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In cooperation with the Bureau of Land Management, the California State Water Resources Control Board, the Nevada County Resource Conservation District, and the U.S. Department of Agriculture–Forest Service

Geochemical Characterization of Water, Sediment, and Biota Affected by Mercury Contamination and Acidic Drainage from Historical Gold Mining, Greenhorn Creek, Nevada County, California, 1999–2001

Scientific Investigations Report 2004-5251

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

Photographs on front cover (clockwise, from upper left):

(upper left) Visible mercury at contact between alluvium and slate bedrock, Sailor Flat Mine, Greenhorn Creek drainage, Nevada County, California; total length of ruler is 4.8 inches. Photograph by M.P. Hunerlach.

(upper right) Confluence of Greenhorn Creek and main drain from Buckeye Flat, looking upstream, Nevada County, California. Photograph by M.P. Hunerlach.

(lower right) Iron-rich precipitate in ground sluice at Poore Mine, Greenhorn Creek drainage, Nevada County, California. Photograph by M.P. Hunerlach.

(center) Aerial view of central part of Greenhorn Creek drainage showing Buckeye Flat Mine and pit lake, Nevada County, California. Photograph courtesy of the U.S. Department of Agriculture–Forest Service, Tahoe National Forest.

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

U.S. Department of the Interior
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Conversion Factors, Datums, Acronyms, Abbreviations, and Chemical Notation

Multiply	By	To obtain
cubic foot per second (ft^3/s)	0.02832	cubic meter per second (m^3/s)
cubic yard (yd^3)	0.7646	cubic meter (m^3)
foot (ft)	0.3048	meter (m)
gallon per minute (gal/min)	0.002228	cubic foot per second (ft^3/s))
gallon per minute (gal/min)	0.06309	liter per second (L/s)
inch (in.)	2.54	centimeter (cm)
mile (mi)	1.609	kilometer (km)
pound (lb)	0.4536	kilogram (kg)

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

$$°F = (1.8 \times °C) + 32$$

Spatial Datums

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

Elevation, as used in this report, refers to distance above the National Geodetic Vertical Datum of 1929 (NGVD of 1929).

Specific conductance is given in microsiemens per centimeter at 25 degrees Celsius (µS/cm at 25°C).

Concentrations of chemical constituents in water are given in either milligrams per liter (mg/L), micrograms per liter (µg/L), or nanograms per liter (ng/L).

Acronyms, Abbreviations, and Chemical Notation

Acronyms

ASTM, American Society for Testing and Materials

CRV, certified reference value

CVAAS, cold-vapor atomic-absorption spectrometry

CVAFS, cold-vapor atomic-fluorescence spectrometry

DI, deionized (water)

DO, dissolved oxygen

DOC, dissolved organic carbon

EWI, equal width increment

FDA, Food and Drug Administration

GC, gas chromatography

GI, gastrointestinal

IC, ion chromatography

ICP–AES, inductively coupled plasma–atomic emission spectrometry

ICP–MS, inductively coupled plasma–mass spectrometry

MDL, method detection limit

NCRCD, Nevada County Resource Conservation District
NRCC, National Research Council Canada
NRP, National Research Program
NIST, National Institute of Standards and Technology
PACF, Patuxent Analytical Control Facility
POC, Particulate organic carbon
QA, quality assurance
QC, quality control
RPD, relative percentage difference
RSD, relative standard deviation
SC, specific conductance
SRM, standard reference material
SRWS, standard reference water sample
SSC, suspended sediment concentration
SSWD, South Sutter Water District
SWRCB, State Water Resources Control Board
TERL, Trace Element Research Laboratory
USDA–FS, U.S. Department of Agriculture–Forest Service
USEPA, United States Environmental Protection Agency
USGS, United States Geological Survey
WDML, Wisconsin District Mercury Laboratory

Abbreviations

cm, centimeter
g, gram
kg, kilogram
L, liter
µg, microgram
mg, milligram
mL, milliliter
µm, micrometer
MΩ-cm, megaohm-centimeter
ng, nanogram
ppb, part per billion
ppm, part per million
wt, weight
s, second
>, greater than
<, less than

Chemical Notation

Al, aluminum

As, arsenic
B, boron
Ba, barium
Be, beryllium
Bi, bismuth
B, boron
Ca, calcium
Cd, cadmium
Ce, cerium
CH_2Cl_2, methylene chloride
Cl, chloride
Co, cobalt
Cr, chromium
Cs, cesium
Cu, copper
$CuSO_4$, copper sulfate
Dy, dysprosium
Er, erbium
Eu, europium
Fe, iron
Gd, gadolinium
HCl, hydrochloric acid
HF, hydrofluoric acid
Hg, mercury
Hg^0, elemental mercury
Hg^{2+}, mercuric ion
$HgCl_2$, mercuric chloride
HNO_3, nitric acid
Ho, holmium
In, indium
Ir, iridium
K, potassium
KBr, potassium bromide
La, lanthanum
Li, lithium
Lu, lutetium
MeHg, methylmercury (monomethylmercury)
Mg, magnesium
Mn, manganese
N, nitrogen
Na, sodium
$NaBEt_4$, sodium tetra-ethyl borate

Nd, neodymium
NH_3, ammonia
Ni, nickel
NO_2^-, nitrite
NO_3^-, nitrate
P, phosphorous
PO_4, orthophosphate
Pb, lead
Pr, praseodymium
Rb, rubidium
Re, rhenium
Rh, rhodium
S, sulfur
Sb, antimony
Se, selenium
SiO_2, silicon oxide (silica)
Sm, samarium
Sn, tin
SO_4, sulfate
$SnCl_2$, stannous chloride
Sr, strontium
Tb, terbium
Te, tellurium
Th, thorium
THg, total mercury
Tl, thallium
Tm, thulium
U, uranium
V, vanadium
Y, yttrium
Yb, ytterbium
Zn, zinc
Zr, zirconium

Geochemical characterization of water, sediment, and biota affected by mercury contamination and acidic drainage from historical gold mining, Greenhorn Creek, Nevada County, California, 1999–2001

By Charles N. Alpers, Michael P. Hunerlach, Jason T. May, Roger L. Hothem, Howard E. Taylor, Ronald C. Antweiler, John F. De Wild, and David A. Lawler

Abstract

In 1999, the U.S. Geological Survey (USGS) initiated studies of mercury and methylmercury occurrence, transformation, and transport in the Bear River and Yuba River watersheds of the northwestern Sierra Nevada. Because these watersheds were affected by large-scale, historical gold extraction using mercury amalgamation beginning in the 1850s, they were selected for a pilot study of mercury transport by the USGS and other cooperating agencies. This report presents data on methylmercury (MeHg) and total mercury (THg) concentrations in water, bed sediment, invertebrates, and frogs collected at 40 stations during 1999–2001 in the Greenhorn Creek drainage, a major tributary to the Bear River. Results document several mercury contamination "hot spots" that represent potential targets for ongoing and future remediation efforts at abandoned mine sites in the study area.

Water-quality samples were collected one or more times at each of 29 stations. The concentrations of total mercury in 45 unfiltered water samples ranged from 0.80 to 153,000 nanograms per liter (ng/L); the median was 9.6 ng/L. Total mercury concentrations in filtered water (41 samples) ranged from less than 0.3 to 8,000 ng/L; the median was 2.7 ng/L. Concentrations of methylmercury in the unfiltered water (40 samples) ranged from less than 0.04 to 9.1 ng/L; the median was 0.07 ng/L. Methylmercury in filtered water (13 samples) ranged from less than 0.04 to 0.27 ng/L; the median was 0.04 ng/L. Acidic drainage with pH values as low as 3.4 was encountered in some of the mined areas. Elevated concentrations of aluminum, cadmium, copper, iron, manganese, nickel, and zinc were found at several stations, especially in the more acidic water samples.

Total mercury concentrations in sediment were determined by laboratory and field methods. Total mercury concentrations (determined by laboratory methods) in ten samples from eight stations ranged from about 0.0044 to 12 µg/g (microgram per gram, equivalent to part per million). Methylmercury concentrations in these samples ranged from less than 0.00011 to 0.0095 µg/g. A field panning method was used to determine the concentration of liquid elemental mercury in 22 samples from 14 stations. Measured quantities of elemental mercury recovered by panning ranged from a trace amount estimated at 100 milligrams per kilogram (equivalent to parts per million) to 45,000 milligrams per kilogram (equivalent to 4.5 per cent, by weight).

In total, 194 invertebrate samples were collected at 31 stations; 78 of the samples were analyzed for concentrations of THg and MeHg and used to calculate MeHg to THg ratios. In total, 69 frog samples were collected at 19 stations, and all were analyzed only for THg. Ranges of MeHg concentrations (µg/g, wet weight) in invertebrate samples and number of samples (n) were 0.0012–0.048 for banana slugs (Arionidae, n = 27), 0.027–0.39 for dobsonflies (Corydalidae, n = 14), 0.029–0.50 for predaceous diving beetles (Dytiscidae, n = 31), 0.026–0.52 for predaceous stoneflies (Perlidae, n = 18), 0.011–1.6 for dragonflies (Odonata, n = 46), and 0.061–0.55 for water striders (Gerridae, n = 56). The ratio of MeHg to THg in invertebrates was greater than 50 percent for 74 of 78 samples.

The data from this reconnaissance sampling effort have been used by land-management agencies in selecting abandoned mine sites for remediation. The Forest Service has remediated the Sailor Flat site, and the Bureau of Land Management has initiated plans to remediate the Boston Mine drainage tunnel.

Introduction

The Bear River watershed in the northwestern Sierra Nevada (*fig. 1*) was the site of considerable mining of *placer gold* deposits using *hydraulic* methods during the latter half of the 19th century and the first part of the 20th century (Hunerlach and others, 1999; Alpers and Hunerlach, 2000; Hunerlach and Alpers, 2003; Alpers and others, 2005). Gilbert (1917) estimated that between the 1850s and early 1900s hydraulic mining displaced 254 million cubic yards of gravel and sediment in the Bear River watershed. We estimate that 71 million cubic yards of this total were displaced in the Greenhorn Creek drainage, as explained in a later section of this report. The reader is referred to the reports cited above (and references therein) for a description of the history of hydraulic mining in the Sierra Nevada, including documentation of the extensive use of liquid mercury (Hg) to recover gold from placer ores by sluicing methods and *amalgamation*.

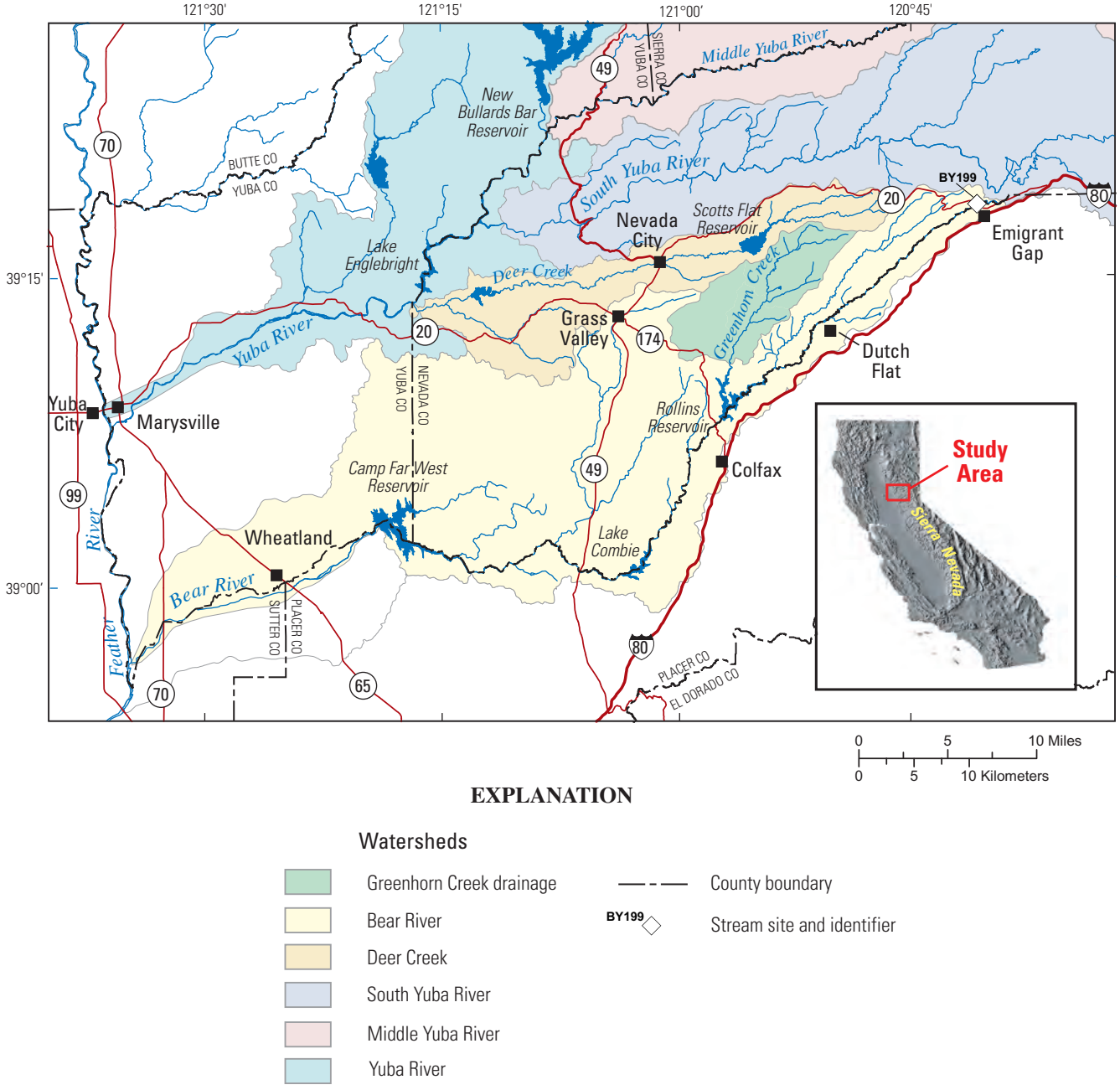


Figure 1. Location of Greenhorn Creek drainage in the Bear River watershed, Nevada County, California.

Description of Study Area

Greenhorn Creek is a tributary to Rollins Reservoir, one of several man-made impoundments on the Bear River (*fig. 1*). The Greenhorn Creek drainage is located within Nevada County, in the northwestern Sierra Nevada. The Bear River flows into the lower Feather River, a major tributary to the Sacramento River, which flows into the Sacramento–San Joaquin Delta and San Francisco Bay. The elevation of the Rollins Reservoir spillway is 2,171 feet above sea level. The highest sampling point in the Greenhorn Creek watershed is the Headwaters station (*figs. 2*, *3*) at 4,262 feet above sea level. The area has a Mediterranean climate; precipitation falls primarily between November and April. Annual precipitation in nearby Grass Valley, California (*fig. 1*), is 53.3 inches per year, including average annual snowfall of about 10 inches per year, based on records from October 1966 through March 2003 (Western Regional Climate Center, 2004).

Mining History

According to one version of California Gold Rush history, hydraulic mining began during 1852, when Antoine Chabot used a canvas hose to wash loose gravel from a large *bench deposit* at Buckeye Hill, located on Buckeye Ridge, between the South Fork of Greenhorn Creek and Greenhorn Creek (*fig. 4*) (May, 1970). In 1853, Edward Matteson applied a steel nozzle to a canvas hose to improve the velocity and force of water delivery at American Hill near Grass Valley, and his success led to the rapid spread of hydraulic mining throughout the vast *Tertiary-age river-channel deposits* exposed in the drainages of Greenhorn Creek. Large-scale hydraulic mining occurred in the Sierra Nevada from 1855 through the early 1880s (Clark, 1963). Most hydraulic mining stopped in 1884 because of the case of Woodruff versus North Bloomfield, which led to what has become known as the Sawyer Decision (Kelley, 1959). Woodruff was a farmer whose lands were affected by sediments discharged from upstream hydraulic mines, and North Bloomfield was one of the largest mining companies in the Sierra Nevada, active in the Malakoff Diggings area of the South Yuba River watershed (*fig. 1*).

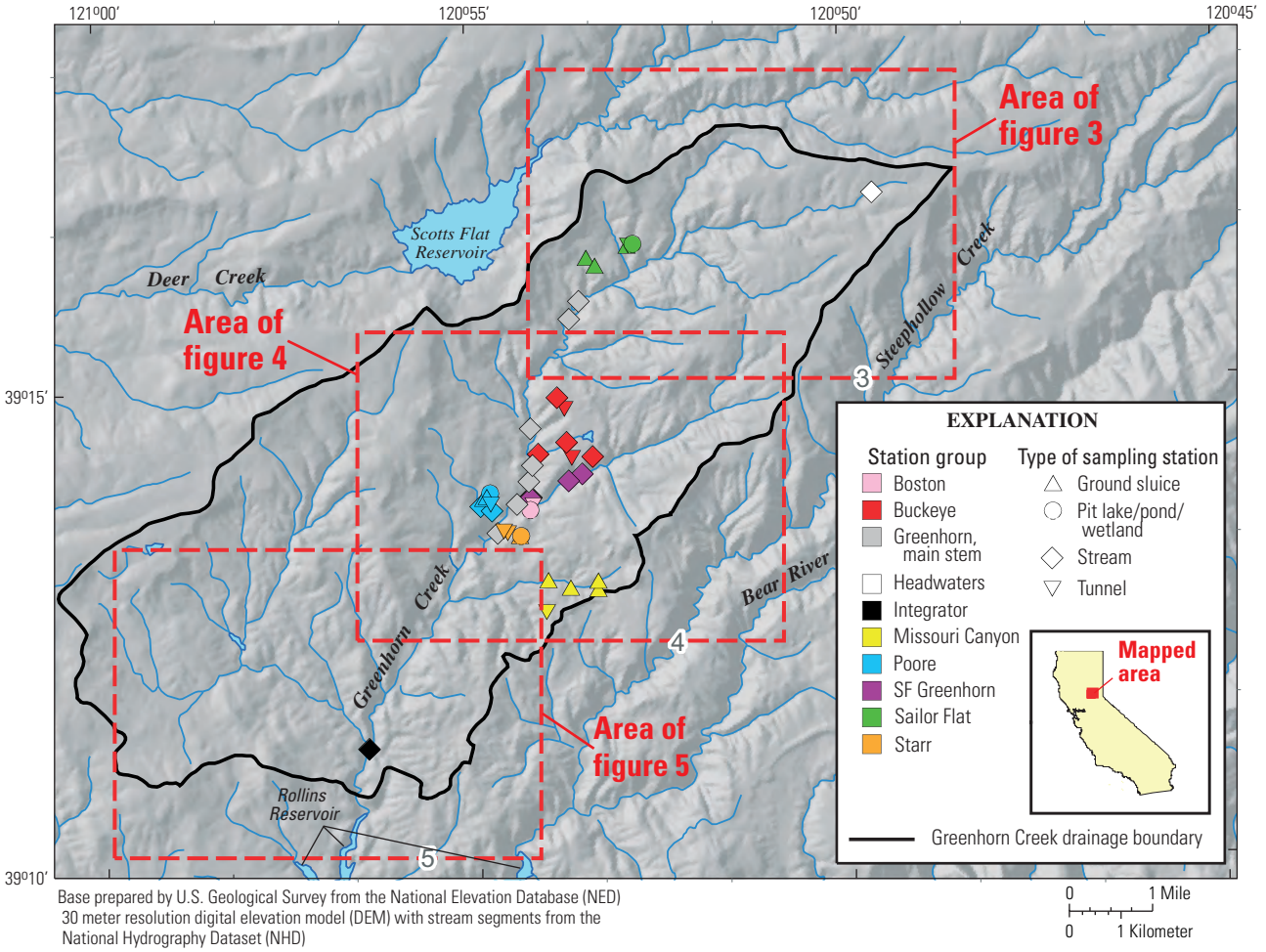


Figure 2. Sampling stations in the Greenhorn Creek drainage, Nevada County, California. Red boxes outline areas of figures 3–5.

The rich, gold-bearing gravels in the Greenhorn Creek drainage were part of the ancestral Yuba River system, which flowed from south to north in this area (Lindgren, 1911). The gold-bearing river-channel deposits ranged from one to four miles wide and were up to 600 feet thick near Hunts Hill (formerly known as Gouge Eye) and at Buckeye Hill. Greenhorn Creek and its tributaries drain three principal mining areas—Quaker Hill, Red Dog, and You Bet (*fig. A1*)—which contributed the bulk of the 71 million cubic yards of production from numerous hydraulic mines. At Quaker Hill, more than 35 million cubic yards of gravel with an average yield of $0.06 per cubic yard were processed. (The value of gold during the late 1800s was about $20 per ounce; a *tenor* of $0.06 per cubic yard corresponds to 0.003 ounces per cubic yard.) More than 6.7 million cubic yards were processed at Hunts Hill and more than 6 million cubic yards at Buckeye Hill. The You Bet and Red Dog mining areas are in both the Greenhorn Creek and Steephollow Creek drainages; combined production in these areas was more than 47 million cubic yards, of which about half, some 23.5 million cubic yards with a gold tenor of more than $0.25 per yard, probably was discharged into the Greenhorn Creek drainage (Jarmin, 1927), and the remainder was discharged into Steephollow Creek (*fig. 2*).

The unconsolidated upper gravels in the deposits of the ancestral Yuba River were easily mined by the hydraulic method, whereas the deeper, more *cemented gravels* were commonly drift mined. Drift mining was done underground through tunnels that commonly followed the deepest portion of the channel parallel to its original course. The well-cemented deeper gravels required *stamp mills* to break up the ore and liberate of the gold (Hobson and Wiltsee, 1893). At least fifteen stamp mills were operated in the Red Dog and Quaker Hill mining districts during peak production.

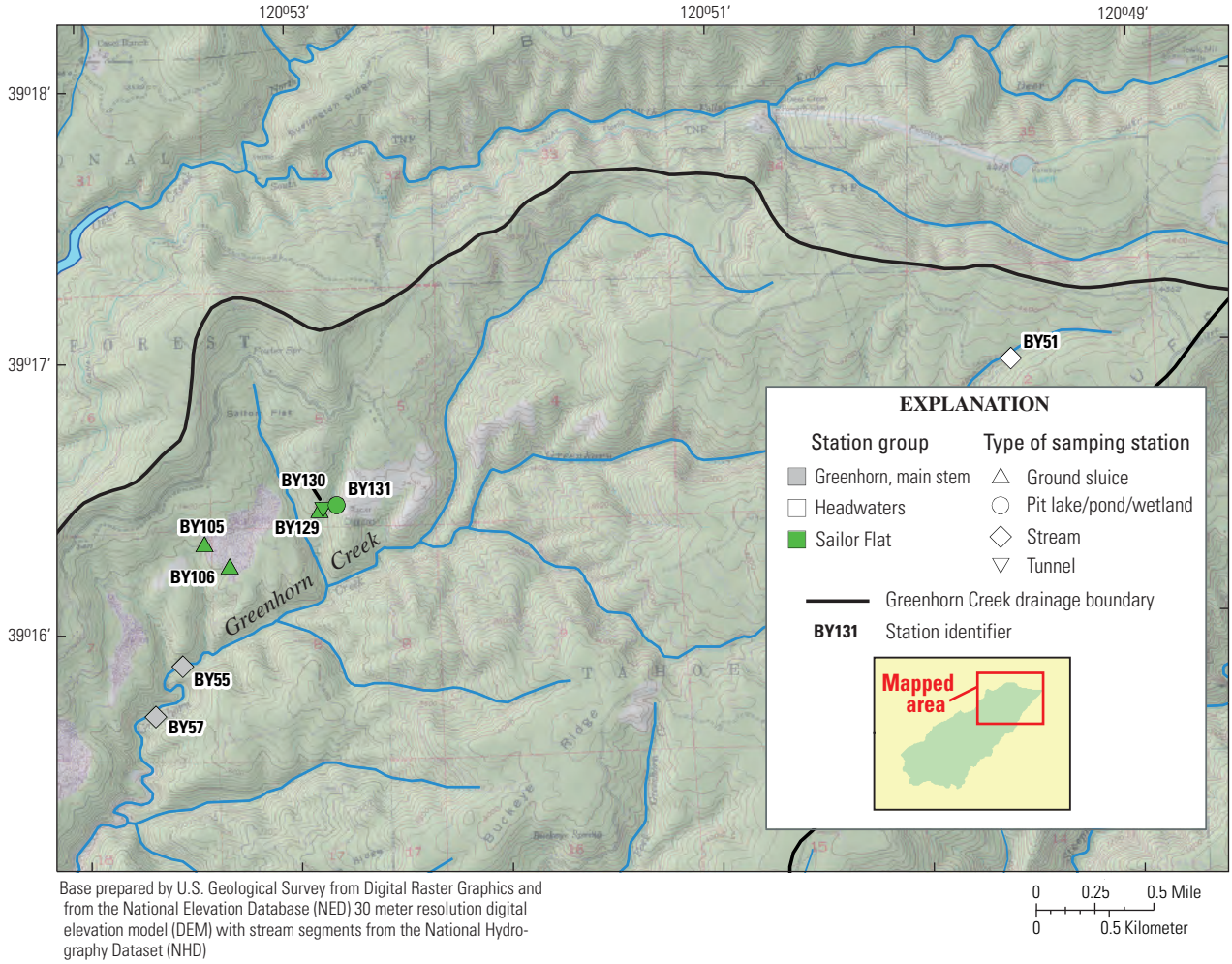
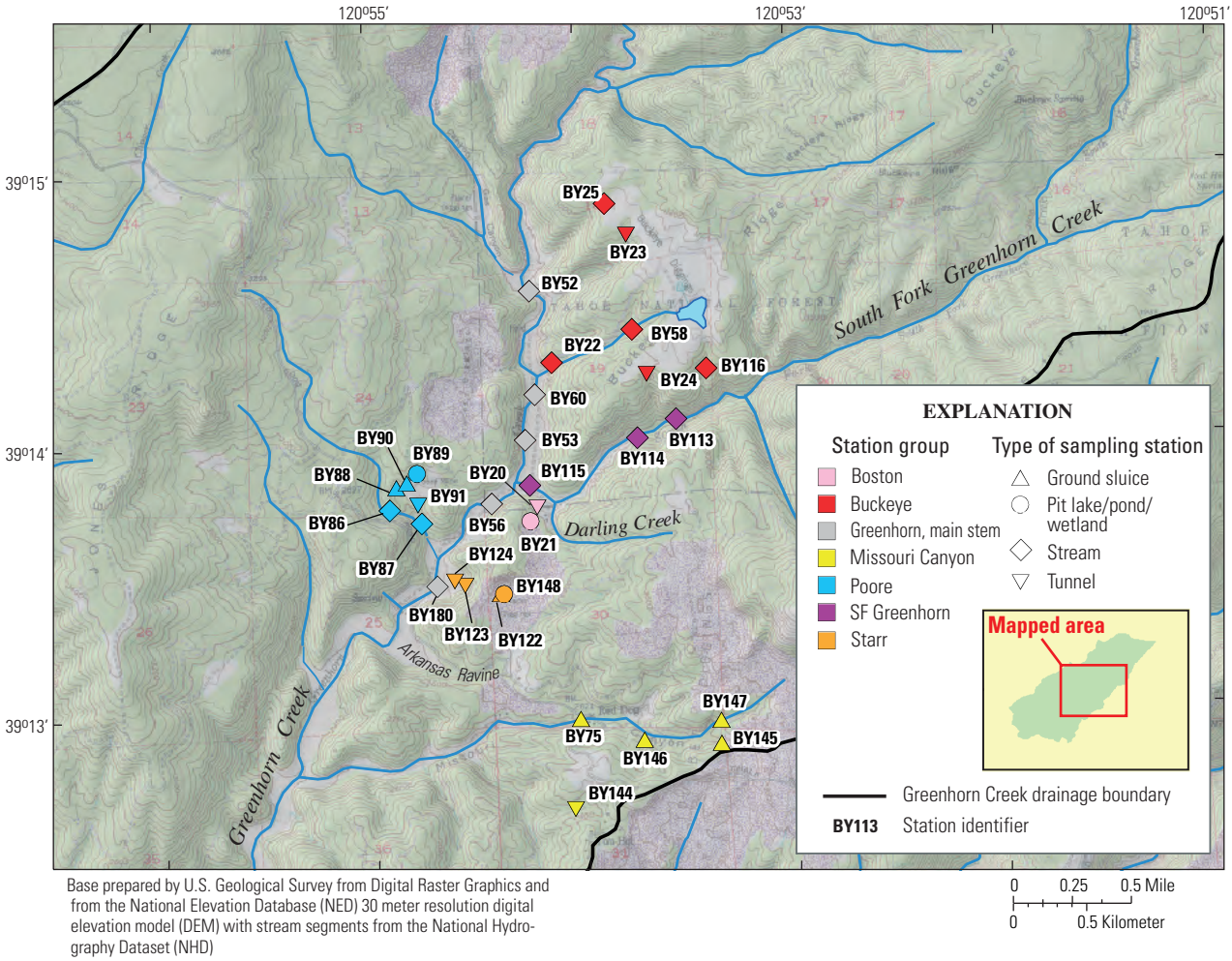


Figure 3. Sampling stations in the northern part of Greenhorn Creek drainage, Nevada County, California.

Previous Work on Mercury Contamination

A reconnaissance sampling of mercury in invertebrates and small fish during the mid 1990s indicated that mercury *bioaccumulation* in the Bear River and South Yuba River watersheds was more severe than in adjacent watersheds in the northern Sierra Nevada, including the North Yuba, Middle Yuba, Feather, and American River watersheds (Slottton and others, 1997). Based in part on the data of Slotton and others (1997), on preliminary studies in the Dutch Flat mining district (Bear River watershed; Hunerlach and others, 1999), and on an analysis of hydraulic mining intensity (Alpers and Hunerlach, 2000), the USGS began a cooperative study with other public agencies in 1999 to address mercury contamination associated with historical gold mining in the Bear River, Deer Creek, and South Yuba River watersheds (hereinafter referred to as the Bear-Yuba study area).

A key component of the multi-agency cooperative study was to assess mercury bioaccumulation in sport fish, the consumption of which is thought to be the primary pathway for mercury to affect human health and ecosystems. The fish-tissue data published by May and others (2000) were the basis for a state-level fish consumption advisory (Klasing and Brodberg, 2003), the first of its kind for the Sierra Nevada. In addition, the fish-tissue data reported by May and others (2000) were used to identify three reservoirs in the Bear River watershed and the segment of the Bear River near Dog Bar Road as impaired water bodies by the State of California under section 303(d) of the Clean Water Act (California Regional Water Quality Control Board, Central Valley Region, 2003). Stakeholders, including federal, state, and local agencies, have expressed interest in attempting to reduce *mercury loads* to downstream reservoirs by remediating mine sites that may be significant sources of mercury and *methylmercury* in the upper Bear River watershed.



Base prepared by U.S. Geological Survey from Digital Raster Graphics and from the National Elevation Database (NED) 30 meter resolution digital elevation model (DEM) with stream segments from the National Hydrography Dataset (NHD)

Figure 4. Sampling stations in the central part of Greenhorn Creek drainage, Nevada County, California.

Purpose and Scope

A key overall objective of the multi-agency cooperative study is to identify "*hot spots*" of mercury contamination and bioaccumulation, so that land-management agencies and other stakeholders can design appropriate *remediation* strategies to protect public health and ecological systems. Preliminary data from about 125 stations sampled for this study in the Bear River, Deer Creek, and South Yuba River watersheds were provided to federal land-management agencies, primarily the Bureau of Land Management (BLM) and the U.S. Department of Agriculture–Forest Service (USDA–FS), so that potential remediation sites could be identified and priorities established for mine-site remediation. Two of the highest priority areas for remediation in the Bear-Yuba watersheds are located within the Greenhorn Creek drainage of the Bear River watershed (*fig. 1*): the Sailor Flat mine site (USDA–FS lands, Tahoe National Forest; stations shown on *figs. 2*, *3*, *A1*) and the Boston mine site (primarily on BLM lands; stations shown on *figs. 2*, *4*, *A1*).

This report documents the results of sampling water, sediment, invertebrates, and frogs for concentrations of methylmercury (MeHg), *total mercury* (THg), and other constituents at 40 stations in the Greenhorn Creek drainage during 1999–2001. Similar data gathered from other parts of the Bear River watershed and from the Deer Creek and South Yuba River watersheds will be published separately.

The main body of this report consists of this Introduction, followed by a section regarding the study design, which includes subsections on sample locations, constituents analyzed, field and laboratory methods, and quality assurance and quality control; the next section documents the study results, followed by the summary and conclusions. Detailed information on sampling stations in the study area, including photographs and an inventory of mine tunnels, is given in *Appendix A* (figures) and *Appendix C* (tables). Details regarding quality assurance and quality control are given in *Appendix B* (figures) and *Appendix D* (tables).

Acknowledgments

The authors are grateful to the Bureau of Land Management (BLM), the California State Water Resources Control Board (SWRCB), the Nevada County Resource Conservation District (NCRCD), and the U.S. Department of Agriculture–Forest Service (USDA–FS) for providing funds and logistical support for the work described in this report. At the BLM, Timothy Carroll (Folsom Field Office) assisted with field work and the development of annual work plans; Richard Forester and Richard Grabowski (State Office) assisted with administration. Rick Weaver (USDA–FS, Tahoe National Forest) assisted with field work and the development of work plans; Janine Clayton (USDA–FS, Regional Office) assisted with administration and coordination. Rick Humphreys of the SWRCB assisted with field work and contract management. Curtis Davidson, Tamara Gallentine, and Gail Bakker of the NCRCD provided administrative support in conjunction with a Proposition 204 grant managed by Rick Humphreys at the SWRCB. Gail Bakker, Rick Humphreys, and several USGS reviewers provided comments on an earlier draft of this report. Other agencies, including the California Department of Parks and Recreation and the Nevada Irrigation District, have contributed to the study by providing access to stations and available data. In addition, several private landowners allowed sampling on their lands, which is much appreciated. All biological samples were collected under the auspices of scientific collecting permits issued by the California Department of Fish and Game. USGS personnel and employees of the California State University Sacramento Foundation who contributed significantly to this project include Michael Atamian, Stacy Burnett, Michael Casselberry, Michelle Chao, Connie Clapton, Joseph Domagalski, Stephanie Dudash, Mary Elizabeth, Susan Fregien, Steven Gallanthine, Jerry Harmon, Mark Jennings, Mark Johnson, David Kelly, Sandor Kelly, Rebecca Kershnar, Cynthia Kester, Matthew Law, Erick Oshel, Kelly McPherson, Frank Moseanko, Darnella Murphy, Raef Porter, Kelly Rider, and Larry Shelton.

Study Design

In this report, we document results from sampling water, sediment, invertebrates, and frogs at 40 stations in the Greenhorn Creek drainage during 1999–2001. During the 1999 field season, reconnaissance sampling was done at several mine sites and adjacent areas affected by historical mining activity. On the basis of preliminary data from the initial sampling, follow-up sampling took place during 2000 and 2001 at a number of the locations to confirm anomalously high concentrations of mercury and methylmercury in water, sediment, and biota and to document inter-annual variability; also, some mine sites in the study area were visited for the first time during this period. Results of follow-up sampling that took place during 2002 in the Greenhorn Creek drainage will be published separately, as will results from samples collected during 1999–2002 in the Deer Creek watershed, the South Yuba River watershed, and other parts of the Bear River watershed.

Sample Locations

The locations of sampling stations in the Greenhorn Creek drainage are shown in *figure 2*. A description of each sampling station is given in Appendix C (*table C1*). More detailed maps of the Greenhorn Creek drainage (*figs. 3–5*) include map ID numbers (for example BY20), which can be used to track information in the data tables. Stations in Greenhorn Creek itself were divided into three groups: a headwaters station (a reference site), main-stem stations in the central part of the drainage, and an integrator station near the confluence with Rollins Reservoir (*fig. 2*). The remaining stations were grouped by sub-watershed or mining district. Symbol shapes in *figures 2–5* indicate the type of water body or mining feature sampled, including ground *sluices*; pit lakes, ponds, or wetlands; streams; and tunnels. The same definitions of symbol color and shape are used in many of the plots described in the Results section. Also presented in this report are data for invertebrate samples from a baseline reference sampling station outside of the Greenhorn Creek drainage, in the headwaters of the Bear River watershed, upstream of known mining effects. The location of the baseline reference station (BY199) is shown on *figure 1*.

Samples were collected from 40 locations in the Greenhorn Creek drainage for this study during 1999–2001. Forty-nine water-quality samples were collected at 27 of the sampling stations. Ten sediment samples for laboratory analysis were collected at eight locations. At 5 of these 8 locations, plus 9 others (a total of 14), *elemental mercury* concentration in sediment was assessed using a field panning method. A total of 194 invertebrate samples were collected at 31 sampling stations in the study area, and 69 frog samples were collected at 19 of the sampling stations. An additional 19 invertebrate samples were collected at the baseline reference station. Banana slugs and six taxa of predaceous aquatic insects were collected as available at each invertebrate sampling station. Three taxa of frogs were collected as available, up to three individuals per taxon per station per year.

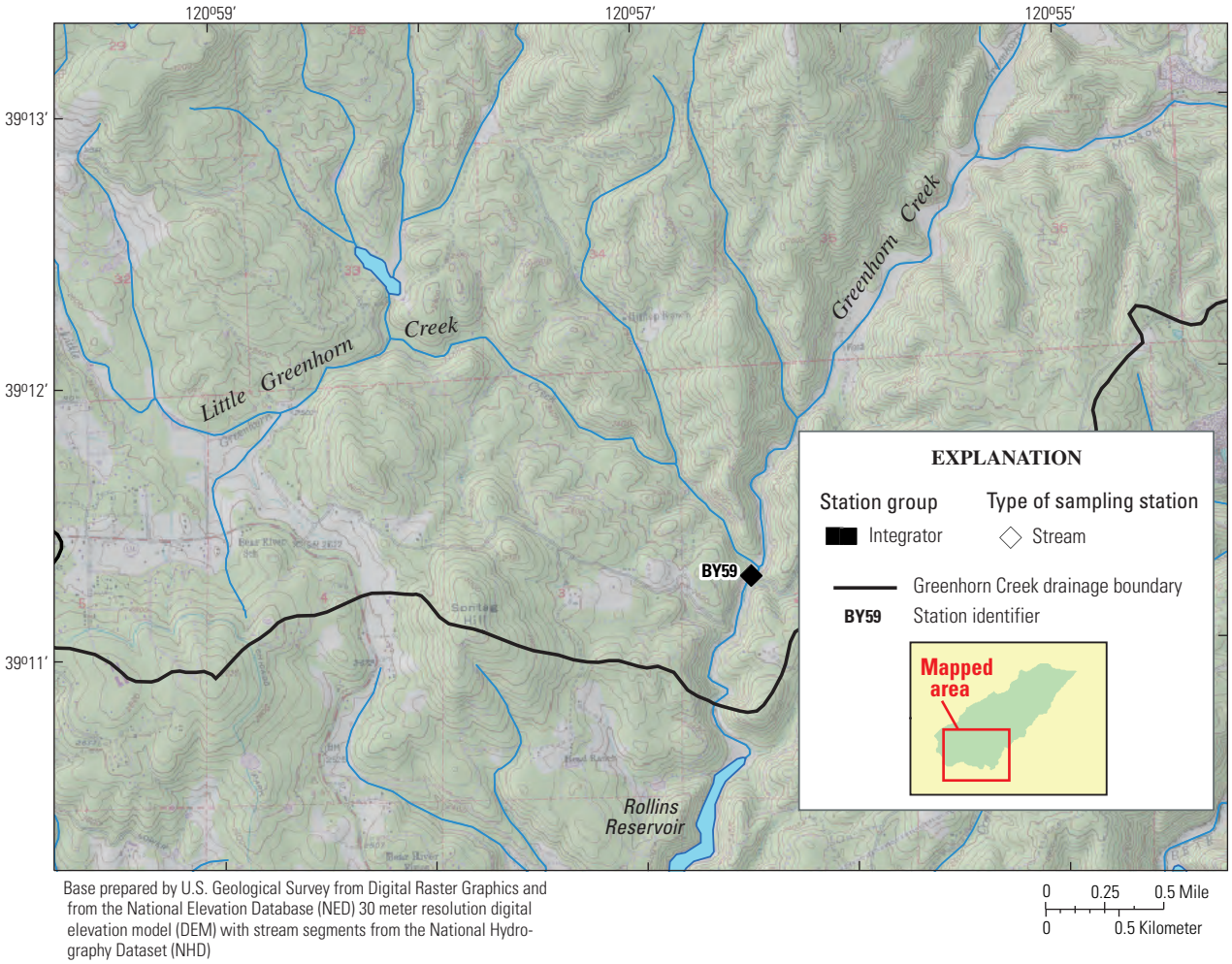


Figure 5. "Integrator" sampling station in the southern part of Greenhorn Creek drainage, Nevada County, California.

Constituents Analyzed

Constituents analyzed in water samples included mercury in four categories: (1) total mercury (THg) in unfiltered water, (2) THg in filtered water, (3) monomethylmercury (MeHg) in unfiltered water, and (4) MeHg in filtered water. (For the remainder of this report, the term methylmercury [also abbreviated as MeHg] is used instead of "monomethylmercury;" note that other methylated forms of mercury such as dimethylmercury may be present but are not included in reported methylmercury analyses.) Total mercury in unfiltered and filtered water and MeHg in unfiltered water were analyzed in nearly all of the 49 water-quality samples; however, MeHg in filtered water was analyzed in only 12 samples. All analyses of THg in water for this study were done by the USGS National Research Program (NRP) laboratory in Boulder, Colorado; analyses of MeHg in water were done by the USGS Wisconsin District Mercury Laboratory (WDML) in Middleton, Wisconsin.

Water-quality was characterized in the field for unstable constituents and in the laboratory for stable constituents in preserved water samples. Unstable water-quality parameters measured in the field included pH, temperature, specific conductance, and dissolved oxygen. Alkalinity (a proxy for dissolved bicarbonate) was analyzed by titration in the laboratory on a filtered subsample (stored chilled until analysis), usually within 48 hours of collection. Major cations (calcium, iron, magnesium, potassium, silica, and sodium) and more than 40 trace elements were analyzed in filtered and unfiltered samples by the USGS NRP laboratory. Major anions (sulfate and chloride in filtered samples only) also were analyzed by the USGS NRP laboratory. Nutrients in filtered and unfiltered samples were analyzed by the USGS National Water Quality Laboratory (NWQL) in Denver, Colorado. Forms of nitrogen (N) that were analyzed included ammonia plus organic N in both unfiltered and filtered water, and the following three forms of N in filtered water only: ammonia, nitrite, and nitrite plus nitrate. Forms of phosphorous (P) that were analyzed included total P in both unfiltered and filtered water and orthophosphate in filtered water only. Organic carbon in filtered and particulate form was analyzed by the USGS NWQL. Stable isotopes of hydrogen and oxygen were analyzed in unfiltered water by the Geology Department laboratory at the University of California, Davis. Stable isotopes of sulfur and oxygen in dissolved sulfate were analyzed by a USGS laboratory in Denver, Colorado. The USGS laboratory in Marina, California, determined concentration of total suspended sediment in water samples along with the percentage of sand in the suspended sediment, which was used to compute the concentration of suspended silt and clay (<0.063 mm diameter).

Sediment samples were analyzed for MeHg concentration by the USGS WDML. Analyses of THg in sediment were done by the WDML or the USGS NRP laboratory. In nearly all cases, the MeHg and THg concentrations are reported on a dry basis. However, the THg concentration in one sediment sample is reported on a wet basis because the moisture content was not determined. The sediment samples analyzed in the field for visible, elemental mercury by panning methods were analyzed on a wet basis.

The analyzed invertebrates include adult water striders and giant water bugs (order Hemiptera; families Gerridae and Belostomatidae), adult predaceous diving beetles (order Coleoptera; family Dytiscidae), larval stoneflies (order Plecoptera; family Perlidae), larval dobsonflies (order Megaloptera; family Corydalidae), larval dragonflies (order Odonata; families Aeshnidae, Cordulegastridae, Gomphidae, and Libellulidae), and adult banana slugs (order Gastropoda; family Arionidae). Insects were identified using taxonomic keys of Merritt and Cummins (1996) and McCaffrey (1981). All invertebrates were analyzed for MeHg; some of the invertebrate samples were also analyzed for THg, so that the ratio of MeHg to THg could be assessed. Previous studies have shown that values of MeHg/THg in invertebrates can vary from 20 to 90 percent, depending on functional feeding strategies, with *predatory insects* generally having higher values (Tremblay and others, 1996; Slotton and others, 1997; Tremblay and Lucotte, 1997; Hall and others, 1998; Mason and others, 2000; Schwarzbach and others, 2002).

Three species of post-metamorphic frogs were collected in this study: bullfrogs (*Rana catesbeiana*), foothill yellow-legged frogs (*Rana boylii*), and Pacific treefrogs (*Hyla regilla*). Frogs were identified using descriptions by Stebbins (1985). Frog samples were analyzed for THg after cleaning and removal of gut contents. Other studies show that the mercury in frog tissue is largely in the form of MeHg (Roger L. Hothem, written commun., 2002).

Methods

Field Methods

Specialized cleaning and sampling techniques were used during all stages of sample collection to prevent sample contamination. Prior to use, all containers and equipment used for water and sediment sampling were cleaned using a dilute liquid soap followed by a 5-percent hydrochloric acid solution and multiple rinses in ultrapure, deionized (DI) water (18 megaohm-centimeter [MΩ-cm]), following standard USGS protocols (Shelton, 1994). Specific sampling and preservation methods are described below.

Water

Water samples were collected in Teflon or fluorinated plastic containers and then transferred to a Teflon-lined, stainless steel churn for splitting. In small streams discharging less than about 100 gal/min, grab samples typically were collected, because shallow conditions and narrow stream width preclude using integrated sampling techniques. In streams with higher flows, integrated samples were collected using the *equal width increment (EWI) method* using either 1-L Teflon bottles or D-77 samplers. All stations at all times were sampled by wading except for Greenhorn Creek at You Bet Road on December 21, 2001, which was sampled using a D-77 sampler from the You Bet Road bridge.

Water samples collected for analysis of suspended sediment concentration (SSC) were taken from the churn and collected in pre-weighed 1-L Nalgene bottles. In contrast to all other splits, the bottles were not rinsed with the ambient water, to avoid introducing extraneous suspended sediment to the container. The SSC samples were chilled on wet ice or refrigerated at less than 5°C until analysis.

Filtration was done in the field using Gelman capsule filters of 0.45-µm pore size. Filtered and unfiltered water samples for analysis of THg by the USGS NRP laboratory were stored in acid-washed glass bottles provided by the laboratory and were preserved using a potassium dichromate–nitric acid solution. Filtered and unfiltered water samples for analysis of MeHg were stored in acid-washed Teflon bottles provided by the WDML and were preserved either by freezing on dry ice or by using a 50-percent hydrochloric acid solution provided by the WDML. Filtered and unfiltered samples for analysis of cations and trace elements were preserved using distilled (ultrapure) nitric acid provided by the NRP laboratory.

Filtered samples collected for analysis of anions were chilled on wet ice or refrigerated at less than 5°C until analysis. Unfiltered samples collected for analysis of nutrients were preserved using a sulfuric acid solution and then chilled on wet ice followed by refrigeration; filtered nutrient samples were not acidified but were chilled prior to analysis. Samples collected for analysis of stable isotopes of hydrogen and oxygen in water were stored in glass bottles with polyseal caps with minimal headspace to retard evaporation. Aqueous sulfate was precipitated from filtered water samples at 90°C using a barium chloride solution after using HCl to lower the pH value to about 2; the resulting barium sulfate precipitate was filtered using 0.7-µm filters and then transferred to silver-foil trays.

For most water samples, care was taken not to disturb bed sediments before sample collection. Such samples are referred to throughout this report as environmental samples. The amount of suspended sediment in two of the water samples was intentionally increased by human activity. These two samples are referred to throughout this report as disturbed samples.

Unstable water-quality constituents measured in the field included temperature, pH, specific conductance, and dissolved oxygen (*table 1*). Values of pH were determined using an Orion 250A or 290A meter with a gel-filled Triode electrode. The pH meter was calibrated using commercially available pH 7 and 4 buffers. Water temperatures were measured using a thermometer that was checked against a thermometer certified by the American Society for Testing and Materials (ASTM); temperature data are accurate within 0.5°C. Specific conductance was determined using a Cole-Parmer meter and probe; a one-point calibration was done with a USGS standard in the approximate concentration range of the unknowns. Dissolved oxygen was determined using a YSI meter and probe, calibrated using standard procedures.

Sediment

Sediment samples were collected using polycarbonate, Teflon, or stainless steel spoons and knives, and were transferred to Teflon or acid-washed glass containers using acid-cleaned stainless steel spatulas, following the protocols described by Shelton and Capel (1994). Sediment samples collected for analysis of THg were chilled immediately on wet ice and stored at 5°C or less until analysis. Sediment samples collected for analysis of MeHg were stored immediately on dry ice and frozen until analysis.

Invertebrates

Invertebrates were collected using dip nets and (or) by hand. Captured invertebrates were temporarily stored with native water in zippered plastic bags and were passively depurated over 4–24 hours. Invertebrates typically were combined as composites of multiple individuals to obtain a minimum of one gram of biomass for the analysis. In some cases, however, samples weighing less than one gram were analyzed. Prior to initial processing, samples were held on dry ice or wet ice. Initial processing of invertebrate samples proceeded within 24 hours of collection. Samples were thoroughly rinsed with DI water and patted dry using disposable paper towels. Composites of similar size and (or) age individuals (visually estimated) were placed in chemically cleaned jars (VWR Trace Clean TM jars, certified at <0.2 µg/L Hg). Invertebrate samples were analyzed primarily for MeHg; in some cases, however, samples were analyzed for both THg and MeHg.

Frogs

Frogs were held on wet ice for 4–8 hours and then placed on dry ice. The samples were stored frozen up to 3 months before dissecting out the gastrointestinal (GI) tract. After excising the GI tract, frog carcasses were placed in certified, chemically cleaned jars and kept frozen until sent to the analytical laboratory. Usually, individual frog samples were sent for analysis, but, in one case, a composite of immature Pacific treefrogs was sent. Frogs were analyzed only for THg.

Table 1. Data for water-quality parameters measured in the field, Greenhorn Creek drainage, Nevada County, California.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; Cyn, Canyon; mi, mile; N, North; nr, near; Rd, Road; S, South; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µS/cm, microsiemens per centimeter; mg/L, milligram per liter; gal/min, gallon per minute; —, not determined]

Station map ID	Station name	Station number	Date	Time	Water temperature (degrees Celsius) (00010)	pH (00400)	Specific conductance (µS/cm) (00905)	Dissolved oxygen (mg/L) (00300)	Discharge (gal/min)	Comments
Environmental samples										
BY20	Boston Mine tunnel outlet nr Grass Valley	391346120540901	6/18/1999	14:30	—	6.6	120	—	2.5	
BY20	Boston Mine tunnel outlet nr Grass Valley	391346120540901	12/14/1999	12:00	7.0	8.0	151	—	6	
BY20	Boston Mine tunnel outlet nr Grass Valley	391346120540901	5/24/2000	16:00	15.0	6.9	95	—	—	
BY20	Boston Mine tunnel outlet nr Grass Valley	391346120540901	12/21/2001	12:10	7.6	7.0	73	10.8	15	
BY21	Boston Mine wetlands pond nr Grass Valley	391343120541101	12/14/1999	10:30	5.0	7.4	151	—	—	
BY21	Boston Mine wetlands pond nr Grass Valley	391343120541101	5/24/2000	16:30	27.0	6.9	82	—	—	
BY58	Buckeye Flat Mine main drain 0.45 mi ab Greenhorn Cr	391425120534101	8/21/2000	11:00	15.0	3.4	334	—	2	
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	391446120534201	6/18/1999	11:30	—	3.7	407	—	7.5	
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	391446120534201	12/2/1999	11:00	9.0	4.0	291	—	—	
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	391446120534201	8/22/2000	10:45	14.0	4.2	372	—	4.8	
BY116	Buckeye Flat Mine pond drain 0.15 mi ab SF Greenhorn Cr	391416120532001	8/21/2000	14:10	16.0	5.7	29	—	2	
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	391415120533701	8/26/1999	11:00	24.0	5.1	—	—	1	Discharge estimated
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	391415120533701	8/22/2000	12:10	16.0	5.6	23	—	.5	
BY25	Buckeye Flat Mine upper drain	391453120534801	4/9/2001	10:00	8.0	5.1	97	—	—	
BY25	Buckeye Flat Mine upper drain	391453120534801	10/18/2001	11:30	12.0	5.1	123	2.9	—	Ponded
BY52	Greenhorn Cr 0.3 mi ab Buckeye Ford nr Nevada City	391434120541001	1/25/2000	10:45	—	6.6	34	—	—	
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	391116120562501	1/25/2000	12:00	—	6.9	39	—	—	
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	391116120562501	7/24/2001	11:00	19.5	7.5	68	8.4	1,050	
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	391116120562501	8/29/2001	15:00	—	7.4	68	—	624	
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	391116120562501	9/14/2001	13:00	21.0	7.1	—	—	754	
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	391116120562501	10/15/2001	12:00	13.2	7.3	70	8.5	900	Discharge estimated
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	391116120562501	11/20/2001	13:20	12.5	7.4	78	10.1	2,060	
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	391116120562501	12/10/2001	12:20	8.3	7.4	71	—	19,700	
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	391116120562501	12/21/2001	13:00	7.5	6.6	—	9.8	67,800	
BY51	Greenhorn Cr nr headwaters nr Scotts Flat Reservoir	391657120493101	1/25/2000	9:30	—	6.7	18	—	—	
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	391259120535801	12/14/1999	14:00	9.0	6.9	132	—	2,200	
BY86	Poore Mine creek ab tunnel nr Grass Valley	391346120545101	3/31/1999	17:40	6.6	7.2	38	12.2	—	

Table 1. Data for water-quality parameters measured in the field, Greenhorn Creek drainage, Nevada County, California–*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; Cyn, Canyon; mi, mile; N, North; nr, near; Rd, Road; S, South; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µS/cm, microsiemens per centimeter; mg/L, milligram per liter; gal/min, gallon per minute; —, not determined]

Station map ID	Station name	Station number	Date	Time	Water temperature (degrees Celsius) (00010)	pH (00400)	Specific conductance (µS/cm) (00905)	Dissolved oxygen (mg/L) (00300)	Discharge (gal/min)	Comments
BY87	Poore Mine creek bl tunnel nr Grass Valley	391343120544201	3/31/1999	13:30	6.4	7.2	42	12.5	1,400	
BY88	Poore Mine ground sluice nr Grass Valley	391351120544901	4/1/1999	15:40	11.6	5.8	98	11.5	3	
BY89	Poore Mine pit lake nr Grass Valley	391354120544301	4/1/1999	16:50	11.6	6.4	33	7.6	—	
BY89	Poore Mine pit lake nr Grass Valley	391354120544301	5/23/2000	10:45	23.6	5.8	178	—	—	
BY90	Poore Mine seep ab ground sluice nr Grass Valley	391352120544601	4/1/1999	16:00	—	5.5	—	—	—	
BY91	Poore Mine tunnel effluent nr Grass Valley	391347120544301	3/31/1999	15:20	10.9	6.9	118	10.2	—	
BY91	Poore Mine tunnel effluent nr Grass Valley	391347120544301	12/15/1999	13:30	—	7.6	173	—	10	
BY91	Poore Mine tunnel effluent nr Grass Valley	391347120544301	5/23/2000	12:00	9.0	6.8	163	—	—	
BY105	Sailor Flat Mine main drain Gulch 01 nr Quaker Hill	391620120532201	7/6/1999	16:00	—	5.1	62	—	.02	
BY105	Sailor Flat Mine main drain Gulch 01 nr Quaker Hill	391620120532201	12/2/1999	14:30	—	6.3	21	—	—	
BY106	Sailor Flat Mine main drainage to Greenhorn Cr, Gulch 03	391615120531501	4/9/2001	12:30	10.0	6.2	—	—	—	
BY114	SF Greenhorn Cr 0.7 mi ab Greenhorn Cr nr Nevada City	391401120534001	8/22/2000	15:10	16.5	7.3	65	—	55	Discharge estimated
BY115	SF Greenhorn Cr bl Boston Mine nr Nevada City	391351120541101	12/21/2001	12:40	6.3	6.7	41	10.2	4,500	
BY122	Starr Mine tunnel inflow nr Grass Valley	391327120542001	4/23/1999	15:00	14.6	7.4	114	8.2	—	
BY123	Starr Mine tunnel midway nr Grass Valley	391329120543001	4/23/1999	13:40	14.9	7.3	211	—	—	
BY123	Starr Mine tunnel midway nr Grass Valley	391329120543001	12/15/1999	10:45	—	7.6	287	—	15	
BY124	Starr Mine tunnel outlet nr Grass Valley	391330120543301	8/23/2000	17:30	16.0	4.8	—	—	3	
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	391627120524901	6/28/2000	12:00	14.0	—	—	—	—	
BY130	Tom and Jerry Mine drain at tunnel outlet nr Nevada City	391627120524801	6/28/2000	11:30	—	—	—	—	—	
BY131	Tom and Jerry Mine drainage pond nr Nevada City	391628120524401	8/23/2000	10:45	13.3	6.6	52	—	—	
Disturbed samples										
BY123	Starr Mine tunnel midway nr Grass Valley	391329120543001	12/15/1999	11:30	—	7.6	284	—	15	Disturbed sample
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	391627120524901	6/28/2000	12:30	21.5	7.9	109	9.3	—	Disturbed sample

Laboratory Methods of Chemical Analysis

This section presents information on analytical methods used in this study. Where USGS-approved methods were used by laboratories such as the USGS NWQL, relatively little information is given in this report, and the reader is referred to published sources. More detailed information is given in this section for research methods that are not officially approved by the USGS as "production methods."

Water

Total mercury (THg) in water was analyzed by the USGS NRP laboratory in Boulder, Colorado, using cold-vapor atomic-fluorescence spectrometry (CVAFS). Mercury stock and standard solutions were made from Puratronic grade (99.9995 percent) mercuric chloride ($HgCl_2$) salt (Johnson Matthey Plc) and preserved in a solution of high-purity nitric acid and primary-standard grade potassium dichromate using the same reagents and concentrations as those used to preserve samples. Deionized water (type 1, 18 MΩ-cm) was used for preparing all standards and reagent solutions. A solution of 3 percent hydrochloric acid (volume:volume, hydrochloric acid: type 1, 18 MΩ-cm DI water) was used to prepare a 2-percent stannous chloride ($SnCl_2$) solution (wt:volume, stannous chloride:3 percent hydrochloric acid), which was used to reduce mercury to its elemental form in the cold vapor reactor. The vapor was transported to the detector with a stream of argon gas. Trace concentration levels of mercury were measured using an automated, cold-vapor atomic-fluorescence spectrometer or CVAFS (PS Analytical) using methods described previously by Roth (1994) and by David A. Roth (U.S. Geological Survey, written commun., 1999). Instrument parameters for the CVAFS mercury analysis were the same as those described by Alpers and others (2000). Peak height intensities of unknown samples were compared to a six-point calibration curve prepared from aqueous standards ranging in concentration from 0 to 50 ng/L.

Methylmercury (MeHg) in water was analyzed at the USGS WDML in Middleton, Wisconsin using ethylation-distillation CVAFS methods with double amalgamation, as described by Olson and De Wild (1999) and by De Wild and others (2002). Analysis of MeHg in water by the WDML was approved by the USGS Branch of Quality Assurance as a production method in August 2002, after the analyses in this report were completed. The method used by the WDML to analyze MeHg in water samples in this study was identical to the USGS-approved method.

Major cations and trace metals in water were analyzed by inductively coupled plasma (ICP) methods: both atomic emission spectrometry (AES) and mass spectrometry (MS) were used. Major elements including calcium (Ca), iron (Fe), magnesium (Mg), potassium (K), sodium (Na), and silica (SiO_2) were determined by ICP–AES techniques using a Perkin-Elmer Optima 3300DV multi-channel emission spectrometer. Use of the dual-view (radial and axial) optical configuration provided optimal sensitivity for various elements regardless of concentration. A description of the analysis conditions and procedures is reported by Garbarino and Taylor (1979). Details of the operational conditions are described by Mitko and Bebek (1999, 2000). Except for mercury, trace-element determinations were done by ICP–MS using a Perkin Elmer Elan Model 6000. Aerosols of acidified aqueous samples were introduced into the spectrometer with a cone-spray pneumatic nebulizer. Multiple internal standards (indium [In], iridium [Ir], and rhodium [Rh]), which covered the mass range, were used to normalize the system for drift. Details of the specific analysis techniques, procedures, and instrumental settings are described by Garbarino and Taylor (1996) and Taylor (2001). Major anions in filtered water (chloride and sulfate) were analyzed by ion chromatography following procedures described by Fishman and Friedman (1989).

Nutrients in each water sample were analyzed for three forms of phosphorus (P) and five forms of nitrogen (N), as described below. The phosphorus analyses included orthophosphate in filtered water, plus total phosphorus in both unfiltered and filtered water. Orthophosphate was determined using an automated, colorimetric, phosphomolybdate blue procedure with antimony (Sb) added to increase the reduction rate (Patton and Truitt, 1992; Fishman, 1993). Total phosphorus was determined colorimetrically as orthophosphate after Kjeldahl digestion (Patton and Truitt, 1992). Filtered water samples were analyzed for nitrogen in the following forms: (1) nitrite (NO_2^-), (2) nitrite plus nitrate (NO_3^-), (3) ammonia (NH_3), and (4) ammonia plus organic nitrogen. Ammonia plus organic nitrogen was also determined in raw water samples. The method used to analyze nitrite was diazotization using sulfanilamide and N-1-naphthylethylenediamine under acidic conditions to form a red compound, the absorbance of which was determined colorimetrically using an automated segment flow procedure (Fishman, 1993). The concentration of nitrite plus nitrate was determined by reducing nitrate to nitrite using cadmium metal; the nitrite was then analyzed by diazotization (Fishman, 1993). Ammonia was analyzed using a salicylate-hypochlorite method, in the presence of ferricyanide ions, that produces the salicylic acid analog of indophenol blue, which was analyzed colorimetrically using an automated-segmented flow procedure (Fishman, 1993). The concentration of ammonia plus organic nitrogen in raw and filtered samples was determined using the same Kjeldahl digestion as that used for total phosphorus, in which the organic nitrogen is reduced to the ammonium ion, followed by determination of the ammonium ion concentration by the colorimetric salicylate-hypochlorite method (Fishman and Friedman, 1989; Patton and Truitt, 1992).

Concentrations of dissolved organic carbon (DOC) were determined in 100-mL filtered water samples (0.45-µm silver membrane filter). The filtrates were acidified first to remove dissolved and colloidal carbonates and bicarbonates, then the organic carbon was oxidized to carbon dioxide by adding persulfate and exposing the samples to ultraviolet light. The carbon dioxide was then measured by infrared spectrometry using a Dorhmann carbon analyzer (Brenton and Arnett, 1993). Particulate organic carbon (POC) concentrations were determined in the residual material that was collected on the silver membrane filters used to prepare DOC samples. The silver membrane filters were treated with acid to dissolve inorganic forms of carbon, then were reacted with potassium persulfate in glass ampules for 4 hours at 116° to 130°C. Then the ampules were broken in the carbon analyzer, releasing carbon dioxide, which was measured by infrared spectrometry using an Oceanography International carbon analyzer (Wershaw and others, 1987).

Sediments

For most constituents, the analytical methods used for determining concentrations in sediment were similar to those used for water samples. After a small aliquot (usually 50 to 100 mg) of sediment was selected for analysis and weighed, the constituents of concern were liberated from the sediment by digestion or chemical extraction. After dilution and preservation, the digests were analyzed by methods similar to those used for water samples.

Sediments in subsamples collected for analysis of trace metals and major elements were completely dissolved using a total HCl–HNO_3–HF acid microwave digestion procedure (Hayes, 1993). The digested subsamples were diluted at 1:10 (volume:volume, digest:DI water) with 18 MΩ-cm DI water for analysis by ICP methods. The digested sediment subsamples were stabilized with the same reagents used for the preservation of the water samples.

Methylmercury in sediment was analyzed at the USGS WDML in Middleton, Wisconsin, using CVAFS methods with double amalgamation after ethylation of MeHg by extraction, a method less prone to produce MeHg artifacts than the distillation method used to analyze MeHg in water samples. MeHg can be a difficult constituent to measure in solids because of matrix interferences and the possibility of unintentionally producing MeHg during distillation (Bloom and others, 1997; Hintelmann and others, 1997; Hammerschmidt and Fitzgerald, 2001). Researchers at the WDML have adopted a published technique (Hintelmann, 1999) for extracting MeHg from solids that eliminates formation of MeHg in samples with high inorganic mercury levels. Solids (0.5 to 1.0 g) are placed into a centrifuge tube. Potassium bromide (KBr), copper sulfate ($CuSO_4$), and methylene chloride (CH_2Cl_2) are added sequentially. The mixture is allowed to react for an hour and then is shaken for an hour to ensure complete extraction of the MeHg. Following the shaking, the samples are centrifuged to break any emulsion that has formed. An aliquot of the CH_2Cl_2 is cleanly transferred to a vial containing reagent water. These vials are placed in a heating block until all CH_2Cl_2 has evaporated and the MeHg has back-extracted into the reagent water. The pH of the extractant is adjusted to 4.9 (to maximize ethylation potential) using acetate buffer. The extractant then is ethylated using sodium tetraethyl borate ($NaBEt_4$) and allowed to react for 15 minutes. After the reaction, the extractant is purged with nitrogen gas (N_2) for 20 minutes and the ethylated forms of Hg are collected on a sample trap containing Carbotrap. These ethylated Hg species are desorbed thermally from the sample trap, separated using a gas chromatographic (GC) column, reduced using a pyrolytic column, and detected using a CVAFS detector.

Invertebrates and Frogs

Total mercury and MeHg in biological samples were analyzed at the Trace Element Research Laboratory (TERL) at Texas A&M University in College Station, Texas. Before samples were analyzed for THg by cold-vapor atomic-absorption spectrometry (CVAAS), the Hg was converted to the Hg^{2+} form. Mercury was digested using a modified version of USEPA methods 245.5 and 245.6. Tissue samples were freeze-dried or wet when analyzed. Freeze-dried tissue samples were homogenized in the original sample containers and then subsampled; wet samples were homogenized in a Tekmar Tissumizer and then subsampled. Samples were digested with a mixture containing nitric acid, sulfuric acid, potassium permanganate, and potassium persulfate in polypropylene tubes in a water bath at 90–95°C. Before analysis, hydroxylamine hydrochloride was added to reduce excess permanganate, and the samples were brought to full volume using distilled-deionized water.

When the CVAAS procedure for determining THg in the biological tissue samples is used, divalent mercury (Hg^{2+}) in aqueous samples (digested tissue samples) is reduced to the elemental state (Hg^0) by a strong reducing agent (stannous chloride). Gaseous Hg^0 is transported by the sweep gas into an atomic absorption cell, where light produced by a Hg vapor lamp is absorbed by the free Hg atoms. The concentration of Hg in the sample is determined by comparing light absorption of the sample with that of external calibration standards.

The procedure for determining MeHg in biological tissue samples measured the sum of all organo-mercury species extracted by the solvent. Samples were wet or freeze-dried when analyzed. Homogenized aliquots were extracted by an organic solvent with potassium bromide and copper sulfate added to improve extraction efficiency. The organic phase was digested in combusted glass vials, using nitric and sulfuric acids and potassium permanganate, to convert all mercury species to ionic mercury and to remove traces of organic solvent that could affect the measurement. Analysis was based on the CVAAS method.

Moisture content was determined by weight loss during freeze-drying and is expressed as weight percentage of the original wet sample. Depending upon sample size, either the whole sample or a representative aliquot was frozen and then dried in a vacuum until a constant weight was attained. Samples were prepared and dried using plastic materials to minimize potential contamination artifacts.

Quality Assurance and Quality Control

A variety of measurements and analyses were used to determine the quality of the data associated with this study. The quality assurance (QA) program consisted of quality-control (QC) measures including field and laboratory blank samples, standard reference materials (SRM) where available, spike recoveries, and replicate samples.

Water and Sediments

Major and trace elements in water were analyzed by inductively coupled plasma (ICP) methods; each analysis consisted of at least four replicate instrumental measurements. Each filtered and unfiltered sample was collected in duplicate and analyzed in triplicate. The triplicate analyses were analyzed statistically and the analyses were accepted if the standard deviation was within standard tolerances of precision (generally less than 15 percent of the amount present). The error tolerance is increased for analyses close to the detection limit for a given analyte. Median detection limits for trace elements analyzed by ICP–MS are given in *table D1*.

When each batch of samples was analyzed by ICP for trace element and major cations, several standard reference materials were also analyzed as unknowns as part of the QA program. Plots of reported values in relation to observed values for certified SRM and USGS standard reference water samples (SRWS) are shown in figures *B1* through *B7*. The number of times each standard was analyzed during 1999–2001 is indicated on each figure; the standards typically were run several hundred times during the study period. There is excellent agreement between all reported and observed values for the standards. Regression coefficients were derived from correlation plots of observed and reported values for the analysis of standard reference materials for 21 selected trace elements (*table D2*); the regression coefficients range from 0.9881 for manganese to 1.000 for beryllium and antimony.

Data for spiked, blank samples for the elements arsenic, beryllium, copper, and zinc analyzed during July 2000 through August 2001 are shown in *figure B8*. In nearly all cases, the spike recovery was within the control range of 80 to 120 percent of the expected amount. Data for spiked blank samples having an expected THg concentration of 5 ng/L are given in *figure B9*. Nearly all results fall in the control range of 80 to 120 percent recovery. Results for trace-element spikes of unknown samples are shown in *figure B10* for four trace elements and in *figure B11* for mercury. Spike levels were generally three to ten times the amount present in field samples for each element. Again, nearly all the spike recoveries were in the control range of 80 to 120 percent of the expected value.

Because replicate split samples were routinely analyzed as separate unknowns and each replicate was analyzed in triplicate, plots of replicate 1 versus replicate 2 indicate the analytical variability as well as possible contamination issues regarding bottles and sample-splitting equipment. The plots in figures *B12* and *B13* for 12 of the elements analyzed by the NRP laboratory during the study period show very few outliers for replicate analyses. Values of relative standard deviation (RSD) for six elements (*fig. B14*) are generally less than 10 percent at concentrations well above the method detection limit (MDL) for each element, whereas RSD values tend to be higher at concentrations near the MDL, where lower precision is generally indicated by reporting data to fewer significant figures. Results for replicate analyses of specific samples are shown for mercury in unfiltered water (*fig. B15*) and for mercury in filtered water (*fig. B16*). One outlier is evident on *fig. B15*; it was not used to compute averages or median values.

Precision and accuracy criteria for THg in filtered and unfiltered water samples were evaluated by analyzing results for field and laboratory blank samples, standard reference materials, spike addition recoveries, and replicate samples. All samples were analyzed at least in triplicate. In most cases, each sample was sent to the laboratory in two bottles designated as split replicates “1 of 2” and “2 of 2.” The MDL for the THg analyses was 0.3 nanogram per liter (ng/L).

Data for THg in field blanks are given in *table D3*. Deionized source water from a MilliQ purification system at the USGS laboratory in Sacramento, California, was used for blanks taken in late November 1999. The source water blank had THg concentrations of 2.1 to 3.3 ng/L. Nine subsequent equipment and process (filtered) blanks taken during January and February 2000 had a median THg concentration of 0.5 ng/L, just above the MDL, and a range from <0.4 ng/L to 1.6 ng/L. In comparison, the medians of station-averaged values for unfiltered and filtered THg in this study were 14.6 ng/L and 2.8 ng/L, respectively. Several values for filtered THg in field samples are less than the MDL of 0.3 ng/L (*table 2*). Given that some of the blank values for THg are in the same concentration range as the values for some of the filtered samples, these lower-levels values must be interpreted with caution.

Quality-control measures used during analysis of MeHg in water were described by De Wild and others (2002). Water samples were analyzed in batches of 11 samples plus three laboratory blanks, a matrix spike, and a matrix spike duplicate. The reported values for MeHg concentrations were corrected for daily blank values, as described by De Wild and others (2002). The MDL for MeHg in water at the USGS Wisconsin District Mercury Laboratory, defined using standard protocol (U.S. Environmental Protection Agency, 1990), was 0.025 ng/L during 1999–2000 and was 0.04 ng/L during 2001. A conservative MDL for MeHg of 0.04 ng/L is used throughout this report.

Table 2. Concentrations of total mercury in water samples, Greenhorn Creek drainage, Nevada County, California.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, mile; nr, near; Rd, Road; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. BIT, broken in transit; *, suspect value (filtered concentration greater than unfiltered concentration). ng/L, nanogram per liter; —, not determined; <, less than]

Station map ID	Station name	Date	Time	Mercury, unfiltered (ng/L) replicate 1 of 2 (50286)		Mercury, unfiltered (ng/L) replicate 2 of 2 (50286)		Mercury, filtered (ng/L) replicate 1 of 2 (50287)		Mercury, filtered (ng/L) replicate 1 of 2 (50287)	
				Value	Standard deviation	Value	Standard deviation	Value	Standard deviation	Value	Standard deviation
Environmental samples											
BY20	Boston Mine tunnel outlet nr Grass Valley	6/18/1999	14:30	10.4	0.4	9.6	0.2	2.7	0.1	3.4	0.3
BY20	Boston Mine tunnel outlet nr Grass Valley	12/14/1999	12:00	121	1	86	2	4.9	.1	5.6	.2
BY20	Boston Mine tunnel outlet nr Grass Valley	5/24/2000	16:00	12.5	.4	7.6	.2	—	—	—	—
BY20	Boston Mine tunnel outlet nr Grass Valley	12/21/2001	12:10	16.6	.1	17.8	.1	1.7	.1	2.3	.2
BY21	Boston Mine wetlands pond nr Grass Valley	12/14/1999	10:30	254	4	3.5	.2	2.8	.2	2.1	.1
BY21	Boston Mine wetlands pond nr Grass Valley	5/24/2000	16:30	2.1	.2	2.0	.2	—	—	—	—
BY58	Buckeye Flat Mine main drain 0.45 mi ab Greenhorn Cr	8/21/2000	11:00	1.4	.1	1.6	.2	.7	.2	1.2	0
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	6/18/1999	11:30	3.9	.3	4.2	0	2.2	.1	2.7	.3
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	12/2/1999	11:00	30,380	1,081	31,644	779	1,221	40	1,330	35
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	8/22/2000	10:45	7,990	346	3,150	83	3,000	—	2,000	—
BY116	Buckeye Flat Mine pond drain 0.15 mi ab SF Greenhorn Cr	8/21/2000	14:10	9.2	.2	9.6	.3	10.2	.2	9.9	.3
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/26/1999	11:00	188,000	9,600	183,000	3,500	6,000	700	6,400	300
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/22/2000	12:10	56,700	1,100	31,200	313	8,000	—	8,000	—
BY25	Buckeye Flat Mine upper drain	4/9/2001	10:00	3.1	.2	3.5	.3	1.3	.2	1.2	.1
BY25	Buckeye Flat Mine upper drain	10/18/2001	11:30	4.8	.2	5.5	.4	.9	.1	1.1	.2
BY52	Greenhorn Cr 0.3 mi ab Buckeye Ford nr Nevada City	1/25/2000	10:45	29.8	.2	24.4	0	3.7	.1	3.7	.2
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	1/25/2000	12:00	437	2	412	25	9.0	.5	8.7	.1
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	7/24/2001	11:00	5.1	.1	4.9	.2	1.3	.2	1.3	.2
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	8/29/2001	15:00	3.9	.1	3.9	.1	1.7	.2	1.9	0
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	9/14/2001	13:00	7.3	.3	5.5	0	2.9	.2	2.7	.1
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	10/15/2001	12:00	1.8	.1	1.9	.1	.9	.2	1.3	.1
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	11/20/2001	13:20	—	—	—	—	1.9	.1	2	.1
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/10/2001	12:20	—	—	—	—	4.7	0	4.7	.1
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/21/2001	13:00	51	.2	53	.2	—	—	—	—
BY51	Greenhorn Cr nr headwaters nr Scotts Flat Res	1/25/2000	9:30	8.6	.1	5.4	.3	5.2	.1	5	.4
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	12/14/1999	14:00	6.2	.2	5.9	.3	2.0	.3	2.2	.1
BY86	Poore Mine creek ab Tunnel nr Grass Valley	3/31/1999	17:40	17.1	0	—	—	<.3	.1	—	—
BY87	Poore Mine creek bl Tunnel nr Grass Valley	3/31/1999	13:30	5.0	.7	4.6	.9	.7	.3	.8	0

Table 2. Concentrations of total mercury in water samples, Greenhorn Creek drainage, Nevada County, California—*Continued.*

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, mile; nr, near; Rd, Road; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. BIT, broken in transit; ng/L, nanogram per liter; —, not determined; <, less than]

Station map ID	Station name	Date	Time	Mercury, unfiltered (ng/L) replicate 1 of 2 (50286)		Mercury, unfiltered (ng/L) replicate 2 of 2 (50286)		Mercury, filtered (ng/L) replicate 1 of 2 (50287)		Mercury, filtered (ng/L) replicate 1 of 2 (50287)	
				Value	Standard deviation	Value	Standard deviation	Value	Standard deviation	Value	Standard deviation
BY88	Poore Mine ground sluice nr Grass Valley	4/1/1999	15:40	0.8	0.1	0.9	0.1	<0.3	0.2	—	—
BY89	Poore Mine pit lake nr Grass Valley	4/1/1999	16:50	5.7	.4	—	—	.5	.2	.7	.1
BY89	Poore Mine pit lake nr Grass Valley	5/23/2000	10:45	4.3	.2	4.3	.3	1.3	.1	.8	.2
BY90	Poore Mine seep ab ground sluice nr Grass Valley	4/1/1999	16:00	—	—	—	—	<.3	.1	—	—
BY91	Poore Mine tunnel effluent nr Grass Valley	3/31/1999	15:20	6.3	.7	6.1	.5	<.3	.1	<.3	.1
BY91	Poore Mine tunnel effluent nr Grass Valley	12/15/1999	13:30	6.5	.3	14.5	.5	1.5	.2	2.1	0
BY91	Poore Mine tunnel effluent nr Grass Valley	5/23/2000	12:00	55.8	.5	59.3	1	—	—	—	—
BY105	Sailor Flat Mine main drain Gulch 01 nr Quaker Hill	7/6/1999	16:00	9.5	0	8.1	.1	1.4	.2	1.7	.2
BY105	Sailor Flat Mine main drain Gulch 01 nr Quaker Hill	12/2/1999	14:30	153,000	11,000	153,000	4,000	BIT	BIT	3,440	40
BY106	Sailor Flat Mine main drainage to Greenhorn Cr, Gulch 03	4/9/2001	12:30	14.5	.3	14.6	.4	10.1	.2	9.9	.3
BY114	SF Greenhorn Cr 0.7 mi ab Greenhorn Cr nr Nevada City	8/22/2000	15:10	231	4	186	6	196	24	170	19
BY115	SF Greenhorn Cr bl Boston Mine nr Nevada City	12/21/2001	12:40	12.4	.1	11.8	.2	—	—	6.4	.4
BY122	Starr Mine tunnel inflow nr Grass Valley	4/23/1999	15:00	4.3	.3	4.9	.2	.5	.1	.6	.1
BY123	Starr Mine tunnel midway nr Grass Valley	4/23/1999	13:40	656	9	415	12	4.4	0	4.6	.1
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	10:45	1,545	30	1,734	46	4.3	0	4.8	.1
BY124	Starr Mine tunnel outlet nr Grass Valley	8/23/2000	17:30	538	17	392	13	3.5	0.3	3.4	.2
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:00	24.9	1.2	27.7	.1	—	—	—	—
BY130	Tom and Jerry Mine drain at tunnel outlet nr Nevada City	6/28/2000	11:30	1.3	0	1.2	.2	—	—	—	—
BY131	Tom and Jerry Mine drainage pond nr Nevada City	8/23/2000	10:45	33.2	1.2	31.6	.5	16.4	.4	15.9	.1
Disturbed samples											
BY123	Starr Mine Tunnel midway nr Grass Valley	12/15/1999	11:30	428,000	35,000	495,000	52,000	33.7	0.2	32.3	0.6
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:30	232	4	230	4	—	—	—	—

Concentrations of MeHg in blanks analyzed during this study are given in *table D4*. Methylmercury was below the MDL of 0.04 ng/L in all six of the equipment and process blanks taken during the study period. A single process (filtered) blank had a MeHg value of 0.04 ng/L, right at the detection limit.

Figure B17 shows the relation between specific conductance (SC) and the sum of equivalent change based on analyses of major anions (Cl^- and SO_4^{2-}) plus bicarbonate alkalinity (as HCO_3^-). Theoretically, the relation in *figure B17* should define a straight line. Based on the relation in *figure B17*, data for SC, anions, and alkalinity for five water samples that plotted as outliers were deemed unreliable and were removed from the data tables.

Concentration values for trace metals and major cations in blank water samples are given in *table D5* (filtered and unfiltered process blanks) and *table B6* (equipment blanks and source blanks).

Invertebrates and Frogs

Duplicate samples of invertebrates and frogs were analyzed at a rate of 5 percent of total samples, with at least one duplicate per matrix per analytical run to estimate the precision of the methods. To confirm the accuracy of the methods, procedural blanks, spiked samples, and SRMs were analyzed. To confirm that no analyte was added during the processing of the sample, procedural blanks were analyzed at a rate of 5 percent of the total samples, with at least one per matrix per analytical run. Spiked samples were analyzed at a rate of 5 percent, with at least one spike per matrix per analytical run. Spikes were samples fortified with a known quantity of analyte and analyzed as part of the run. Standard reference materials (dogfish liver and muscle) were analyzed at a rate of 5 percent to ensure that the method worked with naturally incorporated mercury.

The U.S. Fish and Wildlife Service's Patuxent Analytical Control Facility (PACF) was responsible for assuring the quality of the chemical analyses provided by TERL. Their reports indicated that the limits of detection for THg and MeHg were all below the maximum acceptable value (0.20 µg/g, dry weight), and analyses of procedural blanks were within normal limits. Spiked sample recoveries averaged 96.7 percent for THg (n = 24 [number of samples]) and ranged between 83.2 and 116 percent. For MeHg, spiked sample recoveries averaged 95.7 percent (n = 21) and ranged between 79.3 and 107 percent. For both THg and MeHg, the spiked sample recoveries were acceptable because they were within 2 standard deviations of the mean in at least 95 percent of the samples. The average percentage recovery (and range) from SRMs for THg (n = 26) was 96.7 percent (84.5–110 percent); for MeHg (n = 22) the average percentage recovery was 98.8 percent (85.6–112 percent). All percentage recoveries were within acceptable limits. THg was analyzed in duplicate on 25 samples, and the *relative percentage difference* (RPD) between duplicates ranged from 0.53 to 16.7 percent and averaged 5.2 percent. MeHg was analyzed in duplicate on 21 samples, and the RPD between duplicates ranged from 0.35 to 24.2 percent and averaged 5.4 percent. All duplicate analyses were within acceptable limits.

Results

This section is divided into two parts. The first part describes overall trends in the data set, and the second part describes the data by geographic area.

Overall Trends

In this section, the overall trends in the data are discussed in terms of water quality, sediment, and biota. The relations between mercury and methylmercury concentrations are investigated for water, sediment, and invertebrates. For the water samples, the relations between mercury and methylmercury concentrations and pH and sulfate are explored.

Water Quality

Water-quality data for the 49 samples collected in the Greenhorn Creek drainage during 1999–2001 are given in tables *1–8* (table 4 in back of report) and figures *6–17*. (Note that results less than the MDL, referred to as non-detects, are plotted on all figures using a value equal to one-half the MDL, with an error bar extending to the MDL.)

Field parameters (*table 1*) include water temperature, pH, specific conductance, and dissolved oxygen. Values of pH ranged from 3.4 at the Buckeye main drain to 8.0 at the Boston Mine tunnel outlet. Specific conductance values ranged from 18 microsiemens per centimeter (µS/cm) at the Headwaters station (BY51) to 407 µS/cm in the Buckeye Flat Mine north drain (BY23). Dissolved oxygen (DO) was measured in 14 of the 49 water samples. Thirteen of the 14 DO measurements were greater than 7.5 milligrams per liter (mg/L), indicating near-saturation, typical of flowing surface waters. The lowest recorded value of DO was 2.9 mg/L from the Buckeye Flat Mine upper drain. Discharge data in *table 1* are considered to be accurate within 20 percent of the measured flow rate, except the data marked as estimates, for which the uncertainty may be as high as 50 to 75 percent.

Table 3. Concentrations of methylmercury in water samples, Greenhorn Creek drainage, Nevada County, California.

[NOTE: *Table 4* begins on page 71. Station name abbreviations: ab, above; bl, below; Cr, Creek; Cyn, Canyon; mi, mile; N, North; nr, near; Rd, Road; S, South; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. The method detection limit for methylmercury was 0.04 nanogram per liter (ng/L). — , not determined; <, less than]

Station map ID	Station name	Date	Time	Methylmercury, unfiltered (ng/L) (50284)	Methylmercury, filtered (ng/L) (50285)
Environmental samples					
BY20	Boston Mine tunnel outlet nr Grass Valley	6/18/1999	14:30	0.09	—
BY20	Boston Mine tunnel outlet nr Grass Valley	12/14/1999	12:00	<.04	—
BY20	Boston Mine tunnel outlet nr Grass Valley	5/24/2000	16:00	.13	—
BY20	Boston Mine tunnel outlet nr Grass Valley	12/21/2001	12:10	.10	0.04
BY21	Boston Mine wetlands pond nr Grass Valley	12/14/1999	10:30	.04	—
BY21	Boston Mine wetlands pond nr Grass Valley	5/24/2000	16:30	.63	—
BY58	Buckeye Flat Mine main drain 0.45 mi ab Greenhorn Cr	8/21/2000	11:00	—	—
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	6/18/1999	11:30	<.04	—
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	12/2/1999	11:00	.30	—
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	8/22/2000	10:45	—	—
BY116	Buckeye Flat Mine pond drain 0.15 mi ab SF Greenhorn Cr	8/21/2000	14:10	—	—
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/26/1999	11:00	9.11	—
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/22/2000	12:10	—	—
BY25	Buckeye Flat Mine upper drain	4/9/2001	10:00	<.04	<.04
BY25	Buckeye Flat Mine upper drain	10/18/2001	11:30	.06	.05
BY52	Greenhorn Cr 0.3 mi ab Buckeye Ford nr Nevada City	1/25/2000	10:45	<.04	—
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	1/25/2000	12:00	.10	—
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	7/24/2001	11:00	<.04	—
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	8/29/2001	15:00	.11	.05
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	9/14/2001	13:00	.07	.04
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	10/15/2001	12:00	.04	<.04
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	11/20/2001	13:20	—	<.04
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/10/2001	12:20	—	<.04
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/21/2001	13:00	.08	—
BY51	Greenhorn Cr nr headwaters nr Scotts Flat Reservoir	1/25/2000	9:30	.06	—
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	12/14/1999	14:00	.07	—
BY86	Poore Mine creek ab tunnel nr Grass Valley	3/31/1999	17:40	<.04	—
BY87	Poore Mine creek bl tunnel nr Grass Valley	3/31/1999	13:30	<.04	—
BY88	Poore Mine ground sluice nr Grass Valley	4/1/1999	15:40	<.04	—
BY89	Poore Mine pit lake nr Grass Valley	4/1/1999	16:50	.11	—
BY89	Poore Mine pit lake nr Grass Valley	5/23/2000	10:45	.05	—
BY90	Poore Mine seep ab ground sluice nr Grass Valley	4/1/1999	16:00	—	—
BY91	Poore Mine tunnel effluent nr Grass Valley	3/31/1999	15:20	<.04	—
BY91	Poore Mine tunnel effluent nr Grass Valley	12/15/1999	13:30	<.04	—
BY91	Poore Mine tunnel effluent nr Grass Valley	5/23/2000	12:00	.88	—
BY105	Sailor Flat Mine main drain Gulch 01 nr Quaker Hill	7/6/1999	16:00	.30	—
BY105	Sailor Flat Mine main drain Gulch 01 nr Quaker Hill	12/2/1999	14:30	2.64	—
BY106	Sailor Flat Mine main drainage to Greenhorn Cr, Gulch 03	4/9/2001	12:30	.10	.06
BY114	SF Greenhorn Cr 0.7 mi ab Greenhorn Cr nr Nevada City	8/22/2000	15:10	.13	.27
BY115	SF Greenhorn Cr bl Boston Mine nr Nevada City	12/21/2001	12:40	<.04	<.04
BY122	Starr Mine tunnel inflow nr Grass Valley	4/23/1999	15:00	<.04	—
BY123	Starr Mine tunnel midway nr Grass Valley	4/23/1999	13:40	.79	—
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	10:45	.78	—
BY124	Starr Mine tunnel outlet nr Grass Valley	8/23/2000	17:30	.53	<.04
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:00	.18	—
BY130	Tom and Jerry Mine drain at tunnel outlet nr Nevada City	6/28/2000	11:30	<.04	—
BY131	Tom and Jerry Mine drainage pond nr Nevada City	8/23/2000	10:45	<.04	—
Disturbed Samples					
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	11:30	244	—
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:30	.04	—

Table 5. Concentrations of major anions and alkalinity in filtered water samples, Greenhorn Creek drainage, Nevada County, California.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; Cyn, Canyon; mi, mile; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. $CaCO_3$, calcium carbonate; mg/L, milligram per liter; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Chloride (Cl) (mg/L) (00940)	Sulfate (SO_4) (mg/L) (99113)	Alkalinity, laboratory (mg/L as $CaCO_3$) (29803)
Environmental samples						
BY20	Boston Mine tunnel outlet nr Grass Valley	6/18/99	14:30	0.74	13	40
BY20	Boston Mine tunnel outlet nr Grass Valley	12/14/99	12:00	0.62	21	54
BY20	Boston Mine tunnel outlet nr Grass Valley	5/24/00	16:00	0.50	11	38
BY20	Boston Mine tunnel outlet nr Grass Valley	12/21/01	12:10	0.81	12	14
BY21	Boston Mine wetlands pond nr Grass Valley	12/14/99	10:30	0.91	15	61
BY21	Boston Mine wetlands pond nr Grass Valley	5/24/00	16:30	0.50	7	34
BY58	Buckeye Flat Mine main drain 0.45 mi ab Greenhorn Cr	8/21/00	11:00	0.50	110	0
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	6/18/99	11:30	0.60	169	0
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	12/2/99	11:00	0.69	120	0
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	8/22/00	10:45	0.55	170	0
BY116	Buckeye Flat Mine pond drain 0.15 mi ab SF Greenhorn Cr	8/21/00	14:10	0.65	6	0
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/26/99	11:00	—	—	—
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/22/00	12:10	0.77	6	—
BY25	Buckeye Flat Mine upper drain	4/9/01	10:00	0.67	44	0
BY25	Buckeye Flat Mine upper drain	10/18/01	11:30	0.54	55	1
BY52	Greenhorn Cr 0.3 mi ab Buckeye Ford nr Nevada City	1/25/00	10:45	0.70	5	9
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	1/25/00	12:00	0.80	7	7
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	7/24/01	11:00	1.50	17	5
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	8/29/01	15:00	2.30	13	12
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	9/14/01	13:00	—	—	—
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	10/15/01	12:00	1.31	13	12
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	11/20/01	13:20	2.12	19	13
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/10/01	12:20	1.62	15	12
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/21/01	13:00	—	—	6
BY51	Greenhorn Cr nr headwaters nr Scotts Flat Reservoir	1/25/00	9:30	0.60	<1	7
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	12/14/99	14:00	0.99	39	11
BY86	Poore Mine Cr ab tunnel nr Grass Valley	3/31/99	17:40	1.19	3	11
BY87	Poore Mine Cr bl tunnel nr Grass Valley	3/31/99	13:30	1.15	4	12
BY88	Poore Mine ground sluice nr Grass Valley	4/1/99	15:40	0.83	40	10
BY89	Poore Mine pit lake nr Grass Valley	4/1/99	16:50	0.68	8	2
BY89	Poore Mine pit lake nr Grass Valley	5/23/00	10:45	0.60	77	0
BY90	Poore Mine seep ab ground sluice nr Grass Valley	4/1/99	16:00	—	—	—
BY91	Poore Mine tunnel effluent nr Grass Valley	3/31/99	15:20	0.73	32	17
BY91	Poore Mine tunnel effluent nr Grass Valley	12/15/99	13:30	0.69	43	30
BY91	Poore Mine tunnel effluent nr Grass Valley	5/23/00	12:00	0.84	42	27
BY105	Sailor Flat Mine main drain Gulch 01 nr Quaker Hill	7/6/99	16:00	1.46	17	2
BY105	Sailor Flat Mine main drain Gulch 01 nr Quaker Hill	12/2/99	14:30	0.72	6	1
BY106	Sailor Flat Mine main drainage to Greenhorn Cr, Gulch 03	4/9/01	12:30	—	—	—
BY114	SF Greenhorn Cr 0.7 mi ab Greenhorn Cr nr Nevada City	8/22/00	15:10	0.69	3	21
BY115	SF Greenhorn Cr bl Boston Mine nr Nevada City	12/21/01	12:40	0.89	5	5
BY122	Starr Mine tunnel inflow nr Grass Valley	4/23/99	15:00	0.70	35	11
BY123	Starr Mine tunnel midway nr Grass Valley	4/23/99	13:40	0.80	29	72
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/99	10:45	0.96	56	68
BY124	Starr Mine tunnel outlet nr Grass Valley	8/23/00	17:30	—	—	—
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/00	12:00	1.00	2	13
BY130	Tom and Jerry Mine drain at tunnel outlet nr Nevada City	6/28/00	11:30	0.80	15	37
BY131	Tom and Jerry Mine drainage pond nr Nevada City	8/23/00	10:45	1.00	4	14
Disturbed samples						
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/99	11:30	0.94	57	79
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/00	12:30	0.76	13	33

Table 6. Concentrations of nutrients and organic carbon in water samples, Greenhorn Creek drainage, Nevada County, California.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; Cyn, Canyon; mi, mile; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. Elements: N, nitrogen; P, phosphorous; C, carbon. E, estimated value; mg/L, milligram per liter; <, less than; >, greater than; —, not determined]

Station map ID	Station name	Date	Time	Nitrogen, ammonia, filtered (mg/L as N) (00608)	Nitrogen, ammonia plus organic, filtered (mg/L as N) (00623)	Nitrogen, ammonia plus organic, unfiltered (mg/L as N) (00625)	Nitrogen, nitrite plus nitrate, filtered (mg/L as N) (00631)	Nitrogen, nitrite, filtered (mg/L as N) (00613)	Total nitrogen, particulate (mg/L) (49570)	Total phosphorus, filtered (mg/L as P) (00666)	Phosphorus, orthophos-phate, filtered (mg/L as P) (00671)	Total phosphorus, unfiltered (mg/L as P) (00665)	Carbon, inorganic plus organic, particulate (mg/L as C) (00694)	Carbon, organic, filtered (mg/L as C) (00681)	Carbon, organic, particulate (mg/L as C) (00689)
				Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value
Environmental samples															
BY20	Boston Mine tunnel outlet nr Grass Valley	6/18/99	14:30	<0.02	<0.1	0.11	<0.05	<0.01	—	<0.004	0.01	<0.004	—	0.7	0.3
BY20	Boston Mine tunnel outlet nr Grass Valley	12/14/99	12:00	<0.02	<0.1	<0.1	<0.05	<0.01	—	E0.005	<0.01	E0.006	—	0.5	<0.2
BY20	Boston Mine tunnel outlet nr Grass Valley	5/24/00	16:00	<0.02	E0.05	E0.07	<0.05	<0.01	—	<0.006	<0.01	E0.006	—	0.6	<0.2
BY20	Boston Mine tunnel outlet nr Grass Valley	12/21/01	12:10	<0.04	<0.1	E0.06	<0.05	<0.008	—	<0.004	<0.02	0.008	—	—	—
BY21	Boston Mine wetlands pond nr Grass Valley	12/14/99	10:30	<0.02	E0.09	0.15	<0.05	<0.01	—	E0.005	<0.01	0.011	—	2.1	0.3
BY21	Boston Mine wetlands pond nr Grass Valley	5/24/00	16:30	<0.02	0.19	0.26	<0.05	<0.01	—	0.008	<0.01	0.025	—	3.1	0.5
BY58	Buckeye Flat Mine main drain 0.45 mi ab Greenhorn Cr	8/21/00	11:00	—	—	—	—	—	—	—	—	—	—	0.4	<0.2
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	6/18/99	11:30	<0.02	<0.1	0.1	<0.05	<0.01	—	<0.004	<0.01	<0.004	—	0.3	<0.2
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	12/2/99	11:00	<0.02	<0.1	<0.1	<0.05	<0.01	—	0.024	0.02	E0.004	—	1.3	—
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	8/22/00	10:45	<0.02	<0.1	E0.06	<0.05	<0.01	—	<0.006	<0.01	<0.008	—	0.6	0.2
BY116	Buckeye Flat Mine pond drain 0.15 mi ab SF Greenhorn Cr	8/21/00	14:10	—	—	—	—	—	—	—	—	—	—	0.7	<0.2

Table 6. Concentrations of nutrients and organic carbon in water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; Cyn, Canyon; mi, mile; N, north; nr, near; RD, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. Elements: N, nitrogen; P, phosphorous; C, carbon. E, estimated value; mg/L, milligram per liter; <, less than; >, greater than; —, not determined]

Station map ID	Station name	Date	Time	Nitrogen, ammonia, filtered (mg/L as N) (00608)	Nitrogen, ammonia plus organic, filtered (mg/L as N) (00623)	Nitrogen, ammonia plus organic, unfiltered (mg/L as N) (00625)	Nitrogen, nitrite plus nitrate, filtered (mg/L as N) (00631)	Nitrogen, nitrite, filtered (mg/L as N) (00613)	Total nitrogen, particulate (mg/L) (49570)	Total phosphorus, filtered (mg/L as P) (00666)	Phosphorus, orthophos-phate, filtered (mg/L as P) (00671)	Total phosphorus, unfiltered (mg/L as P) (00665)	Carbon, inorganic plus organic, particulate (mg/L as C) (00694)	Carbon, organic, filtered (mg/L as C) (00681)	Carbon, organic, particulate (mg/L as C) (00689)
				Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/26/99	11:00	<0.02	E0.06	E0.09	<0.05	<0.01	—	<0.05	<0.01	<0.05	—	0.9	0.2
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/22/00	12:10	<0.02	<0.1	0.23	<0.05	<0.01	—	<0.006	<0.01	0.019	—	0.8	1.4
BY25	Buckeye Flat Mine upper drain	4/9/01	10:00	<0.04	<0.1	E0.05	<0.05	<0.006	0.03	<0.006	<0.02	0.004	0.1	0.6	—
BY25	Buckeye Flat Mine upper drain	10/18/01	11:30	<0.04	<0.1	<0.1	<0.05	<0.008	—	<0.004	<0.02	E0.003	—	0.6	<0.2
BY52	Greenhorn Cr 0.3 mi ab Buckeye Ford nr Nevada City	1/25/00	10:45	<0.02	0.1	E0.07	<0.05	<0.01	—	<0.006	<0.01	<0.05	—	1.6	0.2
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	1/25/00	12:00	<0.02	<0.1	0.15	0.08	<0.01	—	E0.004	<0.01	0.31	—	1.5	1.1
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	7/24/01	11:00	<0.04	<0.1	<0.08	E0.04	<0.006	—	<0.006	<0.02	<0.004	—	1.3	0.4
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	8/29/01	15:00	<0.04	<0.1	<0.08	<0.05	<0.006	—	<0.006	<0.02	E0.003	—	0.5	<0.2
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	9/14/01	13:00	<0.04	<0.1	<0.08	<0.05	<0.006	—	<0.006	<0.02	E0.003	—	0.6	2
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	10/15/01	12:00	—	—	—	—	—	—	—	—	—	—	—	—
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	11/20/01	13:20	E0.02	<0.1	E0.05	<0.05	<0.008	—	<0.004	<0.02	E0.002	—	1.0	<0.2

Table 6. Concentrations of nutrients and organic carbon in water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; Cyn, Canyon; mi, mile; N, north; nr, near; RD, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. Elements: N, nitrogen; P, phosphorous; C, carbon. E, estimated value; mg/L, milligram per liter; <, less than; >, greater than; —, not determined]

Station map ID	Station name	Date	Time	Nitrogen, ammonia, filtered (mg/L as N) (00608)	Nitrogen, ammonia plus organic, filtered (mg/L as N) (00623)	Nitrogen, ammonia plus organic, unfiltered (mg/L as N) (00625)	Nitrogen, nitrite plus nitrate, filtered (mg/L as N) (00631)	Nitrogen, nitrite, filtered (mg/L as N) (00613)	Total nitrogen, particulate (mg/L) (49570)	Total phosphorus, filtered (mg/L as P) (00666)	Phosphorus, orthophos-phate, filtered (mg/L as P) (00671)	Total phosphorus, unfiltered (mg/L as P) (00665)	Carbon, inorganic plus organic, particulate (mg/L as C) (00694)	Carbon, organic, filtered (mg/L as C) (00681)	Carbon, organic, particulate (mg/L as C) (00689)
				Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/10/01	12:20	<0.04	E0.06	<0.1	0.14	<0.008	—	<0.004	<0.02	0.017	—	1.0	<0.2
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/21/01	13:00	<0.04	E0.06	0.11	0.13	<0.008	—	E0.002	<0.02	0.134	—	1.0	0.6
BY51	Greenhorn Cr nr headwaters nr Scotts Flat Reservoir	1/25/00	9:30	<0.02	<0.1	<0.1	<0.05	<0.01	—	E0.003	<0.01	E0.005	—	1.6	<0.2
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	12/14/99	14:00	<0.02	<0.1	<0.1	<0.05	<0.01	—	E0.003	<0.01	<0.008	—	1.0	<0.2
BY86	Poore Mine creek ab tunnel nr Grass Valley	3/31/99	17:40	<0.02	<0.1	E0.05	<0.05	<0.01	—	<0.004	<0.01	0.014	—	0.9	0.3
BY87	Poore Mine creek bl tunnel nr Grass Valley	3/31/99	13:30	<0.02	<0.1	E0.05	<0.05	<0.01	—	<0.004	<0.01	0.011	—	0.9	0.2
BY88	Poore Mine ground sluice nr Grass Valley	4/1/99	15:40	<0.02	<0.1	<0.1	<0.05	<0.01	—	<0.004	<0.01	<0.004	—	0.9	0.2
BY89	Poore Mine pit lake nr Grass Valley	4/1/99	16:50	<0.02	<0.1	<0.1	<0.05	<0.01	—	0.004	<0.01	<0.004	—	1.1	0.3
BY89	Poore Mine pit lake nr Grass Valley	5/23/00	10:45	<0.02	<0.1	0.2	<0.05	<0.01	—	<0.006	<0.01	0.014	—	2.2	0.2
BY90	Poore Mine seep ab ground sluice nr Grass Valley	4/1/99	16:00	—	—	—	—	—	—	—	—	—	—	—	—
BY91	Poore Mine tunnel effluent nr Grass Valley	3/31/99	15:20	<0.02	<0.1	<0.1	<0.05	<0.01	—	0.004	<0.01	0.007	—	0.3	0.8

Table 6. Concentrations of nutrients and organic carbon in water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; Cyn, Canyon; mi, mile; N, north; nr, near; RD, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. Elements: N, nitrogen; P, phosphorous; C, carbon. E, estimated value; mg/L, milligram per liter; <, less than; >, greater than; —, not determined]

Station map ID	Station name	Date	Time	Nitrogen, ammonia, filtered (mg/L as N) (00608)	Nitrogen, ammonia plus organic, filtered (mg/L as N) (00623)	Nitrogen, ammonia plus organic, unfiltered (mg/L as N) (00625)	Nitrogen, nitrite plus nitrate, filtered (mg/L as N) (00631)	Nitrogen, nitrite, filtered (mg/L as N) (00613)	Total nitrogen, particulate (mg/L) (49570)	Total phosphorus, filtered (mg/L as P) (00666)	Phosphorus, orthophos-phate, filtered (mg/L as P) (00671)	Total phosphorus, unfiltered (mg/L as P) (00665)	Carbon, inorganic plus organic, particulate (mg/L as C) (00694)	Carbon, organic, filtered (mg/L as C) (00681)	Carbon, organic, particulate (mg/L as C) (00689)
				Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value
BY91	Poore Mine tunnel effluent nr Grass Valley	12/15/99	13:30	<0.02	<0.1	E0.07	<0.05	<0.01	—	0.012	<0.01	0.016	—	0.6	0.4
BY91	Poore Mine tunnel effluent nr Grass Valley	5/23/00	12:00	<0.02	<0.1	0.21	<0.05	<0.01	—	0.006	<0.01	0.047	—	E0.3	0.3
BY105	Sailor Flat Mine main drain Gulch 01 nr Quaker Hill	7/6/99	16:00	<0.02	<0.1	0.25	<0.05	<0.01	—	<0.004	0.01	0.025	—	2.0	0.9
BY105	Sailor Flat Mine main drain Gulch 01 nr Quaker Hill	12/2/99	14:30	—	—	—	—	—	—	—	—	—	—	—	—
BY106	Sailor Flat Mine main drainage to Greenhorn Cr, Gulch 03	4/9/01	12:30	<0.04	<0.1	0.13	<0.05	<0.006	0.09	<0.006	E0.01	0.005	0.3	3.1	—
BY114	SF Greenhorn Cr 0.7 mi ab Greenhorn Cr nr Nevada City	8/22/00	15:10	—	—	—	—	—	—	—	—	—	—	—	—
BY115	SF Greenhorn Cr bl Boston Mine nr Nevada City	12/21/01	12:40	<0.04	E0.07	E0.06	0.26	<0.008	—	E0.003	<0.02	0.006	—	—	—
BY122	Starr Mine tunnel inflow nr Grass Valley	4/23/99	15:00	<0.02	E0.06	<0.1	0.07	<0.01	—	<0.004	0.01	<0.004	—	0.6	<0.2
BY123	Starr Mine tunnel midway nr Grass Valley	4/23/99	13:40	<0.02	<0.1	E0.06	0.07	<0.01	—	<0.004	0.02	0.007	—	0.3	0.2
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/99	10:45	<0.02	E0.06	E0.09	<0.05	<0.01	—	<0.006	<0.01	0.021	—	1.1	0.5
BY124	Starr Mine tunnel outlet nr Grass Valley	8/23/00	17:30	<0.02	<0.1	0.17	<0.05	<0.01	—	E0.005	<0.01	0.048	—	0.6	1.1

Table 6. Concentrations of nutrients and organic carbon in water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; Cyn, Canyon; mi, mile; N, north; nr, near; RD, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. Elements: N, nitrogen; P, phosphorous; C, carbon. E, estimated value; mg/L, milligram per liter; <, less than; >, greater than; —, not determined]

Station map ID	Station name	Date	Time	Nitrogen, ammonia, filtered (mg/L as N) (00608)	Nitrogen, ammonia plus organic, filtered (mg/L as N) (00623)	Nitrogen, ammonia plus organic, unfiltered (mg/L as N) (00625)	Nitrogen, nitrite plus nitrate, filtered (mg/L as N) (00631)	Nitrogen, nitrite, filtered (mg/L as N) (00613)	Total nitrogen, particulate (mg/L) (49570)	Total phosphorus, filtered (mg/L as P) (00666)	Phosphorus, orthophos-phate, filtered (mg/L as P) (00671)	Total phosphorus, unfiltered (mg/L as P) (00665)	Carbon, inorganic plus organic, particulate (mg/L as C) (00694)	Carbon, organic, filtered (mg/L as C) (00681)	Carbon, organic, particulate (mg/L as C) (00689)
				Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/00	12:00	<0.02	<0.1	0.33	<0.05	<0.01	—	0.006	<0.01	0.18	—	1.0	<0.2
BY130	Tom and Jerry Mine drain at tunnel outlet nr Nevada City	6/28/00	11:30	<0.02	<0.1	E0.05	<0.05	<0.01	—	<0.006	<0.01	0.014	—	0.6	<0.2
BY131	Tom and Jerry Mine drainage pond nr Nevada City	8/23/00	10:45	<0.02	<0.1	E0.06	<0.05	<0.01	—	E0.004	<0.01	0.012	—	0.4	<0.2
Disturbed samples															
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/99	11:30	<0.02	<0.1	5.5	<0.05	<0.01	—	E0.004	<0.01	3.99	—	0.7	>10
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/00	12:30	<0.02	E0.06	2.2	<0.05	<0.01	—	<0.006	<0.01	2.7	—	0.8	0.3

Table 7. Data for suspended sediment in water samples, Greenhorn Creek drainage, Nevada County, California.

[Percentage sand determined gravimetrically using 0.063-millimeter screen. Station name abbreviations: ab, above; bl, below; Cr, Creek; Cyn, Canyon; mi, mile; N, north; nr, near; Rd, Road; S, south; SF, South Fork. mm, millimeter; mg/L milligram per liter; —, not determined]

Station map ID	Station name	Date	Time	Suspended sediment, percentage finer than 0.063 mm	Suspended sediment concentration (mg/L)
Environmental samples					
BY20	Boston Mine tunnel outlet nr Grass Valley	6/18/99	14:30	—	—
BY20	Boston Mine tunnel outlet nr Grass Valley	12/14/99	12:00	40	6
BY20	Boston Mine tunnel outlet nr Grass Valley	5/24/00	16:00	—	7
BY20	Boston Mine tunnel outlet nr Grass Valley	12/21/01	12:10	79	8
BY21	Boston Mine wetlands pond nr Grass Valley	12/14/99	10:30	62	2
BY21	Boston Mine wetlands pond nr Grass Valley	5/24/00	16:30	—	3
BY58	Buckeye Flat Mine main drain 0.45 mi ab Greenhorn Cr	8/21/00	11:00	—	1
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	6/18/99	11:30	—	—
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	12/2/99	11:00	72	708
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	8/22/00	10:45	—	1
BY116	Buckeye Flat Mine pond drain 0.15 mi ab SF Greenhorn Cr	8/21/00	14:10	—	2
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/26/99	11:00	—	—
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/22/00	12:10	—	19
BY25	Buckeye Flat Mine upper drain	4/9/01	10:00	6	19
BY25	Buckeye Flat Mine upper drain	10/18/01	11:30	50	1
BY52	Greenhorn Cr 0.3 mi ab Buckeye Ford nr Nevada City	1/25/00	10:45	69	32
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	1/25/00	12:00	64	715
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	7/24/01	11:00	—	4
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	8/29/01	15:00	50	1
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	9/14/01	13:00	67	0
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	10/15/01	12:00	29	1
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	11/20/01	13:20	75	3
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/10/01	12:20	52	63
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/21/01	13:00	92	266
BY51	Greenhorn Cr nr headwaters nr Scotts Flat Reservoir	1/25/00	9:30	86	1
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	12/14/99	14:00	—	0
BY86	Poore Mine creek ab tunnel nr Grass Valley	3/31/99	17:40	—	9
BY87	Poore Mine creek bl tunnel nr Grass Valley	3/31/99	13:30	—	13
BY88	Poore Mine ground sluice nr Grass Valley	4/1/99	15:40	—	2
BY89	Poore Mine pit lake nr Grass Valley	4/1/99	16:50	—	2
BY89	Poore Mine pit lake nr Grass Valley	5/23/00	10:45	—	—
BY90	Poore Mine seep above ground sluice nr Grass Valley	4/1/99	16:00	—	—
BY91	Poore Mine tunnel effluent nr Grass Valley	3/31/99	15:20	—	3
BY91	Poore Mine tunnel effluent nr Grass Valley	12/15/99	13:30	43	7
BY91	Poore Mine tunnel effluent nr Grass Valley	5/23/00	12:00	—	—
BY105	Sailor Flat Mine main drain Gulch 01 nr Quaker Hill	7/6/99	16:00	—	—
BY105	Sailor Flat Mine main drain Gulch 01 nr Quaker Hill	12/2/99	14:30	58	1,369
BY106	Sailor Flat Mine main drainage to Greenhorn Cr, Gulch 03,	4/9/01	12:30	87	3
BY114	SF Greenhorn Cr 0.7 mi ab Greenhorn Cr nr Nevada City	8/22/00	15:10	—	1
BY115	SF Greenhorn Cr bl Boston Mine nr Nevada City	12/21/01	12:40	94	7
BY122	Starr Mine tunnel inflow nr Grass Valley	4/23/99	15:00	—	3
BY123	Starr Mine tunnel midway nr Grass Valley	4/23/99	13:40	—	12
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/99	10:45	56	20
BY124	Starr Mine tunnel outlet nr Grass Valley	8/23/00	17:30	—	—
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/00	12:00	83	308
BY130	Tom and Jerry Mine drain at tunnel outlet nr Nevada City	6/28/00	11:30	67	6
BY131	Tom and Jerry Mine drainage pond nr Nevada City	8/23/00	10:45	—	12
Disturbed samples					
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/99	11:30	60	8,781
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/00	12:30	97	6,039

Table 8. Data for stable isotopes of sulfur and oxygen in aqueous sulfate and of oxygen and hydrogen in water, Greenhorn Creek drainage, Nevada County, California.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; Cyn, Canyon; mi, mile; N, north; nr, near; Rd, Road; S, south; SF, South Fork. $\delta^{18}O\ SO_4$, delta-oxygen-18 in aqueous sulfate; $\delta^{18}O\ H_2O$, delta-oxygen-18 in water; $\delta^{34}S\ SO_4$, delta-sulfur-34 in aqueous sulfate; $\delta D\ H_2O$, delta-deuterium in water. per mil, per thousand; VSMOW, Vienna Standard Mean Ocean Water; CDT, Canyon Diablo Meteorite; (1 of 2) and (2 of 2) refer to replicate analyses; —, not determined]

Station map ID	Station name	Date	Time	$\delta^{18}O\ SO_4$		$\delta^{34}S\ SO_4$		$\delta^{18}O\ H_2O$		$\delta D\ H_2O$	
				(1 of 2) per mil, VSMOW	(2 of 2) per mil, VSMOW	(1 of 2) per mil, CDT	(2 of 2) per mil, CDT	(1 of 2) per mil, VSMOW	(2 of 2) per mil, VSMOW	(1 of 2) per mil, VSMOW	(2 of 2) per mil, VSMOW
Environmental samples											
BY20	Boston Mine tunnel outlet nr Grass Valley	6/18/99	14:30	5.3	—	–7.6	—	–8.75	–8.85	–62.6	—
BY20	Boston Mine tunnel outlet nr Grass Valley	12/14/99	12:00	4.3	—	–11.9	—	–8.93	—	–61.8	—
BY20	Boston Mine tunnel outlet nr Grass Valley	5/24/00	16:00	4.9	—	–7.4	—	–9.74	—	–67.1	–66.1
BY20	Boston Mine tunnel outlet nr Grass Valley	12/21/01	12:10	2.1	—	–12.2	—	–9.94	—	–68.6	—
BY21	Boston Mine wetlands pond nr Grass Valley	12/14/99	10:30	2.7	—	–5.6	—	–8.27	—	–56.6	—
BY21	Boston Mine wetlands pond nr Grass Valley	5/24/00	16:30	–0.6	—	–4.4	—	–8.81	—	–66.9	—
BY58	Buckeye Flat Mine main drain 0.45 mi ab Greenhorn Cr	8/21/00	11:00	—	—	—	—	–6.92	—	–62.0	—
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	6/18/99	11:30	–3.8	—	–16.8	—	–9.58	—	–67.2	—
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	12/2/99	11:00	–3.5	—	–17.1	—	–9.03	—	–60.4	—
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	8/22/00	10:45	—	—	—	—	–9.90	—	–68.5	—
BY116	Buckeye Flat Mine pond drain 0.15 mi ab SF Greenhorn Cr	8/21/00	14:10	—	—	—	—	–7.63	—	–64.7	—
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/26/99	11:00	—	—	—	—	–7.51	–7.52	–57.6	—
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/22/00	12:10	—	—	—	—	–8.41	—	–64.6	—
BY25	Buckeye Flat Mine upper drain	4/9/01	10:00	–3.9	—	–19.4	—	–10.68	—	–75.1	—
BY25	Buckeye Flat Mine upper drain	10/18/01	11:30	0.5	—	–19.5	—	–9.98	—	–68.8	—
BY52	Greenhorn Cr 0.3 mi ab Buckeye Ford nr Nevada City	1/25/00	10:45	—	—	—	—	–11.56	—	–83.2	—
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	1/25/00	12:00	–1.9	–1.8	–9.0	—	–11.52	–11.46	–80.5	—
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	7/24/01	11:00	0.5	—	–9.7	—	–9.91	—	–72.4	—
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	8/29/01	15:00	1.4	—	–8.0	—	–9.74	—	–73.4	—
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	9/14/01	13:00	0.4	—	–9.0	—	–9.78	—	–71.6	—
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	10/15/01	12:00	0.5	—	–9.2	—	–9.98	—	–72.2	—
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	11/20/01	13:20	0.0	—	–9.2	–9.3	–10.19	—	–72.5	—
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/10/01	12:20	–1.5	—	–8.6	—	–10.04	—	–72.3	—
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/21/01	13:00	–1.2	—	–8.7	—	–10.18	—	–70.1	—
BY51	Greenhorn Cr nr headwaters nr Scotts Flat Reservoir	1/25/00	9:30	—	—	—	—	–11.78	—	–85.3	—
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	12/14/99	14:00	–0.5	—	–10.8	–10.7	–9.29	—	–65.8	–66.4
BY86	Poore Mine creek ab tunnel nr Grass Valley	3/31/99	17:40	—	—	—	—	–9.59	—	–66.3	—
BY87	Poore Mine creek bl tunnel nr Grass Valley	3/31/99	13:30	0.5	—	–9.9	—	–10.66	—	–74.8	–74.9
BY88	Poore Mine ground sluice nr Grass Valley	4/1/99	15:40	–0.6	—	–9.7	—	–9.28	—	–64.6	—
BY89	Poore Mine pit lake nr Grass Valley	4/1/99	16:50	—	—	—	—	–8.61	—	–60.5	—
BY89	Poore Mine pit lake nr Grass Valley	5/23/00	10:45	–3.9	—	23.1	23.1	–7.32	—	–60.9	—
BY90	Poore Mine seep above ground sluice nr Grass Valley	4/1/99	16:00	0.1	—	–9.6	—	–9.33	—	–64.5	—
BY91	Poore Mine tunnel effluent nr Grass Valley	3/31/99	15:20	–2.6	—	–5.7	—	–9.47	—	–65.6	—

Table 8. Data for stable isotopes of sulfur and oxygen in aqueous sulfate and of oxygen and hydrogen in water, Greenhorn Creek drainage, Nevada County, California—*Continued.*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; Cyn, Canyon; mi, mile; N, north; nr, near; Rd, Road; S, south; SF, South Fork. $\delta^{18}O\ SO_4$, delta-oxygen-18 in aqueous sulfate; $\delta^{18}O\ H_2O$, delta-oxygen-18 in water; $\delta^{34}S\ SO_4$, delta-sulfur-34 in aqueous sulfate; $\delta D\ H_2O$, delta-deuterium in water. per mil, per thousand; VSMOW, Vienna Standard Mean Ocean Water; CDT, Canyon Diablo Meteorite; (1 of 2) and (2 of 2) refer to replicate analyses; —, not determined]

Station map ID	Station name	Date	Time	$\delta^{18}O\ SO_4$		$\delta^{34}S\ SO_4$		$\delta^{18}O\ H_2O$		$\delta D\ H_2O$	
				(1 of 2) per mil, VSMOW	(2 of 2) per mil, VSMOW	(1 of 2) per mil, CDT	(2 of 2) per mil, CDT	(1 of 2) per mil, VSMOW	(2 of 2) per mil, VSMOW	(1 of 2) per mil, VSMOW	(2 of 2) per mil, VSMOW
BY91	Poore Mine tunnel effluent nr Grass Valley	12/15/99	13:30	–2.7	—	–8.1	—	–9.71	—	–69.2	—
BY91	Poore Mine tunnel effluent nr Grass Valley	5/23/00	12:00	–2.4	–2.3	–7.1	—	–10.03	—	–71.5	–70.7
BY105	Sailor Flat Mine main drain Gulch 01 nr Quaker Hill	7/6/99	16:00	2.2	—	–18.4	–18.3	–8.81	—	–64.3	–64.1
BY105	Sailor Flat Mine main drain Gulch 01 nr Quaker Hill	12/2/99	14:30	2.4	—	–11.3	—	–7.77	—	–49.8	—
BY106	Sailor Flat Mine main drainage to Greenhorn Cr Gulch 03	4/9/01	12:30	—	—	—	—	–10.85	—	–78.1	—
BY114	SF Greenhorn Cr 0.7 mi ab Greenhorn Cr nr Nevada City	8/22/00	15:10	—	—	—	—	–10.13	—	–70.4	—
BY115	SF Greenhorn Cr bl Boston Mine nr Nevada City	12/21/01	12:40	—	—	—	—	—	—	—	—
BY122	Starr Mine tunnel inflow nr Grass Valley	4/23/99	15:00	–1.1	—	–21.9	—	–9.09	–9.08	–64.4	–64.4
BY123	Starr Mine tunnel midway nr Grass Valley	4/23/99	13:40	–0.6	–0.3	–16.5	—	–9.59	—	–67.4	—
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/99	10:45	–0.1	—	–20.3	—	–9.08	—	–62.3	—
BY124	Starr Mine tunnel outlet nr Grass Valley	8/23/00	17:30	1.6	—	–16.4	—	–9.49	—	–67.0	—
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/00	12:00	—	—	—	—	–10.27	—	–73.2	—
BY130	Tom and Jerry Mine drain at tunnel outlet nr Nevada City	6/28/00	11:30	0.3	—	–8.8	—	–10.17	—	–74.3	—
BY131	Tom and Jerry Mine drainage pond nr Nevada City	8/23/00	10:45	—	—	—	—	–10.33	–10.38	–74.3	—
Disturbed samples											
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/99	11:30	–0.3	—	–20.3	—	—	—	—	—
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/00	12:30	0.3	—	–9.7	—	–10.15	–10.18	–73.4	—

The overall distribution of mercury concentrations in the environmental water samples collected for this study is shown in *figure 6* for the following mercury analytes and matrices: THg in unfiltered water, THg in filtered water, MeHg in unfiltered water, and MeHg in filtered water. Concentrations of THg in unfiltered water (*table 2*) are the highest of these four types of mercury samples. The range of concentrations of THg in the unfiltered, environmental water samples was 0.80 to 153,000 nanograms per liter (ng/L) with a median value of 9.6 ng/L. Total mercury concentrations in filtered water (*table 2*) ranged from <0.3 to 8,000 ng/L with a median value of 2.7 ng/L. Concentrations of MeHg in the unfiltered water (*table 3*) ranged from <0.04 to 9.1 ng/L in 40 undisturbed (environmental) samples, with a median value of 0.07 ng/L. Methylmercury in filtered water (12 samples) ranged from <0.04 to 0.27 ng/L with a median value of 0.04 ng/L.

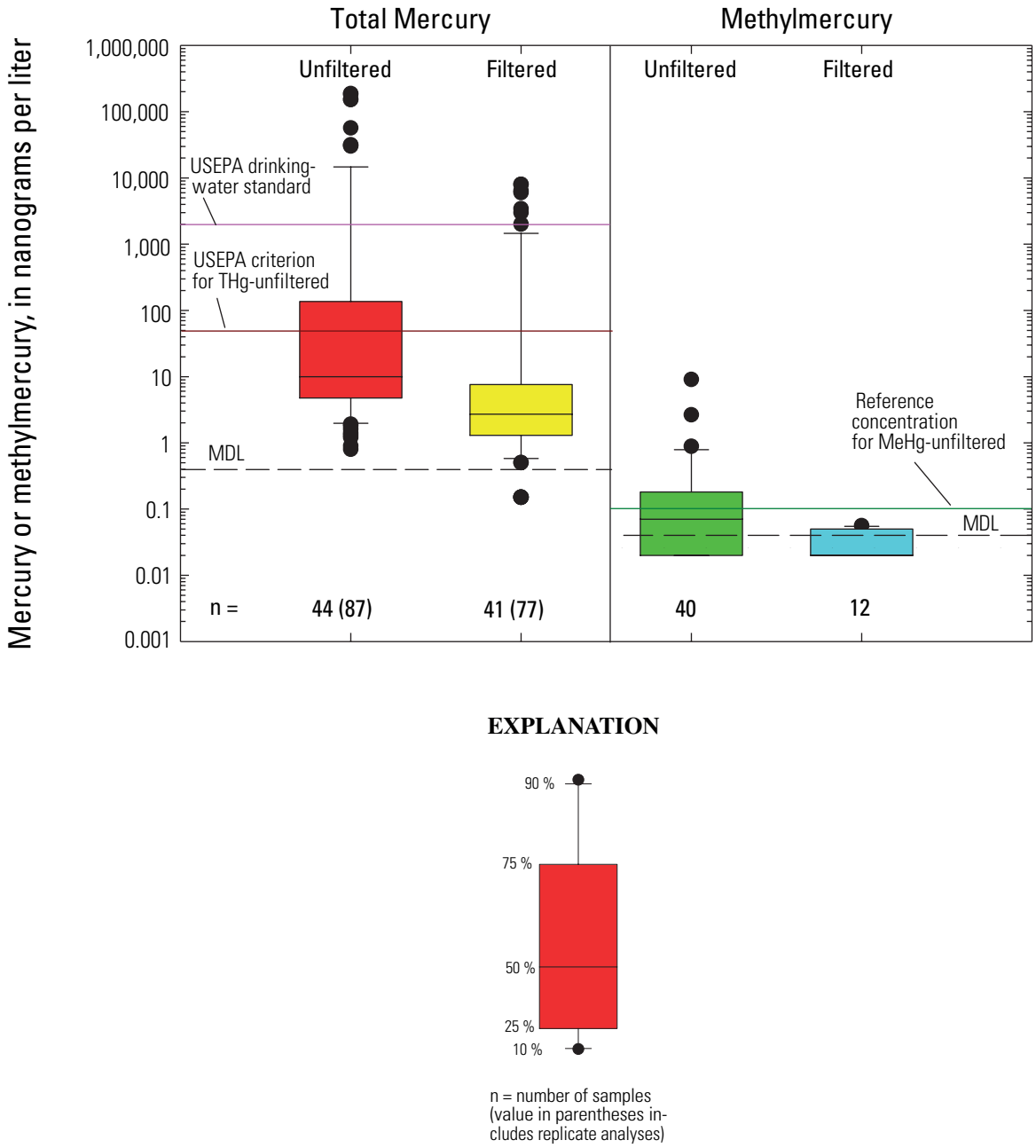


Figure 6. Box plots showing distribution of total mercury concentration and methylmercury concentration in unfiltered and filtered water samples from the Greenhorn Creek drainage, Nevada County, California. Non-detects plotted at 50 percent of method detection limit (MDL). USEPA, U.S. Environmental Protection Agency; THg, total mercury; MeHg, methylmercury. USEPA criterion for THg-unfiltered from U.S. Environmental Protection Agency (1999). USEPA drinking water standard from U.S. Environmental Protection Agency (2003). Reference concentration for MeHg-unfiltered from Rudd (1995).

The disturbed water sample from the Starr Mine tunnel contained extremely high concentrations of unfiltered THg (between 400,000 and 500,000 ng/L in two replicate analyses) and unfiltered MeHg (244 ng/L). Concentrations of this magnitude were related to increased concentrations of suspended sediment associated with human activity and likely persisted only a short time after cessation of the disturbance. Evidence of recent human disturbance was commonly observed in most of the mine tunnels visited for this study. The most likely type of disturbance apparently was related to attempted extraction of residual gold and gold-mercury amalgam in tunnel sluices. Based on observations while working in the tunnels, it is likely that discharge of mercury and MeHg is greatly increased by the release of suspended sediment during such disturbance.

The applicable aquatic-life water-quality criterion from the California Toxics Rule for THg in unfiltered water is 50 ng/L (U.S. Environmental Protection Agency, 1999). The federal drinking-water standard for THg is 2,000 ng/L (U.S. Environmental Protection Agency, 2003). Although there is currently no water-quality criterion for MeHg concentration in water, a reference concentration of 0.1 ng/L is noted in the literature as an indicator of non-pristine conditions likely to result in MeHg bioaccumulation above baseline levels (Rudd, 1995).

Comparisons of the distribution of mercury and MeHg concentrations in four types of water bodies (tunnels; ground sluices; pit lakes, ponds, or wetlands; and streams) are shown in figure *7A–C*. Total mercury in unfiltered water in tunnels (*fig. 7A*) had the highest median concentration; more than half of the samples from tunnels had concentrations above the 50 ng/L water-quality criterion. Total mercury in filtered water (*fig. 7B*) had median concentrations in a narrow range (2 to 4 ng/L) in all four water-body types. Elevated concentrations (>1,000 ng/L) of THg in filtered samples were observed in some of the samples from tunnels and ground sluices. The medians for MeHg concentrations in unfiltered water in samples from tunnels and from ground sluices (*fig. 7C*) were near the reference concentration of 0.1 ng/L; the median MeHg concentrations in unfiltered samples from pit lakes, ponds, or wetlands and from streams were less than those for the other water-body types, but greater than the MDL of 0.04 ng/L. The medians for the ratio of MeHg to THg (MeHg/THg) in unfiltered water samples (*fig. 8*) ranged from 0.3 to 1.2 percent for the four water-body types. The highest value of MeHg/THg (30 percent) was found in a sample from the wetlands at the Boston Mine (station BY21 on *fig. 4*).

Analyses of THg and MeHg in filtered and unfiltered subsamples provide information on the suspended particulate concentration of these constituents. Plots showing the relation between concentrations of the same analyte in unfiltered and filtered subsamples can be used to display the proportion of the analyte that passed through the filter. A secondary use of such plots is for quality control, to identify filtered values that are apparently higher than the unfiltered values. A plot of THg in unfiltered and filtered subsamples (*fig. 9*) shows that 10 to 100 percent of the THg in most samples passed through the filter. A single outlier from station BY 115 has been screened out because one of the filtered subsamples was likely contaminated. A plot of MeHg concentrations in unfiltered and filtered subsamples (*fig. 10*) indicates similarly that 10 to 100 percent of the MeHg in most samples passed through the filter. An outlier for MeHg (station BY59) also was screened out because the filtered subsample was likely contaminated. The screened out data points also were excluded from the station averages discussed below.

Plots showing the relation between THg and MeHg for various media, including water, sediment, and biota, show the proportion of mercury that is in the methyl form as a function of total mercury concentration. This relation is shown for unfiltered water samples in *figure 11*. Diagonal lines represent constant values of MeHg/THg. Values of MeHg/THg in unfiltered water samples ranged from 0.001 to 30 percent, with most values ranging from 0.01 to 5 percent. A similar plot showing the relation between THg and MeHg in filtered water samples (*fig. 12*) indicates that most values of MeHg/THg in filtered samples range from about 0.1 to less than 10 percent.

The surface waters of the Greenhorn Creek drainage had a relatively wide range of pH values (3.4 to 8.0, *table 1*). Sulfate is commonly the dominant anion in acidic waters and may also play a role in methylation of mercury through the action of sulfate-reducing bacteria (Gilmour and others, 1992). Therefore, the relations among pH and the concentrations of sulfate, mercury, and MeHg may be important in determining processes that control water quality in this environmental setting. The relation between pH and sulfate (*fig. 13*) indicates a wide scatter of values; the data trend toward higher sulfate concentrations at lower pH, typical of acid mine drainage. The most acidic samples, which also have the highest sulfate concentration (>100 mg/L), are from the Buckeye area. The Headwaters station (BY51) has the least sulfate (< 1 mg/L, *table 5*) and has near-neutral pH (6.7, *table 1*). Other samples that are near-neutral in pH (6 to 8) have sulfate concentrations in the range of 3 to 80 mg/L (*fig. 13*, tables *1* and *5*).

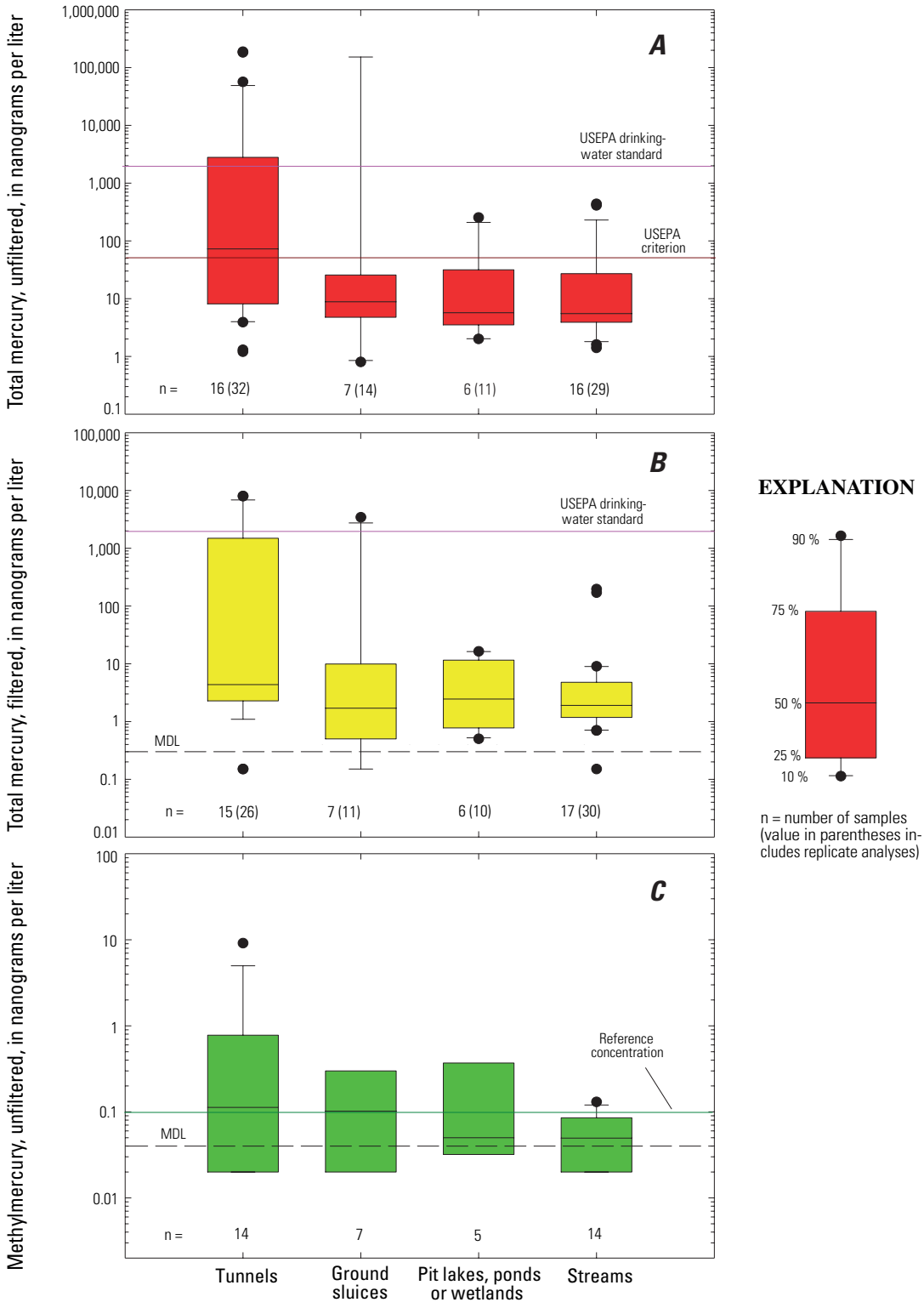


Figure 7. Box plots showing distribution of (*A*) total mercury concentration in unfiltered water, (*B*) total mercury concentration in filtered water, and (*C*) methylmercury concentration in unfiltered water, grouped by type of water body, Greenhorn Creek drainage, Nevada County, California. Non-detects plotted at 50 percent of method detection limit (MDL). USEPA, U.S. Environmental Protection Agency; THg, total mercury; MeHg, methylmercury. USEPA criterion for THg-unfiltered from U.S. Environmental Protection Agency (1999). USEPA drinking water standard from U.S. Environmental Protection Agency (2003). Reference concentration for MeHg-unfiltered from Rudd (1995).

The relations between pH in unfiltered water and the concentrations of various forms of mercury in unfiltered and filtered water are shown in *figure 14*. No clear pattern is evident in the relation between pH and THg in unfiltered water (*fig. 14A*); the samples with highest mercury concentrations were in the pH range of 4 to 5.5; the most acidic samples (pH < 4) had relatively low THg concentrations (<10 ng/L). For THg in filtered water, the pH of samples having elevated concentrations of THg (>1,000 ng/L) ranges from 4.0 to 6.3 (*fig. 14B*); it is not known whether all of the mercury passing through the 0.45-µm pore-size filters is truly dissolved; some of it may in the form of colloidal particles. Relatively high concentrations of MeHg (unfiltered), above the reference concentration of 0.1 ng/L, span the pH range of 4 to 7.7, nearly the full range encountered in the Greenhorn Creek drainage, and values of MeHg below the detection limit (0.04 ng/L) span the entire range of pH (3.5 to 8.0) (*fig. 14C*).

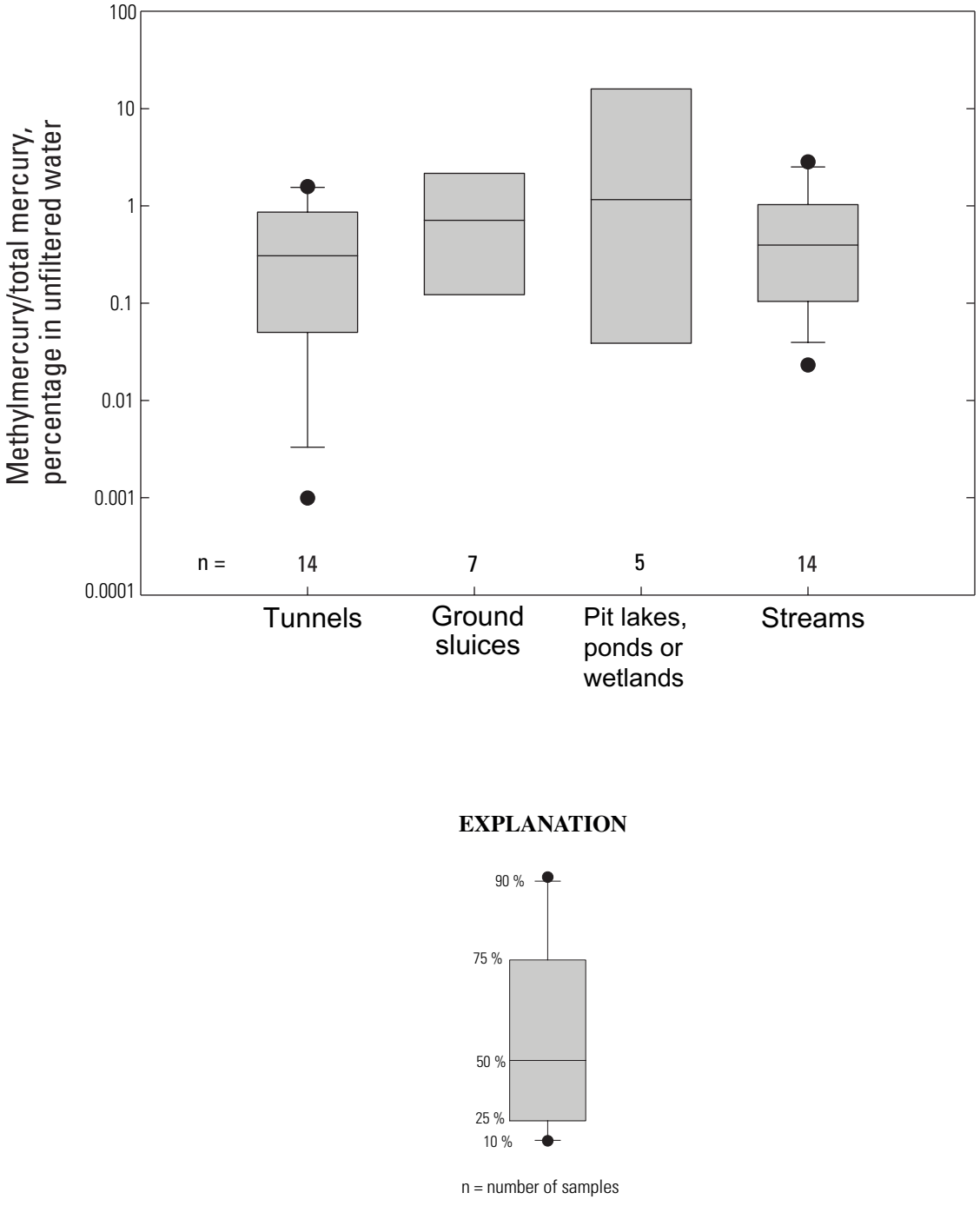


Figure 8. Box plots showing distribution of the ratio of methylmercury to total mercury in unfiltered water samples grouped by type of water body, Greenhorn Creek drainage, Nevada County, California.

Elevated concentrations of several trace elements were found in filtered water samples from some of the sampling stations. These trace elements tend to be most highly concentrated in samples with the lowest pH values. Three water samples from a station in the Buckeye area (BY23) were among the most acidic (pH values ranging from 3.7 to 4.2) and were consistently among the most metal rich, with concentrations in filtered water of aluminum from 3,900 to 4,100 µg/L, cadmium from 1.2 to 2.6 µg/L, copper from 28 to 48 µg/L, iron from 130 to 4,500 µg/L, manganese from 1,700 to 3,400 µg/L, nickel from 140 to 240 µg/L, and zinc from 290 to 560 µg/L (*table 4B* [see back of report]) Three other sampling stations in the Buckeye area (BY24, 25, and 58) also had relatively acidic water (pH values 3.4 to 5.6) with some anomalously high trace metal concentrations (*table 4B*). Water

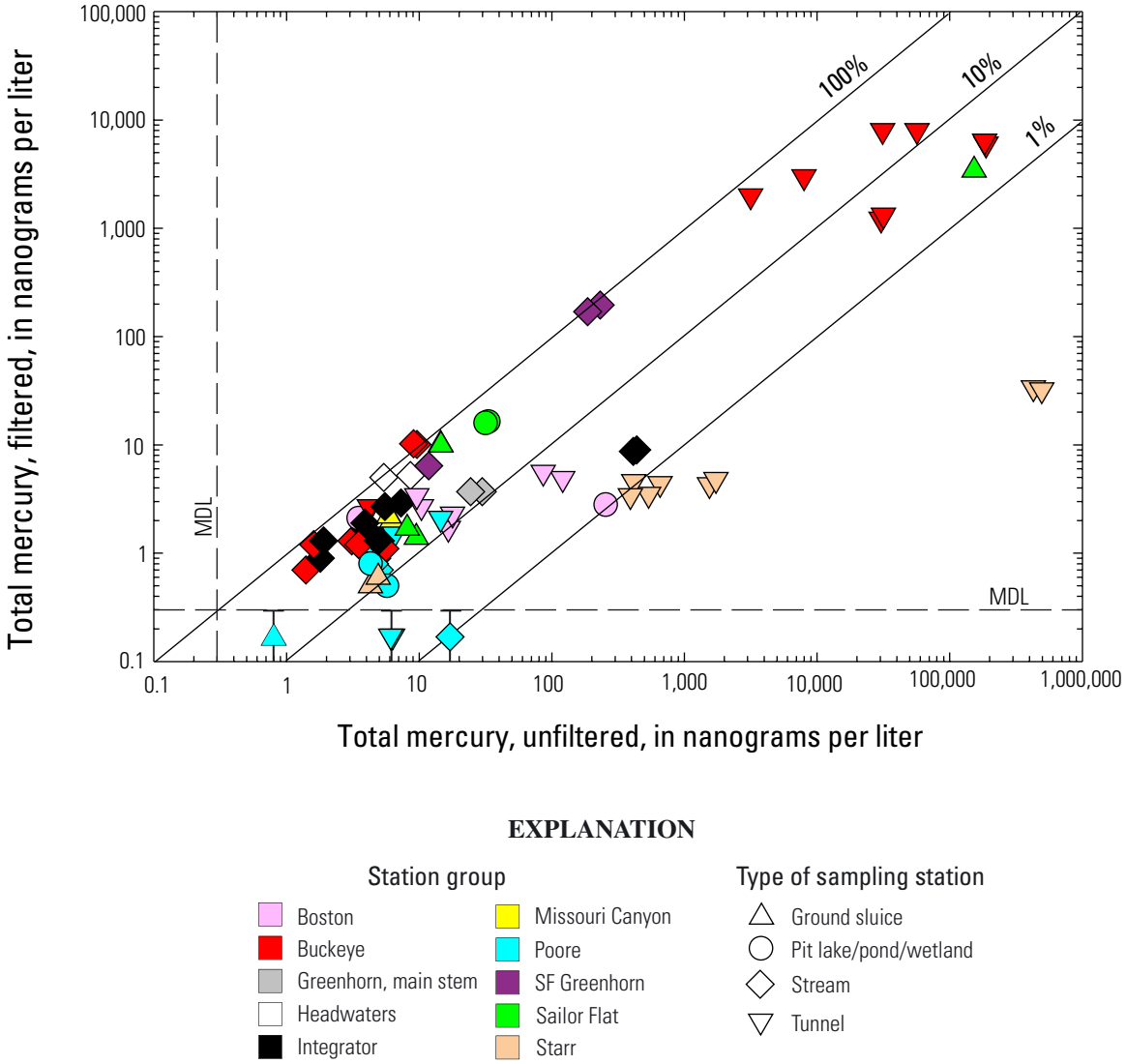


Figure 9. Relation between total mercury concentration in unfiltered and filtered water samples, Greenhorn Creek drainage, Nevada County, California. Diagonal lines represent percentage of mercury passing through filter. Non-detects plotted at 50 percent of method detection limit (MDL).

samples from two stations associated with a ground sluice at Poore Mine (BY88 and 90) had moderately high concentrations of iron (570 and 300 µg/L, respectively) and manganese (390 to 400 µg/L) at mildly acidic pH (5.8 and 5.5), but had relatively low concentrations of other trace metals. A water sample from the pit lake at Poore Mine (BY89) taken in May 2000 had a similar pH value (5.8) and lower iron concentration (32 to 33 µg/L), but higher aluminum (130 µg/L), cadmium (1.1 µg/L), copper (11 to 12 µg/L), manganese (1,300 µg/L), and zinc (85 µg/L) concentrations (*table 4B*). Arsenic concentrations in filtered water were less than 1.0 µg/L at all sites except the Integrator site (BY59, Greenhorn Creek at You Bet Road), located downstream of the confluence with Little Greenhorn Creek, which drains a hardrock gold mining area including the Lava Cap Mine, where a tailings impoundment failed in January 1997, resulting in downstream arsenic contamination (CH2M Hill, 2001).

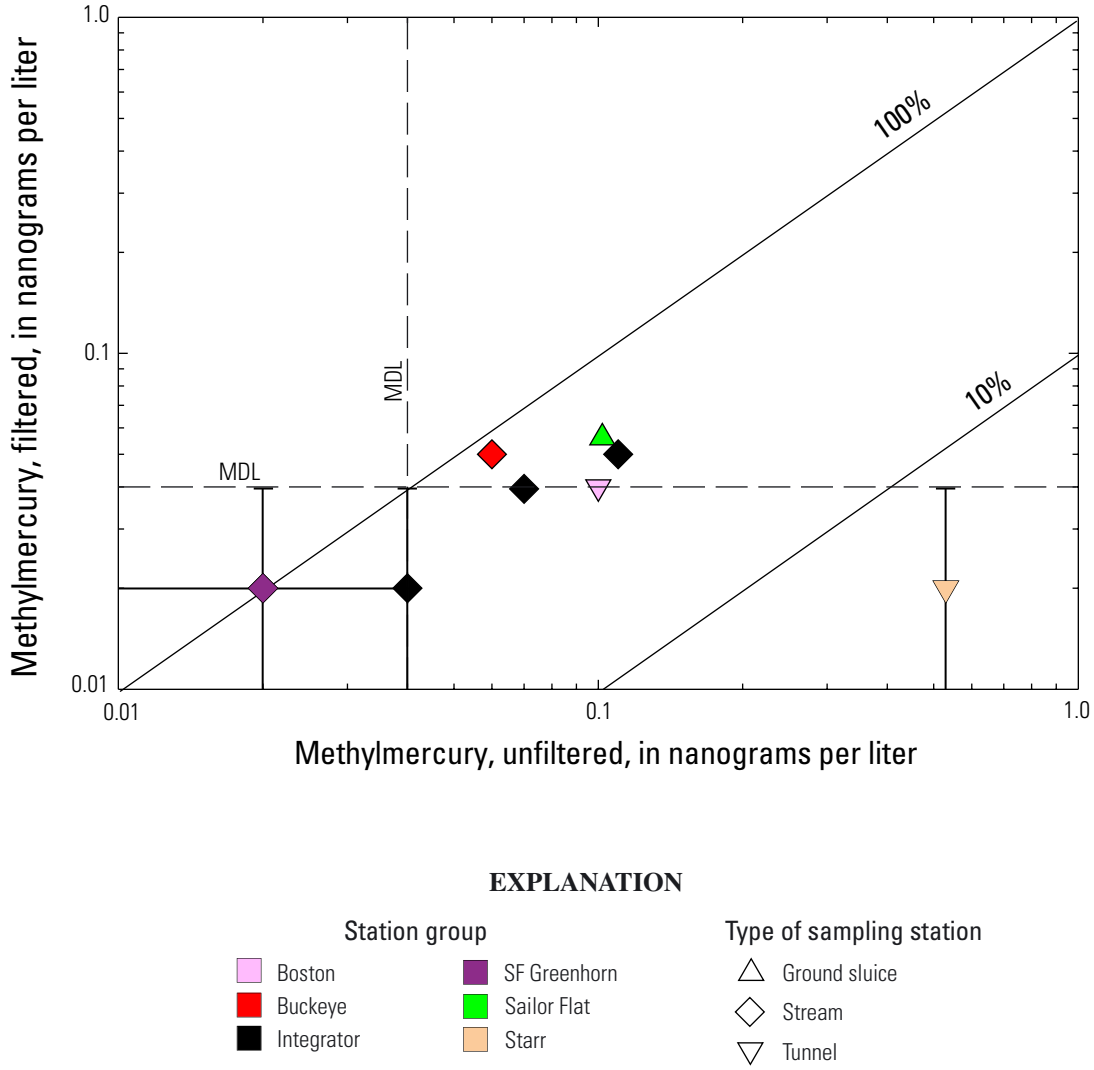


Figure 10. Relation between methylmercury concentration in unfiltered and filtered water samples, Greenhorn Creek drainage, Nevada County, California. Diagonal lines represent percentage of methylmercury passing through filter. Non-detects plotted at 50 percent of method detection limit (MDL).

The relations between sulfate concentration and different forms of mercury are shown in *figure 15*. Concentrations of THg (unfiltered) above the water-quality criterion of 50 ng/L are in samples having sulfate concentrations between 3.0 and 170 mg/L. Only the three most dilute water samples (two of which had replicates for THg) having the lowest concentrations of sulfate (<3 mg/L), including the Headwaters sample, are in a range where elevated THg was not observed. The samples having elevated THg in filtered water (>1,000 ng/L; *fig. 15B*) had sulfate concentrations ranging from 6 to 170 mg/L. Water samples with elevated MeHg concentrations (above the reference value of 0.1 ng/L; *fig. 15C*) span nearly the full range of sulfate concentrations (2 to 120 mg/L).

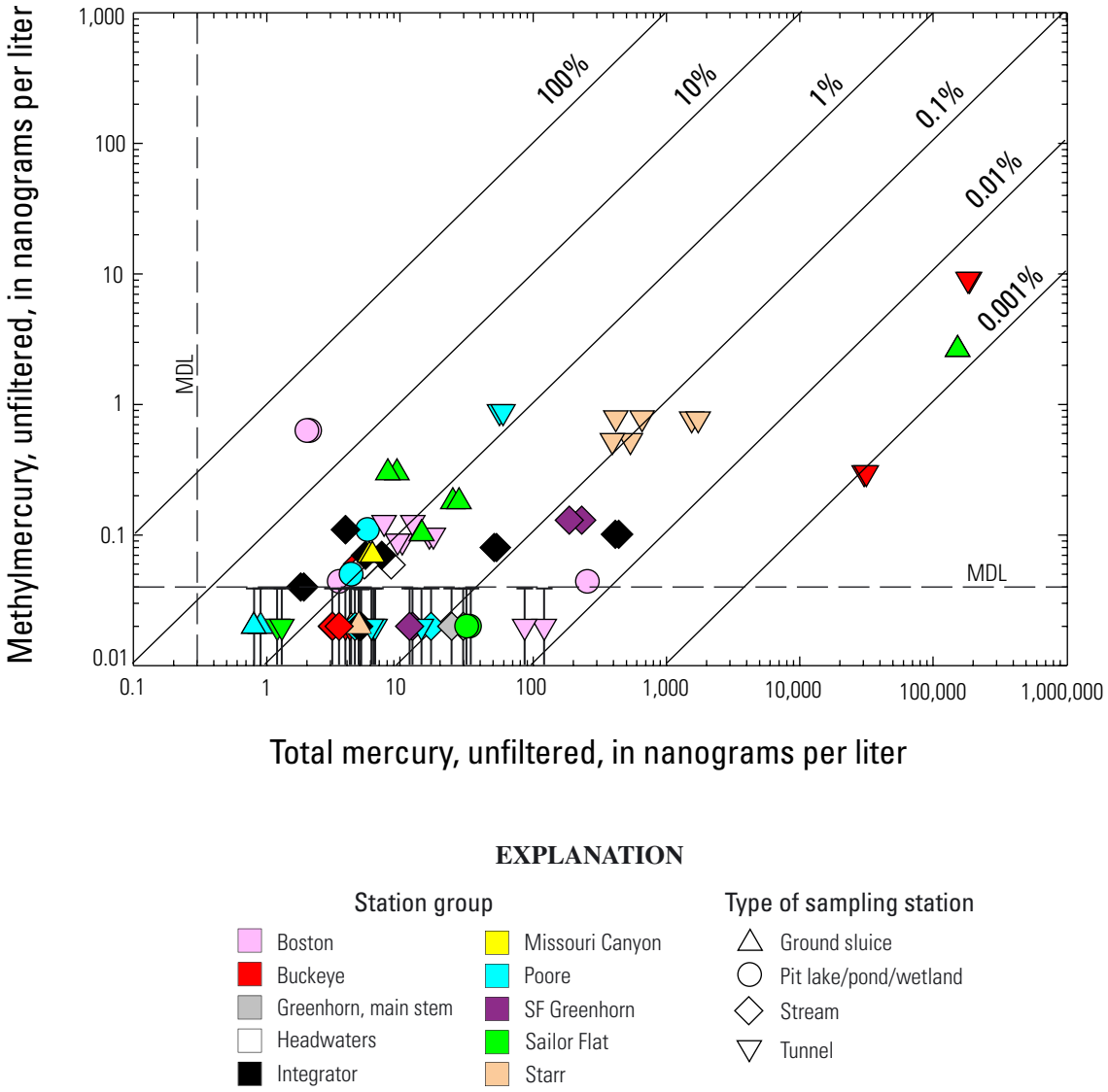


Figure 11. Relation between total mercury and methylmercury concentration in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California. Diagonal lines represent constant values of the ratio of methylmercury to total mercury. Non-detects plotted at 50 percent of method detection limit (MDL).

Scatter plots comparing the concentration of mercury in water with the concentration of suspended solids can be used to evaluate the range in concentration of mercury in the suspended solids. As a first approximation, one can use the concentration of mercury in unfiltered water for such plots, with the implicit assumption that all of the mercury is in particulate form (that is, that mercury passing through the filter represents fine particulates or colloids). On a plot of THg in unfiltered water versus total suspended sediment (*fig. 16*), the diagonal lines represent apparent concentrations of mercury in suspended material, assuming all of the mercury is in that form. Most of the data points for suspended sediment in *figure 16* are clustered around the line representing 1 microgram per gram (µg/g), equivalent to 1 part per million (ppm) THg.

Data for nine samples (excluding replicates) plotted on *figure 16* represent apparent mercury concentrations in suspended sediment in the range of 10 ppm to 10,000 ppm (equivalent to 1 percent by weight). Of these nine samples, six are from tunnel sites at the Boston Mine, the Starr Mine, and the Buckeye Flat Mine; the three non-tunnel sites are the wetland at Boston Mine, a ground sluice at Sailor Flat, and a stream station on South Fork Greenhorn Creek, which drains the area of the Boston Mine and the southern part of the Buckeye Flat Mine. The lowest apparent concentration of THg in suspended sediment based on the data in *figure 16*, represented by a pair of data points (two split replicates), is about 0.10 ppm, for a ground sluice at Sailor Flat.

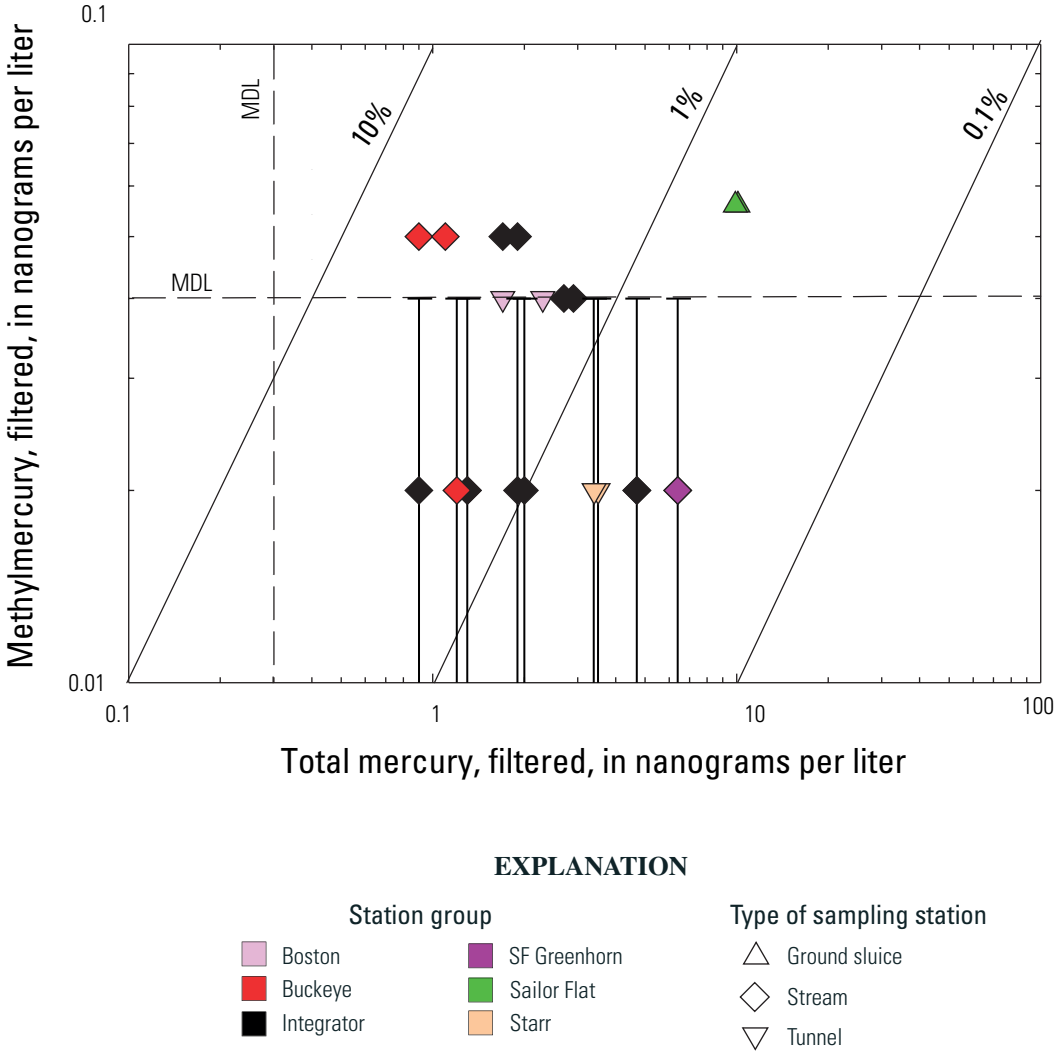


Figure 12. Relation between total mercury and methylmercury concentration in filtered water samples, Greenhorn Creek drainage, Nevada County, California. Diagonal lines represent constant values of the ratio of methylmercury to total mercury. Non-detects plotted at 50 percent of method detection limit (MDL).

Determining the difference between the THg concentration in filtered and unfiltered samples (referred to as particulate mercury concentration) is another way to describe mercury in suspended particulate material in the Greenhorn Creek drainage. Particulate mercury concentrations are plotted as a function of total suspended sediment concentration (*fig. 17*) to evaluate the mercury content of particulate material that did not pass through the 0.45-µm pore-diameter filters. For construction of *fig. 17*, geometric means of replicate analyses of THg in filtered and unfiltered water were calculated prior to calculating the particulate mercury concentrations. Comparison of data in *figures 16* and *17* indicates a possible range of concentration for THg (unfiltered or particulate) in suspended sediment. No matter which assumptions are made, the apparent mercury content of suspended material at several sites, primarily tunnels, is in the range of ten to several thousand ppm.

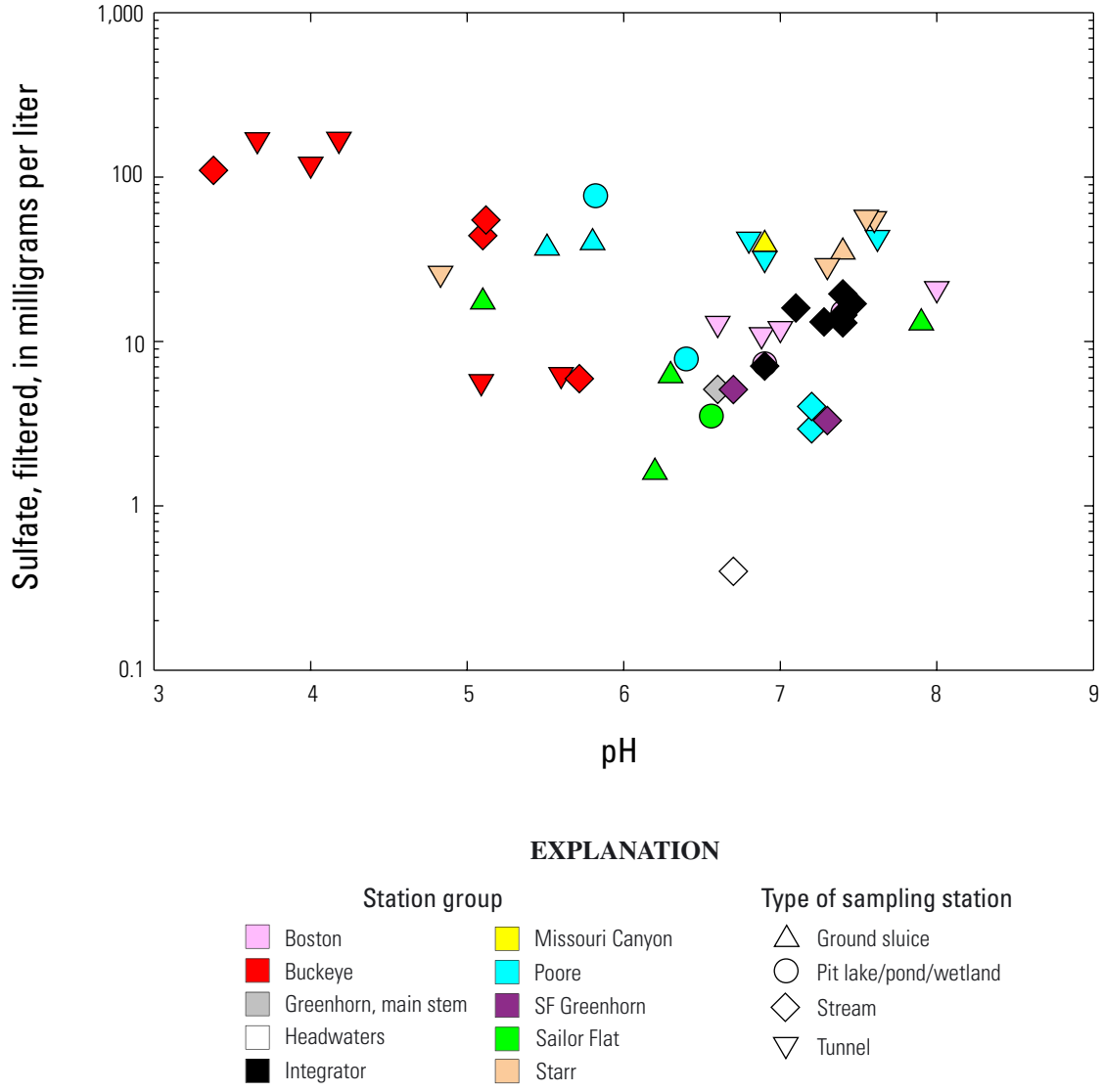


Figure 13. Relation between pH in unfiltered water and sulfate concentration in filtered water, Greenhorn Creek drainage, Nevada County, California.

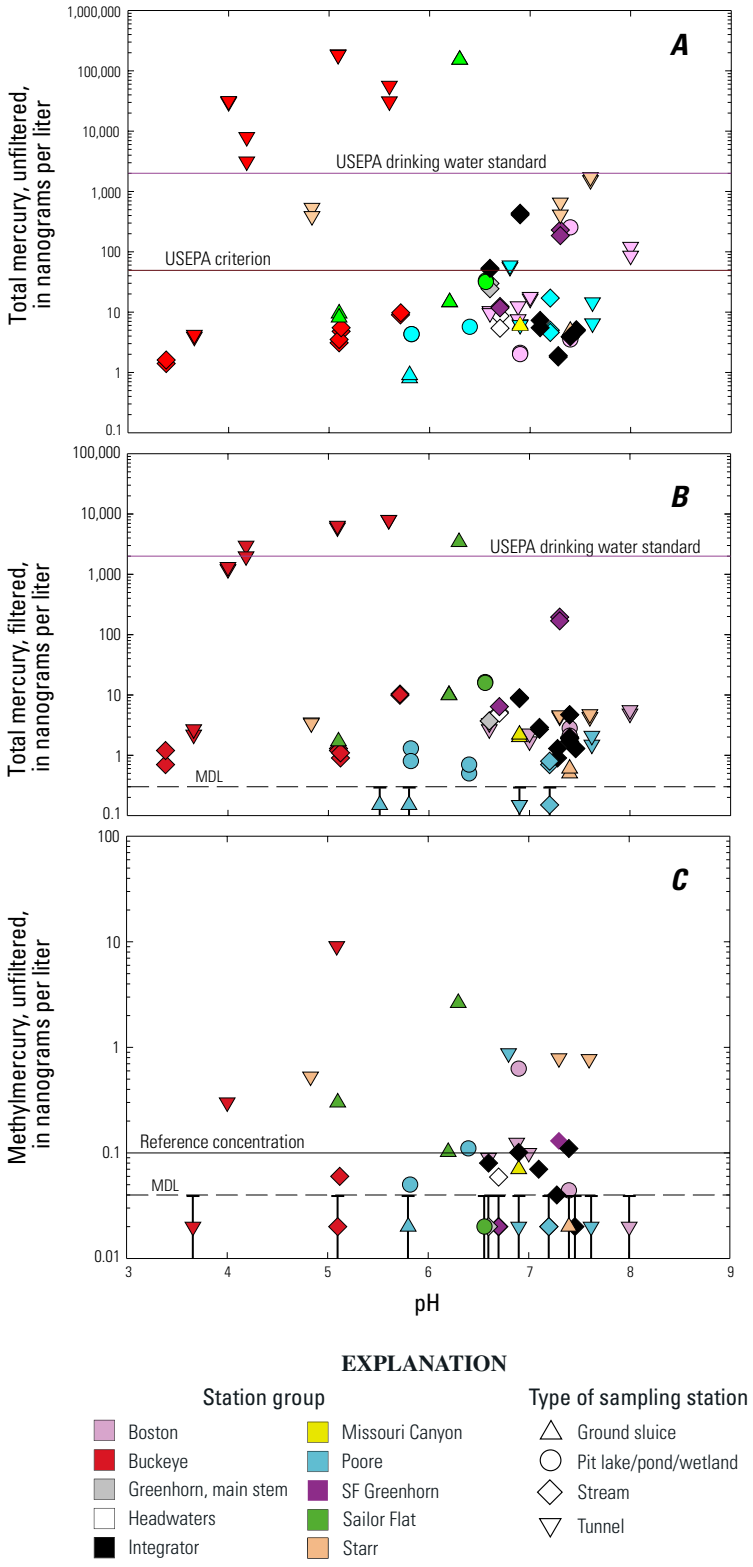


Figure 14. Relation between pH and (*A*) total mercury in unfiltered water, (*B*) total mercury in filtered water, and (*C*) methylmercury in unfiltered water, Greenhorn Creek drainage, Nevada County, California. USEPA criterion for total mercury (unfiltered) from U.S. Environmental Protection Agency (1999). USEPA drinking water standard from U.S. Environmental Protection Agency (2003). Reference concentration for MeHg (unfiltered) from Rudd (1995).

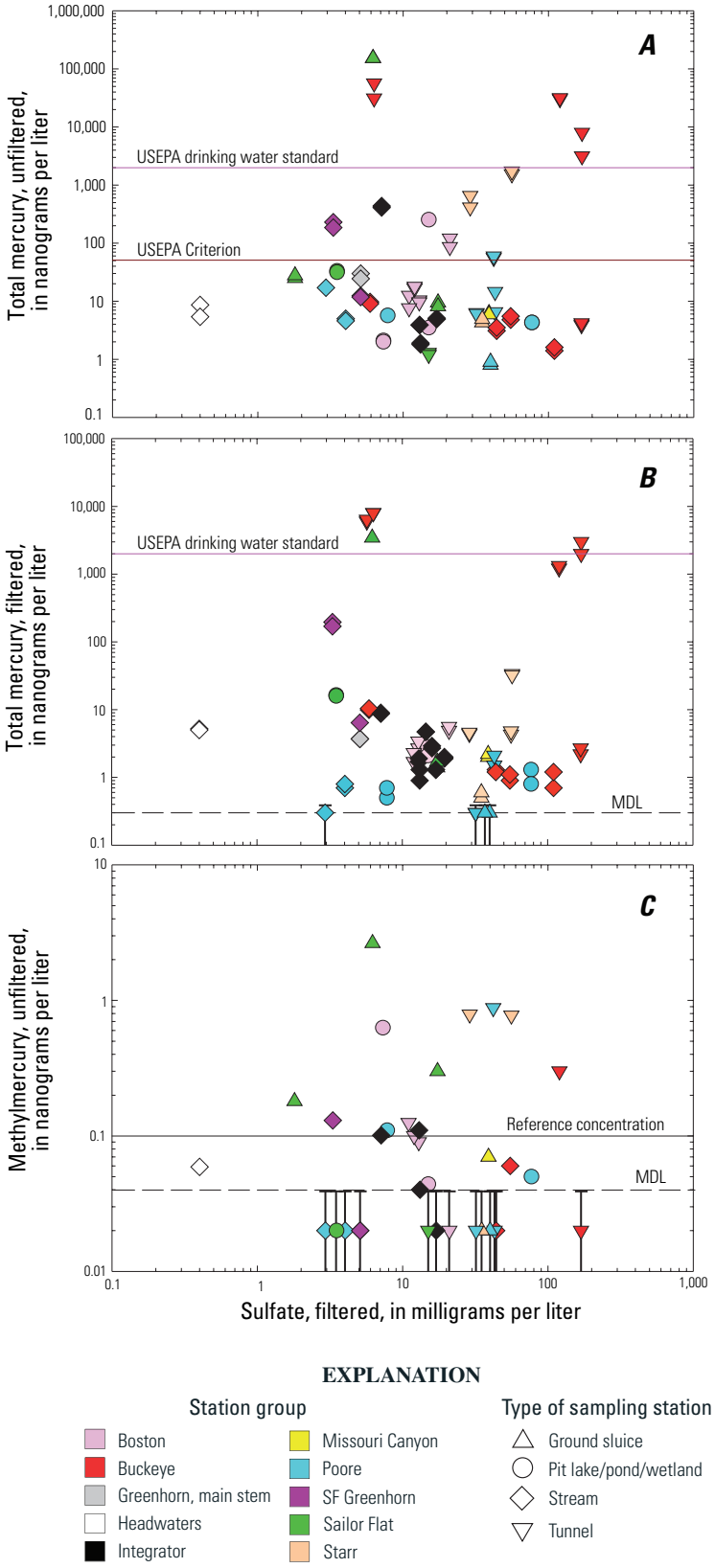


Figure 15. Relation between sulfate concentration in filtered water and (*A*) total mercury in unfiltered water, (*B*) total mercury in filtered water, and (C) methylmercury in unfiltered water, Greenhorn Creek drainage, Nevada County, California. USEPA criterion for total mercury (unfiltered) from U.S. Environmental Protection Agency (1999). USEPA drinking water standard from U.S. Environmental Protection Agency (2003). Reference concentration for MeHg (unfiltered) from Rudd (1995).

Sediment

Concentration data for MeHg and THg in sediment samples are given in tables *9* and *10*. Laboratory analyses of THg and MeHg (*table 9*) are available for ten samples from eight stations. Total mercury concentrations ranged from about 0.0044 to 12 µg/g (microgram per gram, equivalent to ppm). Methylmercury concentrations ranged from less than detection to 0.0095 µg/g. Field panning methods were used to determine the concentration of free, elemental mercury in sediment samples where the mercury was visible. The detection limit of the field balance was 100 mg, and the amount of mercury present when trace amounts of free mercury were observed is estimated at 100 mg/kg (milligram per kilogram, equivalent to part per million or ppm). Measured quantities of elemental mercury recovered by panning were as high as 45,000 mg/kg (4.5 per cent, by weight) at the Boston Mine tunnel outlet (station BY20).

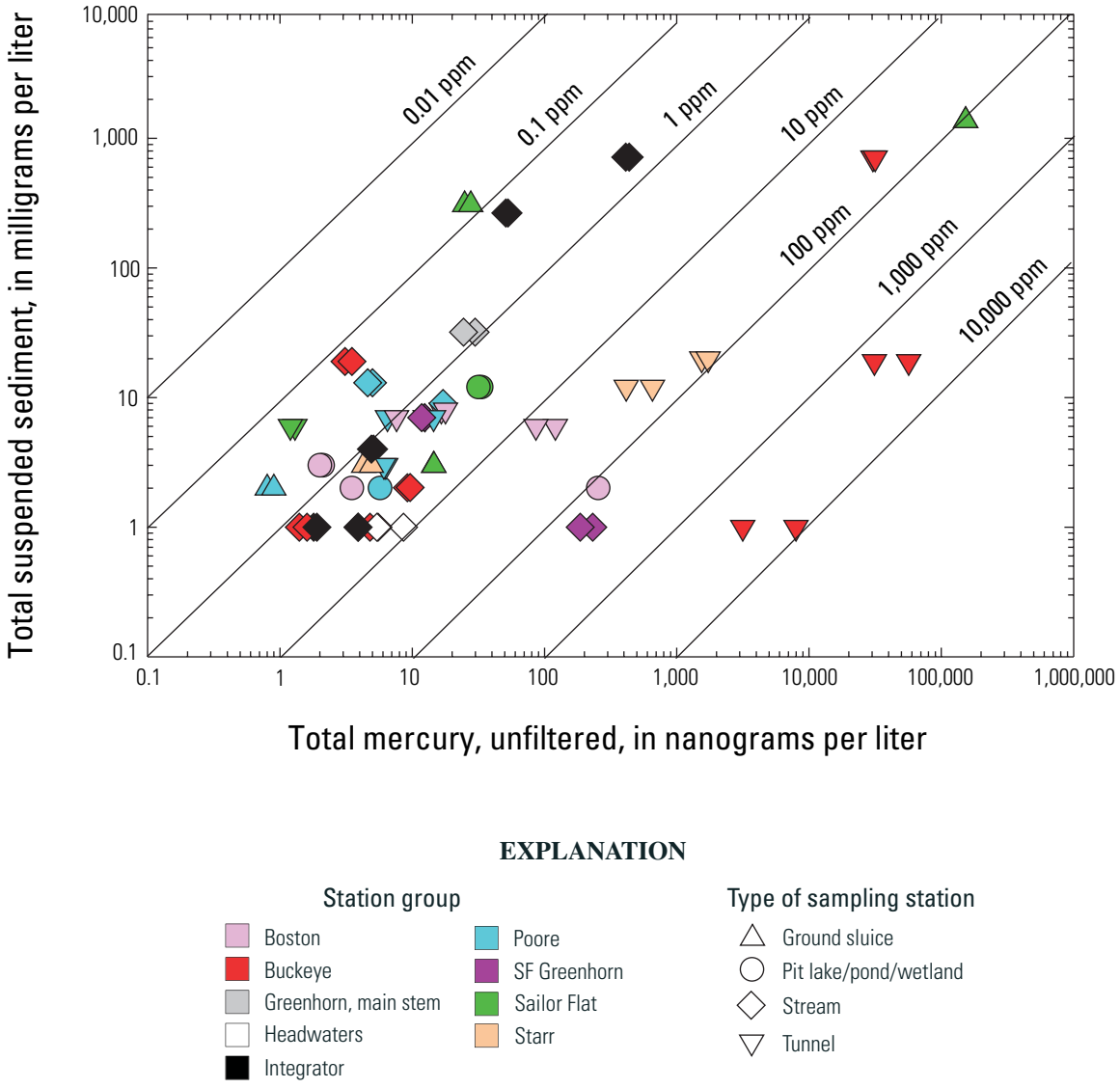


Figure 16. Relation between total mercury concentration in unfiltered water and total suspended sediment concentration, Greenhorn Creek drainage, Nevada County, California. The diagonal lines represent the apparent concentrations of mercury in suspended material. ppm, part per million.

Box plots using a logarithmic vertical scale (*fig. 18*) show the wide range of concentrations: more than three orders of magnitude for MeHg and more than six orders of magnitude for THg (laboratory and field values). A scatter plot showing the relation between THg and MeHg in sediment samples (*fig. 19*) indicates that the ratio of MeHg to THg in the sediment samples ranged from less than 0.001 percent to about 3 percent. The station with the highest MeHg to THg ratio was associated with a wetland environment in the Boston Mine area (BY21).

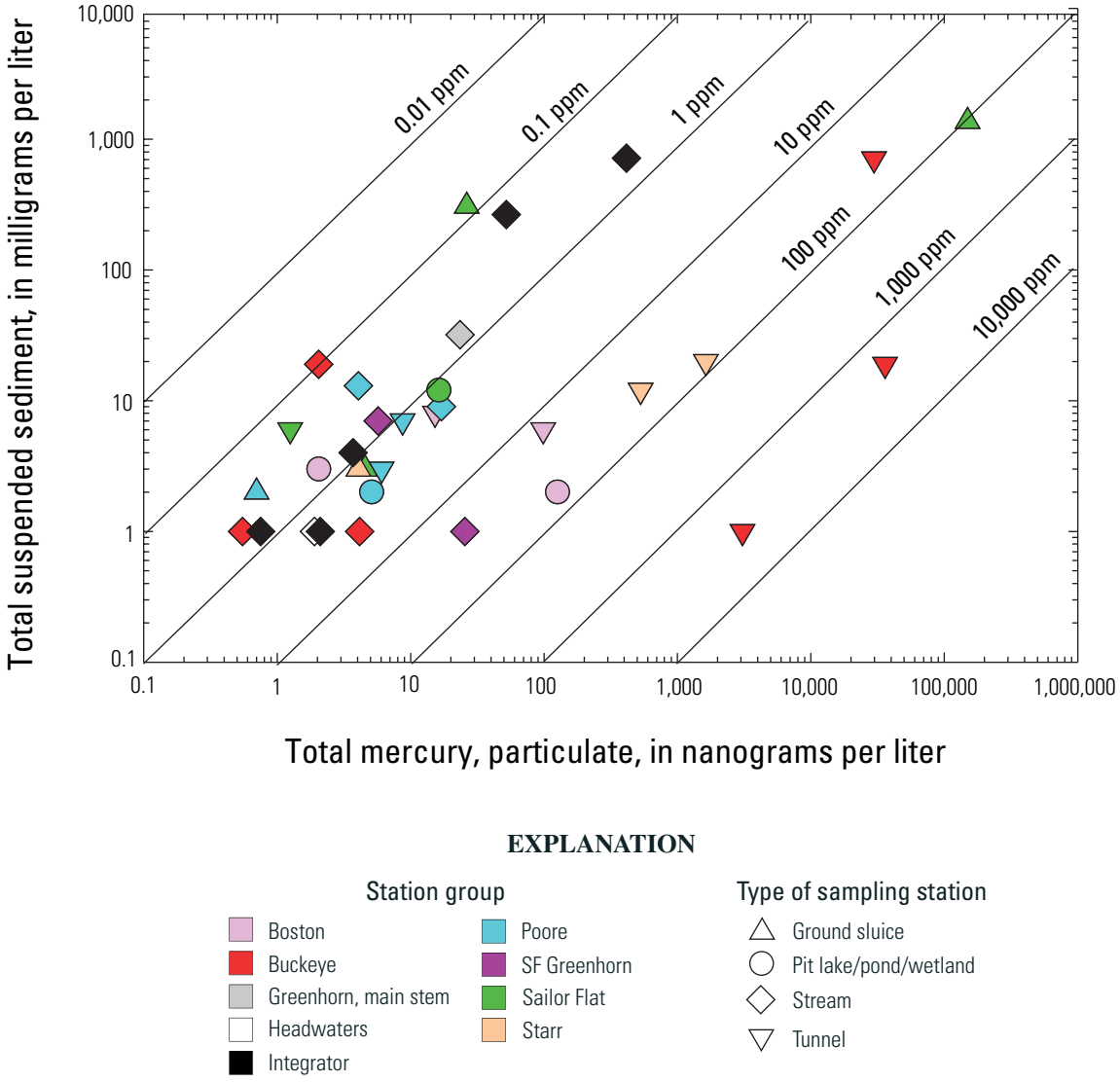


Figure 17. Relation between particulate total mercury concentration and total suspended sediment concentration, Greenhorn Creek drainage, Nevada County, California. The diagonal lines represent apparent concentrations of mercury in suspended material. ppm, parts per million.

Table 9. Concentrations of mercury and methylmercury in sediment samples, determined by laboratory methods, Greenhorn Creek drainage, Nevada County, California.

[WI, Wisconsin; CO, Colorado. Station name abbreviations: ab, above; Cr, Creek; Cyn, Canyon; mi, mile; N, North; nr, near; S, South; SF, South Fork. µg/g, microgram per gram (equivalent to part per million); s.d., standard deviation (three or more analyses); —, not determined; >>, much greater than; <, less than]

Station map ID	Station name	Date	Time	Methyl-mercury, dry (µg/g) WI Lab	Total mercury, dry (µg/g) WI Lab	Total mercury, dry (µg/g) CO Lab				Total mercury, wet (µg/g) CO Lab	
	Replicate			1 of 1	1 of 1	1 of 2		2 of 2		1 of 1	
				value	value	value	s.d.	value	s.d.	value	s.d.
BY20	Boston Mine tunnel outlet nr Grass Valley	6/18/99	14:30	0.00031	—	8.9	0.073	9.0	0.06	—	—
BY21	Boston Mine wetlands pond nr Grass Valley	12/14/99	10:30	0.0034	0.0927	—	—	—	—	—	—
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	6/18/99	11:30	0.00005	—	12	0.431	0.20	0.004	—	—
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/26/99	11:00	0.0019	—	0.15	0.0030	—	—	—	—
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	12/14/99	14:00	0.0012	0.175	—	—	—	—	—	—
BY88	Poore Mine ground sluice nr Grass Valley	4/1/99	12:00	0.0052	—	>>0 .013	—	—	—	0.013	0.003
BY105	Sailor Flat Mine main drain Gulch 01 nr Quaker Hill	7/6/99	16:00	<0.00011	—	0.0076	0.0002	—	—	—	—
BY105	Sailor Flat Mine main drain Gulch 01 nr Quaker Hill	11/12/99	14:30	<0.00002	0.00443	—	—	—	—	—	—
BY105	Sailor Flat Mine main drain Gulch 01 nr Quaker Hill	11/12/99	15:00	0.00003	0.00633	—	—	—	—	—	—
BY123	Starr Mine tunnel midway nr Grass Valley	11/12/99	12:30	0.0095	12.1	—	—	—	—	—	—

Table 10. Concentrations of visible total mercury in sediment samples, determined by field panning methods, Greenhorn Creek drainage, Nevada County, California.

[NOTE: *Table 11* begins on page 204. All samples were measured "wet" after water had been allowed to drain. Water was then added during panning to facilitate recovery. Mercury was separated from concentrate and weighed after residual water was removed. Station name abbreviations: ab, above; bl, below; Cr, Creek; Cyn, Canyon; mi, mile; nr, near; Rd, Road; SF, South Fork. gal/min, gallon per minute; mg/kg, milligram per kilogram (equivalent to parts per million); ft, foot; trace, trace mercury, less than or equal to 100 mg/kg; —, not determined]

Station map ID	Station name	Date	Discharge (gal/min)	Location	Mercury (mg/kg)
BY20	Boston Mine tunnel outlet nr Grass Valley	6/18/99	2.5	Pool below tunnel	1,100
BY20	Boston Mine tunnel outlet nr Grass Valley	12/14/99	6	Pool below tunnel	2,600
BY20	Boston Mine tunnel outlet nr Grass Valley	10/18/01	3	Bedrock, edge of pool	45,000
BY20	Boston Mine tunnel outlet nr Grass Valley	10/18/01	3	20 ft from portal, inside	1,000
BY20	Boston Mine tunnel outlet nr Grass Valley	12/21/01	15	Pool below tunnel	15,000
BY22	Buckeye Flat Mine drain 0.1 mi ab Greenhorn Cr	8/21/00	—	Riffle in creek	trace
BY180	Greenhorn Cr .2 mi bl the Narrows	8/21/01	—	Bedrock crevice	trace
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	1/25/00	—	Bedrock crevice	trace
BY56	Greenhorn Cr bl SF Greenhorn Cr nr Nevada City	12/21/01	—	Bedrock crevice	trace
BY146	Missouri Cyn 1.6 mi ab Greenhorn Cr nr Chicago Park	12/14/99	—	Riffle in sluice cut	trace
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	12/14/99	2,200	Riffle above bridge	500
BY87	Poore Mine creek bl tunnel nr Grass Valley	1/14/99	—	Bedrock crevice	trace
BY88	Poore Mine ground sluice nr Grass Valley	1/14/99	—	50 ft below tunnel outlet	400
BY91	Poore Mine tunnel effluent nr Grass Valley	1/14/99	—	Pool below tunnel	trace
BY105	Sailor Flat Mine main drain Gulch 01 nr Quaker Hill	12/2/99	—	Pool below riffle	1,000
BY105	Sailor Flat Mine main drain Gulch 01 nr Quaker Hill	12/2/99	—	Pool below riffle	2,000
BY105	Sailor Flat Mine main drain Gulch 01 nr Quaker Hill	12/2/99	—	Pool below riffle	13,000
BY105	Sailor Flat Mine main drain Gulch 01 nr Quaker Hill	12/2/99	—	Pool below riffle	17,000
BY105	Sailor Flat Mine main drain Gulch 01 nr Quaker Hill	12/2/99	—	Pool below riffle	18,000
BY115	SF Greenhorn Cr bl Boston Mine nr Nevada City	12/21/01	—	Bedrock crevice	trace
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/99	15	Riffle, midway in tunnel	1,000
BY130	Tom and Jerry Mine drain at tunnel outlet at Nevada City	3/15/00	10	Tunnel outlet	1,000

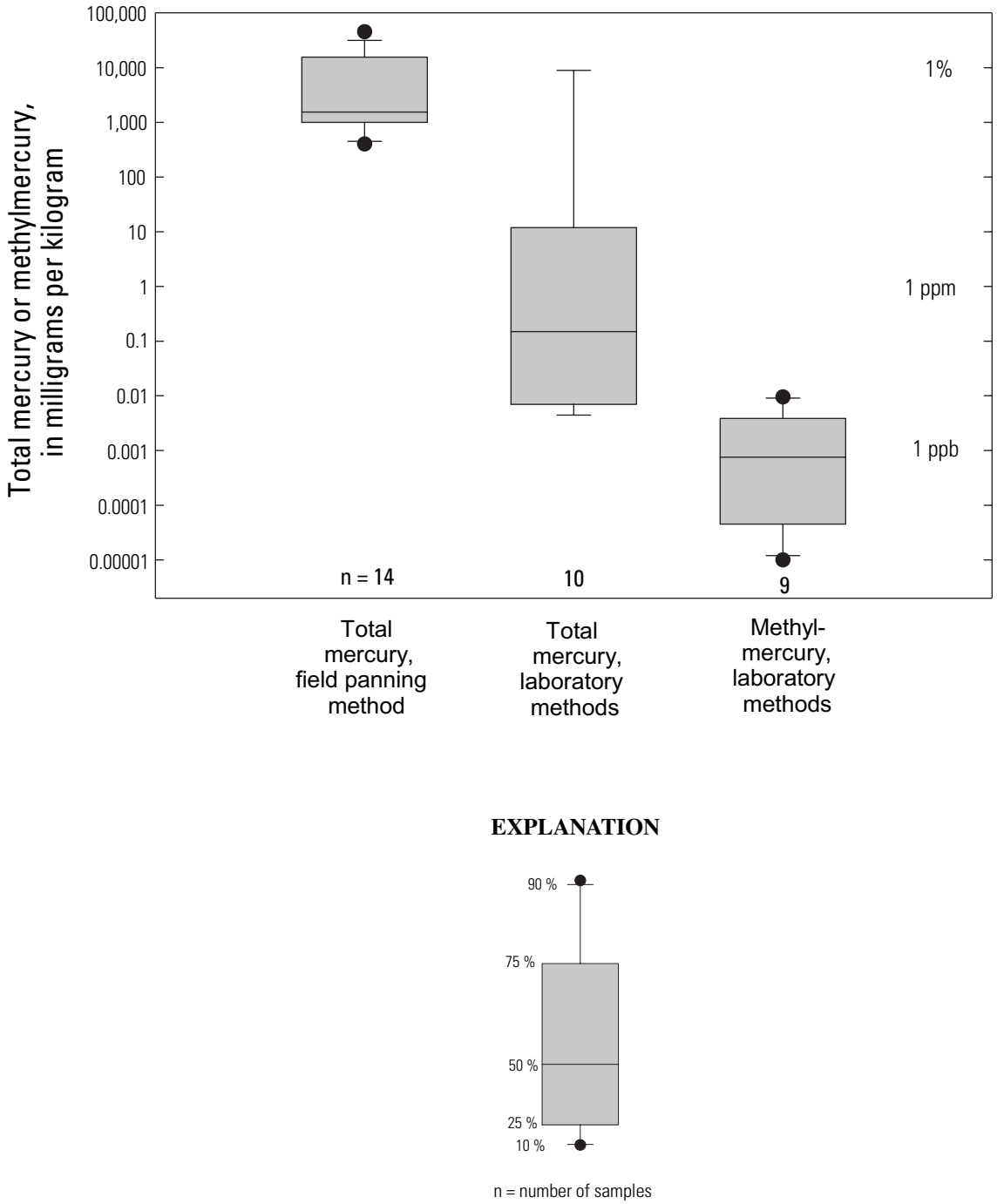


Figure 18. Box plots showing distribution of total mercury and methylmercury concentration in sediment samples from the Greenhorn Creek drainage, Nevada County, California. ppm, part per million; ppb, part per billion.

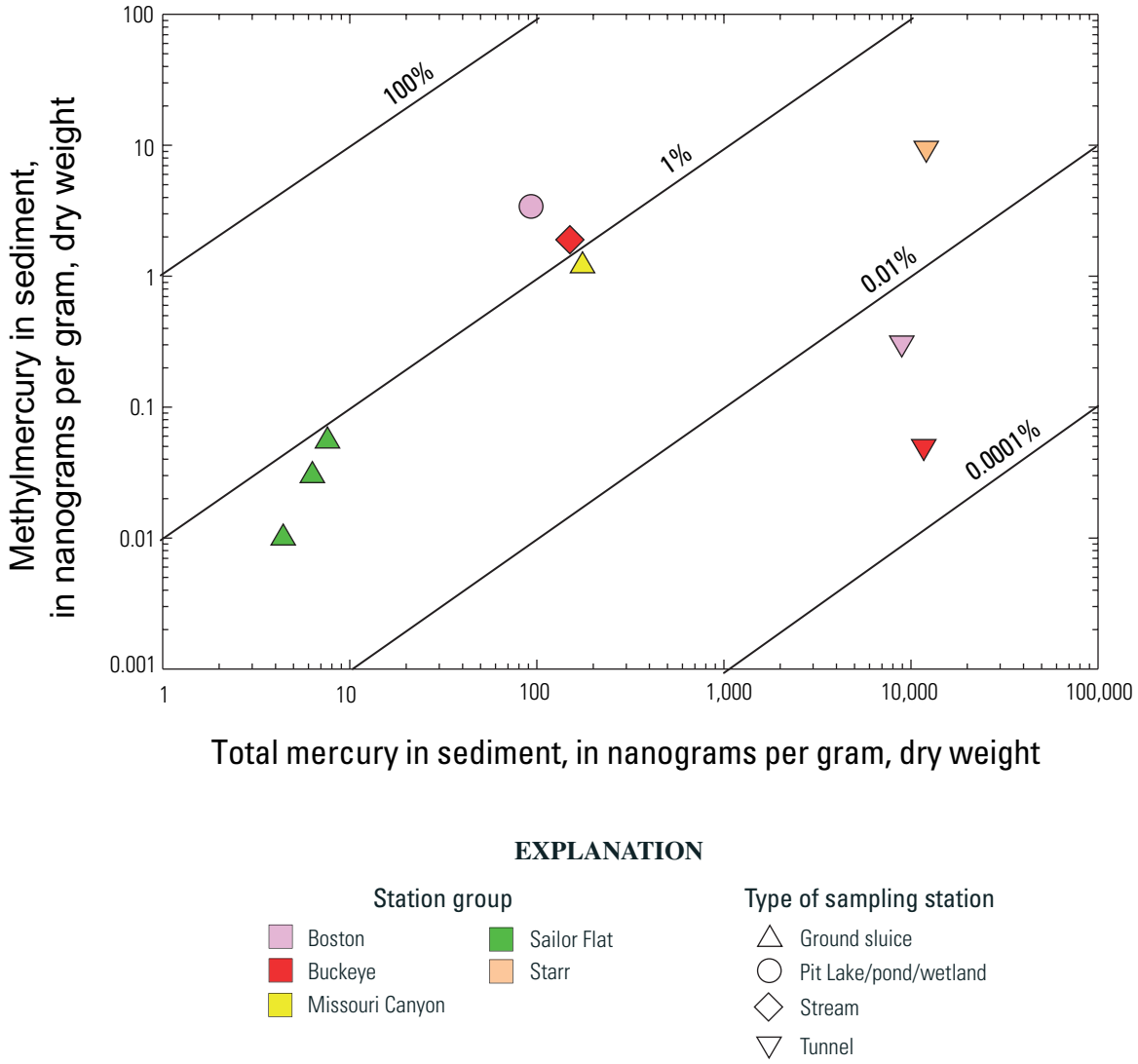


Figure 19. Relation between total mercury and methylmercury concentration in sediment samples from the Greenhorn Creek drainage, Nevada County, California. The diagonal lines represent constant values of the ratio of methylmercury to total mercury.

Invertebrates

A total of 194 invertebrate samples were collected at 31 stations in the study area. Eighty of the samples were analyzed for concentrations of THg and MeHg and used to calculate MeHg to THg ratios (*table 11A* in back of report). Sixty-nine frog samples were collected at 19 stations, and all were analyzed only for THg (*table 12*). Taxa collected (order: family) included banana slugs (Gastropoda: Arionidae, n = 27 [n is number of samples]), dobsonflies (Megaloptera: Corydalidae, n = 14), dragonflies (Odonata: Aeshnidae, n = 19; Cordulegastridae, n = 21; Gomphidae, n = 4; Libellulidae, n = 2), giant water bugs (Hemiptera: Belostomatidae, n = 2), predaceous diving beetles (Coleoptera: Dytiscidae, n = 31), predaceous stoneflies (Plecoptera: Perlidae, n = 18), and water striders (Hemiptera: Gerridae, n = 56) (*table 11A*). An additional 19 samples of six invertebrate taxa were collected at the baseline reference site (*table 11B* in back of report).

Table 12. Mercury concentration data for frogs, Greenhorn Creek drainage, Nevada County, California.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; Cyn, Canyon; MF, Middle Fork; mi, mile; NF, North fork; nr, near; Rd, Road; SF, South Fork. n, number of organisms (parentheses indicate sample is part of the four-sample composite); g, gram; mm, millimeter; µg/g, microgram per gram; —, not determined]

Station map ID	Station name	Collection date	Common name	Scientific name	Sample size (n)	Live weight (g)	Sample weight (g)	Total length (mm)	Moisture (percent)	Total mercury (µg/g wet)	Age	Gender
BY21	Boston Mine wetlands pond nr Grass Valley	8/12/99	Bullfrog	*Rana catesbeiana*	1	9.50	9.31	46.77	78.4	0.036	Juvenile	Male
BY21	Boston Mine wetlands pond nr Grass Valley	8/13/99	Bullfrog	*Rana catesbeiana*	1	244.32	240.53	120.43	78.2	0.15	Adult	Male
BY21	Boston Mine wetlands pond nr Grass Valley	8/13/99	Bullfrog	*Rana catesbeiana*	1	195.60	189.11	109.67	78.5	0.066	Adult	Female
BY21	Boston Mine wetlands pond nr Grass Valley	8/21/00	Bullfrog	*Rana catesbeiana*	1	174.25	171.61	119.37	78.0	0.061	Adult	Female
BY21	Boston Mine wetlands pond nr Grass Valley	9/13/01	Bullfrog	*Rana catesbeiana*	1	83.55	78.50	90.42	81.3	0.055	Adult	Female
BY21	Boston Mine wetlands pond nr Grass Valley	9/13/01	Bullfrog	*Rana catesbeiana*	1	93.57	75.46	99.00	81.2	0.055	Adult	Female
BY21	Boston Mine wetlands pond nr Grass Valley	9/13/01	Bullfrog	*Rana catesbeiana*	1	5.19	5.01	38.50	83.1	0.033	Juvenile	Undetermined
BY21	Boston Mine wetlands pond nr Grass Valley	9/13/01	Bullfrog	*Rana catesbeiana*	1	3.90	3.38	35.15	82.2	0.031	Juvenile	Undetermined
BY148	Starr Pit pond nr Grass Valley	8/21/00	Bullfrog	*Rana catesbeiana*	1	288.52	271.00	129.61	77.7	0.056	Adult	Male
BY22	Buckeye Flat Mine drain 0.1 mi ab Greenhorn Cr	9/29/99	Foothill yellow-legged frog	*Rana boylii*	1	20.70	18.31	54.09	77.6	0.050	Adult	Male
BY22	Buckeye Flat Mine drain 0.1 mi ab Greenhorn Cr	9/29/99	Foothill yellow-legged frog	*Rana boylii*	1	12.24	10.57	43.34	82.3	0.044	Adult	Male
BY53	Greenhorn Cr ab SF Greenhorn Cr nr Nevada City	9/13/01	Foothill yellow-legged frog	*Rana boylii*	1	0.89	0.85	20.55	80.0	0.092	Juvenile	Undetermined
BY53	Greenhorn Cr ab SF Greenhorn Cr nr Nevada City	9/13/01	Foothill yellow-legged frog	*Rana boylii*	1	1.22	1.16	24.18	75.4	0.069	Juvenile	Undetermined
BY53	Greenhorn Cr ab SF Greenhorn Cr nr Nevada City	9/13/01	Foothill yellow-legged frog	*Rana boylii*	1	2.25	2.02	30.86	77.0	0.047	Juvenile	Undetermined
BY56	Greenhorn Cr bl SF Greenhorn Cr nr Nevada City	9/13/01	Foothill yellow-legged frog	*Rana boylii*	1	16.36	15.44	53.12	79.2	0.087	Adult	Male
BY56	Greenhorn Cr bl SF Greenhorn Cr nr Nevada City	9/13/01	Foothill yellow-legged frog	*Rana boylii*	1	15.87	19.95	53.08	80.1	0.085	Adult	Male
BY56	Greenhorn Cr bl SF Greenhorn Cr nr Nevada City	9/13/01	Foothill yellow-legged frog	*Rana boylii*	1	18.48	16.60	54.68	82.1	0.043	Adult	Female
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	8/31/99	Foothill yellow-legged frog	*Rana boylii*	1	1.91	1.90	—	79.4	0.032	Juvenile	Undetermined
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	8/31/99	Foothill yellow-legged frog	*Rana boylii*	1	13.46	8.60	42.75	83.3	0.031	Adult	Female
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	8/31/99	Foothill yellow-legged frog	*Rana boylii*	1	1.82	1.78	22.23	76.7	0.028	Juvenile	Undetermined

Table 12. Mercury concentration data for frogs, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; Cyn, Canyon; MF, Middle Fork; mi, mile; NF, North fork; nr, near; Rd, Road; SF, South Fork. n, number of organisms (parentheses indicate sample is part of the four-sample composite); g, gram; mm, millimeter; µg/g, microgram per gram; —, not determined]

Station map ID	Station name	Collection date	Common name	Scientific name	Sample size (n)	Live weight (g)	Sample weight (g)	Total length (mm)	Moisture (percent)	Total mercury (µg/g wet)	Age	Gender
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	8/31/99	Foothill yellow-legged frog	*Rana boylii*	1	36.81	34.33	58.33	77.5	0.18	Adult	Female
BY75	Missouri Cyn C 1.2 mi ab Greenhorn Cr nr Chicago Park	8/31/99	Foothill yellow-legged frog	*Rana boylii*	1	16.22	15.23	46.84	80.1	0.13	Adult	Female
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	8/31/99	Foothill yellow-legged frog	*Rana boylii*	1	5.98	4.72	33.18	83.1	0.052	Juvenile	Undetermined
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	9/14/01	Foothill yellow-legged frog	*Rana boylii*	1	16.52	16.02	54.50	75.7	0.18	Adult	Male
BY147	NF MF Missouri Cyn nr Chicago Park	9/25/00	Foothill yellow-legged frog	*Rana boylii*	1	13.26	12.59	49.42	76.0	0.30	Adult	Female
BY147	NF MF Missouri Cyn nr Chicago Park	9/14/01	Foothill yellow-legged frog	*Rana boylii*	1	4.57	4.34	36.80	79.9	0.15	Juvenile	Undetermined
BY86	Poore Mine creek ab tunnel nr Grass Valley	9/26/00	Foothill yellow-legged frog	*Rana boylii*	1	32.76	31.20	64.57	75.5	0.12	Adult	Female
BY86	Poore Mine creek ab tunnel nr Grass Valley	9/26/00	Foothill yellow-legged frog	*Rana boylii*	1	22.18	20.53	57.64	78.4	0.11	Adult	Female
BY86	Poore Mine creek ab tunnel nr Grass Valley	9/26/00	Foothill yellow-legged frog	*Rana boylii*	1	7.34	6.89	39.20	80.6	0.044	Adult	Male
BY114	SF Greenhorn Cr 0.7 mi ab Greenhorn Cr nr Nevada City	9/25/00	Foothill yellow-legged frog	*Rana boylii*	1	12.71	11.77	46.89	79.5	0.16	Adult	Male
BY114	SF Greenhorn Cr 0.7 mi ab Greenhorn Cr nr Nevada City	9/13/01	Foothill yellow-legged frog	*Rana boylii*	1	14.71	14.13	50.88	74.5	0.25	Adult	Male
BY114	SF Greenhorn Cr 0.7 mi ab Greenhorn Cr nr Nevada City	9/13/01	Foothill yellow-legged frog	*Rana boylii*	1	14.85	13.82	52.04	79.6	0.12	Adult	Male
BY114	SF Greenhorn Cr 0.7 mi ab Greenhorn Cr nr Nevada City	9/13/01	Foothill yellow-legged frog	*Rana boylii*	1	6.95	6.61	41.78	79.2	0.10	Adult	Male
BY113	SF Greenhorn Cr 0.8 mi ab Greenhorn Cr nr Nevada City	9/13/01	Foothill yellow-legged frog	*Rana boylii*	1	40.40	38.69	72.68	72.7	0.19	Adult	Female
BY113	SF Greenhorn Cr 0.8 mi ab Greenhorn Cr nr Nevada City	9/13/01	Foothill yellow-legged frog	*Rana boylii*	1	15.22	13.95	51.00	76.3	0.11	Adult	Female
BY115	SF Greenhorn Cr bl Boston Mine nr Nevada City	9/13/01	Foothill yellow-legged frog	*Rana boylii*	1	1.63	1.53	27.24	79.0	0.25	Juvenile	Undetermined
BY115	SF Greenhorn Cr bl Boston Mine nr Nevada City	9/13/01	Foothill yellow-legged frog	*Rana boylii*	1	1.85	1.67	27.56	80.5	0.20	Juvenile	Undetermined
BY115	SF Greenhorn Cr bl Boston Mine nr Nevada City	9/13/01	Foothill yellow-legged frog	*Rana boylii*	1	7.43	7.17	44.49	79.8	0.11	Adult	Female

Table 12. Mercury concentration data for frogs, Greenhorn Creek drainage, Nevada County, California—*Continued.*

[Station name abbreviations: ab, above; bl, below; Cr, Creek; Cyn, Canyon; MF, Middle Fork; mi, mile; NF, North fork; nr, near; Rd, Road; SF, South Fork. n, number of organisms (parentheses indicate sample is part of the four-sample composite); g, gram; mm, millimeter; µg/g, microgram per gram; —, not determined]

Station map ID	Station name	Collection date	Common name	Scientific name	Sample size (n)	Live weight (g)	Sample weight (g)	Total length (mm)	Moisture (percent)	Total mercury (µg/g wet)	Age	Gender
BY124	Starr Mine tunnel outlet nr Grass Valley	8/13/99	Foothill yellow-legged frog	*Rana boylii*	1	7.19	6.20	39.40	79.9	0.11	Juvenile	Undetermined
BY124	Starr Mine tunnel outlet nr Grass Valley	8/13/99	Foothill yellow-legged frog	*Rana boylii*	1	8.32	7.46	39.47	81.4	0.092	Juvenile	Undetermined
BY124	Starr Mine tunnel outlet nr Grass Valley	8/13/99	Foothill yellow-legged frog	*Rana boylii*	1	14.53	11.95	47.61	80.8	0.058	Adult	Female
BY20	Boston Mine tunnel outlet nr Grass Valley	8/31/99	Pacific treefrog	*Hyla regilla*	1	7.71	7.05	41.33	74.4	0.11	Adult	Female
BY20	Boston Mine tunnel outlet nr Grass Valley	8/31/99	Pacific treefrog	*Hyla regilla*	1	5.99	5.34	35.82	75.1	0.073	Adult	Female
BY20	Boston Mine tunnel outlet nr Grass Valley	8/31/99	Pacific treefrog	*Hyla regilla*	1	7.23	6.59	41.27	77.8	0.070	Adult	Female
BY20	Boston Mine tunnel outlet nr Grass Valley	8/21/00	Pacific treefrog	*Hyla regilla*	1	4.46	3.98	41.46	71.2	0.29	Adult	Female
BY20	Boston Mine tunnel outlet nr Grass Valley	8/21/00	Pacific treefrog	*Hyla regilla*	1	4.51	4.22	39.00	76.6	0.25	Adult	Female
BY20	Boston Mine tunnel outlet nr Grass Valley	8/21/00	Pacific treefrog	*Hyla regilla*	1	2.03	1.74	31.91	78.0	0.17	Juvenile	Undetermined
BY20	Boston Mine tunnel outlet nr Grass Valley	9/13/01	Pacific treefrog	*Hyla regilla*	1	3.80	3.64	36.63	76.1	0.17	Adult	Female
BY20	Boston Mine tunnel outlet nr Grass Valley	9/13/01	Pacific treefrog	*Hyla regilla*	1	3.62	3.32	36.55	77.1	0.16	Adult	Male
BY20	Boston Mine tunnel outlet nr Grass Valley	9/13/01	Pacific treefrog	*Hyla regilla*	1	4.21	3.89	38.48	75.4	0.14	Adult	Female
BY58	Buckeye Flat Mine main drain 0.45 mi ab Greenhorn Cr	9/12/01	Pacific treefrog	*Hyla regilla*	1	5.37	5.25	41.96	73.0	0.081	Adult	Female
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	8/31/99	Pacific treefrog	*Hyla regilla*	1	1.82	1.45	29.46	81.6	0.035	Juvenile	Undetermined
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	9/14/01	Pacific treefrog	*Hyla regilla*	1	3.55	3.41	38.16	74.6	0.11	Adult	Male
BY90	Poore Mine seep above Ground Sluice nr Grass Valley	9/26/00	Pacific treefrog	*Hyla regilla*	1	2.53	2.25	30.74	73.4	0.079	Adult	Male
BY91	Poore Mine tunnel effluent nr Grass Valley	10/16/01	Pacific treefrog	*Hyla regilla*	1	4.62	4.53	37.22	75.3	0.068	Adult	Female

Table 12. Mercury concentration data for frogs, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; Cyn, Canyon; MF, Middle Fork; mi, mile; NF, North fork; nr, near; Rd, Road; SF, South Fork. n, number of organisms (parentheses indicate sample is part of the four-sample composite); g, gram; mm, millimeter; µg/g, microgram per gram; —, not determined]

Station map ID	Station name	Collection date	Common name	Scientific name	Sample size (n)	Live weight (g)	Sample weight (g)	Total length (mm)	Moisture (percent)	Total mercury (µg/g wet)	Age	Gender
BY91	Poore Mine tunnel effluent nr Grass Valley	10/16/01	Pacific treefrog	*Hyla regilla*	1	5.25	4.91	39.82	75.1	0.052	Adult	Female
BY91	Poore Mine tunnel effluent nr Grass Valley	10/16/01	Pacific treefrog	*Hyla regilla*	1	4.99	4.76	39.50	75.3	0.045	Adult	Female
BY105	Sailor Flat Mine main drain Gulch 01 nr Quaker Hill	8/24/99	Pacific treefrog	*Hyla regilla*	1	2.87	2.48	32.43	83.0	0.037	Adult	Male
BY105	Sailor Flat Mine main drain Gulch 01 nr Quaker Hill	8/24/99	Pacific treefrog	*Hyla regilla*	4	3.21	2.93	—	85.1	0.034	—	—
BY105	Sailor Flat Mine main drain Gulch 01 nr Quaker Hill	8/24/99	Pacific treefrog	*Hyla regilla*	(1)	0.76	0.66	20.02	85.1	—	Juvenile	Undetermined
BY105	Sailor Flat Mine main drain Gulch 01 nr Quaker Hill	8/24/99	Pacific treefrog	*Hyla regilla*	(1)	0.82	0.75	20.20	85.1	—	Juvenile	Undetermined
BY105	Sailor Flat Mine main drain Gulch 01 nr Quaker Hill	8/24/99	Pacific treefrog	*Hyla regilla*	(1)	0.56	0.50	17.88	85.1	—	Juvenile	Undetermined
BY105	Sailor Flat Mine main drain Gulch 01 nr Quaker Hill	8/24/99	Pacific treefrog	*Hyla regilla*	(1)	1.07	1.02	20.81	85.1	—	Juvenile	Undetermined
BY124	Starr Mine tunnel outlet nr Grass Valley	8/21/00	Pacific treefrog	*Hyla regilla*	1	6.82	6.59	43.14	71.1	0.12	Adult	Female
BY124	Starr Mine tunnel outlet nr Grass Valley	8/21/00	Pacific treefrog	*Hyla regilla*	1	6.70	6.53	41.25	70.8	0.085	Adult	Female
BY124	Starr Mine tunnel outlet nr Grass Valley	8/21/00	Pacific treefrog	*Hyla regilla*	1	5.57	5.19	40.85	71.6	0.075	Adult	Female
BY130	Tom Jerry Mine drain at tunnel outlet nr Nevada City	9/12/01	Pacific treefrog	*Hyla regilla*	1	6.27	6.08	42.60	72.2	0.14	Adult	Female
BY130	Tom Jerry Mine drain at tunnel outlet nr Nevada City	9/12/01	Pacific treefrog	*Hyla regilla*	1	7.04	6.67	42.57	69.7	0.090	Adult	Female
BY130	Tom Jerry Mine drain at tunnel outlet nr Nevada City	9/12/01	Pacific treefrog	*Hyla regilla*	1	3.15	2.95	34.67	76.6	0.066	Adult	Female

Ranges of MeHg concentrations (µg/g, wet weight) in invertebrate samples were 0.0012– 0.048 for banana slugs, 0.027–0.39 for dobsonflies, 0.011–1.6 for dragonflies, 0.029–0.50 for predaceous diving beetles, 0.026–0.52 for predaceous stoneflies, and 0.061–0.55 for water striders (*fig. 20*, *table 11A*). As expected, the MeHg concentrations in banana slugs, which are *detritivores*, were dramatically less than those in predatory insects (*fig. 20*). Average values for invertebrate samples from the baseline reference station (BY199, *fig. 1, table 11B*) are lower than most of the values for samples from the study area (*fig. 20*, *table 11A*). For three taxa (dragonflies, giant water bugs, and water striders), average values from the baseline station were less than the 25th percentile of the sample distribution from the study area. For two of the taxa (dobsonflies and predaceous stoneflies), the average values from the baseline station were approximately equal to the 25th percentile values, and for one taxon (predaceous diving beetles) the average baseline value was approximately equal to the median value for the study area (*fig. 20*).

The mean value of MeHg/THg for predatory insects collected during 1999–2001 in the Greenhorn Creek drainage was 76 percent, with a standard deviation of 22 percent. A plot of the relation between amounts of THg and MeHg in the predatory insects (*fig. 21A*) indicates that the value of MeHg/THg was greater than 50 percent for 74 of 78 samples. The ranges of MeHg/THg values per taxon are shown in parentheses: dobsonflies (27–65 percent), dragonflies (65–120 percent), predaceous diving beetles (36–94 percent), predaceous stoneflies (55–109 percent), and water striders (58 –127 percent). Box plots of MeHg/THg for five invertebrate taxa (*fig. 21B*) indicate that dragonflies had consistently higher values of MeHg/THg relative to the other taxa.

Plots of MeHg concentration relative to the mass of individual organisms can be used to evaluate whether the mass (a proxy for age) of the organisms is more significant than other factors in determining the MeHg content. This approach is best applied when comparing multiple samples of different size (age) organisms of a single taxon from the same station, preferably collected at the same time. It has been shown in other studies (for example, Wong and others, 1997) that larger (older) individuals of a given invertebrate taxon will tend to have higher MeHg concentrations than smaller (younger) individuals from the same location. However, in this study, we did not collect a sufficient number of samples to evaluate the relationship between organism size and MeHg bioaccumulation; our main objective was to evaluate variations between sites. In this report, plots of organism mass versus MeHg content in biota show data for individual taxa from multiple sites so that variability in organism size can be assessed in the context of evaluating site-to-site variations in MeHg concentrations in biota. The relation between organism mass and MeHg content for each of the invertebrate taxa are plotted in figures *22–27*; the relations between mass and THg for frog taxa are plotted in figures *28–31*.

Although MeHg concentrations in banana slugs (*fig. 22*) were lower than in other, more predatory invertebrate taxa (*fig. 20*), the sites with relatively high concentrations of MeHg and THg in the slugs correspond with “hot spot” stations having other taxa that contain higher than usual concentrations of MeHg or THg. A composite sample of banana slugs collected in 2001 at a station in the Buckeye area (BY116) had the highest concentration of MeHg, although it was the lowest in terms of average mass. The second-highest MeHg concentration in a banana slug sample was from a composite sample taken at a ground sluice station in Missouri Canyon (BY 147).

The MeHg concentrations in dragonflies at the Buckeye South station (BY24) and the Boston Mine tunnel outlet (BY 20) were much higher than those at all other stations (*fig. 23*). The dragonfly sample taken at station BY24 in 1999 had a MeHg concentration of 1.6 µg/g (wet basis), the highest concentration observed for any invertebrate sample in this study. Dragonfly samples taken at station BY24 had lower concentrations of MeHg in 2000 (0.32 µg/g) and in 2001 (0.079 and 0.10 µg/g); however the organisms in these samples were smaller in mass than the 1999 sample. At other stations in the study area, MeHg concentrations in dragonflies ranged between 0.011 and 0.89 µg/g, a range similar to that observed for other taxa. The average MeHg concentration for two dragonfly samples from the baseline station was 0.02 µg/g, lower than more than 75 percent of the dragonfly samples from the study area (*fig. 20*).

The highest MeHg concentration (0.39 µg/g) in dobsonflies (*fig. 24*) was from a station in the Missouri Canyon area (BY147). Dobsonflies collected from another Missouri Canyon site (BY 75) ranged from 0.08 to 0.20 µg/g. Data for the stations in the South Fork Greenhorn Creek area (BY 113, 114, and 115; *fig. 4*) show that MeHg content in dobsonflies increases in the downstream direction (*table 11A*). The average MeHg concentration for four dobsonfly samples from the baseline site was 0.039 µg/g.

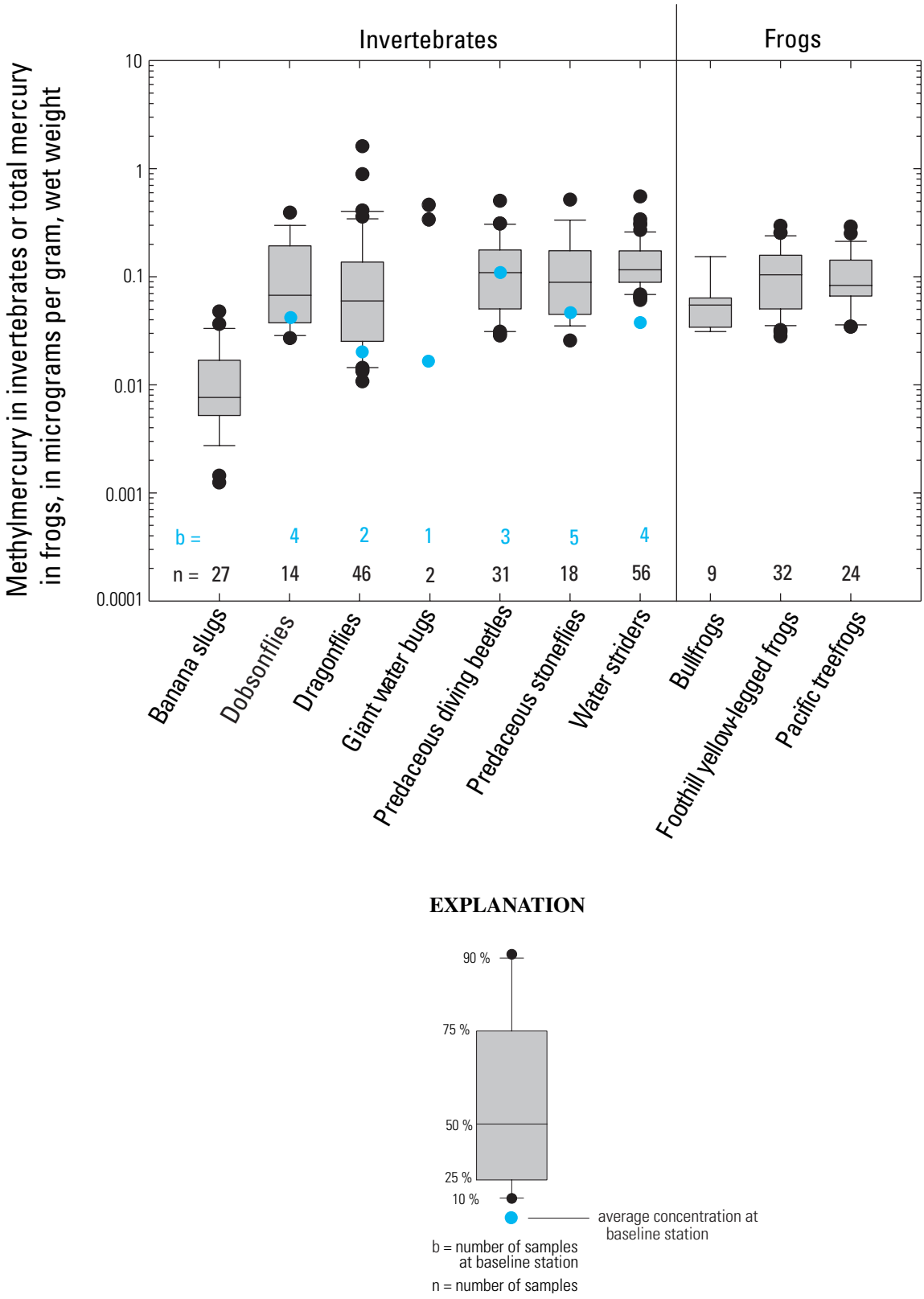


Figure 20. Box plots showing distribution of methylmercury concentrations in invertebrates and total mercury concentrations in frogs from the Greenhorn Creek drainage, Nevada County, California. n is coordinate; b is number of analyses from a baseline station, Bear River at Highway 20 near Emigrant Gap.

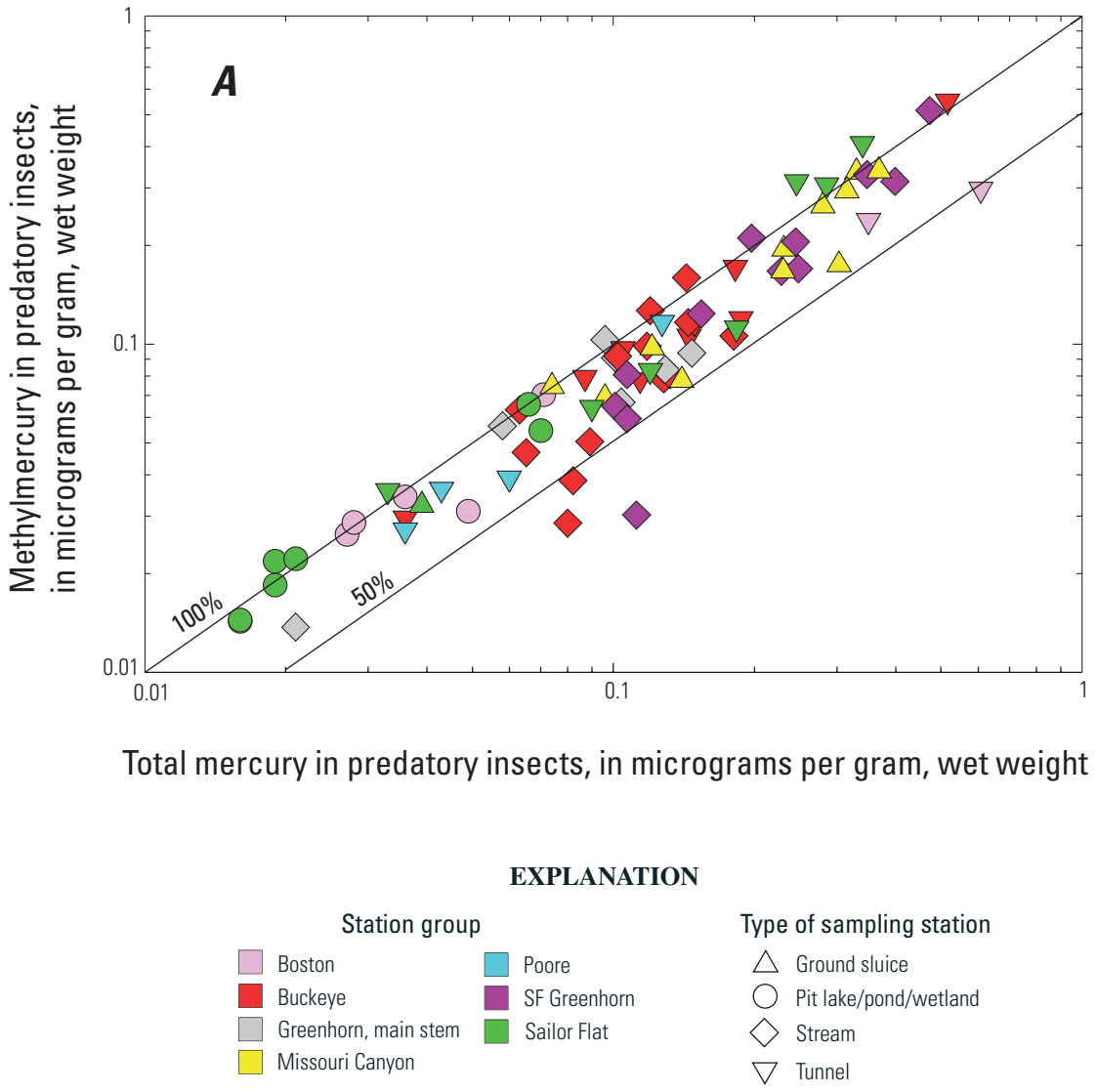
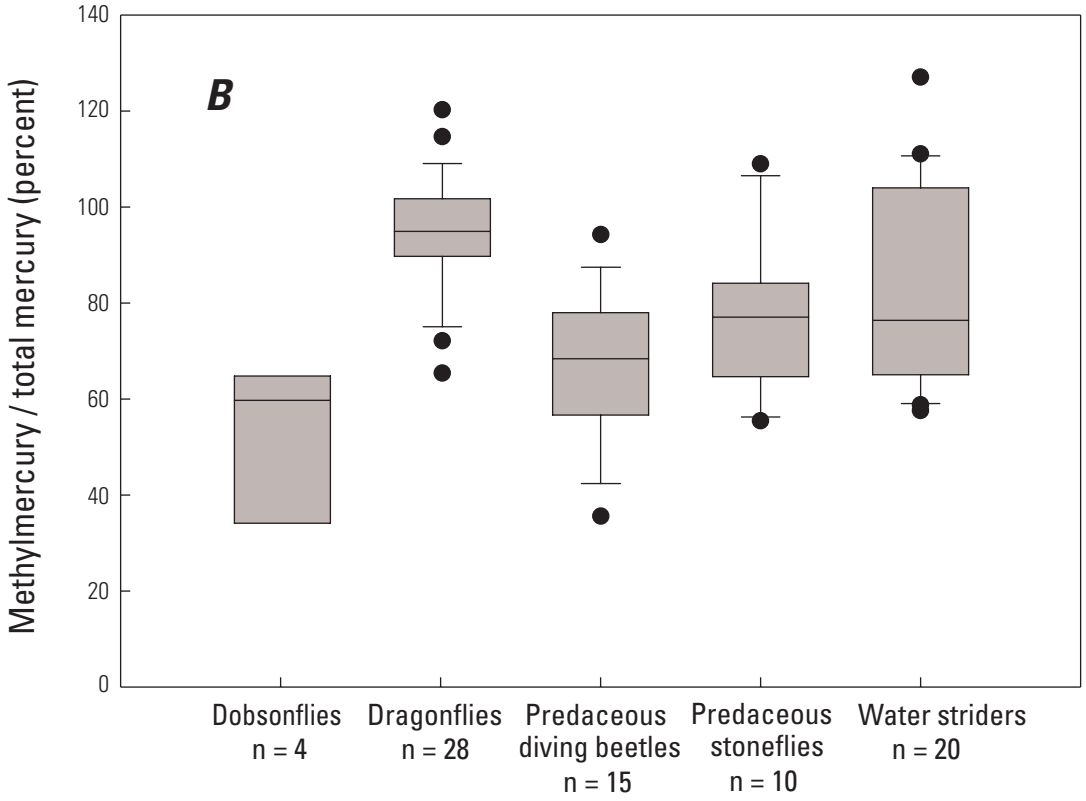


Figure 21. Data for total mercury and methylmercury in predatory insects: (*A*) scatter plot showing relation between total mercury and methylmercury concentration; diagonal lines indicate constant values of the ratio methylmercury to total mercury; (*B*) box plots showing ratio of methylmercury to total mercury for individual insect taxa from the Greenhorn Creek drainage, Nevada County, California.



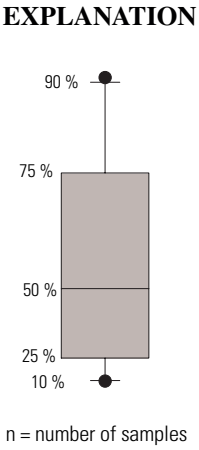


Figure 21.—*Continued.*

The highest MeHg concentrations in predaceous diving beetles (*fig. 25*, *table 11A*) were at the Boston Mine tunnel outlet (BY20). Of the stations in the Missouri Canyon area, the station at the North Fork of the Middle Fork (BY147) had diving beetles with the highest MeHg concentration. The Buckeye samples ranged from 0.03 to 0.17 µg/g; the beetles at station BY24 (Buckeye South drain) had the highest MeHg concentration. The average MeHg concentration of three beetle samples from the baseline station (BY199) was 0.113 µg/g, approximately equal to the median value of samples from the study area.

The predaceous stoneflies at the South Fork Greenhorn Creek stations (BY113, 114, and 115) showed generally increasing MeHg concentrations in the downstream direction (*fig. 26*, *table 11A*). Average MeHg concentrations (µg/g) for three composite samples per station varied from 0.06 at BY113, to 0.14 at BY114, and to 0.34 at BY115. This spatial trend is similar to that observed for dobsonflies, as discussed above. The average value of five samples of predaceous stoneflies from the baseline station (BY199) was 0.054 µg/g, approximately equal to the 25th percentile of samples from the study area.

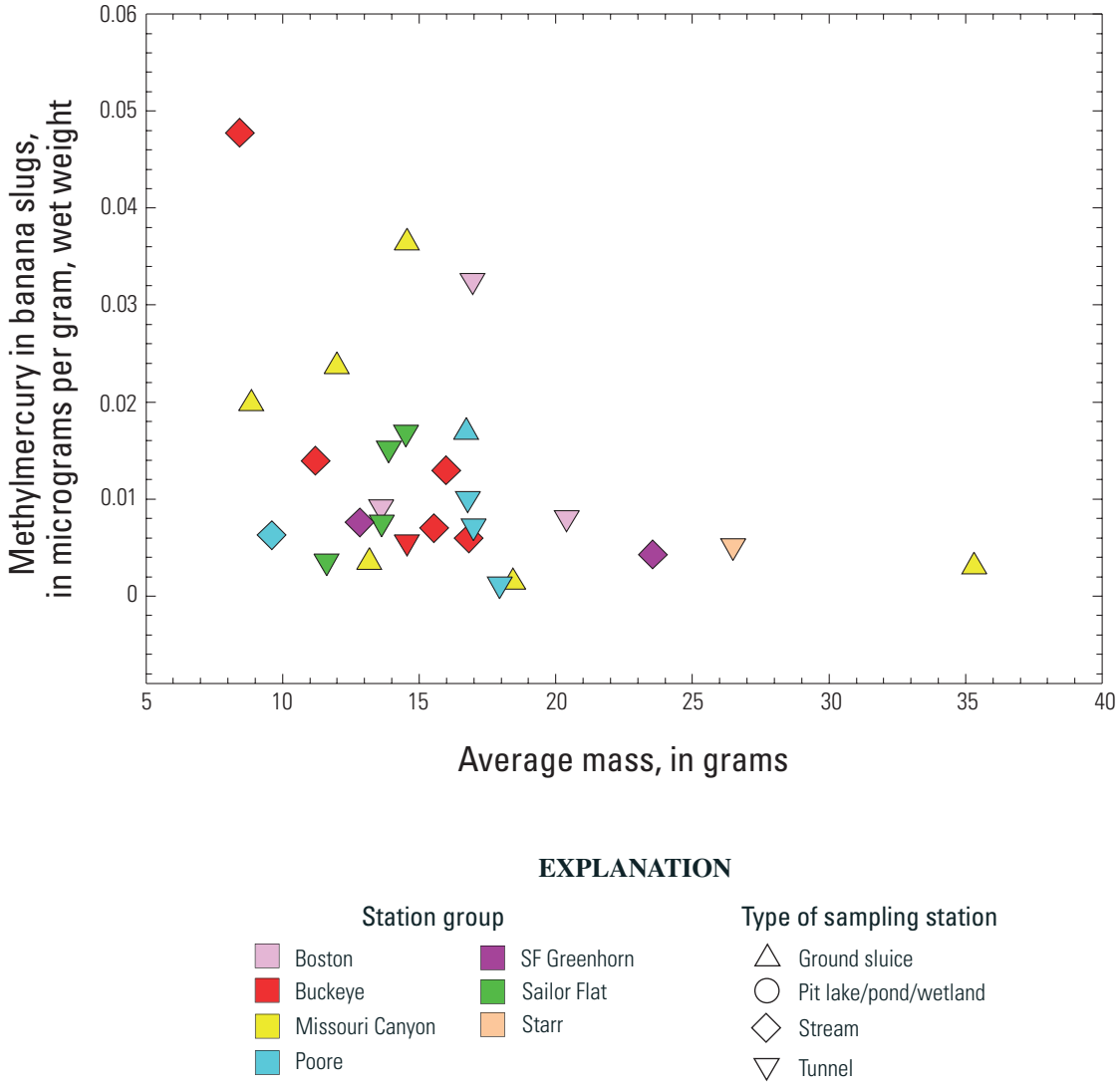


Figure 22. Relation between methylmercury concentration and average mass of banana slugs from the Greenhorn Creek drainage, Nevada County, California.

The highest MeHg concentration in water striders (*fig. 27*) was 0.55 µg/g in a sample taken during 1999 from station BY 24 (Buckeye South drain). Similar samples of water striders from this site in 2000 and 2001 had much lower concentrations, ranging from 0.11 to 0.16 µg/g (*table 11A*). This decline was similar to that observed for the dragonflies from this site. Similarly, the MeHg concentration in water striders at two Missouri Canyon stations (BY75 and 147) varied greatly year-to-year, with a trend toward lower concentrations of MeHg in 2001. Water striders at station BY20 (Boston Mine tunnel outlet) had relatively consistent MeHg concentrations through time, which is probably related to the consistency of the microhabitat and the hydrogeology at that site. MeHg concentrations in water striders at stations in South Fork Greenhorn Creek (BY113, 114, 115) increased in the downstream direction toward the confluence of South Fork Greenhorn Creek with the main stem of Greenhorn Creek, a trend also observed for dobsonflies and predaceous stoneflies, as noted above. Station BY115, the most downstream station on South Fork Greenhorn Creek, serves as an integrator of multiple contaminated sites, including the Boston Mine tunnel outlet (BY20) and the southern Buckeye sites (BY24 and 116). The average MeHg concentration of four samples of water striders from the baseline station (BY199) is 0.036 µg/g, which is lower than all 56 of the water strider samples from the study area.

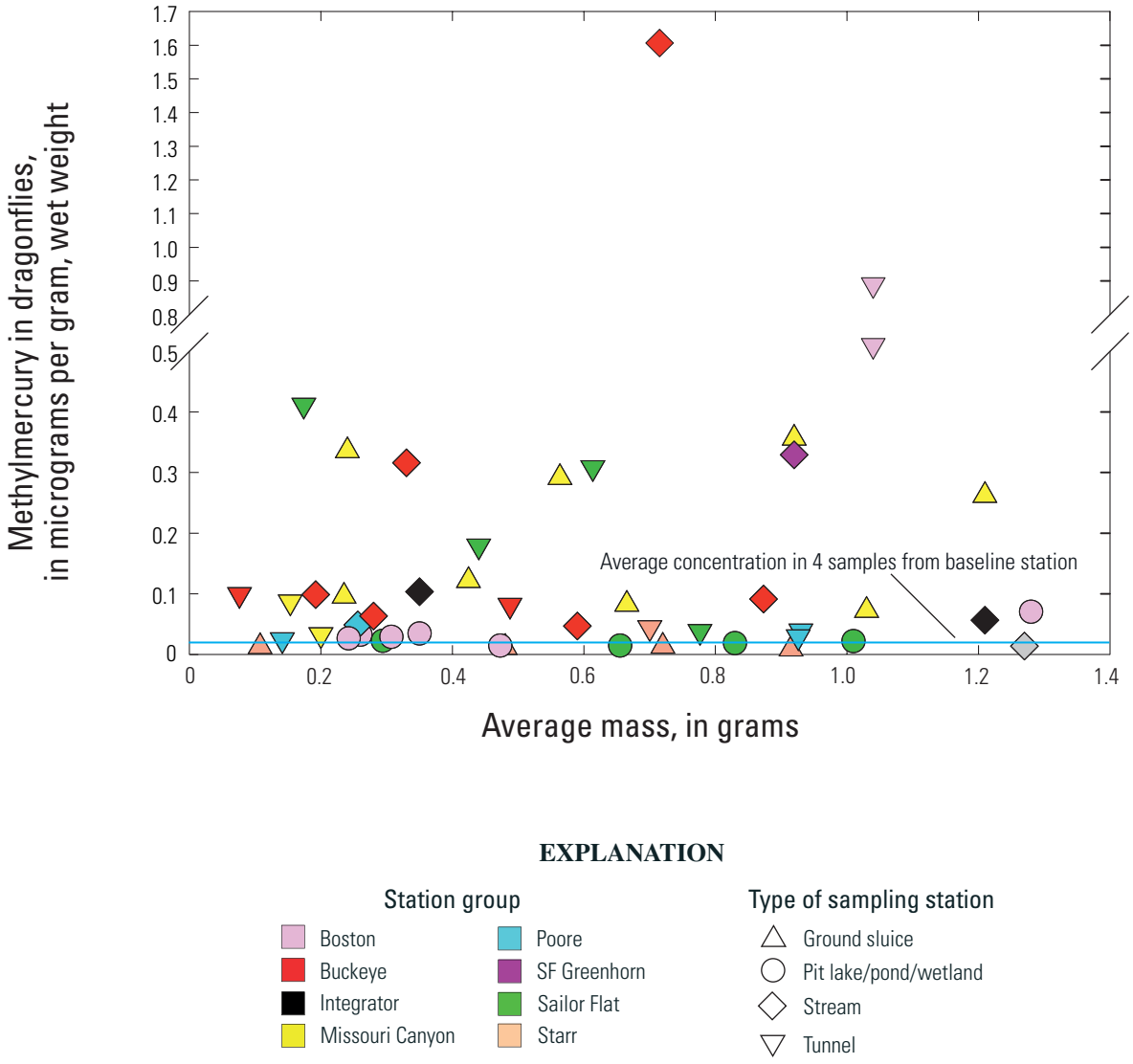


Figure 23. Relation between methylmercury concentration and average mass of dragonflies from the Greenhorn Creek drainage, Nevada County, California.

Frogs

During 1999–2001, a total of 9 bullfrogs, 32 foothill yellow-legged frogs, and 24 Pacific treefrogs were collected from the study area. Ranges of THg concentrations (wet weight) are in parentheses: bullfrogs (0.031–0.15 µg/g), foothill yellow-legged frogs (0.028–0.30 µg/g), and Pacific treefrogs (0.034–0.29 µg/g) (figs. *28–31*, *table 12*).

Total mercury was plotted against mass for all three species of frogs on the same graph (*fig. 28*). The mass of the frogs is displayed on a logarithmic scale because of the wide range of sample size among the frogs sampled (from less than 1 g for Pacific treefrogs to nearly 300 g for the largest bullfrog). Given the diversity of sampling stations, no clear relation between frog size and THg would be expected. In fact, the frog with the second-highest concentration of THg (0.29 µg/g, *table 12*) was a relatively small Pacific treefrog (4.46 g) collected from one of the most contaminated sites, the Boston Mine tunnel outlet (BY20). The frog with the highest concentration of THg (0.30 µg/g) was a foothill yellow-legged frog of 13.36 g, much smaller than most of the bullfrogs collected; the bullfrogs had lower concentrations of THg (0.03 to 0.15 µg/g). In other watersheds, bullfrogs bioaccumulated extremely high concentrations of THg (for example, 2.8 µg/g in an adult bullfrog from Cache Creek, California; Roger L. Hothem, written commun., 2002). In this study, bullfrogs were sampled from only two stations, and 8 of the 9 samples came from a single station, the Boston Mine wetlands (BY21). Apparently, the stations in the Greenhorn Creek drainage where bullfrogs were sampled in this study were less contaminated by MeHg than some of the other stations. Therefore, it appears that spatial variation in MeHg exposure, rather than mass of the organism, is the primary factor influencing MeHg bioaccumulation in the study area.

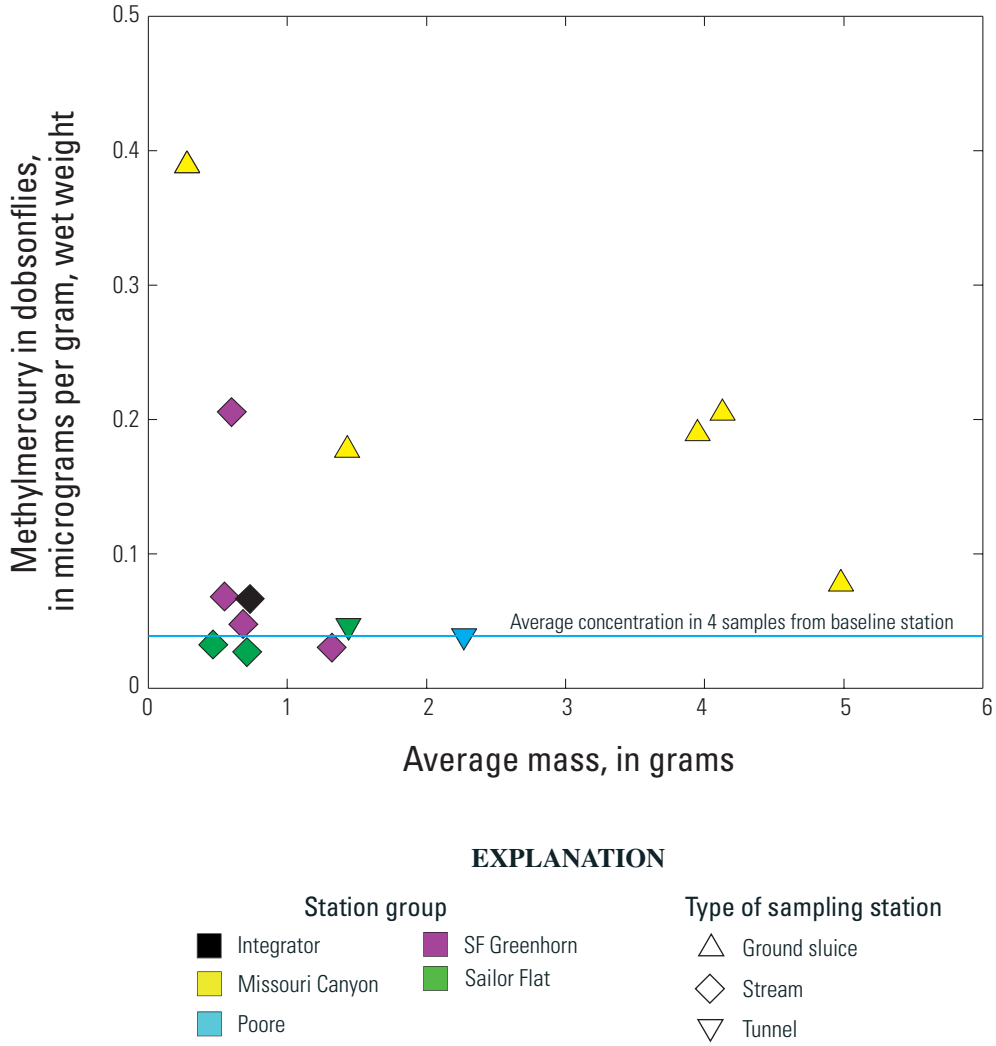


Figure 24. Relation between methylmercury concentration and average mass of dobsonflies from the Greenhorn Creek drainage, Nevada County, California.

Although there is no clear relation between sizes of all frogs and THg, the THg concentrations in bullfrogs from the Boston wetlands (station BY21) do appear to increase in relation to sample mass (*fig. 29*). No clear relation between size (age) and Hg content is apparent for the other two frog species (figs. *30* and *31*). Unlike the bullfrogs, which were nearly all from one site, the treefrogs and the yellow-legged frogs were from multiple site and year combinations, representing a wide variation in mercury exposure. Total mercury concentrations were compared with the total mass of individual bullfrogs from the Boston Mine wetlands (BY21) (*fig. 29*). The plot shows an increasing trend in THg relative to mass for the eight samples. The foothill yellow-legged frogs with the highest concentrations of THg were from the Missouri Canyon (BY147) and the South Fork Greenhorn Creek areas (BY113–115) (*fig. 30*, *table 12*). A yellow-legged frog sample from the North Fork of the Middle Fork of Missouri Canyon (station BY147) had the most elevated concentration of THg in this species. At two stations in Missouri Canyon (BY75 and 147), adult foothill yellow-legged frogs had higher concentrations of THg than did the juveniles from the same sites. Foothill yellow-legged frogs from the South Fork Greenhorn Creek area showed a trend of increasing THg concentration closer to Greenhorn Creek, but, likely because these animals are more

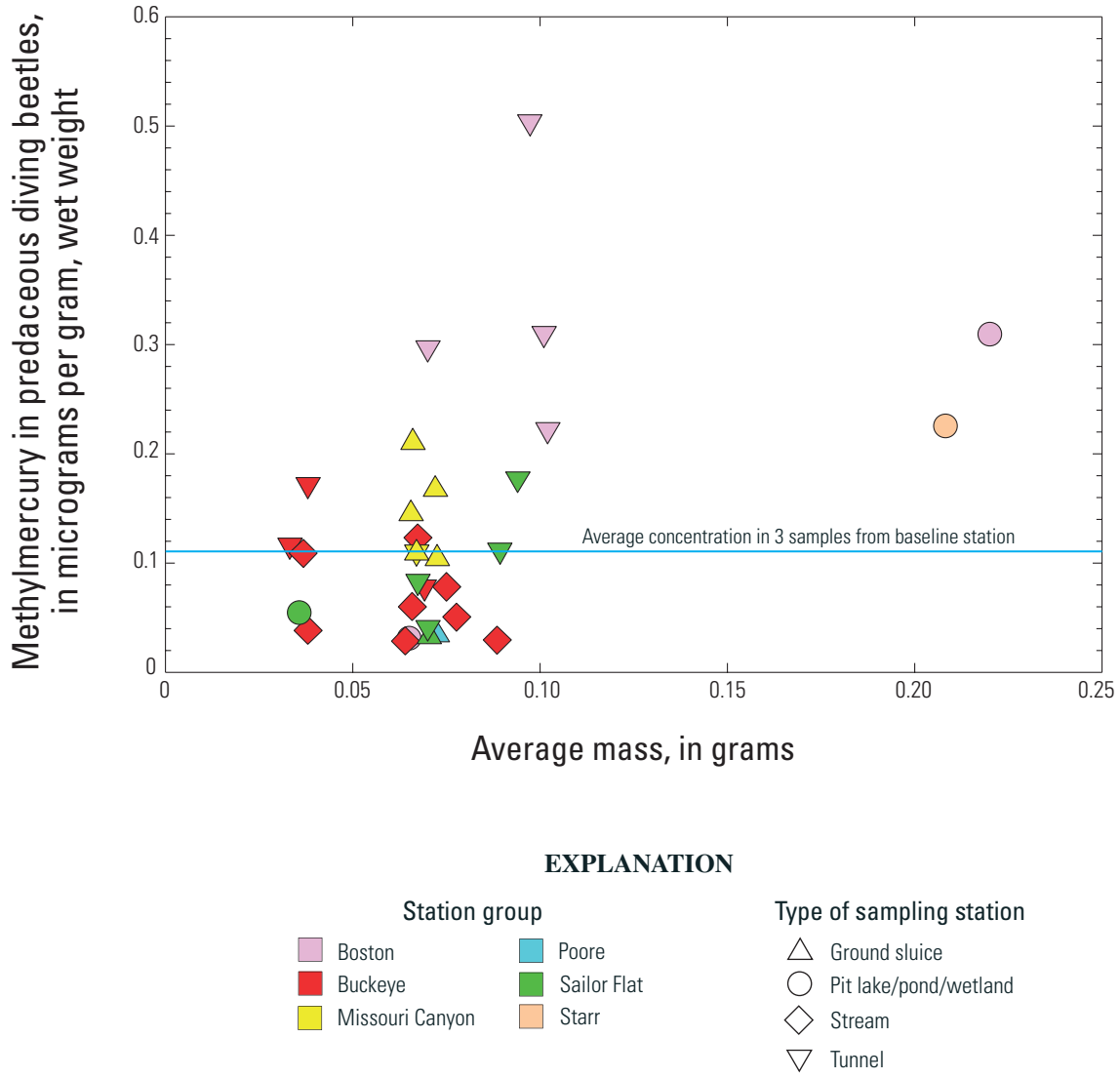


Figure 25. Relation between methylmercury concentration and average mass of predaceous diving beetles from the Greenhorn Creek drainage, Nevada County, California.

mobile and the sites were very close together, this trend was less distinct than that shown by the invertebrates. Foothill yellow-legged frog samples from the main stem of Greenhorn Creek (BY53 and BY56), the Buckeye area (BY22), the Poore Mine area (BY86), and the Integrator station (BY59) generally had lower concentrations of THg compared with samples from other station groups. All six of the Pacific treefrogs collected from the Boston Mine tunnel outlet (BY20) in 2000 and 2001 had higher THg concentrations than the other treefrogs collected from the Greenhorn Creek study area (*fig. 31*). The relative stability of the habitat at station BY20 likely contributed to both the high THg values and the consistency of these values. The relatively high concentration of MeHg observed in the invertebrates collected from this site (*table 11A*) caused us to expect a high concentration of THg in the frogs that consume these invertebrates.

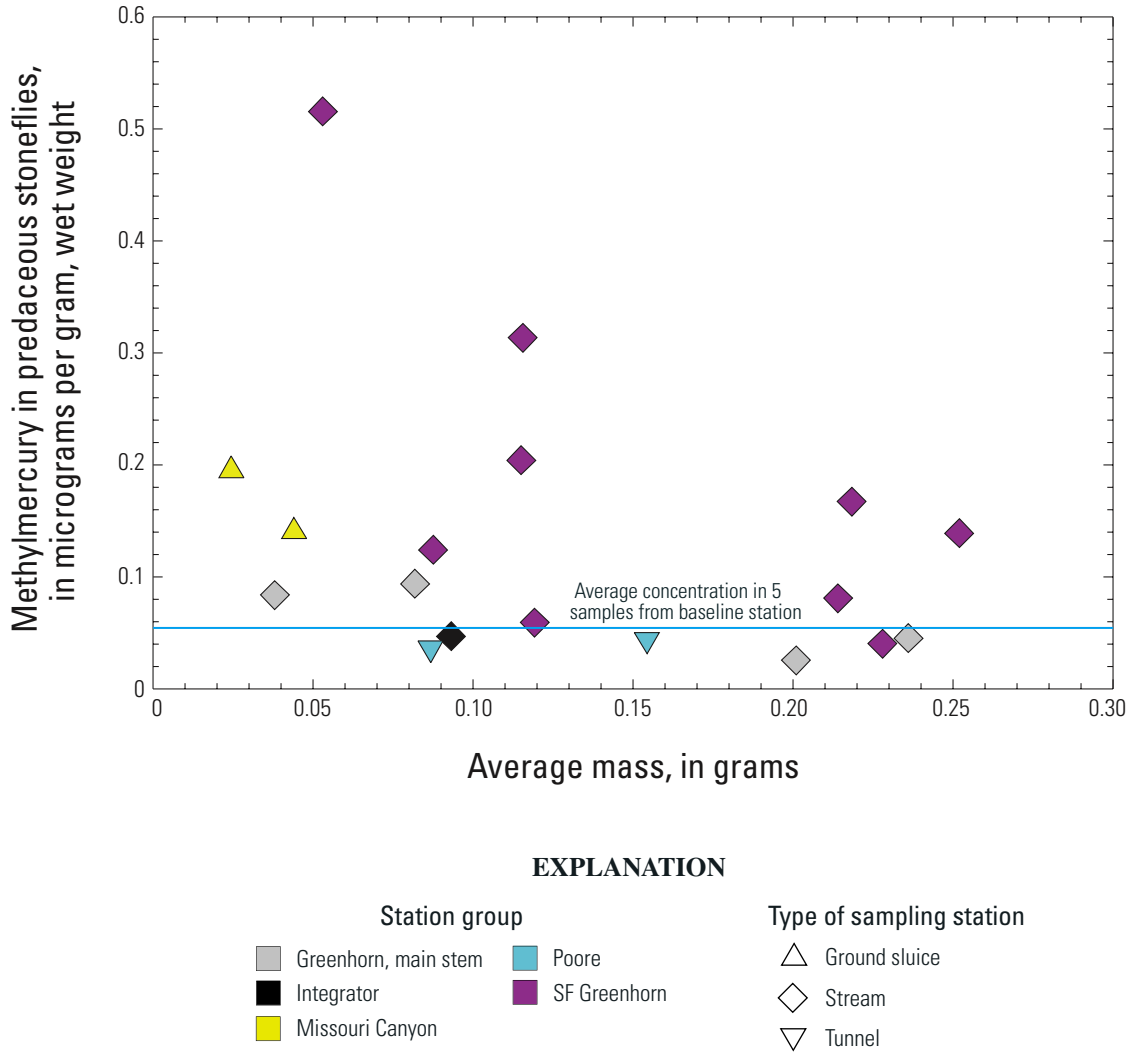


Figure 26. Relation between methylmercury concentration and average mass of predaceous stoneflies from the Greenhorn Creek drainage, Nevada County, California.

Summary of Results by Geographic Area

Normalizing concentration data using medians for each constituent allows comparison of the relative degree of mercury contamination at the various sampling stations. For each analyte, a single value was derived for each sampling station by taking the geometric mean of available data. The median for each analyte among the various stations included in this study (referred to as the "study median") was then computed using the geometric means corresponding to each station for which data were available. When values were reported as less than the detection limit (in water and sediment data), a value equal to one-half the detection limit was used to compute the geometric mean.

To compare different analytes among stations, the normalized data were split into five categories, shaded in different colors on a summary chart (*fig. 32*). For the study area, values less than half of the median for each analyte were considered very low (blue). Values greater than or equal to half of the median and less than the median were considered low (green). Values greater than or equal to the median and less than twice the median were considered moderately high (grey); values greater than or equal to twice the median and less than 10 times the median were high (yellow); and values greater than 10 times the median were considered extremely high (red). The summary chart illustrates the values of the normalized concentrations for the following analytes: (1) four types of mercury in water (unfiltered and filtered THg [*table 2*], and

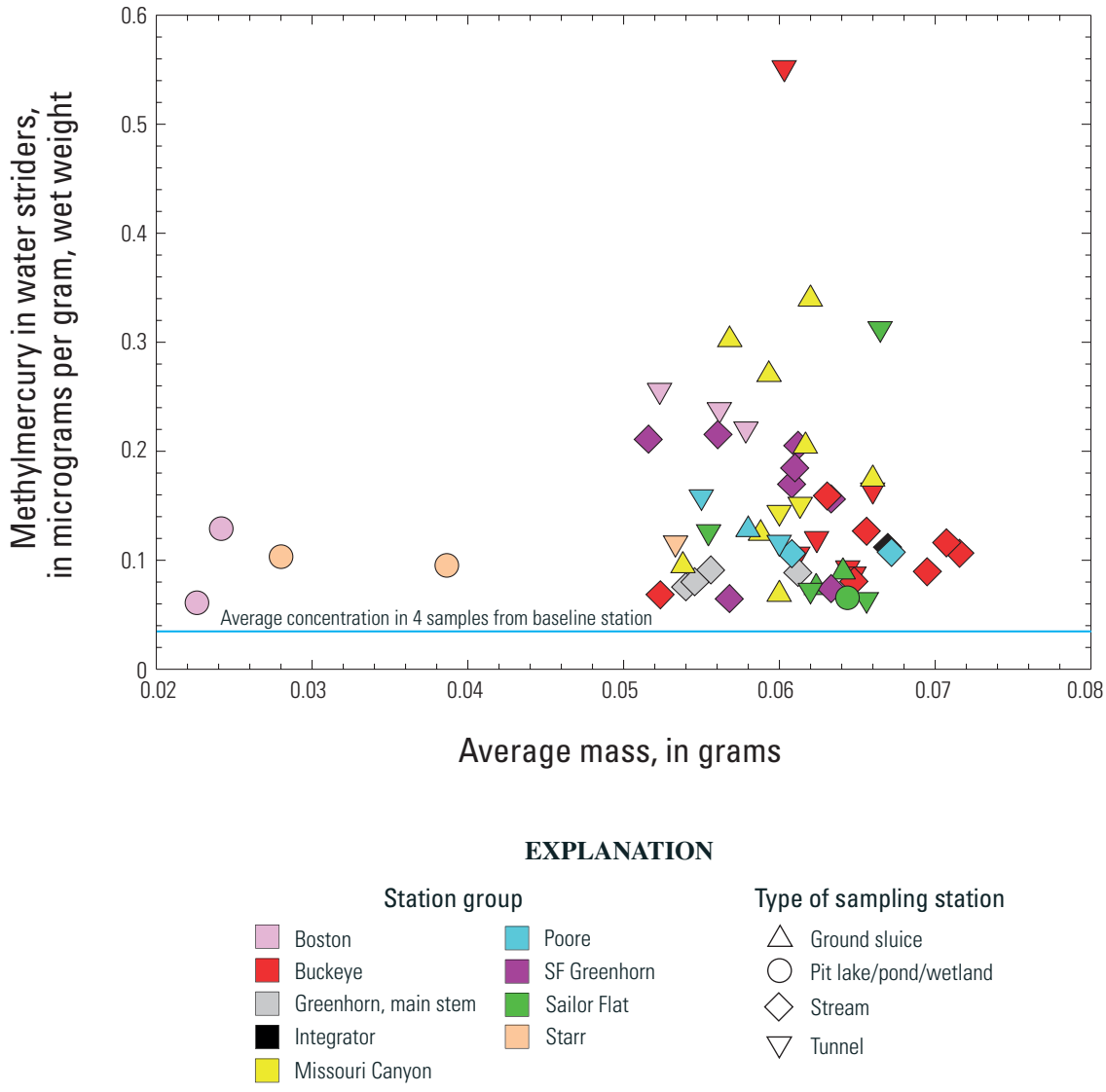


Figure 27. Relation between methylmercury concentration and average mass of water striders from the Greenhorn Creek drainage, Nevada County, California.

unfiltered and filtered MeHg [*table 3*]), (2) three types of mercury in sediment (visible THg [*table 10*]) and THg and MeHg from laboratory analysis [*table 9*]), (3) six invertebrate taxa (*table 11A*), and (4) two frog taxa (*table 12*). Giant water bugs and bullfrogs were not included in *figure 32* because the number of stations sampled for these taxa was too small (n = 2).

Study median values for all mercury-bearing constituents (water, sediment, and biota) are described below. For the entire study area, the medians for the four types of mercury in water were as follows: 14.6 ng/L in unfiltered THg, 2.8 ng/L in filtered THg, 0.07 ng/L in unfiltered MeHg, and 0.03 ng/L in filtered MeHg. (Note that the median value for filtered MeHg was less than the MDL of 0.04 ng/L because one-half the MDL was used for samples below the MDL.) In the case of visible mercury (*table 10*), it was assumed that a trace amount corresponded to 100 mg/kg (equivalent to 100 ppm); 100 mg was the detection limit of the field balance used to evaluate the results of panning 1-kg sediment samples. The median for this analyte turned out to be the trace amount; therefore, the trace amount has a normalized concentration of 1.0 (cells shaded yellow on *figure 32*).

The study median for THg in sediment analyzed in the laboratory is 0.175 mg/kg (equivalent to ppm) and for MeHg in sediment, 0.00155 mg/kg. For invertebrates, the study medians for MeHg concentration were as follows: banana slugs, 0.0076 µg/g; dragonflies, 0.065 µg/g; dobsonflies, 0.067 µg/g; stoneflies, 0.084 µg/g; diving beetles, 0.10 µg/g; and water striders, 0.11 µg/g. For frogs, the median concentrations for THg were 0.080 µg/g for Pacific treefrogs and 0.083 µg/g for Foothill yellow-legged frogs.

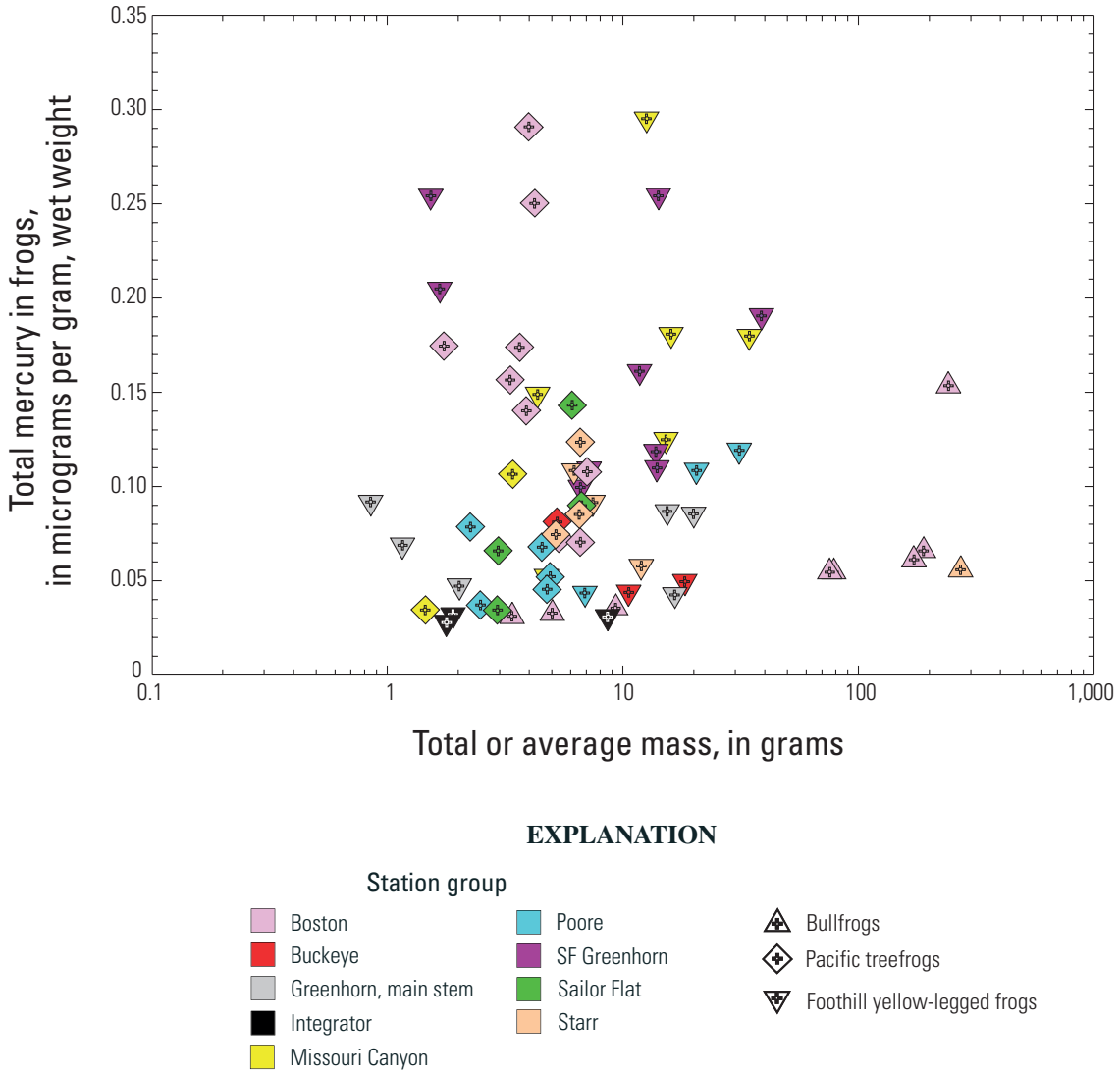


Figure 28. Relation between total mercury concentration and total or average mass of all frog species from the Greenhorn Creek drainage, Nevada County, California.

In the remainder of this section, results for each of the ten geographic areas identified in figures *2–5* are discussed. The discussion begins with the Headwaters station (BY51), then covers each of the subwatersheds with mining inputs in approximate downstream order, and then progresses to the Integrator station (Greenhorn Creek at You Bet Road, BY59).

Greenhorn Creek—Headwaters

Relatively few water and sediment samples were collected from the Headwaters reach of Greenhorn Creek (station BY51). The water sample that was collected from this station in January 2000 was rated very low for unfiltered THg, and low for unfiltered MeHg (*fig. 32*). However, the filtered THg value (about 5 ng/L) was unexpectedly rated in the moderately high category. Although there are no known mine wastes upstream of this station, soils in this area may have been contaminated by locally or regionally derived atmospheric deposition of mercury. Locally derived atmospheric mercury sources may have included *retort* activity during the period of active hydraulic and underground gold mining (1850–1942); regional sources included retort activity associated with mercury mining in the Coast Range (Alpers and Hunerlach, 2000); globally derived atmospheric deposition of mercury may also be a factor. The baseline station (BY199, *fig. 1*) is used in this report as a reference site for invertebrate samples. Although it is also upstream of known mining sources, it may also have been affected by atmospheric deposition of mercury, as described above.

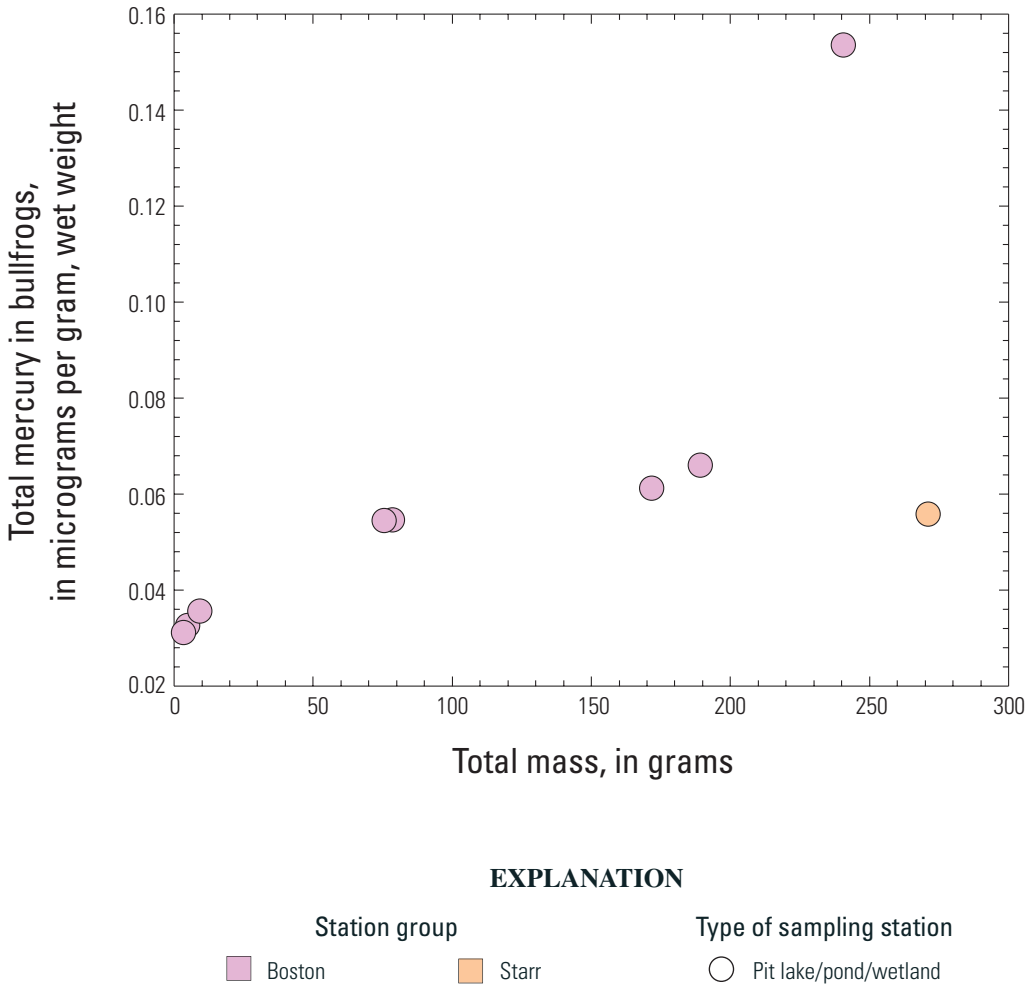


Figure 29. Relation between total mercury concentration and mass of individual bullfrogs from the Greenhorn Creek drainage, Nevada County, California.

Sailor Flat Area

Biological samples of six taxa were collected at the outlet of the Tom and Jerry tunnel (BY130) in 2000 and 2001 (*fig. 32*); four of the six taxa rated in the moderately high and high categories and the other two were in the low category, falling somewhat below study median values. Mercury was visible at this station, rating in the extremely high category. In contrast, results for a water sample collected in June 2000 rated in the low category for both unfiltered THg and unfiltered MeHg. Concentrations of THg and MeHg in unfiltered water from a water sample collected at the inlet to the Tom and Jerry tunnel (BY129) in June 2000 were higher than the study medians. A disturbed water sample collected at this station (not used in the summary table) had approximately 10 times more THg in both filtered and unfiltered water than an undisturbed sample collected on the same date (*table 2*). A water sample collected from a pond at the Tom and Jerry Mine station (BY131) in August 2000 rated high with regard to THg in both filtered and unfiltered water, and dragonfly samples from this station rated moderately high. The Tom and Jerry area (also known as Sailor Flat East) was chosen by the USDA–FS as a pilot remediation project (U.S. Department of Agriculture–Forest Service, 2002) and underwent restoration activity during November 2003.

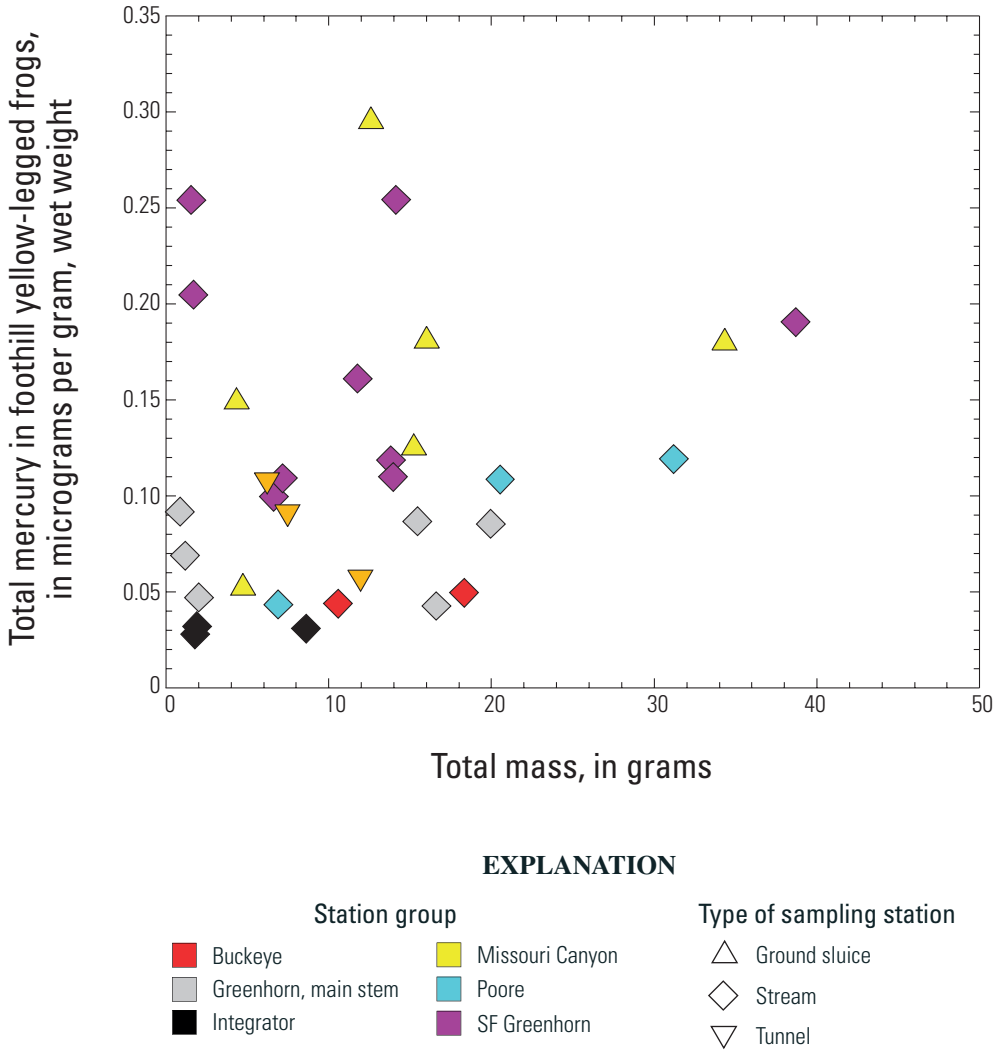


Figure 30. Relation between total mercury concentration and mass of individual foothill yellow-legged frogs from the Greenhorn Creek drainage, Nevada County, California.

The main drainage gulch on the western side of the Sailor Flat area (BY105) had extremely high concentrations of mercury and MeHg in water, and consistently high concentrations of visible mercury were panned from bottom sediments in the plunge pools of the deeply incised bedrock drainage below the mine. Although no quantitative discharge measurements were made, high flow during a storm event was estimated to be about two to five cubic feet per second. Large quantities of sediment were observed being transported during this storm event. Subsequent sediment sampling yielded visible mercury in the bottom of a plunge pool after waters had receded. Sediment samples sent to the laboratory from this station were generally low in both THg and MeHg, and biological samples from three taxa were relatively low compared with those from other stations.

Water samples from the drainage of the western side of the Sailor Flat area toward Greenhorn Creek (BY106) were moderately high in both filtered and unfiltered MeHg and high in filtered THg, but relatively low in unfiltered THg. Although water in the western side of the Sailor Flat area appears to be contaminated with relatively high concentrations of THg and MeHg, the lack of well defined remediation targets such as tunnels or ground sluices makes this station challenging in terms of formulating a remediation strategy.

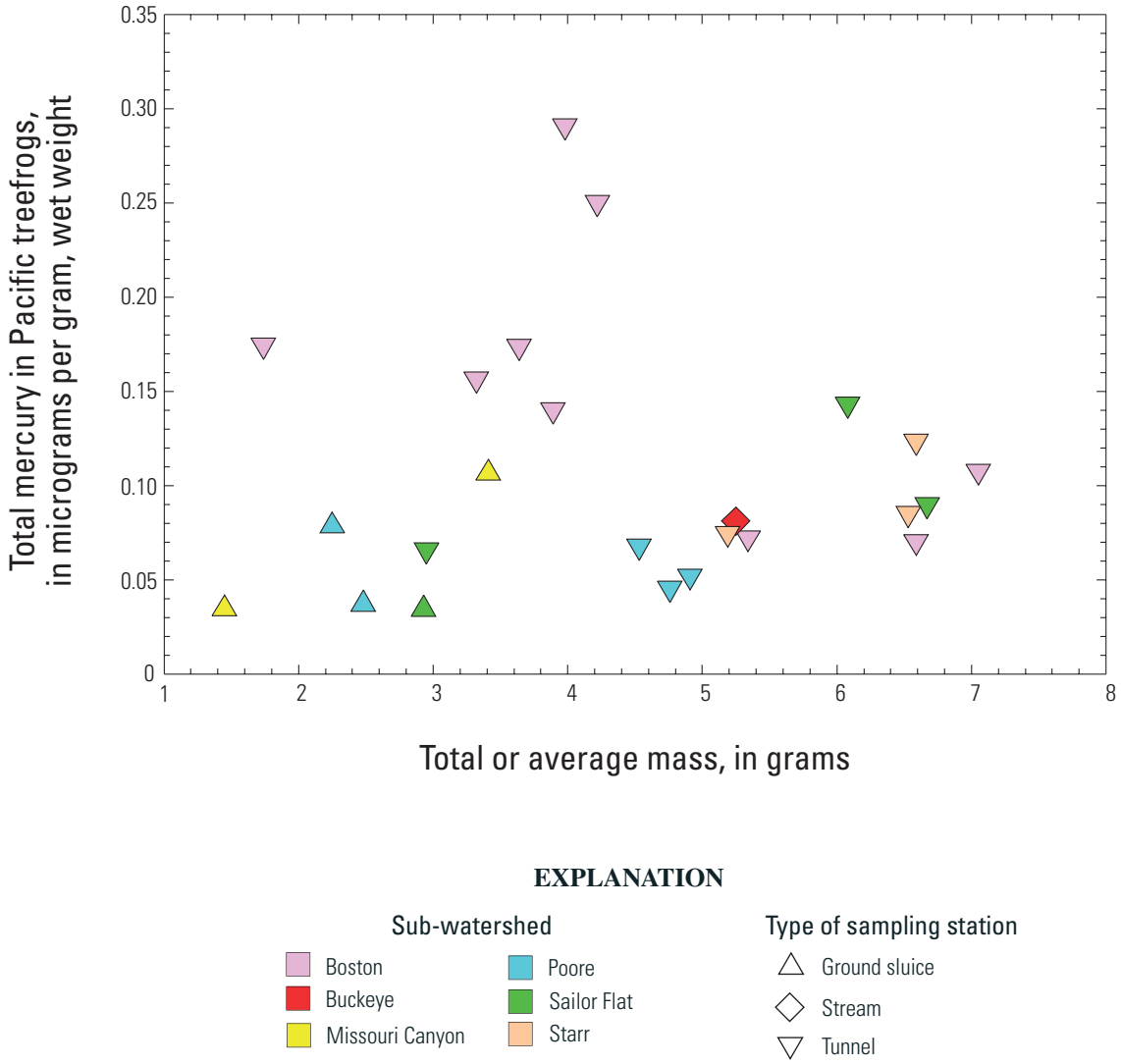


Figure 31. Relation between total mercury concentration and total or average mass of Pacific treefrogs from the Greenhorn Creek drainage, Nevada County, California.

Station map ID	Station Name	Water				Sediment			Invertebrates						Frogs	
		THg - unf	THg - fil	MeHg - unf	MeHg - fil	Visible THg	THg (Lab)	MeHg (Lab)	Banana slugs	Dragonflies	Dobsonflies	Diving beetles	Stoneflies	Water striders	Foothill yellow-legged frogs	Pacific tree frogs
Headwaters																
BY51	Greenhorn Cr headwaters nr Scotts Flat Reservoir	0.48	1.8	0.84												
Sailor Flat / Tom and Jerry																
BY105	Sailor Flat Mine main drain Gulch 01 nr Quaker Hill	80	26	13		60	0.03	0.02				0.33		0.73		0.45
BY106	Sailor Flat Mine main drain to Greenhorn Cr, Gulch 03	1.0	3.5	1.5	1.8											
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	1.8		2.6												
BY130	Tom and Jerry Mine drain at tunnel outlet nr Nevada City	0.09		0.28		10			1.2	2.6	0.70	0.93		1.0		1.2
BY131	Tom and Jerry Mine drainage pond nr Nevada City	2.2	5.7	0.28						0.29		0.56		0.59		
Buckeye																
BY22	Buckeye Flat Mine drain 0.1 mi ab Greenhorn Cr					1.0						0.30		0.80	0.56	
BY58	Buckeye Flat Mine main drain 0.45 mi ab Greenhorn Cr	0.1	0.34						0.85			0.53		0.87		1.0
BY23	Buckeye Flat Mine N drain to Greenhorn Cr Grass Valley	61	70	1.1			5.7	0.03	0.74					0.81		
BY116	Buckeye Flat Mine pond drain 0.15 mi ab SF Greenhorn Cr	0.65	3.55						4.1	1.1		0.89		1.1		
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr Grass Valley	6,200	2,500	130			0.86	1.2		3.9		1.2		1.6		
BY25	Buckeye Flat Mine upper drain	0.28	0.4	0.49	1.00				1.7			0.80		0.72		
Boston Mine																
BY20	Boston Mine tunnel outlet nr Grass Valley	1.4	1.1	0.98	1.3	45	51	0.20	1.8	14		3.3		2.1		1.8
BY21	Boston Mine wetlands pond nr Grass Valley	1.1	0.87	2.4			0.53	2.2		0.47		1.7		0.85		
South Fork Greenhorn Creek																
BY113	SF Greenhorn Cr 0.8 mi ab Greenhorn Cr nr Nevada City								1.0		0.58		0.69	0.62	1.8	
BY114	SF Greenhorn Cr 0.7 mi ab Greenhorn Cr nr Nevada City	14	65	1.9	8.5				0.57		1.0		1.7	1.6	1.8	
BY115	SF Greenhorn bl Boston Mine nr Nevada City	0.83	2.3	0.28	0.63	1.0				5.1	3.1		3.8	1.8	2.1	
Poore Mine																
BY86	Poore Mine creek ab tunnel nr Grass Valley	1.2	0.05	0.28					0.83	0.75				0.95	0.99	
BY87	Poore Mine creek bl tunnel nr Grass Valley	0.33	0.27	0.28		1.0										
BY88	Poore Mine ground sluice nr Grass Valley	0.06	0.05	0.28		4.0		3.4								
BY89	Poore Mine pit lake nr Grass Valley	0.34	0.28	1.1		1.0										
BY90	Poore Mine seep above ground sluice nr Grass Valley		0.05						2.2			0.35		1.1		0.98
BY91	Poore Mine tunnel effluent nr Grass Valley	1.1	0.18	1.0					0.59	0.43	0.59		0.48	1.2		0.68
Starr Mine																
BY122	Starr Mine tunnel inflow nr Grass Valley	0.32	0.19	0.28												
BY123	Starr Mine tunnel midway nr Grass Valley	64	1.6	11		10	69	6.1								
BY124	Starr Mine tunnel outlet nr Grass Valley	32	1.2	7.6	0.63				0.68	0.65				1.0	1.0	1.2
BY148	Starr Pit Pond nr Grass Valley									0.21		2.3		0.89		
Missouri Canyon																
BY144	Coon Hollow Cr drain tunnel outlet nr Dutch Flat									0.89		1.1		1.3		
BY146	Missouri Cyn 1.6 mi ab Greenhorn Cr nr Chicago Park					1.0			3.1			1.1		1.8		
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	0.42	0.74	1.0		5.0	1.0	0.77	0.33	1.4	2.3		2.0	1.1	1.5	0.88
BY145	Missouri Cyn Cr tributary nr Chicago Park											1.1		3.0		
BY147	NF MF Missouri Cyn nr Chicago Park								3.7	4.8	5.9	1.8		2.0	2.7	
Greenhorn Creek - Main stem																
BY55	Greenhorn Cr 0.1 mi bl Sailor Flat west drain nr Nevada City													0.68		
BY57	Greenhorn Cr 0.3 mi bl Sailor Flat west drain nr Nevada City										0.45		0.42	0.72		
BY52	Greenhorn Cr 0.3 mi ab Buckeye Ford nr Nevada City	1.9	1.3	0.28												
BY60	Greenhorn Cr bl Buckeye drain nr Nevada City													0.79		
BY53	Greenhorn Cr ab SF Greenhorn Cr nr Nevada City												1.0		0.80	
BY56	Greenhorn Cr bl SF Greenhorn Cr nr Nevada City					1.0				0.21			1.1		0.82	
BY180	Greenhorn Cr 0.2 mi bl The Narrows					1.0				1.2	1.0			0.81		
Integrator																
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	0.90	0.88	1.0	0.87	1.0							0.56	1.0	0.36	

EXPLANATION

Mercury ratings

Extremely high	$c' \geq 10$
High	$10 > c' \geq 2$
Moderately high	$2 > c' \geq 1$
Low	$1 > c' \geq 0.5$
Very low	$0.5 > c'$

c', concentration values normalized to median for individual sites

Abbreviations

ab, above	Lab, laboratory	NF, North Fork	S, south
bl, below	MeHg, methylmercury	nr, near	SF, South Fork
Cr, Creek	MF, Middle Fork	Pk, Park	THg, total mercury
Cyn, Canyon	mi, mile	Rd, Road	unf, unfiltered
fil, filtered	N, north	Res, Reservoir	

Figure 32. Summary of data for mercury and methylmercury in water, sediment, and biota, Greenhorn Creek drainage, Nevada County, California.

Buckeye Area

Samples from the Buckeye Flat complex (6 stations) yielded some of the highest concentrations of MeHg and THg in water, sediment, and biota (*fig. 32*). The Buckeye South station (BY24) ranked among the five most contaminated locations with regard to both water and invertebrates, although sediment samples from the station were near median values in terms of THg and MeHg concentrations. Water samples collected from station BY24 during August 1999 and August 2000 had extremely elevated levels of THg (filtered and unfiltered) and MeHg (unfiltered), with concentrations several orders of magnitude greater than those in samples from most other stations. Concentrations of THg and MeHg in water and biota were highly variable from year to year at this station, resulting in a moderate overall rank for biota. Buckeye North drain (BY23) ranked extremely high for THg in water, high for THg in sediment, and moderately high for MeHg in unfiltered water, based on water samples collected during 1999 and 2000 and a sediment sample collected during 1999, but ranked very low for MeHg in sediment and low for MeHg in two invertebrate taxa sampled during 2000. The acidic conditions of the water at BY23 (pH 3.7 to 4.2; table 1) may have affected rates of Hg methylation and bioaccumulation and certainly affected ecological diversity.

Measured flows at station BY24 during sampling in August 1999 and August 2000 were approximately 1 gal/min; however, evidence of higher flow was observed. Deep plunge pools in the incised drainage below BY24 contained small amounts of both fine- and coarse-grained sediments with abundant organic material. These plunge pools are isolated during low flow and contain water with temperatures as high as 24°C. Waters draining the hydraulic pit toward the south travel through a network of ground sluices. Because of a moderate hydraulic gradient, the sediment transported through the BY24 station is mostly sand- and silt-sized particles.

The Buckeye Flat North drain (BY23) drains a smaller area and has a steeper gradient than station BY24. The drainage is controlled by a network of deeply incised bedrock sluices that drain through a tunnel. A large concentration of debris and sediment has accumulated in the steeply incised drainage below the tunnel. Flows were relatively consistent, between 5 and 8 gal/min. Some evidence of disturbance from recreational mining was observed just below the tunnel discharge. There is a large concentration of organic material from the forest canopy. The low pH values (3.7–4.2) measured at station BY23 may have been caused by the oxidation of abundant pyrite exposed in the slate bedrock throughout this portion of the hydraulic pit and pyrite in residual gravel deposits.

Boston Mine Area

The Boston Mine tunnel (BY20) contains a remnant section of an old sluice box that is partially filled with mining debris. Elemental mercury was found in the sediment, with the largest concentrations at and near the bedrock contact. Precipitation and storage of water in the hydraulic pit above the tunnel leads to flow through the tunnel, where water can interact with mercury-contaminated sediments. The upstream entrance to the tunnel is caved or blocked. Measured discharge at the tunnel outlet ranged from 2.5 to 15 gal/min. On the basis of several site visits, it was evident that recreational miners had frequently disturbed sediment within the tunnel and below the tunnel. The tunnel outlet is located in bedrock about 20 feet above ground surface, leading to a cascade of the outfall down a fractured bedrock face. At the higher flows, fine-grained sediment and particulate mercury are probably transported out of the tunnel. Bedrock fractures alongside the deep plunge pool below the tunnel yielded sediment containing the highest measured visible mercury concentration within the study area (45,000 mg/kg, equivalent to 4.5 percent by weight).

Samples of biota and water were collected from the Boston Mine tunnel outlet (BY20) during 1999, 2000, and 2001. Samples of biota (four taxa of invertebrates, and Pacific treefrogs) consistently had elevated concentrations of MeHg and THg (*fig. 32*). Dragonflies from station BY20 are the only example of an extremely high normalized concentration (greater than 10 times the study median) for all of the biological samples in the study area. Water samples from the Boston Mine tunnel outlet were moderately high in filtered and unfiltered THg and in filtered MeHg, and just below the study median value in unfiltered MeHg.

The ponded wetlands at the Boston Mine (BY21, *fig. 4*) are located upstream of the mine tunnel. Water and sediment samples from this station had moderately high to high levels of MeHg and somewhat lower levels of THg compared with those from the tunnel outlet (BY20). Samples of three taxa of invertebrates from these wetlands had lower levels of MeHg than equivalent samples from the mine tunnel outlet, but the levels for the predaceous diving beetles were moderately high. Caution must be used in the interpretation of data for predaceous diving beetles, as values even from the baseline reference station (BY199) were relatively high (near the median for all samples from the study area). Eight bullfrog samples from the Boston Mine wetlands varied in size and THg content; the concentration of MeHg in the frog generally corresponded to the size of the frog (*fig. 29*). The largest bullfrog had a THg content of about 0.15 µg/g (wet basis).

The Bureau of Land Management selected the Boston Mine tunnel for a pilot remediation project. Environmental compliance documents were prepared, and remediation is scheduled for 2005.

South Fork Greenhorn Creek

The South Fork Greenhorn Creek tributary to Greenhorn Creek is the initial water body to receive discharge from the Buckeye South drainage (BY 24), the Buckeye East drain (BY 116), and the Boston Mine tunnel outlet (BY20) (*fig. 4*). Three sampling stations (BY113, BY114, and BY115) were located longitudinally along a reach of the South Fork of Greenhorn Creek. Of these three, station BY115 is farthest downstream, near the confluence with the main stem of Greenhorn Creek; station BY114 is located upstream of the Boston Mine tunnel outlet (BY20) but downstream of the Buckeye Drain inputs (BY24 and BY116). Station BY113 is the farthest upstream station, but is still downstream of the Buckeye East Drain (BY116). MeHg in dobsonflies, stoneflies, and water striders, and THg in foothill yellow-legged frogs, collected from this reach of South Fork Greenhorn Creek (tables *11*, *12*; *fig. 32*) show a systematic increase apparently associated with distance downstream and the cumulative effects of the inputs from the Buckeye and Boston Mine areas.

Poore Mine Area

Samples of water from six stations in the Poore Mine area were among the least contaminated samples from the mine sites sampled for this study. All of the normalized values for filtered THg are in the very low range (*fig. 32*). Two of five values of both unfiltered THg and unfiltered MeHg are in the moderately high range, just above the study median values for these analytes, whereas the remaining three values for both analytes are in the very low range. Sediment contained a high concentration of visible mercury in a ground sluice and a trace amount (considered moderately high, equal to the median) at two other stations in the area. The MeHg concentration in a sediment sample from the ground sluice area was also moderately high.

Mercury and MeHg in most of the biological samples from the Poore Mine area were in the very low to low range. Exceptions to this generalization were a banana slug sample from a seepage area above the ground sluice (BY90) that had high MeHg and water striders from BY90 and the tunnel effluent station (BY91) that had moderately high MeHg amounts just above the study median.

Starr Mine Area

Samples of water and sediment from a point near the middle of the Starr Mine tunnel (BY123) and samples of water from the tunnel outlet (BY124) indicate that this area is heavily contaminated with THg and MeHg (*fig. 32*). In contrast, the inflow water to the Starr Mine tunnel (BY122) was very low in both THg and MeHg, which suggests that the water flowing through and out of the tunnel acquired its THg and MeHg by interacting with contaminated sediments in the tunnel.

Biological sampling in the middle of the Starr Mine tunnel was not possible because target species were not present. Samples of five taxa of biota from the tunnel outlet area were low to moderately high in MeHg. Samples of three taxa of biota from a pond in the Starr Mine pit (BY148) were rated very low (dragonflies) to high (diving beetles). Although not shown in *fig. 32*, a bullfrog sample from the Starr Mine pit was relatively low in THg compared with samples of comparable mass from the Boston Mine wetlands (BY21) (*fig. 29*, *table 12*).

Missouri Canyon Area

MeHg in biological samples from most stations in the Missouri Canyon area were rated moderately high to high (*fig. 32*). All of the sampling stations in this area are interpreted to be ground sluices except the Coon Hollow tunnel outlet (BY144). A ground sluice station at the North Fork of the Middle Fork of Missouri Canyon (BY147) had four taxa in the high category and two in the moderately high category; combining these data gives the highest overall ranking of MeHg in biota of all stations in the study area. A foothill yellow-legged frog sample from station BY147 had a THg concentration of 0.30 µg/g, the highest of all frog samples from the study area (*fig. 28*, *table 12*).

Few samples of water and sediment were collected from Missouri Canyon during the study period. A water sample from station BY75 collected in December 1999 was rated very low for unfiltered THg, low for filtered THg, and was near the study median (moderately high) for unfiltered MeHg. Sediment from station BY75 contained a high concentration of visible mercury; MeHg and THg concentrations in a sediment sample analyzed in the laboratory were rated low and moderately high, respectively. A trace (moderately high) of visible mercury was found at another ground sluice station (BY146). Several of the sampling stations in the Missouri Canyon area contained elevated levels of MeHg in biota, which qualifies this area as a “hot spot.” However, more sampling and hydrogeological analysis is needed to determine whether a suitable strategy for remediation can be identified.

Greenhorn Creek—Main Stem

Samples were collected from the part of the main-stem reach of Greenhorn Creek located between the Sailor Flat area (BY55) and a point below the Narrows (BY180), a distance of about 4 river miles. A single water sample from the station above Buckeye Ford (BY52) had moderately high THg in filtered and unfiltered water, but very low MeHg in unfiltered water (*fig. 32*). Trace amounts of visible mercury (moderately high) were documented at two of the main-stem stations. Biological data for this area ranged from very low to moderately high. Water striders and Foothill yellow-legged frogs had low values at all six stations at which samples were collected. Three of the main-stem Greenhorn Creek stations had taxa with moderately high values, ranging from 1.0 to 1.2 times the study median for dragonflies, dobsonflies, and stoneflies. Concentrations of MeHg tended to increase with distance downstream for each of the five biological taxa for which data are available (*fig. 32*), suggesting a systematic, cumulative increase of bioavilable MeHg downstream.

Greenhorn Creek at You Bet Road—Integrator Site

The Integrator station at the bottom of the Greenhorn Creek drainage was generally rated low for THg and MeHg in water and biota (*fig. 32*). Three taxa of biota (stoneflies, water striders, and foothill yellow-legged frogs) were sampled in August 1999. Water was sampled monthly from July to December 2001. A trace of visible mercury was found by panning methods, but no sediment samples were analyzed quantitatively for THg and MeHg. The relatively low THg and MeHg concentrations in biota from this station could have been caused in part by dilution, as well as by intense in-stream gravel mining activity upstream which continually disturbs the area during the summer and fall months each year. The high degree of disturbance degraded the aquatic habitat, making it difficult to compare with other sites that were not as disturbed. Mercury that was mobilized in this area because of the gravel mining activity may have accumulated in Rollins Reservoir, or may have been transported farther downstream in the Bear River watershed.

Summary and Conclusions

Reconnaissance sampling of water, sediment, and biota was done at 40 stations in the Greenhorn Creek drainage during 1999–2001 to characterize the degree of mercury and methylmercury (MeHg) contamination associated with historical gold mining and to identify potential remediation sites. The distribution of mercury and methylmercury is highly variable in time and space. Results identified two remediation sites for federal land management agencies: abandoned sluice tunnels in the Sailor Flat Mine area (U.S. Department of Agriculture–Forest Service) and the Boston Mine area (Bureau of Land Management).

The range in concentrations of THg in unfiltered water spanned nearly seven orders of magnitude; more than 25 percent of the analyzed concentrations exceeded 50 ng/L (nanogram per liter), the applicable water-quality criterion for protection of aquatic life. Total mercury (THg) concentrations in unfiltered water exceeded 2,000 ng/L, the national drinking water standard, in a small number of the water samples. The highest concentrations of THg in water were found in ground sluices and tunnel sluices as opposed to ponds, wetlands, pit lakes, or streams. The concentration of MeHg in several of the unfiltered water samples was greater than 0.1 ng/L, a reference concentration above which significant bioaccumulation of MeHg has been observed in other systems. Values of the ratio MeHg to THg in unfiltered water samples spanned a wide range, from 0.001 to 30 percent, with most values in the range of 0.1 to 5 percent. The highest value of MeHg/THg in water was associated with a sample from a wetland environment.

Acidic drainage in some of the mined areas had pH values as low as 3.4. Data for major and trace elements are reported for filtered and unfiltered water samples collected at 29 of the stations. Elevated concentrations of aluminum, cadmium, copper, iron, manganese, nickel, and zinc were found at several stations, especially in the more acidic water samples.

Visible mercury in sediment was observed in several areas, and concentrations were quantified using a panning method. Concentrations of elemental mercury documented by the panning method ranged from trace amounts (about 100 mg/kg [milligram per kilogram]) to large beads (45,000 mg/kg or 4.5 percent by weight). The median for THg in sediment samples analyzed by laboratory methods was around 1 mg/kg, and the median for MeHg in the sediment was around 0.001 mg/kg (dry basis). The range of values of the ratio of MeHg to THg in the sediment samples was about 0.01 to 3 percent. The sediment sample with the highest value of MeHg/THg was from a wetland environment.

For biological samples, annual variations in MeHg concentrations by taxon appear to be related primarily to the degree of habitat stability, with intermittent habitats being more variable, and permanent features having relatively consistent MeHg concentrations. Values of MeHg/THg for invertebrate samples ranged from about 35 to 125 percent. Median values for five taxa were in the range of 60 (dobsonflies) to 95 percent (dragonflies). Other studies have found similar values of MeHg/THg in predatory insects; variations typically are related to trophic position—upper trophic level taxa (predators) tend to have higher percentages of MeHg than lower level taxa (herbivores, detritivores, and omnivores).

Insects have often been used in studies to document elevated levels of metals from historic and ongoing mining operations. In this study, concentrations of MeHg in several taxa of predatory insects, with the exception of predaceous diving beetles, served as a consistent and reproducible criterion for prioritizing remediation projects at abandoned hydraulic gold mine sites. Methylmercury concentrations were highly variable within families of insects across the study area, but were consistent among families from a given site, indicating localized contamination.

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Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equiivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Aluminum (Al), unfiltered (µg/L) (01104)		Arsenic (As), unfiltered (µg/L) (01002)		Boron (B), unfiltered (µg/L) (00999)		Barium (Ba), unfiltered (µg/L) (01007)		Beryllium (Be), unfiltered (µg/L) (00998)		Bismuth (Bi), unfiltered (µg/L) (01017)		Calcium (Ca), unfiltered (mg/L) (00916)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
Environmental samples																		
BY20	Boston Mine tunnel outlet nr Grass Valley	6/18/1999	14:30	1of2	14	3	<50	10	<6	3	54	3	<0.05	0.01	0.007	0.001	13	0
BY20	Boston Mine tunnel outlet nr Grass Valley	6/18/1999	14:30	2of2	16	6	<50	0	<6	3	55	1	<0.05	0.03	0.009	0.006	13	0
BY20	Boston Mine tunnel outlet nr Grass Valley	12/14/1999	12:00	1of2	25	3	<20	8	<9	3	96	8	<0.03	0.04	0.006	0.003	18	0
BY20	Boston Mine tunnel outlet nr Grass Valley	12/14/1999	12:00	2of2	17	2	<20	11	<9	4	101	6	<0.03	0.03	0.005	0.004	18	2
BY20	Boston Mine tunnel outlet nr Grass Valley	5/24/2000	16:00	1of2	17	4	<35	29	19	16	56	0	<0.07	0.02	0.003	0.001	12	0
BY20	Boston Mine tunnel outlet nr Grass Valley	5/24/2000	16:00	2of2	21	2	<35	19	<16	13	75	2	<0.07	0.03	0.002	0.001	12	0
BY21	Boston Mine wetlands pond nr Grass Valley	12/14/1999	10:30	1of2	5.7	0.5	<20	15	15	14	50	0	<0.07	0.02	0.005	0.004	19	0
BY21	Boston Mine wetlands pond nr Grass Valley	12/14/1999	10:30	2of2	8.4	2.2	<20	12	11	8	52	3	<0.07	0.01	0.006	0.004	19	0
BY21	Boston Mine wetlands pond nr Grass Valley	5/24/2000	16:30	1of2	6.8	2.6	<35	16	<16	11	43	1	<0.07	0.05	0.006	0.001	11	0
BY21	Boston Mine wetlands pond nr Grass Valley	5/24/2000	16:30	2of2	15	4	<35	9	<16	7	45	2	<0.07	0.04	0.007	0.006	11	0
BY58	Buckeye Flat Mine main drain 0.45mi ab Greenhorn Cr	8/21/2000	11:00	1of2	1,900	0	<20	0	<1,000	0	36	7	<1	1	<0.1	0.0	12	1
BY58	Buckeye Flat Mine main drain 0.45mi ab Greenhorn Cr	8/21/2000	11:00	2of2	1,600	0	<20	10	<1,000	1,000	34	7	<1	1	<0.1	0.1	12	3
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	6/18/1999	11:30	1of2	4,000	100	<50	10	<6	5	23	1	0.80	0.06	0.006	0.004	19	0

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Aluminum (Al), unfiltered (µg/L) (01104)		Arsenic (As), unfiltered (µg/L) (01002)		Boron (B), unfiltered (µg/L) (00999)		Barium (Ba), unfiltered (µg/L) (01007)		Beryllium (Be), unfiltered (µg/L) (00998)		Bismuth (Bi), unfiltered (µg/L) (01017)		Calcium (Ca), unfiltered (mg/L) (00916)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	6/18/1999	11:30	2of2	4,000	0	<50	30	<6	4	22	1	0.87	0.02	0.006	0.004	20	0
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	12/2/1999	11:00	1of2	3,800	400	<20	13	<9	5	30	6	0.58	0.11	0.010	0.001	12	1
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	12/2/1999	11:00	2of2	3,600	0	<20	6	<9	4	39	3	0.54	0.08	0.014	0.008	11	0
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	8/22/2000	10:45	1of2	4,100	100	<20	10	<1,000	1,000	38	9	<1	0	<0.1	0.1	23	1
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	8/22/2000	10:45	2of2	3,800	0	<20	10	<1,000	1,000	38	7	<1	1	<0.1	0.1	21	2
BY116	Buckeye Flat Mine pond drain 0.15mi ab SF Greenhorn Cr	8/21/2000	14:10	1of2	43	1	<20	10	<9	6	61	4	<0.1	0.1	0.015	0.004	1.0	0.2
BY116	Buckeye Flat Mine pond drain 0.15mi ab SF Greenhorn Cr	8/21/2000	14:10	2of2	50	2	<20	0	<9	5	57	2	<0.1	0.1	0.026	0.011	0.87	0.05
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/26/1999	11:00	1of2	72	7	<50	40	7	13	19	0	<0.05	0.02	0.50	0.09	0.48	0.03
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/26/1999	11:00	2of2	67	4	<50	20	<6	1	19	0	<0.05	0.01	0.50	0.13	0.45	0.01
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/22/2000	12:10	1of2	250	40	<20	10	<9	5	23	1	<0.1	0.1	0.025	0.008	0.43	0.15
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/22/2000	12:10	2of2	260	40	<20	10	<9	9	26	3	<0.1	0.1	0.035	0.002	0.53	0.12
BY25	Buckeye Flat Mine upper drain	4/9/2001	10:00	1of2	630	40	<20	10	<6	1	41	3	0.10	0.06	0.010	0.005	4.7	0.9

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Aluminum (Al), unfiltered (µg/L) (01104)		Arsenic (As), unfiltered (µg/L) (01002)		Boron (B), unfiltered (µg/L) (00999)		Barium (Ba), unfiltered (µg/L) (01007)		Beryllium (Be), unfiltered (µg/L) (00998)		Bismuth (Bi), unfiltered (µg/L) (01017)		Calcium (Ca), unfiltered (mg/L) (00916)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY25	Buckeye Flat Mine upper drain	4/9/2001	10:00	2of2	620	10	<20	10	<6	7	40	1	0.11	0.02	0.009	0.006	4.6	0.7
BY52	Greenhorn Cr 0.3mi ab Buckeye Ford nr Nevada City	1/25/2000	10:45	1of2	460	20	<20	25	14	1	23	1	0.07	0.01	0.011	0.003	2.8	0.1
BY52	Greenhorn Cr 0.3mi ab Buckeye Ford nr Nevada City	1/25/2000	10:45	2of2	420	10	<20	9	9	3	23	0	<0.07	0.00	0.010	0.004	2.8	0.1
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	7/24/2001	11:00	1of2	38	3	<60	42	<10	5	34	3	<0.06	0.01	0.01	0.01	5.1	0.4
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	7/24/2001	11:00	2of2	4	2	<60	12	<10	6	35	2	<0.06	0.03	0.02	0.02	5.5	0.5
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	8/29/2001	15:00	1of2	23	1	<60	21	<10	4	25	1	<0.06	0.02	0.01	0.01	5.4	0.3
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	8/29/2001	15:00	2of2	25	2	<60	32	<10	2	27	3	<0.06	0.02	0.02	0.00	5.6	0.4
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	9/14/2001	13:00	1of2	29	1	<60	23	<8	5	30	1	<0.04	0.01	<0.02	0.01	5.1	0.2
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	9/14/2001	13:00	2of2	28	1	<60	5	<8	1	32	2	<0.04	0.01	<0.02	0.00	5.2	0.5
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	10/15/2001	12:00	1of2	12	2	<60	16	<10	5	34	1	0.05	0.11	<0.02	0.01	5.6	0.4
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	10/15/2001	12:00	2of2	13	2	<60	22	<10	1	36	3	<0.03	0.03	<0.02	0.00	5.6	0.2
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	11/20/2001	13:20	1of2	57	3	<30	7	<8	3	37	1	<0.04	0.02	0.03	0.00	6.5	0.7
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	11/20/2001	13:20	2of2	56	2	<30	4	<8	1	40	1	<0.04	0.01	<0.02	0.00	6.5	0.5

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Aluminum (Al), unfiltered (µg/L) (01104)		Arsenic (As), unfiltered (µg/L) (01002)		Boron (B), unfiltered (µg/L) (00999)		Barium (Ba), unfiltered (µg/L) (01007)		Beryllium (Be), unfiltered (µg/L) (00998)		Bismuth (Bi), unfiltered (µg/L) (01017)		Calcium (Ca), unfiltered (mg/L) (00916)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/10/2001	12:20	1of2	910	48	<100	24	<10	2	35	0	0.06	0.01	<0.02	0.00	6.3	0.7
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/10/2001	12:20	2of2	880	16	<100	13	<10	2	38	3	<0.03	0.03	<0.02	0.01	6.5	0.7
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/21/2001	13:00	1of2	4,500	420	<100	46	<9	20	79	8	0.16	0.03	<0.04	0.01	5.0	0.6
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/21/2001	13:00	2of2	4,700	120	<100	18	15	19	81	3	0.18	0.04	<0.04	0.01	5.1	0.5
BY51	Greenhorn Cr nr headwaters nr Scotts Flat Res	1/25/2000	9:30	1of2	77	3	<20	10	3	3	16	1	<0.07	0.03	0.006	0.005	1.4	0.2
BY51	Greenhorn Cr nr headwaters nr Scotts Flat Res	1/25/2000	9:30	2of2	78	3	<20	16	4	2	16	0	<0.07	0.02	<0.002	0.001	1.2	0.1
BY75	Missouri Cyn Cr 1.2mi ab Greenhorn Cr nr Chicago Park	12/14/1999	14:00	1of2	52	7	<20	9	<9	7	39	10	0.10	0.02	<0.004	0.003	13	1
BY75	Missouri Cyn Cr 1.2mi ab Greenhorn Cr nr Chicago Park	12/14/1999	14:00	2of2	55	2	<20	3	<9	3	37	9	0.14	0.03	0.008	0.003	12	0
BY86	Poore Mine Creek ab tunnel nr Grass Valley	3/31/1999	17:40	1of2	660	10	12	10	<13	19	20	0	<0.04	0.01	0.010	0.003	3.3	0.1
BY86	Poore Mine Creek ab tunnel nr Grass Valley	3/31/1999	17:40	2of2	640	10	<10	10	<13	8	20	1	0.07	0.02	0.007	0.001	3.2	0.1
BY87	Poore Mine Creek bl tunnel nr Grass Valley	3/31/1999	13:30	1of2	540	30	<10	10	<13	19	20	1	<0.04	0.03	0.008	0.002	3.6	0.2
BY87	Poore Mine Creek bl tunnel nr Grass Valley	3/31/1999	13:30	2of2	580	30	<10	10	<13	18	20	1	<0.04	0.04	0.008	0.002	3.6	0.2
BY88	Poore Mine ground sluice nr Grass Valley	4/1/1999	15:40	1of2	95	7	<10	10	<13	8	27	1	0.07	0.02	0.005	0.003	6.7	0.0

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Aluminum (Al), unfiltered (µg/L) (01104)		Arsenic (As), unfiltered (µg/L) (01002)		Boron (B), unfiltered (µg/L) (00999)		Barium (Ba), unfiltered (µg/L) (01007)		Beryllium (Be), unfiltered (µg/L) (00998)		Bismuth (Bi), unfiltered (µg/L) (01017)		Calcium (Ca), unfiltered (mg/L) (00916)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY88	Poore Mine ground sluice nr Grass Valley	4/1/1999	15:40	2of2	87	7	<10	10	<13	2	26	1	0.06	0.03	<0.003	0.001	6.7	0.3
BY89	Poore Mine pit lake nr Grass Valley	4/1/1999	16:50	1of2	52	4	<10	0	<13	4	39	4	<0.04	0.00	0.007	0.002	2.6	0.3
BY89	Poore Mine pit lake nr Grass Valley	4/1/1999	16:50	2of2	58	6	<10	0	<13	7	39	1	<0.04	0.01	0.011	0.005	2.6	0.1
BY89	Poore Mine pit lake nr Grass Valley	5/23/2000	10:45	1of2	139	1	<35	21	<16	6	110	1	0.53	0.00	0.006	0.001	14	1
BY89	Poore Mine pit lake nr Grass Valley	5/23/2000	10:45	2of2	144	5	<35	6	<16	7	106	1	0.60	0.03	0.006	0.002	14	0
BY90	Poore Mine seep above ground sluice nr Grass Valley	4/1/1999	16:00	1of2	—		—		—		—		—		—		—	
BY90	Poore Mine seep above ground sluice nr Grass Valley	4/1/1999	16:00	2of2	—		—		—		—		—		—		—	
BY91	Poore Mine tunnel effluent nr Grass Valley	3/31/1999	15:20	1of2	55	7	<10	10	14	10	28	1	0.06	0.04	0.010	0.003	12	1
BY91	Poore Mine tunnel effluent nr Grass Valley	3/31/1999	15:20	2of2	54	11	<10	10	20	13	29	0	<0.04	0.03	0.011	0.003	12	0
BY91	Poore Mine tunnel effluent nr Grass Valley	12/15/1999	13:00	1of2	61	1	<20	2	<9	7	31	4	<0.03	0.02	0.009	0.001	18	0
BY91	Poore Mine tunnel effluent nr Grass Valley	12/15/1999	13:00	2of2	78	3	<20	10	<9	1	28	6	<0.03	0.03	<0.004	0.001	19	1
BY91	Poore Mine tunnel effluent nr Grass Valley	5/23/2000	12:00	1of2	439	11	<35	32	<16	6	44	0	0.22	0.04	0.013	0.002	17	1
BY91	Poore Mine tunnel effluent nr Grass Valley	5/23/2000	12:00	2of2	438	9	<35	26	<16	3	40	1	0.24	0.04	0.013	0.000	18	0
BY105	Sailor Flat Mine main drain gulch 01nr Quaker Hill	7/6/1999	16:00	1of2	600	10	<50	10	<6	5	97	4	0.36	0.02	0.010	0.003	3.1	0.0

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

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Station map ID	Station name	Date	Time	Rep-licate	Aluminum (Al), unfiltered (µg/L) (01104)		Arsenic (As), unfiltered (µg/L) (01002)		Boron (B), unfiltered (µg/L) (00999)		Barium (Ba), unfiltered (µg/L) (01007)		Beryllium (Be), unfiltered (µg/L) (00998)		Bismuth (Bi), unfiltered (µg/L) (01017)		Calcium (Ca), unfiltered (mg/L) (00916)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY105	Sailor Flat Mine main drain gulch 01nr Quaker Hill	7/6/1999	16:00	2of2	610	10	<50	10	<6	2	97	3	0.41	0.03	0.015	0.011	3.1	0.1
BY105	Sailor Flat Mine main drain Gulch 01nr Quaker Hill	12/2/1999	14:30	1of2	5,400	100	<20	7	<9	5	150	10	0.42	0.06	0.37	0.00	2.9	0.3
BY105	Sailor Flat Mine main drain Gulch 01nr Quaker Hill	12/2/1999	14:30	2of2	5,200	0	<20	5	<9	1	180	10	0.45	0.04	0.28	0.00	2.7	0.1
BY106	Sailor Flat Mine main drainage to Greenhorn Cr, Gulch 03	4/9/2001	12:30	1of 2	290	30	<20	10	<6	6	33	3	<0.08	0.06	0.014	0.007	0.55	0.04
BY106	Sailor Flat Mine main drainage to Greenhorn Cr, Gulch 03	4/9/2001	12:30	2of 2	290	0	<20	10	<6	5	34	1	0.09	0.05	0.019	0.013	0.56	0.10
BY114	SF Greenhorn Cr 0.7mi ab Greenhorn Cr nr Nevada City	8/22/2000	15:10	1of2	31	2	<20	0	<9	13	18	4	<0.1	0.1	0.019	0.006	8.7	0.7
BY114	SF Greenhorn Cr 0.7mi ab Greenhorn Cr nr Nevada City	8/22/2000	15:10	2of2	32	2	<20	10	12	8	17	4	<0.1	0.0	0.023	0.004	8.1	2.0
BY122	Starr Mine tunnel inflow nr Grass Valley	4/23/1999	15:00	1of2	92	9	<10	10	<13	3	21	1	<0.04	0.01	<0.003	0.001	9.8	0.9
BY122	Starr Mine tunnel inflow nr Grass Valley	4/23/1999	15:00	2of2	100	10	<10	10	<13	7	23	0	<0.04	0.01	0.008	0.002	11	0
BY123	Starr Mine tunnel midway nr Grass Valley	4/23/1999	13:40	1of2	85	7	<10	10	<13	15	60	2	<0.04	0.01	0.008	0.004	27	0
BY123	Starr Mine tunnel midway nr Grass Valley	4/23/1999	13:40	2of2	95	4	<10	10	<13	9	59	3	<0.04	0.02	0.010	0.002	26	1
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	10:45	1of2	200	20	<20	3	<9	1	70	4	<0.03	0.02	0.005	0.002	34	0
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	10:45	2of2	200	0	<20	1	<9	1	74	14	<0.03	0.02	0.008	0.002	33	1

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued.*

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Station map ID	Station name	Date	Time	Rep-licate	Aluminum (Al), unfiltered (µg/L) (01104)		Arsenic (As), unfiltered (µg/L) (01002)		Boron (B), unfiltered (µg/L) (00999)		Barium (Ba), unfiltered (µg/L) (01007)		Beryllium (Be), unfiltered (µg/L) (00998)		Bismuth (Bi), unfiltered (µg/L) (01017)		Calcium (Ca), unfiltered (mg/L) (00916)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY124	Starr Mine tunnel outlet nr Grass Valley	8/23/2000	17:30	1of2	530	0	<20	0	17	5	68	5	<0.1	0.0	0.048	0.023	33	0
BY124	Starr Mine tunnel outlet nr Grass Valley	8/23/2000	17:30	2of2	620	10	<20	0	12	10	61	3	<0.1	0.1	0.045	0.012	32	0
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:00	1of2	1,900	300	<20	0	<9	13	94	5	0.2	0.1	0.053	0.019	4.0	0.9
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:00	2of2	1,800	300	<20	0	<9	14	110	10	0.2	0.1	0.082	0.052	4.2	0.2
BY130	Tom and Jerry Mine drain at tunnel outlet nr Nevada City	6/28/2000	11:30	1of2	41	5	<20	10	10	9	67	8	<0.1	0.1	0.021	0.009	11	1
BY130	Tom and Jerry Mine drain at tunnel outlet nr Nevada City	6/28/2000	11:30	2of2	42	6	<20	0	14	4	69	10	<0.1	0.0	0.021	0.010	12	2
BY131	Tom and Jerry Mine drainage pond nr Nevada City	8/23/2000	10:45	1of2	98	1	<20	0	9	8	57	1	<0.1	0.0	0.018	0.006	4.5	0.2
BY131	Tom and Jerry Mine drainage pond nr Nevada City	8/23/2000	10:45	2of2	100	11	<20	0	16	8	47	4	<0.1	0.0	0.013	0.002	4.2	1.0
Disturbed samples																		
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	11:30	1of2	40,000	1,000	170	10	17	16	11,000	0	5.3	0.5	1.0	0.0	130	0
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	11:30	2of2	38,000	2,000	160	10	<10	5	11,000	0	5.5	0.1	0.96	0.03	120	0
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:30	1of2	23,000	1,000	<20	10	<9	6	550	10	1.9	0.2	0.26	0.02	20	0
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:30	2of2	24,000	0	<20	0	<9	2	690	110	1.8	0.1	0.27	0.01	26	5

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Replicate	Cadmium (Cd), unfiltered (µg/L) (01027)		Cerium (Ce), unfiltered (µg/L) (01112)		Cobalt (Co), unfiltered (µg/L) (01037)		Chromium (Cr), unfiltered (µg/L) (01034)		Cesium (Cs), unfiltered (µg/L) (01117)		Copper (Cu), unfiltered (µg/L) (01042)		Dysprosium (Dy), unfiltered (µg/L) (82330)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
Environmental samples																		
BY20	Boston Mine tunnel outlet nr Grass Valley	6/18/1999	14:30	1of2	0.083	0.000	0.12	0.03	1.9	0.0	5	3	<0.06	0.03	2.3	0.6	0.017	0.002
BY20	Boston Mine tunnel outlet nr Grass Valley	6/18/1999	14:30	2of2	0.081	0.007	0.086	0.007	2.1	0.1	<3	1	<0.06	0.02	1.8	0.4	0.012	0.001
BY20	Boston Mine tunnel outlet nr Grass Valley	12/14/1999	12:00	1of2	0.72	0.00	0.63	0.09	4.1	0.1	<2	0	<2	0	5.1	0.6	0.15	0.03
BY20	Boston Mine tunnel outlet nr Grass Valley	12/14/1999	12:00	2of2	0.36	0.05	0.42	0.06	3.9	0.0	<2	1	<2	1	2.2	0.2	0.086	0.011
BY20	Boston Mine tunnel outlet nr Grass Valley	5/24/2000	16:00	1of2	<0.03	0.06	0.17	0.01	2.1	0.0	<1	1	<0.06	0.03	3.5	0.2	0.028	0.002
BY20	Boston Mine tunnel outlet nr Grass Valley	5/24/2000	16:00	2of2	0.08	0.02	0.33	0.01	3.6	0.2	<1	1	<0.06	0.02	4.6	0.3	0.064	0.007
BY21	Boston Mine wetlands pond nr Grass Valley	12/14/1999	10:30	1of2	0.034	0.010	0.037	0.002	0.14	0.01	<0.4	0.2	<0.2	0.1	0.26	0.02	<0.003	0.001
BY21	Boston Mine wetlands pond nr Grass Valley	12/14/1999	10:30	2of2	0.036	0.005	0.043	0.002	0.17	0.02	<0.4	0.5	<0.2	0.1	0.28	0.05	0.011	0.003
BY21	Boston Mine wetlands pond nr Grass Valley	5/24/2000	16:30	1of2	<0.03	0.03	0.043	0.000	0.17	0.03	<1	0	0.08	0.04	1.1	0.1	0.009	0.001
BY21	Boston Mine wetlands pond nr Grass Valley	5/24/2000	16:30	2of2	<0.03	0.00	0.046	0.004	0.19	0.01	<1	0	<0.06	0.01	1.4	0.3	0.009	0.003
BY58	Buckeye Flat Mine main drain 0.45mi ab Greenhorn Cr	8/21/2000	11:00	1of2	<1	0	29	0	76	0	2	0	0.6	0.6	7	0	3.6	0.1
BY58	Buckeye Flat Mine main drain 0.45mi ab Greenhorn Cr	8/21/2000	11:00	2of2	<1	1	23	1	60	4	<1	1	0.4	0.5	5	0	2.8	0.1

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Cadmium (Cd), unfiltered (µg/L) (01027)		Cerium (Ce), unfiltered (µg/L) (01112)		Cobalt (Co), unfiltered (µg/L) (01037)		Chromium (Cr), unfiltered (µg/L) (01034)		Cesium (Cs), unfiltered (µg/L) (01117)		Copper (Cu), unfiltered (µg/L) (01042)		Dysprosium (Dy), unfiltered (µg/L) (82330)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	6/18/1999	11:30	1of2	2.3	0.0	38	1	85	3	4	2	0.09	0.04	38	0	4.8	0.0
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	6/18/1999	11:30	2of2	2.1	0.4	37	6	89	3	3	2	0.08	0.04	33	2	4.6	0.5
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	12/2/1999	11:00	1of2	2.6	0.1	26	3	78	3	<2	1	<2	1	37	3	3.2	0.0
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	12/2/1999	11:00	2of2	2.2	0.1	32	2	76	0	<2	1	<2	1	35	1	4.2	0.3
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	8/22/2000	10:45	1of2	<1	1	46	0	70	0	2	1	0.4	0.3	33	1	4.9	0.2
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	8/22/2000	10:45	2of2	<1	1	41	0	67	8	3	1	<0.4	0.3	31	2	4.7	0.1
BY116	Buckeye Flat Mine pond drain 0.15mi ab SF Greenhorn Cr	8/21/2000	14:10	1of2	<0.08	0.02	0.27	0.02	0.93	0.00	<2	1	0.09	0.09	1.2	0.1	0.042	0.000
BY116	Buckeye Flat Mine pond drain 0.15mi ab SF Greenhorn Cr	8/21/2000	14:10	2of2	<0.08	0.04	0.32	0.01	1.0	0.0	<2	0	0.10	0.06	1.4	0.2	0.030	0.005
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/26/1999	11:00	1of2	0.13	0.01	0.76	0.09	6.5	0.2	3	3	<0.06	0.01	38	10	0.095	0.012
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/26/1999	11:00	2of2	0.15	0.07	0.75	0.07	7.6	0.8	3	2	<0.06	0.04	33	7	0.087	0.005
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/22/2000	12:10	1of2	0.11	0.02	2.2	0.4	8.2	1.4	<3	1	0.21	0.03	8.2	1.3	0.25	0.05
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/22/2000	12:10	2of2	0.11	0.03	2.3	0.3	8.6	1.0	<3	1	0.23	0.07	7.9	0.2	0.23	0.01

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Cadmium (Cd), unfiltered (µg/L) (01027)		Cerium (Ce), unfiltered (µg/L) (01112)		Cobalt (Co), unfiltered (µg/L) (01037)		Chromium (Cr), unfiltered (µg/L) (01034)		Cesium (Cs), unfiltered (µg/L) (01117)		Copper (Cu), unfiltered (µg/L) (01042)		Dysprosium (Dy), unfiltered (µg/L) (82330)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY25	Buckeye Flat Mine upper drain	4/9/2001	10:00	1of2	0.91	0.09	8.6	0.6	19	1	1	0	0.64	0.30	34	2	0.83	0.07
BY25	Buckeye Flat Mine upper drain	4/9/2001	10:00	2of2	0.89	0.05	8.6	0.3	19	0	<1	0	0.25	0.07	33	0	0.88	0.01
BY52	Greenhorn Cr 0.3mi ab Buckeye Ford nr Nevada City	1/25/2000	10:45	1of2	0.089	0.009	2.0	0.0	2.5	0.0	<0.4	0.4	<0.2	0.0	2.4	0.1	0.21	0.00
BY52	Greenhorn Cr 0.3mi ab Buckeye Ford nr Nevada City	1/25/2000	10:45	2of2	0.093	0.008	2.0	0.1	2.5	0.0	<0.4	0.4	<0.2	0.2	2.3	0.1	0.20	0.01
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	7/24/2001	11:00	1of2	0.05	0.02	0.098	0.014	0.46	0.01	<4	2	0.14	0.03	0.6	0.0	<0.009	0.004
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	7/24/2001	11:00	2of2	0.06	0.01	0.12	0.00	0.48	0.02	<4	0	1.6	0.0	0.5	0.1	0.013	0.002
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	8/29/2001	15:00	1of2	0.03	0.03	0.060	0.003	0.10	0.02	<4	2	0.084	0.019	0.4	0.1	<0.009	0.002
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	8/29/2001	15:00	2of2	0.02	0.01	0.064	0.004	0.10	0.01	7	0	0.11	0.01	0.5	0.1	<0.009	0.002
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	9/14/2001	13:00	1of2	0.04	0.01	0.066	0.005	0.19	0.03	<4	1	<0.04	0.02	1.2	0.1	0.006	0.001
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	9/14/2001	13:00	2of2	0.07	0.04	0.064	0.007	0.18	0.01	<4	1	<0.04	0.02	0.73	0.03	0.008	0.002
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	10/15/2001	12:00	1of2	0.12	0.13	0.027	0.002	0.15	0.06	<3	2	<0.02	0.01	0.4	0.1	0.008	0.002
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	10/15/2001	12:00	2of2	0.06	0.06	0.032	0.004	0.11	0.02	<3	0	0.02	0.01	0.3	0.1	<0.006	0.002
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	11/20/2001	13:20	1of2	0.09	0.01	0.21	0.00	1.3	0.1	<1	0	<0.04	0.01	0.97	0.15	0.029	0.003
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	11/20/2001	13:20	2of2	0.14	0.03	0.23	0.01	1.3	0.0	<1	0	<0.04	0.01	1.0	0.2	0.032	0.001

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

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Station map ID	Station name	Date	Time	Rep-licate	Cadmium (Cd), unfiltered (µg/L) (01027)		Cerium (Ce), unfiltered (µg/L) (01112)		Cobalt (Co), unfiltered (µg/L) (01037)		Chromium (Cr), unfiltered (µg/L) (01034)		Cesium (Cs), unfiltered (µg/L) (01117)		Copper (Cu), unfiltered (µg/L) (01042)		Dysprosium (Dy), unfiltered (µg/L) (82330)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/10/2001	12:20	1of2	0.14	0.02	2.0	0.0	2.5	0.2	1.9	0.1	0.11	0.00	2.8	0.1	0.23	0.01
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/10/2001	12:20	2of2	0.14	0.02	2.0	0.1	2.5	0.2	2.0	0.6	0.10	0.01	2.5	0.2	0.22	0.00
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/21/2001	13:00	1of2	0.13	0.06	8.2	0.8	5.2	0.5	5	1	0.39	0.06	14	3.9	0.87	0.10
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/21/2001	13:00	2of2	<0.05	0.02	8.1	0.7	5.6	0.0	6	2	0.39	0.04	12	0.1	0.95	0.03
BY51	Greenhorn Cr nr headwaters nr Scotts Flat Res	1/25/2000	9:30	1of2	0.057	0.002	0.30	0.01	0.22	0.01	<0.4	0.5	<0.2	0.0	5.0	0.1	0.060	0.007
BY51	Greenhorn Cr nr headwaters nr Scotts Flat Res	1/25/2000	9:30	2of2	0.031	0.008	0.30	0.01	0.21	0.00	<0.4	0.4	<0.2	0.1	5.0	0.1	0.057	0.005
BY75	Missouri Cyn Cr 1.2mi ab Greenhorn Cr nr Chicago Park	12/14/1999	14:00	1of2	0.16	0.04	0.64	0.20	4.0	0.1	<2	1	<2	1	1.3	0.1	0.077	0.003
BY75	Missouri Cyn Cr 1.2mi ab Greenhorn Cr nr Chicago Park	12/14/1999	14:00	2of2	0.15	0.03	0.68	0.15	3.6	0.1	<2	1	<2	1	1.4	0.1	0.11	0.02
BY86	Poore Mine Creek ab tunnel nr Grass Valley	3/31/1999	17:40	1of2	0.024	0.009	0.83	0.14	0.24	0.01	<2	2	<0.04	0.03	1.3	0.2	0.051	0.003
BY86	Poore Mine Creek ab tunnel nr Grass Valley	3/31/1999	17:40	2of2	0.018	0.005	0.73	0.06	0.22	0.01	<2	2	<0.04	0.01	1.6	0.5	0.047	0.002
BY87	Poore Mine Creek bl tunnel nr Grass Valley	3/31/1999	13:30	1of2	0.015	0.002	0.58	0.03	0.21	0.01	<2	1	<0.04	0.03	1.1	0.1	0.055	0.002
BY87	Poore Mine Creek bl tunnel nr Grass Valley	3/31/1999	13:30	2of2	0.012	0.006	0.79	0.03	0.22	0.03	<2	1	<0.04	0.02	1.1	0.2	0.064	0.002

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

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Station map ID	Station name	Date	Time	Rep-licate	Cadmium (Cd), unfiltered (µg/L) (01027)		Cerium (Ce), unfiltered (µg/L) (01112)		Cobalt (Co), unfiltered (µg/L) (01037)		Chromium (Cr), unfiltered (µg/L) (01034)		Cesium (Cs), unfiltered (µg/L) (01117)		Copper (Cu), unfiltered (µg/L) (01042)		Dysprosium (Dy), unfiltered (µg/L) (82330)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY88	Poore Mine ground sluice nr Grass Valley	4/1/1999	15:40	1of2	0.056	0.021	0.14	0.02	1.1	0.2	<2	2	0.05	0.02	1.0	0.4	0.026	0.000
BY88	Poore Mine ground sluice nr Grass Valley	4/1/1999	15:40	2of2	0.042	0.011	0.16	0.02	1.1	0.0	<2	1	<0.04	0.01	0.78	0.03	0.040	0.005
BY89	Poore Mine pit lake nr Grass Valley	4/1/1999	16:50	1of2	0.063	0.009	0.11	0.01	0.77	0.03	<2	1	<0.04	0.04	1.7	0.2	0.017	0.001
BY89	Poore Mine pit lake nr Grass Valley	4/1/1999	16:50	2of2	0.072	0.005	0.12	0.02	0.83	0.04	<2	2	<0.04	0.03	1.5	0.3	0.018	0.004
BY89	Poore Mine pit lake nr Grass Valley	5/23/2000	10:45	1of2	1.1	0.0	0.26	0.01	9.4	0.1	<1	0	<0.06	0.03	15	0	0.045	0.004
BY89	Poore Mine pit lake nr Grass Valley	5/23/2000	10:45	2of2	<0.03	0.14	0.26	0.01	9.7	0.2	<1	0	<0.06	0.02	16	0	0.048	0.003
BY90	Poore Mine seep above ground sluice nr Grass Valley	4/1/1999	16:00	1of2	—		—		—		—		—		—		—	
BY90	Poore Mine seep above ground sluice nr Grass Valley	4/1/1999	16:00	2of2	—		—		—		—		—		—		—	
BY91	Poore Mine tunnel effluent nr Grass Valley	3/31/1999	15:20	1of2	0.064	0.006	0.16	0.00	0.057	0.016	<2	1	0.22	0.03	1.3	0.2	0.016	0.002
BY91	Poore Mine tunnel effluent nr Grass Valley	3/31/1999	15:20	2of2	0.044	0.005	0.19	0.02	0.075	0.022	<2	1	0.17	0.01	1.1	0.2	0.019	0.005
BY91	Poore Mine tunnel effluent nr Grass Valley	12/15/1999	13:00	1of2	0.021	0.004	0.24	0.01	0.24	0.02	<2	2	<2	0	0.88	0.08	0.029	0.004
BY91	Poore Mine tunnel effluent nr Grass Valley	12/15/1999	13:00	2of2	0.037	0.007	0.21	0.05	0.29	0.12	<2	1	<2	0	0.84	0.07	0.026	0.003
BY91	Poore Mine tunnel effluent nr Grass Valley	5/23/2000	12:00	1of2	<0.03	0.02	2.7	0.0	2.1	0.0	<1	1	0.37	0.05	13	0	0.31	0.01
BY91	Poore Mine tunnel effluent nr Grass Valley	5/23/2000	12:00	2of2	<0.03	0.04	2.5	0.1	2.0	0.0	<1	0	0.34	0.04	12	0	0.30	0.02

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

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Station map ID	Station name	Date	Time	Rep-licate	Cadmium (Cd), unfiltered (µg/L) (01027)		Cerium (Ce), unfiltered (µg/L) (01112)		Cobalt (Co), unfiltered (µg/L) (01037)		Chromium (Cr), unfiltered (µg/L) (01034)		Cesium (Cs), unfiltered (µg/L) (01117)		Copper (Cu), unfiltered (µg/L) (01042)		Dysprosium (Dy), unfiltered (µg/L) (82330)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY105	Sailor Flat Mine main drain gulch 01nr Quaker Hill	7/6/1999	16:00	1of2	0.11	0.00	12	2	21	2	4	3	0.06	0.03	10	2	1.7	0.1
BY105	Sailor Flat Mine main drain gulch 01nr Quaker Hill	7/6/1999	16:00	2of2	0.18	0.01	8.0	0.8	20	0	5	3	0.15	0.01	13	2	1.1	0.1
BY105	Sailor Flat Mine main drain Gulch 01nr Quaker Hill	12/2/1999	14:30	1of2	0.21	0.03	44	6	8.0	0.2	3	1	2	1	43	0	3.9	0.0
BY105	Sailor Flat Mine main drain Gulch 01nr Quaker Hill	12/2/1999	14:30	2of2	0.21	0.01	40	1	8.0	0.2	<2	2	2	1	32	1	2.8	0.1
BY106	Sailor Flat Mine main drainage to Greenhorn Cr, Gulch 03	4/9/2001	12:30	1of 2	0.07	0.04	2.4	0.2	1.4	0.1	3	0	0.41	0.38	3.1	0.2	0.25	0.02
BY106	Sailor Flat Mine main drainage to Greenhorn Cr, Gulch 03	4/9/2001	12:30	2of 2	0.05	0.02	2.4	0.0	1.4	0.0	3	0	0.36	0.19	3.2	0.3	0.26	0.01
BY114	SF Greenhorn Cr 0.7mi ab Greenhorn Cr nr Nevada City	8/22/2000	15:10	1of2	<0.08	0.04	0.059	0.010	<0.03	0.01	<3	1	<0.08	0.05	0.7	0.0	0.006	0.002
BY114	SF Greenhorn Cr 0.7mi ab Greenhorn Cr nr Nevada City	8/22/2000	15:10	2of2	<0.08	0.02	0.058	0.004	<0.03	0.00	<3	1	0.36	0.11	3.4	0.2	<0.006	0.002
BY122	Starr Mine tunnel inflow nr Grass Valley	4/23/1999	15:00	1of2	0.078	0.003	0.13	0.01	0.35	0.04	<2	0	<0.04	0.01	4.9	0.1	0.036	0.002
BY122	Starr Mine tunnel inflow nr Grass Valley	4/23/1999	15:00	2of2	0.073	0.011	0.18	0.03	0.38	0.02	<2	0	<0.04	0.01	4.9	0.2	0.048	0.005
BY123	Starr Mine tunnel midway nr Grass Valley	4/23/1999	13:40	1of2	0.022	0.011	0.24	0.05	0.79	0.01	<2	1	0.11	0.01	1.2	0.1	0.037	0.003
BY123	Starr Mine tunnel midway nr Grass Valley	4/23/1999	13:40	2of2	0.020	0.006	0.16	0.02	0.71	0.02	2	0	0.15	0.03	1.2	0.2	0.019	0.004

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Cadmium (Cd), unfiltered (µg/L) (01027)		Cerium (Ce), unfiltered (µg/L) (01112)		Cobalt (Co), unfiltered (µg/L) (01037)		Chromium (Cr), unfiltered (µg/L) (01034)		Cesium (Cs), unfiltered (µg/L) (01117)		Copper (Cu), unfiltered (µg/L) (01042)		Dysprosium (Dy), unfiltered (µg/L) (82330)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	10:45	1of2	0.059	0.015	0.36	0.06	2.5	0.0	<2	0	<2	1	2.5	0.2	0.064	0.019
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	10:45	2of2	0.071	0.007	0.40	0.03	2.5	0.1	<2	0	<2	0	2.7	0.4	0.063	0.005
BY124	Starr Mine tunnel outlet nr Grass Valley	8/23/2000	17:30	1of2	<0.08	0.03	1.6	0.0	2.2	0.3	<3	1	1.0	0.1	6.1	0.2	0.13	0.00
BY124	Starr Mine tunnel outlet nr Grass Valley	8/23/2000	17:30	2of2	0.08	0.02	1.8	0.0	2.4	0.0	<3	1	0.36	0.08	6.4	0.2	0.14	0.00
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:00	1of2	0.15	0.04	20	4	12	2	19	4	0.53	0.10	21	1	2.0	0.4
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:00	2of2	0.17	0.07	19	3	10	1	18	2	0.61	0.07	20	2	2.0	0.3
BY130	Tom and Jerry Mine drain at tunnel outlet nr Nevada City	6/28/2000	11:30	1of2	<0.08	0.00	0.27	0.01	0.40	0.02	<3	0	0.20	0.12	1.1	0.3	0.030	0.008
BY130	Tom and Jerry Mine drain at tunnel outlet nr Nevada City	6/28/2000	11:30	2of2	<0.08	0.04	0.31	0.01	0.50	0.01	<3	1	0.15	0.06	1.0	0.0	0.036	0.008
BY131	Tom and Jerry Mine drainage pond nr Nevada City	8/23/2000	10:45	1of2	<0.08	0.03	0.28	0.01	0.06	0.02	<3	2	0.11	0.10	1.8	0.0	0.042	0.009
BY131	Tom and Jerry Mine drainage pond nr Nevada City	8/23/2000	10:45	2of2	<0.08	0.03	0.28	0.04	0.04	0.02	<3	1	<0.08	0.02	1.8	0.2	0.051	0.012

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Replicate	Cadmium (Cd), unfiltered (µg/L) (01027)		Cerium (Ce), unfiltered (µg/L) (01112)		Cobalt (Co), unfiltered (µg/L) (01037)		Chromium (Cr), unfiltered (µg/L) (01034)		Cesium (Cs), unfiltered (µg/L) (01117)		Copper (Cu), unfiltered (µg/L) (01042)		Dysprosium (Dy), unfiltered (µg/L) (82330)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
Disturbed samples																		
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	11:30	1of2	21	0	131	2	1,200	0	80	11	16	0	1,100	200	23	3
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	11:30	2of2	21	1	113	7	1,100	100	71	1	16	1	910	0	19	0
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:30	1of2	2.1	0.0	220	30	87	1	76	9	7.1	0.1	200	0	19	3
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:30	2of2	1.9	0.3	240	10	94	14	77	9	6.6	1.1	210	30	21	1

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Erbium (Er), unfiltered (µg/L) (01246)		Europium (Eu), unfiltered (µg/L) (01236)		Iron (Fe), unfiltered (µg/L) (01045)		Gadolinium (Gd), unfiltered (µg/L) (01219)		Holmium (Ho), unfiltered (µg/L) (01247)		Potassium (K), unfiltered (µg/L) (00937)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
Environmental samples																
BY20	Boston Mine tunnel outlet nr Grass Valley	6/18/1999	14:30	1of2	0.011	0.002	0.0056	0.0039	290	0	0.016	0.003	0.0038	0.0010	1.7	0.0
BY20	Boston Mine tunnel outlet nr Grass Valley	6/18/1999	14:30	2of2	0.012	0.002	0.0050	0.0032	280	0	0.014	0.004	0.0029	0.0008	1.7	0.0
BY20	Boston Mine tunnel outlet nr Grass Valley	12/14/1999	12:00	1of2	0.085	0.005	0.032	0.001	290	40	0.15	0.01	0.030	0.004	1.9	0.0
BY20	Boston Mine tunnel outlet nr Grass Valley	12/14/1999	12:00	2of2	0.046	0.004	0.026	0.005	270	10	0.11	0.01	0.016	0.001	1.9	0.1
BY20	Boston Mine tunnel outlet nr Grass Valley	5/24/2000	16:00	1of2	0.014	0.003	0.005	0.001	373	24	0.036	0.001	0.0061	0.0005	1.6	0.0
BY20	Boston Mine tunnel outlet nr Grass Valley	5/24/2000	16:00	2of2	0.044	0.004	0.012	0.001	584	50	0.071	0.005	0.013	0.001	1.7	0.0
BY21	Boston Mine wetlands pond nr Grass Valley	12/14/1999	10:30	1of2	<0.006	0.001	<0.001	0.001	120	10	<0.004	0.003	0.0008	0.0008	2.7	0.2
BY21	Boston Mine wetlands pond nr Grass Valley	12/14/1999	10:30	2of2	<0.006	0.003	<0.001	0.001	140	0	0.004	0.003	0.0011	0.0001	2.5	0.0
BY21	Boston Mine wetlands pond nr Grass Valley	5/24/2000	16:30	1of2	0.006	0.002	<0.001	0.001	257	13	0.008	0.002	0.0016	0.0006	1.7	0.1
BY21	Boston Mine wetlands pond nr Grass Valley	5/24/2000	16:30	2of2	<0.005	0.003	0.002	0.004	258	25	0.006	0.001	0.0016	0.0003	1.7	0.0
BY58	Buckeye Flat Mine main drain 0.45mi ab Greenhorn Cr	8/21/2000	11:00	1of2	1.9	0.0	0.86	0.05	1,900	0	3.8	0.1	0.70	0.00	2.2	0.7
BY58	Buckeye Flat Mine main drain 0.45mi ab Greenhorn Cr	8/21/2000	11:00	2of2	1.5	0.1	0.66	0.02	2,300	0	3.1	0.2	0.54	0.01	2.4	0.9

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Replicate	Erbium (Er), unfiltered (µg/L) (01246)		Europium (Eu), unfiltered (µg/L) (01236)		Iron (Fe), unfiltered (µg/L) (01045)		Gadolinium (Gd), unfiltered (µg/L) (01219)		Holmium (Ho), unfiltered (µg/L) (01247)		Potassium (K), unfiltered (µg/L) (00937)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	6/18/1999	11:30	1of2	2.7	0.2	1.2	0.1	4,500	100	4.2	0.8	0.95	0.09	1.3	0.0
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	6/18/1999	11:30	2of2	2.8	0.1	1.3	0.3	4,400	0	5.7	0.3	0.93	0.02	1.3	0.0
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	12/2/1999	11:00	1of2	1.9	0.1	0.90	0.01	220	30	3.7	0.6	0.68	0.00	1.2	0.1
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	12/2/1999	11:00	2of2	2.0	0.0	1.1	0.2	250	70	5.8	0.3	0.74	0.04	1.3	0.0
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	8/22/2000	10:45	1of2	2.7	0.0	1.3	0.1	270	10	5.6	0.2	1.0	0.1	1.2	1.0
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	8/22/2000	10:45	2of2	2.4	0.1	1.3	0.1	240	30	5.1	0.0	1.0	0.0	1.5	1.4
BY116	Buckeye Flat Mine pond drain 0.15mi ab SF Greenhorn Cr	8/21/2000	14:10	1of2	0.017	0.005	0.015	0.005	330	10	0.044	0.007	0.007	0.002	0.6	0.1
BY116	Buckeye Flat Mine pond drain 0.15mi ab SF Greenhorn Cr	8/21/2000	14:10	2of2	0.020	0.007	0.009	0.000	330	20	0.043	0.007	0.007	0.000	0.5	0.1
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/26/1999	11:00	1of2	0.065	0.000	0.024	0.004	150	10	0.067	0.005	0.019	0.000	0.40	0.02
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/26/1999	11:00	2of2	0.076	0.003	0.029	0.007	140	0	0.11	0.03	0.024	0.004	0.39	0.00
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/22/2000	12:10	1of2	0.12	0.01	0.076	0.003	790	10	0.29	0.00	0.051	0.007	0.2	0.0
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/22/2000	12:10	2of2	0.14	0.03	0.066	0.006	970	170	0.28	0.04	0.050	0.001	0.2	0.1

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Replicate	Erbium (Er), unfiltered (µg/L) (01246)		Europium (Eu), unfiltered (µg/L) (01236)		Iron (Fe), unfiltered (µg/L) (01045)		Gadolinium (Gd), unfiltered (µg/L) (01219)		Holmium (Ho), unfiltered (µg/L) (01247)		Potassium (K), unfiltered (µg/L) (00937)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY25	Buckeye Flat Mine upper drain	4/9/2001	10:00	1of2	0.43	0.04	0.19	0.01	100	20	0.82	0.02	0.16	0.00	0.41	0.07
BY25	Buckeye Flat Mine upper drain	4/9/2001	10:00	2of2	0.42	0.01	0.20	0.01	110	30	0.86	0.00	0.17	0.00	0.39	0.06
BY52	Greenhorn Cr 0.3mi ab Buckeye Ford nr Nevada City	1/25/2000	10:45	1of2	0.11	0.007	0.056	0.000	460	20	0.22	0.02	0.040	0.003	0.61	0.01
BY52	Greenhorn Cr 0.3mi ab Buckeye Ford nr Nevada City	1/25/2000	10:45	2of2	0.11	0.021	0.058	0.006	430	20	0.23	0.02	0.043	0.003	0.62	0.03
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	7/24/2001	11:00	1of2	<0.008	0.002	0.002	0.002	86	14	0.013	0.008	0.003	0.002	0.73	0.04
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	7/24/2001	11:00	2of2	<0.008	0.001	0.003	0.001	104	5	0.018	0.003	0.003	0.001	0.69	0.05
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	8/29/2001	15:00	1of2	<0.008	0.003	<0.001	0.001	75	15	0.011	0.002	<0.002	0.001	0.71	0.02
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	8/29/2001	15:00	2of2	<0.008	0.002	0.003	0.002	84	6	<0.007	0.003	<0.002	0.001	0.73	0.08
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	9/14/2001	13:00	1of2	0.006	0.003	<0.002	0.001	76	0	0.009	0.003	0.002	0.001	0.8	0.1
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	9/14/2001	13:00	2of2	0.005	0.001	<0.002	0.000	77	6	0.010	0.004	0.001	0.001	0.9	0.1
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	10/15/2001	12:00	1of2	0.003	0.002	0.003	0.002	44	6	0.006	0.004	0.0014	0.0006	0.7	0.1
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	10/15/2001	12:00	2of2	<0.002	0.002	0.003	0.003	48	3	0.005	0.002	<0.0008	0.0001	0.8	0.1
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	11/20/2001	13:20	1of2	0.016	0.000	0.007	0.002	110	18	0.032	0.010	0.006	0.001	1.0	0.1
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	11/20/2001	13:20	2of2	0.022	0.005	0.008	0.000	109	13	0.035	0.003	0.006	0.000	1.0	0.0

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Replicate	Erbium (Er), unfiltered (µg/L) (01246)		Europium (Eu), unfiltered (µg/L) (01236)		Iron (Fe), unfiltered (µg/L) (01045)		Gadolinium (Gd), unfiltered (µg/L) (01219)		Holmium (Ho), unfiltered (µg/L) (01247)		Potassium (K), unfiltered (µg/L) (00937)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/10/2001	12:20	1of2	0.13	0.01	0.061	0.000	963	109	0.22	0.01	0.037	0.001	0.8	0.1
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/10/2001	12:20	2of2	0.11	0.00	0.057	0.002	922	111	0.25	0.00	0.047	0.001	0.9	0.1
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/21/2001	13:00	1of2	0.44	0.01	0.24	0.03	4,630	537	1.03	0.00	0.171	0.023	1.25	0.13
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/21/2001	13:00	2of2	0.50	0.01	0.24	0.02	4,630	465	0.85	0.02	0.173	0.012	1.25	0.14
BY51	Greenhorn Cr nr headwaters nr Scotts Flat Res	1/25/2000	9:30	1of2	0.330	0.002	0.017	0.004	56	4	0.064	0.006	0.013	0.002	0.48	0.02
BY51	Greenhorn Cr nr headwaters nr Scotts Flat Res	1/25/2000	9:30	2of2	0.033	0.003	0.018	0.002	52	8	0.067	0.009	0.013	0.000	0.43	0.00
BY75	Missouri Cyn Cr 1.2mi ab Greenhorn Cr nr Chicago Park	12/14/1999	14:00	1of2	0.057	0.003	0.027	0.007	160	20	0.12	0.04	0.020	0.005	1.5	0.0
BY75	Missouri Cyn Cr 1.2mi ab Greenhorn Cr nr Chicago Park	12/14/1999	14:00	2of2	0.057	0.006	0.018	0.001	200	50	0.098	0.035	0.021	0.001	1.5	0.0
BY86	Poore Mine Creek ab tunnel nr Grass Valley	3/31/1999	17:40	1of2	0.035	0.003	0.020	0.001	460	20	0.087	0.005	0.012	0.000	0.53	0.00
BY86	Poore Mine Creek ab tunnel nr Grass Valley	3/31/1999	17:40	2of2	0.033	0.002	0.018	0.004	450	30	0.059	0.011	0.013	0.001	0.53	0.02
BY87	Poore Mine Creek bl tunnel nr Grass Valley	3/31/1999	13:30	1of2	0.034	0.002	0.022	0.003	380	30	0.072	0.010	0.010	0.000	0.55	0.04
BY87	Poore Mine Creek bl tunnel nr Grass Valley	3/31/1999	13:30	2of2	0.038	0.010	0.020	0.003	410	40	0.077	0.005	0.011	0.001	0.56	0.04

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Erbium (Er), unfiltered (µg/L) (01246)		Europium (Eu), unfiltered (µg/L) (01236)		Iron (Fe), unfiltered (µg/L) (01045)		Gadolinium (Gd), unfiltered (µg/L) (01219)		Holmium (Ho), unfiltered (µg/L) (01247)		Potassium (K), unfiltered (µg/L) (00937)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY88	Poore Mine ground sluice nr Grass Valley	4/1/1999	15:40	1of2	0.018	0.000	0.011	0.003	770	10	0.031	0.007	0.0068	0.0019	1.6	0.1
BY88	Poore Mine ground sluice nr Grass Valley	4/1/1999	15:40	2of2	0.021	0.003	0.008	0.002	780	50	0.043	0.005	0.0069	0.0003	1.5	0.1
BY89	Poore Mine pit lake nr Grass Valley	4/1/1999	16:50	1of2	0.012	0.001	0.006	0.002	340	50	0.022	0.001	0.0044	0.0007	1.3	0.1
BY89	Poore Mine pit lake nr Grass Valley	4/1/1999	16:50	2of2	0.011	0.002	0.007	0.003	350	20	0.024	0.007	0.0038	0.0005	1.3	0.0
BY89	Poore Mine pit lake nr Grass Valley	5/23/2000	10:45	1of2	0.019	0.002	0.006	0.003	64	6	0.045	0.006	0.0095	0.0014	2.4	0.1
BY89	Poore Mine pit lake nr Grass Valley	5/23/2000	10:45	2of2	0.025	0.003	0.008	0.005	62	1	0.052	0.002	0.0089	0.0010	2.4	0.0
BY90	Poore Mine seep above ground sluice nr Grass Valley	4/1/1999	16:00	1of2	—		—		—		—		—		—	
BY90	Poore Mine seep above ground sluice nr Grass Valley	4/1/1999	16:00	2of2	—		—		—		—		—		—	
BY91	Poore Mine tunnel effluent nr Grass Valley	3/31/1999	15:20	1of2	0.007	0.002	0.006	0.000	94	6	0.018	0.004	0.0032	0.0004	1.4	0.1
BY91	Poore Mine tunnel effluent nr Grass Valley	3/31/1999	15:20	2of2	0.011	0.002	0.007	0.004	97	9	0.021	0.007	0.0043	0.0007	1.5	0.0
BY91	Poore Mine tunnel effluent nr Grass Valley	12/15/1999	13:00	1of2	0.012	0.004	0.006	0.002	200	60	0.028	0.004	0.0044	0.0009	1.5	0.0
BY91	Poore Mine tunnel effluent nr Grass Valley	12/15/1999	13:00	2of2	0.014	0.002	0.008	0.002	350	10	0.034	0.014	0.0044	0.0009	1.7	0.1
BY91	Poore Mine tunnel effluent nr Grass Valley	5/23/2000	12:00	1of2	0.16	0.01	0.078	0.001	1,403	59	0.36	0.00	0.057	0.001	1.8	0.0
BY91	Poore Mine tunnel effluent nr Grass Valley	5/23/2000	12:00	2of2	0.14	0.00	0.071	0.001	1,420	62	0.32	0.01	0.055	0.002	1.8	0.0

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Replicate	Erbium (Er), unfiltered (µg/L) (01246)		Europium (Eu), unfiltered (µg/L) (01236)		Iron (Fe), unfiltered (µg/L) (01045)		Gadolinium (Gd), unfiltered (µg/L) (01219)		Holmium (Ho), unfiltered (µg/L) (01247)		Potassium (K), unfiltered (µg/L) (00937)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY105	Sailor Flat Mine main drain gulch 01nr Quaker Hill	7/6/1999	16:00	1of2	0.87	0.01	0.46	0.05	3,100	0	1.5	0.1	0.30	0.01	1.4	0.1
BY105	Sailor Flat Mine main drain gulch 01nr Quaker Hill	7/6/1999	16:00	2of2	0.84	0.03	0.37	0.00	3,100	0	0.92	0.02	0.27	0.04	1.4	0.1
BY105	Sailor Flat Mine main drain Gulch 01nr Quaker Hill	12/2/1999	14:30	1of2	1.7	0.0	0.97	0.09	5,500	200	3.5	0.1	0.67	0.00	2.2	0.1
BY105	Sailor Flat Mine main drain Gulch 01nr Quaker Hill	12/2/1999	14:30	2of2	1.6	0.0	1.1	0.1	5,300	0	4.3	0.1	0.53	0.02	2.0	0.1
BY106	Sailor Flat Mine main drainage to Greenhorn Cr, Gulch 03	4/9/2001	12:30	1of 2	0.15	0.01	0.081	0.002	180	10	0.29	0.00	0.054	0.008	0.42	0.03
BY106	Sailor Flat Mine main drainage to Greenhorn Cr, Gulch 03	4/9/2001	12:30	2of 2	0.14	0.01	0.069	0.003	190	30	0.28	0.02	0.052	0.001	0.44	0.08
BY114	SF Greenhorn Cr 0.7mi ab Greenhorn Cr nr Nevada City	8/22/2000	15:10	1of2	<0.008	0.005	0.003	0.002	38	9	0.007	0.003	<0.001	0.001	0.2	0.2
BY114	SF Greenhorn Cr 0.7mi ab Greenhorn Cr nr Nevada City	8/22/2000	15:10	2of2	<0.008	0.003	0.003	0.002	31	9	<0.005	0.002	<0.001	0.001	0.3	0.1
BY122	Starr Mine tunnel inflow nr Grass Valley	4/23/1999	15:00	1of2	0.020	0.001	0.012	0.001	94	19	0.051	0.002	0.0069	0.0004	1.2	0.1
BY122	Starr Mine tunnel inflow nr Grass Valley	4/23/1999	15:00	2of2	0.022	0.004	0.012	0.002	98	2	0.062	0.005	0.0082	0.0008	1.3	0.0
BY123	Starr Mine tunnel midway nr Grass Valley	4/23/1999	13:40	1of2	0.015	0.003	0.009	0.002	700	40	0.037	0.007	0.0062	0.0001	2.2	0.1
BY123	Starr Mine tunnel midway nr Grass Valley	4/23/1999	13:40	2of2	0.009	0.001	0.007	0.002	660	60	0.024	0.006	0.0044	0.0005	2.1	0.1

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Erbium (Er), unfiltered (µg/L) (01246)		Europium (Eu), unfiltered (µg/L) (01236)		Iron (Fe), unfiltered (µg/L) (01045)		Gadolinium (Gd), unfiltered (µg/L) (01219)		Holmium (Ho), unfiltered (µg/L) (01247)		Potassium (K), unfiltered (µg/L) (00937)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	10:45	1of2	0.038	0.005	0.017	0.008	1,700	100	0.077	0.027	0.012	0.001	2.3	0.1
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	10:45	2of2	0.033	0.005	0.008	0.005	1,600	0	0.068	0.021	0.013	0.001	2.2	0.0
BY124	Starr Mine tunnel outlet nr Grass Valley	8/23/2000	17:30	1of2	0.087	0.017	0.043	0.009	2,300	200	0.16	0.02	0.027	0.001	1.8	0.3
BY124	Starr Mine tunnel outlet nr Grass Valley	8/23/2000	17:30	2of2	0.091	0.005	0.035	0.001	2,100	0	0.15	0.00	0.031	0.002	1.8	0.3
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:00	1of2	1.1	0.2	0.66	0.11	8,900	400	2.4	0.5	0.38	0.07	0.5	0.1
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:00	2of2	0.98	0.19	0.64	0.10	10,000	1,000	2.3	0.4	0.37	0.05	0.4	0.1
BY130	Tom and Jerry Mine drain at tunnel outlet nr Nevada City	6/28/2000	11:30	1of2	0.015	0.006	0.011	0.003	630	70	0.046	0.010	0.006	0.002	0.6	0.1
BY130	Tom and Jerry Mine drain at tunnel outlet nr Nevada City	6/28/2000	11:30	2of2	0.018	0.004	0.011	0.003	630	120	0.038	0.007	0.009	0.000	0.6	0.2
BY131	Tom and Jerry Mine drainage pond nr Nevada City	8/23/2000	10:45	1of2	0.025	0.004	0.013	0.003	95	6	0.050	0.013	0.010	0.003	0.7	0.1
BY131	Tom and Jerry Mine drainage pond nr Nevada City	8/23/2000	10:45	2of2	0.026	0.005	0.013	0.003	98	32	0.057	0.009	0.009	0.001	0.6	0.1

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Erbium (Er), unfiltered (µg/L) (01246)		Europium (Eu), unfiltered (µg/L) (01236)		Iron (Fe), unfiltered (µg/L) (01045)		Gadolinium (Gd), unfiltered (µg/L) (01219)		Holmium (Ho), unfiltered (µg/L) (01247)		Potassium (K), unfiltered (µg/L) (00937)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
Disturbed samples																
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	11:30	1of2	15	1	5.1	0.2	920,000	10,000	24	5	4.7	0.0	10	0
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	11:30	2of2	14	0	5.8	0.3	780,000	10,000	23	2	4.4	0.1	9.6	0.1
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:30	1of2	8.9	1.4	6.7	1.0	72,000	1,000	24	3	3.4	0.6	1.6	0.1
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:30	2of2	9.8	0.5	7.4	0.3	93,000	20,000	24	4	3.8	0.2	2.1	0.6

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Lanthanum (La), unfiltered (µg/L) (01182)		Lithium (Li), unfiltered (µg/L) (01132)		Lutetium (Lu), unfiltered (µg/L) (01244)		Magnesium (Mg), unfiltered (mg/L) (00921)		Manganese (Mn), unfiltered (µg/L) (01055)		Molybdenum (Mo), unfiltered (µg/L) (01062)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
Environmental samples																
BY20	Boston Mine tunnel outlet nr Grass Valley	6/18/1999	14:30	1of2	0.057	0.008	2.6	0.1	0.0016	0.0003	4.6	0.0	220	0	0.11	0.03
BY20	Boston Mine tunnel outlet nr Grass Valley	6/18/1999	14:30	2of2	0.044	0.010	2.4	0.1	0.0017	0.0003	4.6	0.1	220	0	0.21	0.10
BY20	Boston Mine tunnel outlet nr Grass Valley	12/14/1999	12:00	1of2	0.41	0.05	3.2	0.1	0.010	0.002	6.1	0.1	540	90	0.10	0.04
BY20	Boston Mine tunnel outlet nr Grass Valley	12/14/1999	12:00	2of2	0.29	0.01	2.7	0.3	0.007	0.001	6.2	0.6	500	60	0.09	0.07
BY20	Boston Mine tunnel outlet nr Grass Valley	5/24/2000	16:00	1of2	0.095	0.005	2.3	0.3	0.0019	0.0011	3.9	0.2	302	13	0.09	0.04
BY20	Boston Mine tunnel outlet nr Grass Valley	5/24/2000	16:00	2of2	0.21	0.01	2.3	0.2	0.0050	0.0003	4.1	0.0	510	4	0.07	0.01
BY21	Boston Mine wetlands pond nr Grass Valley	12/14/1999	10:30	1of2	0.015	0.002	0.92	0.06	<0.001	0.001	5.7	0.0	15	1	0.33	0.02
BY21	Boston Mine wetlands pond nr Grass Valley	12/14/1999	10:30	2of2	0.017	0.003	0.91	0.02	0.001	0.001	5.7	0.3	27	1	0.26	0.13
BY21	Boston Mine wetlands pond nr Grass Valley	5/24/2000	16:30	1of2	0.024	0.000	3.0	0.2	<0.0009	0.0004	2.8	0.1	56	2	0.10	0.03
BY21	Boston Mine wetlands pond nr Grass Valley	5/24/2000	16:30	2of2	0.026	0.003	2.8	0.2	<0.0009	0.0003	2.8	0.1	56	3	0.09	0.01
BY58	Buckeye Flat Mine main drain 0.45 mi ab Greenhorn Cr	8/21/2000	11:00	1of2	16	1	21	1	0.18	0.01	12	2	1,800	100	<4	0
BY58	Buckeye Flat Mine main drain 0.45 mi ab Greenhorn Cr	8/21/2000	11:00	2of2	12	0	17	1	0.13	0.00	11	3	1,400	100	<4	2

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Lanthanum (La), unfiltered (µg/L) (01182)		Lithium (Li), unfiltered (µg/L) (01132)		Lutetium (Lu), unfiltered (µg/L) (01244)		Magnesium (Mg), unfiltered (mg/L) (00921)		Manganese (Mn), unfiltered (µg/L) (01055)		Molybdenum (Mo), unfiltered (µg/L) (01062)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	6/18/1999	11:30	1of2	16	0	22	0	0.20	0.02	17	0	2,700	100	0.10	0.02
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	6/18/1999	11:30	2of2	21	1	22	1	0.25	0.02	17	0	2,600	200	0.10	0.02
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	12/2/1999	11:00	1of2	13	2	16	1	0.18	0.03	10	1	1,600	100	0.21	0.12
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	12/2/1999	11:00	2of2	17	1	14	0	0.25	0.05	10	0	1,600	0	0.08	0.01
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	8/22/2000	10:45	1of2	23	0	20	4	0.26	0.01	17	4	2,100	0	<4	1
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	8/22/2000	10:45	2of2	21	0	17	1	0.24	0.02	17	2	1,900	0	<4	1
BY116	Buckeye Flat Mine pond drain 0.15 mi ab SF Greenhorn Cr	8/21/2000	14:10	1of2	0.13	0.01	2.5	0.2	0.002	0.001	0.8	0.0	68	1	<0.1	0.0
BY116	Buckeye Flat Mine pond drain 0.15 mi ab SF Greenhorn Cr	8/21/2000	14:10	2of2	0.15	0.00	2.5	0.0	0.002	0.001	0.6	0.1	67	5	<0.1	0.2
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/26/1999	11:00	1of2	0.33	0.02	1.4	0.1	0.0060	0.0003	0.58	0.02	150	10	0.04	0.01
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/26/1999	11:00	2of2	0.33	0.00	1.3	0.1	0.0058	0.0003	0.57	0.01	150	0	0.04	0.01
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/22/2000	12:10	1of2	0.99	0.19	2.4	0.2	0.015	0.003	0.7	0.3	110	0	<0.1	0.1
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/22/2000	12:10	2of2	0.99	0.14	2.5	0.1	0.016	0.000	0.7	0.2	100	10	<0.1	0.1

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Lanthanum (La), unfiltered (µg/L) (01182)		Lithium (Li), unfiltered (µg/L) (01132)		Lutetium (Lu), unfiltered (µg/L) (01244)		Magnesium (Mg), unfiltered (mg/L) (00921)		Manganese (Mn), unfiltered (µg/L) (01055)		Molybdenum (Mo), unfiltered (µg/L) (01062)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY25	Buckeye Flat Mine upper drain	4/9/2001	10:00	1of2	4.4	0.3	4.6	0.4	0.039	0.001	4.6	0.4	360	70	<0.3	0.1
BY25	Buckeye Flat Mine upper drain	4/9/2001	10:00	2of2	4.4	0.0	4.6	0.1	0.038	0.001	5.5	0.1	370	0	<0.3	0.1
BY52	Greenhorn Cr 0.3 mi ab Buckeye Ford nr Nevada City	1/25/2000	10:45	1of2	0.87	0.01	1.2	0.0	0.015	0.000	1.3	0.1	36	2	0.17	0.05
BY52	Greenhorn Cr 0.3 mi ab Buckeye Ford nr Nevada City	1/25/2000	10:45	2of2	0.87	0.01	1.2	0.1	0.014	0.001	1.3	0.1	36	1	0.40	0.05
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	7/24/2001	11:00	1of2	0.051	0.002	0.9	0.1	<0.002	0.000	2.2	0.2	113	3	<0.5	0.3
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	7/24/2001	11:00	2of2	0.051	0.002	0.7	0.3	<0.002	0.000	2.3	0.2	124	0	<0.5	0.3
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	8/29/2001	15:00	1of2	0.029	0.001	0.9	0.0	<0.002	0.001	2.2	0.2	36	2	<0.5	0.4
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	8/29/2001	15:00	2of2	0.038	0.004	0.9	0.3	<0.002	0.001	2.3	0.2	37	0	<0.5	0.0
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	9/14/2001	13:00	1of2	0.040	0.001	0.77	0.02	<0.001	0.000	2.2	0.1	61	1	<0.5	0.0
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	9/14/2001	13:00	2of2	0.037	0.002	0.91	0.13	<0.001	0.000	2.2	0.2	59	1	<0.5	0.4
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	10/15/2001	12:00	1of2	0.017	0.001	0.8	0.3	<0.0005	0.0003	2.4	0.2	54	1	0.5	0.6
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	10/15/2001	12:00	2of2	0.017	0.001	0.7	0.1	0.0005	0.0006	2.4	0.1	57	2	<0.5	0.0
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	11/20/2001	13:20	1of2	0.100	0.010	0.87	0.06	0.002	0.001	2.7	0.4	200	22	<0.5	0.0
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	11/20/2001	13:20	2of2	0.10	0.01	0.84	0.08	0.003	0.000	2.7	0.3	200	14	<0.5	0.0

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Lanthanum (La), unfiltered (µg/L) (01182)		Lithium (Li), unfiltered (µg/L) (01132)		Lutetium (Lu), unfiltered (µg/L) (01244)		Magnesium (Mg), unfiltered (mg/L) (00921)		Manganese (Mn), unfiltered (µg/L) (01055)		Molybdenum (Mo), unfiltered (µg/L) (01062)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/10/2001	12:20	1of2	0.85	0.02	1.3	0.2	0.016	0.002	2.6	0.3	110	13	<0.5	0.1
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/10/2001	12:20	2of2	0.80	0.08	1.2	0.1	0.016	0.003	2.6	0.3	111	14	<0.5	0.1
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/21/2001	13:00	1of2	3.4	0.4	2.5	0.2	0.059	0.009	2.7	0.3	190	24	<0.7	1.6
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/21/2001	13:00	2of2	3.3	0.4	2.8	0.0	0.060	0.014	2.8	0.4	191	18	1.0	1.7
BY51	Greenhorn Cr nr headwaters nr Scotts Flat Res	1/25/2000	9:30	1of2	0.23	0.01	0.31	0.05	0.005	0.001	0.76	0.07	3	0	0.11	0.12
BY51	Greenhorn Cr nr headwaters nr Scotts Flat Res	1/25/2000	9:30	2of2	0.22	0.01	0.35	0.03	0.005	0.000	0.68	0.05	3	0	0.07	0.06
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	12/14/1999	14:00	1of2	0.40	0.13	8.1	2.1	0.008	0.004	4.4	0.2	89	21	0.18	0.06
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	12/14/1999	14:00	2of2	0.40	0.12	6.8	0.1	0.008	0.003	4.0	0.1	78	11	0.17	0.02
BY86	Poore Mine Creek ab tunnel nr Grass Valley	3/31/1999	17:40	1of2	0.38	0.01	0.6	0.1	0.0048	0.0010	1.5	0.0	10	0	0.05	0.01
BY86	Poore Mine Creek ab tunnel nr Grass Valley	3/31/1999	17:40	2of2	0.30	0.03	0.7	0.1	0.0039	0.0006	1.5	0.0	10	0	0.06	0.00
BY87	Poore Mine Creek bl tunnel nr Grass Valley	3/31/1999	13:30	1of2	0.30	0.05	0.8	0.2	0.0044	0.0008	1.6	0.1	8	1	0.11	0.03
BY87	Poore Mine Creek bl tunnel nr Grass Valley	3/31/1999	13:30	2of2	0.37	0.03	0.9	0.1	0.0063	0.0006	1.6	0.1	9	1	0.07	0.01

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Replicate	Lanthanum (La), unfiltered (µg/L) (01182)		Lithium (Li), unfiltered (µg/L) (01132)		Lutetium (Lu), unfiltered (µg/L) (01244)		Magnesium (Mg), unfiltered (mg/L) (00921)		Manganese (Mn), unfiltered (µg/L) (01055)		Molybdenum (Mo), unfiltered (µg/L) (01062)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY88	Poore Mine ground sluice nr Grass Valley	4/1/1999	15:40	1of2	0.089	0.007	10	0	0.0041	0.0003	3.4	0.2	370	0	0.05	0.01
BY88	Poore Mine ground sluice nr Grass Valley	4/1/1999	15:40	2of2	0.11	0.02	10	1	0.0037	0.0002	3.2	0.1	380	0	0.05	0.02
BY89	Poore Mine pit lake nr Grass Valley	4/1/1999	16:50	1of2	0.061	0.004	2.4	0.2	0.0016	0.0010	1.1	0.1	120	0	0.04	0.02
BY89	Poore Mine pit lake nr Grass Valley	4/1/1999	16:50	2of2	0.067	0.012	2.4	0.2	0.0017	0.0003	1.1	0.0	120	10	0.04	0.00
BY89	Poore Mine pit lake nr Grass Valley	5/23/2000	10:45	1of2	0.20	0.01	11	1	0.0027	0.0013	5.9	0.1	1,300	8	0.05	0.02
BY89	Poore Mine pit lake nr Grass Valley	5/23/2000	10:45	2of2	0.20	0.01	11	0	0.0030	0.0003	6.1	0.1	1,300	6	0.08	0.00
BY90	Poore Mine seep above ground sluice nr Grass Valley	4/1/1999	16:00	1of2	—		—		—		—		—		—	
BY90	Poore Mine seep above ground sluice nr Grass Valley	4/1/1999	16:00	2of2	—		—		—		—		—		—	
BY91	Poore Mine tunnel effluent nr Grass Valley	3/31/1999	15:20	1of2	0.095	0.003	8.0	0.4	<0.0009	0.0005	3.5	0.1	10	0	0.12	0.05
BY91	Poore Mine tunnel effluent nr Grass Valley	3/31/1999	15:20	2of2	0.11	0.01	8.2	0.2	0.0010	0.0002	3.6	0.1	10	0	0.10	0.02
BY91	Poore Mine tunnel effluent nr Grass Valley	12/15/1999	13:00	1of2	0.13	0.02	8.3	0.4	0.002	0.001	5.1	0.0	9	1	0.42	0.11
BY91	Poore Mine tunnel effluent nr Grass Valley	12/15/1999	13:00	2of2	0.12	0.04	11	0	0.001	0.001	5.7	0.1	31	38	0.47	0.05
BY91	Poore Mine tunnel effluent nr Grass Valley	5/23/2000	12:00	1of2	1.5	0.0	10	0	0.016	0.001	5.1	0.1	130	7	0.17	0.01
BY91	Poore Mine tunnel effluent nr Grass Valley	5/23/2000	12:00	2of2	1.4	0.1	10	1	0.016	0.001	5.2	0.1	120	4	0.17	0.04

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Lanthanum (La), unfiltered (µg/L) (01182)		Lithium (Li), unfiltered (µg/L) (01132)		Lutetium (Lu), unfiltered (µg/L) (01244)		Magnesium (Mg), unfiltered (mg/L) (00921)		Manganese (Mn), unfiltered (µg/L) (01055)		Molybdenum (Mo), unfiltered (µg/L) (01062)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY105	Sailor Flat Mine main drain gulch 01 nr Quaker Hill	7/6/1999	16:00	1of2	3.8	0.1	7.8	0.2	0.12	0.01	2.0	0.0	150	0	0.18	0.05
BY105	Sailor Flat Mine main drain gulch 01 nr Quaker Hill	7/6/1999	16:00	2of2	2.7	0.1	7.8	0.1	0.083	0.005	2.0	0.0	150	0	0.18	0.02
BY105	Sailor Flat Mine main drain Gulch 01 nr Quaker Hill	12/2/1999	14:30	1of2	19	1	3.8	0.1	0.20	0.00	2.2	0.2	91	29	0.27	0.05
BY105	Sailor Flat Mine main drain Gulch 01 nr Quaker Hill	12/2/1999	14:30	2of2	21	1	4.2	0.5	0.21	0.00	2.0	0.1	80	16	0.21	0.01
BY106	Sailor Flat Mine main drainage to Greenhorn Cr, Gulch 03	4/9/2001	12:30	1of 2	0.99	0.03	1.2	0.1	0.025	0.000	0.39	0.01	21	2	<0.3	0.0
BY106	Sailor Flat Mine main drainage to Greenhorn Cr, Gulch 03	4/9/2001	12:30	2of 2	0.96	0.02	1.1	0.1	0.023	0.000	0.39	0.06	20	1	<0.3	0.2
BY114	SF Greenhorn Cr 0.7 mi ab Greenhorn Cr nr Nevada City	8/22/2000	15:10	1of2	0.032	0.004	0.6	0.1	0.001	0.001	2.3	0.2	<0.6	0	<0.1	0.1
BY114	SF Greenhorn Cr 0.7 mi ab Greenhorn Cr nr Nevada City	8/22/2000	15:10	2of2	0.037	0.005	0.7	0.2	<0.001	0.001	2.1	0.6	<0.6	0	0.3	0.2
BY122	Starr Mine tunnel inflow nr Grass Valley	4/23/1999	15:00	1of2	0.14	0.01	4.7	0.2	0.0014	0.0005	4.5	0.4	51	4	0.06	0.02
BY122	Starr Mine tunnel inflow nr Grass Valley	4/23/1999	15:00	2of2	0.17	0.01	5.7	0.3	0.0025	0.0004	4.9	0.1	58	1	0.06	0.02
BY123	Starr Mine tunnel midway nr Grass Valley	4/23/1999	13:40	1of2	0.12	0.03	10	1	0.0018	0.0007	8.1	0.1	300	10	0.23	0.01
BY123	Starr Mine tunnel midway nr Grass Valley	4/23/1999	13:40	2of2	0.080	0.014	9.8	0.3	0.0017	0.0006	8.3	0.2	280	10	0.25	0.01

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Lanthanum (La), unfiltered (µg/L) (01182)		Lithium (Li), unfiltered (µg/L) (01132)		Lutetium (Lu), unfiltered (µg/L) (01244)		Magnesium (Mg), unfiltered (mg/L) (00921)		Manganese (Mn), unfiltered (µg/L) (01055)		Molybdenum (Mo), unfiltered (µg/L) (01062)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	10:45	1of2	0.16	0.04	11	1	0.005	0.001	10	0	730	20	0.38	0.05
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	10:45	2of2	0.17	0.01	8.8	0.6	0.005	0.001	9.9	0.4	710	20	0.29	0.01
BY124	Starr Mine tunnel outlet nr Grass Valley	8/23/2000	17:30	1of2	0.56	0.01	8.4	0.7	0.007	0.001	8.7	0.2	560	10	0.6	0.2
BY124	Starr Mine tunnel outlet nr Grass Valley	8/23/2000	17:30	2of2	0.66	0.00	8.6	0.5	0.011	0.000	8.4	0.2	630	30	0.6	0.4
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:00	1of2	9.5	1.7	6.3	1.2	0.087	0.015	2.4	0.6	650	20	<0.1	0.2
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:00	2of2	9.1	1.3	6.6	0.3	0.091	0.015	2.6	0.3	740	40	<0.1	0.0
BY130	Tom and Jerry Mine drain at tunnel outlet nr Nevada City	6/28/2000	11:30	1of2	0.14	0.01	11	2	<0.001	0.001	5.2	0.5	89	1	<0.1	0.0
BY130	Tom and Jerry Mine drain at tunnel outlet nr Nevada City	6/28/2000	11:30	2of2	0.16	0.02	13	0	0.002	0.001	5.4	1.0	96	9	0.1	0.2
BY131	Tom and Jerry Mine drainage pond nr Nevada City	8/23/2000	10:45	1of2	0.18	0.02	1.2	0.1	0.002	0.001	2.6	0.2	7	0	<0.1	0.2
BY131	Tom and Jerry Mine drainage pond nr Nevada City	8/23/2000	10:45	2of2	0.18	0.02	1.5	0.0	0.004	0.001	2.4	0.6	7	1	<0.1	0.1

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Lanthanum (La), unfiltered (µg/L) (01182)		Lithium (Li), unfiltered (µg/L) (01132)		Lutetium (Lu), unfiltered (µg/L) (01244)		Magnesium (Mg), unfiltered (mg/L) (00921)		Manganese (Mn), unfiltered (µg/L) (01055)		Molybdenum (Mo), unfiltered (µg/L) (01062)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
Disturbed samples																
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	11:30	1of2	48	9	74	1	1.7	0.4	36	0	430,000	0	18	0
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	11:30	2of2	48	1	67	3	1.9	0.0	33	1	390,000	10,000	19	1
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:30	1of2	84	12	32	5	0.81	0.13	12	0	7,600	400	0.2	0.0
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:30	2of2	93	4	35	1	0.80	0.13	16	3	8,100	0	0.1	0.1

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Sodium (Na), unfiltered (mg/L) (00923)		Neodymium (Nd), unfiltered (µg/L) (01237)		Nickel (Ni), unfiltered (µg/L) (01067)		Lead (Pb), unfiltered (µg/L) (01051)		Praesodymium (Pr), unfiltered (µg/L) (010238)		Rubidium (Rb), unfiltered (µg/L) (01137)		Rhenium (Re), unfiltered (µg/L) (01242)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
Environmental samples																		
BY20	Boston Mine tunnel outlet nr Grass Valley	6/18/1999	14:30	1of2	1.2	0.0	0.090	0.010	10	0	0.05	0.01	0.021	0.004	2.0	0.3	0.0038	0.0006
BY20	Boston Mine tunnel outlet nr Grass Valley	6/18/1999	14:30	2of2	1.4	0.2	0.074	0.002	7.1	0.4	0.06	0.02	0.014	0.001	1.6	0.2	0.0024	0.0011
BY20	Boston Mine tunnel outlet nr Grass Valley	12/14/1999	12:00	1of2	1.4	0.0	0.70	0.06	37	3	0.16	0.12	0.15	0.02	2.2	0.2	0.004	0.000
BY20	Boston Mine tunnel outlet nr Grass Valley	12/14/1999	12:00	2of2	1.5	0.1	0.35	0.01	22	1	0.14	0.02	0.080	0.008	1.7	0.1	0.003	0.001
BY20	Boston Mine tunnel outlet nr Grass Valley	5/24/2000	16:00	1of2	1.4	0.1	0.14	0.00	8.8	0.2	0.08	0.02	0.030	0.001	1.7	0.0	0.005	0.000
BY20	Boston Mine tunnel outlet nr Grass Valley	5/24/2000	16:00	2of2	1.4	0.1	0.31	0.03	17	1	0.07	0.01	0.065	0.001	1.8	0.1	<0.002	0.000
BY21	Boston Mine wetlands pond nr Grass Valley	12/14/1999	10:30	1of2	3.0	0.3	0.024	0.005	0.92	0.07	0.11	0.02	0.006	0.001	2.6	0.0	0.011	0.000
BY21	Boston Mine wetlands pond nr Grass Valley	12/14/1999	10:30	2of2	1.4	0.1	0.027	0.006	0.95	0.07	0.14	0.01	0.007	0.001	2.6	0.2	0.007	0.002
BY21	Boston Mine wetlands pond nr Grass Valley	5/24/2000	16:30	1of2	1.3	0.1	0.032	0.006	2.2	0.0	0.12	0.03	0.007	0.001	2.2	0.1	0.005	0.002
BY21	Boston Mine wetlands pond nr Grass Valley	5/24/2000	16:30	2of2	1.3	0.1	0.033	0.007	2.2	0.1	0.10	0.01	0.007	0.000	2.2	0.1	0.003	0.001
BY58	Buckeye Flat Mine main drain 0.45 mi ab Greenhorn Cr	8/21/2000	11:00	1of2	3	1	16	0	130	10	<1	0	4.0	0.3	9.3	0.2	<0.02	0.01
BY58	Buckeye Flat Mine main drain 0.45 mi ab Greenhorn Cr	8/21/2000	11:00	2of2	2	0	13	0	93	3	<1	1	3.2	0.0	7.2	0.3	<0.02	0.02

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Sodium (Na), unfiltered (mg/L) (00923)		Neodymium (Nd), unfiltered (µg/L) (01237)		Nickel (Ni), unfiltered (µg/L) (01067)		Lead (Pb), unfiltered (µg/L) (01051)		Praesodymium (Pr), unfiltered (µg/L) (010238)		Rubidium (Rb), unfiltered (µg/L) (01137)		Rhenium (Re), unfiltered (µg/L) (01242)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	6/18/1999	11:30	1of2	2.4	0.0	22	1	220	0	0.46	0.01	5.1	0.5	4.3	0.4	0.0027	0.0012
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	6/18/1999	11:30	2of2	2.3	0.0	22	0	220	0	0.64	0.04	4.8	0.0	3.7	0.1	0.0034	0.0007
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	12/2/1999	11:00	1of2	1.9	0.2	16	0	130	10	0.61	0.08	3.6	0.1	3.5	0.3	0.007	0.001
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	12/2/1999	11:00	2of2	2.1	0.2	16	0	130	0	0.84	0.12	4.4	0.1	2.9	0.0	0.006	0.000
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	8/22/2000	10:45	1of2	4	1	25	0	170	10	<1	0	6.0	0.1	2.1	0.1	<0.02	0.01
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	8/22/2000	10:45	2of2	4	1	22	0	160	10	<1	0	5.6	0.0	2.0	0.3	<0.02	0.02
BY116	Buckeye Flat Mine pond drain 0.15 mi ab SF Greenhorn Cr	8/21/2000	14:10	1of2	0.55	0.03	0.19	0.01	4.5	0.3	<0.1	0.1	0.047	0.002	2.0	0.0	0.003	0.001
BY116	Buckeye Flat Mine pond drain 0.15 mi ab SF Greenhorn Cr	8/21/2000	14:10	2of2	0.54	0.03	0.20	0.01	5.2	0.3	<0.1	0.1	0.048	0.002	2.0	0.0	<0.003	0.002
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/26/1999	11:00	1of2	0.66	0.11	0.50	0.01	8.5	0.7	3.9	0.2	0.11	0.01	1.2	0.3	0.0015	0.0010
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/26/1999	11:00	2of2	0.62	0.01	0.50	0.01	9.2	1.0	4.0	0.3	0.11	0.01	1.0	0.2	0.0016	0.0008
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/22/2000	12:10	1of2	0.64	0.12	1.4	0.1	10.0	1.6	0.9	0.0	0.31	0.05	1.1	0.1	<0.003	0.001
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/22/2000	12:10	2of2	0.70	0.02	1.3	0.2	9.6	0.5	0.9	0.1	0.30	0.05	0.99	0.05	0.004	0.001

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Sodium (Na), unfiltered (mg/L) (00923)		Neodymium (Nd), unfiltered (µg/L) (01237)		Nickel (Ni), unfiltered (µg/L) (01067)		Lead (Pb), unfiltered (µg/L) (01051)		Praesodymium (Pr), unfiltered (µg/L) (010238)		Rubidium (Rb), unfiltered (µg/L) (01137)		Rhenium (Re), unfiltered (µg/L) (01242)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY25	Buckeye Flat Mine upper drain	4/9/2001	10:00	1of2	1.3	0.3	4.1	0.3	65	4	<0.2	0.1	1.0	0.1	1.4	0.1	<0.003	0.001
BY25	Buckeye Flat Mine upper drain	4/9/2001	10:00	2of2	1.4	0.4	4.0	0.1	66	0	<0.2	0.2	1.0	0.0	1.4	0.0	<0.003	0.001
BY52	Greenhorn Cr 0.3 mi ab Buckeye Ford nr Nevada City	1/25/2000	10:45	1of2	1.4	0.1	1.2	0.0	5.8	0.2	0.55	0.01	0.27	0.00	1.7	0.0	<0.002	0.002
BY52	Greenhorn Cr 0.3 mi ab Buckeye Ford nr Nevada City	1/25/2000	10:45	2of2	1.4	0.0	1.1	0.0	6.0	0.1	0.51	0.02	0.27	0.01	1.7	0.0	<0.002	0.001
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	7/24/2001	11:00	1of2	2.4	0.1	0.05	0.00	1.9	0.1	0.10	0.04	0.013	0.002	1.5	0.1	0.005	0.001
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	7/24/2001	11:00	2of2	2.4	0.2	0.08	0.00	2.1	0.1	0.11	0.00	0.014	0.002	1.5	0.0	0.006	0.001
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	8/29/2001	15:00	1of2	2.5	0.1	0.03	0.01	0.96	0.06	<0.06	0.02	0.011	0.001	1.4	0.1	0.007	0.001
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	8/29/2001	15:00	2of2	2.5	0.3	0.03	0.01	1.0	0.0	0.06	0.05	0.009	0.002	1.5	0.1	0.007	0.002
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	9/14/2001	13:00	1of2	2.0	0.1	0.048	0.008	1.6	0.1	0.07	0.00	0.011	0.003	1.5	0.1	0.005	0.001
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	9/14/2001	13:00	2of2	2.1	0.2	0.042	0.008	1.5	0.0	0.06	0.01	0.011	0.002	1.5	0.1	0.007	0.004
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	10/15/2001	12:00	1of2	3.0	0.4	0.020	0.010	1.5	0.2	0.19	0.18	0.004	0.003	1.2	0.1	0.005	0.002
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	10/15/2001	12:00	2of2	3.0	0.3	0.021	0.008	1.4	0.1	<0.07	0.04	0.005	0.001	1.2	0.1	0.005	0.002
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	11/20/2001	13:20	1of2	2.8	0.4	0.16	0.02	3.5	0.0	0.19	0.03	0.050	0.005	1.6	0.0	0.006	0.000
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	11/20/2001	13:20	2of2	2.8	0.3	0.14	0.01	3.5	0.1	0.23	0.08	0.035	0.000	1.7	0.1	0.006	0.001

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Sodium (Na), unfiltered (mg/L) (00923)		Neodymium (Nd), unfiltered (µg/L) (01237)		Nickel (Ni), unfiltered (µg/L) (01067)		Lead (Pb), unfiltered (µg/L) (01051)		Praesodymium (Pr), unfiltered (µg/L) (010238)		Rubidium (Rb), unfiltered (µg/L) (01137)		Rhenium (Re), unfiltered (µg/L) (01242)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/10/2001	12:20	1of2	2.5	0.2	1.2	0.0	6.6	0.5	0.57	0.01	0.28	0.00	2.1	0.0	0.005	0.002
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/10/2001	12:20	2of2	2.6	0.2	1.2	0.1	6.8	0.5	0.46	0.01	0.27	0.01	2.2	0.1	0.005	0.000
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/21/2001	13:00	1of2	1.9	0.2	4.7	0.3	11.4	0.7	2.8	0.0	1.06	0.09	6.6	0.5	<0.004	0.002
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/21/2001	13:00	2of2	1.9	0.3	4.9	0.0	11.8	0.1	2.7	0.0	1.04	0.09	6.5	0.7	<0.004	0.001
BY51	Greenhorn Cr nr headwaters nr Scotts Flat Res	1/25/2000	9:30	1of2	1.4	0.0	0.35	0.01	2.0	0.0	0.17	0.02	0.079	0.001	0.53	0.02	<0.002	0.001
BY51	Greenhorn Cr nr headwaters nr Scotts Flat Res	1/25/2000	9:30	2of2	0.85	0.07	0.33	0.01	2.0	0.1	0.13	0.01	0.078	0.003	0.54	0.01	<0.002	0.001
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	12/14/1999	14:00	1of2	3.0	0.1	0.43	0.05	29	1	0.11	0.04	0.10	0.02	3.3	0.0	0.006	0.001
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	12/14/1999	14:00	2of2	2.7	0.0	0.44	0.02	29	0	0.12	0.03	0.11	0.01	4.0	0.7	0.007	0.001
BY86	Poore Mine Creek ab tunnel nr Grass Valley	3/31/1999	17:40	1of2	1.9	0.1	0.35	0.01	3.0	0.4	0.25	0.05	0.085	0.009	1.2	0.2	<0.001	0.0010
BY86	Poore Mine Creek ab tunnel nr Grass Valley	3/31/1999	17:40	2of2	2.0	0.2	0.33	0.01	2.5	0.2	0.20	0.02	0.077	0.006	1.3	0.2	<0.001	0.0012
BY87	Poore Mine Creek bl tunnel nr Grass Valley	3/31/1999	13:30	1of2	1.8	0.0	0.34	0.01	2.5	0.3	0.21	0.04	0.078	0.004	1.2	0.0	<0.001	0.0008
BY87	Poore Mine Creek bl tunnel nr Grass Valley	3/31/1999	13:30	2of2	1.9	0.1	0.36	0.00	2.7	0.2	0.29	0.01	0.086	0.001	1.1	0.2	0.0015	0.0013
BY88	Poore Mine ground sluice nr Grass Valley	4/1/1999	15:40	1of2	1.7	0.2	0.11	0.00	10	1	<0.01	0.03	0.024	0.004	7.2	1.8	0.011	0.000

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Replicate	Sodium (Na), unfiltered (mg/L) (00923)		Neodymium (Nd), unfiltered (µg/L) (01237)		Nickel (Ni), unfiltered (µg/L) (01067)		Lead (Pb), unfiltered (µg/L) (01051)		Praesodymium (Pr), unfiltered (µg/L) (010238)		Rubidium (Rb), unfiltered (µg/L) (01137)		Rhenium (Re), unfiltered (µg/L) (01242)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY88	Poore Mine ground sluice nr Grass Valley	4/1/1999	15:40	2of2	1.6	0.1	0.12	0.00	11	1	<0.01	0.02	0.026	0.002	6.1	0.1	0.011	0.003
BY89	Poore Mine pit lake nr Grass Valley	4/1/1999	16:50	1of2	0.9	0.1	0.10	0.00	3.4	0.3	0.07	0.02	0.021	0.002	2.4	0.3	<0.001	0.0013
BY89	Poore Mine pit lake nr Grass Valley	4/1/1999	16:50	2of2	0.9	0.2	0.10	0.00	3.5	0.3	0.09	0.05	0.022	0.004	2.2	0.3	0.0015	0.0003
BY89	Poore Mine pit lake nr Grass Valley	5/23/2000	10:45	1of2	1.4	0.1	0.15	0.01	61	0	0.07	0.02	0.037	0.003	7.7	0.1	0.005	0.000
BY89	Poore Mine pit lake nr Grass Valley	5/23/2000	10:45	2of2	1.5	0.2	0.16	0.01	64	1	0.06	0.01	0.037	0.001	7.9	0.5	0.008	0.001
BY90	Poore Mine seep above ground sluice nr Grass Valley	4/1/1999	16:00	1of2	—		—		—		—		—		—		—	
BY90	Poore Mine seep above ground sluice nr Grass Valley	4/1/1999	16:00	2of2	—		—		—		—		—		—		—	
BY91	Poore Mine tunnel effluent nr Grass Valley	3/31/1999	15:20	1of2	1.7	0.1	0.094	0.005	5.2	0.2	0.28	0.03	0.024	0.001	6.3	0.3	0.0063	0.0019
BY91	Poore Mine tunnel effluent nr Grass Valley	3/31/1999	15:20	2of2	1.7	0.1	0.099	0.007	6.3	0.5	0.35	0.06	0.024	0.001	5.7	0.7	0.0099	0.0003
BY91	Poore Mine tunnel effluent nr Grass Valley	12/15/1999	13:00	1of2	2.4	0.2	0.11	0.00	3.1	0.1	0.46	0.03	0.031	0.002	5.5	0.0	0.013	0.003
BY91	Poore Mine tunnel effluent nr Grass Valley	12/15/1999	13:00	2of2	2.9	0.3	0.13	0.01	2.7	0.4	0.44	0.18	0.028	0.003	4.7	0.6	0.009	0.001
BY91	Poore Mine tunnel effluent nr Grass Valley	5/23/2000	12:00	1of2	3.1	0.3	1.5	0.0	15	0	6.5	0.0	0.37	0.00	6.1	0.2	0.010	0.001
BY91	Poore Mine tunnel effluent nr Grass Valley	5/23/2000	12:00	2of2	3.0	0.2	1.4	0.0	14	0	6.2	0.1	0.35	0.00	6.1	0.0	0.010	0.001
BY105	Sailor Flat Mine main drain gulch 01 nr Quaker Hill	7/6/1999	16:00	1of2	1.7	0.1	6.5	0.0	42	5	1.0	0.1	1.6	0.3	4.1	0.8	0.0038	0.0005

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

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Station map ID	Station name	Date	Time	Rep-licate	Sodium (Na), unfiltered (mg/L) (00923)		Neodymium (Nd), unfiltered (µg/L) (01237)		Nickel (Ni), unfiltered (µg/L) (01067)		Lead (Pb), unfiltered (µg/L) (01051)		Praesodymium (Pr), unfiltered (µg/L) (010238)		Rubidium (Rb), unfiltered (µg/L) (01137)		Rhenium (Re), unfiltered (µg/L) (01242)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY105	Sailor Flat Mine main drain gulch 01 nr Quaker Hill	7/6/1999	16:00	2of2	1.8	0.1	6.8	0.0	39	6	0.66	0.05	1.4	0.3	5.4	0.9	0.0025	0.0007
BY105	Sailor Flat Mine main drain Gulch 01 nr Quaker Hill	12/2/1999	14:30	1of2	1.3	0.3	22	0	12	1	10	0	6.1	0.1	17	0	<0.002	0.000
BY105	Sailor Flat Mine main drain Gulch 01 nr Quaker Hill	12/2/1999	14:30	2of2	1.2	0.0	20	0	12	0	10	0	4.9	0.1	13	0	<0.002	0.001
BY106	Sailor Flat Mine main drainage to Greenhorn Cr, Gulch 03	4/9/2001	12:30	1of 2	0.70	0.07	1.4	0.1	4.5	0.3	<0.2	0.1	0.34	0.03	1.8	0.2	<0.003	0.001
BY106	Sailor Flat Mine main drainage to Greenhorn Cr, Gulch 03	4/9/2001	12:30	2of 2	0.73	0.16	1.4	0.0	4.7	0.9	<0.2	0.1	0.34	0.01	1.8	0.1	<0.003	0.002
BY114	SF Greenhorn Cr 0.7 mi ab Greenhorn Cr nr Nevada City	8/22/2000	15:10	1of2	2.0	0.3	0.03	0.01	0.7	0.1	<0.1	0.1	0.007	0.002	0.44	0.06	<0.003	0.000
BY114	SF Greenhorn Cr 0.7 mi ab Greenhorn Cr nr Nevada City	8/22/2000	15:10	2of2	2.0	0.2	0.03	0.00	1.2	0.1	0.4	0.0	0.008	0.001	0.45	0.06	0.004	0.002
BY122	Starr Mine tunnel inflow nr Grass Valley	4/23/1999	15:00	1of2	1.5	0.1	0.17	0.00	11	1	1.5	0.0	0.037	0.003	3.0	0.1	0.0057	0.0005
BY122	Starr Mine tunnel inflow nr Grass Valley	4/23/1999	15:00	2of2	1.6	0.1	0.19	0.00	13	0	1.8	0.0	0.043	0.005	3.0	0.3	0.0067	0.0013
BY123	Starr Mine tunnel midway nr Grass Valley	4/23/1999	13:40	1of2	2.2	0.1	0.13	0.01	3.5	0.2	0.79	0.01	0.032	0.004	4.6	0.1	0.0092	0.0012
BY123	Starr Mine tunnel midway nr Grass Valley	4/23/1999	13:40	2of2	2.2	0.1	0.086	0.003	3.0	0.6	0.60	0.08	0.020	0.002	4.7	0.1	0.010	0.003
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	10:45	1of2	2.2	0.1	0.23	0.00	7.5	0.5	2.1	0.1	0.050	0.001	6.2	0.2	0.021	0.002

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Sodium (Na), unfiltered (mg/L) (00923)		Neodymium (Nd), unfiltered (µg/L) (01237)		Nickel (Ni), unfiltered (µg/L) (01067)		Lead (Pb), unfiltered (µg/L) (01051)		Praesodymium (Pr), unfiltered (µg/L) (010238)		Rubidium (Rb), unfiltered (µg/L) (01137)		Rhenium (Re), unfiltered (µg/L) (01242)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	10:45	2of2	2.2	0.1	0.25	0.01	7.8	0.3	2.1	0.0	0.055	0.005	6.5	0.2	0.022	0.000
BY124	Starr Mine tunnel outlet nr Grass Valley	8/23/2000	17:30	1of2	2.7	0.2	0.64	0.02	10	0	5.1	0.5	0.16	0.02	4.6	0.1	0.011	0.002
BY124	Starr Mine tunnel outlet nr Grass Valley	8/23/2000	17:30	2of2	2.8	0.2	0.73	0.02	12	1	7.3	0.5	0.17	0.02	5.0	0.0	0.011	0.002
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:00	1of2	1.2	0.2	12	2	44	8	1.9	0.4	2.8	0.5	2.5	0.4	0.004	0.002
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:00	2of2	1.2	0.1	11	2	42	7	2.0	0.3	2.6	0.4	2.3	0.3	<0.003	0.000
BY130	Tom and Jerry Mine drain at tunnel outlet nr Nevada City	6/28/2000	11:30	1of2	1.7	0.3	0.21	0.03	6.1	0.0	<0.1	0.1	0.041	0.001	0.95	0.11	0.004	0.001
BY130	Tom and Jerry Mine drain at tunnel outlet nr Nevada City	6/28/2000	11:30	2of2	1.7	0.3	0.24	0.02	6.3	0.2	<0.1	0.0	0.059	0.024	0.97	0.12	0.004	0.001
BY131	Tom and Jerry Mine drainage pond nr Nevada City	8/23/2000	10:45	1of2	2.1	0.2	0.24	0.01	3.7	0.1	<0.1	0.0	0.055	0.005	0.73	0.01	<0.003	0.001
BY131	Tom and Jerry Mine drainage pond nr Nevada City	8/23/2000	10:45	2of2	2.1	0.3	0.26	0.01	2.9	0.1	<0.1	0.0	0.052	0.007	0.70	0.09	<0.003	0.002

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Replicate	Sodium (Na), unfiltered (mg/L) (00923)		Neodymium (Nd), unfiltered (µg/L) (01237)		Nickel (Ni), unfiltered (µg/L) (01067)		Lead (Pb), unfiltered (µg/L) (01051)		Praesodymium (Pr), unfiltered (µg/L) (010238)		Rubidium (Rb), unfiltered (µg/L) (01137)		Rhenium (Re), unfiltered (µg/L) (01242)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
Disturbed samples																		
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	11:30	1of2	2.9	0.0	85	0	3,700	0	980	140	17	0	92	18	0.036	0.003
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	11:30	2of2	2.6	0.1	85	3	3,300	200	1,000	0	16	0	86	0	0.030	0.004
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:30	1of2	1.6	0.2	120	20	350	10	25	4	28	4	23	3	0.003	0.000
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:30	2of2	1.5	0.3	140	10	370	50	28	1	32	2	23	3	0.003	0.002

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Replicate	Sulfur (S), unfiltered (mg/L) (80107)		Antimony (Sb), unfiltered (µg/L) (01097)		Selenium (Se), unfiltered (µg/L) (01147)		Silica (Si), unfiltered (mg/L as SiO_2) (00956)		Samarium (Sm), unfiltered (µg/L) (82322)		Strontium (Sr), unfiltered (µg/L) (01084)		Terbium (Tb), unfiltered (µg/L) (01218)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
Environmental samples																		
BY20	Boston Mine tunnel outlet nr Grass Valley	6/18/1999	14:30	1of2	4.9	0.1	0.16	0.04	<2	2	14	0	0.018	0.003	86	2	0.0023	0.0003
BY20	Boston Mine tunnel outlet nr Grass Valley	6/18/1999	14:30	2of2	4.9	0.0	0.19	0.01	<2	1	14	0	0.017	0.001	86	3	0.0021	0.0007
BY20	Boston Mine tunnel outlet nr Grass Valley	12/14/1999	12:00	1of2	6.6	0.0	0.07	0.02	0.7	0.4	14	3	0.13	0.01	132	5	0.021	0.004
BY20	Boston Mine tunnel outlet nr Grass Valley	12/14/1999	12:00	2of2	6.8	0.4	0.05	0.01	<0.6	0.4	14	1	0.084	0.010	102	4	0.014	0.003
BY20	Boston Mine tunnel outlet nr Grass Valley	5/24/2000	16:00	1of2	4.2	0.2	0.088	0.017	<86	8	14	0	0.030	0.005	81	2	0.0052	0.0013
BY20	Boston Mine tunnel outlet nr Grass Valley	5/24/2000	16:00	2of2	4.2	0.2	0.085	0.005	<86	14	14	1	0.062	0.003	83	3	0.011	0.001
BY21	Boston Mine wetlands pond nr Grass Valley	12/14/1999	10:30	1of2	5.7	0.3	0.049	0.002	<0.2	0.3	4.3	0.3	<0.006	0.002	122	1	0.0011	0.0007
BY21	Boston Mine wetlands pond nr Grass Valley	12/14/1999	10:30	2of2	5.4	0.1	0.055	0.001	<0.2	0.4	4.3	0.2	0.006	0.004	121	7	0.0010	0.0000
BY21	Boston Mine wetlands pond nr Grass Valley	5/24/2000	16:30	1of2	2.7	0.1	0.079	0.008	<86	16	11	0	0.011	0.007	73	1	0.0019	0.0004
BY21	Boston Mine wetlands pond nr Grass Valley	5/24/2000	16:30	2of2	2.8	0.1	0.081	0.000	<86	12	11	0	<0.007	0.003	71	4	0.0012	0.0003
BY58	Buckeye Flat Mine main drain 0.45 mi ab Greenhorn Cr	8/21/2000	11:00	1of2	42	5	0.4	0.1	<8	3	30	5	3.4	0.4	87	22	0.60	0.05
BY58	Buckeye Flat Mine main drain 0.45 mi ab Greenhorn Cr	8/21/2000	11:00	2of2	40	10	<0.4	0.3	<8	7	29	7	2.7	0.3	86	17	0.48	0.06

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Sulfur (S), unfiltered (mg/L) (80107)		Antimony (Sb), unfiltered (µg/L) (01097)		Selenium (Se), unfiltered (µg/L) (01147)		Silica (Si), unfiltered (mg/L as SiO_2) (00956)		Samarium (Sm), unfiltered (µg/L) (82322)		Strontium (Sr), unfiltered (µg/L) (01084)		Terbium (Tb), unfiltered (µg/L) (01218)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	6/18/1999	11:30	1of2	61	0	0.10	0.02	<2	2	36	2	4.3	0.1	140	0	0.67	0.10
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	6/18/1999	11:30	2of2	62	0	0.095	0.035	<2	1	35	1	4.8	0.5	140	0	0.82	0.03
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	12/2/1999	11:00	1of2	39	0	0.04	0.01	<0.6	0.4	28	2	3.5	0.3	88	10	0.53	0.09
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	12/2/1999	11:00	2of2	37	0	0.04	0.01	<0.6	0.5	28	1	3.6	0.2	65	3	0.76	0.09
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	8/22/2000	10:45	1of2	65	3	<0.4	0.2	<8	6	46	0	5.5	0.2	130	40	0.92	0.00
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	8/22/2000	10:45	2of2	59	6	<0.4	0.2	<8	2	41	5	5.2	0.1	130	30	0.82	0.02
BY116	Buckeye Flat Mine pond drain 0.15 mi ab SF Greenhorn Cr	8/21/2000	14:10	1of2	2.3	0.1	0.06	0.02	<1	1	5.2	0.6	0.028	0.004	14	2	0.006	0.001
BY116	Buckeye Flat Mine pond drain 0.15 mi ab SF Greenhorn Cr	8/21/2000	14:10	2of2	2.1	0.1	0.07	0.03	<1	1	4.7	0.3	0.050	0.004	14	0	0.007	0.001
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/26/1999	11:00	1of2	2.0	0.1	2.0	0.0	<2	2	6.9	0.2	0.11	0.00	5.6	0.2	0.014	0.002
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/26/1999	11:00	2of2	1.9	0.0	1.4	0.0	<2	2	6.6	0.1	0.11	0.01	5.3	0.0	0.013	0.000
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/22/2000	12:10	1of2	1.6	0.1	0.07	0.02	<1	1	8.3	2.9	0.26	0.01	6.1	1.0	0.044	0.007
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/22/2000	12:10	2of2	2.0	0.4	0.07	0.01	<1	1	7.9	1.6	0.29	0.00	6.6	1.7	0.045	0.002

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Nevada County, California—*Continued.*

[Station name abbreviations: ab, above; bl, below; Cr, Creek; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Sulfur (S), unfiltered (mg/L) (80107)		Antimony (Sb), unfiltered (µg/L) (01097)		Selenium (Se), unfiltered (µg/L) (01147)		Silica (Si), unfiltered (mg/L as SiO_2) (00956)		Samarium (Sm), unfiltered (µg/L) (82322)		Strontium (Sr), unfiltered (µg/L) (01084)		Terbium (Tb), unfiltered (µg/L) (01218)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY25	Buckeye Flat Mine upper drain	4/9/2001	10:00	1of2	12	1	<0.04	0.01	<2	1	12	1	0.74	0.08	32	2	0.14	0.02
BY25	Buckeye Flat Mine upper drain	4/9/2001	10:00	2of2	15	0	<0.04	0.00	<2	1	13	2	0.76	0.00	31	1	0.14	0.01
BY52	Greenhorn Cr 0.3 mi ab Buckeye Ford nr Nevada City	1/25/2000	10:45	1of2	2.1	0.1	0.054	0.007	<0.2	0.1	11	1	0.25	0.03	24	1	0.036	0.001
BY52	Greenhorn Cr 0.3 mi ab Buckeye Ford nr Nevada City	1/25/2000	10:45	2of2	2.0	0.1	0.054	0.007	<0.2	0.2	11	0	0.24	0.03	24	0	0.038	0.000
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	7/24/2001	11:00	1of2	5.8	0.0	0.08	0.07	<0.8	0.2	12	1	<0.01	0.00	44	4	<0.002	0.001
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	7/24/2001	11:00	2of2	6.2	0.3	0.13	0.05	<0.8	0.8	12	0	0.02	0.01	44	2	<0.002	0.001
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	8/29/2001	15:00	1of2	5.2	0.3	0.11	0.08	<0.8	0.1	12	1	<0.01	0.01	46	3	<0.002	0.000
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	8/29/2001	15:00	2of2	5.2	0.3	0.09	0.05	<0.8	0.5	13	1	<0.01	0.00	47	4	<0.002	0.002
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	9/14/2001	13:00	1of2	5.9	0.2	—		1.3	0.0	12	0	0.011	0.002	47	3	0.0013	0.0008
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	9/14/2001	13:00	2of2	5.7	0.1	—		<0.9	0.3	12	1	0.008	0.004	47	2	0.0015	0.0007
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	10/15/2001	12:00	1of2	5.8	0.4	—		0.8	0.4	13	1	0.007	0.003	47	3	0.0010	0.0004
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	10/15/2001	12:00	2of2	5.9	0.2	—		0.9	0.4	13	0	<0.006	0.001	48	6	<0.0008	0.0002
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	11/20/2001	13:20	1of2	7.1	0.9	—		<0.9	0.5	12	1	0.033	0.008	54	4	0.0066	0.0000
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	11/20/2001	13:20	2of2	7.6	0.1	—		<0.9	0.2	12	1	0.038	0.006	55	2	0.0058	0.0004

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Sulfur (S), unfiltered (mg/L) (80107)		Antimony (Sb), unfiltered (µg/L) (01097)		Selenium (Se), unfiltered (µg/L) (01147)		Silica (Si), unfiltered (mg/L as SiO_2) (00956)		Samarium (Sm), unfiltered (µg/L) (82322)		Strontium (Sr), unfiltered (µg/L) (01084)		Terbium (Tb), unfiltered (µg/L) (01218)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/10/2001	12:20	1of2	6.1	0.7	—		0.6	0.2	16	2	0.26	0.00	51	4	0.039	0.004
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/10/2001	12:20	2of2	6.2	0.8	0.20	0.13	0.6	0.2	16	2	0.26	0.01	53	4	0.037	0.002
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/21/2001	13:00	1of2	4.2	0.4	0.28	0.25	<0.9	0.6	26	3	1.02	0.11	45	4	0.160	0.005
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/21/2001	13:00	2of2	4.3	0.5	0.26	0.15	<0.9	0.3	26	3	1.02	0.01	45	4	0.139	0.011
BY51	Greenhorn Cr nr headwaters nr Scotts Flat Res	1/25/2000	9:30	1of2	0.2	0.0	0.022	0.003	<0.2	0.4	7.9	0.3	0.081	0.000	17	0	0.0099	0.0004
BY51	Greenhorn Cr nr headwaters nr Scotts Flat Res	1/25/2000	9:30	2of2	0.1	0.1	0.024	0.009	0.4	0.1	7.6	0.2	0.080	0.010	17	0	0.011	0.002
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	12/14/1999	14:00	1of2	16	1	0.08	0.01	<0.6	0.6	26	1	0.080	0.007	96	22	0.018	0.007
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	12/14/1999	14:00	2of2	15	0	0.09	0.01	<0.6	0.4	24	0	0.084	0.017	102	26	0.017	0.005
BY86	Poore Mine Creek ab tunnel nr Grass Valley	3/31/1999	17:40	1of2	1.2	0.0	0.096	0.007	<2	0	17	0	0.073	0.005	39	0	0.012	0.000
BY86	Poore Mine Creek ab tunnel nr Grass Valley	3/31/1999	17:40	2of2	1.2	0.1	0.10	0.02	<2	1	17	1	0.069	0.008	39	2	0.0092	0.0017
BY87	Poore Mine Creek bl tunnel nr Grass Valley	3/31/1999	13:30	1of2	1.7	0.2	0.094	0.013	<2	1	17	1	0.070	0.003	39	2	0.010	0.002
BY87	Poore Mine Creek bl tunnel nr Grass Valley	3/31/1999	13:30	2of2	1.7	0.2	0.093	0.009	<2	1	16	0	0.081	0.005	40	2	0.011	0.001

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Sulfur (S), unfiltered (mg/L) (80107)		Antimony (Sb), unfiltered (µg/L) (01097)		Selenium (Se), unfiltered (µg/L) (01147)		Silica (Si), unfiltered (mg/L as SiO_2) (00956)		Samarium (Sm), unfiltered (µg/L) (82322)		Strontium (Sr), unfiltered (µg/L) (01084)		Terbium (Tb), unfiltered (µg/L) (01218)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY88	Poore Mine ground sluice nr Grass Valley	4/1/1999	15:40	1of2	13	0	0.080	0.023	<2	1	25	0	0.025	0.001	43	2	0.0049	0.0001
BY88	Poore Mine ground sluice nr Grass Valley	4/1/1999	15:40	2of2	13	1	0.071	0.003	<2	0	26	0	0.031	0.004	41	2	0.0064	0.0012
BY89	Poore Mine pit lake nr Grass Valley	4/1/1999	16:50	1of2	3.3	0.2	0.20	0.00	<2	1	15	0	0.025	0.004	24	2	0.0033	0.0003
BY89	Poore Mine pit lake nr Grass Valley	4/1/1999	16:50	2of2	3.2	0.1	0.23	0.05	<2	0	15	1	0.026	0.006	25	1	0.0039	0.0012
BY89	Poore Mine pit lake nr Grass Valley	5/23/2000	10:45	1of2	25	1	0.058	0.008	<86	22	21	0	0.029	0.004	122	2	0.0068	0.0012
BY89	Poore Mine pit lake nr Grass Valley	5/23/2000	10:45	2of2	25	0	0.054	0.004	<86	11	21	0	0.029	0.002	126	6	0.0078	0.0006
BY90	Poore Mine seep above ground sluice nr Grass Valley	4/1/1999	16:00	1of2	—		—		—		—		—		—		—	
BY90	Poore Mine seep above ground sluice nr Grass Valley	4/1/1999	16:00	2of2	—		—		—		—		—		—		—	
BY91	Poore Mine tunnel effluent nr Grass Valley	3/31/1999	15:20	1of2	11	0	0.16	0.01	<2	1	28	1	0.017	0.001	80	3	0.0031	0.0002
BY91	Poore Mine tunnel effluent nr Grass Valley	3/31/1999	15:20	2of2	11	0	0.20	0.01	<2	1	29	0	0.019	0.003	82	1	0.0036	0.0008
BY91	Poore Mine tunnel effluent nr Grass Valley	12/15/1999	13:00	1of2	15	0	0.09	0.01	<0.6	0.4	34	1	0.022	0.004	110	0	0.0053	0.0005
BY91	Poore Mine tunnel effluent nr Grass Valley	12/15/1999	13:00	2of2	17	0	0.07	0.01	<0.6	0.3	38	1	0.033	0.010	110	20	0.0038	0.0015
BY91	Poore Mine tunnel effluent nr Grass Valley	5/23/2000	12:00	1of2	15	0	0.14	0.02	<86	30	36	0	0.32	0.01	123	4	0.050	0.004
BY91	Poore Mine tunnel effluent nr Grass Valley	5/23/2000	12:00	2of2	16	0	0.14	0.01	<86	21	37	1	0.29	0.02	121	6	0.044	0.003

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Replicate	Sulfur (S), unfiltered (mg/L) (80107)		Antimony (Sb), unfiltered (µg/L) (01097)		Selenium (Se), unfiltered (µg/L) (01147)		Silica (Si), unfiltered (mg/L as SiO_2) (00956)		Samarium (Sm), unfiltered (µg/L) (82322)		Strontium (Sr), unfiltered (µg/L) (01084)		Terbium (Tb), unfiltered (µg/L) (01218)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY105	Sailor Flat Mine main drain gulch 01 nr Quaker Hill	7/6/1999	16:00	1of2	6.5	0.1	0.15	0.02	<2	2	27	1	1.7	0.2	56	1	0.25	0.03
BY105	Sailor Flat Mine main drain gulch 01 nr Quaker Hill	7/6/1999	16:00	2of2	6.5	0.1	0.19	0.01	<2	3	26	1	1.6	0.1	56	1	0.16	0.02
BY105	Sailor Flat Mine main drain Gulch 01 nr Quaker Hill	12/2/1999	14:30	1of2	2.7	0.2	0.55	0.00	<0.6	0.0	32	1	4.0	0.0	61	0	0.57	0.09
BY105	Sailor Flat Mine main drain Gulch 01 nr Quaker Hill	12/2/1999	14:30	2of2	2.6	0.2	0.45	0.01	<0.6	0.1	31	1	4.5	0.0	55	8	0.55	0.04
BY106	Sailor Flat Mine main drainage to Greenhorn Cr, Gulch 03	4/9/2001	12:30	1of 2	0.59	0.07	0.05	0.03	<2	0	12	1	0.32	0.00	11	1	0.048	0.002
BY106	Sailor Flat Mine main drainage to Greenhorn Cr, Gulch 03	4/9/2001	12:30	2of 2	0.54	0.08	<0.04	0.01	<2	0	12	3	0.31	0.01	11	0	0.044	0.001
BY114	SF Greenhorn Cr 0.7 mi ab Greenhorn Cr nr Nevada City	8/22/2000	15:10	1of2	1.6	0.1	0.05	0.01	<1	1	13	3	<0.008	0.002	43	6	<0.002	0.001
BY114	SF Greenhorn Cr 0.7 mi ab Greenhorn Cr nr Nevada City	8/22/2000	15:10	2of2	1.5	0.4	0.10	0.02	<1	1	11	1	<0.008	0.005	40	16	<0.002	0.000
BY122	Starr Mine tunnel inflow nr Grass Valley	4/23/1999	15:00	1of2	13	1	0.22	0.01	<2	0	15	1	0.044	0.003	54	4	0.0073	0.0009
BY122	Starr Mine tunnel inflow nr Grass Valley	4/23/1999	15:00	2of2	14	0	0.23	0.01	<2	1	17	0	0.053	0.008	59	1	0.0095	0.0020
BY123	Starr Mine tunnel midway nr Grass Valley	4/23/1999	13:40	1of2	12	1	0.15	0.01	<2	1	20	1	0.032	0.005	200	10	0.0055	0.0017
BY123	Starr Mine tunnel midway nr Grass Valley	4/23/1999	13:40	2of2	12	1	0.14	0.01	<2	1	20	1	0.016	0.006	200	10	0.0045	0.0011

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Replicate	Sulfur (S), unfiltered (mg/L) (80107)		Antimony (Sb), unfiltered (µg/L) (01097)		Selenium (Se), unfiltered (µg/L) (01147)		Silica (Si), unfiltered (mg/L as SiO_2) (00956)		Samarium (Sm), unfiltered (µg/L) (82322)		Strontium (Sr), unfiltered (µg/L) (01084)		Terbium (Tb), unfiltered (µg/L) (01218)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	10:45	1of2	21	1	0.13	0.00	1.0	0.1	19	1	0.061	0.007	280	20	0.010	0.004
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	10:45	2of2	21	0	0.12	0.02	1.2	0.2	18	0	0.057	0.001	270	0	0.011	0.002
BY124	Starr Mine tunnel outlet nr Grass Valley	8/23/2000	17:30	1of2	9.2	0.0	0.28	0.02	<1	0	22	3	0.15	0.00	200	30	0.026	0.002
BY124	Starr Mine tunnel outlet nr Grass Valley	8/23/2000	17:30	2of2	8.9	0.3	0.30	0.04	<1	1	20	1	0.15	0.01	190	40	0.027	0.000
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:00	1of2	0.74	0.19	0.25	0.05	<1	1	19	1	2.5	0.5	60	16	0.37	0.07
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:00	2of2	0.86	0.08	0.23	0.01	<1	1	22	2	2.4	0.4	61	11	0.35	0.05
BY130	Tom and Jerry Mine drain at tunnel outlet nr Nevada City	6/28/2000	11:30	1of2	6.1	0.2	0.12	0.04	<1	1	18	2	0.037	0.006	110	0	0.004	0.000
BY130	Tom and Jerry Mine drain at tunnel outlet nr Nevada City	6/28/2000	11:30	2of2	6.7	0.4	0.11	0.03	<1	1	19	4	0.046	0.017	120	10	0.007	0.002
BY131	Tom and Jerry Mine drainage pond nr Nevada City	8/23/2000	10:45	1of2	1.5	0.1	0.07	0.02	<1	1	16	1	0.055	0.007	43	4	0.008	0.001
BY131	Tom and Jerry Mine drainage pond nr Nevada City	8/23/2000	10:45	2of2	1.4	0.4	0.06	0.02	<1	2	15	4	0.042	0.002	39	8	0.009	0.001

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Replicate	Sulfur (S), unfiltered (mg/L) (80107)		Antimony (Sb), unfiltered (µg/L) (01097)		Selenium (Se), unfiltered (µg/L) (01147)		Silica (Si), unfiltered (mg/L as SiO_2) (00956)		Samarium (Sm), unfiltered (µg/L) (82322)		Strontium (Sr), unfiltered (µg/L) (01084)		Terbium (Tb), unfiltered (µg/L) (01218)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
Disturbed samples																		
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	11:30	1of2	36	0	2.9	0.4	15	0	280	20	20	0	1,300	0	3.7	0.0
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	11:30	2of2	33	1	2.8	0.0	15	0	270	20	21	0	1,100	0	3.3	0.1
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:30	1of2	4.8	0.2	0.19	0.01	<1	1	84	2	26	4	280	40	3.6	0.5
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:30	2of2	6.3	1.4	0.19	0.03	<1	1	110	30	29	1	300	20	4.0	0.2

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Tellurium (Te), unfiltered (µg/L) (01064)		Thorium (Th), unfiltered (µg/L) (82364)		Thallium (Tl), unfiltered (µg/L) (01059)		Thulium (Tm), unfiltered (µg/L) —		Uranium (U), unfiltered (µg/L) (28011)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
Environmental samples														
BY20	Boston Mine tunnel outlet nr Grass Valley	6/18/1999	14:30	1of2	<0.02	0.01	0.0054	0.0014	0.017	0.006	0.0016	0.0003	0.0078	0.0012
BY20	Boston Mine tunnel outlet nr Grass Valley	6/18/1999	14:30	2of2	<0.02	0.01	0.0027	0.0006	0.016	0.003	0.0015	0.0002	0.012	0.005
BY20	Boston Mine tunnel outlet nr Grass Valley	12/14/1999	12:00	1of2	<0.02	0.00	0.015	0.008	0.024	0.003	0.011	0.000	0.019	0.003
BY20	Boston Mine tunnel outlet nr Grass Valley	12/14/1999	12:00	2of2	<0.02	0.01	0.019	0.006	0.021	0.007	0.0068	0.0012	0.018	0.001
BY20	Boston Mine tunnel outlet nr Grass Valley	5/24/2000	16:00	1of2	<0.04	0.04	0.003	0.001	0.016	0.004	0.0033	0.0015	0.011	0.001
BY20	Boston Mine tunnel outlet nr Grass Valley	5/24/2000	16:00	2of2	<0.04	0.01	0.004	0.002	0.020	0.010	0.0061	0.0004	0.013	0.003
BY21	Boston Mine wetlands pond nr Grass Valley	12/14/1999	10:30	1of2	<0.05	0.03	<0.005	0.004	0.013	0.009	<0.001	0.001	0.006	0.001
BY21	Boston Mine wetlands pond nr Grass Valley	12/14/1999	10:30	2of2	<0.05	0.02	0.006	0.003	0.007	0.002	<0.001	0.000	0.008	0.001
BY21	Boston Mine wetlands pond nr Grass Valley	5/24/2000	16:30	1of2	<0.04	0.04	0.005	0.002	0.017	0.010	0.0012	0.0003	0.008	0.002
BY21	Boston Mine wetlands pond nr Grass Valley	5/24/2000	16:30	2of2	<0.04	0.02	0.004	0.001	0.008	0.005	0.0009	0.0002	0.008	0.002
BY58	Buckeye Flat Mine main drain 0.45 mi ab Greenhorn Cr	8/21/2000	11:00	1of2	<0.6	0.3	<0.02	0.01	<0.3	0.1	0.25	0.01	0.31	0.04
BY58	Buckeye Flat Mine main drain 0.45 mi ab Greenhorn Cr	8/21/2000	11:00	2of2	<0.6	0.3	<0.02	0.00	<0.3	0.1	0.17	0.02	0.25	0.02

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Tellurium (Te), unfiltered (µg/L) (01064)		Thorium (Th), unfiltered (µg/L) (82364)		Thallium (Tl), unfiltered (µg/L) (01059)		Thulium (Tm), unfiltered (µg/L) —		Uranium (U), unfiltered (µg/L) (28011)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	6/18/1999	11:30	1of2	<0.02	0.01	0.014	0.000	0.13	0.00	0.31	0.03	0.39	0.00
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	6/18/1999	11:30	2of2	<0.02	0.02	0.015	0.002	0.15	0.00	0.32	0.04	0.42	0.01
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	12/2/1999	11:00	1of2	<0.02	0.02	0.14	0.00	0.13	0.00	0.27	0.03	0.41	0.01
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	12/2/1999	11:00	2of2	<0.02	0.01	0.12	0.01	0.15	0.01	0.29	0.02	0.41	0.00
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	8/22/2000	10:45	1of2	<0.6	0.2	<0.02	0.01	<0.3	0.3	0.34	0.00	0.38	0.01
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	8/22/2000	10:45	2of2	<0.6	0.5	<0.02	0.01	<0.3	0.6	0.32	0.01	0.41	0.09
BY116	Buckeye Flat Mine pond drain 0.15 mi ab SF Greenhorn Cr	8/21/2000	14:10	1of2	<0.07	0.05	0.020	0.013	<0.07	0.01	0.002	0.001	0.008	0.001
BY116	Buckeye Flat Mine pond drain 0.15 mi ab SF Greenhorn Cr	8/21/2000	14:10	2of2	<0.07	0.01	0.042	0.016	<0.07	0.01	0.003	0.001	0.014	0.002
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/26/1999	11:00	1of2	0.22	0.05	0.0077	0.0016	0.012	0.005	0.0078	0.0008	0.031	0.001
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/26/1999	11:00	2of2	0.18	0.06	0.0094	0.0006	0.015	0.003	0.0099	0.0014	0.034	0.002
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/22/2000	12:10	1of2	<0.07	0.03	0.029	0.002	<0.07	0.02	0.017	0.003	0.10	0.00
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/22/2000	12:10	2of2	<0.07	0.02	0.021	0.004	<0.07	0.03	0.016	0.003	0.098	0.005

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Tellurium (Te), unfiltered (µg/L) (01064)		Thorium (Th), unfiltered (µg/L) (82364)		Thallium (Tl), unfiltered (µg/L) (01059)		Thulium (Tm), unfiltered (µg/L) —		Uranium (U), unfiltered (µg/L) (28011)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY25	Buckeye Flat Mine upper drain	4/9/2001	10:00	1of2	<0.1	0.0	<0.02	0.00	0.01	0.00	0.054	0.002	0.044	0.001
BY25	Buckeye Flat Mine upper drain	4/9/2001	10:00	2of2	<0.1	0.0	<0.02	0.00	<0.01	0.02	0.055	0.000	0.042	0.001
BY52	Greenhorn Cr 0.3 mi ab Buckeye Ford nr Nevada City	1/25/2000	10:45	1of2	<0.05	0.03	0.18	0.01	0.016	0.003	0.013	0.002	0.11	0.00
BY52	Greenhorn Cr 0.3 mi ab Buckeye Ford nr Nevada City	1/25/2000	10:45	2of2	<0.05	0.01	0.19	0.00	0.018	0.006	0.015	0.003	0.11	0.00
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	7/24/2001	11:00	1of2	<0.08	0.03	<0.006	0.000	<0.04	0.01	0.002	0.001	0.054	0.009
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	7/24/2001	11:00	2of2	<0.08	0.02	<0.006	0.001	<0.04	0.02	<0.002	0.000	0.013	0.001
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	8/29/2001	15:00	1of2	<0.08	0.01	<0.006	0.001	<0.04	0.00	<0.002	0.001	<0.007	0.000
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	8/29/2001	15:00	2of2	<0.08	0.02	<0.006	0.001	<0.04	0.01	<0.002	0.001	<0.007	0.003
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	9/14/2001	13:00	1of2	<0.03	0.02	<0.004	0.001	<0.06	0.02	0.0012	0.0007	<0.008	0.004
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	9/14/2001	13:00	2of2	<0.03	0.02	<0.004	0.001	<0.06	0.04	<0.001	0.000	<0.008	0.002
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	10/15/2001	12:00	1of2	<0.05	0.02	<0.006	0.002	<0.05	0.02	<0.001	0.001	<0.006	0.001
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	10/15/2001	12:00	2of2	<0.05	0.04	<0.006	0.001	<0.05	0.00	<0.001	0.001	<0.006	0.004
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	11/20/2001	13:20	1of2	<0.03	0.02	<0.004	0.000	<0.06	0.03	0.0020	0.0003	0.011	0.005
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	11/20/2001	13:20	2of2	<0.03	0.03	<0.004	0.000	<0.06	0.01	0.0034	0.0006	<0.008	0.002

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Tellurium (Te), unfiltered (µg/L) (01064)		Thorium (Th), unfiltered (µg/L) (82364)		Thallium (Tl), unfiltered (µg/L) (01059)		Thulium (Tm), unfiltered (µg/L) —		Uranium (U), unfiltered (µg/L) (28011)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/10/2001	12:20	1of2	<0.05	0.01	0.076	0.001	<0.05	0.02	0.016	0.000	0.11	0.01
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/10/2001	12:20	2of2	<0.05	0.04	0.075	0.001	<0.05	0.02	0.017	0.002	0.10	0.01
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/21/2001	13:00	1of2	<0.11	0.08	0.40	0.08	<0.11	0.08	0.059	0.001	0.49	0.00
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/21/2001	13:00	2of2	<0.11	0.06	0.41	0.04	0.23	0.35	0.065	0.002	0.47	0.01
BY51	Greenhorn Cr nr headwaters nr Scotts Flat Res	1/25/2000	9:30	1of2	<0.05	0.02	0.017	0.004	0.003	0.005	0.003	0.001	0.012	0.001
BY51	Greenhorn Cr nr headwaters nr Scotts Flat Res	1/25/2000	9:30	2of2	<0.05	0.00	0.019	0.010	<0.003	0.003	0.005	0.001	0.009	0.000
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	12/14/1999	14:00	1of2	<0.02	0.00	0.016	0.014	0.019	0.010	0.0088	0.0013	0.017	0.003
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	12/14/1999	14:00	2of2	<0.02	0.02	0.010	0.002	0.009	0.006	0.0074	0.0006	0.018	0.001
BY86	Poore Mine Creek ab tunnel nr Grass Valley	3/31/1999	17:40	1of2	<0.02	0.01	0.057	0.006	<0.004	0.002	0.0043	0.0001	0.029	0.003
BY86	Poore Mine Creek ab tunnel nr Grass Valley	3/31/1999	17:40	2of2	<0.02	0.03	0.061	0.000	<0.004	0.005	0.0043	0.0003	0.028	0.001
BY87	Poore Mine Creek bl tunnel nr Grass Valley	3/31/1999	13:30	1of2	<0.02	0.03	0.049	0.002	<0.004	0.008	0.0042	0.0007	0.025	0.001
BY87	Poore Mine Creek bl tunnel nr Grass Valley	3/31/1999	13:30	2of2	<0.02	0.01	0.054	0.010	<0.004	0.003	0.0055	0.0018	0.024	0.000

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Replicate	Tellurium (Te), unfiltered (µg/L) (01064)		Thorium (Th), unfiltered (µg/L) (82364)		Thallium (Tl), unfiltered (µg/L) (01059)		Thulium (Tm), unfiltered (µg/L) —		Uranium (U), unfiltered (µg/L) (28011)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY88	Poore Mine ground sluice nr Grass Valley	4/1/1999	15:40	1of2	<0.02	0.03	0.004	0.001	<0.004	0.001	0.0026	0.0005	0.012	0.004
BY88	Poore Mine ground sluice nr Grass Valley	4/1/1999	15:40	2of2	<0.02	0.02	0.005	0.003	<0.004	0.003	0.0035	0.0001	0.0097	0.0012
BY89	Poore Mine pit lake nr Grass Valley	4/1/1999	16:50	1of2	<0.02	0.02	0.007	0.000	<0.004	0.003	0.0018	0.0006	0.0082	0.0013
BY89	Poore Mine pit lake nr Grass Valley	4/1/1999	16:50	2of2	<0.02	0.01	0.007	0.002	<0.004	0.007	0.0023	0.0005	0.0088	0.0015
BY89	Poore Mine pit lake nr Grass Valley	5/23/2000	10:45	1of2	<0.04	0.02	0.004	0.001	0.029	0.004	0.0035	0.0007	0.031	0.002
BY89	Poore Mine pit lake nr Grass Valley	5/23/2000	10:45	2of2	<0.04	0.02	0.005	0.001	0.028	0.000	0.0027	0.0006	0.030	0.002
BY90	Poore Mine seep above ground sluice nr Grass Valley	4/1/1999	16:00	1of2	—		—		—		—		—	
BY90	Poore Mine seep above ground sluice nr Grass Valley	4/1/1999	16:00	2of2	—		—		—		—		—	
BY91	Poore Mine tunnel effluent nr Grass Valley	3/31/1999	15:20	1of2	<0.02	0.03	0.006	0.002	<0.004	0.006	0.0011	0.0005	0.048	0.001
BY91	Poore Mine tunnel effluent nr Grass Valley	3/31/1999	15:20	2of2	<0.02	0.00	0.010	0.002	<0.004	0.001	0.0012	0.0006	0.045	0.001
BY91	Poore Mine tunnel effluent nr Grass Valley	12/15/1999	13:00	1of2	<0.02	0.02	0.013	0.003	<0.006	0.001	0.0014	0.0012	0.079	0.004
BY91	Poore Mine tunnel effluent nr Grass Valley	12/15/1999	13:00	2of2	<0.02	0.01	0.046	0.004	<0.006	0.004	0.0019	0.0013	0.079	0.001
BY91	Poore Mine tunnel effluent nr Grass Valley	5/23/2000	12:00	1of2	<0.04	0.01	0.032	0.001	0.011	0.008	0.019	0.002	0.35	0.01
BY91	Poore Mine tunnel effluent nr Grass Valley	5/23/2000	12:00	2of2	<0.04	0.02	0.027	0.001	0.008	0.002	0.019	0.001	0.32	0.00

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Tellurium (Te), unfiltered (µg/L) (01064)		Thorium (Th), unfiltered (µg/L) (82364)		Thallium (Tl), unfiltered (µg/L) (01059)		Thulium (Tm), unfiltered (µg/L) —		Uranium (U), unfiltered (µg/L) (28011)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY105	Sailor Flat Mine main drain gulch 01 nr Quaker Hill	7/6/1999	16:00	1of2	<0.02	0.01	0.22	0.03	0.047	0.013	0.11	0.00	0.66	0.05
BY105	Sailor Flat Mine main drain gulch 01 nr Quaker Hill	7/6/1999	16:00	2of2	0.03	0.01	0.23	0.03	0.045	0.003	0.11	0.00	0.72	0.00
BY105	Sailor Flat Mine main drain Gulch 01 nr Quaker Hill	12/2/1999	14:30	1of2	0.06	0.03	13	0	0.17	0.01	0.23	0.02	5.7	0.2
BY105	Sailor Flat Mine main drain Gulch 01 nr Quaker Hill	12/2/1999	14:30	2of2	0.03	0.02	11	0	0.19	0.01	0.24	0.02	6.0	0.1
BY106	Sailor Flat Mine main drainage to Greenhorn Cr, Gulch 03	4/9/2001	12:30	1of 2	<0.1	0.0	0.07	0.00	<0.01	0.00	0.023	0.004	0.43	0.05
BY106	Sailor Flat Mine main drainage to Greenhorn Cr, Gulch 03	4/9/2001	12:30	2of 2	<0.1	0.0	0.09	0.02	<0.01	0.01	0.023	0.002	0.43	0.00
BY114	SF Greenhorn Cr 0.7 mi ab Greenhorn Cr nr Nevada City	8/22/2000	15:10	1of2	<0.07	0.04	0.007	0.003	<0.07	0.01	<0.001	0.000	0.011	0.003
BY114	SF Greenhorn Cr 0.7 mi ab Greenhorn Cr nr Nevada City	8/22/2000	15:10	2of2	<0.07	0.02	0.008	0.005	<0.07	0.01	<0.001	0.000	0.010	0.004
BY122	Starr Mine tunnel inflow nr Grass Valley	4/23/1999	15:00	1of2	<0.02	0.01	0.006	0.001	<0.004	0.003	0.0032	0.0008	0.0085	0.0012
BY122	Starr Mine tunnel inflow nr Grass Valley	4/23/1999	15:00	2of2	<0.02	0.02	0.008	0.002	<0.004	0.001	0.0035	0.0008	0.0086	0.0011
BY123	Starr Mine tunnel midway nr Grass Valley	4/23/1999	13:40	1of2	<0.02	0.02	0.12	0.00	<0.004	0.004	0.0024	0.0004	0.046	0.002
BY123	Starr Mine tunnel midway nr Grass Valley	4/23/1999	13:40	2of2	<0.02	0.03	0.013	0.003	<0.004	0.005	0.0017	0.0002	0.040	0.001

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Tellurium (Te), unfiltered (µg/L) (01064)		Thorium (Th), unfiltered (µg/L) (82364)		Thallium (Tl), unfiltered (µg/L) (01059)		Thulium (Tm), unfiltered (µg/L) —		Uranium (U), unfiltered (µg/L) (28011)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	10:45	1of2	<0.02	0.03	0.031	0.003	<0.006	0.003	0.0057	0.0012	0.062	0.002
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	10:45	2of2	<0.02	0.01	0.031	0.000	<0.006	0.007	0.0051	0.0009	0.061	0.002
BY124	Starr Mine tunnel outlet nr Grass Valley	8/23/2000	17:30	1of2	<0.07	0.08	0.022	0.003	<0.07	0.05	0.010	0.002	0.19	0.00
BY124	Starr Mine tunnel outlet nr Grass Valley	8/23/2000	17:30	2of2	<0.07	0.03	0.021	0.003	<0.07	0.02	0.013	0.002	0.19	0.00
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:00	1of2	<0.07	0.00	0.25	0.00	<0.07	0.03	0.13	0.03	0.13	0.03
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:00	2of2	<0.07	0.01	0.24	0.00	<0.07	0.00	0.13	0.02	0.14	0.01
BY130	Tom and Jerry Mine drain at tunnel outlet nr Nevada City	6/28/2000	11:30	1of2	<0.07	0.04	0.020	0.012	<0.07	0.00	0.002	0.001	0.006	0.000
BY130	Tom and Jerry Mine drain at tunnel outlet nr Nevada City	6/28/2000	11:30	2of2	<0.07	0.05	0.014	0.005	<0.07	0.01	0.002	0.000	0.007	0.002
BY131	Tom and Jerry Mine drainage pond nr Nevada City	8/23/2000	10:45	1of2	<0.07	0.05	0.013	0.002	<0.07	0.01	0.003	0.000	0.008	0.001
BY131	Tom and Jerry Mine drainage pond nr Nevada City	8/23/2000	10:45	2of2	<0.07	0.06	0.010	0.003	<0.07	0.01	0.005	0.000	0.009	0.002

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Replicate	Tellurium (Te), unfiltered (µg/L) (01064)		Thorium (Th), unfiltered (µg/L) (82364)		Thallium (Tl), unfiltered (µg/L) (01059)		Thulium (Tm), unfiltered (µg/L) —		Uranium (U), unfiltered (µg/L) (28011)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
Disturbed samples														
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	11:30	1of2	0.75	0.06	14	0	3.1	0.1	2.0	0.1	7.6	0.3
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	11:30	2of2	0.61	0.08	12	0	3.4	0.1	2.2	0.0	7.1	0.2
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:30	1of2	0.10	0.08	5.6	0.2	0.16	0.06	1.1	0.2	4.7	0.7
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:30	2of2	0.07	0.05	5.9	0.0	0.21	0.03	1.2	0.0	5.2	0.2

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Replicate	Vanadium (V), unfiltered (µg/L) (01087)		Yttrium (Y), unfiltered (µg/L) (01203)		Ytterbium (Yb), unfiltered (µg/L) (01196)		Zinc (Zn), unfiltered (µg/L) (01092)		Zirconium (Zr) unfiltered (µg/L) (01162)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
Environmental samples														
BY20	Boston Mine tunnel outlet nr Grass Valley	6/18/1999	14:30	1of2	<3	2	0.16	0.03	0.009	0.001	5.1	0.9	0.006	0.003
BY20	Boston Mine tunnel outlet nr Grass Valley	6/18/1999	14:30	2of2	<3	2	0.16	0.02	0.010	0.002	4.7	1.9	0.011	0.003
BY20	Boston Mine tunnel outlet nr Grass Valley	12/14/1999	12:00	1of2	<4	1	1.1	0.0	0.060	0.003	43	11	0.018	0.006
BY20	Boston Mine tunnel outlet nr Grass Valley	12/14/1999	12:00	2of2	<4	3	0.47	0.05	0.044	0.002	29	3	0.012	0.004
BY20	Boston Mine tunnel outlet nr Grass Valley	5/24/2000	16:00	1of2	<1	0	0.22	0.01	0.015	0.003	5.0	0.4	0.006	0.001
BY20	Boston Mine tunnel outlet nr Grass Valley	5/24/2000	16:00	2of2	<1	1	0.46	0.01	0.030	0.007	13	1	0.009	0.005
BY21	Boston Mine wetlands pond nr Grass Valley	12/14/1999	10:30	1of2	<2	1	0.028	0.001	<0.002	0.001	15	2	0.011	0.006
BY21	Boston Mine wetlands pond nr Grass Valley	12/14/1999	10:30	2of2	<2	1	0.037	0.001	0.004	0.001	14	3	0.011	0.002
BY21	Boston Mine wetlands pond nr Grass Valley	5/24/2000	16:30	1of2	<1	1	0.058	0.005	0.003	0.000	4.4	0.1	0.013	0.002
BY21	Boston Mine wetlands pond nr Grass Valley	5/24/2000	16:30	2of2	<1	0	0.054	0.004	0.004	0.002	7.4	0.6	1.0	0.1
BY58	Buckeye Flat Mine main drain 0.45 mi ab Greenhorn Cr	8/21/2000	11:00	1of2	<1	1	22	1	1.4	0.1	290	10	<0.3	0.1
BY58	Buckeye Flat Mine main drain 0.45 mi ab Greenhorn Cr	8/21/2000	11:00	2of2	<1	1	17	1	0.99	0.01	220	10	<0.3	0.2

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Vanadium (V), unfiltered (µg/L) (01087)		Yttrium (Y), unfiltered (µg/L) (01203)		Ytterbium (Yb), unfiltered (µg/L) (01196)		Zinc (Zn), unfiltered (µg/L) (01092)		Zirconium (Zr) unfiltered (µg/L) (01162)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	6/18/1999	11:30	1of2	<3	2	44	1	1.8	0.1	550	30	0.021	0.000
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	6/18/1999	11:30	2of2	<3	2	31	5	2.0	0.1	550	10	0.014	0.004
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	12/2/1999	11:00	1of2	<4	2	25	1	1.5	0.0	270	20	0.093	0.005
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	12/2/1999	11:00	2of2	<4	0	18	1	1.9	0.0	270	0	0.091	0.007
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	8/22/2000	10:45	1of2	<1	1	32	0	1.9	0.2	400	0	19	1
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	8/22/2000	10:45	2of2	<1	1	29	3	1.8	0.0	360	10	8.0	7.9
BY116	Buckeye Flat Mine pond drain 0.15 mi ab SF Greenhorn Cr	8/21/2000	14:10	1of2	<2	1	0.17	0.02	0.016	0.001	9	0	0.011	0.007
BY116	Buckeye Flat Mine pond drain 0.15 mi ab SF Greenhorn Cr	8/21/2000	14:10	2of2	<2	1	0.17	0.00	0.015	0.004	9	1	0.016	0.009
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/26/1999	11:00	1of2	<3	2	0.98	0.06	0.048	0.004	23	1	0.015	0.002
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/26/1999	11:00	2of2	<3	1	0.94	0.08	0.056	0.010	21	8	0.014	0.006
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/22/2000	12:10	1of2	<2	1	1.4	0.1	0.11	0.03	17	2	0.035	0.011
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/22/2000	12:10	2of2	<2	1	1.3	0.2	0.11	0.02	19	0	0.079	0.028

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Replicate	Vanadium (V), unfiltered (µg/L) (01087)		Yttrium (Y), unfiltered (µg/L) (01203)		Ytterbium (Yb), unfiltered (µg/L) (01196)		Zinc (Zn), unfiltered (µg/L) (01092)		Zirconium (Zr) unfiltered (µg/L) (01162)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY25	Buckeye Flat Mine upper drain	4/9/2001	10:00	1of2	<1	1	4.9	0.2	0.29	0.00	80	6	<0.02	0.01
BY25	Buckeye Flat Mine upper drain	4/9/2001	10:00	2of2	<1	1	5.2	0.0	0.30	0.01	81	1	<0.02	0.00
BY52	Greenhorn Cr 0.3 mi ab Buckeye Ford nr Nevada City	1/25/2000	10:45	1of2	<2	1	1.0	0.0	0.092	0.001	17	2	0.091	0.011
BY52	Greenhorn Cr 0.3 mi ab Buckeye Ford nr Nevada City	1/25/2000	10:45	2of2	<2	1	1.0	0.0	0.092	0.001	19	1	0.090	0.012
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	7/24/2001	11:00	1of2	<2	1	0.052	0.003	0.005	0.002	3.1	0.3	<0.01	0.00
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	7/24/2001	11:00	2of2	<2	1	0.066	0.007	0.006	0.002	2.4	0.6	<0.01	0.00
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	8/29/2001	15:00	1of2	<2	1	0.038	0.007	<0.004	0.001	1.3	0.4	<0.01	0.01
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	8/29/2001	15:00	2of2	<2	1	0.043	0.002	0.006	0.003	1.9	0.4	<0.01	0.01
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	9/14/2001	13:00	1of2	<2	2	0.047	0.003	0.005	0.002	4.3	0.8	<0.02	0.00
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	9/14/2001	13:00	2of2	<2	2	0.049	0.001	<0.003	0.002	4.5	0.6	<0.02	0.01
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	10/15/2001	12:00	1of2	<1	1	0.032	0.012	0.004	0.003	<2	0	<0.02	0.01
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	10/15/2001	12:00	2of2	<1	2	0.029	0.002	0.004	0.002	<2	1	<0.02	0.00
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	11/20/2001	13:20	1of2	<2	1	0.17	0.01	0.015	0.002	13	2	<0.02	0.01
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	11/20/2001	13:20	2of2	<2	1	0.19	0.00	0.016	0.001	16	0	<0.02	0.00

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Replicate	Vanadium (V), unfiltered (µg/L) (01087)		Yttrium (Y), unfiltered (µg/L) (01203)		Ytterbium (Yb), unfiltered (µg/L) (01196)		Zinc (Zn), unfiltered (µg/L) (01092)		Zirconium (Zr) unfiltered (µg/L) (01162)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/10/2001	12:20	1of2	3	1	1.2	0.0	0.087	0.006	3	1	0.05	0.01
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/10/2001	12:20	2of2	4	2	1.2	0.1	0.10	0.00	5	0	0.06	0.01
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/21/2001	13:00	1of2	17	1	4.6	0.3	0.37	0.01	25	4	0.07	0.01
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/21/2001	13:00	2of2	17	5	4.9	0.1	0.46	0.01	25	1	0.06	0.00
BY51	Greenhorn Cr nr headwaters nr Scotts Flat Reservoir	1/25/2000	9:30	1of2	<2	1	0.30	0.02	0.032	0.006	13	1	0.040	0.002
BY51	Greenhorn Cr nr headwaters nr Scotts Flat Reservoir	1/25/2000	9:30	2of2	<2	1	0.29	0.01	0.027	0.005	14	0	0.043	0.008
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	12/14/1999	14:00	1of2	<4	1	0.70	0.16	0.045	0.013	45	1	0.019	0.004
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	12/14/1999	14:00	2of2	<4	1	0.60	0.06	0.045	0.007	44	1	0.017	0.008
BY86	Poore Mine Creek ab tunnel nr Grass Valley	3/31/1999	17:40	1of2	<4	0	0.26	0.01	0.032	0.003	4.1	1.3	0.071	0.002
BY86	Poore Mine Creek ab tunnel nr Grass Valley	3/31/1999	17:40	2of2	<4	1	0.37	0.05	0.028	0.005	5.3	1.9	0.087	0.007
BY87	Poore Mine Creek bl tunnel nr Grass Valley	3/31/1999	13:30	1of2	<4	1	0.40	0.02	0.033	0.003	3.9	0.8	0.089	0.016

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Replicate	Vanadium (V), unfiltered (µg/L) (01087)		Yttrium (Y), unfiltered (µg/L) (01203)		Ytterbium (Yb), unfiltered (µg/L) (01196)		Zinc (Zn), unfiltered (µg/L) (01092)		Zirconium (Zr) unfiltered (µg/L) (01162)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY87	Poore Mine Creek bl tunnel nr Grass Valley	3/31/1999	13:30	2of2	<4	1	0.31	0.03	0.039	0.002	2.8	0.4	0.080	0.000
BY88	Poore Mine ground sluice nr Grass Valley	4/1/1999	15:40	1of2	<4	2	0.25	0.02	0.019	0.002	11	1	0.010	0.002
BY88	Poore Mine ground sluice nr Grass Valley	4/1/1999	15:40	2of2	<4	2	0.20	0.01	0.024	0.002	8.9	0.1	0.005	0.001
BY89	Poore Mine pit lake nr Grass Valley	4/1/1999	16:50	1of2	<4	0	0.13	0.03	0.010	0.003	16	3	0.028	0.002
BY89	Poore Mine pit lake nr Grass Valley	4/1/1999	16:50	2of2	<4	0	0.12	0.01	0.013	0.001	14	3	0.009	0.002
BY89	Poore Mine pit lake nr Grass Valley	5/23/2000	10:45	1of2	2	0	0.36	0.01	0.015	0.002	85	0	0.023	0.005
BY89	Poore Mine pit lake nr Grass Valley	5/23/2000	10:45	2of2	<1	1	0.37	0.01	0.016	0.001	84	1	0.016	0.003
BY90	Poore Mine seep above ground sluice nr Grass Valley	4/1/1999	16:00	1of2	—		—		—		—		—	
BY90	Poore Mine seep above ground sluice nr Grass Valley	4/1/1999	16:00	2of2	—		—		—		—		—	
BY91	Poore Mine tunnel effluent nr Grass Valley	3/31/1999	15:20	1of2	<4	1	0.14	0.02	0.007	0.002	13	2	0.010	0.001
BY91	Poore Mine tunnel effluent nr Grass Valley	3/31/1999	15:20	2of2	<4	3	0.11	0.01	0.009	0.001	10	2	0.011	0.007
BY91	Poore Mine tunnel effluent nr Grass Valley	12/15/1999	13:00	1of2	<4	2	0.10	0.01	0.010	0.003	14	1	0.011	0.004
BY91	Poore Mine tunnel effluent nr Grass Valley	12/15/1999	13:00	2of2	<4	1	0.16	0.00	0.012	0.004	16	2	0.015	0.004
BY91	Poore Mine tunnel effluent nr Grass Valley	5/23/2000	12:00	1of2	2	1	2.0	0.0	0.11	0.00	28	0	0.008	0.003

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Replicate	Vanadium (V), unfiltered (µg/L) (01087)		Yttrium (Y), unfiltered (µg/L) (01203)		Ytterbium (Yb), unfiltered (µg/L) (01196)		Zinc (Zn), unfiltered (µg/L) (01092)		Zirconium (Zr) unfiltered (µg/L) (01162)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY91	Poore Mine tunnel effluent nr Grass Valley	5/23/2000	12:00	2of2	<1	0	1.9	0.0	0.11	0.00	30	2	0.069	0.007
BY105	Sailor Flat Mine main drain gulch 01 nr Quaker Hill	7/6/1999	16:00	1of2	<3	1	5.7	0.0	0.84	0.12	41	1	0.19	0.03
BY105	Sailor Flat Mine main drain gulch 01 nr Quaker Hill	7/6/1999	16:00	2of2	3	1	8.5	1.9	0.65	0.00	42	0	0.24	0.06
BY105	Sailor Flat Mine main drain Gulch 01 nr Quaker Hill	12/2/1999	14:30	1of2	19	1	14	0	1.3	0.0	38	2	0.32	0.03
BY105	Sailor Flat Mine main drain Gulch 01 nr Quaker Hill	12/2/1999	14:30	2of2	18	4	14	1	1.5	0.2	37	2	0.32	0.00
BY106	Sailor Flat Mine main drainage to Greenhorn Cr, Gulch 03	4/9/2001	12:30	1of 2	2	1	1.3	0.2	0.18	0.00	6.3	3.1	0.23	0.00
BY106	Sailor Flat Mine main drainage to Greenhorn Cr, Gulch 03	4/9/2001	12:30	2of 2	<1	0	1.3	0.0	0.18	0.01	5.3	1.0	0.22	0.05
BY114	SF Greenhorn Cr 0.7 mi ab Greenhorn Cr nr Nevada City	8/22/2000	15:10	1of2	<2	1	0.025	0.005	<0.002	0.001	2	0	0.015	0.003
BY114	SF Greenhorn Cr 0.7 mi ab Greenhorn Cr nr Nevada City	8/22/2000	15:10	2of2	<2	2	0.025	0.003	0.004	0.001	15	1	0.035	0.005
BY122	Starr Mine tunnel inflow nr Grass Valley	4/23/1999	15:00	1of2	<4	1	0.27	0.00	0.019	0.005	21	1	0.008	0.003
BY122	Starr Mine tunnel inflow nr Grass Valley	4/23/1999	15:00	2of2	<4	1	0.23	0.03	0.021	0.001	20	3	0.010	0.006
BY123	Starr Mine tunnel midway nr Grass Valley	4/23/1999	13:40	1of2	<4	0	0.16	0.05	0.014	0.003	2.8	1.1	0.006	0.004

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Vanadium (V), unfiltered (µg/L) (01087)		Yttrium (Y), unfiltered (µg/L) (01203)		Ytterbium (Yb), unfiltered (µg/L) (01196)		Zinc (Zn), unfiltered (µg/L) (01092)		Zirconium (Zr) unfiltered (µg/L) (01162)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY123	Starr Mine tunnel midway nr Grass Valley	4/23/1999	13:40	2of2	<4	0	0.14	0.01	0.011	0.004	3.3	1.0	0.006	0.001
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	10:45	1of2	<4	1	0.44	0.10	0.032	0.010	17	1	0.020	0.009
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	10:45	2of2	<4	2	0.43	0.05	0.032	0.013	19	2	0.017	0.003
BY124	Starr Mine tunnel outlet nr Grass Valley	8/23/2000	17:30	1of2	3	1	0.83	0.03	0.074	0.004	25	1	0.030	0.007
BY124	Starr Mine tunnel outlet nr Grass Valley	8/23/2000	17:30	2of2	5	0	0.92	0.02	0.063	0.003	21	1	0.028	0.007
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:00	1of2	9	2	9.8	1.6	0.73	0.14	60	10	0.032	0.011
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:00	2of2	10	2	9.4	1.5	0.71	0.14	49	8	0.039	0.009
BY130	Tom and Jerry Mine drain at tunnel outlet nr Nevada City	6/28/2000	11:30	1of2	<2	0	0.17	0.00	0.016	0.005	4	1	0.028	0.010
BY130	Tom and Jerry Mine drain at tunnel outlet nr Nevada City	6/28/2000	11:30	2of2	<2	0	0.20	0.00	0.014	0.006	12	2	0.029	0.011
BY131	Tom and Jerry Mine drainage pond nr Nevada City	8/23/2000	10:45	1of2	<2	0	0.24	0.02	0.017	0.004	3	0	0.025	0.002

Table 4A. Concentrations of trace metals and selected major elements in unfiltered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Vanadium (V), unfiltered (µg/L) (01087)		Yttrium (Y), unfiltered (µg/L) (01203)		Ytterbium (Yb), unfiltered (µg/L) (01196)		Zinc (Zn), unfiltered (µg/L) (01092)		Zirconium (Zr) unfiltered (µg/L) (01162)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY131	Tom and Jerry Mine drainage pond nr Nevada City	8/23/2000	10:45	2of2	<2	1	0.26	0.04	0.031	0.003	3	1	0.053	0.034
Disturbed samples														
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	11:30	1of2	290	0	194	4	10	1	2,700	0	0.68	0.01
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	11:30	2of2	280	10	176	11	13	1	2,500	100	0.68	0.03
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:30	1of2	100	0	86	12	6.2	1.0	230	10	0.28	0.04
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:30	2of2	130	20	93	5	6.8	0.3	240	40	0.35	0.02

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Aluminum (Al), filtered (µg/L) (01105)		Arsenic (As), filtered (µg/L) (01000)		Boron (B), filtered (µg/L) (01020)		Barium (Ba), filtered (µg/L) (01005		Beryllium (Be), filtered (µg/L) (01010)		Bismuth (Bi), filtered (µg/L) (01015)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
Environmental samples																
BY20	Boston Mine tunnel outlet nr Grass Valley	6/18/1999	14:30	1of2	1.2	0.1	0.35	0.01	3	1	52	0	< 0.005	0.002	<0.0008	0.0006
BY20	Boston Mine tunnel outlet nr Grass Valley	6/18/1999	14:30	2of2	1.1	0.3	0.35	0.01	2	0	54	0	<0.005	0.004	<0.0008	0.0001
BY20	Boston Mine tunnel outlet nr Grass Valley	12/14/1999	12:00	1of2	0.70	0.17	<0.6	0.4	4	6	55	3	<0.003	0.001	0.015	0.018
BY20	Boston Mine tunnel outlet nr Grass Valley	12/14/1999	12:00	2of2	0.55	0.27	<0.6	0.5	5	3	56	3	<0.003	0.001	<0.002	0.001
BY20	Boston Mine tunnel outlet nr Grass Valley	5/24/2000	16:00	1of2	9.2	0.1	<0.2	0.1	<20	10	53	1	<0.06	0.04	0.011	0.001
BY20	Boston Mine tunnel outlet nr Grass Valley	5/24/2000	16:00	2of2	9.5	0.2	<0.2	0.1	<20	10	52	0	<0.06	0.04	0.003	0.001
BY21	Boston Mine wetlands pond nr Grass Valley	12/14/1999	10:30	1of2	0.77	0.08	<0.6	0.3	6	4	50	1	0.005	0.004	<0.002	0.001
BY21	Boston Mine wetlands pond nr Grass Valley	12/14/1999	10:30	2of2	0.31	0.25	<0.6	0.2	6	4	50	1	0.004	0.003	<0.002	0.002
BY21	Boston Mine wetlands pond nr Grass Valley	5/24/2000	16:30	1of2	2.3	0.4	0.3	0.0	<20	20	50	0	<0.06	0.01	0.003	0.001
BY21	Boston Mine wetlands pond nr Grass Valley	5/24/2000	16:30	2of2	2.0	0.0	0.4	0.1	<20	10	47	2	<0.06	0.01	<0.003	0.001
BY58	Buckeye Flat Mine main drain 0.45 mi ab Greenhorn Cr	8/21/2000	11:00	1of2	1,500	0	<0.1	0.0	<20	0	32	1	0.39	0.12	<0.003	0.001
BY58	Buckeye Flat Mine main drain 0.45 mi ab Greenhorn Cr	8/21/2000	11:00	2of2	1,500	100	<0.1	0.0	<20	10	32	1	0.30	0.10	0.003	0.003
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	6/18/1999	11:30	1of2	4,100	400	0.44	0.05	2	0	23	0	0.76	0.00	<0.0008	0.0011
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	6/18/1999	11:30	2of2	4,100	400	0.40	0.01	4	2	23	0	0.75	0.00	<0.0008	0.0012
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	12/2/1999	11:00	1of2	4,000	100	<0.6	0.1	8	6	33	0	0.52	0.03	0.005	0.008
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	12/2/1999	11:00	2of2	4,100	100	<0.6	0.2	8	3	33	2	0.54	0.01	0.003	0.003

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Aluminum (Al), filtered (µg/L) (01105)		Arsenic (As), filtered (µg/L) (01000)		Boron (B), filtered (µg/L) (01020)		Barium (Ba), filtered (µg/L) (01005		Beryllium (Be), filtered (µg/L) (01010)		Bismuth (Bi), filtered (µg/L) (01015)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	8/22/2000	10:45	1of2	3,900	100	0.1	0.0	<20	0	35	1	0.43	0.14	0.004	0.004
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	8/22/2000	10:45	2of2	4,100	0	0.2	0.0	<20	10	36	1	0.43	0.14	<0.003	0.000
BY116	Buckeye Flat Mine pond drain 0.15 mi ab SF Greenhorn Cr	8/21/2000	14:10	1of2	9.5	0.9	<0.1	0.1	<20	20	59	2	<0.2	0.1	<0.003	0.001
BY116	Buckeye Flat Mine pond drain 0.15 mi ab SF Greenhorn Cr	8/21/2000	14:10	2of2	10.3	0.4	<0.1	0.0	<20	20	61	0	<0.2	0.1	<0.003	0.001
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/26/1999	11:00	1of2	55	1	0.32	0.02	4	3	18	0	0.04	0.03	0.0016	0.0002
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/26/1999	11:00	2of2	51	0	0.32	0.03	4	3	17	0	<0.03	0.01	0.0019	0.0008
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/22/2000	12:10	1of2	71	1	<0.1	0.0	<20	0	23	0	<0.2	0.1	<0.003	0.001
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/22/2000	12:10	2of2	70	1	<0.1	0.1	<20	10	24	1	<0.2	0.1	<0.003	0.001
BY25	Buckeye Flat Mine upper drain	4/9/2001	10:00	1of2	600	90	<0.1	0.0	<20	0	41	7	0.10	0.06	<0.02	0.00
BY25	Buckeye Flat Mine upper drain	4/9/2001	10:00	2of2	580	0	<0.1	0.0	<20	10	41	2	0.14	0.03	0.03	0.00
BY52	Greenhorn Cr 0.3 mi ab Buckeye Ford nr Nevada City	1/25/2000	10:45	1of2	27	0	<0.1	0.1	<5	2	18	0	0.09	0.10	0.005	0.001
BY52	Greenhorn Cr 0.3 mi ab Buckeye Ford nr Nevada City	1/25/2000	10:45	2of2	31	0	<0.1	0.1	5	3	18	1	<0.05	0.00	<0.003	0.001
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	7/24/2001	11:00	1of2	2.0	0.1	1.0	0.0	7.2	1.1	34	1	0.02	0.00	0.0035	0.0021
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	7/24/2001	11:00	2of2	2.0	0.0	1.0	0.0	6.7	0.4	33	0	0.10	0.14	<0.0009	0.0003

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Aluminum (Al), filtered (µg/L) (01105)		Arsenic (As), filtered (µg/L) (01000)		Boron (B), filtered (µg/L) (01020)		Barium (Ba), filtered (µg/L) (01005		Beryllium (Be), filtered (µg/L) (01010)		Bismuth (Bi), filtered (µg/L) (01015)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	8/29/2001	15:00	1of2	1.8	0.1	1.9	0.0	5.7	0.2	26	1	<0.01	0.00	<0.0009	0.0007
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	8/29/2001	15:00	2of2	1.8	0.0	2.0	0.0	6.2	0.3	26	0	<0.01	0.00	<0.0009	0.0002
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	9/14/2001	13:00	1of2	2.4	0.1	1.2	0.0	6	0	30	0	<0.008	0.003	<0.001	0.001
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	9/14/2001	13:00	2of2	2.5	0.0	1.2	0.0	6	0	30	0	<0.008	0.008	<0.001	0.001
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	10/15/2001	12:00	1of2	0.96	0.04	0.98	0.02	5	0	34	0	<0.008	0.004	<0.001	0.000
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	10/15/2001	12:00	2of2	0.96	0.06	0.95	0.01	5	0	34	0	<0.008	0.003	<0.001	0.001
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	11/20/2001	13:20	1of2	8.7	0.4	0.71	0.03	6	0	37	0	<0.005	0.003	<0.0008	0.0008
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	11/20/2001	13:20	2of2	9.2	0.4	0.73	0.04	6	1	36	1	<0.005	0.003	<0.0008	0.0015
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/10/2001	12:20	1of2	11	0	1.8	0.0	4.7	0.3	27	0	<0.008	0.003	<0.001	0.001
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/10/2001	12:20	2of2	12	0	1.8	0.1	4.3	0.2	27	0	<0.008	0.005	<0.001	0.000
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/21/2001	13:00	1of2	12	0	0.92	0.00	3.8	0.4	20	0	<0.006	0.004	<0.001	0.002
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/21/2001	13:00	2of2	11	0	0.91	0.01	3.9	0.6	21	0	<0.006	0.002	<0.001	0.001
BY51	Greenhorn Cr nr Headwaters nr Scotts Flat Reservoir	1/25/2000	9:30	1of2	28	2	<0.1	0.1	<5	1	14	0	<0.05	0.00	0.004	0.004
BY51	Greenhorn Cr nr Headwaters nr Scotts Flat Reservoir	1/25/2000	9:30	2of2	24	1	<0.1	0.0	<5	1	16	1	<0.05	0.02	<0.003	0.002
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	12/14/1999	14:00	1of2	18	0	<0.6	0.1	6	5	40	1	0.11	0.00	<0.002	0.001
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	12/14/1999	14:00	2of2	18	0	<0.6	0.2	8	7	41	1	0.12	0.00	0.006	0.010
BY86	Poore Mine creek ab tunnel nr Grass Valley	3/31/1999	17:40	1of2	12	1	0.12	0.01	<9	0	16	0	<0.02	0.01	0.0029	0.0035
BY86	Poore Mine creek ab tunnel nr Grass Valley	3/31/1999	17:40	2of2	11	0	0.14	0.03	<9	0	16	0	<0.02	0.02	0.0007	0.0008

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Aluminum (Al), filtered (µg/L) (01105)		Arsenic (As), filtered (µg/L) (01000)		Boron (B), filtered (µg/L) (01020)		Barium (Ba), filtered (µ/L) (01005		Beryllium (Be), filtered (µg/L) (01010)		Bismuth (Bi), filtered (µg/L) (01015)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY87	Poore Mine creek bl tunnel nr Grass Valley	3/31/1999	13:30	1of2	6.9	0.3	0.15	0.01	<9	0	17	1	<0.02	0.00	0.0010	0.0012
BY87	Poore Mine creek bl tunnel nr Grass Valley	3/31/1999	13:30	2of2	5.9	0.1	0.15	0.01	<9	0	16	2	<0.02	0.00	0.0028	0.0015
BY88	Poore Mine ground sluice nr Grass Valley	4/1/1999	15:40	1of2	72	2	0.13	0.01	<9	2	28	1	0.07	0.00	<0.0007	0.0002
BY88	Poore Mine ground sluice nr Grass Valley	4/1/1999	15:40	2of2	69	0	0.15	0.05	2	0	28	1	0.071	0.007	<0.0008	0.0006
BY89	Poore Mine pit lake nr Grass Valley	4/1/1999	16:50	1of2	4.9	0.2	0.18	0.02	3	0	37	0	0.015	0.001	0.0017	0.0017
BY89	Poore Mine pit lake nr Grass Valley	4/1/1999	16:50	2of2	4.0	0.2	0.16	0.01	3	0	37	0	0.013	0.002	<0.0008	0.0038
BY89	Poore Mine pit lake nr Grass Valley	5/23/2000	10:45	1of2	130	0	<0.2	0.1	<20	20	120	0	0.54	0.03	<0.003	0.001
BY89	Poore Mine pit lake nr Grass Valley	5/23/2000	10:45	2of2	130	0	<0.2	0.0	<20	10	120	0	0.57	0.05	<0.003	0.000
BY90	Poore Mine seep ab ground sluice nr Grass Valley	4/1/1999	16:00	1of2	33	3	0.13	0.01	2	0	30	0	0.055	0.002	0.0009	0.0010
BY90	Poore Mine seep ab ground sluice nr Grass Valley	4/1/1999	16:00	2of2	33	0	0.13	0.02	2	0	28	0	0.044	0.001	0.0040	0.0035
BY91	Poore Mine tunnel effluent nr Grass Valley	3/31/1999	15:20	1of2	5.6	0.3	0.12	0.00	<9	1	29	2	0.04	0.01	0.0024	0.0001
BY91	Poore Mine tunnel effluent nr Grass Valley	3/31/1999	15:20	2of2	5.2	0.4	0.10	0.02	5	0	29	0	0.041	0.005	0.0014	0.0014
BY91	Poore Mine tunnel effluent nr Grass Valley	12/15/1999	13:00	1of2	2.9	0.2	<0.6	0.1	13	1	27	1	0.007	0.001	<0.002	0.002
BY91	Poore Mine tunnel effluent nr Grass Valley	12/15/1999	13:00	2of2	3.9	1.6	<0.6	0.2	10	3	27	1	0.006	0.002	0.019	0.025
BY91	Poore Mine tunnel effluent nr Grass Valley	5/23/2000	12:00	1of2	5.2	0.1	<0.2	0.1	64	42	37	1	<0.06	0.03	<0.003	0.001
BY91	Poore Mine tunnel effluent nr Grass Valley	5/23/2000	12:00	2of2	7.7	1.9	0.2	0.1	6	1	37	0	<0.05	0.04	<0.003	0.003
BY105	Sailor Flat Mine main drain Gulch 01nr Quaker Hill	7/6/1999	16:00	1of2	11	0	0.61	0.01	4	1	85	1	0.07	0.00	0.0008	0.0006
BY105	Sailor Flat Mine main drain Gulch 01nr Quaker Hill	7/6/1999	16:00	2of2	10	0	0.55	0.02	<9	5	86	5	0.06	0.00	<0.0007	0.0007
BY105	Sailor Flat Mine main drain Gulch 01nr Quaker Hill	12/2/1999	14:30	1of2	79	3	<0.6	0.2	5	1	32	0	0.039	0.006	0.083	0.111

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Replicate	Aluminum (Al), filtered (µg/L) (01105)		Arsenic (As), filtered (µg/L) (01000)		Boron (B), filtered (µg/L) (01020)		Barium (Ba), filtered (µ/L) (01005		Beryllium (Be), filtered (µg/L) (01010)		Bismuth (Bi), filtered (µg/L) (01015)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY105	Sailor Flat Mine main drain Gulch 01nr Quaker Hill	12/2/1999	14:30	2of2	74	3	<0.6	0.1	3	2	33	1	0.047	0.001	<0.002	0.000
BY106	Sailor Flat Mine main drainage to Greenhorn Cr, Gulch 03	4/9/01	12:30	1of 2	96	12	0.54	0.16	<20	0	30	7	<0.03	0.04	<0.02	0.00
BY106	Sailor Flat Mine main drainage to Greenhorn Cr, Gulch 03	4/9/2001	12:30	2of 2	110	20	0.50	0.12	<20	10	30	6	0.06	0.07	<0.02	0.01
BY114	SF Greenhorn Cr 0.7 mi ab Greenhorn Cr nr Nevada City	8/22/2000	15:10	1of2	3.8	0.3	0.1	0.0	<20	0	17	1	<0.2	0.1	<0.003	0.001
BY114	SF Greenhorn Cr 0.7 mi ab Greenhorn Cr nr Nevada City	8/22/2000	15:10	2of2	4.2	1.1	0.2	0.1	<20	20	16	0	<0.2	0.1	<0.003	0.001
BY122	Starr Mine tunnel inflow nr Grass Valley	4/23/1999	15:00	1of2	28	2	0.088	0.007	3	0	22	1	0.025	0.002	0.0019	0.0003
BY122	Starr Mine tunnel inflow nr Grass Valley	4/23/1999	15:00	2of2	27	2	0.083	0.002	3	1	21	2	0.018	0.006	<0.0008	0.0004
BY123	Starr Mine tunnel midway nr Grass Valley	4/23/1999	13:40	1of2	0.90	0.04	0.17	0.04	5	1	49	0	<0.005	0.000	0.0018	0.0011
BY123	Starr Mine tunnel midway nr Grass Valley	4/23/1999	13:40	2of2	2.3	0.1	0.18	0.04	6	1	49	1	<0.005	0.004	<0.0008	0.0002
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	10:45	1of2	0.47	0.05	<0.6	0.3	9	5	55	5	0.005	0.002	0.004	0.002
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	10:45	2of2	0.54	0.21	<0.6	0.1	6	1	59	2	<0.003	0.002	0.004	0.003
BY124	Starr Mine tunnel outlet nr Grass Valley	8/23/2000	17:30	1of2	2.9	0.1	0.4	0.0	<20	10	42	1	<0.2	0.1	<0.003	0.001
BY124	Starr Mine tunnel outlet nr Grass Valley	8/23/2000	17:30	2of2	2.4	0.4	0.4	0.1	<20	0	42	2	<0.2	0.1	0.008	0.009
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:00	1of2	2.7	0.1	<0.4	0.1	100	110	35	1	<0.2	0.1	<0.003	0.002
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:00	2of2	2.8	0.1	<0.4	0.1	<60	140	34	0	<0.2	0.0	<0.003	0.000
BY130	Tom and Jerry Mine drain at tunnel outlet nr Nevada City	6/28/2000	11:30	1of2	1.4	0.4	<0.4	0.3	<60	100	68	3	<0.2	0.1	<0.003	0.001
BY130	Tom and Jerry Mine drain at tunnel outlet nr Nevada City	6/28/2000	11:30	2of2	1.6	0.7	<0.4	0.1	<60	110	68	0	<0.2	0.0	<0.003	0.002

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Replicate	Aluminum (Al), filtered (µg/L) (01105)		Arsenic (As), filtered (µg/L) (01000)		Boron (B), filtered (µg/L) (01020)		Barium (Ba), filtered (µ/L) (01005		Beryllium (Be), filtered (µg/L) (01010)		Bismuth (Bi), filtered (µg/L) (01015)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY131	Tom and Jerry Mine drainage pond nr Nevada City	8/23/2000	10:45	1of2	2.5	0.3	<0.1	0.0	<20	10	52	0	<0.2	0.1	<0.003	0.001
BY131	Tom and Jerry Mine drainage pond nr Nevada City	8/23/2000	10:45	2of2	2.7	0.4	<0.1	0.0	<20	10	52	0	<0.2	0.1	0.004	0.001
Disturbed samples																
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	11:30	1of2	0.73	0.23	<0.6	0.1	5	0	46	1	<0.003	0.003	<0.002	0.001
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	11:30	2of2	0.42	0.03	<0.6	0.2	7	1	46	1	<0.003	0.001	0.005	0.005
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:30	1of2	1.6	0.3	<0.4	0.3	110	150	59	0	<0.2	0.0	0.004	0.007
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:30	2of2	1.5	0.3	<0.4	0.2	66	131	60	1	<0.2	0.0	<0.003	0.002

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Calcium (Ca), filtered (mg/L) (00915)		Cadmium (Cd), filtered (µg/L) (01025)		Cerium (Ce), filtered (µg/L) (01110		Cobalt (Co), filtered (µg/L) (01035)		Chromium (Cr), filtered (µg/L) (01030)		Cesium (Cs), filtered (µg/L) (01115)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
Environmental samples																
BY20	Boston Mine tunnel outlet nr Grass Valley	6/18/1999	14:30	1of2	14	0	0.024	0.002	0.018	0.002	0.95	0.05	<0.1	0.0	0.020	0.001
BY20	Boston Mine tunnel outlet nr Grass Valley	6/18/1999	14:30	2of2	14	0	0.024	0.002	0.016	0.003	0.95	0.06	<0.1	0.1	0.021	0.004
BY20	Boston Mine tunnel outlet nr Grass Valley	12/14/1999	12:00	1of2	17	1	0.024	0.001	0.0026	0.0003	0.24	0.00	<0.1	0.1	0.023	0.002
BY20	Boston Mine tunnel outlet nr Grass Valley	12/14/1999	12:00	2of2	21	0	0.018	0.003	0.0034	0.0008	0.24	0.01	<0.1	0.1	0.034	0.021
BY20	Boston Mine tunnel outlet nr Grass Valley	5/24/2000	16:00	1of2	12	3	0.04	0.01	0.024	0.002	0.74	0.03	<0.6	0.2	<0.2	0.1
BY20	Boston Mine tunnel outlet nr Grass Valley	5/24/2000	16:00	2of2	13	2	0.03	0.00	0.025	0.001	0.75	0.00	<0.6	0.1	<0.2	0.3
BY21	Boston Mine wetlands pond nr Grass Valley	12/14/1999	10:30	1of2	23	5	0.010	0.002	0.0057	0.0001	<0.006	0.001	<0.1	0.0	0.0071	0.0006
BY21	Boston Mine wetlands pond nr Grass Valley	12/14/1999	10:30	2of2	21	1	0.010	0.001	0.0053	0.0003	<0.006	0.003	<0.1	0.0	0.0081	0.0010
BY21	Boston Mine wetlands pond nr Grass Valley	5/24/2000	16:30	1of2	12	0	0.02	0.00	0.019	0.001	0.13	0.03	<0.6	0.0	<0.2	0.2
BY21	Boston Mine wetlands pond nr Grass Valley	5/24/2000	16:30	2of2	11	2	0.03	0.00	0.016	0.001	0.10	0.01	<0.6	0.3	<0.2	0.2
BY58	Buckeye Flat Mine main drain 0.45 mi ab Greenhorn Cr	8/21/2000	11:00	1of2	12	0	0.32	0.03	21	0	55	0	<3	1	0.06	0.01
BY58	Buckeye Flat Mine main drain 0.45 mi ab Greenhorn Cr	8/21/2000	11:00	2of2	12	0	0.34	0.03	22	1	58	1	<3	1	0.06	0.01
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	6/18/1999	11:30	1of2	20	0	2.1	0.0	42	0	110	0	0.3	0.1	0.071	0.001
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	6/18/1999	11:30	2of2	20	0	2.1	0.0	44	1	99	0	0.3	0.0	0.074	0.002

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Calcium (Ca), filtered (mg/L) (00915)		Cadmium (Cd), filtered (µg/L) (01025)		Cerium (Ce), filtered (µg/L) (01110		Cobalt (Co), filtered (µg/L) (01035)		Chromium (Cr), filtered (µg/L) (01030)		Cesium (Cs), filtered (µg/L) (01115)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	12/2/1999	11:00	1of2	13	1	2.6	0.0	31	1	81	1	0.5	0.0	0.027	0.002
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	12/2/1999	11:00	2of2	13	1	2.5	0.0	31	2	81	0	0.4	0.0	0.027	0.002
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	8/22/2000	10:45	1of2	20	1	1.3	0.0	42	1	67	2	<3	1	<0.02	0.01
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	8/22/2000	10:45	2of2	20	1	1.2	0.0	44	0	69	0	<3	1	<0.02	0.01
BY116	Buckeye Flat Mine pond drain 0.15 mi ab SF Greenhorn Cr	8/21/2000	14:10	1of2	0.8	0.0	0.03	0.01	0.048	0.006	0.66	0.03	<3	1	<0.02	0.01
BY116	Buckeye Flat Mine pond drain 0.15 mi ab SF Greenhorn Cr	8/21/2000	14:10	2of2	0.8	0.0	0.05	0.01	0.053	0.003	0.72	0.04	<3	1	<0.02	0.01
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/26/1999	11:00	1of2	0.47	0.05	0.11	0.00	0.82	0.02	7.4	0.1	0.1	0.1	0.006	0.001
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/26/1999	11:00	2of2	0.51	0.13	0.12	0.00	0.76	0.03	7.0	0.1	0.1	0.0	0.008	0.002
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/22/2000	12:10	1of2	0.4	0.0	0.15	0.02	0.60	0.01	8.7	0.1	<3	1	<0.02	0.00
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/22/2000	12:10	2of2	0.4	0.0	0.15	0.02	0.63	0.03	8.7	0.2	<3	1	<0.02	0.00
BY25	Buckeye Flat Mine upper drain	4/9/2001	10:00	1of2	5.1	0.8	0.85	0.13	8.9	1.7	19	3	<0.5	0.2	0.20	0.04
BY25	Buckeye Flat Mine upper drain	4/9/2001	10:00	2of2	5.1	0.3	0.86	0.07	8.8	0.4	19	1	<0.5	0.2	0.25	0.09

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Calcium (Ca), filtered (mg/L) (00915)		Cadmium (Cd), filtered (µg/L) (01025)		Cerium (Ce), filtered (µg/L) (01110		Cobalt (Co), filtered (µg/L) (01035)		Chromium (Cr), filtered (µg/L) (01030)		Cesium (Cs), filtered (µg/L) (01115)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY52	Greenhorn Cr 0.3 mi ab Buckeye Ford nr Nevada City	1/25/2000	10:45	1of2	2.7	0.2	0.04	0.01	0.57	0.02	1.9	0.1	<0.4	0.3	<0.5	0.2
BY52	Greenhorn Cr 0.3 mi ab Buckeye Ford nr Nevada City	1/25/2000	10:45	2of2	2.7	0.1	<0.03	0.03	0.54	0.02	2.1	0.0	<0.4	0.1	<0.5	0.2
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	7/24/2001	11:00	1of2	5.6	0.1	0.040	0.010	0.013	0.001	0.47	0.01	<0.06	0.06	0.038	0.003
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	7/24/2001	11:00	2of2	5.5	0.1	0.040	0.006	0.013	0.000	0.49	0.03	<0.06	0.00	0.047	0.023
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	8/29/2001	15:00	1of2	5.3	0.2	0.009	0.002	0.010	0.000	0.053	0.003	<0.06	0.04	0.021	0.003
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	8/29/2001	15:00	2of2	5.4	0.0	0.009	0.000	0.0100	0.0001	0.057	0.003	<0.06	0.01	0.013	0.002
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	9/14/2001	13:00	1of2	5.3	0.2	0.020	0.000	0.0081	0.0004	0.099	0.002	0.26	0.05	0.018	0.003
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	9/14/2001	13:00	2of2	5.2	0.1	0.022	0.002	0.0086	0.0001	0.10	0.00	0.31	0.04	0.018	0.002
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	10/15/2001	12:00	1of2	5.3	0.1	0.020	0.006	0.0046	0.0003	0.080	0.003	<0.07	0.02	0.010	0.002
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	10/15/2001	12:00	2of2	5.3	0.1	0.017	0.001	0.0054	0.0003	0.077	0.001	<0.07	0.01	0.014	0.001
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	11/20/2001	13:20	1of2	6.2	0.1	0.078	0.002	0.074	0.003	1.2	0.0	<0.2	0.1	0.019	0.002
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	11/20/2001	13:20	2of2	6.2	0.0	0.072	0.005	0.079	0.002	1.2	0.0	<0.2	0.1	0.021	0.001
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/10/2001	12:20	1of2	6.0	0.1	0.094	0.001	0.24	0.00	1.9	0.0	<0.04	0.03	0.014	0.002

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Calcium (Ca), filtered (mg/L) (00915)		Cadmium (Cd), filtered (µg/L) (01025)		Cerium (Ce), filtered (µg/L) (01110		Cobalt (Co), filtered (µg/L) (01035)		Chromium (Cr), filtered (µg/L) (01030)		Cesium (Cs), filtered (µg/L) (01115)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/10/2001	12:20	2of2	6.1	0.1	0.090	0.002	0.25	0.01	1.9	0.0	<0.04	0.03	0.011	0.002
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/21/2001	13:00	1of2	4.4	0.0	0.054	0.001	0.49	0.00	1.2	0.0	0.07	0.01	0.013	0.001
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/21/2001	13:00	2of2	4.3	0.0	0.054	0.003	0.47	0.00	1.2	0.0	<0.06	0.01	0.013	0.005
BY51	Greenhorn Cr nr Headwaters nr Scotts Flat Reservoir	1/25/2000	9:30	1of2	1.3	0.1	0.03	0.01	0.15	0.01	0.07	0.02	0.6	0.3	<0.5	0.2
BY51	Greenhorn Cr nr Headwaters nr Scotts Flat Reservoir	1/25/2000	9:30	2of2	1.3	0.0	0.01	0.01	0.15	0.00	0.06	0.02	<0.4	0.1	<0.5	0.1
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	12/14/1999	14:00	1of2	11	1	0.15	0.00	0.44	0.01	3.7	0.0	<0.1	0.0	0.046	0.001
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	12/14/1999	14:00	2of2	15	4	0.15	0.00	0.44	0.01	3.6	0.0	<0.1	0.0	0.048	0.001
BY86	Poore Mine creek ab tunnel nr Grass Valley	3/31/1999	17:40	1of2	3.5	0.2	0.016	0.000	0.072	0.005	0.033	0.002	<0.3	0.2	0.002	0.005
BY86	Poore Mine creek ab tunnel nr Grass Valley	3/31/1999	17:40	2of2	3.5	0.0	0.012	0.002	0.067	0.002	0.029	0.002	<0.3	0.1	0.004	0.009
BY87	Poore Mine creek bl tunnel nr Grass Valley	3/31/1999	13:30	1of2	3.8	0.0	0.014	0.000	0.061	0.005	0.020	0.000	<0.3	0.1	0.002	0.000
BY87	Poore Mine creek bl tunnel nr Grass Valley	3/31/1999	13:30	2of2	3.7	0.0	0.013	0.001	0.051	0.002	0.026	0.005	<0.3	0.2	0.002	0.000
BY88	Poore Mine ground sluice nr Grass Valley	4/1/1999	15:40	1of2	7.5	0.1	0.048	0.001	0.13	0.00	1.1	0.0	<0.3	0.1	0.043	0.000
BY88	Poore Mine ground sluice nr Grass Valley	4/1/1999	15:40	2of2	7.6	0.1	0.047	0.005	0.13	0.00	1.1	0.1	<0.1	0.1	0.044	0.003

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Calcium (Ca), filtered (mg/L) (00915)		Cadmium (Cd), filtered (µg/L) (01025)		Cerium (Ce), filtered (µg/L) (01110		Cobalt (Co), filtered (µg/L) (01035)		Chromium (Cr), filtered (µg/L) (01030)		Cesium (Cs), filtered (µg/L) (01115)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY89	Poore Mine pit lake nr Grass Valley	4/1/1999	16:50	1of2	2.6	0.1	0.055	0.005	0.037	0.001	0.85	0.04	<0.1	0.0	0.006	0.001
BY89	Poore Mine pit lake nr Grass Valley	4/1/1999	16:50	2of2	2.6	0.1	0.056	0.004	0.032	0.002	0.80	0.04	<0.1	0.2	0.010	0.005
BY89	Poore Mine pit lake nr Grass Valley	5/23/2000	10:45	1of2	15	0	1.1	0.0	0.24	0.01	9.8	0.0	<0.6	0.1	<0.2	0.1
BY89	Poore Mine pit lake nr Grass Valley	5/23/2000	10:45	2of2	15	1	1.1	0.0	0.25	0.01	9.5	0.3	<0.6	0.2	<0.2	0.3
BY90	Poore Mine seep ab ground sluice nr Grass Valley	4/1/1999	16:00	1of2	7.1	0.1	0.042	0.003	0.031	0.001	1.3	0.1	<0.1	0.1	0.041	0.003
BY90	Poore Mine seep ab ground sluice nr Grass Valley	4/1/1999	16:00	2of2	7.2	0.1	0.041	0.002	0.031	0.000	1.3	0.0	<0.1	0.0	0.038	0.001
BY91	Poore Mine tunnel effluent nr Grass Valley	3/31/1999	15:20	1of2	13	0	0.041	0.001	0.013	0.003	0.021	0.010	<0.3	0.1	0.20	0.00
BY91	Poore Mine tunnel effluent nr Grass Valley	3/31/1999	15:20	2of2	12	0	0.035	0.000	0.013	0.001	0.012	0.022	<0.1	0.1	0.21	0.00
BY91	Poore Mine tunnel effluent nr Grass Valley	12/15/1999	13:00	1of2	20	2	0.017	0.005	0.0085	0.0076	<0.006	0.002	<0.1	0.1	0.22	0.00
BY91	Poore Mine tunnel effluent nr Grass Valley	12/15/1999	13:00	2of2	23	2	0.025	0.013	0.0037	0.0002	<0.006	0.003	<0.1	0.1	0.22	0.01
BY91	Poore Mine tunnel effluent nr Grass Valley	5/23/2000	12:00	1of2	20	1	0.04	0.01	0.0045	0.0004	<0.02	0.01	<0.6	0.1	0.4	0.1
BY91	Poore Mine tunnel effluent nr Grass Valley	5/23/2000	12:00	2of2	18	0	0.05	0.00	0.004	0.001	<0.01	0.01	<2	0	<0.5	0.0
BY105	Sailor Flat Mine main drain Gulch 01nr Quaker Hill	7/6/1999	16:00	1of2	3.1	0.1	0.11	0.00	1.0	0.0	6.8	0.1	0.3	0.0	0.051	0.001
BY105	Sailor Flat Mine main drain Gulch 01nr Quaker Hill	7/6/1999	16:00	2of2	2.9	0.0	0.11	0.00	0.97	0.09	6.6	0.6	<0.3	0.3	0.051	0.004

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Calcium (Ca), filtered (mg/L) (00915)		Cadmium (Cd), filtered (µg/L) (01025)		Cerium (Ce), filtered (µg/L) (01110		Cobalt (Co), filtered (µg/L) (01035)		Chromium (Cr), filtered (µg/L) (01030)		Cesium (Cs), filtered (µg/L) (01115)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY105	Sailor Flat Mine main drain Gulch 01nr Quaker Hill	12/2/1999	14:30	1of2	1.2	0.1	0.13	0.08	1.9	0.1	2.4	0.1	0.2	0.0	0.055	0.068
BY105	Sailor Flat Mine main drain Gulch 01nr Quaker Hill	12/2/1999	14:30	2of2	1.1	0.2	0.067	0.006	2.0	0.0	2.3	0.0	0.2	0.0	0.0055	0.0008
BY106	Sailor Flat Mine main drainage to Greenhorn Cr, Gulch 03	4/9/2001	12:30	1of 2	0.6	0.2	<0.03	0.01	1.9	0.4	1.4	0.3	0.7	0.2	0.23	0.08
BY106	Sailor Flat Mine main drainage to Greenhorn Cr, Gulch 03	4/9/2001	12:30	2of 2	0.6	0.2	<0.03	0.01	1.9	0.4	1.3	0.3	0.9	0.2	0.18	0.11
BY114	SF Greenhorn Cr 0.7 mi ab Greenhorn Cr nr Nevada City	8/22/2000	15:10	1of2	7.6	0.2	<0.03	0.01	0.006	0.000	<0.02	0.01	<3	1	<0.02	0.01
BY114	SF Greenhorn Cr 0.7 mi ab Greenhorn Cr nr Nevada City	8/22/2000	15:10	2of2	7.5	0.2	<0.03	0.01	0.006	0.001	<0.02	0.01	<3	1	<0.02	0.00
BY122	Starr Mine tunnel inflow nr Grass Valley	4/23/1999	15:00	1of2	9.4	0.1	0.070	0.000	0.059	0.003	0.23	0.03	<0.1	0.0	0.022	0.000
BY122	Starr Mine tunnel inflow nr Grass Valley	4/23/1999	15:00	2of2	9.8	0.4	0.073	0.001	0.058	0.003	0.23	0.03	<0.1	0.0	0.023	0.001
BY123	Starr Mine tunnel midway nr Grass Valley	4/23/1999	13:40	1of2	29	1	0.0044	0.0001	0.0010	0.0002	<0.003	0.031	<0.1	0.1	0.17	0.01
BY123	Starr Mine tunnel midway nr Grass Valley	4/23/1999	13:40	2of2	29	0	0.0069	0.0022	0.0011	0.0001	<0.003	0.012	<0.1	0.0	0.17	0.00
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	10:45	1of2	33	0	0.015	0.002	0.0029	0.0003	0.013	0.000	<0.1	0.1	0.15	0.00
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	10:45	2of2	36	1	0.013	0.003	0.0040	0.0003	0.014	0.002	<0.1	0.0	0.15	0.00
BY124	Starr Mine tunnel outlet nr Grass Valley	8/23/2000	17:30	1of2	36	0	<0.03	0.01	0.014	0.002	<0.02	0.01	<3	0	0.07	0.02

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Calcium (Ca), filtered (mg/L) (00915)		Cadmium (Cd), filtered (µg/L) (01025)		Cerium (Ce), filtered (µg/L) (01110		Cobalt (Co), filtered (µg/L) (01035)		Chromium (Cr), filtered (µg/L) (01030)		Cesium (Cs), filtered (µg/L) (01115)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY124	Starr Mine tunnel outlet nr Grass Valley	8/23/2000	17:30	2of2	35	1	<0.03	0.01	0.004	0.001	<0.02	0.01	<3	1	0.06	0.00
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:00	1of2	2.8	0.1	<0.01	0.02	0.022	0.002	0.02	0.00	<2	1	<0.01	0.01
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:00	2of2	2.7	0.2	<0.01	0.01	0.025	0.001	<0.02	0.00	<2	1	<0.01	0.01
BY130	Tom and Jerry Mine drain at tunnel outlet nr Nevada City	6/28/2000	11:30	1of2	11	0	<0.01	0.01	0.006	0.001	0.41	0.02	<2	1	<0.01	0.01
BY130	Tom and Jerry Mine drain at tunnel outlet nr Nevada City	6/28/2000	11:30	2of2	11	1	<0.01	0.00	0.008	0.001	0.40	0.01	<2	1	<0.01	0.01
BY131	Tom and Jerry Mine drainage pond nr Nevada City	8/23/2000	10:45	1of2	4.0	0.1	<0.03	0.01	0.012	0.000	<0.02	0.01	<3	1	<0.02	0.00
BY131	Tom and Jerry Mine drainage pond nr Nevada City	8/23/2000	10:45	2of2	4.0	0.1	<0.03	0.01	0.013	0.003	<0.02	0.01	<3	1	<0.02	0.01
Disturbed samples																
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	11:30	1of2	33	2	0.002	0.001	0.0009	0.0000	<0.006	0.002	<0.1	0.0	0.15	0.00
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	11:30	2of2	41	0	0.006	0.006	0.0010	0.0000	<0.006	0.004	<0.1	0.0	0.15	0.00
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:30	1of2	9.9	0.2	<0.01	0.01	0.013	0.001	<0.02	0.01	<2	2	0.03	0.02
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:30	2of2	9.8	0.4	<0.01	0.01	0.016	0.000	<0.02	0.01	<2	2	0.02	0.01

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Copper (Cu), filtered (µg/L) (01040)		Dysprosium (Dy), filtered (µg/L) (82331)		Erbium (Er), filtered (µg/L) (50573		Europium (Eu), filtered (µg/L) (50574)		Iron (Fe), filtered (µg/L) (01046)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
Environmental samples														
BY20	Boston Mine tunnel outlet nr Grass Valley	6/18/1999	14:30	1of2	0.63	0.04	0.0032	0.0001	0.0023	0.0005	<0.0001	0.0037	12	1
BY20	Boston Mine tunnel outlet nr Grass Valley	6/18/1999	14:30	2of2	0.58	0.03	0.0024	0.0003	0.0024	0.0003	<0.0001	0.0031	9.0	1.3
BY20	Boston Mine tunnel outlet nr Grass Valley	12/14/1999	12:00	1of2	0.24	0.03	0.0009	0.0000	0.0007	0.0005	<0.0004	0.0002	4	0
BY20	Boston Mine tunnel outlet nr Grass Valley	12/14/1999	12:00	2of2	0.23	0.00	0.0011	0.0002	0.0007	0.0010	<0.0004	0.0003	3	1
BY20	Boston Mine tunnel outlet nr Grass Valley	5/24/2000	16:00	1of2	1.5	0.2	0.006	0.003	<0.004	0.001	<0.001	0.002	24	0
BY20	Boston Mine tunnel outlet nr Grass Valley	5/24/2000	16:00	2of2	1.5	0.1	0.004	0.001	<0.004	0.001	<0.001	0.001	23	0
BY21	Boston Mine wetlands pond nr Grass Valley	12/14/1999	10:30	1of2	0.35	0.02	0.0014	0.0002	0.0009	0.0002	0.0007	0.0004	11	4
BY21	Boston Mine wetlands pond nr Grass Valley	12/14/1999	10:30	2of2	0.34	0.01	0.0013	0.0001	0.0008	0.0001	0.0005	0.0003	8	0
BY21	Boston Mine wetlands pond nr Grass Valley	5/24/2000	16:30	1of2	1.1	0.2	0.003	0.000	<0.004	0.001	<0.001	0.001	77	6
BY21	Boston Mine wetlands pond nr Grass Valley	5/24/2000	16:30	2of2	0.57	0.03	0.004	0.001	<0.004	0.001	<0.001	0.001	59	3
BY58	Buckeye Flat Mine main drain 0.45 mi ab Greenhorn Cr	8/21/2000	11:00	1of2	2.9	0.2	2.7	0.1	1.5	0.0	0.63	0.00	1,900	100
BY58	Buckeye Flat Mine main drain 0.45 mi ab Greenhorn Cr	8/21/2000	11:00	2of2	3.0	0.2	2.7	0.1	1.5	0.0	0.65	0.03	2,100	100
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	6/18/1999	11:30	1of2	48	1	5.3	0.0	2.9	0.0	1.3	0.0	4,500	0
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	6/18/1999	11:30	2of2	48	0	5.5	0.1	3.0	0.1	1.3	0.0	4,500	0

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Copper (Cu), filtered (µg/L) (01040)		Dysprosium (Dy), filtered (µg/L) (82331)		Erbium (Er), filtered (µg/L) (50573		Europium (Eu), filtered (µg/L) (50574)		Iron (Fe), filtered (µg/L) (01046)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	12/2/1999	11:00	1of2	43	1	3.7	0.0	2.0	0.0	0.92	0.01	150	10
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	12/2/1999	11:00	2of2	42	0	3.7	0.1	2.0	0.0	0.89	0.04	170	0
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	8/22/2000	10:45	1of2	28	1	4.9	0.0	2.7	0.0	1.2	0.0	140	10
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	8/22/2000	10:45	2of2	28	1	4.9	0.0	2.7	0.1	1.3	0.0	130	20
BY116	Buckeye Flat Mine pond drain 0.15 mi ab SF Greenhorn Cr	8/21/2000	14:10	1of2	14	0	0.009	0.003	0.005	0.002	0.005	0.003	<20	10
BY116	Buckeye Flat Mine pond drain 0.15 mi ab SF Greenhorn Cr	8/21/2000	14:10	2of2	16	1	0.012	0.002	0.006	0.004	0.006	0.003	<20	0
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/26/1999	11:00	1of2	22	0	0.10	0.00	0.060	0.002	0.024	0.001	68	2
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/26/1999	11:00	2of2	22	0	0.095	0.005	0.055	0.001	0.022	0.000	79	19
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/22/2000	12:10	1of2	4.6	0.1	0.075	0.007	0.048	0.002	0.016	0.000	<20	10
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/22/2000	12:10	2of2	4.8	0.2	0.081	0.006	0.049	0.007	0.017	0.001	<20	10
BY25	Buckeye Flat Mine upper drain	4/9/2001	10:00	1of2	34	5	0.82	0.16	0.48	0.02	0.18	0.03	41	3
BY25	Buckeye Flat Mine upper drain	4/9/2001	10:00	2of2	33	1	0.86	0.00	0.46	0.00	0.19	0.00	42	4

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Copper (Cu), filtered (µg/L) (01040)		Dysprosium (Dy), filtered (µg/L) (82331)		Erbium (Er), filtered (µg/L) (50573		Europium (Eu), filtered (µg/L) (50574)		Iron (Fe), filtered (µg/L) (01046)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY52	Greenhorn Cr 0.3 mi ab Buckeye Ford nr Nevada City	1/25/2000	10:45	1of2	1.1	0.1	0.076	0.006	0.046	0.004	0.020	0.003	27	2
BY52	Greenhorn Cr 0.3 mi ab Buckeye Ford nr Nevada City	1/25/2000	10:45	2of2	0.92	0.04	0.075	0.004	0.046	0.003	0.019	0.001	28	1
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	7/24/2001	11:00	1of2	0.30	0.06	0.0027	0.0001	0.0016	0.0003	0.0009	0.0002	18	0
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	7/24/2001	11:00	2of2	5.6	7.4	0.0025	0.0003	0.0016	0.0003	<0.0002	0.0003	18	0
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	8/29/2001	15:00	1of2	0.31	0.06	0.0021	0.0001	0.0012	0.0006	0.0005	0.0003	29	0
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	8/29/2001	15:00	2of2	0.24	0.01	0.0018	0.0007	0.0015	0.0004	0.0005	0.0004	28	1
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	9/14/2001	13:00	1of2	0.36	0.01	0.0020	0.0002	0.0012	0.0004	<0.0001	0.0004	20	1
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	9/14/2001	13:00	2of2	0.39	0.01	0.0022	0.0001	0.0010	0.0003	<0.0001	0.0001	20	1
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	10/15/2001	12:00	1of2	0.11	0.03	0.0012	0.0003	0.0004	0.0001	<0.0001	0.0004	13	1
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	10/15/2001	12:00	2of2	0.08	0.00	0.0017	0.0003	0.0008	0.0003	<0.0001	0.0003	14	1
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	11/20/2001	13:20	1of2	0.37	0.03	0.011	0.000	0.0068	0.0004	0.0063	0.0006	31	1
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	11/20/2001	13:20	2of2	0.36	0.00	0.012	0.000	0.0071	0.0005	0.0076	0.0002	34	1
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/10/2001	12:20	1of2	0.33	0.02	0.033	0.002	0.020	0.001	0.0090	0.0004	22	1

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Copper (Cu), filtered (µg/L) (01040)		Dysprosium (Dy), filtered (µg/L) (82331)		Erbium (Er), filtered (µg/L) (50573		Europium (Eu), filtered (µg/L) (50574)		Iron (Fe), filtered (µg/L) (01046)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/10/2001	12:20	2of2	0.34	0.03	0.029	0.000	0.021	0.001	0.0098	0.0003	23	0
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/21/2001	13:00	1of2	0.66	0.04	0.070	0.002	0.043	0.000	0.021	0.001	18	0
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/21/2001	13:00	2of2	0.67	0.01	0.070	0.001	0.044	0.003	0.022	0.000	15	0
BY51	Greenhorn Cr nr Headwaters nr Scotts Flat Reservoir	1/25/2000	9:30	1of2	5.1	0.1	0.043	0.001	0.031	0.007	0.012	0.002	14	1
BY51	Greenhorn Cr nr Headwaters nr Scotts Flat Reservoir	1/25/2000	9:30	2of2	4.2	0.3	0.040	0.006	0.030	0.000	0.013	0.001	15	2
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	12/14/1999	14:00	1of2	0.88	0.04	0.059	0.001	0.038	0.000	0.013	0.000	49	7
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	12/14/1999	14:00	2of2	0.92	0.04	0.061	0.004	0.037	0.002	0.013	0.000	59	3
BY86	Poore Mine creek ab tunnel nr Grass Valley	3/31/1999	17:40	1of2	0.64	0.01	0.013	0.001	0.008	0.002	0.0048	0.0010	11	0
BY86	Poore Mine creek ab tunnel nr Grass Valley	3/31/1999	17:40	2of2	0.47	0.00	0.012	0.001	0.007	0.001	0.0049	0.0022	9.3	1.0
BY87	Poore Mine creek bl tunnel nr Grass Valley	3/31/1999	13:30	1of2	0.48	0.02	0.014	0.001	0.009	0.000	0.0058	0.0002	6.7	0.6
BY87	Poore Mine creek bl tunnel nr Grass Valley	3/31/1999	13:30	2of2	0.58	0.02	0.014	0.003	0.010	0.006	0.0059	0.0008	5.2	0.5
BY88	Poore Mine ground sluice nr Grass Valley	4/1/1999	15:40	1of2	0.82	0.08	0.030	0.002	0.019	0.000	0.0086	0.0003	570	10
BY88	Poore Mine ground sluice nr Grass Valley	4/1/1999	15:40	2of2	0.74	0.07	0.028	0.002	0.019	0.002	0.0078	0.0004	580	20

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Copper (Cu), filtered (µg/L) (01040)		Dysprosium (Dy), filtered (µg/L) (82331)		Erbium (Er), filtered (µg/L) (50573		Europium (Eu), filtered (µg/L) (50574)		Iron (Fe), filtered (µg/L) (01046)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY89	Poore Mine pit lake nr Grass Valley	4/1/1999	16:50	1of2	1.0	0.1	0.0071	0.0005	0.0047	0.0008	0.0011	0.0025	90	5
BY89	Poore Mine pit lake nr Grass Valley	4/1/1999	16:50	2of2	0.87	0.05	0.0047	0.0021	0.0038	0.0009	0.0011	0.0041	78	2
BY89	Poore Mine pit lake nr Grass Valley	5/23/2000	10:45	1of2	11	0	0.039	0.005	0.021	0.002	<0.001	0.001	33	2
BY89	Poore Mine pit lake nr Grass Valley	5/23/2000	10:45	2of2	12	0	0.039	0.001	0.019	0.001	<0.001	0.002	32	3
BY90	Poore Mine seep ab ground sluice nr Grass Valley	4/1/1999	16:00	1of2	0.50	0.04	0.011	0.003	0.0042	0.0046	0.0015	0.0015	330	10
BY90	Poore Mine seep ab ground sluice nr Grass Valley	4/1/1999	16:00	2of2	0.44	0.08	0.0085	0.0006	0.0070	0.0008	0.0016	0.0022	330	0
BY91	Poore Mine tunnel effluent nr Grass Valley	3/31/1999	15:20	1of2	0.50	0.01	0.0025	0.0005	0.001	0.000	0.0011	0.0018	2.1	0.2
BY91	Poore Mine tunnel effluent nr Grass Valley	3/31/1999	15:20	2of2	0.45	0.01	0.0035	0.0015	0.0028	0.0015	0.0038	0.0048	4	1
BY91	Poore Mine tunnel effluent nr Grass Valley	12/15/1999	13:00	1of2	0.23	0.09	0.0011	0.0003	0.0005	0.0006	<0.0004	0.0000	26	27
BY91	Poore Mine tunnel effluent nr Grass Valley	12/15/1999	13:00	2of2	0.25	0.07	0.0011	0.0001	0.0006	0.0001	<0.0004	0.0005	4	4
BY91	Poore Mine tunnel effluent nr Grass Valley	5/23/2000	12:00	1of2	0.51	0.12	<0.002	0.000	<0.004	0.000	<0.001	0.001	1.5	0.0
BY91	Poore Mine tunnel effluent nr Grass Valley	5/23/2000	12:00	2of2	0.71	0.08	<0.003	0.002	<0.002	0.002	<0.001	0.001	1.9	0.4
BY105	Sailor Flat Mine main drain Gulch 01nr Quaker Hill	7/6/1999	16:00	1of2	2.8	0.0	0.18	0.00	0.12	0.00	0.052	0.009	8.5	0.4
BY105	Sailor Flat Mine main drain Gulch 01nr Quaker Hill	7/6/1999	16:00	2of2	2.7	0.1	0.17	0.01	0.11	0.01	0.061	0.002	8	0

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Replicate	Copper (Cu), filtered (µg/L) (01040)		Dysprosium (Dy), filtered (µg/L) (82331)		Erbium (Er), filtered (µg/L) (50573		Europium (Eu), filtered (µg/L) (50574)		Iron (Fe), filtered (µg/L) (01046)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY105	Sailor Flat Mine main drain Gulch 01nr Quaker Hill	12/2/1999	14:30	1of2	4.8	0.2	0.29	0.01	0.17	0.01	0.098	0.000	58	1
BY105	Sailor Flat Mine main drain Gulch 01nr Quaker Hill	12/2/1999	14:30	2of2	4.6	0.1	0.30	0.00	0.18	0.00	0.099	0.001	56	6
BY106	Sailor Flat Mine main drainage to Greenhorn Cr, Gulch 03	4/9/2001	12:30	1of 2	2.8	0.3	0.22	0.04	0.13	0.02	0.058	0.010	67	2
BY106	Sailor Flat Mine main drainage to Greenhorn Cr, Gulch 03	4/9/2001	12:30	2of 2	3.0	0.4	0.22	0.03	0.13	0.04	0.062	0.016	72	4
BY114	SF Greenhorn Cr 0.7 mi ab Greenhorn Cr nr Nevada City	8/22/2000	15:10	1of2	<0.4	0.0	<0.005	0.002	<0.005	0.004	<0.003	0.001	<20	0
BY114	SF Greenhorn Cr 0.7 mi ab Greenhorn Cr nr Nevada City	8/22/2000	15:10	2of2	<0.4	0.1	<0.005	0.001	<0.005	0.003	<0.003	0.002	<20	0
BY122	Starr Mine tunnel inflow nr Grass Valley	4/23/1999	15:00	1of2	3.0	0.5	0.021	0.002	0.012	0.001	0.0043	0.0022	9	1
BY122	Starr Mine tunnel inflow nr Grass Valley	4/23/1999	15:00	2of2	3.3	0.0	0.020	0.001	0.012	0.002	0.0050	0.0036	9	1
BY123	Starr Mine tunnel midway nr Grass Valley	4/23/1999	13:40	1of2	0.25	0.09	<0.0005	0.0004	0.0014	0.0019	0.0042	0.0039	3.0	0.1
BY123	Starr Mine tunnel midway nr Grass Valley	4/23/1999	13:40	2of2	0.30	0.04	<0.0005	0.0001	<0.0006	0.0002	0.0036	0.0017	4.6	1.8
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	10:45	1of2	0.22	0.03	0.0010	0.0003	0.0004	0.0005	<0.0004	0.0003	<3	1
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	10:45	2of2	0.26	0.02	0.0011	0.0003	0.0006	0.0000	<0.0004	0.0001	<3	1

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Replicate	Copper (Cu), filtered (µg/L) (01040)		Dysprosium (Dy), filtered (µg/L) (82331)		Erbium (Er), filtered (µg/L) (50573		Europium (Eu), filtered (µg/L) (50574)		Iron (Fe), filtered (µg/L) (01046)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY124	Starr Mine tunnel outlet nr Grass Valley	8/23/2000	17:30	1of2	<0.4	0.1	<0.005	0.001	<0.005	0.001	<0.003	0.002	<20	10
BY124	Starr Mine tunnel outlet nr Grass Valley	8/23/2000	17:30	2of2	0.4	0.1	<0.005	0.004	<0.005	0.004	<0.003	0.001	<20	20
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:00	1of2	0.8	0.2	0.010	0.004	0.004	0.003	<0.002	0.001	<7	0
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:00	2of2	0.8	0.2	0.008	0.001	0.006	0.002	<0.002	0.001	<7	2
BY130	Tom and Jerry Mine drain at tunnel outlet nr Nevada City	6/28/2000	11:30	1of2	<0.2	0.1	<0.003	0.002	<0.003	0.000	<0.002	0.002	66	17
BY130	Tom and Jerry Mine drain at tunnel outlet nr Nevada City	6/28/2000	11:30	2of2	0.3	0.1	<0.003	0.002	0.004	0.004	<0.002	0.001	75	9
BY131	Tom and Jerry Mine drainage pond nr Nevada City	8/23/2000	10:45	1of2	2.0	0.0	0.007	0.000	0.005	0.002	<0.003	0.001	<20	10
BY131	Tom and Jerry Mine drainage pond nr Nevada City	8/23/2000	10:45	2of2	1.9	0.0	0.009	0.001	0.006	0.004	0.004	0.001	<20	10
Disturbed samples														
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	11:30	1of2	0.20	0.03	0.0006	0.0004	0.0005	0.0001	<0.0004	0.0003	7	2
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	11:30	2of2	0.18	0.02	<0.0005	0.0006	0.0009	0.0001	0.0005	0.0001	7	1
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:30	1of2	0.6	0.2	0.006	0.001	0.004	0.004	<0.002	0.001	<7	2
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:30	2of2	0.5	0.1	0.010	0.000	0.004	0.003	0.002	0.000	12	4

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Gadolinium (Gd), filtered (µg/L) (50575)		Holmium (Ho), filtered (µg/L) (50577)		Potassium (K), filtered (mg/L) (00935)		Lanthanum (La), filtered (µg/L) (01180)		Lithium (Li), filtered (µg/L) (01130)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
Environmental samples														
BY20	Boston Mine tunnel outlet nr Grass Valley	6/18/1999	14:30	1of2	0.0033	0.0006	0.0007	0.0002	1.7	0.0	0.0087	0.0007	2.4	0.1
BY20	Boston Mine tunnel outlet nr Grass Valley	6/18/1999	14:30	2of2	0.0026	0.0006	0.0006	0.0000	1.8	0.1	0.0078	0.0015	2.4	0.1
BY20	Boston Mine tunnel outlet nr Grass Valley	12/14/1999	12:00	1of2	0.0006	0.0005	0.0003	0.0001	1.8	0.0	0.0025	0.0004	3.1	0.1
BY20	Boston Mine tunnel outlet nr Grass Valley	12/14/1999	12:00	2of2	0.0011	0.0002	0.0002	0.0001	2.2	0.0	0.0028	0.0005	2.9	0.1
BY20	Boston Mine tunnel outlet nr Grass Valley	5/24/2000	16:00	1of2	0.006	0.002	0.0012	0.0001	1.7	0.2	0.014	0.001	2.2	0.1
BY20	Boston Mine tunnel outlet nr Grass Valley	5/24/2000	16:00	2of2	0.004	0.002	0.0010	0.0006	1.6	0.0	0.013	0.000	2.2	0.1
BY21	Boston Mine wetlands pond nr Grass Valley	12/14/1999	10:30	1of2	0.0014	0.0002	0.0004	0.0000	3.4	0.2	0.0034	0.0001	0.90	0.05
BY21	Boston Mine wetlands pond nr Grass Valley	12/14/1999	10:30	2of2	0.0017	0.0003	0.0003	0.0000	3.0	0.2	0.0035	0.0004	0.92	0.08
BY21	Boston Mine wetlands pond nr Grass Valley	5/24/2000	16:30	1of2	0.004	0.001	0.0009	0.0005	1.6	0.4	0.011	0.001	2.9	0.2
BY21	Boston Mine wetlands pond nr Grass Valley	5/24/2000	16:30	2of2	0.004	0.002	0.0010	0.0003	1.6	0.1	0.011	0.000	2.8	0.1
BY58	Buckeye Flat Mine main drain 0.45 mi ab Greenhorn Cr	8/21/2000	11:00	1of2	2.9	0.0	0.54	0.00	1.7	0.1	11	0	14	0
BY58	Buckeye Flat Mine main drain 0.45 mi ab Greenhorn Cr	8/21/2000	11:00	2of2	3.0	0.1	0.54	0.01	1.8	0.1	11	0	16	1
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	6/18/1999	11:30	1of2	5.6	0.3	1.1	0.0	1.3	0.0	21	0	24	0
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	6/18/1999	11:30	2of2	5.7	0.3	1.1	0.0	1.3	0.0	21	0	25	0

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

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Station map ID	Station name	Date	Time	Replicate	Gadolinium (Gd), filtered (µg/L) (50575)		Holmium (Ho), filtered (µg/L) (50577)		Potassium (K), filtered (mg/L) (00935)		Lanthanum (La), filtered (µg/L) (01180)		Lithium (Li), filtered (µg/L) (01130)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	12/2/1999	11:00	1of2	3.9	0.0	0.74	0.01	1.4	0.0	16	0	16	1
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	12/2/1999	11:00	2of2	3.9	0.2	0.73	0.02	1.4	0.1	15	1	17	1
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	8/22/2000	10:45	1of2	5.5	0.1	0.98	0.00	0.6	0.1	22	0	17	1
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	8/22/2000	10:45	2of2	5.1	0.2	0.98	0.00	0.6	0.0	22	0	19	0
BY116	Buckeye Flat Mine pond drain 0.15 mi ab SF Greenhorn Cr	8/21/2000	14:10	1of2	0.013	0.004	0.002	0.001	0.6	0.1	0.024	0.003	2.1	0.3
BY116	Buckeye Flat Mine pond drain 0.15 mi ab SF Greenhorn Cr	8/21/2000	14:10	2of2	0.012	0.003	0.002	0.001	0.7	0.1	0.026	0.000	2.0	0.2
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/26/1999	11:00	1of2	0.10	0.00	0.022	0.000	0.25	0.01	0.39	0.00	1.5	0.0
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/26/1999	11:00	2of2	0.096	0.000	0.019	0.000	0.26	0.01	0.35	0.01	1.6	0.3
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/22/2000	12:10	1of2	0.077	0.001	0.018	0.000	0.2	0.1	0.31	0.00	2.0	0.2
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/22/2000	12:10	2of2	0.082	0.007	0.018	0.002	0.2	0.0	0.32	0.00	1.7	0.2
BY25	Buckeye Flat Mine upper drain	4/9/2001	10:00	1of2	0.91	0.15	0.17	0.03	0.64	0.09	4.6	0.8	4.2	0.2
BY25	Buckeye Flat Mine upper drain	4/9/2001	10:00	2of2	0.97	0.00	0.17	0.01	0.64	0.07	4.6	0.0	4.7	0.5

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Gadolinium (Gd), filtered (µg/L) (50575)		Holmium (Ho), filtered (µg/L) (50577)		Potassium (K), filtered (mg/L) (00935)		Lanthanum (La), filtered (µg/L) (01180)		Lithium (Li), filtered (µg/L) (01130)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY52	Greenhorn Cr 0.3 mi ab Buckeye Ford nr Nevada City	1/25/2000	10:45	1of2	0.085	0.013	0.016	0.000	0.56	0.03	0.30	0.02	1.0	0.1
BY52	Greenhorn Cr 0.3 mi ab Buckeye Ford nr Nevada City	1/25/2000	10:45	2of2	0.085	0.002	0.016	0.000	0.53	0.04	0.31	0.00	1.0	0.2
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	7/24/2001	11:00	1of2	0.0026	0.0002	0.0006	0.0000	0.68	0.01	0.0094	0.0008	0.52	0.04
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	7/24/2001	11:00	2of2	0.0032	0.0000	0.0006	0.0003	0.68	0.01	0.0087	0.0003	0.56	0.01
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	8/29/2001	15:00	1of2	0.0018	0.0000	0.0005	0.0000	0.72	0.01	0.0084	0.0001	0.42	0.03
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	8/29/2001	15:00	2of2	0.0028	0.0007	0.0005	0.0001	0.74	0.01	0.0082	0.0006	0.45	0.01
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	9/14/2001	13:00	1of2	0.0024	0.0006	0.0005	0.0001	0.69	0.01	0.0071	0.0004	0.44	0.01
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	9/14/2001	13:00	2of2	0.0022	0.0001	0.0003	0.0000	0.69	0.01	0.0070	0.0005	0.45	0.01
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	10/15/2001	12:00	1of2	0.0015	0.0004	0.0002	0.0001	0.63	0.02	0.0049	0.0003	0.37	0.00
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	10/15/2001	12:00	2of2	0.0016	0.0002	0.0004	0.0000	0.63	0.02	0.0051	0.0005	0.37	0.01
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	11/20/2001	13:20	1of2	0.013	0.001	0.0025	0.0001	0.77	0.00	0.037	0.001	0.52	0.00
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	11/20/2001	13:20	2of2	0.014	0.000	0.0028	0.0004	0.75	0.01	0.041	0.000	0.52	0.00
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/10/2001	12:20	1of2	0.037	0.001	0.0067	0.0008	0.60	0.00	0.10	0.00	0.86	0.02

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Gadolinium (Gd), filtered (µg/L) (50575)		Holmium (Ho), filtered (µg/L) (50577)		Potassium (K), filtered (mg/L) (00935)		Lanthanum (La), filtered (µg/L) (01180)		Lithium (Li), filtered (µg/L) (01130)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/10/2001	12:20	2of2	0.037	0.003	0.0068	0.0000	0.60	0.00	0.11	0.00	0.88	0.02
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/21/2001	13:00	1of2	0.085	0.005	0.015	0.000	0.55	0.00	0.19	0.00	0.73	0.03
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/21/2001	13:00	2of2	0.084	0.001	0.015	0.001	0.55	0.01	0.18	0.00	0.74	0.04
BY51	Greenhorn Cr nr Headwaters nr Scotts Flat Reservoir	1/25/2000	9:30	1of2	0.058	0.005	0.011	0.001	0.44	0.03	0.15	0.00	0.3	0.1
BY51	Greenhorn Cr nr Headwaters nr Scotts Flat Reservoir	1/25/2000	9:30	2of2	0.061	0.004	0.010	0.000	0.45	0.02	0.17	0.00	0.2	0.1
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	12/14/1999	14:00	1of2	0.065	0.002	0.013	0.000	1.5	0.2	0.29	0.00	7.6	0.1
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	12/14/1999	14:00	2of2	0.066	0.004	0.013	0.001	1.7	0.2	0.29	0.01	7.9	0.3
BY86	Poore Mine creek ab tunnel nr Grass Valley	3/31/1999	17:40	1of2	0.016	0.000	0.0028	0.0004	0.59	0.04	0.061	0.004	0.41	0.04
BY86	Poore Mine creek ab tunnel nr Grass Valley	3/31/1999	17:40	2of2	0.015	0.001	0.0028	0.0004	0.57	0.01	0.059	0.003	0.41	0.02
BY87	Poore Mine creek bl tunnel nr Grass Valley	3/31/1999	13:30	1of2	0.017	0.001	0.0029	0.0001	0.59	0.02	0.059	0.006	0.65	0.04
BY87	Poore Mine creek bl tunnel nr Grass Valley	3/31/1999	13:30	2of2	0.016	0.001	0.0025	0.0003	0.57	0.01	0.049	0.003	0.63	0.02
BY88	Poore Mine ground sluice nr Grass Valley	4/1/1999	15:40	1of2	0.029	0.001	0.0060	0.0001	1.7	0.0	0.077	0.005	10	0
BY88	Poore Mine ground sluice nr Grass Valley	4/1/1999	15:40	2of2	0.029	0.001	0.0065	0.0006	1.7	0.0	0.077	0.001	11	0

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Replicate	Gadolinium (Gd), filtered (µg/L) (50575)		Holmium (Ho), filtered (µg/L) (50577)		Potassium (K), filtered (mg/L) (00935)		Lanthanum (La), filtered (µg/L) (01180)		Lithium (Li), filtered (µg/L) (01130)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY89	Poore Mine pit lake nr Grass Valley	4/1/1999	16:50	1of2	0.0081	0.0004	0.0013	0.0002	1.2	0.0	0.022	0.001	2.3	0.1
BY89	Poore Mine pit lake nr Grass Valley	4/1/1999	16:50	2of2	0.0069	0.0004	0.0013	0.0002	1.3	0.0	0.020	0.002	2.3	0.2
BY89	Poore Mine pit lake nr Grass Valley	5/23/2000	10:45	1of2	0.039	0.002	0.0078	0.0004	2.4	0.1	0.19	0.00	11	0
BY89	Poore Mine pit lake nr Grass Valley	5/23/2000	10:45	2of2	0.045	0.001	0.0079	0.0001	2.5	0.1	0.20	0.01	11	0
BY90	Poore Mine seep ab ground sluice nr Grass Valley	4/1/1999	16:00	1of2	0.010	0.003	0.0023	0.0002	1.7	0.0	0.022	0.004	10	0
BY90	Poore Mine seep ab ground sluice nr Grass Valley	4/1/1999	16:00	2of2	0.0081	0.0013	0.0023	0.0002	1.7	0.0	0.027	0.004	10	0
BY91	Poore Mine tunnel effluent nr Grass Valley	3/31/1999	15:20	1of2	0.002	0.001	0.0007	0.0002	1.7	0.0	0.016	0.002	8.7	0.5
BY91	Poore Mine tunnel effluent nr Grass Valley	3/31/1999	15:20	2of2	0.0030	0.0002	0.0007	0.0001	1.5	0.1	0.017	0.001	8.7	0.1
BY91	Poore Mine tunnel effluent nr Grass Valley	12/15/1999	13:00	1of2	0.0006	0.0001	0.0003	0.0000	1.9	0.1	0.0048	0.0002	9.8	1.9
BY91	Poore Mine tunnel effluent nr Grass Valley	12/15/1999	13:00	2of2	0.0013	0.0003	0.0002	0.0001	2.0	0.4	0.0051	0.0002	11	0
BY91	Poore Mine tunnel effluent nr Grass Valley	5/23/2000	12:00	1of2	<0.003	0.002	<0.0005	0.0002	1.8	0.1	0.0075	0.0003	11	0
BY91	Poore Mine tunnel effluent nr Grass Valley	5/23/2000	12:00	2of2	<0.003	0.002	<0.001	0.000	1.8	0.0	0.007	0.001	11	0
BY105	Sailor Flat Mine main drain Gulch 01nr Quaker Hill	7/6/1999	16:00	1of2	0.19	0.00	0.039	0.000	1.5	0.0	0.46	0.00	7.9	0.3
BY105	Sailor Flat Mine main drain Gulch 01nr Quaker Hill	7/6/1999	16:00	2of2	0.22	0.01	0.038	0.004	1.4	0.0	0.44	0.04	7.4	0.3

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Replicate	Gadolinium (Gd), filtered (µg/L) (50575)		Holmium (Ho), filtered (µg/L) (50577)		Potassium (K), filtered (mg/L) (00935)		Lanthanum (La), filtered (µg/L) (01180)		Lithium (Li), filtered (µg/L) (01130)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY105	Sailor Flat Mine main drain Gulch 01nr Quaker Hill	12/2/1999	14:30	1of2	0.34	0.00	0.057	0.002	1.1	0.1	0.68	0.02	2.2	0.1
BY105	Sailor Flat Mine main drain Gulch 01nr Quaker Hill	12/2/1999	14:30	2of2	0.34	0.00	0.058	0.000	1.0	0.1	0.70	0.01	2.2	0.1
BY106	Sailor Flat Mine main drainage to Greenhorn Cr, Gulch 03	4/9/2001	12:30	1of 2	0.21	0.02	0.045	0.012	0.64	0.15	0.73	0.17	0.9	0.3
BY106	Sailor Flat Mine main drainage to Greenhorn Cr, Gulch 03	4/9/2001	12:30	2of 2	0.21	0.02	0.048	0.012	0.67	0.15	0.74	0.16	1.0	0.3
BY114	SF Greenhorn Cr 0.7 mi ab Greenhorn Cr nr Nevada City	8/22/2000	15:10	1of2	<0.004	0.004	<0.0009	0.0006	0.4	0.0	0.011	0.001	<0.4	0.2
BY114	SF Greenhorn Cr 0.7 mi ab Greenhorn Cr nr Nevada City	8/22/2000	15:10	2of2	<0.004	0.001	<0.0009	0.0003	0.3	0.0	0.010	0.001	<0.4	0.2
BY122	Starr Mine tunnel inflow nr Grass Valley	4/23/1999	15:00	1of2	0.026	0.002	0.0041	0.0002	1.1	0.0	0.072	0.003	5.1	0.1
BY122	Starr Mine tunnel inflow nr Grass Valley	4/23/1999	15:00	2of2	0.026	0.000	0.0035	0.0014	1.2	0.0	0.071	0.008	5.2	0.2
BY123	Starr Mine tunnel midway nr Grass Valley	4/23/1999	13:40	1of2	0.0004	0.0002	<0.0001	0.0000	2.2	0.2	0.0020	0.0002	10	0
BY123	Starr Mine tunnel midway nr Grass Valley	4/23/1999	13:40	2of2	0.0005	0.0002	<0.0001	0.0000	2.1	0.1	0.0015	0.0002	10	0
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	10:45	1of2	0.0004	0.0003	0.0002	0.0001	2.2	0.0	0.0025	0.0002	9.3	0.8
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	10:45	2of2	0.0010	0.0001	0.0002	0.0000	2.4	0.0	0.0030	0.0001	9.1	0.4
BY124	Starr Mine tunnel outlet nr Grass Valley	8/23/2000	17:30	1of2	<0.004	0.003	<0.0009	0.0006	1.9	0.1	0.007	0.002	8.4	0.6

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Replicate	Gadolinium (Gd), filtered (µg/L) (50575)		Holmium (Ho), filtered (µg/L) (50577)		Potassium (K), filtered (mg/L) (00935)		Lanthanum (La), filtered (µg/L) (01180)		Lithium (Li), filtered (µg/L) (01130)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY124	Starr Mine tunnel outlet nr Grass Valley	8/23/2000	17:30	2of2	<0.004	0.002	<0.0009	0.0006	2.0	0.2	0.002	0.000	7.9	0.7
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:00	1of2	0.010	0.002	0.002	0.000	0.4	0.1	0.020	0.002	4.7	0.2
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:00	2of2	0.007	0.001	0.002	0.000	0.4	0.1	0.019	0.000	4.4	0.2
BY130	Tom and Jerry Mine drain at tunnel outlet nr Nevada City	6/28/2000	11:30	1of2	<0.003	0.005	<0.0008	0.0004	0.7	0.2	0.006	0.002	11	0
BY130	Tom and Jerry Mine drain at tunnel outlet nr Nevada City	6/28/2000	11:30	2of2	<0.003	0.002	<0.0008	0.0002	0.8	0.1	0.006	0.002	11	1
BY131	Tom and Jerry Mine drainage pond nr Nevada City	8/23/2000	10:45	1of2	0.008	0.002	0.002	0.001	0.7	0.0	0.025	0.003	1.0	0.2
BY131	Tom and Jerry Mine drainage pond nr Nevada City	8/23/2000	10:45	2of2	0.012	0.002	0.002	0.001	0.7	0.1	0.028	0.001	0.9	0.3
Disturbed samples														
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	11:30	1of2	0.0004	0.0003	0.0002	0.0001	2.4	0.1	0.0014	0.0001	8.7	0.2
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	11:30	2of2	0.0005	0.0004	0.0002	0.0000	2.8	0.1	0.0015	0.0002	8.4	0.3
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:30	1of2	0.008	0.002	0.002	0.000	0.8	0.1	0.026	0.000	11	0
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:30	2of2	0.011	0.002	0.002	0.000	0.8	0.0	0.028	0.000	11	0

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Replicate	Lutetium (Lu), filtered (µg/L) (62844)		Magnesium (Mg), filtered (mg/L) (00925)		Manganese (Mn), filtered (µg/L) (01056)		Molybdenum (Mo), filtered (µg/L) (01060)		Sodium (Na), filtered (mg/L) (00930)		Neodymium (Nd), filtered (µg/L) (50579)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
Environmental samples																
BY20	Boston Mine tunnel outlet nr Grass Valley	6/18/1999	14:30	1of2	0.0004	0.0001	4.8	0.2	100	0	0.23	0.01	1.2	0.1	0.013	0.002
BY20	Boston Mine tunnel outlet nr Grass Valley	6/18/1999	14:30	2of2	0.0005	0.0002	4.8	0.2	120	20	0.19	0.02	1.2	0.1	0.013	0.002
BY20	Boston Mine tunnel outlet nr Grass Valley	12/14/1999	12:00	1of2	<0.0001	0.0002	6.3	0.8	51	3	0.13	0.03	1.6	0.2	0.0035	0.0003
BY20	Boston Mine tunnel outlet nr Grass Valley	12/14/1999	12:00	2of2	0.0001	0.0000	7.1	0.0	52	2	0.16	0.00	1.5	0.1	0.0033	0.0005
BY20	Boston Mine tunnel outlet nr Grass Valley	5/24/2000	16:00	1of2	0.0010	0.0005	4.0	0.7	120	0	0.22	0.03	1.5	0.0	0.020	0.005
BY20	Boston Mine tunnel outlet nr Grass Valley	5/24/2000	16:00	2of2	0.0003	0.0004	4.1	0.4	120	0	0.08	0.00	1.5	0.1	0.021	0.003
BY21	Boston Mine wetlands pond nr Grass Valley	12/14/1999	10:30	1of2	<0.0001	0.0000	6.6	1.3	12	0	<0.05	0.00	1.6	0.3	0.0048	0.0003
BY21	Boston Mine wetlands pond nr Grass Valley	12/14/1999	10:30	2of2	0.0001	0.0000	6.2	0.3	12	0	0.09	0.05	1.5	0.2	0.0049	0.0006
BY21	Boston Mine wetlands pond nr Grass Valley	5/24/2000	16:30	1of2	0.0004	0.0002	2.8	0.8	45	2	0.15	0.08	1.5	0.1	0.016	0.002
BY21	Boston Mine wetlands pond nr Grass Valley	5/24/2000	16:30	2of2	0.0002	0.0004	2.9	0.4	44	0	0.10	0.06	1.5	0.0	0.018	0.000
BY58	Buckeye Flat Mine main drain 0.45 mi ab Greenhorn Cr	8/21/2000	11:00	1of2	0.14	0.01	11	0	1,500	0	0.05	0.02	1.8	0.0	12	0
BY58	Buckeye Flat Mine main drain 0.45 mi ab Greenhorn Cr	8/21/2000	11:00	2of2	0.14	0.01	12	1	1,400	100	<0.04	0.03	1.8	0.0	12	0
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	6/18/1999	11:30	1of2	0.25	0.00	17	0	3,400	0	0.079	0.014	2.3	0.1	24	0
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	6/18/1999	11:30	2of2	0.26	0.00	18	0	3,100	100	0.085	0.014	2.3	0.1	25	0

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

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Station map ID	Station name	Date	Time	Rep-licate	Lutetium (Lu), filtered (µg/L) (62844)		Magnesium (Mg), filtered (mg/L) (00925)		Manganese (Mn), filtered (µg/L) (01056)		Molybdenum (Mo), filtered (µg/L) (01060)		Sodium (Na), filtered (mg/L) (00930)		Neodymium (Nd), filtered (µg/L) (50579)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	12/2/1999	11:00	1of2	0.19	0.00	12	1	1,700	0	0.10	0.08	2.1	0.2	18	1
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	12/2/1999	11:00	2of2	0.19	0.01	12	0	1,700	0	<0.05	0.01	2.1	0.3	17	1
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	8/22/2000	10:45	1of2	0.26	0.00	16	0	2,200	100	0.05	0.01	3.8	0.0	24	0
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	8/22/2000	10:45	2of2	0.24	0.01	15	1	2,300	200	0.09	0.06	3.8	0.0	24	0
BY116	Buckeye Flat Mine pond drain 0.15 mi ab SF Greenhorn Cr	8/21/2000	14:10	1of2	<0.001	0.000	0.7	0.2	54	2	<0.04	0.01	0.60	0.03	0.047	0.004
BY116	Buckeye Flat Mine pond drain 0.15 mi ab SF Greenhorn Cr	8/21/2000	14:10	2of2	<0.001	0.001	0.8	0.1	53	0	0.07	0.06	0.61	0.03	0.050	0.007
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/26/1999	11:00	1of2	0.0073	0.0001	0.54	0.08	140	10	0.06	0.04	0.60	0.06	0.46	0.01
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/26/1999	11:00	2of2	0.0070	0.0000	0.54	0.11	140	10	<0.04	0.01	0.56	0.08	0.42	0.02
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/22/2000	12:10	1of2	0.005	0.000	0.6	0.1	100	0	<0.04	0.02	0.68	0.03	0.32	0.01
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/22/2000	12:10	2of2	0.005	0.000	0.6	0.2	100	0	<0.04	0.02	0.68	0.02	0.32	0.01
BY25	Buckeye Flat Mine upper drain	4/9/2001	10:00	1of2	0.044	0.007	5.2	0.3	370	20	<0.2	0.1	1.6	0.3	4.1	0.8
BY25	Buckeye Flat Mine upper drain	4/9/2001	10:00	2of2	0.043	0.001	5.4	0.4	390	10	<0.2	0.1	1.6	0.1	4.2	0.1

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Lutetium (Lu), filtered (µg/L) (62844)		Magnesium (Mg), filtered (mg/L) (00925)		Manganese (Mn), filtered (µg/L) (01056)		Molybdenum (Mo), filtered (µg/L) (01060)		Sodium (Na), filtered (mg/L) (00930)		Neodymium (Nd), filtered (µg/L) (50579)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY52	Greenhorn Cr 0.3 mi ab Buckeye Ford nr Nevada City	1/25/2000	10:45	1of2	0.0063	0.0009	1.2	0.1	27	0	0.07	0.01	1.7	0.1	0.45	0.01
BY52	Greenhorn Cr 0.3 mi ab Buckeye Ford nr Nevada City	1/25/2000	10:45	2of2	0.0062	0.0012	1.1	0.1	28	1	0.09	0.04	1.7	0.1	0.42	0.01
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	7/24/2001	11:00	1of2	0.0002	0.0001	2.5	0.0	110	0	0.25	0.03	2.3	0.1	0.012	0.000
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	7/24/2001	11:00	2of2	0.0003	0.0001	2.5	0.0	120	0	0.18	0.02	2.3	0.1	0.0099	0.0016
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	8/29/2001	15:00	1of2	0.0002	0.0001	2.2	0.1	28	0	0.12	0.01	2.5	0.0	0.0095	0.0000
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	8/29/2001	15:00	2of2	0.0002	0.0001	2.3	0.0	29	0	0.14	0.02	2.6	0.1	0.011	0.001
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	9/14/2001	13:00	1of2	<0.0001	0.0001	2.2	0.0	53	0	0.15	0.04	2.1	0.1	0.0079	0.0006
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	9/14/2001	13:00	2of2	0.0002	0.0001	2.2	0.0	54	0	0.18	0.05	2.1	0.0	0.0091	0.0006
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	10/15/2001	12:00	1of2	<0.0001	0.0000	2.2	0.0	55	0	0.13	0.06	2.3	0.1	0.0062	0.0008
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	10/15/2001	12:00	2of2	0.0001	0.0001	2.3	0.1	53	0	0.09	0.02	2.4	0.0	0.0077	0.0008
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	11/20/2001	13:20	1of2	0.0009	0.0001	2.6	0.1	200	0	0.14	0.05	2.2	0.1	0.057	0.001
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	11/20/2001	13:20	2of2	0.0010	0.0001	2.6	0.0	190	0	0.11	0.02	2.2	0.0	0.059	0.000
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/10/2001	12:20	1of2	0.0026	0.0002	2.4	0.0	98	3	0.18	0.04	2.3	0.0	0.18	0.00

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Lutetium (Lu), filtered (µg/L) (62844)		Magnesium (Mg), filtered (mg/L) (00925)		Manganese (Mn), filtered (µg/L) (01056)		Molybdenum (Mo), filtered (µg/L) (01060)		Sodium (Na), filtered (mg/L) (00930)		Neodymium (Nd), filtered (µg/L) (50579)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/10/2001	12:20	2of2	0.0024	0.0002	2.4	0.0	100	0	0.16	0.02	2.4	0.1	0.19	0.00
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/21/2001	13:00	1of2	0.0059	0.0002	1.9	0.0	76	0	0.16	0.05	1.7	0.1	0.39	0.00
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/21/2001	13:00	2of2	0.0061	0.0009	1.9	0.0	73	0	0.20	0.11	1.7	0.1	0.37	0.00
BY51	Greenhorn Cr nr Headwaters nr Scotts Flat Reservoir	1/25/2000	9:30	1of2	0.0045	0.0001	0.61	0.03	1.9	0.1	0.05	0.02	1.4	0.1	0.26	0.00
BY51	Greenhorn Cr nr Headwaters nr Scotts Flat Reservoir	1/25/2000	9:30	2of2	0.0035	0.0009	0.63	0.02	1.9	0.5	0.05	0.03	1.2	0.1	0.26	0.00
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	12/14/1999	14:00	1of2	0.0048	0.0002	3.9	0.4	98	3	0.14	0.05	2.7	0.4	0.30	0.00
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	12/14/1999	14:00	2of2	0.0049	0.0001	5.0	0.9	99	3	0.13	0.04	2.9	0.3	0.30	0.03
BY86	Poore Mine creek ab tunnel nr Grass Valley	3/31/1999	17:40	1of2	0.0013	0.0002	1.9	0.4	2.4	0.2	0.05	0.01	2.3	0.2	0.078	0.005
BY86	Poore Mine creek ab tunnel nr Grass Valley	3/31/1999	17:40	2of2	0.0013	0.0002	1.8	0.2	2.3	0.2	0.04	0.00	2.1	0.0	0.076	0.002
BY87	Poore Mine creek bl tunnel nr Grass Valley	3/31/1999	13:30	1of2	0.0016	0.0004	1.8	0.1	1.4	0.0	0.09	0.04	2.0	0.1	0.082	0.006
BY87	Poore Mine creek bl tunnel nr Grass Valley	3/31/1999	13:30	2of2	0.0014	0.0005	1.6	0.0	1.4	0.1	0.07	0.02	2.0	0.1	0.078	0.010
BY88	Poore Mine ground sluice nr Grass Valley	4/1/1999	15:40	1of2	0.0032	0.0004	3.7	0.1	430	30	0.03	0.02	1.8	0.0	0.10	0.01
BY88	Poore Mine ground sluice nr Grass Valley	4/1/1999	15:40	2of2	0.0032	0.0005	3.7	0.0	440	50	0.069	0.042	1.9	0.0	0.11	0.01

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Lutetium (Lu), filtered (µg/L) (62844)		Magnesium (Mg), filtered (mg/L) (00925)		Manganese (Mn), filtered (µg/L) (01056)		Molybdenum (Mo), filtered (µg/L) (01060)		Sodium (Na), filtered (mg/L) (00930)		Neodymium (Nd), filtered (µg/L) (50579)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY89	Poore Mine pit lake nr Grass Valley	4/1/1999	16:50	1of2	0.0009	0.0002	1.1	0.0	130	0	0.032	0.025	0.90	0.08	0.037	0.003
BY89	Poore Mine pit lake nr Grass Valley	4/1/1999	16:50	2of2	0.0007	0.0000	1.1	0.0	99	9	0.13	0.02	0.88	0.11	0.031	0.004
BY89	Poore Mine pit lake nr Grass Valley	5/23/2000	10:45	1of2	0.0030	0.0004	6.5	0.4	1,300	100	0.04	0.01	1.5	0.1	0.15	0.00
BY89	Poore Mine pit lake nr Grass Valley	5/23/2000	10:45	2of2	0.0026	0.0007	6.8	0.3	1,300	0	0.02	0.01	1.4	0.1	0.15	0.00
BY90	Poore Mine seep ab ground sluice nr Grass Valley	4/1/1999	16:00	1of2	0.0014	0.0003	3.5	0.1	390	10	0.052	0.032	1.8	0.4	0.031	0.001
BY90	Poore Mine seep ab ground sluice nr Grass Valley	4/1/1999	16:00	2of2	0.0012	0.0002	3.5	0.0	430	10	0.033	0.018	1.8	0.1	0.031	0.004
BY91	Poore Mine tunnel effluent nr Grass Valley	3/31/1999	15:20	1of2	<0.0002	0.0001	4.1	0.1	6.9	0.2	0.14	0.08	1.9	0.0	0.013	0.004
BY91	Poore Mine tunnel effluent nr Grass Valley	3/31/1999	15:20	2of2	0.0003	0.0002	3.8	0.1	7.3	0.6	0.086	0.020	1.8	0.0	0.012	0.000
BY91	Poore Mine tunnel effluent nr Grass Valley	12/15/1999	13:00	1of2	<0.0001	0.0000	5.7	0.4	0.91	0.08	0.42	0.03	2.9	0.0	0.0031	0.0008
BY91	Poore Mine tunnel effluent nr Grass Valley	12/15/1999	13:00	2of2	<0.0001	0.0001	6.3	0.6	0.72	0.01	0.49	0.08	3.1	1.0	0.0046	0.0003
BY91	Poore Mine tunnel effluent nr Grass Valley	5/23/2000	12:00	1of2	<0.0002	0.0003	5.5	0.3	4.0	0.0	0.13	0.04	3.5	0.2	<0.004	0.003
BY91	Poore Mine tunnel effluent nr Grass Valley	5/23/2000	12:00	2of2	<0.0007	0.0003	5.2	0.1	4.4	0.1	0.12	0.02	3.6	0.1	<0.007	0.002
BY105	Sailor Flat Mine main drain Gulch 01nr Quaker Hill	7/6/1999	16:00	1of2	0.020	0.001	2.1	0.1	36	0	0.14	0.01	1.7	0.1	0.90	0.01
BY105	Sailor Flat Mine main drain Gulch 01nr Quaker Hill	7/6/1999	16:00	2of2	0.020	0.001	1.9	0.0	37	3	0.14	0.01	1.6	0.0	0.90	0.07

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Lutetium (Lu), filtered (µg/L) (62844)		Magnesium (Mg), filtered (mg/L) (00925)		Manganese (Mn), filtered (µg/L) (01056)		Molybdenum (Mo), filtered (µg/L) (01060)		Sodium (Na), filtered (mg/L) (00930)		Neodymium (Nd), filtered (µg/L) (50579)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY105	Sailor Flat Mine main drain Gulch 01nr Quaker Hill	12/2/1999	14:30	1of2	0.030	0.002	0.71	0.03	25	0	0.09	0.00	1.2	0.1	1.7	0.1
BY105	Sailor Flat Mine main drain Gulch 01nr Quaker Hill	12/2/1999	14:30	2of2	0.031	0.002	0.67	0.10	24	0	0.08	0.03	1.0	0.0	1.8	0.0
BY106	Sailor Flat Mine main drainage to Greenhorn Cr, Gulch 03	4/9/2001	12:30	1of 2	0.023	0.006	0.37	0.03	22	5	<0.2	0.2	0.92	0.21	1.2	0.3
BY106	Sailor Flat Mine main drainage to Greenhorn Cr, Gulch 03	4/9/2001	12:30	2of 2	0.025	0.005	0.36	0.03	22	4	<0.2	0.1	0.93	0.20	1.2	0.2
BY114	SF Greenhorn Cr 0.7 mi ab Greenhorn Cr nr Nevada City	8/22/2000	15:10	1of2	<0.001	0.000	1.9	0.1	0.5	0.0	0.19	0.09	2.2	0.0	0.017	0.008
BY114	SF Greenhorn Cr 0.7 mi ab Greenhorn Cr nr Nevada City	8/22/2000	15:10	2of2	<0.001	0.001	1.8	0.1	0.5	0.0	0.14	0.06	2.1	0.0	<0.01	0.01
BY122	Starr Mine tunnel inflow nr Grass Valley	4/23/1999	15:00	1of2	0.0015	0.0003	4.6	0.0	39	5	0.049	0.006	1.5	0.0	0.10	0.00
BY122	Starr Mine tunnel inflow nr Grass Valley	4/23/1999	15:00	2of2	0.0013	0.0001	4.7	0.2	38	4	0.053	0.035	1.7	0.3	0.097	0.009
BY123	Starr Mine tunnel midway nr Grass Valley	4/23/1999	13:40	1of2	<0.0001	0.0001	9.1	0.2	11	1	0.22	0.02	2.3	0.0	0.0016	0.0000
BY123	Starr Mine tunnel midway nr Grass Valley	4/23/1999	13:40	2of2	<0.0001	0.0001	8.8	0.0	12	1	0.21	0.01	2.2	0.0	0.0015	0.0005
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	10:45	1of2	0.0001	0.0001	9.6	0.1	72	4	0.27	0.07	3.4	0.1	0.0023	0.0004
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	10:45	2of2	<0.0001	0.0002	11	0	74	1	0.23	0.03	2.4	0.1	0.0028	0.0007

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Lutetium (Lu), filtered (µg/L) (62844)		Magnesium (Mg), filtered (mg/L) (00925)		Manganese (Mn), filtered (µg/L) (01056)		Molybdenum (Mo), filtered (µg/L) (01060)		Sodium (Na), filtered (mg/L) (00930)		Neodymium (Nd), filtered (µg/L) (50579)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY124	Starr Mine tunnel outlet nr Grass Valley	8/23/2000	17:30	1of2	<0.001	0.000	8	2	0.2	0.0	0.44	0.07	2.8	0.1	<0.01	0.00
BY124	Starr Mine tunnel outlet nr Grass Valley	8/23/2000	17:30	2of2	<0.001	0.001	10	1	0.2	0.0	0.42	0.03	2.7	0.1	<0.01	0.00
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:00	1of2	<0.0008	0.0005	1.3	0.3	<0.3	0.1	<0.06	0.05	1.1	0.1	0.030	0.002
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:00	2of2	<0.0008	0.0005	1.5	0.5	<0.3	0.1	0.08	0.10	1.1	0.1	0.031	0.006
BY130	Tom and Jerry Mine drain at tunnel outlet nr Nevada City	6/28/2000	11:30	1of2	<0.0008	0.0003	5.4	1.8	90	4	0.10	0.07	1.7	0.1	<0.004	0.005
BY130	Tom and Jerry Mine drain at tunnel outlet nr Nevada City	6/28/2000	11:30	2of2	<0.0008	0.0007	6.3	0.6	91	1	0.07	0.03	1.7	0.1	0.007	0.001
BY131	Tom and Jerry Mine drainage pond nr Nevada City	8/23/2000	10:45	1of2	0.001	0.001	2.1	0.1	3.6	0.1	<0.04	0.02	2.3	0.1	0.043	0.007
BY131	Tom and Jerry Mine drainage pond nr Nevada City	8/23/2000	10:45	2of2	<0.001	0.001	1.9	0.3	3.9	0.1	0.06	0.04	2.2	0.1	0.042	0.002
Disturbed samples																
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	11:30	1of2	0.0001	0.0000	9.7	0.5	0.29	0.02	0.36	0.00	2.5	0.3	0.0017	0.0003
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	11:30	2of2	0.0002	0.0001	12	0	0.28	0.02	0.37	0.00	2.7	0.4	0.0011	0.0005
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:30	1of2	<0.0008	0.0003	5.5	1.2	0.4	0.1	<0.06	0.01	1.5	0.0	0.036	0.004
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:30	2of2	<0.0008	0.0001	5.7	0.1	0.5	0.1	0.08	0.02	1.4	0.1	0.041	0.004

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Nickel (Ni), filtered (µg/L) (01065)		Lead (Pb), filtered (µg/L) (01049)		Praseodymium (Pr), filtered (µg/L) (50582)		Rubidium (Rb), filtered (µg/L) (01134)		Rhenium (Re), filtered (µg/L) (50583)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
Environmental samples														
BY20	Boston Mine tunnel outlet nr Grass Valley	6/18/1999	14:30	1of2	6.0	0.6	0.009	0.002	0.0026	0.0004	1.9	0.1	0.0030	0.0002
BY20	Boston Mine tunnel outlet nr Grass Valley	6/18/1999	14:30	2of2	6.1	0.4	0.008	0.004	0.0024	0.0005	1.9	0.1	0.0031	0.0002
BY20	Boston Mine tunnel outlet nr Grass Valley	12/14/1999	12:00	1of2	3.0	0.0	0.016	0.010	0.0006	0.0001	2.1	0.0	0.0004	0.0000
BY20	Boston Mine tunnel outlet nr Grass Valley	12/14/1999	12:00	2of2	2.9	0.0	0.017	0.001	0.0007	0.0000	2.0	0.0	0.0011	0.0000
BY20	Boston Mine tunnel outlet nr Grass Valley	5/24/2000	16:00	1of2	4.9	0.0	0.02	0.02	0.0037	0.0007	1.7	0.1	<0.002	0.000
BY20	Boston Mine tunnel outlet nr Grass Valley	5/24/2000	16:00	2of2	5.0	0.1	0.01	0.01	0.0042	0.0002	1.8	0.0	<0.002	0.000
BY21	Boston Mine wetlands pond nr Grass Valley	12/14/1999	10:30	1of2	0.61	0.04	0.009	0.005	0.0011	0.0002	2.5	0.0	0.0079	0.0001
BY21	Boston Mine wetlands pond nr Grass Valley	12/14/1999	10:30	2of2	0.59	0.00	0.017	0.009	0.0009	0.0002	2.6	0.0	0.0067	0.0003
BY21	Boston Mine wetlands pond nr Grass Valley	5/24/2000	16:30	1of2	2.5	0.1	0.06	0.03	0.0029	0.0005	2.3	0.0	<0.002	0.001
BY21	Boston Mine wetlands pond nr Grass Valley	5/24/2000	16:30	2of2	2.3	0.1	0.03	0.01	0.0028	0.0004	2.1	0.0	0.002	0.000
BY58	Buckeye Flat Mine main drain 0.45 mi ab Greenhorn Cr	8/21/2000	11:00	1of2	93	0	0.19	0.01	2.9	0.0	7.1	0.1	<0.003	0.001
BY58	Buckeye Flat Mine main drain 0.45 mi ab Greenhorn Cr	8/21/2000	11:00	2of2	94	0	0.19	0.01	3.1	0.0	7.2	0.3	0.003	0.000
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	6/18/1999	11:30	1of2	240	0	0.61	0.01	5.7	0.0	5.3	0.3	0.0003	0.0001
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	6/18/1999	11:30	2of2	230	10	0.62	0.01	5.8	0.1	5.3	0.2	0.0008	0.0001

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Nickel (Ni), filtered (µg/L) (01065)		Lead (Pb), filtered (µg/L) (01049)		Praseodymium (Pr), filtered (µg/L) (50582)		Rubidium (Rb), filtered (µg/L) (01134)		Rhenium (Re), filtered (µg/L) (50583)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	12/2/1999	11:00	1of2	150	0	0.53	0.01	4.2	0.1	3.8	0.0	0.0079	0.0002
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	12/2/1999	11:00	2of2	140	0	0.53	0.02	4.1	0.2	3.7	0.0	0.0069	0.0001
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	8/22/2000	10:45	1of2	160	10	0.59	0.01	5.7	0.1	2.0	0.1	<0.003	0.001
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	8/22/2000	10:45	2of2	160	0	0.60	0.00	5.9	0.0	2.1	0.0	<0.003	0.003
BY116	Buckeye Flat Mine pond drain 0.15 mi ab SF Greenhorn Cr	8/21/2000	14:10	1of2	4.1	0.2	0.06	0.00	0.011	0.001	2.1	0.0	<0.003	0.001
BY116	Buckeye Flat Mine pond drain 0.15 mi ab SF Greenhorn Cr	8/21/2000	14:10	2of2	4.3	0.3	0.08	0.01	0.010	0.001	2.2	0.0	<0.003	0.001
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/26/1999	11:00	1of2	8.3	0.1	1.8	0.0	0.11	0.00	1.1	0.1	0.0014	0.0001
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/26/1999	11:00	2of2	8.0	0.1	1.7	0.0	0.098	0.003	1.0	0.0	0.0014	0.0003
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/22/2000	12:10	1of2	9.7	0.0	0.16	0.00	0.080	0.004	0.70	0.01	<0.003	0.001
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/22/2000	12:10	2of2	9.7	0.4	0.16	0.01	0.081	0.002	0.72	0.02	<0.003	0.001
BY25	Buckeye Flat Mine upper drain	4/9/2001	10:00	1of2	67	11	0.30	0.02	1.1	0.2	1.4	0.2	<0.003	0.002
BY25	Buckeye Flat Mine upper drain	4/9/2001	10:00	2of2	67	3	0.31	0.02	1.1	0.0	1.4	0.1	<0.003	0.002

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Nickel (Ni), filtered (µg/L) (01065)		Lead (Pb), filtered (µg/L) (01049)		Praseodymium (Pr), filtered (µg/L) (50582)		Rubidium (Rb), filtered (µg/L) (01134)		Rhenium (Re), filtered (µg/L) (50583)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY52	Greenhorn Cr 0.3 mi ab Buckeye Ford nr Nevada City	1/25/2000	10:45	1of2	5.1	0.0	0.03	0.01	0.092	0.001	1.0	0.1	0.003	0.001
BY52	Greenhorn Cr 0.3 mi ab Buckeye Ford nr Nevada City	1/25/2000	10:45	2of2	4.9	0.2	0.02	0.01	0.096	0.001	1.0	0.1	<0.002	0.002
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	7/24/2001	11:00	1of2	1.9	0.1	0.028	0.012	0.0024	0.0000	1.4	0.0	0.0060	0.0001
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	7/24/2001	11:00	2of2	2.0	0.1	0.027	0.028	0.0023	0.0002	1.5	0.0	0.0061	0.0009
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	8/29/2001	15:00	1of2	0.89	0.01	<0.007	0.004	0.0026	0.0001	1.4	0.0	0.0042	0.0004
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	8/29/2001	15:00	2of2	0.88	0.02	<0.007	0.001	0.0026	0.0001	1.5	0.0	0.0047	0.0000
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	9/14/2001	13:00	1of2	1.3	0.0	0.016	0.006	0.0018	0.0002	1.5	0.0	0.0053	0.0002
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	9/14/2001	13:00	2of2	1.4	0.0	0.021	0.005	0.0020	0.0002	1.5	0.0	0.0061	0.0001
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	10/15/2001	12:00	1of2	1.1	0.0	0.010	0.005	0.0013	0.0003	1.2	0.0	0.0057	0.0005
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	10/15/2001	12:00	2of2	1.2	0.0	<0.004	0.000	0.0012	0.0000	1.2	0.0	0.0055	0.0001
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	11/20/2001	13:20	1of2	3.4	0.1	0.020	0.003	0.012	0.001	1.7	0.0	0.0066	0.0002
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	11/20/2001	13:20	2of2	3.4	0.1	0.016	0.004	0.012	0.000	1.7	0.0	0.0062	0.0012
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/10/2001	12:20	1of2	5.4	0.1	0.017	0.000	0.040	0.000	1.3	0.0	0.0045	0.0001

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Nickel (Ni), filtered (µg/L) (01065)		Lead (Pb), filtered (µg/L) (01049)		Praseodymium (Pr), filtered (µg/L) (50582)		Rubidium (Rb), filtered (µg/L) (01134)		Rhenium (Re), filtered (µg/L) (50583)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/10/2001	12:20	2of2	5.5	0.1	0.019	0.003	0.040	0.001	1.3	0.0	0.0037	0.0006
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/21/2001	13:00	1of2	4.3	0.0	0.018	0.001	0.079	0.000	1.1	0.0	0.0022	0.0002
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/21/2001	13:00	2of2	4.2	0.0	0.026	0.002	0.076	0.001	1.1	0.0	0.0025	0.0003
BY51	Greenhorn Cr nr Headwaters nr Scotts Flat Reservoir	1/25/2000	9:30	1of2	2.3	0.5	0.06	0.05	0.059	0.003	0.56	0.04	<0.002	0.001
BY51	Greenhorn Cr nr Headwaters nr Scotts Flat Reservoir	1/25/2000	9:30	2of2	2.0	0.1	0.01	0.00	0.062	0.002	0.47	0.03	<0.002	0.002
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	12/14/1999	14:00	1of2	30	0	0.006	0.003	0.068	0.000	4.0	0.0	0.0041	0.0002
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	12/14/1999	14:00	2of2	31	1	0.020	0.021	0.068	0.001	4.1	0.1	0.0051	0.0004
BY86	Poore Mine creek ab tunnel nr Grass Valley	3/31/1999	17:40	1of2	1.4	0.2	0.029	0.003	0.018	0.001	0.76	0.03	<0.0004	0.0001
BY86	Poore Mine creek ab tunnel nr Grass Valley	3/31/1999	17:40	2of2	1.3	0.0	0.015	0.006	0.017	0.001	0.78	0.03	<0.0004	0.0005
BY87	Poore Mine creek bl tunnel nr Grass Valley	3/31/1999	13:30	1of2	1.2	0.1	0.023	0.004	0.018	0.002	0.89	0.02	0.0007	0.0006
BY87	Poore Mine creek bl tunnel nr Grass Valley	3/31/1999	13:30	2of2	1.4	0.1	0.031	0.007	0.016	0.002	0.84	0.02	<0.0004	0.0001
BY88	Poore Mine ground sluice nr Grass Valley	4/1/1999	15:40	1of2	12	0	0.012	0.002	0.022	0.001	7.2	0.1	0.0049	0.0003
BY88	Poore Mine ground sluice nr Grass Valley	4/1/1999	15:40	2of2	11	1	0.016	0.008	0.022	0.001	7.4	0.0	0.0070	0.0009

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Nickel (Ni), filtered (µg/L) (01065)		Lead (Pb), filtered (µg/L) (01049)		Praseodymium (Pr), filtered (µg/L) (50582)		Rubidium (Rb), filtered (µg/L) (01134)		Rhenium (Re), filtered (µg/L) (50583)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY89	Poore Mine pit lake nr Grass Valley	4/1/1999	16:50	1of2	3.8	0.2	0.052	0.003	0.0076	0.0005	2.1	0.1	0.0011	0.0000
BY89	Poore Mine pit lake nr Grass Valley	4/1/1999	16:50	2of2	3.5	0.2	0.072	0.003	0.0066	0.0008	2.0	0.1	0.0007	0.0005
BY89	Poore Mine pit lake nr Grass Valley	5/23/2000	10:45	1of2	60	0	0.03	0.01	0.034	0.003	7.6	0.0	<0.002	0.000
BY89	Poore Mine pit lake nr Grass Valley	5/23/2000	10:45	2of2	61	1	0.04	0.00	0.036	0.000	7.5	0.1	<0.002	0.000
BY90	Poore Mine seep ab ground sluice nr Grass Valley	4/1/1999	16:00	1of2	9.4	0.4	0.007	0.002	0.0069	0.0006	6.6	0.1	0.0021	0.0006
BY90	Poore Mine seep ab ground sluice nr Grass Valley	4/1/1999	16:00	2of2	9.3	0.8	0.018	0.008	0.0068	0.0007	6.5	0.3	0.0052	0.0000
BY91	Poore Mine tunnel effluent nr Grass Valley	3/31/1999	15:20	1of2	6.0	0.2	0.027	0.004	0.0032	0.0009	5.0	0.1	0.0022	0.0002
BY91	Poore Mine tunnel effluent nr Grass Valley	3/31/1999	15:20	2of2	5.9	0.8	0.019	0.011	0.0031	0.0001	5.3	0.3	0.0044	0.0000
BY91	Poore Mine tunnel effluent nr Grass Valley	12/15/1999	13:00	1of2	1.8	0.0	0.011	0.005	0.0009	0.0002	5.7	0.2	0.0062	0.0012
BY91	Poore Mine tunnel effluent nr Grass Valley	12/15/1999	13:00	2of2	1.7	0.1	0.033	0.023	0.0010	0.0002	5.7	0.0	0.0042	0.0003
BY91	Poore Mine tunnel effluent nr Grass Valley	5/23/2000	12:00	1of2	5.6	0.0	0.01	0.01	0.0009	0.0003	5.6	0.0	0.005	0.001
BY91	Poore Mine tunnel effluent nr Grass Valley	5/23/2000	12:00	2of2	5.9	0.2	0.05	0.01	0.0014	0.0002	5.5	0.2	<0.002	0.001
BY105	Sailor Flat Mine main drain Gulch 01nr Quaker Hill	7/6/1999	16:00	1of2	33	1	0.017	0.004	0.19	0.01	4.8	0.2	0.0022	0.0001
BY105	Sailor Flat Mine main drain Gulch 01nr Quaker Hill	7/6/1999	16:00	2of2	33	3	0.026	0.000	0.19	0.02	4.6	0.0	0.0019	0.0005

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Nickel (Ni), filtered (µg/L) (01065)		Lead (Pb), filtered (µg/L) (01049)		Praseodymium (Pr), filtered (µg/L) (50582)		Rubidium (Rb), filtered (µg/L) (01134)		Rhenium (Re), filtered (µg/L) (50583)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY105	Sailor Flat Mine main drain Gulch 01nr Quaker Hill	12/2/1999	14:30	1of2	4.1	0.1	0.10	0.06	0.35	0.01	1.8	0.0	0.0006	0.0000
BY105	Sailor Flat Mine main drain Gulch 01nr Quaker Hill	12/2/1999	14:30	2of2	4.1	0.0	0.056	0.004	0.36	0.00	1.8	0.0	0.0008	0.0001
BY106	Sailor Flat Mine main drainage to Greenhorn Cr, Gulch 03	4/9/2001	12:30	1of 2	5.2	0.6	0.26	0.02	0.28	0.06	1.6	0.4	<0.003	0.000
BY106	Sailor Flat Mine main drainage to Greenhorn Cr, Gulch 03	4/9/2001	12:30	2of 2	5.4	0.8	0.28	0.02	0.29	0.06	1.6	0.4	<0.003	0.002
BY114	SF Greenhorn Cr 0.7 mi ab Greenhorn Cr nr Nevada City	8/22/2000	15:10	1of2	0.44	0.10	0.01	0.01	0.002	0.000	0.43	0.01	<0.003	0.001
BY114	SF Greenhorn Cr 0.7 mi ab Greenhorn Cr nr Nevada City	8/22/2000	15:10	2of2	0.39	0.04	0.01	0.00	0.002	0.001	0.44	0.01	<0.003	0.001
BY122	Starr Mine tunnel inflow nr Grass Valley	4/23/1999	15:00	1of2	12	1	0.29	0.01	0.021	0.001	3.2	0.2	0.0046	0.0002
BY122	Starr Mine tunnel inflow nr Grass Valley	4/23/1999	15:00	2of2	12	1	0.28	0.02	0.021	0.002	3.2	0.2	0.0038	0.0008
BY123	Starr Mine tunnel midway nr Grass Valley	4/23/1999	13:40	1of2	1.4	0.9	0.036	0.002	0.0011	0.0015	5.2	0.3	0.0075	0.0003
BY123	Starr Mine tunnel midway nr Grass Valley	4/23/1999	13:40	2of2	1.5	0.7	0.044	0.000	0.0003	0.0001	5.4	0.3	0.0066	0.0008
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	10:45	1of2	1.0	0.0	0.017	0.017	0.0004	0.0002	5.7	0.0	0.0049	0.0001
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	10:45	2of2	1.1	0.0	0.008	0.003	0.0007	0.0002	5.8	0.1	0.0085	0.0004
BY124	Starr Mine tunnel outlet nr Grass Valley	8/23/2000	17:30	1of2	0.88	0.19	0.01	0.00	0.001	0.000	4.5	0.1	0.009	0.001

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Nickel (Ni), filtered (µg/L) (01065)		Lead (Pb), filtered (µg/L) (01049)		Praseodymium (Pr), filtered (µg/L) (50582)		Rubidium (Rb), filtered (µg/L) (01134)		Rhenium (Re), filtered (µg/L) (50583)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY124	Starr Mine tunnel outlet nr Grass Valley	8/23/2000	17:30	2of2	0.93	0.27	0.01	0.01	<0.001	0.001	4.4	0.0	0.008	0.002
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:00	1of2	0.86	0.09	<0.02	0.00	0.006	0.000	0.79	0.03	<0.002	0.001
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:00	2of2	0.95	0.09	<0.02	0.00	0.006	0.000	0.76	0.05	0.002	0.002
BY130	Tom and Jerry Mine drain at tunnel outlet nr Nevada City	6/28/2000	11:30	1of2	5.6	0.2	<0.02	0.01	<0.002	0.000	0.94	0.06	<0.002	0.001
BY130	Tom and Jerry Mine drain at tunnel outlet nr Nevada City	6/28/2000	11:30	2of2	5.9	0.1	<0.02	0.01	0.002	0.000	0.93	0.03	<0.002	0.001
BY131	Tom and Jerry Mine drainage pond nr Nevada City	8/23/2000	10:45	1of2	2.7	0.2	0.02	0.00	0.007	0.000	0.65	0.03	<0.003	0.002
BY131	Tom and Jerry Mine drainage pond nr Nevada City	8/23/2000	10:45	2of2	2.8	0.1	0.03	0.00	0.009	0.001	0.65	0.03	<0.003	0.001
Disturbed samples														
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	11:30	1of2	<0.02	0.00	0.005	0.002	0.0003	0.0000	5.9	0.0	0.0061	0.0004
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	11:30	2of2	<0.02	0.00	0.008	0.001	0.0003	0.0002	5.6	0.1	0.0023	0.0004
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:30	1of2	2.7	0.1	<0.02	0.01	0.007	0.000	1.2	0.0	0.003	0.000
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:30	2of2	2.5	0.1	<0.02	0.01	0.008	0.000	1.1	0.1	<0.002	0.001

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Sulfur (S), filtered (mg/L) (63719)		Antimony (Sb), filtered (µg/L) (01095)		Selenium (Se), filtered (µg/L) (01145)		Silica (Si), filtered (mg/L) (00955)		Samarium (Sm), filtered (µg/L) (82323)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
Environmental samples														
BY20	Boston Mine tunnel outlet nr Grass Valley	6/18/1999	14:30	1of2	—		0.036	0.003	0.12	0.07	15	1	0.0033	0.0003
BY20	Boston Mine tunnel outlet nr Grass Valley	6/18/1999	14:30	2of2	—		0.036	0.004	0.098	0.043	15	0	0.0034	0.0009
BY20	Boston Mine tunnel outlet nr Grass Valley	12/14/1999	12:00	1of2	—		0.031	0.003	0.22	0.06	14	2	0.0011	0.0001
BY20	Boston Mine tunnel outlet nr Grass Valley	12/14/1999	12:00	2of2	—		0.033	0.000	0.24	0.03	14	2	0.0012	0.0001
BY20	Boston Mine tunnel outlet nr Grass Valley	5/24/2000	16:00	1of2	4.3	1.0	0.075	0.037	<0.3	0.5	15	3	0.003	0.001
BY20	Boston Mine tunnel outlet nr Grass Valley	5/24/2000	16:00	2of2	4.6	0.6	0.064	0.018	<0.3	0.3	15	2	0.004	0.001
BY21	Boston Mine wetlands pond nr Grass Valley	12/14/1999	10:30	1of2	—		0.042	0.002	<0.06	0.05	4.9	0.9	0.0012	0.0001
BY21	Boston Mine wetlands pond nr Grass Valley	12/14/1999	10:30	2of2	—		0.054	0.002	<0.06	0.03	4.8	0.4	0.0009	0.0007
BY21	Boston Mine wetlands pond nr Grass Valley	5/24/2000	16:30	1of2	3.2	0.0	0.067	0.005	<0.3	0.2	13	1	<0.003	0.002
BY21	Boston Mine wetlands pond nr Grass Valley	5/24/2000	16:30	2of2	2.9	0.5	0.080	0.037	<0.3	0.4	11	0	<0.003	0.002
BY58	Buckeye Flat Mine main drain 0.45 mi ab Greenhorn Cr	8/21/2000	11:00	1of2	40	1	<0.005	0.007	<0.8	0.5	26	1	2.5	0.0
BY58	Buckeye Flat Mine main drain 0.45 mi ab Greenhorn Cr	8/21/2000	11:00	2of2	42	1	0.005	0.004	<0.8	0.5	29	2	2.6	0.1
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	6/18/1999	11:30	1of2	—		0.013	0.003	1.4	0.1	37	0	5.1	0.0
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	6/18/1999	11:30	2of2	—		0.013	0.001	1.4	0.1	37	0	5.2	0.0

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Sulfur (S), filtered (mg/L) (63719)		Antimony (Sb), filtered (µg/L) (01095)		Selenium (Se), filtered (µg/L) (01145)		Silica (Si), filtered (mg/L) (00955)		Samarium (Sm), filtered (µg/L) (82323)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	12/2/1999	11:00	1of2	—		0.012	0.007	0.52	0.05	34	3	3.6	0.0
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	12/2/1999	11:00	2of2	—		0.009	0.000	0.56	0.01	33	0	3.5	0.2
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	8/22/2000	10:45	1of2	57	3	0.015	0.007	<0.8	0.4	40	1	5.1	0.0
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	8/22/2000	10:45	2of2	52	0	0.016	0.006	<0.8	0.4	41	2	4.8	0.1
BY116	Buckeye Flat Mine pond drain 0.15 mi ab SF Greenhorn Cr	8/21/2000	14:10	1of2	2.3	0.8	0.008	0.001	<0.8	0.8	4.8	1.3	0.013	0.004
BY116	Buckeye Flat Mine pond drain 0.15 mi ab SF Greenhorn Cr	8/21/2000	14:10	2of2	2.4	0.5	0.013	0.007	<0.8	0.7	5.2	0.8	0.013	0.005
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/26/1999	11:00	1of2	2.0	0.2	0.29	0.00	<0.1	0.0	6.2	0.1	0.090	0.002
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/26/1999	11:00	2of2	2.0	0.4	0.29	0.00	<0.1	0.0	6.8	1.0	0.087	0.004
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/22/2000	12:10	1of2	1.7	0.3	0.009	0.004	<0.8	0.2	6.7	1.2	0.059	0.003
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/22/2000	12:10	2of2	1.8	0.6	0.006	0.000	<0.8	0.7	7.3	2.1	0.072	0.006
BY25	Buckeye Flat Mine upper drain	4/9/2001	10:00	1of2	15	1	<0.04	0.01	<0.9	0.5	14	1	0.78	0.13
BY25	Buckeye Flat Mine upper drain	4/9/2001	10:00	2of2	15	1	<0.04	0.00	<0.9	0.4	15	1	0.79	0.01

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Sulfur (S), filtered (mg/L) (63719)		Antimony (Sb), filtered (µg/L) (01095)		Selenium (Se), filtered (µg/L) (01145)		Silica (Si), filtered (mg/L) (00955)		Samarium (Sm), filtered (µg/L) (82323)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY52	Greenhorn Cr 0.3 mi ab Buckeye Ford nr Nevada City	1/25/2000	10:45	1of2	1.9	0.1	0.031	0.003	<0.8	0.5	10	1	0.098	0.002
BY52	Greenhorn Cr 0.3 mi ab Buckeye Ford nr Nevada City	1/25/2000	10:45	2of2	1.9	0.1	0.039	0.013	<0.8	0.8	9.6	0.6	0.091	0.003
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	7/24/2001	11:00	1of2	6.4	0.1	0.089	0.015	0.23	0.07	13	0	0.0037	0.0001
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	7/24/2001	11:00	2of2	6.4	0.0	0.093	0.019	0.14	0.03	13	0	0.0034	0.0001
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	8/29/2001	15:00	1of2	4.9	0.1	0.082	0.001	0.11	0.06	13	0	0.0026	0.0011
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	8/29/2001	15:00	2of2	4.9	0.1	0.083	0.001	0.10	0.02	13	0	0.0021	0.0007
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	9/14/2001	13:00	1of2	5.8	0.0	0.13	0.00	0.12	0.03	12	0	0.0022	0.0005
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	9/14/2001	13:00	2of2	5.9	0.0	0.14	0.00	0.14	0.04	12	0	0.0036	0.0004
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	10/15/2001	12:00	1of2	5.6	0.0	0.12	0.00	0.12	0.04	12	0	0.0017	0.0006
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	10/15/2001	12:00	2of2	5.5	0.0	0.11	0.00	0.15	0.03	12	0	0.0018	0.0003
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	11/20/2001	13:20	1of2	7.0	0.0	0.12	0.01	<0.2	0.1	12	0	0.013	0.001
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	11/20/2001	13:20	2of2	6.8	0.0	0.12	0.00	<0.2	0.1	12	0	0.014	0.001
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/10/2001	12:20	1of2	5.9	0.0	0.16	0.00	0.20	0.02	12	0	0.038	0.005

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Sulfur (S), filtered (mg/L) (63719)		Antimony (Sb), filtered (µg/L) (01095)		Selenium (Se), filtered (µg/L) (01145)		Silica (Si), filtered (mg/L) (00955)		Samarium (Sm), filtered (µg/L) (82323)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/10/2001	12:20	2of2	6.0	0.0	0.095	0.003	0.20	0.03	12	0	0.040	0.002
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/21/2001	13:00	1of2	4.0	0.0	0.14	0.00	0.16	0.02	12	0	0.087	0.000
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/21/2001	13:00	2of2	4.0	0.0	0.14	0.01	0.12	0.05	11	0	0.076	0.001
BY51	Greenhorn Cr nr Headwaters nr Scotts Flat Reservoir	1/25/2000	9:30	1of2	0.14	0.02	0.021	0.006	<0.8	0.1	7.3	0.5	0.049	0.001
BY51	Greenhorn Cr nr Headwaters nr Scotts Flat Reservoir	1/25/2000	9:30	2of2	0.19	0.02	0.021	0.008	<0.8	0.0	7.5	0.2	0.064	0.005
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	12/14/1999	14:00	1of2	—		0.069	0.005	0.15	0.08	22	3	0.055	0.004
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	12/14/1999	14:00	2of2	—		0.067	0.001	0.16	0.02	28	4	0.053	0.000
BY86	Poore Mine creek ab tunnel nr Grass Valley	3/31/1999	17:40	1of2	—		0.014	0.001	<0.4	0.2	18	1	0.015	0.002
BY86	Poore Mine creek ab tunnel nr Grass Valley	3/31/1999	17:40	2of2	—		0.012	0.002	<0.4	0.3	17	0	0.017	0.004
BY87	Poore Mine creek bl tunnel nr Grass Valley	3/31/1999	13:30	1of2	—		0.021	0.001	<0.4	0.0	18	0	0.015	0.000
BY87	Poore Mine creek bl tunnel nr Grass Valley	3/31/1999	13:30	2of2	—		0.018	0.001	<0.4	0.1	17	0	0.014	0.002
BY88	Poore Mine ground sluice nr Grass Valley	4/1/1999	15:40	1of2	—		0.016	0.002	<0.4	0.3	28	0	0.023	0.003
BY88	Poore Mine ground sluice nr Grass Valley	4/1/1999	15:40	2of2	—		0.023	0.005	0.12	0.17	28	1	0.025	0.002

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Sulfur (S), filtered (mg/L) (63719)		Antimony (Sb), filtered (µg/L) (01095)		Selenium (Se), filtered (µg/L) (01145)		Silica (Si), filtered (mg/L) (00955)		Samarium (Sm), filtered (µg/L) (82323)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY89	Poore Mine pit lake nr Grass Valley	4/1/1999	16:50	1of2	—		0.13	0.01	0.091	0.041	14	0	0.0089	0.0004
BY89	Poore Mine pit lake nr Grass Valley	4/1/1999	16:50	2of2	—		0.13	0.00	0.089	0.011	14	0	0.0090	0.0013
BY89	Poore Mine pit lake nr Grass Valley	5/23/2000	10:45	1of2	26	0	0.036	0.004	<0.3	0.1	22	1	0.030	0.002
BY89	Poore Mine pit lake nr Grass Valley	5/23/2000	10:45	2of2	28	1	0.033	0.001	<0.3	0.2	23	1	0.030	0.001
BY90	Poore Mine seep ab ground sluice nr Grass Valley	4/1/1999	16:00	1of2	—		0.022	0.002	0.15	0.09	27	0	0.0074	0.0008
BY90	Poore Mine seep ab ground sluice nr Grass Valley	4/1/1999	16:00	2of2	—		0.023	0.002	0.16	0.02	28	0	0.0081	0.0006
BY91	Poore Mine tunnel effluent nr Grass Valley	3/31/1999	15:20	1of2	—		0.082	0.004	<0.4	0.1	33	0	0.002	0.001
BY91	Poore Mine tunnel effluent nr Grass Valley	3/31/1999	15:20	2of2	—		0.079	0.004	0.35	0.02	30	1	0.0027	0.0008
BY91	Poore Mine tunnel effluent nr Grass Valley	12/15/1999	13:00	1of2	—		0.070	0.005	0.41	0.07	36	2	0.0008	0.0004
BY91	Poore Mine tunnel effluent nr Grass Valley	12/15/1999	13:00	2of2	—		0.30	0.32	0.42	0.03	37	2	0.0011	0.0005
BY91	Poore Mine tunnel effluent nr Grass Valley	5/23/2000	12:00	1of2	18	1	0.071	0.001	<0.3	0.2	38	1	<0.003	0.003
BY91	Poore Mine tunnel effluent nr Grass Valley	5/23/2000	12:00	2of2	16	0	0.064	0.007	<0.8	0.8	36	1	<0.004	0.002
BY105	Sailor Flat Mine main drain Gulch 01nr Quaker Hill	7/6/1999	16:00	1of2	—		0.060	0.002	0.093	0.036	28	0	0.23	0.00
BY105	Sailor Flat Mine main drain Gulch 01nr Quaker Hill	7/6/1999	16:00	2of2	—		0.057	0.003	<0.4	0.0	24	0	0.21	0.00

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Sulfur (S), filtered (mg/L) (63719)		Antimony (Sb), filtered (µg/L) (01095)		Selenium (Se), filtered (µg/L) (01145)		Silica (Si), filtered (mg/L) (00955)		Samarium (Sm), filtered (µg/L) (82323)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY105	Sailor Flat Mine main drain Gulch 01nr Quaker Hill	12/2/1999	14:30	1of2	—		0.11	0.01	<0.06	0.03	11	1	0.42	0.01
BY105	Sailor Flat Mine main drain Gulch 01nr Quaker Hill	12/2/1999	14:30	2of2	—		0.11	0.00	<0.06	0.06	10	1	0.43	0.00
BY106	Sailor Flat Mine main drainage to Greenhorn Cr, Gulch 03	4/9/2001	12:30	1of 2	0.6	0.0	<0.04	0.01	<0.9	0.3	13	0	0.27	0.08
BY106	Sailor Flat Mine main drainage to Greenhorn Cr, Gulch 03	4/9/2001	12:30	2of 2	0.6	0.0	<0.04	0.01	<0.9	0.4	13	0	0.28	0.06
BY114	SF Greenhorn Cr 0.7 mi ab Greenhorn Cr nr Nevada City	8/22/2000	15:10	1of2	1.3	0.0	0.026	0.020	<0.8	0.5	11	0	<0.004	0.005
BY114	SF Greenhorn Cr 0.7 mi ab Greenhorn Cr nr Nevada City	8/22/2000	15:10	2of2	1.3	0.1	0.011	0.001	<0.8	0.7	10	1	0.004	0.008
BY122	Starr Mine tunnel inflow nr Grass Valley	4/23/1999	15:00	1of2	—		0.16	0.00	0.099	0.268	14	0	0.024	0.001
BY122	Starr Mine tunnel inflow nr Grass Valley	4/23/1999	15:00	2of2	—		0.15	0.00	0.23	0.08	15	1	0.019	0.001
BY123	Starr Mine tunnel midway nr Grass Valley	4/23/1999	13:40	1of2	—		0.072	0.005	1.4	0.4	20	1	<0.0004	0.0002
BY123	Starr Mine tunnel midway nr Grass Valley	4/23/1999	13:40	2of2	—		0.083	0.012	1.3	0.1	20	0	<0.0004	0.0002
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	10:45	1of2	—		0.044	0.000	1.0	0.1	17	0	0.0006	0.0005
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	10:45	2of2	—		0.043	0.002	1.1	0.0	18	1	0.0010	0.0001
BY124	Starr Mine tunnel outlet nr Grass Valley	8/23/2000	17:30	1of2	10	1	0.085	0.003	1	1	18	2	<0.004	0.006

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Replicate	Sulfur (S), filtered (mg/L) (63719)		Antimony (Sb), filtered (µg/L) (01095)		Selenium (Se), filtered (µg/L) (01145)		Silica (Si), filtered (mg/L) (00955)		Samarium (Sm), filtered (µg/L) (82323)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY124	Starr Mine tunnel outlet nr Grass Valley	8/23/2000	17:30	2of2	10	0	0.090	0.004	<0.8	0.7	19	1	<0.004	0.004
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:00	1of2	0.7	0.2	0.044	0.004	<4	1	9.3	2.6	0.010	0.002
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:00	2of2	0.9	0.3	0.040	0.009	<4	1	10	3	<0.009	0.004
BY130	Tom and Jerry Mine drain at tunnel outlet nr Nevada City	6/28/2000	11:30	1of2	6.5	2.0	0.055	0.008	<4	1	20	6	<0.009	0.004
BY130	Tom and Jerry Mine drain at tunnel outlet nr Nevada City	6/28/2000	11:30	2of2	7	1	0.062	0.007	<4	1	23	3	<0.009	0.001
BY131	Tom and Jerry Mine drainage pond nr Nevada City	8/23/2000	10:45	1of2	1.1	0.1	0.013	0.007	<0.8	0.6	13	1	0.010	0.004
BY131	Tom and Jerry Mine drainage pond nr Nevada City	8/23/2000	10:45	2of2	1.3	0.3	0.020	0.003	<0.8	0.4	14	1	0.010	0.002
Disturbed samples														
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	11:30	1of2	—		0.070	0.000	1.1	0.1	17	1	0.0009	0.0002
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	11:30	2of2	—		0.070	0.001	1.1	0.1	20	2	<0.0006	0.0004
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:30	1of2	6.6	0.4	0.090	0.009	<4	0	18	3	<0.009	0.002
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:30	2of2	6.3	0.1	0.075	0.003	<4	0	19	0	<0.009	0.001

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Strontium (Sr), filtered (µg/L) (01080)		Terbium (Tb), filtered (µg/L) (50586)		Tellurium (Te), filtered (µg/L) (50585)		Thorium (Th), filtered (µg/L) (82365)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.
Environmental samples												
BY20	Boston Mine tunnel outlet nr Grass Valley	6/18/1999	14:30	1of2	91	4	0.0005	0.0001	<0.004	0.002	0.0006	0.0006
BY20	Boston Mine tunnel outlet nr Grass Valley	6/18/1999	14:30	2of2	91	5	0.0005	0.0002	<0.004	0.002	0.0003	0.0000
BY20	Boston Mine tunnel outlet nr Grass Valley	12/14/1999	12:00	1of2	120	0	<0.0001	0.0001	<0.003	0.001	<0.001	0.000
BY20	Boston Mine tunnel outlet nr Grass Valley	12/14/1999	12:00	2of2	120	0	<0.0001	0.0000	<0.003	0.001	<0.001	0.000
BY20	Boston Mine tunnel outlet nr Grass Valley	5/24/2000	16:00	1of2	82	2	0.0011	0.0001	<0.02	0.01	0.0008	0.0002
BY20	Boston Mine tunnel outlet nr Grass Valley	5/24/2000	16:00	2of2	82	2	0.0008	0.0002	<0.02	0.02	0.0007	0.0002
BY21	Boston Mine wetlands pond nr Grass Valley	12/14/1999	10:30	1of2	120	0	0.0001	0.0000	<0.003	0.003	<0.001	0.001
BY21	Boston Mine wetlands pond nr Grass Valley	12/14/1999	10:30	2of2	120	0	<0.0001	0.0000	<0.003	0.002	<0.001	0.000
BY21	Boston Mine wetlands pond nr Grass Valley	5/24/2000	16:30	1of2	73	1	<0.0007	0.0001	<0.02	0.02	0.0012	0.0005
BY21	Boston Mine wetlands pond nr Grass Valley	5/24/2000	16:30	2of2	71	0	<0.0007	0.0000	<0.02	0.01	0.0011	0.0006
BY58	Buckeye Flat Mine main drain 0.45 mi ab Greenhorn Cr	8/21/2000	11:00	1of2	81	2	0.44	0.01	<0.08	0.03	0.0045	0.0023
BY58	Buckeye Flat Mine main drain 0.45 mi ab Greenhorn Cr	8/21/2000	11:00	2of2	82	3	0.44	0.02	<0.08	0.05	0.0054	0.0005
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	6/18/1999	11:30	1of2	150	10	0.91	0.00	<0.004	0.005	0.011	0.000
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	6/18/1999	11:30	2of2	150	0	0.93	0.00	0.005	0.001	0.012	0.000

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Strontium (Sr), filtered (µg/L) (01080)		Terbium (Tb), filtered (µg/L) (50586)		Tellurium (Te), filtered (µg/L) (50585)		Thorium (Th), filtered (µg/L) (82365)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	12/2/1999	11:00	1of2	89	1	0.62	0.01	<0.003	0.001	0.021	0.001
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	12/2/1999	11:00	2of2	87	0	0.61	0.03	<0.003	0.003	0.024	0.003
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	8/22/2000	10:45	1of2	130	0	0.84	0.01	<0.08	0.03	0.020	0.001
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	8/22/2000	10:45	2of2	130	0	0.82	0.05	<0.08	0.05	0.020	0.001
BY116	Buckeye Flat Mine pond drain 0.15 mi ab SF Greenhorn Cr	8/21/2000	14:10	1of2	15	1	0.002	0.001	<0.08	0.01	0.0014	0.0007
BY116	Buckeye Flat Mine pond drain 0.15 mi ab SF Greenhorn Cr	8/21/2000	14:10	2of2	15	1	0.002	0.001	<0.08	0.05	0.0015	0.0007
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/26/1999	11:00	1of2	5.5	0.4	0.016	0.000	0.04	0.00	0.0031	0.0006
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/26/1999	11:00	2of2	5.3	0.1	0.015	0.001	0.04	0.00	0.0028	0.0003
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/22/2000	12:10	1of2	5.8	0.2	0.013	0.002	<0.08	0.03	0.0020	0.0006
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/22/2000	12:10	2of2	5.9	0.3	0.012	0.002	<0.08	0.04	0.0022	0.0008
BY25	Buckeye Flat Mine upper drain	4/9/2001	10:00	1of2	32	6	0.14	0.03	<0.08	0.02	0.007	0.003
BY25	Buckeye Flat Mine upper drain	4/9/2001	10:00	2of2	32	2	0.14	0.00	<0.08	0.04	0.007	0.004

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Strontium (Sr), filtered (µg/L) (01080)		Terbium (Tb), filtered (µg/L) (50586)		Tellurium (Te), filtered (µg/L) (50585)		Thorium (Th), filtered (µg/L) (82365)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY52	Greenhorn Cr 0.3 mi ab Buckeye Ford nr Nevada City	1/25/2000	10:45	1of2	23	2	0.013	0.002	0.08	0.11	0.012	0.001
BY52	Greenhorn Cr 0.3 mi ab Buckeye Ford nr Nevada City	1/25/2000	10:45	2of2	22	1	0.015	0.000	<0.06	0.02	0.013	0.001
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	7/24/2001	11:00	1of2	44	1	0.0004	0.0001	<0.002	0.001	0.008	0.007
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	7/24/2001	11:00	2of2	44	1	0.0004	0.0000	<0.002	0.001	<0.001	0.000
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	8/29/2001	15:00	1of2	46	0	0.0006	0.0001	<0.002	0.005	<0.001	0.000
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	8/29/2001	15:00	2of2	47	0	0.0004	0.0001	<0.002	0.001	<0.001	0.000
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	9/14/2001	13:00	1of2	46	1	0.0003	0.0001	<0.005	0.003	0.001	0.001
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	9/14/2001	13:00	2of2	47	0	0.0003	0.0001	<0.005	0.003	0.002	0.001
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	10/15/2001	12:00	1of2	46	0	0.0003	0.0001	<0.005	0.004	0.004	0.005
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	10/15/2001	12:00	2of2	46	0	0.0003	0.0000	<0.005	0.002	0.001	0.001
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	11/20/2001	13:20	1of2	52	0	0.0020	0.0001	<0.005	0.002	0.003	0.003
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	11/20/2001	13:20	2of2	53	1	0.0021	0.0001	<0.005	0.003	0.002	0.002
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/10/2001	12:20	1of2	51	0	0.0051	0.0001	<0.007	0.002	0.003	0.001

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Strontium (Sr), filtered (µg/L) (01080)		Terbium (Tb), filtered (µg/L) (50586)		Tellurium (Te), filtered (µg/L) (50585)		Thorium (Th), filtered (µg/L) (82365)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/10/2001	12:20	2of2	51	1	0.0058	0.0000	<0.007	0.002	0.002	0.001
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/21/2001	13:00	1of2	37	0	0.011	0.000	<0.008	0.001	0.0043	0.0021
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/21/2001	13:00	2of2	36	1	0.011	0.000	<0.008	0.000	0.0043	0.0025
BY51	Greenhorn Cr nr Headwaters nr Scotts Flat Reservoir	1/25/2000	9:30	1of2	18	1	0.0061	0.0000	<0.06	0.04	0.011	0.002
BY51	Greenhorn Cr nr Headwaters nr Scotts Flat Reservoir	1/25/2000	9:30	2of2	17	2	0.0081	0.0017	<0.06	0.02	0.010	0.001
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	12/14/1999	14:00	1of2	100	0	0.0097	0.0001	<0.003	0.002	0.002	0.001
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	12/14/1999	14:00	2of2	100	0	0.0092	0.0000	<0.003	0.005	0.002	0.000
BY86	Poore Mine creek ab tunnel nr Grass Valley	3/31/1999	17:40	1of2	41	1	0.0023	0.0005	<0.007	0.006	0.0005	0.0001
BY86	Poore Mine creek ab tunnel nr Grass Valley	3/31/1999	17:40	2of2	41	1	0.0020	0.0001	<0.007	0.008	0.0005	0.0002
BY87	Poore Mine creek bl tunnel nr Grass Valley	3/31/1999	13:30	1of2	42	1	0.0027	0.0003	<0.007	0.004	0.0004	0.0001
BY87	Poore Mine creek bl tunnel nr Grass Valley	3/31/1999	13:30	2of2	40	0	0.0023	0.0004	<0.007	0.002	<0.0004	0.0001
BY88	Poore Mine ground sluice nr Grass Valley	4/1/1999	15:40	1of2	48	2	0.0046	0.0006	<0.007	0.002	0.0010	0.0003
BY88	Poore Mine ground sluice nr Grass Valley	4/1/1999	15:40	2of2	48	1	0.0043	0.0003	<0.004	0.002	0.0006	0.0003

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Strontium (Sr), filtered (µg/L) (01080)		Terbium (Tb), filtered (µg/L) (50586)		Tellurium (Te), filtered (µg/L) (50585)		Thorium (Th), filtered (µg/L) (82365)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY89	Poore Mine pit lake nr Grass Valley	4/1/1999	16:50	1of2	25	1	0.0012	0.0002	0.007	0.004	0.0009	0.0000
BY89	Poore Mine pit lake nr Grass Valley	4/1/1999	16:50	2of2	24	1	0.0006	0.0007	<0.004	0.002	0.0004	0.0005
BY89	Poore Mine pit lake nr Grass Valley	5/23/2000	10:45	1of2	120	0	0.0067	0.0001	<0.02	0.01	0.0008	0.0012
BY89	Poore Mine pit lake nr Grass Valley	5/23/2000	10:45	2of2	120	0	0.0057	0.0003	<0.02	0.02	0.0011	0.0007
BY90	Poore Mine seep ab ground sluice nr Grass Valley	4/1/1999	16:00	1of2	44	1	0.0016	0.0003	<0.004	0.004	0.0004	0.0001
BY90	Poore Mine seep ab ground sluice nr Grass Valley	4/1/1999	16:00	2of2	44	1	0.0013	0.0002	<0.004	0.000	0.0008	0.0003
BY91	Poore Mine tunnel effluent nr Grass Valley	3/31/1999	15:20	1of2	87	0	0.0004	0.0000	<0.007	0.002	0.0012	0.0009
BY91	Poore Mine tunnel effluent nr Grass Valley	3/31/1999	15:20	2of2	91	4	0.0005	0.0002	<0.004	0.001	0.0002	0.0001
BY91	Poore Mine tunnel effluent nr Grass Valley	12/15/1999	13:00	1of2	130	10	<0.0001	0.0001	<0.003	0.003	<0.001	0.000
BY91	Poore Mine tunnel effluent nr Grass Valley	12/15/1999	13:00	2of2	130	0	0.0001	0.0001	0.005	0.002	<0.001	0.000
BY91	Poore Mine tunnel effluent nr Grass Valley	5/23/2000	12:00	1of2	120	0	<0.0007	0.0005	<0.02	0.01	<0.0003	0.0002
BY91	Poore Mine tunnel effluent nr Grass Valley	5/23/2000	12:00	2of2	130	0	<0.0004	0.0001	<0.06	0.01	<0.001	0.001
BY105	Sailor Flat Mine main drain Gulch 01nr Quaker Hill	7/6/1999	16:00	1of2	57	2	0.030	0.001	0.007	0.003	0.021	0.001
BY105	Sailor Flat Mine main drain Gulch 01nr Quaker Hill	7/6/1999	16:00	2of2	56	1	0.030	0.002	<0.007	0.005	0.018	0.000

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Strontium (Sr), filtered (µg/L) (01080)		Terbium (Tb), filtered (µg/L) (50586)		Tellurium (Te), filtered (µg/L) (50585)		Thorium (Th), filtered (µg/L) (82365)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY105	Sailor Flat Mine main drain Gulch 01nr Quaker Hill	12/2/1999	14:30	1of2	20	0	0.051	0.002	0.006	0.001	0.14	0.00
BY105	Sailor Flat Mine main drain Gulch 01nr Quaker Hill	12/2/1999	14:30	2of2	19	0	0.052	0.000	0.005	0.004	0.12	0.00
BY106	Sailor Flat Mine main drainage to Greenhorn Cr, Gulch 03	4/9/2001	12:30	1of 2	11	2	0.038	0.011	<0.08	0.02	0.11	0.04
BY106	Sailor Flat Mine main drainage to Greenhorn Cr, Gulch 03	4/9/2001	12:30	2of 2	11	2	0.037	0.009	<0.08	0.01	0.14	0.00
BY114	SF Greenhorn Cr 0.7 mi ab Greenhorn Cr nr Nevada City	8/22/2000	15:10	1of2	40	1	<0.001	0.001	<0.08	0.04	<0.001	0.001
BY114	SF Greenhorn Cr 0.7 mi ab Greenhorn Cr nr Nevada City	8/22/2000	15:10	2of2	40	1	<0.001	0.000	<0.08	0.05	<0.001	0.001
BY122	Starr Mine tunnel inflow nr Grass Valley	4/23/1999	15:00	1of2	58	3	0.0037	0.0002	<0.004	0.000	0.0005	0.0002
BY122	Starr Mine tunnel inflow nr Grass Valley	4/23/1999	15:00	2of2	59	2	0.0036	0.0007	0.004	0.002	0.0004	0.0001
BY123	Starr Mine tunnel midway nr Grass Valley	4/23/1999	13:40	1of2	210	10	<0.0001	0.0000	<0.004	0.002	<0.0002	0.0002
BY123	Starr Mine tunnel midway nr Grass Valley	4/23/1999	13:40	2of2	210	10	<0.0001	0.0000	<0.004	0.006	0.0003	0.0003
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	10:45	1of2	250	0	<0.0001	0.0000	<0.003	0.004	<0.001	0.000
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	10:45	2of2	250	0	<0.0001	0.0000	<0.003	0.003	0.002	0.002
BY124	Starr Mine tunnel outlet nr Grass Valley	8/23/2000	17:30	1of2	220	0	<0.001	0.000	<0.08	0.03	0.0014	0.0008

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Strontium (Sr), filtered (µg/L) (01080)		Terbium (Tb), filtered (µg/L) (50586)		Tellurium (Te), filtered (µg/L) (50585)		Thorium (Th), filtered (µg/L) (82365)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY124	Starr Mine tunnel outlet nr Grass Valley	8/23/2000	17:30	2of2	220	10	<0.001	0.000	<0.08	0.03	<0.001	0.001
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:00	1of2	49	2	0.001	0.000	<0.06	0.04	<0.002	0.000
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:00	2of2	48	2	0.0011	0.0008	<0.06	0.02	0.0015	0.0013
BY130	Tom and Jerry Mine drain at tunnel outlet nr Nevada City	6/28/2000	11:30	1of2	120	10	<0.0008	0.0004	<0.06	0.03	<0.002	0.001
BY130	Tom and Jerry Mine drain at tunnel outlet nr Nevada City	6/28/2000	11:30	2of2	120	10	<0.0008	0.0003	<0.06	0.06	0.0018	0.0009
BY131	Tom and Jerry Mine drainage pond nr Nevada City	8/23/2000	10:45	1of2	44	1	<0.001	0.000	<0.08	0.04	<0.001	0.001
BY131	Tom and Jerry Mine drainage pond nr Nevada City	8/23/2000	10:45	2of2	44	2	0.002	0.000	<0.08	0.03	<0.001	0.001
Disturbed samples												
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	11:30	1of2	250	0	<0.0001	0.0000	<0.003	0.000	<0.001	0.000
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	11:30	2of2	240	0	<0.0001	0.0000	<0.003	0.001	0.005	0.006
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:30	1of2	130	0	0.0013	0.0004	<0.06	0.00	0.0024	0.0015
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:30	2of2	120	10	<0.0008	0.0003	<0.06	0.05	0.0019	0.0009

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Thallium (Tl), filtered (µg/L) (01057)		Uranium (U), filtered (µg/L) (22703)		Vanadium (V), filtered (µg/L) (01085)		Yttrium (Y), filtered (µg/L) (01201)		Ytterbium (Yb), filtered (µg/L) (01194)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
Environmental samples														
BY20	Boston Mine tunnel outlet nr Grass Valley	6/18/1999	14:30	1of2	0.0003	0.0000	0.0068	0.0004	0.066	0.037	0.029	0.002	0.0022	0.0003
BY20	Boston Mine tunnel outlet nr Grass Valley	6/18/1999	14:30	2of2	0.0003	0.0000	0.0061	0.0001	0.065	0.059	0.027	0.003	0.0021	0.0006
BY20	Boston Mine tunnel outlet nr Grass Valley	12/14/1999	12:00	1of2	0.0002	0.0000	0.016	0.001	<1	1	0.012	0.001	0.0006	0.0001
BY20	Boston Mine tunnel outlet nr Grass Valley	12/14/1999	12:00	2of2	<0.0001	0.0001	0.016	0.001	<1	1	0.012	0.000	0.0008	0.0000
BY20	Boston Mine tunnel outlet nr Grass Valley	5/24/2000	16:00	1of2	0.0015	0.0000	0.009	0.001	<0.7	0.3	0.032	0.003	0.003	0.001
BY20	Boston Mine tunnel outlet nr Grass Valley	5/24/2000	16:00	2of2	<0.001	0.000	0.009	0.001	<0.7	0.3	0.033	0.004	0.003	0.000
BY21	Boston Mine wetlands pond nr Grass Valley	12/14/1999	10:30	1of2	<0.0001	0.0000	0.0053	0.0008	<1	1	0.011	0.001	0.0006	0.0001
BY21	Boston Mine wetlands pond nr Grass Valley	12/14/1999	10:30	2of2	0.0001	0.0000	0.0072	0.0029	<1	1	0.010	0.000	0.0007	0.0001
BY21	Boston Mine wetlands pond nr Grass Valley	5/24/2000	16:30	1of2	<0.001	0.000	0.005	0.001	<0.7	0.1	0.027	0.000	0.002	0.000
BY21	Boston Mine wetlands pond nr Grass Valley	5/24/2000	16:30	2of2	<0.001	0.000	0.004	0.001	<0.7	0.1	0.025	0.001	0.003	0.003
BY58	Buckeye Flat Mine main drain 0.45 mi ab Greenhorn Cr	8/21/2000	11:00	1of2	0.16	0.00	0.23	0.00	<0.4	0.1	16	0	1.0	0.0
BY58	Buckeye Flat Mine main drain 0.45 mi ab Greenhorn Cr	8/21/2000	11:00	2of2	0.18	0.00	0.25	0.00	<0.4	0.1	16	0	1.0	0.0
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	6/18/1999	11:30	1of2	0.35	0.00	0.39	0.00	0.15	0.04	35	0	1.9	0.0
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	6/18/1999	11:30	2of2	0.36	0.00	0.39	0.01	0.17	0.04	35	0	2.0	0.0

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Thallium (Tl), filtered (µg/L) (01057)		Uranium (U), filtered (µg/L) (22703)		Vanadium (V), filtered (µg/L) (01085)		Yttrium (Y), filtered (µg/L) (01201)		Ytterbium (Yb), filtered (µg/L) (01194)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	12/2/1999	11:00	1of2	0.25	0.00	0.40	0.01	<1	0	23	0	1.4	0.0
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	12/2/1999	11:00	2of2	0.25	0.01	0.41	0.00	<1	0	22	0	1.4	0.1
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	8/22/2000	10:45	1of2	0.31	0.00	0.42	0.00	<0.4	0.1	29	0	1.8	0.0
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	8/22/2000	10:45	2of2	0.32	0.00	0.42	0.00	<0.4	0.1	29	1	1.9	0.0
BY116	Buckeye Flat Mine pond drain 0.15 mi ab SF Greenhorn Cr	8/21/2000	14:10	1of2	<0.001	0.001	0.002	0.001	<0.4	0.1	0.053	0.003	0.005	0.003
BY116	Buckeye Flat Mine pond drain 0.15 mi ab SF Greenhorn Cr	8/21/2000	14:10	2of2	0.0011	0.0010	0.002	0.001	<0.4	0.1	0.057	0.005	0.005	0.001
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/26/1999	11:00	1of2	0.0080	0.0001	0.021	0.001	<0.1	0.1	0.66	0.03	0.051	0.000
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/26/1999	11:00	2of2	0.0082	0.0001	0.019	0.000	<0.1	0.1	0.62	0.01	0.048	0.000
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/22/2000	12:10	1of2	0.0059	0.0012	0.021	0.002	<0.4	0.1	0.52	0.01	0.033	0.001
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/22/2000	12:10	2of2	0.0062	0.0012	0.022	0.002	<0.4	0.1	0.55	0.01	0.041	0.003
BY25	Buckeye Flat Mine upper drain	4/9/2001	10:00	1of2	0.052	0.010	0.030	0.005	<0.9	0.2	5.2	0.9	0.31	0.04
BY25	Buckeye Flat Mine upper drain	4/9/2001	10:00	2of2	0.051	0.001	0.034	0.002	<0.9	0.2	5.2	0.3	0.30	0.03

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Thallium (Tl), filtered (µg/L) (01057)		Uranium (U), filtered (µg/L) (22703)		Vanadium (V), filtered (µg/L) (01085)		Yttrium (Y), filtered (µg/L) (01201)		Ytterbium (Yb), filtered (µg/L) (01194)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY52	Greenhorn Cr 0.3 mi ab Buckeye Ford nr Nevada City	1/25/2000	10:45	1of2	0.007	0.001	0.029	0.002	<0.3	0.1	0.40	0.02	0.045	0.001
BY52	Greenhorn Cr 0.3 mi ab Buckeye Ford nr Nevada City	1/25/2000	10:45	2of2	0.006	0.000	0.030	0.001	<0.3	0.1	0.42	0.00	0.046	0.007
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	7/24/2001	11:00	1of2	0.0002	0.0000	0.004	0.002	0.18	0.08	0.018	0.000	0.0017	0.0009
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	7/24/2001	11:00	2of2	0.0002	0.0001	0.003	0.001	0.18	0.08	0.017	0.000	0.0015	0.0001
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	8/29/2001	15:00	1of2	0.0003	0.0000	0.003	0.001	0.23	0.01	0.015	0.000	0.0010	0.0002
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	8/29/2001	15:00	2of2	0.0002	0.0001	0.002	0.001	0.24	0.02	0.015	0.001	0.0011	0.0000
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	9/14/2001	13:00	1of2	0.0001	0.0001	0.004	0.000	0.20	0.01	0.014	0.001	0.0008	0.0001
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	9/14/2001	13:00	2of2	0.0002	0.0000	0.003	0.001	0.21	0.01	0.015	0.001	0.0010	0.0004
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	10/15/2001	12:00	1of2	0.0002	0.0001	0.002	0.001	0.12	0.01	0.010	0.000	0.0009	0.0002
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	10/15/2001	12:00	2of2	0.0002	0.0000	<0.001	0.000	0.13	0.02	0.010	0.000	0.0009	0.0006
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	11/20/2001	13:20	1of2	0.0011	0.0000	0.0071	0.0012	0.10	0.02	0.082	0.001	0.0057	0.0007
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	11/20/2001	13:20	2of2	0.0010	0.0001	0.0077	0.0006	0.11	0.04	0.084	0.002	0.0058	0.0002
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/10/2001	12:20	1of2	0.0030	0.0001	0.013	0.000	0.25	0.02	0.20	0.00	0.016	0.001

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Thallium (Tl), filtered (µg/L) (01057)		Uranium (U), filtered (µg/L) (22703)		Vanadium (V), filtered (µg/L) (01085)		Yttrium (Y), filtered (µg/L) (01201)		Ytterbium (Yb), filtered (µg/L) (01194)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/10/2001	12:20	2of2	0.0029	0.0001	0.013	0.000	0.24	0.02	0.20	0.00	0.016	0.000
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/21/2001	13:00	1of2	0.0062	0.0002	0.012	0.001	0.29	0.03	0.47	0.00	0.040	0.000
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/21/2001	13:00	2of2	0.0056	0.0000	0.011	0.001	0.28	0.05	0.44	0.00	0.040	0.000
BY51	Greenhorn Cr nr Headwaters nr Scotts Flat Reservoir	1/25/2000	9:30	1of2	0.004	0.002	0.006	0.000	<0.3	0.1	0.25	0.02	0.025	0.004
BY51	Greenhorn Cr nr Headwaters nr Scotts Flat Reservoir	1/25/2000	9:30	2of2	0.003	0.001	0.007	0.002	<0.3	0.1	0.24	0.04	0.023	0.006
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	12/14/1999	14:00	1of2	0.0048	0.0000	0.013	0.001	<1	0	0.50	0.00	0.030	0.000
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	12/14/1999	14:00	2of2	0.0051	0.0002	0.013	0.000	<1	1	0.49	0.02	0.029	0.003
BY86	Poore Mine creek ab tunnel nr Grass Valley	3/31/1999	17:40	1of2	0.0010	0.0000	0.0038	0.0003	0.30	0.02	0.083	0.002	0.0076	0.0006
BY86	Poore Mine creek ab tunnel nr Grass Valley	3/31/1999	17:40	2of2	0.0010	0.0001	0.0042	0.0001	0.28	0.00	0.082	0.001	0.0080	0.0012
BY87	Poore Mine creek bl tunnel nr Grass Valley	3/31/1999	13:30	1of2	0.0013	0.0000	0.0040	0.0009	0.47	0.16	0.10	0.00	0.0080	0.0001
BY87	Poore Mine creek bl tunnel nr Grass Valley	3/31/1999	13:30	2of2	0.0010	0.0001	0.0040	0.0007	0.35	0.03	0.097	0.002	0.0078	0.0009
BY88	Poore Mine ground sluice nr Grass Valley	4/1/1999	15:40	1of2	0.0027	0.0002	0.0069	0.0003	<0.07	0.06	0.22	0.00	0.017	0.002
BY88	Poore Mine ground sluice nr Grass Valley	4/1/1999	15:40	2of2	0.0033	0.0008	0.0072	0.0003	<0.06	0.05	0.23	0.01	0.017	0.000

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Thallium (Tl), filtered (µg/L) (01057)		Uranium (U), filtered (µg/L) (22703)		Vanadium (V), filtered (µg/L) (01085)		Yttrium (Y), filtered (µg/L) (01201)		Ytterbium (Yb), filtered (µg/L) (01194)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY89	Poore Mine pit lake nr Grass Valley	4/1/1999	16:50	1of2	0.0006	0.0000	0.0034	0.0004	<0.06	0.02	0.041	0.002	0.0049	0.0003
BY89	Poore Mine pit lake nr Grass Valley	4/1/1999	16:50	2of2	0.0007	0.0001	0.0038	0.0006	<0.06	0.08	0.037	0.001	0.0042	0.0012
BY89	Poore Mine pit lake nr Grass Valley	5/23/2000	10:45	1of2	0.0041	0.0001	0.016	0.001	<0.7	0.3	0.32	0.00	0.018	0.000
BY89	Poore Mine pit lake nr Grass Valley	5/23/2000	10:45	2of2	0.0030	0.0010	0.017	0.001	<0.7	0.2	0.33	0.00	0.016	0.003
BY90	Poore Mine seep ab ground sluice nr Grass Valley	4/1/1999	16:00	1of2	0.0010	0.0001	0.0023	0.0011	<0.06	0.03	0.078	0.004	0.0069	0.0001
BY90	Poore Mine seep ab ground sluice nr Grass Valley	4/1/1999	16:00	2of2	0.0010	0.0001	0.0023	0.0010	<0.06	0.04	0.077	0.000	0.0070	0.0007
BY91	Poore Mine tunnel effluent nr Grass Valley	3/31/1999	15:20	1of2	0.0002	0.0001	0.033	0.004	0.19	0.03	0.026	0.002	0.0013	0.0002
BY91	Poore Mine tunnel effluent nr Grass Valley	3/31/1999	15:20	2of2	0.0002	0.0002	0.036	0.000	0.13	0.03	0.029	0.003	0.0006	0.0008
BY91	Poore Mine tunnel effluent nr Grass Valley	12/15/1999	13:00	1of2	<0.0001	0.0000	0.058	0.005	<1	1	0.008	0.000	0.0002	0.0001
BY91	Poore Mine tunnel effluent nr Grass Valley	12/15/1999	13:00	2of2	0.0001	0.0001	0.060	0.001	<1	1	0.009	0.000	0.0006	0.0003
BY91	Poore Mine tunnel effluent nr Grass Valley	5/23/2000	12:00	1of2	<0.001	0.000	0.041	0.004	<0.7	0.4	0.011	0.001	<0.002	0.001
BY91	Poore Mine tunnel effluent nr Grass Valley	5/23/2000	12:00	2of2	<0.001	0.001	0.045	0.004	<0.3	0.0	0.010	0.002	<0.004	0.002
BY105	Sailor Flat Mine main drain Gulch 01nr Quaker Hill	7/6/1999	16:00	1of2	0.017	0.000	0.068	0.002	0.24	0.11	0.98	0.00	0.12	0.00
BY105	Sailor Flat Mine main drain Gulch 01nr Quaker Hill	7/6/1999	16:00	2of2	0.017	0.000	0.061	0.003	0.18	0.03	0.94	0.02	0.12	0.01

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Thallium (Tl), filtered (µg/L) (01057)		Uranium (U), filtered (µg/L) (22703)		Vanadium (V), filtered (µg/L) (01085)		Yttrium (Y), filtered (µg/L) (01201)		Ytterbium (Yb), filtered (µg/L) (01194)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY105	Sailor Flat Mine main drain Gulch 01nr Quaker Hill	12/2/1999	14:30	1of2	0.025	0.000	0.30	0.00	<1	0	1.2	0.0	0.19	0.00
BY105	Sailor Flat Mine main drain Gulch 01nr Quaker Hill	12/2/1999	14:30	2of2	0.026	0.000	0.30	0.00	<1	1	1.2	0.0	0.20	0.00
BY106	Sailor Flat Mine main drainage to Greenhorn Cr, Gulch 03	4/9/2001	12:30	1of 2	0.019	0.003	0.33	0.07	<0.9	0.2	1.1	0.2	0.14	0.04
BY106	Sailor Flat Mine main drainage to Greenhorn Cr, Gulch 03	4/9/2001	12:30	2of 2	0.023	0.001	0.33	0.07	<0.9	0.4	1.1	0.2	0.14	0.01
BY114	SF Greenhorn Cr 0.7 i ab Greenhorn Cr nr Nevada City	8/22/2000	15:10	1of2	<0.001	0.000	0.008	0.001	<0.4	0.1	0.014	0.002	<0.003	0.001
BY114	SF Greenhorn Cr 0.7 i ab Greenhorn Cr nr Nevada City	8/22/2000	15:10	2of2	<0.001	0.001	0.007	0.001	<0.4	0.1	0.013	0.001	<0.003	0.003
BY122	Starr Mine tunnel inflow nr Grass Valley	4/23/1999	15:00	1of2	0.0015	0.0000	0.0044	0.0003	0.11	0.02	0.14	0.00	0.0086	0.0004
BY122	Starr Mine tunnel inflow nr Grass Valley	4/23/1999	15:00	2of2	0.0015	0.0002	0.0051	0.0003	0.12	0.00	0.14	0.00	0.0085	0.0014
BY123	Starr Mine tunnel midway nr Grass Valley	4/23/1999	13:40	1of2	<0.0001	0.0000	0.036	0.001	0.074	0.007	0.010	0.005	<0.0003	0.0001
BY123	Starr Mine tunnel midway nr Grass Valley	4/23/1999	13:40	2of2	<0.0001	0.0000	0.037	0.000	<0.06	0.01	0.0076	0.0003	<0.0003	0.0001
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	10:45	1of2	0.0001	0.0001	0.044	0.001	<1	1	0.011	0.000	0.0003	0.0000
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	10:45	2of2	<0.0001	0.0001	0.044	0.001	<1	0	0.013	0.001	0.0003	0.0000
BY124	Starr Mine tunnel outlet nr Grass Valley	8/23/2000	17:30	1of2	<0.001	0.000	0.13	0.00	1.0	0.2	0.012	0.001	<0.003	0.000

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Rep-licate	Thallium (Tl), filtered (µg/L) (01057)		Uranium (U), filtered (µg/L) (22703)		Vanadium (V), filtered (µg/L) (01085)		Yttrium (Y), filtered (µg/L) (01201)		Ytterbium (Yb), filtered (µg/L) (01194)	
					value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
BY124	Starr Mine tunnel outlet nr Grass Valley	8/23/2000	17:30	2of2	<0.001	0.000	0.13	0.01	0.9	0.2	0.015	0.002	<0.003	0.002
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:00	1of2	<0.001	0.001	0.003	0.001	<3	1	0.042	0.001	<0.003	0.001
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:00	2of2	<0.001	0.000	0.002	0.001	<3	1	0.043	0.002	0.004	0.002
BY130	Tom and Jerry Mine drain at tunnel outlet nr Nevada City	6/28/2000	11:30	1of2	<0.001	0.001	0.004	0.002	<3	1	0.014	0.001	<0.003	0.001
BY130	Tom and Jerry Mine drain at tunnel outlet nr Nevada City	6/28/2000	11:30	2of2	<0.001	0.000	0.004	0.002	<3	1	0.015	0.001	<0.003	0.001
BY131	Tom and Jerry Mine drainage pond nr Nevada City	8/23/2000	10:45	1of2	0.0010	0.0003	0.001	0.000	<0.4	0.2	0.070	0.003	<0.003	0.002
BY131	Tom and Jerry Mine drainage pond nr Nevada City	8/23/2000	10:45	2of2	<0.001	0.000	0.002	0.001	<0.4	0.1	0.069	0.006	0.005	0.002
Disturbed samples														
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	11:30	1of2	<0.0001	0.0000	0.063	0.001	<1	0	0.010	0.001	0.0002	0.0000
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	11:30	2of2	0.0001	0.0001	0.062	0.002	<1	0	0.010	0.000	0.0003	0.0001
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:30	1of2	<0.001	0.000	0.006	0.001	<3	1	0.054	0.002	0.003	0.000
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:30	2of2	<0.001	0.000	0.007	0.002	<3	1	0.055	0.001	<0.003	0.001

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Replicate	Zinc (Zn), filtered (µg/L) (01090)		Zirconium (Zr), filtered (µg/L) (01160)	
					value	s.d.	value	s.d.
Environmental samples								
BY20	Boston Mine tunnel outlet nr Grass Valley	6/18/1999	14:30	1of2	1.6	0.0	0.0016	0.0002
BY20	Boston Mine tunnel outlet nr Grass Valley	6/18/1999	14:30	2of2	1.4	0.1	0.0016	0.0002
BY20	Boston Mine tunnel outlet nr Grass Valley	12/14/1999	12:00	1of2	2.4	0.3	0.0019	0.0011
BY20	Boston Mine tunnel outlet nr Grass Valley	12/14/1999	12:00	2of2	1.9	0.2	0.0022	0.0007
BY20	Boston Mine tunnel outlet nr Grass Valley	5/24/2000	16:00	1of2	2.9	0.2	0.005	0.002
BY20	Boston Mine tunnel outlet nr Grass Valley	5/24/2000	16:00	2of2	3.0	0.0	< 0.004	0.002
BY21	Boston Mine wetlands pond nr Grass Valley	12/14/1999	10:30	1of2	2.3	0.3	0.0019	0.0001
BY21	Boston Mine wetlands pond nr Grass Valley	12/14/1999	10:30	2of2	2.4	0.1	0.0020	0.0000
BY21	Boston Mine wetlands pond nr Grass Valley	5/24/2000	16:30	1of2	6.2	0.3	0.007	0.001
BY21	Boston Mine wetlands pond nr Grass Valley	5/24/2000	16:30	2of2	2.4	0.2	0.007	0.003
BY58	Buckeye Flat Mine main drain 0.45 mi ab Greenhorn Cr	8/21/2000	11:00	1of2	200	0	<0.01	0.01
BY58	Buckeye Flat Mine main drain 0.45 mi ab Greenhorn Cr	8/21/2000	11:00	2of2	200	10	0.014	0.007
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	6/18/1999	11:30	1of2	560	0	0.011	0.003

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Replicate	Zinc (Zn), filtered (µg/L) (01090)		Zirconium (Zr), filtered (µg/L) (01160)	
					value	s.d.	value	s.d.
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	6/18/1999	11:30	2of2	550	10	0.0090	0.0012
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	12/2/1999	11:00	1of2	300	0	0.041	0.001
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	12/2/1999	11:00	2of2	290	0	0.041	0.001
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	8/22/2000	10:45	1of2	370	0	0.026	0.007
BY23	Buckeye Flat Mine N drain to Greenhorn Cr, Grass Valley	8/22/2000	10:45	2of2	370	0	0.021	0.001
BY116	Buckeye Flat Mine pond drain 0.15 mi ab SF Greenhorn Cr	8/21/2000	14:10	1of2	8.3	0.1	<0.01	0.01
BY116	Buckeye Flat Mine pond drain 0.15 mi ab SF Greenhorn Cr	8/21/2000	14:10	2of2	8.8	0.3	<0.01	0.00
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/26/1999	11:00	1of2	20	2	0.0083	0.0006
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/26/1999	11:00	2of2	20	1	0.0055	0.0007
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/22/2000	12:10	1of2	14	0	<0.01	0.00
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr, Grass Valley	8/22/2000	12:10	2of2	14	0	<0.01	0.00

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Replicate	Zinc (Zn), filtered (µg/L) (01090)		Zirconium (Zr), filtered (µg/L) (01160)	
					value	s.d.	value	s.d.
BY25	Buckeye Flat Mine upper drain	4/9/2001	10:00	1of2	79	11	0.015	0.011
BY25	Buckeye Flat Mine upper drain	4/9/2001	10:00	2of2	76	0	0.017	0.004
BY52	Greenhorn Cr 0.3 mi ab Buckeye Ford nr Nevada City	1/25/2000	10:45	1of2	4.2	0.5	0.044	0.004
BY52	Greenhorn Cr 0.3 mi ab Buckeye Ford nr Nevada City	1/25/2000	10:45	2of2	3.6	0.3	0.047	0.003
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	7/24/2001	11:00	1of2	1.5	0.1	0.0091	0.0058
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	7/24/2001	11:00	2of2	1.7	0.0	0.0026	0.0003
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	8/29/2001	15:00	1of2	0.67	0.08	0.0019	0.0006
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	8/29/2001	15:00	2of2	0.55	0.02	0.0035	0.0015
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	9/14/2001	13:00	1of2	0.90	0.05	0.0022	0.0019
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	9/14/2001	13:00	2of2	1.2	0.0	0.0036	0.0010
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	10/15/2001	12:00	1of2	1.5	0.0	0.0031	0.0013
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	10/15/2001	12:00	2of2	1.5	0.0	0.0036	0.0016
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	11/20/2001	13:20	1of2	2.5	0.1	0.0026	0.0006

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Replicate	Zinc (Zn), filtered (µg/L) (01090)		Zirconium (Zr), filtered (µg/L) (01160)	
					value	s.d.	value	s.d.
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	11/20/2001	13:20	2of2	2.2	0.1	0.0035	0.0010
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/10/2001	12:20	1of2	2.8	0.0	0.017	0.001
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/10/2001	12:20	2of2	3.0	0.1	0.016	0.006
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/21/2001	13:00	1of2	1.3	0.0	0.032	0.005
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	12/21/2001	13:00	2of2	1.4	0.1	0.025	0.003
BY51	Greenhorn Cr nr Headwaters nr Scotts Flat Reservoir	1/25/2000	9:30	1of2	4.2	2.9	0.041	0.005
BY51	Greenhorn Cr nr Headwaters nr Scotts Flat Reservoir	1/25/2000	9:30	2of2	1.3	0.1	0.035	0.004
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	12/14/1999	14:00	1of2	33	1	0.0065	0.0008
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	12/14/1999	14:00	2of2	32	1	0.0077	0.0009
BY86	Poore Mine creek ab tunnel nr Grass Valley	3/31/1999	17:40	1of2	2.1	0.0	0.010	0.001
BY86	Poore Mine creek ab tunnel nr Grass Valley	3/31/1999	17:40	2of2	1.5	0.1	0.0093	0.0016

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Replicate	Zinc (Zn), filtered (µg/L) (01090)		Zirconium (Zr), filtered (µg/L) (01160)	
					value	s.d.	value	s.d.
BY87	Poore Mine creek bl tunnel nr Grass Valley	3/31/1999	13:30	1of2	1.4	0.1	0.010	0.003
BY87	Poore Mine creek bl tunnel nr Grass Valley	3/31/1999	13:30	2of2	1.8	0.1	0.010	0.001
BY88	Poore Mine ground sluice nr Grass Valley	4/1/1999	15:40	1of2	9.2	0.2	0.0026	0.0006
BY88	Poore Mine ground sluice nr Grass Valley	4/1/1999	15:40	2of2	9.7	0.6	0.0057	0.0128
BY89	Poore Mine pit lake nr Grass Valley	4/1/1999	16:50	1of2	11	0	0.0019	0.0011
BY89	Poore Mine pit lake nr Grass Valley	4/1/1999	16:50	2of2	10	0	0.0016	0.0001
BY89	Poore Mine pit lake nr Grass Valley	5/23/2000	10:45	1of2	85	0	0.005	0.002
BY89	Poore Mine pit lake nr Grass Valley	5/23/2000	10:45	2of2	85	4	0.004	0.001
BY90	Poore Mine seep ab ground sluice nr Grass Valley	4/1/1999	16:00	1of2	8.5	0.3	<0.0006	0.0027
BY90	Poore Mine seep ab ground sluice nr Grass Valley	4/1/1999	16:00	2of2	7.9	0.0	0.0039	0.0016
BY91	Poore Mine tunnel effluent nr Grass Valley	3/31/1999	15:20	1of2	6.5	0.0	0.035	0.001
BY91	Poore Mine tunnel effluent nr Grass Valley	3/31/1999	15:20	2of2	6.6	0.3	0.0048	0.0002

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Replicate	Zinc (Zn), filtered (µg/L) (01090)		Zirconium (Zr), filtered (µg/L) (01160)	
					value	s.d.	value	s.d.
BY91	Poore Mine tunnel effluent nr Grass Valley	12/15/1999	13:00	1of2	2.9	0.0	0.0013	0.0004
BY91	Poore Mine tunnel effluent nr Grass Valley	12/15/1999	13:00	2of2	3.1	0.4	0.0025	0.0004
BY91	Poore Mine tunnel effluent nr Grass Valley	5/23/2000	12:00	1of2	7.6	0.2	0.005	0.004
BY91	Poore Mine tunnel effluent nr Grass Valley	5/23/2000	12:00	2of2	7.5	0.0	<0.004	0.002
BY105	Sailor Flat Mine main drain Gulch 01nr Quaker Hill	7/6/1999	16:00	1of2	27	0	0.11	0.00
BY105	Sailor Flat Mine main drain Gulch 01nr Quaker Hill	7/6/1999	16:00	2of2	25	2	0.12	0.00
BY105	Sailor Flat Mine main drain Gulch 01nr Quaker Hill	12/2/1999	14:30	1of2	8.0	1.0	0.29	0.00
BY105	Sailor Flat Mine main drain Gulch 01nr Quaker Hill	12/2/1999	14:30	2of2	7.4	0.3	0.28	0.01
BY106	Sailor Flat Mine main drainage to Greenhorn Cr, Gulch 03	4/9/2001	12:30	1of 2	4.4	0.3	0.31	0.08
BY106	Sailor Flat Mine main drainage to Greenhorn Cr, Gulch 03	4/9/2001	12:30	2of 2	4.7	0.5	0.32	0.09

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Replicate	Zinc (Zn), filtered (µg/L) (01090)		Zirconium (Zr), filtered (µg/L) (01160)	
					value	s.d.	value	s.d.
BY114	SF Greenhorn Cr 0.7 i ab Greenhorn Cr nr Nevada City	8/22/2000	15:10	1of2	<0.2	0.1	<0.01	0.01
BY114	SF Greenhorn Cr 0.7 mi ab Greenhorn Cr nr Nevada City	8/22/2000	15:10	2of2	<0.2	0.1	0.065	0.067
BY122	Starr Mine tunnel inflow nr Grass Valley	4/23/1999	15:00	1of2	16	0	0.0020	0.0001
BY122	Starr Mine tunnel inflow nr Grass Valley	4/23/1999	15:00	2of2	17	1	0.0029	0.0005
BY123	Starr Mine tunnel midway nr Grass Valley	4/23/1999	13:40	1of2	0.53	0.08	0.0028	0.0006
BY123	Starr Mine tunnel midway nr Grass Valley	4/23/1999	13:40	2of2	0.59	0.02	0.0043	0.0004
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	10:45	1of2	2.1	0.3	0.0027	0.0001
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	10:45	2of2	1.7	0.3	0.0030	0.0008
BY124	Starr Mine tunnel outlet nr Grass Valley	8/23/2000	17:30	1of2	0.4	0.1	<0.01	0.01
BY124	Starr Mine tunnel outlet nr Grass Valley	8/23/2000	17:30	2of2	0.4	0.1	<0.01	0.00
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:00	1of2	0.5	0.2	0.010	0.008
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:00	2of2	0.4	0.1	<0.006	0.003

Table 4B. Concentrations of trace metals and selected major elements in filtered water samples, Greenhorn Creek drainage, Nevada County, California—*Continued*.

[Station name abbreviations: ab, above; bl, below; Cr, creek; Cyn, Canyon; mi, miles; N, north; nr, near; Rd, Road; S, south; SF, South Fork. Number in parentheses is the data parameter code, a five-digit code used in the U.S. Geological Survey computerized data system. µg/L, microgram per liter (equivalent to part per billion); mg/L, milligram per liter (at low concentration, equivalent to part per million); s.d., standard deviation; <, less than; —, not determined]

Station map ID	Station name	Date	Time	Replicate	Zinc (Zn), filtered (µg/L) (01090)		Zirconium (Zr), filtered (µg/L) (01160)	
					value	s.d.	value	s.d.
BY130	Tom and Jerry Mine drain at tunnel outlet nr Nevada City	6/28/2000	11:30	1of2	1.1	0.3	<0.006	0.004
BY130	Tom and Jerry Mine drain at tunnel outlet nr Nevada City	6/28/2000	11:30	2of2	1.1	0.3	<0.006	0.000
BY131	Tom and Jerry Mine drainage pond nr Nevada City	8/23/2000	10:45	1of2	1.6	0.1	<0.01	0.00
BY131	Tom and Jerry Mine drainage pond nr Nevada City	8/23/2000	10:45	2of2	1.5	0.1	<0.01	0.00
Disburbed samples								
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	11:30	1of2	3.2	0.1	0.0022	0.0001
BY123	Starr Mine tunnel midway nr Grass Valley	12/15/1999	11:30	2of2	1.5	0.2	0.0026	0.0016
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:30	1of2	1.1	0.3	0.032	0.030
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	6/28/2000	12:30	2of2	0.5	0.1	0.008	0.007

Table 11A. Mercury and methylmercury concentration data for invertebrates, Greenhorn Creek drainage, Nevada County, California.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; Cyn, Canyon; MF, Middle Fork; mi, miles; N, north; NF, North Fork; nr, near; Rd, Road; S, south; SF, South Fork. MeHg, methylmercury; THg, total mercury. n, number of organisms; g, gram; µg/g, microgram per gram; —, not determined]

Station map ID	Station name	Collection date	Common name	Order	Family	Sample size (n)	Live weight (g)	Moisture (percent)	Total mercury (µg/g wet)	Methyl-mercury (µg/g wet)	MeHg/THg (percent)	Age
BY20	Boston Mine tunnel outlet nr Grass Valley	8/31/99	Banana slug	Gastropoda	Arionidae	3	50.87	84.2	—	0.033	—	Undetermined
BY20	Boston Mine tunnel outlet nr Grass Valley	8/21/00	Banana slug	Gastropoda	Arionidae	3	40.82	81.8	—	0.0092	—	Undetermined
BY20	Boston Mine tunnel outlet nr Grass Valley	9/13/01	Banana slug	Gastropoda	Arionidae	3	61.19	82.9	—	0.0081	—	Undetermined
BY58	Buckeye Flat Mine main drain 0.45 mi ab Greenhorn Cr	8/22/00	Banana slug	Gastropoda	Arionidae	3	50.45	81.5	—	0.0060	—	Undetermined
BY58	Buckeye Flat Mine main drain 0.45 mi ab Greenhorn Cr	9/13/01	Banana slug	Gastropoda	Arionidae	3	46.64	84.5	—	0.0070	—	Undetermined
BY23	Buckeye Flat Mine N drain to Greenhorn Cr Grass Valley	8/22/00	Banana slug	Gastropoda	Arionidae	3	43.67	88.7	—	0.0056	—	Undetermined
BY116	Buckeye Flat Mine pond drain 0.15 mi ab SF Greenhorn Cr	8/22/00	Banana slug	Gastropoda	Arionidae	3	33.60	89.5	—	0.014	—	Undetermined
BY116	Buckeye Flat Mine pond drain 0.15 mi ab SF Greenhorn Cr	9/12/01	Banana slug	Gastropoda	Arionidae	3	25.34	84.6	—	0.048	—	Undetermined
BY25	Buckeye Flat Mine upper drain	10/19/01	Banana slug	Gastropoda	Arionidae	3	47.97	80.9	0.039	0.013	33	Undetermined
BY146	Missouri Cyn 1.6 mi ab Greenhorn Cr nr Chicago Park	9/25/00	Banana slug	Gastropoda	Arionidae	3	35.94	87.6	—	0.024	—	Undetermined
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	8/31/99	Banana slug	Gastropoda	Arionidae	2	36.87	82.2	—	0.0014	—	Undetermined
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	8/21/00	Banana slug	Gastropoda	Arionidae	3	105.94	79.5	—	0.0031	—	Undetermined
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	9/15/01	Banana slug	Gastropoda	Arionidae	3	39.53	80.3	—	0.0035	—	Undetermined
BY147	NF MF Missouri Cyn nr Chicago Park	9/25/00	Banana slug	Gastropoda	Arionidae	3	43.67	87.6	—	0.036	—	Undetermined
BY147	NF MF Missouri Cyn nr Chicago Park	9/15/01	Banana slug	Gastropoda	Arionidae	3	26.56	82.9	—	0.020	—	Undetermined
BY86	Poore Mine Creek ab tunnel nr Grass Valley	9/26/00	Banana slug	Gastropoda	Arionidae	3	28.83	84.1	—	0.006	—	Undetermined
BY90	Poore Mine Seep above ground sluice nr Grass Valley	9/26/00	Banana slug	Gastropoda	Arionidae	3	50.19	84.2	—	0.017	—	Undetermined
BY91	Poore Mine tunnel effluent nr Grass Valley	8/13/99	Banana slug	Gastropoda	Arionidae	3	53.86	83.6	—	0.0010	—	Undetermined
BY91	Poore Mine tunnel effluent nr Grass Valley	8/21/00	Banana slug	Gastropoda	Arionidae	3	50.97	85.6	—	0.0072	—	Undetermined
BY91	Poore Mine tunnel effluent nr Grass Valley	10/17/01	Banana slug	Gastropoda	Arionidae	3	50.35	85.5	—	0.010	—	Undetermined
BY114	SF Greenhorn Cr 0.7 mi ab Greenhorn Cr nr Nevada City	8/22/00	Banana slug	Gastropoda	Arionidae	3	70.67	86.8	—	0.0043	—	Undetermined
BY113	SF Greenhorn Cr 0.8 mi ab Greenhorn Cr nr Nevada City	9/13/01	Banana slug	Gastropoda	Arionidae	3	38.46	89.8	0.087	0.0076	9	Undetermined

Table 11A. Mercury and methylmercury concentration data for invertebrates, Greenhorn Creek drainage, Nevada County, California—*Continued.*

[Station name abbreviations: ab, above; bl, below; Cr, Creek; Cyn, Canyon; MF, Middle Fork; mi, miles; N, north; NF, North Fork; nr, near; Rd, Road; S, south; SF, South Fork. MeHg, methylmercury; THg, total mercury. n, number of organisms; g, gram; µg/g, microgram per gram; —, not determined]

Station map ID	Station name	Collection date	Common name	Order	Family	Sample size (n)	Live weight (g)	Moisture (percent)	Total mercury (µg/g wet)	Methyl-mercury (µg/g wet)	MeHg/THg (percent)	Age
BY124	Starr Mine tunnel outlet nr Grass Valley	8/21/00	Banana slug	Gastropoda	Arionidae	2	52.97	81.5	—	0.0052	—	Undetermined
BY130	Tom Jerry Mine drain at tunnel outlet nr Nevada City	8/23/00	Banana slug	Gastropoda	Arionidae	3	41.66	87.9	—	0.015	—	Undetermined
BY130	Tom Jerry Mine drain at tunnel outlet nr Nevada City	8/23/00	Banana slug	Gastropoda	Arionidae	3	34.86	85.9	—	0.0036	—	Undetermined
BY130	Tom Jerry Mine drain at tunnel outlet nr Nevada City	9/13/01	Banana slug	Gastropoda	Arionidae	3	40.90	82.0	—	0.0076	—	Undetermined
BY130	Tom Jerry Mine drain at tunnel outlet nr Nevada City	9/13/01	Banana slug	Gastropoda	Arionidae	3	43.56	88.2	—	0.017	—	Undetermined
BY180	Greenhorn Cr .2 mi bl The Narrows	10/17/01	Dobsonfly	Megaloptera	Corydalidae	1	0.73	63.4	0.10	0.067	64	Immature
BY57	Greenhorn Cr 0.3 mi bl Sailor Flat West drain nr Nevada City	9/29/99	Dobsonfly	Megaloptera	Corydalidae	4	2.84	75.6	—	0.027	—	Immature
BY57	Greenhorn Cr 0.3 mi bl Sailor Flat West drain nr Nevada City	9/29/99	Dobsonfly	Megaloptera	Corydalidae	3	1.40	76.6	—	0.033	—	Immature
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	8/31/99	Dobsonfly	Megaloptera	Corydalidae	1	1.43	70.5	—	0.18	—	Immature
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	8/21/00	Dobsonfly	Megaloptera	Corydalidae	1	4.13	67.2	—	0.20	—	Immature
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	8/21/00	Dobsonfly	Megaloptera	Corydalidae	1	3.95	70.0	—	0.19	—	Immature
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	9/15/01	Dobsonfly	Megaloptera	Corydalidae	1	4.98	68.0	0.14	0.078	56	Immature
BY147	NF MF Missouri Cyn nr Chicago Park	9/25/00	Dobsonfly	Megaloptera	Corydalidae	3	0.84	82.6	—	0.39	—	Immature
BY91	Poore Mine tunnel effluent nr Grass Valley	10/17/01	Dobsonfly	Megaloptera	Corydalidae	1	2.27	76.9	0.060	0.039	65	Immature
BY114	SF Greenhorn Cr 0.7 mi ab Greenhorn Cr nr Nevada City	8/22/00	Dobsonfly	Megaloptera	Corydalidae	3	1.65	75.3	—	0.068	—	Immature
BY113	SF Greenhorn Cr 0.8 mi ab Greenhorn Cr nr Nevada City	8/22/00	Dobsonfly	Megaloptera	Corydalidae	3	2.05	75.9	—	0.048	—	Immature
BY113	SF Greenhorn Cr 0.8 mi ab Greenhorn Cr nr Nevada City	9/13/01	Dobsonfly	Megaloptera	Corydalidae	3	3.96	70.4	0.11	0.030	27	Immature
BY115	SF Greenhorn Cr bl Boston Mine nr Nevada City	8/21/00	Dobsonfly	Megaloptera	Corydalidae	1	0.60	77.8	—	0.21	—	Immature
BY130	Tom Jerry Mine drain at tunnel outlet nr Nevada City	8/23/00	Dobsonfly	Megaloptera	Corydalidae	1	1.44	73.4	—	0.047	—	Immature
BY20	Boston Mine tunnel outlet nr Grass Valley	8/21/00	Dragonfly	Odonata	Cordulegastridae	1	1.04	78.6	—	0.89	—	Immature
BY21	Boston Mine wetlands pond nr Grass Valley	8/12/99	Dragonfly	Odonata	Aeshnidae	3	3.84	76.7	0.071	0.070	99	Immature

Table 11A. Mercury and methylmercury concentration data for invertebrates, Greenhorn Creek drainage, Nevada County, California—*Continued.*

[Station name abbreviations: ab, above; bl, below; Cr, Creek; Cyn, Canyon; MF, Middle Fork; mi, miles; N, north; NF, North Fork; nr, near; Rd, Road; S, south; SF, South Fork. MeHg, methylmercury; THg, total mercury. n, number of organisms; g, gram; µg/g, microgram per gram; —, not determined]

Station map ID	Station name	Collection date	Common name	Order	Family	Sample size (n)	Live weight (g)	Moisture (percent)	Total mercury (µg/g wet)	Methyl-mercury (µg/g wet)	MeHg/THg (percent)	Age
BY21	Boston Mine wetlands pond nr Grass Valley	8/21/00	Dragonfly	Odonata	Aeshnidae	8	2.08	82.6	—	0.032	—	Immature
BY21	Boston Mine wetlands pond nr Grass Valley	9/13/01	Dragonfly	Odonata	Libellulidae	8	3.78	82.5	0.016	0.014	89	Immature
BY21	Boston Mine wetlands pond nr Grass Valley	9/13/01	Dragonfly	Odonata	Aeshnidae	7	2.45	83.6	0.036	0.034	95	Immature
BY21	Boston Mine wetlands pond nr Grass Valley	9/13/01	Dragonfly	Odonata	Aeshnidae	10	2.42	82.1	0.027	0.026	97	Immature
BY21	Boston Mine wetlands pond nr Grass Valley	9/13/01	Dragonfly	Odonata	Aeshnidae	7	2.15	82.0	0.028	0.029	102	Immature
BY116	Buckeye Flat Mine pond drain 0.15 mi ab SF Greenhorn Cr	8/22/00	Dragonfly	Odonata	Cordulegastridae	3	2.62	83.6	0.10	0.092	90	Immature
BY116	Buckeye Flat Mine pond drain 0.15 mi ab SF Greenhorn Cr	9/12/01	Dragonfly	Odonata	Aeshnidae	2	1.18	83.5	0.065	0.047	72	Immature
BY116	Buckeye Flat Mine pond drain 0.15 mi ab SF Greenhorn Cr	9/12/01	Dragonfly	Odonata	Gomphidae	5	0.96	81.8	0.12	0.10	83	Immature
BY116	Buckeye Flat Mine pond drain 0.15 mi ab SF Greenhorn Cr	9/12/01	Dragonfly	Odonata	Aeshnidae	4	1.12	81.6	0.063	0.063	100	Immature
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr Grass Valley	8/26/99	Dragonfly	Odonata	Aeshnidae	4	2.86	79.3	—	1.6	—	Immature
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr Grass Valley	8/22/00	Dragonfly	Odonata	Aeshnidae	3	0.99	83.2	—	0.32	—	Immature
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr Grass Valley	9/12/01	Dragonfly	Odonata	Aeshnidae	4	1.95	78.4	0.087	0.079	91	Immature
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr Grass Valley	9/12/01	Dragonfly	Odonata	Aeshnidae	10	0.76	83.6	0.11	0.10	92	Immature
BY144	Coon Hollow Cr drain tunnel outlet nr Dutch Flat	9/26/00	Dragonfly	Odonata	Aeshnidae	6	0.92	83.5	—	0.085	—	Immature
BY144	Coon Hollow Cr drain tunnel outlet nr Dutch Flat	9/26/00	Dragonfly	Odonata	Aeshnidae	6	1.20	85.1	—	0.031	—	Immature
BY180	Greenhorn Cr .2 mi bl The Narrows	10/17/01	Dragonfly	Odonata	Cordulegastridae	1	1.21	82.2	0.058	0.056	97	Immature
BY180	Greenhorn Cr .2 mi bl The Narrows	10/17/01	Dragonfly	Odonata	Aeshnidae	4	1.40	84.6	0.10	0.10	108	Immature
BY56	Greenhorn Cr bl SF Greenhorn Cr nr Nevada City	9/14/01	Dragonfly	Odonata	Cordulegastridae	1	1.27	86.4	0.021	0.014	65	Immature
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	8/31/99	Dragonfly	Odonata	Cordulegastridae	7	2.97	81.6	—	0.12	—	Immature
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	8/21/00	Dragonfly	Odonata	Cordulegastridae	6	3.99	85.1	—	0.084	—	Immature
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	9/15/01	Dragonfly	Odonata	Gomphidae	14	3.29	79.0	0.12	0.10	81	Immature
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	9/15/01	Dragonfly	Odonata	Cordulegastridae	5	5.15	85.1	0.074	0.074	100	Immature

Table 11A. Mercury and methylmercury concentration data for invertebrates, Greenhorn Creek drainage, Nevada County, California—*Continued.*

[Station name abbreviations: ab, above; bl, below; Cr, Creek; Cyn, Canyon; MF, Middle Fork; mi, miles; N, north; NF, North Fork; nr, near; Rd, Road; S, south; SF, South Fork. MeHg, methylmercury; THg, total mercury. n, number of organisms; g, gram; µg/g, microgram per gram; —, not determined]

Station map ID	Station name	Collection date	Common name	Order	Family	Sample size (n)	Live weight (g)	Moisture (percent)	Total mercury (µg/g wet)	Methyl-mercury (µg/g wet)	MeHg/THg (percent)	Age
BY147	NF MF Missouri Cyn nr Chicago Park	9/25/00	Dragonfly	Odonata	Cordulegastridae	1	0.92	82.6	—	0.36	—	Immature
BY147	NF MF Missouri Cyn nr Chicago Park	9/15/01	Dragonfly	Odonata	Gomphidae	12	2.88	80.7	0.37	0.34	92	Immature
BY147	NF MF Missouri Cyn nr Chicago Park	9/15/01	Dragonfly	Odonata	Aeshnidae	3	1.69	82.0	0.32	0.29	93	Immature
BY147	NF MF Missouri Cyn nr Chicago Park	9/15/01	Dragonfly	Odonata	Cordulegastridae	2	2.42	83.7	0.28	0.26	94	Immature
BY86	Poore Mine Creek ab tunnel nr Grass Valleyley	9/26/00	Dragonfly	Odonata	Gomphidae	5	1.28	78.5	—	0.049	—	Immature
BY91	Poore Mine tunnel effluent nr Grass Valleyley	8/13/99	Dragonfly	Odonata	Cordulegastridae	9	1.27	81.4	—	0.022	—	Immature
BY91	Poore Mine tunnel effluent nr Grass Valleyley	8/21/00	Dragonfly	Odonata	Cordulegastridae	2	1.86	82.6	—	0.037	—	Immature
BY91	Poore Mine tunnel effluent nr Grass Valley	10/17/01	Dragonfly	Odonata	Cordulegastridae	5	4.63	81.4	0.036	0.027	75	Immature
BY115	SF Greenhorn Cr bl Boston Mine nr Nevada City	9/13/01	Dragonfly	Odonata	Cordulegastridae	1	0.92	72.8	0.35	0.33	95	Immature
BY124	Starr Mine tunnel outlet nr Grass Valley	8/21/00	Dragonfly	Odonata	Cordulegastridae	3	2.10	85.0	—	0.042	—	Immature
BY148	Starr Pit pond nr Grass Valley	8/12/99	Dragonfly	Odonata	Aeshnidae	2	1.83	86.4	—	0.011	—	Immature
BY148	Starr Pit pond nr Grass Valley	8/21/00	Dragonfly	Odonata	Aeshnidae	6	4.32	79.1	—	0.015	—	Immature
BY148	Starr Pit pond nr Grass Valley	8/21/00	Dragonfly	Odonata	Aeshnidae	16	1.72	82.8	—	0.015	—	Immature
BY148	Starr Pit pond nr Grass Valley	8/21/00	Dragonfly	Odonata	Libellulidae	5	2.40	85.5	—	0.013	—	Immature
BY130	Tom Jerry Mine drain at tunnel outlet nr Nevada City	8/23/00	Dragonfly	Odonata	Cordulegastridae	4	1.76	82.2	—	0.18	—	Immature
BY130	Tom Jerry Mine drain at tunnel outlet nr Nevada City	9/13/01	Dragonfly	Odonata	Cordulegastridae	3	1.84	83.8	0.29	0.31	107	Immature
BY130	Tom Jerry Mine drain at tunnel outlet nr Nevada City	9/13/01	Dragonfly	Odonata	Cordulegastridae	5	0.87	84.2	0.34	0.41	120	Immature
BY130	Tom Jerry Mine drain at tunnel outlet nr Nevada City	9/13/01	Dragonfly	Odonata	Cordulegastridae	3	2.33	84.3	0.033	0.036	108	Immature
BY131	Tom Jerry Mine drainage pond nr Nevada City	9/13/01	Dragonfly	Odonata	Cordulegastridae	4	2.62	83.0	0.016	0.014	90	Immature
BY131	Tom Jerry Mine drainage pond nr Nevada City	9/13/01	Dragonfly	Odonata	Cordulegastridae	3	2.49	78.2	0.019	0.018	97	Immature
BY131	Tom Jerry Mine drainage pond nr Nevada City	9/13/01	Dragonfly	Odonata	Aeshnidae	5	1.47	82.4	0.021	0.022	106	Immature
BY131	Tom Jerry Mine drainage pond nr Nevada City	9/13/01	Dragonfly	Odonata	Cordulegastridae	3	3.03	87.1	0.019	0.022	115	Immature
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	8/31/99	Giant Water Bug	Hemiptera	Belostomatidae	1	3.27	66.4	0.33	0.34	102	Adult
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	8/21/00	Giant Water Bug	Hemiptera	Belostomatidae	1	3.95	63.9	—	0.47	—	Adult

Table 11A. Mercury and methylmercury concentration data for invertebrates, Greenhorn Creek drainage, Nevada County, California—*Continued.*

[Station name abbreviations: ab, above; bl, below; Cr, Creek; Cyn, Canyon; MF, Middle Fork; mi, miles; N, north; NF, North Fork; nr, near; Rd, Road; S, south; SF, South Fork. MeHg, methylmercury; THg, total mercury. n, number of organisms; g, gram; µg/g, microgram per gram; —, not determined]

Station map ID	Station name	Collection date	Common name	Order	Family	Sample size (n)	Live weight (g)	Moisture (percent)	Total mercury (µg/g wet)	Methyl-mercury (µg/g wet)	MeHg/THg (percent)	Age
BY20	Boston Mine tunnel outlet nr Grass Valley	8/12/99	Predaceous diving beetle	Coleoptera	Dytiscidae	10	1.01	49.9	—	0.31	—	Adult
BY20	Boston Mine tunnel outlet nr Grass Valley	8/12/99	Predaceous diving beetle	Coleoptera	Dytiscidae	10	1.02	48.9	—	0.22	—	Adult
BY20	Boston Mine tunnel outlet nr Grass Valley	8/21/00	Predaceous diving beetle	Coleoptera	Dytiscidae	22	2.14	57.3	—	0.50	—	Adult
BY20	Boston Mine tunnel outlet nr Grass Valley	9/13/01	Predaceous diving beetle	Coleoptera	Dytiscidae	7	0.49	53.6	0.61	0.30	49	Adult
BY21	Boston Mine wetlands pond nr Grass Valley	8/12/99	Predaceous diving beetle	Coleoptera	Dytiscidae	5	1.10	58.8	—	0.31	—	Adult
BY21	Boston Mine wetlands pond nr Grass Valley	9/13/01	Predaceous diving beetle	Coleoptera	Dytiscidae	20	1.30	61.5	0.049	0.031	63	Adult
BY22	Buckeye Flat Mine drain 0.1 mi ab Greenhorn Cr	9/29/99	Predaceous diving beetle	Coleoptera	Dytiscidae	20	1.77	55.1	0.036	0.030	82	Adult
BY58	Buckeye Flat Mine main drain 0.45 mi ab Greenhorn Cr	8/22/00	Predaceous diving beetle	Coleoptera	Dytiscidae	40	1.47	48.0	—	0.11	—	Adult
BY58	Buckeye Flat Mine main drain 0.45 mi ab Greenhorn Cr	8/22/00	Predaceous diving beetle	Coleoptera	Dytiscidae	12	0.79	47.2	—	0.060	—	Adult
BY58	Buckeye Flat Mine main drain 0.45 mi ab Greenhorn Cr	9/13/01	Predaceous diving beetle	Coleoptera	Dytiscidae	15	0.96	51.6	0.080	0.029	36	Adult
BY58	Buckeye Flat Mine main drain 0.45 mi ab Greenhorn Cr	9/13/01	Predaceous diving beetle	Coleoptera	Dytiscidae	30	1.14	52.5	0.082	0.038	47	Adult
BY116	Buckeye Flat Mine pond drain 0.15 mi ab SF Greenhorn Cr	8/22/00	Predaceous diving beetle	Coleoptera	Dytiscidae	26	1.75	55.2	—	0.12	—	Adult
BY116	Buckeye Flat Mine pond drain 0.15 mi ab SF Greenhorn Cr	9/12/01	Predaceous diving beetle	Coleoptera	Dytiscidae	9	0.70	53.3	0.089	0.050	57	Adult
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr Grass Valley	8/22/00	Predaceous diving beetle	Coleoptera	Dytiscidae	40	1.52	50.8	0.18	0.17	94	Adult

Table 11A. Mercury and methylmercury concentration data for invertebrates, Greenhorn Creek drainage, Nevada County, California—*Continued.*

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Station map ID	Station name	Collection date	Common name	Order	Family	Sample size (n)	Live weight (g)	Moisture (percent)	Total mercury (µg/g wet)	Methyl-mercury (µg/g wet)	MeHg/THg (percent)	Age
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr Grass Valley	9/12/01	Predaceous diving beetle	Coleoptera	Dytiscidae	11	0.76	50.6	0.11	0.078	68	Adult
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr Grass Valley	9/12/01	Predaceous diving beetle	Coleoptera	Dytiscidae	29	0.96	50.1	0.15	0.12	78	Adult
BY25	Buckeye Flat Mine upper drain	10/19/01	Predaceous diving beetle	Coleoptera	Dytiscidae	10	0.75	55.0	0.13	0.078	61	Adult
BY144	Coon Hollow Cr drain tunnel outlet nr Dutch Flat	9/26/00	Predaceous diving beetle	Coleoptera	Dytiscidae	23	1.54	53.6	—	0.11	—	Adult
BY146	Missouri Cyn 1.6 mi ab Greenhorn Cr nr Chicago Park	9/25/00	Predaceous diving beetle	Coleoptera	Dytiscidae	20	1.34	58.4	—	0.11	—	Adult
BY145	Missouri Cyn Cr Tributary nr Chicago Park	9/25/00	Predaceous diving beetle	Coleoptera	Dytiscidae	20	1.45	55.0	—	0.10	—	Adult
BY147	NF MF Missouri Cyn nr Chicago Park	9/25/00	Predaceous diving beetle	Coleoptera	Dytiscidae	20	1.32	55.2	—	0.21	—	Adult
BY147	NF MF Missouri Cyn nr Chicago Park	9/25/00	Predaceous diving beetle	Coleoptera	Dytiscidae	20	1.31	55.0	—	0.14	—	Adult
BY147	NF MF Missouri Cyn nr Chicago Park	9/15/01	Predaceous diving beetle	Coleoptera	Dytiscidae	25	1.80	56.0	0.23	0.17	73	Adult
BY90	Poore Mine Seep above ground sluice nr Grass Valley	9/26/00	Predaceous diving beetle	Coleoptera	Dytiscidae	20	1.45	54.5	—	0.034	—	Adult
BY105	Sailor Flat Mine main drain Gulch 01 nr Quaker Hill	8/24/99	Predaceous diving beetle	Coleoptera	Dytiscidae	25	1.76	51.7	0.039	0.032	83	Adult
BY148	Starr Pit pond nr Grass Valley	8/21/00	Predaceous diving beetle	Coleoptera	Dytiscidae	11	2.29	62.6	—	0.23	—	Adult
BY130	Tom Jerry Mine drain at tunnel outlet nr Nevada City	8/23/00	Predaceous diving beetle	Coleoptera	Dytiscidae	20	1.88	53.5	—	0.18	—	Adult
BY130	Tom Jerry Mine drain at tunnel outlet nr Nevada City	8/23/00	Predaceous diving beetle	Coleoptera	Dytiscidae	9	0.63	55.5	—	0.041	—	Adult

Table 11A. Mercury and methylmercury concentration data for invertebrates, Greenhorn Creek drainage, Nevada County, California—*Continued.*

[Station name abbreviations: ab, above; bl, below; Cr, Creek; Cyn, Canyon; MF, Middle Fork; mi, miles; N, north; NF, North Fork; nr, near; Rd, Road; S, south; SF, South Fork. MeHg, methylmercury; THg, total mercury. n, number of organisms; g, gram; µg/g, microgram per gram; —, not determined]

Station map ID	Station name	Collection date	Common name	Order	Family	Sample size (n)	Live weight (g)	Moisture (percent)	Total mercury (µg/g wet)	Methyl-mercury (µg/g wet)	MeHg/THg (percent)	Age
BY130	Tom Jerry Mine drain at tunnel outlet nr Nevada City	9/13/01	Predaceous diving beetle	Coleoptera	Dytiscidae	13	1.16	57.6	0.18	0.11	61	Adult
BY130	Tom Jerry Mine drain at tunnel outlet nr Nevada City	9/13/01	Predaceous diving beetle	Coleoptera	Dytiscidae	15	1.01	49.9	0.12	0.083	69	Adult
BY131	Tom Jerry Mine drainage pond nr Nevada City	9/13/01	Predaceous diving beetle	Coleoptera	Dytiscidae	30	1.07	50.9	0.070	0.055	78	Adult
BY57	Greenhorn Cr 0.3 mi bl Sailor Flat West drain nr Nevada City	9/29/99	Predaceous stonefly	Plecoptera	Perlidae	10	2.01	74.3	—	0.026	—	Immature
BY57	Greenhorn Cr 0.3 mi bl Sailor Flat West drain nr Nevada City	9/29/99	Predaceous stonefly	Plecoptera	Perlidae	10	2.36	72.4	—	0.045	—	Immature
BY53	Greenhorn Cr ab SF Greenhorn Cr nr Nevada City	9/14/01	Predaceous stonefly	Plecoptera	Perlidae	25	0.95	79.8	0.13	0.084	65	Immature
BY56	Greenhorn Cr bl SF Greenhorn Cr nr Nevada City	9/14/01	Predaceous stonefly	Plecoptera	Perlidae	11	0.90	78.0	0.15	0.094	64	Immature
BY59	Greenhorn Crk at You Bet Rd nr Nevada City	8/31/99	Predaceous stonefly	Plecoptera	Perlidae	13	1.21	73.0	—	0.047	—	Immature
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	8/21/00	Predaceous stonefly	Plecoptera	Perlidae	10	0.44	75.1	—	0.14	—	Immature
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	9/15/01	Predaceous stonefly	Plecoptera	Perlidae	16	0.39	72.7	0.23	0.19	84	Immature
BY91	Poore Mine tunnel effluent nr Grass Valley	8/13/99	Predaceous stonefly	Plecoptera	Perlidae	7	1.08	71.4	—	0.044	—	Immature
BY91	Poore Mine tunnel effluent nr Grass Valley	10/17/01	Predaceous stonefly	Plecoptera	Perlidae	6	0.52	70.1	0.043	0.036	84	Immature
BY114	SF Greenhorn Cr 0.7 mi ab Greenhorn Cr nr Nevada City	8/22/00	Predaceous stonefly	Plecoptera	Perlidae	10	2.52	71.7	—	0.14	—	Immature
BY114	SF Greenhorn Cr 0.7 mi ab Greenhorn Cr nr Nevada City	9/13/01	Predaceous stonefly	Plecoptera	Perlidae	6	1.31	70.4	0.23	0.17	73	Immature
BY114	SF Greenhorn Cr 0.7 mi ab Greenhorn Cr nr Nevada City	9/13/01	Predaceous stonefly	Plecoptera	Perlidae	12	1.05	75.0	0.15	0.12	81	Immature
BY113	SF Greenhorn Cr 0.8 mi ab Greenhorn Cr nr Nevada City	8/22/00	Predaceous stonefly	Plecoptera	Perlidae	10	2.28	75.2	—	0.040	—	Immature
BY113	SF Greenhorn Cr 0.8 mi ab Greenhorn Cr nr Nevada City	9/13/01	Predaceous stonefly	Plecoptera	Perlidae	12	1.43	77.0	0.11	0.059	55	Immature
BY113	SF Greenhorn Cr 0.8 mi ab Greenhorn Cr nr Nevada City	9/13/01	Predaceous stonefly	Plecoptera	Perlidae	5	1.07	76.5	0.11	0.081	76	Immature
BY115	SF Greenhorn Cr bl Boston Mine nr Nevada City	9/28/99	Predaceous stonefly	Plecoptera	Perlidae	14	1.61	73.1	—	0.20	—	Immature
BY115	SF Greenhorn Cr bl Boston Mine nr Nevada City	8/21/00	Predaceous stonefly	Plecoptera	Perlidae	11	1.27	72.5	0.40	0.31	79	Immature

Table 11A. Mercury and methylmercury concentration data for invertebrates, Greenhorn Creek drainage, Nevada County, California—*Continued.*

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Station map ID	Station name	Collection date	Common name	Order	Family	Sample size (n)	Live weight (g)	Moisture (percent)	Total mercury (µg/g wet)	Methyl-mercury (µg/g wet)	MeHg/THg (percent)	Age
BY115	SF Greenhorn Cr bl Boston Mine nr Nevada City	9/13/01	Predaceous stonefly	Plecoptera	Perlidae	10	0.53	78.6	0.47	0.52	109	Immature
BY20	Boston Mine tunnel outlet nr Grass Valley	8/12/99	Water strider	Hemiptera	Gerridae	26	1.36	61.3	—	0.26	—	Adult
BY20	Boston Mine tunnel outlet nr Grass Valley	8/21/00	Water strider	Hemiptera	Gerridae	14	0.81	58.3	—	0.22	—	Adult
BY20	Boston Mine tunnel outlet nr Grass Valley	9/13/01	Water strider	Hemiptera	Gerridae	13	0.73	56.9	0.35	0.24	68	Adult
BY21	Boston Mine wetlands pond nr Grass Valley	8/12/99	Water strider	Hemiptera	Gerridae	50	1.13	62.3	—	0.061	—	Adult
BY21	Boston Mine wetlands pond nr Grass Valley	8/21/00	Water strider	Hemiptera	Gerridae	24	0.58	58.7	—	0.13	—	Adult
BY22	Buckeye Flat Mine drain 0.1 mi ab Greenhorn Cr	9/29/99	Water strider	Hemiptera	Gerridae	20	1.39	55.9	—	0.090	—	Adult
BY58	Buckeye Flat Mine main drain 0.45 mi ab Greenhorn Cr	8/22/00	Water strider	Hemiptera	Gerridae	34	1.78	65.3	—	0.068	—	Adult
BY58	Buckeye Flat Mine main drain 0.45 mi ab Greenhorn Cr	9/13/01	Water strider	Hemiptera	Gerridae	25	1.64	60.5	0.12	0.13	106	Adult
BY23	Buckeye Flat Mine N drain to Greenhorn Cr Grass Valley	8/22/00	Water strider	Hemiptera	Gerridae	25	1.61	68.6	—	0.093	—	Adult
BY23	Buckeye Flat Mine N drain to Greenhorn Cr Grass Valley	8/22/00	Water strider	Hemiptera	Gerridae	25	1.62	66.0	—	0.087	—	Adult
BY116	Buckeye Flat Mine pond drain 0.15 mi ab SF Greenhorn Cr	8/22/00	Water strider	Hemiptera	Gerridae	32	2.02	62.8	0.14	0.16	111	Adult
BY116	Buckeye Flat Mine pond drain 0.15 mi ab SF Greenhorn Cr	9/12/01	Water strider	Hemiptera	Gerridae	25	1.79	58.9	0.18	0.11	59	Adult
BY116	Buckeye Flat Mine pond drain 0.15 mi ab SF Greenhorn Cr	9/12/01	Water strider	Hemiptera	Gerridae	25	1.77	61.8	0.15	0.12	80	Adult
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr Grass Valley	8/26/99	Water strider	Hemiptera	Gerridae	32	1.93	59.7	0.52	0.55	107	Adult
BY24	Buckeye Flat Mine S drain to SF Greenhorn C Grass Valley	8/22/00	Water strider	Hemiptera	Gerridae	25	1.65	60.6	—	0.16	—	Adult
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr Grass Valley	9/12/01	Water strider	Hemiptera	Gerridae	25	1.56	60.2	0.19	0.12	64	Adult
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr Grass Valley	9/12/01	Water strider	Hemiptera	Gerridae	25	1.53	63.1	0.15	0.11	73	Adult
BY25	Buckeye Flat Mine upper drain	10/19/01	Water strider	Hemiptera	Gerridae	25	1.62	58.1	0.13	0.081	61	Adult
BY144	Coon Hollow Cr drain tunnel outlet nr Dutch Flat	9/26/00	Water strider	Hemiptera	Gerridae	30	1.84	57.2	—	0.15	—	Adult
BY144	Coon Hollow Cr drain tunnel outlet nr Dutch Flat	9/26/00	Water strider	Hemiptera	Gerridae	30	1.80	58.6	—	0.14	—	Adult

Table 11A. Mercury and methylmercury concentration data for invertebrates, Greenhorn Creek drainage, Nevada County, California—*Continued*.

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Station map ID	Station name	Collection date	Common name	Order	Family	Sample size (n)	Live weight (g)	Moisture (percent)	Total mercury (µg/g wet)	Methyl-mercury (µg/g wet)	MeHg/THg (percent)	Age
BY55	Greenhorn Cr 0.1 mi bl Sailor Flat West drain nr Nevada City	9/29/99	Water strider	Hemiptera	Gerridae	20	1.08	56.0	—	0.076	—	Adult
BY180	Greenhorn Cr 0.2 mi bl The Narrows	10/17/01	Water strider	Hemiptera	Gerridae	25	1.39	59.0	0.10	0.091	90	Adult
BY57	Greenhorn Cr 0.3 mi bl Sailor Flat West drain nr Nevada City	9/29/99	Water strider	Hemiptera	Gerridae	24	1.31	59.0	—	0.080	—	Adult
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	8/31/99	Water strider	Hemiptera	Gerridae	23	1.54	53.2	—	0.11	—	Adult
BY60	Greenhorn Creek bl Buckeye drain nr Nevada City	9/29/99	Water strider	Hemiptera	Gerridae	25	1.53	61.2	—	0.089	—	Adult
BY146	Missouri Cyn 1.6 mi ab Greenhorn Cr nr Chicago Park	9/25/00	Water strider	Hemiptera	Gerridae	30	1.85	56.6	—	0.20	—	Adult
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	8/31/99	Water strider	Hemiptera	Gerridae	21	1.13	61.8	—	0.10	—	Adult
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	8/21/00	Water strider	Hemiptera	Gerridae	22	1.25	65.8	—	0.30	—	Adult
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	8/21/00	Water strider	Hemiptera	Gerridae	25	1.47	64.5	—	0.12	—	Adult
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	9/15/01	Water strider	Hemiptera	Gerridae	25	1.50	62.4	0.10	0.069	72	Adult
BY145	Missouri Cyn Cr Tributary nr Chicago Park	9/25/00	Water strider	Hemiptera	Gerridae	30	1.86	57.1	—	0.34	—	Adult
BY147	NF MF Missouri Cyn nr Chicago Park	9/25/00	Water strider	Hemiptera	Gerridae	30	1.78	55.9	—	0.27	—	Adult
BY147	NF MF Missouri Cyn nr Chicago Park	9/15/01	Water strider	Hemiptera	Gerridae	25	1.65	60.6	0.30	0.17	58	Adult
BY86	Poore Mine Creek ab tunnel nr Grass Valley	9/26/00	Water strider	Hemiptera	Gerridae	25	1.68	53.8	—	0.11	—	Adult
BY86	Poore Mine Creek ab tunnel nr Grass Valley	9/26/00	Water strider	Hemiptera	Gerridae	25	1.52	53.8	—	0.11	—	Adult
BY90	Poore Mine Seep above ground sluice nr Grass Valley	9/26/00	Water strider	Hemiptera	Gerridae	20	1.16	57.6	—	0.13	—	Adult
BY91	Poore Mine tunnel effluent nr Grass Valley	8/21/00	Water strider	Hemiptera	Gerridae	22	1.21	66.2	—	0.16	—	Adult
BY91	Poore Mine tunnel effluent nr Grass Valley	10/17/01	Water strider	Hemiptera	Gerridae	25	1.50	59.6	0.13	0.12	92	Adult
BY105	Sailor Flat Mine main drain Gulch 01 nr Quaker Hill	8/24/99	Water strider	Hemiptera	Gerridae	22	1.41	53.8	—	0.089	—	Adult
BY105	Sailor Flat Mine main drain Gulch 01 nr Quaker Hill	8/24/99	Water strider	Hemiptera	Gerridae	21	1.31	56.8	—	0.075	—	Adult
BY114	SF Greenhorn Cr 0.7 mi ab Greenhorn Cr nr Nevada City	8/22/00	Water strider	Hemiptera	Gerridae	36	2.28	58.0	—	0.16	—	Adult
BY114	SF Greenhorn Cr 0.7 mi ab Greenhorn Cr nr Nevada City	9/13/01	Water strider	Hemiptera	Gerridae	25	1.52	62.4	0.25	0.17	69	Adult

Table 11A. Mercury and methylmercury concentration data for invertebrates, Greenhorn Creek drainage, Nevada County, California—*Continued*.

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Station map ID	Station name	Collection date	Common name	Order	Family	Sample size (n)	Live weight (g)	Moisture (percent)	Total mercury (µg/g wet)	Methyl-mercury (µg/g wet)	MeHg/THg (percent)	Age
BY114	SF Greenhorn Cr 0.7 mi ab Greenhorn Cr nr Nevada City	9/13/01	Water strider	Hemiptera	Gerridae	25	1.53	59.7	0.25	0.21	84	Adult
BY113	SF Greenhorn Cr 0.8 mi ab Greenhorn Cr nr Nevada City	8/22/00	Water strider	Hemiptera	Gerridae	21	1.33	57.6	—	0.074	—	Adult
BY113	SF Greenhorn Cr 0.8 mi ab Greenhorn Cr nr Nevada City	9/13/01	Water strider	Hemiptera	Gerridae	25	1.42	57.4	0.10	0.065	64	Adult
BY115	SF Greenhorn Cr bl Boston Mine nr Nevada City	9/28/99	Water strider	Hemiptera	Gerridae	20	1.22	57.1	—	0.18	—	Adult
BY115	SF Greenhorn Cr bl Boston Mine nr Nevada City	8/21/00	Water strider	Hemiptera	Gerridae	28	1.57	62.6	—	0.22	—	Adult
BY115	SF Greenhorn Cr bl Boston Mine nr Nevada City	9/13/01	Water strider	Hemiptera	Gerridae	25	1.29	63.5	0.20	0.21	107	Adult
BY124	Starr Mine tunnel outlet nr Grass Valley	8/21/00	Water strider	Hemiptera	Gerridae	9	0.48	57.5	—	0.12	—	Adult
BY148	Starr Pit pond nr Grass Valley	8/12/99	Water strider	Hemiptera	Gerridae	15	0.58	51.7	—	0.10	—	Adult
BY148	Starr Pit pond nr Grass Valley	8/21/00	Water strider	Hemiptera	Gerridae	35	0.98	63.9	—	0.10	—	Adult
BY130	Tom and Jerry Mine drain at tunnel outlet nr Nevada City	8/23/00	Water strider	Hemiptera	Gerridae	22	1.22	64.3	—	0.13	—	Adult
BY130	Tom and Jerry Mine drain at tunnel outlet nr Nevada City	8/23/00	Water strider	Hemiptera	Gerridae	30	1.86	65.8	—	0.073	—	Adult
BY130	Tom and Jerry Mine drain at tunnel outlet nr Nevada City	9/13/01	Water strider	Hemiptera	Gerridae	17	1.13	53.8	0.25	0.31	127	Adult
BY130	Tom and Jerry Mine drain at tunnel outlet nr Nevada City	9/13/01	Water strider	Hemiptera	Gerridae	25	1.64	57.2	0.090	0.064	71	Adult
BY131	Tom and Jerry Mine drainage pond nr Nevada City	9/13/01	Water strider	Hemiptera	Gerridae	16	1.03	54.5	0.066	0.066	99	Adult

Table 11B. Mercury and methylmercury concentration data for invertebrates at baseline site, Nevada County, California.

[Station name abbreviations: nr, near. MeHg, methylmercury; THg, total mercury. n, number of organisms; g, gram; µg/g, microgram per gram; —, not determined]

Station map ID	Station name	Collection date	Common name	Order	Family	Sample size (n)	Live weight (g)	Moisture (percent)	Total mercury (µg/g wet)	Methyl-mercury (µg/g wet)	MeHg/THg (percent)	Age
BY199	Bear River at Highway 20 nr Emigrant Gap	9/21/00	Dobsonfly	Megaloptera	Corydalidae	1	1.52	74.9	0.035	0.038	109	Immature
BY199	Bear River at Highway 20 nr Emigrant Gap	9/15/01	Dobsonfly	Megaloptera	Corydalidae	4	3.48	75.7	0.040	0.029	73	Immature
BY199	Bear River at Highway 20 nr Emigrant Gap	9/15/01	Dobsonfly	Megaloptera	Corydalidae	4	0.61	79.6	0.041	0.04	98	Immature
BY199	Bear River at Highway 20 nr Emigrant Gap	8/23/02	Dobsonfly	Megaloptera	Corydalidae	2	3.03	71.2	0.05	0.048	96	—
BY199	Bear River at Highway 20 nr Emigrant Gap	9/15/01	Dragonfly	Odonata	Aeshnidae	7	3.89	81.9	0.022	0.014	64	Immature
BY199	Bear River at Highway 20 nr Emigrant Gap	8/23/02	Dragonfly	Odonata	Aeshnidae	8	3.63	79.9	0.024	0.026	108	Immature
BY199	Bear River at Highway 20 nr Emigrant Gap	9/15/01	Giant water bug	Hemiptera	Belosto-matidae	1	4.47	72.6	0.022	0.015	68	Adult
BY199	Bear River at Highway 20 nr Emigrant Gap	9/15/01	Predaceous diving beetle	Coleoptera	Dytiscidae	24	1.07	54.8	0.061	0.041	67	Adult
BY199	Bear River at Highway 20 nr Emigrant Gap	9/15/01	Predaceous diving beetle	Coleoptera	Dytiscidae	7	0.59	57.6	0.14	0.15	107	Adult
BY199	Bear River at Highway 20 nr Emigrant Gap	8/23/02	Predaceous diving beetle	Coleoptera	Dytiscidae	11	0.75	56.7	0.14	0.14	100	Adult
BY199	Bear River at Highway 20 nr Emigrant Gap	10/1/99	Predaceous stonefly	Plecoptera	Perlidae	14	1.94	69.2	0.037	0.039	105	Immature
BY199	Bear River at Highway 20 nr Emigrant Gap	9/21/00	Predaceous stonefly	Plecoptera	Perlidae	5	1.2	68.9	—	0.067	—	Immature
BY199	Bear River at Highway 20 nr Emigrant Gap	9/15/01	Predaceous stonefly	Plecoptera	Perlidae	12	2.5	69.3	0.076	0.060	79	Immature
BY199	Bear River at Highway 20 nr Emigrant Gap	9/15/01	Predaceous stonefly	Plecoptera	Perlidae	12	1.7	72.2	0.056	0.058	104	Immature
BY199	Bear River at Highway 20 nr Emigrant Gap	8/23/02	Predaceous stonefly	Plecoptera	Perlidae	12	1.5	68.8	0.052	0.044	85	Immature
BY199	Bear River at Highway 20 nr Emigrant Gap	10/1/99	Water strider	Hemiptera	Gerridae	21	1.1	57.2	—	0.027	—	Adult
BY199	Bear River at Highway 20 nr Emigrant Gap	9/21/00	Water strider	Hemiptera	Gerridae	26	1.3	76.1	0.028	0.027	96	Adult
BY199	Bear River at Highway 20 nr Emigrant Gap	9/15/01	Water strider	Hemiptera	Gerridae	25	1.3	64.7	0.070	0.050	71	Adult
BY199	Bear River at Highway 20 nr Emigrant Gap	8/23/02	Water strider	Hemiptera	Gerridae	25	1.4	63.0	0.045	0.041	91	Adult

Appendix A. Map of Tunnel Locations and Photographs of Field Sites, Greenhorn Creek Drainage, Nevada County, California

(Note: Additional descriptions of photographs in figures *A2* through *A26* are in *table C3*.)

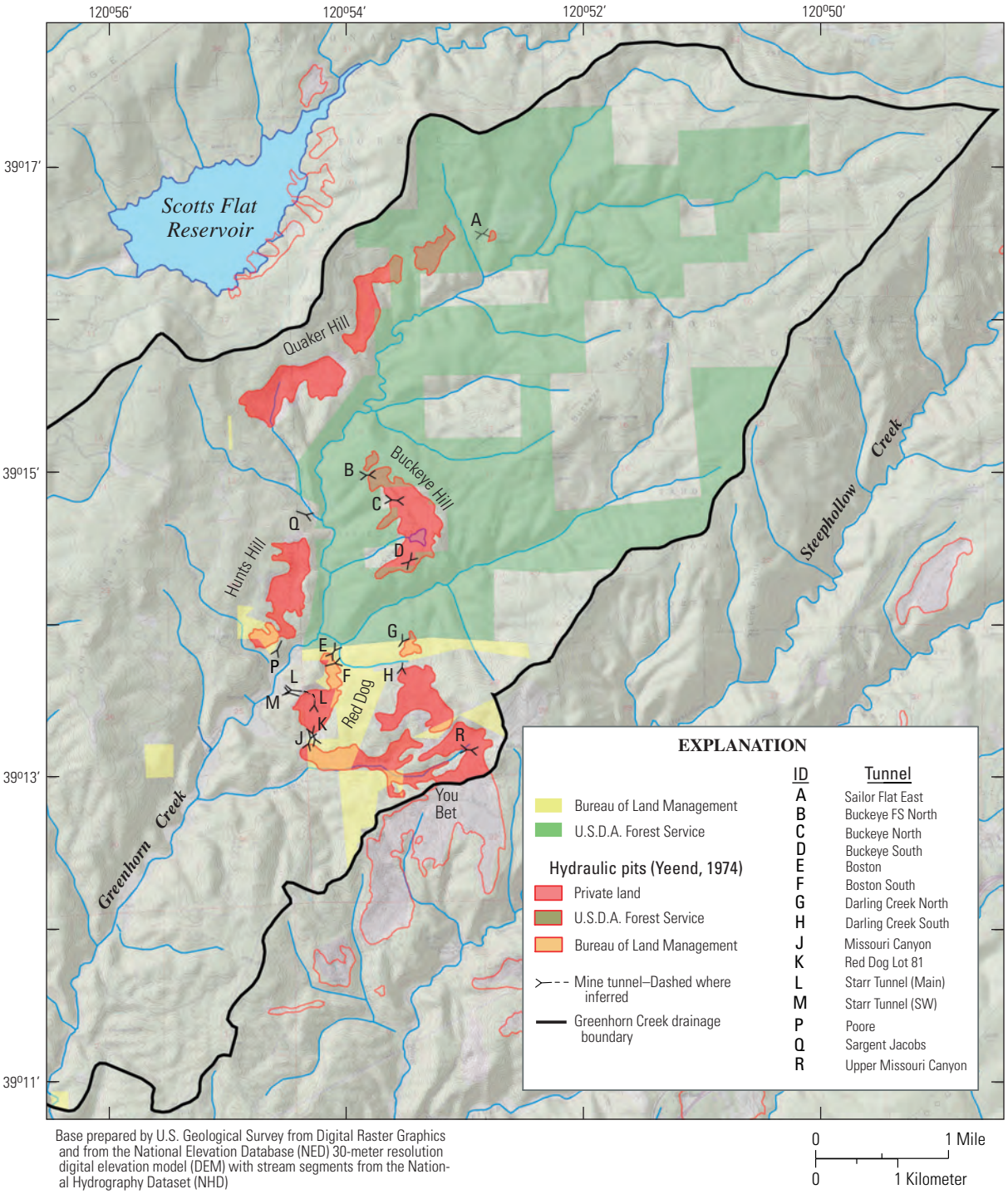

Figure A1. Locations of mine tunnels, hydraulic pits, and lands managed by federal land management agencies, Greenhorn Creek drainage, Nevada County, California. Boundaries of public lands provided by the Bureau of Land Management and the U.S. Department of Agriculture–Forest Service. Tunnel locations accurate to within approximately 300 feet.

Figure A2. Main drainage gulch at Sailor Flat (station BY105) with visible mercury bead about one inch in diameter, Greenhorn Creek drainage, Nevada County, California.

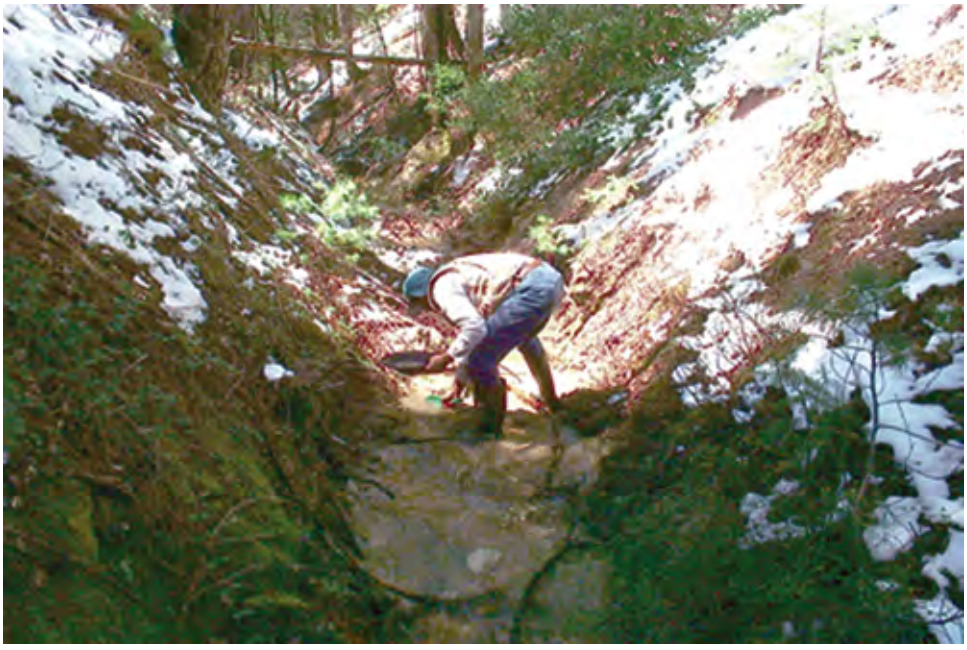

Figure A3. Sailor Flat main drainage to Greenhorn Creek (station BY106), Nevada County, California.

Figure A4. Tom and Jerry Mine tunnel outlet (station BY130), Greenhorn Creek drainage, Nevada County, California.

Figure A5. Buckeye main drain entering Greenhorn Creek (station BY58), Nevada County, California.

Figure A6. mercury beads on bedrock at Boston Mine tunnel outlet (station BY20), Greenhorn Creek drainage, Nevada County, California.

Figure A7. Historical photograph of Boston Mine (station BY21), Greenhorn Creek drainage, Nevada County, California. Photograph courtesy of the Bancroft Library, University of California, Berkeley.

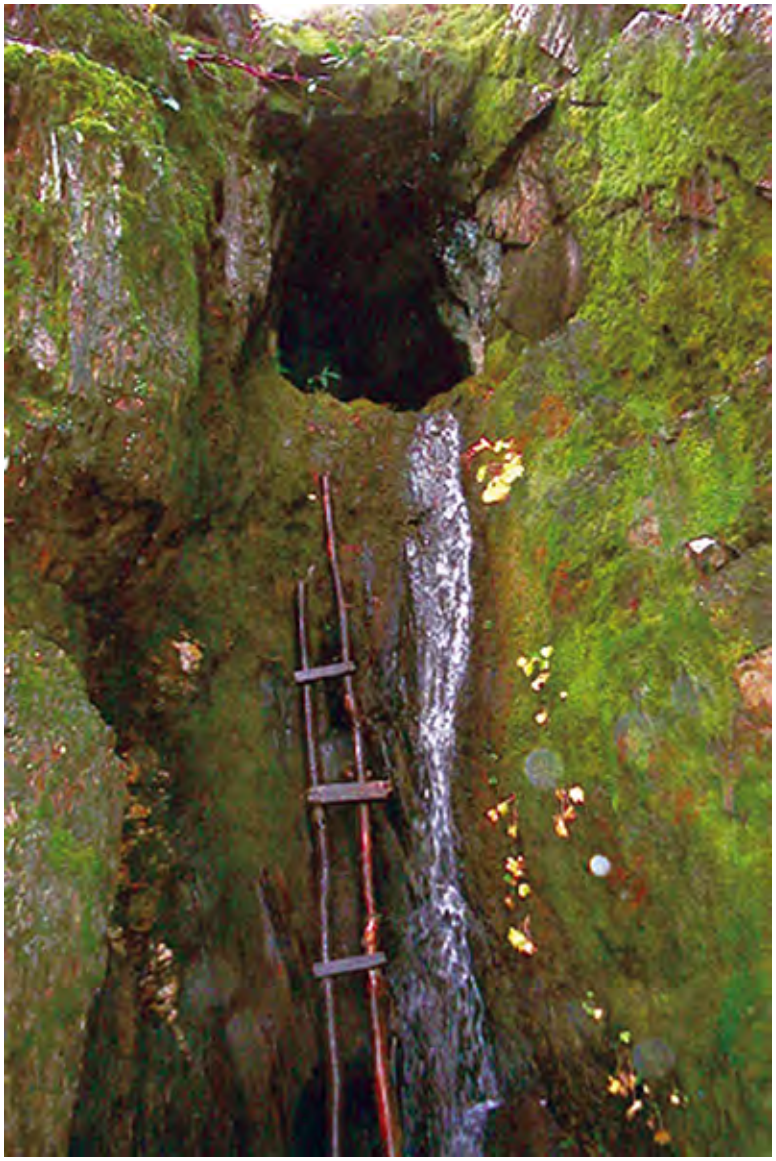

Figure A8. Dscharge from Boston Mine tunnel outlet (station BY20), Greenhorn Creek drainage, Nevada County, California.

Figure A9. Iron precipitate in ground sluice at Poore Mine (station BY88), Greenhorn Creek drainage, Nevada County, California.

Figure A10. Poore Mine pit lake (station BY89), Greenhorn Creek drainage, Nevada County, California.

Figure A11. Poore Mine tunnel outlet (station BY91), Greenhorn Creek drainage, Nevada County, California.

Figure A12. Starr Mine tunnel inlet area (station BY122), Greenhorn Creek drainage, Nevada County, California.

Figure A13. Midway station in Starr Mine tunnel (station BY123), Greenhorn Creek drainage, Nevada County, California.

Figure A14. Starr Mine tunnel, near outlet (station BY124), Greenhorn Creek drainage, Nevada County, California.

Figure A15. Starr Mine pit lake (station BY148), Greenhorn Creek drainage, Nevada County, California.

Figure A16. Missouri Canyon ground sluice (station BY146), Greenhorn Creek drainage, Nevada County, California.

Figure A17. Missouri Canyon ground sluice above creek (station BY75), Greenhorn Creek drainage, Nevada County, California.

Figure A18. Greenhorn Creek at You Bet Road (station BY59), Nevada County, California.

Figure A19. Confluence of Little Greenhorn Creek with Greenhorn Creek upstream of You Bet Road (station BY59), Nevada County, California.

Figure A20. Streambank showing flood incision of gravels, Greenhorn Creek at the Narrows (station BY180), Nevada County, California.

Figure A21. Greenhorn Creek at the Narrows, looking downstream (station BY180), Nevada County, California.

Figure A22. Hunts Hill drainage tunnel outlet, near Buckeye Ford in Greenhorn Creek, Nevada County, California.

Figure A23. Confluence of Gas Canyon with Greenhorn Creek (station BY52), Nevada County, California.

Figure A24. Greenhorn Creek at Buckeye Drain, looking upstream (station BY60), Nevada County, California.

Figure A25. Greenhorn Creek at Red Dog Road crossing, Nevada County, California.

Figure A26. Pit lake at Buckeye Flat Mine, Greenhorn Creek drainage, Nevada County, California.

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Appendix B. Quality Assurance and Quality Control Plots for Chemical Analyses of Water Samples from the Greenhorn Creek Drainage, Nevada County, California

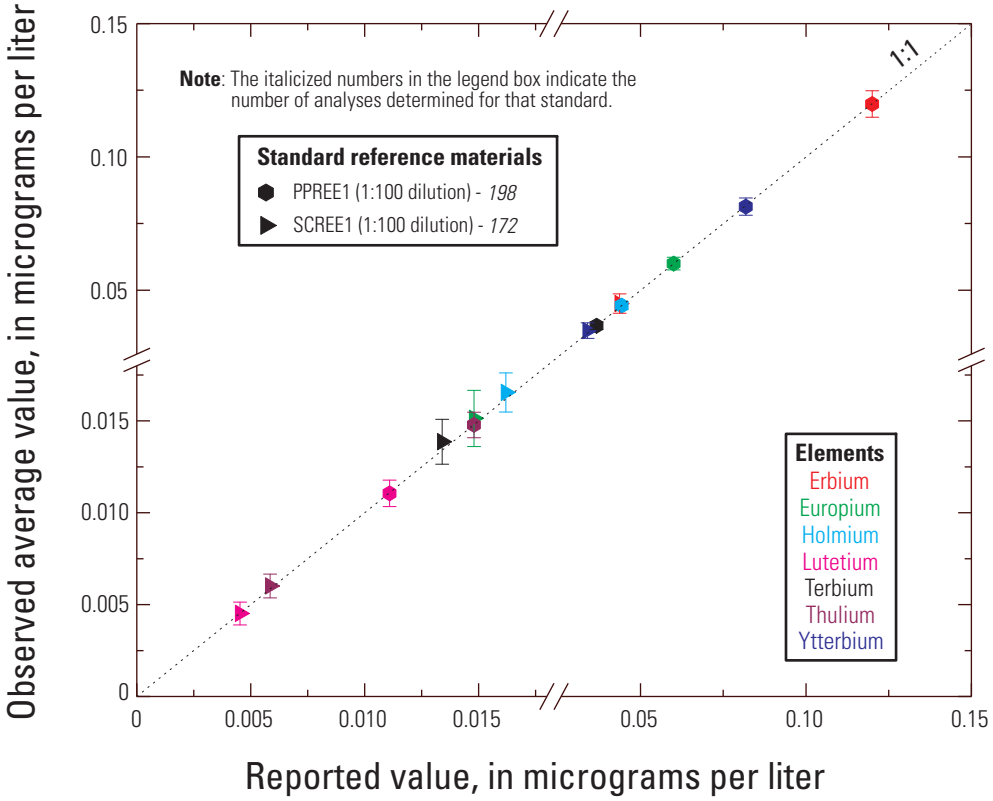

Figure B1. Correlation plot of observed values versus reported values for erbium, europium, holmium, lutetium, terbium, thulium, and ytterbium determined in standard reference materials.

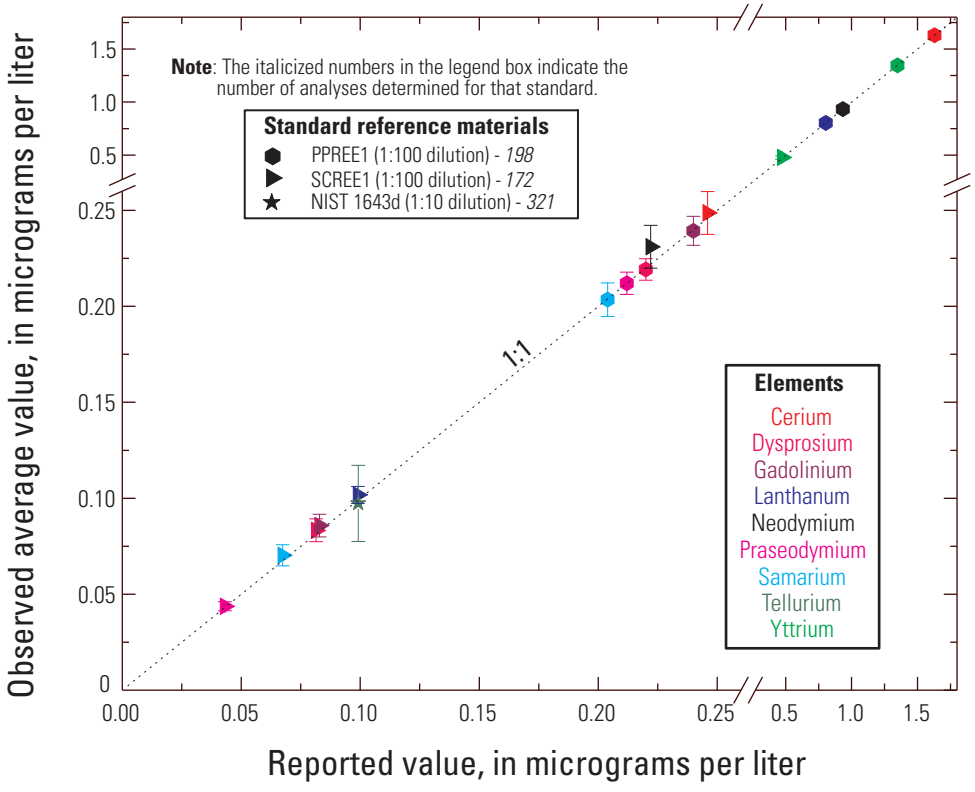

Figure B2. Correlation plot of observed values versus reported values for cerium, dysprosium, gadolinium, lanthanum, neodymium, praseodymium, samarium, tellurium, and yttrium determined in standard reference materials.

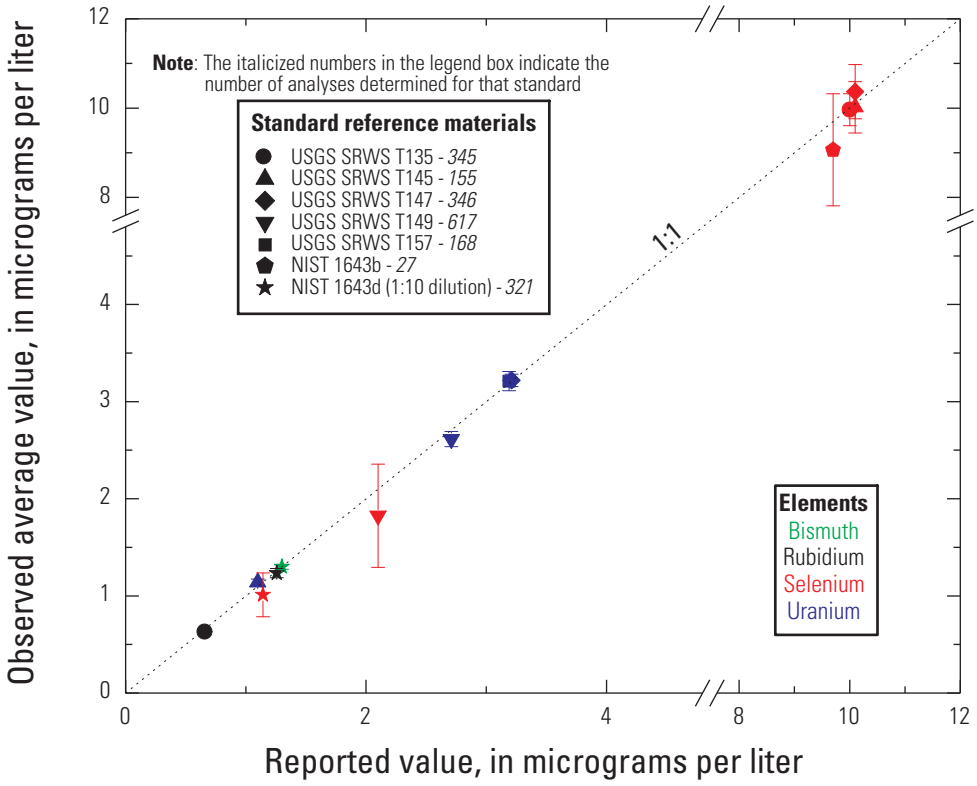

Figure B3. Correlation plot of observed values versus reported values for bismuth, rubidium, selenium, and uranium determined in standard reference materials.

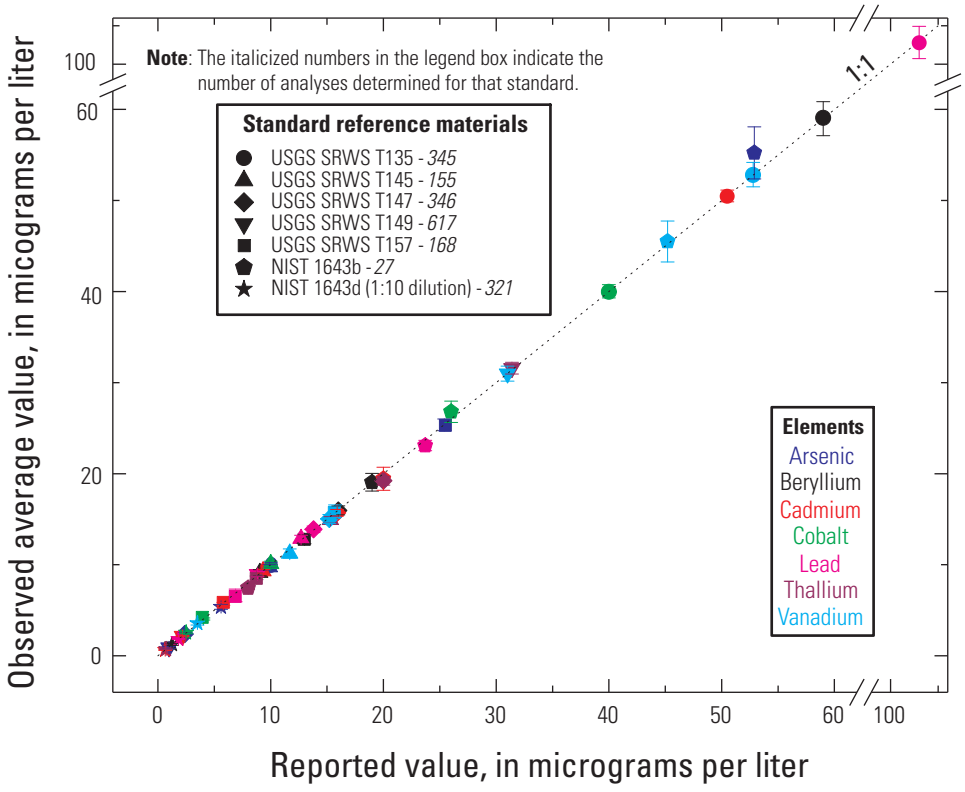

Figure B4. Correlation plot of observed values versus reported values for arsenic, beryllium, cadmium, cobalt, lead, thallium, and vanadium determined in standard reference materials.

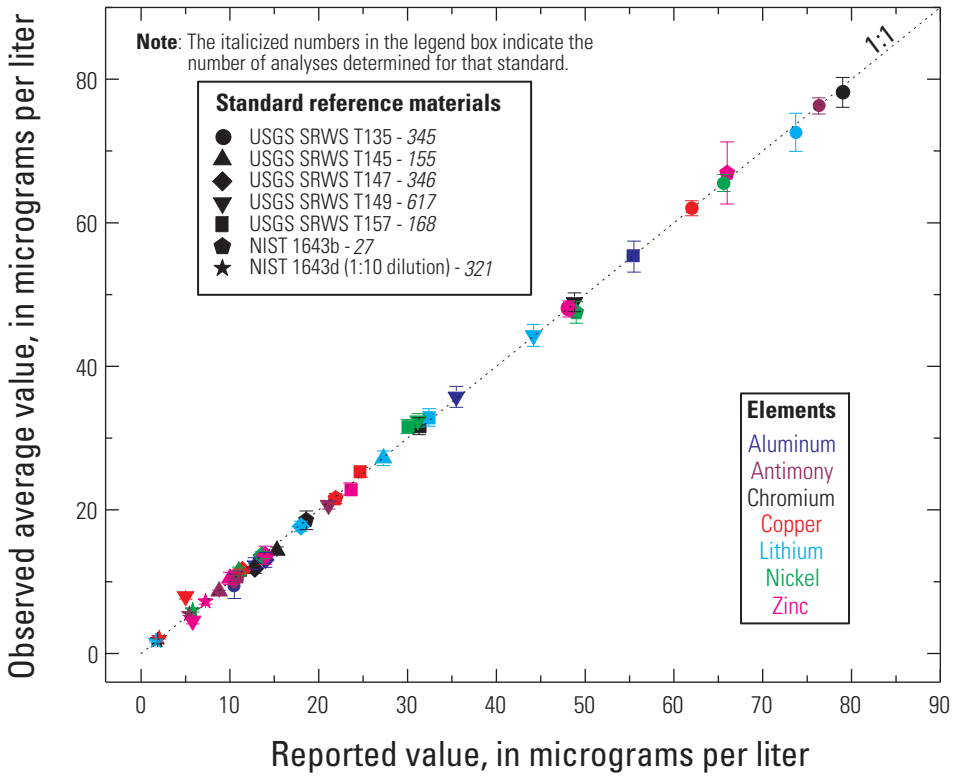

Figure B5. Correlation plot of observed values versus reported values for aluminum, antimony, chromium, copper, lithium, nickel, and zinc determined in standard reference materials.

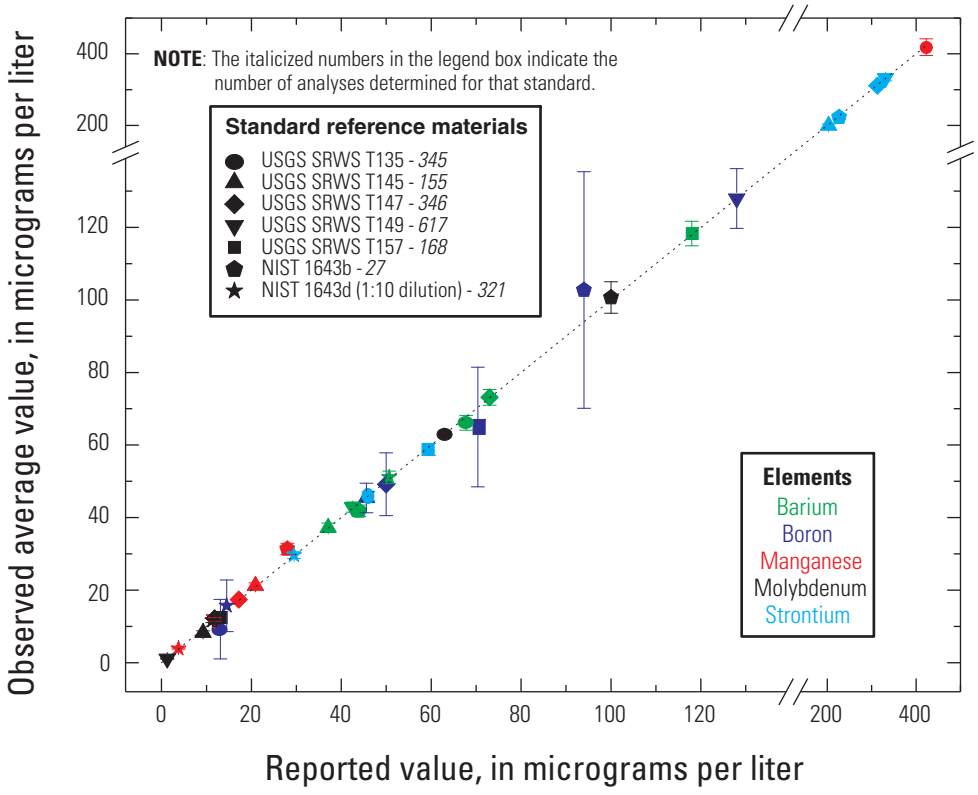

Figure B6. Correlation plot of observed values versus reported values for barium, boron, manganese, molybdenum, and strontium determined in standard reference materials.

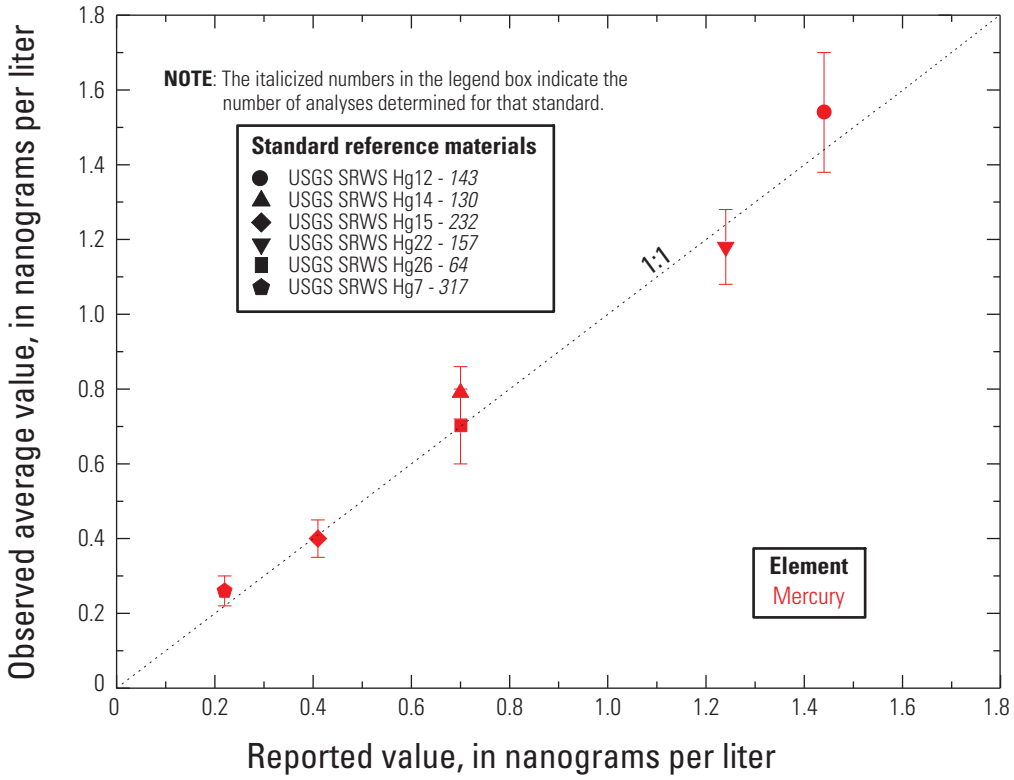

Figure B7. Correlation plot of observed values versus reported values for mercury determined in standard reference materials.

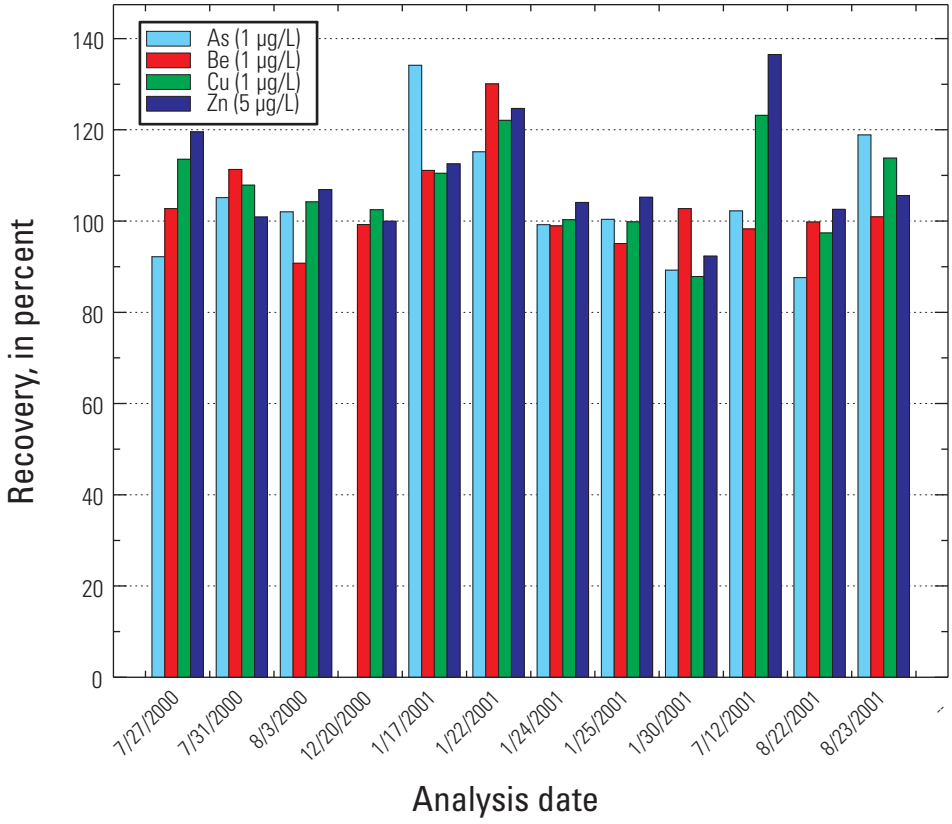

Figure B8. Bar graph plotting recovery (in percent) for arsenic (As), beryllium (Be), copper (Cu), and zinc (Zn) spiked in blanks for selected analysis dates. µg/L, microgram per liter.

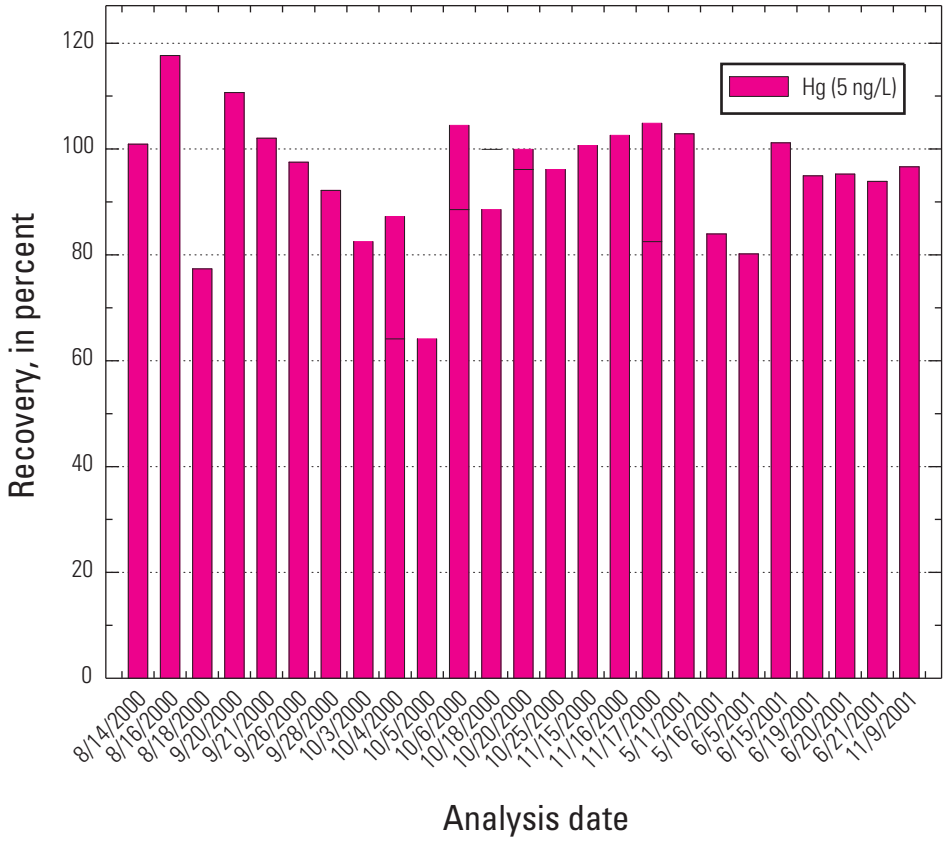

Figure B9. Bar graph plotting recovery (in percent) for mercury (Hg) spiked in blanks for selected analysis dates. ng/L, nanogram per liter.

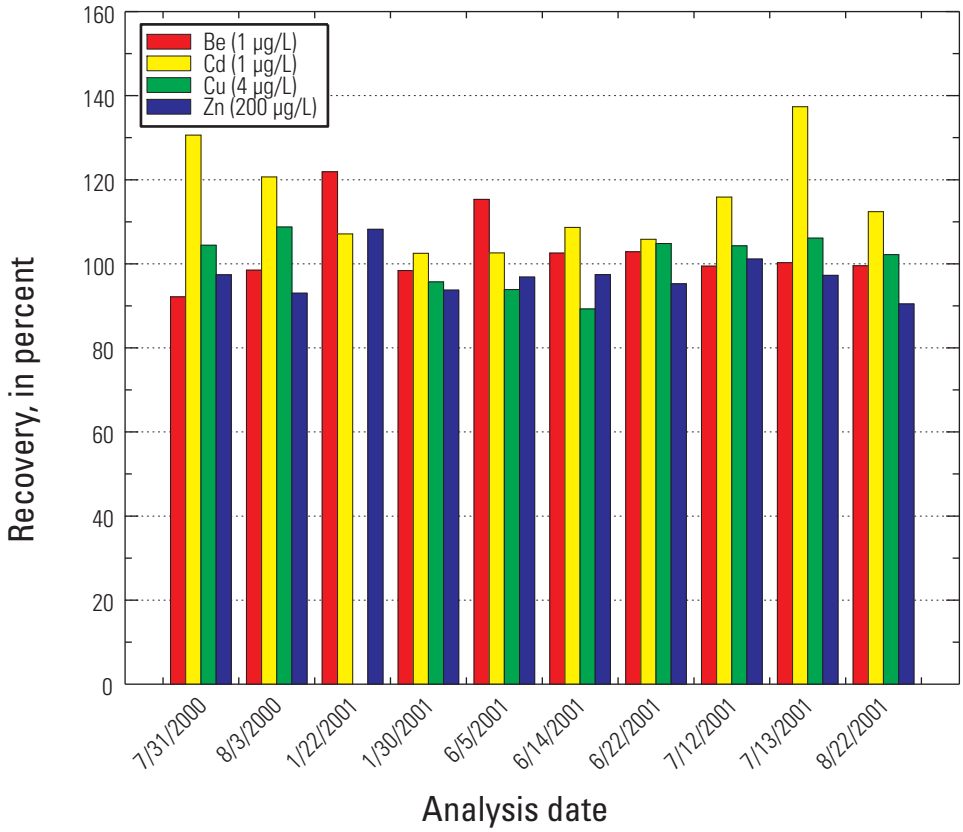

Figure B10. Graph plotting recovery (in percent) for beryllium (Be), cadmium (Cd), copper (Cu), and zinc (Zn) spiked in samples for selected analysis dates. µg/L, microgram per liter.

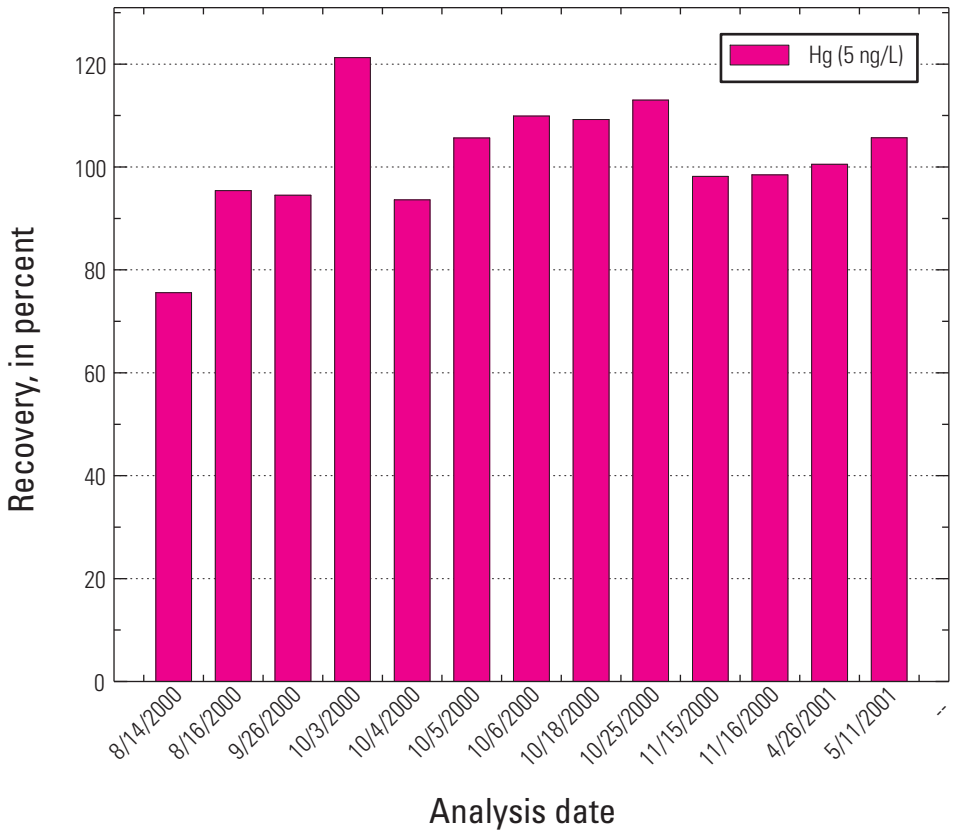

Figure B11. Plotting recovery (in percent) for mercury spiked in samples for selected analysis dates. ng/L, nanogram per liter.

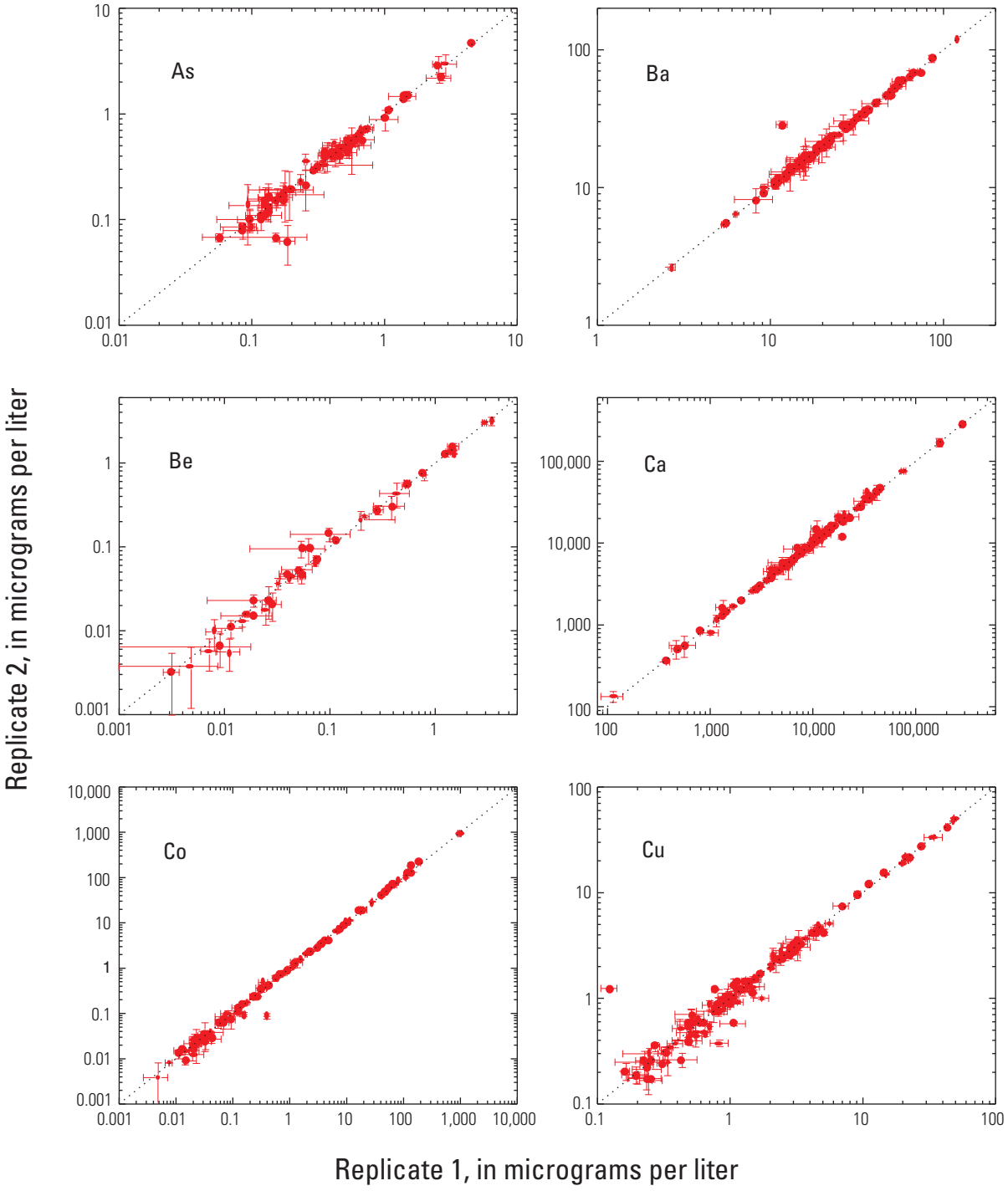

Figure B12. Field replicate analyses of six elements: arsenic (As), barium (Ba), beryllium (Be), calcium (Ca), cobalt (Co), and copper (Cu). [Each replicate sample analyzed in triplicate; mean value shown with standard deviation.]

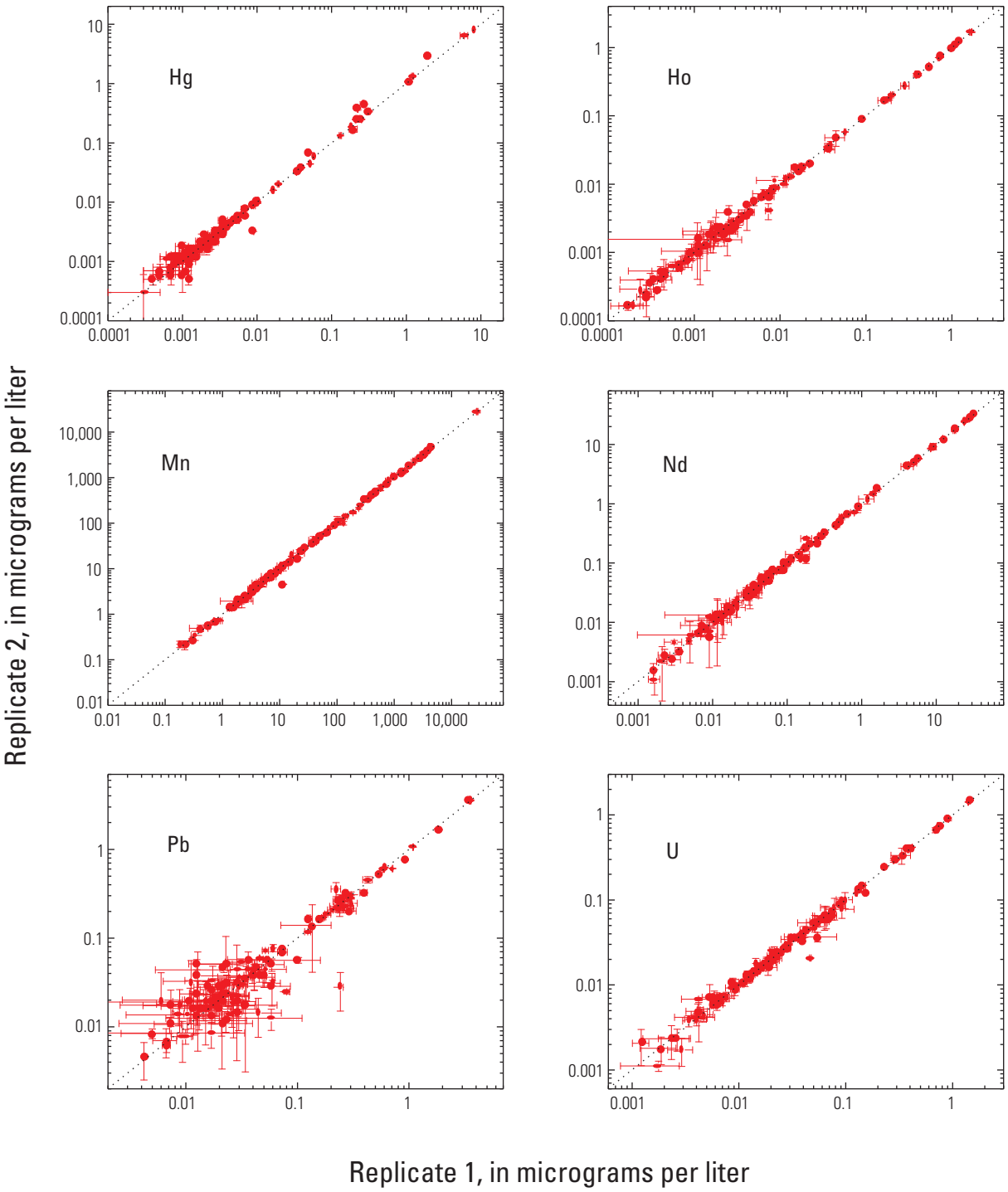

Figure B13. Correlation plots of field replicate analyses of six elements: mercury (Hg), holmium (Ho), manganese (Mn), neodymium (Nd), lead (Pb), and uranium (U). [Each replicate sample analyzed in triplicate; mean value shown with standard deviation.]

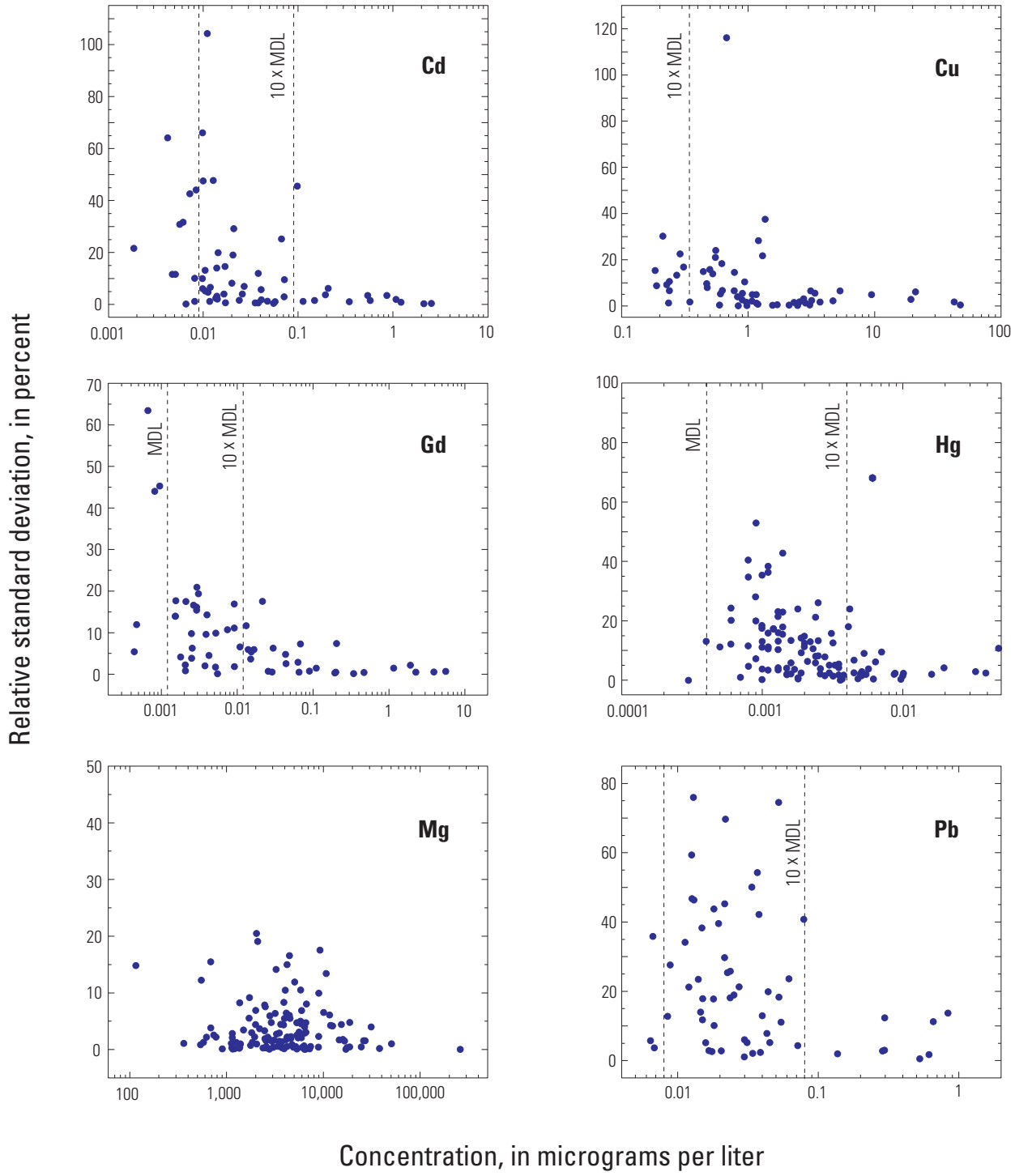

Figure B14. Percent relative standard deviation versus concentration for six elements: cadmium (Cd), copper (Cu), gadolinium (Gd), mercury (Hg), magnesium (Mg), and lead (Pb). MDL, method detection limit.

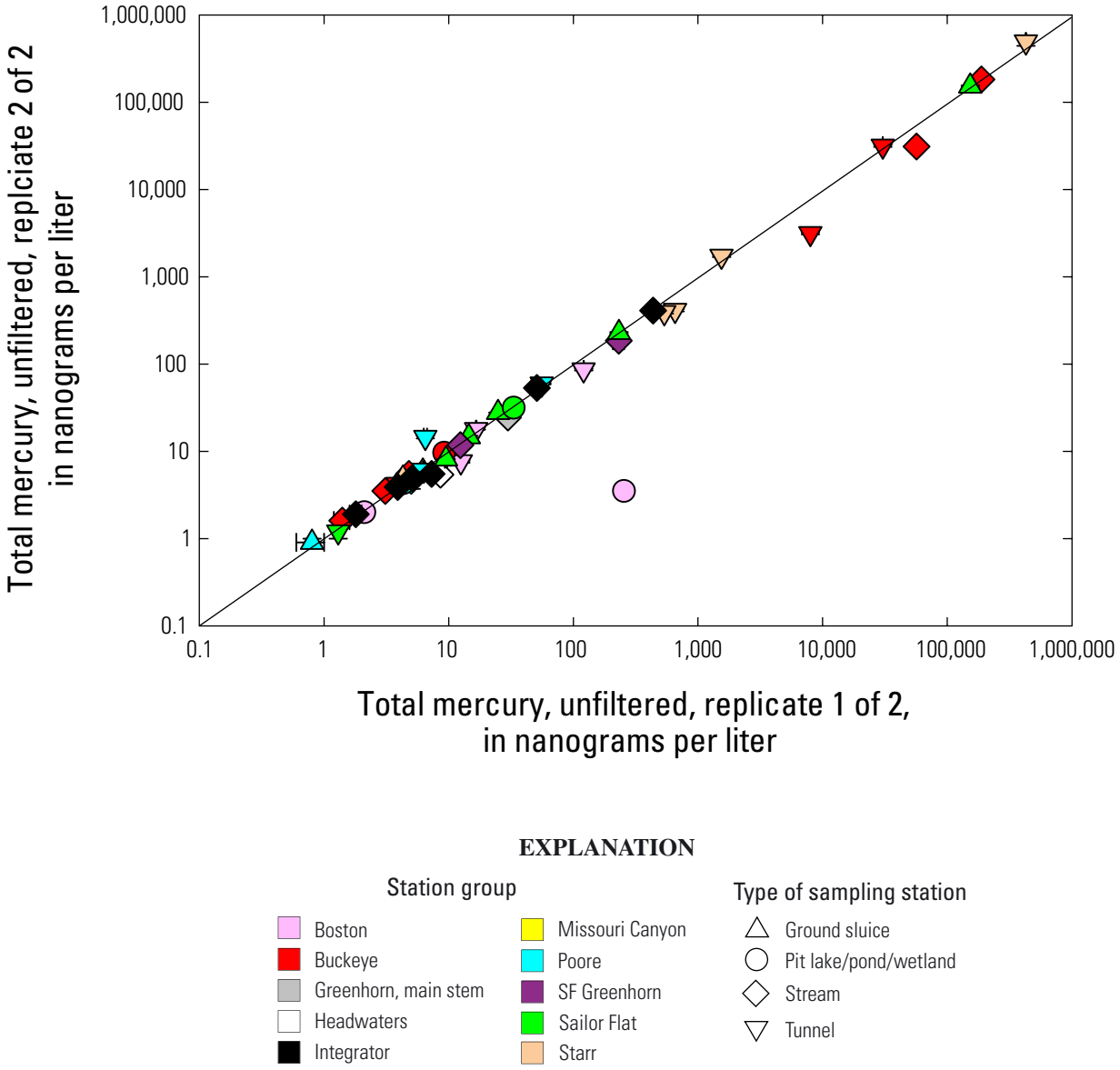

Figure B15. Total mercury concentrations in unfiltered water showing relation of replicate 1 of 2 and replicate 2 of 2. [Each replicate analyzed in triplicate; mean value shown with standard deviation.]

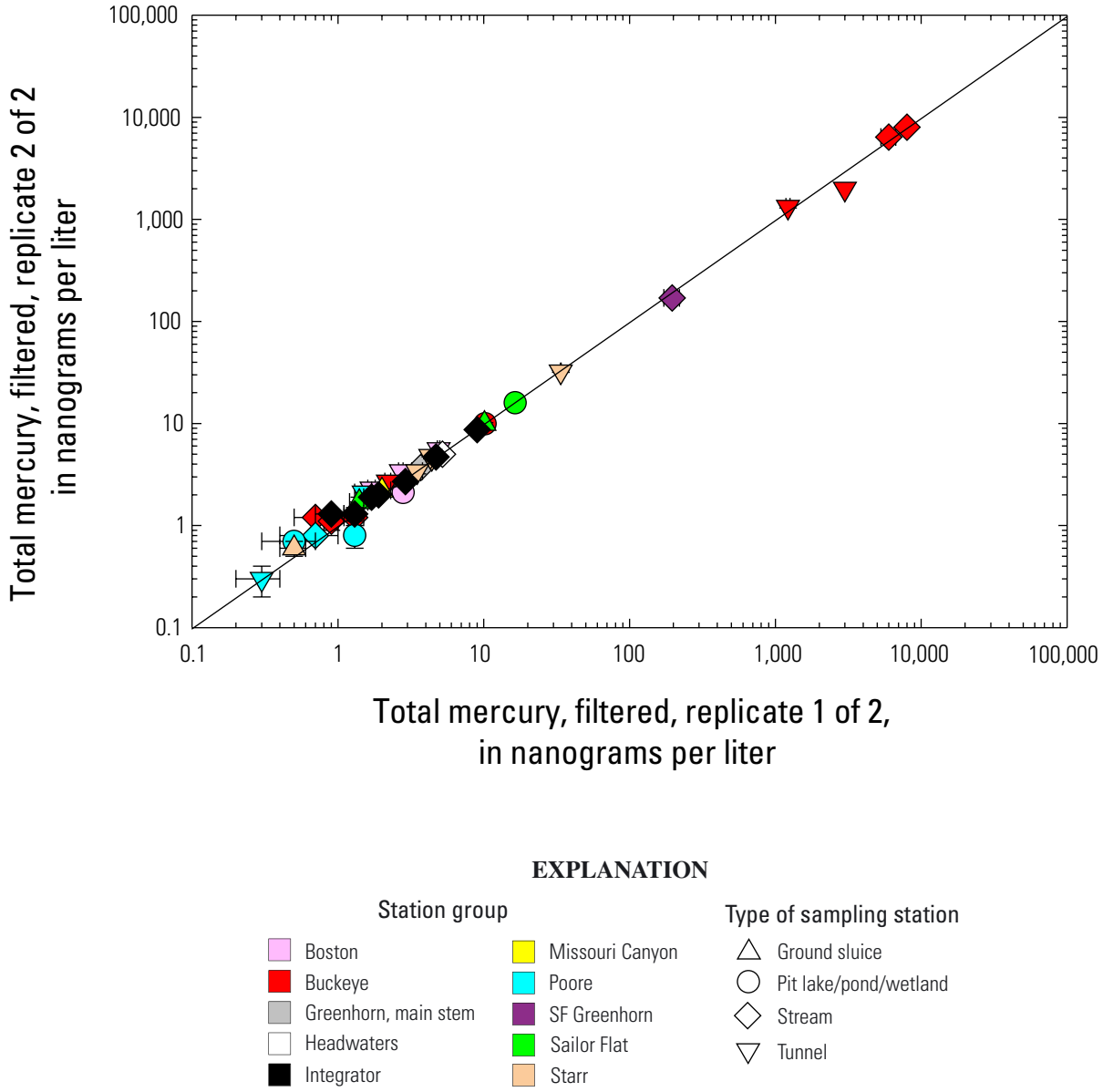

Figure B16. Total mercury concentrations in filtered water showing relation of replicate 1 of 2 and replicate 2 of 2. [Each replicate analyzed in triplicate; mean value shown with standard deviation.]

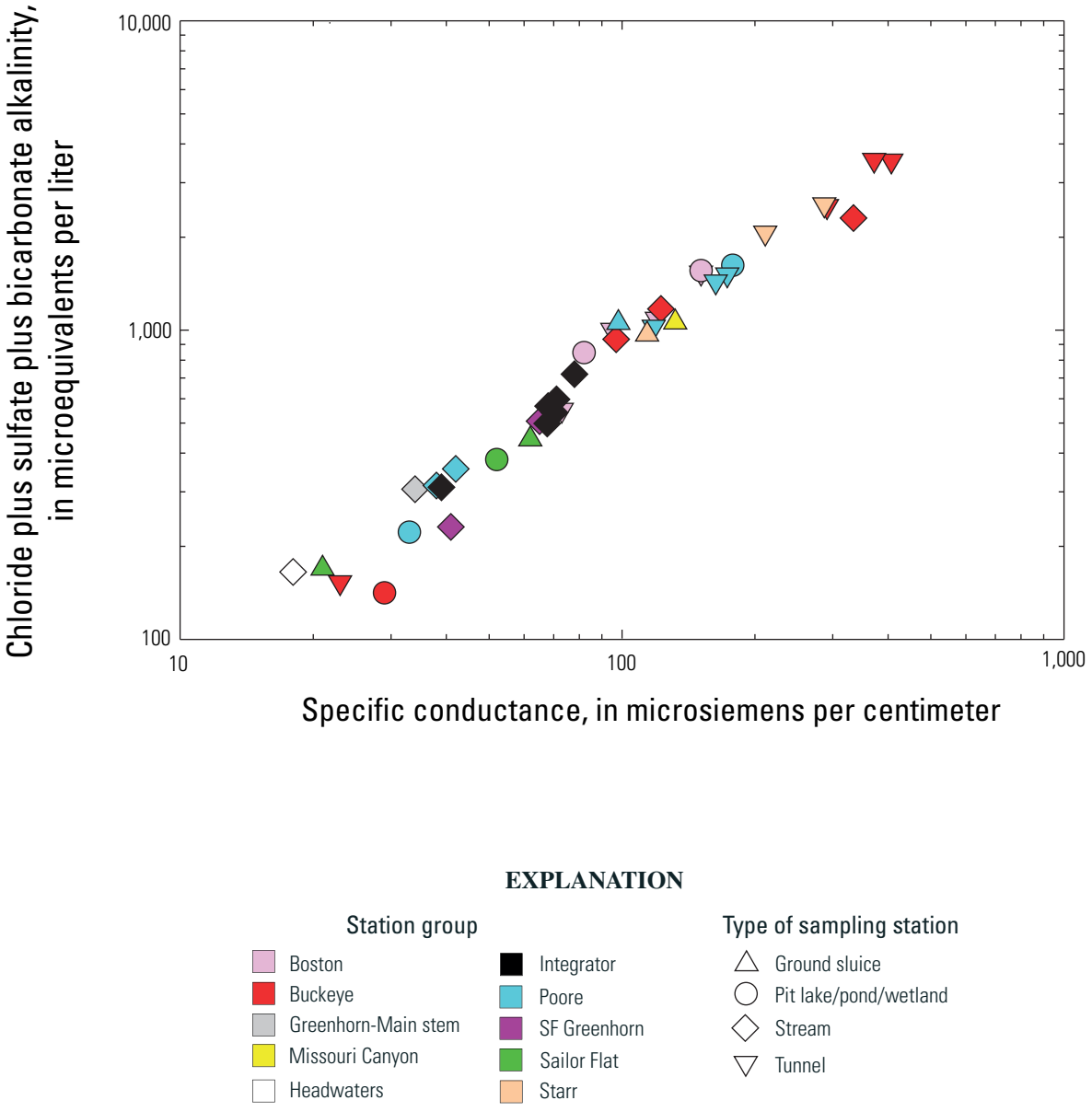

Figure B17. Relation of specific conductance with sum of microequivalent concentrations of chloride, sulfate, and bicarbonate alkalinity.

Appendix C. Locations and Characteristics of Sampling Stations and Tunnels, Greenhorn Creek Drainage, Nevada County, California

Table C1. Locations, descriptions, and characteristics of sampling stations, Greenhorn Creek drainage, Nevada County, California.

[Latitude and longitude are referenced to NAD 27; elevation is NGVD 29. Station name abbreviations: ab, above; bl, below; Cr, Creek; Cyn, Canyon; MF, Middle Fork; mi, miles; E, east; N, north; NF, North Fork; nr, near; Rd, Road; S, south; SF, South Fork; W, west. USGS, U.S. Geological Survey; BLM, Bureau of Land Management; USDA–FS, U.S. Department of Agriculture–Forest Service. —, not determined]

Station map ID	Station name	Station number	Site characteristic	Township (North)	Range (East)	Section	Latitude	Longitude	Elevation (in feet)	County
BY199	Bear River at Highway 20 nr Emigrant Gap	391823120404101	River	17	12	20	39°18′23″	120°40′41″	4,560	Nevada
BY20	Boston Mine tunnel outlet nr Grass Valley	391346120540901	Tunnel	16	10	30	39°13′46″	120°54′09″	2,560	Nevada
BY21	Boston Mine wetlands pond nr Grass Valley	391343120541101	Pit lake	16	10	30	39°13′43″	120°54′11″	2,630	Nevada
BY22	Buckeye Flat Mine drain 0.1 mi ab Greenhorn Cr	391418120540401	Stream	16	10	19	39°14′18″	120°54′04″	2,590	Nevada
BY58	Buckeye Flat Mine main drain 0.45 mi ab Greenhorn Cr	391425120534101	Stream	16	10	19	39°14′25″	120°53′41″	2,930	Nevada
BY23	Buckeye Flat Mine N drain to Greenhorn Cr Grass Valley	391446120534201	Tunnel	16	10	18	39°14′46″	120°53′42″	2,970	Nevada
BY116	Buckeye Flat Mine pond drain 0.15 mi ab SF Greenhorn Cr	391416120532001	Stream	16	10	19	39°14′16″	120°53′20″	2,939	Nevada
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr Grass Valley	391415120533701	Tunnel	16	10	19	39°14′15″	120°53′37″	2,950	Nevada
BY25	Buckeye Flat Mine upper drain	391453120534801	Stream	16	10	18	39°14′53″	120°53′48″	3,100	Nevada
BY144	Coon Hollow Cr drain tunnel outlet nr Dutch Flat	391239120540001	Tunnel	16	10	31	39°12′39″	120°54′00″	2,760	Nevada
BY180	Greenhorn Cr 0.2 mi bl the Narrows	391329120543801	Stream	16	9	25	39°13′29″	120°54′38″	2,468	Nevada
BY52	Greenhorn Cr 0.3 mi ab Buckeye Ford nr Nevada City	391434120541001	Stream	16	10	19	39°14′34″	120°54′10″	2,580	Nevada
BY55	Greenhorn Cr 0.1 mi bl Sailor Flat west drain nr Nevada City	391553120532901	Stream	16	10	7	39°15′53″	120°53′29″	2,860	Nevada
BY57	Greenhorn Cr 0.3 mi bl Sailor Flat west Drain nr Nevada City	391542120533701	Stream	16	10	7	39°15′42″	120°53′37″	2,860	Nevada
BY53	Greenhorn Cr ab SF Greenhorn Cr nr Nevada City	391401120541201	Stream	16	10	19	39°14′01″	120°54′12″	2,513	Nevada
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	391116120562501	Stream	15	9	2	39°11′16″	120°56′25″	2,200	Nevada
BY60	Greenhorn Cr bl Buckeye drain nr Nevada City	391411120540901	Stream	16	10	19	39°14′11″	120°54′09″	2,520	Nevada
BY56	Greenhorn Cr bl SF Greenhorn Cr nr Nevada City	391347120542201	Stream	16	10	30	39°13′47″	120°54′22″	2,520	Nevada
BY51	Greenhorn Cr nr headwaters nr Scotts Flat Reservoir	391657120493101	Stream	16	10	2	39°16′57″	120°49′31″	4,262	Nevada
BY146	Missouri Cyn 1.6 mi ab Greenhorn Cr nr Chicago Park	391254120534001	Ground sluice	16	10	31	39°12′54″	120°53′40″	2,750	Nevada
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	391259120535801	Ground sluice	16	10	30	39°12′59″	120°53′58″	2,600	Nevada

Table C1. Locations, descriptions, and characteristics of sampling stations, Greenhorn Creek drainage, Nevada County, California—*Continued.*

[Latitude and longitude are referenced to NAD 27; elevation is NGVD 29. Station name abbreviations: ab, above; bl, below; Cr, Creek; Cyn, Canyon; MF, Middle Fork; mi, miles; E, east; N, north; NF, North Fork; nr, near; Rd, Road; S, south; SF, South Fork; W, west. USGS, U.S. Geological Survey; BLM, Bureau of Land Management; USDA–FS, U.S. Department of Agriculture–Forest Service. —, not determined]

Station map ID	Station name	Station number	Site characteristic	Township (North)	Range (East)	Section	Latitude	Longitude	Elevation (in feet)	County
BY145	Missouri Cyn Cr tributary nr Chicago Park	391253120531801	Ground sluice	16	10	31	39°12′53″	120°53′18″	2,840	Nevada
BY147	NF MF Missouri Cyn nr Chicago Park	391258120531801	Ground sluice	16	10	30	39°12′58″	120°53′18″	2,850	Nevada
BY86	Poore Mine creek ab tunnel nr Grass Valley	391346120545101	Stream	16	9	24	39°13′46″	120°54′51″	2,640	Nevada
BY87	Poore Mine creek bl tunnel nr Grass Valley	391343120544201	Stream	16	9	25	39°13′43″	120°54′42″	2,510	Nevada
BY88	Poore Mine ground sluice nr Grass Valley	391351120544901	Ground sluice	16	9	24	39°13′51″	120°54′49″	2,660	Nevada
BY89	Poore Mine pit lake nr Grass Valley	391354120544301	Pit lake	16	9	24	39°13′54″	120°54′43″	2,740	Nevada
BY90	Poore Mine seep above ground sluice nr Grass Valley	391352120544601	Ground sluice	16	9	24	39°13′52″	120°54′46″	2,680	Nevada
BY91	Poore Mine tunnel effluent nr Grass Valley	391347120544301	Tunnel	16	9	24	39°13′47″	120°54′43″	2,600	Nevada
BY105	Sailor Flat Mine main drain Gulch 01 nr Quaker Hill	391620120532201	Ground sluice	16	10	7	39°16′20″	120°53′22″	3,180	Nevada
BY106	Sailor Flat Mine main drainage to Greenhorn Cr, Gulch 03	391615120531501	Ground sluice	16	10	8	39°16′15″	120°53′15″	3,200	Nevada
BY114	SF Greenhorn Cr 0.7 mi ab Greenhorn Cr nr Nevada City	391401120534001	Stream	16	10	19	39°14′01″	120°53′40″	2,600	Nevada
BY113	SF Greenhorn Cr 0.8 mi ab Greenhorn Cr nr Nevada City	391405120532901	Stream	16	10	19	39°14′05″	120°53′29″	2,600	Nevada
BY115	SF Greenhorn Cr bl Boston Mine nr Nevada City	391351120541101	Stream	16	10	19	39°13′51″	120°54′11″	2,520	Nevada
BY122	Starr Mine tunnel inflow nr Grass Valley	391327120542001	Ground sluice	16	10	30	39°13′27″	120°54′20″	2,670	Nevada
BY123	Starr Mine tunnel midway nr Grass Valley	391329120543001	Tunnel	16	9	25	39°13′29″	120°54′30″	2,540	Nevada
BY124	Starr Mine tunnel outlet nr Grass Valley	391330120543301	Tunnel	16	9	25	39°13′30″	120°54′33″	2,510	Nevada
BY148	Starr Pit pond nr Grass Valley	391327120541901	Pit lake	16	10	30	39°13′27″	120°54′19″	2,640	Nevada
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	391627120524901	Ground sluice	16	10	5	39°16′27″	120°52′49″	3,200	Nevada
BY130	Tom and Jerry Mine drain at tunnel outlet nr Nevada City	391627120524801	Tunnel	16	10	5	39°16′27″	120°52′48″	3,200	Nevada
BY131	Tom and Jerry Mine drainage pond nr Nevada City	391628120524401	Pit lake	16	10	5	39°16′28″	120°52′44″	3,240	Nevada

Table C1. Locations, descriptions, and characteristics of sampling stations, Greenhorn Creek drainage, Nevada County, California—*Continued.*

[Latitude and longitude are referenced to NAD 27; elevation is NGVD 29. Station name abbreviations: ab, above; bl, below; Cr, Creek; Cyn, Canyon; MF, Middle Fork; mi, miles; E, east; N, north; NF, North Fork; nr, near; Rd, Road; S, south; SF, South Fork; W, west. USGS, U.S. Geological Survey; BLM, Bureau of Land Management; USDA–FS, U.S. Department of Agriculture–Forest Service. —, not determined]

Station map ID	Station name	USGS 7.5 minute quadrangle	Station description
BY199	Bear River at Highway 20 nr Emigrant Gap	Blue Canyon	The sample location is downstream of the Highway 20 crossing of the Bear River. The site is located 1 mi N of Emigrant Gap.
BY20	Boston Mine tunnel outlet nr Grass Valley	Chicago Park	The sample location is in a pool directly below the portal of the Boston mine drainage tunnel that is accessed by trail on the north side of the hydraulic pit. The site is located 8.5 mi E of the town of Grass Valley and 1 mi SE of the Buckeye Flat–Greenhorn Cr crossing, in the Bear River drainage.
BY21	Boston Mine wetlands pond nr Grass Valley	Chicago Park	The sample location is on the north east side of the pond due south of the portal of the Boston mine drainage tunnel in the hydraulic pit. The site is located 8.5 mi E of the town of Grass Valley, and 1 mi SE of the Buckeye Flat–Greenhorn Cr Crossing, in the Bear River drainage.
BY22	Buckeye Flat Mine drain 0.1 mi ab Greenhorn Cr	Chicago Park	The sample location is in Buckeye Drain 200 meters upstream from its discharge to Greenhorn Cr. The site is located 8 mi SE of Nevada City, in the Bear River drainage.
BY58	Buckeye Flat Mine main drain 0.45 mi ab Greenhorn Cr	Chicago Park	Located in a ravine draining the southwestern section of Buckeye Diggings, this site is immediately adjacent to and below Buckeye Road, 7.6 mi NE of Chicago Park.
BY23	Buckeye Flat Mine N drain to Greenhorn Cr Grass Valley	Chicago Park	The sample location is in a steeply incised slate bedrock gulch in a step pool at the Tahoe National Forest Boundary about 750 feet below the drainage tunnel portal that is located at the far west side of the northern hydraulic pit (Buckeye Flat North). The site is located 8 mi NE of the town of Grass Valley and 1 mi E of the Buckeye Flat–Greenhorn Cr Crossing, in the Bear River drainage.
BY116	Buckeye Flat Mine pond drain 0.15 mi ab SF Greenhorn Cr	Chicago Park	This is a steeply incised bedrock gulch draining the Buckeye Ridge below Buckeye Diggings. Located 8 mi SE of Nevada City.
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr Grass Valley	Chicago Park	The sample location is in a steeply incised slate bedrock gulch in a step pool below the confluence of 2 drainage tunnels and a large surface drainage feature about 2,000 feet south east of a large pit lake in the southern hydraulic pit. The site is located 8 mi NE of the town of Grass Valley and 1 mi E of the Buckeye Flat–Greenhorn Cr Crossing in the Bear River drainage.
BY25	Buckeye Flat Mine upper drain	Chicago Park	Northwest corner of Buckeye diggings in Tahoe National Forest north of Buckeye Ridge, 8 mi NE of Grass Valley, and 1 mi E of Buckeye Flat–Greenhorn Crossing.
BY144	Coon Hollow Cr drain tunnel outlet nr Dutch Flat	Chicago Park	Located in a ravine draining the middle portion of the Red Dog–You Bet Diggings towards the west and into Missouri Cyn. This site is 0.2 mi SW of the fork of Red Dog Rd and Chalk Bluff Rd and is 5.5 mi NE of Chicago Park.
BY180	Greenhorn Cr 0.2 mi bl The Narrows	Chicago Park	The sample location is in the middle of Greenhorn Cr just below where the bedrock “pinches” to form a slot, about 2,000 feet upstream of the Red Dog Rd crossing. The site is 6.5 mi NE of the town of Grass Valley in the Bear River drainage.
BY52	Greenhorn Cr 0.3 mi ab Buckeye Ford nr Nevada City	Chicago Park	Site is located on right bank 0.3 mi upstream from Buckeye Ford.
BY55	Greenhorn Cr 0.1 mi bl Sailor Flat west drain nr Nevada City	North Bloomfield	The sample location is in Greenhorn Cr 150 meters below the discharge of the Sailor Flat West drain. The site is located 8 mi NE of town of Nevada City and 1.5 mi SE of Scotts Flat Reservoir, in the Bear River drainage.
BY57	Greenhorn Cr 0.3 mi bl Sailor Flat west Drain nr Nevada City	North Bloomfield	The sample location is in Greenhorn Cr 500 meters below confluence with Sailor Flat West Drain, 8 mi NE of town of Nevada City, in the Bear River drainage.
BY53	Greenhorn Cr ab SF Greenhorn Cr nr Nevada City	Chicago Park	Located on the built-up gravelized tailings filling the Greenhorn Cr canyon running from NE to SW. This site is 160 meters upstream of the confluence of Greenhorn Cr and the South Fork of Greenhorn Cr.
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	Chicago Park	The sample location is in Greenhorn Cr below the You Bet Road bridge crossing. The site is located 6.5 mi SE of Grass Valley in the Bear River drainage.
BY60	Greenhorn Cr bl Buckeye drain nr Nevada City	Chicago Park	The sample location is in Greenhorn Cr 200 meters below the discharge from Buckeye Drain. The site is located 7 mi NE of town of Nevada City, in the Bear River drainage.

Table C1. Locations, descriptions, and characteristics of sampling stations, Greenhorn Creek drainage, Nevada County, California—*Continued.*

[Latitude and longitude are referenced to NAD 27; elevation is NGVD 29. Station name abbreviations: ab, above; bl, below; Cr, Creek; Cyn, Canyon; MF, Middle Fork; mi, miles; E, east; N, north; NF, North Fork; nr, near; Rd, Road; S, south; SF, South Fork; W, west. USGS, U.S. Geological Survey; BLM, Bureau of Land Management; USDA–FS, U.S. Department of Agriculture–Forest Service. —, not determined]

Station map ID	Station name	USGS 7.5 minute quadrangle	Station description
BY56	Greenhorn Cr bl SF Greenhorn Cr nr Nevada City	Chicago Park	Located on the built-up gravelized tailings filling the Greenhorn Cr canyon running from NE to SW. This site is 160 meters downstream of the confluence of Greenhorn Cr and the South Fork of Greenhorn Cr.
BY51	Greenhorn Cr nr headwaters nr Scotts Flat Reservoir	Washington	Site is located on upper left fork of creek, 0.31 mi upstream from where Greenhorn Cr forks. Drive 0.24 mi N on light duty road off of Chalk Bluff Rd in center of Chalk Bluff Ridge and 0.7 mi down first W trending dirt road that parallels drainage.
BY146	Missouri Cyn 1.6 mi ab Greenhorn Cr nr Chicago Park	Chicago Park	Located in Missouri Cyn serving as the western drainage of the middle portion of Red Dog–You Bet Diggings. This site is 0.3 mi upstream of the intersection of Missouri Cyn and Red Dog Rd, approximately 6 mi NE of Chicago Park.
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	Chicago Park	The sample location is in Missouri Cyn Drain downstream from Red Dog Rd crossing. The site is located 8.5 mi E of the town of Grass Valley, in the Bear River drainage.
BY145	Missouri Cyn Cr tributary nr Chicago Park	Chicago Park	Located in Missouri Cyn serving as the western drainage of the middle portion of Red Dog–You Bet Diggings. This site is 0.5 mi upstream from the intersection of Missouri Cyn and Red Dog Rd, 0.1 mi north of Chalk Bluff Rd. and approximately 6 mi NE of Chicago Park.
BY147	NF MF Missouri Cyn nr Chicago Park	Chicago Park	Located in Missouri Cyn serving as the western drainage of the middle portion of Red Dog–You Bet Diggings. This site is 0.5 mi upstream from the intersection of Missouri Cyn and Red Dog Rd, approximately 6 mi NE of Chicago Park
BY86	Poore Mine creek ab tunnel nr Grass Valley	Chicago Park	The sample location is in a pool about 100 feet upstream of the confluence of the drainage from the portal of the Poore Mine and about 0.25 mi upstream from the confluence with Greenhorn Cr. The site is located 6.5 mi E of the town of Grass Valley and 0.5 mi NE of the Narrows in Greenhorn Cr, in the Bear River drainage.
BY87	Poore Mine creek bl tunnel nr Grass Valley	Chicago Park	The sample location is in a pool about 100 feet upstream of the confluence with Greenhorn Cr. The site is located 6.5 mi E of the town of Grass Valley, and 0.5 mi NE of the Narrows in Greenhorn Cr, in the Bear River drainage.
BY88	Poore Mine ground sluice nr Grass Valley	Chicago Park	The sample location is in a pool about 150 feet below the unworked gravel highwall in an incised drainage feature on the west side of the Poore Mine hydraulic pit. The site is located 6.5 mi E of the town of Grass Valley, and 0.5 mi NE of the Narrows in Greenhorn Cr, in the Bear River drainage.
BY89	Poore Mine pit lake nr Grass Valley	Chicago Park	The sample location is in a pond at the far southwest end of the hydraulic pit at the base of the highwall. The site is located 6.5 mi E of the town of Grass Valley and 0.5 mi NE of the Narrows in Greenhorn Cr, in the Bear River drainage.
BY90	Poore Mine seep above ground sluice nr Grass Valley	Chicago Park	The sample location is in an incised mine cut at the base of a 110-foot-high cemented gravel “highwall” about 150 feet north of an old ground sluice. The site is located 6.5 mi E of the town of Grass Valley, and 0.5 mi NE of the Narrows in Greenhorn Cr, in the Bear River drainage.
BY91	Poore Mine tunnel effluent nr Grass Valley	Chicago Park	The sample location is in a pool about 50 feet below the portal of the Poore Mine. The site is 6.5 mi E of the town of Grass Valley and 0.5 mi NE of the Narrows in Greenhorn Cr in the Bear River drainage.
BY105	Sailor Flat Mine main drain Gulch 01 nr Quaker Hill	North Bloomfield	The sample location is at the far northwest side of the hydraulic pit 15 feet below the surface exposed bedrock in a deeply incised slate bedrock gulch, 10 mi NE of the town of Grass Valley, Bear River drainage.
BY106	Sailor Flat Mine main drainage to Greenhorn Cr, Gulch 03	North Bloomfield	South edge of Sailor Flat Strip Mine, 0.25 mi north of Greenhorn Cr in Tahoe National Forest, 10 mi NE of Grass Valley.
BY114	SF Greenhorn Cr 0.7 mi ab Greenhorn Cr nr Nevada City	Chicago Park	This site is within the canyon of the South Fork of Greenhorn Cr about 100 meters downstream of the ravine draining the southern section of the Buckeye Diggings. Approximately 0.6 mi upstream of the confluence with Greenhorn Cr and approximately 7 mi NE of Chicago Park.
BY113	SF Greenhorn Cr 0.8 mi ab Greenhorn Cr nr Nevada City	Chicago Park	This site is within the canyon of the South Fork of Greenhorn Cr about 75 meters upstream of the ravine draining the southern section of the Buckeye Diggings. Approximately 0.8 mi upstream of the confluence with Greenhorn Cr and approximately 7 mi NE of Chicago Park.

Table C1. Locations, descriptions, and characteristics of sampling stations, Greenhorn Creek drainage, Nevada County, California—*Continued.*

[Latitude and longitude are referenced to NAD 27; elevation is NGVD 29. Station name abbreviations: ab, above; bl, below; Cr, Creek; Cyn, Canyon; MF, Middle Fork; mi, miles; E, east; N, north; NF, North Fork; nr, near; Rd, Road; S, south; SF, South Fork; W, west. USGS, U.S. Geological Survey; BLM, Bureau of Land Management; USDA–FS, U.S. Department of Agriculture–Forest Service. —, not determined]

Station map ID	Station name	USGS 7.5 minute quadrangle	Station description
BY115	SF Greenhorn Cr bl Boston Mine nr Nevada City	Chicago Park	The sample location is in the South Fork Greenhorn Cr, 250 feet upstream of the confluence of South Fork Greenhorn Cr and Greenhorn Cr and 500 feet downstream of the Boston Mine. The site is located 7 mi E of Nevada City, in the Bear River drainage.
BY122	Starr Mine tunnel inflow nr Grass Valley	Chicago Park	The sample location is in a sump at the base of the confluence of 3 large ground sluices in the middle of the hydraulic pit, about 40 feet below the exposed bedrock surface. The site is located 8.5 mi SE of the town of Grass Valley, and 1 mi S of the Narrows in Greenhorn Cr, in the Bear River drainage.
BY123	Starr Mine tunnel midway nr Grass Valley	Chicago Park	The sample location is in about 500 feet from the portal of the Starr mine drainage tunnel (also known as the Birdseye tunnel) at a small riffle below an old wooden sluice box cross support. The site is located 8.5 mi SE of the town of Grass Valley and 0.5 mi S of the Narrows in Greenhorn Cr, in the Bear River drainage.
BY124	Starr Mine tunnel outlet nr Grass Valley	Chicago Park	Located about 0.2 mi east and above Greenhorn Cr, this site is the western drainage of the Starr Pit Mine. The tunnel outlet is about 0.3 mi ENE of the Red Dog Rd ford at Greenhorn Cr and is 6.1 mi NE from Chicago Park.
BY148	Starr Pit pond nr Grass Valley	Chicago Park	Located about 0.3 mi east and above Greenhorn Cr atop a table 0.5 mi west of the northernmost section of the Red Dog–You Bet Diggings. The mine pit is 0.5 mi ENE of the Red Dog Rd ford at Greenhorn Cr and approximately 6 mi NE of Chicago Park.
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	North Bloomfield	At the drain tunnel intlet of Tom and Jerry placer diggings within a moderately incised ravine 0.3 mi above the confluence of Fowler Spring Cr and Greenhorn Cr. Tom and Jerry diggings are 1.3 mi NE of Quaker Hill and 7.2 mi west of Nevada City.
BY130	Tom and Jerry Mine drain at tunnel outlet nr Nevada City	North Bloomfield	At the drain tunnel outlet of Tom and Jerry placer diggings within a moderately incised ravine 0.3 mi above the confluence of Fowler Spring Cr and Greenhorn Cr. Tom and Jerry diggings are 1.3 mi NE of Quaker Hill and 7.2 mi west of Nevada City.
BY131	Tom and Jerry Mine drainage pond nr Nevada City	North Bloomfield	This is a small pond at the base of the hydraulic pit at Tom and Jerry diggings 100 meters upstream from the drain tunnel inlet and 75 meters from the access road. Tom and Jerry diggings are 1.3 mi NE of Quaker Hill and 7.2 mi west of Nevada City.

Table C1. Locations, descriptions, and characteristics of sampling stations, Greenhorn Creek drainage, Nevada County, California—*Continued.*

[Latitude and longitude are referenced to NAD 27; elevation is NGVD 29. Station name abbreviations: ab, above; bl, below; Cr, Creek; Cyn, Canyon; MF, Middle Fork; mi, miles; E, east; N, north; NF, North Fork; nr, near; Rd, Road; S, south; SF, South Fork; W, west. USGS, U.S. Geological Survey; BLM, Bureau of Land Management; USDA–FS, U.S. Department of Agriculture–Forest Service. —, not determined]

Station map ID	Station name	Ownership	Watershed	Nearest stream	Mining district
BY199	Bear River at Highway 20 nr Emigrant Gap	Public access	Bear River	Greenhorn Cr	None
BY20	Boston Mine tunnel outlet nr Grass Valley	BLM	Bear River	Greenhorn Cr	Red Dog
BY21	Boston Mine wetlands pond nr Grass Valley	BLM	Bear River	Greenhorn Cr	Red Dog
BY22	Buckeye Flat Mine drain 0.1 mi ab Greenhorn Cr	USDA–FS	Bear River	Greenhorn Cr	Buckeye Hill
BY58	Buckeye Flat Mine main drain 0.45 mi ab Greenhorn Cr	USDA–FS	Bear River	Greenhorn Cr	Buckeye Hill
BY23	Buckeye Flat Mine N drain to Greenhorn Cr Grass Valley	USDA–FS	Bear River	Greenhorn Cr	Buckeye Hill
BY116	Buckeye Flat Mine pond drain 0.15 mi ab SF Greenhorn Cr	Private	Bear River	SF Greehnorn Cr	Buckeye Hill
BY24	Buckeye Flat Mine S drain to SF Greenhorn Cr Grass Valley	USDA–FS	Bear River	Greenhorn Cr	Buckeye Hill
BY25	Buckeye Flat Mine upper drain	USDA–FS	Bear River	Greenhorn Cr	Buckeye Hill
BY144	Coon Hollow Cr drain tunnel outlet nr Dutch Flat	Private	Bear River	Missouri Cyn	You Bet/Red Dog
BY180	Greenhorn Cr 0.2 mi bl The Narrows	Private	Bear River	Greenhorn Cr	You Bet/Red Dog
BY52	Greenhorn Cr 0.3 mi ab Buckeye Ford nr Nevada City	USDA–FS	Bear River	Greenhorn Cr	Scotts Flat
BY55	Greenhorn Cr 0.1 mi bl Sailor Flat west drain nr Nevada City	USDA–FS	Bear River	Greenhorn Cr	Scotts Flat
BY57	Greenhorn Cr 0.3 mi bl Sailor Flat west Drain nr Nevada City	USDA–FS	Bear River	Greenhorn Cr	Scotts Flat
BY53	Greenhorn Cr ab SF Greenhorn Cr nr Nevada City	USDA–FS	Bear River	Greenhorn Cr	Scotts Flat
BY59	Greenhorn Cr at You Bet Rd nr Nevada City	Nevada Irrigation District	Bear River	Greenhorn Cr	You Bet/Red Dog
BY60	Greenhorn Cr bl Buckeye drain nr Nevada City	USDA–FS	Bear River	Greenhorn Cr	Scotts Flat
BY56	Greenhorn Cr bl SF Greenhorn Cr nr Nevada City	USDA–FS	Bear River	Greenhorn Cr	Scotts Flat
BY51	Greenhorn Cr nr headwaters nr Scotts Flat Reservoir	USDA–FS	Bear River	Greenhorn Cr	Scotts Flat
BY146	Missouri Cyn 1.6 mi ab Greenhorn Cr nr Chicago Park	BLM	Bear River	Missouri Cyn	You Bet/Red Dog
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	Private	Bear River	Greenhorn Cr	You Bet/Red Dog
BY145	Missouri Cyn Cr tributary nr Chicago Park	BLM	Bear River	Missouri Cyn	You Bet/Red Dog
BY147	NF MF Missouri Cyn nr Chicago Park	BLM	Bear River	Missouri Cyn	You Bet/Red Dog
BY86	Poore Mine creek ab tunnel nr Grass Valley	BLM	Bear River	Greenhorn Cr	Hunts Hill
BY87	Poore Mine creek bl tunnel nr Grass Valley	BLM	Bear River	Greenhorn Cr	Hunts Hill
BY88	Poore Mine ground sluice nr Grass Valley	BLM	Bear River	Greenhorn Cr	Hunts Hill
BY89	Poore Mine pit lake nr Grass Valley	BLM	Bear River	Greenhorn Cr	Hunts Hill
BY90	Poore Mine seep above ground sluice nr Grass Valley	BLM	Bear River	Greenhorn Cr	Hunts Hill
BY91	Poore Mine tunnel effluent nr Grass Valley	BLM	Bear River	Greenhorn Cr	Hunts Hill
BY105	Sailor Flat Mine main drain Gulch 01 nr Quaker Hill	USDA–FS	Bear River	Greenhorn Cr	Sailor Flat
BY106	Sailor Flat Mine main drainage to Greenhorn Cr, Gulch 03	BLM	Bear River	Greenhorn Cr	Sailor Flat
BY114	SF Greenhorn Cr 0.7 mi ab Greenhorn Cr nr Nevada City	USDA–FS	Bear River	SF Greehnorn Cr	Red Dog
BY113	SF Greenhorn Cr 0.8 mi ab Greenhorn Cr nr Nevada City	USDA–FS	Bear River	SF Greehnorn Cr	Red Dog
BY115	SF Greenhorn Cr bl Boston Mine nr Nevada City	USDA–FS	Bear River	SF Greehnorn Cr	Red Dog
BY122	Starr Mine tunnel inflow nr Grass Valley	Private	Bear River	Greenhorn Cr	Red Dog
BY123	Starr Mine tunnel midway nr Grass Valley	Private	Bear River	Greenhorn Cr	Red Dog
BY124	Starr Mine tunnel outlet nr Grass Valley	Private	Bear River	Greenhorn Cr	Red Dog
BY148	Starr Pit pond nr Grass Valley	Private	Bear River	Greenhorn Cr	Red Dog
BY129	Tom and Jerry Mine drain at tunnel inlet nr Nevada City	USDA–FS	Bear River	Greenhorn Cr	Sailor Flat
BY130	Tom and Jerry Mine drain at tunnel outlet nr Nevada City	USDA–FS	Bear River	Greenhorn Cr	Sailor Flat
BY131	Tom and Jerry Mine drainage pond nr Nevada City	USDA–FS	Bear River	Greenhorn Cr	Sailor Flat

Table C2. Characteristics of tunnels at hydraulic mines in the Greenhorn Creek drainage, Nevada County, California.

[Mining districts based on classification by Clark (1963). Bearing indicates direction of travel when entering tunnel. O, open; B, blocked; Cr, Creek; N, north; PB, partially blocked; S, south; E, east; W, west; USDA–FS, United States Department of Agriculture–Forest Service; FS, Forest Service; BLM, Bureau of Land Management; Hg, mercury. gal/min, gallon per minute; —, not determined; ≥, greater than or equal to]

Map ID (fig. A1)	Tunnel	Alternate name	Mining district	Tunnel inlet			Tunnel outlet			Length (feet)	Condition (open/ blocked)		Notes	Visible mercury	Discharge, gal/min (date)	Land status
				Latitude	Longitude	Bearing	Latitude	Longitude	Bearing		Outlet	Inlet				
A	Sailor Flat East	Tom and Jerry	Scotts Flat	39°16′27″	120°52′49″	S80W	39°16′27″	120°52′48″	N80E	110	O	O	Tunnel removed during site restoration in 2003	yes	10 (3/15/00)	USDA–FS
B	Buckeye FS North		Scotts Flat	39°14′53″	120°53′48″	N85W	—	—	S83W	—	O	O	Extensive ground sluices leading to tunnel	trace	10 (4/9/01) ponded (10/18/01) ponded (9/9/03)	USDA–FS
C	Buckeye N		Scotts Flat	39°14′44″	120°53′32″	N85W	39°14′43″	120°53′40″	S80E	—	O	O	Extensive ground sluices leading to tunnel; low pH (3.4)	trace	7.5 (6/18/99) 4.8 (8/22/00) ponded (9/8/03)	USDA–FS
D	Buckeye S		Scotts Flat	—	—	S40W	39°14′17″	120°53′33″	N40E	—	O	B	Small pit lake and wetlands at blocked inlet	no	0.5 (8/22/00) 0.2 (9/9/03)	USDA–FS
E	Boston	California Placer Mine Lot 80	Red Dog	—	—	N30E	39°13′46″	120°54′09″	S30W	≥185	O	B	Seasonal pit lake at blocked inlet	yes - abundant Hg panned	2.5 (6/18/99) 6 (12/14/99) 1 (9/8/03)	BLM
F	Boston S	California Placer Mine Lot 80	Red Dog	—	—	—	39°13′39″	120°54′11″	S75W	≥160	O	B	Blocked by muck from roof cave-in; thin mud layer on tunnel floor	yes		BLM
G	Darling Cr N		Red Dog	39°13′43″	120°53′40″	S30W	—	—	—	≥300	O	O	Outlet end of tunnel filled with sediment	trace	1 (4/7/03)	BLM
H	Darling Cr S	Hussey Diggins	Red Dog	39°13′37″	120°53′37″	N5E	—	—	—	≥130	O	O	Tunnel complex extending from base of Chalk Bluff to Darling Cr	trace	2 (4/7/03)	Private
J	Missouri Canyon	Arkansas Ravine	Red Dog	39°13′08″	120°54′25″	N20E	39°13′10″	120°54′25″	S20W	—	O	O	Two short tunnels drain west side of Red Dog pit near old cemetary	trace	dry (9/8/03)	BLM

Table C2. Characteristics of tunnels at hydraulic mines in the Greenhorn Creek drainage, Bear River watershed, California—*Continued*.

[Mining districts based on classification by Clark (1963). Bearing indicates direction of travel when entering tunnel. O, open; B, blocked; Cr, Creek; N, north; PB, partially blocked; S, south; E, east; W, west; USDA–FS, United States Department of Agriculture–Forest Service; FS, Forest Service; BLM, Bureau of Land Management; Hg, mercury. gal/min, gallon per minute; —, not determined; ≥, greater than or equal to]

Map ID (fig. A1)	Tunnel	Alternate name	Mining district	Tunnel inlet			Tunnel outlet			Length (feet)	Condition (open/ blocked)		Notes	Visible mercury	Discharge, gal/min (date)	Land status
				Latitude	Longitude	Bearing	Latitude	Longitude	Bearing		Outlet	Inlet				
K	Red Dog Lot 81	Red Dog Lot 81	Red Dog	39°13′14″	120°54′23″	—	39°13′13″	120°54′23″	N20W	≥55	O	O	Water flows into tunnel inlet when pond fills to top of dam, then spills over top	trace	3.5 (4/7/03)	BLM
L	Starr Tunnel (Main)	Birdseye	Red Dog	39°13′23″	120°54′20″	N10E	39°13′29″	120°54′33″	S85E	≥900	O	O	Numerous seasonal pit lakes within extensive ground sluice network; remnant sluice box in tunnel	yes - abundant Hg panned	15 (12/15/99) 3 (9/8/03)	Private
M	Starr Tunnel (SW)		Red Dog	—	—	—	39°13′28″	120°54′35″	S72E	—	PB	B	75% blocked		5 (2/21/03) dry (9/8/03)	Private
P	Poore	Gouge Eye	Hunts Hill (Scotts Flat)	—	—	—	39°13′45″	120°54′40″	N25E	—	O	B	Seasonal pit lake at blocked inlet	trace	5 (1/17/99) 10 (12/15/99)	BLM
Q	Sargent Jacobs	Gas Canyon	Quaker Hill (Scotts Flat)	—	—	—	39°14′38″	120°54′24″	N70W	—	O	B	Drift tunnel with abundant discharge in Gas Canyon		20 (9/9/03)	Private
R	Upper Missouri Canyon	Hussey Diggins	Red Dog	39°13′03″	120°53′04″	N80W	39°13′04″	120°53′05″	S85E	≥150	B	O	Inlet end of tunnel filled with sediment	trace	1 (4/7/03)	Private

Table C3. Descriptions of photographs of sampling stations, Greenhorn Creek drainage, Nevada County, California.

[Station name abbreviations: ab, above; bl, below; Cr, Creek; Cyn, Canyon; mi, mile; nr, near; Rd, Road; ***, not USGS station. SWRCB, State Water Resources Control Board]

Station map ID	Station name	Photograph description	Figure number
Headwaters			
BY51	Greenhorn Cr nr headwaters nr Scotts Flat Reservoir		A1
Sailor Flat / Tom and Jerry			
BY105	Sailor Flat Mine main drain gulch 01 nr Quaker Hill	Elemental mercury on bedrock in plunge pool at interface between metamorphic bedrock and alluvium. Major divisions on ruler are one inch; total length of ruler approximately 4.8 inches.	A2
BY106	Sailor Flat Mine main drainage to Greenhorn Cr, gulch 03	Rick Humphreys (SWRCB) panning sediment in drainage gulch	A3
BY130	Tom and Jerry Mine drain at tunnel outlet nr Nevada City	Looking at drain tunnel outlet from inside tunnel	A4
Buckeye			
BY22	Buckeye Flat Mine drain 0.1 mi ab Greenhorn Cr	Buckeye Flat Mine, main drainage at Greenhorn Cr	A5
***	Buckeye Flat Mine	Pit lake	A26
Boston Mine			
BY20	Boston Mine tunnel outlet nr Grass Valley	Elemental mercury beads on bedrock in plunge pool below tunnel	A6
BY20	Boston Mine tunnel outlet nr Grass Valley	Historical photo of hydraulic mining operations at the Boston Mine	A7
BY20	Boston Mine tunnel outlet nr Grass Valley	Boston Mine discharge	A8
Poore Mine			
BY88	Poore Mine ground sluice nr Grass Valley	Iron precipitate in ground sluice	A9
BY89	Poore Mine pit lake nr Grass Valley	Small pit lake in bottom of Poore Mine hydraulic pit	A10
BY91	Poore Mine tunnel effluent nr Grass Valley	Poore Mine drainage tunnel outlet	A11
Starr Mine			
BY122	Starr Mine tunnel inflow nr Grass Valley	Water flowing toward tunnel in bottom of Starr pit; note truck on right for scale	A12
BY123	Starr Mine tunnel midway nr Grass Valley	Remnant sluice support railing (horizontal feature in top third of photograph) and sediments	A13
BY124	Starr Mine tunnel outlet nr Grass Valley	Old “mine rail” riffles from bottom of sluice near tunnel outlet	A14
BY148	Starr pit pond nr Grass Valley	Flooded pit floor and ground sluice visible on left	A15
Missouri Canyon			
BY146	Missouri Cyn 1.6 mi ab Greenhorn Cr nr Chicago Park	Ground sluice in bottom of Missouri Canyon	A16
BY75	Missouri Cyn Cr 1.2 mi ab Greenhorn Cr nr Chicago Park	Old ground sluice above Missouri Canyon Creek	A17
Greenhorn Creek–Main stem			
BY180	Greenhorn Cr 0.2 mi bl the Narrows	Flood incision in gravels at Narrows	A20
BY180	Greenhorn Cr 0.2 mi bl the Narrows	Flood incision in gravels, looking downstream	A21
BY52	Greenhorn Cr 0.3 mi ab Buckeye Ford nr Nevada City	Confluence of Gas Canyon and Greenhorn Cr	A23
BY60	Greenhorn Cr bl Buckeye drain nr Nevada City	Debris fan of tailings from Buckeye Flat Mine visible at top	A24
***	Greenhorn Cr	Hunts Hill tunnel outlet, near Buckeye Ford	A22
***	Greenhorn Cr	Greenhorn Cr at Red Dog Road Crossing	A25
Integrator			
BY59	Greenhorn Cr at You Bet Road nr Nevada City	Sampling water, Greenhorn Cr below You Bet Road	A18
BY59	Greenhorn Cr at You Bet Road nr Nevada City	Little Greenhorn Cr entering Greenhorn Cr upstream of You Bet Road	A19

Appendix D. Quality Assurance and Quality Control Information for Chemical Analyses of Samples from the Greenhorn Creek Drainage, Nevada County, California

Table D1. Trace elements analyzed by inductively coupled plasma–mass spectrometry, and corresponding median detection limits.

[Elements defined in front matter and in Tables 4A and 4B. n, number of analyses during 1999–2001. µg/L, microgram per liter]

Element	Dectection limit (µg/L)	n
Al	0.2	419
As	0.05	415
B	11	420
Ba	0.02	446
Be	0.03	459
Bi	0.003	447
Cd	0.009	430
Ce	0.0005	449
Co	0.007	447
Cr	0.3	432
Cs	0.01	442
Cu	0.03	445
Dy	0.001	472
Er	0.0009	467
Eu	0.0005	476
Gd	0.001	463
Ho	0.0002	471
La	0.0007	452
Li	0.07	421
Lu	0.0002	466
Mn	0.06	436
Mo	0.03	442
Nd	0.001	464
Ni	0.03	443
Pb	0.008	399
Pr	0.0004	472
Rb	0.003	449
Re	0.001	475
Sb	0.004	450
Se	0.4	423
Sm	0.002	474
Sr	0.1	434
Tb	0.0003	469
Te	0.02	462
Th	0.0006	436
Tl	0.005	439
Tm	0.0003	460
U	0.001	453
V	0.1	414
Y	0.0008	451
Yb	0.0007	472
Zn	0.2	425
Zr	0.003	444

Table D2. Selected trace elements and regression correlation coefficients (R^2) for correlation plots of observed versus reported values of analyses of standard reference materials.

Element	R^2
Al	0.9995
As	0.9996
B	0.9903
Ba	0.9986
Be	1.000
Cd	0.9999
Co	0.9996
Cr	0.9995
Cu	0.9974
Li	0.9997
Mn	0.9881
Mo	0.9998
Ni	0.9980
Pb	0.9999
Sb	1.000
Se	0.9955
Sr	0.9998
Tl	0.9989
U	0.9965
V	0.9998
Zn	0.9994

Table D3. Data for total mercury in blanks.

[value, mean of triplicate analyses; MilliQ is water deionization unit manufactured by Millipore, Inc.; s.d., standard deviation of triplicate analyses; ng/L, nanogram per liter; <, less than]

Blank type	Replicate	Date	Time	Total mercury	
				value (ng/L)	s.d. (ng/L)
Source Blank - Deionized Water - MilliQ	1 of 2	11/30/99	11:00	3.3	0.2
Source Blank - Deionized Water - MilliQ	2 of 2	11/30/99	11:00	2.1	0.4
Equipment Blank - Teflon-lined Churn	1 of 2	12/1/99	10:30	3.8	0.0
Equipment Blank - Teflon-lined Churn	2 of 2	12/1/99	10:30	<0.6	0.3
Equipment Blank - Teflon-lined Churn	1 of 1	1/26/00	5:00	0.9	0.2
Equipment Blank - Churn #5	1 of 1	1/26/00	5:00	1.2	0.1
Equipment Blank - Jerrican BY01	1 of 1	1/26/00	5:00	0.5	0.4
Equipment Blank - Jerrican BY02	1 of 1	1/26/00	5:00	<0.6	0.0
Equipment Blank - Jerrican BY03	1 of 1	1/26/00	5:00	<0.6	0.1
Equipment Blank - MilliQ Holding Bottle	1 of 1	1/26/00	5:00	1.6	0.1
Equipment Blank - Holding Bottle #4	1 of 1	1/26/00	5:00	0.8	0.3
Process Blank - Churn 2 FB-C2	1 of 1	2/27/00	10:45	<0.4	0.2
Process Blank - Churn 2 FB-C2	1 of 1	2/28/00	11:30	<0.4	0.1

Table D4. Data for methylmercury in blanks.

[ng/L, nanogram per liter; <, less than; —, not determined)

Type of blank	Date	Time	Methylmercury	
			Unfiltered (ng/L)	Filtered (ng/L)
Equipment Blank - Churn # HT-1	6/17/1999	14:00	<0.04	—
Equipment Blank - Holding Bottle #4	6/17/1999	14:30	<0.04	—
Equipment Blank - Holding Bottle #3	8/21/2000	20:30	<0.04	—
Process Blank - Holding Bottle #2	8/21/2000	18:45	<0.04	—
Process Blank - Holding Bottle #4	8/21/2000	18:45	<0.04	—
Process Blank	6/6/2001	14:45	<0.04	0.04

Table D5. Data for trace elements in process blanks.

[value, mean of triplicate analyses; s.d., standard deviation of triplicate analyses. HCl, hydrochloric acid; HNO_3, nitric acid; µg/L, microgram per liter; mg/L, milligram per liter; —, not determined; <, less than]

Blank type	Date	Aluminum (Al) (µg/L)		Arsenic (As) (µg/L)		Boron (B) (µg/L)		Barium (Ba) (µg/L)		Beryllium (Be) (µg/L)		Bismuth (Bi) (µg/L)		Calcium (Ca) (mg/L)		Cadmium (Cd) (µg/L)	
		value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
Process blank- unfiltered - quartz still HCl	3/6/2000	2.4	0.9	<20	10	6	3	0.05	0.03	0.44	0.03	0.006	0.003	< 0.05	0.07	0.037	0.001
Process blank- filtered (Ultrex HCl)	3/7/2000	4.5	0.9	<20	10	<2	1	0.19	0.03	0.31	0.00	0.039	0.002	< 0.05	0.02	0.046	0.005
Process blank- unfiltered (Ultrex HCl)	3/7/2000	3.1	0.6	<20	10	4	2	0.13	0.01	0.21	0.02	0.018	0.003	0.06	0.05	0.026	0.003
Process blank- 1%HNO_3+HCl-pressure-new bottle	1/29/2001	33	1	<20	10	<400	100	0.61	0.06	<0.1	0.0	0.15	0.03	<0.1	0.1	<0.08	0.00
Process blank- 1%HNO_3+HCl-vacuum-new bottle	1/31/2001	5	1	<10	10	<40	10	0.14	0.03	<0.2	0.1	0.024	0.007	0.12	0.11	<0.08	0.04
Process blank - unfiltered (whole water)	6/11/2001	—	—	<30	20	<5	1	<0.06	0.02	<0.04	0.06	0.08	0.06	<0.05	0.03	<0.04	0.01
Filter blank	6/12/2001	—	—	<30	30	8	14	<0.06	0.01	<0.04	0.09	<0.03	0.01	0.09	0.12	<0.04	0.01
Filter blank	6/12/2001	—	—	<30	10	18	4	<0.06	0.05	<0.04	0.03	<0.03	0.01	0.09	0.10	<0.04	0.02
Process blank - unfiltered (whole water)	6/12/2001	—	—	<30	30	<5	6	<0.06	0.02	<0.04	0.02	<0.03	0.02	<0.05	0.01	<0.04	0.01
Process blank - unfiltered (whole water)	6/12/2001	—	—	<30	30	5	5	<0.06	0.05	<0.04	0.02	0.04	0.03	<0.05	0.01	<0.04	0.01
Process blank - unfiltered (whole water)	6/12/2001	—	—	<30	20	8	4	<0.06	0.04	<0.04	0.04	<0.03	0.01	<0.05	0.04	<0.04	0.01

Table D5. Data for trace elements in process blanks—*Continued*.

[value, mean of triplicate analyses; s.d., standard deviation of triplicate analyses. HCl, hydrochloric acid; HNO_3, nitric acid; µg/L, microgram per liter; mg/L, milligram per liter; —, not determined; <, less than]

Blank type	Date	Cerium (Ce) (µg/L)		Cobalt (Co) (µg/L)		Chromium (Cr) (µg/L)		Cesium (Cs) (µg/L)		Copper (Cu) (µg/L)		Dysprosium (Dy) (µg/L)		Erbium (Er) (mg/L)		Europium (Eu) (µg/L)	
		value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
Process blank- unfiltered - quartz still HCl	3/6/2000	0.002	0.003	0.16	0.01	<0.4	0.6	<0.2	0.0	0.16	0.02	<0.003	0.000	<0.006	0.000	<0.001	0.001
Process blank- filtered (Ultrex HCl)	3/7/2000	0.005	0.007	0.45	0.01	<0.4	0.3	<0.2	0.1	0.19	0.03	<0.003	0.000	<0.006	0.004	<0.001	0.001
Process blank- unfiltered (Ultrex HCl)	3/7/2000	0.004	0.005	0.34	0.03	<0.4	0.4	<0.2	0.0	0.09	0.00	<0.003	0.002	<0.006	0.004	<0.001	0.001
Process blank- 1%HNO_3+HCl-pressure-new bottle	1/29/2001	0.16	0.02	<0.02	0.01	<2	1	0.17	0.06	3.2	0.1	0.007	0.002	<0.004	0.003	0.003	0.001
Process blank- 1%HNO_3+HCl-vacuum-new bottle	1/31/2001	0.021	0.004	<0.03	0.02	<1	1	<0.08	0.01	0.8	0.4	<0.003	0.004	0.003	0.002	0.002	0.001
Process blank - unfiltered (whole water)	6/11/2001	0.011	0.003	<0.03	0.01	1.5	0.7	<0.2	0.0	1.1	0.2	<0.005	0.001	<0.002	0.001	<0.002	0.001
Filter blank	6/12/2001	0.005	0.000	<0.03	0.02	<0.7	0.2	<0.2	0.0	0.8	0.0	<0.005	0.002	0.003	0.002	<0.002	0.001
Filter blank	6/12/2001	0.007	0.001	<0.03	0.02	<0.7	0.1	0.3	0.2	0.8	0.1	<0.005	0.002	0.002	0.001	<0.002	0.001
Process blank - unfiltered (whole water)	6/12/2001	0.010	0.004	<0.03	0.02	0.7	0.3	2.5	2.7	0.8	0.2	<0.005	0.001	<0.002	0.002	<0.002	0.001
Process blank - unfiltered (whole water)	6/12/2001	0.007	0.004	<0.03	0.02	1.6	0.6	0.3	0.1	0.9	0.1	<0.005	0.002	<0.002	0.001	<0.002	0.001
Process blank - unfiltered (whole water)	6/12/2001	0.008	0.003	<0.03	0.01	1.1	0.4	<0.2	0.2	0.9	0.1	<0.005	0.002	<0.002	0.002	<0.002	0.001

Table D5. Data for trace elements in process blanks—*Continued*.

[value, mean of triplicate analyses; s.d., standard deviation of triplicate analyses. µg/L, microgram per liter; mg/L, milligram per liter; —, not determined; <, less than]

Blank type	Date	Iron (Fe) (µg/L)		Gadolinium (Gd) (µg/L)		Holmium (Ho) (µg/L)		Potassium (K) (mg/L)		Lanthanum (La) (µg/L)		Lithium (Li) (µg/L)		Lutetium (Lu) (µg/L)		Magnesium (Mg) (mg/L)	
		value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
Process blank- unfiltered - quartz still HCl	3/6/2000	7	0	<0.004	0.001	<0.001	0.001	<0.03	0.01	<0.002	0.001	0.07	0.00	<0.001	0.001	0.06	0.02
Process blank- filtered (Ultrex HCl)	3/7/2000	10	13	<0.004	0.001	<0.001	0.000	<0.03	0.02	0.002	0.002	0.06	0.04	<0.001	0.001	<0.04	0.02
Process blank- unfiltered (Ultrex HCl)	3/7/2000	6	12	<0.004	0.002	<0.001	0.000	<0.03	0.03	<0.002	0.002	0.06	0.02	<0.001	0.001	<0.04	0.05
Process blank-1%HNO_3+HCl-pressure-new bottle	1/29/2001	35	1	0.006	0.004	<0.001	0.000	<0.06	0.03	0.095	0.004	0.3	0.1	<0.001	0.000	<0.1	0.0
Process blank-1%HNO_3+HCl-vacuum-new bottle	1/31/2001	13	11	<0.004	0.002	<0.009	0.0003	<0.08	0.01	0.010	0.002	0.5	0.1	<0.0006	0.0005	0.04	0.04
Process blank - unfiltered (whole water)	6/11/2001	7	3	<0.006	0.002	<0.008	0.0007	<0.02	0.01	<0.004	0.001	<0.1	0.1	<0.0007	0.0002	<0.07	0.07
Filter blank	6/12/2001	15	15	<0.006	0.001	<0.008	0.0005	0.02	0.03	<0.004	0.001	<0.1	0.1	<0.0007	0.0007	<0.07	0.00
Filter blank	6/12/2001	14	14	<0.006	0.003	<0.008	0.0006	0.04	0.04	<0.004	0.001	<0.1	0.2	<0.0007	0.0003	<0.07	0.02
Process blank - unfiltered (whole water)	6/12/2001	3	1	<0.006	0.001	<0.008	0.0010	<0.02	0.01	<0.004	0.001	0.2	0.1	<0.0007	0.0004	<0.07	0.00
Process blank - unfiltered (whole water)	6/12/2001	6	2	<0.006	0.002	<0.008	0.0004	<0.02	0.01	<0.004	0.001	0.2	0.1	<0.0007	0.0006	<0.07	0.06
Process blank - unfiltered (whole water)	6/12/2001	6	4	<0.006	0.001	<0.008	0.0004	<0.02	0.01	<0.004	0.001	0.4	0.0	<0.0007	0.0007	<0.07	0.04

Table D5. Data for trace elements in process blanks—*Continued*.

[value, mean of triplicate analyses; s.d., standard deviation of triplicate analyses. µg/L, microgram per liter; mg/L, milligram per liter; —, not determined; <, less than]

Blank type	Date	Manganese (Mn) (µg/L)		Molybdenium (Mo) (µg/L)		Sodium (Na) (mg/L)		Neodymium (Nd) (µg/L)		Nickel (Ni) (µg/L)		Lead (Pb) (µg/L)		Praseodymium (Pr) (µg/L)		Rubidium (Rb) (µg/L)	
		value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
Process blank- unfiltered - quartz still HCl	3/6/2000	0.9	1.1	0.15	0.13	<0.1	0.0	<0.004	0.002	0.24	0.04	0.10	0.05	<0.001	0.000	0.007	0.004
Process blank- filtered (Ultrex HCl)	3/7/2000	<0.6	0.2	0.14	0.09	<0.1	0.1	<0.004	0.006	0.11	0.02	0.05	0.01	<0.001	0.001	0.051	0.005
Process blank- unfiltered (Ultrex HCl)	3/7/2000	<0.6	0.3	<0.06	0.07	<0.1	0.1	0.007	0.004	0.06	0.01	0.03	0.00	<0.001	0.001	0.038	0.002
Process blank-1%HNO_3+HCl-pressure-new bottle	1/29/2001	<0.2	0.2	0.6	0.7	0.07	0.01	0.067	0.007	1.4	0.1	2.1	0.1	0.018	0.000	0.08	0.01
Process blank-1%HNO_3+HCl-vacuum-new bottle	1/31/2001	<0.4	0.1	0.1	0.0	0.079	0.027	0.007	0.006	0.5	0.1	<0.1	0.0	0.003	0.001	0.028	0.002
Process blank - unfiltered (whole water)	6/11/2001	0.7	0.4	0.2	0.2	<0.02	0.05	<0.005	0.003	1.9	0.1	<0.2	0.1	<0.002	0.001	<0.02	0.03
Filter blank	6/12/2001	0.7	0.1	<0.2	0.2	0.33	0.39	<0.005	0.003	1.2	0.0	<0.2	0.1	<0.002	0.001	<0.02	0.01
Filter blank	6/12/2001	0.6	0.2	<0.2	0.2	0.35	0.40	<0.005	0.005	1.3	0.1	<0.2	0.0	<0.002	0.000	<0.02	0.01
Process blank - unfiltered (whole water)	6/12/2001	<0.5	0.3	0.4	0.6	<0.02	0.04	<0.005	0.002	2.0	0.2	<0.2	0.1	<0.002	0.000	<0.02	0.01
Process blank - unfiltered (whole water)	6/12/2001	<0.5	0.1	0.5	0.7	0.10	0.04	<0.005	0.002	1.6	0.3	<0.2	0.1	<0.002	0.001	0.02	0.01
Process blank - unfiltered (whole water)	6/12/2001	<0.5	0.1	<0.2	0.3	0.21	0.07	<0.005	0.004	1.5	0.0	<0.2	0.2	<0.002	0.000	0.03	0.01

Table D5. Data for trace elements in process blanks—*Continued*.

[value, mean of triplicate analyses; s.d., standard deviation of triplicate analyses. µg/L, microgram per liter; mg/L, milligram per liter; —, not determined; <, less than]

Blank type	Date	Rhenium (Re) (µg/L)		Sulfur (S) (mg/L)		Antimony (Sb) (µg/L)		Selenium (Se) (µg/L)		Silica (SiO_2) (mg/L)		Samarium (Sm) (µg/L)		Strontium (Sr) (µg/L)		Terbium (Tb) (µg/L)	
		value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
Process blank- unfiltered - quartz still HCl	3/6/2000	<0.002	0.002	<0.1	0.1	0.020	0.012	<0.2	0.6	<0.2	0.0	<0.006	0.002	<0.07	0.06	<0.001	0.000
Process blank- filtered (Ultrex HCl)	3/7/2000	<0.002	0.002	<0.1	0.1	0.021	0.005	<0.2	0.1	<0.2	0.0	<0.006	0.001	0.09	0.04	<0.001	0.000
Process blank- unfiltered (Ultrex HCl)	3/7/2000	<0.002	0.001	<0.1	0.0	0.012	0.005	<0.2	0.1	<0.2	0.1	<0.006	0.005	<0.07	0.04	<0.001	0.001
Process blank-1%HNO_3+HCl-pressure-new bottle	1/29/2001	<0.003	0.001	<0.2	0.0	0.08	0.03	<0.7	1.3	<0.3	0.2	0.010	0.005	<0.2	0.2	0.003	0.0001
Process blank-1%HNO_3+HCl-vacuum-new bottle	1/31/2001	0.002	0.001	0.10	0.15	0.078	0.035	<1	1	<0.2	0.1	<0.007	0.003	<0.3	0.1	<0.001	0.000
Process blank - unfiltered (whole water)	6/11/2001	<0.002	0.001	<0.2	0.1	<0.03	0.01	<2	0	<0.05	0.04	<0.005	0.002	<0.3	0.2	<0.001	0.001
Filter blank	6/12/2001	<0.002	0.001	<0.2	0.1	<0.03	0.02	<2	1	0.07	0.11	<0.005	0.001	<0.3	0.1	<0.001	0.000
Filter blank	6/12/2001	<0.002	0.001	<0.2	0.0	<0.03	0.02	<2	0	<0.05	0.06	<0.005	0.001	<0.3	0.1	<0.001	0.001
Process blank - unfiltered (whole water)	6/12/2001	<0.002	0.000	<0.2	0.1	<0.03	0.03	<2	0	0.07	0.10	<0.005	0.003	<0.3	0.1	<0.001	0.001
Process blank - unfiltered (whole water)	6/12/2001	<0.002	0.000	<0.2	0.0	0.13	0.01	<2	1	<0.05	0.03	<0.005	0.001	<0.3	0.2	<0.001	0.000
Process blank - unfiltered (whole water)	6/12/2001	<0.002	0.001	<0.2	0.1	<0.03	0.01	<2	0	<0.05	0.02	<0.005	0.001	<0.3	0.0	<0.001	0.000

Table D5. Data for trace elements in process blanks—*Continued*.

[value, mean of triplicate analyses; s.d., standard deviation of triplicate analyses. µg/L, microgram per liter; mg/L, milligram per liter; —, not determined; <, less than]

Blank type	Date	Tellurium (Te) (µg/L)		Thorium (Th) (µg/L)		Thallium (Tl) (µg/L)		Thulium (Tm) (µg/L)		Uranium (U) (µg/L)		Vanadium (V) (µg/L)	
		value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
Process blank- unfiltered - quartz still HCl	3/6/2000	<0.05	0.02	<0.005	0.002	0.004	0.008	<0.001	0.000	<0.002	0.000	<2	1
Process blank- filtered (Ultrex HCl)	3/7/2000	<0.05	0.01	<0.005	0.002	<0.003	0.002	<0.001	0.001	<0.002	0.002	<2	0
Process blank- unfiltered (Ultrex HCl)	3/7/2000	<0.05	0.02	<0.005	0.002	<0.003	0.003	<0.001	0.001	<0.002	0.000	<2	1
Process blank-1%HNO_3+HCl-pressure-new bottle	1/29/2001	<0.1	0.0	0.004	0.000	<0.02	0.02	<0.0005	0.0001	0.010	0.001	<1	0
Process blank-1%HNO_3+HCl-vacuum-new bottle	1/31/2001	<0.08	0.06	0.006	0.002	<0.02	0.00	<0.0008	0.0003	0.0049	0.0048	<1	1
Process blank - unfiltered (whole water)	6/11/2001	<0.03	0.02	<0.002	0.001	<0.01	0.00	<0.001	0.000	<0.005	0.006	<2	1
Filter blank	6/12/2001	<0.03	0.06	<0.002	0.000	<0.01	0.02	<0.001	0.001	<0.005	0.005	<2	1
Filter blank	6/12/2001	<0.03	0.01	<0.002	0.001	<0.01	0.01	<0.001	0.001	<0.005	0.001	<2	1
Process blank - unfiltered (whole water)	6/12/2001	<0.03	0.03	<0.002	0.001	<0.01	0.01	<0.001	0.001	<0.005	0.003	<2	0
Process blank - unfiltered (whole water)	6/12/2001	<0.03	0.01	<0.002	0.001	<0.01	0.02	<0.001	0.001	<0.005	0.002	<2	0
Process blank - unfiltered (whole water)	6/12/2001	<0.03	0.05	<0.002	0.001	<0.01	0.01	<0.001	0.000	<0.005	0.003	<2	1

Table D5. Data for trace elements in process blanks—*Continued*.

[value, mean of triplicate analyses; s.d., standard deviation of triplicate analyses. µg/L, microgram per liter; mg/L, milligram per liter; —, not determined; <, less than]

Blank type	Date	Yttrium (Y) (µg/L)		Ytterbium (Yb) (µg/L)		Zinc (Zn) (µg/L)		Zirconium (Zr) (µg/L)	
		value	s.d.	value	s.d.	value	s.d.	value	s.d.
Process blank- unfiltered - quartz still HCl	3/6/2000	0.009	0.001	<0.002	0.001	11	1	0.018	0.002
Process blank- filtered (Ultrex HCl)	3/7/2000	0.007	0.004	<0.002	0.001	2.4	0.3	0.080	0.008
Process blank- unfiltered (Ultrex HCl)	3/7/2000	0.005	0.001	<0.002	0.001	1.8	0.1	0.054	0.006
Process blank-1%HNO_3+HCl-pressure-new bottle	1/29/2001	0.028	0.004	<0.003	0.003	40	1	0.03	0.01
Process blank-1%HNO_3+HCl-vacuum-new bottle	1/31/2001	0.003	0.001	0.002	0.002	2.6	0.5	0.013	0.003
Process blank - unfiltered (whole water)	6/11/2001	0.002	0.000	<0.003	0.002	3	0	<0.01	0.00
Filter blank	6/12/2001	<0.001	0.001	<0.003	0.003	<2	1	<0.01	0.00
Filter blank	6/12/2001	<0.001	0.001	<0.003	0.000	3	1	<0.01	0.01
Process blank - unfiltered (whole water)	6/12/2001	<0.001	0.001	<0.003	0.001	<2	1	<0.01	0.00
Process blank - unfiltered (whole water)	6/12/2001	<0.001	0.001	<0.003	0.001	3	3	<0.01	0.01
Process blank - unfiltered (whole water)	6/12/2001	<0.001	0.000	<0.003	0.001	3	0	<0.01	0.00

Table D6. Data for trace elements in source blanks and equipment blanks.

[value, mean of triplicate analyses; MilliQ is a water deionization unit manufactured by Millipore, Inc.; s.d., standard deviation of triplicate analyses. µg/L, microgram per liter; mg/L, milligram per liter; —, not determined; <, less than]

Blank type	Date	Aluminum (Al) (µg/L)		Arsenic (As) (µg/L)		Boron (B) (µg/L)		Barium (Ba) (µg/L)		Beryllium (Be) (µg/L)	
		value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
Equipment blank-1L poly	2/10/1999	<0.1	0.17	<0.01	0.01	<1	0	<0.01	0.02	<0.01	0.01
Source blank-MilliQ	2/10/1999	<0.1	0.25	<0.01	0.01	<1	1	<0.01	0.01	<0.01	0.01
Equipment blank-churn	2/12/1999	0.24	0.2	<0.01	0.01	<1	0	0.02	0.01	<0.01	0
Process blank	2/21/1999	1.35	0.15	<0.02	0.02	<9	1	0.05	0	<0.02	0.01
Source blank-MilliQ	11/30/1999	<0.1	0	<0.01	0.01	4	3	<0.007	0.005	<0.005	0.001
Source blank-MilliQ	11/30/1999	<0.1	0.1	<0.01	0.01	7	1	<0.007	0.002	<0.005	0.004
Source blank-MilliQ	11/30/1999	<0.1	0.02	<0.01	0.01	4.35	2.98	<0.01	0.01	<0.01	0
Source blank-MilliQ	11/30/1999	<0.1	0.08	<0.01	0.01	7.45	1.1	<0.01	0	<0.01	0
Equipment blank-field-new churn	12/1/1999	<0.1	0	<0.01	0	2	2	<0.007	0.001	<0.005	0.004
Equipment blank-field-new churn	12/1/1999	0.4	0.5	<0.01	0	3	2	<0.007	0.004	<0.005	0.003
Equipment blank-field-new churn	12/1/1999	<0.1	0.03	<0.01	0	2.32	1.71	<0.01	0	<0.01	0
Equipment blank-field-new churn	12/1/1999	0.38	0.55	<0.01	0	2.88	1.92	<0.01	0	<0.01	0
Equipment blank-2L holding bottle #4	1/26/2000	<0.1	0.1	<0.01	0	3	3	<0.007	0.004	<0.005	0.006
Equipment blank-2L holding bottle #4	1/26/2000	<0.1	0.08	<0.01	0	3.42	2.87	<0.01	0	<0.01	0.01
Equipment blank-jerrican	1/26/2000	<0.1	0	<0.01	0.01	3	2	<0.007	0.002	<0.005	0.003
Equipment blank-jerrican	1/26/2000	<0.1	0	<0.01	0	<2	0	<0.007	0.002	<0.005	0.003
Equipment blank-jerrican	1/26/2000	<0.1	0.1	<0.01	0.01	3	2	<0.007	0.002	<0.005	0.004
Equipment blank-jerrican	1/26/2000	<0.1	0.01	<0.01	0.01	3.07	2.09	<0.01	0	<0.01	0
Equipment blank-jerrican	1/26/2000	<0.1	0.02	<0.01	0	<2	0	<0.01	0	<0.01	0
Equipment blank-jerrican	1/26/2000	<0.1	0.07	<0.01	0.01	3.17	1.87	<0.01	0	<0.01	0
Source blank-MilliQ	1/26/2000	<0.1	0	<0.01	0	<2	0	<0.007	0.001	<0.005	0.002
Source blank-MilliQ	1/26/2000	<0.1	0.04	<0.01	0	<2	0	<0.01	0	<0.01	0
Equipment blank-new Teflon churn	1/26/2000	<0.1	0	<0.01	0.01	<2	2	<0.007	0.004	<0.005	0.002
Equipment blank-new Teflon churn	1/26/2000	<0.1	0.01	<0.01	0.01	<2	2	<0.01	0	<0.01	0
Equipment blank-USGS churn #5	1/26/2000	<0.1	0	<0.01	0.01	<2	1	<0.007	0.005	<0.005	0.001
Equipment blank-USGS churn #5	1/26/2000	<0.1	0.03	<0.01	0.01	<2	1	<0.01	0	<0.01	0
Equipment blank-field churn #2	3/16/2000	<0.9	0.24	<0.1	0.03	<5	2	0.04	0.06	<0.05	0.05

Table D6. Data for trace elements in source blanks and equipment blanks—*Continued*.

[value, mean of triplicate analyses; MilliQ is a water deionization unit manufactured by Millipore, Inc.; s.d., standard deviation of triplicate analyses. µg/L, microgram per liter; mg/L, milligram per liter; —, not determined; <, less than]

Blank type	Date	Bismuth (Bi) (µg/L)		Calcium (Ca) (mg/L)		Cadmium (Cd) (µg/L)		Cerium (Ce) (µg/L)		Cobalt (Co) (µg/L)	
		value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
Equipment blank-1L poly	2/10/1999	—		0.03	0.04	—		—		—	
Source blank-MilliQ	2/10/1999	—		0.03	0.06	—		—		—	
Equipment blank-churn	2/12/1999	—		0.03	0.05	0.01	0	—		0.01	0.02
Process blank	2/21/1999	—		0.01	0	—		—		0.02	0
Source blank-MilliQ	11/30/1999	<0.002	0	0.15	0.17	<0.002	0	<0.0002	0.0001	<0.0008	0.0011
Source blank-MilliQ	11/30/1999	<0.002	0	<0.01	0	<0.002	0.001	<0.0002	0	<0.0008	0.0004
Source blank-MilliQ	11/30/1999	—		0.15	0.17	—		—		—	
Source blank-MilliQ	11/30/1999	—		<0.01	0	—		—		—	
Equipment blank-field-new churn	12/1/1999	<0.002	0.001	0.03	0.02	<0.002	0.001	<0.0002	0.0001	<0.0008	0.0002
Equipment blank-field-new churn	12/1/1999	<0.002	0	0.02	0.03	0.002	0.002	<0.0002	0.0001	<0.0008	0.0003
Equipment blank-field-new churn	12/1/1999	—		0.03	0.02	—		—		—	
Equipment blank-field-new churn	12/1/1999	—		0.02	0.03	—		—		—	
Equipment blank-2L holding bottle #4	1/26/2000	<0.002	0.001	0.05	0.08	<0.002	0.001	<0.0002	0.0001	<0.0008	0.0008
Equipment blank-2L holding bottle #4	1/26/2000	—		0.05	0.08	—		—		—	
Equipment blank-jerrican	1/26/2000	0.004	0	0.08	0.08	<0.002	0.001	<0.0002	0.0001	<0.0008	0.0002
Equipment blank-jerrican	1/26/2000	<0.002	0.002	0.02	0.02	<0.002	0.001	<0.0002	0.0002	<0.0008	0.0006
Equipment blank-jerrican	1/26/2000	<0.002	0	0.03	0.04	<0.002	0	<0.0002	0.0001	<0.0008	0.0002
Equipment blank-jerrican	1/26/2000	—		0.08	0.08	—		—		—	
Equipment blank-jerrican	1/26/2000	—		0.02	0.02	—		—		—	
Equipment blank-jerrican	1/26/2000	—		0.03	0.04	—		—		—	
Source blank-MilliQ	1/26/2000	<0.002	0.002	0.04	0.05	<0.002	0	<0.0002	0.0002	<0.0008	0.0003
Source blank-MilliQ	1/26/2000	—		0.04	0.05	—		—		—	
Equipment blank-new Teflon churn	1/26/2000	<0.002	0.001	0.04	0.03	<0.002	0.001	0.0002	0.0001	<0.0008	0.0003
Equipment blank-new Teflon churn	1/26/2000	—		0.04	0.03	—		—		—	
Equipment blank-USGS churn #5	1/26/2000	<0.002	0.001	<0.01	0.02	<0.002	0.001	<0.0002	0.0001	<0.0008	0.0004
Equipment blank-USGS churn #5	1/26/2000	—		<0.01	0.02	—		—		—	
Equipment blank-field churn #2	3/16/2000	—		<0.02	0.01	0.01	0	—		<0.01	0.01

Table D6. Data for trace elements in source blanks and equipment blanks—*Continued*.

[value, mean of triplicate analyses; MilliQ is a water deionization unit manufactured by Millipore, Inc.; s.d., standard deviation of triplicate analyses. µg/L, microgram per liter; mg/L, milligram per liter; —, not determined; <, less than]

Blank type	Date	Chromium (Cr) (µg/L)		Cesium (Cs) (µg/L)		Copper (Cu) (µg/L)		Dysprosium (Dy) (µg/L)		Erbium (Er) (µg/L)	
		value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
Equipment blank-1L poly	2/10/1999	<0.1	0.05	—		<0.03	0.01	—		—	
Source blank-MilliQ	2/10/1999	<0.1	0.03	—		<0.03	0.13	—		—	
Equipment blank-churn	2/12/1999	<0.1	0.03	—		<0.03	0.16	—		—	
Process blank	2/21/1999	0.4	0.15	—		0.05	0.05	—		—	
Source blank-MilliQ	11/30/1999	<0.1	0	<0.0009	0.0002	<0.04	0.02	<0.0006	0.0002	<0.0007	0.0004
Source blank-MilliQ	11/30/1999	<0.1	0	<0.0009	0	<0.04	0.01	<0.0006	0.0001	<0.0007	0.0001
Source blank-MilliQ	11/30/1999	<0.1	0.03	—		<0.04	0.02	—		—	
Source blank-MilliQ	11/30/1999	<0.1	0.04	—		<0.04	0.01	—		—	
Equipment blank-field-new churn	12/1/1999	<0.1	0	<0.0009	0.0002	<0.04	0.01	<0.0006	0.0002	<0.0007	0.0003
Equipment blank-field-new churn	12/1/1999	<0.1	0	0.0014	0.0016	<0.04	0.02	<0.0006	0.0002	<0.0007	0.0002
Equipment blank-field-new churn	12/1/1999	<0.1	0.02	—		<0.04	0.01	—		—	
Equipment blank-field-new churn	12/1/1999	<0.1	0.02	—		<0.04	0.02	—		—	
Equipment blank-2L holding bottle #4	1/26/2000	<0.1	0	<0.0009	0.0003	<0.04	0.01	<0.0006	0.0004	<0.0007	0.0003
Equipment blank-2L holding bottle #4	1/26/2000	<0.1	0.05	—		<0.04	0.01	—		—	
Equipment blank-jerrican	1/26/2000	<0.1	0	0.0011	0.0009	<0.04	0	<0.0006	0.0002	<0.0007	0.0002
Equipment blank-jerrican	1/26/2000	<0.1	0	<0.0009	0.0003	<0.04	0.02	<0.0006	0.0001	<0.0007	0.0001
Equipment blank-jerrican	1/26/2000	<0.1	0	<0.0009	0.0004	<0.04	0	<0.0006	0.0004	<0.0007	0.0001
Equipment blank-jerrican	1/26/2000	<0.1	0.01	—		<0.04	0	—		—	
Equipment blank-jerrican	1/26/2000	<0.1	0.03	—		<0.04	0.02	—		—	
Equipment blank-jerrican	1/26/2000	<0.1	0.04	—		<0.04	0	—		—	
Source blank-MilliQ	1/26/2000	<0.1	0	0.0022	0.0002	<0.04	0	<0.0006	0.0001	<0.0007	0.0002
Source blank-MilliQ	1/26/2000	<0.1	0.02	—		<0.04	0	—		—	
Equipment blank-new Teflon churn	1/26/2000	<0.1	0	<0.0009	0.0003	<0.04	0.01	<0.0006	0.0002	<0.0007	0.0003
Equipment blank-new Teflon churn	1/26/2000	<0.1	0.04	—		<0.04	0.01	—		—	
Equipment blank-USGS churn #5	1/26/2000	<0.1	0.1	<0.0009	0	<0.04	0.01	<0.0006	0.0001	<0.0007	0.0002
Equipment blank-USGS churn #5	1/26/2000	<0.1	0.08	—		<0.04	0.01	—		—	
Equipment blank-field churn #2	3/16/2000	<0.4	0.3	<0.5	0.13	0.16	0.11	—		—	

Table D6. Data for trace elements in source blanks and equipment blanks—*Continued*.

[value, mean of triplicate analyses; MilliQ is a water deionization unit manufactured by Millipore, Inc.; s.d., standard deviation of triplicate analyses. µg/L, microgram per liter; mg/L, milligram per liter; —, not determined; <, less than]

Blank type	Date	Europium (Eu) (µg/L)		Iron (Fe) (µg/L)		Gadolinium (Gd) (µg/L)		Holmium (Ho) (µg/L)		Potassium (K) (mg/L)	
		value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
Equipment blank-1L poly	2/10/1999	—		<2	0	—		—		0.01	0
Source blank-MilliQ	2/10/1999	—		<2	0	—		—		<0.01	0.01
Equipment blank-churn	2/12/1999	—		<2	1	—		—		<0.01	0
Process blank	2/21/1999	—		12.04	1.4	—		—		<0.01	0
Source blank-MilliQ	11/30/1999	<0.0002	0.0001	0.6	0.7	<0.0004	0.0001	<0.0001	0	0.007	0.01
Source blank-MilliQ	11/30/1999	<0.0002	0	0.5	0.4	<0.0004	0.0003	<0.0001	0	<0.006	0.009
Source blank-MilliQ	11/30/1999	—		0.6	0.66	—		—		0.01	0.01
Source blank-MilliQ	11/30/1999	—		0.45	0.45	—		—		<0.01	0.01
Equipment blank-field-new churn	12/1/1999	<0.0002	0.0002	<0.4	0	<0.0004	0.0001	<0.0001	0.0001	0.007	0.007
Equipment blank-field-new churn	12/1/1999	<0.0002	0.0001	<0.4	0.3	<0.0004	0.0001	<0.0001	0	<0.006	0.007
Equipment blank-field-new churn	12/1/1999	—		<0.4	0.03	—		—		0.01	0.01
Equipment blank-field-new churn	12/1/1999	—		<0.4	0.35	—		—		<0.01	0.01
Equipment blank-2L holding bottle #4	1/26/2000	<0.0002	0.0001	<0.4	0.1	0.0004	0.0001	<0.0001	0.0001	<0.006	0.003
Equipment blank-2L holding bottle #4	1/26/2000	—		<0.4	0.07	—		—		<0.01	0
Equipment blank-jerrican	1/26/2000	<0.0002	0.0001	<0.4	0.4	<0.0004	0.0001	<0.0001	0.0001	<0.006	0.004
Equipment blank-jerrican	1/26/2000	<0.0002	0.0001	1	1.1	<0.0004	0.0002	<0.0001	0.0001	<0.006	0.001
Equipment blank-jerrican	1/26/2000	<0.0002	0	<0.4	0.3	<0.0004	0.0002	<0.0001	0.0001	0.009	0.011
Equipment blank-jerrican	1/26/2000	—		<0.4	0.39	—		—		<0.01	0
Equipment blank-jerrican	1/26/2000	—		1.04	1.14	—		—		<0.01	0
Equipment blank-jerrican	1/26/2000	—		<0.4	0.31	—		—		0.01	0.01
Source blank-MilliQ	1/26/2000	<0.0002	0.0002	1	1.1	<0.0004	0.0003	<0.0001	0.0001	<0.006	0
Source blank-MilliQ	1/26/2000	—		1.01	1.07	—		—		<0.01	0
Equipment blank-new Teflon churn	1/26/2000	<0.0002	0	<0.4	0.1	<0.0004	0.0005	<0.0001	0.0001	0.007	0.006
Equipment blank-new Teflon churn	1/26/2000	—		<0.4	0.12	—		—		0.01	0.01
Equipment blank-USGS churn #5	1/26/2000	<0.0002	0.0001	<0.4	0.1	<0.0004	0.0002	<0.0001	0.0001	<0.006	0.004
Equipment blank-USGS churn #5	1/26/2000	—		<0.4	0.1	—		—		<0.01	0
Equipment blank-field churn #2	3/16/2000	—		0.81	0.79	—		—		<0.03	0.01

Table D6. Data for trace elements in source blanks and equipment blanks—*Continued.*

[value, mean of triplicate analyses; MilliQ is a water deionization unit manufactured by Millipore, Inc.; s.d., standard deviation of triplicate analyses. µg/L, microgram per liter; mg/L, milligram per liter; —, not determined; <, less than]

Blank type	Date	Lanthanum (La) (µg/L)		Lithium (Li) (µg/L)		Lutetium (Lu) (µg/L)		Magnesium (Mg) (mg/L)		Manganese (Mn) (µg/L)	
		value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
Equipment blank-1L poly	2/10/1999	—		<0.01	0.05	—		<0.03	0.02	0.04	0.05
Source blank-MilliQ	2/10/1999	—		<0.01	0.04	—		<0.03	0.01	<0.02	0.04
Equipment blank-churn	2/12/1999	—		<0.01	0.01	—		<0.03	0.04	0.4	0.26
Process blank	2/21/1999	—		<0.02	0.01	—		<0.01	0	0.51	0.2
Source blank-MilliQ	11/30/1999	<0.0004	0.0002	0.008	0.007	<0.0002	0	<0.0006	0.0004	0.009	0.003
Source blank-MilliQ	11/30/1999	<0.0004	0.0001	0.009	0.003	<0.0002	0	<0.0006	0.0005	0.01	0.001
Source blank-MilliQ	11/30/1999	—		0.01	0.01	—		—		0.01	0
Source blank-MilliQ	11/30/1999	—		0.01	0	—		—		0.01	0
Equipment blank-field-new churn	12/1/1999	<0.0004	0	0.005	0.003	<0.0002	0	<0.0006	0	0.003	0.001
Equipment blank-field-new churn	12/1/1999	<0.0004	0.0002	0.004	0.002	<0.0002	0.0001	<0.0006	0.0002	0.008	0.003
Equipment blank-field-new churn	12/1/1999	—		0.01	0	—		—		—	
Equipment blank-field-new churn	12/1/1999	—		—		—		—		0.01	0
Equipment blank-2L holding bottle #4	1/26/2000	<0.0004	0.0001	0.007	0.008	<0.0002	0	<0.0006	0	<0.002	0.003
Equipment blank-2L holding bottle #4	1/26/2000	—		0.01	0.01	—		—		—	
Equipment blank-jerrican	1/26/2000	<0.0004	0.0002	<0.004	0.003	<0.0002	0.0001	<0.0006	0.0002	0.004	0.001
Equipment blank-jerrican	1/26/2000	<0.0004	0.0001	0.007	0.007	<0.0002	0.0001	<0.0006	0.0001	<0.002	0.002
Equipment blank-jerrican	1/26/2000	<0.0004	0.0002	0.005	0.004	<0.0002	0	<0.0006	0.0001	0.006	0.005
Equipment blank-jerrican	1/26/2000	—		—		—		—		—	
Equipment blank-jerrican	1/26/2000	—		0.01	0.01	—		—		—	
Equipment blank-jerrican	1/26/2000	—		0.01	0	—		—		0.01	0.01
Source blank-MilliQ	1/26/2000	<0.0004	0.0001	<0.004	0.004	<0.0002	0.0001	<0.0006	0.0001	0.007	0.005
Source blank-MilliQ	1/26/2000	—		—		—		—		0.01	0
Equipment blank-new Teflon churn	1/26/2000	<0.0004	0.0002	0.006	0.004	<0.0002	0.0001	<0.0006	0.0002	0.013	0.008
Equipment blank-new Teflon churn	1/26/2000	—		0.01	0	—		—		0.01	0.01
Equipment blank-USGS churn #5	1/26/2000	<0.0004	0.0001	<0.004	0.005	<0.0002	0	<0.0006	0.0001	0.013	0.011
Equipment blank-USGS churn #5	1/26/2000	—		—		—		—		0.01	0.01
Equipment blank-field churn #2	3/16/2000	—		<0.2	0.05	—		<0.01	0.01	0.07	0.06

Table D6. Data for trace elements in source blanks and equipment blanks—*Continued*.

[value, mean of triplicate analyses; MilliQ is a water deionization unit manufactured by Millipore, Inc.; s.d., standard deviation of triplicate analyses. µg/L, microgram per liter; mg/L, milligram per liter; —, not determined; <, less than]

Blank type	Date	Molybdenum (Mo) (µg/L)		Sodium (Na) (mg/L)		Neodymium (Nd) (µg/L)		Nickel (Ni) (µg/L)		Lead (Pb) (µg/L)	
		value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
Equipment blank-1L poly	2/10/1999	0.02	0.02	<0.05	0.06	—		<0.05	0.12	—	
Source blank-MilliQ	2/10/1999	<0.02	0.01	0.05	0.03	—		<0.05	0.11	—	
Equipment blank-churn	2/12/1999	<0.02	0.01	<0.05	0.04	—		0.64	0.11	0.01	0.03
Process blank	2/21/1999	0.03	0.01	0.09	0.05	—		1.01	0.03	0.01	0
Source blank-MilliQ	11/30/1999	0.12	0.03	0.001	0.002	<0.0006	0.0004	0.01	0.004	0.007	0.004
Source blank-MilliQ	11/30/1999	0.05	0.06	0.026	0.006	0.0007	0.0001	0.006	0.003	0.006	0
Source blank-MilliQ	11/30/1999	0.12	0.03	—		—		0.01	0	0.01	0
Source blank-MilliQ	11/30/1999	0.05	0.06	0.03	0.01	—		0.01	0	0.01	0
Equipment blank-field-new churn	12/1/1999	<0.04	0.03	0.002	0.001	<0.0006	0.0004	0.003	0.002	<0.004	0.002
Equipment blank-field-new churn	12/1/1999	<0.04	0.04	0.003	0.002	<0.0006	0.0003	0.012	0.005	0.005	0.003
Equipment blank-field-new churn	12/1/1999	<0.04	0.03	—		—		—		—	
Equipment blank-field-new churn	12/1/1999	<0.04	0.04	—		—		0.01	0	—	
Equipment blank-2L holding bottle #4	1/26/2000	<0.04	0.04	0.003	0.003	<0.0006	0.0006	—		0.004	0.003
Equipment blank-2L holding bottle #4	1/26/2000	<0.04	0.04	—		—		—		—	
Equipment blank-jerrican	1/26/2000	<0.04	0.03	0.003	0.002	<0.0006	0.0001	0.011	0.003	0.008	0.003
Equipment blank-jerrican	1/26/2000	<0.04	0.04	0.001	0.002	<0.0006	.0001	0.005	0.006	<0.004	0.004
Equipment blank-jerrican	1/26/2000	0.05	0.07	0.002	0	<0.0006	0.0002	0.007	0.002	0.007	0.005
Equipment blank-jerrican	1/26/2000	<0.04	0.03	—		—		0.01	0	0.01	0
Equipment blank-jerrican	1/26/2000	<0.04	0.04	—		—		0.01	0.01	—	
Equipment blank-jerrican	1/26/2000	0.05	0.07	—		—		0.01	0	0.01	0
Source blank-MilliQ	1/26/2000	<0.04	0.02	0.003	0.004	<0.0006	0.0003	0.008	0.001	0.006	0.003
Source blank-MilliQ	1/26/2000	<0.04	0.02	—		—		0.01	0	0.01	0
Equipment blank-new Teflon churn	1/26/2000	0.04	0.05	0.002	0.002	<0.0006	0.0007	0.008	0.003	0.007	0.003
Equipment blank-new Teflon churn	1/26/2000	0.04	0.05	—		—		0.01	0	0.01	0
Equipment blank-USGS churn #5	1/26/2000	<0.04	0.04	0.002	0.001	<0.0006	0.0003	0.009	0.002	0.007	0.003
Equipment blank-USGS churn #5	1/26/2000	<0.04	0.04	—		—		0.01	0	0.01	0
Equipment blank-field churn #2	3/16/2000	0.02	0.02	0.01	0	<0.01	0	0.17	0.13	0.02	0.01

Table D6. Data for trace elements in source blanks and equipment blanks—*Continued.*

[value, mean of triplicate analyses; MilliQ is a water deionization unit manufactured by Millipore, Inc.; s.d., standard deviation of triplicate analyses. µg/L, microgram per liter; mg/L, milligram per liter; —, not determined; <, less than]

Blank type	Date	Praseodymium (Pr) (µg/L)		Rubidium (Rb) (µg/L)		Rhenium (Re) (µg/L)		Sulfur (S) (mg/L)		Antimony (Sb) (µg/L)	
		value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
Equipment blank-1L poly	2/10/1999	—		—		—		—		—	
Source blank-MilliQ	2/10/1999	—		—		—		—		—	
Equipment blank-churn	2/12/1999	—		—		—		—		—	
Process blank	2/21/1999	—		—		—		—		—	
Source blank-MilliQ	11/30/1999	<0.0001	0	<0.0005	0.0007	<0.0003	0.0002	—		0.0046	0.0027
Source blank-MilliQ	11/30/1999	<0.0001	0	<0.0005	0.0006	<0.0003	0.0001	—		0.0082	0.0047
Source blank-MilliQ	11/30/1999	—		—		—		—		—	
Source blank-MilliQ	11/30/1999	—		—		—		—		0.01	0
Equipment blank-field-new churn	12/1/1999	<0.0001	0.0001	<0.0005	0.0003	<0.0003	0.0001	—		0.0035	0.0034
Equipment blank-field-new churn	12/1/1999	<0.0001	0.0001	0.001	0.0009	<0.0003	0.0001	—		0.0033	0.0015
Equipment blank-field-new churn	12/1/1999	—		—		—		—		—	
Equipment blank-field-new churn	12/1/1999	—		—		—		—		—	
Equipment blank-2L holding bottle #4	1/26/2000	<0.0001	0.0001	<0.0005	0	<0.0003	0.0003	—		0.0054	0.0018
Equipment blank-2L holding bottle #4	1/26/2000	—		—		—		—		0.01	0
Equipment blank-jerrican	1/26/2000	0.0002	0.0002	<0.0005	0.0004	<0.0003	0.0001	—		0.0038	0.0011
Equipment blank-jerrican	1/26/2000	<0.0001	0.0001	<0.0005	0.0008	<0.0003	0	—		0.0034	0.002
Equipment blank-jerrican	1/26/2000	<0.0001	0.0001	0.0007	0.0001	<0.0003	0.0001	—		0.0053	0.0031
Equipment blank-jerrican	1/26/2000	—		—		—		—		—	
Equipment blank-jerrican	1/26/2000	—		—		—		—		—	
Equipment blank-jerrican	1/26/2000	—		—		—		—		0.01	0
Source blank-MilliQ	1/26/2000	0.0011	0.0001	0.001	0.0003	<0.0003	0	—		0.0027	0.0011
Source blank-MilliQ	1/26/2000	—		—		—		—		—	
Equipment blank-new Teflon churn	1/26/2000	<0.0001	0.0001	<0.0005	0.0001	<0.0003	0.0001	—		0.006	0.0013
Equipment blank-new Teflon churn	1/26/2000	—		—		—		—		0.01	0
Equipment blank-USGS churn #5	1/26/2000	<0.0001	0.0001	<0.0005	0.0001	<0.0003	0.0001	—		0.0023	0.0024
Equipment blank-USGS churn #5	1/26/2000	—		—		—		—		—	
Equipment blank-field churn #2	3/16/2000	—		<0.01	0	—		0.05	0.01	0.05	0

Table D6. Data for trace elements in source blanks and equipment blanks—*Continued*.

[value, mean of triplicate analyses; MilliQ is a water deionization unit manufactured by Millipore, Inc.; s.d., standard deviation of triplicate analyses. µg/L, microgram per liter; mg/L, milligram per liter; —, not determined; <, less than]

Blank type	Date	Selenium (Se) (µg/L)		Silica (SiO_2) (mg/L)		Samarium (Sm) (µg/L)		Strontium (Sr) (µg/L)		Terbium (Tb) (µg/L)	
		value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
Equipment blank-1L poly	2/10/1999	<0.08	0.01	0.05	0.07	—		<0.02	0.12	—	
Source blank-MilliQ	2/10/1999	<0.08	0.58	<0.03	0.01	—		<0.02	0.12	—	
Equipment blank-churn	2/12/1999	<0.08	0.05	<0.03	0.04	—		<0.02	0.09	—	
Process blank	2/21/1999	0.4	0.27	0.02	0.01	—		<0.1	0.06	—	
Source blank-MilliQ	11/30/1999	<0.05	0.05	0.06	0.04	<0.0007	0.0002	<0.01	0.01	<0.0002	0.0001
Source blank-MilliQ	11/30/1999	<0.05	0.07	0.03	0.02	<0.0007	0.0002	<0.01	0.01	<0.0002	0
Source blank-MilliQ	11/30/1999	<0.05	0.05	0.06	0.04	—		<0.01	0.01	—	
Source blank-MilliQ	11/30/1999	<0.05	0.07	0.03	0.02	—		<0.01	0.01	—	
Equipment blank-field-new churn	12/1/1999	<0.05	0.05	0.02	0.02	<0.0007	0.0002	<0.01	0.01	<0.0002	0
Equipment blank-field-new churn	12/1/1999	0.06	0.03	0.03	0.01	<0.0007	0.0005	<0.01	0	<0.0002	0.0001
Equipment blank-field-new churn	12/1/1999	<0.05	0.05	0.02	0.02	—		<0.01	0.01	—	
Equipment blank-field-new churn	12/1/1999	0.06	0.03	0.03	0.01	—		<0.01	0	—	
Equipment blank-2L holding bottle #4	1/26/2000	<0.05	0.03	0.02	0.02	<0.0007	0.0006	<0.01	0	<0.0002	0
Equipment blank-2L holding bottle #4	1/26/2000	<0.05	0.03	0.02	0.02	—		<0.01	0	—	
Equipment blank-jerrican	1/26/2000	<0.05	0.06	0.03	0.02	<0.0007	0.0003	<0.01	0	<0.0002	0.0001
Equipment blank-jerrican	1/26/2000	<0.05	0.1	<0.02	0.02	<0.0007	0.0003	<0.01	0.01	<0.0002	0.0001
Equipment blank-jerrican	1/26/2000	<0.05	0.03	0.04	0.03	<0.0007	0.0003	<0.01	0.01	<0.0002	0
Equipment blank-jerrican	1/26/2000	<0.05	0.06	0.03	0.02	—		<0.01	0	—	
Equipment blank-jerrican	1/26/2000	<0.05	0.1	<0.02	0.02	—		<0.01	0.01	—	
Equipment blank-jerrican	1/26/2000	<0.05	0.03	0.04	0.03	—		<0.01	0.01	—	
Source blank-MilliQ	1/26/2000	<0.05	0.04	0.02	0.02	<0.0007	0.0004	<0.01	0.01	<0.0002	0
Source blank-MilliQ	1/26/2000	<0.05	0.04	0.02	0.02	—		<0.01	0.01	—	
Equipment blank-new Teflon churn	1/26/2000	0.06	0.07	0.04	0.04	<0.0007	0.0003	<0.01	0.01	<0.0002	0
Equipment blank-new Teflon churn	1/26/2000	0.06	0.07	0.04	0.04	—		<0.01	0.01	—	
Equipment blank-USGS churn #5	1/26/2000	<0.05	0.07	0.02	0.03	<0.0007	0.0004	<0.01	0.01	<0.0002	0.0001
Equipment blank-USGS churn #5	1/26/2000	<0.05	0.07	0.02	0.03	—		<0.01	0.01	—	
Equipment blank-field churn #2	3/16/2000	<0.8	0.26	<0.3	0.15	—		<0.1	0.01	—	

Table D6. Data for trace elements in source blanks and equipment blanks—*Continued.*

[value, mean of triplicate analyses; MilliQ is a water deionization unit manufactured by Millipore, Inc.; s.d., standard deviation of triplicate analyses. µg/L, microgram per liter; mg/L, milligram per liter; —, not determined; <, less than]

Blank type	Date	Tellurium (Te) (µg/L)		Thorium (Th) (µg/L)		Thallium (Tl) (µg/L)		Thulium (Tm) (µg/L)	
		value	s.d.	value	s.d.	value	s.d.	value	s.d.
Equipment blank-1L poly	2/10/1999	—		—		—		—	
Source blank-MilliQ	2/10/1999	—		—		—		—	
Equipment blank-churn	2/12/1999	—		—		—		—	
Process blank	2/21/1999	<0.01	0.01	—		—		—	
Source blank-MilliQ	11/30/1999	<0.01	0.003	<0.0002	0	0.0008	0.0016	<0.0001	0
Source blank-MilliQ	11/30/1999	<0.01	0.001	<0.0002	0.0001	0.0078	0.0066	<0.0001	0
Source blank-MilliQ	11/30/1999	<0.01	0	—		—		—	
Source blank-MilliQ	11/30/1999	<0.01	0	—		0.01	0.01	—	
Equipment blank-field-new churn	12/1/1999	<0.01	0.004	<0.0002	0.0001	0.0003	0.0004	<0.0001	0
Equipment blank-field-new churn	12/1/1999	<0.01	0.004	<0.0002	0.0001	0.0004	0.0002	<0.0001	0
Equipment blank-field-new churn	12/1/1999	<0.01	0	—		—		—	
Equipment blank-field-new churn	12/1/1999	<0.01	0	—		—		—	
Equipment blank-2L holding bottle #4	1/26/2000	<0.01	0	<0.0002	0	0.0016	0.0014	<0.0001	0.0001
Equipment blank-2L holding bottle #4	1/26/2000	<0.01	0	—		—		—	
Equipment blank-jerrican	1/26/2000	<0.01	0.004	<0.0002	0	0.0009	0.0011	<0.0001	0
Equipment blank-jerrican	1/26/2000	<0.01	0.002	<0.0002	0.0001	0.0006	0.0005	<0.0001	0.0001
Equipment blank-jerrican	1/26/2000	<0.01	0.001	<0.0002	0.0001	0.0005	0.0007	<0.0001	0
Equipment blank-jerrican	1/26/2000	<0.01	0	—		—		—	
Equipment blank-jerrican	1/26/2000	<0.01	0	—		—		—	
Equipment blank-jerrican	1/26/2000	<0.01	0	—		—		—	
Source blank-MilliQ	1/26/2000	<0.01	0.003	<0.0002	0.0001	0.0013	0.0016	<0.0001	0
Source blank-MilliQ	1/26/2000	<0.01	0	—		—		—	
Equipment blank-new Teflon churn	1/26/2000	<0.01	0.004	<0.0002	0.0003	0.0024	0.0017	<0.0001	0.0001
Equipment blank-new Teflon churn	1/26/2000	<0.01	0	—		—		—	
Equipment blank-USGS churn #5	1/26/2000	<0.01	0.003	<0.0002	0.0002	0.0013	0.0008	<0.0001	0.0001
Equipment blank-USGS churn #5	1/26/2000	<0.01	0	—		—		—	
Equipment blank-field churn #2	3/16/2000	<0.06	0.04	—		0.01	0.01	—	

Table D6. Data for trace elements in source blanks and equipment blanks—*Continued*.

[value, mean of triplicate analyses; MilliQ is a water deionization unit manufactured by Millipore, Inc.; s.d., standard deviation of triplicate analyses. µg/L, microgram per liter; mg/L, milligram per liter; —, not determined; <, less than]

Blank type	Date	Uranium (U) (µg/L)		Vanadium (V) (µg/L)		Yttrium (Y) (µg/L)		Ytterbium (Yb) (µg/L)		Zinc (Zn) (µg/L)		Zirconium (Zr) (µg/L)	
		value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.	value	s.d.
Equipment blank-1L poly	2/10/1999	—		<0.06	0.03	—		—		<0.07	0.19	—	
Source blank-MilliQ	2/10/1999	—		<0.06	0.01	—		—		<0.07	0.17	—	
Equipment blank-churn	2/12/1999	—		<0.06	0.03	—		—		0.13	0.19	—	
Process blank	2/21/1999	—		<0.07	0.08	—		—		0.33	0.04	—	
Source blank-MilliQ	11/30/1999	<0.0005	0.0001	<0.1	0.09	0.0002	0.000	<0.0004	0.0001	0.79	0.11	0.0017	0.0006
Source blank-MilliQ	11/30/1999	0.0012	0.0007	<0.1	0.14	<0.0001	0.000	<0.0004	0.0001	1.2	0.3	<0.0008	0.0003
Source blank-MilliQ	11/30/1999	—		<0.1	0.09	—		—		0.79	0.11	—	
Source blank-MilliQ	11/30/1999	—		<0.1	0.14	—		—		1.18	0.31	—	
Equipment blank-field-new churn	12/1/1999	<0.0005	0.0004	<0.1	0.07	<0.0001	0.000	<0.0004	0.0001	0.94	0.11	<0.0008	0.0001
Equipment blank-field-new churn	12/1/1999	<0.0005	0.0004	<0.1	0.13	<0.0001	0	<0.0004	0.0002	1.1	0	<0.0008	0.0005
Equipment blank-field-new churn	12/1/1999	—		<0.1	0.07	—		—		0.94	0.11	—	
Equipment blank-field-new churn	12/1/1999	—		<0.1	0.13	—		—		1.12	0.01	—	
Equipment blank-2L holding bottle #4	1/26/2000	<0.0005	0.0002	<0.1	0.14	<0.0001	0.000	<0.0004	0.0003	0.97	0.02	<0.0008	0.0003
Equipment blank-2L holding bottle #4	1/26/2000	—		<0.1	0.14	—		—		0.97	0.02	—	
Equipment blank-jerrican	1/26/2000	<0.0005	0.0001	<0.1	0.07	<0.0001	0.000	<0.0004	0.0002	1.3	0.4	<0.0008	0.0003
Equipment blank-jerrican	1/26/2000	<0.0005	0.0001	<0.1	0.07	0.0001	0	<0.0004	0.0003	0.91	0.16	<0.0008	0.0005
Equipment blank-jerrican	1/26/2000	<0.0005	0.0001	<0.1	0.14	<0.0001	0.000	<0.0004	0.0001	0.79	0.09	<0.0008	0.0005
Equipment blank-jerrican	1/26/2000	—		<0.1	0.07	—		—		1.26	0.41	—	
Equipment blank-jerrican	1/26/2000	—		<0.1	0.07	—		—		0.91	0.16	—	
Equipment blank-jerrican	1/26/2000	—		<0.1	0.14	—		—		0.79	0.09	—	
Source blank-MilliQ	1/26/2000	<0.0005	0.0002	<0.1	0.06	0.0001	0	<0.0004	0.0001	0.95	0.19	<0.0008	0.0004
Source blank-MilliQ	1/26/2000	—		<0.1	0.06	—		—		0.95	0.19	—	
Equipment blank-new Teflon churn	1/26/2000	<0.0005	0.0006	<0.1	0.16	0.0003	0	<0.0004	0.0001	1.3	0.1	<0.0008	0.0004
Equipment blank-new Teflon churn	1/26/2000	—		<0.1	0.16	—		—		1.29	0.1	—	
Equipment blank-USGS churn #5	1/26/2000	<0.0005	0.000	<0.1	0.09	<0.0001	0.000	<0.0004	0.0001	0.85	0.14	<0.0008	0.0006
Equipment blank-USGS churn #5	1/26/2000	—		<0.1	0.09	—		—		0.85	0.14	—	
Equipment blank-field churn #2	3/16/2000	—		<0.3	0.12	—		—		1.72	0.38	—	

Glossary

amalgamation The process by which a metal is united in an alloy with mercury. Metals known to amalgamate include gold, silver, copper, and tin.

bench deposit Gravel deposits located anywhere from tens to several hundreds of feet above a stream channel or flood plain.

bioaccumulation The process by which a chemical constituent derived from the environment builds up in the tissues of an organism.

cemented gravels Gravels and sand particles bound together in a sedimentary formation by geological materials usually containing calcium, silica, or iron.

detritivore An animal that consumes decomposing organic particles (detritus), deriving nutrition primarily from microbes on the particles.

elemental mercury The pure form of mercury, the only element to be stable as a liquid at room temperature; also known as quicksilver.

equal width increment (EWI) method A method for collecting an integrated cross-sectional sample of a flowing river or stream. The sample is obtained by collecting a volume proportional to the amount of flow at each of several equally spaced verticals in a cross section.

"hot spot" An area characterized by an anomalously high concentration of one or more contaminants of interest. In this study, mercury and methylmercury concentrations in water, sediment, and biota were considered in defining "hot spots."

hydraulic mining A method of mining in which a bank of gold-bearing earth or gravel is washed away by a powerful jet of water and carried into sluices, where the gold drops out because of its higher density.

mercury load The amount (mass) of mercury transported by a river or stream passing a specific location during a given time; typical units for mercury load are grams per day and kilograms per year.

methylmercury (MeHg) An organic form of mercury (formula CH_3Hg^+) that is readily bioaccumulated. It is more toxic to humans and other biota than native (elemental) mercury.

placer gold Gold grains or flakes in an unconsolidated sediment deposit. Also known as alluvial gold.

predatory insect An insect that feeds on another species of insect (or, rarely, on a member of the same species)

remediation Remedying or mitigating the effects of pollution of lands or waters, or restoring land or waters to their former state.

retort (1) (verb) to distill or decompose by heat; (2) (noun) vessel in which gold-mercury amalgam is heated to drive off the mercury as vapor. The mercury vapor is cooled in a condenser pipe and is recovered as a liquid. A similar process was used to extract mercury from cinnabar (mercury sulfide) ores and concentrates.

RPD Relative Percentage Difference Quantity computed for the evaluation of precision (or variability) of laboratory analytical data using randomly submitted split samples.

$$\mathrm{RPD} = \frac{\text{difference between reported values}}{\text{average reported value}} \times 100$$

RSD Relative Standard Deviation A quantity computed for the evaluation of precision (or variability) of data. Relative standard deviation is the standard deviation of a series of measurements divided by the average of those measurements times 100:

$$\mathrm{RSD} = \frac{\text{standard deviation}}{\text{average reported value}} \times 100$$

sluice (1) (verb) To mine an alluvial deposit using hydraulic mining methods (2) (noun) A long, trough-like box set on a gentle slope of about 1:20, through which placer gravel is carried by a stream of water. The sand, gravel, and finer sediments are carried away while most of the gold and other heavy minerals are caught in riffles. Amalgamation (reaction with mercury) is commonly practiced by putting native (elemental) mercury between riffles.

stamp mill An apparatus, and the building containing it, in which rock is crushed by descending pestles (stamps), operated by water power or steam power. Amalgamation (reaction with mercury) was commonly combined with crushing to recover gold and (or) silver.

tenor The percentage or average content of metal or precious metal in an ore. As commonly used, it is synonymous with an approximate concentration.

Tertiary channel deposit Ancient gravel deposit, commonly auriferous (gold-bearing), composed of stream alluvium of Tertiary age (1.8 to 65 million years before present). Tertiary channel deposits are abundant in the Sierra Nevada gold belt of California where many have been covered by extensive volcanic eruptions and subsequently elevated by mountain uplifts. They are now deeply-buried channels, high above the present stream beds.

total mercury (THg) The sum of all forms or species of mercury in a sample of water, sediment, or biota.