46	CAECA			
PP-5	8/28/01	RAINBOW	M	153	37	FILLET			
PP-5	8/28/01	RAINBOW	M	167	42	FILLET	MT-PP5-FIL1	21.82	20.8
PP-5	8/28/01	RAINBOW	M	154	36	FILLET			
PP-5	8/28/01	RAINBOW	F	155	34	FILLET	MT-PP5-FIL2	15.71	14.24
PP-5	8/28/01	RAINBOW	M	220	106	FILLET			
PP-5	8/28/01	RAINBOW	M	222	99	FILLET	MT-PP5-FIL3	27.34	23.19
PP-5	8/28/01	RAINBOW	F	161	43	FILLET			
PP-5	8/28/01	RAINBOW	M	195	76	FILLET	MT-PP5-FIL4	17.08	14.67
PP-5	8/28/01	RAINBOW	F	167	46	FILLET			

Lipid Peroxidation (Continued)

Site ID	Date	Species	Sex	Length	Weight	Tissue	Sample ID	340 µm	360 µm
PP-5	8/28/01	RAINBOW	M	185	64	FILLET	MT-PP5-FIL5	20.72	19.44
PP-5	8/28/01	RAINBOW	F	174	49	FILLET			
PP-5	8/28/01	RAINBOW	M	173	50	FILLET	MT-PP5-FIL6	176.6	108.4
PP-5	8/28/01	RAINBOW	M	154	60	FILLET			
PP-5	8/28/01	RAINBOW	M	182	60	FILLET	MT-PP5-FIL7	18.05	16.60
PP-5	8/28/01	RAINBOW	F	168	46	FILLET			
PP-5	8/28/01	RAINBOW	-	153	37	WL. FISH	MT-PP5-WF1	N/A	N/A
PP-5	8/28/01	RAINBOW	-	167	42	WL. FISH	MT-PP5-WF2	N/A	N/A
PP-5	8/28/01	RAINBOW	-	154	36	WL. FISH	MT-PP5-WF3	N/A	N/A
PP-5	8/28/01	RAINBOW	-	155	34	WL. FISH	MT-PP5-WF4	N/A	N/A
PP-5	8/28/01	RAINBOW	-	220	106	WL. FISH	MT-PP5-WF5	N/A	N/A
ULGP	8/29/01	WSC	M	420	747	LIVER	MT-ULG-LIV1	237.8	175.0
ULGP	8/29/01	WSC	M	302	248	LIVER	MT-ULG-LIV2	181.0	116.8
ULGP	8/29/01	WSC	M	312	270	LIVER	MT-ULG-LIV3	527.9	250.3
ULGP	8/29/01	WSC	M	294	253	LIVER	MT-ULG-LIV4	351.4	196.2
ULGP	8/29/01	WSC	M	263	174	LIVER	MT-ULG-LIV5	364.5	211.8
ULGP	8/29/01	WSC	M	260	177	LIVER	MT-ULG-LIV6	352.5	194.8
ULGP	8/29/01	WSC	M	420	747	GILL	MT-ULG-LIV1	68.64	82.25
ULGP	8/29/01	WSC	M	302	248	GILL	MT-ULG-LIV2	59.26	54.72
ULGP	8/29/01	WSC	M	312	270	GILL	MT-ULG-LIV3	45.34	40.43
ULGP	8/29/01	WSC	M	294	253	GILL	MT-ULG-LIV4	25.84	25.70
ULGP	8/29/01	WSC	M	263	174	GILL	MT-ULG-LIV5	20.87	19.53
ULGP	8/29/01	WSC	M	260	177	GILL	MT-ULG-LIV6	30.29	27.98
ULGP	8/29/01	WSC	M	420	747	CAECA	MT-ULG-PYC1	396.8	188.4
ULGP	8/29/01	WSC	M	302	248	CAECA	MT-ULG-PYC2	257.5	153.2
ULGP	8/29/01	WSC	M	312	270	CAECA	MT-ULG-PYC3	502.7	257.8
ULGP	8/29/01	WSC	M	294	253	CAECA	MT-ULG-PYC4	670.6	276.1
ULGP	8/29/01	WSC	M	263	174	CAECA	MT-ULG-PYC5	598.4	265.0
ULGP	8/29/01	WSC	M	260	177	CAECA	MT-ULG-PYC6	546.0	288.2
ULGP	8/29/01	WSC	M	420	747	FILLET	MT-ULG-FIL1	51.12	57.20
ULGP	8/29/01	WSC	M	302	248	FILLET	MT-ULG-FIL2	30.61	23.18
ULGP	8/29/01	WSC	M	312	270	FILLET	MT-ULG-FIL3	11.88	10.82
ULGP	8/29/01	WSC	M	294	253	FILLET	MT-ULG-FIL4	17.09	14.60
ULGP	8/29/01	WSC	M	263	174	FILLET	MT-ULG-FIL5	32.16	30.48
ULGP	8/29/01	WSC	M	260	177	FILLET	MT-ULG-FIL6	15.79	13.02
ULGP	8/29/01	WSC	-	186	58	WL. FISH	MT-ULG-WF 1	N/A	N/A
ULGP	8/29/01	WSC	-	313	277	WL. FISH	MT-ULG-WF 2	N/A	N/A
ULGP	8/29/01	WSC	-	370	422	WL. FISH	MT-ULG-WF 3	N/A	N/A
WS-3	8/27/01	BROOK	M	127	23	LIVER			
WS-3	8/27/01	BROOK	-	93	10	LIVER			
WS-3	8/27/01	BROOK	F	111	12	LIVER	MT-WS3-LIV1	256.5	176.5
WS-3	8/27/01	BROOK	F	114	15	LIVER			
WS-3	8/27/01	BROOK	-	100	9	LIVER			
WS-3	8/27/01	BROOK	F	114	17	LIVER			
WS-3	8/27/01	BROOK	F	142	28	LIVER			
WS-3	8/27/01	BROOK	M	115	14	LIVER			
WS-3	8/27/01	BROOK	-	97	8	LIVER	MT-WS3-LIV2	264.7	166.3
WS-3	8/27/01	BROOK	M	110	14	LIVER			
WS-3	8/27/01	BROOK	M	112	13	LIVER			
WS-3	8/27/01	BROOK	-	105	9	LIVER			
WS-3	8/27/01	BROOK	M	120	19	LIVER			

Lipid Peroxidation (Continued)

Site ID	Date	Species	Sex	Length	Weight	Tissue	Sample ID	340 µm	360 µm
WS-3	8/27/01	BROOK	M	132	26	LIVER			
WS-3	8/27/01	BROOK	F	100	9	LIVER	MT-WS3-LIV3	247.4	174.4
WS-3	8/27/01	BROOK	-	105	9	LIVER			
WS-3	8/27/01	BROOK	M	102	10	LIVER			
WS-3	8/27/01	BROOK	-	108	12	LIVER			
WS-3	8/27/01	BROOK	-	111	13	LIVER			
WS-3	8/27/01	BROOK	M	125	20	LIVER			
WS-3	8/27/01	BROOK	M	112	12	LIVER	MT-WS3-LIV4	197.2	160.2
WS-3	8/27/01	BROOK	-	109	10	LIVER			
WS-3	8/27/01	BROOK	M	110	13	LIVER			
WS-3	8/27/01	BROOK	-	105	9	LIVER			
WS-3	8/27/01	BROOK	-	98	9	LIVER			
WS-3	8/27/01	BROOK	M	127	23	GILL			
WS-3	8/27/01	BROOK	-	93	10	GILL			
WS-3	8/27/01	BROOK	F	111	12	GILL	MT-WS3-GILL1	45.71	46.79
WS-3	8/27/01	BROOK	F	114	15	GILL			
WS-3	8/27/01	BROOK	-	100	9	GILL			
WS-3	8/27/01	BROOK	F	114	17	GILL			
WS-3	8/27/01	BROOK	F	142	28	GILL			
WS-3	8/27/01	BROOK	M	115	14	GILL			
WS-3	8/27/01	BROOK	-	97	8	GILL	MT-WS3-GIL2	35.36	32.83
WS-3	8/27/01	BROOK	M	110	14	GILL			
WS-3	8/27/01	BROOK	M	112	13	GILL			
WS-3	8/27/01	BROOK	-	105	9	GILL			
WS-3	8/27/01	BROOK	M	120	19	GILL			
WS-3	8/27/01	BROOK	M	132	26	GILL			
WS-3	8/27/01	BROOK	F	100	9	GILL	MT-WS3-GIL3	31.78	29.96
WS-3	8/27/01	BROOK	-	105	9	GILL			
WS-3	8/27/01	BROOK	M	102	10	GILL			
WS-3	8/27/01	BROOK	-	108	12	GILL			
WS-3	8/27/01	BROOK	-	111	13	GILL			
WS-3	8/27/01	BROOK	M	125	20	GILL			
WS-3	8/27/01	BROOK	M	112	12	GILL	MT-WS3-GIL4	14.11	12.90
WS-3	8/27/01	BROOK	-	109	10	GILL			
WS-3	8/27/01	BROOK	M	110	13	GILL			
WS-3	8/27/01	BROOK	-	105	9	GILL			
WS-3	8/27/01	BROOK	-	98	9	GILL			
WS-3	8/27/01	BROOK	M	127	23	CAECA			
WS-3	8/27/01	BROOK	-	93	10	CAECA			
WS-3	8/27/01	BROOK	F	111	12	CAECA	MT-WS3-PYC1	314.9	188.3
WS-3	8/27/01	BROOK	F	114	15	CAECA			
WS-3	8/27/01	BROOK	-	100	9	CAECA			
WS-3	8/27/01	BROOK	F	114	17	CAECA			
WS-3	8/27/01	BROOK	F	142	28	CAECA			
WS-3	8/27/01	BROOK	M	115	14	CAECA			
WS-3	8/27/01	BROOK	-	97	8	CAECA	MT-WS3-PYC2	295.8	183.7
WS-3	8/27/01	BROOK	M	110	14	CAECA			
WS-3	8/27/01	BROOK	M	112	13	CAECA			
WS-3	8/27/01	BROOK	-	105	9	CAECA			
WS-3	8/27/01	BROOK	M	120	19	CAECA			
WS-3	8/27/01	BROOK	M	132	26	CAECA			
WS-3	8/27/01	BROOK	F	100	9	CAECA	MT-WS3-PYC3	274.8	161.9
WS-3	8/27/01	BROOK	-	105	9	CAECA			
WS-3	8/27/01	BROOK	M	102	10	CAECA			

Lipid Peroxidation (Continued)

Site ID	Date	Species	Sex	Length	Weight	Tissue	Sample ID	340 µm	360 µm
WS-3	8/27/01	BROOK	-	108	12	CAECA			
WS-3	8/27/01	BROOK	-	111	13	CAECA			
WS-3	8/27/01	BROOK	M	125	20	CAECA			
WS-3	8/27/01	BROOK	M	112	12	CAECA	MT-WS3- PYC4	343.0	219.5
WS-3	8/27/01	BROOK	-	109	10	CAECA			
WS-3	8/27/01	BROOK	M	110	13	CAECA			
WS-3	8/27/01	BROOK	-	105	9	CAECA			
WS-3	8/27/01	BROOK	-	98	9	CAECA			
WS-3	8/27/01	BROOK	M	127	23	FILLET			
WS-3	8/27/01	BROOK	-	93	10	FILLET			
WS-3	8/27/01	BROOK	F	111	12	FILLET	MT-WS3-FIL1	24.83	18.32
WS-3	8/27/01	BROOK	F	114	15	FILLET			
WS-3	8/27/01	BROOK	-	100	9	FILLET			
WS-3	8/27/01	BROOK	F	114	17	FILLET			
WS-3	8/27/01	BROOK	F	142	28	FILLET			
WS-3	8/27/01	BROOK	M	115	14	FILLET			
WS-3	8/27/01	BROOK	-	97	8	FILLET	MT-WS3-FIL2	17.28	15.82
WS-3	8/27/01	BROOK	M	110	14	FILLET			
WS-3	8/27/01	BROOK	M	112	13	FILLET			
WS-3	8/27/01	BROOK	-	105	9	FILLET			
WS-3	8/27/01	BROOK	M	120	19	FILLET			
WS-3	8/27/01	BROOK	M	132	26	FILLET			
WS-3	8/27/01	BROOK	F	100	9	FILLET	MT-WS3-FIL3	16.89	14.75
WS-3	8/27/01	BROOK	-	105	9	FILLET			
WS-3	8/27/01	BROOK	M	102	10	FILLET			
WS-3	8/27/01	BROOK	-	108	12	FILLET			
WS-3	8/27/01	BROOK	-	111	13	FILLET			
WS-3	8/27/01	BROOK	M	125	20	FILLET			
WS-3	8/27/01	BROOK	M	112	12	FILLET	MT-WS3- FIL4	17.24	15.83
WS-3	8/27/01	BROOK	-	109	10	FILLET			
WS-3	8/27/01	BROOK	M	110	13	FILLET			
WS-3	8/27/01	BROOK	-	105	9	FILLET			
WS-3	8/27/01	BROOK	-	98	9	FILLET			

Metallothionein

Site ID	Date	Species	Sex	Length (mm)	Weight (gm)	Tissue	Sample ID	Metallothionein (µg/g)
PP-1	8/29/01	BROOK	F	185	82	LIVER	MT-PP1-LIV1	135.6
PP-1	8/29/01	BROOK	M	222	130	LIVER		
PP-1	8/29/01	BROOK	F	200	82	LIVER	MT-PP1-LIV2	118.5
PP-1	8/29/01	BROOK	M	180	63	LIVER		
PP-1	8/29/01	BROOK	F	190	70	LIVER	MT-PP1-LIV3	130.6
PP-1	8/29/01	BROOK	M	188	86	LIVER		
PP-1	8/29/01	BROOK	M	168	60	LIVER		
PP-1	8/29/01	BROOK	F	206	93	LIVER	MT-PP1-LIV4	51.5
PP-1	8/29/01	BROOK	M	174	51	LIVER		
PP-1	8/29/01	BROOK	M	194	84	LIVER	MT-PP1-LIV5	103.9
PP-1	8/29/01	BROOK	F	199	77	LIVER		
PP-1	8/29/01	BROOK	F	176	60	LIVER	MT-PP1-LIV6	54.0
PP-1	8/29/01	BROOK	-	205	95	LIVER		
PP-1	8/29/01	BROOK	M	200	103	LIVER	MT-PP1-LIV7	93.7
PP-1	8/29/01	BROOK	M	210	121	LIVER		
PP-1	8/29/01	BROOK	F	185	82	GILL	MT-PP1-GIL1	16.1
PP-1	8/29/01	BROOK	M	222	130	GILL		
PP-1	8/29/01	BROOK	F	200	82	GILL	MT-PP1-GIL2	20.9
PP-1	8/29/01	BROOK	M	180	63	GILL		
PP-1	8/29/01	BROOK	F	190	70	GILL		
PP-1	8/29/01	BROOK	M	188	86	GILL	MT-PP1-GIL3	38.1
PP-1	8/29/01	BROOK	M	168	60	GILL		
PP-1	8/29/01	BROOK	F	206	93	GILL	MT-PP1-GIL4	44.0
PP-1	8/29/01	BROOK	M	174	51	GILL		
PP-1	8/29/01	BROOK	M	194	84	GILL	MT-PP1-GIL5	75.9
PP-1	8/29/01	BROOK	F	199	77	GILL		
PP-1	8/29/01	BROOK	F	176	60	GILL	MT-PP1-GIL6	48.1
PP-1	8/29/01	BROOK	-	205	95	GILL		
PP-1	8/29/01	BROOK	M	200	103	GILL	MT-PP1-GIL7	101.2
PP-1	8/29/01	BROOK	M	210	121	GILL		
PP-1	8/29/01	BROOK	F	185	82	CAECA	MT-PP1-PYC1	316.2
PP-1	8/29/01	BROOK	M	222	130	CAECA		
PP-1	8/29/01	BROOK	F	200	82	CAECA	MT-PP1-PYC2	301.0
PP-1	8/29/01	BROOK	M	180	63	CAECA		
PP-1	8/29/01	BROOK	F	190	70	CAECA	MT-PP1-PYC3	367.8
PP-1	8/29/01	BROOK	M	188	86	CAECA		
PP-1	8/29/01	BROOK	M	168	60	CAECA		
PP-1	8/29/01	BROOK	F	206	93	CAECA	MT-PP1-PYC4	322.4
PP-1	8/29/01	BROOK	M	174	51	CAECA		
PP-1	8/29/01	BROOK	M	194	84	CAECA	MT-PP1-PYC5	510.0
PP-1	8/29/01	BROOK	F	199	77	CAECA		
PP-1	8/29/01	BROOK	F	176	60	CAECA	MT-PP1-PYC6	332.5
PP-1	8/29/01	BROOK	-	205	95	CAECA		
PP-1	8/29/01	BROOK	M	200	103	CAECA	MT-PP1-PYC7	161.7
PP-1	8/29/01	BROOK	M	210	121	CAECA		
PP-1	8/29/01	BROOK	F	185	82	FILLET	MT-PP1-FIL1	26.5
PP-1	8/29/01	BROOK	M	222	130	FILLET		
PP-1	8/29/01	BROOK	F	200	82	FILLET	MT-PP1-FIL2	6.2
PP-1	8/29/01	BROOK	M	180	63	FILLET		
PP-1	8/29/01	BROOK	F	190	70	FILLET	MT-PP1-FIL3	10.3
PP-1	8/29/01	BROOK	M	188	86	FILLET		
PP-1	8/29/01	BROOK	M	168	60	FILLET		
PP-1	8/29/01	BROOK	F	206	93	FILLET	MT-PP1-FIL4	7.2
PP-1	8/29/01	BROOK	M	174	51	FILLET		

Metallothionein (Continued)

Site ID	Date	Species	Sex	Length	Weight	Tissue	Sample ID	Metallothionein (µg/g)
PP-1	8/29/01	BROOK	M	194	84	FILLET	MT-PP1-FIL5	4.90
PP-1	8/29/01	BROOK	F	199	77	FILLET		
PP-1	8/29/01	BROOK	F	176	60	FILLET	MT-PP1-FIL6	17.1
PP-1	8/29/01	BROOK	-	205	95	FILLET		
PP-1	8/29/01	BROOK	M	200	103	FILLET	MT-PP1-FIL7	39.0
PP-1	8/29/01	BROOK	M	210	121	FILLET		
PP-3	8/28/01	BROOK	F	164	43	LIVER		
PP-3	8/28/01	BROOK	M	167	39	LIVER	MT-PP3-LIV1	429.6
PP-3	8/28/01	BROOK	M	134	20	LIVER		
PP-3	8/28/01	BROOK	M	167	43	LIVER		
PP-3	8/28/01	BROOK	M	151	32	LIVER	MT-PP3-LIV2	553.5
PP-3	8/28/01	BROOK	F	139	28	LIVER		
PP-3	8/28/01	BROOK	F	140	22	LIVER		
PP-3	8/28/01	BROOK	M	163	39	LIVER	MT-PP3-LIV3	1,057
PP-3	8/28/01	BROOK	M	169	46	LIVER		
PP-3	8/28/01	BROOK	M	190	76	LIVER	MT-PP3-LIV4	480.2
PP-3	8/28/01	BROOK	M	150	32	LIVER		
PP-3	8/28/01	BROOK	F	153	43	LIVER		
PP-3	8/28/01	BROOK	F	147	28	LIVER	MT-PP3-LIV5	523.9
PP-3	8/28/01	BROOK	M	151	29	LIVER		
PP-3	8/28/01	BROOK	F	243	140	LIVER	MT-PP3-LIV6	407.4
PP-3	8/28/01	RAINBOW	F	247	140	LIVER	MT-PP3-LIV7	574.3
PP-3	8/28/01	RAINBOW	M	268	194	LIVER	MT-PP3-LIV8	464.4
PP-3	8/28/01	RAINBOW	M	265	176	LIVER	MT-PP3-LIV9	275.2
PP-3	8/28/01	RAINBOW	F	302	222	LIVER	MT-PP3-LIV10	261.6
PP-3	8/28/01	RAINBOW	F	302	258	LIVER	MT-PP3-LIV11	121.1
PP-3	8/28/01	BROOK	F	164	43	GILL		
PP3	8/28/01	BROOK	M	167	39	GILL	MT-PP3-GIL1	196.9
PP-3	8/28/01	BROOK	M	134	20	GILL		
PP-3	8/28/01	BROOK	M	167	43	GILL		
PP-3	8/28/01	BROOK	M	151	32	GILL	MT-PP3-GIL2	264.6
PP-3	8/28/01	BROOK	F	139	28	GILL		
PP-3	8/28/01	BROOK	F	140	22	GILL		
PP-3	8/28/01	BROOK	M	163	39	GILL	MT-PP3-GIL3	123.2
PP-3	8/28/01	BROOK	M	169	46	GILL		
PP-3	8/28/01	BROOK	M	190	76	GILL	MT-PP3-GIL4	293.8
PP-3	8/28/01	BROOK	M	150	32	GILL		
PP-3	8/28/01	BROOK	F	153	43	GILL		
PP-3	8/28/01	BROOK	F	147	28	GILL	MT-PP3-GIL5	143.4
PP-3	8/28/01	BROOK	M	151	29	GILL		
PP-3	8/28/01	BROOK	F	243	140	GILL	MT-PP3-GIL6	182.0
PP-3	8/28/01	RAINBOW	F	247	140	GILL	MT-PP3-GIL7	60.9
PP-3	8/28/01	RAINBOW	M	268	194	GILL	MT-PP3-GIL8	69.9
PP-3	8/28/01	RAINBOW	M	265	176	GILL	MT-PP3-GIL9	109.7
PP-3	8/28/01	RAINBOW	F	302	222	GILL	MT-PP3-GIL10	96.4
PP-3	8/28/01	RAINBOW	F	302	258	GILL	MT-PP3-GIL11	87.4
PP-3	8/28/01	BROOK	F	164	43	CAECA		
PP-3	8/28/01	BROOK	M	167	39	CAECA	MT-PP3-PYC1	699.2
PP-3	8/28/01	BROOK	M	134	20	CAECA		
PP-3	8/28/01	BROOK	M	167	43	CAECA	MT-PP3-PYC2	665.9

Metallothionein (Continued)

Site ID	Date	Species	Sex	Length	Weight	Tissue	Sample ID	Metallothionein (µg/g)
PP-3	8/28/01	BROOK	M	151	32	CAECA		
PP-3	8/28/01	BROOK	M	163	39	CAECA	MT-PP3-PYC3	621.8
PP-3	8/28/01	BROOK	M	169	46	CAECA		
PP-3	8/28/01	BROOK	M	190	76	CAECA	MT-PP3-PYC4	898.2
PP-3	8/28/01	BROOK	M	150	32	CAECA		
PP-3	8/28/01	BROOK	F	153	43	CAECA		
PP-3	8/28/01	BROOK	F	147	28	CAECA	MT-PP3-PYC5	318.5
PP-3	8/28/01	BROOK	M	151	29	CAECA		
PP-3	8/28/01	BROOK	F	243	140	CAECA	MT-PP3-PYC6	708.0
PP-3	8/28/01	RAINBOW	F	247	140	CAECA	MT-PP3-PYC7	771.7
PP-3	8/28/01	RAINBOW	M	268	194	CAECA	MT-PP3-PYC8	646.4
PP-3	8/28/01	RAINBOW	M	265	176	CAECA	MT-PP3-PYC9	838.8
PP-3	8/28/01	RAINBOW	F	302	222	CAECA	MT-PP3-PYC10	496.9
PP-3	8/28/01	RAINBOW	F	302	258	CAECA	MT-PP3-PYC11	1,178
PP-3	8/28/01	BROOK	F	164	43	FILLET		
PP-3	8/28/01	BROOK	M	167	39	FILLET	MT-PP3-FIL1	25.7
PP-3	8/28/01	BROOK	M	134	20	FILLET		
PP-3	8/28/01	BROOK	M	167	43	FILLET		
PP-3	8/28/01	BROOK	M	151	32	FILLET	MT-PP3-FIL2	17.6
PP-3	8/28/01	BROOK	F	139	28	FILLET		
PP-3	8/28/01	BROOK	F	140	22	FILLET		
PP-3	8/28/01	BROOK	M	163	39	FILLET	MT-PP3-FIL3	-
PP-3	8/28/01	BROOK	M	169	46	FILLET		
PP-3	8/28/01	BROOK	M	190	76	FILLET	MT-PP3-FIL4	-
PP-3	8/28/01	BROOK	M	150	32	FILLET		
PP-3	8/28/01	BROOK	F	153	43	FILLET		
PP-3	8/28/01	BROOK	F	147	28	FILLET	MT-PP3-FIL5	509.7
PP-3	8/28/01	BROOK	M	151	29	FILLET		
PP-3	8/28/01	BROOK	F	243	140	FILLET	MT-PP3-FIL6	1,611
PP-3	8/28/01	RAINBOW	F	247	140	FILLET	MT-PP3-FIL7	285.0
PP-3	8/28/01	RAINBOW	M	268	194	FILLET	MT-PP3-FIL8	78.0
PP-3	8/28/01	RAINBOW	M	265	176	FILLET	MT-PP3-FIL9	-
PP-3	8/28/01	RAINBOW	F	302	222	FILLET	MT-PP3-FIL10	155.7
PP-3	8/28/01	RAINBOW	F	302	258	FILLET	MT-PP3-FIL11	104.5
PP-5	8/28/01	RAINBOW	M	153	37	LIVER		
PP-5	8/28/01	RAINBOW	M	167	42	LIVER	MT-PP5-LIV1	114.0
PP-5	8/28/01	RAINBOW	M	154	36	LIVER		
PP-5	8/28/01	RAINBOW	F	155	34	LIVER	MT-PP5-LIV2	50.4
PP-5	8/28/01	RAINBOW	M	220	106	LIVER		
PP-5	8/28/01	RAINBOW	M	222	99	LIVER	MT-PP5-LIV3	43.1
PP-5	8/28/01	RAINBOW	F	161	43	LIVER		
PP-5	8/28/01	RAINBOW	M	195	76	LIVER	MT-PP5-LIV4	263.9
PP-5	8/28/01	RAINBOW	F	167	46	LIVER		
PP-5	8/28/01	RAINBOW	M	185	64	LIVER	MT-PP5-LIV5	294.1
PP-5	8/28/01	RAINBOW	F	174	49	LIVER		
PP-5	8/28/01	RAINBOW	M	173	50	LIVER	MT-PP5-LIV6	182.9
PP-5	8/28/01	RAINBOW	M	154	60	LIVER		
PP-5	8/28/01	RAINBOW	M	182	60	LIVER	MT-PP5-LIV7	54.1
PP-5	8/28/01	RAINBOW	F	168	46	LIVER		
PP-5	8/28/01	RAINBOW	M	153	37	GILL		
PP-5	8/28/01	RAINBOW	M	167	42	GILL	MT-PP5-GIL1	186.9
PP-5	8/28/01	RAINBOW	M	154	36	GILL		
PP-5	8/28/01	RAINBOW	F	155	34	GILL	MT-PP5-GIL2	167.9
PP-5	8/28/01	RAINBOW	M	220	106	GILL		

Metallothionein (Continued)

Site ID	Date	Species	Sex	Length	Weight	Tissue	Sample ID	Metallothionein (µg/g)
PP-5	8/28/01	RAINBOW	M	222	99	GILL	MT-PP5-GIL3	111.3
PP-5	8/28/01	RAINBOW	F	161	43	GILL		
PP-5	8/28/01	RAINBOW	M	195	76	GILL	MT-PP5-GIL4	126.7
PP-5	8/28/01	RAINBOW	F	167	46	GILL		
PP-5	8/28/01	RAINBOW	M	185	64	GILL	MT-PP5-GIL5	53.2
PP-5	8/28/01	RAINBOW	F	174	49	GILL		
PP-5	8/28/01	RAINBOW	M	173	50	GILL	MT-PP5-GIL6	126.1
PP-5	8/28/01	RAINBOW	M	154	60	GILL		
PP-5	8/28/01	RAINBOW	M	182	60	GILL	MT-PP5-LIV7	35.4
PP-5	8/28/01	RAINBOW	F	168	46	GILL		
PP-5	8/28/01	RAINBOW	M	153	37	CAECA		
PP-5	8/28/01	RAINBOW	M	167	42	CAECA	MT-PP5-PYC1	634.3
PP-5	8/28/01	RAINBOW	M	154	36	CAECA		
PP-5	8/28/01	RAINBOW	F	155	34	CAECA	MT-PP5-PYC2	-
PP-5	8/28/01	RAINBOW	M	220	106	CAECA		
PP-5	8/28/01	RAINBOW	M	222	99	CAECA	MT-PP5-PYC3	544.3
PP-5	8/28/01	RAINBOW	F	161	43	CAECA		
PP-5	8/28/01	RAINBOW	M	195	76	CAECA	MT-PP5-PYC4	-
PP-5	8/28/01	RAINBOW	F	167	46	CAECA		
PP-5	8/28/01	RAINBOW	M	185	64	CAECA	MT-PP5-PYC5	513.8
PP-5	8/28/01	RAINBOW	F	174	49	CAECA		
PP-5	8/28/01	RAINBOW	M	173	50	CAECA	MT-PP5-PYC6	-
PP-5	8/28/01	RAINBOW	M	154	60	CAECA		
PP-5	8/28/01	RAINBOW	M	182	60	CAECA	MT-PP5-PYC7	-
PP-5	8/28/01	RAINBOW	F	168	46	CAECA		
PP-5	8/28/01	RAINBOW	M	153	37	FILLET		
PP-5	8/28/01	RAINBOW	M	167	42	FILLET	MT-PP5-FIL1	148.4
PP-5	8/28/01	RAINBOW	M	154	36	FILLET		
PP-5	8/28/01	RAINBOW	F	155	34	FILLET	MT-PP5-FIL2	51.3
PP-5	8/28/01	RAINBOW	M	220	106	FILLET		
PP-5	8/28/01	RAINBOW	M	222	99	FILLET	MT-PP5-FIL3	32.9
PP-5	8/28/01	RAINBOW	F	161	43	FILLET		
PP-5	8/28/01	RAINBOW	M	195	76	FILLET	MT-PP5-FIL4	83.8
PP-5	8/28/01	RAINBOW	F	167	46	FILLET		
PP-5	8/28/01	RAINBOW	M	185	64	FILLET	MT-PP5-FIL5	38.3
PP-5	8/28/01	RAINBOW	F	174	49	FILLET		
PP-5	8/28/01	RAINBOW	M	173	50	FILLET	MT-PP5-FIL6	59.0
PP-5	8/28/01	RAINBOW	M	154	60	FILLET		
PP-5	8/28/01	RAINBOW	M	182	60	FILLET	MT-PP5-FIL7	33.3
PP-5	8/28/01	RAINBOW	F	168	46	FILLET		
ULGP	8/29/01	WSC	M	420	747	LIVER	MT-ULG-LIV1	81.5
ULGP	8/29/01	WSC	M	302	248	LIVER	MT-ULG-LIV2	1043
ULGP	8/29/01	WSC	M	312	270	LIVER	MT-ULG-LIV3	97.7
ULGP	8/29/01	WSC	M	294	253	LIVER	MT-ULG-LIV4	36.1
ULGP	8/29/01	WSC	M	263	174	LIVER	MT-ULG-LIV5	90.5
ULGP	8/29/01	WSC	M	260	177	LIVER	MT-ULG-LIV6	141.4
ULGP	8/29/01	WSC	M	420	747	GILL	MT-ULG-LIV1	46.7
ULGP	8/29/01	WSC	M	302	248	GILL	MT-ULG-LIV2	46.7
ULGP	8/29/01	WSC	M	312	270	GILL	MT-ULG-LIV3	33.5
ULGP	8/29/01	WSC	M	294	253	GILL	MT-ULG-LIV4	41.7
ULGP	8/29/01	WSC	M	263	174	GILL	MT-ULG-LIV5	94.5
ULGP	8/29/01	WSC	M	260	177	GILL	MT-ULG-LIV6	46.9
ULGP	8/29/01	WSC	M	420	747	CAECA	MT-ULG-PYC1	279.9
ULGP	8/29/01	WSC	M	302	248	CAECA	MT-ULG-PYC2	342.0

Metallothionein (Continued)

Site ID	Date	Species	Sex	Length	Weight	Tissue	Sample ID	Metallothionein (µg/g)
ULGP	8/29/01	WSC	M	312	270	CAECA	MT-ULG-PYC3	275.8
ULGP	8/29/01	WSC	M	294	253	CAECA	MT-ULG-PYC4	315.5
ULGP	8/29/01	WSC	M	263	174	CAECA	MT-ULG-PYC5	415.7
ULGP	8/29/01	WSC	M	260	177	CAECA	MT-ULG-PYC6	484.7
ULGP	8/29/01	WSC	M	420	747	FILLET	MT-ULG-FIL1	-
ULGP	8/29/01	WSC	M	302	248	FILLET	MT-ULG-FIL2	2.0
ULGP	8/29/01	WSC	M	312	270	FILLET	MT-ULG-FIL3	49.2
ULGP	8/29/01	WSC	M	294	253	FILLET	MT-ULG-FIL4	29.9
ULGP	8/29/01	WSC	M	263	174	FILLET	MT-ULG-FIL5	39.4
ULGP	8/29/01	WSC	M	260	177	FILLET	MT-ULG-FIL6	49.7
WS-3	8/27/01	BROOK	M	127	23	LIVER		
WS-3	8/27/01	BROOK	-	93	10	LIVER		
WS-3	8/27/01	BROOK	F	111	12	LIVER	MT-WS3-LIV1	273.4
WS-3	8/27/01	BROOK	F	114	15	LIVER		
WS-3	8/27/01	BROOK	-	100	9	LIVER		
WS-3	8/27/01	BROOK	F	114	17	LIVER		
WS-3	8/27/01	BROOK	F	142	28	LIVER		
WS-3	8/27/01	BROOK	M	115	14	LIVER		
WS-3	8/27/01	BROOK	-	97	8	LIVER	MT-WS3-LIV2	36.1
WS-3	8/27/01	BROOK	M	110	14	LIVER		
WS-3	8/27/01	BROOK	M	112	13	LIVER		
WS-3	8/27/01	BROOK	-	105	9	LIVER		
WS-3	8/27/01	BROOK	M	120	19	LIVER		
WS-3	8/27/01	BROOK	M	132	26	LIVER		
WS-3	8/27/01	BROOK	F	100	9	LIVER	MT-WS3-LIV3	178.1
WS-3	8/27/01	BROOK	-	105	9	LIVER		
WS-3	8/27/01	BROOK	M	102	10	LIVER		
WS-3	8/27/01	BROOK	-	108	12	LIVER		
WS-3	8/27/01	BROOK	-	111	13	LIVER		
WS-3	8/27/01	BROOK	M	125	20	LIVER		
WS-3	8/27/01	BROOK	M	112	12	LIVER	MT-WS3-LIV4	87.0
WS3	8/27/01	BROOK	-	109	10	LIVER		
WS-3	8/27/01	BROOK	M	110	13	LIVER		
WS-3	8/27/01	BROOK	-	105	9	LIVER		
WS-3	8/27/01	BROOK	-	98	9	LIVER		
WS-3	8/27/01	BROOK	M	127	23	GILL		
WS-3	8/27/01	BROOK	-	93	10	GILL		
WS-3	8/27/01	BROOK	F	111	12	GILL	MT-WS3-GIL1	211.6
WS-3	8/27/01	BROOK	F	114	15	GILL		
WS-3	8/27/01	BROOK	-	100	9	GILL		
WS-3	8/27/01	BROOK	F	114	17	GILL		
WS-3	8/27/01	BROOK	F	142	28	GILL		
WS-3	8/27/01	BROOK	M	115	14	GILL		
WS-3	8/27/01	BROOK	-	97	8	GILL	MT-WS3-GIL2	140.9
WS-3	8/27/01	BROOK	M	110	14	GILL		
WS-3	8/27/01	BROOK	M	112	13	GILL		
WS-3	8/27/01	BROOK	-	105	9	GILL		
WS-3	8/27/01	BROOK	M	120	19	GILL		
WS-3	8/27/01	BROOK	M	132	26	GILL		
WS-3	8/27/01	BROOK	F	100	9	GILL	MT-WS3-GIL3	159.9
WS-3	8/27/01	BROOK	-	105	9	GILL		
WS-3	8/27/01	BROOK	M	102	10	GILL		
WS-3	8/27/01	BROOK	-	108	12	GILL		
WS-3	8/27/01	BROOK	-	111	13	GILL		
WS-3	8/27/01	BROOK	M	125	20	GILL		

Metallothionein (Continued)

Site ID	Date	Species	Sex	Length	Weight	Tissue	Sample ID	Metallothionein (µg/g)
WS-3	8/27/01	BROOK	M	112	12	GILL	MT-WS3-GIL4	300.9
WS-3	8/27/01	BROOK	-	109	10	GILL		
WS-3	8/27/01	BROOK	M	110	13	GILL		
WS-3	8/27/01	BROOK	-	105	9	GILL		
WS-3	8/27/01	BROOK	-	98	9	GILL		
WS-3	8/27/01	BROOK	M	127	23	CAECA		
WS-3	8/27/01	BROOK	-	93	10	CAECA		
WS-3	8/27/01	BROOK	F	111	12	CAECA	MT-WS3-PYCL1	532.0
WS-3	8/27/01	BROOK	F	114	15	CAECA		
WS-3	8/27/01	BROOK	-	100	9	CAECA		
WS-3	8/27/01	BROOK	F	114	17	CAECA		
WS-3	8/27/01	BROOK	F	142	28	CAECA		
WS-3	8/27/01	BROOK	M	115	14	CAECA		
WS-3	8/27/01	BROOK	-	97	8	CAECA	MT-WS3-PYC2	442.6
WS-3	8/27/01	BROOK	M	110	14	CAECA		
WS-3	8/27/01	BROOK	M	112	13	CAECA		
WS-3	8/27/01	BROOK	-	105	9	CAECA		
WS-3	8/27/01	BROOK	M	120	19	CAECA		
WS-3	8/27/01	BROOK	M	132	26	CAECA		
WS-3	8/27/01	BROOK	F	100	9	CAECA	MT-WS3-PYC3	345.3
WS-3	8/27/01	BROOK	-	105	9	CAECA		
WS-3	8/27/01	BROOK	M	102	10	CAECA		
WS-3	8/27/01	BROOK	-	108	12	CAECA		
WS-3	8/27/01	BROOK	-	111	13	CAECA		
WS-3	8/27/01	BROOK	M	125	20	CAECA		
WS-3	8/27/01	BROOK	M	112	12	CAECA	MT-WS3- PYC4	640.0
WS-3	8/27/01	BROOK	-	109	10	CAECA		
WS-3	8/27/01	BROOK	M	110	13	CAECA		
WS-3	8/27/01	BROOK	-	105	9	CAECA		
WS-3	8/27/01	BROOK	-	98	9	CAECA		
WS-3	8/27/01	BROOK	M	127	23	FILLET		
WS-3	8/27/01	BROOK	-	93	10	FILLET		
WS-3	8/27/01	BROOK	F	111	12	FILLET	MT-WS3-FIL1	11.4
WS-3	8/27/01	BROOK	F	114	15	FILLET		
WS-3	8/27/01	BROOK	-	100	9	FILLET		
WS-3	8/27/01	BROOK	F	114	17	FILLET		
WS-3	8/27/01	BROOK	F	142	28	FILLET		
WS-3	8/27/01	BROOK	M	115	14	FILLET		
WS-3	8/27/01	BROOK	-	97	8	FILLET	MT-WS3-FIL2	-
WS-3	8/27/01	BROOK	M	110	14	FILLET		
WS-3	8/27/01	BROOK	M	112	13	FILLET		
WS-3	8/27/01	BROOK	-	105	9	FILLET		
WS-3	8/27/01	BROOK	M	120	19	FILLET		
WS-3	8/27/01	BROOK	M	132	26	FILLET		
WS-3	8/27/01	BROOK	F	100	9	FILLET	MT-WS3-FIL3	20.0
WS-3	8/27/01	BROOK	-	105	9	FILLET		
WS-3	8/27/01	BROOK	M	102	10	FILLET		
WS-3	8/27/01	BROOK	-	108	12	FILLET		
WS-3	8/27/01	BROOK	-	111	13	FILLET		
WS-3	8/27/01	BROOK	M	125	20	FILLET		
WS-3	8/27/01	BROOK	M	112	12	FILLET	MT-WS3- FIL4	37.2
WS-3	8/27/01	BROOK	-	109	10	FILLET		
WS-3	8/27/01	BROOK	M	110	13	FILLET		
WS-3	8/27/01	BROOK	-	105	9	FILLET		
WS-3	8/27/01	BROOK	-	98	9	FILLET		

Trout Population Data

Site ID	Date	Species	Length (mm)	Weight (g)	Biomass (kg/hectare)
PP-1	8/29/2001	BROOK	124	19	
PP-1	8/29/2001	BROOK	208	121	
PP-1	8/29/2001	BROOK	205	95	
PP-1	8/29/2001	BROOK	172	58	
PP-1	8/29/2001	BROOK	184	67	
PP-1	8/29/2001	BROOK	154	38	
PP-1	8/29/2001	BROOK	166	42	
PP-1	8/29/2001	BROOK	154	32	
PP-1	8/29/2001	BROOK	121	15	
PP-1	8/29/2001	BROOK	122	18	
PP-1	8/29/2001	BROOK	132	25	
PP-1	8/29/2001	BROOK	103	11	
PP-1	8/29/2001	BROOK	156	36	
PP-1	8/29/2001	BROOK	173	56	
PP-1	8/29/2001	BROOK	128	21	
PP-1	8/29/2001	BROOK	114	14	
PP-1	8/29/2001	BROOK	102	12	
PP-1	8/29/2001	BROOK	184	80	
PP-1	8/29/2001	BROOK	154	39	
PP-1	8/29/2001	BROOK	174	54	
PP-1	8/29/2001	BROOK	196	84	
PP-1	8/29/2001	BROOK	196	78	
PP-1	8/29/2001	BROOK	119	16	
PP-1	8/29/2001	BROOK	190	73	
PP-1	8/29/2001	BROOK	120	17	
PP-1	8/29/2001	BROOK	124	21	
PP-1	8/29/2001	BROOK	96	10	
PP-1	8/29/2001	BROOK	150	35	
PP-1	8/29/2001	BROOK	160	37	
PP-1	8/29/2001	BROOK	105	10	
PP-1	8/29/2001	BROOK	198	83	
PP-1	8/29/2001	BROOK	205	97	
PP-1	8/29/2001	BROOK	110	13	
PP-1	8/29/2001	BROOK	122	18	
PP-1	8/29/2001	BROOK	124	17	
PP-1	8/29/2001	BROOK	122	18	
PP-1	8/29/2001	BROOK	104	11	
PP-1	8/29/2001	BROOK	102	12	
PP-1	8/29/2001	BROOK	124	19	
PP-1	8/29/2001	BROOK	114	14	
PP-1	8/29/2001	BROOK	112	15	
PP-1	8/29/2001	BROOK	180	64	
PP-1	8/29/2001	BROOK	124	18	
PP-1	8/29/2001	BROOK	222	129	
PP-1	8/29/2001	BROOK	100	10	
PP-1	8/29/2001	BROOK	110	14	
PP-1	8/29/2001	BROOK	104	12	
PP-1	8/29/2001	BROOK	164	42	
PP-1	8/29/2001	BROOK	119	14	
PP-1	8/29/2001	BROOK	110	15	
PP-1	8/29/2001	BROOK	121	19	
PP-1	8/29/2001	BROOK	122	17	
PP-1	8/29/2001	BROOK	100	10	
PP-1	8/29/2001	BROOK	107	10	
PP-1	8/29/2001	BROOK	108	11	
PP-1	8/29/2001	BROOK	103	10	

Trout Population Data (Continued)

Site ID	Date	Species	Length (mm)	Weight (g)	Biomass (kg/hectare)
PP-1	8/29/2001	BROOK	122	16	
PP-1	8/29/2001	BROOK	164	45	
PP-1	8/29/2001	BROOK	114	15	
PP-1	8/29/2001	BROOK	108	14	
PP-1	8/29/2001	BROOK	108	12	
PP-1	8/29/2001	BROOK	142	32	
PP-1	8/29/2001	BROOK	201	105	
PP-1	8/29/2001	BROOK	115	16	
PP-1	8/29/2001	BROOK	139	27	
PP-1	8/29/2001	BROOK	122	22	
PP-1	8/29/2001	BROOK	125	21	
PP-1	8/29/2001	BROOK	111	14	
PP-1	8/29/2001	BROOK	104	10	
PP-1	8/29/2001	BROOK	110	12	
PP-1	8/29/2001	BROOK	176	63	
PP-1	8/29/2001	BROOK	162	37	
PP-1	8/29/2001	BROOK	104	12	
PP-1	8/29/2001	BROOK	109	13	
PP-1	8/29/2001	BROOK	122	19	
PP-1	8/29/2001	BROOK	128	23	
PP-1	8/29/2001	BROOK	115	13	
PP-1	8/29/2001	BROOK	120	16	
PP-1	8/29/2001	BROOK	216	96	
PP-1	8/29/2001	BROOK	96	9	
PP-1	8/29/2001	BROOK	174	54	
PP-1	8/29/2001	BROOK	196	84	
PP-1	8/29/2001	BROOK	196	78	
PP-1	8/29/2001	BROOK	119	16	
PP-1	8/29/2001	BROOK	190	73	
PP-1	8/29/2001	BROOK	120	17	
PP-1	8/29/2001	BROOK	124	21	
PP-1	8/29/2001	BROOK	96	10	
PP-1	8/29/2001	BROOK	150	35	
PP-1	8/29/2001	BROOK	160	37	
PP-1	8/29/2001	BROOK	105	10	
PP-1	8/29/2001	BROOK	198	83	
PP-1	8/29/2001	BROOK	205	97	
PP-1	8/29/2001	BROOK	110	13	
PP-1	8/29/2001	BROOK	122	18	
PP-1	8/29/2001	BROOK	124	17	
PP-1	8/29/2001	BROOK	122	18	
PP-1	8/29/2001	BROOK	104	11	
PP-1	8/29/2001	BROOK	102	12	
PP-1	8/29/2001	BROOK	124	19	
PP-1	8/29/2001	MEAN (all species)	137	33	81
PP-3	8/28/2001	BROOK	244	140	
PP-3	8/28/2001	BROOK	188	79	
PP-3	8/28/2001	BROOK	160	65	
PP-3	8/28/2001	BROOK	164	74	
PP-3	8/28/2001	BROOK	168	47	
PP-3	8/28/2001	BROOK	142	33	
PP-3	8/28/2001	BROOK	144	34	
PP-3	8/28/2001	BROOK	148	35	
PP-3	8/28/2001	BROOK	150	36	
PP-3	8/28/2001	BROOK	138	35	
PP-3	8/28/2001	BROOK	150	36	

Trout Population Data (Continued)

Site ID	Date	Species	Length (mm)	Weight (g)	Biomass (kg/hectare)
PP-3	8/28/2001	BROOK	146	25	
PP-3	8/28/2001	BROOK	96	11	
PP-3	8/28/2001	BROOK	128	26	
PP-3	8/28/2001	BROOK	94	11	
PP-3	8/28/2001	BROOK	98	12	
PP-3	8/28/2001	BROOK	98	13	
PP-3	8/28/2001	BROOK	92	13	
PP-3	8/28/2001	BROOK	98	15	
PP-3	8/28/2001	BROOK	92	10	
PP-3	8/28/2001	BROOK	90	8	
PP-3	8/28/2001	BROWN	439	839	
PP-3	8/28/2001	BROWN	294	248	
PP-3	8/28/2001	BROWN	269	221	
PP-3	8/28/2001	BROWN	260	158	
PP-3	8/28/2001	BROWN	262	187	
PP-3	8/28/2001	BROWN	210	109	
PP-3	8/28/2001	BROWN	240	153	
PP-3	8/28/2001	BROWN	228	118	
PP-3	8/28/2001	BROWN	230	128	
PP-3	8/28/2001	BROWN	264	189	
PP-3	8/28/2001	BROWN	242	148	
PP-3	8/28/2001	BROWN	208	90	
PP-3	8/28/2001	BROWN	214	114	
PP-3	8/28/2001	BROWN	198	77	
PP-3	8/28/2001	BROWN	150	55	
PP-3	8/28/2001	BROWN	220	101	
PP-3	8/28/2001	BROWN	154	46	
PP-3	8/28/2001	BROWN	200	73	
PP-3	8/28/2001	BROWN	152	37	
PP-3	8/28/2001	BROWN	184	63	
PP-3	8/28/2001	BROWN	144	33	
PP-3	8/28/2001	BROWN	154	50	
PP-3	8/28/2001	BROWN	142	31	
PP-3	8/28/2001	BROWN	136	24	
PP-3	8/28/2001	BROWN	152	34	
PP-3	8/28/2001	BROWN	126	22	
PP-3	8/28/2001	BROWN	128	21	
PP-3	8/28/2001	RAINBOW	264	212	
PP-3	8/28/2001	RAINBOW	298	240	
PP-3	8/28/2001	RAINBOW	258	206	
PP-3	8/28/2001	RAINBOW	308	254	
PP-3	8/28/2001	RAINBOW	200	75	
PP-3	8/28/2001	RAINBOW	220	111	
PP-3	8/28/2001	RAINBOW	240	142	
PP-3	8/28/2001	RAINBOW	262	179	
PP-3	8/28/2001	RAINBOW	298	219	
PP-3	8/28/2001	RAINBOW	160	62	
PP-3	8/28/2001	RAINBOW	122	28	
PP-3	8/28/2001	RAINBOW	130	24	
PP-3	8/28/2001	RAINBOW	115	19	
PP-3	8/28/2001	RAINBOW	114	19	
PP-3	8/28/2001	RAINBOW	120	21	
PP-3	8/28/2001	BROOK	166	44	
PP-3	8/28/2001	BROOK	160	40	
PP-3	8/28/2001	BROOK	90	7	
PP-3	8/28/2001	BROOK	156	37	

Trout Population Data (Continued)

Site ID	Date	Species	Length (mm)	Weight (g)	Biomass (kg/hectare)
PP-3	8/28/2001	BROOK	90	8	
PP-3	8/28/2001	BROWN	236	130	
PP-3	8/28/2001	BROWN	226	130	
PP-3	8/28/2001	BROWN	150	31	
PP-3	8/28/2001	BROWN	144	28	
PP-3	8/28/2001	BROWN	160	40	
PP-3	8/28/2001	BROWN	132	24	
PP-3	8/28/2001	BROWN	126	18	
PP-3	8/28/2001	RAINBOW	130	20	
PP-3	8/28/2001	RAINBOW	166	42	
PP-3	8/28/2001	RAINBOW	134	24	
PP-3	8/28/2001	RAINBOW	132	21	
PP-3	8/28/2001	RAINBOW	134	24	
PP-3	8/28/2001	MEAN (all species)	176	83	167
PP-5	8/28/2001	BROWN	161	39	
PP-5	8/28/2001	BROWN	151	36	
PP-5	8/28/2001	BROWN	162	38	
PP-5	8/28/2001	BROWN	240	122	
PP-5	8/28/2001	BROWN	161	38	
PP-5	8/28/2001	BROWN	170	53	
PP-5	8/28/2001	BROWN	159	30	
PP-5	8/28/2001	BROWN	290	178	
PP-5	8/28/2001	RAINBOW	181	59	
PP-5	8/28/2001	RAINBOW	160	42	
PP-5	8/28/2001	RAINBOW	145	29	
PP-5	8/28/2001	RAINBOW	163	45	
PP-5	8/28/2001	RAINBOW	161	38	
PP-5	8/28/2001	RAINBOW	190	75	
PP-5	8/28/2001	RAINBOW	154	34	
PP-5	8/28/2001	RAINBOW	152	31	
PP-5	8/28/2001	RAINBOW	142	26	
PP-5	8/28/2001	RAINBOW	146	30	
PP-5	8/28/2001	RAINBOW	244	108	
PP-5	8/28/2001	RAINBOW	145	32	
PP-5	8/28/2001	RAINBOW	159	38	
PP-5	8/28/2001	RAINBOW	153	37	
PP-5	8/28/2001	RAINBOW	151	34	
PP-5	8/28/2001	RAINBOW	220	105	
PP-5	8/28/2001	RAINBOW	131	23	
PP-5	8/28/2001	RAINBOW	136	24	
PP-5	8/28/2001	RAINBOW	172	48	
PP-5	8/28/2001	RAINBOW	138	28	
PP-5	8/28/2001	RAINBOW	137	27	
PP-5	8/28/2001	RAINBOW	166	48	
PP-5	8/28/2001	RAINBOW	183	65	
PP-5	8/28/2001	RAINBOW	152	35	
PP-5	8/28/2001	RAINBOW	143	31	
PP-5	8/28/2001	BROWN	170	43	
PP-5	8/28/2001	RAINBOW	172	50	
PP-5	8/28/2001	MEAN (all species)	167	49	24
L-1a	8/26/2001	CUTTHROAT	154	29	
L-1a	8/26/2001	CUTTHROAT	124	15	
L-1a	8/26/2001	CUTTHROAT	127	17	
L-1a	8/26/2001	CUTTHROAT	105	10	
L-1a	8/26/2001	CUTTHROAT	120	16	
L-1a	8/26/2001	CUTTHROAT	130	20	

Trout Population Data (Continued)

Site ID	Date	Species	Length (mm)	Weight (g)	Biomass (kg/hectare)
L-1a	8/26/2001	CUTTHROAT	85	5	
L-1a	8/26/2001	CUTTHROAT	71	3	
L-1a	8/26/2001	CUTTHROAT	102	9	
L-1a	8/26/2001	CUTTHROAT	75	4	
L-1a	8/26/2001	CUTTHROAT	95	7	
L-1a	8/26/2001	CUTTHROAT	82	4	
L-1a	8/26/2001	CUTTHROAT	104	8	
L-1a	8/26/2001	CUTTHROAT	101	6	
L-1a	8/26/2001	CUTTHROAT	69	3	
L-1a	8/26/2001	CUTTHROAT	67	2	
L-1a	8/26/2001	CUTTHROAT	70	3	
L-1a	8/26/2001	CUTTHROAT	70	3	
L-1a	8/26/2001	CUTTHROAT	80	4	
L-1a	8/26/2001	CUTTHROAT	71	3	
L-1a	8/26/2001	CUTTHROAT	60	2	
L-1a	8/26/2001	CUTTHROAT	65	2	
L-1a	8/26/2001	CUTTHROAT	70	3	
L-1a	8/26/2001	CUTTHROAT	75	4	
L-1a	8/26/2001	CUTTHROAT	70	3	
L-1a	8/26/2001	CUTTHROAT	110	11	
L-1a	8/26/2001	CUTTHROAT	140	20	
L-1a	8/26/2001	CUTTHROAT	100	9	
L-1a	8/26/2001	CUTTHROAT	98	8	
L-1a	8/26/2001	CUTTHROAT	98	9	
L-1a	8/26/2001	CUTTHROAT	65	3	
L-1a	8/26/2001	CUTTHROAT	86	4	
L-1a	8/26/2001	CUTTHROAT	71	3	
L-1a	8/26/2001	CUTTHROAT	84	4	
L-1a	8/26/2001	CUTTHROAT	77	4	
L-1a	8/26/2001	CUTTHROAT	72	3	
L-1a	8/26/2001	CUTTHROAT	68	3	
L-1a	8/26/2001	CUTTHROAT	72	4	
L-1a	8/26/2001	CUTTHROAT	128	19	
L-1a	8/26/2001	CUTTHROAT	100	9	
L-1a	8/26/2001	MEAN (all species)	90	7	17
L-5	8/30/2001	BROOK	117	15	
L-5	8/30/2001	BROOK	120	16	
L-5	8/30/2001	BROOK	97	9	
L-5	8/30/2001	BROOK	137	24	
L-5	8/30/2001	BROOK	157	37	
L-5	8/30/2001	BROOK	127	24	
L-5	8/30/2001	BROOK	128	20	
L-5	8/30/2001	BROOK	163	41	
L-5	8/30/2001	BROOK	111	12	
L-5	8/30/2001	BROOK	134	22	
L-5	8/30/2001	BROOK	120	18	
L-5	8/30/2001	BROOK	115	14	
L-5	8/30/2001	BROOK	117	14	
L-5	8/30/2001	BROOK	98	7	
L-5	8/30/2001	BROOK	129	25	
L-5	8/30/2001	BROOK	156	36	
L-5	8/30/2001	BROOK	175	62	
L-5	8/30/2001	BROOK	93	8	
L-5	8/30/2001	BROOK	142	20	
L-5	8/30/2001	BROOK	90	6	
L-5	8/30/2001	BROOK	170	51	

Trout Population Data (Continued)

Site ID	Date	Species	Length (mm)	Weight (g)	Biomass (kg/hectare)
L-5	8/30/2001	BROOK	112	13	
L-5	8/30/2001	BROOK	113	12	
L-5	8/30/2001	BROOK	99	7	
L-5	8/30/2001	BROOK	95	5	
L-5	8/30/2001	BROOK	106	10	
L-5	8/30/2001	BROOK	115	12	
L-5	8/30/2001	BROOK	127	21	
L-5	8/30/2001	BROOK	102	9	
L-5	8/30/2001	BROOK	139	25	
L-5	8/30/2001	BROOK	143	27	
L-5	8/30/2001	BROOK	144	26	
L-5	8/30/2001	BROOK	143	26	
L-5	8/30/2001	BROOK	102	8	
L-5	8/30/2001	BROOK	134	20	
L-5	8/30/2001	BROOK	103	8	
L-5	8/30/2001	BROOK	102	8	
L-5	8/30/2001	BROOK	111	13	
L-5	8/30/2001	BROOK	126	15	
L-5	8/30/2001	BROOK	97	8	
L-5	8/30/2001	BROOK	103	9	
L-5	8/30/2001	BROOK	122	16	
L-5	8/30/2001	BROOK	124	20	
L-5	8/30/2001	BROOK	101	8	
L-5	8/30/2001	BROOK	96	8	
L-5	8/30/2001	BROOK	143	27	
L-5	8/30/2001	BROOK	124	14	
L-5	8/30/2001	BROOK	112	12	
L-5	8/30/2001	BROOK	107	11	
L-5	8/30/2001	BROOK	150	32	
L-5	8/30/2001	BROOK	110	13	
L-5	8/30/2001	BROOK	90	7	
L-5	8/30/2001	BROOK	106	11	
L-5	8/30/2001	BROOK	103	10	
L-5	8/30/2001	BROOK	111	12	
L-5	8/30/2001	BROOK	114	12	
L-5	8/30/2001	BROOK	121	15	
L-5	8/30/2001	BROOK	145	30	
L-5	8/30/2001	BROOK	91	9	
L-5	8/30/2001	BROOK	136	24	
L-5	8/30/2001	BROOK	128	22	
L-5	8/30/2001	BROOK	105	9	
L-5	8/30/2001	BROOK	110	10	
L-5	8/30/2001	BROOK	120	13	
L-5	8/30/2001	BROOK	120	13	
L-5	8/30/2001	BROOK	90	6	
L-5	8/30/2001	BROOK	92	7	
L-5	8/30/2001	BROOK	113	12	
L-5	8/30/2001	BROOK	91	6	
L-5	8/30/2001	BROOK	100	9	
L-5	8/30/2001	BROOK	108	10	
L-5	8/30/2001	BROOK	115	14	
L-5	8/30/2001	BROOK	122	16	
L-5	8/30/2001	BROOK	103	7	
L-5	8/30/2001	BROOK	95	7	
L-5	8/30/2001	BROOK	97	7	
L-5	8/30/2001	BROOK	82	5	

Trout Population Data (Continued)

Site ID	Date	Species	Length (mm)	Weight (g)	Biomass (kg/hectare)
L-5	8/30/2001	BROOK	100	8	
L-5	8/30/2001	BROOK	97	8	
L-5	8/30/2001	BROOK	136	21	
L-5	8/30/2001	BROOK	104	10	
L-5	8/30/2001	BROOK	91	7	
L-5	8/30/2001	BROOK	94	8	
L-5	8/30/2001	BROOK	125	16	
L-5	8/30/2001	BROOK	89	6	
L-5	8/30/2001	BROOK	99	9	
L-5	8/30/2001	BROOK	91	6	
L-5	8/30/2001	BROOK	118	13	
L-5	8/30/2001	BROOK	132	19	
L-5	8/30/2001	BROOK	107	11	
L-5	8/30/2001	BROOK	99	8	
L-5	8/30/2001	BROOK	125	18	
L-5	8/30/2001	BROOK	107	11	
L-5	8/30/2001	BROOK	112	13	
L-5	8/30/2001	BROOK	119	16	
L-5	8/30/2001	BROOK	90	6	
L-5	8/30/2001	BROOK	104	9	
L-5	8/30/2001	BROOK	98	9	
L-5	8/30/2001	BROOK	90	6	
L-5	8/30/2001	BROOK	109	12	
L-5	8/30/2001	BROOK	103	10	
L-5	8/30/2001	BROOK	140	28	
L-5	8/30/2001	BROOK	85	6	
L-5	8/30/2001	BROOK	98	9	
L-5	8/30/2001	BROOK	99	8	
L-5	8/30/2001	BROOK	96	9	
L-5	8/30/2001	BROOK	89	6	
L-5	8/30/2001	BROOK	85	5	
L-5	8/30/2001	BROOK	107	10	
L-5	8/30/2001	BROOK	117	15	
L-5	8/30/2001	BROOK	120	16	
L-5	8/30/2001	BROOK	97	9	
L-5	8/30/2001	MEAN (all species)	113	14	57
WS-3	8/27/2001	BROOK	91	6	
WS-3	8/27/2001	BROOK	130	27	
WS-3	8/27/2001	BROOK	100	9	
WS-3	8/27/2001	BROOK	105	10	
WS-3	8/27/2001	BROOK	88	6	
WS-3	8/27/2001	BROOK	96	8	
WS-3	8/27/2001	BROOK	99	10	
WS-3	8/27/2001	BROOK	112	13	
WS-3	8/27/2001	BROOK	90	6	
WS-3	8/27/2001	BROOK	115	17	
WS-3	8/27/2001	BROOK	99	9	
WS-3	8/27/2001	BROOK	100	12	
WS-3	8/27/2001	BROOK	127	24	
WS-3	8/27/2001	BROOK	89	7	
WS-3	8/27/2001	BROOK	83	5	
WS-3	8/27/2001	BROOK	107	10	
WS-3	8/27/2001	BROOK	97	10	
WS-3	8/27/2001	BROOK	86	6	
WS-3	8/27/2001	BROOK	115	16	
WS-3	8/27/2001	BROOK	84	6	

Trout Population Data (Continued)

Site ID	Date	Species	Length (mm)	Weight (g)	Biomass (kg/hectare)
WS-3	8/27/2001	BROOK	117	19	
WS-3	8/27/2001	BROOK	107	12	
WS-3	8/27/2001	BROOK	74	4	
WS-3	8/27/2001	BROOK	93	8	
WS-3	8/27/2001	BROOK	82	5	
WS-3	8/27/2001	BROOK	89	9	
WS-3	8/27/2001	BROOK	110	12	
WS-3	8/27/2001	BROOK	81	5	
WS-3	8/27/2001	BROOK	95	9	
WS-3	8/27/2001	BROOK	91	6	
WS-3	8/27/2001	BROOK	82	6	
WS-3	8/27/2001	BROOK	88	7	
WS-3	8/27/2001	BROOK	94	8	
WS-3	8/27/2001	BROOK	93	8	
WS-3	8/27/2001	BROOK	87	6	
WS-3	8/27/2001	BROOK	82	5	
WS-3	8/27/2001	BROOK	82	6	
WS-3	8/27/2001	BROOK	97	7	
WS-3	8/27/2001	BROOK	92	9	
WS-3	8/27/2001	BROOK	100	10	
WS-3	8/27/2001	BROOK	86	5	
WS-3	8/27/2001	BROOK	105	10	
WS-3	8/27/2001	MEAN (all species)	96	9	17
C-5	8/30/2001	BROOK	129	26	
C-5	8/30/2001	BROOK	136	32	
C-5	8/30/2001	BROOK	129	22	
C-5	8/30/2001	BROOK	127	21	
C-5	8/30/2001	BROOK	133	26	
C-5	8/30/2001	BROOK	217	105	
C-5	8/30/2001	BROOK	112	13	
C-5	8/30/2001	BROOK	139	24	
C-5	8/30/2001	BROOK	176	54	
C-5	8/30/2001	BROOK	119	18	
C-5	8/30/2001	BROOK	132	19	
C-5	8/30/2001	BROOK	177	57	
C-5	8/30/2001	BROOK	140	31	
C-5	8/30/2001	BROOK	114	16	
C-5	8/30/2001	BROOK	114	15	
C-5	8/30/2001	BROOK	134	20	
C-5	8/30/2001	BROOK	130	22	
C-5	8/30/2001	BROOK	133	21	
C-5	8/30/2001	BROOK	152	38	
C-5	8/30/2001	BROOK	131	23	
C-5	8/30/2001	BROOK	125	18	
C-5	8/30/2001	BROOK	157	38	
C-5	8/30/2001	BROOK	165	48	
C-5	8/30/2001	BROOK	132	24	
C-5	8/30/2001	BROOK	132	25	
C-5	8/30/2001	BROOK	133	20	
C-5	8/30/2001	BROOK	131	22	
C-5	8/30/2001	BROOK	120	17	
C-5	8/30/2001	BROWN	195	91	
C-5	8/30/2001	BROWN	132	24	
C-5	8/30/2001	BROWN	122	19	
C-5	8/30/2001	BROWN	95	9	
C-5	8/30/2001	BROWN	85	6	

Trout Population Data (Continued)

Site ID	Date	Species	Length (mm)	Weight (g)	Biomass (kg/hectare)
C-5	8/30/2001	BROWN	130	23	
C-5	8/30/2001	BROWN	106	10	
C-5	8/30/2001	BROWN	118	15	
C-5	8/30/2001	BROWN	198	84	
C-5	8/30/2001	BROWN	87	8	
C-5	8/30/2001	BROWN	179	57	
C-5	8/30/2001	BROWN	188	60	
C-5	8/30/2001	BROWN	107	11	
C-5	8/30/2001	BROWN	125	20	
C-5	8/30/2001	BROWN	121	17	
C-5	8/30/2001	BROWN	117	18	
C-5	8/30/2001	BROWN	106	11	
C-5	8/30/2001	BROWN	127	23	
C-5	8/30/2001	BROWN	110	13	
C-5	8/30/2001	BROWN	101	10	
C-5	8/30/2001	BROWN	109	13	
C-5	8/30/2001	BROWN	111	14	
C-5	8/30/2001	BROWN	90	7	
C-5	8/30/2001	BROWN	107	10	
C-5	8/30/2001	BROWN	121	18	
C-5	8/30/2001	BROWN	106	12	
C-5	8/30/2001	BROWN	109	12	
C-5	8/30/2001	BROWN	95	9	
C-5	8/30/2001	BROWN	115	13	
C-5	8/30/2001	BROWN	114	14	
C-5	8/30/2001	BROWN	112	13	
C-5	8/30/2001	BROWN	104	10	
C-5	8/30/2001	BROWN	100	9	
C-5	8/30/2001	BROWN	102	10	
C-5	8/30/2001	BROWN	100	10	
C-5	8/30/2001	BROWN	117	17	
C-5	8/30/2001	BROWN	102	10	
C-5	8/30/2001	BROWN	105	11	
C-5	8/30/2001	BROWN	99	9	
C-5	8/30/2001	BROWN	87	6	
C-5	8/30/2001	BROWN	142	25	
C-5	8/30/2001	BROWN	119	17	
C-5	8/30/2001	BROWN	100	8	
C-5	8/30/2001	BROWN	116	15	
C-5	8/30/2001	BROWN	125	20	
C-5	8/30/2001	BROWN	92	8	
C-5	8/30/2001	BROWN	111	11	
C-5	8/30/2001	RAINBOW	152	32	
C-5	8/30/2001	RAINBOW	107	12	
C-5	8/30/2001	RAINBOW	105	10	
C-5	8/30/2001	BROOK	133	25	
C-5	8/30/2001	BROOK	115	12	
C-5	8/30/2001	BROWN	99	10	
C-5	8/30/2001	BROWN	100	9	
C-5	8/30/2001	BROWN	122	18	
C-5	8/30/2001	BROWN	98	9	
C-5	8/30/2001	BROWN	95	8	
C-5	8/30/2001	BROWN	107	11	
C-5	8/30/2001	BROWN	110	12	
C-5	8/30/2001	BROWN	100	9	
C-5	8/30/2001	BROWN	95	8	

Trout Population Data (Continued)

Site ID	Date	Species	Length (mm)	Weight (g)	Biomass (kg/hectare)
C-5	8/30/2001	RAINBOW	97	9	
C-5	8/30/2001	RAINBOW	86	7	
C-5	8/30/2001	RAINBOW	94	8	
C-5	8/30/2001	RAINBOW	80	5	
C-5	8/30/2001	RAINBOW	113	13	
C-5	8/30/2001	MEAN (all species)	121	20	71

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