



GEOCHEMICAL ANALYSES OF SOILS AND SEDIMENTS, COEUR D'ALENE DRAINAGE BASIN, IDAHO: SAMPLING, ANALYTICAL METHODS, AND RESULTS

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Abstract

This report presents the locations, descriptions, analytical procedures used, and an inter-lab comparison of over 1100 geochemical analyses of samples of soil and sediment in and downstream of a major lead-zinc-silver mining district in the Coeur d'Alene (CdA) drainage basin of northern Idaho. The samples fall in 3 broad categories: (1) samples from vertical profiles of floodplain soils in the valley of the main stem of the CdA River (767 samples) and of the South Fork of the CdA River (38 samples), (2) size fractionated surficial samples of sediment bedload within the channel of the South Fork of the CdA River (68 samples), and (3) samples from vertical profiles of sediment bedload within the channel of the main stem of the CdA River (260 samples).

Five different laboratories contributed geochemical data for this report. Four of the five laboratories employed analytical methods that require sample dissolution prior to analysis; one laboratory (US Geological Survey) used analytical instrumentation (energy dispersive x-ray fluorescence [EDXRF]) that is applied to pulverized samples. Some dissolution procedures use four acids (hydrochloric, nitric, perchloric, and hydrofluoric; Eastern Washington University [EWU] Geochemical Laboratory and XRAL Laboratories, Inc.), others use two acids (nitric acid and aqua regia; CHEMEX Labs, Inc.), and some use only concentrated nitric acid (ACZ Laboratories, Inc.). Most analyses of dissolved samples were done by Inductively Coupled Plasma – Atomic Emission Spectroscopy (ICP-AES) or by ICP – MS (Mass Spectroscopy). Some analyses for Ag and K were done by Flame Atomic Absorption (FAA).

Inter-laboratory comparisons are made for 6 elements: lead (Pb), zinc (Zn), iron (Fe), manganese (Mn), arsenic (As), and cadmium (Cd). In general inter-laboratory correlations are better for samples within the compositional range of the Standard Reference Materials (SRMs) from the National Institute of Standards and Technology (NIST). Analyses by EWU are the most accurate relative to the NIST standards (mean recoveries within 1% for Pb, Fe, Mn, and As, 3% for Zn and 5% for Cd) and are the most precise (within 7% of the mean at the 95% confidence interval). USGS-EDXRF is similarly accurate for Pb and Zn. XRAL and ACZ are relatively accurate for Pb (within

5-8% of certified NIST values), but were considerably less accurate for the other 5 elements of concern (10-25% of NIST values). However, analyses of sample splits by more than one laboratory reveal that, for some elements, XRAL (Pb, Mn, Cd) and ACZ (Pb, Mn, Zn, Fe) analyses were comparable to EWU analyses of the same samples (when values are within the range of NIST SRMs). These results suggest that, for some elements, XRAL and ACZ dissolutions are more effective on the matrix of the CdA samples than on the matrix of the NIST samples (obtained from soils around Butte, Montana). Splits of CdA samples analyzed by CHEMEX were the least accurate, yielding values 10-25% less than those of EWU.

Introduction

This report presents a compilation of about 1,000 geochemical analyses of alluvial sediments, collected from stream- and river- beds, banks, and floodplains downstream from mines and mills of the Coeur d'Alene (CdA) silver-lead-zinc mining district in north Idaho. Methods of sample collection, preparation, and analysis are described. Locations of sample sites are shown on maps and listed in tables showing latitude and longitude (in degrees to four decimal places), sample-depth intervals (cm), sample descriptions, and chemical analytical results for as many as 40 chemical elements.

Purpose

The purpose of this report is to document the results of about 1,000 chemical analyses of samples of sediments that were deposited in the CdA drainage basin before and during the era of large-scale mining in the CdA mining district, in north Idaho. These samples were collected as part of an effort to determine the character, distribution, thickness, volume, and metals contents of sediments and soils within the CdA drainage basin. Such information is needed for a Natural Resource Damage Assessment (NRDA), and for an environmental Remediation Investigation/Feasibility Study (RI/FS) being conducted by the Environmental Protection Agency. In response to requests for information from litigants on both sides of an ongoing court case, descriptions of sampling and analytical methods and procedures given here are more inclusive than those

that would accompany most purely scientific publications.

Participants and Cooperators

Employees and associates of the U.S. Geological Survey - Geologic Division (USGS-GD), Mineral Resources Program (MRP), Spokane Field Office (SFO) collected these sediment samples in the course of a series of geo-environmental studies conducted from 1993 to 1999. The geochemistry laboratory in the Department of Geology at Eastern Washington University provided many of the chemical analyses, and the University of Idaho provided a Livingston core sampler. This work was funded by USGS-GD-MRP. It was done in cooperation with the Coeur d'Alene Tribe, the U.S. Geological Survey-Water Resources Division (USGS-WRD), U.S. Fish and Wildlife Service, U.S. Environmental Protection Agency, U.S. Bureau of Land Management (USBLM), and U.S. Department of Agriculture-Forest Service (USDA-FS).

Study Area

The study area covered by this report is mostly within the CdA River basin in north Idaho ([figure 1](#)). The CdA mining district, which lies mostly within the South Fork drainage basin ([figure 2](#)), is one of the largest past-producers of silver in the world, and is also a giant past-producer of lead and zinc (Long, De Young, and Ludington, 1998).

Coeur d'Alene River Basin

The CdA River drains a large part of the north Idaho panhandle -- from a divide that defines Idaho's eastern border, to CdA Lake, near Idaho's western border ([figure 1](#)). The CdA River Basin occupies the western side of the northern Bitterroot Range, between the Clark Fork River Basin to the northeast, and the St. Joe River Basin to the south. The North Fork of the CdA River drains an area of about 900 sq mi, and its average discharge is about 2,000 ft³/s. The South Fork of the CdA River drains an area of about 300 sq mi, and its average discharge is about 500 ft³/s.

The North and South Forks of the CdA River join near Enaville, Idaho, to form the main stem of the CdA River, which meanders about 58 km (36 mi) southwesterly to

CdA Lake, near Harrison, Idaho (figures 1 and 2). Relatively steep gradients of the North and South Forks flatten downstream, and approach a nearly flat gradient from Cataldo Flats to CdA Lake. The cobble-gravel bottom of the river channel upstream from Cataldo Flats to the mouth of the CdA River into CdA Lake. The cobble-gravel bottom of the river channel upstream from Cataldo Flats gives way to a large central sand bar, which occupies a wide bend in the river channel at Cataldo boat landing. Metal-enriched river-bottom sediments are predominantly sandy from there to the toe of the delta front on CdA Lake. Most of the bottom of CdA Lake beyond the delta is covered by fine-grained metal-enriched sediment (Horowitz, Elrick and Cook, 1993).

The Post Falls Dam, on the Spokane River west of the northwest outlet of CdA Lake, holds summer lake level at 2,125 ft elev, and backs lake water up to about Cataldo Landing (figure 2). Thus, in summer, the CdA River becomes a long, narrow, meandering, eastern extension of the Post Falls - CdA Lake reservoir, with little or no current along the 47 km (29 mi) river distance between Cataldo Flats and CdA Lake (figure 2).

Coeur d'Alene Mining District

The CdA mining district is one of the giant silver-lead-zinc mining areas in the world. Its past production ranks first in the United States for silver and third for lead and zinc. Remaining resources of silver rank fourth in the United States (Long, De Young, and Ludington, 2000). The CdA district includes the Bunker Hill mine, mill, tailings impoundment, smelter, and smelter-emissions fallout zone, all of which are in the Bunker Hill Superfund Site (figure 1). The CdA district also includes about 30 other significant mine/mill complexes, and more than 100 relatively small mines and prospects, some of which are in the North Fork drainage basin. To date, the CdA district has produced about 7 million metric tonnes of lead, 3 million tonnes of zinc, and 30 thousand tonnes of silver (Long, 1998a). Significant resources remain (Long, DeYoung, and Ludington, 1998), and, as of mid-2000, production continues at a few major mines.

Mining and milling in the CdA mining region have produced approximately 109 million tonnes of tailings, containing over 1 million tonnes of lead, 1 million tonnes of

zinc, and 3 thousand tonnes of silver (Long, 1998b). From 1896 to about 1910, the predominant milling technology included hand sorting, crushing with stamp mills, and gravity separation. Jigs sorted particles according to their settling velocities by “jigging” them up and down on under-water screens, or by forcing pulses of water up through the screens and particles. Zinc was not intentionally recovered, and lead recoveries commonly ranged from 50 to 80 percent. Tailings commonly contained up to 5 wt. percent each of lead and zinc (Long, 1998b). Addition of other gravity separation devices improved recoveries somewhat, but recovery from slimes (silt and finer grain sizes) remained poor. Most mill-sites were on hillsides near the bottoms of narrow canyons, and their tailings commonly were discarded directly or indirectly into passing streams. Slimes tended to wash away rapidly, but sand- and pebble-sized tailings tended to accumulate near mills, to be washed downstream during high stream-flow episodes.

The flotation process was introduced in the early 1910’s to treat tailings from gravity separators. By the early 1930’s, most mills had converted to flotation as their principal recovery method. In flotation cells, ore-mineral particles preferentially adhere to surfaces of bubbles formed by agitation and injection of air into a slurry of finely ground mineral particles, water, and oily frothing agents. The bubbles rise through the froth, collecting ore particles, and carrying them to the surface, where they are paddled into collecting troughs. Mineral particles that do not attach to the bubbles sink, forming a slurry of tailings in oily water. Successive sink-float cycles are necessary to concentrate each recoverable ore mineral (generally lead sulfide and zinc sulfide in this case). Adoption and improvement of flotation techniques gradually increased metal recoveries, allowing mines to produce larger amounts of lower-grade ores. This resulted in production of larger quantities of finer-grained tailings (fine sand and finer grain sizes) with lower metal contents.

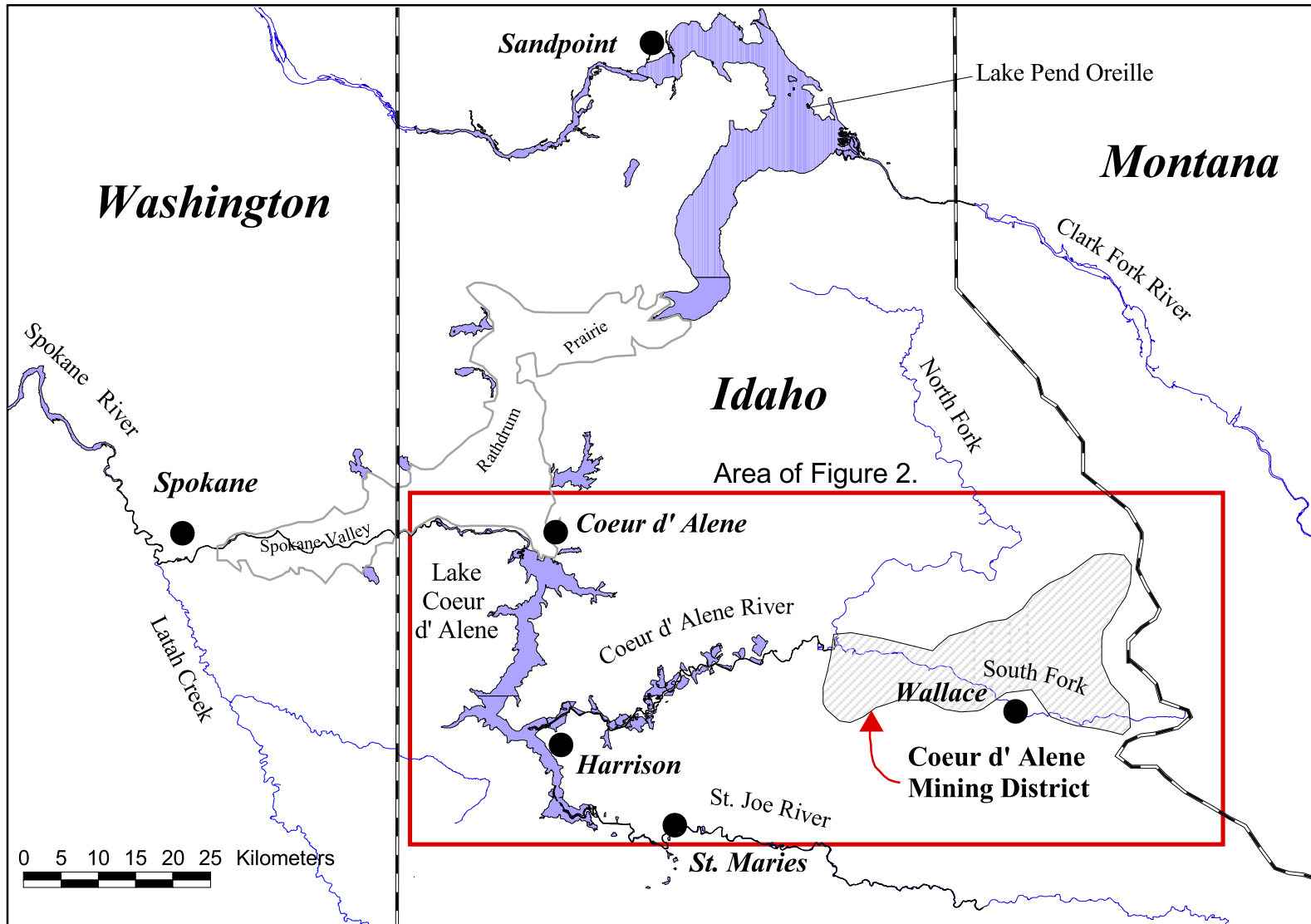
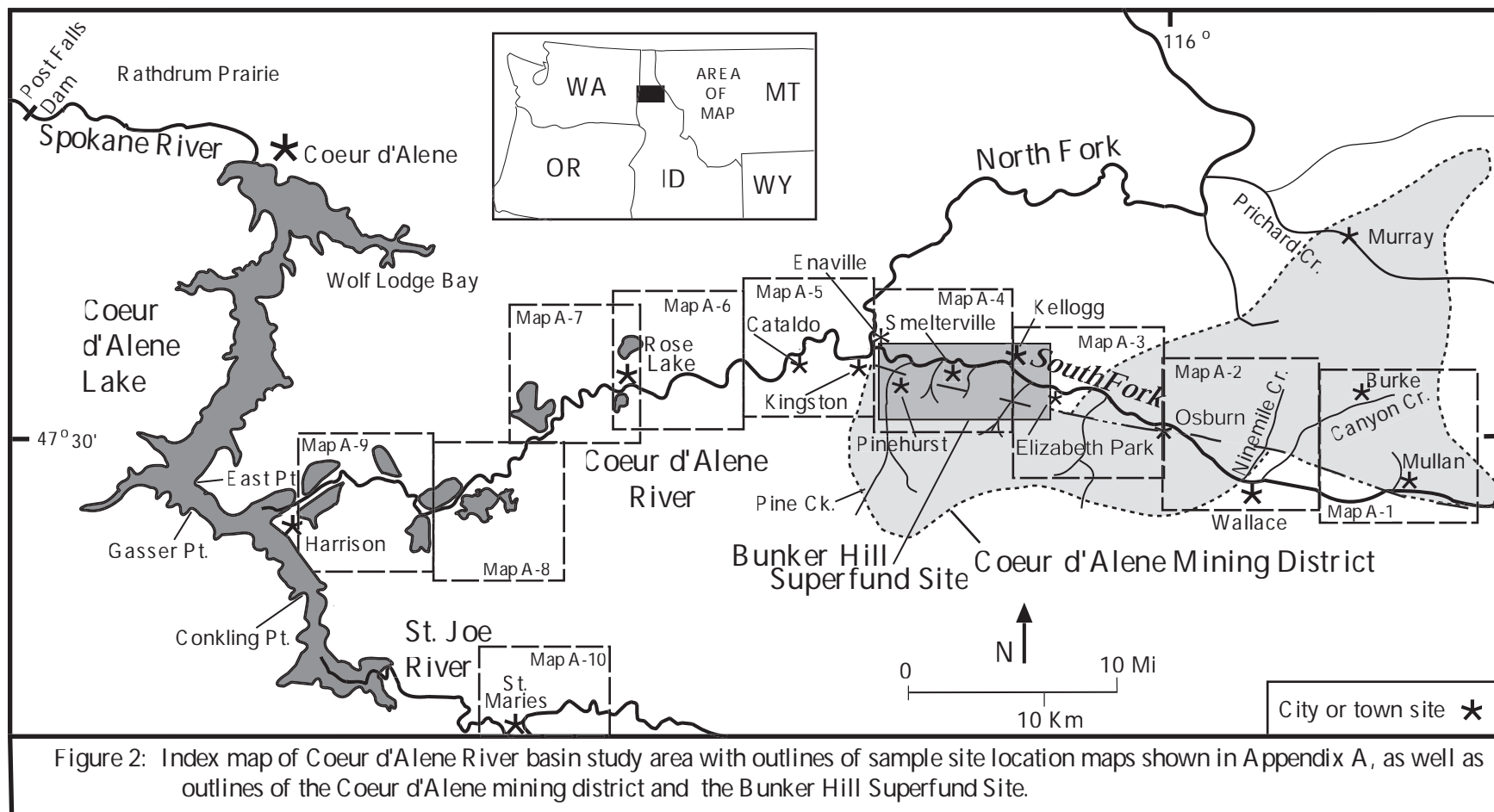


Figure 1. Regional map of the Coeur d'Alene River system and other major tributary streams and rivers of the Spokane River basin in northern Idaho, eastern Washington and western Montana. Area of figure 2 shown by outline.



Metal-enriched sediments of the CdA drainage basin are derived mostly from mining and milling wastes, discarded into the South Fork and its tributaries. Mill tailings were washed down-valley and onto floodplains by fluvial processes, including annual spring run-offs, and sudden winter floods, caused by rain-on-snow episodes. Approximately 51 percent of the tailings generated in the CdA district were discarded directly into creeks that are tributary to the CdA River (Long, 1998b). The Bunker Hill and Page mills used tailings-settling ponds beginning in 1927, but most other mills discarded tailings into creeks until 1968, when that was prohibited by Federal law. Prior to 1968, an average of about 2,000 metric tonnes of metal-bearing mine slimes were being discarded into streams each day (Hoffman, 1995), and the South Fork ran “the color of ‘dirty dough’” with suspended mill tailings (Rabe and Flaherty, 1974). At the confluence of the North and South Forks the flow volume of muddy South Fork water met and mixed with about 4 times its flow volume of relatively clear North-Fork water, to form the larger CdA River, which ran turbid with suspended sediment.

From 1932 to 1967 a suction dredge removed metal-enriched sediment from the river bottom near Cataldo Landing, and placed it on Cataldo Flats, forming extensive dredge-spoil deposits on the floodplain there. Each year the dredge excavated an area of about 10 hm² (25 acres) of river channel to a depth of about 6.7 m (22 ft), forming a crescent-shaped dredge pond about 180 m (600 ft) across and 1,200 m (2,800 ft) long (Grant, 1952). Dredging was discontinued in 1967, after which tailings were no longer discarded into streams. Aerial photographs made in 1983 show that by then the dredge pond had filled, and the central sand bar had formed in approximately its present location, size and shape.

Sample Locations and Descriptions

Sample-Site Location Methods

Sample locations are tabulated in [Appendix B](#) as decimal degrees of latitude and longitude, keyed to the North American datum of 1927 (NAD27) and given to 4 decimal places. [Appendix B](#) also lists the sample site location method used to locate each sample

site. Samples collected prior to 1996 were located on 1:24,000 scale U.S. Geological Survey topographic maps by matching identifiable features on the map to corresponding features on the ground, and (or) by measuring or triangulating from such features. Latitude and longitude of sample-site map locations were determined by measurement from the map grid, and are tabulated in decimal degrees to 4 places ([Appendix B](#)). Locations are considered accurate to within about 50 to 150 ft, depending on the distinctiveness of the site and (or) its distance from features recognized on both the ground and the map ([Appendix B](#), site-location method “a”). Reference locations on riverbanks at opposite ends of river-channel core transects were staked and flagged. The reference locations were marked on 1:24,000-scale maps, as described above. Drill holes in the channel of the river were located by compass-and-tape measurements from the reference locations. Sample sites along onshore extensions of river transects also were located by compass-and-tape measurements from the reference locations ([Appendix B](#), site-location method “b”). The reference location stakes were re-visited in 1996 and locations were derived with a GPS instrument. After 1996 all sample sites were located with the NAVSTAR Global Positioning System (GPS) Precise Positioning Service (PPS), using a PLGGR receiver for Federal Civilian Users ([Appendix B](#), site-location method “c”). Locations determined in this way are considered accurate to within about 10 m (33 ft).

All sample locations are plotted on digital raster graphic topographic maps (DRGs) in [Appendix A](#) (maps A1 to A10). Sample locations were also plotted on Digital Orthophoto Quarter Quadrangles (DOQQs) with a scale of 1:12000 (not shown). Sample locations on these two electronic base maps were compared to the original field maps in order to check the accuracy of the sample-site latitudes and longitudes. In some cases sample locations were corrected to reflect the known position relative to some feature on the DRG or DOQQ.

Sample Descriptions

Lithologic descriptions of the samples are given in [Appendix C](#). Samples were described in the field (or laboratory) for grain size, sediment color, organic content, sedimentary and biogenic structures, and degree of cementation. Grain size was estimated using a hand lens by comparison with silt and sand samples of six classified sieve sizes,

mounted on a card, and named according to the size classification used by most North American geologists and engineers (Compton, 1985). Color was estimated by comparing sediment color to the Rock Color Chart of the Geological Society of America (Goddard and others, 1970).

Sampling Techniques and Their Applications

Sampling of soil and sediment within the CdA valley fall in 3 broad categories: (1) samples from vertical profiles of floodplain soils in the valley of the main stem of the CdA River (767 samples) and of the South Fork of the CdA River (38 samples), (2) surficial samples of sediment bedload within the channel of the South Fork of the CdA River (68 samples), and (3) samples from vertical profiles of sediment bedload within the channel of the main stem of the CdA River (260 samples). The range of surficial environments and sample target depths necessitated a diverse array of sampling techniques. The sampling technique used at each sample site is given in [Appendix B](#) and described in some detail below.

1. Surface Grab

Surface grab samples are collected by scooping or scraping sediment from small sample sites, generally at or near the exposed sediment surface, without much digging. Spot-grab samples of sediment can be taken from relatively steep exposures, such as riverbanks, or from relatively flat exposures, such as subaerially exposed stream-beds or floodplains ([Appendix B](#), sampling technique 1).

In the summer of 1994 Julie Eddy, an Eastern Washington University student under the direction of Stephen Box, collected surface grab samples of stream sediments of the South Fork of the Coeur d'Alene River and its tributaries (94JE samples, [Appendix B](#)). Samples were collected during summer low flow from wet or dry sediment bars within the high water channel of the South Fork of the Coeur d'Alene River and its tributaries. Each sample is a composite of 3-5 samples collected from the upper 5 cm of the bar over a 2-5 m distance with a shovel or plastic trowel. Finer grained accumulations behind obstacles in the river channel were generally targeted for

collection. The samples were screened in the field with a 2 mm mesh screen, lightly washing the sample through the screen with river water. The oversized material was discarded. The pan with undersized material and water was allowed to settle for 10 minutes and the overlying water was gently poured off. The wet sample was placed in a pre-labeled cambric cloth bag and stored for transport in a plastic box. Samples were kept in the locked vehicle until they were transported to the locked USGS lab at Eastern Washington University (within 1-3 days of collection).

2. Vertical Groove

Vertical groove samples were scooped or scraped from a steep exposure, to form a vertical groove, roughly perpendicular to sedimentary layering. Vertical groove samples are representative of the stratigraphic interval from which they are taken. Vertical groove sampling has several advantages over auger- or core drilling. It takes less equipment and time. The material is visible before, during, and after the sampling. Sampling can be done without compressing or disrupting layering or other sedimentary structures. Contamination of samples from vertically deeper samples by overlying materials, a problem with core sampling, can be avoided.

Vertical groove sampling was the main technique used to sample riverbank exposures ([Appendix B](#), sampling technique 2, Rbw map unit). Sample intervals were selected based on subdivision of the stratigraphic section into lithologically distinct intervals. Groove sampling also was used to sample floodplain sediments exposed in test pits dug into floodplain sediments above the zone of water saturation. However, groove sampling is not well suited to sampling below the water table, where pit walls tend to collapse.

Before sampling, the exposure was cleaned by cutting a fresh exposure, working from top to bottom with a clean, sharp steel shovel. A stainless steel spoon or knife was used to scoop or scrape samples from the exposure, working from the bottom up, to avoid downward contamination by falling sediment. Removed sediment was caught and placed in new, finely woven, tightly sewn, 5.5 by 10.5-inch cambric cloth bags, labeled with a sample site identifier and the sample interval depth range. Sampling tools and hands were

well rinsed after each sample was collected to avoid cross-sample contamination.

3. Depth-Bracket Sampling

In 1998 EWU students John Wallis and Patrick Blair, under the direction of A.A. Bookstrom, collected 130 samples from 37 sites (labeled “T98-xx” in [Appendix B](#)) on the floodplain of the Coeur d’Alene River to fill gaps in the database on thickness and metal content of metal-enriched sediment, particularly in upland and palustrine environments. The sampling was done from late September to early November, as water levels declined, and access to marshy locations improved. Sample locations were determined from the NAVSTAR Global Positioning System (GPS) Precise Positioning Service (PPS), using a PLGGR receiver for Federal Civil Users. Locations are considered accurate to within about 30 to 50 ft.

At each sample site, a pit was dug and sampled, and (or) a hole was made and sampled with a core tube or auger ([Appendix B](#), sampling technique 3). Samples were collected from a series of 4 ± 1 cm depth intervals, vertically spaced at about 20 cm centers (at depths of 0 to the 1980 volcanic ash layer, or to 4 cm, 18 to 22 cm, 38 to 42 cm, etc.). Spaced intervals were sampled to limit the size and number of samples, thus maximizing the number of sites that could be sampled and analyzed within budget. In most cases, visible contrast in the character of sediment between the bracketing samples indicates the bottom depth and thickness of the layer of metal-enriched sediment more precisely. At the outset we used a field lead-test kit to indicate whether the entire section of metal-enriched sediment had been sampled. However, by checking with a field XRF analyzer, we found that the field lead test is not dependable in oxidized metal-enriched sediment. After that, we took our samples to the BLM office in Coeur d’Alene, Idaho, where rapid preliminary analyses were done for lead using their portable Outokumpu ® XRF analyzer. This gave a reliable indication of whether we had reached the bottom of the section of metal-enriched sediment. If not, we could return to the site, and try to sample deeper.

A bucket auger was often used in 1998 to sample below the water table, where it was encountered in test pits. Bucket-auger samples are taken by pushing and twisting

auger teeth into the ground, thus cutting a cylindrical hole, and forcing the cut-sediment into a collection cylinder, or “bucket,” above the cutter teeth. Our stainless-steel bucket auger has curved triangular bit teeth that overlap, and extend about 5 cm ahead of an open-ended sample cylinder, 6.5 cm in diameter, and 20 cm long. The diameter of the cutting head is about 7 cm. A “bucket handle” is welded to the top of the sample cylinder, and the drive pipe is screwed into a fitting at the top of the handle. Multiple sections of pipe can be added to lengthen the reach of the bucket auger. A cross bar at the top of the pipe is used to twist and press the auger into the soil, thus cutting and forcing sediment into the bucket. After penetrating 20 cm, the auger is pulled, and the sample extracted. Sediment from the top third of the bucket is discarded to avoid down-hole contamination. Sediment from the bottom part of the bucket is collected for chemical analysis. Sample intervals were determined by the penetration of the auger required to fill the auger bucket.

4. Hand Cores

Various hand-driven coring devices were used to sample floodplain sediments below the water table, where test pits tend to collapse ([Appendix B](#), sampling technique 4). One commercially available hand-driven coring device has a 2 cm (0.75-inch)-diameter transparent plastic core barrel inside a stainless steel drive tube with a slide-hammer attachment. Because of excessive friction along the walls of that small-diameter core tube, it tended to penetrate faster than it accepted sediment into the core barrel. Therefore, core recoveries generally were poor, except in soft, water-saturated sediment. Our best use of this tool was to extend our sampling below the water table in hand-dug test pits. After recovery the filled plastic core tube was transported to the lab and split. Sample intervals were selected based on subdivision of the cored section into lithologically distinct intervals. Samples were collected into labeled cambric cloth bags.

To improve core recovery in marsh environments, we experimented with larger-diameter PVC plastic tubes, which we sharpened on one end, and split lengthwise by sawing. We taped the two halves of the split tube together to make a core tube that could be opened. We cleared away the mat of surface vegetation, placed a block of wood over the top end of the tube, and pushed and pounded it into the sediment as far as possible.

We measured from the top of the tube to the ground, outside the tube to indicate penetration, and inside the tube to indicate core recovery. We taped shut the top of the tube to create a near vacuum, as we pulled it to extract the core. We experimented with 1-, 2-, and 3-inch diameter tubes, and found that with increasing tube diameter, core recovery increased, but core retention during withdrawal decreased. Multiple attempts were often required to successfully extract full core tubes. When we successfully extracted a core, we opened the tube lengthwise, split the core with a stainless steel knife, measured and examined the core, marked sample intervals, and sampled. We collected samples into labeled cambric cloth bags for analysis from one half of the core, and for archive from the other split half.

In 1998 we used a relatively thin-walled aluminum pipe for hand coring. The thin-walled pipe was easier drive into the sediment than the thicker-walled PVC plastic pipe. However, the aluminum pipe, which was 3 inches in diameter, was not split. To remove the core, we tilted the pipe and tapped it to dislodge it, so that gravity would pull it from the pipe. The core was extruded onto a clean plywood board or plastic sheet, where it was split lengthwise with a knife, measured, described, and sampled into labeled cambric cloth bags.

5. Power Cores

In the summer of 1994 a Giddings power-impact coring machine was used to drill six core holes ([Appendix B](#), sampling technique 5) along a transect northwest from the riverbank across Strobl Marsh, east of Killarney Lake ([Appendix B](#), sites 94GID2 to 94GID6). The trailer-mounted Giddings coring machine is powered by a small engine, which rotates the drill string, and hydraulically presses the rotating steel drill pipe downward. Core is forced into a 2-inch-diameter transparent plastic core barrel inside the drill pipe. The machine can drill to about 20 ft, using 4-ft sections of drill pipe. Penetration and recovery were noted during drilling. The transparent core tubes with recovered sediment were transported back to the lab for sampling. In the lab the transparent core tubes were split lengthwise, and the recovered core was measured and described. Sample intervals were selected based on subdivision of the cored section into lithologically distinct intervals. Samples were collected into labeled cambric cloth bags.

Because of uncertainty in the consistency of core recovery, sample intervals in [Appendix C](#) are the measured intervals plus the penetration depth of the start of the four foot core section. The gaps in sampled intervals in the GID- cores represent the difference between the core recovery and the 4 foot (122 cm) penetration interval.

6. Vibro-Cores

Vibro-core drilling is particularly well suited to core sampling in sandy unconsolidated sediment that is water-saturated. A vibrating drill pipe agitates the intergranular pore water, which lifts and separates sand grains, so that the drill pipe sinks more-or-less as it would in quicksand. Vibro-core drilling of CdA River bottom sediment was done from a USGS-WRD research boat in 1994, using 9 to 12 m (30-40 ft) lengths of 7.6 cm (3 inch) diameter aluminum pipe ([Appendix B](#), sampling technique 6). A concrete vibrator, driven by an electric motor, and powered by a portable generator, was clamped to the pipe. The vibrator was tightly clamped perpendicular to the pipe by a specially built steel bracket. Eccentric rotation of a cable-driven mechanism in the head of the vibrator creates very strong vibrations, which are transmitted to the drill pipe. We lowered the vertical pipe, with vibrator attached, over the side of the boat, until it touched bottom, measured the bottom depth, and then turned on the vibrator. At first, the vibrating pipe penetrated rapidly, but as it filled with core, its vibration was dampened, and its penetration rate decreased. In some cases we increased penetration by standing on the vibrator clamp, and bouncing up and down as it vibrated. When penetration stopped, we measured the length of pipe above the water line and plugged the top of the tube with an expanding rubber plug, to create a near vacuum as we extracted the sediment-filled core tube, using the boat's motorized winch, with its cable wrapped around the vibrator clamp. Sandy material at the bottom of a hole tended to fall out of the tube as it was pulled up through the water column, but cohesive inter-beds of clay-rich sediment acted as plugs.

After transporting the horizontal core to the shore, we measured the length of the empty core tube above (and sometimes below, in the case of lost sand) the recovered core. The core was removed from the pipes by tipping them up to about 45°, and tapping their sides with a rubber mallet. Tapping reduced adhesion between the core and the tube,

and gravity pulled the core downward, extruding it from the lower end of the tube. We extruded the core onto clean plastic sheets or wooden trays. We measured core length, and compared it to the depth of penetration. Except for sand lost from the bottom of the hole during retrieval, core recovery generally was nearly 100 percent. We split the core longitudinally and described litho-stratigraphic units. The core was divided into 33.3 cm intervals for sampling. We collected one half of the split core for analysis, and the other for reference. The samples were placed in labeled, 30 by 50 cm plastic bags, marked with the drill-hole number and depth interval (in cm), and transported to the lab.

7. Vibro-Piston Cores

In the summer of 1995 we rented a Livingston Piston core sampler from the University of Idaho, and William C. Rember joined us in testing it in combination with our vibro-coring equipment, in an effort to penetrate completely through the metal-enriched sediment in the river channel ([Appendix B](#), sampling technique 7). None of the 1994 vibro-cores had completely penetrated the historic, metal-enriched sediment into pre-mining sediment with background metal concentrations. The piston-core sampler, as described by Sprenke and others (2000), had been used to core metal-enriched sediment on the bottoms of several lateral lakes in the lower CdA valley. It is operated from two inflatable neoprene rafts, joined by an aluminum frame and derrick. The drill string consists of 1 to 2 m sections of 5-cm outer pipe, attached at a downward-flared, and vented conical coupling, to which a 7.6-cm PVC plastic core tube is fitted and screwed. An inner 2-cm “stinger” pipe passes through a hole in the top of the conical coupling, into the core barrel, where a rubber piston is attached to its end. The piston fits snugly into the lower end of the core tube. As the core tube is forced into the sediment, the rubber piston is forced toward the cap at the upper end of the tube. This creates a partial vacuum, which holds the sediment core in place as the core tube is pulled out of the hole. If a hole can be re-entered, it can be deepened in two-meter increments.

This piston core device had to be modified to successfully penetrate into the sandy sediments of the river bottom. Although the piston core device works well in relatively soft, cohesive lake-bottom sediment, sand is difficult to penetrate by pushing down on the core tube, and difficult to hold in the core tube when pulling up on it,

because sand is strong under compression but weak under tension. To penetrate sand found in the river channel, the concrete vibrator used with our vibro-core device was attached to the drive pipe of the piston-coring rig to allow core tube penetration by vibrating the grains apart. To keep the hole from collapsing when the first core tube is pulled out of the hole, a 20 cm diameter PVC pipe was first vibrated down to about 2 m. The vibro-piston core was begun within the 20 cm PVC casing. Penetration and recovery were carefully measured. Except for loss of most of the recovered sediment from the first core segment of 95PCK1 (sand slid out of the core tube while lifting the core out of the hole, accounting for the missing interval 15-168 cm), recovery from the other two cores of 95PCK1 and from the one core of 95PCUD2 was 100%.

The cores were transported to the lab and split longitudinally. The lithology of the split core was described and sample intervals were picked based on lithologic units. We collected one half of the split core for analysis, and the other for archival storage. The samples were placed in labeled, 30 by 50 cm plastic bags and marked with the drill-hole number and depth interval (in cm).

8. Auger In Vibro-Core Casing

To increase the depth of vibro-core penetration, we used thin-walled aluminum vibro-core pipe as a casing, and used a bucket auger to remove some of the sediment from within the casing, thus freeing it to vibrate more freely and penetrate deeper ([Appendix B](#), sampling technique 8). Using the dual rafts and aluminum derrick of the piston-core sampler, we vibrated a 9 m long, 7.6 cm diameter aluminum pipe into the river-bottom sediment until it stopped. Instead of capping and pulling the pipe, we bailed the water from the pipe, and used a bucket auger (with a 7 cm diameter and sample barrel 20 cm long) to remove successive 20-cm increments of sediment. When the auger touched bottom, we marked the auger drive pipe at the top of the casing pipe, measured up 20 cm, and twisted the auger down until the 20-cm mark was at the top of the casing. We recorded the auger-sample intervals in a field notebook, and on sample bags. Samples were described and the top part of the sample was discarded to minimize possible down-hole contamination. The sample for analysis was spooned from the lower end of the auger bucket, and the rest of the interval was bagged for archival storage. After partially

emptying the aluminum drill pipe, we re-attached the vibrator and vibrated the pipe deeper into the sediment until it stopped again. Then we removed more sediment with the auger, and vibrated down again, until top of the core tube approached water level. By then we were in relatively cohesive sediment, and the hole stayed open enough that we were able to advance the auger into relatively cohesive sediment below the end of the pipe. In this way we were able to recover samples to depths of 486 cm (about 16 ft) in drill hole 95VCUD1, and 572 cm (about 19 ft) in 95VCD3.

Sediment flowage into hole 95VCUD1 occurred during vibration-penetration of the core tube below 338 cm sub-bottom. After vibrating the core tip to 338 cm below the bottom, we augered out the pipe to 306 cm sub-bottom (leaving 32 cm in core tube). The core tip was then vibrated to 414 cm sub-bottom, after which we found that the sediment surface in the core tube had moved up 205 cm (so our auger hit sediment at 101 cm sub-bottom). We augered to the end of the core tube at 414 cm sub-bottom (recording the new sample depths) and 72 cm beyond the bottom of the core tube to 486 cm, with the walls of the hole remaining open below the tube. All of the auger samples were analysed and we found that 205 cm of material with consistent metal concentrations had flowed into the hole at 338 cm, probably when the vibrator was turned on. We interpret that, after vibrating the core tip to 414 cm, the interval augered from 101 to 133 cm had been floated up above the inflowing sediment from an original depth of 306-338 cm. All of the re-augered samples from 133-338 cm were the consistent metal content material (analyses not included here) that had flowed into the hole. The material below 338 cm had much higher metal contents and is interpreted to have remained at approximately its original depth during and after the overlying sediment flowage incident. Because of the above caveats, we are highly confident in the stratigraphic section above 306 cm, and less confident in our interpretation of the true sample depths from 306-486 cm.

Drill hole 95VCD3 was drilled after 95VCUD1, and, to prevent any recurrence of sediment flowage into the core tube, we did not remove more than about half of the sediment in the casing before vibrating it deeper, and there were no long time gaps during which sediment could move up into the pipe. The casing was driven to 309 cm, emptied to 84 cm, then driven to 360 cm. From there to the end of the hole at 572 cm, the hole remained open without casing. At 402 to 423 cm we penetrated a basal layer of lead-rich

sediment, containing over 26,000 ppm. Below that, lead concentrations decrease downward but are high enough to indicate probable down-hole contamination of pre-mining-era sediment.

Sample Custody Procedures

The chain of sample custody was not formally documented for any of the samples listed in this report. However, samples were labeled and tracked to avoid sample loss or confusion, and were kept in secure facilities to prevent sample tampering or contamination. Sample collectors collected and transported samples in lockable government vehicles, and retained custody of the samples until they were stored at lockable government-owned or rented offices, labs, or storage facilities in Spokane, and (or) Cheney, WA. Sample collectors made an effort to separate probable metal-rich and metal-poor samples, packaging and transporting them separately to avoid possible cross-contamination between metal-rich and metal-poor samples. Informal sample lists were used to track samples at EWU. Sample-submittal forms were prepared for samples submitted to commercial labs for sample preparation or chemical analysis. Pulps of most pulverized and chemically analyzed samples are stored in the USGS Lab at EWU. However, pulps of samples analyzed by XRAL Laboratories, Inc. (XRAL), are stored at the USGS sample archive in Denver, CO. Bulk reference samples are stored at a warehouse near Cheney, WA, rented by USGS and EWU.

Sample Preparation Methods

Sample preparation for samples collected before 1995 (except those labeled “94JE-”, discussed below) was done in the USGS Lab at Eastern Washington University (EWU), by university students working under the direction of James Lindsay, Mohammed Ikramuddin, Stephen Box, Arthur Bookstrom, and funded through a cooperative agreement between USGS and EWU. Samples collected in 1995 and 1996 were prepared at SVL Analytical, Inc., in Kellogg, ID. Sample preparation for the 1998 samples was done at the USGS sample-control/sample-preparation facility in Denver,

CO.

Upon arrival in the lab, samples were dried in a warm oven at 60-80° C (except samples labeled “T98-”, which were freeze-dried at the sample-preparation facility in Denver, CO). Dried samples were passed through a minus 20-mesh sieve (grain diameters less than 0.83 mm) to remove sticks, leaves, and roots. The minus 20-mesh fraction was pulverized to minus 200 mesh (grain diameters less than 0.074 mm) in a shatter-box with a chrome-molybdenum steel barrel.

The stream sediment samples labeled “94JE-” were handled differently. Samples were wet sieved in the field to capture only the less than 2 mm grain size fraction. After drying samples were split and one half sample was archived in labeled plastic sample jar. The other sample split was poured into two nested sieves (250 and 63 micrometer mesh size) and agitated with a Rotap device for 20 minutes. Each sieve fraction (0.250-2.0 mm, 0.063-0.250 mm, and < 0.063 mm fractions) was weighed and placed in labeled plastic sample jars. The sieves and bottom pan were cleaned with a brush and blown out with compressed air between each sample fractionation. 8-10 grams of the 0.250-2.0 mm fraction was hand ground using an agate mortar and pestle to pass through a 0.318 mm sieve and placed in a separate labeled plastic sample jar. The ground 0.250-2.0 mm fraction from all the sample sites and the other two fractions from a subset of the sample sites were shipped to the Chemex labs in Reno, Nevada for analyses.

Chemical Elements

[Table 1](#) lists chemical elements mentioned in this paper, gives their chemical symbols, and specifies detection limits for elements analyzed by Inductively-Coupled Plasma Atomic Emission Spectroscopy (ICP-AES). The elements are divided into those of generally major and minor geo chemical abundance. Concentrations of the major elements generally are expressed in wt. percent, whereas concentrations of the minor elements generally are expressed in parts per million parts (ppm). Some elements are listed without concentration units, because they are mentioned as reagents used in sample digestion procedures, but their abundance in the samples was not determined.

Analytical Methods and Their Applications

US Geological Survey energy dispersive Xray fluorescence analysis (USGS-EDXRF)

Most of the samples collected in 1993 were analyzed for Cu, Pb, and Zn, by USGS geochemists, James Lindsay and Bi Shea King, using Energy Dispersive X-Ray Fluorescence Spectroscopy (EDXRF) at the USGS Analytical Laboratory in Menlo Park, California (Johnson and King, 1987). [Appendix D](#) lists the analytical results. EDXRF analyses were performed as follows.

A prepared sample was placed in a plastic sample cup, the bottom of which is covered with 3.5- micrometer mylar film. The film was held tight with plastic ring around the outside. Each sample was analyzed in air, using a Kevex G700/7000 EDXRF Spectrometer, equipped with a Rh target X-ray tube, Si (Li) detector, and 6 secondary targets, using 200-second count times, and the run-parameters summarized in [table 2](#). Analyses were done for Pb, Zn, and Cu. Matrix effects were compensated by ratio to the Compton scatter for the secondary target.

Eastern Washington University Geochemistry Laboratory (EWU) Analysis

Some of the 1993 samples and all of the 1994, 1995, and 1996 samples were analyzed at the Geochemistry Laboratory of Eastern Washington University by Dr. Mohammed Ikramuddin. All analyses were preceded by 4-acid “total extraction.” Analysis of minor and trace elements was by Induced-Coupled Plasma - Mass Spectroscopy (ICP-MS). Major-element analysis was by Induced-Coupled Plasma – Atomic Emission Spectroscopy (ICP-AES). Analysis for Ag and K were by Flame Atomic Absorption (FAA). [Appendix E](#) lists the analytical results. The sample digestions and analyses were performed as follows.

EWU sample digestion procedures (4-acid)

Nearly total digestion of most minerals is provided by 4-acid digestion procedures, which use nitric (HNO₃), perchloric (HClO₄), hydrofluoric (HF), and hydrochloric (HCl) acids

to extract chemical elements from solids for analysis. Nitric and perchloric acids are strong, oxidizing acids, which attack non-silicate minerals and oxidize organic matter. Hydrofluoric acid breaks strong silicate bonds, and HCl decomposes sulfides and dissolves the salts remaining after evaporation (Hall, 1999). Such digestion extracts most chemical elements from rock-forming silicate minerals, as well as from sulfide ore minerals, and their associated gangue minerals and weathering products. Minerals that are resistant to attack include cassiterite, rutile, monazite, ilmenite, garnet, wolframite spinels, sphene, beryl, zircon, tourmaline and high concentrations of barite, none of which are minerals of environmental importance in the CdA drainage basin.

1. A 250-mg sub-sample of the pulverized sample was weighed and placed in a teflon beaker. Two ml of HNO₃ and one ml of HClO₄ were added to the sample and heated until the volume was reduced to half. Then 2 ml of HF and 5 ml of aqua regia were added and the sample solution heated to dryness. Another 5 ml of aqua regia is later added to the sample to completely break down any sulfide minerals.
2. The solution was heated to incipient dryness, and 4 ml of 1:1:2 HCl:HNO₃:H₂O were added and the solution warmed. Finally, the solution was diluted to 25 ml with ASTM Type I water (giving a final dilution factor of 100), and the solution was transferred to 60-ml polyethylene bottles. For ICP-MS analysis, the sample solutions were further diluted by a factor of 10 with Type I water.
3. For analysis of Ag a separate digestion was used. For this purpose, a prepared sample (1.0g) was digested with aqua regia and diluted to 20 ml with 2N HCl.
4. Preparation blanks, duplicate samples, and reference standards were carried through the same procedure. Only Baker intra-analysed acids and Type I water were used during the digestion procedure.

EWU Analytical Methods

Elemental concentrations of As, Ba, Be, Cd, Ce, Co, Cr, Cs, Cu, Ga, La, Mo, Ni, P, Pb, Rb, Sb, Sn, Sr, Th, Tl, U, V, W, Y, Zn and Zr were determined by ICP-MS, using a Perkins Elmer Sciex model 5000 ICP-MS instrument. Concentrations of Al, Ca, Fe,

Mg, Mn, and Ti were determined by ICP-AES, using a Perkin Elmer model ICP/6000 ICP-AES instrument. When concentrations of Pb and Zn were very high, their concentrations were determined by ICP-AES. Ag and K were analyzed using a Flame Atomic Absorption (FAA) Spectrophotometer, Perkin Elmer model 5000.

EWU ICP-MS Procedure

For all ICP-MS quantitative measurements an external calibration was used, and a linear regression (forced through zero) was applied to establish a calibration line. ICP-MS calibration was performed using a reagent blank and multi-element standard solution the following concentrations: 50 ppb for Ce, Co, Cr, Cs, Mo, Pb, Rb, Sb, Sr, Th, Tl, U, V, W, Y and Zr; 100 ppb for Ba, Cd, Cu, Ga, La, Ni and Sn; 250 ppb for As, Be and Zn; and 1000 ppb for P. These solutions were prepared by serial dilution of 1000 ppm stock solutions of each element, obtained from Alfa Aesar Chemicals and Baker Chemicals. Internal standards (Sc, In and Ho; or Sc, Rh and Pt), which provided a range of atomic masses used in the analyses, were added to each blank, standard and sample solution, to correct for instrument drift and physical interferences. The final concentrations of these elements were 50 ppb of In, Rh and Ho, and 100 ppb of Sc and Pt. For ICP-MS analysis the original 4-acid digestion solutions (0.25 g sample in 25 ml with 4% HCl and HNO₃) were further diluted by a factor of 10 with Type I water, so that the final solutions contained 0.4 % HCl and HNO₃. In some cases it was necessary to dilute the samples further to bring the concentrations of certain elements within the linear range.

EWU ICP-AES Procedure

ICP-AES calibration was performed using a reagent-blank, and standard solutions with concentrations of 50 ppm for Ti, and 100 ppm for Al, Ca, Fe, Mg, Mn, Pb and Zn. Ca, Mg, Mn, Pb, Ti and Zn were analyzed directly from 4-acid digestion-sample solutions, whereas for the determination of Al and Fe, samples were further diluted by a factor of 10 and 20 respectively. Samples containing high concentrations of elements were further diluted to bring them within the linear range.

Table 1. Chemical elements and geochemical detection limits

Major Element Symbol	Major Element Name	ICP AES Detection Limits ^a	Chemex Upper Limit ^b	Minor Element Symbol	Minor Element Name	ICP AES Detection Limits ^a	Chemex Upper Limit ^b
		wt %	wt %			ppm	ppm
Al	Aluminum	0.01	15	Ag	Silver	0.1	
Ca	Calcium	0.01	15	As	Arsenic	2 to 3	10,000
Cl	Chlorine			Au	Gold		
F	Fluorine			Ba	Barium	1 to 10	10,000
Fe	Iron	0.01	15	Be	Beryllium	0.5	100
H	Hydrogen			Bi	Bismuth	2 to 3	10,000
K	Potassium	0.01	10	Cd	Cadmium	0.5 to 1	500
Mg	Magnesium	0.01	15	Ce	Cerium		
N	Nitrogen			Co	Cobalt	1	10,000
Na	Sodium	0.01		Cr	Chromium	1	10,000
O	Oxygen			Cu	Copper	0.5 to 1	10,000
P	Phosphorus	0.001 to 0.01	10	Eu	Europium		
Ti	Titanium	0.01		Ga	Gallium	10	10,000
				Ge	Germanium		
				Ho	Holmium		
				In	Indium		
				La	Lanthanum	0.5 to 10	10,000
				Li	Lithium		
				Lu	Lutetium		
				Mn	Manganese	0.01 to 5	10,000
				Mo	Molybdenum	1	10,000
				Nb	Niobium		
				Nd	Neodymium		
				Ni	Nickel	1	10,000
				Pb	Lead	2	10,000
				Sb	Antimony	2 to 5	10,000
				Sc	Scandium	0.5	
				Sn	Tin	10	
				Sr	Strontium	0.5	
				Ta	Tantalum	1	
				Th	Thorium		
				U	Uranium		
				V	Vanadium	2	
				W	Tungsten	10	
				Y	Yttrium	0.1	
				Yb	Ytterbium		
				Zn	Zinc	0.5	
				Zr	Zirconium	0.5	

^a Lower detection limits for analysis by ICP-AES, according to XRAL and Chemex catalogues.

^b Upper limits for Chemex G32 package. Higher concentrations require dilution or chemical assay.

Table 2. USGS-EDXRF instrumental run parameters

Element	Secondary Target	Kv	MA	Line
Pb	Ag	35	1.7	L beta
Zn	Ge	20	2.0	K alpha
Cu	Ge	20	2.0	K alpha

EWU FAA Procedure

Three single-element standards of Ag and K (1, 3 and 6 ppm) were used for FAA calibration. Analyses for Ag in samples containing low concentrations of Ag were done using a single standard of 0.5 ppm and a high sensitivity nebulizer. For analysis of K, original 4-acid digestion solutions of samples were further diluted by a factor of 50 and blanks, standards and samples contained 1000 ppm of Cs or Na to compensate for ionization interferences.

CHEMEX Labs Analysis

Splits of the 1993 samples, previously analyzed for Pb, Zn, and Cu by EDXRF, as well as samples labeled “94JE-”, were analyzed for 32 elements by CHEMEX Labs, Ltd., in Reno, Nevada, using Induced-Coupled Plasma Atomic Emission Spectroscopy (ICP-AES) after extraction by nitric acid and aqua regia. [Appendix F](#) lists the analytical results.

Chemex Labs used a nitric acid – aqua regia digestion to extract chemical constituents from pulverized samples for ICP-AES analysis. Aqua regia is a mixture of 3 parts HCl to 1 part HNO₃. It is an efficient solvent for numerous metal sulfides, many sulfates (except barite), some simple oxide minerals and their hydrates, phosphates, carbonates, and organically bound elements. However, most silicates and some oxides are only slightly attacked (Hall, 1999). Chemex Labs performed the digestions and analyses as follows.

A pulverized sample (1.0g) was digested with concentrated nitric acid for at least one hour. After cooling, hydrochloric acid was added to produce aqua regia, and the mixture was then digested for an additional hour and a half. The resulting solution was diluted to 25 ml with demineralized water, mixed and analyzed by ICP-AES. Elemental concentrations were determined for 32 elements, using a Jarrell Ash 1100 plasma spectrometer after calibration with proper standards. The analytical results were corrected for spectral inter-element interferences. Concentrations higher than the Chemex upper detection limit ([table 1](#)) were reported as greater than that limit.

XRAL Laboratories Analysis

Since 1997, XRAL Laboratories, Inc. has been the contract laboratory for the Mineral Resources Program of the Geologic Division of the U.S. Geological Survey. XRAL Laboratories analyzed our CdA soil samples collected in 1998 for 40 elements, using 4-acid digestion, followed by ICP-AES analysis. [Appendix G](#) lists the results. Apparatus, reagents, digestion procedures, and analytical methods used by XRAL Laboratories to perform these analyses are described below.

XRAL Apparatus

- Thermo Jarrell Ash, Model 1160 Plasma Atomcomp simultaneous ICP-AES or Perkin Elmer Optima 3000 simultaneous ICP-AES
- Hot plate with 50-position aluminum heating block
- 30-mL Teflon vessels with caps (Savillex)
- Acid dispensers (Labindustries)
- Repeating pipet (Eppendorf)
- Drying oven set at 95° C
- 13x100 mm disposable polypropylene test tubes with caps

XRAL Reagents

- Hydrochloric acid, HCl reagent grade, 37 percent
- Nitric acid, HNO₃ reagent grade, 70 percent
- Hydrofluoric acid, HF reagent grade, 48 percent
- Perchloric acid, HClO₄ reagent grade, 70 percent
- De-ionized water (DI)
- One percent nitric acid solution: 10 mL 70 percent concentrated HNO₃ diluted in 1000 mL DI water

- Aqua regia: three parts concentrated HCl and one part concentrated HNO₃; solution is not stable and must be prepared immediately before use
- Lutetium internal standard (Lu): 500 g Lu/mL, as Lu₂O₃ in 5 percent (v/v) HCl

XRAL Sample Digestion Procedure (4-acid)

1. Weigh 0.200 g sample into Teflon vessel.
2. Add 100 µL Lu internal standard to each vessel with repeating pipet.
3. Rinse side walls of Teflon vessel with a minimum amount of DI water.
4. In the fume hood, slowly add 3 mL HCl and allow any reaction to subside.
5. Add 2 mL HNO₃, 1 mL HClO₄, and 2 mL HF. Place sample solution vessel on hot plate with aluminum heat block at a controlled temperature of 110° C in a perchloric acid fume hood.
6. Evaporate sample solution to hard dryness on hot plate (usually overnight).
7. Remove from hot plate, cool to touch and add 1 mL HClO₄ and 2 to 3 mL DI water.
8. Return to hot plate, and evaporate to hard dryness. The temperature of the hot plate is increased to 160° C. This step usually takes a few hours.
9. Remove dried sample from hot plate and cool.
10. Add 1.0 mL aqua regia with repeating pipet and let react for 15 min.
11. Add 9.0 mL 1 percent HNO₃ and thread screw cap tightly on vessel. Place vessel in drying oven for 1 hour at a controlled temperature of 95° C.
12. Remove sample solution and cool. Transfer solution into labeled disposable polypropylene test tube and cap with test tube cap.
13. Analyze sample solution by ICP-AES.

Sample decomposition using this multi-acid digestion technique is suited to dissolve certain rock types, soils, and sediments. The method does not fully dissolve

refractory or resistant minerals and some secondary minerals. Examples of incomplete digestion are as follows: Ba in barite, Cr in chromite, Ti in rutile, Sn in cassiterite, Al in corundum, and rare earth elements in monazite. Samples that contain elements in high concentrations where normally the element is a trace constituent or beyond the linear working range have to be diluted (i.e., Mg in a dolomite, Pb in a galena, Zn in a sphalerite, Cu in a chalcopyrite). This dilution increases the lower reporting limits.

XRAL Analysis by ICP-AES

The ICP-AES instrument is calibrated at the start of each day using four-element solutions for the Jarrell Ash 1160, and nine solutions for the Perkin-Elmer Optima. Calibrations are checked against certified total mean values for established geological Standard Reference Materials, including SO3 and STILL4 from the Canadian Certified Reference Materials Project, and USGS Basalt BHVO-1. The major and trace elements are determined by comparing the element intensities obtained from the standards to those obtained from the samples. There are three method preparation blanks digested with each sample set. A blank subtraction is performed to negate the effect of the reagents.

ACZ Laboratories

Campbell and others (1999), of the U.S. Fish and Wildlife Service, reported the results analyses of about 800 surface-sediment samples from wetlands of the CdA River valley. ACZ Laboratories, Inc. analyzed these samples for Pb, Zn, Fe, Mn, As, and Cd, using microwave-assisted nitric-acid digestion, and ICP-AES. To test whether we could legitimately compile and use the USFWS and USGS data together, we needed data from analyses of the same samples, using nitric-acid digestion, as compared to EWU and XRAL four-acid digestions. Spits from the set of 27 previously analyzed samples, sent to XRAL Laboratories for analysis of four-acid extractions, were sent to ACZ Laboratories, for nitric-acid digestion and analysis by ICP-AES. [Appendix H](#) lists the results of analyses by ACZ Laboratories.

ACZ Laboratories used concentrated nitric acid digestion to prepare samples for ICP-AES analysis. Nitric acid is a strong oxidizing acid, however it is less effective than HCl in attacking sulfides, and is relatively ineffective in dissolving iron and manganese

oxides because of its oxidizing properties. It is relatively ineffective in attacking silicate minerals. Digestion procedures and analytical methods used by ACZ Laboratories are described below.

ACZ Microwave-Assisted Nitric Acid Digestion Procedure

Splits of pulverized samples were digested using a microwave-assisted nitric-acid procedure specified by USEPA method 3051, in which a representative sample of up to 0.5 g is digested in 10 mL of concentrated nitric acid for 10 minutes using a suitable laboratory microwave heating unit. The sample and acid are placed in a fluorocarbon (PFA or TFM) microwave vessel. The vessel is capped and heated in the microwave unit. After cooling, the vessel contents are filtered, centrifuged, or allowed to settle and then diluted to volume and analyzed by the appropriate method.

ACZ Analysis by ICP-AES

Digested samples produced by the above procedure were analyzed for Pb, Zn, Fe, Mn, As, and Cd by ICP-AES, according to EPA method CLP 3/90.

Analytical Quality Control, Assessment, and Assurance

“Quality Control (QC) includes those activities undertaken to control the quality of services delivered by analytical laboratories” (Kane, 1991).” These services need to be timely and economic as well as consistent and accurate to within acceptable limits. “QC can be maintained only if accuracy can be measured in some manner on an on-going basis; such measurement activities in the laboratory comprise quality assessment” (Kane, 1991). Quality Assurance (QA) “involves those activities undertaken by management to ensure that both the control and the assessment activities are performed routinely and documented adequately so that the quality of services delivered is defined for, and can be demonstrated to, the clients.”

Economic constraints required the use of instrumental multi-element geochemical analyses rather than single element assays, even though single-element assays may be

more accurate for high concentrations of Fe (over 15 wt %), Pb, Zn, Mn or As (over 1000 ppm), or Cd (over 500 ppm).

Quality Control Procedures

Quality control procedures consist of a number of routine actions taken by the analytical laboratory to test the precision and accuracy of its analytical techniques. Repeated analysis of materials of known composition is the primary tool to assess the accuracy of the laboratory analyses, and repeated analyses of materials both of known and of unknown composition are used to assess analytical precision. Accuracy is a measure of how closely a result or an average result approaches the true value (Levinson, 1974), as represented by an accepted standard, or target value. Quantification of accuracy (relative to a common standard) provides a basis for comparison of results from different laboratories. Accuracy is expressed as mean percent recovery (mean of concentrations determined by the laboratory / target concentration) x 100%. Precision is a measure of consistency, or the ability to reproduce or repeat the same result (Levinson, 1974). Random errors are assumed to follow a normal Gaussian distribution about their concentration, and analytical precision is then specified as the percent relative variation at the two standard deviation (95%) confidence level (Fletcher, 1981). Analytical precision is calculated relative to the mean concentration, as $Pm = (2 \text{ standard deviations} / \text{mean}) \times 100\%$.

All of the samples analyzed for this report are in solid form, but these solids must first be dissolved using chemical reagents before analysis using the ICP and AA analytical techniques (EDXRF analysis is performed directly on the pulverized sample). Typically the ICP and AA analytical instruments are calibrated initially and checked at regular intervals using lab-prepared solutions of laboratory reagents in known proportions, while the EDXRF is calibrated and checked with pulverized SRMs. Analyses of blanks (distilled water and/or chemical reagents used in preparation of sample solutions) are done to assure no elements of interest are being added during sample digestion and preparation of the sample solution. Reanalysis of analyzed samples and analysis of sample splits provide additional checks on the precision (repeatability) of replicate analyses of the same material. “Spikes” are samples to which a known

concentration of elements of interest are added, and the analyses of spiked and unspiked samples are compared.

Pulverized Standard Reference Materials (SRMs) of known composition that encompass the range of compositions of the unknown samples are periodically analyzed (after dissolution for ICP and AA methods) to check the accuracy of the analytical method from sample preparation to instrumental analysis. The USGS-EDXRF and EWU geochemical laboratories used United States NIST SRMs for these check standards, whereas Chemex and XRAL used Canadian SRMs, and ACZ used standards commercially prepared by Environmental Resources Associates (ERA).

Typically, samples of known composition and replicate samples are also submitted “blind” to the analyst (so the analyst doesn’t know they are a standard or replicate sample, and does not treat them with any special care) as an additional test of precision and accuracy. Blind submittals of USGS SRMs were used to assess the precision and accuracy of XRAL data. Accuracy of EWU, XRAL, and ACZ data were also tested by analysis of blind submittals of NIST SRMs, and comparison of laboratory results with NIST-certified values for the SRMs analyzed.

[Table 3](#) summarizes what Quality Control procedures were performed routinely by each of the five laboratories that provided chemical analyses included in this report. The commercial laboratories (ACZ, XRAL, and CHEMEX) have computerized Laboratory Information Management Systems (LIMS), in which internal records of results from quality control procedures are maintained. However, only ACZ Laboratories, Inc. provided us with printed records of those results. USGS also maintains a LIMS for XRAL data on USGS Standard Reference Materials (SRMs), which are routinely submitted for analysis with each batch of samples analyzed by XRAL. The EWU academic research laboratory maintains internal records of results from its quality control procedures, but it is not staffed to make those records public. The USGS EDXRF Laboratory is no longer staffed, but we were able to retrieve some of the Quality Control information.

Table 3. Quality control procedures, precision, and accuracy for geochemical analysis at the laboratories used for this report.

subject	USGS-EDXRF	EWU	CHEMEX	XRAL	ACZ
Laboratory Type	government, research	academic, research	commercial, accredited	commercial, USGS contractor	commercial, USFWS contractor
Number of Analyses	203	336	236	331	27
Digestion Method	none	4-acid	nitric acid and aqua regia	4-acid	4-acid
Analytical Method	EDXRF	ICP-MS, ICP-AES, FAA	ICP-AES	ICP-AES	ACP-AES
Analytes	Cu, Pb, Zn	35 elements	32 elements	40 elements	Pb, Zn, Fe, Mn, As, Cd
Quality Control					
Calibration Solutions		EWU-prepared	CHEMEX-prep.	XRAL-prepared	ACZ-prepared
Calibration Checks	yes	yes	yes	yes	yes
a. Initial	yes	yes	yes	yes	yes
b. Continuing	yes	yes, 1 in 10	yes	yes	yes
c. Blank		yes	yes	yes	yes
d. Re-analysis		if b >5% off	yes	yes 5%	
e. Duplicate Split		yes		yes 5%	yes 5%
f. spikes				yes (Lu)	yes
SRMs used in analyses					
of known standards	NIST ¹ SRMs 1645, 2704 2710, 2711	NIST ¹ SRMs 2710, 2711	CANMET ³ SRMs LKSD-1 to 4 STSD-1 to 4	CCRMP ⁴ SRMs SS03 STILL4	ERA ⁵ SRMs
	USGS ² SRMs AGV-1, GXR-1 GXR-2, GXR-4 GXR-5, GXR-6		RTS-2 and 4 MP-2, SU-1a	USGS BHVO-1	
Percent of checks	3%	2 to 10%	3%	NR	40%
Precision (Pb, Zn)		Pb 3.5%, Zn 2.5%			Pb 8%, Zn 12%
Percent Recov. (Pb, Zn)	101%, 98%	Pb 100%, Zn 98%			Pb 99%, Zn 99%
Prep Blanks		yes			
Reagent Blanks		yes	yes	yes	yes
Run Logs		yes		yes	yes
Lab Info. Mgmt. Syst.		yes	yes	yes	yes
QC Data Available	no longer	not readily	no longer	available	available
Blind analyses of SRMs					
SRMs used in analyses	no	yes	no	yes	yes
of known standards		NIST SRMs 2710, 2711		USGS SRMs SAR-L, SAR-M	NIST SRMs 2710, 2711
				NIST SRMs 2710, 2711	
% of blind checks		2%		5%	9%
Precision (Pb, Zn)				11%, 15%	
Mean Recov. (vs NIST)		Pb 102%, Zn 99%		Pb 97%, Zn 81%	Pb 88%, Zn 87%

¹ National Institute of Standards & Technology (NIST)

² USGS SRM (Govindaraju, 1994).

³ Canada Centre for Mineral & Energy Technology

⁴ Canadian Certified Reference Materials Project

⁵ Environmental Resources Associates.

US Geological Survey EDXRF Quality Control

Standard Reference Materials (SRMs) were used to establish an EDXRF calibration curve showing the relation between measured X-ray fluorescence values and accepted values for concentrations of Pb, Zn, and Cu, in the SRMs. Two types of SRMs were used in preparing the calibration curve. For low concentrations of metals USGS National Rock Standards AVG-1, GXR-1, GXR-2, GXR-4, GXR-5, and GXR-6 were used. Mean compositions of those SRMs are given by Govindaraju, 1994. For moderate to high concentrations of metals, National Institute of Standards and Technology (NIST) Standard Reference Materials 2710 and 2711 were used. Certified values for mean total concentrations of elements in those materials are given by Gills (1993a, 1993b). Results from one set of check analyses of four NIST SRMs indicate calibration accuracy to within or very near the range of precision of the NIST-certified mean total values at the 95% confidence level ([table 4](#)). Of the 203 samples analyzed by USGS-EDXRF, 70 were also analyzed by EWU, 131 by CHEMEX, and 15 by XRAL.

Eastern Washington University Geochemistry Lab (EWU) Quality Control

EWU quality control procedures are listed in [Table 3](#). Results of repeated analyses of known NIST SRMs were reported by EWU and are given in [table 5](#) and discussed below. Blind analyses of the same NIST SRMs are given in [tables 9](#) and [10](#) and discussed below. Of the 336 samples analyzed by EWU, 70 were also analyzed by USGS-EDXRF spectroscopy, 30 were analyzed by CHEMEX, and 27 others were analyzed by both XRAL and ACZ laboratories.

EWU analyses of known Standard Reference Materials

Prepared standard solutions were used to perform instrumental calibrations at 10-sample intervals. Acid concentrations in standards and blanks matched those in samples for each instrumental analysis by ICP-MS, ICP-AES, or FAA. NIST SRMs 2710 and 2711 were repeatedly analyzed ([table 5](#)). USGS Rock Standards also were analyzed occasionally. The results obtained on NIST and USGS Reference Standards were within

Table 4. USGS-EDXRF analysis of four NIST Standard Reference Materials for Pb, Zn and Cu.

^a NIST SRM	Element	NIST certified value (ppm)	^b (+/-) NIST precision	^c USGS EDXRF value (ppm)	^d USGS Recovery%
2704	Pb	161	N R	184	114.3%
2704	Zn	438	N R	454	103.7%
2704	Cu	99	N R	116	117.2%
1645	Pb	714	N R	603	84.5%
1645	Zn	1720	N R	1514	88.0%
1645	Cu		N R		
2711	Pb	1162	31	1200	103.3%
2711	Zn	350	5	350	100.0%
2711	Cu	114	2	122	107.0%
2710	Pb	5532	80	5600	101.2%
2710	Zn	6952	91	6940	99.8%
2710	Cu	2950	130	2970	100.7%

^a National Institute of Standards and Technology (NIST) Standard Reference Material (SRM).

^b at 95% confidence level (NR is "not reported").

^c Bi-Shia King, USGS, analyst, 7/8/94.

^d Recovery % = (USGS EDXRF value/NIST value) * 100%

4% of certified values for all elements except for refractory Ba, Ni, P, Ti. Measured concentrations of Ba, Ni, and P were up to 6.5% lower than NIST-certified values, while Ti was up to 15% lower.

EWU Duplicates and Blanks

Five percent of the samples and a few reference standards were analyzed in duplicate. The results obtained on these samples were reproducible within the range of $\pm 5\%$. Preparation blanks were processed and analyzed with each batch of sediment samples to check possible contributions from acids, glassware, teflon-ware and the environment. The contributions from blanks were negligible and concentrations generally were below minimum analytical detection limits.

EWU Precision and Accuracy

EWU precision (relative to the means of EWU analyses of NIST SRMs 2710 and 2711) averages ± 2.5 percent for Zn and Mn, $\pm 3.5\%$ for Pb, $\pm 5.5\%$ for Fe and As, and $\pm 6.5\%$ for Cd ([table 6](#)). EWU calibration accuracy (expressed as percent-recovery relative to NIST-certified mean total values for SRMs 2710 and 2711) averages 96% for Mn and Cd, 98% for Zn, 100% for As, Fe and Pb ([table 5](#)).

EWU Analyses of Blind Standard Reference Materials

NIST SRMs 2710 and 2711 were submitted to the EWU Geochemistry Laboratory as blind samples in a large analytical job in 1996. The analytical results and percent recovery are given in [Tables 9](#) and [10](#). For Pb, Zn, Mn and As, the reported values are within 3% of the certified values. Fe was high by 8% for 2711, and Cd was low by almost 8% for each SRM.

CHEMEX Laboratories Quality Control

CHEMEX quality control procedures are summarized in [table 3](#). Results of quality control analyses were not included in reports of analytical results received from Chemex, nor were any blind NIST standards submitted with the CdA samples. Of

Table 5. Analytical values, precision, and accuracy of EWU analyses of known and blind NIST SRMs 2710 and 2711.

SRM 2710	units	NIST mean	NIST Pm ^a	EWU mean ^b	EWU std dev	EWU Pm ^a	EWU mean recov% ^c	EWU blind recov% ^d
Al	wt%	6.44	1.2%	6.34	0.14	4.5%	98.4%	97.5%
Ca	wt%	1.25	2.4%	1.26	0.06	10.2%	100.5%	87.2%
Fe	wt%	3.38	3.0%	3.36	0.10	6.2%	99.5%	100.3%
K	wt%	2.11	5.2%	2.09	0.06	6.1%	98.9%	96.7%
Mg	wt%	0.85	4.9%	0.88	0.02	3.9%	102.6%	99.6%
Ag	ppm	35.30	4.2%	34.65	0.93	5.4%	98.2%	99.7%
As	ppm	626	6.1%	623	17	5.6%	99.5%	98.6%
Ba	ppm	707	7.2%	676	16	4.6%	95.7%	91.1%
Cd	ppm	21.8	0.9%	20.6	0.6	6.0%	94.7%	92.2%
Cu	ppm	2950	4.4%	2857	39	2.7%	96.8%	95.4%
Mn	ppm	10100	4.0%	9973	130	2.6%	98.7%	97.4%
Ni	ppm	14.3	7.0%	14.0	0.5	6.9%	97.9%	90.9%
P	ppm	1060	14.2%	991	26	5.2%	93.5%	90.6%
Pb	ppm	5532	1.4%	5472	116	4.3%	98.9%	100.9%
Sb	ppm	38.4	7.8%	37.6	0.6	3.1%	97.9%	85.9%
Sr	ppm							118.8%
Ti	ppm	2830	3.5%	2624	54	4.1%	92.7%	88.3%
Tl	ppm							
V	ppm	76.6	3.0%	75.5	1.4	3.8%	98.5%	87.5%
Zn	ppm	6952	1.3%	6723	78	2.3%	96.7%	98.0%
SRM 2711	units	NIST mean	NIST Pm ^a	EWU mean ^b	EWU std dev	EWU Pm ^a	EWU mean recov% ^c	EWU blind recov% ^d
Al	wt%	6.53	1.4%	6.40	0.17	5.5%	98.0%	98.3%
Ca	wt%	2.88	2.8%	2.85	0.11	7.5%	98.9%	95.8%
Fe	wt%	2.89	2.1%	2.91	0.08	5.3%	100.8%	108.0%
K	wt%	2.45	3.3%	2.48	0.07	5.5%	101.2%	105.7%
Mg	wt%	1.05	2.9%	1.07	0.03	5.5%	101.4%	110.5%
Ag	ppm	4.63	8.4%	4.63	0.13	5.7%	100%	101.5%
As	ppm	105	7.6%	105	2.6	5.0%	100.2%	99.0%
Ba	ppm	726	5.2%	683	17.5	5.1%	94.1%	98.5%
Cd	ppm	41.7	0.6%	40.3	1.4	6.9%	96.6%	92.8%
Cu	ppm	114	1.8%	110	1.3	2.4%	96.2%	96.5%
Mn	ppm	638	4.4%	639	11.5	3.6%	99.8%	102.8%
Ni	ppm	20.6	5.3%	19.3	0.5	5.2%	93.9%	92.2%
P	ppm	860	8.1%	822	15.6	3.8%	95.5%	93.0%
Pb	ppm	1162	2.7%	1181	18.6	3.2%	101.6%	103.7%
Sb	ppm	19.4	9.3%	18.9	0.4	4.2%	97.6%	97.9%
Sr	ppm	245	0.3%	239	5.2	4.4%	97.6%	93.4%
Ti	ppm	3060	7.5%	2626	55.8	4.3%	85.8%	81.7%
Tl	ppm	2.47	6.1%	2.40	0.03	2.6%	97.0%	
V	ppm	81.6	3.6%	80.3	1.5	3.6%	98.4%	89.5%
Zn	ppm	350	1.4%	347.6	6.1	3.5%	99.2%	100.6%

^a Precision relative to mean of known standard runs

(Pm = (2 standard deviations/mean)*100%)

^b EWU number of known standard runs (n) = 8

^c EWU mean recovery % = (EWU [known] mean/NIST mean)* 100%

^d Blind recovery % = (EWU blind run value/NIST mean)* 100% (see Tables 9 & 10)

the 236 samples analyzed by Chemex Laboratories, USGS analyzed 131 by EDXRF spectroscopy, EWU analyzed 30 samples, and XRAL analyzed 15 samples.

XRAL Laboratories Quality Control

XRAL quality control procedures are listed in [Table 3](#). Results of repeated analyses of known NIST SRMs were not included in reports of analytical results received from XRAL. However results of repeated blind analyses of USGS SRMs (Govindaraju, 1994) and a few blind analyses of NIST SRMs is discussed in the following sections. Of the 314 samples analyzed by XRAL Laboratories, 15 were analyzed both by USGS-EDXRF and by CHEMEX, and 27 samples were analyzed both by EWU and by ACZ.

XRAL Precision

To monitor the precision of XRAL data, USGS Sample Control routinely submits for analysis USGS Standard Reference Materials SAR-L and SAR-M as blind samples, at a rate of 1 SRM sample in every 10 samples. Based on analyses of those samples, XRAL precision relative to mean results for those samples is listed for each element in [tables 6](#) and [7](#). In summary, XRAL precision for 16 analyses of SAR-L and 15 analyses of SAR-M averaged $\pm 5\%$ for Fe and Mn, $\pm 11\%$ for Pb, $\pm 15\%$ for Zn, $\pm 23\%$ for Cd, and $\pm 26\%$ for As.

XRAL Recovery Relative to USGS SRM Target Values

Mean recoveries (relative to USGS target values) for 16 splits of SAR-L and 15 splits of SAR-M are listed for each element in [tables 6](#) and [7](#). In summary, XRAL accuracy, expressed as percent recovery relative to USGS target values, averaged 95%

Table 6. Analytical values, precision and accuracy of XRAL blind analyses of USGS Standard Reference Material (SRM) SAR-L

Element	units	USGS	USGS	XRAL	XRAL	XRAL	XRAL
		mean ^a	std dev	mean ^b	std dev	Pm ^c	recov% ^d
Al	wt %	5.79	0.17	5.69	0.16	5.7%	98.3%
Ca	wt %	1.06	0.02	1.07	0.03	5.6%	101%
Fe	wt %	2.67	0.06	2.58	0.07	5.1%	96.7%
K	wt %	2.98	0.10	2.92	0.07	4.8%	98.1%
Mg	wt %	0.55	0.01	0.51	0.46	181%	93.2%
Na	wt %	1.53	0.01	1.42	0.04	5.9%	93.0%
P	wt %	0.09	0.01	0.08	0.004	10.5%	85.8%
Ti	wt %	0.25	0.04	0.29	0.02	13.7%	115%
Ag	ppm	2.56	0.24	2.58	0.90	69.7%	100.9%
As	ppm	16.5	1.11	21.6	2.87	26.7%	131%
Au	ppm	0.33	0.23	<8	N/A ^e	N/A	N/A
Ba	ppm	879	31.8	887	31.2	7.0%	100.9%
Be	ppm	3.24	0.21	3.75	0.58	30.8%	116%
Bi	ppm	1.1	0.23	<50	N/A	N/A	N/A
Cd	ppm	2.5	0.15	3	0.37	24.3%	120%
Ce	ppm	150	4.27	153	7.74	10.1%	102%
Co	ppm	7.5	0.61	7.3	0.95	25.9%	97.5%
Cr	ppm	110	9.01	147	10.1	13.8%	133%
Cu	ppm	370	15.5	348	21.1	12.1%	94.0%
Eu	ppm	1.5	0.02	<2	N/A ^e	N/A	N/A
Ga	ppm	17	1.27	21	2.62	25.0%	123%
Ho	ppm	1.9	0.60	<4	N/A	N/A	N/A
La	ppm	75	3.18	76	3.57	9.4%	101.0%
Li	ppm	28	0.87	26	2.87	21.8%	94.2%
Mn	ppm	2094	65.0	2045	42.3	4.1%	97.7%
Mo	ppm	13	0.85	16	1.09	13.3%	126.4%
Nb	ppm	35	2.73	27	4.15	31.2%	75.9%
Nd	ppm	66	2.11	66	3.58	10.8%	100.6%
Ni	ppm	52	3.49	54	2.92	10.9%	103.1%
Pb	ppm	578	22.2	618	30.0	9.7%	107.0%
Sc	ppm	7.8	0.22	7.7	0.48	12.5%	98.6%
Sn	ppm	6	N/A	<50	N/A	N/A	N/A
Sr	ppm	158	11.8	148	4.37	5.9%	93.6%
Ta	ppm	2.8	0.09	<40	N/A	N/A	N/A
Th	ppm	19	1.21	21	1.36	13.0%	109.9%
U	ppm	5.2	0.06	<100	N/A	N/A	N/A
V	ppm	140	3.36	129	4.16	6.4%	92.4%
Y	ppm	44	1.58	40	2.24	11.2%	91.1%
Yb	ppm	5.7	1.13	4.3	0.48	22.2%	75.7%
Zn	ppm	420	53.1	395	29.6	15.0%	94.0%

^a USGS n = 5 to 24

^b XRAL n=16

^c Precision relative to mean (Pm) = (2 std. dev./mean) * 100%

^d Recovery % = (XRAL mean/USGS mean) * 100%

^e N/A = not applicable because of qualified value

Table 7. Analytical values, precision and accuracy of XRAL blind analyses of USGS Standard Reference Material (SRM) SAR-M

Element	units	USGS mean ^a	USGS std dev	XRAL mean ^b	XRAL std dev	XRAL Pm ^c	XRAL recov% ^d
Al	wt %	6.06	0.20	6.01	0.15	5.0%	99.2%
Ca	wt %	0.57	0.03	0.57	0.01	3.7%	100%
Fe	wt %	3.21	0.13	3.05	0.06	3.6%	94.8%
K	wt %	2.89	0.11	2.88	0.14	9.7%	99.6%
Mg	wt %	0.50	0.02	0.46	0.01	5%	93.4%
Na	wt %	1.18	0.05	1.12	0.02	4.3%	94.6%
P	wt %	0.07977	0.01	0.07	0.00	12.1%	88.0%
Ti	wt %	0.35	0.04	0.34	0.02	11.1%	98%
Ag	ppm	3.18	0.40	4.20	1.01	48.3%	132.1%
As	ppm	37.2	4.38	39.2	4.71	24.0%	105%
Au	ppm	0.03	0.03	<8	N/A ^e	N/A	N/A
Ba	ppm	776	44.6	788	29.5	7.5%	101.5%
Be	ppm	2.40	0.03	2.07	0.26	25.0%	86%
Bi	ppm	0.98	0.84	N/A	N/A	N/A	N/A
Cd	ppm	4.64	0.35	6	0.65	21.8%	129%
Ce	ppm	119	6.08	117	8.72	14.9%	99%
Co	ppm	10.3975	1.26	10.9	1.53	28.1%	105.2%
Cr	ppm	97.0	8.39	78	25.0	63.9%	81%
Cu	ppm	310	24.5	303	16.5	10.9%	97.9%
Eu	ppm	0.67	0.70	N/A	N/A	N/A	N/A
Ga	ppm	19.7	0.44	19	3.01	31.6%	97%
Ho	ppm	1.72	0.16	N/A	N/A	N/A	N/A
La	ppm	57.605	4.59	59	3.24	10.9%	103.0%
Li	ppm	29.5	0.81	27	2.09	15.5%	91.2%
Mn	ppm	5262.01	332	5099	122	4.8%	96.9%
Mo	ppm	13	3.50	16	1.75	22.3%	121.0%
Nb	ppm	28.0	3.10	27	3.71	27.8%	95.5%
Nd	ppm	51.4	3.36	48	3.89	16.2%	93.7%
Ni	ppm	42	5.00	42	3.08	14.7%	100.2%
Pb	ppm	906	76.4	1030	63.9	12.4%	113.7%
Sc	ppm	8.34	0.37	7.9	0.83	21.2%	94.4%
Sn	ppm	9.4	1.70	N/A	N/A	N/A	N/A
Sr	ppm	154	7.60	148	2.66	3.6%	96.1%
Ta	ppm	2.63	0.19	N/A	N/A	N/A	N/A
Th	ppm	18.1	0.96	18	2.39	26.3%	100.2%
U	ppm	5.19	0.14	N/A	N/A	N/A	N/A
V	ppm	65.5	2.85	66	1.77	5.4%	100.0%
Y	ppm	31.6	3.80	27	1.13	8.4%	85.4%
Yb	ppm	4.17	0.84	3.0	0.00	0.0%	71.9%
Zn	ppm	883	102	842	59.5	14.1%	95.4%

^a USGS n = 4 to 24

^b XRAL n = 15

^c Precision relative to mean (Pm) = (2 std. dev./mean) * 100%

^d Recovery % = (XRAL mean/USGS mean) * 100%

^e N/A = not applicable because of qualified value

for Zn, 97% for Fe and Mn, 110% for Pb, 118% for As, and 125% for Cd. Data are deemed acceptable by USGS when the percent recovery of an element is between the range of 80 and 120% of the target value for that element, provided the target value of that element is > 5 times the lower detection limit for that element. (See detection limits, [table 1](#), and XRAL percent recovery, [tables 6 and 7](#)). By those criteria, XRAL data for Pb, Zn, Fe, and Mn, are of acceptable accuracy, but XRAL data for As and Cd are of marginal acceptability.

XRAL Recovery Relative to Blind NIST SRM certified values

NIST SRMs 2710 and 2711 were submitted to the XRAL Laboratory as blind samples and the analytical results and percent recovery (relative to NIST certified values) are listed in [tables 9 and 10](#). Mean recoveries for the two NIST SRMs range are more than 90% for Pb and Fe (96.9% and 92.6%, respectively), between 85% and 90% for Mn and As (89.3% and 88.7%, respectively), and between 80% and 85% for Zn and Cd (81% and 82.5%, respectively). Recoveries were considerably less than those from the USGS SRMs.

ACZ Laboratories Quality Control

ACZ Laboratories listed quality control data in their report of analyses, which included the precision and recovery data for prepared calibration solutions and recovery data for known pulverized SRMs supplied by Environmental Resources Associates (ERA) ([table 8](#)). Two blind NIST SRMs were submitted with our analytical jobs and their analytical data and percent recovery are given in [tables 9 and 10](#). All 27 samples analyzed by ACZ Laboratories were also analyzed by both EWU and XRAL laboratories.

ACZ Precision and Accuracy

Based on repeated analyses of prepared calibration solutions ([table 8](#)), ACZ precision is $\pm 7\%$ for Mn, $\pm 8\%$ for Pb and Cd, $\pm 10\%$ for Fe and As, and $\pm 12\%$ for Zn. ACZ recovery relative to ERA standards is 116% for Mn, 113% for Zn, 107% for Fe, 99% for Pb and Cd, and 87% for As.

Table 8. Analytical values, precision, and accuracy of ACZ analyses of lab-prepared calibration solutions and of nitric-acid dissolutions of known, pulverized SRMs.

Element	Analyses of lab-prepared calibration solutions						Analyses of pulverized SRMs			
	TRUE ¹	Tests	Mean FOUND	Std. Dev.	Precis. Pm	Mean Recov.	TRUE ²	Tests	Mean FOUND	Mean Recov.
	ppm	n	ppm	ppm	%	%	ppm	n	ppm	%
Pb	5000	8	4966	199	8	99.3	136	2	135	98.9
Zn	1250	11	1240	72	12	99.2	70	3	79	112.7
Fe	2500	7	2514	123	10	100.6	7850	1	8410	107.1
Mn	1250	8	1210	42	7	96.8	147	2	171	116.3
As	5000	12	4994	256	10	99.9	94.2	3	82	86.7
Cd	2500	8	2470	98	8	98.8	98.3	3	97	98.7

1 Concentration of calibration standard solution.

2 Target values supplied Environmental Resources Associates (ERA).

Table 9. Analyses of blind submittals of NIST SRM 2711 (with moderately elevated metals) by
XRAL, EWU, and ACZ laboratories.

Element	Reporting units	^a NIST mean	^b NIST plus or minus	EWU value	^c XRAL value	ACZ value	EWU ^d Recov. %	XRAL ^d Recov. %	ACZ ^d Recov. %
Al	%	6.53	0.09	6.42	6.28		98.3%	96.1%	
Ca	%	2.88	0.08	2.76	2.80		95.8%	97.3%	
Fe	%	2.89	0.06	3.12	2.75	1.95	108.0%	95.0%	67.5%
K	%	2.45	0.08	2.59	2.36		105.7%	96.1%	
Mg	%	1.05	0.03	1.16	0.99		110.5%	94.3%	
Na	%	1.14	0.03		1.07			94.1%	
P	%	0.09	0.01	0.08	0.08		93.0%	95.9%	
Ti	%	0.31	0.02	0.25	0.30		81.7%	98.9%	
Ag	ppm	4.6	0.4	4.7	4.5		101.5%	97.2%	
As	ppm	105	8	104	98	44	99.0%	93.3%	41.6%
Au	ppm	<i>0.03</i>							
Ba	ppm	726	38	715	711		98.5%	97.9%	
Be	ppm			2	2				
Bi	ppm								
Cd	ppm	41.7	0.3	38.7	39.5	36.9	92.8%	94.7%	88.5%
Ce	ppm	69		62	75		89.9%	108.0%	
Co	ppm	10		9	10		90.0%	95.0%	
Cr	ppm	47			65			138.3%	
Cu	ppm	114	2	110	102		96.5%	89.5%	
Eu	ppm	1.1							
Ga	ppm	15		14	27		93.3%	176.7%	
La	ppm	40		30	40		75.0%	100.0%	
Li	ppm				23				
Mn	ppm	638	28	656	585	455	102.8%	91.6%	71.3%
Mo	ppm	1.6		2.0	5.5		125.0%	344%	
Nb	ppm				9				
Nd	ppm	31			34			108.1%	
Ni	ppm	20.6	1.1	19	19		92.2%	92.2%	
Pb	ppm	1162	31	1205	1150	973	103.7%	99.0%	83.7%
Sb	ppm	19.4	1.8	19			97.9%		
Sc	ppm	9			10			111.1%	
Sn	ppm			3					
Sr	ppm	245.3	0.7	229	230		93.4%	93.8%	
Ta	ppm								
Th	ppm	14		15	12		107.1%	85.7%	
U	ppm	2.6		2.5					
V	ppm	81.6	2.9	73	81		89.5%	98.7%	
Y	ppm	25		23	25		92.0%	100.0%	
Yb	ppm	2.7			3			111.1%	
Zn	ppm	350	4.8	352	302	307	100.6%	86.3%	87.7%

a - Certified values (non-certified in italics).

b - at 95% confidence level.

c - mean of two analyses

d - % recovery relative to NIST mean values.

Table 10. Analyses of blind submittals of NIST SRM 2710 (with highly elevated metals) by XRAL, EWU, and ACZ laboratories.

Element	Reporting units	^a NIST mean	^b NIST plus or minus	EWU value	^c XRAL value	ACZ value	EWU ^d Recov. %	XRAL ^d Recov. %	ACZ ^d Recov. %
Al	%	6.44	0.08	6.28	5.93		97.5%	92.0%	
Ca	%	1.250	0.030	1.090	1.213		87.2%	97.1%	
Fe	%	3.38	0.10	3.39	3.05	2.44	100.3%	90.2%	72.2%
K	%	2.11	0.11	2.04	1.92		96.7%	91.2%	
Mg	%	0.853	0.042	0.850	0.790		99.6%	92.6%	
Na	%	1.14	0.06		0.99			86.4%	
P	%	0.106	0.015	0.096	0.100		90.6%	94.3%	
Ti	%	0.283	0.010	0.250	0.286		88.3%	101.1%	
Ag	ppm	35.3	1.5	35.2	40.0		99.7%	113.3%	
As	ppm	626	38	617	526	570	98.6%	84.0%	91.1%
Au	ppm	0.6							
Ba	ppm	707	51	644	660		91.1%	93.4%	
Be	ppm			2.4	2.0				
Bi	ppm								
Cd	ppm	21.8	0.2	20.1	15.3	18.9	92.2%	70.3%	86.7%
Ce	ppm	57		48	61		84.2%	107.6%	
Co	ppm	10		8	9		80.0%	90.0%	
Cr	ppm	39			50			128.2%	
Cu	ppm	2950	130	2815	2453		95.4%	83.2%	
Eu	ppm	1							
Ga	ppm	34		30	40		88.2%	117.6%	
La	ppm	34		24	31		70.6%	91.2%	
Li	ppm				35				
Mn	ppm	10100	400	9841	8790	7830	97.4%	87.0%	77.5%
Mo	ppm	19		18	21		94.7%	108.8%	
Nb	ppm				7				
Nd	ppm	23			24			102.9%	
Ni	ppm	14.3	1	13	14		90.9%	97.9%	
Pb	ppm	5532	80	5580	5243	5110	100.9%	94.8%	92.4%
Sb	ppm	38.4	3	33			85.9		
Sc	ppm	8.7			9			103.4%	
Sn	ppm								
Sr	ppm	240		285	300		118.8%	124.9%	
Ta	ppm								
Th	ppm	13		14	11		107.7%	84.6%	
U	ppm	25		24.6					
V	ppm	76.6	2.3	67	70		87.5%	91.8%	
Y	ppm	23		18	20		78.3%	87.0%	
Yb	ppm	1.3			2			179.5%	
Zn	ppm	6952	91	6815	5253	6000	98.0%	75.6%	86.3%

a - Certified values (non-certified in italics).
b - at 95% confidence level.
c - mean of three analyses
d - % recovery relative to NIST mean values.

ACZ Recovery Relative to Blind NIST SRM certified values

NIST SRMs 2710 and 2711 were submitted to the ACZ Laboratory as blind samples and the analytical results and percent recovery (relative to NIST certified values) are listed in [tables 9](#) and [10](#). Mean recoveries for the two NIST SRMs are between 85% and 90% for Pb, Zn and Cd (88.1%, 87%, and 87.6%, respectively), and are between 65% and 75% for Mn, Fe and As (74%, 70% and 66.4%, respectively). Recoveries were considerably less than those reported by ACZ from the ERA SRMs.

Comparison between laboratories of analyses of NIST Standards

Four of the five laboratories (USGS-EDXRF, EWU, XRAL, and ACZ laboratories) analyzed NIST SRMs 2710 and 2711 as either known standards, blind submittals, or as both (discussed earlier); analyses of NIST SRMs are lacking only for CHEMEX laboratories. How well do analyses of NIST SRMs by each lab compare to the NIST-certified values for the main elements of concern here (Pb, Zn, Fe, Mn, As, Cd)? The accuracy (or percent recovery) can be compared by element for each analyses or for the means of several analyses ([tables 4, 5, 9](#) and [10](#)). Visual comparison of the accuracy between labs is given by x-y plots (NIST values on the x-axis, lab values on the y-axis) for each of these elements in [figures 3, 4](#) and [5](#). For reference, the charts include a thin line with a slope of $y = 1.0 x$, indicating a perfect correlation with NIST-certified values. Linear regressions calculated by the least squares method from the data of each lab for each these elements (projected through origin) are given as the slope of the line in [tables 11 through 13](#) (column labeled “slope (y/NIST)”). The number of available analyses of NIST SRMs from each lab is given in the same tables. A third type of comparison is given by the mean percent recovery for each element, based on all the analyses of NIST SRMs by each lab. These values are also given in [tables 11 through 13](#).

For all of the elements of concern (Pb, Zn, Fe, Mn, As and Cd), the EWU Geochemical Laboratories gives the closest values to the certified values NIST SRMs (within 1% for Pb, Fe, Mn, and As, 3% for Zn and 5% for Cd). Analyses by USGS-EDXRF (Pb and Zn only) are nearly as accurate as those of EWU. XRAL and ACZ

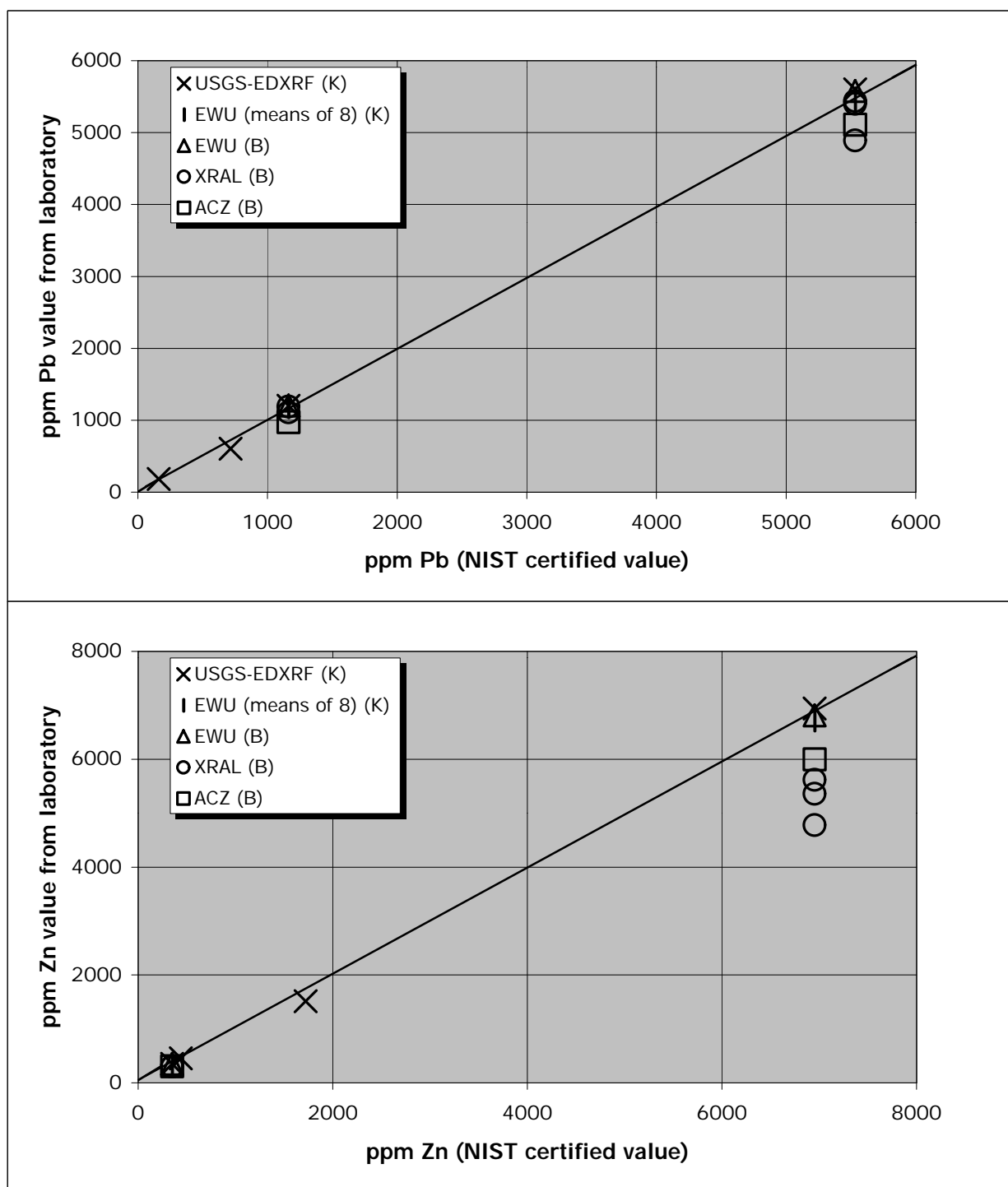


Figure 3. Comparison of laboratory analytical values of known ("K") and blind ("B") NIST SRMs with NIST certified values. Line represents 1:1 correlation for reference. (A) Pb, (B) Zn.

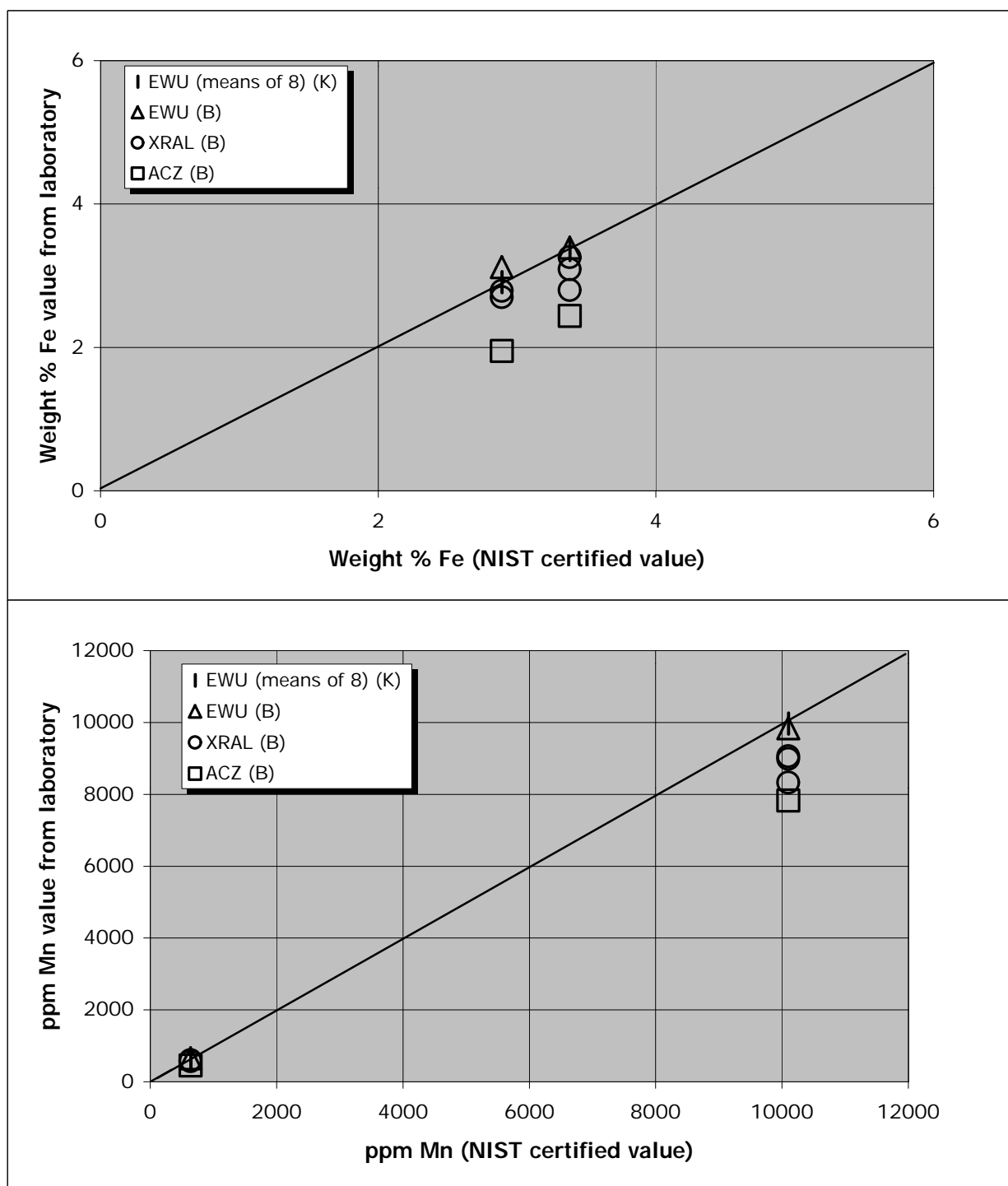


Figure 4. Comparison of laboratory analytical values of known ("K") and blind ("B") NIST SRMs with NIST certified values. Line represents 1:1 correlation for reference. (A) Fe, (B) Mn.

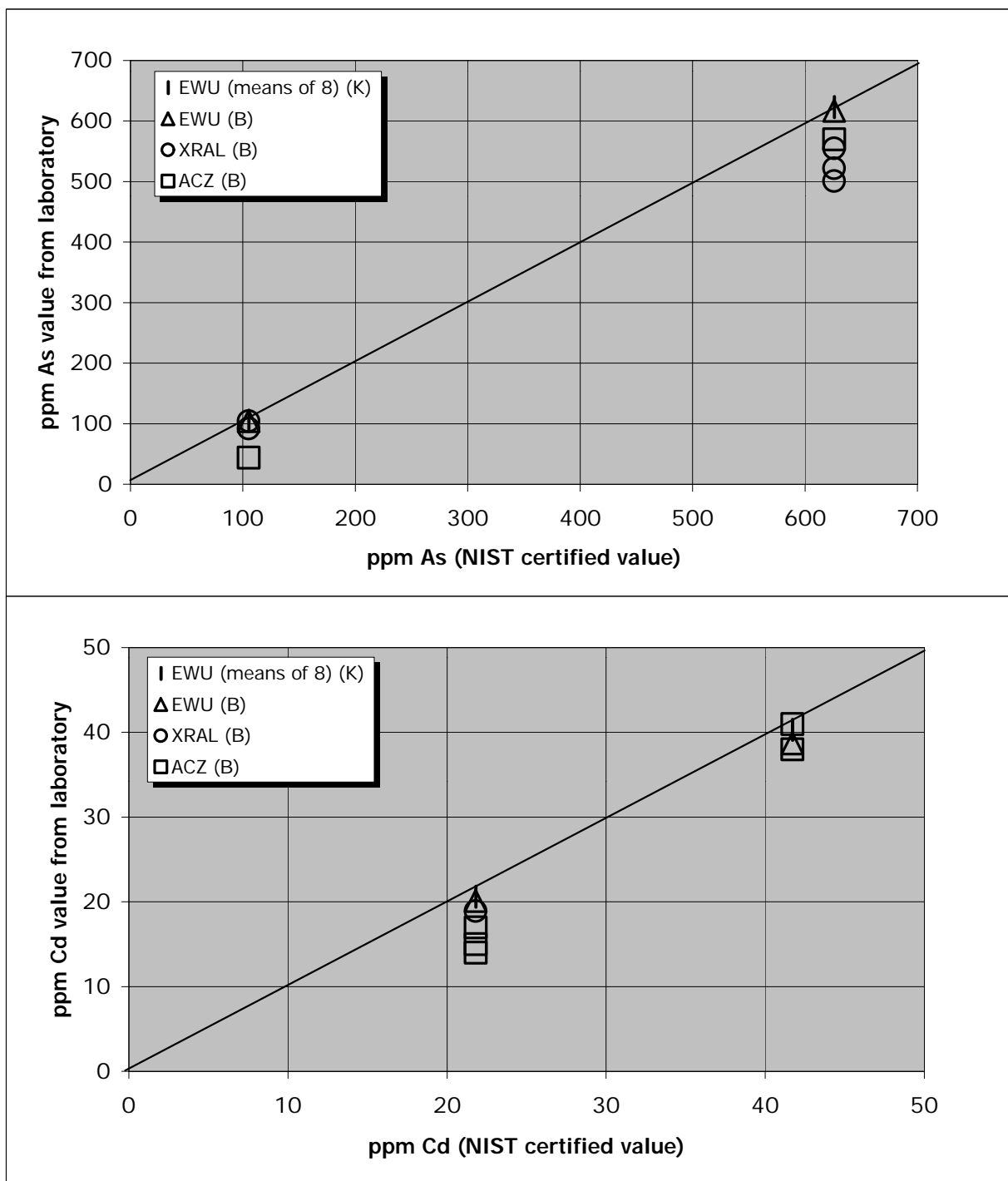


Figure 5. Comparison of laboratory analytical values of known ("K") and blind ("B") NIST SRMs with NIST certified values. Line represents 1:1 correlation for reference. (A) As, (B) Cd.

values are distinctly less than NIST-certified values for each of the 6 elements. Pb is 5 to 8% low by XRAL and ACZ, but the other 5 elements are from 10% to over 30% low by these labs.

Comparison between laboratories of analyses of sample splits

As discussed earlier, a large number of the soil and sediment samples were analyzed by more than one laboratory, each using a different sample preparation or analytical method. Since the EWU Geochemistry Laboratory produced analyses that most closely matched certified values for NIST SRMs, comparisons are made between the values of other labs and of EWU for Pb, Zn, Fe, Mn, As, and Cd in [figures 6 through 11](#). For most elements (except Fe) the correlation between labs is better and there is less scatter when elemental values in the analyzed samples are less than that of the NIST SRM with the highest metal values (2710). In [tables 11 through 13](#), the number of commonly analyzed samples between labs, the slope of a least-squares linear regression line (projected through the origin), and the coefficient of determination (R^2 , a measure of the scatter around the regression line) are given for each element at a given range of analytical values between each laboratory and the EWU Geochemistry Laboratory.

Comparison of the inter-laboratory analyses of Pb ([figure 6](#)) indicates that values of USGS-EDXRF are less than 3% higher and those of XRAL and ACZ are less than 2% lower than EWU values for Pb concentrations less than 8,000 ppm. The scatter around the linear regression is relatively narrow, with R^2 values of 0.96 or better ([table 11](#)). In other words, for Coeur d'Alene valley samples below 8,000 ppm Pb, the four laboratories (USGS-EDXRF, EWU, XRAL, and ACZ) give comparable analytical values for Pb (within 5%). Above 8,000 ppm Pb, the values of USGS-EDXRF, XRAL, and ACZ are 6-11% lower than those EWU, and the scatter is higher. On the other hand, Pb analyses by CHEMEX for values less than 8,000 ppm Pb are considerably lower (23%) than those of EWU, and the scatter is even higher ($R^2 = 0.85$). Although we are lacking data from CHEMEX on the accuracy of its analyses relative to NIST SRMs, we can infer, from the comparison with EWU analyses of the same samples, that the accuracy or percent recovery of CHEMEX Pb analyses is roughly 77%.

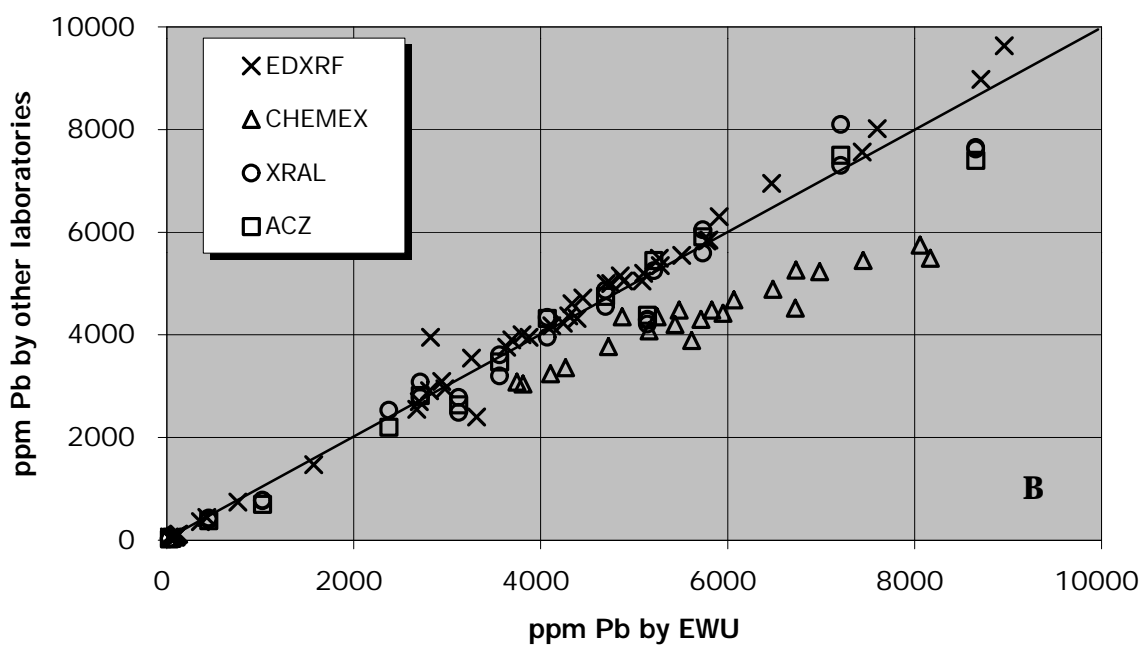
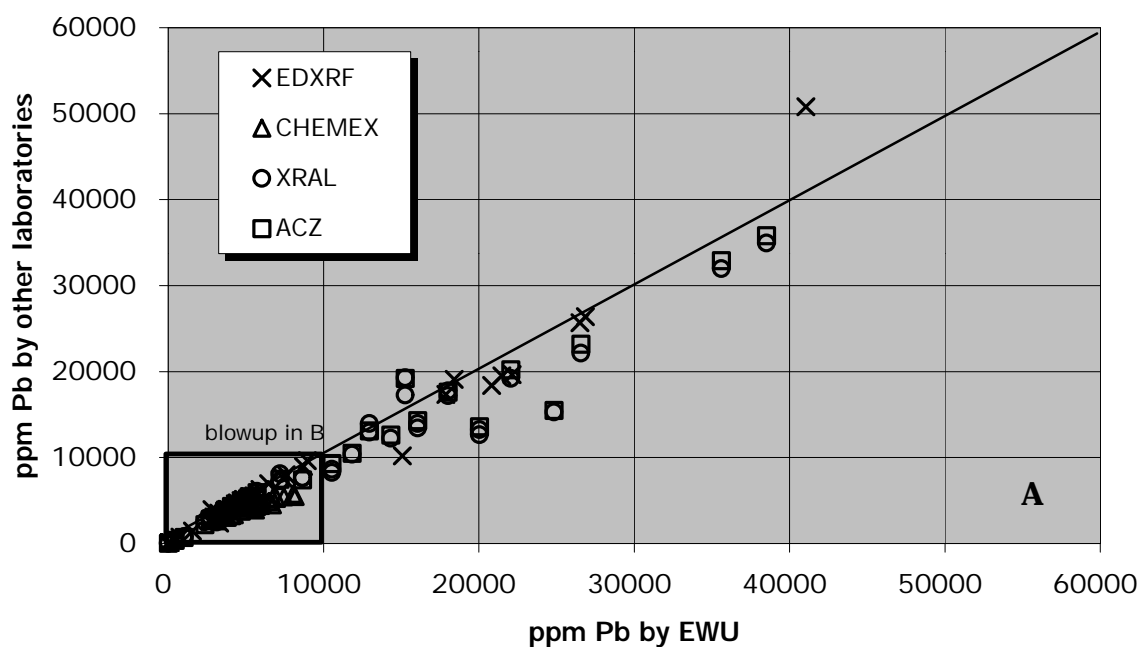


Figure 6. Pb analyses of sample splits analysed by EWU and by one of the other 4 laboratories. (A) Entire dataset, (B) blowup of the lower left corner of A. Line shows 1:1 correlation of analytical values.

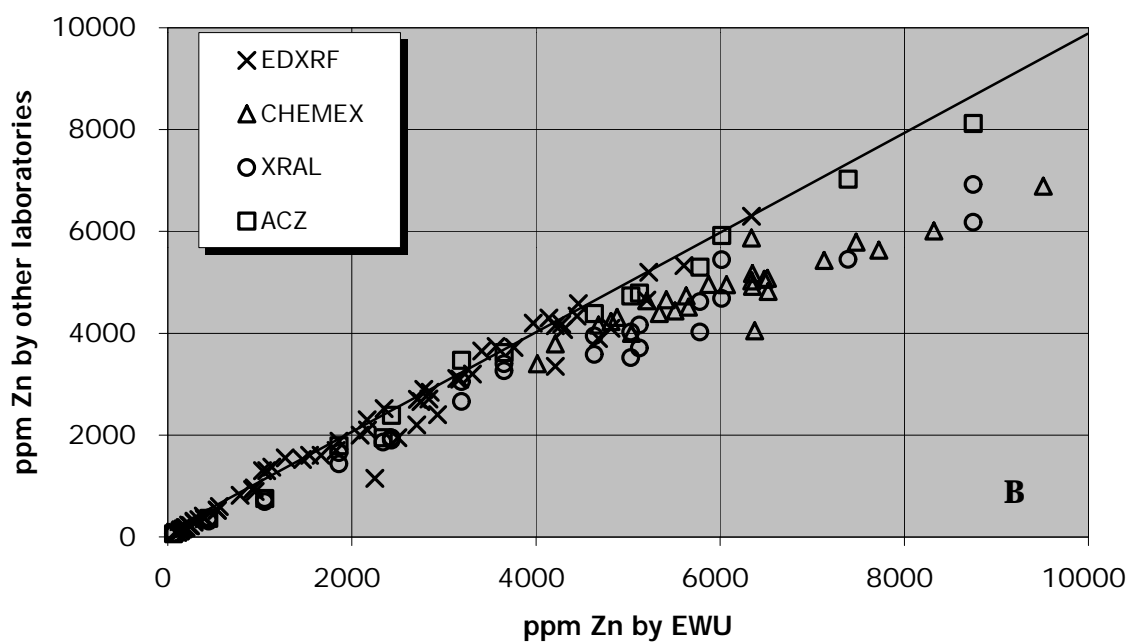
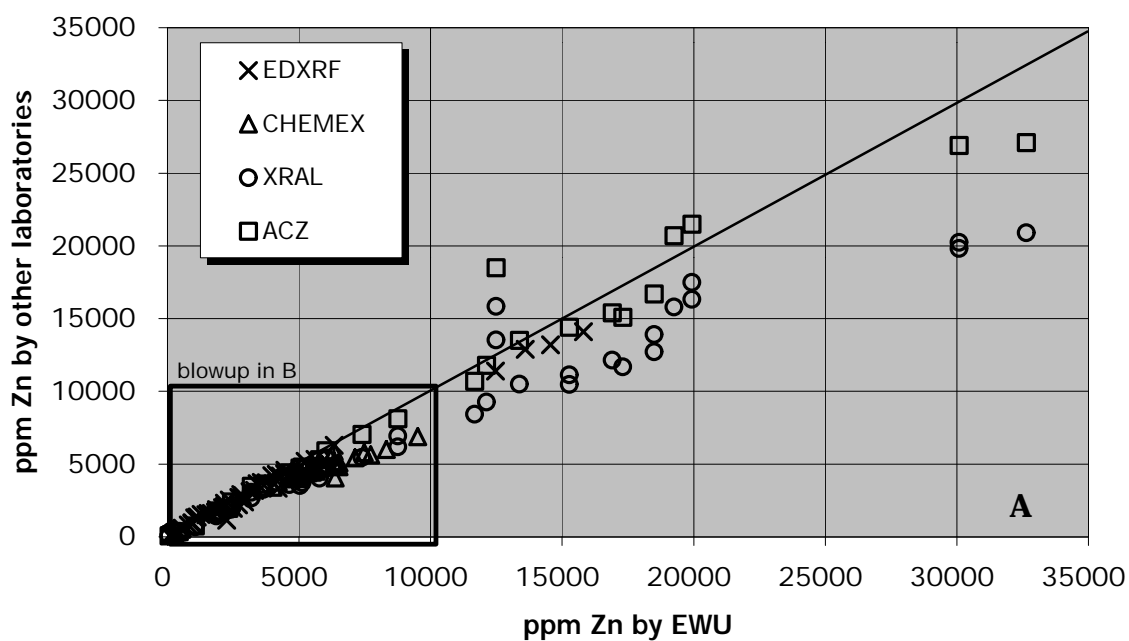


Figure 7. Zn analyses of sample splits analysed by EWU and by one of the other 4 laboratories. (A) Entire dataset, (B) blowup of the lower left corner of A. Line shows 1:1 correlation of analytical values.

Table 11. Comparisons of Pb and Zn values by EWU with those of other labs, and of NIST SRMs by all labs against certified values.

Analyzed element	¹ Laboratory data compared (y/x)	² Compositional range compared (ppm)	Number of sample pairs	³ coefficient of determ. (R ²)	⁴ slope (y/x)	Number of NIST SRM analyses	Mean Pb recov. of NIST SRM values	⁴ slope (y/NIST)
Pb	EWU/NIST	1,162 to 5,532	18	1.00	0.99	18	100.0%	0.99
Pb	USGS-EDXRF/EWU	20 to 8,000	59	0.99	1.03	4	100.8%	1.01
Pb	USGS-EDXRF/EWU	8,000 to 35,000	10	0.92	0.94			
Pb	CHEMEX/EWU	20 to 8,000	20	0.85	0.77			
Pb	XRAL/EWU	20 to 8,000	25	0.96	0.98	5	96.5%	0.95
Pb	XRAL/EWU	8,000 to 35,000	18	0.94	0.92			
Pb	ACZ/EWU	20 to 8,000	13	0.98	1.00	2	88.1%	0.92
Pb	ACZ/EWU	8,000 to 35,000	14	0.89	0.89			
Analyzed element	Laboratory data compared (y/x)	Compositional range compared (ppm)	Number of sample pairs	coefficient of determ. (R ²)	slope (y/x)	Number of NIST SRM analyses	Mean Zn recov. of NIST SRM values	slope (y/NIST)
Zn	EWU/NIST	350 to 6,952	18	1.00	0.97	18	98.1%	0.97
Zn	USGS-EDXRF/EWU	80 to 7,000	65	0.98	0.96	4	97.9%	0.99
Zn	USGS-EDXRF/EWU	7,000 to 16,000	4	0.91	0.91			
Zn	CHEMEX/EWU	4,000 to 7,000	22	0.52	0.81			
Zn	CHEMEX/EWU	7,000 to 10,000	5	0.89	0.74			
Zn	XRAL/EWU	60 to 7,000	26	0.97	0.80	5	79.8%	0.76
Zn	XRAL/EWU	7,000 to 33,000	20	0.68	0.79			
Zn	ACZ/EWU	60 to 7,000	13	0.99	0.95	2	87.0%	0.86
Zn	ACZ/EWU	7,000 to 33,000	14	0.84	0.94			

¹for samples analyzed by both methods (y=first listed lab, x = second listed lab)

²values given from analyses by lab listed second

³measure of goodness-of-fit of least squares linear regression through the paired analytical values, projected through origin.

⁴slope of least-squares linear regression through paired analytical values and the origin.

Comparison of the inter-laboratory analyses of Zn ([figure 7](#)) indicates that USGS-EDXRF and ACZ give values less than 5% lower than those of EWU for concentrations less than 7,000 ppm, while both CHEMEX and XRAL give values that are about 20% low ([table 11](#)). The relative recoveries by each laboratory relative to EWU are lower for Zn concentrations above 7,000 ppm, and the scatter is higher.

Comparison of the inter-laboratory analyses of Fe ([figure 8](#)) indicates that, for concentrations below 16% Fe, analyses by ACZ and by XRAL are less than 8% low relative to EWU values (with considerable scatter: $R^2 = 0.90-0.92$), while CHEMEX analyses are about 16 % low ([table 12](#)). Only a few samples (analyzed by XRAL and ACZ) have Fe concentrations greater than 16%, and these few samples appear to have even lower Fe recovery relative to EWU values.

Comparison of the inter-laboratory analyses of Mn ([figure 9](#)) indicates that, for concentrations below 10,000 ppm, only XRAL analyses closely compare with those of EWU (within 1%); ACZ analyses are about 6% greater than, and CHEMEX are about 18% less than those of EWU ([table 12](#)). For Mn concentrations above 10,000 ppm, the scatter of the inter-laboratory analyses is even greater, comparisons are even worse for ACZ and CHEMEX, but recoveries are similar for XRAL.

Comparison of the inter-laboratory analyses of As ([figure 10](#)) indicates that, for low concentrations (less than 70 ppm) XRAL and ACZ give very similar values to those of EWU, while CHEMEX gives considerably lower values ([table 13](#)). At higher concentrations (but still below the As concentration of NIST SRM 2710), all 3 laboratories (XRAL, ACZ and CHEMEX) consistently yield values that are 11-14% less than those of EWU with relatively narrow scatter ($R^2 = 0.97-0.98$).

Comparison of the inter-laboratory analyses of Cd ([figure 11](#)) indicates that, for Cd concentrations less than 50 ppm, XRAL analyses are very close to those of EWU (within 2%) with little scatter, while those of CHEMEX and ACZ are 8-13% lower ([table 13](#)). At concentrations from 50 to 150 ppm Cd, relative recoveries of Cd by XRAL and ACZ are higher and even closer to EWU values, although scatter is higher.

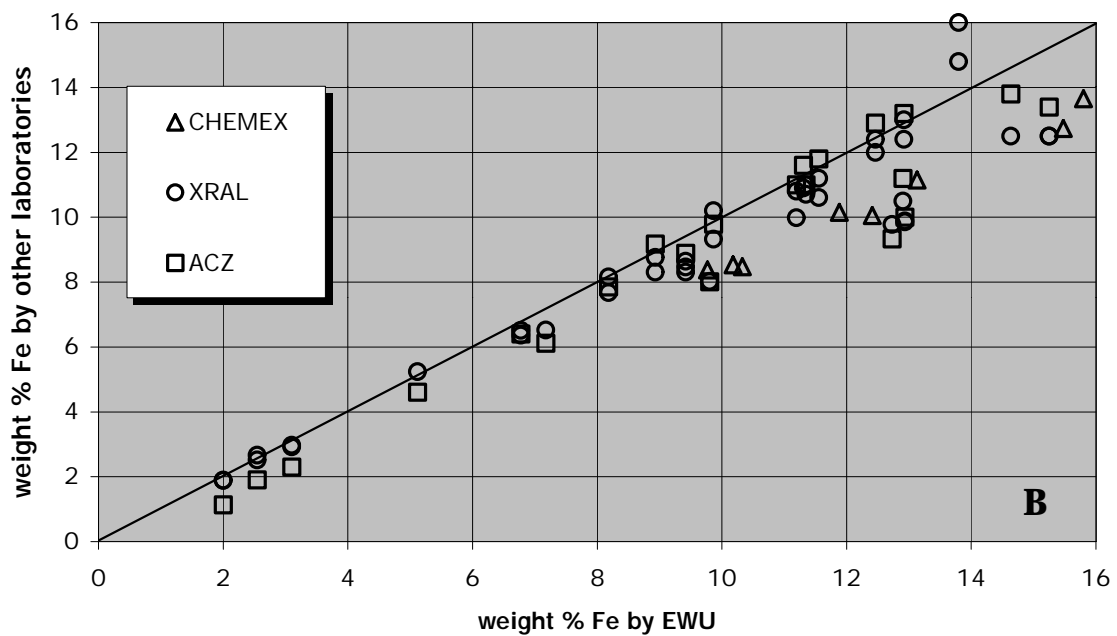
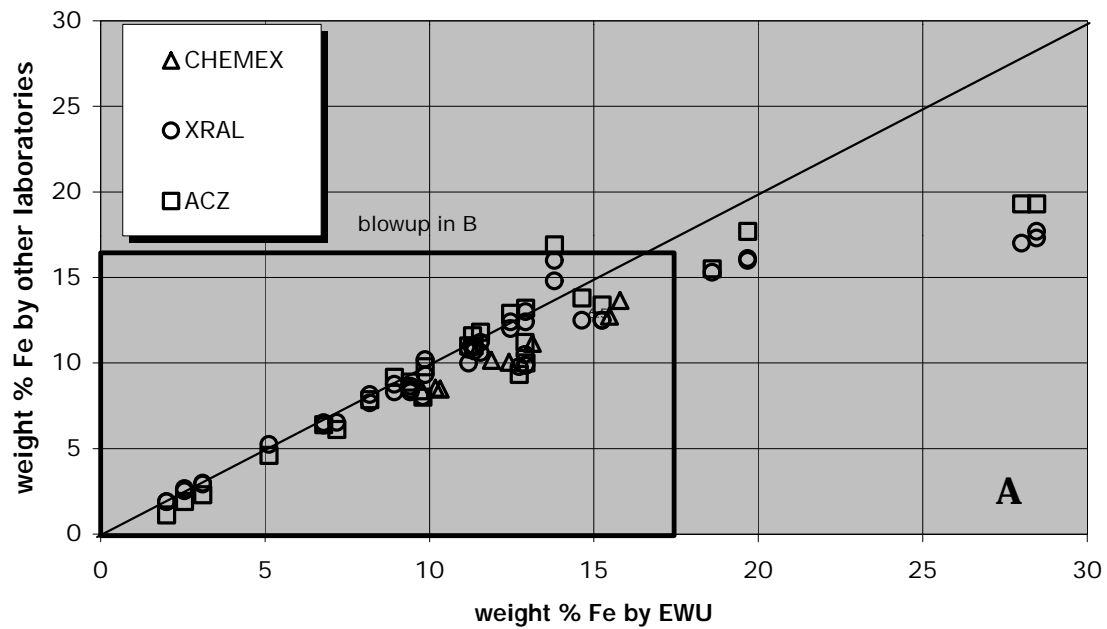


Figure 8. Fe analyses of sample splits analyzed by EWU and by one of the other 4 laboratories. (A) Entire dataset, (B) blowup of the lower left corner of A. Line shows 1:1 correlation of analytical values.

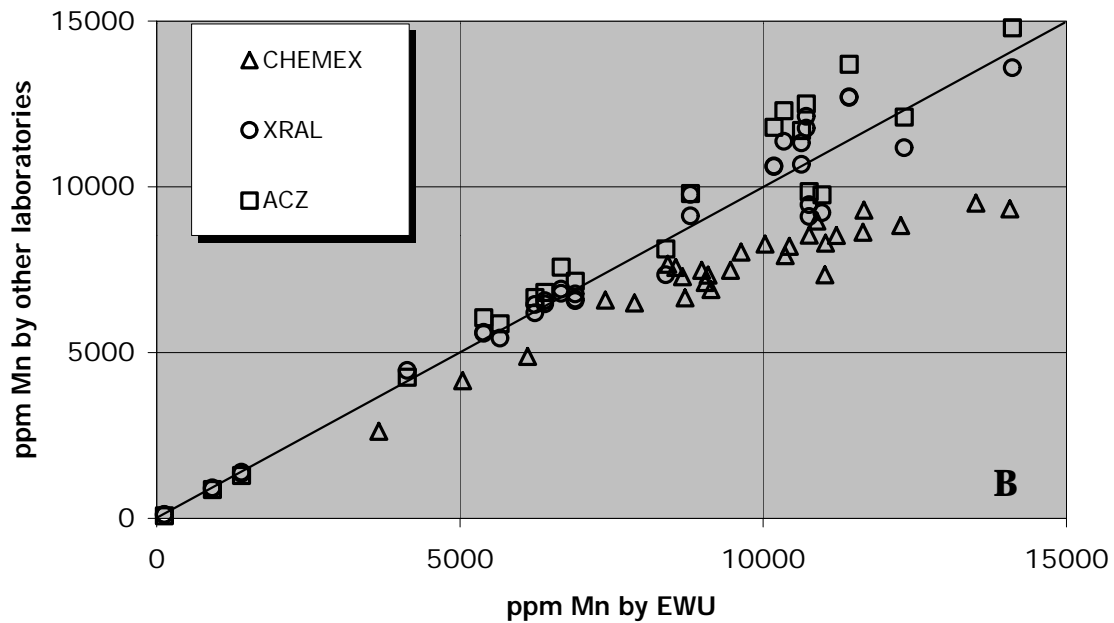
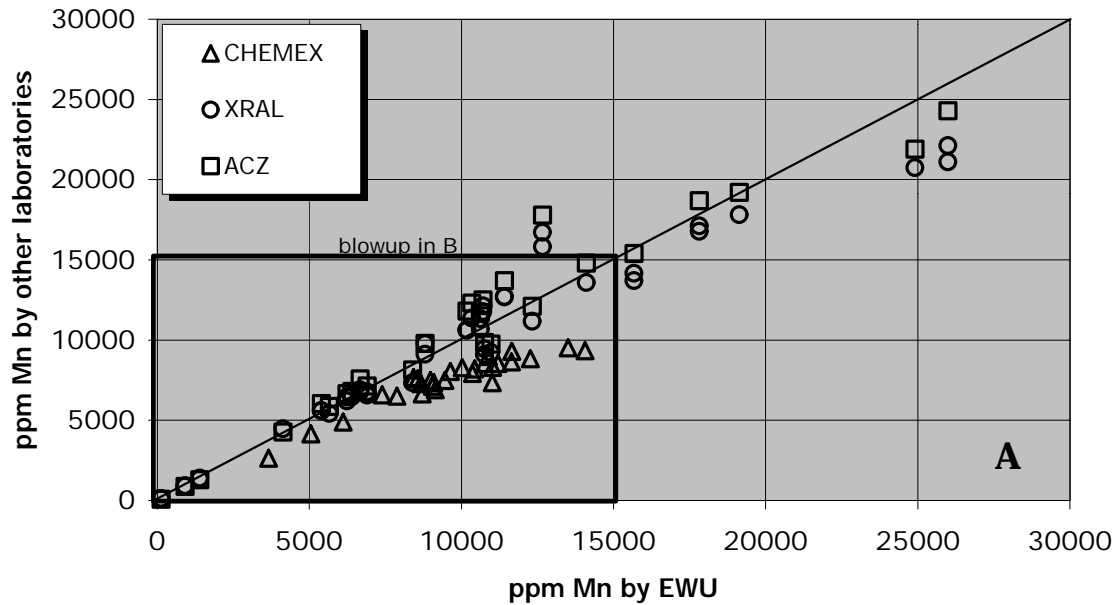


Figure 9. Mn analyses of sample splits analysed by EWU and by one of the other 4 laboratories. (A) Entire dataset, (B) blowup of the lower left corner of A. Line shows 1:1 correlation of analytical values.

Table 12. Comparisons of Fe and Mn values by EWU with those of other labs, and of NIST SRMs by all labs against certified values.

Analyzed element	¹ Laboratory data compared (y/x)	² Compositional range compared (wt%)	Number of sample pairs	³ coefficient of determ. (R ²)	⁴ slope (y/x)	Number of NIST SRM analyses	Mean Fe recov. of NIST SRM values	⁴ slope (y/NIST)
Fe	EWU/NIST	2.7 to 3.3	18	0.82	1.00	18	100.6%	1.00
Fe	CHEMEX/EWU	9 to 16	8	0.98	0.84			
Fe	XRAL/EWU	2 to 16	40	0.92	0.93	5	92.1%	0.92
Fe	ACZ/EWU	2 to 16	23	0.90	0.95	2	69.8%	0.84
Analyzed element	Laboratory data compared (y/x)	Compositional range compared (ppm)	Number of sample pairs	coefficient of determ. (R ²)	slope (y/x)	Number of NIST SRM analyses	Mean Mn recov. of NIST SRM values	slope (y/NIST)
Mn	EWU/NIST	638 to 10,100	18	1.00	0.99	18	99.5%	0.99
Mn	CHEMEX/EWU	3500 to 10,000	15	0.93	0.82			
Mn	CHEMEX/EWU	10,000 to 14,000	13	0.07	0.75			
Mn	XRAL/EWU	100 to 10,000	22	0.98	1.01	5	88.9%	0.87
Mn	XRAL/EWU	10,000 to 20,000	21	0.64	1.00			
Mn	ACZ/EWU	100 to 10,000	12	0.99	1.06	2	74.4%	0.78
Mn	ACZ/EWU	10,000 to 20,000	13	0.69	1.08			

¹for samples analyzed by both methods (y=first listed lab, x = second listed lab)

²values given from analyses by lab listed second

³measure of goodness-of-fit of least squares linear regression through the paired analytical values, projected through origin.

⁴slope of least-squares linear regression through paired analytical values and the origin.

Comparison of recoveries relative to EWU for CdA samples and to NIST for NIST SRMs for each laboratory indicates general similarities with a few interesting differences (tables 11 to 13). Recoveries of Pb and Zn by USGS-EDXRF are within 4% both of EWU values of CdA samples and of NIST certified values of NIST SRM. XRAL percent recoveries of certified values of NIST SRMs are similar to percent recoveries of EWU values for CdA samples for most elements except for Mn and Cd. XRAL recovery of Mn and Cd from CdA samples relative to EWU values is 98-100%, while Mn and Cd recovery by XRAL from NIST SRMs is much lower (87-89%). In other words for a given CdA sample, XRAL and EWU yielded similar Mn and Cd analytical values, even though XRAL had much poorer recovery of Mn and Cd from NIST SRMs than did EWU. In contrast ACZ analytical values for Pb, Zn, Fe, and Mn for split CdA samples are similar to EWU values (within 6%), even though ACZ analytical values of NIST SRMs were considerably lower (12-30%) than the certified value. ACZ values for As and Cd for split CdA samples are much lower than corresponding EWU values (87-89%), and are similar to ACZ percent recoveries of certified values for NIST SRMs. These differences in recovery for CdA samples versus for NIST SRMs probably reflects differences in the way these elements are held in the matrix of the two sample types and the contrasting efficiency of the several sample dissolution methods used.

Conclusions

This report documents the results of over 1,100 chemical analyses of samples of sediments and soils that were deposited in the CdA drainage basin before and during the era of large-scale mining in the CdA mining district, in north Idaho. These samples were collected as part of an effort to determine the character, distribution, thickness, volume, and metals contents of sediments and soils within the CdA drainage basin. Five different laboratories using different sample preparation and analytical techniques contributed geochemical data for this report. Analytical accuracy is given by comparison of data from multiple analyses of pulverized NIST SRMs by four of the laboratories. Analytical precision is calculated for data from two laboratories (EWU and XRAL) from repeated analyses of SRMs. Analyses of splits of over 21% of the soil and sediment samples by

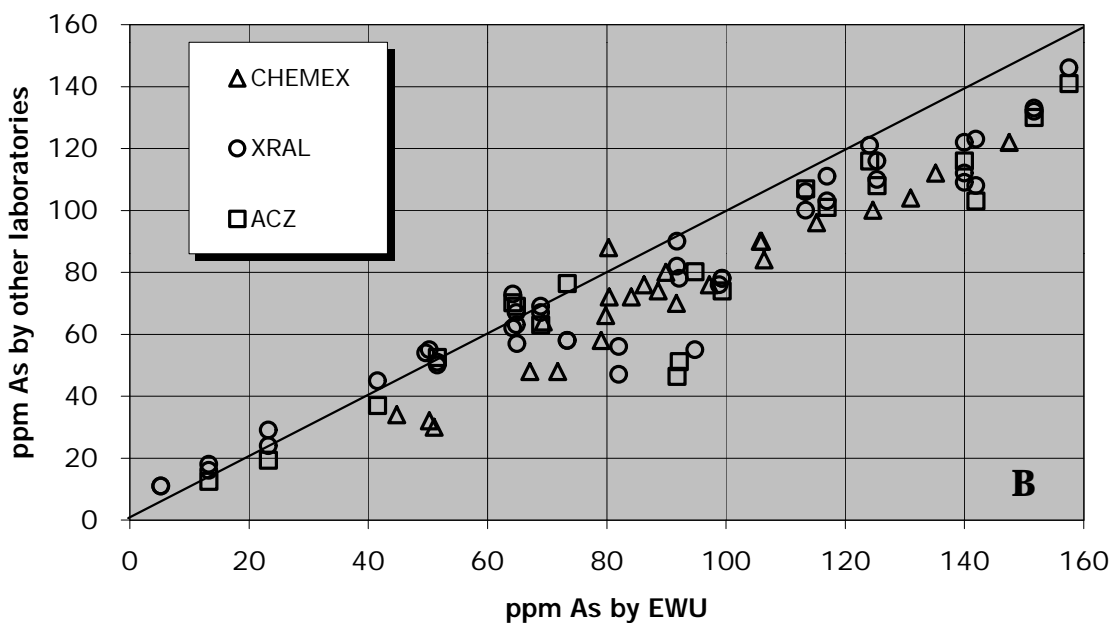
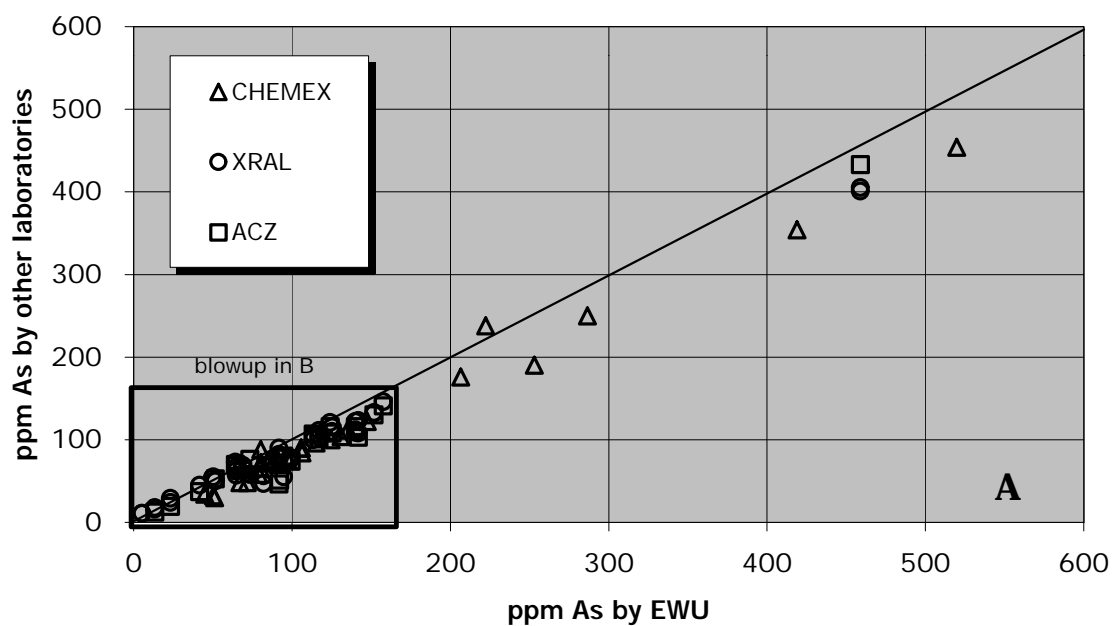


Figure 10. As analyses of sample splits analysed by EWU and by one of the other 4 laboratories. (A) Entire dataset, (B) blowup of the lower left corner of A. Line shows 1:1 correlation of analytical values.

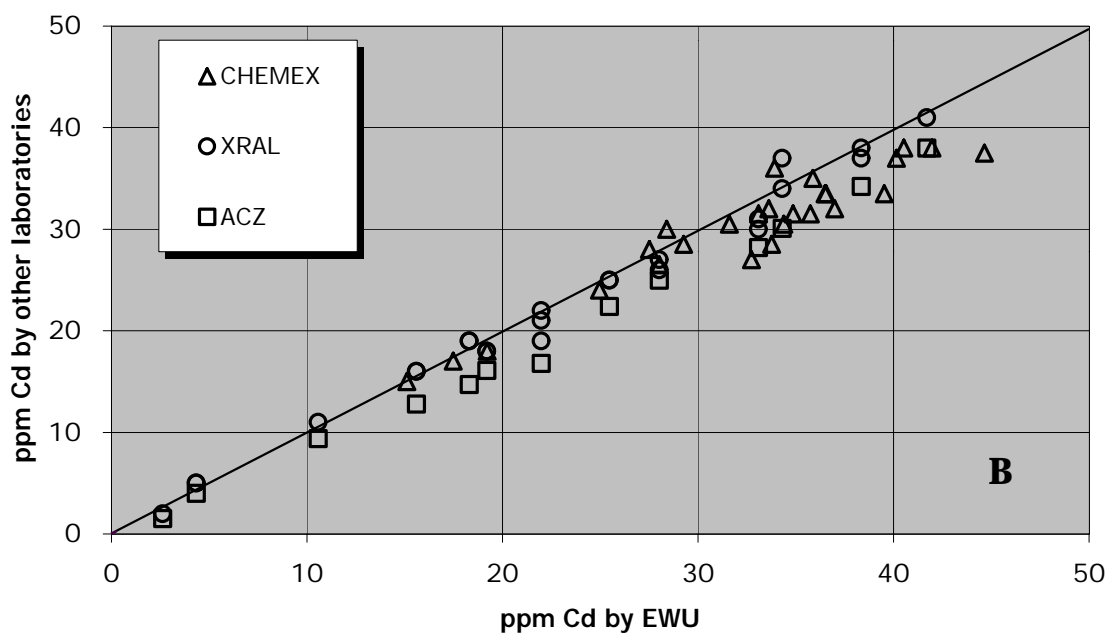
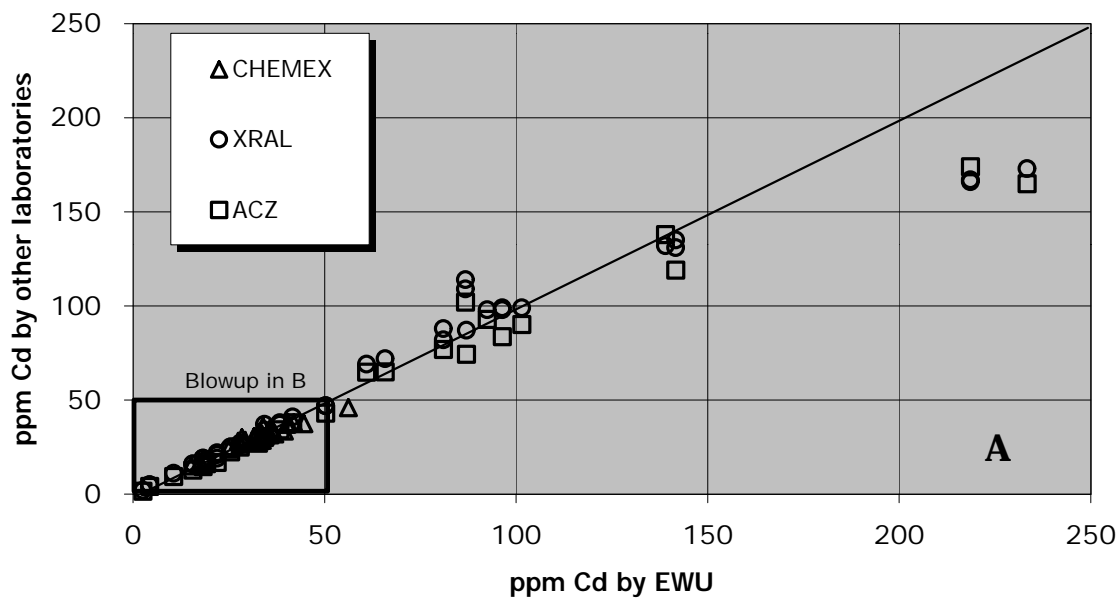


Figure 11. Cd analyses of sample splits analysed by EWU and by one of the other 4 laboratories. (A) Entire dataset, (B) blowup of the lower left corner of A. Line shows 1:1 correlation of analytical values.

Table 13. Comparisons of As and Cd values by EWU with those of other labs, and of NIST SRMs by all labs against certified values.

Analyzed element	¹ Laboratory data compared (y/x)	² Compositional range compared (ppm)	Number of sample pairs	³ coefficient of determ. (R ²)	⁴ slope (y/x)	Number of NIST SRM analyses	Mean As recov. of NIST SRM values	⁴ slope (y/NIST)
As	EWU/NIST	105 to 626	18	1.00	0.99	18	99.8%	0.99
As	CHEMEX/EWU	45 to 520	30	0.98	0.86			
As	XRAL/EWU	5 to 70	18	0.96	1.01			
As	XRAL/EWU	70 to 460	28	0.98	0.86	5	87.8%	0.84
As	ACZ/EWU	5 to 70	7	0.96	1.00			
As	ACZ/EWU	70 to 460	28	0.97	0.89	2	66.3%	0.90
Analyzed element	Laboratory data compared (y/x)	Compositional range compared (ppm)	Number of sample pairs	coefficient of determ. (R ²)	slope (y/x)	Number of NIST SRM analyses	Mean Cd recov. of NIST SRM values	slope (y/NIST)
Cd	EWU/NIST	21.8 to 41.7	18	0.99	0.96	18	95.3%	0.96
Cd	CHEMEX/EWU	15 to 45	27	0.89	0.92			
Cd	XRAL/EWU	2 to 50	24	0.99	0.98	5	80.1%	0.88
Cd	XRAL/EWU	50 to 150	19	0.85	1.02			
Cd	ACZ/EWU	2 to 50	13	0.99	0.87	2	87.6%	0.88
Cd	ACZ/EWU	50 to 150	11	0.87	0.94			

¹for samples analyzed by both methods (y=first listed lab, x = second listed lab)

²values given from analyses by lab listed second

³measure of goodness-of-fit of least squares linear regression through the paired analytical values, projected through origin.

⁴slope of least-squares linear regression through paired analytical values and the origin.

more than one laboratory allow direct comparison of the laboratories in analysis of CdA basin materials.

Inter-laboratory comparisons are made for 6 elements: lead (Pb), zinc (Zn), iron (Fe), manganese (Mn), arsenic (As), and cadmium (Cd). In general inter-laboratory correlations are better for samples within the compositional ranges of the NIST SRMs. Analyses by EWU are the most accurate relative to the NIST standards (within 1% for Pb, Fe, Mn, and As, 3% for Zn and 5% for Cd) and are the most precise (within 7%). USGS-EDXRF is similarly accurate for Pb and Zn. CHEMEX were the least accurate, yielding values 10-25% less than those of EWU. XRAL and ACZ are relatively accurate for Pb (within 5-8% of NIST values and of EWU analyses), but were considerably less accurate for the other 5 elements of concern (10-25% of NIST values). For some elements, however, XRAL and ACZ analyses of CdA samples were comparable to EWU analyses of the same samples, suggesting that, for some elements, XRAL and ACZ dissolutions are more effective on the matrix of the CdA samples than on the matrix of the NIST samples (obtained from soils around Butte, Montana).

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John Wallis completed the digital conversion of all the data and wrote the metadata file. The manuscript was greatly improved by the review of Laurie Balistreri.

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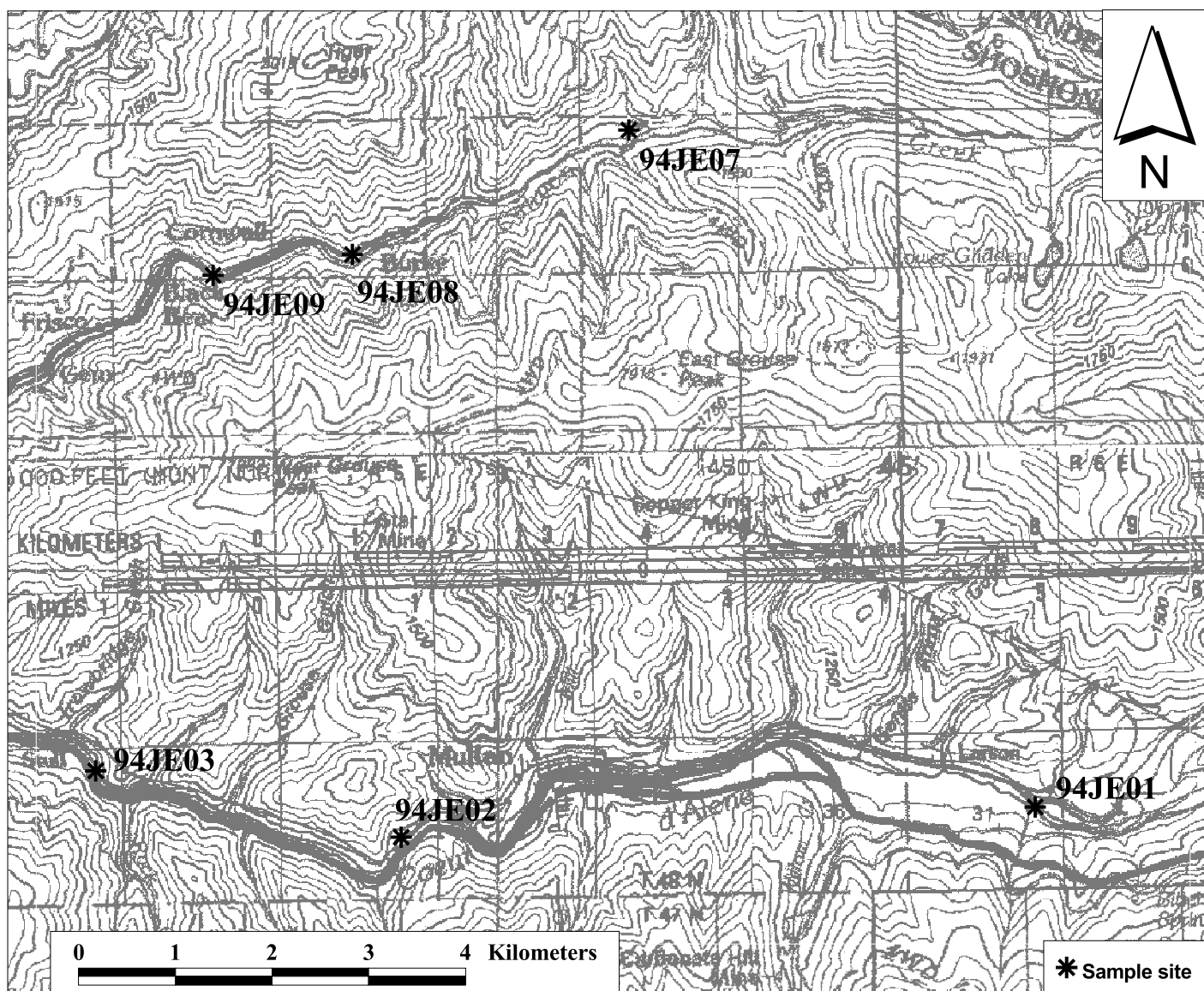
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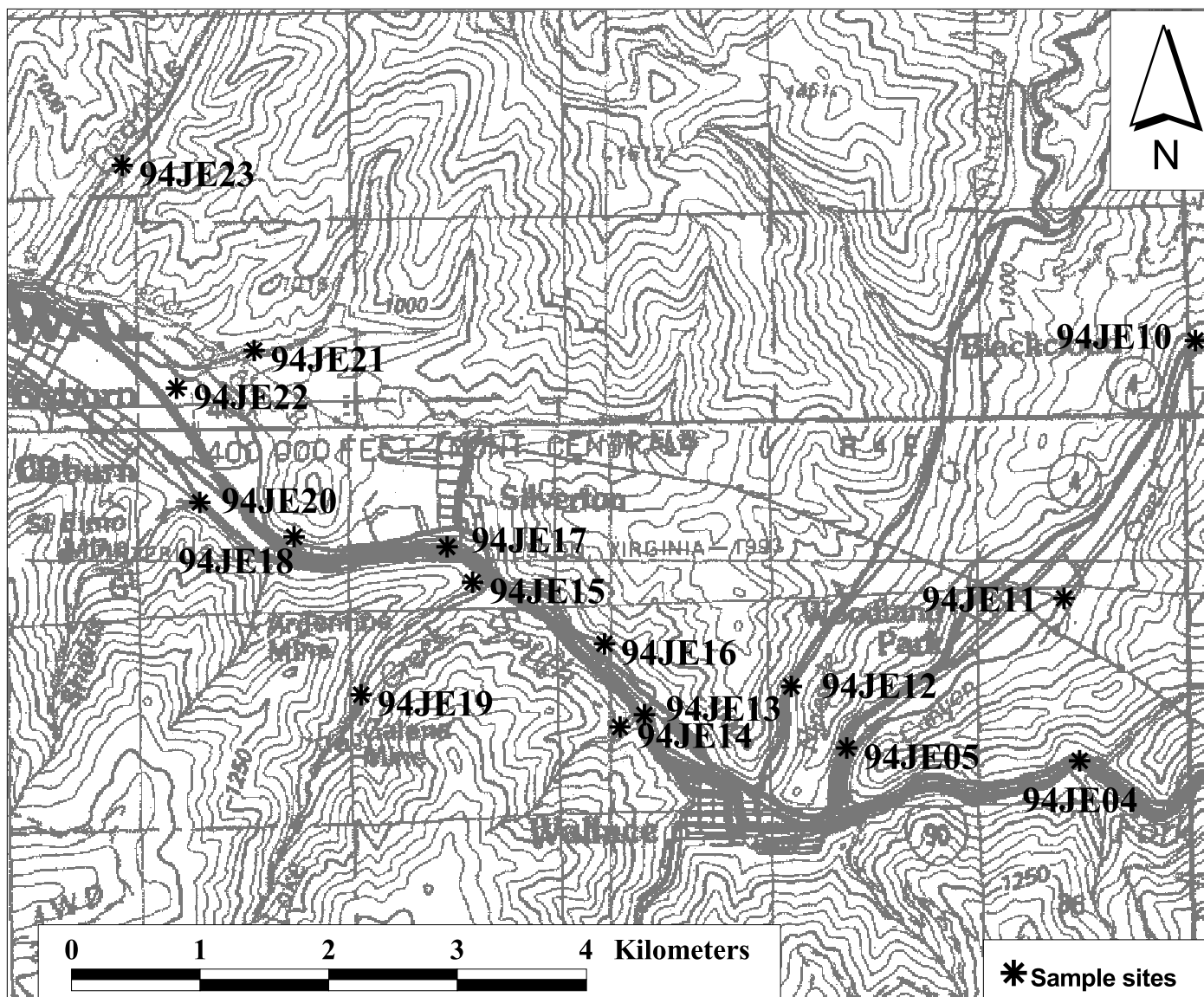
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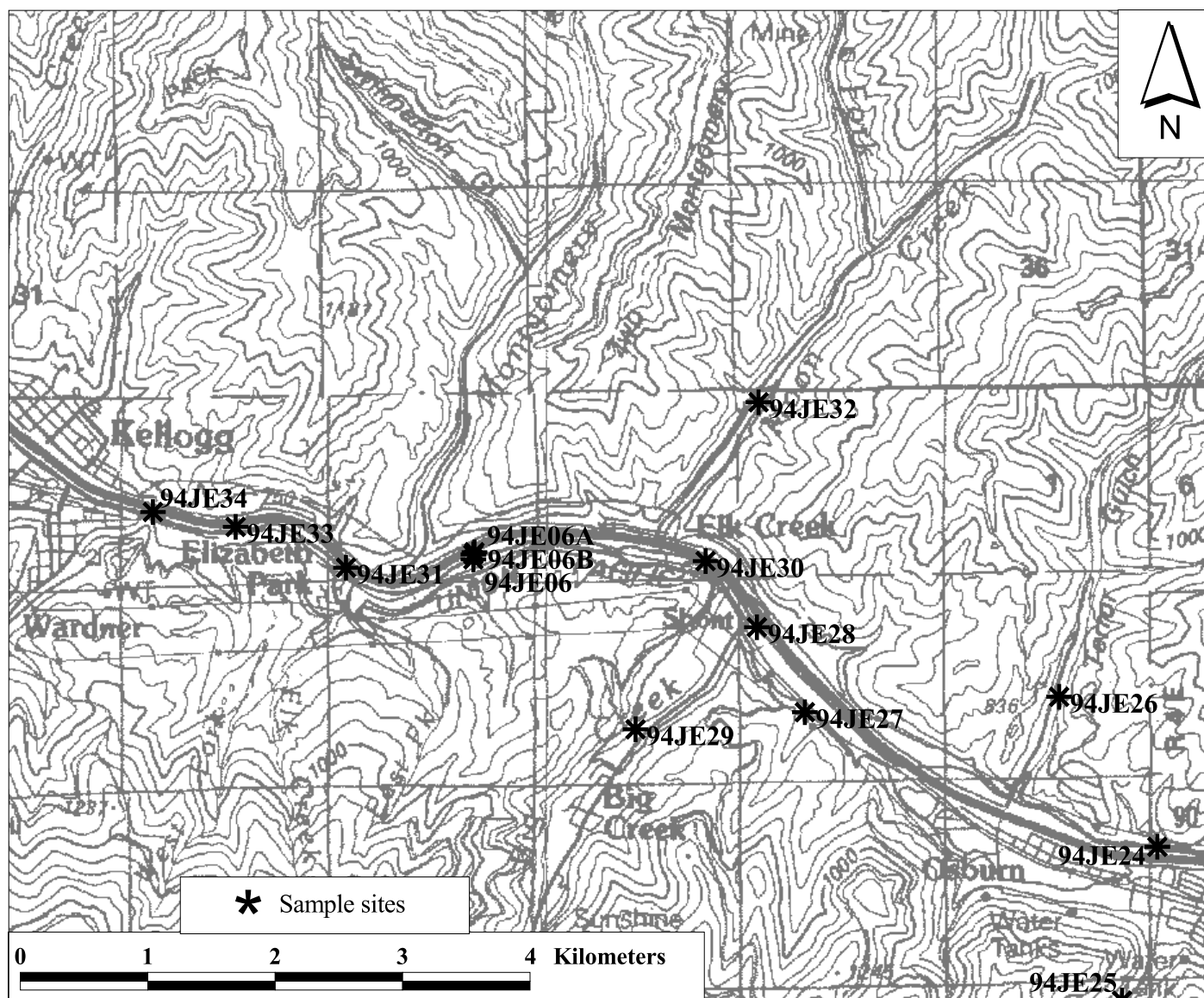
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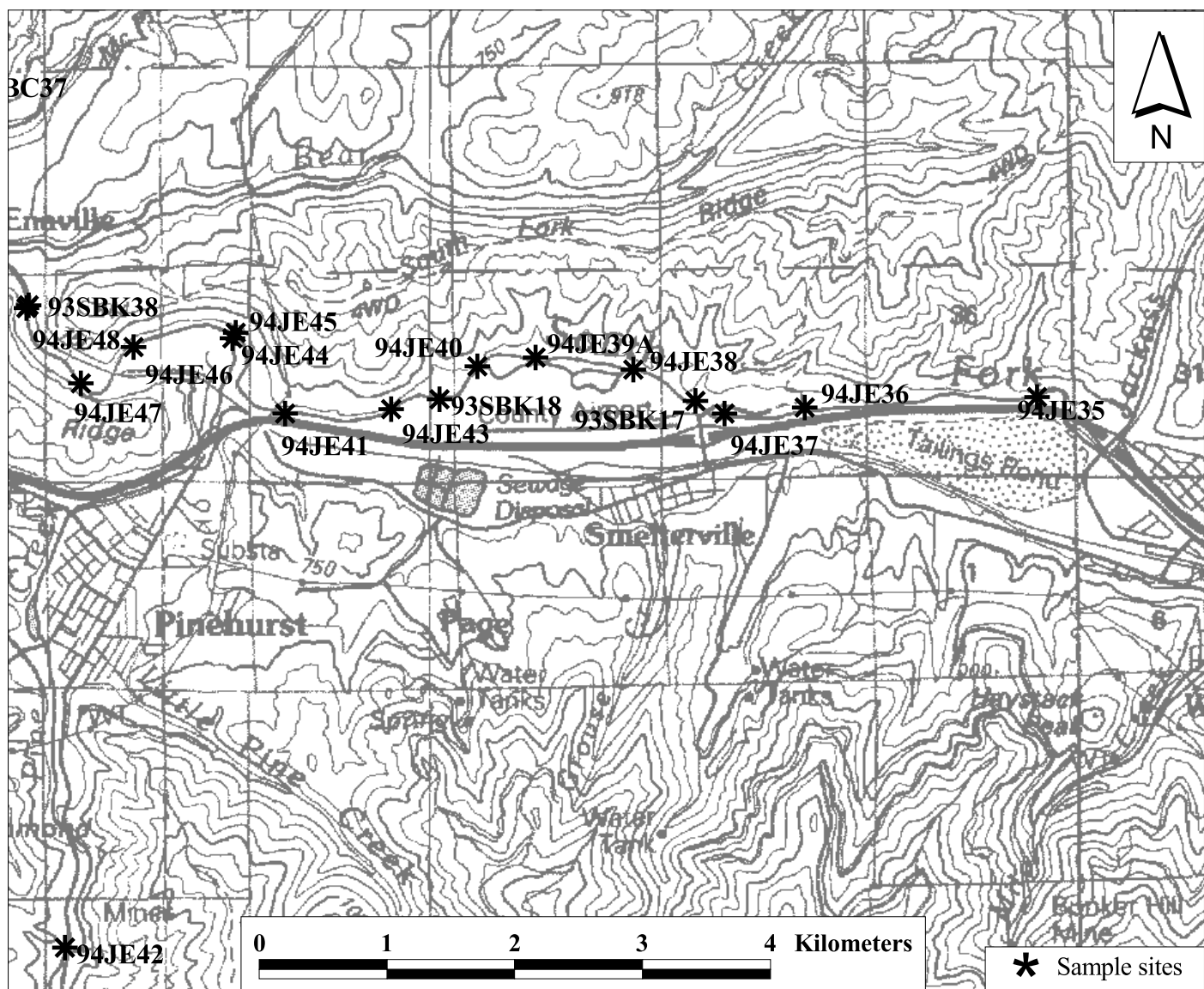
Map A-1: Sample site location map for the South Fork of the Coeur d'Alene River and tributaries near Mullan and Burke, Idaho. Base map from USGS Thomson Falls and Wallace, Idaho 1:100,000 quadrangles.



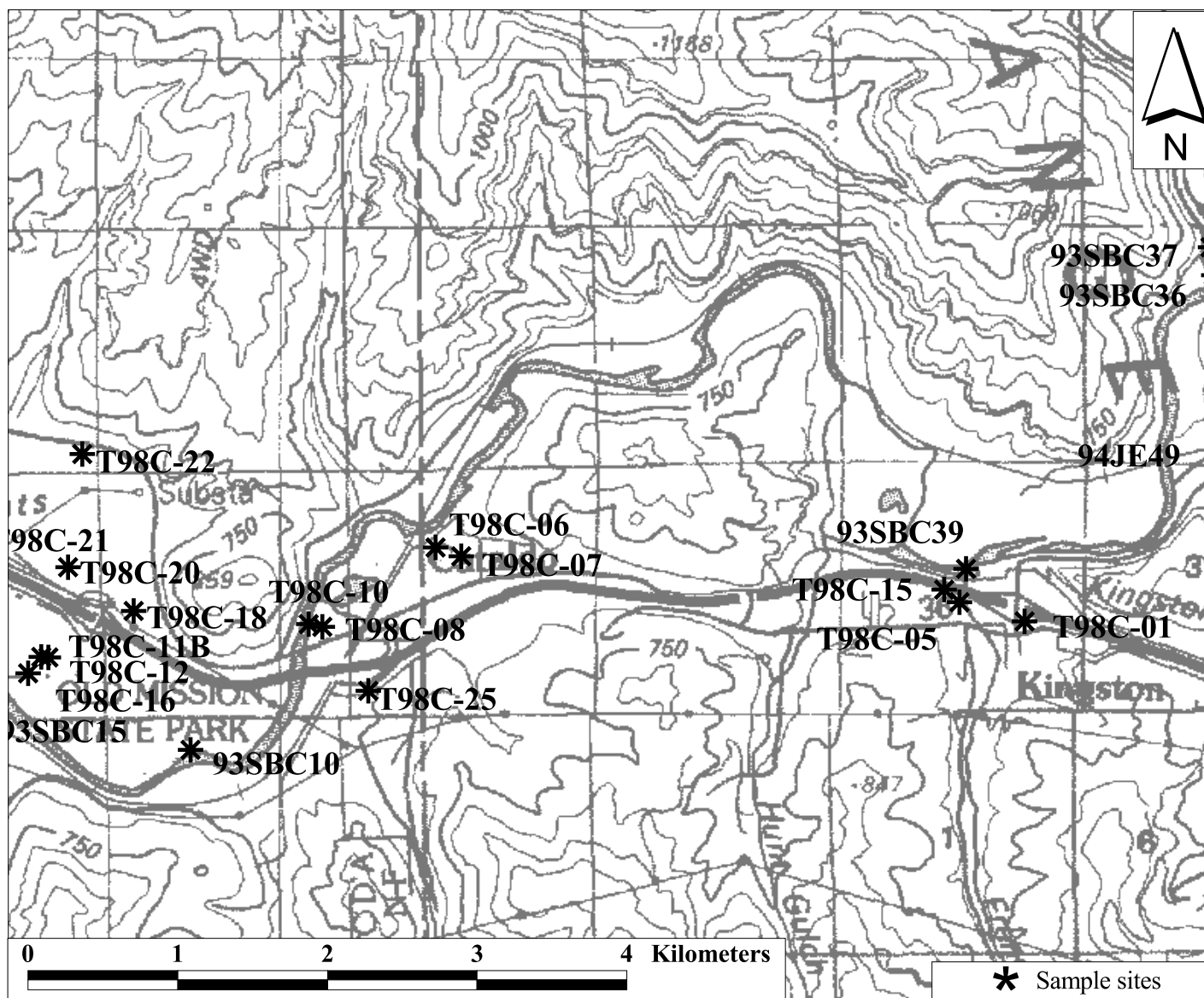
Map A-2: Sample site locations along the South Fork of the Coeur d'Alene River and tributaries near Wallace, Idaho.
Base map from USGS Thomson Falls and Wallace, Idaho 1:100,000 quadrangles.



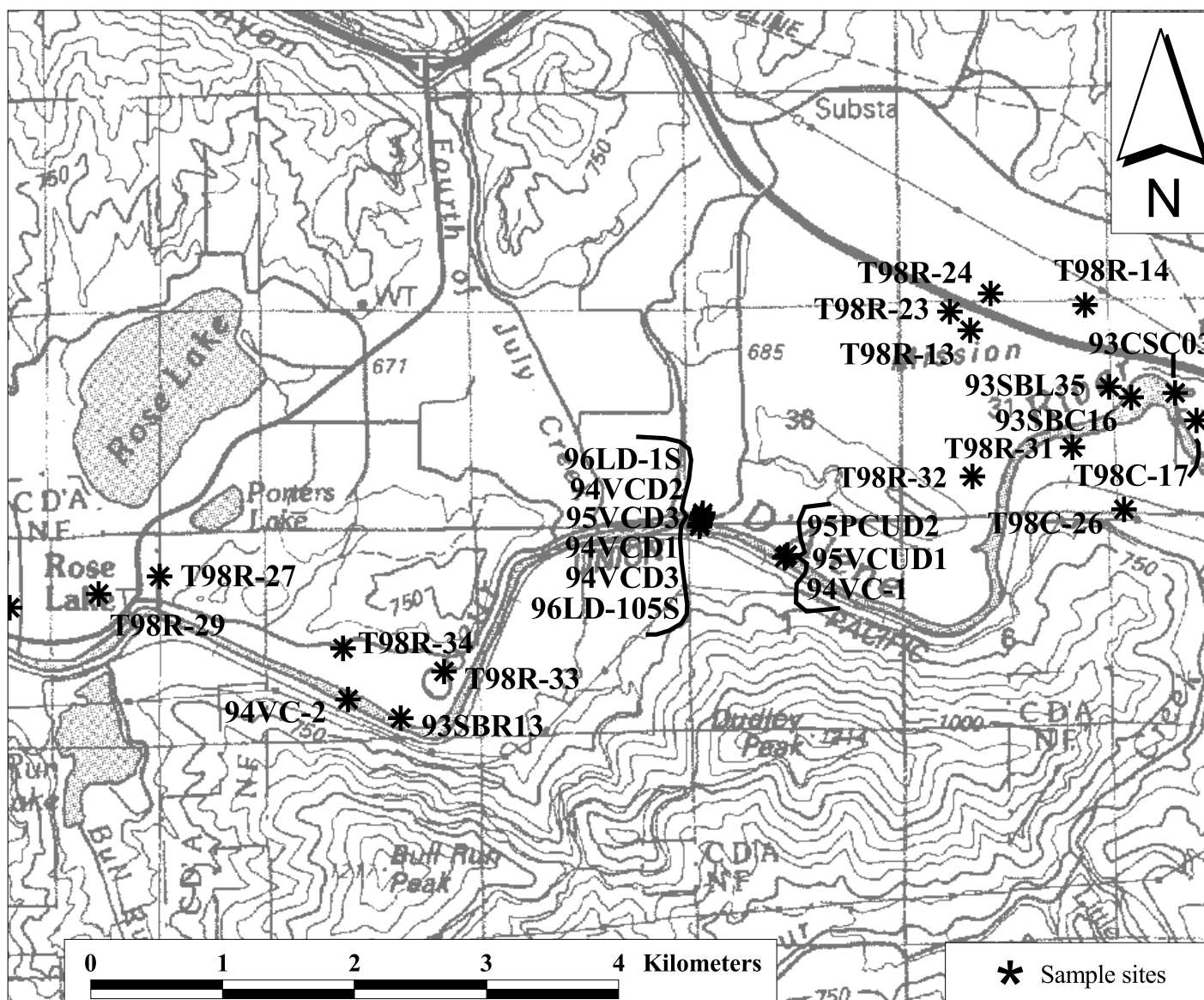
Map A-3: Sample site location map for the South Fork of the Coeur d'Alene River and tributaries between Osburn and Kellogg, Idaho. Base map from USGS Coeur d'Alene, Idaho 1:100,000 quadrangle.



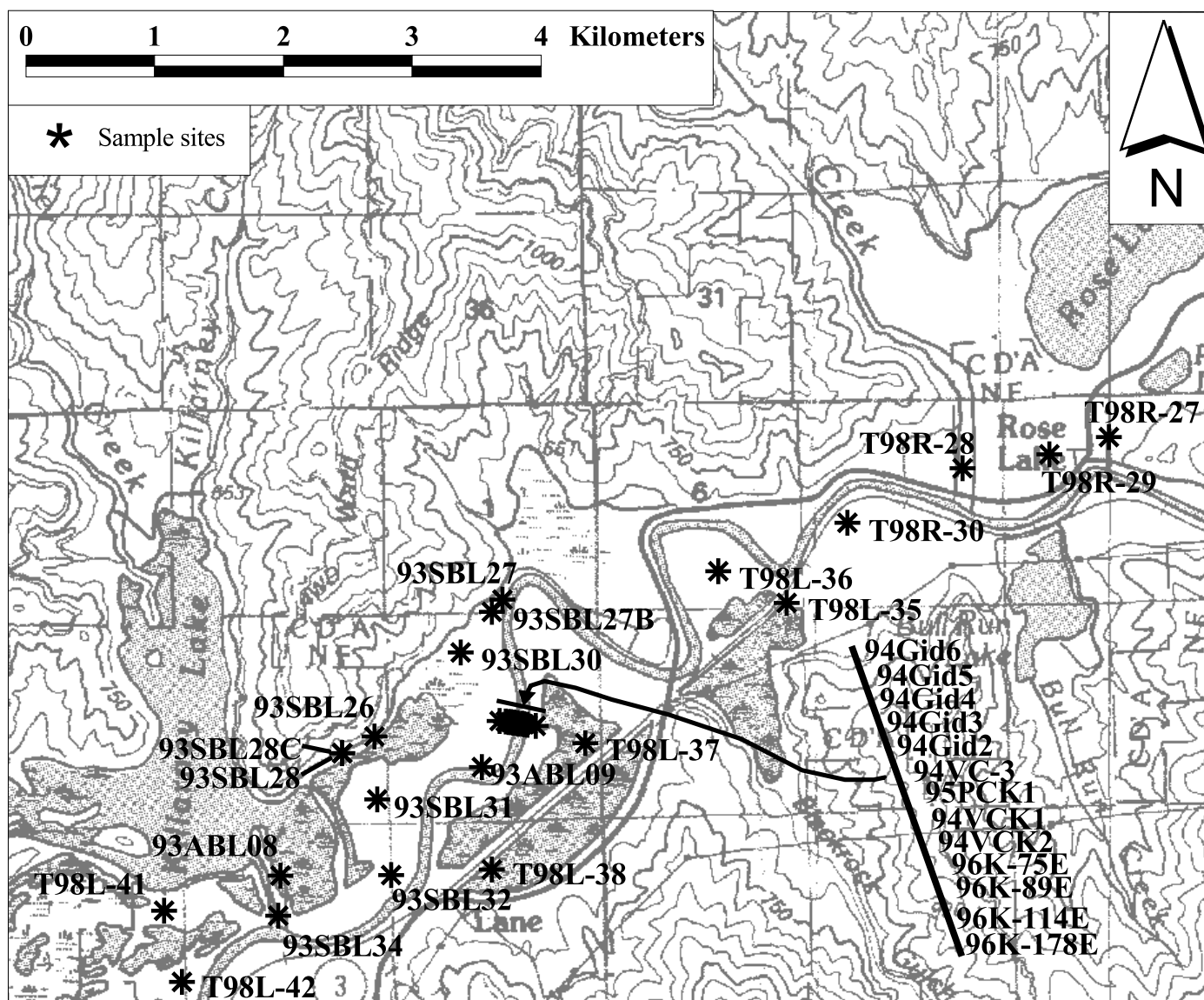
Map A-4: Sample site location map for the South Fork of the Coeur d'Alene River and tributaries between Kellogg and Pinehurst, Idaho. Base map from USGS Coeur d'Alene, Idaho 1:100,000 quadrangle.



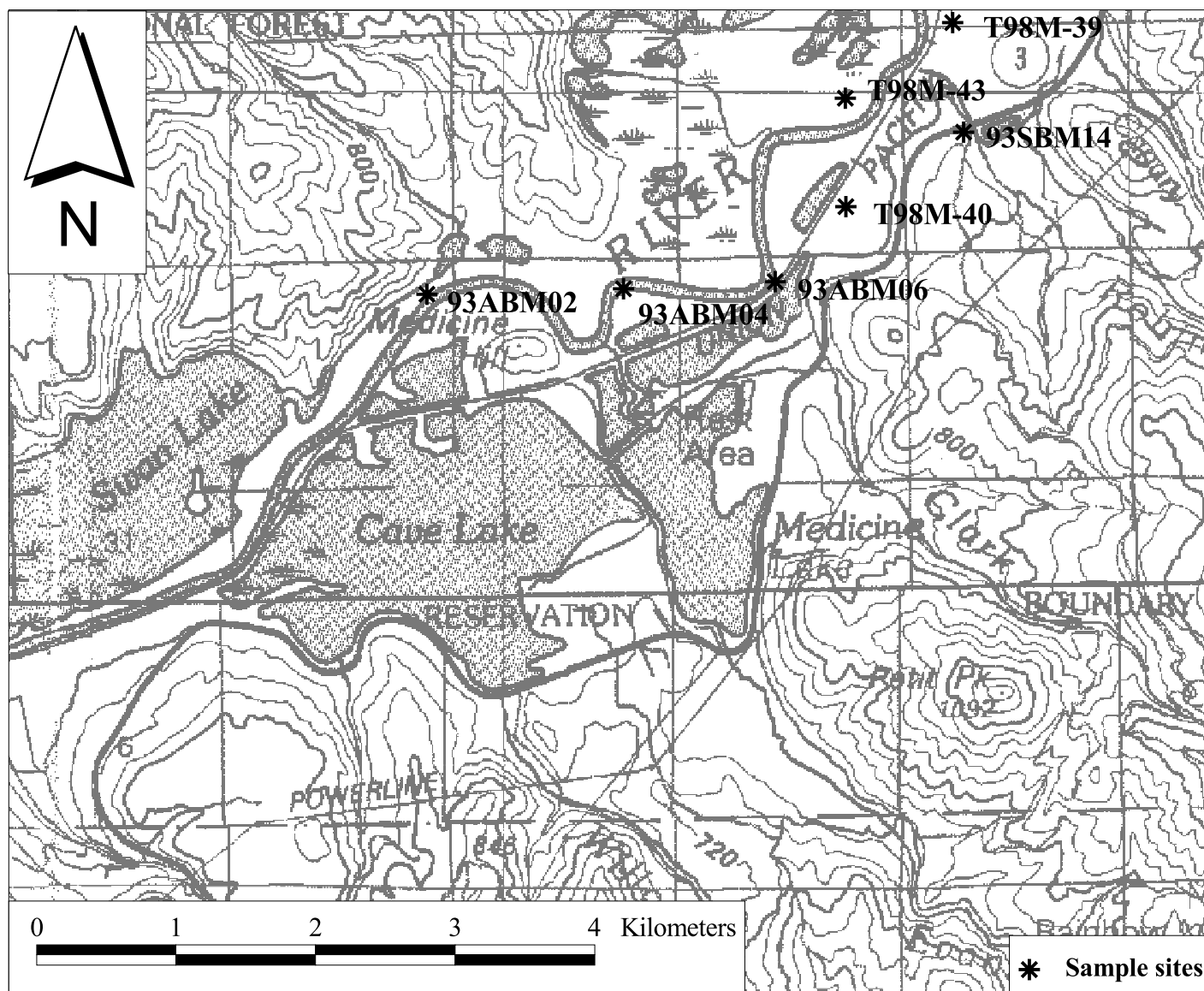
Map A-5: Sample site location map for the North Fork and mainstem of the Coeur d'Alene River between Enaville and the Cataldo Mission, Idaho. Base map from USGS Coeur d'Alene, Idaho 1:100,000 quadrangle.



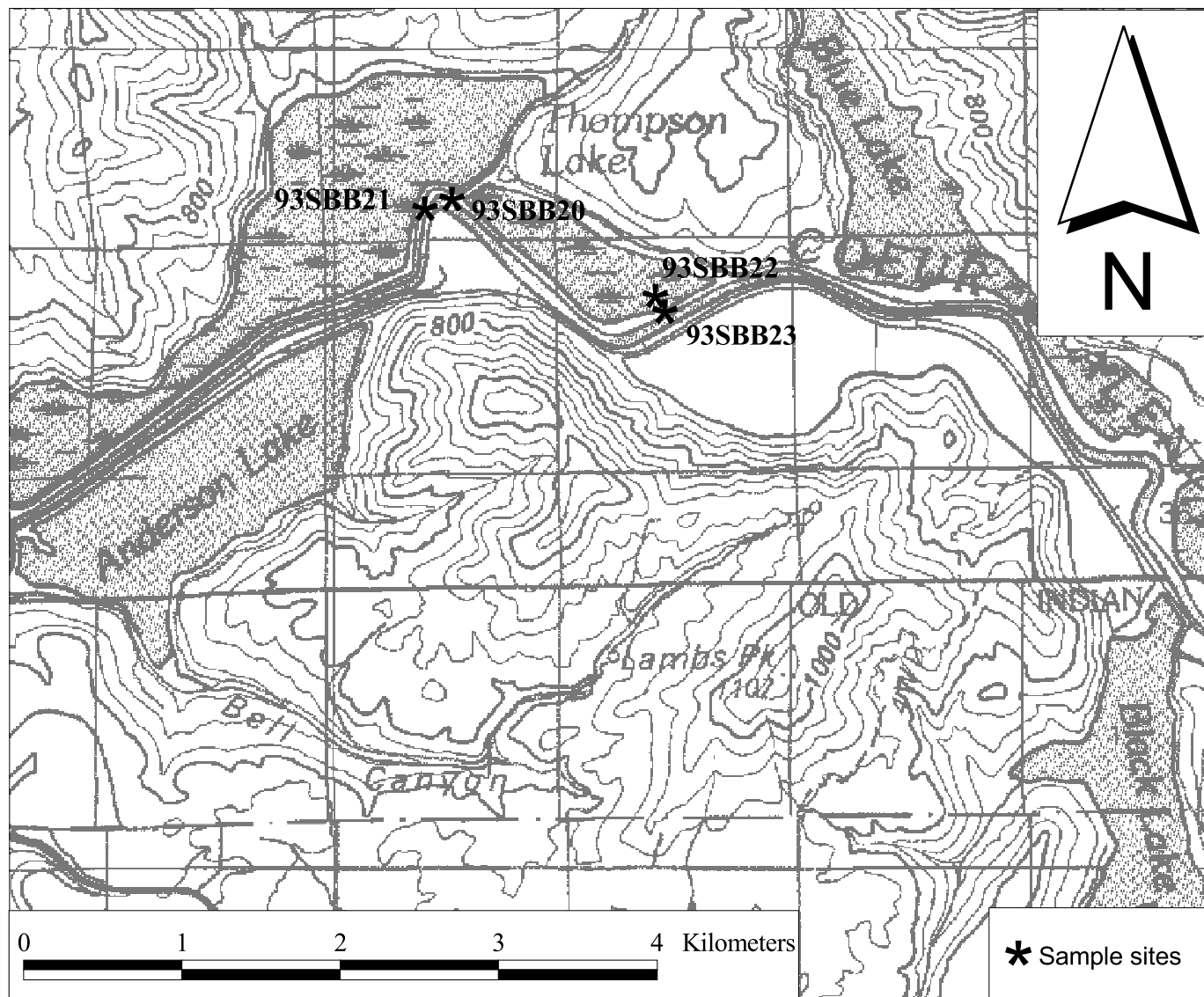
Map A-6: Sample site locations for the mainstem Coeur d'Alene River between Cataldo Mission and Rose Lake, Idaho. Base map from USGS Coeur d'Alene, Idaho 1:100,000 quadrangle.



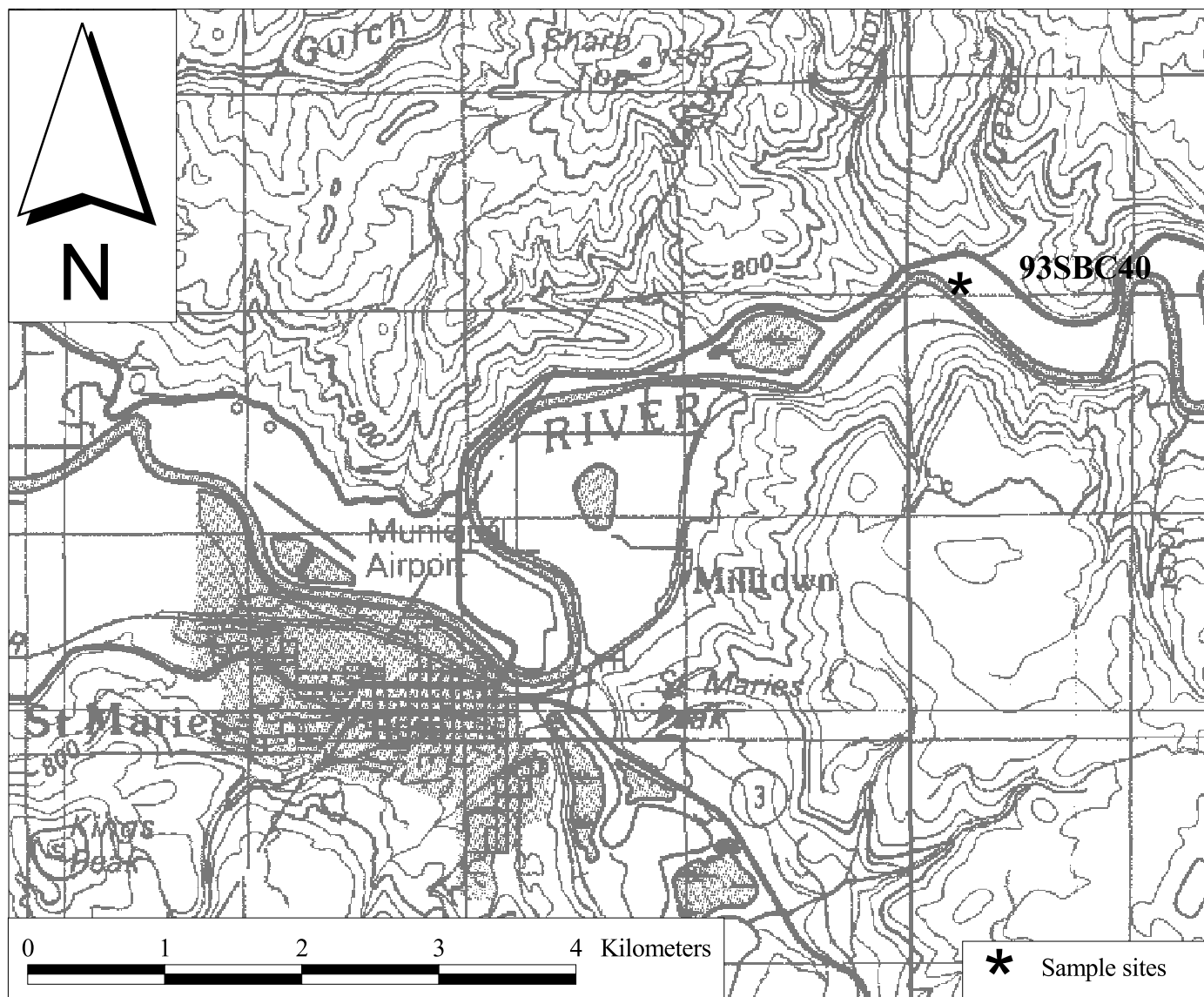
Map A-7: Sample site locations for the main stem of the Coeur d'Alene River between Rose and Killarney Lakes, Idaho. Base map from USGS Coeur d'Alene, Idaho 1:100,000 quadrangle.



Map A-8: Sample site location map for the main stem of the Coeur d'Alene River near Cave and Medicine Lakes, Idaho. Base map from USGS St. Maries, Idaho 1:100,000 quadrangle.



Map A-9: Sample site location map for the mainstem of the Coeur d'Alene River near Thompson Lake, Idaho. Base map from USGS St. Maries, Idaho 1:100,000 quadrangle.



Appendix B. Sample site locations, depositional environments, depositional map units, sampling techniques and laboratory and analytical methods used on samples from that site (all=samples from site; some=some samples from site).

Site ID	Latitude	Longitude	Water depth (m)	Site Location Map in Appendix A	Site-Location Method*	Environment	USGS map unit description	USGS map unit
SITE_ID	LATITUDE	LONGITUDE	WTR_DEPTH	APDX_MAPNO	LOC_METHOD	ENVIRONMNT	UNIT_DESC	UNIT_LABEL
93ABM02	47.4817	-116.6092		MAP A-8	a	Subaerial floodplain	Riverbank wedge	Rbw
93CSC03	47.5520	-116.3661		MAP A-6	a	Subaerial floodplain	Riverbank wedge	Rbw
93ABM04	47.4820	-116.5905		MAP A-8	a	Subaerial floodplain	Upland, levee backslope	Ulb
93ABM06	47.4824	-116.5760		MAP A-8	a	Subaerial floodplain	Riverbank wedge	Rbw
93ABL08	47.5097	-116.5542		MAP A-7	a	Marsh	Palustrine, perennial	PEph
93ABL09	47.5172	-116.5333		MAP A-7	a	Exposed channel bar	Riverbank wedge	Rbw
93SBC10	47.5418	-116.3435		MAP A-5	a	Subaerial floodplain	Upland, alluvial terrace	Uat3
93SBR13	47.5302	-116.4443		MAP A-6	a	Subaerial floodplain	Riverbank wedge	Rbw
93SBM14	47.4919	-116.5581		MAP A-8	a	Miocene lake seds	Highland, Miocene seds.	HMs
93SBC15	47.5447	-116.3608		MAP A-5	a	Subaerial floodplain	Upland levee sand	Uls
93SBC16	47.5517	-116.3706	0.1	MAP A-6	a	Submerged channel	River sand bar	Rscb
93SBK17	47.5489	-116.1750		MAP A-4	a	Subaerial floodplain	Jig-era overbank sediments	Jos
93SBK18	47.5492	-116.2016		MAP A-4	a	Subaerial floodplain	Jig-era overbank sediments	Jos
93SBB20	47.4858	-116.7239		MAP A-9	a	Subaerial floodplain	Riverbank wedge	Rbw
93SBB21	47.4856	-116.7258		MAP A-9	a	Subaerial floodplain	Riverbank wedge	Rbw
93SBB22	47.4794	-116.7039		MAP A-9	a	Marsh	Seasonal marsh with emergent vegetation	PEs
93SBB23	47.4786	-116.7036		MAP A-9	a	Subaerial floodplain	Riverbank wedge	Rbw
93SBL26	47.5194	-116.5444		MAP A-7	a	Marsh	Palustrine, perennial	PEph
93SBL27	47.5289	-116.5311		MAP A-7	a	Subaerial floodplain	Riverbank wedge	Rbw
93SBL27B	47.5281	-116.5322		MAP A-7	a	Subaerial floodplain	Upland levee sand	Uls
93SBL28	47.5182	-116.5478		MAP A-7	a	Marsh	Palustrine, perennial	PEph
93SBL28C	47.5182	-116.5478		MAP A-7	a	Marsh	Palustrine, perennial	PEph
93SBL30	47.5252	-116.5355		MAP A-7	a	Subaerial floodplain	Upland levee sand	Uls
93SBL31	47.5150	-116.5442		MAP A-7	a	Subaerial floodplain	Upland sand splay	Ussc
93SBL32	47.5097	-116.5428		MAP A-7	a	Subaerial floodplain	Upland meander scroll set	Umsf
93SBL34	47.5069	-116.5544		MAP A-7	a	Subaerial floodplain	Riverbank wedge	Rbw
93SBC35	47.5524	-116.3728		MAP A-6	a	Subaerial dredge spoils	Dredge spoils, subaerial	Ads1

*a=map,b=compass and tape,c=GPS.**1=Bookstom and others (1999),2=Box and others(in prep.)*** 1=grab,2=grove, 3=depth-bracket,4=hand core,5=power core,6=vibro core,7=vibro-piston core,8=auger in casing.

Appendix B. Sample site locations, depositional environments, depositional map units, sampling techniques and laboratory and analytical methods used on samples from that site (all=samples from site; some=some samples from site).

Site ID	USGS map **	Sampling Technique***	USGS EDXRF	EWU 4-acid	CHEMEX nitric-aqua regia	XRAL 4-acid	ACZ nitric
SITE_ID	REF_MAP	SAMP_TECH	EDXRF	EWU-4-ACID	NITRIC-AQR	XRL-4-ACID	ACZ-NITRIC
93ABM02	1	2	all		all	some	
93CSC03	1	2		all			
93ABM04	1	2	all		all	some	
93ABM06	1	1	all		all		
93ABL08	1	1	all		all		
93ABL09	1	1	all		all		
93SBC10	1	2	all		all	some	
93SBR13	1	2	all		all		
93SBM14	1	2	all		all		
93SBC15	1	2	all	all			
93SBC16	1	2	all		all		
93SBK17	2	2	all		all	some	
93SBK18	2	2	all		all	some	
93SBB20	1	1	all		all	some	
93SBB21	1	2, 4	all	all			
93SBB22	1	2	all		all	some	
93SBB23	1	2	all		all	some	
93SBL26	1	4	all		all	some	
93SBL27	1	2	all	all		some	
93SBL27B	1	4, 2	all		all		
93SBL28	1	4	all		all		
93SBL28C	1	4	all		all		
93SBL30	1	2, 4	all	all			
93SBL31	1	2, 4	all		all	some	
93SBL32	1	2	all		all	some	
93SBL34	1	2	all	all	all		
93SBC35	1	1	all		all		

*a=map,b=compass and tape,c=GPS.**1=Bookstom and others (1999),2=Box and others(in prep.)*** 1=grab,2=grove, 3=depth-bracket,4=hand core,5=power core,6=vibro core,7=vibro-piston core,8=auger in casing.

Appendix B. Sample site locations, depositional environments, depositional map units, sampling techniques and laboratory and analytical methods used on samples from that site (all=samples from site; some=some samples from site).

Site ID	Latitude	Longitude	Water depth (m)	Site Location Map in Appendix A	Site-Location Method*	Environment	USGS map unit description	USGS map unit
93SBC36	47.5697	-116.2522		MAP A-5	a	Exposed channel bar	River, gravel bottomed	Rg
93SBC37	47.5714	-116.2525		MAP A-5	a	Exposed channel bar	River, gravel bottomed	Rg
93SBK38	47.5561	-116.2442		MAP A-4	a	Exposed channel bar	Sandy gravels of the present channel	Pcg
93SBC39	47.5522	-116.2744		MAP A-5	a	Subaerial floodplain	Upland alluvial terrace	Uat1
93SBC40	47.3420	-116.5165		MAP A-10	a	Subaerial floodplain	Riverbank wedge	
94Gid2	47.5203	-116.5301		MAP A-7	b	Subaerial floodplain	Riverbank wedge	Rbw
94Gid3	47.5203	-116.5304		MAP A-7	b	Subaerial floodplain	Upland levee sand	Ulso
94Gid4	47.5204	-116.5306		MAP A-7	b	Subaerial floodplain	Upland levee sand	Ulso
94Gid5	47.5204	-116.5309		MAP A-7	b	Subaerial floodplain	Upland meander scroll set, farmed	Umsf
94Gid6	47.5204	-116.5315		MAP A-7	b	Subaerial floodplain	Upland meander scroll set, farmed	Umsf
94JE01	47.4662	-115.7321		MAP A-1	a	Exposed channel bar	Sandy gravels of the present channel	Pcg
94JE02	47.4643	-115.8187		MAP A-1	a	Exposed channel bar	Sandy gravels of the present channel	Pcg
94JE03	47.4709	-115.8603		MAP A-1	a	Exposed channel bar	Sandy gravels of the present channel	Pcg
94JE04	47.4758	-115.8896		MAP A-2	a	Exposed channel bar	Sandy gravels of the present channel	Pcg
94JE05	47.4770	-115.9136		MAP A-2	a	Exposed channel bar	Sandy gravels of the present channel	Pcg
94JE06	47.5318	-116.0775		MAP A-3	a	Subaerial floodplain	Jig-era overbank sediments	Jos
94JE06A	47.5319	-116.0774		MAP A-3	a	Exposed channel bar	Sandy gravels of the present channel	Pcg
94JE06B	47.5314	-116.0775		MAP A-3	a	Subaerial floodplain	Jig-era overbank sediments	Jos
94JE07	47.5294	-115.7861		MAP A-1	a	Exposed channel bar	Sandy gravels of the present channel	Pcg
94JE08	47.5183	-115.8242		MAP A-1	a	Exposed channel bar	Sandy gravels of the present channel	Pcg
94JE09	47.5166	-115.8432		MAP A-1	a	Exposed channel bar	Sandy gravels of the present channel	Pcg
94JE10	47.5051	-115.8771		MAP A-2	a	Exposed channel bar	Sandy gravels of the present channel	Pcg
94JE11	47.4872	-115.8910		MAP A-2	a	Exposed channel bar	Sandy gravels of the present channel	Pcg
94JE12	47.4813	-115.9192		MAP A-2	a	Exposed channel bar	Sandy gravels of the present channel	Pcg
94JE13	47.4795	-115.9344		MAP A-2	a	Exposed channel bar	Sandy gravels of the present channel	Pcg
94JE14	47.4786	-115.9369		MAP A-2	a	Exposed channel bar	Sandy gravels of the present channel	Pcg
94JE15	47.4889	-115.9519		MAP A-2	a	Exposed channel bar	Sandy gravels of the present channel	Pcg
94JE16	47.4844	-115.9385		MAP A-2	a	Exposed channel bar	Sandy gravels of the present channel	Pcg

*a=map,b=compass and tape,c=GPS.**1=Bookstom and others (1999),2=Box and others(in prep.)*** 1=grab,2=grove, 3=depth-bracket,4=hand core,5=power core,6=vibro core,7=vibro-piston core,8=auger in casing.

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Site ID	USGS map **	Sampling Technique***	USGS EDXRF	EWU 4-acid	CHEMEX nitric-aqua regia	XRAL 4-acid	ACZ nitric
93SBC36	1	1	all	all			
93SBC37	1	2	all	all			
93SBK38	2	2	all	all			
93SBC39	1	2	all	all			
93SBC40	---	2		all			
94Gid2	1	5		all		some	some
94Gid3	1	5		all		some	some
94Gid4	1	5		all		some	some
94Gid5	1	5		all			
94Gid6	1	5		all		some	some
94JE01	2	1			all		
94JE02	2	1			all		
94JE03	2	1			all		
94JE04	2	1			all		
94JE05	2	1			all		
94JE06	2	1		all			
94JE06A	2	1			all		
94JE06B	2	1		all			
94JE07	2	1			all		
94JE08	2	1			all		
94JE09	2	1			all		
94JE10	2	1			all		
94JE11	2	1			all		
94JE12	2	1			all		
94JE13	2	1			all		
94JE14	2	1			all		
94JE15	2	1			all		
94JE16	2	1			all		

*a=map,b=compass and tape,c=GPS.**1=Bookstom and others (1999),2=Box and others(in prep.)*** 1=grab,2=grove, 3=depth-bracket,4=hand core,5=power core,6=vibro core,7=vibro-piston core,8=auger in casing.

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Site ID	Latitude	Longitude	Water depth (m)	Site Location Map in Appendix A	Site-Location Method*	Environment	USGS map unit description	USGS map unit
94JE17	47.4914	-115.9545		MAP A-2	a	Exposed channel bar	Sandy gravels of the present channel	Pcg
94JE18	47.4922	-115.9703		MAP A-2	a	Exposed channel bar	Sandy gravels of the present channel	Pcg
94JE19	47.4811	-115.9636		MAP A-2	a	Exposed channel bar	Sandy gravels of the present channel	Pcg
94JE20	47.4947	-115.9800		MAP A-2	a	Exposed channel bar	Sandy gravels of the present channel	Pcg
94JE21	47.5053	-115.9742		MAP A-2	a	Exposed channel bar	Sandy gravels of the present channel	Pcg
94JE22	47.5027	-115.9822		MAP A-2	a	Exposed channel bar	Sandy gravels of the present channel	Pcg
94JE23	47.5183	-115.9875		MAP A-2	a	Exposed channel bar	Sandy gravels of the present channel	Pcg
94JE24	47.5106	-116.0067		MAP A-3	a	Exposed channel bar	Sandy gravels of the present channel	Pcg
94JE25	47.4997	-116.0105		MAP A-3	a	Exposed channel bar	Sandy gravels of the present channel	Pcg
94JE26	47.5212	-116.0167		MAP A-3	a	Exposed channel bar	Sandy gravels of the present channel	Pcg
94JE27	47.5203	-116.0432		MAP A-3	a	Exposed channel bar	Sandy gravels of the present channel	Pcg
94JE28	47.5264	-116.0481		MAP A-3	a	Exposed channel bar	Sandy gravels of the present channel	Pcg
94JE29	47.5193	-116.0608		MAP A-3	a	Exposed channel bar	Sandy gravels of the present channel	Pcg
94JE30	47.5311	-116.0533		MAP A-3	a	Exposed channel bar	Sandy gravels of the present channel	Pcg
94JE31	47.5309	-116.0908		MAP A-3	a	Exposed channel bar	Sandy gravels of the present channel	Pcg
94JE32	47.5423	-116.0476		MAP A-3	a	Exposed channel bar	Sandy gravels of the present channel	Pcg
94JE33	47.5339	-116.1022		MAP A-3	a	Exposed channel bar	Sandy gravels of the present channel	Pcg
94JE34	47.5350	-116.1108		MAP A-3	a	Exposed channel bar	Sandy gravels of the present channel	Pcg
94JE35	47.5489	-116.1394		MAP A-4	a	Exposed channel bar	Sandy gravels of the present channel	Pcg
94JE36	47.5483	-116.1636		MAP A-4	a	Exposed channel bar	Sandy gravels of the present channel	Pcg
94JE37	47.5480	-116.1720		MAP A-4	a	Exposed channel bar	Sandy gravels of the present channel	Pcg
94JE38	47.5511	-116.1814		MAP A-4	a	Exposed channel bar	Sandy gravels of the present channel	Pcg
94JE39A	47.5521	-116.1915		MAP A-4	a	Exposed channel bar	Sandy gravels of the present channel	Pcg
94JE40	47.5515	-116.1976		MAP A-4	a	Exposed channel bar	Sandy gravels of the present channel	Pcg
94JE41	47.5483	-116.2177		MAP A-4	a	Exposed channel bar	Sandy gravels of the present channel	Pcg
94JE42	47.5108	-116.2411		MAP A-4	a	Exposed channel bar	Sandy gravels of the present channel	Pcg
94JE43	47.5485	-116.2066		MAP A-4	a	Exposed channel bar	Sandy gravels of the present channel	Pcg
94JE44	47.5536	-116.2231		MAP A-4	a	Exposed channel bar	Sandy gravels of the present channel	Pcg

*a=map,b=compass and tape,c=GPS.**1=Bookstom and others (1999),2=Box and others(in prep.)*** 1=grab,2=grove, 3=depth-bracket,4=hand core,5=power core,6=vibro core,7=vibro-piston core,8=auger in casing.

Appendix B. Sample site locations, depositional environments, depositional map units, sampling techniques and laboratory and analytical methods used on samples from that site (all=samples from site; some=some samples from site).

Site ID	USGS map **	Sampling Technique***	USGS EDXRF	EWU 4-acid	CHEMEX nitric-aqua regia	XRAL 4-acid	ACZ nitric
94JE17	2	1			all		
94JE18	2	1			all		
94JE19	2	1			all		
94JE20	2	1			all		
94JE21	2	1			all		
94JE22	2	1			all		
94JE23	2	1			all		
94JE24	2	1			all		
94JE25	2	1			all		
94JE26	2	1			all		
94JE27	2	1			all		
94JE28	2	1			all		
94JE29	2	1			all		
94JE30	2	1			all		
94JE31	2	1			all		
94JE32	2	1			all		
94JE33	2	1			all		
94JE34	2	1			all		
94JE35	2	1			all		
94JE36	2	1			all		
94JE37	2	1			all		
94JE38	2	1			all		
94JE39A	2	1			all		
94JE40	2	1			all		
94JE41	2	1			all		
94JE42	2	1			all		
94JE43	2	1			all		
94JE44	2	1			all		

*a=map,b=compass and tape,c=GPS.**1=Bookstom and others (1999),2=Box and others(in prep.)*** 1=grab,2=grove, 3=depth-bracket,4=hand core,5=power core,6=vibro core,7=vibro-piston core,8=auger in casing.

Appendix B. Sample site locations, depositional environments, depositional map units, sampling techniques and laboratory and analytical methods used on samples from that site (all=samples from site; some=some samples from site).

Site ID	Latitude	Longitude	Water depth (m)	Site Location Map in Appendix A	Site-Location Method*	Environment	USGS map unit description	USGS map unit
94JE45	47.5540	-116.2227		MAP A-4	a	Exposed channel bar	Sandy gravels of the present channel	Pcg
94JE46	47.5531	-116.2333		MAP A-4	a	Exposed channel bar	Sandy gravels of the present channel	Pcg
94JE47	47.5506	-116.2389		MAP A-4	a	Exposed channel bar	Sandy gravels of the present channel	Pcg
94JE48	47.5559	-116.2445		MAP A-4	a	Exposed channel bar	Sandy gravels of the present channel	Pcg
94JE49	47.5595	-116.2520		MAP A-5	a	Exposed channel bar	Sandy gravels of the present channel	Pcg
94VC-1	47.5409	-116.4055	3.9	MAP A-6	b	Submerged channel	Sand-bottomed river channel	Rs
94VC-2	47.5315	-116.4497	4.2	MAP A-6	b	Submerged channel	Sand-bottomed river channel	Rs
94VC-3	47.5203	-116.5300	2.7	MAP A-7	b	Submerged channel	Sand-bottomed river channel	Rs
94VCD1	47.5436	-116.4139	5.1	MAP A-6	b	Submerged channel	Sand-bottomed river channel	Rs
94VCD2	47.5438	-116.4138	2.0	MAP A-6	b	Submerged channel	Sand-bottomed river channel	Rs
94VCD3	47.5433	-116.4141	3.4	MAP A-6	b	Submerged channel	Pre-mining era sediments in channel	Rpm
94VCK1	47.5203	-116.5297	4.4	MAP A-7	b	Submerged channel	Sand-bottomed river channel	Rs
94VCK2	47.5203	-116.5296	5.9	MAP A-7	b	Submerged channel	Sand-bottomed river channel	Rs
95PCK1	47.5203	-116.5300	2.0	MAP A-7	b	Submerged channel	Sand-bottomed river channel	Rs
95PCUD2	47.5410	-116.4055	3.9	MAP A-6	b	Submerged channel	Sand-bottomed river channel	Rs
95VCD3	47.5437	-116.4139	4.4	MAP A-6	b	Submerged channel	Sand-bottomed river channel	Rs
95VCUD1	47.5411	-116.4053	4.0	MAP A-6	b	Submerged channel	Sand-bottomed river channel	Rs
96K-75E	47.5202	-116.5291	3.0	MAP A-7	b	Submerged channel	Pre-mining era sediments in channel	Rpm
96K-89E	47.5202	-116.5290		MAP A-7	b	Subaerial floodplain	Upland sand splay	Uss
96K-114E	47.5202	-116.5286		MAP A-7	b	Subaerial floodplain	Palustrine, perennial	PEp
96K-178E	47.5201	-116.5278		MAP A-7	b	Subaerial floodplain	Palustrine, perennial	PEp
96LD-1S	47.5440	-116.4138		MAP A-6	b	Subaerial floodplain	Riverbank wedge	Rbw
96LD-105S	47.5431	-116.4141		MAP A-6	b	Subaerial floodplain	Riverbank wedge	Rbw
T98C-01	47.5490	-116.2693		MAP A-5	c	Marsh	Palustrine, seasonal, emergent plants	PEs
T98C-05	47.5502	-116.2751		MAP A-5	c	Marsh	Palustrine, seasonal, emergent plants	PEs
T98C-06	47.5538	-116.3215		MAP A-5	c	Subaerial floodplain	Upland, levee sand	Ulso
T98C-07	47.5533	-116.3193		MAP A-5	c	Subaerial floodplain	Upland, upper alluvial terrace	Uat3
T98C-08	47.5491	-116.3316		MAP A-5	c	Subaerial floodplain	Upland, middle alluvial terrace	Uat2

*a=map,b=compass and tape,c=GPS.**1=Bookstom and others (1999),2=Box and others(in prep.)*** 1=grab,2=grove, 3=depth-bracket,4=hand core,5=power core,6=vibro core,7=vibro-piston core,8=auger in casing.

Appendix B. Sample site locations, depositional environments, depositional map units, sampling techniques and laboratory and analytical methods used on samples from that site (all=samples from site; some=some samples from site).

Site ID	USGS map **	Sampling Technique***	USGS EDXRF	EWU 4-acid	CHEMEX nitric-aqua regia	XRAL 4-acid	ACZ nitric
94JE45	2	1			all		
94JE46	2	1			all		
94JE47	2	1			all		
94JE48	2	1			all		
94JE49	2	1			all		
94VC-1	1	6		all		some	some
94VC-2	1	6			all		
94VC-3	1	6		all	all		
94VCD1	1	6		all			
94VCD2	1	6		all			
94VCD3	1	6		all		some	some
94VCK1	1	6		all		some	some
94VCK2	1	6		all		some	some
95PCK1	1	7		all		some	some
95PCUD2	1	7		all		some	some
95VCD3	1	8		all		some	some
95VCUD1	1	8		all		some	some
96K-75E	1	2		all			
96K-89E	1	2		all			
96K-114E	1	2		all		some	some
96K-178E	1	2		all			
96LD-1S	1	2		all			
96LD-105S	1	2		all			
T98C-01	1	3				all	
T98C-05	1	3				all	
T98C-06	1	3				all	
T98C-07	1	3				all	
T98C-08	1	3				all	

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Appendix B. Sample site locations, depositional environments, depositional map units, sampling techniques and laboratory and analytical methods used on samples from that site (all=samples from site; some=some samples from site).

Site ID	Latitude	Longitude	Water depth (m)	Site Location Map in Appendix A	Site-Location Method*	Environment	USGS map unit description	USGS map unit
T98C-10	47.5493	-116.3329		MAP A-5	c	Exposed channel bar	Upland, lower terrace base at river shore	Rg
T98C-11B	47.5474	-116.3560		MAP A-5	c	Marsh	Riverine, high-water channel on terrace	Rhc
T98C-12	47.5474	-116.3566		MAP A-5	c	Subaerial floodplain	Upland, levee of slough on terrace	Uat2
T98R-13	47.5563	-116.3867		MAP A-6	c	Marsh	Dredge spoils, palustrine, common reed	AdsPEcr
T98R-14	47.5580	-116.3751		MAP A-6	c	Subaerial dredge spoils	Dredge spoils, subaerial	Ads1
T98C-15	47.5510	-116.2764		MAP A-5	c	Marsh	Palustrine, seasonal, emergent plants	PEs
T98C-16	47.5465	-116.3578		MAP A-5	c	Subaerial floodplain	Upland, middle alluvial terrace	Uat2
T98C-17	47.5501	-116.3640		MAP A-6	c	Subaerial floodplain	Upland, levee sand	UIso
T98C-18	47.5502	-116.3484		MAP A-5	c	Subaerial floodplain	Upland, middle alluvial terrace	Uat2
T98C-20	47.5528	-116.3542		MAP A-5	c	Subaerial floodplain	Upland, levee\palustrine, aquatic shore	UIso\PA
T98C-21	47.5523	-116.3607		MAP A-5	c	Marsh	Palustrine, perennial, emergent plants	PEp
T98C-22	47.5596	-116.3528		MAP A-5	c	Marsh	Palustrine, emergent common reed	PEcr
T98R-23	47.5576	-116.3887		MAP A-6	c	Marsh	Dredge spoils, palustrine, common reed	AdsPEcr
T98R-24	47.5588	-116.3846		MAP A-6	c	Marsh	Dredge spoils, palustrine, common reed	AdsPEcr
T98C-25	47.5452	-116.3276		MAP A-5	c	Subaerial floodplain	Upland, middle alluvial terrace	Uat2
T98C-26	47.5441	-116.3713		MAP A-6	c	Marsh	Palustrine, seasonal, emergent plants	PEs
T98R-27	47.5400	-116.4685		MAP A-6	c	Marsh	Palustrine, distributary, blocked	PdisbE
T98R-28	47.5379	-116.4836		MAP A-7	c	Marsh	Palustrine, seasonal, bushes and trees	PEsT
T98R-29	47.5388	-116.4746		MAP A-6	c	Subaerial floodplain	Upland, levee of blocked distributary	Udisb
T98R-30	47.5341	-116.4955		MAP A-7	c	Subaerial floodplain	Upland, levee of channel scar	Ucsl
T98R-31	47.5483	-116.3765		MAP A-6	c	Marsh	Upland, channel scar (filled with sediment)	Ucs
T98R-32	47.5464	-116.3866		MAP A-6	c	Subaerial floodplain	Upland, distributary levee	Udis
T98R-33	47.5334	-116.4400		MAP A-6	c	Subaerial floodplain	Upland, levee sand	UIso
T98R-34	47.5350	-116.4501		MAP A-6	c	Shallow lake	Lacustrine, littoral	LtE
T98L-35	47.5286	-116.5018		MAP A-7	c	Marsh	Palustrine, perennial, emergent plants	PEp
T98L-36	47.5308	-116.5089		MAP A-7	c	Subaerial floodplain	Upland, sand splay	Uss
T98L-37	47.5189	-116.5227		MAP A-7	c	Marsh	Palustrine, aquatic plants	PA
T98L-38	47.5101	-116.5324		MAP A-7	c	Marsh	Palustrine, perennial, emergent plants	PEp

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Appendix B. Sample site locations, depositional environments, depositional map units, sampling techniques and laboratory and analytical methods used on samples from that site (all=samples from site; some=some samples from site).

Site ID	USGS map **	Sampling Technique***	USGS EDXRF	EWU 4-acid	CHEMEX nitric-aqua regia	XRAL 4-acid	ACZ nitric
T98C-10	1	3				all	
T98C-11B	1	3				all	
T98C-12	1	3				all	
T98R-13	1	3				all	
T98R-14	1	3				all	
T98C-15	1	3				all	
T98C-16	1	3				all	
T98C-17	1	3				all	
T98C-18	1	3				all	
T98C-20	1	3				all	
T98C-21	1	3				all	
T98C-22	1	3				all	
T98R-23	1	3				all	
T98R-24	1	3				all	
T98C-25	1	3				all	
T98C-26	1	3				all	
T98R-27	1	3				all	
T98R-28	1	3				all	
T98R-29	1	3				all	
T98R-30	1	3				all	
T98R-31	1	3				all	
T98R-32	1	3				all	
T98R-33	1	3				all	
T98R-34	1	3				all	
T98L-35	1	3				all	
T98L-36	1	3				all	
T98L-37	1	3				all	
T98L-38	1	3				all	

*a=map,b=compass and tape,c=GPS.**1=Bookstom and others (1999),2=Box and others(in prep.)*** 1=grab,2=grove, 3=depth-bracket,4=hand core,5=power core,6=vibro core,7=vibro-piston core,8=auger in casing.

Appendix B. Sample site locations, depositional environments, depositional map units, sampling techniques and laboratory and analytical methods used on samples from that site (all=samples from site; some=some samples from site).

Site ID	Latitude	Longitude	Water depth (m)	Site Location Map in Appendix A	Site-Location Method*	Environment	USGS map unit description	USGS map unit
T98M-39	47.4990	-116.5590		MAP A-8	c	Drained marsh	Palustrine, seasonal, drained, farmed	PEsdf
T98M-40	47.4872	-116.5693		MAP A-8	c	Drained marsh	Palustrine, seasonal to perennial, drained	Pespdf
T98L-41	47.5073	-116.5662		MAP A-7	c	Marsh	Palustrine, perennial, emergent rice	PEpr
T98L-42	47.5024	-116.5644		MAP A-7	c	Marsh	Palustrine, perennial, emergent plants	PEp
T98M-43	47.4942	-116.5693		MAP A-8	c	Subaerial floodplain	Upland, levee backslope	Ulb

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Appendix B. Sample site locations, depositional environments, depositional map units, sampling techniques and laboratory and analytical methods used on samples from that site (all=samples from site; some=some samples from site).

Site ID	USGS map **	Sampling Technique***	USGS EDXRF	EWU 4-acid	CHEMEX nitric-aqua regia	XRAL 4-acid	ACZ nitric
T98M-39	1	3				all	
T98M-40	1	3				all	
T98L-41	1	3				all	
T98L-42	1	3				all	
T98M-43	1	3				all	

*a=map,b=compass and tape,c=GPS.**1=Bookstom and others (1999),2=Box and others(in prep.)*** 1=grab,2=grove, 3=depth-bracket,4=hand core,5=power core,6=vibro core,7=vibro-piston core,8=auger in casing.

Appendix C. Lithologic descriptions of soil and sediment samples for which chemical analyses are given in this report (Appendix_C.xls, Appendix_C.dbf)

Sample No.	Site ID	Depth interval, top (cm)	Depth interval, bottom (cm)	Lithologic description
SAMPLE_NO.	SITE_ID	INT_TOP_CM	INT_BT_M_CM	LITH_DESC
93ABM02(0-10)	93ABM02	0	10	light brown fine sand
93ABM02(10-11)	93ABM02	10	11	gray-white ash (May,1980 Mt. St. Helens)
93ABM02(11-22)	93ABM02	11	22	medium brown medium-fine sand
93ABM02(22-36)	93ABM02	22	36	orange laminated silt with 3 cm dark brown fine sand at 25-28
93ABM02(36-44)	93ABM02	36	44	dark brown, ripple-laminated fine sand with wavy bedding top
93ABM02(44-66)	93ABM02	44	66	8 couplets of dark brown, very fine sand and orange silt
93ABM02(66-85)	93ABM02	66	85	orange-brown fine sand with climbing ripple laminations and 3 grass-mat
93ABM02(85-97)	93ABM02	85	97	gray silty mud with irregular lens of orange cemented silty mud
93ABM02(97-110)	93ABM02	97	110	massive gray silty mud
93ABM02(110-126)	93ABM02	110	126	massive gray silty mud with sparse orange 0.5 cm spots
93ABM02(0-97)	93ABM02	0	97	composite 0.5 liter channel sample of orange, sandy section
93ABM02(97-126)	93ABM02	97	126	composite 0.5 liter sample of gray muddy section
93ABM02(0-97)	93ABM02	0	97	composite 6 liter channel sample of orange, sandy section
93ABM02(97-129)	93ABM02	97	129	composite 6 liter sample of gray muddy section
93CSC03(0-6)	93CSC03	0	6	brown fine-very fine sand
93CSC03(6-6.5)	93CSC03	6	6.5	gray-white ash (May,1980 Mt. St. Helens)
93CSC03(6.5-10)	93CSC03	6.5	10	pale brown medium and fine sand
93CSC03(10-43)	93CSC03	10	43	tan silt-very fine sand
93CSC03(43-46)	93CSC03	43	46	red brown silt
93CSC03(46-55)	93CSC03	46	55	red brown very fine sand
93CSC03(55-61)	93CSC03	55	61	red-brown fine and medium sand
93CSC03(61-66)	93CSC03	61	66	tan very fine sand and silt
93CSC03(66-71)	93CSC03	66	71	interbedded coarse and medium sand
93CSC03(71-77)	93CSC03	71	77	pale brown very fine sand and silt
93CSC03(77-95)	93CSC03	77	95	pale brown silt
93CSC03(95-112)	93CSC03	95	112	chocolate brown silt
93CSC03(112-121.5)	93CSC03	112	121.5	muddy red-brown silt
93CSC03(121.5-133)	93CSC03	121.5	133	chocolate brown fine sand
93CSC03(133-145)	93CSC03	133	145	pale brown silt-very fine sand
93CSC03(145-155)	93CSC03	145	155	pale brown silt-very fine sand
93CSC03(155-168)	93CSC03	155	168	gray silt and fine sand
93CSC03(168-192)	93CSC03	168	192	gray very fine sand
93CSC03(192-232)	93CSC03	192	232	medium sand
93CSC03(232-256)	93CSC03	232	256	gray silt and fine sand
93ABM04(0-12)	93ABM04	0	12	tan unconsolidated fine-grained sand

Appendix C. Lithologic descriptions of soil and sediment samples for which chemical analyses are given in this report (Appendix_C.xls, Appendix_C.dbf)

Sample No.	Site ID	Depth interval, top (cm)	Depth interval, bottom (cm)	Lithologic description
SAMPLE_NO.	SITE_ID	INT_TOP_CM	INT_BTM_CM	LITH_DESC
93ABM04(12-13)	93ABM04	12	13	gray-white ash (May,1980 Mt. St. Helens)
93ABM04(13-18)	93ABM04	13	18	rusty red-brown fine sand, weakly cemented by iron hydroxide
93ABM04(22-27)	93ABM04	22	27	rusty red-brown fine sand, weakly cemented by iron hydroxide
93ABM04(32-37)	93ABM04	32	37	rusty red-brown fine sand, weakly cemented by iron hydroxide
93ABM04(42-48)	93ABM04	42	48	rusty red-brown fine sand, weakly cemented by iron hydroxide
93ABM04(48-76)	93ABM04	48	76	orange-brown laminated silt, weakly cemented by iron hydroxide
93ABM04(76-142)	93ABM04	76	142	gray massive silt, obvious root bioturbation in upper 25 cm; lake level
93ABM06	93ABM06			crs. grained, 2 cm thick red-brown quartz sand lens under angular 0.5 m quartzite block of RR embankment fill
93ABM06	93ABM06			gray silt 45 cm below 6A: lake level (2128') 50 cm below
93ABL08(0-5)	93ABL08	0	5	red-brown silty mud
93ABL09(0-83)	93ABL09	0	83	tan unconsolidated fine sand
93SBC10(0-3)	93SBC10	0	3	tan unconsolidated fine-grained sand
93SBC10(3-3.5)	93SBC10	3	3.5	gray-white ash (May,1980 Mt. St. Helens)
93SBC10(3.5-30)	93SBC10	3.5	30	pale brown fine sand, weakly cemented
93SBC10(30-70)	93SBC10	30	70	red-brown fine-medium sand, ripple-laminated with black cross-laminae,
93SBC10(70-90)	93SBC10	70	90	brown fine sand, weakly cemented, with irregular leaf-rich seams
93SBC10(90-100)	93SBC10	90	100	brown fine sand, weakly cemented, with irregular leaf-rich seams
93SBC10(100-130)	93SBC10	100	130	mottled dark to light tan silty sand with 5 cm wood-rich seam at top and 1 cm charcoal seam at base
93SBC10(130-160)	93SBC10	130	160	mottled dark to light tan silty sand
93SBC10(160-360)	93SBC10	160	360	pebbly to cobbly gravel, clast-supported, clasts to 10 cm: river level at 360
93SBR13(0-15)	93SBR13	0	15	tan unconsolidated fine-grained sand
93SBR13(15-16)	93SBR13	15	16	gray-white ash (May,1980 Mt. St. Helens)
93SBR13(16-52)	93SBR13	16	52	tan unconsolidated medium sand with climbing-ripple laminations
93SBR13(57-65)	93SBR13	57	65	orange-brown laminated silt, weakly cemented by iron hydroxide; 2 cm very fine sand in center
93SBR13(221-237)	93SBR13	221	237	dark red-brown medium-fine sand, weakly cemented by iron hydroxide
93SBR13(237-251)	93SBR13	237	251	dark red-brown fine sand, weakly cemented by iron hydroxide
93SBR13(251-291)	93SBR13	251	291	orange-brown laminated silt, weakly cemented by iron hydroxide
93SBR13(291-351)	93SBR13	291	351	gray clayey silt with irregular orange-cemented fractures; lake level (2128')
93SBM14	93SBM14			moderately cemented tan mudstone with Miocene leaf impressions
93SBC15(0-15)	93SBC15	0	15	tan unconsolidated fine-grained sand
93SBC15(15-16)	93SBC15	15	16	gray-white ash (May,1980 Mt. St. Helens)
93SBC15(16-35)	93SBC15	16	35	tan very fine sand with 4 cm medium fine sand in center

Appendix C. Lithologic descriptions of soil and sediment samples for which chemical analyses are given in this report (Appendix_C.xls, Appendix_C.dbf)

Sample No.	Site ID	Depth interval, top (cm)	Depth interval, bottom (cm)	Lithologic description
SAMPLE_NO.	SITE_ID	INT_TOP_CM	INT_BT_M_CM	LITH_DESC
93SBC15(35-90)	93SBC15	35	90	alternating 1-3 cm thick layers of laminated orange silt and weakly cemented pale brown fine sand
93SBC15(90-165)	93SBC15	90	165	orange laminated silt with several 1 cm dark fine sand layers
93SBC15(165-214)	93SBC15	165	214	orange massive silt with several 0.5-1.0 cm very fine sand layers
93SBC15(214-242)	93SBC15	214	242	mottled gray, black, orange and brown clayey silt
93SBC15(242-261)	93SBC15	242	261	gray clayey silt with irregular orange streaks: lake level (2127.8') at 261
93SBC16(0-5)	93SBC16	0	5	poorly sorted gravelly sand with considerable mud; 5 cm below lake surface (2128') on mid-river sand bar
93SBK17(0-8)	93SBK17	0	8	artificially placed angular white quartzite gravel
93SBK17(8-25)	93SBK17	8	25	black, magnetite-rich coarse-grained sand with pea gravel lenses
93SBK17(25-68)	93SBK17	25	68	maroon and tan ripple cross-laminated medium to coarse-grained sand with lens of imbricated gravel with rounded 1 cm disc-shaped clasts
93SBK17(68-106)	93SBK17	68	106	dark red-orange clayey silt, well laminated, weathered surface partially coated with white sulfate
93SBK17(106-152)	93SBK17	106	152	bioturbated tan silty sand with some clay; upper 15 cm is organic-rich clayey silt; floating 3-5 cm pebbles in lower 25 cm
93SBK17(152-230)	93SBK17	152	230	unconsolidated cobble conglomerate, matrix-supported in upper 20 cm, clast-supported below: average clast size: 5 cm, max. clast size: 15 cm
93SBK17(230-300)	93SBK17	230	300	similar to above conglomerate: river at 300
93SBK18(0-7)	93SBK18	0	7	artificially placed wood chips
93SBK18(7-10)	93SBK18	7	10	orange-brown silt, weakly cemented
93SBK18(10-11)	93SBK18	10	11	gray-white ash (May, 1980 Mt. St. Helens)
93SBK18(11-26)	93SBK18	11	26	orange-brown silt, weakly cemented
93SBK18(26-82)	93SBK18	26	82	ripple-laminated, very fine sand in 1 cm beds (weathered-orange, unweathered-tan) with numerous 0.3 cm orange silt seams; several finely
93SBK18(82-92)	93SBK18	82	92	gray clay with black sooty organics within and at base
93SBK18(92-109)	93SBK18	92	109	gray massive clay with 5-10% floating pebbles to 3 cm in diameter
93SBK18(109-160)	93SBK18	109	160	clast-supported round-cobble gravel coarsening downward from 2-3 cm clasts to greater than 10 cm clasts
93SBB20(0-5)	93SBB20	0	5	red-orange silt at edge of gravelled parking lot; overlies earlier white gravel and underlies black gravel of most recent surfacing
93SBB21(0-9)	93SBB21	0	9	unconsolidated fine sand, grading from red to black to tan upwards
93SBB21(9-10)	93SBB21	9	10	gray-white ash (May, 1980 Mt. St. Helens)
93SBB21(10-41)	93SBB21	10	41	thinly bedded dark-brown fine sand with a few 1 cm white mud layers

Appendix C. Lithologic descriptions of soil and sediment samples for which chemical analyses are given in this report (Appendix_C.xls, Appendix_C.dbf)

Sample No.	Site ID	Depth interval, top (cm)	Depth interval, bottom (cm)	Lithologic description
SAMPLE_NO.	SITE_ID	INT_TOP_CM	INT_BT_M_CM	LITH_DESC
93SBB21(41-72)	93SBB21	41	72	alternated 1 cm layers of light orange silt and dark brown fine sand; 3 cm magnetite-rich ripple-laminated fine sand at base
93SBB21(72-84)	93SBB21	72	84	orange silt with 3.5 cm ripple-laminated fine sand in center
93SBB21(84-99)	93SBB21	84	99	light tan-orange muddy silt in lower half; alternated dark red-brown fine sand-orange silt in upper half
93SBB21(99-111)	93SBB21	99	111	pale gray silt (irregularly mottled orange) with disseminated black woody
93SBB21(111-120)	93SBB21	111	120	gray clay with black organic flecks and rare red blotches
93SBB21(120-130)	93SBB21	120	130	light brown medium sand with irregular orange streaks
93SBB21(130-148)	93SBB21	130	148	dark gray-brown silty mud with rare orange spots
93SBB21(148-160)	93SBB21	148	160	light brown medium sand
93SBB21(160-180)	93SBB21	160	180	gray-brown thinly bedded fine sand, silt, and mud; lake level (2125.87') at
93SBB21(173-180)	93SBB21	173	180	gray-brown mud
93SBB21(180-192)	93SBB21	180	192	tan fine sand
93SBB21(192-203)	93SBB21	192	203	gray silty clay
93SBB22(0-4)	93SBB22	0	4	matted vegetation
93SBB22(4-4.5)	93SBB22	4	4.5	gray-white ash (May, 1980 Mt. St. Helens)
93SBB22(4.5-7.5)	93SBB22	4.5	7.5	vegetation mat with minor silt component
93SBB22(7.5-12)	93SBB22	7.5	12	orange-brown silty clay
93SBB22(12-15)	93SBB22	12	15	orange-brown silty clay with abundant roots
93SBB22(15-19)	93SBB22	15	19	orange-brown clay with silty seams
93SBB22(19-26)	93SBB22	19	26	orange-brown silty clay, mottled gray at base
93SBB22(26-29)	93SBB22	26	29	gray and orange mottled clay, gray near base
93SBB22(29-36)	93SBB22	29	36	gray-black organic-rich mud
93SBB22(36-48)	93SBB22	36	48	dark-gray peat
93SBB22(48-60)	93SBB22	48	60	dark-gray peat with preserved vegetative mats
93SBB22(60-82)	93SBB22	60	82	gray-brown weakly layered peat
93SBB23(0-5)	93SBB23	0	5	tan unconsolidated fine-grained sand
93SBB23(5-6)	93SBB23	5	6	gray-white ash (May, 1980 Mt. St. Helens)
93SBB23(6-12)	93SBB23	6	12	lower 3 cm-dark brown fine sand; upper 3 cm-light tan silt
93SBB23(12-17)	93SBB23	12	17	brown silt to very fine sand; grass mat layer at base
93SBB23(17-22)	93SBB23	17	22	brown silt to very fine sand; grass mat layer at base
93SBB23(22-30)	93SBB23	22	30	dark brown fine sand; grass mat layer at base
93SBB23(30-46)	93SBB23	30	46	dark to light brown fine sand, ripple cross-laminated, irregular channelized
93SBB23(46-53)	93SBB23	46	53	orange laminated silt, with 1 cm organic rich layer at base

Appendix C. Lithologic descriptions of soil and sediment samples for which chemical analyses are given in this report (Appendix_C.xls, Appendix_C.dbf)

Sample No.	Site ID	Depth interval, top (cm)	Depth interval, bottom (cm)	Lithologic description
SAMPLE_NO.	SITE_ID	INT_TOP_CM	INT_BT_M_CM	LITH_DESC
93SBB23(53-86)	93SBB23	53	86	tan to light tan mottled and massive silty clay, grossly layered in upper 10
93SBB23(86-117)	93SBB23	86	117	tan to light tan mottled and massive silty clay
93SBL26(0-6)	93SBL26	0	6	60% horsetail stalks. 40% gray mud; mud is brown with red tinge at top
93SBL26(6-12)	93SBL26	6	12	gray brown mud with reddish tinge; 40% horsetail stalks and dark organic
93SBL26(12-20)	93SBL26	12	20	gray brown mud with 30% horsetail stalks and dark organic matter
93SBL26(20-28)	93SBL26	20	28	gray brown mud with 50% vegetative matter (including horsetail stalks)
93SBL26(28-34)	93SBL26	28	34	upper 3 cm - brown-black muddy peat; lower 3 cm - vegetative matter
93SBL26(34-47)	93SBL26	34	47	brown-black peat with 1.5 cm vegetative mat of horsetail stalks and grass
93SBL26(47-58)	93SBL26	47	58	brown-black peat with 1.5 cm vegetative mat of horsetail stalks and grass
93SBL27(0-7)	93SBL27	0	7	tan unconsolidated fine-grained sand
93SBL27(7-7.5)	93SBL27	7	7.5	gray-white ash (May, 1980 Mt. St. Helens)
93SBL27(7.5-19)	93SBL27	7.5	19	medium-grained sand with black-streaked ripple-laminations
93SBL27(19-23)	93SBL27	19	23	orange laminated silt
93SBL27(23-39)	93SBL27	23	39	dark brown fine-grained sand with two 1 cm orange silt layers
93SBL27(39-46)	93SBL27	39	46	alternating dark brown fine-grained sand and orange silt
93SBL27(46-50)	93SBL27	46	50	1 cm orange silt beds with fine sand partings
93SBL27(50-60)	93SBL27	50	60	alternating dark brown fine-grained sand and orange silt
93SBL27(60-76)	93SBL27	60	76	gray brown bioturbated muddy very fine sand
93SBL27(63-65)	93SBL27	63	65	orange-brown silt filling burrow(?)
93SBL27(76-90)	93SBL27	76	90	gray brown bioturbated muddy very fine sand
93SBL27(90-99)	93SBL27	90	99	gray brown bioturbated muddy very fine sand
93SBL27B(0-4)	93SBL27B	0	4	tan unconsolidated fine-grained sand
93SBL27B(4-5)	93SBL27B	4	5	gray-white ash (May, 1980 Mt. St. Helens)
93SBL27B(5-16)	93SBL27B	5	16	dark brown fine to medium-grained sand
93SBL27B(16-23)	93SBL27B	16	23	alternating cm-thick orange silt and very fine sand beds
93SBL27B(23-34)	93SBL27B	23	34	dark brown-orange silty fine sand, weakly cemented by iron hydroxide
93SBL27B(34-43)	93SBL27B	34	43	laminated pale tan to orange silt and very fine sand
93SBL27B(43-53)	93SBL27B	43	53	laminated pale tan to orange silt and very fine sand
93SBL27B(53-69)	93SBL27B	53	69	laminated pale tan to orange silt and very fine sand
93SBL27B(69-85)	93SBL27B	69	85	gray bioturbated silty fine sand
93SBL28(0-11)	93SBL28	0	11	gray mud with 70% horsetail stalks
93SBL28(11-16)	93SBL28	11	16	gray mud with 50% organic material (decomposed horsetail stalks)
93SBL28(16-25)	93SBL28	16	25	gray mud with <25% organic material
93SBL28(25-34)	93SBL28	25	34	gray mud with <25% organic material

Appendix C. Lithologic descriptions of soil and sediment samples for which chemical analyses are given in this report (Appendix_C.xls, Appendix_C.dbf)

Sample No.	Site ID	Depth interval, top (cm)	Depth interval, bottom (cm)	Lithologic description
SAMPLE_NO.	SITE_ID	INT_TOP_CM	INT_BTM_CM	LITH_DESC
93SBL28(34-37)	93SBL28	34	37	gray mud with <25% organic material (horsetail mat parting at base)
93SBL28(37-41)	93SBL28	37	41	gray mud with <25% organic material (horsetail mat parting at base)
93SBL28(41-46)	93SBL28	41	46	gray mud with <25% organic material
93SBL28C(0-25)	93SBL28C	0	25	vegetative mat (horsetails) with minor reddish mud
93SBL28C(25-28)	93SBL28C	25	28	brown mud with 75% horsetail stalks and roots
93SBL28C(28-37)	93SBL28C	28	37	brownish gray mud with 30-40% wiry black organic material
93SBL28C(37-48)	93SBL28C	37	48	dark gray mud with 15 % black organic material
93SBL28C(48-54)	93SBL28C	48	54	dark gray clay with 30% wiry black organic material
93SBL28C(54-64)	93SBL28C	54	64	dark gray muddy compost with 60% black organic material
93SBL28C(64-72)	93SBL28C	64	72	brown compost (95-100% organic) with gray coating
93SBL28C(72-83)	93SBL28C	72	83	brown compost with dark smooth coating
93SBL28C(83-93)	93SBL28C	83	93	brown-black composted horsetail stalks/roots
93SBL28C(93-97)	93SBL28C	93	97	brown-black composted horsetail stalks/roots
93SBL30(0-4)	93SBL30	0	4	orange-brown clayey silt to very fine sand
93SBL30(4-4.5)	93SBL30	4	4.5	gray-white ash (May,1980 Mt. St. Helens)
93SBL30(4.5-9)	93SBL30	4.5	9	orange-brown clayey silt to very fine sand, grass root network
93SBL30(9-18)	93SBL30	9	18	orange-brown clayey silt to very fine sand; grass mat parting at base
93SBL30(18-23)	93SBL30	18	23	yellow-brown clayey silt to very fine sand; grass mat parting at base
93SBL30(23-28.5)	93SBL30	23	28.5	yellow-orange clayey silt to very fine sand; grass mat parting at base
93SBL30(28.5-31.5)	93SBL30	28.5	31.5	yellow-orange clayey silt to very fine sand; grass mat parting at base
93SBL30(31.5-37)	93SBL30	31.5	37	bright red-orange, moderately cemented fine sand
93SBL30(37-48)	93SBL30	37	48	black clayey silt with 20% irregular gray lenses
93SBL30(48-62)	93SBL30	48	62	black clayey silt
93SBL30(62-77)	93SBL30	62	77	gray-black clayey silt with 1% orange spots
93SBL30(77-100)	93SBL30	77	100	homogenous gray clayey silt with minor orange specks
93SBL30(100-122)	93SBL30	100	122	homogenous gray clayey silt
93SBL30(127-137.5)	93SBL30	127	137.5	pale gray clayey silt with horizontal cracks every 0.5 cm
93SBL30(137.5-144.5)	93SBL30	137.5	144.5	gray-brown unlayered clayey silt
93SBL30(144.5-158.5)	93SBL30	144.5	158.5	gray-brown clayey silt with horizontal cracks every 1.5 cm
93SBL30(158.5-172)	93SBL30	158.5	172	gray clayey silt with horizontal cracks every 2 cm
93SBL30(172-180)	93SBL30	172	180	gray clayey silt with horizontal cracks every 1 cm
93SBL30(180-187)	93SBL30	180	187	gray clayey silt with horizontal cracks every 1 cm
93SBL31(0-6)	93SBL31	0	6	medium brown, very fine unconsolidated sand
93SBL31(6-6.5)	93SBL31	6	6.5	gray-white ash (May,1980 Mt. St. Helens)

Appendix C. Lithologic descriptions of soil and sediment samples for which chemical analyses are given in this report (Appendix_C.xls, Appendix_C.dbf)

Sample No.	Site ID	Depth interval, top (cm)	Depth interval, bottom (cm)	Lithologic description
SAMPLE_NO.	SITE_ID	INT_TOP_CM	INT_BT_M_CM	LITH_DESC
93SBL31(6.5-18)	93SBL31	6.5	18	alternating cm-thick dusky brown and medium brown silt couplets; lower 3 cm-dark brown fine sand
93SBL31(18-23)	93SBL31	18	23	3 cm ripple-laminated salt & pepper fine sand underlain by 2 cmm pale
93SBL31(23-30)	93SBL31	23	30	dark brown fine sand with ripple laminations defined by alternating black and pale orange streaks
93SBL31(30-35)	93SBL31	30	35	dark brown fine sand grades up to 0.5 cm silt at top
93SBL31(35-42)	93SBL31	35	42	tan very fine sand with black ripple-laminations, grades up to 1 cm silt at
93SBL31(42-48)	93SBL31	42	48	light brown very fine sand with 1 cm silt at top
93SBL31(48-61)	93SBL31	48	61	orange-brown silt with fine laminae; bright orange-brown very fine sand
93SBL31(61-67)	93SBL31	61	67	1 cm orange silt at base, capped by two 3 cm sands with orange silt
93SBL31(67-73)	93SBL31	67	73	orange silt with black spots; black organic parting at base
93SBL31(73-87)	93SBL31	73	87	dark orange, tan and black fine- to medium-grained sand with ripple laminations; orange silt parting at base
93SBL31(87-108)	93SBL31	87	108	coarsely banded orange and tan fine sand with ripple-laminations decreasing in height from 2 cm at bottom to 0.5 cm at top; gradational with
93SBL31(108-130)	93SBL31	108	130	homogenous tan fine sand with irregular black and orange streaks
93SBL31(130-137)	93SBL31	130	137	pale yellow brown very fine sand with orange laminae
93SBL31(137-146)	93SBL31	137	146	alternating dark gray muddy silt and very fine sand in 0.5 cm thick layers
93SBL31(146-160)	93SBL31	146	160	medium gray to light olive gray silty very fine sand
93SBL31(185-200)	93SBL31	185	200	alternating gray silt and tan very fine sand in 0.5 cm layers
93SBL31(200-211)	93SBL31	200	211	three 3 cm tan fine sand layers separated by 1 cm dark gray silt layers
93SBL32(0-3)	93SBL32	0	3	medium brown very fine sand with roots
93SBL32(3-3.5)	93SBL32	3	3.5	gray-white ash (May 1980 Mt. St. Helens)
93SBL32(3.5-10.5)	93SBL32	3.5	10.5	light red-orange brown very fine sand
93SBL32(10.5-16)	93SBL32	10.5	16	dusky brown silt
93SBL32(16-24)	93SBL32	16	24	irregular lens of dark red-brown silt in homogenous moderate brown silt
93SBL32(24-31)	93SBL32	24	31	dusky brown silt with mottles of light brown
93SBL32(31-48)	93SBL32	31	48	moderate brown silty mud with no mottling
93SBL34a	93SBL34			gray black mud with 10% red spots at water's edge at 2121.4' above sea
93SBL34b	93SBL34			red very fine sand and silt with gray streaks vertical meter above 93SBL 34a and 10 cm below 93SBL 34c
93SBL34c	93SBL34			gray black mud 10 cm above 93SBL34b and adjacent to 93SBL34d
93SBL34d	93SBL34			irregular blob of red-orange, moderately cemented mud penetrating downward into layer of 93SBL 34c

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Sample No.	Site ID	Depth interval, top (cm)	Depth interval, bottom (cm)	Lithologic description
SAMPLE_NO.	SITE_ID	INT_TOP_CM	INT_BT_M_CM	LITH_DESC
93SBL34e	93SBL34			gray black mud with minor red streaks 2m east of 93SBL34d and about 1.5 m below ground surface
93SBL34f	93SBL34			red cemented silty mud along vertical fracture (3 cm wide) cutting gray-black mud layer of 93SBL34e
93SBL34g	93SBL34			25 cm thick red-orange layered silt 50 cm above 93SBL34e
93SBL34h	93SBL34			2 cm gray lens in red-orange layered silt between layers of 93SBL34g and
93SBL34i	93SBL34			25 cm red-orange layered silt-very fine sand above 93SBL34h with layer top 65 cm below ground surface
93SBC35A(0-5)	93SBC35A	0	5	gravelly coarse unconsolidated sand from dredge pile west of Cataldo boat
93SBC35B(0-5)	93SBC35B	0	5	gravelly coarse unconsolidated sand from dredge pile west of Cataldo boat
93SBC36(0-5)	93SBC36	0	5	coarse to fine sand from modern sandbar
93SBC37(0-30)	93SBC37	0	30	tan medium-coarse unconsolidated sand with scattered 1-2 cm clasts in
93SBK38(0-2)	93SBK38	0	2	tan unconsolidated fine sand in small patches on modern gravel point bar
93SBK38(0-11)	93SBK38	0	11	brown muddy fine sand (no Mt. St. Helens ash)
93SBK38(11-20)	93SBK38	11	20	red-brown medium sand
93SBK38(20-55)	93SBK38	20	55	gravelly coarse sand with 25% 2-cm rounded quartzite clasts
93SBK38(55-100)	93SBK38	55	100	red-brown sandy gravel (70% 2-5 cm clasts; 30% coarse sand)
93SBC39(0-2)	93SBC39	0	2	medium-fine sand from eddy bar in modern channel
93SBC39(0-5)	93SBC39	0	5	light tan fine unconsolidated sand
93SBC39(5-5.5)	93SBC39	5	5.5	gray-white ash (May,1980 Mt. St. Helens)
93SBC39(5.5-10)	93SBC39	5.5	10	orange-brown fine sand
93SBC39(10-20)	93SBC39	10	20	marble-cake (brown, orange, black) fine sand
93SBC39(20-27)	93SBC39	20	27	dark brown and black fine sand
93SBC39(27-32)	93SBC39	27	32	red-brown fine sand
93SBC39(32-40)	93SBC39	32	40	dark brown clayey very fine sand
93SBC39(40-58)	93SBC39	40	58	light brown clayey very fine sand
93SBC39(58-72)	93SBC39	58	72	dark brown clayey fine sand
93SBC39(72-225)	93SBC39	72	225	unconsolidated round cobble conglomerate; river at 225
94SB40(0-2)	94SB40	0	2	unconsolidated medium sand from modern point bar deposit
94SB40(0-15)	94SB40	0	15	grassroot-filled fine sand with visible mica flakes
94SB40(15-16)	94SB40	15	16	gray-white ash (May,1980 Mt. St. Helens)
94SB40(16-50)	94SB40	16	50	brown silt to very fine sand, unlayered, with visible mica flakes
94SB40(50-75)	94SB40	50	75	mottled gray-orange-brown fine sand with clayey matrix; no layering

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Sample No.	Site ID	Depth interval, top (cm)	Depth interval, bottom (cm)	Lithologic description
SAMPLE_NO.	SITE_ID	INT_TOP_CM	INT_BT_M_CM	LITH_DESC
94SB40(75-100)	94SB40	75	100	mottled gray-orange-brown fine sand with clayey matrix with two distinct 2-cm dark brown silts with dark organics
94SB40(100-125)	94SB40	100	125	mottled gray-orange-brown fine sand with clayey matrix with 1 cm dark brown silt layer with dark organics; base is 2 m above lake surface
94Gid2(0-3)	94Gid2	0	3	grassy duff with disseminated fine sand
94Gid2(3-4)	94Gid2	3	4	fine sand
94Gid2(4-9)	94Gid2	4	9	mottled red-brown to gray very fine sand and silt layers, 1-2 cm thick
94Gid2(9-10)	94Gid2	9	10	fine sand
94Gid2(10-27)	94Gid2	10	27	mottled red-brown to gray very fine sand and silt layers, 1-2 cm thick
94Gid2(27-29)	94Gid2	27	29	red-brown fine sand with organics
94Gid2(29-52)	94Gid2	29	52	mottled gray silt with organics
94Gid2(52-56)	94Gid2	52	56	fine sand
94Gid2(56-86)	94Gid2	56	86	dark gray silt with two 0.5 cm very fine sand layers
94Gid2(86-90)	94Gid2	86	90	fine-very fine sand and silt layers (0.5 cm each)
94Gid2(90-142)	94Gid2	90	142	homogenous gray fine sand
94Gid2(142-181)	94Gid2	142	181	cm-thick layered gray muddy silt with rootlets
94Gid2(181-203)	94Gid2	181	203	gray very fine sand
94Gid2(203-215)	94Gid2	203	215	gray fine sand
94Gid2(215-245)	94Gid2	215	245	gray very fine sand
94Gid2(245-250)	94Gid2	245	250	gray silt
94Gid2(250-280)	94Gid2	250	280	gray silt and muddy silt with rootlets; layered in 0.2-1.0 cm layers of gray
94Gid3(0-3)	94Gid3	0	3	tan very fine sand
94Gid3(3-3.5)	94Gid3	3	3.5	gray white ash, 1980 Mt. St. Helens
94Gid3(3.5-12)	94Gid3	3.5	12	dark gray fine sand
94Gid3(12-67.5)	94Gid3	12	67.5	laminated dark brown and yellow-orange very fine sand and silt layers, 0.1-
94Gid3(122-130)	94Gid3	122	130	laminated dark brown and yellow-orange very fine sand and silt layers, 0.1-
94Gid3(130-136)	94Gid3	130	136	fine salt & pepper dark gray sand
94Gid3(136-151)	94Gid3	136	151	orange laminated silt with 5% irregular gray splotches
94Gid3(151-190)	94Gid3	151	190	dark gray muddy silt with fine sand 155-157; plant debris rich layers at 153,
94Gid3(190-223)	94Gid3	190	223	tan-gray muddy silt with indistinct layers
94Gid3(244-252)	94Gid3	244	252	tan gray muddy silt & very fine sand
94Gid3(252-284)	94Gid3	252	284	tan, massive medium-fine sand
94Gid3(284-297)	94Gid3	284	297	tan muddy silt; black plant debris rich seam at 286 cm
94Gid3(297-300)	94Gid3	297	300	tan fine sand
94Gid3(300-321)	94Gid3	300	321	tan muddy silt

Appendix C. Lithologic descriptions of soil and sediment samples for which chemical analyses are given in this report (Appendix_C.xls, Appendix_C.dbf)

Sample No.	Site ID	Depth interval, top (cm)	Depth interval, bottom (cm)	Lithologic description
SAMPLE_NO.	SITE_ID	INT_TOP_CM	INT_BTM_CM	LITH_DESC
94Gid3(321-326)	94Gid3	321	326	tan fine sand
94Gid3(326-337)	94Gid3	326	337	tan muddy silt
94Gid4(0-2)	94Gid4	0	2	grassy duff layer
94Gid4(2-10)	94Gid4	2	10	tan medium-fine sand with grass rootlets
94Gid4(10-16)	94Gid4	10	16	very fine sand and silt layers, dark brown
94Gid4(16-40)	94Gid4	16	40	orange brown laminated silt
94Gid4(40-46)	94Gid4	40	46	dark brown-black fine sand
94Gid4(46-52)	94Gid4	46	52	orange-brown silt
94Gid4(52-57)	94Gid4	52	57	brown fine sand
94Gid4(57-63.5)	94Gid4	57	63.5	laminated orange silt, gray on bottom
94Gid4(63.5-122)	94Gid4	63.5	122	No recovery
94Gid4(122-128)	94Gid4	122	128	black-brown silty clay, blotchy layers with red, eye-shaped lenses in upper
94Gid4(128-132)	94Gid4	128	132	medium-fine brown sand
94Gid4(132-194)	94Gid4	132	194	tan silty clay with dark gray laminae visible below 160
94Gid4(194-198)	94Gid4	194	198	tan silty medium-fine sand
94Gid4(198-215)	94Gid4	198	215	tan silty clay with irregular black laminae
94Gid4(215-244)	94Gid4	215	244	No recovery
94Gid4(244-251)	94Gid4	244	251	tan silty clay with thin fine sand laminae
94Gid4(251-255)	94Gid4	251	255	very fine sand
94Gid4(255-256)	94Gid4	255	256	tan silty clay with thin fine sand laminae
94Gid4(256-267)	94Gid4	256	267	fine sand
94Gid4(267-273)	94Gid4	267	273	tan silty clay with thin fine sand laminae
94Gid4(273-279)	94Gid4	273	279	very fine sand
94Gid4(279-351)	94Gid4	279	351	tan silty clay with irregular rusty blotches; sporadic thin fine sand layers
94Gid5(0-5)	94Gid5	0	5	grassy duff layer 0-1.5 cm; tan fine sand with grass roots 1.5-5.0 cm
94Gid5(5-5.5)	94Gid5	5	5.5	gray white ash, 1980 Mt. St. Helens
94Gid5(5.5-10)	94Gid5	5.5	10	tan fine sand
94Gid5(10-18)	94Gid5	10	18	fine sand, gradually changing from orange to dark brown downward
94Gid5(18-43)	94Gid5	18	43	dark brown silty very fine sand with irregular lenses of orange silt in upper 5 cm; orange fine sand 35-36
94Gid5(43-90)	94Gid5	43	90	homogenous dark brown-black silt becoming somewhat lighter in lower half; sharp basal contact
94Gid5(90-96)	94Gid5	90	96	0.2-0.4 cm layers of tan very fine sand and dark brown silt
94Gid5(96-122)	94Gid5	96	122	No recovery
94Gid5(122-128)	94Gid5	122	128	dark gray brown silt, fine light and dark layers

Appendix C. Lithologic descriptions of soil and sediment samples for which chemical analyses are given in this report (Appendix_C.xls, Appendix_C.dbf)

Sample No.	Site ID	Depth interval, top (cm)	Depth interval, bottom (cm)	Lithologic description
SAMPLE_NO.	SITE_ID	INT_TOP_CM	INT_BT_M_CM	LITH_DESC
94Gid5(128-131)	94Gid5	128	131	chocolate brown fine sand with twigs
94Gid5(131-225)	94Gid5	131	225	homogenous, unlayered silty clay and very fine sand, dark at top becoming tan by 180 to bottom. irregular orange blotches throughout
94Gid6(0-3)	94Gid6	0	3	grassy duff with fine sand content increasing downward
94Gid6(3-4)	94Gid6	3	4	gray white ash. 1980 Mt. St. Helens
94Gid6(4-8)	94Gid6	4	8	tan-orange very fine sand
94Gid6(8-11)	94Gid6	8	11	orange silt
94Gid6(11-16)	94Gid6	11	16	orange very fine sand
94Gid6(16-20)	94Gid6	16	20	mottled orange and gray very fine sand
94Gid6(20-70)	94Gid6	20	70	dark brown very fine sand-silt grading downward to light brown, very fine sand-silt. no layering
94Gid6(70-79)	94Gid6	70	79	laminated gray-tan silt with pale rust splotches
94Gid6(79-122)	94Gid6	79	122	No recovery
94Gid6(122-127)	94Gid6	122	127	laminated gray-tan silt
94Gid6(127-130)	94Gid6	127	130	red-brown fine sand with grass stalks
94Gid6(130-226)	94Gid6	130	226	homogenous gray-tan silty clay and very fine sand as gradational 1-3 cm layers becoming lighter downward
94VC-1(0-91)	94VC-1	0	91	light olive brown medium-grained sand
94VC-1(91-97)	94VC-1	91	97	olive gray silt
94VC-1(97-110)	94VC-1	97	110	olive gray muddy silt
94VC-1(110-130)	94VC-1	110	130	light olive gray fine-grained sand
94VC-1(130-135)	94VC-1	130	135	olive gray muddy silt
94VC-1(135-148)	94VC-1	135	148	light olive gray very fine-grained sand
94VC-1(148-159)	94VC-1	148	159	olive gray muddy silt
94VC-1(159-172)	94VC-1	159	172	light olive gray fine-grained sand (with woody debris)
94VC-1(172-176)	94VC-1	172	176	olive gray muddy silt
94VC-1(176-180)	94VC-1	176	180	light olive gray fine-grained sand (with woody debris)
94VC-1(180-191)	94VC-1	180	191	olive gray muddy silt
94VC-1(191-207)	94VC-1	191	207	light olive gray medium-fine-grained sand
94VC-2(0-15)	94VC-2	0	15	brown, medium-grained sand with black wood fragments
94VC-2(15-30)	94VC-2	15	30	inclined contact between brown medium-grained sand above and olive
94VC-2(30-70)	94VC-2	30	70	dark olive gray silty mud
94VC-2(70-80)	94VC-2	70	80	dark olive gray silty mud with 30% very fine sand
94VC-2(80-147)	94VC-2	80	147	dark olive gray silty mud with 30-60% fine sand
94VC-2(147-164)	94VC-2	147	164	dark olive gray medium-grained sand with black wood chips, sticks

Appendix C. Lithologic descriptions of soil and sediment samples for which chemical analyses are given in this report (Appendix_C.xls, Appendix_C.dbf)

Sample No.	Site ID	Depth interval, top (cm)	Depth interval, bottom (cm)	Lithologic description
SAMPLE_NO.	SITE_ID	INT_TOP_CM	INT_BT_M_CM	LITH_DESC
94VC-3(0-55)	94VC-3	0	55	light olive brown medium-fine-grained sand
94VC-3(55-120)	94VC-3	55	120	light olive gray fine-grained sand
94VC-3(120-130)	94VC-3	120	130	dark gray silt
94VC-3(130-140)	94VC-3	130	140	light olive gray medium-fine-grained sand
94VC-3(140-170)	94VC-3	140	170	light olive gray fine-grained sand
94VC-3(170-173)	94VC-3	170	173	dark gray silt
94VC-3(173-190)	94VC-3	173	190	olive gray very fine-grained sand
94VC-3(190-195)	94VC-3	190	195	light olive gray fine-grained sand
94VC-3(195-209)	94VC-3	195	209	olive gray very fine-grained sand
94VC-3(209-211)	94VC-3	209	211	olive gray very fine-grained sand with black woody debris
94VC-3(211-214)	94VC-3	211	214	olive gray very fine-grained sand
94VC-3(214-220)	94VC-3	214	220	olive gray very fine-grained sand with black woody debris
94VC-3(220-230)	94VC-3	220	230	olive gray fine- to very fine-grained sand
94VCD1(0-103)	94VCD1	0	103	light olive gray coarse-grained sand (wood fragments in upper 10 cm)
94VCD1(103-155)	94VCD1	103	155	olive gray medium-grained sand
94VCD1(155-171)	94VCD1	155	171	dark gray muddy silt
94VCD1(171-229)	94VCD1	171	229	olive gray medium-grained sand (abun wood chips=190-200, 210-216, 225-
94VCD1(229-235)	94VCD1	229	235	dark gray very fine-grained sand
94VCD1(235-260)	94VCD1	235	260	dark olive gray silt (black leaf debris @ 257 cm)
94VCD1(260-282)	94VCD1	260	282	olive gray medium-fine-grained sand
94VCD2(0-40)	94VCD2	0	40	olive gray medium-fine-grained sand
94VCD2(40-100)	94VCD2	40	100	light gray muddy silt
94VCD2(100-188)	94VCD2	100	188	light gray medium-grained sand
94VCD2(188-192)	94VCD2	188	192	light gray muddy silt
94VCD2(192-260)	94VCD2	192	260	light gray medium-grained sand
94VCD2(260-295)	94VCD2	260	295	light gray medium-fine-grained sand
94VCD2(295-303)	94VCD2	295	303	very light gray muddy silt
94VCD2(303-325)	94VCD2	303	325	olive gray fine-grained sand
94VCD3(0-24)	94VCD3	0	24	olive gray fine-grained sand (black leaf layers @ 15 & 22 cm)
94VCD3(24-38)	94VCD3	24	38	alternating 2 cm layers of fine-grained sand and silt
94VCD3(38-42)	94VCD3	38	42	gray silt
94VCD3(42-56)	94VCD3	42	56	olive gray fine-grained sand
94VCD3(56-73)	94VCD3	56	73	olive gray medium-grained sand (woody layer @ 73 cm)
94VCD3(73-81)	94VCD3	73	81	olive gray fine-grained sand
94VCD3(81-91)	94VCD3	81	91	alternating 2 cm layers of fine-grained sand and silt

Appendix C. Lithologic descriptions of soil and sediment samples for which chemical analyses are given in this report (Appendix_C.xls, Appendix_C.dbf)

Sample No.	Site ID	Depth interval, top (cm)	Depth interval, bottom (cm)	Lithologic description
SAMPLE_NO.	SITE_ID	INT_TOP_CM	INT_BT_M_CM	LITH_DESC
94VCD3(91-100)	94VCD3	91	100	medium-fine-grained sand
94VCD3(100-125)	94VCD3	100	125	alternating 2 cm layers of fine-grained sand and silt
94VCD3(125-140)	94VCD3	125	140	medium-grained sand
94VCD3(140-175)	94VCD3	140	175	alternating 2 cm layers of fine-grained sand and silt (black leaf horizon @
94VCK1(0-133)	94VCK1	0	133	light olive medium-grained sand
94VCK1(133-180)	94VCK1	133	180	light olive medium-fine-grained sand
94VCK1(180-325)	94VCK1	180	325	grayish-olive fine-grained sand
94VCK1(325-348)	94VCK1	325	348	olive gray clayey silt
94VCK1(348-350)	94VCK1	348	350	plant debris rich layer
94VCK1(350-360)	94VCK1	350	360	olive gray clayey silt
94VCK1(360-367)	94VCK1	360	367	grayish-olive fine-grained sand
94VCK1(367-380)	94VCK1	367	380	olive gray clayey silt
94VCK2(0-90)	94VCK2	0	90	light olive gray medium-grained sand
94VCK2(90-240)	94VCK2	90	240	Medium olive gray medium-grained sand
94VCK2(240-267)	94VCK2	240	267	medium olive gray medium-fine-grained sand
94VCK2(267-300)	94VCK2	267	300	medium olive gray fine-grained sand with ~10% mud
94VCK2(300-325)	94VCK2	300	325	olive gray fine- and very fine-grained sand with ~10% mud
94VCK2(325-333)	94VCK2	325	333	gray silt with black wood chips
94VCK2(333-340)	94VCK2	333	340	olive gray fine- and very fine-grained sand with ~10% mud
95PCK1(0-15)	95PCK1	0	15	tan medium-grained sand
95PCK1(168-193)	95PCK1	168	193	olive gray, fine-grained sand
95PCK1(193-204)	95PCK1	193	204	dark gray, very fine-grained sand
95PCK1(204-227)	95PCK1	204	227	light gray very fine-grained sand, laminated
95PCK1(227-229)	95PCK1	227	229	dark gray organic silt
95PCK1(229-241)	95PCK1	229	241	finely laminated, light gray very fine-grained sand
95PCK1(241-249)	95PCK1	241	249	alternating fine- and very fine-grained sand
95PCK1(249-250)	95PCK1	249	250	silty mud
95PCK1(250-260)	95PCK1	250	260	alternating fine- and very fine-grained sand
95PCK1(260-262)	95PCK1	260	262	silty mud
95PCK1(262-297)	95PCK1	262	297	fine-grained sand with occasional silty mud rip-up clasts
95PCK1(297-326)	95PCK1	297	326	interlayered silt/silty mud
95PCK1(326-343)	95PCK1	326	343	fine-medium-grained sand with interlayered 1 cm silt beds
95PCK1(343-351)	95PCK1	343	351	medium-fine-grained sand
95PCK1(351-360)	95PCK1	351	360	peaty silty mud with sticks, roots; 1 cm fine-grained sand layers at 353,
95PCK1(360-363)	95PCK1	360	363	medium-grained sand

Appendix C. Lithologic descriptions of soil and sediment samples for which chemical analyses are given in this report (Appendix_C.xls, Appendix_C.dbf)

Sample No.	Site ID	Depth interval, top (cm)	Depth interval, bottom (cm)	Lithologic description
SAMPLE_NO.	SITE_ID	INT_TOP_CM	INT_BT_M_CM	LITH_DESC
95PCK1(363-366)	95PCK1	363	366	peaty silty mud
95PCK1(366-369)	95PCK1	366	369	medium-grained sand
95PCK1(369-375)	95PCK1	369	375	fine-grained sand
95PCK1(375-381)	95PCK1	375	381	medium-grained sand
95PCK1(381-393)	95PCK1	381	393	alternating organic-debris-rich muddy silt and fine-grained sand
95PCK1(393-400)	95PCK1	393	400	medium-fine sand
95PCK1(400-407)	95PCK1	400	407	medium sand
95PCK1(407-411)	95PCK1	407	411	peaty silty mud
95PCK1(411-415)	95PCK1	411	415	med sand
95PCK1(415-418)	95PCK1	415	418	peaty silty mud
95PCUD2(0-25)	95PCUD2	0	25	muddy silt
95PCUD2(25-50)	95PCUD2	25	50	muddy silt
95PCUD2(50-75)	95PCUD2	50	75	muddy silt
95PCUD2(75-100)	95PCUD2	75	100	muddy silt
95PCUD2(100-125)	95PCUD2	100	125	muddy silt
95PCUD2(125-150)	95PCUD2	125	150	muddy silt
95PCUD2(150-165)	95PCUD2	150	165	sandy silt
95VCD3(0-28)	95VCD3	0	28	fine-grained sand
95VCD3(28-56)	95VCD3	28	56	olive gray medium-grained sand
95VCD3(56-84)	95VCD3	56	84	olive gray medium-grained sand
95VCD3(84-177)	95VCD3	84	177	olive fine-grained sand
95VCD3(177-195.5)	95VCD3	177	195.5	olive gray silt
95VCD3(195.5-214)	95VCD3	195.5	214	olive gray fine-grained sand
95VCD3(214-230)	95VCD3	214	230	olive black fine-grained sand
95VCD3(230-262)	95VCD3	230	262	olive black medium-grained sand
95VCD3(262-277)	95VCD3	262	277	olive gray medium-coarse-grained sand
95VCD3(277-298)	95VCD3	277	298	olive black fine-grained sand
95VCD3(298-340)	95VCD3	298	340	olive gray very fine-grained sand
95VCD3(340-402)	95VCD3	340	402	olive black very fine-grained sand
95VCD3(402-423)	95VCD3	402	423	olive-brown silt
95VCD3(423-547)	95VCD3	423	547	olive gray muddy silt with fibrous wood fragments
95VCD3(547-572)	95VCD3	547	572	olive gray silt
95VCUD1(0-25)	95VCUD1	0	25	coarse-grained sand
95VCUD1(25-50)	95VCUD1	25	50	coarse-grained sand with wood fragments
95VCUD1(50-75)	95VCUD1	50	75	coarse-grained sand with wood fragments

Appendix C. Lithologic descriptions of soil and sediment samples for which chemical analyses are given in this report (Appendix_C.xls, Appendix_C.dbf)

Sample No.	Site ID	Depth interval, top (cm)	Depth interval, bottom (cm)	Lithologic description
SAMPLE_NO.	SITE_ID	INT_TOP_CM	INT_BT_M_CM	LITH_DESC
95VCUD1(75-100)	95VCUD1	75	100	medium-coarse-grained sand grading down to fine-grained sand
95VCUD1(100-125)	95VCUD1	100	125	[Data missing]
95VCUD1(125-150)	95VCUD1	125	150	[Data missing]
95VCUD1(150-175)	95VCUD1	150	175	[Data missing]
95VCUD1(175-200)	95VCUD1	175	200	[Data missing]
95VCUD1(200-224)	95VCUD1	200	224	[Data missing]
95VCUD1(224-245)	95VCUD1	224	245	[Data missing]
95VCUD1(245-266)	95VCUD1	245	266	[Data missing]
95VCUD1(266-286)	95VCUD1	266	286	[Data missing]
95VCUD1(286-306)	95VCUD1	286	306	[Data missing]
95VCUD1(311-328)	95VCUD1	311	328	[Data missing]
95VCUD1(328-344)	95VCUD1	328	344	[Data missing]
95VCUD1(344-360)	95VCUD1	344	360	[Data missing]
95VCUD1(360-377)	95VCUD1	360	377	[Data missing]
95VCUD1(377-393)	95VCUD1	377	393	[Data missing]
95VCUD1(393-409)	95VCUD1	393	409	[Data missing]
95VCUD1(409-435)	95VCUD1	409	435	fine sand and silt
95VCUD1(435-461)	95VCUD1	435	461	fine sand and silt
95VCUD1(461-486)	95VCUD1	461	486	fine sand and silt
95VCUD1(486-512)	95VCUD1	486	512	[Data missing]
95VCUD1(512-538)	95VCUD1	512	538	[Data missing]
95VCUD1(538-564)	95VCUD1	538	564	[Data missing]
95VCUD1(564-589)	95VCUD1	564	589	medium-fine sand
96K-75E(0-10)	96K-75E	0	10	gray clayey silt
96K-89E(0-23)	96K-89E	0	23	tan medium-fine grained sand, 4 layers, orange colored near base; 1 cm
96K-89E(23-49)	96K-89E	23	49	alternating 2-4 cm layers of very fine sand, fine sand, and red-brown silt (duff layer @ 42 cm)
96K-89E(49-85)	96K-89E	49	85	mostly red-brown silt to very fine sand with (3) 3 cm fine-grained, rippled sand beds (duff @ 52 cm); irregular gray lenses in middle part
96K-89E(85-93)	96K-89E	85	93	medium-grained sand with ripple laminations
96K-89E(93-110)	96K-89E	93	110	alternating layers of red-brown silt and very fine sand, heavily cemented by
96K-89E(110-132)	96K-89E	110	132	dark gray muddy silt with (2) 1 cm red-brown horizons @ 116 and 124 cm
96K-89E(132-162)	96K-89E	132	162	light gray muddy silt with disseminated cm-sized orange spots
96K-114E(0-15)	96K-114E	0	15	tan medium-fine grained sand
96K-114E(15-33)	96K-114E	15	33	medium brown fine sand (1 cm MSH ash @ 33 cm)

Appendix C. Lithologic descriptions of soil and sediment samples for which chemical analyses are given in this report (Appendix_C.xls, Appendix_C.dbf)

Sample No.	Site ID	Depth interval, top (cm)	Depth interval, bottom (cm)	Lithologic description
SAMPLE_NO.	SITE_ID	INT_TOP_CM	INT_BTM_CM	LITH_DESC
96K-114E(33-43)	96K-114E	33	43	dark brown-black medium fine sand
96K-114E(43-61)	96K-114E	43	61	interlayered brown fine sand and orange silt layers
96K-114E(61-80)	96K-114E	61	80	mostly silt with thin fine sand layers
96K-114E(80-104)	96K-114E	80	104	dark brown-black medium fine sand with black streaks
96K-114E(104-130)	96K-114E	104	130	medium brown fine sand
96K-114E(130-162)	96K-114E	130	162	light gray fine sand
96K-114E(162-175)	96K-114E	162	175	dark gray muddy silt
96K-178E(0-9)	96K-178E	0	9	tan fine sand with minimal roots
96K-178E(9-13)	96K-178E	9	13	tan fine sand with abundant roots and black plant matter seam on top
96K-178E(13-18)	96K-178E	13	18	orange-brown very fine sand, laminated
96K-178E(18-19)	96K-178E	18	19	gray-white ash, 1980 Mt St. Helens
96K-178E(19-35)	96K-178E	19	35	orange-brown mottled silt & very fine sand, laminated
96K-178E(35-70)	96K-178E	35	70	orange-brown silt and very fine sand, bioturbated
96K-178E(70-84)	96K-178E	70	84	orange-brown silt and very fine sand, finely layered
96K-178E(84-102)	96K-178E	84	102	dark gray very fine sand with rare red streaks
96K-178E(102-140)	96K-178E	102	140	dark gray silt to very fine sand, layered
96LD-1S(0-16)	96LD-1S	0	16	8 medium sand-silt couplets, light brown above 10 cm, medium brown
96LD-1S(16-43)	96LD-1S	16	43	alternating silt and very-fine sand, with several thin medium sand layers
96LD-1S(43-70)	96LD-1S	43	70	orange-brown fine and very fine sand layers, with moderate iron-oxide
96LD-1S(70-93)	96LD-1S	70	93	Orange brown silt with occasional very fine sand layers, stronger iron-oxide cementation than above
96LD-1S(105-120)	96LD-1S	105	120	very fine sand, silt, clay and woody debris; med gray with 25% orange-
96LD-105S(0-5)	96LD-105S	0	5	3 cm forest duff overlain by 2 cm of tan, medium-grained sand
96LD-105S(5-18)	96LD-105S	5	18	red-brown medium-fine grained sand capped by 0.5 cm Mt St Helens ash
96LD-105S(18-34)	96LD-105S	18	34	dark red-brown-black medium-fine sand with 1 cm orange silt at base
96LD-105S(34-49)	96LD-105S	34	49	gray homogenous fine sand with 5 cm charcoal layer at top, scattered charcoal fragments below
T98C-1(0-3)	T98C-1	0	3	silt, dark brown, with organic debris
T98C-1(3-4)	T98C-1	3	4	1980 Mt. St. Helens ash, very fine-grained, very pale gray
T98C-1(4-15)	T98C-1	4	15	silt, dark brown, with sparse fragments of gray clay (plowed?)
T98C-1(15-30)	T98C-1	15	30	silt, rusty colored, with abundant fragments of gray clay (plowed?)
T98C-1(30-50)	T98C-1	30	50	silt, rusty colored
T98C-1(50-65)	T98C-1	50	65	clay, gray
T98C-5(0-5)	T98C-5	0	5	soil, blackish brown, with organic debris
T98C-5(5-20)	T98C-5	5	20	silt, red-brown (hematitic, goethitic)

Appendix C. Lithologic descriptions of soil and sediment samples for which chemical analyses are given in this report (Appendix_C.xls, Appendix_C.dbf)

Sample No.	Site ID	Depth interval, top (cm)	Depth interval, bottom (cm)	Lithologic description
SAMPLE_NO.	SITE_ID	INT_TOP_CM	INT_BTM_CM	LITH_DESC
T98C-5(20-24)	T98C-5	20	24	sand, coarse-grained, red-brown
T98C-5(24-34)	T98C-5	24	34	clay, red-brown
T98C-5(34-36)	T98C-5	34	36	sand, coarse-grained, red-brown
T98C-5(36-44)	T98C-5	36	44	clay, gray
T98C-5(44-60)	T98C-5	44	60	clay, gray, with fragments of red-brown clay (plowed?)
T98C-5(60-110)	T98C-5	60	110	clay, gray (water saturated), with fragments of red-brown clay
T98C-5(110-200)	T98C-5	110	200	clay, dark gray to black, organic-rich, water saturated
T98C-6(0-3)	T98C-6	0	3	soil, black-brown
T98C-6(3-3.2)	T98C-6	3	3.2	1980 Mt. St. Helens ash, very fine-grained, very pale gray
T98C-6(3.2-11)	T98C-6	3.2	11	sand and silt, very fine-grained, red-brown
T98C-6(11-25)	T98C-6	11	25	sandy silt, red-brown
T98C-6(25-80)	T98C-6	25	80	silt, red-brown
T98C-6(80-120)	T98C-6	80	120	sand and silt, very fine-grained, red-brown
T98C-6(120-200)	T98C-6	120	200	sand, very fine-grained, red-brown
T98C-7(0-5)	T98C-7	0	5	silt, dark brown, organic-bearing
T98C-7(5-5.2)	T98C-7	5	5.2	1980 Mt. St. Helens ash, very fine-grained, very pale gray
T98C-7(5.2-25)	T98C-7	5.2	25	silt, orange-brown
T98C-7(25-35)	T98C-7	25	35	sand, brown-gray
T98C-8(0-3)	T98C-8	0	3	silt, dark brown, organic-bearing
T98C-8(3-3.2)	T98C-8	3	3.2	1980 Mt. St. Helens ash, very fine-grained, very pale gray
T98C-8(3.2-23)	T98C-8	3.2	23	silt, red brown
T98C-8(23-38)	T98C-8	23	38	sand, medium-grained, gray
T98C-10(0-23)	T98C-10	0	23	silt, dark brown (at edge of river bed)
T98C-10(23-23.6)	T98C-10	23	23.6	1980 Mt. St. Helens ash, very fine-grained, very pale gray; thick, inclined
T98C-10(23.6-40)	T98C-10	23.6	40	silt, very fine-grained, red-brown, grading downward to clay
T98C-10(40-45)	T98C-10	40	45	gravel
T98C-11B(0-25)	T98C-11B	0	25	silt, gray, with fragments of black peat
T98C-11B(25-68)	T98C-11B	25	68	silt, gray, with fragments of black peat
T98C-11B(68-111)	T98C-11B	68	111	sand, very fine-grained, dark gray
T98C-12(0-5)	T98C-12	0	5	soil, light brown to gray, organic-bearing
T98C-12(5-5.2)	T98C-12	5	5.2	1980 Mt. St. Helens ash, very fine-grained, very pale gray
T98C-12(5.2-30)	T98C-12	5.2	30	silt, red-brown
T98C-12(30-79)	T98C-12	30	79	silt, red-brown
T98R-13(0-4)	T98R-13	0	4	soil, dark gray to black, organic-rich
T98R-13(4-8)	T98R-13	4	8	soil containing dispersed 1980 volcanic ash

Appendix C. Lithologic descriptions of soil and sediment samples for which chemical analyses are given in this report (Appendix_C.xls, Appendix_C.dbf)

Sample No.	Site ID	Depth interval, top (cm)	Depth interval, bottom (cm)	Lithologic description
SAMPLE_NO.	SITE_ID	INT_TOP_CM	INT_BT_M_CM	LITH_DESC
T98R-13(8-35)	T98R-13	8	35	silt, red-brown (hematitic), with thin clay interbeds
T98R-13(35-60)	T98R-13	35	60	clay, gray, with sandy to silty interbeds throughout
T98R-14(0-3)	T98R-14	0	3	silt, dark brown, organic-bearing
T98R-14(3-3.5)	T98R-14	3	3.5	1980 Mt. St. Helens ash, very fine-grained, very pale gray
T98R-14(3.5-35)	T98R-14	3.5	35	silt, red-brown, rusty, with fragments of gray silt
T98R-14(35-50)	T98R-14	35	50	sand, yellowish brown
T98R-14(50-60)	T98R-14	50	60	sand, gray
T98R-14(60-90)	T98R-14	60	90	sand, gray
T98R-14(90-120)	T98R-14	90	120	sand, gray, water saturated
T98C-15(0-3)	T98C-15	0	3	silt, dark brown, organic-bearing
T98C-15(3-3.2)	T98C-15	3	3.2	1980 Mt. St. Helens ash, very fine-grained, very pale gray
T98C-15(3.2-30)	T98C-15	3.2	30	silt, dark brown and black, grading down to red-brown
T98C-15(30-46)	T98C-15	30	46	silt, layers of red, brown, gray, and red-brown
T98C-15(46-80)	T98C-15	46	80	clay, gray, with red-brown fragments (plowed?)
T98C-15(80-120)	T98C-15	80	120	clay, gray
T98C-16(0-9.9)	T98C-16	0	9.9	silty mud, dark brown, organic-rich
T98C-16(9.9-10.1)	T98C-16	9.9	10.1	1980 Mt. St. Helens ash, very fine-grained, very pale gray
T98C-16(10.1-34)	T98C-16	10.1	34	silt, fine-grained, red-brown with gray interbeds
T98C-16(34-50)	T98C-16	34	50	silt, fine-grained, dark red-brown, with interbeds of coarse, black silt
T98C-16(50-62)	T98C-16	50	62	sand, fine-grained, red-brown, with black interbeds
T98C-16(62-133)	T98C-16	62	133	silt, light brown and red-brown
T98C-16(133-160)	T98C-16	133	160	sand, very fine grained, dark gray
T98C-16(160-182)	T98C-16	160	182	sand, fine-grained, brownish gray
T98C-16(182-210)	T98C-16	182	210	sand, medium-grained, light brown
T98C-17(0-8)	T98C-17	0	8	silt to clay, red-brown, with roots and black organic fragments
T98C-17(8-9)	T98C-17	8	9	1980 Mt. St. Helens ash, very fine-grained, very pale gray; thick layer (1
T98C-17(9-20)	T98C-17	9	20	silt grades downward to medium-grained sand, red brown
T98C-17(20-92)	T98C-17	20	92	silt, red-brown
T98C-17(92-155)	T98C-17	92	155	silt, brown-red, grading downward to
T98C-17(155-173)	T98C-17	155	173	silt, red-brown
T98C-17(173-194)	T98C-17	173	194	silt, grading downward to clay, reddish gray
T98C-17(194-202)	T98C-17	194	202	clay, light brownish gray
T98C-18(0-3)	T98C-18	0	3	soil, brown, with mossy organic material
T98C-18(3-3.5)	T98C-18	3	3.5	1980 Mt. St. Helens ash, very fine-grained, very pale gray
T98C-18(3.5-8)	T98C-18	3.5	8	silt, light brown

Appendix C. Lithologic descriptions of soil and sediment samples for which chemical analyses are given in this report (Appendix_C.xls, Appendix_C.dbf)

Sample No.	Site ID	Depth interval, top (cm)	Depth interval, bottom (cm)	Lithologic description
SAMPLE_NO.	SITE_ID	INT_TOP_CM	INT_BTM_CM	LITH_DESC
T98C-18(8-10)	T98C-18	8	10	silt, red brown
T98C-18(10-17)	T98C-18	10	17	sand, fine-grained, dark brown
T98C-18(17-31)	T98C-18	17	31	silt, red brown
T98C-18(31-55)	T98C-18	31	55	silt, gray, with fragments of red-brown silt (plowed?)
T98C-18(55-130)	T98C-18	55	130	silt, dark brown
T98C-18(130-175)	T98C-18	130	175	silt, dark brown, with about 25 percent of clay
T98C-18(175-192)	T98C-18	175	192	silt and clay, red-brown
T98C-18(192-200)	T98C-18	192	200	clay, reddish brown
T98C-20(0-2.5)	T98C-20	0	2.5	silty mud, dark brown, organic-bearing
T98C-20(2.5-32)	T98C-20	2.5	32	silt, red-brown
T98C-20(32-41)	T98C-20	32	41	silt, organic-rich, black
T98C-20(41-46)	T98C-20	41	46	clay, gray
T98C-21(0-14)	T98C-21	0	14	silt, light brown, organic-bearing
T98C-21(14-15)	T98C-21	14	15	1980 Mt. St. Helens ash, very fine-grained, very pale gray
T98C-21(15-30)	T98C-21	15	30	silt, light brown, with fragments of gray clay and plant roots (plowed?)
T98C-21(30-45)	T98C-21	30	45	silt, red-brown, laminated
T98C-21(45-60)	T98C-21	45	60	sand, dark gray
T98C-21B(60-125)	T98C-21B	60	125	sand, medium-grained, gray
T98C-21B(125-200)	T98C-21B	125	200	sand, gray
T98C-22(0-30)	T98C-22	0	30	clay, dark brown, organic-rich, with fragments of red-brown clay (plowed?)
T98C-22(30-47)	T98C-22	30	47	clay, dark brown, with fragments of red-brown clay (plowed?)
T98C-22(47-80)	T98C-22	47	80	clay, gray
T98C-23(0-13)	T98C-23	0	13	silt, brown-black, organic-rich (smells like a sewer)
T98C-23(13-24)	T98C-23	13	24	clay, broken fragments of red and gray clay (plowed?)
T98C-23(24-40)	T98C-23	24	40	silt, dark gray
T98C-23(40-50)	T98C-23	40	50	clay
T98R-24(0-5)	T98R-24	0	5	mud, black, organic-rich
T98R-24(5-50)	T98R-24	5	50	silt, red-brown, with lenses of red-gray sand, and gray clay (plowed?)
T98R-24(50-60)	T98R-24	50	60	clay, gray
T98R-24(60-75)	T98R-24	60	75	sand, coarse, gray to red-brown
T98R-24(75-95)	T98R-24	75	95	clay, gray
T98C-25(0-5)	T98C-25	0	5	silt, light brown, organic-bearing
T98C-25(5-6)	T98C-25	5	6	1980 Mt. St. Helens ash, very fine-grained, very pale gray
T98C-25(5-15)	T98C-25	5	15	silt, red-brown
T98C-25(15-21)	T98C-25	15	21	silt, organic-bearing, brown-black

Appendix C. Lithologic descriptions of soil and sediment samples for which chemical analyses are given in this report (Appendix_C.xls, Appendix_C.dbf)

Sample No.	Site ID	Depth interval, top (cm)	Depth interval, bottom (cm)	Lithologic description
SAMPLE_NO.	SITE_ID	INT_TOP_CM	INT_BTM_CM	LITH_DESC
T98C-25(21-26)	T98C-25	21	26	silt, with dark brown and red-brown horizontal lenses
T98C-25(26-140)	T98C-25	26	140	silt
T98C-25(140-150)	T98C-25	140	150	silt and clay, red-brown
T98C-25(150-165)	T98C-25	150	165	silty clay, gray
T98C-25(165-175)	T98C-25	165	175	clay, light gray
T98C-26(0-3)	T98C-26	0	3	soil, dark brown, organic-rich
T98C-26(3-25)	T98C-26	3	25	clay, red-brown, with horizontal lenses of gray clay
T98C-26(25-40)	T98C-26	25	40	clay, gray
T98R-27(0-15)	T98R-27	0	15	silt, red-brown, organic-rich
T98R-27(15-60)	T98R-27	15	60	silt, light gray with small fragments of red-brown silt (plowed?)
T98R-27(60-100)	T98R-27	60	100	silt, light gray with small fragments of red-brown silt (plowed?)
T98R-27(100-134)	T98R-27	100	134	silt, light gray with small fragments of red-brown silt (plowed?)
T98R-27(134-161)	T98R-27	134	161	sand, very fine-grained, with small fragments of red silt (plowed?)
T98R-27(161-180)	T98R-27	161	180	silt and sand, red-brown, with fragments of red silt (plowed?)
T98R-27(180-190)	T98R-27	180	190	silt, red brown, with small fragments of gray silt (plowed?)
T98R-27(190-200)	T98R-27	190	200	fine-grained silt, blue gray
T98R-28(0-2.5)	T98R-28	0	2.5	silt, black-gray-brown, organic-bearing
T98R-28(2.5-3)	T98R-28	2.5	3	1980 Mt. St. Helens ash, very fine-grained, very pale gray
T98R-28(3-11)	T98R-28	3	11	silt, black-gray-brown, organic-bearing
T98R-28(11-17)	T98R-28	11	17	silt, light brown
T98R-28(17-30)	T98R-28	17	30	clay, red
T98R-28(30-45)	T98R-28	30	45	clay, black to gray
T98R-28(45-60)	T98R-28	45	60	clay, black
T98R-28(60-100)	T98R-28	60	100	clay, gray
T98R-28(100-135)	T98R-28	100	135	clay, gray, with small fragments of red clay
T98R-29(0-10)	T98R-29	0	10	clay, red-brown, organic-bearing
T98R-29(10-30)	T98R-29	10	30	clay, red-brown, with fragments of black organics and gray clay
T98R-29(30-60)	T98R-29	30	60	clay, gray, with small fragments of very red clay throughout (plowed?)
T98R-29(60-75)	T98R-29	60	75	clay, gray with fragments of very red clay, decreasing downward
T98R-29(75-100)	T98R-29	75	100	clay, gray
T98R-29(100-120)	T98R-29	100	120	silt, gray, grading downward to medium-grained sand, mostly gray
T98R-30(0-4)	T98R-30	0	4	silty soil, red-brown, organic-bearing
T98R-30(4-4.9)	T98R-30	4	4.9	1980 Mt. St. Helens ash, very fine-grained, very pale gray
T98R-30(4.9-14)	T98R-30	4.9	14	silt, red-brown, with rootlets
T98R-30(14-80)	T98R-30	14	80	silt, black-gray

Appendix C. Lithologic descriptions of soil and sediment samples for which chemical analyses are given in this report (Appendix_C.xls, Appendix_C.dbf)

Sample No.	Site ID	Depth interval, top (cm)	Depth interval, bottom (cm)	Lithologic description
SAMPLE_NO.	SITE_ID	INT_TOP_CM	INT_BT_M_CM	LITH_DESC
T98R-31(0-5)	T98R-31	0	5	silt, red-brown, with organic debris
T98R-31(5-6)	T98R-31	5	6	1980 Mt. St. Helens ash, very fine-grained, very pale gray
T98R-31(6-35)	T98R-31	6	35	silt, with rootlets
T98R-31(35-52)	T98R-31	35	52	silt, with horizontal lenses of gray sand, 4 to 5 cm thick
T98R-31(52-63)	T98R-31	52	63	silt
T98R-31(63-135)	T98R-31	63	135	sand, very fine-grained, dark red-brown
T98R-31(135-155)	T98R-31	135	155	silt, coarse, orange-red
T98R-31(155-165)	T98R-31	155	165	silt, orange red, with fragments of gray clay
T98R-31(165-185)	T98R-31	165	185	silt and very fine sand, orange-red
T98R-31(185-190)	T98R-31	185	190	silt, red-brown, with fragments of gray clay
T98R-32(0-2)	T98R-32	0	2	silt, dark brown, organic-rich
T98R-32(2-55)	T98R-32	2	55	silt, red-brown, with organic debris, and sand layers, dark red to black
T98R-32(55-85)	T98R-32	55	85	silt, red-brown
T98R-32(85-110)	T98R-32	85	110	silt, red-brown, with horizontal layers of red-orange clay
T98R-32(110-180)	T98R-32	110	180	silt, red-orange, with fragments of gray silt and clay
T98R-33(0-5)	T98R-33	0	5	silt, dark brown, organic-rich
T98R-33(5-10)	T98R-33	5	10	silt, red-brown
T98R-33(10-21)	T98R-33	10	21	silt, brown
T98R-33(21-40)	T98R-33	21	40	silt, red, with lenses of fine sand, dark brown
T98R-33(40-45)	T98R-33	40	45	silt, dark gray with fragments of red silt
T98R-33(45-60)	T98R-33	45	60	silt, light gray, with fragments of red silt
T98R-33(60-145)	T98R-33	60	145	silt, yellow to reddish yellow
T98R-33(145-185)	T98R-33	145	185	clay
T98R-34(0-15)	T98R-34	0	15	silt, black-gray, organic-bearing
T98R-34(15-22)	T98R-34	15	22	silt
T98R-34(22-40)	T98R-34	22	40	clay, brown-black
T98R-34(40-60)	T98R-34	40	60	silty clay, dark brown
T98R-34(60-90)	T98R-34	60	90	clay, dark brown
T98L-35(0-18)	T98L-35	0	18	clay, brown and gray, organic-bearing
T98L-35(18-52)	T98L-35	18	52	clay, gray, water-saturated
T98L-35(52-72)	T98L-35	52	72	silt, gray
T98L-35(72-92)	T98L-35	72	92	sand to silt, gray
T98L-35(92-115)	T98L-35	92	115	mixed silt, sand and clay, in order of decreasing abundance
T98L-35(115-139)	T98L-35	115	139	sand, fine-grained, gray
T98L-35(139-161)	T98L-35	139	161	silt, gray

Appendix C. Lithologic descriptions of soil and sediment samples for which chemical analyses are given in this report (Appendix_C.xls, Appendix_C.dbf)

Sample No.	Site ID	Depth interval, top (cm)	Depth interval, bottom (cm)	Lithologic description
SAMPLE_NO.	SITE_ID	INT_TOP_CM	INT_BTM_CM	LITH_DESC
T98L-35(161-195)	T98L-35	161	195	clay, gray
T98L-36(0-10)	T98L-36	0	10	sand, medium-grained, light brown
T98L-36(10-16)	T98L-36	10	16	sand, fine-grained, gray, cross-bedded
T98L-36(16-16.5)	T98L-36	16	16.5	1980 Mt. St. Helens ash, very fine grained, very pale gray
T98L-36(16.5-25)	T98L-36	16.5	25	sand, medium-grained
T98L-36(25-30)	T98L-36	25	30	silt, red-brown
T98L-36(30-65)	T98L-36	30	65	sand, fine-grained, gray, cross-bedded
T98L-36(65-90)	T98L-36	65	90	sand, fine-grained, red
T98L-36(90-105)	T98L-36	90	105	sand, yellow
T98L-36(105-120)	T98L-36	105	120	sand, yellow, with clasts of gray clay
T98L-36(120-165)	T98L-36	120	165	sand, yellow-gray
T98L-36(165-180)	T98L-36	165	180	silt, gray
T98L-36(180-195)	T98L-36	180	195	sand, fine-grained, gray
T98L-37(0-35)	T98L-37	0	35	clay, gray, with organic debris and fragments of red clay (plowed?)
T98L-37(35-45)	T98L-37	35	45	clay, gray, water-saturated, with fragments of red clay (plowed?)
T98L-37(45-65)	T98L-37	45	65	clay, dark gray, with fragments of light gray clay (plowed?)
T98L-37(65-200)	T98L-37	65	200	clay, gray, dark gray, and light gray
T98L-38(0-5)	T98L-38	0	5	clay, dark brown, with limonite-cemented tubes of red clay around roots
T98L-38(5-45)	T98L-38	5	45	clay, dark brown, organic-bearing
T98L-38(45-55)	T98L-38	45	55	clay, gray, organic-bearing
T98L-38(55-75)	T98L-38	55	75	clay, medium gray, organic-bearing
T98L-38(75-105)	T98L-38	75	105	clay, gray, organic-bearing
T98L-38(105-125)	T98L-38	105	125	clay, dark gray, organic-bearing
T98L-38(125-185)	T98L-38	125	185	clay, brown-red, organic-bearing
T98L-38(185-195)	T98L-38	185	195	clay, organic-bearing, with fragments of light gray and red-brown clay
T98L-38(195-205)	T98L-38	195	205	clay
T98M-39(0-5)	T98M-39	0	5	silt, dark brown, organic-bearing, with fragments of 1980 Mt. St. Helens
T98M-39(5-30)	T98M-39	5	30	silt, fine-grained, dark brown, organic-bearing
T98M-39(30-58)	T98M-39	30	58	clay, gray-brown, organic-bearing
T98M-39(58-85)	T98M-39	58	85	clay, gray to dark brown
T98M-39(85-135)	T98M-39	85	135	clay, gray, with fragments of light yellow to red-brown clay
T98M-39(135-147)	T98M-39	135	147	silt, yellow-gray
T98M-39(147-175)	T98M-39	147	175	clay, gray, with fragments of red-brown clay
T98M-39(175-205)	T98M-39	175	205	clay, gray
T98M-40(0-15)	T98M-40	0	15	silt, dark brown, organic-bearing, with small red fragments

Appendix C. Lithologic descriptions of soil and sediment samples for which chemical analyses are given in this report (Appendix_C.xls, Appendix_C.dbf)

Sample No.	Site ID	Depth interval, top (cm)	Depth interval, bottom (cm)	Lithologic description
SAMPLE_NO.	SITE_ID	INT_TOP_CM	INT_BTML_CM	LITH_DESC
T98M-40(15-48)	T98M-40	15	48	silt, gray, organic-bearing, with red fragments, and red stain around
T98M-40(48-130)	T98M-40	48	130	silty clay, dark brown
T98M-40(130-155)	T98M-40	130	155	clay, light gray, with small fragments of red-brown clay
T98M-40(155-168)	T98M-40	155	168	clay
T98M-40(168-180)	T98M-40	168	180	clay, light gray with small fragments of red clay
T98M-40(180-195)	T98M-40	180	195	silt, light gray
T98L-41(0-10)	T98L-41	0	10	clay, gray, organic-bearing
T98L-41(10-40)	T98L-41	10	40	silt, red-brown
T98L-41(40-52)	T98L-41	40	52	clay, gray, with fragments of red-black clay
T98L-41(52-70)	T98L-41	52	70	peat, black
T98L-41(70-105)	T98L-41	70	105	clay, gray
T98L-42(0-11)	T98L-42	0	11	clay, red-brown, organic-bearing
T98L-42(11-25)	T98L-42	11	25	clay, gray, organic-bearing, with fragments of red clay
T98L-42(25-35)	T98L-42	25	35	clay, organic-rich, dark gray
T98L-42(35-45)	T98L-42	35	45	peat, dark gray
T98L-42(45-110)	T98L-42	45	110	clay, gray
T98L-42(110-120)	T98L-42	110	120	silt
T98M-43(0-2)	T98M-43	0	2	silt, organic-bearing
T98M-43(2-2.5)	T98M-43	2	2.5	1980 Mt. St. Helens ash, very fine-grained, very pale gray
T98M-43(2.5-20)	T98M-43	2.5	20	silt, organic-bearing
T98M-43(20-30)	T98M-43	20	30	silt, dark brown
T98M-43(30-135)	T98M-43	30	135	silt, light brown to brown
T98M-43(135-155)	T98M-43	135	155	fine silt, brown
T98M-43(155-190)	T98M-43	155	190	silt, yellowish brown

Appendix D. Chemical composition of samples analyzed by energy dispersive X-ray fluorescence (EDXRF) at the USGS labs, Menlo Park, CA (Appendix_D.xls, Appendix_D.dbf)

Sample No.	Site ID	Depth interval, top (cm)	Depth interval, bottom (cm)	*Other analyses (Appendix #)	Cu (ppm)	Pb (ppm)	Zn (ppm)
SAMPLE_NO.	SITE_ID	INT_TOP_CM	INT_BTML_CM	OTHR_ANALYS	CU_PPM	PB_PPM	ZN_PPM
93ABM02(0-10)	93ABM02	0	10	F	128	4200	3450
93ABM02(11-22)	93ABM02	11	22	F, G	130	4000	3150
93ABM02(22-36)	93ABM02	22	36	F	138	4150	5450
93ABM02(36-44)	93ABM02	36	44	F	138	4150	2250
93ABM02(44-66)	93ABM02	44	66	F	120	5050	2700
93ABM02(66-85)	93ABM02	66	85	F	108	5900	1650
93ABM02(85-97)	93ABM02	85	97	F	106	4600	3200
93ABM02(97-110)	93ABM02	97	110	F	56	70	620
93ABM02(110-126)	93ABM02	110	126	F	60	70	525
93ABM02(0-97)	93ABM02	0	97	F	120	4700	3000
93ABM02(97-126)	93ABM02	97	126	F	48	60	555
93ABM02(0-97)L	93ABM02	0	97	F	110	4900	3350
93ABM02(97-129)L	93ABM02	97	126	F	42	57	570
93ABM04(0-12)	93ABM04	0	12	F	118	3700	4000
93ABM04(13-18)	93ABM04	13	18	F	38	3900	2750
93ABM04(22-27)	93ABM04	22	27	F	122	3850	6000
93ABM04(32-37)	93ABM04	32	37	F	98	3350	3450
93ABM04(42-48)	93ABM04	42	48	F	97	3700	2700
93ABM04(48-76)	93ABM04	48	76	F	160	10400	4200
93ABM04(76-142)	93ABM04	76	142	F, G	48	340	340
93ABM6A	93ABM06			F	64	2800	1050
93ABM6B	93ABM06			F	40	83	129
93ABL08(0-5)	93ABL08	0	5	F	145	4750	3450
93ABL09(0-83)	93ABL09	0	83	F	134	4050	5700
93SBC10(0-3)	93SBC10	0	3	F	140	3310	1840
93SBC10(3-30)	93SBC10	3	30	F	130	3820	2110
93SBC10(30-70)	93SBC10	30	70	F	230	10700	3080
93SBC10(70-90)	93SBC10	70	90	F, G	270	11300	2460
93SBC10(90-100)	93SBC10	90	100	F	200	12900	1950
93SBC10(100-130)	93SBC10	100	130	F	100	640	1100
93SBC10(130-160)	93SBC10	130	160	F	55	55	1500
93SBR13(0-15)	93SBR13	0	15	F	184	5350	4550
93SBR13(16-52)	93SBR13	16	52	F	149	5650	4050
93SBR13(57-65)	93SBR13	57	65	F	136	6850	4200
93SBR13(221-237)	93SBR13	221	237	F	365	21150	5850
93SBR13(237-251)	93SBR13	237	251	F	220	13300	5450
93SBR13(251-291)	93SBR13	251	291	F	190	11850	5300
93SBM14	93SBM14			F	49	46	102
93SBC15(0-15)	93SBC15	0	15	E	160	740	520
93SBC15(15-35)	93SBC15	15	35	E	130	1470	820
93SBC15(35-90)	93SBC15	35	90	E	150	2910	1520
93SBC15(90-165)	93SBC15	90	165	E	220	7560	2710
93SBC15(165-214)	93SBC15	165	214	E	190	8980	2660
93SBC15(214-242)	93SBC15	214	242	E	160	9630	3720
93SBC15(242-261)	93SBC15	242	261	E	170	8020	3740
93SBC16(0-5)	93SBC16	0	5	F	65	1880	1240
93SBK17(8-25)	93SBK17	8	25	----	370	50800	12900
93SBK17(25-68)	93SBK17	25	68	F, G	390	18300	10200
93SBK17(68-106)L	93SBK17	68	106	F	355	60600	5900

*Other analyses (Appendix #): E =EWU, F =CHEMEX, G = XRAL, ----- = none.

Appendix D. Chemical composition of samples analyzed by energy dispersive X-ray fluorescence (EDXRF) at the USGS labs, Menlo Park, CA (Appendix_D.xls, Appendix_D.dbf)

Sample No.	Site ID	Depth interval, top (cm)	Depth interval, bottom (cm)	*Other analyses (Appendix #)	Cu (ppm)	Pb (ppm)	Zn (ppm)
SAMPLE_NO.	SITE_ID	INT_TOP_CM	INT_BTML_CM	OTHR_ANALYS	CU_PPM	PB_PPM	ZN_PPM
93SBK17(106-152)	93SBK17	106	152	F, G	70	3320	1880
93SBK17(152-230)	93SBK17	152	230	F	58	1080	1310
93SBK18(7-10)	93SBK18	7	10	F, G	370	24500	5560
93SBK18(10-26)	93SBK18	10	26	F	450	33800	5820
93SBK18(26-82)L	93SBK18	26	82	F, G	670	37450	5300
93SBK18(82-92)	93SBK18	82	92	F	100	3230	2730
93SBK18(92-109)	93SBK18	92	109	F	56	260	5920
93SBK18(109-160)	93SBK18	109	160	F	39	220	1700
93SBB20(0-5)	93SBB20	0	5	F, G	110	3220	2930
93SBB21(0-9)	93SBB21	0	9	E	110	3090	4580
93SBB21(41-72)	93SBB21	41	72	E	120	3760	3200
93SBB21(72-84)	93SBB21	72	84	E	110	4720	2520
93SBB21(84-99)	93SBB21	84	99	E	110	5350	1880
93SBB21(99-111)	93SBB21	99	111	E	110	5830	2840
93SBB21(111-120)	93SBB21	111	120	E	43	360	1370
93SBB21(120-130)	93SBB21	120	130	E	31	50	230
93SBB21(130-148)	93SBB21	130	148	E	32	46	180
93SBB21(148-160)	93SBB21	148	160	E	35	40	97
93SBB21(160-180)	93SBB21	160	180	E	30	47	89
93SBB21(173-180)	93SBB21	173	180	E	340	120	340
93SBB21(180-192)	93SBB21	180	192	E	180	98	220
93SBB21(192-203)	93SBB21	192	203	E	160	40	160
93SBB22(0-4)	93SBB22	0	4	F	87	1180	480
93SBB22(4.5-7.5)	93SBB22	4.5	7.5	F	200	2620	970
93SBB22(7.5-12)	93SBB22	7.5	12	F	120	4170	1860
93SBB22(12-15)	93SBB22	12	15	F	160	4200	4060
93SBB22(15-19)	93SBB22	15	19	F	120	5140	3240
93SBB22(19-26)	93SBB22	19	26	F, G	150	9740	3370
93SBB22(26-29)	93SBB22	26	29	F	210	16800	1680
93SBB22(29-36)	93SBB22	29	36	F	85	580	1090
93SBB22(36-48)	93SBB22	36	48	F	190	74	450
93SBB22(48-60)	93SBB22	48	60	F	160	40	270
93SBB22(60-82)	93SBB22	60	82	F	54	50	120
93SBB23(0-5)	93SBB23	0	5	F	120	3950	2400
93SBB23(5-12)	93SBB23	5	12	F	98	2530	3310
93SBB23(12-17)	93SBB23	12	17	F	140	3810	4430
93SBB23(17-22)	93SBB23	17	22	F	130	4550	3590
93SBB23(22-30)	93SBB23	22	30	F	120	4760	2540
93SBB23(30-46)	93SBB23	30	46	F	150	6280	2430
93SBB23(46-53)	93SBB23	46	53	F, G	170	7030	5800
93SBB23(53-86)	93SBB23	53	86	F	36	63	620
93SBB23(86-117)	93SBB23	86	117	F	40	63	290
93SBL26(0-6)	93SBL26	0	6	F, G	230	2850	1490
93SBL26(6-12)	93SBL26	6	12	F	390	4830	6800
93SBL26(12-20)	93SBL26	12	20	F	280	5120	3860
93SBL26(20-28)	93SBL26	20	28	F	340	7470	2100
93SBL26(28-34)	93SBL26	28	34	F	130	1430	2170
93SBL26(34-47)	93SBL26	34	47	F	97	270	240
93SBL26(47-58)	93SBL26	47	58	F	220	280	340

*Other analyses (Appendix #): E =EWU, F =CHEMEX, G = XRAL, ----- = none.

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Appendix D. Chemical composition of samples analyzed by energy dispersive X-ray fluorescence (EDXRF) at the USGS labs, Menlo Park, CA (Appendix_D.xls, Appendix_D.dbf)

Sample No.	Site ID	Depth interval, top (cm)	Depth interval, bottom (cm)	*Other analyses (Appendix #)	Cu (ppm)	Pb (ppm)	Zn (ppm)
SAMPLE_NO.	SITE_ID	INT_TOP_CM	INT_BTML_CM	OTHR_ANALYS	CU_PPM	PB_PPM	ZN_PPM
93SBL27(0-7)	93SBL27	0	7	E	150	4610	4200
93SBL27(7-19)	93SBL27	7	19	E	140	4230	4340
93SBL27(19-23)	93SBL27	19	23	E	160	4370	3100
93SBL27(23-39)	93SBL27	23	39	E	120	4320	4070
93SBL27(39-46)	93SBL27	39	46	E	130	4180	4180
93SBL27(46-50)	93SBL27	46	50	E	160	5490	4150
93SBL27(50-60)	93SBL27	50	60	E	150	5050	5330
93SBL27(60-76)	93SBL27	60	76	E	54	63	960
93SBL27(63-65)	93SBL27	63	65	----	120	4440	3530
93SBL27(76-90)	93SBL27	76	90	E	54	57	530
93SBL27(90-99)	93SBL27	90	99	E	72	60	310
93SBL27B(0-4)	93SBL27B	0	4	F	210	4460	3460
93SBL27B(4-16)	93SBL27B	4	16	F	160	4910	4330
93SBL27B(16-23)	93SBL27B	16	23	F	160	4570	4890
93SBL27B(23-34)	93SBL27B	23	34	F	160	5030	3380
93SBL27B(34-43)	93SBL27B	34	43	F	130	5390	2000
93SBL27B(43-53)	93SBL27B	43	53	F	150	6090	2100
93SBL27B(53-69)	93SBL27B	53	69	F	120	5330	1740
93SBL27B(69-85)	93SBL27B	69	85	F	110	<40	1580
93SBL28(0-11)	93SBL28	0	11	F	180	3280	2820
93SBL28(11-16)	93SBL28	11	16	F	190	2970	980
93SBL28(16-25)	93SBL28	16	25	F	200	3980	4000
93SBL28(25-34)	93SBL28	25	34	F	130	4250	2980
93SBL28(34-37)	93SBL28	34	37	F	150	5030	3230
93SBL28(37-41)	93SBL28	37	41	F	210	7150	3480
93SBL28(41-46)	93SBL28	41	46	F	170	5880	1580
93SBL28C(0-25)	93SBL28C	0	25	F	210	1960	1530
93SBL28C(25-28)	93SBL28C	25	28	F	302	3900	1550
93SBL28C(28-37)	93SBL28C	28	37	F	203	3650	3900
93SBL28C(37-48)	93SBL28C	37	48	F	160	4330	2910
93SBL28C(48-54)	93SBL28C	48	54	F	220	5840	3380
93SBL28C(54-64)	93SBL28C	54	64	F	170	6820	1840
93SBL28C(64-72)	93SBL28C	64	72	F	160	350	2280
93SBL28C(72-83)	93SBL28C	72	83	F	160	79	910
93SBL28C(83-93)	93SBL28C	83	93	F	180	68	540
93SBL28C(93-97)	93SBL28C	93	97	F	430	300	490
93SBL30(0-4)	93SBL30	0	4	E	140	5200	4300
93SBL30(4-9)	93SBL30	4	9	E	198	5150	5200
93SBL30(9-18)	93SBL30	9	18	E	182	5000	3650
93SBL30(18-23)	93SBL30	18	23	E	1650	6300	9800
93SBL30(23-28.5)	93SBL30	23	28.5	E	154	6950	2900
93SBL30(28.5-31.5)	93SBL30	28.5	31.5	E	150	5850	2700
93SBL30(31.5-37)	93SBL30	31.5	37	E	120	5550	3110
93SBL30(37-48)	93SBL30	37	48	E	60	440	930
93SBL30(48-62)	93SBL30	48	62	E	55	79	600
93SBL30(62-77)	93SBL30	62	77	E	61	40	410
93SBL30(77-100)	93SBL30	77	100	E	50	48	290
93SBL30(100-122)	93SBL30	100	122	----	42	48	240
93SBL30(127-137.5)	93SBL30	127	137.5	E	120	46	130

*Other analyses (Appendix #): E =EWU, F =CHEMEX, G = XRAL, ----- = none.

Appendix D. Chemical composition of samples analyzed by energy dispersive X-ray fluorescence (EDXRF) at the USGS labs, Menlo Park, CA (Appendix_D.xls, Appendix_D.dbf)

Sample No.	Site ID	Depth interval, top (cm)	Depth interval, bottom (cm)	*Other analyses (Appendix #)	Cu (ppm)	Pb (ppm)	Zn (ppm)
SAMPLE_NO.	SITE_ID	INT_TOP_CM	INT_BTML_CM	OTHR_ANALYS	CU_PPM	PB_PPM	ZN_PPM
93SBL30(137.5-144.5)	93SBL30	137.5	144.5	E	160	40	360
93SBL30(144.5-158.5)	93SBL30	144.5	158.5	E	91	47	180
93SBL30(158.5-172)	93SBL30	158.5	172	E	110	45	110
93SBL30(172-180)	93SBL30	172	180	E	180	47	140
93SBL30(180-187)	93SBL30	180	187	E	260	71	220
93SBL31(0-6)	93SBL31	0	6	F	140	4720	1900
93SBL31(6.5-18)	93SBL31	6.5	18	F	136	4300	3800
93SBL31(18-23)	93SBL31	18	23	F	132	3650	3300
93SBL31(23-30)	93SBL31	23	30	F	117	4000	2300
93SBL31(30-35)	93SBL31	30	35	F	116	3950	1850
93SBL31(35-42)	93SBL31	35	42	F	108	3450	1450
93SBL31(42-48)	93SBL31	42	48	F	107	3700	1600
93SBL31(48-61)	93SBL31	48	61	----	108	4050	2200
93SBL31(61-67)	93SBL31	61	67	----	94	3950	1950
93SBL31(67-73)	93SBL31	67	73	----	96	3950	2400
93SBL31(73-87)	93SBL31	73	87	F	120	4550	2150
93SBL31(87-108)	93SBL31	87	108	----	91	4300	2350
93SBL31(108-130)	93SBL31	108	130	----	97	4650	2850
93SBL31(130-137)	93SBL31	130	137	F	140	5200	5380
93SBL31(137-146)	93SBL31	137	146	F, G	150	5150	4850
93SBL31(146-160)	93SBL31	146	160	F	160	5280	7500
93SBL31(185-200)	93SBL31	185	200	F, G	240	6240	4780
93SBL31(200-211)	93SBL31	200	211	F	190	5320	4780
93SBL32(0-3)	93SBL32	0	3	F	167	2650	1700
93SBL32(3-10.5)	93SBL32	3	10.5	F	129	4800	2200
93SBL32(10.5-16)	93SBL32	10.5	16	F, G	82	2050	577
93SBL32(16-24)	93SBL32	16	24	F	284	23000	950
93SBL32(24-31)	93SBL32	24	31	F	58	830	328
93SBL32(31-48)	93SBL32	31	48	F	305	72	38
93SBL34a	93SBL34a			F	140	6170	6440
93SBL34b	93SBL34b			E, F	184	10200	3350
93SBL34c	93SBL34c			E, F	380	25700	13200
93SBL34d	93SBL34d			E, F	248	19650	3900
93SBL34e	93SBL34e			E, F	380	26400	14100
93SBL34f	93SBL34f			E, F	215	19500	4100
93SBL34g	93SBL34g			E, F	232	18400	4650
93SBL34h	93SBL34h			E, F	300	19100	11400
93SBL34i	93SBL34i			E, F	254	17350	6300
93SBC35A(0-5)	93SBC35A	0	5	----	98	2950	2600
93SBC35B(0-5)	93SBC35B	0	5	----	79	2350	1800
93SBC36(0-5)	93SBC36	0	5	----	61	29	117
93SBC37(0-5)	93SBC37	0	5	----	34	72	104
93SBK38(SAND)	93SBK38	0	2	E	118	2950	2000
93SBK38(0-11)	93SBK38	0	11	E	108	2700	1600
93SBK38(11-20)	93SBK38	11	20	E	144	5050	1600
93SBK38(20-55)	93SBK38	20	55	E	70	2550	890
93SBK38(55-100)	93SBK38	55	100	E	96	5000	1700
93SBC39(SAND)	93SBC39	0	2	E	101	3550	2300
93SBC39(0-5)	93SBC39	0	5	E	105	2400	1150

*Other analyses (Appendix #): E =EWU, F =CHEMEX, G = XRAL, ----- = none.

Appendix D. Chemical composition of samples analyzed by energy dispersive X-ray fluorescence (EDXRF) at the USGS labs, Menlo Park, CA (Appendix_D.xls, Appendix_D.dbf)

Sample No.	Site ID	Depth interval, top (cm)	Depth interval, bottom (cm)	*Other analyses (Appendix #)	Cu (ppm)	Pb (ppm)	Zn (ppm)
SAMPLE_NO.	SITE_ID	INT_TOP_CM	INT_BT_M_CM	OTHR_ANALYS	CU_PPM	PB_PPM	ZN_PPM
93SBC39(5-10)	93SBC39	5	10	E	104	3950	2200
93SBC39(10-20)	93SBC39	10	20	E	117	4000	1950
93SBC39(20-27)	93SBC39	20	27	E	126	3950	2400
93SBC39(27-32)	93SBC39	27	32	E	104	3900	2100
93SBC39(32-40)	93SBC39	32	40	E	42	70	1550
93SBC39(40-58)	93SBC39	40	58	E	40	76	1300
93SBC39(58-72)	93SBC39	58	72	E	47	56	1300

*Other analyses (Appendix #): E =EWU, F =CHEMEX, G = XRAL, ----- = none.

Appendix E. Chemical composition of samples analyzed, using 4 acid dissolution, by ICP-AES and ICP-MS at Eastern Washington University (EWU), Cheney, WA (Appendix_E.xls, Appendix_E.dbf).

Sample No.	Site ID	Depth Interval, top (cm)	Depth Interval, bottom (cm)	*Other analyses (Appendix #)	Ag (ppm)	Al (%)	As (ppm)	Ba (ppm)	Be (ppm)	Ca (%)	Cd (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cs (ppm)	Cu (ppm)
SAMPLE_NO.	SITE_ID	INT_TOP_CM	INT_BT_M_CM	OTHR_ANALYS	AG_PPM	AL_%	AS_PPM	BA_PPM	BE_PPM	CA_%	CD_PPM	CE_PPM	CO_PPM	CR_PPM	CS_PPM	CU_PPM
94VC1(0-10)	94VC1	0	10	----	8.3	4.0	53	466	1.2	0.19	17.9	38	6	113	7	85
94VC1(10-20)	94VC1	10	20	G, H	8.3	4.1	52	489	1.1	0.20	18.3	35	6	106	7	84
94VC1(20-30)	94VC1	20	30	----	9.7	3.6	56	444	1.2	0.23	23.3	32	6	102	6	93
94VC1(30-40)	94VC1	30	40	----	8.7	3.8	50	469	1.3	0.19	16.7	21	6	104	7	82
94VC1(40-50)	94VC1	40	50	----	10.3	3.6	55	449	1.0	0.23	27.2	23	6	95	6	103
94VC1(50-60)	94VC1	50	60	----	12.3	3.7	49	460	1.2	0.26	31.3	33	7	97	7	117
94VC1(60-70)	94VC1	60	70	----	12.8	3.7	53	491	1.3	0.29	34.2	45	8	98	7	119
94VC1(70-80)	94VC1	70	80	----	12.9	3.2	47	430	1.2	0.28	37.8	27	8	92	6	126
94VC1(80-90)	94VC1	80	90	----	16.6	3.5	57	539	1.3	0.38	42.4	25	10	93	7	149
94VC1(90-97)	94VC1	90	97	----	18.1	3.1	64	575	1.2	0.44	45.9	26	10	90	6	156
94VC1(97-110)	94VC1	97	110	----	31.4	2.9	54	1103	1.5	0.83	98.7	32	12	56	9	254
94VC1(110-120)	94VC1	110	120	----	33.3	2.3	58	812	1.0	0.74	145.7	20	12	68	6	343
94VC1(120-130)	94VC1	120	130	----	35.7	2.5	60	850	0.9	0.84	147.1	23	12	71	6	336
94VC1(130-140)	94VC1	130	140	----	31.1	3.2	58	841	1.2	0.84	135.0	21	13	78	8	318
94VC1(140-150)	94VC1	140	150	G, H	31.3	2.3	73	838	1.0	0.89	141.7	17	13	57	6	280
94VC1(150-160)	94VC1	150	160	G, H	39.8	3.1	99	1038	1.3	0.93	139.0	25	15	58	10	269
94VC1(160-170)	94VC1	160	170	----	31.5	2.5	57	624	0.8	0.57	119.1	24	10	67	5	312
94VC1(170-180)	94VC1	170	180	----	36.3	3.0	65	966	1.2	0.71	131.1	33	12	72	7	334
94VC1(180-190)	94VC1	180	190	G, H	29.5	2.2	65	824	0.8	0.64	86.8	25	11	40	6	203
94VC1(190-200)	94VC1	190	200	G, H	60.0	2.8	95	1138	1.0	0.92	233.4	35	16	71	7	601
94VC1(200-207)	94VC1	200	207	G, H	52.3	2.5	82	916	1.1	0.97	218.6	35	15	96	6	553
94VC3(0-11)	94VC3	0	11	F	15.1	5.7	106	557	1.2	0.39	35.9	35	9	NA	5	106
94VC3(11-22)	94VC3	11	22	F	15.6	5.9	89	553	1.3	0.38	31.6	42	8	NA	5	100
94VC3(22-33)	94VC3	22	33	F	14.2	6.1	131	570	1.4	0.46	36.5	37	10	NA	6	103
94VC3(33-44)	94VC3	33	44	F	12.1	5.8	90	523	1.3	0.38	29.3	36	8	NA	5	89
94VC3(44-55)	94VC3	44	55	F	14.4	5.5	80	565	1.3	0.51	33.1	36	9	NA	6	102
94VC3(55-66)	94VC3	55	66	F	16.1	5.0	86	556	1.4	0.54	35.7	35	10	NA	5	946
94VC3(66-77)	94VC3	66	77	F	15.6	4.9	84	554	1.3	0.54	33.6	38	10	NA	5	100
94VC3(77-88)	94VC3	77	88	F	15.5	5.2	97	588	1.4	0.53	34.4	35	10	NA	5	104
94VC3(88-99)	94VC3	88	99	F	16.2	5.6	92	613	1.2	0.55	33.8	43	10	NA	6	107
94VC3(99-110)	94VC3	99	110	F	16.6	5.2	115	644	1.1	0.58	39.5	39	11	NA	5	117
94VC3(110-120)	94VC3	110	120	F	17.2	4.7	147	611	1.1	0.56	36.5	33	10	NA	5	108
94VC3(120-130)	94VC3	120	130	F	18.4	4.7	206	635	1.3	0.58	34.9	36	12	NA	5	104
94VC3(130-140)	94VC3	130	140	F	19.3	5.4	287	731	1.4	0.63	37.0	29	15	NA	6	123
94VC3(140-150)	94VC3	140	150	F	18.1	5.3	253	667	1.2	0.56	32.7	32	14	NA	6	107
94VC3(150-160)	94VC3	150	160	F	17.6	5.6	222	639	1.5	0.53	28.4	40	12	NA	6	98

*Other analyses (Appendix #): D=USGS-EDXRF, F=CHEMEX, G=XRAL, H=ACZ, ---- = none.

Appendix E. Chemical composition of samples analyzed, using 4 acid dissolution, by ICP-AES and ICP-MS at Eastern Washington University (EWU), Cheney, WA (Appendix_E.xls, Appendix_E.dbf).

Sample No.	Fe (%)	Ga (ppm)	K (%)	La (ppm)	Mg (%)	Mn (ppm)	Mo (ppm)	Ni (ppm)	P (ppm)	Pb (ppm)	Rb (ppm)	Sb (ppm)	Sn (ppm)	Sr (ppm)	Th (ppm)	Ti (%)	Tl (ppm)	U (ppm)
SAMPLE_NO.	FE_%	GA_PPM	K_%	LA_PPM	MG_%	MN_PPM	MO_PPM	NI_PPM	P_PPM	PB_PPM	RB_PPM	SB_PPM	SN_PPM	SR_PPM	TH_PPM	TI_%	TL_PPM	U_PPM
94VC1(0-10)	6.83	9	1.95	16	0.57	5379	4	13	193	2981	97	32	2	32	8	0.0679	0.6	3.2
94VC1(10-20)	6.78	9	1.91	12	0.59	5391	2	11	189	3121	101	34	2	34	8	0.0721	0.6	1.9
94VC1(20-30)	8.53	8	1.70	13	0.60	7179	4	17	170	3199	91	35	2	31	7	0.0685	0.6	1.3
94VC1(30-40)	7.12	9	1.82	10	0.56	5625	2	11	169	3285	96	34	2	32	7	0.0750	0.6	1.6
94VC1(40-50)	9.47	8	1.70	9	0.64	7994	3	12	169	3633	90	40	2	30	7	0.0659	0.5	1.3
94VC1(50-60)	9.32	8	1.75	13	0.63	7990	2	11	164	4693	90	44	2	31	8	0.0775	0.5	1.5
94VC1(60-70)	10.08	8	1.76	18	0.65	8566	4	13	175	5195	94	40	2	33	9	0.0683	0.5	1.5
94VC1(70-80)	9.90	8	1.52	11	0.60	8873	2	10	146	5421	79	48	2	29	7	0.0597	0.5	1.2
94VC1(80-90)	12.11	9	1.70	10	0.69	10824	4	14	172	6639	91	57	3	29	7	0.0609	0.6	1.4
94VC1(90-97)	11.93	8	1.53	11	0.59	10918	2	13	169	7911	84	55	2	30	7	0.0572	0.5	1.3
94VC1(97-110)	18.82	8	1.35	12	0.77	16932	1	17	194	17922	77	56	3	40	7	0.0563	0.5	1.8
94VC1(110-120)	18.22	7	1.14	8	0.73	16761	2	14	130	14774	64	92	2	39	5	0.0649	0.4	1.3
94VC1(120-130)	19.47	7	1.18	9	0.78	18139	3	16	146	15368	69	92	2	42	6	0.0582	0.4	1.3
94VC1(130-140)	18.48	8	1.48	9	0.86	17422	2	17	189	15673	81	95	3	46	6	0.0738	0.5	1.6
94VC1(140-150)	19.67	7	1.05	7	0.81	17824	3	17	137	16072	60	87	2	42	5	0.0594	0.4	1.3
94VC1(150-160)	18.60	9	1.39	10	0.86	19130	2	18	193	22065	83	98	3	46	7	0.0655	0.5	1.9
94VC1(160-170)	14.84	6	1.11	10	0.67	14383	3	13	119	12265	64	88	2	32	6	0.0815	0.4	1.3
94VC1(170-180)	17.02	8	1.37	14	0.80	16573	2	15	161	16935	80	90	3	41	7	0.0752	0.5	1.7
94VC1(180-190)	13.80	5	0.91	10	0.60	12668	2	14	152	15269	55	38	2	32	6	0.0522	0.4	1.5
94VC1(190-200)	28.01	8	1.33	14	1.08	24913	2	18	175	24840	77	121	3	44	8	0.0965	0.6	1.9
94VC1(200-207)	28.46	7	1.19	15	1.13	25996	4	18	154	20035	69	124	2	42	7	0.0965	0.5	1.6
94VC3(0-11)	15.08	7	2.51	15	0.96	8559	1	20	279	3745	71	36	2	28	7	0.0863	0.55	1.8
94VC3(11-22)	14.75	8	2.75	18	0.98	8669	1	12	257	3810	75	38	<1	27	7	0.0928	0.57	1.8
94VC3(22-33)	13.83	8	2.66	16	0.96	7878	1	13	428	4265	76	44	<1	34	7	0.0846	0.70	1.8
94VC3(33-44)	12.60	7	2.65	15	0.90	7400	1	12	241	4105	74	43	1	26	6	0.0699	0.56	1.6
94VC3(44-55)	14.75	8	2.56	15	0.91	8984	1	12	184	4725	75	44	1	26	6	0.0672	0.51	1.7
94VC3(55-66)	16.55	7	2.35	15	0.90	10365	1	26	181	5435	67	45	23	25	6	0.0712	0.42	1.9
94VC3(66-77)	15.37	6	2.24	16	0.86	9633	1	15	175	5480	66	46	1	25	6	0.0694	0.41	1.7
94VC3(77-88)	15.20	7	2.39	15	0.92	9459	1	17	201	5245	69	43	<1	27	6	0.0813	0.46	1.7
94VC3(88-99)	14.61	8	2.55	18	0.94	9138	1	18	221	5160	73	41	2	28	7	0.0731	0.49	1.5
94VC3(99-110)	17.21	7	2.43	16	1.00	11026	1	28	197	5715	70	44	1	27	6	0.0630	0.50	1.4
94VC3(110-120)	16.68	6	2.17	14	0.94	10760	1	23	187	5830	62	43	1	25	6	0.0559	0.42	1.3
94VC3(120-130)	18.36	6	2.15	15	0.97	11643	1	13	207	6065	60	42	1	25	6	0.0491	0.45	1.4
94VC3(130-140)	19.71	7	2.42	12	1.05	12266	2	21	261	6730	68	58	1	29	6	0.0600	0.49	1.8
94VC3(140-150)	17.14	7	2.40	13	0.96	10432	2	22	396	5615	69	50	2	28	6	0.0763	0.44	1.7
94VC3(150-160)	16.20	7	2.55	17	0.97	10028	3	23	260	4870	70	66	4	28	7	0.0696	0.49	1.7

*Other analyses (Appendix #): D=USGS-EDXRF, F=CHEMEX, G=XRAL, H=ACZ, ---- = none.

Appendix E. Chemical composition of samples analyzed, using 4 acid dissolution, by ICP-AES and ICP-MS at Eastern Washington University (EWU), Cheney, WA (Appendix_E.xls, Appendix_E.dbf).

Sample No.	V (ppm)	W (ppm)	Y (ppm)	Zn (ppm)	Zr (ppm)
SAMPLE_NO.	V_PPM	W_PPM	Y_PPM	ZN_PPM	ZR_PPM
94VC1(0-10)	31	1	6	3193	27
94VC1(10-20)	31	1	6	3190	28
94VC1(20-30)	28	1	7	3995	27
94VC1(30-40)	29	1	6	3117	33
94VC1(40-50)	28	1	7	4724	28
94VC1(50-60)	27	1	8	5275	30
94VC1(60-70)	28	1	8	5648	27
94VC1(70-80)	24	1	7	6199	25
94VC1(80-90)	27	1	7	6777	22
94VC1(90-97)	24	1	7	7234	25
94VC1(97-110)	23	1	10	14019	29
94VC1(110-120)	24	2	9	19947	24
94VC1(120-130)	24	1	9	20264	20
94VC1(130-140)	29	2	10	18773	25
94VC1(140-150)	24	1	9	19937	20
94VC1(150-160)	28	1	11	19252	25
94VC1(160-170)	23	1	8	17200	28
94VC1(170-180)	27	1	10	18410	27
94VC1(180-190)	21	1	8	12494	23
94VC1(190-200)	28	2	13	32635	31
94VC1(200-207)	24	1	13	30090	25
94VC3(0-11)	26	3	8	6070	30
94VC3(11-22)	27	2	8	6350	31
94VC3(22-33)	29	1	8	5655	32
94VC3(33-44)	25	1	7	5340	25
94VC3(44-55)	25	1	7	5415	24
94VC3(55-66)	23	2	7	6520	25
94VC3(66-77)	22	1	7	6350	25
94VC3(77-88)	23	1	7	5875	31
94VC3(88-99)	24	1	7	5630	30
94VC3(99-110)	23	3	7	6515	23
94VC3(110-120)	21	1	6	6480	22
94VC3(120-130)	19	2	6	6345	19
94VC3(130-140)	24	2	7	5510	26
94VC3(140-150)	23	1	7	6375	26
94VC3(150-160)	24	1	7	4880	33

*Other analyses (Appendix #): D=USGS-EDXRF, F=CHEMEX, G=XRAL, H=ACZ, ---- = none.

Appendix E. Chemical composition of samples analyzed, using 4 acid dissolution, by ICP-AES and ICP-MS at Eastern Washington University (EWU), Cheney, WA (Appendix_E.xls, Appendix_E.dbf).

Sample No.	Site ID	Depth Interval, top (cm)	Depth Interval, bottom (cm)	*Other analyses (Appendix #)	Ag (ppm)	Al (%)	As (ppm)	Ba (ppm)	Be (ppm)	Ca (%)	Cd (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cs (ppm)	Cu (ppm)
SAMPLE_NO.	SITE_ID	INT_TOP_CM	INT_BT_M_CM	OTHR_ANALYS	AG_PPM	AL_%	AS_PPM	BA_PPM	BE_PPM	CA_%	CD_PPM	CE_PPM	CO_PPM	CR_PPM	CS_PPM	CU_PPM
94VC3(160-170)	94VC3	160	170	F	23.1	5.7	520	855	1.3	0.67	25.0	34	22	NA	6	111
94VC3(170-180)	94VC3	170	180	F	25.3	6.4	419	974	1.7	0.63	28.0	48	22	NA	8	128
94VC3(180-190)	94VC3	180	190	F	22.7	5.0	135	739	1.3	0.63	42.0	40	12	NA	6	124
94VC3(190-200)	94VC3	190	200	F	20.8	4.8	106	641	1.4	0.59	40.5	38	10	NA	5	114
94VC3(200-210)	94VC3	200	210	F	23.7	5.1	125	738	1.3	0.73	56.2	34	12	NA	5	148
94VC3(210-220)	94VC3	210	220	F	18.2	5.8	106	694	1.7	0.63	44.6	40	11	NA	6	125
94VC3(220-230)	94VC3	220	230	F	16.6	4.4	80	536	1.1	0.50	33.9	31	9	NA	5	107
94VCD1(0-33)	94VCD1	0	33	----	8.7	4.0	54	428	1.5	0.17	12.0	29	5	NA	6	69
94VCD1(33-67)	94VCD1	33	67	----	1.2	4.0	61	441	1.3	0.20	15.7	39	6	NA	6	81
94VCD1(67-100)	94VCD1	67	100	----	0.8	3.8	55	416	1.4	0.19	15.9	29	5	NA	5	76
94VCD1(133-167)	94VCD1	133	167	----	34.1	3.8	59	939	1.7	0.57	90.1	41	10	NA	7	271
94VCD1(167-200)	94VCD1	167	200	----	29.2	3.8	40	756	1.5	0.44	87.0	35	9	NA	6	256
94VCD1(200-233)	94VCD1	200	233	----	30.1	3.2	39	711	1.2	0.49	88.0	30	9	NA	6	252
94VCD1(233-267)	94VCD1	233	267	----	45.6	4.1	56	1053	1.4	0.56	89.9	39	11	NA	8	304
94VCD1(267-282)	94VCD1	267	282	----	28.5	4.4	29	698	1.5	0.26	57.1	27	6	NA	7	194
94VCD2(0-33)	94VCD2	0	33	----	21.4	3.5	180	486	1.2	0.30	55.0	18	11	NA	5	161
94VCD2(33-67)	94VCD2	33	67	----	24.6	3.1	544	561	1.3	0.31	61.0	29	18	NA	6	191
94VCD2(67-100)	94VCD2	67	100	----	20.1	4.2	319	655	1.5	0.42	31.6	46	17	NA	8	159
94VCD2(100-133)	94VCD2	100	133	----	18.5	3.3	131	547	1.2	0.31	38.6	20	11	NA	5	135
94VCD2(133-167)	94VCD2	133	167	----	23.2	3.9	78	717	1.7	0.45	73.2	30	11	NA	6	215
94VCD2(167-200)	94VCD2	167	200	----	27.1	2.6	50	689	1.3	0.38	73.2	27	8	NA	4	188
94VCD2(200-233)	94VCD2	200	233	----	26.3	2.7	62	694	1.1	0.45	77.9	19	9	NA	4	194
94VCD2(233-267)	94VCD2	233	267	----	25.2	2.9	98	538	1.2	0.36	71.8	24	9	NA	5	199
94VCD2(267-300)	94VCD2	267	300	----	23.5	2.8	74	977	1.1	0.51	61.7	28	10	NA	5	164
94VCD2(300-325)	94VCD2	300	325	----	27.8	2.9	77	898	1.2	0.52	71.4	22	10	NA	5	200
94VCD3(0-33)	94VCD3	0	33	----	1.2	5.5	10	511	1.8	0.21	3.2	NA	NA	32	NA	21
94VCD3(33-67)	94VCD3	33	67	----	0.21	5.5	4.9	489	1.7	0.19	0.33	NA	NA	27	NA	14
94VCD3(67-100)	94VCD3	67	100	G, H	0.19	5.6	5.2	518	1.6	0.21	0.2	NA	NA	28	NA	15
94VCD3(100-133)	94VCD3	100	133	----	0.13	5.7	5.5	508	1.7	0.21	0.18	NA	NA	27	NA	15
94VCD3(133-167)	94VCD3	133	167	----	0.15	5.2	4.7	474	1.8	0.18	0.16	NA	NA	28	NA	14
94VCD3(167-175)	94VCD3	167	175	----	0.18	5.8	6.3	516	1.7	0.19	0.2	NA	NA	29	NA	16
94VCK1(0-33)	94VCK1	0	33	G, H	10.4	3.4	92	483	0.9	0.24	34.3	34	8	NA	5	104
94VCK1(33-67)	94VCK1	33	67	----	10.5	3.7	94	534	1.0	0.25	36.8	40	8	NA	6	108
94VCK1(67-100)	94VCK1	67	100	----	6.2	3.7	111	490	0.8	0.24	26.3	39	9	NA	6	90
94VCK1(100-133)	94VCK1	100	133	----	9.7	3.3	101	537	0.8	0.34	40.0	33	11	NA	6	117
94VCK1(133-167)	94VCK1	133	167	----	13.8	3.1	129	303	0.8	0.39	43.3	39	12	NA	5	121

*Other analyses (Appendix #): D=USGS-EDXRF, F=CHEMEX, G=XRAL, H=ACZ, ---- = none.

Appendix E. Chemical composition of samples analyzed, using 4 acid dissolution, by ICP-AES and ICP-MS at Eastern Washington University (EWU), Cheney, WA (Appendix_E.xls, Appendix_E.dbf).

Sample No.	Fe (%)	Ga (ppm)	K (%)	La (ppm)	Mg (%)	Mn (ppm)	Mo (ppm)	Ni (ppm)	P (ppm)	Pb (ppm)	Rb (ppm)	Sb (ppm)	Sn (ppm)	Sr (ppm)	Th (ppm)	Ti (%)	Tl (ppm)	U (ppm)
SAMPLE_NO.	FE_%	GA_PPM	K_%	LA_PPM	MG_%	MN_PPM	MO_PPM	NI_PPM	P_PPM	PB_PPM	RB_PPM	SB_PPM	SN_PPM	SR_PPM	TH_PPM	TI_%	TL_PPM	U_PPM
94VC3(160-170)	23.20	8	2.60	14	1.13	14171	2	33	317	5950	72	63	3	29	7	0.0523	0.54	1.8
94VC3(170-180)	22.06	9	2.90	20	1.08	13508	3	21	321	6725	83	72	2	28	8	0.0568	0.57	2.1
94VC3(180-190)	18.56	7	2.26	17	0.99	11659	1	17	230	8170	64	55	1	29	6	0.0622	0.53	1.6
94VC3(190-200)	17.23	7	2.23	16	0.97	11207	1	12	211	6985	62	39	1	26	6	0.0595	0.47	1.4
94VC3(200-210)	21.87	7	2.33	14	1.17	14069	1	15	216	8060	66	56	1	29	6	0.0586	0.56	1.7
94VC3(210-220)	17.41	7	2.72	16	1.07	11014	2	15	237	7450	74	41	1	30	7	0.0712	0.57	1.8
94VC3(220-230)	13.43	6	1.97	13	0.82	8423	1	16	177	6485	56	39	1	23	5	0.0556	0.42	1.4
94VCD1(0-33)	8.89	8	1.87	12	0.64	7693	2	10	236	2760	86	34	2	31	6	0.0808	0.59	1.5
94VCD1(33-67)	11.25	8	1.86	17	0.73	10283	2	9	240	3125	86	39	2	30	7	0.0765	0.57	1.5
94VCD1(67-100)	10.24	8	1.81	12	0.67	9444	2	9	245	2980	80	38	2	28	6	0.0686	0.59	1.4
94VCD1(133-167)	15.35	8	1.67	17	0.77	14818	1	13	233	14910	77	63	2	37	7	0.0824	0.58	2.0
94VCD1(167-200)	11.74	8	1.73	15	0.70	11146	2	12	202	11460	77	76	2	35	7	0.0994	0.53	1.9
94VCD1(200-233)	10.74	7	1.34	12	0.62	10345	1	11	168	12520	68	82	1	36	6	0.0919	0.41	1.7
94VCD1(233-267)	12.00	9	1.65	16	0.69	11197	2	15	296	20370	82	114	1	44	8	0.0942	0.57	2.5
94VCD1(267-282)	6.91	9	1.88	11	0.63	5892	1	11	236	15210	87	85	2	35	7	0.0897	0.57	2.1
94VCD2(0-33)	14.53	7	1.50	7	0.75	12646	2	13	411	4665	65	59	2	30	5	0.0857	0.72	1.8
94VCD2(33-67)	14.31	7	1.32	13	0.63	12376	2	16	515	4610	65	109	2	23	6	0.0695	0.63	2.4
94VCD2(67-100)	12.79	9	1.84	19	0.63	11176	3	19	266	6625	86	72	2	27	8	0.0691	0.54	2.3
94VCD2(100-133)	12.15	7	1.51	8	0.62	11555	1	12	185	6170	65	56	2	20	5	0.0484	0.47	2.6
94VCD2(133-167)	17.16	8	1.79	13	0.89	16945	2	14	219	8265	79	64	2	29	6	0.0683	0.59	2.3
94VCD2(167-200)	13.19	6	1.19	11	0.66	13431	2	10	142	9880	53	57	1	22	4	0.0416	0.41	1.1
94VCD2(200-233)	15.26	6	1.23	8	0.73	15694	1	11	168	9975	54	64	2	24	5	0.0520	0.47	1.3
94VCD2(233-267)	15.21	6	1.37	10	0.76	14996	2	11	167	7740	60	65	2	22	5	0.0659	0.49	1.3
94VCD2(267-300)	14.98	6	1.18	12	0.69	14895	2	13	162	9650	60	49	2	28	5	0.0531	0.57	1.5
94VCD2(300-325)	15.47	6	1.23	9	0.73	15595	2	13	175	11290	59	75	<1	30	5	0.0545	0.44	1.6
94VCD3(0-33)	2.5	NA	NA	NA	0.64	775	0.53	13		230		4.2		50	11	0.1940	0.55	3.2
94VCD3(33-67)	2.1	NA	NA	NA	0.63	175	0.4	11		37		1.5		49	10	0.1920	0.52	3.1
94VCD3(67-100)	2	NA	NA	NA	0.64	128	0.45	12		26		1.4		52	11	0.1825	0.53	3.4
94VCD3(100-133)	2.1	NA	NA	NA	0.64	123	0.43	12		25		1.4		54	12	0.1955	0.51	3.3
94VCD3(133-167)	1.9	NA	NA	NA	0.6	116	0.41	11		21		1.3		53	11	0.1865	0.53	3.5
94VCD3(167-175)	2.2	NA	NA	NA	0.64	163	0.49	12		28		1.6		53	12	0.1960	0.54	3.6
94VCK1(0-33)	9.87	9	1.51	15	0.60	8801	7	11	187	2712	74	43	2	26	6	0.0814	0.51	1.3
94VCK1(33-67)	9.79	10	1.64	18	0.63	8613	11	12	215	3010	83	46	2	29	7	0.0819	0.52	1.4
94VCK1(67-100)	7.70	10	1.63	17	0.54	6732	6	11	191	3123	81	45	4	27	6	0.0811	0.50	1.4
94VCK1(100-133)	10.06	9	1.41	15	0.56	9150	12	14	166	4391	73	50	2	25	6	0.0682	0.47	1.4
94VCK1(133-167)	11.29	8	1.29	17	0.58	10335	7	14	155	5006	67	55	2	25	6	0.0934	0.48	2.4

*Other analyses (Appendix #): D=USGS-EDXRF, F=CHEMEX, G=XRAL, H=ACZ, ---- = none.

Appendix E. Chemical composition of samples analyzed, using 4 acid dissolution, by ICP-AES and ICP-MS at Eastern Washington University (EWU), Cheney, WA (Appendix_E.xls, Appendix_E.dbf).

Sample No.	V (ppm)	W (ppm)	Y (ppm)	Zn (ppm)	Zr (ppm)
SAMPLE_NO.	V_PPM	W_PPM	Y_PPM	ZN_PPM	ZR_PPM
94VC3(160-170)	23	1	7	4015	25
94VC3(170-180)	28	1	8	5035	28
94VC3(180-190)	23	2	7	8320	25
94VC3(190-200)	20	1	7	7475	24
94VC3(200-210)	23	1	8	9510	21
94VC3(210-220)	24	7	8	7725	27
94VC3(220-230)	19	1	6	7130	23
94VCD1(0-33)	28	1	7	2605	30
94VCD1(33-67)	27	1	8	3360	29
94VCD1(67-100)	24	2	7	3510	26
94VCD1(133-167)	28	1	9	14630	32
94VCD1(167-200)	27	2	8	13610	31
94VCD1(200-233)	24	1	8	16020	29
94VCD1(233-267)	31	2	10	16850	32
94VCD1(267-282)	29	2	7	10020	30
94VCD2(0-33)	26	1	8	9035	23
94VCD2(33-67)	25	2	9	7605	24
94VCD2(67-100)	29	2	8	5540	24
94VCD2(100-133)	21	1	6	7690	19
94VCD2(133-167)	26	1	8	11720	24
94VCD2(167-200)	17	1	6	15080	14
94VCD2(200-233)	18	1	7	14185	19
94VCD2(233-267)	22	3	7	13290	22
94VCD2(267-300)	21	1	8	11410	22
94VCD2(300-325)	21	1	7	12280	21
94VCD3(0-33)	44	NA	NA	510	NA
94VCD3(33-67)	42	NA	NA	83	NA
94VCD3(67-100)	45	NA	NA	62	NA
94VCD3(100-133)	44	NA	NA	55	NA
94VCD3(133-167)	42	NA	NA	54	NA
94VCD3(167-175)	45	NA	NA	65	NA
94VCK1(0-33)	27	1	7	6015	33
94VCK1(33-67)	29	1	7	6450	36
94VCK1(67-100)	29	2	7	4740	34
94VCK1(100-133)	25	1	6	6650	27
94VCK1(133-167)	24	1	7	7235	40

*Other analyses (Appendix #): D=USGS-EDXRF, F=CHEMEX, G=XRAL, H=ACZ, ---- = none.

Appendix E. Chemical composition of samples analyzed, using 4 acid dissolution, by ICP-AES and ICP-MS at Eastern Washington University (EWU), Cheney, WA (Appendix_E.xls, Appendix_E.dbf).

Sample No.	Site ID	Depth Interval, top (cm)	Depth Interval, bottom (cm)	*Other analyses (Appendix #)	Ag (ppm)	Al (%)	As (ppm)	Ba (ppm)	Be (ppm)	Ca (%)	Cd (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cs (ppm)	Cu (ppm)
SAMPLE_NO.	SITE_ID	INT_TOP_CM	INT_BT_M_CM	OTHR_ANALYS	AG_PPM	AL_%	AS_PPM	BA_PPM	BE_PPM	CA_%	CD_PPM	CE_PPM	CO_PPM	CR_PPM	CS_PPM	CU_PPM
94VCK1(167-200)	94VCK1	167	200	----	16.6	2.9	268	370	0.7	0.43	43.6	41	14	NA	5	122
94VCK1(200-233)	94VCK1	200	233	----	13.7	3.0	288	633	0.8	0.40	39.8	40	15	NA	5	115
94VCK1(233-267)	94VCK1	233	267	G, H	14.5	3.1	99	302	0.9	0.40	50.3	35	10	NA	5	128
94VCK1(267-300)	94VCK1	267	300	----	15.0	3.1	94	429	0.8	0.40	52.3	39	10	NA	5	127
94VCK1(300-333)	94VCK1	300	333	----	14.7	2.9	109	195	0.7	0.39	45.7	37	10	NA	5	121
94VCK1(333-367)	94VCK1	333	367	----	18.9	3.3	82	497	0.7	0.50	67.5	48	10	NA	6	173
94VCK1(367-380)	94VCK1	367	380	----	19.7	4.5	48	546	0.9	0.33	52.2	49	8	NA	7	172
94VCK2(0-33)	94VCK2	0	33	----	9.7	3.3	107	500	0.8	0.28	41.5	39	9	NA	5	113
94VCK2(33-67)	94VCK2	33	67	----	8.0	3.9	84	494	0.8	0.23	30.9	45	7	NA	6	88
94VCK2(67-100)	94VCK2	67	100	----	10.7	3.1	128	513	0.6	0.33	45.1	38	10	NA	5	117
94VCK2(100-133)	94VCK2	100	133	----	11.5	3.3	111	558	0.6	0.34	41.8	39	10	NA	6	109
94VCK2(133-167)	94VCK2	133	167	----	11.1	3.1	113	536	0.7	0.33	42.3	38	10	NA	5	113
94VCK2(167-200)	94VCK2	167	200	----	11.4	3.0	117	489	1.0	0.34	41.3	37	10	NA	5	114
94VCK2(200-233)	94VCK2	200	233	----	13.5	3.0	110	507	1.0	0.35	46.5	38	10	NA	5	124
94VCK2(233-267)	94VCK2	233	267	----	13.3	3.1	105	539	1.0	0.38	44.2	35	11	NA	5	120
94VCK2(267-300)	94VCK2	267	300	----	9.9	3.2	96	541	1.1	0.37	39.8	32	10	NA	6	111
94VCK2(300-333)	94VCK2	300	333	G, H	13.1	3.0	124	214	1.0	0.39	41.7	28	11	NA	5	119
94VCK2(333-340)	94VCK2	333	340	----	12.6	3.4	152	585	1.1	0.38	35.4	37	14	NA	6	111
95PCK1(0-15)	95PCK1	0	15	----	15.6	3.6	202	570	1.3	0.32	46.1	27	12	NA	5	128
95PCK1(168-193)	95PCK1	168	193	----	16.7	3.3	141	655	1.3	0.44	32.8	27	12	NA	5	102
95PCK1(193-204)	95PCK1	193	204	----	16.8	3.6	205	623	1.4	0.42	33.9	29	14	NA	6	125
95PCK1(204-227)	95PCK1	204	227	----	18.3	3.5	206	772	1.3	0.52	32.3	33	15	NA	6	109
95PCK1(227-229)	95PCK1	227	229	----	24.7	4.0	353	881	1.5	0.54	36.4	33	21	NA	7	139
95PCK1(229-241)	95PCK1	229	241	----	18.5	3.2	299	823	1.1	0.61	23.8	25	19	NA	6	96
95PCK1(241-249)	95PCK1	241	249	----	16.7	3.3	193	744	1.2	0.50	31.6	25	15	NA	6	100
95PCK1(249-250)	95PCK1	249	250	----	20.5	5.3	212	958	1.5	0.50	26.7	36	17	NA	10	114
95PCK1(250-260)	95PCK1	250	260	----	18.1	3.3	160	627	1.1	0.46	34.6	20	12	NA	6	119
95PCK1(260-262)	95PCK1	260	262	G, H	30.2	4.4	158	863	1.7	0.50	65.8	29	13	NA	9	181
95PCK1(262-297)	95PCK1	262	297	----	40.8	3.3	72	1057	1.4	0.61	108.7	36	12	NA	6	300
95PCK1(297-326)	95PCK1	297	326	G, H	76.5	5.4	65	1108	1.8	0.45	92.4	51	10	NA	10	335
95PCK1(326-343)	95PCK1	326	343	----	0.1	6.0	8	554	1.9	0.25	1.4	70	5	NA	7	35
95PCK1(343-360)	95PCK1	343	360	----	0.1	6.1	4	536	2.0	0.23	0.3	60	6	NA	8	17
95PCK1(360-381)	95PCK1	360	381	----	0.1	6.3	2	507	1.7	0.18	0.2	52	5	NA	7	12
95PCK1(381-393)	95PCK1	381	393	----	0.1	6.0	2	528	1.6	0.20	0.3	60	6	NA	8	13
95PCK1(393-407)	95PCK1	393	407	----	0.1	5.6	3	523	1.7	0.17	0.1	62	5	NA	7	11
95PCK1(407-411)	95PCK1	407	411	----	0.1	6.1	3	530	1.8	0.19	0.1	75	5	NA	8	15

*Other analyses (Appendix #): D=USGS-EDXRF, F=CHEMEX, G=XRAL, H=ACZ, ---- = none.

Appendix E. Chemical composition of samples analyzed, using 4 acid dissolution, by ICP-AES and ICP-MS at Eastern Washington University (EWU), Cheney, WA (Appendix_E.xls, Appendix_E.dbf).

Sample No.	Fe (%)	Ga (ppm)	K (%)	La (ppm)	Mg (%)	Mn (ppm)	Mo (ppm)	Ni (ppm)	P (ppm)	Pb (ppm)	Rb (ppm)	Sb (ppm)	Sn (ppm)	Sr (ppm)	Th (ppm)	Ti (%)	Tl (ppm)	U (ppm)
SAMPLE_NO.	FE_%	GA_PPM	K_%	LA_PPM	MG_%	MN_PPM	MO_PPM	NI_PPM	P_PPM	PB_PPM	RB_PPM	SB_PPM	SN_PPM	SR_PPM	TH_PPM	TI_%	TL_PPM	U_PPM
94VCK1(167-200)	12.69	8	1.20	18	0.62	11194	5	15	168	5370	65	58	2	28	6	0.0618	0.49	1.5
94VCK1(200-233)	12.06	8	1.22	18	0.60	11070	10	16	182	5060	63	55	2	26	6	0.0609	0.44	1.3
94VCK1(233-267)	11.19	8	1.32	15	0.62	10629	9	13	148	5735	67	50	2	26	6	0.0633	0.47	1.2
94VCK1(267-300)	11.42	8	1.29	17	0.62	10783	5	12	147	5920	66	51	2	26	6	0.0645	0.50	1.2
94VCK1(300-333)	11.16	8	1.23	17	0.60	10553	8	13	155	5465	64	50	2	25	5	0.0587	0.47	1.2
94VCK1(333-367)	13.22	9	1.32	21	0.70	12384	8	14	197	5960	70	70	2	34	6	0.0712	0.45	1.6
94VCK1(367-380)	7.55	11	1.82	22	0.63	6406	12	13	217	9148	91	72	3	38	8	0.1074	0.56	1.8
94VCK2(0-33)	10.22	8	1.40	17	0.61	9147	10	12	149	3605	71	47	2	24	6	0.0703	0.50	1.3
94VCK2(33-67)	8.30	9	1.68	20	0.60	7241	8	10	166	3340	82	39	2	28	7	0.0826	0.52	1.4
94VCK2(67-100)	10.75	8	1.29	17	0.59	9701	9	13	123	4451	68	52	2	24	6	0.0670	0.45	1.3
94VCK2(100-133)	10.52	8	1.37	17	0.61	9662	9	13	131	4690	71	51	2	25	6	0.0674	0.45	1.4
94VCK2(133-167)	10.55	8	1.38	16	0.58	9713	8	12	132	4572	67	51	2	24	5	0.0689	0.46	1.8
94VCK2(167-200)	10.50	8	1.38	16	0.54	9691	10	13	159	4878	69	49	2	24	6	0.0625	0.47	1.4
94VCK2(200-233)	11.20	8	1.33	17	0.57	10292	8	12	147	4790	67	51	2	24	6	0.0691	0.45	1.3
94VCK2(233-267)	10.92	8	1.38	15	0.56	10121	11	14	155	5065	70	52	2	26	6	0.0660	0.46	1.5
94VCK2(267-300)	10.16	8	1.43	14	0.55	9459	10	13	158	5065	72	50	2	26	5	0.0598	0.45	1.5
94VCK2(300-333)	11.31	8	1.32	12	0.56	10340	9	13	153	5211	66	52	2	24	5	0.0539	0.47	1.4
94VCK2(333-340)	10.41	9	1.50	17	0.57	9579	16	17	178	5033	75	53	2	27	6	0.0624	0.49	1.5
95PCK1(0-15)	11.63	8	1.54	12	0.67	10180	3	16	290	5320	67	51	<1	32	6	0.0996	0.67	2.0
95PCK1(168-193)	11.05	7	1.50	12	0.65	10550	3	15	232	6345	63	40	2	34	6	0.0668	0.48	1.5
95PCK1(193-204)	10.36	7	1.47	13	0.64	9428	2	15	249	6930	67	60	<1	35	7	0.0813	0.43	2.0
95PCK1(204-227)	12.95	7	1.57	14	0.73	12320	3	17	282	6625	66	54	<1	40	7	0.0891	0.46	2.4
95PCK1(227-229)	13.75	9	1.66	14	0.78	12696	3	25	355	9210	70	82	1	43	7	0.0818	0.51	2.3
95PCK1(229-241)	15.52	7	1.45	11	0.80	14990	3	20	342	6080	63	56	<1	42	6	0.0651	0.38	1.6
95PCK1(241-249)	13.63	7	1.44	11	0.71	13020	2	16	272	6275	64	44	1	34	6	0.0585	0.52	1.7
95PCK1(249-250)	13.37	10	1.94	16	0.69	11595	6	21	317	5970	91	74	1	33	8	0.0567	0.55	1.7
95PCK1(250-260)	13.08	7	1.45	8	0.72	12422	2	15	230	7215	63	52	1	30	5	0.0599	0.59	1.7
95PCK1(260-262)	14.63	10	1.80	12	0.78	14107	3	17	282	14330	85	68	3	34	7	0.0707	0.69	2.2
95PCK1(262-297)	16.18	8	1.41	16	0.75	15514	2	15	214	19470	67	110	<1	41	7	0.1016	0.49	2.0
95PCK1(297-326)	9.80	11	2.12	21	0.72	8396	2	17	390	35610	103	164	<1	53	11	0.1360	0.66	3.3
95PCK1(326-343)	2.25	12	2.34	30	0.69	402	1	13	322	378	100	7	1	56	12	0.1827	0.48	2.9
95PCK1(343-360)	2.04	11	2.42	27	0.70	210	2	15	346	53	108	2	<1	51	11	0.1824	0.56	3.1
95PCK1(360-381)	1.90	11	2.39	24	0.66	167	1	12	253	43	107	1	1	46	10	0.1540	0.48	2.3
95PCK1(381-393)	1.95	11	2.43	27	0.69	170	2	14	288	59	107	1	<1	48	11	0.1673	0.52	2.8
95PCK1(393-407)	1.90	12	2.49	27	0.68	150	1	13	205	32	104	1	1	45	10	0.1795	0.49	2.4
95PCK1(407-411)	2.00	12	2.47	34	0.70	162	4	17	294	58	110	1	2	46	12	0.1728	0.59	2.8

*Other analyses (Appendix #): D=USGS-EDXRF, F=CHEMEX, G=XRAL, H=ACZ, ---- = none.

Appendix E. Chemical composition of samples analyzed, using 4 acid dissolution, by ICP-AES and ICP-MS at Eastern Washington University (EWU), Cheney, WA (Appendix_E.xls, Appendix_E.dbf).

Sample No.	V (ppm)	W (ppm)	Y (ppm)	Zn (ppm)	Zr (ppm)
SAMPLE_NO.	V_PPM	W_PPM	Y_PPM	ZN_PPM	ZR_PPM
94VCK1(167-200)	24	1	7	7050	33
94VCK1(200-233)	21	1	7	6100	29
94VCK1(233-267)	23	1	7	8750	28
94VCK1(267-300)	24	1	7	8560	29
94VCK1(300-333)	23	1	7	7615	26
94VCK1(333-367)	25	1	9	10620	34
94VCK1(367-380)	32	1	9	8550	44
94VCK2(0-33)	24	1	7	5765	27
94VCK2(33-67)	28	1	7	7190	34
94VCK2(67-100)	24	3	6	8160	26
94VCK2(100-133)	24	1	7	7105	30
94VCK2(133-167)	24	1	6	7525	29
94VCK2(167-200)	22	1	6	7350	28
94VCK2(200-233)	22	1	7	8435	28
94VCK2(233-267)	23	2	7	7570	32
94VCK2(267-300)	23	1	6	7345	28
94VCK2(300-333)	22	2	6	7390	25
94VCK2(333-340)	22	3	7	6035	32
95PCK1(0-15)	29	1	8	8115	32
95PCK1(168-193)	22	1	7	6005	25
95PCK1(193-204)	23	1	8	5610	34
95PCK1(204-227)	25	1	7	5495	37
95PCK1(227-229)	29	1	9	6010	35
95PCK1(229-241)	24	1	7	4165	31
95PCK1(241-249)	23	1	7	5610	28
95PCK1(249-250)	27	1	8	5405	27
95PCK1(250-260)	23	1	7	6615	24
95PCK1(260-262)	29	2	9	12120	30
95PCK1(262-297)	27	2	10	18850	38
95PCK1(297-326)	41	4	13	17310	55
95PCK1(326-343)	43	2	12	361	57
95PCK1(343-360)	43	2	13	112	57
95PCK1(360-381)	41	1	11	83	48
95PCK1(381-393)	43	1	11	92	52
95PCK1(393-407)	43	2	9	82	49
95PCK1(407-411)	43	1	12	148	52

*Other analyses (Appendix #): D=USGS-EDXRF, F=CHEMEX, G=XRAL, H=ACZ, ---- = none.

Appendix E. Chemical composition of samples analyzed, using 4 acid dissolution, by ICP-AES and ICP-MS at Eastern Washington University (EWU), Cheney, WA (Appendix_E.xls, Appendix_E.dbf).

Sample No.	Site ID	Depth Interval, top (cm)	Depth Interval, bottom (cm)	*Other analyses (Appendix #)	Ag (ppm)	Al (%)	As (ppm)	Ba (ppm)	Be (ppm)	Ca (%)	Cd (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cs (ppm)	Cu (ppm)
SAMPLE_NO.	SITE_ID	INT_TOP_CM	INT_BT_M_CM	OTHR_ANALYS	AG_PPM	AL_%	AS_PPM	BA_PPM	BE_PPM	CA_%	CD_PPM	CE_PPM	CO_PPM	CR_PPM	CS_PPM	CU_PPM
95PCK1(411-415)	95PCK1	411	415	----	0.1	7.7	3	590	1.9	0.20	0.1	86	6	NA	9	14
95PCK1(415-418)	95PCK1	415	418	G, H	1.4	6.1	23	541	1.7	0.22	4.3	66	6	NA	7	25
95PCUD2(0-25)	95PCUD2	0	25	G, H	44.6	6.0	92	892	2.3	0.47	101.5	36	13	NA	11	366
95PCUD2(25-50)	95PCUD2	25	50	----	34.5	5.4	73	592	2.0	0.25	79.8	37	11	NA	9	288
95PCUD2(50-75)	95PCUD2	50	75	----	13.1	6.2	15	537	1.7	0.20	11.6	57	6	NA	8	50
95PCUD2(75-100)	95PCUD2	75	100	----	8.2	5.7	15	529	2.0	0.19	8.4	49	5	NA	7	39
95PCUD2(100-125)	95PCUD2	100	125	----	2.5	5.7	4	516	1.8	0.19	2.3	64	4	NA	7	21
95PCUD2(125-150)	95PCUD2	125	150	----	0.5	5.7	3	508	1.6	0.19	1.1	72	4	NA	8	17
95PCUD2(150-165)	95PCUD2	150	165	----	0.1	6.0	4	525	1.7	0.22	0.4	72	5	NA	8	18
95VCD3(0-28)	95VCD3	0	28	----	12.7	4.1	71	481	1.5	0.22	24.9	32	7	NA	6	102
95VCD3(28-56)	95VCD3	28	56	----	17.4	3.7	218	523	1.2	0.27	40.5	32	10	NA	6	131
95VCD3(56-84)	95VCD3	56	84	----	20.3	3.2	147	646	1.4	0.38	49.6	25	10	NA	5	154
95VCD3(84-112)	95VCD3	84	112	----	16.7	3.8	159	659	1.5	0.35	43.4	29	10	NA	6	155
95VCD3(112-140)	95VCD3	112	140	----	27.3	4.0	100	1115	1.8	0.63	103.1	41	13	NA	7	282
95VCD3(140-158.5)	95VCD3	140	158.5	----	23.6	3.3	83	914	1.2	0.49	72.2	33	10	NA	6	202
95VCD3(158.5-177)	95VCD3	158.5	177	----	23.8	3.0	71	1000	1.3	0.53	64.3	31	10	NA	5	180
95VCD3(177-195.5)	95VCD3	177	195.5	----	26.4	3.7	92	1140	1.5	0.62	46.3	29	13	NA	7	178
95VCD3(195.5-214)	95VCD3	195.5	214	G, H	28.1	3.2	64	791	1.3	0.49	81.0	30	10	NA	6	232
95VCD3(214-230)	95VCD3	214	230	----	26.5	3.3	62	755	1.4	0.49	82.2	38	9	NA	5	223
95VCD3(230-246)	95VCD3	230	246	----	22.1	3.7	54	672	1.2	0.45	69.6	35	9	NA	6	201
95VCD3(246-262)	95VCD3	246	262	----	28.5	3.2	47	630	1.4	0.48	92.7	26	9	NA	5	261
95VCD3(262-277)	95VCD3	262	277	----	26.3	3.1	58	776	1.3	0.51	87.2	28	10	NA	5	248
95VCD3(277-298)	95VCD3	277	298	----	27.2	3.4	57	832	1.1	0.56	92.6	29	11	NA	6	264
95VCD3(298-319)	95VCD3	298	319	----	24.8	3.3	61	805	1.5	0.50	82.1	29	9	NA	6	229
95VCD3(319-340)	95VCD3	319	340	----	27.6	3.5	54	735	1.5	0.55	92.2	33	10	NA	6	257
95VCD3(340-360)	95VCD3	340	360	----	28.3	3.6	59	899	1.6	0.56	96.6	31	11	NA	6	265
95VCD3(360-381)	95VCD3	360	381	----	33.8	4.4	70	1126	1.7	0.67	128.0	40	13	NA	8	371
95VCD3(381-402)	95VCD3	381	402	----	22.1	4.7	68	902	1.7	0.46	114.5	37	12	NA	8	397
95VCD3(402-423)	95VCD3	402	423	G, H	18.2	5.1	50	709	1.9	0.32	61.0	42	8	NA	8	235
95VCD3(423-547)	95VCD3	423	547	----	6.7	6.2	15	562	2.1	0.22	9.9	45	5	NA	8	54
95VCD3(547-572)	95VCD3	547	572	----	1.8	5.6	8	537	1.9	0.21	2.9	57	5	NA	8	32
95VCUD1(0-25)	95VCUD1	0	25	----	7.8	4.2	47	457	1.5	0.16	10.4	34	5	NA	6	63
95VCUD1(25-50)	95VCUD1	25	50	G, H	7.3	3.5	42	413	1.0	0.13	10.6	32	5	NA	5	56
95VCUD1(50-75)	95VCUD1	50	75	----	6.8	3.7	53	432	1.2	0.15	15.6	41	5	NA	6	61
95VCUD1(75-100)	95VCUD1	75	100	----	9.7	3.2	42	380	1.1	0.16	17.9	29	5	NA	5	66
95VCUD1(100-125)	95VCUD1	100	125	----	10.1	3.5	43	408	1.2	0.20	22.7	25	6	NA	5	87

*Other analyses (Appendix #): D=USGS-EDXRF, F=CHEMEX, G=XRAL, H=ACZ, ---- = none.

Appendix E. Chemical composition of samples analyzed, using 4 acid dissolution, by ICP-AES and ICP-MS at Eastern Washington University (EWU), Cheney, WA (Appendix_E.xls, Appendix_E.dbf).

Sample No.	Fe (%)	Ga (ppm)	K (%)	La (ppm)	Mg (%)	Mn (ppm)	Mo (ppm)	Ni (ppm)	P (ppm)	Pb (ppm)	Rb (ppm)	Sb (ppm)	Sn (ppm)	Sr (ppm)	Th (ppm)	Ti (%)	Tl (ppm)	U (ppm)
SAMPLE_NO.	FE_%	GA_PPM	K_%	LA_PPM	MG_%	MN_PPM	MO_PPM	NI_PPM	P_PPM	PB_PPM	RB_PPM	SB_PPM	SN_PPM	SR_PPM	TH_PPM	TI_%	TL_PPM	U_PPM
95PCK1(411-415)	2.24	13	2.78	38	0.80	164	5	18	271	34	126	2	2	52	14	0.2216	0.65	2.9
95PCK1(415-418)	3.10	10	2.13	29	0.67	1399	2	14	298	1025	98	7	1	45	11	0.1544	0.41	2.6
95PCUD2(0-25)	12.73	12	2.38	15	0.83	10970	3	20	414	38520	106	259	<1	47	10	0.1323	0.75	3.9
95PCUD2(25-50)	7.54	11	2.11	15	0.60	5573	1	16	393	36460	96	199	<1	38	9	0.1300	0.65	3.6
95PCUD2(50-75)	2.80	11	2.39	24	0.69	866	2	13	397	5210	101	29	1	47	11	0.1620	0.53	3.6
95PCUD2(75-100)	2.88	10	2.23	21	0.65	1068	1	12	310	3185	96	17	2	45	10	0.1536	0.51	4.5
95PCUD2(100-125)	2.02	11	2.27	27	0.65	334	1	13	225	922	101	6	1	48	11	0.1759	0.47	3.4
95PCUD2(125-150)	1.92	11	2.28	30	0.65	216	1	12	211	498	96	4	1	49	11	0.1723	0.43	3.4
95PCUD2(150-165)	1.92	11	2.33	31	0.69	149	1	14	265	170	103	2	2	51	12	0.1822	0.54	3.8
95VCD3(0-28)	10.49	9	2.07	14	0.70	9668	4	13	224	3460	90	40	2	29	6	0.0780	0.55	1.7
95VCD3(28-56)	12.12	7	1.77	14	0.68	11285	2	13	362	4850	75	55	2	26	7	0.0724	0.58	2.3
95VCD3(56-84)	13.06	7	1.52	11	0.67	12985	2	14	246	6470	67	53	1	26	5	0.0605	0.50	1.7
95VCD3(84-112)	13.47	8	1.86	13	0.74	13137	2	15	290	5615	80	52	2	27	6	0.0623	0.60	1.8
95VCD3(112-140)	20.57	9	1.94	17	1.01	20911	3	18	226	11630	85	81	1	38	7	0.0836	0.55	2.1
95VCD3(140-158.5)	14.60	6	1.48	14	0.76	15197	2	16	206	10960	69	65	<1	30	6	0.0703	0.45	1.8
95VCD3(158.5-177)	14.30	7	1.42	13	0.74	15222	3	16	184	10370	65	61	1	31	6	0.0619	0.40	1.6
95VCD3(177-195.5)	17.52	8	1.68	12	0.81	18183	2	20	259	13620	79	87	1	32	7	0.0591	0.54	2.5
95VCD3(195.5-214)	15.25	6	1.47	13	0.78	15670	3	15	168	10540	66	70	<1	28	6	0.0740	0.42	1.7
95VCD3(214-230)	14.88	7	1.55	16	0.80	15443	1	14	178	10770	68	60	<1	29	6	0.0670	0.38	1.6
95VCD3(230-246)	12.55	7	1.76	15	0.75	12880	2	14	184	9240	77	64	<1	32	7	0.1028	0.48	1.9
95VCD3(246-262)	14.49	7	1.48	11	0.79	14578	2	13	154	10410	65	70	<1	30	5	0.0682	0.44	1.5
95VCD3(262-277)	14.30	7	1.44	12	0.75	14297	1	16	172	10820	63	67	<1	31	6	0.0748	0.43	1.7
95VCD3(277-298)	15.29	7	1.53	12	0.81	15279	2	17	173	11080	70	70	<1	34	6	0.0778	0.44	1.6
95VCD3(298-319)	14.59	7	1.58	12	0.78	14702	2	14	186	10410	68	61	<1	31	6	0.0637	0.48	1.5
95VCD3(319-340)	15.24	7	1.58	14	0.81	14712	2	15	232	13210	67	52	2	35	7	0.0890	0.50	2.4
95VCD3(340-360)	15.53	8	1.63	13	0.85	15314	3	16	212	13660	70	78	1	36	7	0.0842	0.48	2.0
95VCD3(360-381)	15.58	10	1.91	17	0.89	15524	2	17	251	17510	94	127	2	46	8	0.1062	0.63	2.5
95VCD3(381-402)	12.39	10	2.08	16	0.81	11663	3	16	276	23540	92	157	2	40	8	0.1072	0.59	2.4
95VCD3(402-423)	7.18	10	2.14	18	0.69	5659	1	15	300	26570	89	127	2	42	9	0.1305	0.59	2.9
95VCD3(423-547)	2.89	11	2.67	20	0.73	998	3	17	339	3680	108	24	2	45	10	0.1590	0.55	2.9
95VCD3(547-572)	2.36	11	2.47	24	0.65	447	1	17	382	965	91	7	2	47	10	0.1729	0.54	3.4
95VCUD1(0-25)	6.43	9	2.03	15	0.56	5302	3	12	208	2780	89	34	<1	35	7	0.0810	0.51	1.4
95VCUD1(25-50)	5.12	8	1.68	14	0.46	4130	2	10	166	2375	78	65	<1	31	5	0.0652	0.34	1.3
95VCUD1(50-75)	5.51	8	1.80	17	0.51	4401	4	13	216	3505	79	38	<1	34	6	0.1062	0.49	2.0
95VCUD1(75-100)	6.40	7	1.52	12	0.49	5669	2	9	167	3690	67	39	<1	27	5	0.0727	0.39	1.3
95VCUD1(100-125)	8.60	7	1.64	11	0.59	7974	3	10	158	4210	71	38	1	26	5	0.0617	0.42	1.3

*Other analyses (Appendix #): D=USGS-EDXRF, F=CHEMEX, G=XRAL, H=ACZ, ---- = none.

Appendix E. Chemical composition of samples analyzed, using 4 acid dissolution, by ICP-AES and ICP-MS at Eastern Washington University (EWU), Cheney, WA (Appendix_E.xls, Appendix_E.dbf).

Sample No.	V (ppm)	W (ppm)	Y (ppm)	Zn (ppm)	Zr (ppm)
SAMPLE_NO.	V_PPM	W_PPM	Y_PPM	ZN_PPM	ZR_PPM
95PCK1(411-415)	47	2	14	83	66
95PCK1(415-418)	38	1	13	1052	52
95PCUD2(0-25)	44	12	12	16910	48
95PCUD2(25-50)	41	12	11	15840	50
95PCUD2(50-75)	42	4	12	2285	52
95PCUD2(75-100)	40	2	11	1465	52
95PCUD2(100-125)	41	2	12	521	54
95PCUD2(125-150)	40	2	11	315	51
95PCUD2(150-165)	42	1	14	171	61
95VCD3(0-28)	29	1	7	5015	28
95VCD3(28-56)	26	1	8	6470	27
95VCD3(56-84)	24	1	7	8615	22
95VCD3(84-112)	27	1	8	7030	21
95VCD3(112-140)	29	1	10	16560	31
95VCD3(140-158.5)	22	1	9	13970	28
95VCD3(158.5-177)	22	1	8	12020	25
95VCD3(177-195.5)	26	1	9	9325	30
95VCD3(195.5-214)	23	1	8	15280	28
95VCD3(214-230)	23	1	8	15750	25
95VCD3(230-246)	26	2	9	12810	39
95VCD3(246-262)	24	1	8	16980	23
95VCD3(262-277)	23	1	8	15730	25
95VCD3(277-298)	27	1	9	16420	25
95VCD3(298-319)	25	1	8	15050	22
95VCD3(319-340)	26	1	10	15980	29
95VCD3(340-360)	27	2	9	16360	29
95VCD3(360-381)	34	2	11	20050	36
95VCD3(381-402)	33	2	10	19410	38
95VCD3(402-423)	36	3	10	11680	48
95VCD3(423-547)	44	2	10	1525	51
95VCD3(547-572)	44	2	10	596	54
95VCUD1(0-25)	29	1	7	2185	31
95VCUD1(25-50)	24	1	6	2340	26
95VCUD1(50-75)	25	2	8	2715	39
95VCUD1(75-100)	21	1	6	3620	28
95VCUD1(100-125)	22	1	6	4845	25

*Other analyses (Appendix #): D=USGS-EDXRF, F=CHEMEX, G=XRAL, H=ACZ, ---- = none.

Appendix E. Chemical composition of samples analyzed, using 4 acid dissolution, by ICP-AES and ICP-MS at Eastern Washington University (EWU), Cheney, WA (Appendix_E.xls, Appendix_E.dbf).

Sample No.	Site ID	Depth Interval, top (cm)	Depth Interval, bottom (cm)	*Other analyses (Appendix #)	Ag (ppm)	Al (%)	As (ppm)	Ba (ppm)	Be (ppm)	Ca (%)	Cd (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cs (ppm)	Cu (ppm)
SAMPLE_NO.	SITE_ID	INT_TOP_CM	INT_BT_M_CM	OTHR_ANALYS	AG_PPM	AL_%	AS_PPM	BA_PPM	BE_PPM	CA_%	CD_PPM	CE_PPM	CO_PPM	CR_PPM	CS_PPM	CU_PPM
95VCUD1(125-150)	95VCUD1	125	150	----	12.7	3.4	45	417	1.3	0.21	25.3	31	7	NA	5	90
95VCUD1(150-175)	95VCUD1	150	175	----	14.3	3.6	53	445	1.3	0.24	31.9	34	6	NA	5	104
95VCUD1(175-200)	95VCUD1	175	200	----	14.8	3.3	48	437	1.3	0.25	34.8	28	7	NA	5	112
95VCUD1(200-224)	95VCUD1	200	224	----	17.2	3.7	49	592	1.4	0.36	54.6	29	9	NA	6	159
95VCUD1(224-245)	95VCUD1	224	245	----	18.6	3.0	41	485	1.1	0.32	55.1	28	7	NA	5	147
95VCUD1(245-266)	95VCUD1	245	266	----	35.7	3.7	74	970	1.4	0.76	118.3	30	13	NA	8	302
95VCUD1(266-286)	95VCUD1	266	286	G, H	27.6	3.9	50	808	1.3	0.55	87.1	30	10	NA	8	248
95VCUD1(286-306)	95VCUD1	286	306	----	21.8	3.7	40	683	1.1	0.50	72.8	27	9	NA	6	233
95VCUD1(311-328)	95VCUD1	311	328	----	26.1	3.3	36	692	1.1	0.45	78.0	33	8	NA	5	244
95VCUD1(328-344)	95VCUD1	328	344	----	25.8	3.1	39	647	1.0	0.41	72.9	28	8	NA	5	229
95VCUD1(344-360)	95VCUD1	344	360	----	28.3	3.1	37	694	1.1	0.46	80.1	35	8	NA	5	246
95VCUD1(360-377)	95VCUD1	360	377	----	24.7	3.7	37	757	1.5	0.46	74.5	39	8	NA	6	231
95VCUD1(377-393)	95VCUD1	377	393	----	33.2	3.2	42	821	1.2	0.45	73.4	27	8	NA	6	220
95VCUD1(393-409)	95VCUD1	393	409	----	32.4	3.6	54	827	1.2	0.49	86.8	30	9	NA	6	278
95VCUD1(409-435)	95VCUD1	409	435	----	33.1	3.2	46	821	1.2	0.47	104.1	33	9	NA	5	291
95VCUD1(435-461)	95VCUD1	435	461	----	41.2	3.3	55	1169	1.1	0.50	120.9	37	10	NA	6	333
95VCUD1(461-486)	95VCUD1	461	486	----	42.7	3.6	58	928	1.1	0.49	126.7	31	11	NA	6	400
95VCUD1(486-512)	95VCUD1	486	512	----	27.1	3.0	38	632	1.2	0.40	79.8	24	8	NA	5	233
95VCUD1(512-538)	95VCUD1	512	538	----	28.3	3.5	41	762	1.3	0.44	86.8	29	9	NA	6	252
95VCUD1(538-564)	95VCUD1	538	564	----	24.5	3.1	30	625	1.1	0.35	68.4	25	7	NA	5	195
95VCUD1(564-589)	95VCUD1	564	589	----	7.8	4.8	41	804	1.8	0.49	91.5	27	10	NA	7	264
96K75E(0-10)	96K75E	0	10	----	0.3	8.2	9	773	2.6	0.28	<0.5	90	13	78	13	28
94Gid2(0-30)	94Gid2	0	30	G, H	11.9	4.3	140	623	1.4	0.33	22.0	57	7	NA	6	110
94Gid2(30-60)	94Gid2	30	60	G, H	10.4	4.0	152	599	1.2	0.25	38.3	42	7	NA	6	105
94Gid2(60-90)	94Gid2	60	90	G, H	10.7	2.7	459	478	0.8	0.29	33.1	39	17	NA	5	112
94Gid2(90-142)	94Gid2	90	142	----	13.0	2.6	402	263	0.8	0.35	29.8	38	15	NA	4	114
94Gid2(142-181)	94Gid2	142	181	----	17.8	3.3	122	348	1.2	0.51	46.2	37	13	NA	6	140
94Gid2(181-215)	94Gid2	181	215	----	12.8	2.7	370	550	0.9	0.34	31.6	38	14	NA	5	116
94Gid2(215-250)	94Gid2	215	250	----	17.2	2.5	212	389	0.8	0.46	54.2	45	12	NA	4	143
94Gid2(250-280)	94Gid2	250	280	G, H	40.2	3.7	69	175	1.2	0.57	96.4	37	12	NA	8	221
94Gid3(0-3)	94Gid3	0	3	----	12.3	3.8	129	581	1.2	0.24	18.4	48	9	NA	6	104
94Gid3(3-12)	94Gid3	3	12	G, H	11.6	3.8	125	642	1.0	0.16	25.5	54	9	NA	6	121
94Gid3(12-50)	94Gid3	12	50	----	10.7	3.8	245	584	1.0	0.10	23.9	55	14	NA	6	110
94Gid3(50-67.5)	94Gid3	50	67.5	----	15.8	3.7	139	700	1.2	0.16	15.6	48	10	NA	6	123
94Gid3(122-151)	94Gid3	122	151	----	29.8	4.2	100	1106	1.3	0.20	17.3	49	6	NA	8	255
94Gid3(151-190)	94Gid3	151	190	----	0.2	6.6	6	520	1.5	0.20	6.0	75	17	NA	9	19

*Other analyses (Appendix #): D=USGS-EDXRF, F=CHEMEX, G=XRAL, H=ACZ, ---- = none.

Appendix E. Chemical composition of samples analyzed, using 4 acid dissolution, by ICP-AES and ICP-MS at Eastern Washington University (EWU), Cheney, WA (Appendix_E.xls, Appendix_E.dbf).

Sample No.	Fe (%)	Ga (ppm)	K (%)	La (ppm)	Mg (%)	Mn (ppm)	Mo (ppm)	Ni (ppm)	P (ppm)	Pb (ppm)	Rb (ppm)	Sb (ppm)	Sn (ppm)	Sr (ppm)	Th (ppm)	Ti (%)	Tl (ppm)	U (ppm)
SAMPLE_NO.	FE_%	GA_PPM	K_%	LA_PPM	MG_%	MN_PPM	MO_PPM	NI_PPM	P_PPM	PB_PPM	RB_PPM	SB_PPM	SN_PPM	SR_PPM	TH_PPM	TI_%	TL_PPM	U_PPM
95VCUD1(125-150)	8.43	7	1.61	13	0.58	7882	2	10	153	4680	72	40	<1	27	6	0.0660	0.43	1.4
95VCUD1(150-175)	10.35	7	1.70	15	0.68	9968	3	11	170	5210	74	44	<1	27	6	0.0635	0.44	1.5
95VCUD1(175-200)	10.20	7	1.57	12	0.65	9843	2	10	154	5525	71	47	<1	27	5	0.0588	0.40	1.3
95VCUD1(200-224)	11.23	8	1.69	12	0.71	11062	3	13	168	7350	78	53	<1	32	6	0.0726	0.47	1.6
95VCUD1(224-245)	11.02	6	1.38	12	0.66	11110	2	10	135	7410	61	47	<1	25	5	0.0688	0.39	1.3
95VCUD1(245-266)	17.46	9	1.59	13	0.93	16785	2	18	166	16210	87	97	<1	42	6	0.0800	0.46	1.9
95VCUD1(266-286)	12.90	9	1.78	13	0.77	12326	2	14	179	11850	90	82	<1	38	6	0.0806	0.49	1.8
95VCUD1(286-306)	12.16	8	1.70	12	0.72	11856	2	13	151	8725	79	68	<1	35	6	0.0903	0.48	1.5
95VCUD1(311-328)	12.36	7	1.50	14	0.69	11776	1	11	143	9480	66	63	1	31	6	0.0686	0.44	1.3
95VCUD1(328-344)	11.39	7	1.44	12	0.65	10983	2	11	136	9105	64	64	1	30	5	0.0692	0.39	1.6
95VCUD1(344-360)	12.11	7	1.42	15	0.67	11714	1	12	139	10630	65	68	1	32	6	0.0851	0.40	1.5
95VCUD1(360-377)	11.26	8	1.65	17	0.68	10991	2	13	179	10380	74	65	1	36	7	0.0914	0.44	1.8
95VCUD1(377-393)	11.50	7	1.37	11	0.63	11174	1	12	168	15160	65	77	1	31	6	0.0686	0.43	1.6
95VCUD1(393-409)	12.07	8	1.61	13	0.69	11851	2	14	186	13210	75	78	2	34	6	0.0727	0.49	1.6
95VCUD1(409-435)	11.94	7	1.42	14	0.67	11995	2	12	155	12760	65	78	1	32	6	0.0697	0.41	1.5
95VCUD1(435-461)	12.57	7	1.41	15	0.68	12462	2	15	184	19020	67	106	1	33	7	0.0742	0.46	1.8
95VCUD1(461-486)	14.38	8	1.64	13	0.77	14031	2	14	190	15660	74	86	2	34	6	0.0752	0.57	1.8
95VCUD1(486-512)	10.94	6	1.35	10	0.63	10951	2	12	138	9810	60	61	2	29	5	0.0628	0.43	1.3
95VCUD1(512-538)	11.51	7	1.59	12	0.68	11274	2	13	165	9970	73	64	2	34	6	0.0781	0.49	1.5
95VCUD1(538-564)	9.51	6	1.42	11	0.59	9198	3	12	137	8625	64	43	1	30	5	0.0623	0.46	1.2
95VCUD1(564-589)	13.05	10	2.28	11	0.88	12482	2	16	225	9850	99	72	2	46	7	0.0942	0.72	1.7
96K75E(0-10)	2.26	20	3.21	37	1.02	139	2	26	174	59	177	3	4	77	20	0.2782	1.0	4.9
94Gid2(0-30)	9.42	11	1.59	25	0.58	6901	16	13	536	5142	79	47	3	52	9	0.1617	0.79	2.6
94Gid2(30-60)	8.93	9	1.53	19	0.56	6671	10	13	428	4695	78	54	3	38	7	0.0937	0.63	2.2
94Gid2(60-90)	12.92	7	1.08	18	0.57	10713	8	16	282	3560	55	75	2	24	6	0.0627	0.52	1.8
94Gid2(90-142)	13.84	6	1.08	16	0.60	11923	7	15	161	4943	55	67	2	22	5	0.0588	0.39	1.3
94Gid2(142-181)	13.04	8	1.31	16	0.68	12301	8	18	236	9704	68	71	2	33	7	0.0643	0.59	1.9
94Gid2(181-215)	12.59	7	1.11	17	0.58	10790	8	15	195	5119	56	69	2	24	6	0.0590	0.45	1.5
94Gid2(215-250)	14.89	6	1.01	19	0.68	13421	5	13	151	8038	52	65	2	27	6	0.0584	0.40	1.3
94Gid2(250-280)	12.46	10	1.41	16	0.71	11416	5	15	230	18020	77	106	3	42	7	0.0814	0.51	2.1
94Gid3(0-3)	9.23	9	1.41	22	0.54	7621	33	16	354	4935	70	48	2	39	7	0.0984	0.59	2.0
94Gid3(3-12)	11.55	9	1.56	24	0.46	10179	13	12	193	4070	75	54	2	28	7	0.0830	0.53	1.7
94Gid3(12-50)	10.99	9	1.44	24	0.31	9112	9	15	227	5970	71	60	3	24	8	0.0826	0.49	2.1
94Gid3(50-67.5)	12.02	9	1.46	21	0.45	10248	6	13	235	7310	72	67	3	27	7	0.0701	0.51	2.1
94Gid3(122-151)	11.52	10	1.55	21	0.57	7902	8	12	248	17750	80	140	3	33	8	0.0913	0.61	2.2
94Gid3(151-190)	2.03	13	2.08	34	0.72	253	1	12	495	252	105	2	2	52	12	0.1285	0.60	3.1

*Other analyses (Appendix #): D=USGS-EDXRF, F=CHEMEX, G=XRAL, H=ACZ, ---- = none.

Appendix E. Chemical composition of samples analyzed, using 4 acid dissolution, by ICP-AES and ICP-MS at Eastern Washington University (EWU), Cheney, WA (Appendix_E.xls, Appendix_E.dbf).

Sample No.	V (ppm)	W (ppm)	Y (ppm)	Zn (ppm)	Zr (ppm)
SAMPLE_NO.	V_PPM	W_PPM	Y_PPM	ZN_PPM	ZR_PPM
95VCUD1(125-150)	21	1	7	5405	32
95VCUD1(150-175)	21	1	7	6710	29
95VCUD1(175-200)	22	1	7	6825	25
95VCUD1(200-224)	25	2	8	9270	29
95VCUD1(224-245)	20	1	7	11250	27
95VCUD1(245-266)	30	5	11	19540	29
95VCUD1(266-286)	30	1	9	13380	30
95VCUD1(286-306)	26	2	8	11840	27
95VCUD1(311-328)	23	1	7	13470	19
95VCUD1(328-344)	22	1	7	13230	21
95VCUD1(344-360)	23	1	8	15240	27
95VCUD1(360-377)	25	1	9	13280	31
95VCUD1(377-393)	22	1	7	15120	24
95VCUD1(393-409)	25	3	7	14860	25
95VCUD1(409-435)	21	1	7	18020	23
95VCUD1(435-461)	22	1	8	21240	28
95VCUD1(461-486)	24	1	8	19570	26
95VCUD1(486-512)	19	2	6	14420	20
95VCUD1(512-538)	23	1	7	14250	26
95VCUD1(538-564)	19	1	6	13120	21
95VCUD1(564-589)	32	2	8	13860	29
96K75E(0-10)	85	3	18	105	98
94Gid2(0-30)	31	1	13	2430	73
94Gid2(30-60)	29	1	9	5125	43
94Gid2(60-90)	20	1	8	5780	32
94Gid2(90-142)	19	1	7	5670	25
94Gid2(142-181)	25	1	9	10450	39
94Gid2(181-215)	20	1	7	6035	28
94Gid2(215-250)	19	1	8	9670	29
94Gid2(250-280)	31	1	10	18500	42
94Gid3(0-3)	19	1	10	3025	45
94Gid3(3-12)	25	1	9	5030	37
94Gid3(12-50)	27	1	9	4015	42
94Gid3(50-67.5)	27	1	8	2320	35
94Gid3(122-151)	31	2	10	3740	43
94Gid3(151-190)	45	118	11	796	58

*Other analyses (Appendix #): D=USGS-EDXRF, F=CHEMEX, G=XRAL, H=ACZ, ---- = none.

Appendix E. Chemical composition of samples analyzed, using 4 acid dissolution, by ICP-AES and ICP-MS at Eastern Washington University (EWU), Cheney, WA (Appendix_E.xls, Appendix_E.dbf).

Sample No.	Site ID	Depth Interval, top (cm)	Depth Interval, bottom (cm)	*Other analyses (Appendix #)	Ag (ppm)	Al (%)	As (ppm)	Ba (ppm)	Be (ppm)	Ca (%)	Cd (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cs (ppm)	Cu (ppm)
SAMPLE_NO.	SITE_ID	INT_TOP_CM	INT_BT_M_CM	OTHR_ANALYS	AG_PPM	AL_%	AS_PPM	BA_PPM	BE_PPM	CA_%	CD_PPM	CE_PPM	CO_PPM	CR_PPM	CS_PPM	CU_PPM
94Gid3(190-223)	94Gid3	190	223	----	0.1	7.3	6	567	1.6	0.19	2.1	75	23	NA	10	16
94Gid3(244-284)	94Gid3	244	284	G, H	0.4	5.4	13	488	1.4	0.14	2.6	60	12	NA	7	18
94Gid3(284-310)	94Gid3	284	310	----	0.1	6.8	5	557	1.7	0.19	1.3	82	16	NA	9	15
94Gid3(310-337)	94Gid3	310	337	----	0.1	6.3	5	542	1.7	0.18	0.9	81	24	NA	9	14
94Gid4(0-31)	94Gid4	0	31	----	10.3	4.1	166	622	1.2	0.16	22.4	50	9	NA	7	113
94Gid4(31-63)	94Gid4	31	63	G, H	25.2	4.3	113	958	1.2	0.14	19.2	61	7	NA	8	213
94Gid4(63-157)	94Gid4	63	157	----	1.7	6.5	23	593	1.5	0.21	3.7	82	15	NA	9	39
94Gid4(157-186)	94Gid4	157	186	----	0.1	2.6	6	379	1.8	0.14	1.6	47	11	NA	8	21
94Gid4(186-215)	94Gid4	186	215	----	0.1	6.6	6	551	2.1	0.23	1.6	79	19	NA	9	19
94Gid4(244-279)	94Gid4	244	279	----	0.2	5.7	8	484	1.6	0.19	1.2	77	17	NA	8	16
94Gid4(279-315)	94Gid4	279	315	----	0.1	3.5	9	448	1.6	0.19	1.2	61	14	NA	8	17
94Gid4(315-351)	94Gid4	315	351	----	0.1	6.7	10	547	1.8	0.24	1.1	85	21	NA	9	23
94Gid5(0-18)	94Gid5	0	18	----	17.8	4.0	165	718	1.3	0.25	19.1	58	11	NA	6	128
94Gid5(18-43)	94Gid5	18	43	----	8.3	5.0	22	670	1.6	0.30	21.6	59	7	NA	7	77
94Gid5(43-70)	94Gid5	43	70	----	0.1	5.2	6	478	1.5	0.24	6.2	63	19	NA	7	14
94Gid5(70-96)	94Gid5	70	96	----	0.1	5.4	5	470	1.6	0.22	0.4	71	17	NA	7	16
94Gid5(96-155)	94Gid5	96	155	----	0.4	5.5	10	477	1.6	0.22	0.6	77	13	NA	7	19
94Gid5(155-190)	94Gid5	155	190	----	0.1	3.3	6	401	1.4	0.15	0.1	58	13	NA	7	16
94Gid5(190-225)	94Gid5	190	225	----	0.1	5.7	6	481	1.6	0.24	0.1	71	13	NA	7	16
94Gid6(0-20)	94Gid6	0	20	G, H	18.2	4.8	117	730	1.4	0.27	15.6	63	10	NA	7	134
94Gid6(20-50)	94Gid6	20	50	----	0.4	5.9	7	606	1.9	0.29	12.4	73	20	NA	8	20
94Gid6(50-79)	94Gid6	50	79	----	0.1	6.7	7	566	1.7	0.24	0.8	83	17	NA	9	22
94Gid6(122-155)	94Gid6	122	155	----	0.3	6.4	11	564	1.7	0.27	0.6	85	28	NA	8	25
94Gid6(155-190)	94Gid6	155	190	----	0.1	7.1	9	583	1.9	0.29	0.1	82	15	NA	8	22
94Gid6(190-226)	94Gid6	190	226	----	0.1	6.5	8	537	1.8	0.34	0.1	70	14	NA	7	20
96K-89E(0-23)	96K-89E	0	23	----	13.2	3.2	140	574	1.0	0.25	23.5	32	9	NA	6	122
96K-89E(23-49)	96K-89E	23	49	----	14.0	3.1	322	523	1.4	0.12	33.5	29	13	NA	6	125
96K-89E(49-85)	96K-89E	49	85	----	15.1	3.7	186	667	1.2	0.18	11.6	34	9	NA	8	132
96K-89E(85-110)	96K-89E	85	110	----	13.0	3.0	71	539	1.3	0.15	12.8	31	8	NA	6	82
96K-89E(110-132)	96K-89E	110	132	----	9.7	6.8	21	719	1.7	0.27	0.9	85	12	NA	11	70
96K-89E(132-162)	96K-89E	132	162	----	0.2	6.7	11	604	1.6	0.21	<0.5	77	5	NA	10	15
96K-114E(0-15)	96K-114E	0	15	----	14.7	3.2	129	599	0.9	0.37	45.0	33	10	NA	6	138
96K-114E(15-33)	96K-114E	15	33	----	14.7	3.2	126	632	1.0	0.22	27.3	38	11	NA	6	131
96K-114E(33-61)	96K-114E	33	61	----	17.9	2.9	426	650	1.1	0.14	34.2	39	19	NA	6	158
96K-114E(61-80)	96K-114E	61	80	----	16.1	2.8	566	550	1.3	0.09	35.4	22	18	NA	6	134
96K-114E(80-104)	96K-114E	80	104	----	11.9	3.0	129	556	1.0	0.10	8.9	17	12	NA	6	108

*Other analyses (Appendix #): D=USGS-EDXRF, F=CHEMEX, G=XRAL, H=ACZ, ---- = none.

Appendix E. Chemical composition of samples analyzed, using 4 acid dissolution, by ICP-AES and ICP-MS at Eastern Washington University (EWU), Cheney, WA (Appendix_E.xls, Appendix_E.dbf).

Sample No.	Fe (%)	Ga (ppm)	K (%)	La (ppm)	Mg (%)	Mn (ppm)	Mo (ppm)	Ni (ppm)	P (ppm)	Pb (ppm)	Rb (ppm)	Sb (ppm)	Sn (ppm)	Sr (ppm)	Th (ppm)	Ti (%)	Tl (ppm)	U (ppm)
SAMPLE_NO.	FE_%	GA_PPM	K_%	LA_PPM	MG_%	MN_PPM	MO_PPM	NI_PPM	P_PPM	PB_PPM	RB_PPM	SB_PPM	SN_PPM	SR_PPM	TH_PPM	TI_%	TL_PPM	U_PPM
94Gid3(190-223)	2.20	14	2.25	34	0.76	163	1	13	439	29	112	2	2	55	12	0.1623	0.60	3.8
94Gid3(244-284)	2.55	12	2.12	27	0.64	918	<1	12	277	447	96	5	2	42	9	0.1277	0.57	2.3
94Gid3(284-310)	2.09	14	2.20	36	0.73	115	<1	12	408	24	109	1	2	54	13	0.1517	0.66	3.7
94Gid3(310-337)	2.00	13	2.21	37	0.71	103	1	12	353	23	106	2	2	51	12	0.1600	0.59	3.5
94Gid4(0-31)	9.86	9	1.58	22	0.51	7858	11	13	258	5080	79	60	3	29	8	0.0911	0.57	2.2
94Gid4(31-63)	11.35	10	1.64	27	0.34	6399	7	13	265	12960	86	111	3	33	9	0.0951	0.57	2.4
94Gid4(63-157)	3.59	14	2.14	37	0.71	1576	1	13	437	1448	109	14	2	52	12	0.1556	0.66	3.6
94Gid4(157-186)	2.07	13	2.04	20	0.38	95	<1	12	375	25	67	1	2	37	5	0.1596	0.65	3.1
94Gid4(186-215)	2.22	15	2.26	36	0.71	114	<1	14	407	25	118	2	2	61	13	0.1682	0.68	3.9
94Gid4(244-279)	2.19	13	2.17	34	0.65	398	<1	11	285	175	106	3	2	51	11	0.1599	0.60	2.8
94Gid4(279-315)	2.21	13	2.13	26	0.48	202	1	13	352	30	78	2	2	47	7	0.1744	0.65	3.3
94Gid4(315-351)	2.47	15	2.25	38	0.72	190	1	14	449	29	116	2	2	61	13	0.1800	0.66	4.1
94Gid5(0-18)	12.00	10	1.56	25	0.49	10195	17	14	459	6600	81	60	3	39	9	0.1424	0.60	2.4
94Gid5(18-43)	3.88	11	1.87	27	0.57	2327	12	13	848	4550	97	36	3	55	10	0.1389	0.53	2.6
94Gid5(43-70)	1.84	11	1.84	29	0.58	288	<1	11	630	36	96	1	2	55	10	0.1396	0.51	2.7
94Gid5(70-96)	2.06	13	2.12	32	0.61	242	<1	13	465	26	104	1	2	56	11	0.1658	0.56	2.7
94Gid5(96-155)	2.31	13	2.19	34	0.63	528	<1	12	290	237	109	3	2	57	11	0.1720	0.57	2.6
94Gid5(155-190)	1.90	13	2.16	25	0.49	185	<1	13	180	21	87	1	2	45	7	0.1726	0.56	2.4
94Gid5(190-225)	2.02	13	2.07	32	0.63	192	<1	12	183	19	104	1	2	61	11	0.1621	0.60	2.5
94Gid6(0-20)	8.18	12	1.74	28	0.51	6236	11	14	730	7210	89	58	3	53	10	0.1764	0.62	3.0
94Gid6(20-50)	2.26	14	2.11	33	0.64	432	<1	14	1001	200	111	3	2	67	11	0.1689	0.59	3.0
94Gid6(50-79)	2.40	15	2.24	38	0.70	265	<1	14	707	40	118	1	2	66	13	0.1874	0.67	3.4
94Gid6(122-155)	2.58	15	2.25	39	0.68	523	1	14	300	325	117	4	2	71	13	0.2157	0.65	3.3
94Gid6(155-190)	2.50	15	2.32	37	0.70	344	<1	14	264	29	119	2	2	75	13	0.1865	0.69	3.1
94Gid6(190-226)	2.37	14	2.05	31	0.64	304	<1	14	274	30	108	2	2	81	11	0.1869	0.61	2.9
96K-89E(0-23)	9.46	8	1.35	13	0.53	7577	2	13	313	5104	74	42	2	34	8	0.0970	0.6	1.9
96K-89E(23-49)	11.09	8	1.41	12	0.29	8064	2	13	329	5290	74	54	4	27	7	0.0711	0.6	2.1
96K-89E(49-85)	12.61	9	1.64	14	0.35	6604	2	15	317	6434	90	58	4	33	9	0.0914	0.5	2.7
96K-89E(85-110)	6.59	8	1.30	11	0.32	4402	1	11	264	4738	60	33	2	35	7	0.0937	0.4	1.9
96K-89E(110-132)	4.01	16	2.52	33	0.71	1483	1	16	465	4038	134	30	3	71	16	0.2359	0.8	4.8
96K-89E(132-162)	2.95	16	2.32	33	0.71	145	1	14	126	55	135	2	3	63	14	0.2130	0.8	2.7
96K-114E(0-15)	11.30	8	1.44	14	0.64	9857	2	13	205	5324	76	47	2	30	7	0.0886	0.5	1.5
96K-114E(15-33)	11.56	8	1.46	16	0.47	9214	1	14	311	5745	73	42	2	31	9	0.0971	0.6	1.9
96K-114E(33-61)	17.15	8	1.39	16	0.30	14152	2	17	221	5913	72	70	2	25	8	0.0836	0.5	1.9
96K-114E(61-80)	14.75	9	1.61	10	0.24	11364	2	19	272	6003	78	73	3	21	7	0.0926	0.6	2.1
96K-114E(80-104)	10.76	8	1.46	7	0.29	9234	2	13	187	5426	74	46	2	23	6	0.0602	0.4	1.5

*Other analyses (Appendix #): D=USGS-EDXRF, F=CHEMEX, G=XRAL, H=ACZ, ---- = none.

Appendix E. Chemical composition of samples analyzed, using 4 acid dissolution, by ICP-AES and ICP-MS at Eastern Washington University (EWU), Cheney, WA (Appendix_E.xls, Appendix_E.dbf).

Sample No.	V (ppm)	W (ppm)	Y (ppm)	Zn (ppm)	Zr (ppm)
SAMPLE_NO.	V_PPM	W_PPM	Y_PPM	ZN_PPM	ZR_PPM
94Gid3(190-223)	49	168	14	252	78
94Gid3(244-284)	41	92	9	445	57
94Gid3(284-310)	49	116	13	161	72
94Gid3(310-337)	47	214	13	130	71
94Gid4(0-31)	28	2	9	4050	42
94Gid4(31-63)	32	2	11	4635	48
94Gid4(63-157)	48	99	14	652	75
94Gid4(157-186)	50	57	7	169	67
94Gid4(186-215)	53	123	18	183	79
94Gid4(244-279)	45	118	13	188	69
94Gid4(279-315)	53	77	9	207	74
94Gid4(315-351)	56	137	17	222	87
94Gid5(0-18)	30	3	12	2825	67
94Gid5(18-43)	39	1	11	1760	61
94Gid5(43-70)	43	115	12	922	63
94Gid5(70-96)	48	94	12	517	73
94Gid5(96-155)	49	69	13	352	74
94Gid5(155-190)	48	59	8	166	70
94Gid5(190-225)	48	76	12	87	70
94Gid6(0-20)	40	2	14	1860	83
94Gid6(20-50)	50	106	14	832	78
94Gid6(50-79)	57	93	15	393	88
94Gid6(122-155)	56	184	16	342	100
94Gid6(155-190)	57	58	16	296	88
94Gid6(190-226)	52	54	14	285	91
96K-89E(0-23)	30	1	9	3357	37
96K-89E(23-49)	27	1	8	4427	27
96K-89E(49-85)	33	2	9	2922	40
96K-89E(85-110)	30	1	6	1966	37
96K-89E(110-132)	66	2	14	404	85
96K-89E(132-162)	74	2	12	81	71
96K-114E(0-15)	28	1	8	6752	32
96K-114E(15-33)	27	<1	9	4043	38
96K-114E(33-61)	25	1	9	4913	31
96K-114E(61-80)	29	3	8	5294	39
96K-114E(80-104)	25	1	6	1337	20

*Other analyses (Appendix #): D=USGS-EDXRF, F=CHEMEX, G=XRAL, H=ACZ, ---- = none.

Appendix E. Chemical composition of samples analyzed, using 4 acid dissolution, by ICP-AES and ICP-MS at Eastern Washington University (EWU), Cheney, WA (Appendix_E.xls, Appendix_E.dbf).

Sample No.	Site ID	Depth Interval, top (cm)	Depth Interval, bottom (cm)	*Other analyses (Appendix #)	Ag (ppm)	Al (%)	As (ppm)	Ba (ppm)	Be (ppm)	Ca (%)	Cd (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cs (ppm)	Cu (ppm)
SAMPLE_NO.	SITE_ID	INT_TOP_CM	INT_BT_M_CM	OTHR_ANALYS	AG_PPM	AL_%	AS_PPM	BA_PPM	BE_PPM	CA_%	CD_PPM	CE_PPM	CO_PPM	CR_PPM	CS_PPM	CU_PPM
96K-114E(104-130)	96K-114E	104	130	----	12.9	2.8	111	545	1.0	0.17	12.3	21	6	NA	5	102
96K-114E(140-160)	96K-114E	130	160	G, H	20.1	3.5	142	767	1.5	0.29	28.0	33	9	NA	7	145
96K-114E(160-175)	96K-114E	160	175	----	6.8	5.0	15	604	1.9	0.29	17.0	42	7	NA	9	56
96K-178E(0-18)	96K-178E	0	18	----	13.1	4.2	122	585	1.2	0.42	28.4	25	10	NA	8	115
96K-178E(18-35)	96K-178E	18	35	----	18.6	5.0	373	785	1.9	0.33	26.8	56	10	NA	10	162
96K-178E(35-70)	96K-178E	35	70	----	17.2	4.2	561	677	1.4	0.24	17.6	50	11	NA	8	163
96K-178E(70-84)	96K-178E	70	84	----	14.5	3.8	192	656	1.6	0.20	6.8	22	8	NA	8	130
96K-178E(84-102)	96K-178E	84	102	----	11.9	2.9	113	497	1.2	0.42	37.7	23	13	NA	6	113
96K-178E(102-120)	96K-178E	102	120	----	16.6	3.6	144	598	1.3	0.48	31.1	35	18	NA	7	140
96K-178E(120-140)	96K-178E	120	140	----	14.1	4.2	100	714	1.6	0.38	16.9	38	13	NA	9	113
96LD-1S(0-16)	96LD-1S	0	16	----	14.9	3.8	145	598	1.5	0.31	38.4	28	10	43	7	138
96LD-1S(16-43)	96LD-1S	16	43	----	15.6	3.8	402	546	1.1	0.20	30.1	32	11	41	7	132
96LD-1S(43-70)	96LD-1S	43	70	----	15.7	3.1	541	506	1.2	0.15	25.2	36	15	44	6	131
96LD-1S(70-93)	96LD-1S	70	93	----	14.3	2.7	608	456	1.0	0.12	16.2	26	10	48	5	129
96LD-1S(105-120)	96LD-1S	105	120	----	11.0	2.1	699	342	1.0	0.18	44.6	18	17	37	4	110
96LD-105S(0-5)	96LD-105S	0	5	----	12.1	3.9	78	543	1.3	0.27	35.1	27	7	46	7	117
96LD-105S(5-18)	96LD-105S	5	18	----	11.7	4.2	155	600	1.4	0.15	16.4	46	10	52	7	116
96LD-105S(18-34)	96LD-105S	18	34	----	23.1	3.5	106	780	1.3	0.08	9.8	40	9	43	7	190
96LD-105S(34-49)	96LD-105S	34	49	----	0.4	3.4	5	512	1.8	0.16	26.0	47	5	54	7	12
93CSC03(0-6)	93CSC03	0	6	----	7.9	6.3	90	679	2.2	0.60	26.9	59	15	70	10	106
93CSC03(6-10)	93CSC03	6	10	----	18.5	5.7	224	768	1.8	0.29	35.0	80	14	83	10	177
93CSC03(10-43)	93CSC03	10	43	----	17.9	4.0	604	607	1.6	0.23	74.3	58	13	63	8	173
93CSC03(43-46)	93CSC03	43	46	----	18.1	4.9	384	769	1.8	0.20	31.8	47	10	63	11	172
93CSC03(46-55)	93CSC03	46	55	----	16.8	4.2	229	721	1.6	0.16	11.8	36	14	79	8	149
93CSC03(55-61)	93CSC03	55	61	----	16.3	4.1	167	706	1.3	0.17	12.0	54	11	63	8	138
93CSC03(61-66)	93CSC03	61	66	----	23.5	4.8	188	849	1.4	0.21	13.4	52	12	73	10	189
93CSC03(66-71)	93CSC03	66	71	----	27.9	3.7	165	838	1.4	0.15	18.6	37	15	69	8	212
93CSC03(71-77)	93CSC03	71	77	----	21.1	4.9	130	812	1.7	0.21	23.0	66	10	58	11	160
93CSC03(77-95)	93CSC03	77	95	----	27.3	6.8	139	1072	2.3	0.34	26.0	90	21	61	14	191
93CSC03(95-112)	93CSC03	95	112	----	22.8	4.1	504	759	1.2	0.19	20.5	48	9	49	8	170
93CSC03(112-122)	93CSC03	112	122	----	18.6	4.0	180	683	1.4	0.22	18.4	43	6	46	8	117
93CSC03(122-133)	93CSC03	122	133	----	23.7	3.6	107	1196	1.3	0.24	29.6	32	6	53	8	157
93CSC03(133-145)	93CSC03	133	145	----	41.2	4.5	82	1147	1.5	0.27	25.1	45	6	46	11	236
93CSC03(145-155)	93CSC03	145	155	----	42.6	3.8	81	1199	1.3	0.37	98.2	49	8	59	9	302
93CSC03(155-168)	93CSC03	155	168	----	45.9	4.5	65	852	1.3	0.59	139.8	22	14	74	10	364
93CSC03(168-192)	93CSC03	168	192	----	45.4	4.8	56	915	1.5	0.50	103.8	38	15	74	10	336

*Other analyses (Appendix #): D=USGS-EDXRF, F=CHEMEX, G=XRAL, H=ACZ, ---- = none.

Appendix E. Chemical composition of samples analyzed, using 4 acid dissolution, by ICP-AES and ICP-MS at Eastern Washington University (EWU), Cheney, WA (Appendix_E.xls, Appendix_E.dbf).

Sample No.	Fe (%)	Ga (ppm)	K (%)	La (ppm)	Mg (%)	Mn (ppm)	Mo (ppm)	Ni (ppm)	P (ppm)	Pb (ppm)	Rb (ppm)	Sb (ppm)	Sn (ppm)	Sr (ppm)	Th (ppm)	Ti (%)	Tl (ppm)	U (ppm)
SAMPLE_NO.	FE_%	GA_PPM	K_%	LA_PPM	MG_%	MN_PPM	MO_PPM	NI_PPM	P_PPM	PB_PPM	RB_PPM	SB_PPM	SN_PPM	SR_PPM	TH_PPM	TI_%	TL_PPM	U_PPM
96K-114E(104-130)	10.90	7	1.32	8	0.45	8898	1	10	177	5742	68	42	3	21	6	0.0598	0.4	1.4
96K-114E(140-160)	12.94	9	1.58	14	0.60	10758	2	18	321	8656	85	62	4	38	8	0.0772	0.6	2.2
96K-114E(160-175)	2.28	14	2.18	16	0.62	350	2	30	674	3315	117	21	6	63	10	0.1703	0.7	3.9
96K-178E(0-18)	7.97	10	1.71	10	0.58	5619	2	16	629	5665	97	44	3	55	9	0.1146	0.8	2.8
96K-178E(18-35)	11.60	12	2.03	23	0.56	6470	2	19	751	6735	118	73	4	55	13	0.1324	0.8	4.0
96K-178E(35-70)	14.57	10	1.70	21	0.42	8416	2	20	430	6167	95	85	4	37	12	0.0904	0.7	2.9
96K-178E(70-84)	11.78	10	1.66	9	0.37	6543	2	16	343	6164	89	56	4	30	8	0.0794	0.5	2.1
96K-178E(84-102)	10.16	8	1.36	9	0.50	8290	2	17	222	5660	75	44	4	33	7	0.0823	0.4	1.8
96K-178E(102-120)	12.71	10	1.64	14	0.60	11135	3	24	304	7724	88	57	5	44	10	0.1099	0.5	2.8
96K-178E(120-140)	7.41	11	1.89	14	0.61	5825	4	31	568	5636	89	43	4	53	10	0.1490	0.6	3.8
96LD-1S(0-16)	10.00	9	1.68	11	0.59	7978	2	14	351	5235	91	54	2	40	8	0.1051	0.6	2.1
96LD-1S(16-43)	9.80	9	1.56	14	0.38	6738	2	14	599	4634	86	71	3	39	9	0.0929	0.7	2.9
96LD-1S(43-70)	13.63	8	1.36	15	0.30	9447	3	17	421	3792	74	76	3	31	9	0.0753	0.6	2.7
96LD-1S(70-93)	15.44	7	1.21	10	0.33	7863	3	17	269	2937	64	84	3	24	7	0.0672	0.5	2.1
96LD-1S(105-120)	15.83	5	0.95	7	0.54	12292	2	14	167	2981	48	59	2	15	5	0.0446	0.3	1.9
96LD-105S(0-5)	8.04	9	1.77	11	0.59	6400	2	12	262	3858	90	43	2	38	9	0.1064	0.5	1.9
96LD-105S(5-18)	8.01	10	1.86	19	0.50	5697	1	12	376	4380	97	50	2	36	9	0.1009	0.6	2.1
96LD-105S(18-34)	12.54	9	1.63	16	0.34	10103	2	11	254	9965	91	55	3	27	8	0.0734	0.6	2.2
96LD-105S(34-49)	1.58	11	2.11	19	0.58	389	1	13	293	155	108	2	2	43	9	0.1396	0.6	1.8
93CSC03(0-6)	4.94	14	2.14	24	0.68	2565	2	19	1143	3211	110	35	4	99	12	0.2036	0.9	4.3
93CSC03(6-10)	9.97	13	2.20	34	0.63	7352	3	20	859	6804	127	71	4	59	15	0.1535	1.0	4.2
93CSC03(10-43)	15.65	10	1.70	25	0.45	9868	3	20	482	5150	93	127	4	37	11	0.0917	0.7	3.2
93CSC03(43-46)	11.41	12	2.00	19	0.44	7473	3	22	474	7198	108	79	6	41	12	0.1157	0.6	3.3
93CSC03(46-55)	13.29	10	1.81	15	0.36	10230	2	19	344	7696	101	68	4	35	9	0.1035	0.6	2.0
93CSC03(55-61)	11.04	10	1.74	22	0.37	8832	3	18	327	7076	93	54	4	34	11	0.1067	0.5	3.7
93CSC03(61-66)	12.63	11	2.06	22	0.46	8765	2	19	405	10225	111	68	5	40	12	0.1020	0.7	2.7
93CSC03(66-71)	13.29	8	1.64	15	0.39	13210	3	17	272	12621	90	68	3	30	8	0.0783	0.8	2.2
93CSC03(71-77)	13.02	12	2.06	28	0.45	8218	2	20	399	12028	119	66	5	37	13	0.1113	0.7	3.1
93CSC03(77-95)	8.52	16	2.46	37	0.71	6873	2	25	677	11150	145	81	5	67	17	0.1870	0.9	5.1
93CSC03(95-112)	15.89	9	1.66	20	0.43	5802	2	20	376	10919	88	52	4	34	10	0.0763	1.0	2.8
93CSC03(112-122)	12.60	8	1.50	18	0.53	9029	2	16	356	9005	82	57	3	31	9	0.0759	0.8	2.4
93CSC03(122-133)	14.04	8	1.47	13	0.63	11882	2	13	269	12565	82	71	3	27	8	0.0742	0.6	2.2
93CSC03(133-145)	13.01	11	1.74	18	0.69	10038	2	16	381	20908	100	86	4	47	11	0.1105	0.6	3.0
93CSC03(145-155)	13.01	9	1.56	20	0.68	11695	1	16	334	21409	87	116	3	41	10	0.0941	0.6	2.6
93CSC03(155-168)	11.73	10	1.78	9	0.72	11097	3	22	305	22072	103	144	4	50	8	0.0970	0.7	2.7
93CSC03(168-192)	9.11	11	1.86	15	0.74	8073	2	26	401	20950	102	92	3	55	11	0.1302	0.7	3.8

*Other analyses (Appendix #): D=USGS-EDXRF, F=CHEMEX, G=XRAL, H=ACZ, ---- = none.

Appendix E. Chemical composition of samples analyzed, using 4 acid dissolution, by ICP-AES and ICP-MS at Eastern Washington University (EWU), Cheney, WA (Appendix_E.xls, Appendix_E.dbf).

Sample No.	V (ppm)	W (ppm)	Y (ppm)	Zn (ppm)	Zr (ppm)
SAMPLE_NO.	V_PPM	W_PPM	Y_PPM	ZN_PPM	ZR_PPM
96K-114E(104-130)	24	1	6	1218	22
96K-114E(140-160)	32	1	9	3652	35
96K-114E(160-175)	52	4	12	5835	68
96K-178E(0-18)	41	2	12	3404	45
96K-178E(18-35)	48	2	15	2881	50
96K-178E(35-70)	38	2	12	2884	34
96K-178E(70-84)	33	2	9	2276	28
96K-178E(84-102)	28	1	7	3754	29
96K-178E(102-120)	34	2	11	4547	52
96K-178E(120-140)	44	2	11	3773	63
96LD-1S(0-16)	35	1	10	5422	38
96LD-1S(16-43)	35	1	11	2798	35
96LD-1S(43-70)	28	2	10	2453	31
96LD-1S(70-93)	23	2	8	3772	32
96LD-1S(105-120)	16	1	7	2927	20
96LD-105S(0-5)	33	1	8	5155	38
96LD-105S(5-18)	35	1	9	1818	36
96LD-105S(18-34)	31	1	7	3699	26
96LD-105S(34-49)	41	1	6	1434	41
93CSC03(0-6)	59	3	16	1942	76
93CSC03(6-10)	51	2	18	2928	59
93CSC03(10-43)	35	2	12	6127	41
93CSC03(43-46)	42	2	13	4663	49
93CSC03(46-55)	36	2	10	2350	39
93CSC03(55-61)	35	2	11	1938	50
93CSC03(61-66)	41	2	11	2397	37
93CSC03(66-71)	30	1	10	2038	33
93CSC03(71-77)	43	2	13	3715	51
93CSC03(77-95)	62	3	14	3270	52
93CSC03(95-112)	32	1	12	5648	60
93CSC03(112-122)	30	1	11	2454	38
93CSC03(122-133)	29	1	10	2486	37
93CSC03(133-145)	41	2	12	3638	46
93CSC03(145-155)	32	1	12	9116	36
93CSC03(155-168)	38	2	12	19404	34
93CSC03(168-192)	43	4	13	16249	32

*Other analyses (Appendix #): D=USGS-EDXRF, F=CHEMEX, G=XRAL, H=ACZ, ---- = none.

Appendix E. Chemical composition of samples analyzed, using 4 acid dissolution, by ICP-AES and ICP-MS at Eastern Washington University (EWU), Cheney, WA (Appendix_E.xls, Appendix_E.dbf).

Sample No.	Site ID	Depth Interval, top (cm)	Depth Interval, bottom (cm)	*Other analyses (Appendix #)	Ag (ppm)	Al (%)	As (ppm)	Ba (ppm)	Be (ppm)	Ca (%)	Cd (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cs (ppm)	Cu (ppm)
SAMPLE_NO.	SITE_ID	INT_TOP_CM	INT_BT_M_CM	OTHR_ANALYS	AG_PPM	AL_%	AS_PPM	BA_PPM	BE_PPM	CA_%	CD_PPM	CE_PPM	CO_PPM	CR_PPM	CS_PPM	CU_PPM
93CSC03(192-233)	93CSC03	192	233	----	44.1	2.7	63	870	1.1	0.59	156.8	24	11	81	6	383
93CSC03(233-256)	93CSC03	233	256	----	61.3	3.0	78	1610	1.1	0.92	178.3	24	17	126	9	398
94JE06(0-80)	94JE06	0	80	----	67.2	2.6	77	2023	1.2	0.19	56.1	29	12	56	7	519
94JE06(80-120)	94JE06	80	120	----	111.0	2.1	62	1301	1.0	0.21	133.1	16	12	51	6	688
94JE06(120-150)	94JE06	120	150	----	170.2	3.8	76	1348	1.6	0.17	49.5	58	6	43	11	636
94JE06(150-175)	94JE06	150	175	----	1.3	5.2	18	778	2.4	0.17	48.7	76	31	62	14	37
94JE06(175-200)	94JE06	175	200	----	1.4	6.1	18	808	2.2	0.18	35.0	84	21	68	15	43
94JE06B(0-5)	94JE06B	0	5	----	30.1	4.6	126	921	1.5	0.69	26.2	26	13	92	8	253
93SBL34b	93SBL34			D, F	9.3	5.1	45	823	1.7	0.24	17.5	53	5	NA	7	205
93SBL34c	93SBL34			D, F	52.1	5.4	51	937	1.8	0.44	487.7	60	11	NA	10	376
93SBL34d	93SBL34			D, F	39.2	6.4	79	989	2.7	0.27	15.1	50	8	NA	11	281
93SBL34e	93SBL34			D, F	54.2	5.6	50	588	1.7	0.46	375.4	52	11	NA	11	388
93SBL34f	93SBL34			D, F	33.1	5.9	80	1104	2.5	0.25	19.2	64	8	NA	10	242
93SBL34g	93SBL34			D, F	34.8	5.2	69	1168	1.8	0.27	40.1	60	7	NA	9	271
93SBL34h	93SBL34			D, F	27.6	4.1	67	1161	1.6	0.51	137.6	52	10	NA	8	297
93SBL34i	93SBL34			D, F	29.7	3.9	72	811	1.5	0.40	27.5	26	6	NA	8	272
93SBC15(0-15)	93SBC15	0	15	D	2.4	5.0	24	455	1.5	0.46	4.9	NA	7.8	NA	NA	146
93SBC15(15-35)	93SBC15	15	35	D	5.2	5.1	68	500	1.5	0.36	11.0	NA	8.7	NA	NA	108
93SBC15(35-90)	93SBC15	35	90	D	9.5	4.2	181	511	1.3	0.20	9.6	NA	11	NA	NA	125
93SBC15(90-165)	93SBC15	90	165	D	20.0	4.3	97	680	1.5	0.18	22	NA	12	NA	NA	205
93SBC15(165-214)	93SBC15	165	214	D	24.0	4.4	97	718	1.5	0.22	20	NA	11	NA	NA	170
93SBC15(214-242)	93SBC15	214	242	D	23.0	4.7	97	755	1.5	0.26	47	NA	8.3	NA	NA	152
93SBC15(242-261)	93SBC15	242	261	D	20.0	4.4	30	665	1.6	0.28	55	NA	8.7	NA	NA	140
93SBK17(8-25)	93SBK17	8	25	D	115.0	5.5	38	429	1.9	0.25	330	NA	7	NA	NA	360
93SBB21(0-9)	93SBB21	0	9	D	12.0	2.9	144	493	0.96	0.61	28	NA	9.9	NA	NA	100
93SBB21(41-72)	93SBB21	41	72	D	12.0	2.9	331	462	0.99	0.13	23	NA	11	NA	NA	142
93SBB21(72-84)	93SBB21	72	84	D	12.0	3.0	150	518	1.0	0.12	10	NA	7.6	NA	NA	109
93SBB21(84-99)	93SBB21	84	99	D	12.0	3.2	102	528	1.2	0.15	13	NA	6.5	NA	NA	115
93SBB21(99-111)	93SBB21	99	111	D	13.0	3.3	91	568	1.1	0.27	62	NA	8.3	NA	NA	103
93SBB21(111-120)	93SBB21	111	120	D	1.1	3.5	17	399	1.4	0.14	3.0	NA	5.3	NA	NA	23
93SBB21(120-130)	93SBB21	120	130	D	0.3	4.8	4	422	1.5	0.17	2.0	NA	3.5	NA	NA	12
93SBB21(130-148)	93SBB21	130	148	D	0.1	4.9	4	450	1.5	0.21	2.0	NA	4.1	NA	NA	17
93SBB21(148-160)	93SBB21	148	160	D	0.2	5.1	3	344	1.3	0.14	0.5	NA	3.9	NA	NA	11
93SBB21(160-180)	93SBB21	160	180	D	0.2	5.3	4	463	1.5	0.19	0.7	NA	4.1	NA	NA	13
93SBB21(173-180)	93SBB21	173	180	D	0.4	5.7	7	488	1.6	0.12	1.0	NA	6	NA	NA	325
93SBB21(180-192)	93SBB21	180	192	D	0.5	5.8	7	477	1.5	0.11	0.6	NA	5.2	NA	NA	165

*Other analyses (Appendix #): D=USGS-EDXRF, F=CHEMEX, G=XRAL, H=ACZ, ---- = none.

Appendix E. Chemical composition of samples analyzed, using 4 acid dissolution, by ICP-AES and ICP-MS at Eastern Washington University (EWU), Cheney, WA (Appendix_E.xls, Appendix_E.dbf).

Sample No.	Fe (%)	Ga (ppm)	K (%)	La (ppm)	Mg (%)	Mn (ppm)	Mo (ppm)	Ni (ppm)	P (ppm)	Pb (ppm)	Rb (ppm)	Sb (ppm)	Sn (ppm)	Sr (ppm)	Th (ppm)	Ti (%)	Tl (ppm)	U (ppm)
SAMPLE_NO.	FE_%	GA_PPM	K_%	LA_PPM	MG_%	MN_PPM	MO_PPM	NI_PPM	P_PPM	PB_PPM	RB_PPM	SB_PPM	SN_PPM	SR_PPM	TH_PPM	TI_%	TL_PPM	U_PPM
93CSC03(192-233)	15.46	6	1.20	10	0.76	15009	3	14	126	16297	63	84	2	30	6	0.0519	0.4	1.3
93CSC03(233-256)	16.35	8	1.32	11	0.77	15350	2	21	205	23650	76	88	3	44	7	0.0668	0.5	2.2
94JE06(0-80)	19.47	7	1.24	12	0.36	18547	3	19	249	25476	69	86	3	32	6	0.0663	0.5	1.5
94JE06(80-120)	19.73	6	1.00	7	0.50	16531	2	14	178	40160	56	218	4	25	5	0.0476	0.4	1.1
94JE06(120-150)	12.33	11	1.64	24	0.32	5447	2	12	461	69540	93	84	4	75	11	0.0927	0.6	3.3
94JE06(150-175)	2.83	13	2.33	31	0.60	3571	2	16	627	708	128	7	3	51	13	0.1553	0.8	6.1
94JE06(175-200)	2.82	13	2.48	34	0.66	3101	2	15	667	750	138	7	3	57	13	0.1633	0.8	6.6
94JE06B(0-5)	11.22	11	1.65	12	0.45	8160	2	13	407	12860	87	115	4	103	8	0.1326	0.7	3.1
93SBL34b	9.77	10	1.93	24	0.70	6113	1	14	307	15070	87	63	2	45	10	0.1315	0.55	2.8
93SBL34c	10.33	12	1.95	26	0.85	9045	12	35	386	26510	98	126	2	53	11	0.1350	0.68	3.9
93SBL34d	12.41	13	2.38	21	0.67	3664	1	16	498	22150	115	161	1	55	10	0.1305	0.67	4.4
93SBL34e	10.18	12	2.02	22	0.85	9090	8	23	397	26860	104	131	2	54	11	0.1568	0.69	4.3
93SBL34f	11.89	12	2.08	28	0.65	5045	1	15	434	21480	104	129	2	50	11	0.1260	0.61	4.2
93SBL34g	13.13	11	1.99	26	0.70	8709	1	18	343	20830	97	105	2	42	11	0.1163	0.61	3.4
93SBL34h	15.47	9	1.57	22	0.91	14615	9	17	276	18420	75	64	3	41	9	0.0868	0.58	2.7
93SBL34i	15.80	9	1.53	11	0.68	10885	1	14	241	17880	75	97	3	36	7	0.0911	0.52	2.4
93SBC15(0-15)	2.90	NA	NA	NA	0.45	1240	28	17	NA	760	NA	9	NA	82	11	0.2150	0.52	2.9
93SBC15(15-35)	4.10	NA	NA	NA	0.46	2560	12	15	NA	1570	NA	22	NA	69	10	0.2160	0.55	3.0
93SBC15(35-90)	7.00	NA	NA	NA	0.37	5450	18	15	NA	2810	NA	40	NA	49	8.8	0.1550	0.46	2.5
93SBC15(90-165)	9.20	NA	NA	NA	0.36	8390	14	17	NA	7440	NA	65	NA	45	8.1	0.1590	0.53	5.9
93SBC15(165-214)	8.30	NA	NA	NA	0.44	6850	20	16	NA	8710	NA	73	NA	49	7.5	0.1820	0.62	3.1
93SBC15(214-242)	8.60	NA	NA	NA	0.45	5890	7.3	14	NA	8960	NA	71	NA	52	8.9	0.1610	0.64	3.0
93SBC15(242-261)	5.20	NA	NA	NA	0.43	3610	12	17	NA	7600	NA	57	NA	59	7.3	0.1970	0.56	3.1
93SBK17(8-25)	7.80	NA	NA	NA	0.54	7630	4.4	13	NA	41050	NA	228	NA	38	8.2	0.1300	0.78	3.2
93SBB21(0-9)	11.00	NA	NA	NA	0.42	10770	9.4	12	NA	2940	NA	40	NA	24	5.2	0.0980	0.47	1.5
93SBB21(41-72)	12.00	NA	NA	NA	0.32	11220	6.4	13	NA	3635	NA	53	NA	20	6	0.0780	0.41	1.7
93SBB21(72-84)	11.00	NA	NA	NA	0.32	9240	8	12	NA	4450	NA	41	NA	21	6	0.0850	0.38	1.6
93SBB21(84-99)	11.00	NA	NA	NA	0.38	9250	7.3	11	NA	5280	NA	45	NA	24	6.7	0.0980	0.42	1.8
93SBB21(99-111)	11.00	NA	NA	NA	0.56	11230	6.7	13	NA	5780	NA	50	NA	26	6.7	0.0910	0.44	2.1
93SBB21(111-120)	2.40	NA	NA	NA	0.45	354	6.9	13	NA	359	NA	4	NA	37	6	0.1500	0.50	2.3
93SBB21(120-130)	1.90	NA	NA	NA	0.58	139	9.9	10	NA	41	NA	1	NA	45	8.6	0.1490	0.51	1.8
93SBB21(130-148)	2.00	NA	NA	NA	0.59	127	6.9	12	NA	45	NA	1	NA	51	8.6	0.1710	0.58	2.5
93SBB21(148-160)	1.70	NA	NA	NA	0.34	96	8.8	11	NA	34	NA	1	NA	43	4.4	0.1550	0.44	1.6
93SBB21(160-180)	2.20	NA	NA	NA	0.61	99	5.8	11	NA	30	NA	1	NA	50	9.1	0.1640	0.62	2.3
93SBB21(173-180)	2.80	NA	NA	NA	0.64	298	72	24	NA	126	NA	2	NA	52	13	0.2570	0.60	3.3
93SBB21(180-192)	2.80	NA	NA	NA	0.63	221	55	23	NA	112	NA	2	NA	50	13	0.2350	0.57	3.2

*Other analyses (Appendix #): D=USGS-EDXRF, F=CHEMEX, G=XRAL, H=ACZ, ---- = none.

Appendix E. Chemical composition of samples analyzed, using 4 acid dissolution, by ICP-AES and ICP-MS at Eastern Washington University (EWU), Cheney, WA (Appendix_E.xls, Appendix_E.dbf).

Sample No.	V (ppm)	W (ppm)	Y (ppm)	Zn (ppm)	Zr (ppm)
SAMPLE_NO.	V_PPM	W_PPM	Y_PPM	ZN_PPM	ZR_PPM
93CSC03(192-233)	20	1	8	21399	22
93CSC03(233-256)	25	2	10	23420	27
94JE06(0-80)	24	1	9	8322	24
94JE06(80-120)	19	1	7	18569	20
94JE06(120-150)	34	<1	11	7978	39
94JE06(150-175)	51	1	14	1724	56
94JE06(175-200)	53	1	18	1507	64
94JE06B(0-5)	39	2	10	3620	50
93SBL34b	38	3	14	4210	49
93SBL34c	41	3	17	14560	51
93SBL34d	49	2	23	4680	47
93SBL34e	43	3	17	15810	56
93SBL34f	44	2	22	4815	50
93SBL34g	40	2	16	5205	43
93SBL34h	33	2	13	12470	32
93SBL34i	32	2	11	6340	34
93SBC15(0-15)	42	NA	NA	540	NA
93SBC15(15-35)	41	NA	NA	785	NA
93SBC15(35-90)	34	NA	NA	1465	NA
93SBC15(90-165)	37	NA	NA	2835	NA
93SBC15(165-214)	40	NA	NA	2750	NA
93SBC15(214-242)	37	NA	NA	3760	NA
93SBC15(242-261)	43	NA	NA	3565	NA
93SBK17(8-25)	42	NA	NA	13600	NA
93SBB21(0-9)	23	NA	NA	4460	NA
93SBB21(41-72)	23	NA	NA	3310	NA
93SBB21(72-84)	24	NA	NA	2350	NA
93SBB21(84-99)	27	NA	NA	1860	NA
93SBB21(99-111)	27	NA	NA	2850	NA
93SBB21(111-120)	38	NA	NA	1129	NA
93SBB21(120-130)	37	NA	NA	225	NA
93SBB21(130-148)	41	NA	NA	187	NA
93SBB21(148-160)	38	NA	NA	84	NA
93SBB21(160-180)	43	NA	NA	108	NA
93SBB21(173-180)	49	NA	NA	336	NA
93SBB21(180-192)	49	NA	NA	240	NA

*Other analyses (Appendix #): D=USGS-EDXRF, F=CHEMEX, G=XRAL, H=ACZ, ---- = none.

Appendix E. Chemical composition of samples analyzed, using 4 acid dissolution, by ICP-AES and ICP-MS at Eastern Washington University (EWU), Cheney, WA (Appendix_E.xls, Appendix_E.dbf).

Sample No.	Site ID	Depth Interval, top (cm)	Depth Interval, bottom (cm)	*Other analyses (Appendix #)	Ag (ppm)	Al (%)	As (ppm)	Ba (ppm)	Be (ppm)	Ca (%)	Cd (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cs (ppm)	Cu (ppm)
SAMPLE_NO.	SITE_ID	INT_TOP_CM	INT_BT_M_CM	OTHR_ANALYS	AG_PPM	AL_%	AS_PPM	BA_PPM	BE_PPM	CA_%	CD_PPM	CE_PPM	CO_PPM	CR_PPM	CS_PPM	CU_PPM
93SBB21(192-203)	93SBB21	192	203	D	0.2	4.1	4	407	1.5	0.07	0.4	NA	4.1	NA	NA	128
93SBL27(0-7)	93SBL27	0	7	D	15.0	3.8	127	606	1.3	0.23	29	NA	9.9	NA	NA	145
93SBL27(7-19)	93SBL27	7	19	D	16.0	3.5	168	572	1.1	0.16	28	NA	11	NA	NA	143
93SBL27(19-23)	93SBL27	19	23	D	15.0	3.8	289	571	1.3	0.17	34	NA	14	NA	NA	160
93SBL27(23-39)	93SBL27	23	39	D	14.0	3.4	270	576	1.1	0.11	31	NA	15	NA	NA	125
93SBL27(39-46)	93SBL27	39	46	D	13.0	3.4	346	485	1.2	0.10	23	NA	14	NA	NA	128
93SBL27(46-50)	93SBL27	46	50	D	16.0	3.8	327	646	1.2	0.13	23	NA	14	NA	NA	162
93SBL27(50-60)	93SBL27	50	60	D	15.0	3.8	265	606	1.3	0.13	47	NA	14	NA	NA	160
93SBL27(60-76)	93SBL27	60	76	D	0.2	6.0	5	534	1.6	0.22	9.1	NA	5.2	NA	NA	34
93SBL27(76-90)	93SBL27	76	90	D	0.2	6.5	5	540	1.7	0.21	6.6	NA	5.1	NA	NA	32
93SBL27(90-99)	93SBL27	90	99	D	0.3	6.5	6	541	1.8	0.22	3.6	NA	5.6	NA	NA	47
93SBL30(0-4)	93SBL30	0	4	D	13.0	4.7	160	613	1.4	0.41	27	NA	18	NA	NA	118
93SBL30(4-9)	93SBL30	4	9	D	15.0	4.8	297	640	1.6	0.23	28	NA	8.8	NA	NA	168
93SBL30(9-18)	93SBL30	9	18	D	13.0	3.6	289	515	1.3	0.16	18	NA	7.7	NA	NA	140
93SBL30(18-23)	93SBL30	18	23	D	14.0	4.1	120	603	1.5	0.18	13	NA	7.3	NA	NA	180
93SBL30(23-28.5)	93SBL30	23	28.5	D	17.0	3.9	112	618	1.4	0.18	11	NA	6.7	NA	NA	154
93SBL30(28.5-31.5)	93SBL30	28.5	31.5	D	15.0	3.5	132	717	1.3	0.17	8.9	NA	6.6	NA	NA	145
93SBL30(31.5-37)	93SBL30	31.5	37	D	17.0	3.6	98	595	1.8	0.15	6.8	NA	12	NA	NA	128
93SBL30(37-48)	93SBL30	37	48	D	1.4	3.4	6	439	1.9	0.17	5.0	NA	6.1	NA	NA	33
93SBL30(48-62)	93SBL30	48	62	D	0.1	5.6	5	435	1.7	0.17	2.6	NA	4.5	NA	NA	22
93SBL30(62-77)	93SBL30	62	77	D	0.1	5.9	5	466	1.7	0.16	1.6	NA	4	NA	NA	35
93SBL30(77-100)	93SBL30	77	100	D	0.1	5.8	4	470	1.7	0.17	0.8	NA	3.5	NA	NA	27
93SBL30(127-137.5)	93SBL30	127	137.5	D	0.1	5.0	4	440	1.9	0.27	0.2	NA	3.9	NA	NA	92
93SBL30(137.5-144.5)	93SBL30	137.5	144.5	D	0.1	6.1	4	509	2.0	0.25	0.6	NA	5.9	NA	NA	134
93SBL30(144.5-158.5)	93SBL30	144.5	158.5	D	0.1	6.1	3	520	2.0	0.31	0.2	NA	4.4	NA	NA	75
93SBL30(158.5-172)	93SBL30	158.5	172	D	0.1	5.7	4	502	1.7	0.31	0.1	NA	4.6	NA	NA	91
93SBL30(172-180)	93SBL30	172	180	D	0.1	5.2	4	453	1.8	0.31	0.1	NA	8.6	NA	NA	127
93SBL30(180-187)	93SBL30	180	187	D	0.2	6.4	6	533	2.0	0.36	0.5	NA	10	NA	NA	245
93SBK38(SAND)	93SBK38	0	2	D	9.3	4.5	60	535	1.5	0.36	9.6	NA	40	NA	NA	138
93SBK38(0-11)	93SBK38	0	11	D	9.2	5.4	79	538	1.5	0.29	16	NA	13	NA	NA	100
93SBK38(11-20)	93SBK38	11	20	D	15.0	4.7	133	671	1.4	0.16	9.0	NA	11	NA	NA	135
93SBK38(20-55)	93SBK38	20	55	D	7.2	4.9	64	547	1.6	0.13	4.7	NA	9.4	NA	NA	72
93SBK38(55-100)	93SBK38	55	100	D	15.0	4.1	117	559	1.4	0.17	11	NA	9.9	NA	NA	108
93SBC39(SAND)	93SBC39	0	2	D	12.0	3.6	128	435	1.2	0.13	13	NA	9.3	NA	NA	105
93SBC39(0-5)	93SBC39	0	5	D	10.0	3.5	132	447	1.2	0.13	13	NA	9.7	NA	NA	103
93SBC39(5-10)	93SBC39	5	10	D	16.0	3.9	302	542	1.2	0.13	21	NA	13	NA	NA	120

*Other analyses (Appendix #): D=USGS-EDXRF, F=CHEMEX, G=XRAL, H=ACZ, ---- = none.

Appendix E. Chemical composition of samples analyzed, using 4 acid dissolution, by ICP-AES and ICP-MS at Eastern Washington University (EWU), Cheney, WA (Appendix_E.xls, Appendix_E.dbf).

Sample No.	Fe (%)	Ga (ppm)	K (%)	La (ppm)	Mg (%)	Mn (ppm)	Mo (ppm)	Ni (ppm)	P (ppm)	Pb (ppm)	Rb (ppm)	Sb (ppm)	Sn (ppm)	Sr (ppm)	Th (ppm)	Ti (%)	Tl (ppm)	U (ppm)
SAMPLE_NO.	FE_%	GA_PPM	K_%	LA_PPM	MG_%	MN_PPM	MO_PPM	NI_PPM	P_PPM	PB_PPM	RB_PPM	SB_PPM	SN_PPM	SR_PPM	TH_PPM	TI_%	TL_PPM	U_PPM
93SBB21(192-203)	2.50	NA	NA	NA	0.45	121	33	17	NA	39	NA	2	NA	36	6.8	0.2160	0.52	2.3
93SBL27(0-7)	10.00	NA	NA	NA	0.59	10610	8.1	12	NA	4335	NA	50	NA	36	6.9	0.1180	0.62	1.9
93SBL27(7-19)	11.00	NA	NA	NA	0.51	12040	9.2	12	NA	4240	NA	54	NA	25	6.5	0.0850	0.52	1.8
93SBL27(19-23)	12.00	NA	NA	NA	0.51	11240	11	13	NA	4300	NA	59	NA	29	7.7	0.1010	0.63	2.5
93SBL27(23-39)	13.00	NA	NA	NA	0.33	13770	6.3	14	NA	4390	NA	58	NA	25	6.6	0.0860	0.49	1.8
93SBL27(39-46)	11.00	NA	NA	NA	0.29	10860	8.7	14	NA	4120	NA	54	NA	23	6.1	0.0760	0.42	1.7
93SBL27(46-50)	11.00	NA	NA	NA	0.32	11860	6	15	NA	5270	NA	55	NA	29	8.1	0.0960	0.47	2.3
93SBL27(50-60)	12.00	NA	NA	NA	0.32	11830	8.2	18	NA	5085	NA	50	NA	27	7.6	0.0970	0.47	2.1
93SBL27(60-76)	2.00	NA	NA	NA	0.66	273	5.9	12	NA	59	NA	2	NA	50	12	0.1910	0.56	2.7
93SBL27(76-90)	2.10	NA	NA	NA	0.68	212	9.8	12	NA	44	NA	2	NA	52	14	0.2090	0.59	2.9
93SBL27(90-99)	2.20	NA	NA	NA	0.69	227	8.5	12	NA	28	NA	2	NA	54	14	0.2130	0.61	3.5
93SBL30(0-4)	8.80	NA	NA	NA	0.59	9320	7.3	17	NA	5100	NA	47	NA	62	6.8	0.1330	0.62	2.6
93SBL30(4-9)	11.00	NA	NA	NA	0.65	8880	9.2	22	NA	4850	NA	69	NA	40	8.8	0.1270	0.67	3.4
93SBL30(9-18)	11.00	NA	NA	NA	0.48	9290	5.4	16	NA	4700	NA	58	NA	25	6.7	0.0930	0.48	2.4
93SBL30(18-23)	10.00	NA	NA	NA	0.54	9160	6.9	15	NA	5910	NA	54	NA	32	7.7	0.1060	0.49	2.4
93SBL30(23-28.5)	11.00	NA	NA	NA	0.54	9890	5.5	14	NA	6470	NA	60	NA	32	7.2	0.0980	0.5	2.5
93SBL30(28.5-31.5)	12.00	NA	NA	NA	0.56	10930	12	13	NA	5800	NA	54	NA	27	7.1	0.0980	0.45	2.8
93SBL30(31.5-37)	11.00	NA	NA	NA	0.42	6400	6.7	12	NA	5510	NA	45	NA	29	5.6	0.0870	0.53	1.6
93SBL30(37-48)	1.90	NA	NA	NA	0.33	820	3.6	14	NA	428	NA	4	NA	39	4.5	0.1470	0.47	3.0
93SBL30(48-62)	2.00	NA	NA	NA	0.54	364	6	13	NA	97	NA	1	NA	42	9.7	0.1630	0.49	3.5
93SBL30(62-77)	2.20	NA	NA	NA	0.58	272	5.4	12	NA	47	NA	1	NA	44	9.9	0.1590	0.59	3.1
93SBL30(77-100)	2.10	NA	NA	NA	0.58	208	6.1	11	NA	39	NA	1	NA	47	11	0.1590	0.58	2.7
93SBL30(127-137.5)	2.00	NA	NA	NA	0.48	122	15	13	NA	57	NA	1	NA	54	8.2	0.2290	0.55	2.8
93SBL30(137.5-144.5)	2.20	NA	NA	NA	0.60	251	28	16	NA	47	NA	2	NA	62	13	0.2460	0.59	4.1
93SBL30(144.5-158.5)	1.90	NA	NA	NA	0.61	142	13	13	NA	44	NA	1	NA	67	13	0.2290	0.59	3.8
93SBL30(158.5-172)	1.90	NA	NA	NA	0.58	95	7.8	12	NA	45	NA	1	NA	62	11	0.2090	0.58	3.1
93SBL30(172-180)	2.00	NA	NA	NA	0.51	110	13	13	NA	39	NA	1	NA	60	8.3	0.2220	0.56	2.7
93SBL30(180-187)	2.50	NA	NA	NA	0.65	1858	16	15	NA	99	NA	2	NA	68	11	0.2290	0.68	3.0
93SBK38(SAND)	10.00	NA	NA	NA	0.55	7740	228	1384	NA	2975	NA	49	NA	79	7.9	0.0840	0.59	1.8
93SBK38(0-11)	5.20	NA	NA	NA	0.46	3320	2.4	16	NA	2700	NA	42	NA	57	9.6	0.1550	0.65	2.6
93SBK38(11-20)	9.40	NA	NA	NA	0.51	6650	20	112	NA	4890	NA	46	NA	50	9.1	0.1250	0.68	2.2
93SBK38(20-55)	6.50	NA	NA	NA	0.73	4750	3	29	NA	2675	NA	34	NA	57	8.8	0.1080	0.70	1.9
93SBK38(55-100)	12.00	NA	NA	NA	0.59	10710	2.5	12	NA	4750	NA	74	NA	43	7.7	0.0810	0.63	1.8
93SBC39(SAND)	11.00	NA	NA	NA	0.53	9170	12	13	NA	3260	NA	52	NA	31	6.4	0.0770	0.51	1.7
93SBC39(0-5)	11.00	NA	NA	NA	0.55	9420	12	13	NA	3315	NA	60	NA	32	6.6	0.0820	0.55	1.7
93SBC39(5-10)	12.00	NA	NA	NA	0.42	10470	2.4	16	NA	2820	NA	73	NA	34	7.2	0.1090	0.52	2.0

*Other analyses (Appendix #): D=USGS-EDXRF, F=CHEMEX, G=XRAL, H=ACZ, ---- = none.

Appendix E. Chemical composition of samples analyzed, using 4 acid dissolution, by ICP-AES and ICP-MS at Eastern Washington University (EWU), Cheney, WA (Appendix_E.xls, Appendix_E.dbf).

Sample No.	V (ppm)	W (ppm)	Y (ppm)	Zn (ppm)	Zr (ppm)
SAMPLE_NO.	V_PPM	W_PPM	Y_PPM	ZN_PPM	ZR_PPM
93SBB21(192-203)	43	NA	NA	166	NA
93SBL27(0-7)	32	NA	NA	3970	NA
93SBL27(7-19)	27	NA	NA	4445	NA
93SBL27(19-23)	29	NA	NA	3170	NA
93SBL27(23-39)	25	NA	NA	4300	NA
93SBL27(39-46)	26	NA	NA	4280	NA
93SBL27(46-50)	29	NA	NA	4210	NA
93SBL27(50-60)	29	NA	NA	5605	NA
93SBL27(60-76)	43	NA	NA	938	NA
93SBL27(76-90)	44	NA	NA	537	NA
93SBL27(90-99)	46	NA	NA	285	NA
93SBL30(0-4)	36	NA	NA	4140	NA
93SBL30(4-9)	39	NA	NA	5225	NA
93SBL30(9-18)	29	NA	NA	3410	NA
93SBL30(18-23)	32	NA	NA	3150	NA
93SBL30(23-28.5)	31	NA	NA	2780	NA
93SBL30(28.5-31.5)	26	NA	NA	2710	NA
93SBL30(31.5-37)	27	NA	NA	3140	NA
93SBL30(37-48)	42	NA	NA	920	NA
93SBL30(48-62)	41	NA	NA	560	NA
93SBL30(62-77)	45	NA	NA	387	NA
93SBL30(77-100)	46	NA	NA	285	NA
93SBL30(127-137.5)	45	NA	NA	144	NA
93SBL30(137.5-144.5)	49	NA	NA	395	NA
93SBL30(144.5-158.5)	46	NA	NA	199	NA
93SBL30(158.5-172)	47	NA	NA	131	NA
93SBL30(172-180)	46	NA	NA	143	NA
93SBL30(180-187)	55	NA	NA	248	NA
93SBK38(SAND)	41	NA	NA	2090	NA
93SBK38(0-11)	43	NA	NA	1540	NA
93SBK38(11-20)	38	NA	NA	1665	NA
93SBK38(20-55)	38	NA	NA	950	NA
93SBK38(55-100)	35	NA	NA	1830	NA
93SBC39(SAND)	27	NA	NA	2165	NA
93SBC39(0-5)	29	NA	NA	2250	NA
93SBC39(5-10)	31	NA	NA	2705	NA

*Other analyses (Appendix #): D=USGS-EDXRF, F=CHEMEX, G=XRAL, H=ACZ, ---- = none.

Appendix E. Chemical composition of samples analyzed, using 4 acid dissolution, by ICP-AES and ICP-MS at Eastern Washington University (EWU), Cheney, WA (Appendix_E.xls, Appendix_E.dbf).

Sample No.	Site ID	Depth Interval, top (cm)	Depth Interval, bottom (cm)	*Other analyses (Appendix #)	Ag (ppm)	Al (%)	As (ppm)	Ba (ppm)	Be (ppm)	Ca (%)	Cd (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cs (ppm)	Cu (ppm)
SAMPLE_NO.	SITE_ID	INT_TOP_CM	INT_BT_M_CM	OTHR_ANALYS	AG_PPM	AL_%	AS_PPM	BA_PPM	BE_PPM	CA_%	CD_PPM	CE_PPM	CO_PPM	CR_PPM	CS_PPM	CU_PPM
93SBC39(10-20)	93SBC39	10	20	D	17.0	3.3	384	506	1.1	0.14	17	NA	16	NA	NA	132
93SBC39(20-27)	93SBC39	20	27	D	16.0	3.2	346	539	1.1	0.11	21	NA	18	NA	NA	140
93SBC39(27-32)	93SBC39	27	32	D	13.0	4.6	105	707	1.6	0.15	20	NA	12	NA	NA	127
93SBC39(32-40)	93SBC39	32	40	D	0.6	6.6	11	691	1.9	0.23	17	NA	8.4	NA	NA	24
93SBC39(40-58)	93SBC39	40	58	D	0.3	6.4	9	596	1.9	0.20	2.8	NA	7.2	NA	NA	18
93SBC39(58-72)	93SBC39	58	72	D	0.3	6.1	11	571	1.9	0.20	0.8	NA	7.3	NA	NA	19
94SB40(SAND)	94SB40	0	2		0.1	5.7	4	490	1.7	0.62	0.1	NA	7.1	NA	NA	16
94SB40(0-15)	94SB40	0	15		0.1	5.9	8	506	1.7	0.71	0.2	NA	8.1	NA	NA	43
94SB40(16-50)	94SB40	16	50		0.1	5.6	20	491	1.8	0.55	0.2	NA	8.6	NA	NA	130
94SB40(50-75)	94SB40	50	75		0.1	4.9	8	462	1.9	0.38	0.2	NA	9.4	NA	NA	33
94SB40(75-100)	94SB40	75	100		0.1	6.6	6	527	1.8	0.50	0.1	NA	8.8	NA	NA	25
94SB40(100-125)	94SB40	100	125		0.1	5.9	7	487	1.8	0.45	0.2	NA	7.9	NA	NA	24

*Other analyses (Appendix #): D=USGS-EDXRF, F=CHEMEX, G=XRAL, H=ACZ, ---- = none.

Appendix E. Chemical composition of samples analyzed, using 4 acid dissolution, by ICP-AES and ICP-MS at Eastern Washington University (EWU), Cheney, WA (Appendix_E.xls, Appendix_E.dbf).

Sample No.	Fe (%)	Ga (ppm)	K (%)	La (ppm)	Mg (%)	Mn (ppm)	Mo (ppm)	Ni (ppm)	P (ppm)	Pb (ppm)	Rb (ppm)	Sb (ppm)	Sn (ppm)	Sr (ppm)	Th (ppm)	Ti (%)	Tl (ppm)	U (ppm)
SAMPLE_NO.	FE_%	GA_PPM	K_%	LA_PPM	MG_%	MN_PPM	MO_PPM	NI_PPM	P_PPM	PB_PPM	RB_PPM	SB_PPM	SN_PPM	SR_PPM	TH_PPM	TI_%	TL_PPM	U_PPM
93SBC39(10-20)	14.00	NA	NA	NA	0.39	11410	2.4	16	NA	3800	NA	81	NA	27	5.9	0.0960	0.47	1.8
93SBC39(20-27)	14.00	NA	NA	NA	0.36	12070	3.3	24	NA	3875	NA	77	NA	24	6.8	0.1030	0.41	1.7
93SBC39(27-32)	8.20	NA	NA	NA	0.47	6590	2.3	17	NA	3690	NA	48	NA	38	8.5	0.1350	0.49	2.6
93SBC39(32-40)	3.00	NA	NA	NA	0.75	1290	1.7	18	NA	83	NA	2	NA	58	13	0.2070	0.59	4.6
93SBC39(40-58)	2.80	NA	NA	NA	0.74	650	1.6	16	NA	97	NA	2	NA	51	12	0.1970	0.58	4.0
93SBC39(58-72)	2.80	NA	NA	NA	0.71	560	1.3	16	NA	89	NA	2	NA	54	13	0.1880	0.60	4.1
94SB40(SAND)	2.60	NA	NA	NA	0.83	307	1.3	13	NA	21	NA	1	NA	74	8.7	0.2570	0.37	2.6
94SB40(0-15)	2.90	NA	NA	NA	0.86	383	2.3	17	NA	21	NA	1	NA	79	8.9	0.2780	0.40	3.3
94SB40(16-50)	2.70	NA	NA	NA	0.79	314	1.2	16	NA	23	NA	1	NA	65	8.2	0.2720	0.42	3.6
94SB40(50-75)	3.00	NA	NA	NA	0.55	372	2.3	19	NA	22	NA	1	NA	54	5.7	0.2890	0.50	3.9
94SB40(75-100)	3.10	NA	NA	NA	0.62	418	2.7	18	NA	21	NA	1	NA	68	9.6	0.2930	0.45	4.3
94SB40(100-125)	3.00	NA	NA	NA	0.82	351	2	16	NA	23	NA	1	NA	65	9.1	0.2830	0.45	4.9

*Other analyses (Appendix #): D=USGS-EDXRF, F=CHEMEX, G=XRAL, H=ACZ, ---- = none.

Appendix E. Chemical composition of samples analyzed, using 4 acid dissolution, by ICP-AES and ICP-MS at Eastern Washington University (EWU), Cheney, WA (Appendix_E.xls, Appendix_E.dbf).

Sample No.	V (ppm)	W (ppm)	Y (ppm)	Zn (ppm)	Zr (ppm)
SAMPLE_NO.	V_PPM	W_PPM	Y_PPM	ZN_PPM	ZR_PPM
93SBC39(10-20)	30	NA	NA	2500	NA
93SBC39(20-27)	29	NA	NA	2930	NA
93SBC39(27-32)	37	NA	NA	2170	NA
93SBC39(32-40)	48	NA	NA	1275	NA
93SBC39(40-58)	47	NA	NA	1075	NA
93SBC39(58-72)	47	NA	NA	1030	NA
94SB40(SAND)	47	NA	NA	62	NA
94SB40(0-15)	52	NA	NA	94	NA
94SB40(16-50)	52	NA	NA	84	NA
94SB40(50-75)	56	NA	NA	62	NA
94SB40(75-100)	53	NA	NA	66	NA
94SB40(100-125)	51	NA	NA	88	NA

*Other analyses (Appendix #): D=USGS-EDXRF, F=CHEMEX, G=XRAL, H=ACZ, ---- = none.

Appendix F. Chemical composition of samples analyzed by ICP-AES at CHEMEX Labs in Reno, NV using nitric acid-aqua regia dissolution (Appendix_F.xls, Appendix_F.dbf).

Sample No.	Site ID	Depth interval, top (cm)	Depth interval, bottom (cm)	Size fraction (mm)	*wt % of size fraction	**Other analyses (Appendix #)	Ag (ppm)	Al (%)	As (ppm)	Ba (ppm)	Be (ppm)	Bi (ppm)	Ca (%)	Cd (ppm)	Co (ppm)
SAMPLE_NO.	SITE_ID	INT_TOP_CM	INT_BT_M_CM	SIZFRAC_MM	WT%SZFRAC	OTHR_ANALYS	AG_PPM	AL_%	AS_PPM	BA_PPM	BE_PPM	BI_PPM	CA_%	CD_PPM	CO_PPM
93ABM02(0-10)	93ABM02	0	10	<0.83	100%	D	12.8	0.63	140	270	<0.5	<2	0.15	20.5	12
93ABM02(11-22)	93ABM02	11	22	<0.83	100%	D, G	12.8	0.67	152	260	<0.5	<2	0.13	19.5	12
93ABM02(22-36)	93ABM02	22	36	<0.83	100%	D	14.2	0.66	332	280	<0.5	<2	0.12	50.0	17
93ABM02(36-44)	93ABM02	36	44	<0.83	100%	D	10.8	0.44	194	180	<0.5	<2	0.07	17.5	20
93ABM02(44-66)	93ABM02	44	66	<0.83	100%	D	13.0	0.52	318	290	<0.5	<2	0.07	16.0	16
93ABM02(66-85)	93ABM02	66	85	<0.83	100%	D	12.2	0.46	52	200	<0.5	<2	0.09	9.0	9
93ABM02(85-97)	93ABM02	85	97	<0.83	100%	D	9.2	0.81	60	260	<0.5	<2	0.09	33.0	8
93ABM02(97-110)	93ABM02	97	110	<0.83	100%	D	<0.2	1.83	4	130	0.5	2	0.10	6.5	5
93ABM02(110-126)	93ABM02	110	126	<0.83	100%	D	0.2	1.90	4	120	0.5	<2	0.10	7.5	6
93ABM02(0-97)	93ABM02	0	97	<0.83	100%	D	11.8	0.67	166	240	<0.5	<2	0.09	24.0	13
93ABM02(97-126)	93ABM02	97	126	<0.83	100%	D	<0.2	1.70	4	120	0.5	<2	0.09	6.5	5
93ABM02(0-97)L	93ABM02	0	97	<0.83	100%	D	12.2	0.46	218	220	<0.5	<2	0.09	27.0	14
93ABM02(97-129)L	93ABM02	97	129	<0.83	100%	D	0.2	1.89	14	120	0.5	2	0.10	7.5	6
93ABM04(0-12)	93ABM04	0	12	<0.83	100%	D	12.8	0.81	120	310	<0.5	<2	0.15	24.5	12
93ABM04(13-18)	93ABM04	13	18	<0.83	100%	D	12.8	1.23	134	350	<0.5	<2	0.15	20.0	11
93ABM04(22-27)	93ABM04	22	27	<0.83	100%	D	11.8	0.75	188	270	<0.5	<2	0.09	44.5	19
93ABM04(32-37)	93ABM04	32	37	<0.83	100%	D	12.2	0.96	170	300	<0.5	<2	0.08	20.5	13
93ABM04(42-48)	93ABM04	42	48	<0.83	100%	D	11.8	0.57	252	300	<0.5	<2	0.14	22.5	21
93ABM04(48-76)	93ABM04	48	76	<0.83	100%	D	24.2	1.12	198	600	<0.5	<2	0.11	22.0	12
93ABM04(76-142)	93ABM04	76	142	<0.83	100%	D, G	0.8	2.09	6	240	0.5	<2	0.08	4.0	9
93ABM06A	93ABM06			<0.83	100%	D	6.0	1.84	92	250	<0.5	<2	0.17	9.0	22
93ABM06B	93ABM06			<0.83	100%	D	0.2	2.51	8	150	0.5	<2	0.04	0.5	4
93ABL08(0-5)	93ABL08	0	5	<0.83	100%	D	13.2	0.77	260	230	<0.5	<2	0.14	20.5	19
93ABL09(0-83)	93ABL09	0	83	<0.83	100%	D	14.0	0.41	104	130	<0.5	<2	0.22	32.5	8
93SBC10(0-3)	93SBC10	0	3	<0.83	100%	D	10.8	1.40	106	250	<0.5	<2	0.17	15.5	12
93SBC10(3-30)	93SBC10	3	30	<0.83	100%	D	13.4	1.17	198	270	<0.5	<2	0.09	16.0	14
93SBC10(30-70)	93SBC10	30	70	<0.83	100%	D	25.6	0.99	72	510	<0.5	<2	0.10	20.0	12
93SBC10(70-90)	93SBC10	70	90	<0.83	100%	D, G	29.2	1.05	92	320	<0.5	<2	0.16	14.5	11
93SBC10(90-100)	93SBC10	90	100	<0.83	100%	D	31.4	0.78	36	370	<0.5	<2	0.08	15.0	8
93SBC10(100-130)	93SBC10	100	130	<0.83	100%	D	1.0	1.82	16	240	0.5	<2	0.14	24.5	9
93SBC10(130-160)	93SBC10	130	160	<0.83	100%	D	<0.2	2.18	2	300	1.0	<2	0.13	39.5	10
93SBR13(0-15)	93SBR13	0	15	<0.83	100%	D	15.0	1.32	112	370	<0.5	<2	0.15	33.5	14
93SBR13(16-52)	93SBR13	16	52	<0.83	100%	D	15.6	0.91	100	310	<0.5	<2	0.17	24.5	10

* Wt % of size fraction: as % by weight of bulk sample (nm =not measured)

** Other analyses (Appendix #): D =USGS-EDXRF, E =EWU, G =XRAL, ---- = none.

Appendix F. Chemical composition of samples analyzed by ICP-AES at CHEMEX Labs in Reno, NV using nitric acid-aqua regia dissolution (Appendix_F.xls, Appendix_F.dbf).

Sample No.	Cr (ppm)	Cu (ppm)	Fe (%)	Ga (ppm)	Hg (ppm)	K (%)	La (ppm)	Mg (%)	Mn (ppm)	Mo (ppm)	Na (%)	Ni (ppm)	P (ppm)	Pb (ppm)	Sb (ppm)	Sc (ppm)	Sr (ppm)	Ti (%)	Tl (ppm)
SAMPLE_NO.	CR_PPM	CU_PPM	FE_%	GA_PPM	HG_PPM	K_%	LA_PPM	MG_%	MN_PPM	MO_PPM	NA_%	NI_PPM	P_PPM	PB_PPM	SB_PPM	SC_PPM	SR_PPM	TI_%	TL_PPM
93ABM02(0-10)	87	147	9.85	<10	3	0.18	10	0.44	8550	4	0.01	10	320	3752	32	2	6	0.01	<10
93ABM02(11-22)	55	139	9.23	<10	6	0.17	10	0.33	7920	3	<0.01	11	340	3592	34	2	7	0.01	<10
93ABM02(22-36)	65	165	11.54	<10	4	0.18	10	0.26	9245	3	<0.01	14	420	3862	46	3	6	<0.01	<10
93ABM02(36-44)	85	120	9.06	<10	2	0.17	10	0.17	8480	6	<0.01	10	180	3136	36	2	6	<0.01	<10
93ABM02(44-66)	37	143	11.38	<10	3	0.16	10	0.17	8930	2	<0.01	12	240	4450	42	3	6	<0.01	<10
93ABM02(66-85)	34	121	8.44	<10	3	0.15	10	0.21	7705	2	<0.01	9	220	5526	34	2	7	<0.01	<10
93ABM02(85-97)	37	98	7.41	<10	2	0.14	20	0.26	5450	2	<0.01	12	390	4168	24	2	6	0.01	<10
93ABM02(97-110)	55	36	2.07	<10	<1	0.17	30	0.48	165	2	0.01	13	550	80	2	3	6	0.02	<10
93ABM02(110-126)	44	36	2.23	<10	<1	0.17	30	0.47	240	2	0.01	13	590	64	<2	3	6	0.02	<10
93ABM02(0-97)	83	127	9.18	<10	4	0.16	10	0.24	7680	5	<0.01	13	320	4340	36	2	6	<0.01	<10
93ABM02(97-126)	41	23	2.00	<10	<1	0.15	20	0.45	150	1	0.01	12	520	68	<2.0	2	5	0.01	<10
93ABM02(0-97)L	18	122	9.80	<10	3	0.10	10	0.21	8100	1	<0.01	12	290	4370	34	2	6	<0.01	<10
93ABM02(97-129)L	33	20	2.17	<10	<1	0.13	30	0.48	175	1	0.01	13	580	54	2	3	6	0.02	<10
93ABM04(0-12)	261	127	10.08	<10	4	0.30	10	0.46	8845	15	0.01	13	320	3638	36	3	7	<0.01	<10
93ABM04(13-18)	280	153	9.84	<10	6	0.47	20	0.46	8430	15	0.02	13	360	3574	36	3	9	0.01	<10
93ABM04(22-27)	259	125	10.07	<10	3	0.29	10	0.26	9005	17	0.01	14	230	3668	40	2	7	<0.01	<10
93ABM04(32-37)	252	125	10.96	<10	3	0.42	10	0.22	9470	13	0.01	14	200	3200	42	3	9	<0.01	<10
93ABM04(42-48)	260	125	11.43	<10	3	0.23	10	0.33	9775	17	0.01	13	180	3568	40	2	6	<0.01	<10
93ABM04(48-76)	109	188	12.31	<10	6	0.36	20	0.24	>10000	6	0.01	16	380	9284	50	4	10	0.01	<10
93ABM04(76-142)	222	28	2.32	10	<1	0.36	30	0.47	1090	12	0.03	14	510	374	6	4	9	0.02	<10
93ABM06A	334	60	5.96	<10	<1	0.58	20	0.43	5160	17	0.05	15	450	2798	20	4	21	0.03	<10
93ABM06B	203	21	2.32	10	<1	0.42	40	0.49	160	13	0.03	14	510	78	4	4	7	0.03	10
93ABL08(0-5)	15	160	8.96	<10	3	0.12	20	0.27	6690	1	<0.01	16	320	4486	38	3	10	0.01	<10
93ABL09(0-83)	16	146	9.75	<10	5	0.08	10	0.47	8700	1	<0.01	9	240	3552	36	2	8	<0.01	<10
93SBC10(0-3)	213	132	5.58	<10	4	0.34	30	0.36	4020	12	0.02	14	570	3282	36	3	12	0.02	<10
93SBC10(3-30)	257	150	7.89	<10	4	0.31	20	0.32	6200	16	0.01	13	380	3734	46	3	9	0.01	<10
93SBC10(30-70)	179	267	9.83	<10	10	0.27	20	0.36	8640	10	0.01	13	280	>10000	56	3	9	0.01	<10
93SBC10(70-90)	270	317	10.14	<10	12	0.28	10	0.53	8815	16	0.01	13	290	>10000	58	3	9	0.01	<10
93SBC10(90-100)	81	262	10.40	<10	13	0.17	20	0.32	9190	4	<0.01	10	240	>10000	62	2	5	0.01	<10
93SBC10(100-130)	193	86	2.16	<10	<1	0.32	30	0.53	965	10	0.02	14	470	682	4	3	12	0.02	<10
93SBC10(130-160)	37	39	2.40	10	<1	0.22	30	0.56	800	1	0.01	14	560	70	4	4	17	0.03	<10
93SBR13(0-15)	322	199	9.25	<10	6	0.40	20	0.45	8005	18	0.02	14	470	5002	42	3	9	0.01	<10
93SBR13(16-52)	208	172	10.12	<10	7	0.33	10	0.51	9145	10	0.01	11	230	5436	44	3	8	0.01	<10

* Wt % of size fraction: as % by weight of bulk sample (nm =not measured)

** Other analyses (Appendix #): D =USGS-EDXRF, E =EWU, G =XRAL, ---- = none.

Appendix F. Chemical composition of samples analyzed by ICP-AES at CHEMEX Labs in Reno, NV using nitric acid-aqua regia dissolution (Appendix_F.xls, Appendix_F.dbf).

Sample No.	U (ppm)	V (ppm)	W (ppm)	Zn (ppm)
SAMPLE_NO.	U_PPM	V_PPM	W_PPM	ZN_PPM
93ABM02(0-10)	10	12	10	3240
93ABM02(11-22)	10	12	10	3310
93ABM02(22-36)	20	13	10	5578
93ABM02(36-44)	10	9	<10	2376
93ABM02(44-66)	10	11	<10	2748
93ABM02(66-85)	10	9	<10	1676
93ABM02(85-97)	<10	12	10	3026
93ABM02(97-110)	<10	18	<10	596
93ABM02(110-126)	<10	19	<10	490
93ABM02(0-97)	10	12	<10	3040
93ABM02(97-126)	<10	17	<10	530
93ABM02(0-97)L	10	10	<10	3300
93ABM02(97-129)L	<10	19	<10	558
93ABM04(0-12)	10	14	<10	4064
93ABM04(13-18)	20	17	<10	2732
93ABM04(22-27)	10	13	10	6016
93ABM04(32-37)	10	14	<10	3604
93ABM04(42-48)	20	12	<10	2974
93ABM04(48-76)	10	17	<10	4282
93ABM04(76-142)	<10	21	<10	382
93ABM06A	10	29	<10	1112
93ABM06B	<10	28	<10	136
93ABL08(0-5)	<10	12	<10	3398
93ABL09(0-83)	10	9	10	5070
93SBC10(0-3)	<10	21	<10	1870
93SBC10(3-30)	10	17	<10	2266
93SBC10(30-70)	20	15	<10	3398
93SBC10(70-90)	20	16	<10	2634
93SBC10(90-100)	10	12	10	2502
93SBC10(100-130)	<10	20	<10	1080
93SBC10(130-160)	<10	22	<10	1446
93SBR13(0-15)	10	19	10	4506
93SBR13(16-52)	10	15	10	4098

* Wt % of size fraction: as % by weight of bulk sample (nm =not measured)

** Other analyses (Appendix #): D =USGS-EDXRF, E =EWU, G =XRAL, ---- = none.

Appendix F. Chemical composition of samples analyzed by ICP-AES at CHEMEX Labs in Reno, NV using nitric acid-aqua regia dissolution (Appendix_F.xls, Appendix_F.dbf).

Sample No.	Site ID	Depth interval, top (cm)	Depth interval, bottom (cm)	Size fraction (mm)	*wt % of size fraction	**Other analyses (Appendix #)	Ag (ppm)	Al (%)	As (ppm)	Ba (ppm)	Be (ppm)	Bi (ppm)	Ca (%)	Cd (ppm)	Co (ppm)
SAMPLE_NO.	SITE_ID	INT_TOP_CM	INT_BTMM_CM	SIZFRAC_MM	WT%SZFRAC	OTHR_ANALYS	AG_PPM	AL_%	AS_PPM	BA_PPM	BE_PPM	BI_PPM	CA_%	CD_PPM	CO_PPM
93SBR13(57-65)	93SBR13	57	65	<0.83	100%	D	14.8	1.51	112	460	<0.5	<2	0.04	19.0	17
93SBR13(221-237)	93SBR13	221	237	<0.83	100%	D	45.0	1.20	50	660	<0.5	<2	0.13	27.0	8
93SBR13(237-251)	93SBR13	237	251	<0.83	100%	D	26.8	1.26	46	660	<0.5	<2	0.11	23.0	9
93SBR13(251-291)	93SBR13	251	291	<0.83	100%	D	23.2	1.44	64	800	<0.5	<2	0.09	25.0	11
93SBM14	93SBM14				nm	D	0.2	2.67	2	160	0.5	<2	0.13	<0.5	6
93SBC16(0-5)	93SBC16	0	5	<0.83	nm	D	5.6	0.70	88	100	<0.5	<2	0.09	6.0	8
93SBK17(25-68)	93SBK17	25	68	<0.83	nm	D, G	54.2	0.41	58	120	<0.5	<2	0.20	70.5	13
93SBK17(68-106)	93SBK17	68	106	<0.83	nm	D	171.0	0.84	118	140	<0.5	<2	0.06	39.5	10
93SBK17(106-152)	93SBK17	106	152	<0.83	nm	D, G	4.4	1.88	16	290	<0.5	<2	0.07	36.0	29
93SBK17(152-230)	93SBK17	152	230	<0.83	nm	D	2.8	1.19	24	160	<0.5	<2	0.08	19.5	9
93SBK18(7-10)	93SBK18	7	10	<0.83	nm	D, G	55.6	1.18	80	410	<0.5	<2	0.14	47.0	14
93SBK18(10-26)	93SBK18	10	26	<0.83	nm	D	80.4	1.32	66	420	<0.5	<2	0.17	47.5	10
93SBK18(82-92)	93SBK18	82	92	<0.83	nm	D	12.0	0.62	216	280	<0.5	<2	0.14	21.5	14
93SBK18(92-109)	93SBK18	92	109	<0.83	nm	D	<0.2	2.03	12	290	0.5	2	0.09	64.0	12
93SBK18(109-160)	93SBK18	109	160	<0.83	nm	D	0.4	1.57	12	170	0.5	2	0.08	23.0	9
93SBB20(0-5)	93SBB20	0	5	<0.83	100%	D, G	11.8	0.82	304	260	<0.5	<2	0.10	22.0	13
93SBB22(0-4)	93SBB22	0	4	<0.83	100%	D	4.6	1.20	18	160	<0.5	<2	0.34	4.5	6
93SBB22(4.5-7.5)	93SBB22	5	8	<0.83	100%	D	11.2	1.32	42	320	<0.5	<2	0.16	6.0	6
93SBB22(7.5-12)	93SBB22	8	12	<0.83	100%	D	13.8	0.88	248	280	<0.5	<2	0.12	13.5	7
93SBB22(12-15)	93SBB22	12	15	<0.83	100%	D	13.2	0.95	460	240	<0.5	<2	0.10	29.0	20
93SBB22(15-19)	93SBB22	15	19	<0.83	100%	D	12.8	0.81	246	280	<0.5	<2	0.10	10.5	13
93SBB22(19-26)	93SBB22	19	26	<0.83	100%	D, G	20.0	0.91	156	480	<0.5	<2	0.10	8.0	9
93SBB22(26-29)	93SBB22	26	29	<0.83	100%	D	41.6	1.49	78	750	<0.5	<2	0.12	4.0	6
93SBB22(29-36)	93SBB22	29	36	<0.83	100%	D	0.4	3.04	4	200	1.0	<2	0.15	18.0	9
93SBB22(36-48)	93SBB22	36	48	<0.83	100%	D	0.2	3.65	8	270	1.0	<2	0.11	5.0	6
93SBB22(48-60)	93SBB22	48	60	<0.83	100%	D	0.2	3.64	6	280	0.5	<2	0.09	3.0	6
93SBB22(60-82)	93SBB22	60	82	<0.83	100%	D	<0.2	2.53	4	190	0.5	2	0.07	<0.5	5
93SBB23(0-5)	93SBB23	0	5	<0.83	100%	D	12.0	0.68	200	260	<0.5	<2	0.10	15.5	13
93SBB23(5-12)	93SBB23	5	12	<0.83	100%	D	11.0	0.49	122	250	<0.5	<2	0.23	17.5	9
93SBB23(12-17)	93SBB23	12	17	<0.83	100%	D	11.0	0.67	256	250	<0.5	<2	0.04	28.5	15
93SBB23(17-22)	93SBB23	17	22	<0.83	100%	D	12.4	0.63	270	260	<0.5	<2	0.03	16.5	15
93SBB23(22-30)	93SBB23	22	30	<0.83	100%	D	12.4	0.59	136	300	<0.5	<2	0.03	17.5	15
93SBB23(30-46)	93SBB23	30	46	<0.83	100%	D	13.4	0.59	106	260	<0.5	<2	0.08	17.0	11

* Wt % of size fraction: as % by weight of bulk sample (nm =not measured)

** Other analyses (Appendix #): D =USGS-EDXRF, E =EWU, G =XRAL, ---- = none.

Appendix F. Chemical composition of samples analyzed by ICP-AES at CHEMEX Labs in Reno, NV using nitric acid-aqua regia dissolution (Appendix_F.xls, Appendix_F.dbf).

Sample No.	Cr (ppm)	Cu (ppm)	Fe (%)	Ga (ppm)	Hg (ppm)	K (%)	La (ppm)	Mg (%)	Mn (ppm)	Mo (ppm)	Na (%)	Ni (ppm)	P (ppm)	Pb (ppm)	Sb (ppm)	Sc (ppm)	Sr (ppm)	Ti (%)	Tl (ppm)
SAMPLE_NO.	CR_PPM	CU_PPM	FE_%	GA_PPM	HG_PPM	K_%	LA_PPM	MG_%	MN_PPM	MO_PPM	NA_%	NI_PPM	P_PPM	PB_PPM	SB_PPM	SC_PPM	SR_PPM	TI_%	TL_PPM
93SBR13(57-65)	314	153	10.60	<10	4	0.54	20	0.20	9240	19	0.03	14	330	6342	44	4	8	0.01	<10
93SBR13(221-237)	236	420	11.57	<10	15	0.41	10	0.38	9230	12	0.01	12	250	>10000	86	3	9	0.01	<10
93SBR13(237-251)	268	271	14.03	<10	11	0.45	10	0.27	>10000	14	0.02	19	230	>10000	52	4	9	0.01	<10
93SBR13(251-291)	363	225	12.40	<10	12	0.56	20	0.23	>10000	18	0.02	17	250	>10000	50	4	10	0.01	<10
93SBM14	41	29	1.42	10	<1	0.52	40	0.39	110	1	0.01	14	80	40	2	4	10	<0.01	<10
93SBC16(0-5)	196	60	5.14	<10	<1	0.23	20	0.31	3450	11	0.01	9	320	1988	26	1	7	<0.01	<10
93SBK17(25-68)	164	492	14.36	<10	20	0.20	<10	0.51	>10000	11	<0.01	11	170	>10000	102	3	9	<0.01	<10
93SBK17(68-106)	7	498	11.49	<10	20	0.10	10	0.18	6045	1	<0.01	4	460	>10000	228	3	35	0.01	<10
93SBK17(106-152)	140	53	2.74	<10	1	0.34	30	0.32	5665	7	0.01	12	600	3620	16	4	9	0.02	<10
93SBK17(152-230)	186	39	2.96	<10	<1	0.35	20	0.27	2825	11	0.01	11	340	1182	10	2	10	<0.01	<10
93SBK18(7-10)	319	480	12.67	<10	15	0.33	20	0.30	>10000	20	0.04	15	360	>10000	112	4	14	0.02	<10
93SBK18(10-26)	98	599	11.56	<10	20	0.31	20	0.44	9085	7	0.01	15	460	>10000	146	4	23	0.02	<10
93SBK18(82-92)	157	119	10.98	<10	4	0.23	10	0.37	9260	9	0.01	13	330	3020	40	2	7	<0.01	<10
93SBK18(92-109)	182	21	1.79	<10	<1	0.34	30	0.37	885	12	0.01	14	350	258	6	4	12	0.02	<10
93SBK18(109-160)	322	20	2.11	<10	<1	0.57	30	0.25	890	18	0.02	11	310	216	6	3	11	0.01	<10
93SBB20(0-5)	101	122	11.02	<10	3	0.20	20	0.23	8110	6	0.01	12	540	3214	42	3	7	0.01	<10
93SBB22(0-4)	454	61	2.85	<10	1	0.23	10	0.30	1740	25	0.25	14	600	1288	14	2	30	0.06	<10
93SBB22(4.5-7.5)	457	197	7.19	<10	2	0.37	20	0.39	5355	25	0.06	14	450	2662	34	3	12	0.01	<10
93SBB22(7.5-12)	136	144	10.25	<10	1	0.23	10	0.38	6490	8	0.01	8	470	3644	44	3	6	<0.01	<10
93SBB22(12-15)	132	170	12.25	10	<1	0.28	10	0.27	4595	8	0.01	14	450	3538	52	3	6	<0.01	<10
93SBB22(15-19)	169	136	11.09	<10	<1	0.25	10	0.28	4925	11	0.01	14	320	4448	34	3	6	<0.01	<10
93SBB22(19-26)	67	161	11.31	<10	1	0.24	10	0.29	3755	4	0.01	12	380	7908	42	3	8	0.01	<10
93SBB22(26-29)	167	221	7.91	<10	6	0.38	20	0.36	3460	9	0.02	11	530	>10000	70	3	13	0.01	<10
93SBB22(29-36)	91	64	1.82	10	<1	0.26	40	0.38	1285	4	0.02	20	410	642	4	4	16	0.03	<10
93SBB22(36-48)	577	188	2.15	10	<1	0.88	30	0.46	505	35	0.08	17	170	68	6	7	17	0.06	<10
93SBB22(48-60)	523	145	2.41	10	<1	1.08	40	0.51	290	31	0.09	17	210	32	2	7	16	0.06	<10
93SBB22(60-82)	219	32	2.20	10	<1	0.63	40	0.46	160	12	0.05	13	280	34	4	4	11	0.03	<10
93SBB23(0-5)	156	126	9.62	<10	<1	0.24	10	0.24	7875	11	0.01	10	330	3390	34	2	6	<0.01	<10
93SBB23(5-12)	144	106	9.62	<10	<1	0.19	10	0.42	8255	8	<0.01	8	230	2162	30	2	8	<0.01	<10
93SBB23(12-17)	175	147	9.94	<10	<1	0.26	10	0.14	8325	12	0.01	13	210	3414	34	2	4	<0.01	<10
93SBB23(17-22)	135	139	10.12	<10	1	0.23	10	0.14	8230	9	0.01	12	210	4032	36	2	4	<0.01	<10
93SBB23(22-30)	113	150	10.85	<10	<1	0.22	10	0.15	9040	8	<0.01	12	210	4518	34	2	4	<0.01	<10
93SBB23(30-46)	86	146	10.11	<10	1	0.21	10	0.20	8545	5	<0.01	13	200	5486	36	2	8	<0.01	<10

* Wt % of size fraction: as % by weight of bulk sample (nm =not measured)

** Other analyses (Appendix #): D =USGS-EDXRF, E =EWU, G =XRAL, ---- = none.

Appendix F. Chemical composition of samples analyzed by ICP-AES at CHEMEX Labs in Reno, NV using nitric acid-aqua regia dissolution (Appendix_F.xls, Appendix_F.dbf).

Sample No.	U (ppm)	V (ppm)	W (ppm)	Zn (ppm)
SAMPLE_NO.	U_PPM	V_PPM	W_PPM	ZN_PPM
93SBR13(57-65)	10	21	<10	4224
93SBR13(221-237)	10	16	10	5702
93SBR13(237-251)	10	20	<10	5448
93SBR13(251-291)	20	20	<10	5334
93SBM14	<10	17	<10	104
93SBC16(0-5)	<10	11	<10	1324
93SBK17(25-68)	20	11	10	9882
93SBK17(68-106)	<10	12	10	7282
93SBK17(106-152)	10	22	<10	1934
93SBK17(152-230)	<10	15	<10	1354
93SBK18(7-10)	20	21	<10	6244
93SBK18(10-26)	10	20	10	6536
93SBK18(82-92)	20	12	<10	2866
93SBK18(92-109)	<10	22	10	5434
93SBK18(109-160)	<10	18	<10	1654
93SBB20(0-5)	10	16	<10	3138
93SBB22(0-4)	<10	31	<10	504
93SBB22(4.5-7.5)	<10	21	<10	1012
93SBB22(7.5-12)	<10	13	<10	1882
93SBB22(12-15)	<10	13	<10	3798
93SBB22(15-19)	<10	12	<10	3128
93SBB22(19-26)	<10	13	<10	3210
93SBB22(26-29)	<10	19	<10	1694
93SBB22(29-36)	<10	27	<10	1106
93SBB22(36-48)	<10	43	<10	446
93SBB22(48-60)	<10	45	<10	278
93SBB22(60-82)	<10	30	<10	118
93SBB23(0-5)	10	11	<10	2356
93SBB23(5-12)	10	10	<10	3126
93SBB23(12-17)	10	11	<10	4290
93SBB23(17-22)	10	10	<10	3614
93SBB23(22-30)	10	11	<10	2700
93SBB23(30-46)	10	11	<10	2426

* Wt % of size fraction: as % by weight of bulk sample (nm =not measured)

** Other analyses (Appendix #): D =USGS-EDXRF, E =EWU, G =XRAL, ---- = none.

Appendix F. Chemical composition of samples analyzed by ICP-AES at CHEMEX Labs in Reno, NV using nitric acid-aqua regia dissolution (Appendix_F.xls, Appendix_F.dbf).

Sample No.	Site ID	Depth interval, top (cm)	Depth interval, bottom (cm)	Size fraction (mm)	*wt % of size fraction	**Other analyses (Appendix #)	Ag (ppm)	Al (%)	As (ppm)	Ba (ppm)	Be (ppm)	Bi (ppm)	Ca (%)	Cd (ppm)	Co (ppm)
SAMPLE_NO.	SITE_ID	INT_TOP_CM	INT_BT_M_CM	SIZFRAC_MM	WT%SZFRAC	OTHR_ANALYS	AG_PPM	AL_%	AS_PPM	BA_PPM	BE_PPM	BI_PPM	CA_%	CD_PPM	CO_PPM
93SBB23(46-53)	93SBB23	46	53	<0.83	100%	D, G	16.0	0.83	166	440	<0.5	<2	0.12	34.5	15
93SBB23(53-86)	93SBB23	53	86	<0.83	100%	D	0.2	2.07	2	170	0.5	<2	0.11	4.0	8
93SBB23(86-117)	93SBB23	86	117	<0.83	100%	D	<0.2	2.13	6	140	0.5	<2	0.10	0.5	8
93SBL26(0-6)	93SBL26	0	6	<0.83	100%	D, G	10.4	2.53	66	310	<0.5	<2	0.26	11.0	8
93SBL26(6-12)	93SBL26	6	12	<0.83	100%	D	13.2	1.64	158	230	<0.5	<2	0.20	54.5	21
93SBL26(12-20)	93SBL26	12	20	<0.83	100%	D	14.4	1.51	138	270	<0.5	<2	0.24	27.5	18
93SBL26(20-28)	93SBL26	20	28	<0.83	100%	D	21.2	2.29	26	360	<0.5	<2	0.19	14.5	7
93SBL26(28-34)	93SBL26	28	34	<0.83	100%	D	2.8	2.07	52	230	<0.5	<2	0.33	18.5	7
93SBL26(34-47)	93SBL26	34	47	<0.83	100%	D	0.6	1.99	14	180	<0.5	<2	0.50	1.5	3
93SBL26(47-58)	93SBL26	47	58	<0.83	100%	D	0.8	2.63	22	200	<0.5	<2	0.51	3.0	4
93SBL27B(0-4)	93SBL27B	0	4	<0.83	100%	D	12.8	1.42	116	360	<0.5	<2	0.19	24.5	11
93SBL27B(4-16)	93SBL27B	4	16	<0.83	100%	D	14.2	0.70	138	310	<0.5	<2	0.12	25.0	13
93SBL27B(16-23)	93SBL27B	16	23	<0.83	100%	D	13.8	1.05	320	340	<0.5	<2	0.11	37.5	15
93SBL27B(23-34)	93SBL27B	23	34	<0.83	100%	D	13.2	0.81	250	300	<0.5	<2	0.09	19.5	15
93SBL27B(34-43)	93SBL27B	34	43	<0.83	100%	D	13.4	0.93	120	370	<0.5	<2	0.14	19.5	13
93SBL27B(43-53)	93SBL27B	43	53	<0.83	100%	D	13.8	0.77	100	300	<0.5	<2	0.16	16.0	10
93SBL27B(53-69)	93SBL27B	53	69	<0.83	100%	D	13.6	0.78	130	440	<0.5	<2	0.15	10.0	8
93SBL27B(69-85)	93SBL27B	69	85	<0.83	100%	D	10.0	1.54	20	280	<0.5	<2	0.11	14.5	7
93SBL28(0-11)	93SBL28	0	11	<0.83	100%	D	13.8	2.20	154	310	<0.5	<2	0.17	56.0	9
93SBL28(11-16)	93SBL28	11	16	<0.83	100%	D	9.6	1.95	106	260	<0.5	<2	0.17	5.5	6
93SBL28(16-25)	93SBL28	16	25	<0.83	100%	D	17.4	1.39	318	260	<0.5	<2	0.17	48.0	25
93SBL28(25-34)	93SBL28	25	34	<0.83	100%	D	12.2	1.03	234	200	<0.5	<2	0.33	18.5	18
93SBL28(34-37)	93SBL28	34	37	<0.83	100%	D	12.4	1.58	120	250	<0.5	<2	0.37	20.0	16
93SBL28(37-41)	93SBL28	37	41	<0.83	100%	D	17.8	2.31	38	370	<0.5	<2	0.19	23.5	10
93SBL28(41-46)	93SBL28	41	46	<0.83	100%	D	21.2	2.50	16	400	<0.5	<2	0.13	10.0	6
93SBL28C(0-25)	93SBL28C	0	25	<0.83	100%	D	4.8	1.19	292	230	<0.5	<2	0.36	12.5	11
93SBL28C(25-28)	93SBL28C	25	28	<0.83	100%	D	15.8	2.29	210	310	<0.5	<2	0.16	19.0	8
93SBL28C(28-37)	93SBL28C	28	37	<0.83	100%	D	14.8	1.35	308	240	<0.5	<2	0.17	37.0	21
93SBL28C(37-48)	93SBL28C	37	48	<0.83	100%	D	12.2	1.03	198	260	<0.5	<2	0.37	18.5	18
93SBL28C(48-54)	93SBL28C	48	54	<0.83	100%	D	14.8	1.33	86	290	<0.5	<2	0.31	22.5	13
93SBL28C(54-64)	93SBL28C	54	64	<0.83	100%	D	17.4	2.34	26	320	<0.5	<2	0.14	12.5	7
93SBL28C(64-72)	93SBL28C	64	72	<0.83	100%	D	1.0	1.80	82	180	<0.5	<2	0.17	20.0	8
93SBL28C(72-83)	93SBL28C	72	83	<0.83	100%	D	0.2	1.45	34	140	<0.5	2	0.21	1.0	4

* Wt % of size fraction: as % by weight of bulk sample (nm =not measured)

** Other analyses (Appendix #): D =USGS-EDXRF, E =EWU, G =XRAL, ---- = none.

Appendix F. Chemical composition of samples analyzed by ICP-AES at CHEMEX Labs in Reno, NV using nitric acid-aqua regia dissolution (Appendix_F.xls, Appendix_F.dbf).

Sample No.	Cr (ppm)	Cu (ppm)	Fe (%)	Ga (ppm)	Hg (ppm)	K (%)	La (ppm)	Mg (%)	Mn (ppm)	Mo (ppm)	Na (%)	Ni (ppm)	P (ppm)	Pb (ppm)	Sb (ppm)	Sc (ppm)	Sr (ppm)	Ti (%)	Tl (ppm)
SAMPLE_NO.	CR_PPM	CU_PPM	FE_%	GA_PPM	HG_PPM	K_%	LA_PPM	MG_%	MN_PPM	MO_PPM	NA_%	NI_PPM	P_PPM	PB_PPM	SB_PPM	SC_PPM	SR_PPM	TI_%	TL_PPM
93SBB23(46-53)	90	190	11.29	<10	<1	0.29	10	0.22	9800	6	0.01	14	290	5918	40	3	13	<0.01	<10
93SBB23(53-86)	193	19	2.22	10	<1	0.35	40	0.51	290	11	0.02	16	360	62	<2	4	10	0.02	<10
93SBB23(86-117)	141	21	2.27	10	<1	0.29	40	0.50	260	8	0.01	15	290	44	4	4	10	0.02	<10
93SBL26(0-6)	492	216	3.47	10	<1	0.74	20	0.41	1440	26	0.11	17	600	2728	28	4	23	0.02	<10
93SBL26(6-12)	285	368	6.55	<10	<1	0.43	20	0.40	4730	16	0.02	27	370	4556	46	3	13	0.01	<10
93SBL26(12-20)	217	297	7.44	<10	<1	0.51	10	0.43	5950	11	0.02	18	300	4722	40	3	12	<0.01	<10
93SBL26(20-28)	255	344	4.52	<10	<1	0.49	20	0.41	3020	15	0.02	16	490	7116	32	4	15	0.02	<10
93SBL26(28-34)	216	104	2.49	<10	<1	0.31	10	0.23	915	12	0.02	16	780	1360	12	3	26	0.02	<10
93SBL26(34-47)	98	58	1.41	<10	<1	0.14	10	0.16	375	7	0.02	15	850	218	2	2	41	0.02	<10
93SBL26(47-58)	134	177	1.42	10	<1	0.24	10	0.26	445	7	0.03	19	710	242	2	3	41	0.03	<10
93SBL27B(0-4)	401	222	8.74	<10	1	0.43	20	0.44	7010	25	0.07	14	480	4250	28	3	14	0.02	<10
93SBL27B(4-16)	186	170	10.36	<10	2	0.27	10	0.34	9155	11	0.01	10	210	4464	36	2	7	<0.01	<10
93SBL27B(16-23)	179	173	11.04	<10	2	0.30	20	0.33	8540	11	0.01	14	520	4144	40	3	8	0.01	<10
93SBL27B(23-34)	113	167	10.28	<10	<1	0.25	10	0.23	8430	6	0.01	14	260	4610	38	3	9	<0.01	<10
93SBL27B(34-43)	239	179	10.22	<10	1	0.34	10	0.39	8615	14	0.01	12	230	5144	34	3	21	0.01	<10
93SBL27B(43-53)	138	165	10.11	<10	2	0.25	10	0.43	8215	8	0.01	12	270	5736	34	2	8	0.01	<10
93SBL27B(53-69)	169	142	10.94	<10	<1	0.26	10	0.46	8415	11	0.01	9	250	4860	34	3	8	<0.01	<10
93SBL27B(69-85)	117	94	2.89	<10	<1	0.28	30	0.41	1350	7	0.01	12	600	3718	18	2	9	0.02	<10
93SBL28(0-11)	317	170	6.91	10	2	0.72	20	0.39	3435	20	0.04	15	620	2936	54	4	14	0.01	<10
93SBL28(11-16)	511	168	4.48	<10	<1	0.57	20	0.37	1770	33	0.07	17	640	2608	26	3	15	0.01	<10
93SBL28(16-25)	197	228	10.32	<10	3	0.47	10	0.41	7160	12	0.02	19	430	3580	74	3	9	<0.01	<10
93SBL28(25-34)	173	151	9.87	<10	<1	0.34	10	0.47	7965	11	0.01	16	290	3870	36	3	12	<0.01	<10
93SBL28(34-37)	248	159	8.31	<10	<1	0.60	10	0.47	6950	13	0.03	17	300	4666	32	3	15	0.01	<10
93SBL28(37-41)	399	206	6.68	10	1	0.89	20	0.43	5340	23	0.03	17	340	6272	44	4	13	0.01	<10
93SBL28(41-46)	149	159	4.94	10	<1	0.77	20	0.44	3480	8	0.03	13	420	5566	32	5	12	0.01	<10
93SBL28C(0-25)	101	218	8.72	<10	<1	0.49	10	0.32	2255	7	0.09	12	1630	1944	22	1	28	0.02	<10
93SBL28C(25-28)	756	296	5.47	10	4	0.72	20	0.39	2165	40	0.05	20	670	3422	48	4	14	0.01	<10
93SBL28C(28-37)	134	229	10.91	<10	1	0.45	10	0.40	7275	8	0.02	17	370	3148	70	3	9	0.01	<10
93SBL28C(37-48)	143	177	9.84	<10	<1	0.32	10	0.48	8085	9	0.01	16	280	4200	34	3	13	0.01	<10
93SBL28C(48-54)	164	226	8.32	<10	<1	0.46	20	0.46	6910	9	0.02	14	330	5482	38	3	13	0.01	<10
93SBL28C(54-64)	72	162	3.67	10	1	0.42	20	0.39	1920	3	0.02	17	520	6566	28	4	14	0.04	<10
93SBL28C(64-72)	97	112	1.79	<10	<1	0.20	10	0.17	300	6	0.01	18	760	290	4	2	17	0.02	<10
93SBL28C(72-83)	41	116	1.42	<10	<1	0.10	10	0.13	190	3	0.01	12	780	54	2	1	21	0.02	<10

* Wt % of size fraction: as % by weight of bulk sample (nm =not measured)

** Other analyses (Appendix #): D =USGS-EDXRF, E =EWU, G =XRAL, ---- = none.

Appendix F. Chemical composition of samples analyzed by ICP-AES at CHEMEX Labs in Reno, NV using nitric acid-aqua regia dissolution (Appendix_F.xls, Appendix_F.dbf).

Sample No.	U (ppm)	V (ppm)	W (ppm)	Zn (ppm)
SAMPLE_NO.	U_PPM	V_PPM	W_PPM	ZN_PPM
93SBB23(46-53)	10	14	<10	5404
93SBB23(53-86)	<10	22	<10	656
93SBB23(86-117)	<10	23	<10	308
93SBL26(0-6)	<10	30	<10	1406
93SBL26(6-12)	<10	21	<10	6266
93SBL26(12-20)	<10	17	<10	3772
93SBL26(20-28)	<10	24	<10	2060
93SBL26(28-34)	<10	21	<10	1838
93SBL26(34-47)	<10	20	<10	182
93SBL26(47-58)	<10	23	<10	306
93SBL27B(0-4)	<10	22	<10	3428
93SBL27B(4-16)	10	12	<10	4318
93SBL27B(16-23)	10	15	<10	4790
93SBL27B(23-34)	10	12	<10	3390
93SBL27B(34-43)	10	14	<10	2502
93SBL27B(43-53)	10	13	<10	2206
93SBL27B(53-69)	10	13	<10	1812
93SBL27B(69-85)	<10	17	<10	1580
93SBL28(0-11)	<10	24	<10	2598
93SBL28(11-16)	<10	23	<10	858
93SBL28(16-25)	<10	18	<10	3884
93SBL28(25-34)	10	14	<10	3126
93SBL28(34-37)	<10	18	<10	3272
93SBL28(37-41)	<10	23	<10	3342
93SBL28(41-46)	<10	24	<10	1562
93SBL28C(0-25)	<10	17	<10	1434
93SBL28C(25-28)	<10	27	<10	1478
93SBL28C(28-37)	<10	17	<10	3774
93SBL28C(37-48)	10	14	<10	3164
93SBL28C(48-54)	<10	17	<10	3484
93SBL28C(54-64)	<10	26	<10	1788
93SBL28C(64-72)	<10	19	<10	1778
93SBL28C(72-83)	<10	18	<10	736

* Wt % of size fraction: as % by weight of bulk sample (nm =not measured)

** Other analyses (Appendix #): D =USGS-EDXRF, E =EWU, G =XRAL, ---- = none.

Appendix F. Chemical composition of samples analyzed by ICP-AES at CHEMEX Labs in Reno, NV using nitric acid-aqua regia dissolution (Appendix_F.xls, Appendix_F.dbf).

Sample No.	Site ID	Depth interval, top (cm)	Depth interval, bottom (cm)	Size fraction (mm)	*wt % of size fraction	**Other analyses (Appendix #)	Ag (ppm)	Al (%)	As (ppm)	Ba (ppm)	Be (ppm)	Bi (ppm)	Ca (%)	Cd (ppm)	Co (ppm)
SAMPLE_NO.	SITE_ID	INT_TOP_CM	INT_BT_M_CM	SIZFRAC_MM	WT%SZFRAC	OTHR_ANALYS	AG_PPM	AL_%	AS_PPM	BA_PPM	BE_PPM	BI_PPM	CA_%	CD_PPM	CO_PPM
93SBL28C(83-93)	93SBL28C	83	93	<0.83	100%	D	0.2	1.45	28	130	<0.5	<2	0.29	0.5	4
93SBL28C(93-97)	93SBL28C	93	97	<0.83	100%	D	0.6	1.81	18	140	<0.5	<2	0.28	1.0	3
93SBL31(0-6)	93SBL31	0	6	<0.83	100%	D	12.6	1.58	132	370	<0.5	<2	0.18	16.0	11
93SBL31(6.5-18)	93SBL31	7	18	<0.83	100%	D	13.8	0.88	324	310	<0.5	<2	0.11	33.0	18
93SBL31(18-23)	93SBL31	18	23	<0.83	100%	D	12.6	0.61	326	300	<0.5	<2	0.08	20.5	16
93SBL31(23-30)	93SBL31	23	30	<0.83	100%	D	12.6	0.52	274	230	<0.5	<2	0.10	14.0	15
93SBL31(30-35)	93SBL31	30	35	<0.83	100%	D	12.6	0.55	314	210	<0.5	<2	0.12	12.5	12
93SBL31(35-42)	93SBL31	35	42	<0.83	100%	D	11.2	0.38	248	150	<0.5	<2	0.11	9.0	11
93SBL31(42-48)	93SBL31	42	48	<0.83	100%	D	12.2	0.37	274	120	<0.5	<2	0.13	9.5	7
93SBL31(73-87)	93SBL31	73	87	<0.83	100%	D	12.6	0.32	334	140	<0.5	<2	0.13	10.0	7
93SBL31(130-137)	93SBL31	130	137	<0.83	100%	D	12.2	0.62	104	210	<0.5	<2	0.35	59.5	11
93SBL31(137-146)	93SBL31	137	146	<0.83	100%	D, G	11.2	0.83	90	220	<0.5	<2	0.42	74.5	14
93SBL31(146-160)	93SBL31	146	160	<0.83	100%	D	11.6	0.61	80	190	<0.5	<2	0.33	23.5	12
93SBL31(185-200)	93SBL31	185	200	<0.83	100%	D, G	12.2	1.52	74	190	<0.5	<2	0.39	25.0	13
93SBL31(200-211)	93SBL31	200	211	<0.83	100%	D	11.2	1.04	52	290	<0.5	<2	0.34	25.5	12
93SBL32(0-3)	93SBL32	0	3	<0.83	100%	D	6.8	1.50	54	250	<0.5	<2	0.27	11.5	9
93SBL32(3-10.5)	93SBL32	3	11	<0.83	100%	D	12.8	0.93	214	260	<0.5	<2	0.10	21.0	11
93SBL32(10.5-16)	93SBL32	11	16	<0.83	100%	D, G	4.8	1.91	6	310	<0.5	<2	0.08	6.0	9
93SBL32(16-24)	93SBL32	16	24	<0.83	100%	D	62.4	1.33	58	660	<0.5	<2	0.07	2.5	6
93SBL32(24-31)	93SBL32	24	31	<0.83	100%	D	1.2	1.99	12	250	<0.5	<2	0.07	3.0	8
93SBL32(31-48)	93SBL32	31	48	<0.83	100%	D	<0.2	2.01	6	190	<0.5	<2	0.07	2.0	8
93SBL34a	93SBL34			<0.83	100%	D	18.2	0.68	300	160	<0.5	<2	0.31	36.0	17
93SBL34b	93SBL34			<0.83	100%	D, E	25.2	0.83	34	280	<0.5	<2	0.12	17.0	5
93SBL34c	93SBL34			<0.83	100%	D, E	45.2	1.58	30	80	<0.5	<2	0.32	>100	11
93SBL34d	93SBL34			<0.83	100%	D, E	49.6	1.19	58	550	<0.5	<2	0.11	15.0	6
93SBL34e	93SBL34			<0.83	100%	D, E	51.0	1.41	32	130	<0.5	<2	0.35	>100	11
93SBL34f	93SBL34			<0.83	100%	D, E	40.2	1.04	66	550	<0.5	<2	0.12	18.0	7
93SBL34g	93SBL34			<0.83	100%	D, E	35.8	0.87	64	460	<0.5	<2	0.16	37.0	6
93SBL34h	93SBL34			<0.83	100%	D, E	36.4	1.18	48	110	<0.5	<2	0.45	>100	9
93SBL34i	93SBL34			<0.83	100%	D, E	35.8	0.68	48	210	<0.5	<2	0.35	28.0	7
94JE01(0-5)	94JE01	0	5	0.25-2.0	58%	----	<0.2	0.78	6	180	<0.5	<2	0.39	<0.5	2
94JE01(0-5)	94JE01	0	5	0.063-0.25	35%	----	0.2	0.72	4	130	<0.5	<2	0.19	<0.5	2
94JE01(0-5)	94JE01	0	5	<0.063	8%	----	0.6	1.37	8	260	0.5	<2	0.50	0.5	4

* Wt % of size fraction: as % by weight of bulk sample (nm =not measured)

** Other analyses (Appendix #): D =USGS-EDXRF, E =EWU, G =XRAL, ---- = none.

Appendix F. Chemical composition of samples analyzed by ICP-AES at CHEMEX Labs in Reno, NV using nitric acid-aqua regia dissolution (Appendix_F.xls, Appendix_F.dbf).

Sample No.	Cr (ppm)	Cu (ppm)	Fe (%)	Ga (ppm)	Hg (ppm)	K (%)	La (ppm)	Mg (%)	Mn (ppm)	Mo (ppm)	Na (%)	Ni (ppm)	P (ppm)	Pb (ppm)	Sb (ppm)	Sc (ppm)	Sr (ppm)	Ti (%)	Tl (ppm)
SAMPLE_NO.	CR_PPM	CU_PPM	FE_%	GA_PPM	HG_PPM	K_%	LA_PPM	MG_%	MN_PPM	MO_PPM	NA_%	NI_PPM	P_PPM	PB_PPM	SB_PPM	SC_PPM	SR_PPM	TI_%	TL_PPM
93SBL28C(83-93)	114	129	1.30	<10	<1	0.08	10	0.14	135	9	0.01	13	760	46	<2	2	30	0.01	<10
93SBL28C(93-97)	216	336	1.44	<10	<1	0.14	10	0.22	240	13	0.02	16	760	220	2	3	30	0.02	<10
93SBL31(0-6)	203	155	7.83	<10	2	0.38	20	0.45	5620	12	0.04	12	670	4554	30	3	13	0.02	<10
93SBL31(6.5-18)	117	166	11.23	<10	1	0.24	10	0.26	9120	8	0.01	15	440	3998	46	3	7	<0.01	<10
93SBL31(18-23)	152	152	12.92	<10	<1	0.21	10	0.19	>10000	10	0.01	13	250	3176	44	3	6	<0.01	<10
93SBL31(23-30)	120	140	10.95	<10	<1	0.18	10	0.21	9060	7	<0.01	12	230	3594	40	2	6	<0.01	<10
93SBL31(30-35)	154	138	10.65	<10	1	0.19	10	0.28	8665	10	0.01	11	210	3252	40	2	5	<0.01	<10
93SBL31(35-42)	64	121	9.60	<10	1	0.12	<10	0.31	7785	4	<0.01	8	160	2964	34	2	4	<0.01	<10
93SBL31(42-48)	8	111	10.03	<10	<1	0.07	<10	0.37	7700	1	<0.01	8	180	3108	38	2	4	<0.01	<10
93SBL31(73-87)	6	120	11.60	<10	<1	0.07	<10	0.42	8325	1	<0.01	8	160	3966	32	2	4	<0.01	<10
93SBL31(130-137)	140	157	10.72	<10	1	0.26	10	0.46	9010	7	0.01	10	180	4682	32	2	11	<0.01	<10
93SBL31(137-146)	173	158	8.76	10	1	0.27	10	0.45	7565	10	0.01	17	220	4482	30	2	15	0.01	<10
93SBL31(146-160)	109	143	8.94	10	1	0.21	10	0.42	7810	6	0.01	13	210	4782	32	2	13	<0.01	<10
93SBL31(185-200)	491	249	9.54	10	1	0.61	10	0.47	7980	28	0.03	18	230	5220	26	3	17	0.01	<10
93SBL31(200-211)	446	189	9.10	10	2	0.42	10	0.43	8045	23	0.02	14	170	4482	24	3	14	0.01	<10
93SBL32(0-3)	382	153	4.76	10	2	0.41	10	0.47	3865	21	0.06	14	1460	2474	12	2	18	0.02	<10
93SBL32(3-10.5)	16	137	8.93	10	<1	0.12	20	0.30	5600	1	<0.01	12	730	4790	32	3	7	0.01	<10
93SBL32(10.5-16)	16	59	2.58	10	3	0.14	30	0.40	1255	<1	<0.01	11	1170	2260	8	2	9	0.03	<10
93SBL32(16-24)	14	345	8.07	10	12	0.12	20	0.30	3270	1	0.01	8	770	>10000	82	3	9	0.02	<10
93SBL32(24-31)	15	35	2.33	10	<1	0.16	30	0.40	695	<1	0.01	11	1330	890	2	2	12	0.02	<10
93SBL32(31-48)	15	22	2.16	10	<1	0.15	30	0.40	465	<1	<0.01	11	1050	78	<2.0	3	12	0.02	<10
93SBL34a	134	145	12.00	10	2	0.24	10	0.55	>10000	8	0.01	15	290	5156	42	3	12	<0.01	<10
93SBL34b	11	214	8.37	<10	4	0.08	10	0.41	4880	1	<0.01	9	310	>10000	38	2	8	0.01	<10
93SBL34c	194	391	8.47	10	10	0.37	10	0.58	7115	11	0.02	18	360	>10000	62	4	15	0.02	<10
93SBL34d	15	271	10.05	10	8	0.12	20	0.34	2630	1	<0.01	11	480	>10000	66	4	10	0.02	<10
93SBL34e	127	398	8.53	10	12	0.29	10	0.58	7335	8	0.02	18	390	>10000	62	4	19	0.02	<10
93SBL34f	14	245	10.15	10	6	0.10	20	0.34	4150	<1	<0.01	10	440	>10000	58	3	10	0.02	<10
93SBL34g	12	267	11.15	<10	6	0.10	10	0.41	6650	1	<0.01	11	350	>10000	52	3	9	0.02	<10
93SBL34h	145	317	12.73	10	8	0.31	10	0.67	>10000	8	0.02	12	280	>10000	46	3	17	0.01	<10
93SBL34i	10	296	13.65	10	8	0.10	10	0.46	8970	<1	<0.01	10	270	>10000	52	3	14	0.01	<10
94JE01(0-5)	6	15	0.82	<10	<1	0.11	20	0.24	75	<1	<0.01	6	410	78	2	1	21	0.01	<10
94JE01(0-5)	6	13	0.92	<10	<1	0.09	20	0.19	150	<1	<0.01	6	290	64	<2	<1	13	0.01	<10
94JE01(0-5)	34	30	1.31	<10	<1	0.11	20	0.31	175	<1	0.01	18	650	132	2	2	27	0.02	<10

* Wt % of size fraction: as % by weight of bulk sample (nm =not measured)

** Other analyses (Appendix #): D =USGS-EDXRF, E =EWU, G =XRAL, ---- = none.

Appendix F. Chemical composition of samples analyzed by ICP-AES at CHEMEX Labs in Reno, NV using nitric acid-aqua regia dissolution (Appendix_F.xls, Appendix_F.dbf).

Sample No.	U (ppm)	V (ppm)	W (ppm)	Zn (ppm)
SAMPLE_NO.	U_PPM	V_PPM	W_PPM	ZN_PPM
93SBL28C(83-93)	<10	19	<10	406
93SBL28C(93-97)	<10	22	<10	378
93SBL31(0-6)	<10	22	<10	1978
93SBL31(6.5-18)	10	14	<10	4122
93SBL31(18-23)	20	11	<10	3296
93SBL31(23-30)	10	10	<10	2460
93SBL31(30-35)	10	10	<10	1844
93SBL31(35-42)	10	8	<10	1416
93SBL31(42-48)	10	8	<10	1516
93SBL31(73-87)	10	8	<10	1998
93SBL31(130-137)	10	12	<10	5280
93SBL31(137-146)	10	14	30	4506
93SBL31(146-160)	10	12	40	6792
93SBL31(185-200)	10	21	30	4438
93SBL31(200-211)	10	15	30	4394
93SBL32(0-3)	<10	28	10	1502
93SBL32(3-10.5)	<10	14	10	2220
93SBL32(10.5-16)	<10	20	10	562
93SBL32(16-24)	<10	17	20	1102
93SBL32(24-31)	<10	20	<10	308
93SBL32(31-48)	<10	20	<10	272
93SBL34a	20	12	40	5910
93SBL34b	<10	13	20	3790
93SBL34c	10	21	60	>10000
93SBL34d	<10	16	20	4160
93SBL34e	10	19	60	>10000
93SBL34f	<10	14	20	4230
93SBL34g	<10	14	30	4640
93SBL34h	20	19	70	>10000
93SBL34i	10	15	50	5868
94JE01(0-5)	<10	7	<10	86
94JE01(0-5)	<10	7	<10	104
94JE01(0-5)	<10	15	<10	146

* Wt % of size fraction: as % by weight of bulk sample (nm =not measured)

** Other analyses (Appendix #): D =USGS-EDXRF, E =EWU, G =XRAL, ---- = none.

Appendix F. Chemical composition of samples analyzed by ICP-AES at CHEMEX Labs in Reno, NV using nitric acid-aqua regia dissolution (Appendix_F.xls, Appendix_F.dbf).

Sample No.	Site ID	Depth interval, top (cm)	Depth interval, bottom (cm)	Size fraction (mm)	*wt % of size fraction	**Other analyses (Appendix #)	Ag (ppm)	Al (%)	As (ppm)	Ba (ppm)	Be (ppm)	Bi (ppm)	Ca (%)	Cd (ppm)	Co (ppm)
SAMPLE_NO.	SITE_ID	INT_TOP_CM	INT_BT_M_CM	SIZFRAC_MM	WT%SZFRAC	OTHR_ANALYS	AG_PPM	AL_%	AS_PPM	BA_PPM	BE_PPM	BI_PPM	CA_%	CD_PPM	CO_PPM
94JE02(0-5)	94JE02	0	5	0.25-2.0	88%	----	3.4	0.85	20	560	<0.5	2	1.44	3.5	45
94JE02(0-5)	94JE02	0	5	0.063-0.25	11%	----	8.2	0.90	40	750	<0.5	<2	0.96	6.5	29
94JE03(0-5)	94JE03	0	5	0.25-2.0	65%	----	4.2	0.79	24	550	<0.5	<2	1.37	4.5	49
94JE03(0-5)	94JE03	0	5	0.063-0.25	30%	----	7.0	0.59	46	610	<0.5	<2	0.65	7.0	26
94JE03(0-5)	94JE03	0	5	<0.063	5%	----	12.0	1.15	64	780	<0.5	<2	0.45	20.0	25
94JE04(0-5)	94JE04	0	5	0.25-2.0	68%	----	1.2	0.57	32	170	<0.5	<2	0.38	3.5	12
94JE04(0-5)	94JE04	0	5	0.063-0.25	29%	----	8.0	0.46	32	340	<0.5	<2	0.45	6.0	17
94JE04(0-5)	94JE04	0	5	<0.063	3%	----	13.4	0.79	86	520	<0.5	<2	0.42	13.5	19
94JE05(0-5)	94JE05	0	5	0.25-2.0	69%	----	11.8	0.61	20	170	<0.5	<2	0.37	17.0	13
94JE06A(0-5)	94JE06A	0	5	0.25-2.0	68%	----	5.8	0.85	22	150	<0.5	<2	0.15	12.0	11
94JE07(0-5)	94JE07	0	5	0.25-2.0	93%	----	<0.2	0.59	2	70	<0.5	<2	0.03	<0.5	3
94JE08(0-5)	94JE08	0	5	0.25-2.0	83%	----	6.0	0.80	90	320	<0.5	<2	1.14	8.0	36
94JE09(0-5)	94JE09	0	5	0.25-2.0	74%	----	7.0	0.73	30	300	<0.5	<2	1.11	6.5	36
94JE10(0-5)	94JE10	0	5	0.25-2.0	82%	----	13.4	0.64	28	250	<0.5	<2	0.99	13.5	30
94JE11(0-5)	94JE11	0	5	0.25-2.0	84%	----	14.8	0.57	28	130	<0.5	<2	0.44	14.0	17
94JE12(0-5)	94JE12	0	5	0.25-2.0	75%	----	8.6	1.11	16	440	0.5	<2	2.18	13.0	49
94JE13(0-5)	94JE13	0	5	0.25-2.0	74%	----	4.6	1.03	24	490	<0.5	<2	2.74	6.5	52
94JE13(0-5)	94JE13	0	5	0.063-0.25	23%	----	18.2	0.74	52	270	<0.5	<2	1.28	14.0	31
94JE13(0-5)	94JE13	0	5	<0.063	3%	----	18.4	0.97	68	230	<0.5	<2	0.52	15.5	15
94JE14(0-5)	94JE14	0	5	0.25-2.0	64%	----	2.8	0.61	48	740	0.5	<2	0.79	0.5	9
94JE15(0-5)	94JE15	0	5	0.25-2.0	92%	----	8.2	2.20	52	400	0.5	<2	7.37	2.0	197
94JE16(0-5)	94JE16	0	5	0.25-2.0	87%	----	14.2	0.73	32	250	<0.5	<2	0.95	11.0	27
94JE17(0-5)	94JE17	0	5	0.25-2.0	78%	----	18.4	0.90	32	490	<0.5	<2	2.22	11.5	59
94JE18(0-5)	94JE18	0	5	0.25-2.0	92%	----	10.6	0.79	20	420	<0.5	2	1.62	7.5	43
94JE18(0-5)	94JE18	0	5	0.063-0.25	7%	----	21.4	0.59	60	220	<0.5	<2	0.82	18.5	24
94JE19(0-5)	94JE19	0	5	0.25-2.0	89%	----	22.6	1.47	126	660	0.5	<2	5.17	1.0	125
94JE20(0-5)	94JE20	0	5	0.25-2.0	79%	----	2.4	0.77	34	240	0.5	<2	0.24	0.5	9
94JE21(0-5)	94JE21	0	5	0.25-2.0	89%	----	1.6	2.02	32	1020	0.5	<2	5.98	1.0	157
94JE22(0-5)	94JE22	0	5	0.25-2.0	85%	----	6.2	0.80	24	300	<0.5	<2	1.14	8.0	32
94JE23(0-5)	94JE23	0	5	0.25-2.0	87%	----	0.4	0.91	14	120	0.5	<2	0.16	<0.5	8
94JE24(0-5)	94JE24	0	5	0.25-2.0	89%	----	15.4	0.54	28	170	<0.5	<2	0.52	7.5	17
94JE25(0-5)	94JE25	0	5	0.25-2.0	87%	----	10.2	0.40	38	720	<0.5	<2	0.84	1.5	23
94JE26(0-5)	94JE26	0	5	0.25-2.0	87%	----	0.6	1.50	28	910	0.5	<2	4.60	1.0	122

* Wt % of size fraction: as % by weight of bulk sample (nm =not measured)

** Other analyses (Appendix #): D =USGS-EDXRF, E =EWU, G =XRAL, ---- = none.

Appendix F. Chemical composition of samples analyzed by ICP-AES at CHEMEX Labs in Reno, NV using nitric acid-aqua regia dissolution (Appendix_F.xls, Appendix_F.dbf).

Sample No.	Cr (ppm)	Cu (ppm)	Fe (%)	Ga (ppm)	Hg (ppm)	K (%)	La (ppm)	Mg (%)	Mn (ppm)	Mo (ppm)	Na (%)	Ni (ppm)	P (ppm)	Pb (ppm)	Sb (ppm)	Sc (ppm)	Sr (ppm)	Ti (%)	Tl (ppm)
SAMPLE_NO.	CR_PPM	CU_PPM	FE_%	GA_PPM	HG_PPM	K_%	LA_PPM	MG_%	MN_PPM	MO_PPM	NA_%	NI_PPM	P_PPM	PB_PPM	SB_PPM	SC_PPM	SR_PPM	TI_%	TL_PPM
94JE02(0-5)	32	214	5.02	<10	3	0.20	10	0.39	3800	10	0.04	11	400	1065	6	1	236	0.02	<10
94JE02(0-5)	33	226	5.13	<10	1	0.12	10	0.30	4780	7	0.03	11	540	1485	18	1	142	0.02	<10
94JE03(0-5)	30	203	5.99	<10	2	0.17	<10	0.36	4660	9	0.04	12	390	1655	8	1	269	0.02	<10
94JE03(0-5)	25	146	4.86	<10	<1	0.09	<10	0.25	4280	3	0.02	11	390	1670	16	1	105	0.02	<10
94JE03(0-5)	38	224	4.15	<10	2	0.12	20	0.30	7530	2	0.02	18	950	3560	16	2	30	0.04	<10
94JE04(0-5)	8	58	2.72	<10	<1	0.13	10	0.28	1810	1	0.01	9	440	982	4	2	36	<0.01	<10
94JE04(0-5)	13	97	4.59	<10	2	0.07	<10	0.25	4310	2	0.01	10	320	2340	20	1	61	0.01	<10
94JE04(0-5)	205	239	4.52	<10	1	0.08	10	0.27	5220	4	0.01	89	750	4080	42	2	25	0.03	<10
94JE05(0-5)	9	135	3.49	<10	6	0.16	10	0.15	2430	2	0.02	9	320	6450	34	1	62	0.01	<10
94JE06A(0-5)	8	78	3.48	<10	3	0.13	10	0.27	3550	1	0.01	10	360	3140	14	1	17	0.01	<10
94JE07(0-5)	5	12	1.27	<10	2	0.13	30	0.16	245	<1	<0.01	6	170	32	<2	<1	4	<0.01	<10
94JE08(0-5)	23	221	5.28	<10	2	0.24	10	0.21	2440	8	0.03	11	400	2530	28	1	198	0.01	<10
94JE09(0-5)	22	204	4.71	<10	2	0.19	10	0.20	2600	8	0.03	11	360	3930	30	1	196	0.02	<10
94JE10(0-5)	19	178	4.93	<10	4	0.17	<10	0.21	2840	7	0.03	11	380	6450	40	1	163	0.02	<10
94JE11(0-5)	9	144	3.79	<10	7	0.14	10	0.15	2510	2	0.01	8	290	6330	56	1	73	0.01	<10
94JE12(0-5)	35	271	6.30	<10	4	0.27	10	0.28	3960	16	0.06	10	400	4630	14	2	299	0.04	<10
94JE13(0-5)	40	266	6.79	10	2	0.26	10	0.46	4130	19	0.07	12	410	2150	12	2	331	0.03	<10
94JE13(0-5)	25	253	7.57	<10	3	0.13	<10	0.36	4830	9	0.03	16	350	5260	34	1	159	0.02	<10
94JE13(0-5)	35	189	3.86	<10	6	0.11	10	0.34	2810	2	0.01	23	610	5730	28	2	40	0.03	<10
94JE14(0-5)	14	71	2.35	<10	<1	0.19	10	0.24	1260	1	0.01	8	420	72	6	1	27	<0.01	<10
94JE15(0-5)	130	836	>15.00	30	4	0.51	10	0.72	9270	56	0.22	26	670	250	24	4	1235	0.08	<10
94JE16(0-5)	17	184	5.89	<10	4	0.21	10	0.34	4100	6	0.03	11	320	6270	24	1	132	0.01	<10
94JE17(0-5)	38	296	9.63	<10	10	0.21	<10	0.44	6390	15	0.06	14	380	6200	32	1	353	0.03	<10
94JE18(0-5)	27	204	7.20	<10	3	0.21	<10	0.39	5060	11	0.05	11	300	4130	22	1	256	0.02	<10
94JE18(0-5)	18	282	8.63	<10	4	0.12	<10	0.32	5620	4	0.03	15	330	6980	40	1	111	0.02	<10
94JE19(0-5)	85	723	13.80	20	<1	0.35	<10	0.57	8290	40	0.15	20	500	574	44	3	784	0.05	<10
94JE20(0-5)	7	63	3.04	<10	2	0.18	10	0.21	4100	1	<0.01	18	440	76	14	2	11	<0.01	<10
94JE21(0-5)	105	622	12.95	30	6	0.41	10	0.59	6980	47	0.19	22	680	166	8	3	1005	0.07	<10
94JE22(0-5)	21	152	5.20	<10	1	0.19	10	0.34	3690	7	0.03	10	320	3060	18	1	178	0.02	<10
94JE23(0-5)	10	28	3.51	<10	<1	0.17	30	0.12	645	1	0.01	15	440	58	2	1	25	<0.01	<10
94JE24(0-5)	10	145	6.55	<10	<1	0.13	10	0.35	4980	3	0.02	9	260	7020	24	1	77	0.01	<10
94JE25(0-5)	12	396	12.25	<10	<1	0.12	<10	0.34	8600	6	0.02	9	280	302	94	1	130	<0.01	<10
94JE26(0-5)	78	423	10.30	20	1	0.32	<10	0.46	5540	36	0.13	18	500	174	14	2	766	0.04	<10

* Wt % of size fraction: as % by weight of bulk sample (nm =not measured)

** Other analyses (Appendix #): D =USGS-EDXRF, E =EWU, G =XRAL, ---- = none.

Appendix F. Chemical composition of samples analyzed by ICP-AES at CHEMEX Labs in Reno, NV using nitric acid-aqua regia dissolution (Appendix_F.xls, Appendix_F.dbf).

Sample No.	U (ppm)	V (ppm)	W (ppm)	Zn (ppm)
SAMPLE_NO.	U_PPM	V_PPM	W_PPM	ZN_PPM
94JE02(0-5)	<10	12	<10	3650
94JE02(0-5)	<10	13	<10	2810
94JE03(0-5)	<10	12	<10	3560
94JE03(0-5)	<10	12	<10	2470
94JE03(0-5)	<10	18	<10	3910
94JE04(0-5)	<10	6	<10	1200
94JE04(0-5)	<10	7	<10	2230
94JE04(0-5)	<10	14	<10	3020
94JE05(0-5)	<10	9	<10	5380
94JE06A(0-5)	<10	10	10	2720
94JE07(0-5)	<10	4	<10	48
94JE08(0-5)	<10	10	<10	3990
94JE09(0-5)	<10	11	<10	3690
94JE10(0-5)	<10	12	<10	5490
94JE11(0-5)	<10	9	<10	5090
94JE12(0-5)	<10	24	<10	8250
94JE13(0-5)	<10	17	<10	6810
94JE13(0-5)	<10	18	<10	6160
94JE13(0-5)	<10	17	<10	4560
94JE14(0-5)	<10	7	<10	642
94JE15(0-5)	<10	32	<10	>10000
94JE16(0-5)	<10	11	<10	4980
94JE17(0-5)	<10	17	<10	7170
94JE18(0-5)	<10	13	<10	5210
94JE18(0-5)	<10	18	<10	6450
94JE19(0-5)	<10	22	<10	>10000
94JE20(0-5)	<10	9	<10	320
94JE21(0-5)	<10	28	<10	>10000
94JE22(0-5)	<10	12	<10	4300
94JE23(0-5)	<10	11	<10	156
94JE24(0-5)	<10	8	<10	2980
94JE25(0-5)	<10	4	<10	1820
94JE26(0-5)	<10	22	<10	9440

* Wt % of size fraction: as % by weight of bulk sample (nm =not measured)

** Other analyses (Appendix #): D =USGS-EDXRF, E =EWU, G =XRAL, ---- = none.

Appendix F. Chemical composition of samples analyzed by ICP-AES at CHEMEX Labs in Reno, NV using nitric acid-aqua regia dissolution (Appendix_F.xls, Appendix_F.dbf).

Sample No.	Site ID	Depth interval, top (cm)	Depth interval, bottom (cm)	Size fraction (mm)	*wt % of size fraction	**Other analyses (Appendix #)	Ag (ppm)	Al (%)	As (ppm)	Ba (ppm)	Be (ppm)	Bi (ppm)	Ca (%)	Cd (ppm)	Co (ppm)
SAMPLE_NO.	SITE_ID	INT_TOP_CM	INT_BT_M_CM	SIZFRAC_MM	WT%SZFRAC	OTHR_ANALYS	AG_PPM	AL_%	AS_PPM	BA_PPM	BE_PPM	BI_PPM	CA_%	CD_PPM	CO_PPM
94JE27(0-5)	94JE27	0	5	0.25-2.0	71%	----	0.2	0.44	34	70	<0.5	<2	0.17	0.5	5
94JE28(0-5)	94JE28	0	5	0.25-2.0	91%	----	3.8	0.56	22	120	<0.5	<2	0.29	4.0	12
94JE28(0-5)	94JE28	0	5	0.063-0.25	8%	----	17.0	0.48	76	230	<0.5	<2	0.53	10.0	20
94JE29(0-5)	94JE29	0	5	0.25-2.0	85%	----	63.2	0.75	134	430	<0.5	<2	1.46	0.5	51
94JE30(0-5)	94JE30	0	5	0.25-2.0	93%	----	7.8	0.62	32	150	<0.5	<2	0.29	5.0	17
94JE31(0-5)	94JE31	0	5	0.25-2.0	97%	----	4.0	0.68	32	170	<0.5	<2	0.49	5.0	19
94JE32(0-5)	94JE32	0	5	0.25-2.0	74%	----	0.4	0.89	50	100	<0.5	<2	0.19	1.5	18
94JE33(0-5)	94JE33	0	5	0.25-2.0	89%	----	2.0	0.62	26	80	<0.5	<2	0.12	3.0	8
94JE34(0-5)	94JE34	0	5	0.25-2.0	60%	----	10.0	0.59	40	80	<0.5	<2	0.16	8.0	9
94JE34(0-5)	94JE34	0	5	0.063-0.25	35%	----	11.8	0.53	60	170	<0.5	<2	0.21	6.0	11
94JE34(0-5)	94JE34	0	5	<0.063	5%	----	31.4	0.90	134	260	<0.5	<2	0.26	11.0	14
94JE35(0-5)	94JE35	0	5	0.25-2.0	93%	----	8.4	0.59	42	90	<0.5	<2	0.11	2.0	8
94JE36(0-5)	94JE36	0	5	0.25-2.0	43%	----	19.0	0.47	82	100	<0.5	<2	0.13	8.0	8
94JE37(0-5)	94JE37	0	5	0.25-2.0	73%	----	19.4	0.40	50	100	<0.5	<2	0.13	17.5	10
94JE37(0-5)	94JE37	0	5	0.063-0.25	22%	----	21.0	0.58	94	200	<0.5	<2	0.27	17.5	16
94JE37(0-5)	94JE37	0	5	<0.063	5%	----	43.6	1.33	134	330	0.5	<2	0.27	36.5	30
94JE38(0-5)	94JE38	0	5	0.25-2.0	76%	----	10.0	0.93	70	490	<0.5	<2	1.81	8.0	54
94JE39A(0-5)	94JE39A	0	5	0.25-2.0	94%	----	3.0	0.62	48	90	<0.5	<2	0.18	5.5	13
94JE40(0-5)	94JE40	0	5	0.25-2.0	87%	----	5.2	0.53	46	80	<0.5	<2	0.19	5.5	11
94JE41(0-5)	94JE41	0	5	0.25-2.0	9%	----	16.8	0.30	114	50	<0.5	<2	0.20	14.5	4
94JE41(0-5)	94JE41	0	5	0.063-0.25	75%	----	18.4	0.30	274	90	<0.5	<2	0.13	11.0	8
94JE41(0-5)	94JE41	0	5	<0.063	16%	----	27.0	0.37	1095	80	<0.5	2	0.17	23.5	17
94JE42(0-5)	94JE42	0	5	0.25-2.0	98%	----	<0.2	0.58	14	40	<0.5	<2	0.03	0.5	5
94JE43(0-5)	94JE43	0	5	0.25-2.0	70%	----	7.6	0.47	62	70	<0.5	<2	0.15	6.0	7
94JE44(0-5)	94JE44	0	5	0.25-2.0	74%	----	0.8	0.64	44	50	<0.5	<2	0.06	1.0	7
94JE45(0-5)	94JE45	0	5	0.25-2.0	44%	----	6.6	0.58	66	70	<0.5	<2	0.13	5.5	8
94JE46(0-5)	94JE46	0	5	0.25-2.0	54%	----	6.2	0.54	60	100	<0.5	<2	0.24	4.5	13
94JE47(0-5)	94JE47	0	5	0.25-2.0	51%	----	6.8	0.54	82	100	<0.5	<2	0.16	6.5	8
94JE48(0-5)	94JE48	0	5	0.25-2.0	91%	----	6.8	0.58	54	110	<0.5	<2	0.28	4.0	11
94JE49(0-5)	94JE49	0	5	0.25-2.0	30%	----	9.4	0.54	110	120	<0.5	<2	0.14	9.0	11
94JE49(0-5)	94JE49	0	5	0.063-0.25	65%	----	15.2	0.42	156	160	<0.5	<2	0.14	9.5	6
94JE49(0-5)	94JE49	0	5	<0.063	5%	----	23.0	0.77	330	160	<0.5	<2	0.16	25.0	16
94VC-2(0-10)	94VC-2	0	10	<0.83	100%	----	12.0	0.67	78	190	0.5	<2	0.26	28.5	10

* Wt % of size fraction: as % by weight of bulk sample (nm =not measured)

** Other analyses (Appendix #): D =USGS-EDXRF, E =EWU, G =XRAL, ---- = none.

Appendix F. Chemical composition of samples analyzed by ICP-AES at CHEMEX Labs in Reno, NV using nitric acid-aqua regia dissolution (Appendix_F.xls, Appendix_F.dbf).

Sample No.	Cr (ppm)	Cu (ppm)	Fe (%)	Ga (ppm)	Hg (ppm)	K (%)	La (ppm)	Mg (%)	Mn (ppm)	Mo (ppm)	Na (%)	Ni (ppm)	P (ppm)	Pb (ppm)	Sb (ppm)	Sc (ppm)	Sr (ppm)	Ti (%)	Tl (ppm)
SAMPLE_NO.	CR_PPM	CU_PPM	FE_%	GA_PPM	HG_PPM	K_%	LA_PPM	MG_%	MN_PPM	MO_PPM	NA_%	NI_PPM	P_PPM	PB_PPM	SB_PPM	SC_PPM	SR_PPM	TI_%	TL_PPM
94JE27(0-5)	6	15	1.87	<10	<1	0.08	10	0.07	705	<1	<0.01	11	340	42	2	2	7	<0.01	<10
94JE28(0-5)	8	77	4.15	<10	<1	0.14	10	0.29	3050	<1	0.01	9	290	2360	14	1	39	<0.01	<10
94JE28(0-5)	11	250	12.35	<10	<1	0.10	<10	0.38	9350	3	0.02	13	250	5130	30	1	72	0.01	<10
94JE29(0-5)	30	389	7.53	<10	4	0.16	<10	0.36	4750	11	0.04	12	350	950	112	2	259	0.01	<10
94JE30(0-5)	8	120	4.92	<10	2	0.17	10	0.30	3420	<1	0.01	10	350	2780	18	1	36	0.01	<10
94JE31(0-5)	16	82	3.31	<10	1	0.14	10	0.28	2290	2	0.02	11	350	1685	12	1	75	0.01	<10
94JE32(0-5)	12	80	3.49	<10	<1	0.14	30	0.20	870	2	0.01	19	350	328	4	1	35	<0.01	<10
94JE33(0-5)	7	47	2.62	<10	<1	0.14	20	0.25	1390	1	0.01	9	290	1580	10	1	15	<0.01	<10
94JE34(0-5)	7	95	6.59	<10	5	0.14	10	0.34	5110	1	0.01	11	290	3970	18	1	18	<0.01	<10
94JE34(0-5)	9	142	6.72	<10	2	0.09	10	0.27	5030	1	0.01	9	300	3770	28	1	27	0.01	<10
94JE34(0-5)	42	272	5.38	<10	5	0.11	10	0.28	3490	2	0.01	26	630	6500	40	2	21	0.02	<10
94JE35(0-5)	7	82	4.97	<10	2	0.14	20	0.25	3180	<1	0.01	9	320	2450	20	1	12	<0.01	<10
94JE36(0-5)	4	139	9.36	<10	<1	0.10	10	0.30	6090	<1	0.01	10	500	9140	32	1	12	<0.01	<10
94JE37(0-5)	3	130	9.86	<10	6	0.10	<10	0.25	8280	<1	0.01	8	250	9770	38	1	12	<0.01	<10
94JE37(0-5)	9	214	9.72	<10	6	0.09	<10	0.27	8260	2	0.01	11	520	8050	48	1	34	0.01	<10
94JE37(0-5)	29	296	7.49	<10	8	0.13	10	0.26	9570	1	0.02	22	1710	>10000	70	2	18	0.02	<10
94JE38(0-5)	31	259	10.40	<10	1	0.19	10	0.39	7350	14	0.06	11	540	2950	20	1	267	0.02	<10
94JE39A(0-5)	8	68	3.06	<10	2	0.13	20	0.22	2160	1	0.01	8	400	2060	16	1	16	<0.01	<10
94JE40(0-5)	8	75	3.89	<10	2	0.10	10	0.22	2660	2	0.01	8	350	2400	14	1	23	<0.01	<10
94JE41(0-5)	2	113	12.95	<10	<1	0.09	<10	0.52	>10000	1	0.01	8	280	8570	34	1	14	<0.01	<10
94JE41(0-5)	3	133	11.65	<10	1	0.07	<10	0.37	8720	<1	0.01	9	260	3160	46	1	4	<0.01	<10
94JE41(0-5)	7	209	>15.00	<10	4	0.06	<10	0.48	>10000	1	0.01	18	530	6050	56	1	5	0.01	<10
94JE42(0-5)	6	17	1.69	<10	<1	0.11	20	0.16	365	<1	<0.01	6	190	238	2	<1	4	<0.01	<10
94JE43(0-5)	6	79	6.82	<10	1	0.11	10	0.30	4780	<1	0.01	8	260	3220	26	1	14	<0.01	<10
94JE44(0-5)	9	29	2.33	<10	1	0.10	20	0.20	670	<1	<0.01	8	240	896	52	<1	7	<0.01	<10
94JE45(0-5)	8	71	4.22	<10	2	0.11	10	0.24	2670	<1	0.01	7	320	2760	36	1	15	<0.01	<10
94JE46(0-5)	9	92	6.51	<10	<1	0.11	10	0.30	4730	2	0.01	7	470	2700	22	1	28	<0.01	<10
94JE47(0-5)	7	88	7.21	<10	1	0.09	10	0.29	4610	2	0.01	7	650	2900	24	1	18	<0.01	<10
94JE48(0-5)	8	81	7.73	<10	<1	0.11	10	0.32	5560	1	0.01	8	330	2860	26	1	40	<0.01	<10
94JE49(0-5)	8	86	7.09	<10	2	0.10	10	0.27	5210	<1	0.01	8	560	4330	30	1	15	<0.01	<10
94JE49(0-5)	4	132	11.10	<10	2	0.07	10	0.32	7830	2	0.01	10	480	3580	42	1	8	<0.01	<10
94JE49(0-5)	17	222	9.27	<10	8	0.07	10	0.27	5760	1	0.01	16	1290	6810	50	1	10	0.02	<10
94VC-2(0-10)	101	109	11.00	<10	3	0.19	10	0.54	9790	3	0.01	9	260	4380	12	2	10	0.01	<10

* Wt % of size fraction: as % by weight of bulk sample (nm =not measured)

** Other analyses (Appendix #): D =USGS-EDXRF, E =EWU, G =XRAL, ---- = none.

Appendix F. Chemical composition of samples analyzed by ICP-AES at CHEMEX Labs in Reno, NV using nitric acid-aqua regia dissolution (Appendix_F.xls, Appendix_F.dbf).

Sample No.	U (ppm)	V (ppm)	W (ppm)	Zn (ppm)
SAMPLE_NO.	U_PPM	V_PPM	W_PPM	ZN_PPM
94JE27(0-5)	<10	7	<10	92
94JE28(0-5)	<10	7	<10	1675
94JE28(0-5)	<10	14	<10	3690
94JE29(0-5)	<10	10	<10	2980
94JE30(0-5)	<10	8	<10	1740
94JE31(0-5)	<10	10	<10	2080
94JE32(0-5)	<10	9	<10	912
94JE33(0-5)	<10	7	<10	1160
94JE34(0-5)	<10	7	<10	2090
94JE34(0-5)	<10	10	<10	1910
94JE34(0-5)	<10	16	<10	2290
94JE35(0-5)	<10	8	<10	1135
94JE36(0-5)	<10	5	<10	2910
94JE37(0-5)	<10	3	<10	6230
94JE37(0-5)	<10	9	<10	5240
94JE37(0-5)	<10	17	<10	8470
94JE38(0-5)	<10	14	<10	5190
94JE39A(0-5)	<10	8	<10	1555
94JE40(0-5)	<10	7	<10	1780
94JE41(0-5)	<10	2	<10	3620
94JE41(0-5)	<10	4	<10	2890
94JE41(0-5)	<10	7	<10	4000
94JE42(0-5)	<10	6	<10	288
94JE43(0-5)	<10	6	10	2520
94JE44(0-5)	<10	9	<10	474
94JE45(0-5)	<10	7	<10	1670
94JE46(0-5)	<10	8	<10	1390
94JE47(0-5)	<10	8	<10	1675
94JE48(0-5)	<10	8	<10	1780
94JE49(0-5)	<10	7	<10	2580
94JE49(0-5)	<10	7	<10	2940
94JE49(0-5)	<10	14	<10	4460
94VC-2(0-10)	<10	3	<10	5280

* Wt % of size fraction: as % by weight of bulk sample (nm =not measured)

** Other analyses (Appendix #): D =USGS-EDXRf, E =EWU, G =XRAL, ---- = none.

Appendix F. Chemical composition of samples analyzed by ICP-AES at CHEMEX Labs in Reno, NV using nitric acid-aqua regia dissolution (Appendix_F.xls, Appendix_F.dbf).

Sample No.	Site ID	Depth interval, top (cm)	Depth interval, bottom (cm)	Size fraction (mm)	*wt % of size fraction	**Other analyses (Appendix #)	Ag (ppm)	Al (%)	As (ppm)	Ba (ppm)	Be (ppm)	Bi (ppm)	Ca (%)	Cd (ppm)	Co (ppm)
SAMPLE_NO.	SITE_ID	INT_TOP_CM	INT_BT_M_CM	SIZFRAC_MM	WT%SZFRAC	OTHR_ANALYS	AG_PPM	AL_%	AS_PPM	BA_PPM	BE_PPM	BI_PPM	CA_%	CD_PPM	CO_PPM
94VC-2(10-20)	94VC-2	10	20	<0.83	100%	----	16.8	0.67	80	130	<0.5	<2	0.37	50.5	12
94VC-2(20-30)	94VC-2	20	30	<0.83	100%	----	16.2	0.52	90	90	<0.5	<2	0.37	48.0	12
94VC-2(30-40)	94VC-2	30	40	<0.83	100%	----	22.2	0.48	98	50	<0.5	<2	0.52	66.5	14
94VC-2(40-50)	94VC-2	40	50	<0.83	100%	----	21.8	0.43	102	40	<0.5	<2	0.53	79.0	14
94VC-2(50-60)	94VC-2	50	60	<0.83	100%	----	23.6	0.53	126	60	0.5	<2	0.56	66.5	15
94VC-2(60-70)	94VC-2	60	70	<0.83	100%	----	24.0	0.56	122	50	<0.5	<2	0.56	71.5	15
94VC-2(70-80)	94VC-2	70	80	<0.83	100%	----	26.6	0.71	94	50	0.5	<2	0.51	80.0	15
94VC-2(80-90)	94VC-2	80	90	<0.83	100%	----	30.4	0.83	60	40	0.5	<2	0.52	>100.0	14
94VC-2(90-100)	94VC-2	90	100	<0.83	100%	----	29.0	0.63	62	40	<0.5	<2	0.53	>100.0	13
94VC-2(100-110)	94VC-2	100	110	<0.83	100%	----	30.4	0.71	52	50	<0.5	<2	0.47	95.0	13
94VC-2(110-120)	94VC-2	110	120	<0.83	100%	----	28.2	0.62	56	40	0.5	<2	0.49	>100.0	12
94VC-2(120-130)	94VC-2	120	130	<0.83	100%	----	40.0	0.82	70	50	0.5	<2	0.50	>100.0	15
94VC-2(130-140)	94VC-2	130	140	<0.83	100%	----	45.0	0.99	76	70	0.5	<2	0.48	92.0	15
94VC-2(140-150)	94VC-2	140	150	<0.83	100%	----	29.8	1.09	44	140	0.5	<2	0.29	67.5	11
94VC-2(150-160)	94VC-2	150	160	<0.83	100%	----	11.0	0.89	16	210	0.5	<2	0.17	43.0	7
94VC-2(160-164)	94VC-2	160	164	<0.83	100%	----	19.8	0.92	30	100	0.5	<2	0.30	89.0	9
94VC-3(0-11)	94VC-3	0	11	<0.83	100%	E	12.4	0.99	90	320	<0.5	<2	0.21	35.0	8
94VC-3(11-22)	94VC-3	11	22	<0.83	100%	E	13.0	0.97	74	260	<0.5	<2	0.24	30.5	7
94VC-3(22-33)	94VC-3	22	33	<0.83	100%	E	11.6	0.92	104	260	<0.5	<2	0.23	33.5	8
94VC-3(33-44)	94VC-3	33	44	<0.83	100%	E	11.0	0.89	80	240	<0.5	<2	0.24	28.5	8
94VC-3(44-55)	94VC-3	44	55	<0.83	100%	E	11.6	0.84	72	260	<0.5	<2	0.29	31.5	8
94VC-3(55-66)	94VC-3	55	66	<0.83	100%	E	12.0	0.90	76	290	<0.5	<2	0.32	31.5	9
94VC-3(66-77)	94VC-3	66	77	<0.83	100%	E	14.0	0.86	72	300	<0.5	<2	0.34	32.0	9
94VC-3(77-88)	94VC-3	77	88	<0.83	100%	E	13.6	0.80	76	280	<0.5	<2	0.32	30.5	8
94VC-3(88-99)	94VC-3	88	99	<0.83	100%	E	12.6	0.81	70	260	<0.5	<2	0.31	28.5	7
94VC-3(99-110)	94VC-3	99	110	<0.83	100%	E	14.0	0.76	96	270	<0.5	<2	0.32	33.5	9
94VC-3(110-120)	94VC-3	110	120	<0.83	100%	E	15.2	0.62	122	200	<0.5	<2	0.34	33.5	9
94VC-3(120-130)	94VC-3	120	130	<0.83	100%	E	16.0	0.59	176	250	<0.5	<2	0.37	31.5	8
94VC-3(130-140)	94VC-3	130	140	<0.83	100%	E	17.8	0.57	250	240	<0.5	<2	0.35	32.0	12
94VC-3(140-150)	94VC-3	140	150	<0.83	100%	E	13.0	0.87	190	340	<0.5	<2	0.32	27.0	10
94VC-3(150-160)	94VC-3	150	160	<0.83	100%	E	15.0	0.73	238	270	<0.5	<2	0.33	30.0	11
94VC-3(160-170)	94VC-3	160	170	<0.83	100%	E	17.8	0.72	454	300	<0.5	<2	0.41	24.0	17
94VC-3(170-180)	94VC-3	170	180	<0.83	100%	E	19.8	0.78	354	290	<0.5	<2	0.38	26.5	19

* Wt % of size fraction: as % by weight of bulk sample (nm =not measured)

** Other analyses (Appendix #): D =USGS-EDXRF, E =EWU, G =XRAL, ---- = none.

Appendix F. Chemical composition of samples analyzed by ICP-AES at CHEMEX Labs in Reno, NV using nitric acid-aqua regia dissolution (Appendix_F.xls, Appendix_F.dbf).

Sample No.	Cr (ppm)	Cu (ppm)	Fe (%)	Ga (ppm)	Hg (ppm)	K (%)	La (ppm)	Mg (%)	Mn (ppm)	Mo (ppm)	Na (%)	Ni (ppm)	P (ppm)	Pb (ppm)	Sb (ppm)	Sc (ppm)	Sr (ppm)	Ti (%)	Tl (ppm)
SAMPLE_NO.	CR_PPM	CU_PPM	FE_%	GA_PPM	HG_PPM	K_%	LA_PPM	MG_%	MN_PPM	MO_PPM	NA_%	NI_PPM	P_PPM	PB_PPM	SB_PPM	SC_PPM	SR_PPM	TI_%	TL_PPM
94VC-2(10-20)	102	160	13.85	<10	4	0.21	10	0.62	>10000	3	0.01	11	210	6210	14	2	13	<0.01	<10
94VC-2(20-30)	64	155	14.30	<10	4	0.14	10	0.62	>10000	4	0.01	7	180	6080	14	2	12	<0.01	<10
94VC-2(30-40)	40	197	14.90	<10	6	0.13	10	0.63	>10000	4	<0.01	12	160	9230	16	2	16	<0.01	<10
94VC-2(40-50)	64	208	>15.00	<10	7	0.11	10	0.64	>10000	4	<0.01	11	130	9240	18	2	16	<0.01	<10
94VC-2(50-60)	32	222	14.50	<10	6	0.14	10	0.63	>10000	3	<0.01	13	200	>10000	24	3	18	<0.01	<10
94VC-2(60-70)	32	202	14.75	<10	6	0.12	10	0.64	>10000	4	<0.01	13	200	>10000	22	3	18	<0.01	<10
94VC-2(70-80)	56	220	13.70	<10	7	0.19	10	0.60	>10000	3	0.01	12	200	>10000	20	3	17	<0.01	<10
94VC-2(80-90)	69	259	12.60	<10	9	0.20	10	0.60	>10000	3	0.01	13	200	>10000	22	2	18	0.01	<10
94VC-2(90-100)	107	264	13.65	<10	10	0.13	10	0.60	>10000	3	<0.01	11	160	>10000	22	2	18	0.01	<10
94VC-2(100-110)	71	245	11.45	<10	11	0.17	10	0.55	>10000	3	<0.01	12	210	>10000	22	2	17	0.01	<10
94VC-2(110-120)	68	257	12.05	<10	12	0.17	10	0.55	>10000	3	0.01	12	160	>10000	22	2	17	<0.01	<10
94VC-2(120-130)	56	327	13.15	<10	11	0.20	10	0.57	>10000	4	<0.01	13	230	>10000	28	3	19	0.01	<10
94VC-2(130-140)	95	333	11.65	<10	8	0.19	10	0.55	>10000	3	<0.01	15	330	>10000	34	3	19	0.01	<10
94VC-2(140-150)	99	261	6.99	<10	6	0.27	20	0.45	5990	2	0.01	12	300	>10000	22	2	15	0.01	<10
94VC-2(150-160)	128	127	4.53	<10	5	0.26	20	0.40	3800	1	0.01	10	200	5420	12	1	9	0.01	<10
94VC-2(160-164)	237	249	7.15	<10	8	0.28	20	0.44	6460	2	0.01	12	250	>10000	22	2	13	0.01	<10
94VC-3(0-11)	91	108	9.36	<10	<1	0.29	10	0.44	7570	<1	0.01	11	260	3080	18	1	9	<0.01	<10
94VC-3(11-22)	85	104	8.67	<10	<1	0.34	10	0.46	7290	<1	0.01	10	250	3040	26	1	10	<0.01	<10
94VC-3(22-33)	100	100	7.94	<10	<1	0.28	10	0.42	6500	1	0.01	11	390	3360	24	1	10	<0.01	<10
94VC-3(33-44)	103	92	7.78	<10	<1	0.29	10	0.42	6580	<1	0.01	11	230	3240	28	1	10	<0.01	<10
94VC-3(44-55)	69	95	8.67	<10	<1	0.29	10	0.42	7480	1	0.01	9	180	3770	24	1	11	<0.01	<10
94VC-3(55-66)	98	95	9.12	<10	<1	0.35	10	0.43	7920	2	0.01	11	150	4200	24	1	12	<0.01	<10
94VC-3(66-77)	83	105	9.26	<10	<1	0.36	10	0.45	8030	<1	0.01	10	170	4480	28	1	13	<0.01	<10
94VC-3(77-88)	88	103	8.45	<10	<1	0.33	10	0.45	7480	1	0.01	10	170	4350	28	1	12	<0.01	<10
94VC-3(88-99)	85	101	7.66	<10	<1	0.35	10	0.44	6900	1	0.01	9	160	4080	24	1	12	<0.01	<10
94VC-3(99-110)	61	100	9.34	<10	<1	0.28	10	0.45	8300	<1	0.01	11	170	4300	24	1	12	<0.01	<10
94VC-3(110-120)	66	100	9.56	<10	<1	0.24	<10	0.46	8540	1	0.01	11	170	4480	30	1	12	<0.01	<10
94VC-3(120-130)	64	112	9.78	<10	<1	0.26	<10	0.49	8630	1	0.01	10	170	4680	26	1	14	<0.01	<10
94VC-3(130-140)	79	121	9.85	<10	<1	0.21	<10	0.48	8830	2	<0.01	12	200	5260	28	1	13	<0.01	<10
94VC-3(140-150)	80	88	9.50	<10	<1	0.30	10	0.45	8200	2	0.01	11	200	3890	26	1	13	<0.01	<10
94VC-3(150-160)	96	101	9.63	<10	<1	0.25	10	0.46	8270	<1	0.01	12	210	4350	28	1	13	<0.01	<10
94VC-3(160-170)	55	95	12.20	<10	<1	0.25	10	0.51	>10000	2	0.01	16	250	4420	34	2	16	<0.01	<10
94VC-3(170-180)	50	118	11.80	<10	<1	0.28	10	0.50	9510	1	0.01	15	260	4520	34	2	15	<0.01	<10

* Wt % of size fraction: as % by weight of bulk sample (nm =not measured)

** Other analyses (Appendix #): D =USGS-EDXRF, E =EWU, G =XRAL, ---- = none.

Appendix F. Chemical composition of samples analyzed by ICP-AES at CHEMEX Labs in Reno, NV using nitric acid-aqua regia dissolution (Appendix_F.xls, Appendix_F.dbf).

Sample No.	U (ppm)	V (ppm)	W (ppm)	Zn (ppm)
SAMPLE_NO.	U_PPM	V_PPM	W_PPM	ZN_PPM
94VC-2(10-20)	<10	2	<10	8370
94VC-2(20-30)	<10	<1	<10	8100
94VC-2(30-40)	<10	<1	<10	>10000
94VC-2(40-50)	<10	<1	<10	>10000
94VC-2(50-60)	<10	<1	<10	>10000
94VC-2(60-70)	<10	<1	<10	>10000
94VC-2(70-80)	<10	1	<10	>10000
94VC-2(80-90)	<10	4	<10	>10000
94VC-2(90-100)	<10	3	<10	>10000
94VC-2(100-110)	<10	3	<10	>10000
94VC-2(110-120)	<10	1	<10	>10000
94VC-2(120-130)	<10	4	<10	>10000
94VC-2(130-140)	<10	6	<10	>10000
94VC-2(140-150)	<10	8	<10	>10000
94VC-2(150-160)	<10	6	<10	6600
94VC-2(160-164)	<10	7	<10	>10000
94VC-3(0-11)	<10	14	<10	4950
94VC-3(11-22)	<10	13	<10	4920
94VC-3(22-33)	<10	13	<10	4510
94VC-3(33-44)	<10	12	<10	4390
94VC-3(44-55)	<10	12	<10	4660
94VC-3(55-66)	<10	12	<10	4820
94VC-3(66-77)	<10	12	<10	5170
94VC-3(77-88)	<10	11	<10	4960
94VC-3(88-99)	<10	11	<10	4730
94VC-3(99-110)	<10	11	<10	5080
94VC-3(110-120)	<10	10	<10	5060
94VC-3(120-130)	<10	10	<10	5030
94VC-3(130-140)	<10	10	<10	4440
94VC-3(140-150)	<10	12	<10	4050
94VC-3(150-160)	<10	11	<10	4310
94VC-3(160-170)	<10	11	<10	3400
94VC-3(170-180)	<10	13	<10	4000

* Wt % of size fraction: as % by weight of bulk sample (nm =not measured)

** Other analyses (Appendix #): D =USGS-EDXRF, E =EWU, G =XRAL, ---- = none.

Appendix F. Chemical composition of samples analyzed by ICP-AES at CHEMEX Labs in Reno, NV using nitric acid-aqua regia dissolution (Appendix_F.xls, Appendix_F.dbf).

Sample No.	Site ID	Depth interval, top (cm)	Depth interval, bottom (cm)	Size fraction (mm)	*wt % of size fraction	**Other analyses (Appendix #)	Ag (ppm)	Al (%)	As (ppm)	Ba (ppm)	Be (ppm)	Bi (ppm)	Ca (%)	Cd (ppm)	Co (ppm)
SAMPLE_NO.	SITE_ID	INT_TOP_CM	INT_BTML_CM	SIZFRAC_MM	WT%SZFRAC	OTHR_ANALYS	AG_PPM	AL_%	AS_PPM	BA_PPM	BE_PPM	BI_PPM	CA_%	CD_PPM	CO_PPM
94VC-3(180-190)	94VC-3	180	190	<0.83	100%	E	19.0	0.83	112	330	<0.5	<2	0.40	38.0	11
94VC-3(190-200)	94VC-3	190	200	<0.83	100%	E	16.4	0.77	90	340	<0.5	<2	0.38	38.0	9
94VC-3(200-210)	94VC-3	200	210	<0.83	100%	E	18.4	0.60	100	210	<0.5	<2	0.39	46.0	10
94VC-3(210-220)	94VC-3	210	220	<0.83	100%	E	14.6	0.67	84	240	<0.5	<2	0.34	37.5	9
94VC-3(220-230)	94VC-3	220	230	<0.83	100%	E	14.4	0.71	88	230	<0.5	<2	0.33	36.0	8

* Wt % of size fraction: as % by weight of bulk sample (nm =not measured)

** Other analyses (Appendix #): D =USGS-EDXRF, E =EWU, G =XRAL, ---- = none.

Appendix F. Chemical composition of samples analyzed by ICP-AES at CHEMEX Labs in Reno, NV using nitric acid-aqua regia dissolution (Appendix_F.xls, Appendix_F.dbf).

Sample No.	Cr (ppm)	Cu (ppm)	Fe (%)	Ga (ppm)	Hg (ppm)	K (%)	La (ppm)	Mg (%)	Mn (ppm)	Mo (ppm)	Na (%)	Ni (ppm)	P (ppm)	Pb (ppm)	Sb (ppm)	Sc (ppm)	Sr (ppm)	Ti (%)	Tl (ppm)
SAMPLE_NO.	CR_PPM	CU_PPM	FE_%	GA_PPM	HG_PPM	K_%	LA_PPM	MG_%	MN_PPM	MO_PPM	NA_%	NI_PPM	P_PPM	PB_PPM	SB_PPM	SC_PPM	SR_PPM	TI_%	TL_PPM
94VC-3(180-190)	64	126	10.95	<10	<1	0.29	10	0.50	9300	1	0.01	11	200	5490	28	1	13	<0.01	<10
94VC-3(190-200)	64	121	9.69	<10	<1	0.32	10	0.50	8530	1	0.01	11	170	5230	28	1	14	<0.01	<10
94VC-3(200-210)	73	140	10.35	<10	<1	0.25	<10	0.52	9330	<1	0.01	10	170	5750	36	1	13	<0.01	<10
94VC-3(210-220)	99	122	8.38	<10	<1	0.28	10	0.47	7350	1	0.01	11	180	5450	28	1	13	<0.01	<10
94VC-3(220-230)	94	114	8.69	<10	<1	0.28	10	0.47	7660	1	0.01	10	180	4890	30	1	12	<0.01	<10

* Wt % of size fraction: as % by weight of bulk sample (nm =not measured)

** Other analyses (Appendix #): D =USGS-EDXRF, E =EWU, G =XRAL, ---- = none.

Appendix F. Chemical composition of samples analyzed by ICP-AES at CHEMEX Labs in Reno, NV using nitric acid-aqua regia dissolution (Appendix_F.xls, Appendix_F.dbf).

Sample No.	U (ppm)	V (ppm)	W (ppm)	Zn (ppm)
SAMPLE_NO.	U_PPM	V_PPM	W_PPM	ZN_PPM
94VC-3(180-190)	<10	13	<10	6010
94VC-3(190-200)	<10	12	<10	5790
94VC-3(200-210)	<10	11	<10	6890
94VC-3(210-220)	<10	11	<10	5630
94VC-3(220-230)	<10	11	<10	5430

* Wt % of size fraction: as % by weight of bulk sample (nm =not measured)

** Other analyses (Appendix #): D =USGS-EDXRF, E =EWU, G =XRAL, ---- = none.

Appendix G. Chemical composition of samples analyzed by ICP-AES at XRAL Labs in Golden, CO using 4 acid dissolution (Appendix_G.xls, Appendix_G.dbf).

Sample No.	Site ID	Depth interval, top (cm)	Depth interval, bottom (cm)	*Other Analyses (appendix #)	Ag (ppm)	Al (%)	As (ppm)	Au (ppm)	Ba (ppm)	Be (ppm)	Bi (ppm)	Ca (%)	Cd (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cu (ppm)
SAMPLE_NO.	SITE_ID	INT_TOP_CM	INT_BT_M_CM	OTHR_ANALYS	AG_PPM	AL_(%)	AS_PPM	AU_PPM	BA_PPM	BE_PPM	BI_PPM	CA_(%)	CD_PPM	CE_PPM	CO_PPM	CR_PPM	CU_PPM
T98C-01(0-4)	T98C-01	0	4	----	<2	4.7	18	<8	408	1	<50	0.818	36	51	9	80	46
T98C-01(18-22)	T98C-01	18	22	----	<2	6.2	11	<8	576	2	<50	0.235	6	84	9	102	22
T98C-01(38-42)	T98C-01	38	42	----	<2	6.1	22	<8	549	2	<50	0.219	7	89	8	87	27
T98C-01(58-62)	T98C-01	58	62	----	<2	7.4	14	<8	621	2	<50	0.481	<2	108	10	64	32
T98C-05(0-4)	T98C-05	0	4	----	<2	6.1	55	<8	579	2	<50	0.593	4	112	16	94	223
T98C-05(18-22)	T98C-05	18	22	----	<2	6.3	33	<8	569	2	<50	0.454	<2	122	8	88	210
T98C-05(38-42)	T98C-05	38	42	----	<2	5.5	24	<8	484	2	<50	0.516	<2	122	5	71	184
T98C-05(58-62)	T98C-05	58	62	----	<2	6.1	71	<8	549	2	<50	0.563	<2	142	13	75	514
T98C-05(118-122)	T98C-05	118	122	----	<2	8.1	16	<8	593	2	<50	0.390	<2	104	8	92	42
T98C-06(0-4)	T98C-06	0	4	----	4	5.2	33	<8	478	1	<50	1.299	10	54	9	81	51
T98C-06(0-4)	T98C-06	0	4	----	5	5.1	34	<8	530	1	<50	1.048	12	69	9	81	65
T98C-06(18-22)	T98C-06	18	22	----	<2	5.9	13	<8	602	2	<50	0.246	21	87	8	85	24
T98C-06(38-42)	T98C-06	38	42	----	<2	6.2	11	<8	627	2	<50	0.251	<2	84	8	89	29
T98C-06(58-62)	T98C-06	58	62	----	<2	6.3	11	<8	656	2	<50	0.262	<2	94	8	99	15
T98C-06(78-82)	T98C-06	78	82	----	<2	5.9	13	<8	483	2	<50	0.246	<2	86	7	84	13
T98C-06(98-102)	T98C-06	98	102	----	<2	5.5	11	<8	511	2	<50	0.192	<2	103	6	40	15
T98C-06(133-137)	T98C-06	133	137	----	<2	5.4	<10	<8	484	2	<50	0.181	<2	78	5	81	10
T98C-06(153-157)	T98C-06	153	157	----	<2	5.4	<10	<8	479	2	<50	0.203	<2	89	6	42	12
T98C-06(173-177)	T98C-06	173	177	----	<2		13	<8	458	2	<50	0.192	<2	80	6	38	13
T98C-06(198-202)	T98C-06	198	202	----	<2	5.6	13	<8	480	2	<50	0.197	<2	86	6	90	13
T98C-07(0-4)	T98C-07	0	4	----	14	5.3	60	<8	520	2	<50	1.000	24	50	9	75	85
T98C-08(0-4)	T98C-08	0	4	----	17	5.5	118	<8	698	2	<50	0.540	9	64	14	84	147
T98C-10(21-25)	T98C-10	21	25	----	8	6.6	65	<8	608	2	<50	0.952	16	72	14	81	118
T98C-11B(0-14)	T98C-11B	0	14	----	13	5.0	225	<8	539	2	<50	0.336	42	65	21	74	115
T98C-11B(14-34)	T98C-11B	14	34	----	16	3.8	435	<8	536	1	<50	0.347	36	62	29	66	123
T98C-11B(34-55)	T98C-11B	34	55	----	16	3.9	232	<8	586	1	<50	0.508	26	71	21	73	130
T98C-11B(55-71)	T98C-11B	55	71	----	14	4.0	111	<8	706	1	<50	0.497	22	70	16	56	127
T98C-11B(71-92)	T98C-11B	71	92	----	17	3.3	78	<8	634	1	<50	0.347	34	51	14	73	126
T98C-11B(92-111)	T98C-11B	92	111	----	13	3.5	89	<8	598	1	<50	0.363	29	53	15	73	129
T98C-12(6-30)	T98C-12	6	30	----	13	4.9	308	<8	622	2	<50	0.208	22	85	22	85	136
T98R-13(0-4)	T98R-13	0	4	----	10	4.2	66	<8	560	1	<50	1.016	87	37	290	73	85
T98R-13(18-22)	T98R-13	18	22	----	15	3.9	161	<8	617	1	<50	0.181	12	57	11	84	158
T98R-13(38-42)	T98R-13	38	42	----	<2	7.4	10	<8	714	2	<50	0.443	18	76	20	80	10
T98R-14(0-4)	T98R-14	0	4	----	8	5.4	170	<8	354	1	<50	1.497	32	47	56	67	77
T98R-14(18-22)	T98R-14	18	22	----	13	2.9	274	<8	365	<1	<50	0.133	4	55	8	45	79

*Other analyses (Appendix #): D =USGS-EDXRF, E =EWU, F =CHEMEX, H =ACZ, ---- = none.

Appendix G. Chemical composition of samples analyzed by ICP-AES at XRAL Labs in Golden, CO using 4 acid dissolution (Appendix_G.xls, Appendix_G.dbf).

Sample No.	Eu (ppm)	Fe (%)	Ga (ppm)	Ho (ppm)	K (%)	La (ppm)	Li (ppm)	Mg (%)	Mn (ppm)	Mo (ppm)	Na (%)	Nb (ppm)	Nd (ppm)	Ni (ppm)	P (ppm)	Pb (ppm)	Sc (ppm)	Sn (ppm)	Sr (ppm)	Ta (ppm)
SAMPLE_NO.	EU_PPM	FE_(%)	GA_PPM	HO_PPM	K_(%)	LA_PPM	LI_PPM	MG_(%)	MN_PPM	MO_PPM	NA_(%)	NB_PPM	ND_PPM	NI_PPM	P_PPM	PB_PPM	SC_PPM	SN_PPM	SR_PPM	TA_PPM
T98C-01(0-4)	<2	2.53	20	<4	1.35	27	25	0.525	1000	4	0.860	7	27	15	0.125	712	7	<50	108	<40
T98C-01(18-22)	<2	2.73	18	<4	2.17	43	42	0.655	768	4	0.615	9	42	18	0.055	385	9	<50	56	<40
T98C-01(38-42)	<2	3.09	19	<4	2.14	43	37	0.600	1120	4	0.590	12	41	18	0.050	815	9	<50	54	<40
T98C-01(58-62)	2	2.68	24	<4	1.80	66	42	0.545	299	5	0.760	12	63	25	0.040	259	13	<50	115	<40
T98C-05(0-4)	<2	3.20	18	<4	1.88	52	35	0.485	2100	4	0.670	13	52	21	0.065	2710	12	<50	107	<40
T98C-05(18-22)	3	2.40	17	<4	1.90	61	36	0.470	287	3	0.675	11	60	17	0.045	2780	12	<50	99	<40
T98C-05(38-42)	4	2.26	16	<4	1.69	51	24	0.411	281	<2	0.716	<4	65	10	0.042	2680	9	<50	111	<40
T98C-05(58-62)	3	2.40	19	5	1.76	57	30	0.451	896	3	0.811	8	85	12	0.042	4420	12	<50	120	<40
T98C-05(118-122)	3	2.45	24	<4	1.94	58	52	0.595	334	5	0.545	5	54	29	0.050	35	14	<50	69	<40
T98C-06(0-4)	<2	3.81	15	<4	1.46	25	24	0.560	2250	5	1.155	10	30	13	0.080	1890	7	<50	146	<40
T98C-06(0-4)	<2	4.43	11	<4	1.56	37	26	0.550	2910	5	0.970	13	32	15	0.085	2500	7	<50	123	<40
T98C-06(18-22)	<2	2.72	19	<4	2.20	46	39	0.630	867	4	0.575	7	40	16	0.055	552	9	<50	54	<40
T98C-06(38-42)	<2	2.51	21	<4	2.21	43	40	0.685	578	3	0.595	6	39	18	0.050	87	10	<50	57	<40
T98C-06(58-62)	<2	2.53	19	<4	2.28	48	44	0.710	470	3	0.615	7	44	18	0.035	23	11	<50	58	<40
T98C-06(78-82)	<2	2.33	14	<4	2.26	46	37	0.585	296	3	0.570	6	41	15	0.030	60	8	<50	51	<40
T98C-06(98-102)	<2	2.13	23	<4	2.20	50	39	0.630	260	4	0.490	5	48	16	0.030	27	9	<50	43	<40
T98C-06(133-137)	<2	2.05	16	<4	2.23	43	36	0.605	211	3	0.485	5	39	14	0.025	26	8	<50	44	<40
T98C-06(153-157)	<2	2.05	17	<4	2.13	44	35	0.610	210	3	0.510	8	37	15	0.025	10	8	<50	47	<40
T98C-06(173-177)	<2	2.10	19	<4	2.16	41	35	0.585	227	3	0.505	17	38	15	0.025	19	8	<50	46	<40
T98C-06(198-202)	<2	2.16	18	<4	2.22	44	37	0.620	192	4	0.520	8	39	18	0.030	11	9	<50	46	<40
T98C-07(0-4)	<2	4.00	<4	<4	1.55	24	28	0.555	1650	4	1.030	11	21	18	0.125	4300	8	<50	130	<40
T98C-08(0-4)	3	8.99	11	<4	1.83	33	30	0.510	7250	7	0.770	8	33	15	0.050	6160	8	<50	89	<40
T98C-10(21-25)	<2	4.49	14	<4	1.89	36	34	0.605	2140	5	1.300	13	33	18	0.105	2900	8	<50	143	<40
T98C-11B(0-14)	<2	8.25	16	<4	1.79	34	29	0.565	6030	9	0.455	5	31	23	0.065	3510	8	<50	47	<40
T98C-11B(14-34)	3	10.30	<4	<4	1.42	25	22	0.580	9160	8	0.290	4	23	23	0.035	3890	6	<50	34	<40
T98C-11B(34-55)	3	9.44	<4	<4	1.49	30	22	0.585	8760	7	0.280	6	27	18	0.030	5350	6	<50	38	<40
T98C-11B(55-71)	3	9.30	<4	<4	1.55	32	23	0.595	8420	9	0.315	8	31	18	0.035	6140	6	<50	41	<40
T98C-11B(71-92)	3	9.14	8	<4	1.41	26	21	0.535	8630	9	0.205	5	26	14	0.025	7290	5	<50	32	<40
T98C-11B(92-111)	3	9.21	7	<4	1.47	27	21	0.515	8350	7	0.230	5	24	15	0.025	6580	5	<50	34	<40
T98C-12(6-30)	3	9.33	<4	<4	1.77	39	29	0.435	7820	8	0.415	10	37	20	0.050	4720	8	<50	43	<40
T98R-13(0-4)	<2	6.46	10	<4	1.39	16	24	0.515	22450	7	0.540	8	16	38	0.145	1500	6	<50	80	<40
T98R-13(18-22)	3	9.83	<4	<4	1.60	27	20	0.485	7970	5	0.160	5	27	15	0.025	6050	5	<50	21	<40
T98R-13(38-42)	<2	2.35	26	<4	2.46	39	48	0.760	1100	3	0.725	5	33	16	0.015	80	11	<50	81	<40
T98R-14(0-4)	2	6.65	10	<4	1.26	18	23	0.635	7510	6	1.560	8	16	26	0.080	1610	6	<50	179	<40
T98R-14(18-22)	3	9.64	5	<4	1.27	27	15	0.405	7580	5	0.175	8	23	7	0.020	2360	4	<50	20	<40

*Other analyses (Appendix #): D =USGS-EDXRF, E =EWU,
F =CHEMEX, H =ACZ, ---- = none.

Appendix G. Chemical composition of samples analyzed by ICP-AES at XRAL Labs in Golden, CO using 4 acid dissolution (Appendix_G.xls, Appendix_G.dbf).

Sample No.	Th (ppm)	Ti (%)	U (ppm)	V (ppm)	Y (ppm)	Yb (ppm)	Zn (ppm)
SAMPLE_NO.	TH_PPM	TI_%	U_PPM	V_PPM	Y_PPM	YB_PPM	ZN_PPM
T98C-01(0-4)	9	0.219	<100	43	15	2	1150
T98C-01(18-22)	16	0.263	<100	52	19	2	548
T98C-01(38-42)	11	0.275	<100	49	17	2	719
T98C-01(58-62)	16	0.413	<100	73	31	3	378
T98C-05(0-4)	14	0.288	<100	62	23	2	465
T98C-05(18-22)	16	0.363	<100	66	27	3	160
T98C-05(38-42)	8	0.351	<100	51	19	2	167
T98C-05(58-62)	<6	0.385	<100	57	31	4	207
T98C-05(118-122)	15	0.306	<100	59	36	3	86
T98C-06(0-4)	8	0.244	<100	46	11	1	1130
T98C-06(0-4)	10	0.238	<100	48	12	2	1440
T98C-06(18-22)	14	0.288	<100	52	17	2	1760
T98C-06(38-42)	16	0.281	<100	55	18	2	1100
T98C-06(58-62)	17	0.294	<100	58	20	2	140
T98C-06(78-82)	15	0.275	<100	48	16	2	76
T98C-06(98-102)	15	0.231	<100	52	15	2	56
T98C-06(133-137)	12	0.238	<100	48	13	1	53
T98C-06(153-157)	15	0.269	<100	48	15	2	45
T98C-06(173-177)	13	0.238	<100	47	14	2	51
T98C-06(198-202)	13	0.263	<100	49	15	2	48
T98C-07(0-4)	<6	0.231	<100	48	13	2	2550
T98C-08(0-4)	10	0.213	<100	50	14	1	2190
T98C-10(21-25)	14	0.269	<100	54	15	2	1350
T98C-11B(0-14)	13	0.163	<100	44	15	1	4420
T98C-11B(14-34)	12	0.119	<100	35	12	1	4080
T98C-11B(34-55)	13	0.125	<100	35	12	<1	3500
T98C-11B(55-71)	13	0.131	<100	37	11	<1	3200
T98C-11B(71-92)	12	0.106	<100	32	9	<1	4690
T98C-11B(92-111)	11	0.119	<100	31	9	<1	4130
T98C-12(6-30)	15	0.163	<100	43	15	1	2290
T98R-13(0-4)	9	0.15	<100	40	9	2	6960
T98R-13(18-22)	11	0.1	<100	33	9	<1	2000
T98R-13(38-42)	12	0.3	<100	66	12	1	875
T98R-14(0-4)	<6	0.25	<100	42	11	2	7310
T98R-14(18-22)	9	0.081	<100	24	8	<1	831

*Other analyses (Appendix #): D =USGS-EDXRF, E =EWU,
F =CHEMEX, H =ACZ, ---- = none.

Appendix G. Chemical composition of samples analyzed by ICP-AES at XRAL Labs in Golden, CO using 4 acid dissolution (Appendix_G.xls, Appendix_G.dbf).

Sample No.	Site ID	Depth interval, top (cm)	Depth interval, bottom (cm)	*Other Analyses (appendix #)	Ag (ppm)	Al (%)	As (ppm)	Au (ppm)	Ba (ppm)	Be (ppm)	Bi (ppm)	Ca (%)	Cd (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cu (ppm)
SAMPLE_NO.	SITE_ID	INT_TOP_CM	INT_BTM_CM	OTHR_ANALYS	AG_PPM	AL_(%)	AS_PPM	AU_PPM	BA_PPM	BE_PPM	BI_PPM	CA_(%)	CD_PPM	CE_PPM	CO_PPM	CR_PPM	CU_PPM
T98R-14(38-42)	T98R-14	38	42	----	16	2.9	261	<8	396	1	<50	0.144	6	58	9	62	99
T98R-14(58-62)	T98R-14	58	62	----	10	2.8	232	<8	363	1	<50	0.278	12	49	12	35	84
T98R-14(78-82)	T98R-14	78	82	----	10	3.1	148	<8	404	1	<50	0.363	15	49	16	47	85
T98R-14(98-102)	T98R-14	98	102	----	14	3.0	110	<8	528	1	<50	0.310	25	53	15	43	99
T98R-14(118-122)	T98R-14	118	122	----	12	3.2	97	<8	525	1	<50	0.272	24	51	12	42	107
T98C-15(0-4)	T98C-15	0	4	----	21	5.1	102	<8	760	2	<50	0.304	18	73	14	76	171
T98C-15(18-22)	T98C-15	18	22	----	35	5.3	96	<8	1060	2	<50	0.240	27	84	17	64	238
T98C-15(38-42)	T98C-15	38	42	----	40	5.2	57	<8	1050	2	<50	0.208	10	80	12	74	278
T98C-15(58-62)	T98C-15	58	62	----	<2	7.0	17	<8	650	2	<50	0.240	4	87	9	38	18
T98C-16(0-4)	T98C-16	0	4	----	5	6.8	56	<8	638	2	<50	0.347	13	89	14	77	69
T98C-16(18-22)	T98C-16	18	22	----	15	5.2	174	<8	642	2	<50	0.262	16	82	12	77	120
T98C-16(38-42)	T98C-16	38	42	----	17	2.8	413	<8	499	1	<50	0.106	21	60	26	56	110
T98C-16(58-62)	T98C-16	58	62	----	21	2.9	101	<8	610	1	<50	0.106	10	53	13	52	116
T98C-16(78-82)	T98C-16	78	82	----	18	3.5	102	<8	699	1	<50	0.187	15	62	10	78	132
T98C-16(98-102)	T98C-16	98	102	----	19	3.1	118	<8	635	1	<50	0.187	17	60	10	48	126
T98C-16(118-122)	T98C-16	118	122	----	22	2.9	128	<8	678	1	<50	0.213	19	54	11	51	132
T98C-16(143-147)	T98C-16	143	147	----	18	3.2	104	<8	635	1	<50	0.358	57	54	13	55	121
T98C-16(168-172)	T98C-16	168	172	----	14	2.8	113	<8	654	1	<50	0.353	34	55	15	51	108
T98C-16(178-182)	T98C-16	178	182	----	21	3.1	136	<8	667	1	<50	0.283	27	56	13	44	111
T98C-16(208-212)	T98C-16	208	212	----	19	2.9	138	<8	624	<1	<50	0.310	29	58	14	46	110
T98C-17(0-4)	T98C-17	0	4	----	5	7.1	46	<8	668	2	<50	0.379	10	89	14	84	63
T98C-17(18-22)	T98C-17	18	22	----	18	5.0	92	<8	698	2	<50	0.171	14	84	14	70	148
T98C-17(38-42)	T98C-17	38	42	----	15	4.3	318	<8	587	1	<50	0.171	18	67	19	67	127
T98C-17(58-62)	T98C-17	58	62	----	23	5.5	115	<8	902	2	<50	0.235	31	88	14	87	163
T98C-17(78-82)	T98C-17	78	82	----	31	5.1	101	<8	1010	2	<50	0.187	18	77	14	79	205
T98C-17(108-112)	T98C-17	108	112	----	<2	6.2	13	<8	572	2	<50	0.219	3	96	8	48	18
T98C-17(128-132)	T98C-17	128	132	----	<2	6.3	17	<8	573	2	<50	0.208	<2	97	8	41	18
T98C-17(153-157)	T98C-17	153	157	----	<2	5.6	11	<8	507	2	<50	0.176	<2	84	7	62	14
T98C-17(181-185)	T98C-17	181	185	----	<2	6.1	12	<8	538	2	<50	0.192	<2	90	5	48	16
T98C-17(198-202)	T98C-17	198	202	----	<2	5.9	16	<8	564	2	<50	0.197	<2	99	5	42	16
T98C-18(0-4)	T98C-18	0	4	----	4	6.6	56	<8	569	2	<50	0.941	16	71	12	77	50
T98C-18(18-22)	T98C-18	18	22	----	30	4.9	102	<8	961	2	<50	0.197	16	80	12	86	202
T98C-18(38-42)	T98C-18	38	42	----	<2	6.0	<10	<8	572	2	<50	0.208	8	86	8	72	16
T98C-18(58-62)	T98C-18	58	62	----	<2	6.3	12	<8	601	2	<50	0.197	6	97	9	49	17
T98C-18(83-87)	T98C-18	83	87	----	<2	6.4	12	<8	570	2	<50	0.181	3	87	9	94	19

*Other analyses (Appendix #): D =USGS-EDXRF, E =EWU, F =CHEMEX, H =ACZ, ---- = none.

Appendix G. Chemical composition of samples analyzed by ICP-AES at XRAL Labs in Golden, CO using 4 acid dissolution (Appendix_G.xls, Appendix_G.dbf).

Sample No.	Eu (ppm)	Fe (%)	Ga (ppm)	Ho (ppm)	K (%)	La (ppm)	Li (ppm)	Mg (%)	Mn (ppm)	Mo (ppm)	Na (%)	Nb (ppm)	Nd (ppm)	Ni (ppm)	P (ppm)	Pb (ppm)	Sc (ppm)	Sn (ppm)	Sr (ppm)	Ta (ppm)
SAMPLE_NO.	EU_PPM	FE_(%)	GA_PPM	HO_PPM	K_(%)	LA_PPM	LI_PPM	MG_(%)	MN_PPM	MO_PPM	NA_(%)	NB_PPM	ND_PPM	NI_PPM	P_PPM	PB_PPM	SC_PPM	SN_PPM	SR_PPM	TA_PPM
T98R-14(38-42)	3	10.30	9	<4	1.31	25	18	0.465	9080	5	0.145	<4	21	9	0.020	2410	4	<50	18	<40
T98R-14(58-62)	3	8.48	<4	<4	1.24	21	15	0.415	7770	5	0.110	6	18	9	0.015	2460	4	<50	18	<40
T98R-14(78-82)	2	7.51	<4	<4	1.38	24	17	0.420	6990	3	0.145	5	25	13	0.015	3040	4	<50	23	<40
T98R-14(98-102)	3	10.30	<4	<4	1.33	23	16	0.490	9460	5	0.150	5	24	13	0.015	4560	4	<50	24	<40
T98R-14(118-122)	3	9.38	<4	<4	1.42	25	19	0.475	8710	5	0.160	5	25	11	0.015	4930	4	<50	25	<40
T98C-15(0-4)	3	7.45	10	<4	1.74	35	29	0.405	6420	4	0.480	9	31	15	0.050	7460	8	<50	62	<40
T98C-15(18-22)	3	8.85	5	<4	1.86	40	35	0.445	7560	9	0.470	10	40	19	0.055	13970	8	<50	57	<40
T98C-15(38-42)	3	7.28	9	<4	1.84	37	32	0.445	5770	4	0.450	8	35	14	0.050	15410	8	<50	50	<40
T98C-15(58-62)	<2	2.61	25	<4	2.26	47	45	0.720	399	4	0.680	<4	43	19	0.045	42	11	<50	64	<40
T98C-16(0-4)	<2	3.83	19	<4	2.43	43	43	0.635	1950	5	0.685	8	40	24	0.075	1960	11	<50	63	<40
T98C-16(18-22)	<2	6.18	6	<4	1.87	43	34	0.500	3710	4	0.530	11	38	16	0.055	4150	8	<50	59	<40
T98C-16(38-42)	4	12.50	<4	<4	1.16	25	16	0.240	11970	7	0.180	7	21	15	0.025	3720	4	<50	26	<40
T98C-16(58-62)	3	12.40	<4	<4	1.27	25	15	0.295	12190	6	0.130	<4	23	12	0.020	7230	4	<50	19	<40
T98C-16(78-82)	2	10.30	<4	<4	1.46	30	22	0.495	9530	4	0.200	6	28	13	0.025	7820	5	<50	26	<40
T98C-16(98-102)	4	11.00	<4	<4	1.32	26	18	0.520	10360	5	0.155	6	25	13	0.020	6910	4	<50	23	<40
T98C-16(118-122)	3	11.40	<4	<4	1.22	25	17	0.545	10810	6	0.145	5	22	11	0.020	6730	4	<50	22	<40
T98C-16(143-147)	2	9.84	<4	<4	1.35	27	19	0.535	9540	7	0.175	7	25	16	0.025	6990	5	<50	28	<40
T98C-16(168-172)	3	10.60	<4	<4	1.24	24	16	0.530	10450	6	0.125	7	23	14	0.020	5630	4	<50	24	<40
T98C-16(178-182)	4	11.20	<4	5	1.40	24	18	0.565	11230	7	0.140	7	20	12	0.015	5620	4	<50	24	<40
T98C-16(208-212)	3	11.30	<4	<4	1.30	23	18	0.550	11440	6	0.120	4	22	12	0.015	5420	4	<50	24	<40
T98C-17(0-4)	2	3.61	13	<4	2.59	45	45	0.680	1800	5	0.705	10	40	21	0.075	1630	11	<50	66	<40
T98C-17(18-22)	3	7.99	9	<4	1.84	39	28	0.390	6490	6	0.430	10	37	16	0.045	7550	8	<50	44	<40
T98C-17(38-42)	3	10.20	<4	<4	1.58	32	26	0.345	8320	8	0.345	12	33	21	0.045	4650	6	<50	40	<40
T98C-17(58-62)	3	8.09	11	<4	1.95	43	35	0.490	6670	7	0.460	12	41	22	0.065	9440	9	<50	51	<40
T98C-17(78-82)	3	9.68	<4	<4	1.85	37	32	0.460	9200	12	0.390	9	38	16	0.060	14490	8	<50	43	<40
T98C-17(108-112)	<2	2.48	16	<4	2.19	48	41	0.700	382	3	0.640	4	45	17	0.050	237	10	<50	55	<40
T98C-17(128-132)	<2	2.51	21	<4	2.23	48	43	0.700	362	3	0.635	<4	46	17	0.050	91	10	<50	55	<40
T98C-17(153-157)	<2	2.16	17	<4	2.05	45	36	0.610	215	3	0.555	7	42	15	0.045	38	9	<50	48	<40
T98C-17(181-185)	<2	2.28	18	<4	2.11	48	38	0.630	138	4	0.625	9	43	17	0.045	33	10	<50	53	<40
T98C-17(198-202)	<2	2.10	18	<4	2.07	51	42	0.675	122	4	0.620	8	52	18	0.045	26	10	<50	53	<40
T98C-18(0-4)	<2	3.67	25	<4	1.88	32	38	0.645	1660	5	1.175	11	28	22	0.090	1380	9	<50	134	<40
T98C-18(18-22)	3	8.36	<4	<4	1.75	37	30	0.420	6850	7	0.435	8	34	16	0.050	11330	7	<50	49	<40
T98C-18(38-42)	<2	2.36	15	<4	2.12	45	39	0.635	426	4	0.575	7	40	17	0.065	137	9	<50	53	<40
T98C-18(58-62)	<2	2.52	23	<4	2.19	48	41	0.685	347	3	0.600	4	43	18	0.065	44	10	<50	54	<40
T98C-18(83-87)	2	2.62	17	<4	2.20	47	41	0.655	345	4	0.585	10	48	20	0.070	26	10	<50	52	<40

*Other analyses (Appendix #): D =USGS-EDXRF, E =EWU,
F =CHEMEX, H =ACZ, ---- = none.

Appendix G. Chemical composition of samples analyzed by ICP-AES at XRAL Labs in Golden, CO using 4 acid dissolution (Appendix_G.xls, Appendix_G.dbf).

Sample No.	Th (ppm)	Ti (%)	U (ppm)	V (ppm)	Y (ppm)	Yb (ppm)	Zn (ppm)
SAMPLE_NO.	TH_PPM	TI_%	U_PPM	V_PPM	Y_PPM	YB_PPM	ZN_PPM
T98R-14(38-42)	11	0.088	<100	25	7	<1	801
T98R-14(58-62)	11	0.075	<100	22	6	<1	2100
T98R-14(78-82)	9	0.081	<100	25	6	<1	2500
T98R-14(98-102)	9	0.094	<100	26	7	<1	3780
T98R-14(118-122)	8	0.1	<100	28	7	<1	3720
T98C-15(0-4)	12	0.206	<100	46	15	1	2030
T98C-15(18-22)	13	0.231	<100	48	17	1	3380
T98C-15(38-42)	12	0.188	<100	45	16	1	1770
T98C-15(58-62)	14	0.294	<100	62	17	2	335
T98C-16(0-4)	14	0.219	<100	58	18	2	1210
T98C-16(18-22)	14	0.194	<100	49	16	2	1580
T98C-16(38-42)	10	0.094	<100	26	10	<1	2260
T98C-16(58-62)	8	0.1	<100	26	8	<1	1510
T98C-16(78-82)	12	0.106	<100	32	9	<1	1790
T98C-16(98-102)	10	0.119	<100	28	8	<1	1570
T98C-16(118-122)	11	0.1	<100	27	8	<1	1910
T98C-16(143-147)	11	0.094	<100	29	9	<1	5180
T98C-16(168-172)	10	0.094	<100	26	7	<1	5520
T98C-16(178-182)	7	0.11	<100	27	7	<1	4450
T98C-16(208-212)	9	0.075	<100	25	7	<1	4740
T98C-17(0-4)	14	0.256	<100	62	19	2	1110
T98C-17(18-22)	14	0.163	<100	45	13	1	2470
T98C-17(38-42)	12	0.156	<100	39	13	1	2360
T98C-17(58-62)	14	0.188	<100	51	16	1	2970
T98C-17(78-82)	15	0.163	<100	48	15	1	3360
T98C-17(108-112)	16	0.275	<100	55	18	2	305
T98C-17(128-132)	16	0.281	<100	56	21	2	195
T98C-17(153-157)	15	0.256	<100	49	17	2	139
T98C-17(181-185)	15	0.269	<100	51	19	2	139
T98C-17(198-202)	18	0.294	<100	54	20	2	138
T98C-18(0-4)	10	0.275	<100	58	17	2	1440
T98C-18(18-22)	13	0.175	<100	45	15	1	2200
T98C-18(38-42)	10	0.263	<100	51	18	2	442
T98C-18(58-62)	16	0.269	<100	56	20	2	303
T98C-18(83-87)	15	0.244	<100	56	19	2	257

*Other analyses (Appendix #): D =USGS-EDXRF, E =EWU,
F =CHEMEX, H =ACZ, ---- = none.

Appendix G. Chemical composition of samples analyzed by ICP-AES at XRAL Labs in Golden, CO using 4 acid dissolution (Appendix_G.xls, Appendix_G.dbf).

Sample No.	Site ID	Depth interval, top (cm)	Depth interval, bottom (cm)	*Other Analyses (appendix #)	Ag (ppm)	Al (%)	As (ppm)	Au (ppm)	Ba (ppm)	Be (ppm)	Bi (ppm)	Ca (%)	Cd (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cu (ppm)
SAMPLE_NO.	SITE_ID	INT_TOP_CM	INT_BT_M_CM	OTHR_ANALYS	AG_PPM	AL_(%)	AS_PPM	AU_PPM	BA_PPM	BE_PPM	BI_PPM	CA_(%)	CD_PPM	CE_PPM	CO_PPM	CR_PPM	CU_PPM
T98C-18(103-107)	T98C-18	103	107	----	<2	6.3	15	<8	536	2	<50	0.165	<2	85	8	92	17
T98C-18(128-132)	T98C-18	128	132	----	<2	6.4	16	<8	532	2	<50	0.165	<2	86	9	54	19
T98C-18(158-162)	T98C-18	158	162	----	<2	6.6	13	<8	561	2	<50	0.181	<2	85	8	92	17
T98C-18(173-177)	T98C-18	173	177	----	<2	6.3	10	<8	583	2	<50	0.181	<2	96	7	67	26
T98C-20(0-4)	T98C-20	0	4	----	4	6.7	23	<8	527	2	<50	0.866	6	61	8	78	62
T98C-20(18-22)	T98C-20	18	22	----	32	6.2	80	<8	946	2	<50	0.278	26	91	15	78	191
T98C-20(38-42)	T98C-20	38	42	----	28	6.6	41	<8	829	2	<50	0.304	12	76	11	86	165
T98C-20(43-47)	T98C-20	43	47	----	<2	7.3	13	<8	630	2	<50	0.256	8	93	10	80	22
T98C-21(0-4)	T98C-21	0	4	----	5	6.5	52	<8	647	2	<50	0.401	15	83	14	94	64
T98C-21(18-22)	T98C-21	18	22	----	11	6.5	136	<8	677	2	<50	0.379	19	89	16	91	118
T98C-21(38-42)	T98C-21	38	42	----	16	3.6	521	<8	480	1	<50	0.251	26	66	13	63	117
T98C-21(58-62)	T98C-21	58	62	----	14	3.2	262	<8	432	1	<50	0.267	41	52	17	36	109
T98C-21(78-82)	T98C-21	78	82	----	15	3.0	213	<8	482	1	<50	0.229	16	51	16	59	110
T98C-21(108-112)	T98C-21	108	112	----	16	3.3	469	<8	570	1	<50	0.315	22	54	24	55	130
T98C-21(128-132)	T98C-21	128	132	----	14	3.1	235	<8	499	1	<50	0.304	19	58	17	58	110
T98C-21(153-157)	T98C-21	153	157	----	18	3.0	316	<8	489	<1	<50	0.310	16	52	19	41	113
T98C-21(183-187)	T98C-21	183	187	----	15	2.8	276	<8	439	<1	<50	0.347	17	41	16	77	108
T98C-21(198-202)	T98C-21	198	202	----	20	2.4	377	<8	361	<1	<50	0.336	14	46	19	54	122
T98C-22(0-4)	T98C-22	0	4	----	7	5.0	32	<8	425	1	<50	0.770	7	47	8	69	87
T98C-22(18-22)	T98C-22	18	22	----	8	6.9	32	<8	688	2	<50	0.288	5	87	9	64	69
T98C-22(38-42)	T98C-22	38	42	----	<2	6.1	<10	<8	495	2	<50	0.262	<2	78	7	87	20
T98C-22(48-52)	T98C-22	48	52	----	<2	6.3	12	<8	514	2	<50	0.299	<2	80	8	38	20
T98C-22(58-62)	T98C-22	58	62	----	<2	6.7	16	<8	597	2	<50	0.358	<2	99	8	103	19
T98C-22(78-82)	T98C-22	78	82	----	<2	6.4	11	<8	580	2	<50	0.379	<2	92	8	73	15
T98R-23(0-4)	T98R-23	0	4	----	6	5.6	138	<8	551	2	<50	0.807	15	49	15	78	173
T98R-23(18-22)	T98R-23	18	22	----	21	8.0	112	<8	1020	3	<50	0.235	13	56	12	69	189
T98R-23(28-32)	T98R-23	28	32	----	<2	6.8	11	<8	641	2	<50	0.427	10	66	13	85	24
T98R-23(38-42)	T98R-23	38	42	----	<2	6.8	14	<8	702	2	<50	0.401	<2	78	11	46	19
T98R-24(0-4)	T98R-24	0	4	----	5	5.5	28	<8	333	1	<50	1.925	262	32	105	60	79
T98R-24(18-22)	T98R-24	18	22	----	11	2.5	378	<8	349	<1	<50	0.160	6	43	14	38	75
T98R-24(38-42)	T98R-24	38	42	----	14	2.6	357	<8	377	<1	<50	0.497	9	49	14	50	91
T98R-24(58-62)	T98R-24	58	62	----	18	3.3	434	<8	467	1	<50	0.636	27	40	25	56	134
T98R-24(78-82)	T98R-24	78	82	----	31	5.0	485	<8	655	2	<50	0.433	54	55	41	62	258
T98C-25(0-4)	T98C-25	0	4	----	3	6.4	35	<8	575	2	<50	0.989	6	66	10	85	43
T98C-25(18-22)	T98C-25	18	22	----	<2	6.3	13	<8	629	2	<50	0.262	9	83	9	93	20

*Other analyses (Appendix #): D =USGS-EDXRF, E =EWU, F =CHEMEX, H =ACZ, ---- = none.

Appendix G. Chemical composition of samples analyzed by ICP-AES at XRAL Labs in Golden, CO using 4 acid dissolution (Appendix_G.xls, Appendix_G.dbf).

Sample No.	Eu (ppm)	Fe (%)	Ga (ppm)	Ho (ppm)	K (%)	La (ppm)	Li (ppm)	Mg (%)	Mn (ppm)	Mo (ppm)	Na (%)	Nb (ppm)	Nd (ppm)	Ni (ppm)	P (ppm)	Pb (ppm)	Sc (ppm)	Sn (ppm)	Sr (ppm)	Ta (ppm)
SAMPLE_NO.	EU_PPM	FE_(%)	GA_PPM	HO_PPM	K_(%)	LA_PPM	LI_PPM	MG_(%)	MN_PPM	MO_PPM	NA_(%)	NB_PPM	ND_PPM	NI_PPM	P_PPM	PB_PPM	SC_PPM	SN_PPM	SR_PPM	TA_PPM
T98C-18(103-107)	<2	2.59	21	<4	2.12	45	39	0.640	324	5	0.570	6	40	18	0.065	19	11	<50	51	<40
T98C-18(128-132)	<2	2.74	23	<4	2.12	46	39	0.645	317	4	0.580	<4	40	19	0.060	19	10	<50	52	<40
T98C-18(158-162)	2	2.68	22	<4	2.27	46	42	0.670	285	4	0.635	<4	41	18	0.050	21	10	<50	55	<40
T98C-18(173-177)	<2	2.47	23	<4	2.19	49	41	0.695	254	4	0.615	<4	44	22	0.045	19	11	<50	55	<40
T98C-20(0-4)	<2	2.48	22	<4	1.95	28	33	0.620	769	5	1.055	9	24	20	0.105	1150	10	<50	118	<40
T98C-20(18-22)	3	6.95	16	<4	2.08	44	39	0.545	4580	5	0.565	15	41	20	0.065	10970	10	<50	61	<40
T98C-20(38-42)	3	5.55	11	<4	2.25	38	41	0.555	3460	5	0.590	10	35	19	0.080	10250	10	<50	62	<40
T98C-20(43-47)	<2	2.73	25	<4	2.25	47	50	0.780	455	5	0.695	5	44	21	0.055	82	12	<50	61	<40
T98C-21(0-4)	<2	3.79	21	<4	2.38	39	41	0.700	2240	4	0.570	17	37	23	0.095	1870	11	<50	57	<40
T98C-21(18-22)	2	4.86	10	<4	2.15	42	41	0.660	2750	5	0.560	13	41	23	0.080	3290	11	<50	63	<40
T98C-21(38-42)	4	11.20	<4	<4	1.36	30	20	0.335	8880	8	0.255	7	27	15	0.060	3580	5	<50	41	<40
T98C-21(58-62)	2	7.43	<4	5	1.18	25	17	0.455	6190	4	0.260	8	22	17	0.030	3740	5	<50	31	<40
T98C-21(78-82)	3	9.90	<4	<4	1.31	25	15	0.505	8970	6	0.165	6	19	14	0.020	3700	4	<50	23	<40
T98C-21(108-112)	3	9.78	<4	<4	1.32	25	16	0.515	8650	8	0.215	11	23	18	0.030	4080	5	<50	29	<40
T98C-21(128-132)	3	10.40	<4	<4	1.32	24	17	0.510	9720	6	0.175	8	23	14	0.020	4320	4	<50	24	<40
T98C-21(153-157)	3	10.70	<4	<4	1.21	25	14	0.500	9240	7	0.175	11	16	14	0.020	3440	4	<50	25	<40
T98C-21(183-187)	2	10.80	<4	4	1.16	20	16	0.515	9810	6	0.170	5	18	15	0.020	3700	4	<50	23	<40
T98C-21(198-202)	3	12.70	<4	<4	1.09	19	14	0.540	11820	6	0.115	8	15	13	0.015	2630	3	<50	18	<40
T98C-22(0-4)	<2	1.90	19	<4	1.35	22	20	0.425	595	4	0.830	8	18	13	0.120	1550	8	<50	112	<40
T98C-22(18-22)	2	3.56	12	<4	1.84	45	40	0.610	542	5	0.560	11	36	22	0.100	2660	12	<50	63	<40
T98C-22(38-42)	<2	2.18	17	<4	1.77	39	35	0.540	198	4	0.525	5	34	19	0.070	35	10	<50	59	<40
T98C-22(48-52)	<2	2.46	17	<4	1.91	42	36	0.560	147	3	0.570	5	34	17	0.065	26	10	<50	68	<40
T98C-22(58-62)	<2	2.53	23	<4	2.07	47	44	0.695	104	3	0.625	8	40	21	0.040	33	12	<50	73	<40
T98C-22(78-82)	<2	2.37	20	<4	2.05	45	39	0.670	93	3	0.690	5	38	17	0.025	22	10	<50	81	<40
T98R-23(0-4)	<2	5.46	16	<4	1.57	23	25	0.515	400	6	0.825	11	24	20	0.175	3400	8	<50	108	<40
T98R-23(18-22)	<2	6.05	14	<4	3.21	29	30	0.450	695	6	0.305	11	23	19	0.055	5800	11	<50	42	<40
T98R-23(28-32)	<2	2.72	29	<4	1.84	34	40	0.660	447	5	0.540	10	30	23	0.065	43	12	<50	71	<40
T98R-23(38-42)	<2	2.35	29	<4	2.24	43	39	0.720	537	4	0.600	4	31	23	0.010	28	12	<50	80	<40
T98R-24(0-4)	<2	2.25	14	<4	1.03	14	17	0.645	12730	5	1.845	6	16	43	0.100	242	6	<50	238	<40
T98R-24(18-22)	3	10.60	<4	<4	1.06	24	11	0.435	8660	5	0.125	7	16	10	0.015	1890	3	<50	16	<40
T98R-24(38-42)	2	10.30	5	<4	1.12	24	12	0.495	8800	6	0.155	<4	18	11	0.020	2330	4	<50	23	<40
T98R-24(58-62)	2	10.40	<4	<4	1.37	23	14	0.515	9450	7	0.160	5	18	19	0.020	3260	4	<50	26	<40
T98R-24(78-82)	2	10.70	13	<4	2.07	30	20	0.610	10040	9	0.175	6	26	29	0.030	5840	7	<50	30	<40
T98C-25(0-4)	<2	2.91	20	<4	1.93	30	34	0.630	1030	4	1.055	6	27	16	0.095	839	10	<50	129	<40
T98C-25(18-22)	<2	2.64	18	<4	2.12	44	42	0.645	669	5	0.625	7	39	19	0.075	325	10	<50	57	<40

*Other analyses (Appendix #): D =USGS-EDXRF, E =EWU,
F =CHEMEX, H =ACZ, ---- = none.

Appendix G. Chemical composition of samples analyzed by ICP-AES at XRAL Labs in Golden, CO using 4 acid dissolution (Appendix_G.xls, Appendix_G.dbf).

Sample No.	Th (ppm)	Ti (%)	U (ppm)	V (ppm)	Y (ppm)	Yb (ppm)	Zn (ppm)
SAMPLE_NO.	TH_PPM	TI_%	U_PPM	V_PPM	Y_PPM	YB_PPM	ZN_PPM
T98C-18(103-107)	16	0.244	<100	55	19	2	188
T98C-18(128-132)	16	0.294	<100	56	21	2	176
T98C-18(158-162)	15	0.281	<100	58	20	2	183
T98C-18(173-177)	15	0.281	<100	58	20	2	179
T98C-20(0-4)	9	0.256	<100	55	14	2	857
T98C-20(18-22)	14	0.219	<100	56	20	3	3140
T98C-20(38-42)	14	0.25	<100	55	17	2	1850
T98C-20(43-47)	15	0.294	<100	65	20	2	509
T98C-21(0-4)	13	0.219	<100	59	17	2	1370
T98C-21(18-22)	13	0.231	<100	59	20	2	1610
T98C-21(38-42)	11	0.106	<100	32	12	1	2010
T98C-21(58-62)	12	0.15	<100	30	15	<1	3270
T98C-21(78-82)	11	0.106	<100	28	8	<1	2440
T98C-21(108-112)	11	0.125	<100	29	11	<1	2660
T98C-21(128-132)	11	0.106	<100	26	9	<1	2690
T98C-21(153-157)	10	0.131	<100	26	10	<1	2300
T98C-21(183-187)	9	0.081	<100	25	8	<1	2320
T98C-21(198-202)	11	0.063	<100	22	7	<1	2360
T98C-22(0-4)	6	0.225	<100	45	14	1	437
T98C-22(18-22)	15	0.294	<100	62	24	3	659
T98C-22(38-42)	13	0.275	<100	56	20	2	228
T98C-22(48-52)	12	0.263	<100	60	22	2	151
T98C-22(58-62)	14	0.281	<100	69	21	2	83
T98C-22(78-82)	14	0.294	<100	59	18	2	61
T98R-23(0-4)	9	0.206	<100	50	17	2	2020
T98R-23(18-22)	12	0.181	<100	61	13	2	2420
T98R-23(28-32)	11	0.263	<100	59	19	2	1240
T98R-23(38-42)	13	0.281	<100	70	21	2	214
T98R-24(0-4)	<6	0.275	<100	42	12	1	5430
T98R-24(18-22)	9	0.075	<100	21	7	<1	1150
T98R-24(38-42)	11	0.081	<100	24	8	<1	1480
T98R-24(58-62)	9	0.081	<100	27	9	<1	2860
T98R-24(78-82)	10	0.106	<100	39	11	1	5090
T98C-25(0-4)	8	0.263	<100	57	15	2	770
T98C-25(18-22)	13	0.256	<100	54	19	2	715

*Other analyses (Appendix #): D =USGS-EDXRF, E =EWU,
F =CHEMEX, H =ACZ, ---- = none.

Appendix G. Chemical composition of samples analyzed by ICP-AES at XRAL Labs in Golden, CO using 4 acid dissolution (Appendix_G.xls, Appendix_G.dbf).

Sample No.	Site ID	Depth interval, top (cm)	Depth interval, bottom (cm)	*Other Analyses (appendix #)	Ag (ppm)	Al (%)	As (ppm)	Au (ppm)	Ba (ppm)	Be (ppm)	Bi (ppm)	Ca (%)	Cd (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cu (ppm)
SAMPLE_NO.	SITE_ID	INT_TOP_CM	INT_BT_M_CM	OTHR_ANALYS	AG_PPM	AL_(%)	AS_PPM	AU_PPM	BA_PPM	BE_PPM	BI_PPM	CA_(%)	CD_PPM	CE_PPM	CO_PPM	CR_PPM	CU_PPM
T98C-25(38-42)	T98C-25	38	42	----	<2	6.8	13	<8	637	2	<50	0.267	<2	84	10	92	19
T98C-25(58-62)	T98C-25	58	62	----	<2	7.4	14	<8	689	2	<50	0.229	<2	99	11	100	20
T98C-25(78-82)	T98C-25	78	82	----	<2	6.5	13	<8	584	2	<50	0.208	<2	90	10	48	18
T98C-25(98-102)	T98C-25	98	102	----	<2	6.0	16	<8	556	2	<50	0.219	<2	92	8	80	14
T98C-25(118-122)	T98C-25	118	122	----	<2	5.7	10	<8	513	2	<50	0.213	<2	86	8	66	14
T98C-25(138-142)	T98C-25	138	142	----	<2	6.0	13	<8	529	2	<50	0.213	<2	90	8	88	15
T98C-25(153-157)	T98C-25	153	157	----	<2	6.6	12	<8	554	2	<50	0.224	<2	87	8	107	17
T98C-25(173-177)	T98C-25	173	177	----	<2	7.3	12	<8	586	2	<50	0.219	<2	96	6	96	17
T98C-26(0-4)	T98C-26	0	4	----	<2	6.5	20	<8	601	2	<50	0.467	6	100	10	64	35
T98C-26(18-22)	T98C-26	18	22	----	4	7.8	23	<8	772	3	<50	0.415	5	119	8	46	52
T98C-26(38-42)	T98C-26	38	42	----	<2	7.7	<10	<8	677	2	<50	0.368	<2	109	7	86	24
T98R-27(0-4)	T98R-27	0	4	----	8	5.9	58	<8	673	2	<50	0.798	16	64	10	71	65
T98R-27(8-12)	T98R-27	8	12	----	29	5.2	42	<8	866	2	<50	0.305	9	78	6	53	184
T98R-27(18-22)	T98R-27	18	22	----	<2	6.2	<10	<8	653	2	<50	0.326	4	73	4	36	16
T98R-27(38-42)	T98R-27	38	42	----	<2	5.8	<10	<8	567	2	<50	0.273	<2	82	4	45	11
T98R-27(58-62)	T98R-27	58	62	----	<2	6.0	<10	<8	504	2	<50	0.278	<2	90	7	52	11
T98R-27(78-82)	T98R-27	78	82	----	<2	6.3	10	<8	575	2	<50	0.406	<2	87	7	40	16
T98R-27(96-100)	T98R-27	96	100	----	<2	7.0	13	<8	624	2	<50	0.588	<2	90	9	39	24
T98R-27(118-122)	T98R-27	118	122	----	<2	7.4	16	<8	685	2	<50	0.802	<2	88	11	34	28
T98R-27(138-142)	T98R-27	138	142	----	<2	5.1	<10	<8	473	2	<50	0.181	<2	92	10	88	13
T98R-27(163-167)	T98R-27	163	167	----	<2	5.1	55	<8	455	2	<50	0.192	<2	87	11	39	12
T98R-27(178-182)	T98R-27	178	182	----	<2	4.5	48	<8	468	2	<50	0.165	<2	87	18	50	9
T98R-28(0-4)	T98R-28	0	4	----	18	4.7	82	<8	697	2	<50	0.525	14	56	6	59	99
T98R-28(8-12)	T98R-28	8	12	----	26	4.9	107	<8	925	2	<50	0.215	9	77	8	56	154
T98R-28(18-22)	T98R-28	18	22	----	17	5.2	36	<8	710	2	<50	0.315	14	67	9	71	108
T98R-28(38-42)	T98R-28	38	42	----	<2	6.6	<10	<8	498	2	<50	0.173	13	75	3	80	29
T98R-28(58-62)	T98R-28	58	62	----	<2	6.8	<10	<8	589	2	<50	0.168	4	85	3	43	20
T98R-28(78-82)	T98R-28	78	82	----	<2	6.0	10	<8	503	2	<50	0.165	<2	74	5	68	9
T98R-28(88-92)	T98R-28	88	92	----	<2	7.1	<10	<8	606	2	<50	0.187	<2	98	4	98	11
T98R-28(108-112)	T98R-28	108	112	----	<2	6.7	<10	<8	567	2	<50	0.197	<2	96	5	54	12
T98R-28(133-137)	T98R-28	133	137	----	<2	6.8	<10	<8	573	2	<50	0.256	<2	94	6	87	18
T98R-29(0-4)	T98R-29	0	4	----	16	5.6	43	<8	602	2	<50	0.683	15	57	5	72	90
T98R-29(18-22)	T98R-29	18	22	----	84	5.1	80	<8	1720	2	<50	0.158	6	72	7	75	495
T98R-29(38-42)	T98R-29	38	42	----	<2	6.9	<10	<8	652	2	<50	0.226	3	91	5	87	18
T98R-29(68-72)	T98R-29	68	72	----	<2	6.6	<10	<8	592	2	<50	0.289	3	85	5	22	16

*Other analyses (Appendix #): D =USGS-EDXRF, E =EWU, F =CHEMEX, H =ACZ, ---- = none.

Appendix G. Chemical composition of samples analyzed by ICP-AES at XRAL Labs in Golden, CO using 4 acid dissolution (Appendix_G.xls, Appendix_G.dbf).

Sample No.	Eu (ppm)	Fe (%)	Ga (ppm)	Ho (ppm)	K (%)	La (ppm)	Li (ppm)	Mg (%)	Mn (ppm)	Mo (ppm)	Na (%)	Nb (ppm)	Nd (ppm)	Ni (ppm)	P (ppm)	Pb (ppm)	Sc (ppm)	Sn (ppm)	Sr (ppm)	Ta (ppm)
SAMPLE_NO.	EU_PPM	FE_(%)	GA_PPM	HO_PPM	K_(%)	LA_PPM	LI_PPM	MG_(%)	MN_PPM	MO_PPM	NA_(%)	NB_PPM	ND_PPM	NI_PPM	P_PPM	PB_PPM	SC_PPM	SN_PPM	SR_PPM	TA_PPM
T98C-25(38-42)	<2	2.81	20	<4	2.17	46	44	0.715	628	4	0.580	10	43	22	0.075	39	12	<50	54	<40
T98C-25(58-62)	2	3.04	19	<4	2.34	51	49	0.820	629	4	0.630	5	47	22	0.060	26	13	<50	54	<40
T98C-25(78-82)	<2	2.62	23	<4	2.15	46	42	0.685	453	3	0.615	5	40	18	0.050	31	11	<50	53	<40
T98C-25(98-102)	<2	2.33	17	<4	2.13	48	39	0.625	360	3	0.635	<4	43	15	0.040	34	10	<50	56	<40
T98C-25(118-122)	<2	2.17	23	<4	2.07	45	36	0.600	308	3	0.615	5	38	15	0.035	16	9	<50	55	<40
T98C-25(138-142)	<2	2.40	24	<4	2.14	46	38	0.625	397	3	0.625	<4	41	16	0.040	16	10	<50	57	<40
T98C-25(153-157)	<2	2.58	22	<4	2.24	45	42	0.685	263	4	0.630	5	39	17	0.055	17	11	<50	55	<40
T98C-25(173-177)	<2	2.26	26	<4	2.35	50	45	0.745	102	5	0.640	<4	45	20	0.050	18	12	<50	56	<40
T98C-26(0-4)	2	3.26	14	<4	2.01	46	26	0.535	847	6	0.705	5	45	18	0.095	491	12	<50	86	<40
T98C-26(18-22)	3	3.04	28	<4	2.03	56	31	0.595	420	5	0.695	5	55	22	0.080	1950	15	<50	90	<40
T98C-26(38-42)	<2	2.78	26	<4	1.72	54	28	0.535	288	5	0.605	9	52	23	0.085	49	14	<50	81	<40
T98R-27(0-4)	2	5.23	20	<4	1.91	31	28	0.645	4240	5	0.910	9	27	10	0.085	2540	10	<50	107	<40
T98R-27(8-12)	2	6.03	7	<4	1.95	37	27	0.515	4200	5	0.560	11	37	8	0.055	10930	9	<50	62	<40
T98R-27(18-22)	<2	1.92	24	<4	2.28	42	34	0.645	241	4	0.715	4	35	11	0.045	191	10	<50	72	<40
T98R-27(38-42)	<2	2.04	21	<4	2.28	44	33	0.650	118	3	0.630	<4	39	11	0.020	24	10	<50	66	<40
T98R-27(58-62)	<2	2.29	21	<4	2.16	44	35	0.610	142	2	0.640	6	36	14	0.010	17	9	<50	68	<40
T98R-27(78-82)	<2	2.20	27	<4	2.12	45	35	0.625	187	3	0.795	4	39	15	0.010	15	10	<50	91	<40
T98R-27(96-100)	2	2.47	23	<4	2.16	47	37	0.620	385	3	1.090	<4	40	17	0.015	14	10	<50	128	<40
T98R-27(118-122)	<2	2.71	26	<4	1.88	39	36	0.560	717	4	1.450	6	34	21	0.020	11	10	<50	172	<40
T98R-27(138-142)	<2	2.00	15	<4	2.10	47	31	0.545	252	2	0.500	6	40	12	0.015	10	8	<50	50	<40
T98R-27(163-167)	<2	3.98	13	<4	1.99	46	29	0.525	307	3	0.470	5	41	16	0.025	8	8	<50	50	<40
T98R-27(178-182)	<2	6.89	8	<4	1.78	43	26	0.485	1590	4	0.405	11	37	12	0.035	8	7	<50	44	<40
T98R-28(0-4)	2	6.99	<4	<4	1.56	27	23	0.535	3710	4	0.630	9	27	8	0.095	6130	8	<50	76	<40
T98R-28(8-12)	3	9.94	5	<4	1.92	36	27	0.575	6930	8	0.350	11	33	8	0.050	9810	9	<50	40	<40
T98R-28(18-22)	<2	4.79	9	<4	1.63	30	23	0.420	2740	4	0.530	10	30	13	0.070	6490	10	<50	56	<40
T98R-28(38-42)	<2	1.32	27	<4	1.68	33	29	0.385	181	4	0.445	4	31	21	0.115	163	13	<50	45	<40
T98R-28(58-62)	<2	1.48	27	<4	2.06	40	36	0.540	151	4	0.555	7	37	15	0.050	87	13	<50	52	<40
T98R-28(78-82)	<2	1.38	26	<4	1.86	37	35	0.485	136	5	0.545	8	34	17	0.015	33	10	<50	53	<40
T98R-28(88-92)	<2	1.76	29	<4	2.23	50	42	0.610	110	4	0.635	8	45	16	0.015	19	12	<50	60	<40
T98R-28(108-112)	<2	1.71	26	<4	2.13	44	40	0.560	75	3	0.640	5	39	14	0.010	18	11	<50	61	<40
T98R-28(133-137)	<2	1.87	28	<4	2.15	46	39	0.595	86	3	0.700	5	40	17	0.015	27	11	<50	71	<40
T98R-29(0-4)	<2	3.79	14	<4	1.70	26	24	0.480	2520	5	0.800	11	26	13	0.095	4950	9	<50	98	<40
T98R-29(18-22)	4	10.70	11	<4	1.97	34	26	0.435	6030	10	0.325	8	35	3	0.050	30680	9	<50	36	<40
T98R-29(38-42)	<2	2.40	26	<4	2.35	46	40	0.760	312	4	0.650	6	42	15	0.060	343	13	<50	58	<40
T98R-29(68-72)	<2	2.27	18	<4	2.29	44	38	0.705	327	4	0.745	5	39	13	0.035	231	12	<50	67	<40

*Other analyses (Appendix #): D =USGS-EDXRF, E =EWU,
F =CHEMEX, H =ACZ, ---- = none.

Appendix G. Chemical composition of samples analyzed by ICP-AES at XRAL Labs in Golden, CO using 4 acid dissolution (Appendix_G.xls, Appendix_G.dbf).

Sample No.	Th (ppm)	Ti (%)	U (ppm)	V (ppm)	Y (ppm)	Yb (ppm)	Zn (ppm)
SAMPLE_NO.	TH_PPM	TI_%	U_PPM	V_PPM	Y_PPM	YB_PPM	ZN_PPM
T98C-25(38-42)	15	0.263	<100	60	22	2	545
T98C-25(58-62)	17	0.319	<100	69	26	3	131
T98C-25(78-82)	13	0.256	<100	58	20	2	72
T98C-25(98-102)	13	0.281	<100	53	20	2	68
T98C-25(118-122)	15	0.275	<100	50	18	2	53
T98C-25(138-142)	15	0.275	<100	53	19	2	54
T98C-25(153-157)	15	0.288	<100	59	20	2	58
T98C-25(173-177)	15	0.306	<100	60	20	2	60
T98C-26(0-4)	15	0.288	<100	9	21	3	435
T98C-26(18-22)	19	0.364	<100	75	27	3	604
T98C-26(38-42)	17	0.37	<100	69	26	3	258
T98R-27(0-4)	8	0.253	<100	56	16	2	1230
T98R-27(8-12)	12	0.241	<100	48	13	2	1130
T98R-27(18-22)	10	0.306	<100	53	12	2	293
T98R-27(38-42)	14	0.282	<100	52	14	2	160
T98R-27(58-62)	13	0.269	<100	55	14	2	118
T98R-27(78-82)	13	0.294	<100	55	17	2	133
T98R-27(96-100)	13	0.313	<100	55	20	2	135
T98R-27(118-122)	11	0.344	<100	51	25	2	185
T98R-27(138-142)	16	0.256	<100	49	17	2	91
T98R-27(163-167)	13	0.275	<100	47	17	2	97
T98R-27(178-182)	14	0.219	<100	43	14	2	56
T98R-28(0-4)	7	0.188	<100	44	13	1	2210
T98R-28(8-12)	12	0.17	<100	45	15	2	2340
T98R-28(18-22)	6	0.206	<100	44	16	2	984
T98R-28(38-42)	13	0.264	<100	52	21	2	285
T98R-28(58-62)	14	0.294	<100	59	16	2	185
T98R-28(78-82)	13	0.25	<100	55	13	1	134
T98R-28(88-92)	16	0.313	<100	65	18	2	157
T98R-28(108-112)	14	0.275	<100	57	18	2	121
T98R-28(133-137)	13	0.275	<100	57	22	2	120
T98R-29(0-4)	10	0.223	<100	49	13	2	1350
T98R-29(18-22)	14	0.153	<100	44	15	2	2160
T98R-29(38-42)	17	0.282	<100	60	17	2	319
T98R-29(68-72)	9	0.276	<100	56	17	2	236

*Other analyses (Appendix #): D =USGS-EDXRF, E =EWU,
F =CHEMEX, H =ACZ, ---- = none.

Appendix G. Chemical composition of samples analyzed by ICP-AES at XRAL Labs in Golden, CO using 4 acid dissolution (Appendix_G.xls, Appendix_G.dbf).

Sample No.	Site ID	Depth interval, top (cm)	Depth interval, bottom (cm)	*Other Analyses (appendix #)	Ag (ppm)	Al (%)	As (ppm)	Au (ppm)	Ba (ppm)	Be (ppm)	Bi (ppm)	Ca (%)	Cd (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cu (ppm)
SAMPLE_NO.	SITE_ID	INT_TOP_CM	INT_BT_M_CM	OTHR_ANALYS	AG_PPM	AL_(%)	AS_PPM	AU_PPM	BA_PPM	BE_PPM	BI_PPM	CA_(%)	CD_PPM	CE_PPM	CO_PPM	CR_PPM	CU_PPM
T98R-29(88-92)	T98R-29	88	92	----	<2	6.4	<10	<8	536	2	<50	0.315	<2	86	5	91	10
T98R-29(98-102)	T98R-29	98	102	----	<2	6.1	<10	<8	518	2	<50	0.262	<2	92	4	72	11
T98R-29(118-122)	T98R-29	118	122	----	<2	5.9	12	<8	528	2	<50	0.267	<2	89	4	57	8
T98R-30(0-4)	T98R-30	0	4	----	5	6.1	33	<8	617	2	<50	1.024	10	60	9	64	48
T98R-30(6-10)	T98R-30	6	10	----	12	5.2	78	<8	691	2	<50	0.462	12	71	8	76	68
T98R-30(18-22)	T98R-30	18	22	----	<2	6.1	12	<8	720	2	<50	0.404	<2	95	6	82	19
T98R-30(38-42)	T98R-30	38	42	----	<2	6.3	<10	<8	643	2	<50	0.352	<2	95	6	69	18
T98R-30(58-62)	T98R-30	58	62	----	<2	6.5	14	<8	568	2	<50	0.326	<2	85	8	92	17
T98R-30(78-82)	T98R-30	78	82	----	<2	6.1	15	<8	564	2	<50	0.294	<2	95	8	53	18
T98R-31(0-4)	T98R-31	0	4	----	6	6.6	49	<8	653	2	<50	0.368	11	83	9	81	58
T98R-31(18-22)	T98R-31	18	22	----	19	3.9	333	<8	636	1	<50	0.168	23	77	14	53	113
T98R-31(38-42)	T98R-31	38	42	----	34	3.7	270	<8	947	1	<50	0.126	5	72	9	54	184
T98R-31(58-62)	T98R-31	58	62	----	34	3.6	98	<8	848	1	<50	0.105	12	67	11	51	197
T98R-31(73-77)	T98R-31	73	77	----	28	3.2	140	<8	786	1	<50	0.110	24	57	11	53	132
T98R-31(108-112)	T98R-31	108	112	----	34	2.9	61	<8	1020	1	<50	0.194	15	56	9	49	217
T98R-31(133-137)	T98R-31	133	137	----	35	3.1	71	<8	1100	1	<50	0.247	21	56	9	53	195
T98R-31(158-162)	T98R-31	158	162	----	43	3.7	90	<8	1270	1	<50	0.284	31	59	7	55	241
T98R-31(173-177)	T98R-31	173	177	----	33	3.1	96	<8	1340	1	<50	0.268	21	58	7	55	215
T98R-31(188-192)	T98R-31	188	192	----	38	3.4	57	<8	1020	1	<50	0.268	41	54	8	55	277
T98R-32(0-4)	T98R-32	0	4	----	8	5.5	90	<8	653	2	<50	0.315	12	91	11	84	70
T98R-32(18-22)	T98R-32	18	22	----	19	3.7	444	<8	572	1	<50	0.189	29	68	24	60	119
T98R-32(38-42)	T98R-32	38	42	----	17	2.9	438	<8	421	<1	<50	0.168	14	60	12	56	109
T98R-32(58-62)	T98R-32	58	62	----	17	3.3	733	<8	518	1	<50	0.168	10	65	13	55	118
T98R-32(78-82)	T98R-32	78	82	----	15	3.3	145	<8	574	1	<50	0.137	8	63	10	58	102
T98R-32(98-102)	T98R-32	98	102	----	20	4.1	102	<8	650	1	<50	0.168	13	78	9	54	126
T98R-32(118-122)	T98R-32	118	122	----	25	3.7	84	<8	641	1	<50	0.184	34	64	10	56	134
T98R-32(138-142)	T98R-32	138	142	----	13	3.0	85	<8	542	1	<50	0.289	28	53	13	62	102
T98R-32(158-162)	T98R-32	158	162	----	23	3.4	220	<8	818	1	<50	0.389	34	63	16	58	102
T98R-32(178-182)	T98R-32	178	182	----	24	3.3	179	<8	704	1	<50	0.467	34	43	13	54	107
T98R-33(0-4)	T98R-33	0	4	----	14	4.5	70	<8	645	1	<50	0.305	14	73	8	51	85
T98R-33(18-22)	T98R-33	18	22	----	20	3.5	54	<8	661	1	<50	0.084	23	60	8	54	133
T98R-33(38-42)	T98R-33	38	42	----	<2	5.4	13	<8	608	2	<50	0.294	27	81	5	75	23
T98R-33(58-62)	T98R-33	58	62	----	<2	5.8	<10	<8	539	2	<50	0.215	<2	85	6	29	13
T98R-33(78-82)	T98R-33	78	82	----	<2	5.6	11	<8	501	2	<50	0.187	<2	86	5	41	9
T98R-33(108-112)	T98R-33	108	112	----	<2	5.4	11	<8	471	2	<50	0.197	<2	85	7	34	13

*Other analyses (Appendix #): D =USGS-EDXRF, E =EWU, F =CHEMEX, H =ACZ, ---- = none.

Appendix G. Chemical composition of samples analyzed by ICP-AES at XRAL Labs in Golden, CO using 4 acid dissolution (Appendix_G.xls, Appendix_G.dbf).

Sample No.	Eu (ppm)	Fe (%)	Ga (ppm)	Ho (ppm)	K (%)	La (ppm)	Li (ppm)	Mg (%)	Mn (ppm)	Mo (ppm)	Na (%)	Nb (ppm)	Nd (ppm)	Ni (ppm)	P (ppm)	Pb (ppm)	Sc (ppm)	Sn (ppm)	Sr (ppm)	Ta (ppm)
SAMPLE_NO.	EU_PPM	FE_(%)	GA_PPM	HO_PPM	K_(%)	LA_PPM	LI_PPM	MG_(%)	MN_PPM	MO_PPM	NA_(%)	NB_PPM	ND_PPM	NI_PPM	P_PPM	PB_PPM	SC_PPM	SN_PPM	SR_PPM	TA_PPM
T98R-29(88-92)	<2	1.83	31	<4	2.16	43	40	0.625	143	3	0.810	10	37	14	0.025	18	10	<50	78	<40
T98R-29(98-102)	<2	1.76	22	<4	2.12	45	37	0.605	95	3	0.730	11	39	14	0.020	17	9	<50	69	<40
T98R-29(118-122)	<2	1.79	24	<4	2.21	46	38	0.610	105	3	0.710	7	40	13	0.015	10	9	<50	70	<40
T98R-30(0-4)	<2	3.70	17	<4	1.86	29	26	0.650	2320	4	1.145	10	26	12	0.120	1820	10	<50	136	<40
T98R-30(6-10)	3	6.56	9	<4	1.82	34	26	0.580	4560	4	0.540	7	31	9	0.165	5440	10	<50	70	<40
T98R-30(18-22)	<2	2.38	24	<4	2.19	50	33	0.660	519	4	0.670	7	44	15	0.120	52	12	<50	77	<40
T98R-30(38-42)	2	2.49	21	<4	2.27	50	33	0.675	421	5	0.665	<4	44	14	0.080	25	12	<50	72	<40
T98R-30(58-62)	<2	2.54	28	<4	2.23	49	38	0.630	306	4	0.675	7	45	18	0.065	19	10	<50	72	<40
T98R-30(78-82)	<2	2.41	21	<4	2.10	50	36	0.625	275	3	0.650	6	47	17	0.050	16	10	<50	69	<40
T98R-31(0-4)	<2	3.52	22	<4	2.35	44	33	0.625	1490	5	0.700	8	41	17	0.070	1520	12	<50	67	<40
T98R-31(18-22)	3	9.98	<4	<4	1.53	36	19	0.350	8340	7	0.365	4	27	9	0.040	3980	7	<50	39	<40
T98R-31(38-42)	4	12.30	<4	<4	1.48	31	18	0.285	8080	8	0.285	8	30	<3	0.035	10590	7	<50	37	<40
T98R-31(58-62)	3	9.94	<4	<4	1.45	30	18	0.280	11490	6	0.235	7	29	6	0.035	12950	7	<50	30	<40
T98R-31(73-77)	4	12.40	<4	<4	1.35	27	16	0.280	13000	5	0.185	10	29	6	0.025	8650	6	<50	25	<40
T98R-31(108-112)	4	12.40	<4	<4	1.31	22	15	0.545	13940	5	0.135	8	22	<3	0.020	10470	6	<50	23	<40
T98R-31(133-137)	4	11.40	<4	<4	1.28	24	17	0.610	12170	6	0.180	5	24	<3	0.025	11240	6	<50	27	<40
T98R-31(158-162)	4	11.40	<4	<4	1.44	28	20	0.645	10730	7	0.265	5	28	4	0.035	14520	7	<50	35	<40
T98R-31(173-177)	<2	13.00	<4	<4	1.31	26	19	0.690	13550	6	0.170	5	25	<3	0.025	12740	6	<50	28	<40
T98R-31(188-192)	4	12.70	10	<4	1.39	24	20	0.695	12100	8	0.230	<4	25	<3	0.030	13440	6	<50	30	<40
T98R-32(0-4)	<2	5.14	24	<4	1.98	42	32	0.605	3280	5	0.525	10	43	12	0.075	2240	11	<50	56	<40
T98R-32(18-22)	4	12.00	<4	<4	1.44	30	18	0.310	11830	8	0.260	7	27	10	0.050	3390	7	<50	35	<40
T98R-32(38-42)	<2	13.30	<4	<4	1.16	25	15	0.290	11220	7	0.170	<4	23	7	0.030	2920	6	<50	22	<40
T98R-32(58-62)	4	11.80	<4	<4	1.34	29	17	0.300	8910	7	0.200	<4	28	7	0.030	4020	7	<50	25	<40
T98R-32(78-82)	4	9.50	<4	<4	1.36	30	15	0.275	7870	9	0.190	6	27	9	0.025	4640	6	<50	23	<40
T98R-32(98-102)	3	9.62	4	<4	1.67	34	21	0.345	7080	6	0.285	7	34	8	0.035	7080	8	<50	32	<40
T98R-32(118-122)	3	11.00	5	<4	1.51	29	18	0.370	10620	4	0.225	7	28	7	0.030	8990	7	<50	28	<40
T98R-32(138-142)	3	11.00	<4	<4	1.33	25	15	0.520	10470	8	0.120	7	22	6	0.025	4790	6	<50	22	<40
T98R-32(158-162)	3	10.90	<4	<4	1.38	28	18	0.630	11070	8	0.205	4	27	10	0.035	6680	7	<50	34	<40
T98R-32(178-182)	4	11.00	<4	<4	1.34	24	17	0.645	11180	7	0.215	6	25	9	0.030	7180	6	<50	35	<40
T98R-33(0-4)	<2	6.47	8	<4	1.66	34	23	0.540	5340	4	0.480	7	32	7	0.045	3870	8	<50	51	<40
T98R-33(18-22)	3	9.38	<4	<4	1.57	27	20	0.330	9230	7	0.190	7	26	4	0.025	5920	6	<50	25	<40
T98R-33(38-42)	<2	2.16	15	<4	2.03	45	29	0.595	836	3	0.605	5	42	11	0.050	949	9	<50	64	<40
T98R-33(58-62)	<2	2.11	19	<4	2.26	45	31	0.615	247	3	0.585	<4	39	12	0.020	19	9	<50	59	<40
T98R-33(78-82)	<2	2.00	21	<4	2.28	48	34	0.620	119	3	0.545	6	41	13	0.020	10	9	<50	54	<40
T98R-33(108-112)	<2	2.25	20	<4	2.16	46	32	0.580	186	4	0.520	<4	45	13	0.030	9	9	<50	55	<40

*Other analyses (Appendix #): D =USGS-EDXRF, E =EWU,
F =CHEMEX, H =ACZ, ---- = none.

Appendix G. Chemical composition of samples analyzed by ICP-AES at XRAL Labs in Golden, CO using 4 acid dissolution (Appendix_G.xls, Appendix_G.dbf).

Sample No.	Th (ppm)	Ti (%)	U (ppm)	V (ppm)	Y (ppm)	Yb (ppm)	Zn (ppm)
SAMPLE_NO.	TH_PPM	TI_%	U_PPM	V_PPM	Y_PPM	YB_PPM	ZN_PPM
T98R-29(88-92)	15	0.269	<100	52	15	2	172
T98R-29(98-102)	14	0.269	<100	52	14	2	162
T98R-29(118-122)	14	0.294	<100	51	14	2	147
T98R-30(0-4)	8	0.259	<100	53	14	2	1060
T98R-30(6-10)	10	0.217	<100	50	14	2	998
T98R-30(18-22)	16	0.288	<100	56	18	2	190
T98R-30(38-42)	16	0.3	<100	59	21	3	70
T98R-30(58-62)	12	0.269	<100	56	18	2	65
T98R-30(78-82)	16	0.294	<100	57	18	2	53
T98R-31(0-4)	12	0.288	<100	57	19	3	925
T98R-31(18-22)	9	0.153	<100	36	12	1	2610
T98R-31(38-42)	11	0.165	<100	34	10	1	2630
T98R-31(58-62)	9	0.129	<100	32	14	2	2770
T98R-31(73-77)	9	0.112	<100	29	11	1	2120
T98R-31(108-112)	8	0.106	<100	26	9	1	1110
T98R-31(133-137)	7	0.123	<100	27	11	1	1480
T98R-31(158-162)	9	0.135	<100	33	12	1	2560
T98R-31(173-177)	12	0.106	<100	29	11	1	1990
T98R-31(188-192)	9	0.129	<100	31	14	1	4050
T98R-32(0-4)	16	0.223	<100	54	17	3	1160
T98R-32(18-22)	10	0.118	<100	33	12	1	2070
T98R-32(38-42)	9	0.088	<100	26	10	1	1850
T98R-32(58-62)	13	0.112	<100	30	11	1	2010
T98R-32(78-82)	9	0.1	<100	28	9	1	1520
T98R-32(98-102)	10	0.141	<100	38	13	1	2250
T98R-32(118-122)	13	0.118	<100	34	10	1	2930
T98R-32(138-142)	11	0.094	<100	30	8	<1	2730
T98R-32(158-162)	13	0.112	<100	31	11	1	4010
T98R-32(178-182)	7	0.1	<100	29	10	1	4530
T98R-33(0-4)	10	0.188	<100	40	12	2	1800
T98R-33(18-22)	7	0.118	<100	31	9	1	3430
T98R-33(38-42)	9	0.282	<100	49	13	2	923
T98R-33(58-62)	13	0.3	<100	51	12	2	153
T98R-33(78-82)	14	0.306	<100	53	13	1	164
T98R-33(108-112)	14	0.294	<100	52	20	2	217

*Other analyses (Appendix #): D =USGS-EDXRF, E =EWU,
F =CHEMEX, H =ACZ, ---- = none.

Appendix G. Chemical composition of samples analyzed by ICP-AES at XRAL Labs in Golden, CO using 4 acid dissolution (Appendix_G.xls, Appendix_G.dbf).

Sample No.	Site ID	Depth interval, top (cm)	Depth interval, bottom (cm)	*Other Analyses (appendix #)	Ag (ppm)	Al (%)	As (ppm)	Au (ppm)	Ba (ppm)	Be (ppm)	Bi (ppm)	Ca (%)	Cd (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cu (ppm)
SAMPLE_NO.	SITE_ID	INT_TOP_CM	INT_BT_M_CM	OTHR_ANALYS	AG_PPM	AL_(%)	AS_PPM	AU_PPM	BA_PPM	BE_PPM	BI_PPM	CA_(%)	CD_PPM	CE_PPM	CO_PPM	CR_PPM	CU_PPM
T98R-33(123-127)	T98R-33	123	127	----	<2	5.6	12	<8	521	2	<50	0.213	<2	94	8	29	14
T98R-33(143-147)	T98R-33	143	147	----	<2	5.9	15	<8	536	2	<50	0.240	2	91	9	57	14
T98R-33(163-167)	T98R-33	163	167	----	<2	5.6	<10	<8	499	2	<50	0.219	<2	84	8	52	11
T98R-33(183-187)	T98R-33	183	187	----	<2	5.6	<10	<8	510	2	<50	0.181	<2	85	7	47	11
T98R-34(8-12)	T98R-34	8	12	----	18	6.4	21	<8	741	2	<50	0.315	11	69	5	79	98
T98R-34(28-32)	T98R-34	28	32	----	<2	5.9	14	<8	549	2	<50	0.294	4	68	5	79	27
T98R-34(48-52)	T98R-34	48	52	----	<2	6.0	<10	<8	564	2	<50	0.242	<2	77	4	87	25
T98R-34(68-72)	T98R-34	68	72	----	<2	4.6	11	<8	377	2	<50	0.358	<2	64	8	87	28
T98R-34(88-92)	T98R-34	88	92	----	<2	5.1	<10	<8	414	2	<50	0.331	<2	68	7	87	27
T98L-35(0-4)	T98L-35	0	4	----	6	5.4	80	<8	642	2	<50	0.257	11	51	13	80	53
T98L-35(18-22)	T98L-35	18	22	----	19	6.3	123	<8	743	2	<50	0.194	19	63	8	95	136
T98L-35(38-42)	T98L-35	38	42	----	3	7.0	33	<8	634	2	<50	0.263	4	87	6	82	39
T98L-35(58-62)	T98L-35	58	62	----	<2	6.0	11	<8	523	2	<50	0.189	<2	91	6	80	16
T98L-35(78-82)	T98L-35	78	82	----	<2	5.8	11	<8	479	2	<50	0.160	<2	84	6	67	11
T98L-35(98-102)	T98L-35	98	102	----	<2	5.3	13	<8	451	2	<50	0.160	<2	91	5	87	14
T98L-35(118-122)	T98L-35	118	122	----	<2	5.5	12	<8	498	2	<50	0.155	<2	100	5	61	8
T98L-35(143-147)	T98L-35	143	147	----	<2	6.3	10	<8	515	2	<50	0.219	<2	89	5	43	16
T98L-35(168-172)	T98L-35	168	172	----	<2	6.3	<10	<8	496	2	<50	0.192	<2	79	4	88	13
T98L-35(183-187)	T98L-35	183	187	----	<2	6.8	<10	<8	561	2	<50	0.208	<2	91	5	35	17
T98L-36(0-4)	T98L-36	0	4	----	17	4.4	88	<8	696	1	<50	0.389	35	67	10	55	96
T98L-36(18-22)	T98L-36	18	22	----	21	3.1	115	<8	649	1	<50	0.131	23	55	10	50	141
T98L-36(23-27)	T98L-36	23	27	----	19	3.9	338	<8	589	1	<50	0.221	36	65	10	56	127
T98L-36(38-42)	T98L-36	38	42	----	20	3.0	216	<8	574	1	<50	0.137	17	56	14	48	114
T98L-36(63-67)	T98L-36	63	67	----	17	2.9	347	<8	531	<1	<50	0.168	8	46	8	49	87
T98L-36(83-87)	T98L-36	83	87	----	14	3.1	131	<8	496	1	<50	0.163	9	54	8	47	88
T98L-36(98-102)	T98L-36	98	102	----	15	3.1	124	<8	583	1	<50	0.189	15	54	8	46	116
T98L-36(118-122)	T98L-36	118	122	----	17	3.1	107	<8	563	1	<50	0.200	33	55	8	48	90
T98L-36(138-142)	T98L-36	138	142	----	15	3.2	78	<8	550	1	<50	0.173	25	55	8	46	121
T98L-36(158-162)	T98L-36	158	162	----	19	3.3	95	<8	598	1	<50	0.252	46	56	10	54	116
T98L-36(178-182)	T98L-36	178	182	----	21	3.2	91	<8	580	1	<50	0.404	46	48	11	51	101
T98L-36(193-197)	T98L-36	193	197	----	23	3.2	99	<8	733	1	<50	0.263	34	50	10	52	116
T98L-37(0-4)	T98L-37	0	4	----	10	5.9	69	<8	725	2	<50	0.352	22	61	19	79	78
T98L-37(18-22)	T98L-37	18	22	----	22	6.0	101	<8	730	2	<50	0.152	12	73	6	64	113
T98L-37(38-42)	T98L-37	38	42	----	5	6.0	37	<8	647	2	<50	0.299	19	70	6	81	51
T98L-37(58-62)	T98L-37	58	62	----	<2	6.2	13	<8	573	2	<50	0.236	5	89	5	84	29

*Other analyses (Appendix #): D =USGS-EDXRF, E =EWU, F =CHEMEX, H =ACZ, ---- = none.

Appendix G. Chemical composition of samples analyzed by ICP-AES at XRAL Labs in Golden, CO using 4 acid dissolution (Appendix_G.xls, Appendix_G.dbf).

Sample No.	Eu (ppm)	Fe (%)	Ga (ppm)	Ho (ppm)	K (%)	La (ppm)	Li (ppm)	Mg (%)	Mn (ppm)	Mo (ppm)	Na (%)	Nb (ppm)	Nd (ppm)	Ni (ppm)	P (ppm)	Pb (ppm)	Sc (ppm)	Sn (ppm)	Sr (ppm)	Ta (ppm)
SAMPLE_NO.	EU_PPM	FE_(%)	GA_PPM	HO_PPM	K_(%)	LA_PPM	LI_PPM	MG_(%)	MN_PPM	MO_PPM	NA_(%)	NB_PPM	ND_PPM	NI_PPM	P_PPM	PB_PPM	SC_PPM	SN_PPM	SR_PPM	TA_PPM
T98R-33(123-127)	<2	2.23	23	<4	2.21	49	34	0.630	207	4	0.565	<4	43	14	0.025	9	9	<50	59	<40
T98R-33(143-147)	<2	2.24	23	<4	2.30	48	34	0.635	228	3	0.605	5	42	15	0.025	12	9	<50	66	<40
T98R-33(163-167)	<2	2.19	20	<4	2.18	43	33	0.585	173	4	0.570	10	40	15	0.025	9	8	<50	63	<40
T98R-33(183-187)	<2	2.02	17	<4	2.30	44	35	0.600	162	3	0.540	7	36	14	0.025	8	8	<50	57	<40
T98R-34(8-12)	<2	3.56	21	<4	1.90	33	29	0.500	1880	4	0.520	12	30	16	0.100	4630	12	<50	61	<40
T98R-34(28-32)	<2	1.58	18	<4	1.50	31	27	0.395	245	4	0.505	9	27	20	0.105	363	11	<50	59	<40
T98R-34(48-52)	<2	1.54	19	<4	1.82	36	29	0.525	204	3	0.455	12	34	16	0.065	20	12	<50	53	<40
T98R-34(68-72)	<2	1.34	15	<4	1.22	29	20	0.370	205	4	0.295	7	28	19	0.070	16	9	<50	53	<40
T98R-34(88-92)	<2	1.32	26	<4	1.57	34	27	0.475	97	5	0.490	9	29	16	0.045	17	8	<50	65	<40
T98L-35(0-4)	<2	4.51	12	<4	1.97	27	26	0.510	2990	5	0.395	9	24	17	0.135	2120	10	<50	42	<40
T98L-35(18-22)	<2	5.43	14	<4	2.35	32	25	0.450	2600	5	0.315	7	30	14	0.075	3500	11	<50	36	<40
T98L-35(38-42)	<2	2.93	26	<4	1.94	45	33	0.610	403	4	0.585	4	40	19	0.075	880	13	<50	57	<40
T98L-35(58-62)	2	2.08	25	<4	2.01	45	31	0.580	149	4	0.555	7	38	14	0.030	134	11	<50	51	<40
T98L-35(78-82)	<2	1.74	22	<4	2.02	45	36	0.565	106	3	0.530	5	39	19	0.020	55	9	<50	48	<40
T98L-35(98-102)	<2	1.63	18	<4	1.87	47	35	0.495	110	3	0.475	12	39	14	0.030	32	9	<50	46	<40
T98L-35(118-122)	<2	1.61	20	<4	2.14	50	36	0.595	84	3	0.530	7	44	14	0.015	17	9	<50	49	<40
T98L-35(143-147)	<2	1.56	18	<4	2.02	49	37	0.510	61	3	0.650	6	43	16	0.020	20	10	<50	63	<40
T98L-35(168-172)	<2	1.48	18	<4	2.00	41	36	0.485	61	3	0.605	10	38	15	0.025	22	10	<50	58	<40
T98L-35(183-187)	<2	1.56	18	<4	2.13	46	40	0.555	62	3	0.665	8	40	18	0.035	21	11	<50	63	<40
T98L-36(0-4)	2	7.80	<4	<4	1.69	31	23	0.605	7010	7	0.390	4	31	10	0.045	5100	8	<50	47	<40
T98L-36(18-22)	3	11.20	<4	<4	1.40	27	16	0.435	11150	6	0.180	4	23	<3	0.020	4670	6	<50	22	<40
T98L-36(23-27)	3	9.91	<4	<4	1.52	32	19	0.415	7760	8	0.285	6	34	4	0.075	4320	7	<50	32	<40
T98L-36(38-42)	3	11.00	<4	<4	1.33	23	13	0.345	10820	7	0.145	<4	18	<3	0.020	4110	5	<50	18	<40
T98L-36(63-67)	3	10.30	<4	<4	1.24	22	12	0.440	8870	6	0.160	5	18	<3	0.020	3640	5	<50	19	<40
T98L-36(83-87)	2	8.86	<4	<4	1.34	25	13	0.450	8000	5	0.170	4	22	<3	0.015	3710	5	<50	21	<40
T98L-36(98-102)	3	10.20	<4	<4	1.34	27	14	0.530	9450	7	0.160	<4	27	<3	0.020	4790	6	<50	22	<40
T98L-36(118-122)	3	10.20	<4	<4	1.35	27	14	0.530	9670	4	0.165	5	23	3	0.020	4110	5	<50	22	<40
T98L-36(138-142)	3	8.99	5	<4	1.45	26	14	0.510	8590	4	0.165	6	25	5	0.020	4580	6	<50	24	<40
T98L-36(158-162)	3	10.00	<4	<4	1.42	25	16	0.565	9480	6	0.200	<4	22	6	0.025	4920	6	<50	27	<40
T98L-36(178-182)	3	9.77	<4	<4	1.35	23	14	0.535	9480	6	0.200	5	21	8	0.025	5680	6	<50	30	<40
T98L-36(193-197)	3	9.87	<4	<4	1.35	23	15	0.600	10210	9	0.175	4	22	7	0.020	6530	6	<50	26	<40
T98L-37(0-4)	<2	5.27	18	<4	2.07	31	27	0.595	5540	4	0.545	9	30	14	0.105	3250	11	<50	57	<40
T98L-37(18-22)	2	5.10	15	<4	2.38	35	23	0.415	2140	4	0.290	8	32	9	0.040	5540	11	<50	32	<40
T98L-37(38-42)	<2	2.45	11	<4	1.75	35	29	0.510	808	3	0.590	7	31	18	0.070	2010	11	<50	58	<40
T98L-37(58-62)	<2	1.85	20	<4	1.80	41	30	0.475	620	3	0.555	7	40	16	0.075	333	12	<50	52	<40

*Other analyses (Appendix #): D =USGS-EDXRF, E =EWU,
F =CHEMEX, H =ACZ, ---- = none.

Appendix G. Chemical composition of samples analyzed by ICP-AES at XRAL Labs in Golden, CO using 4 acid dissolution (Appendix_G.xls, Appendix_G.dbf).

Sample No.	Th (ppm)	Ti (%)	U (ppm)	V (ppm)	Y (ppm)	Yb (ppm)	Zn (ppm)
SAMPLE_NO.	TH_PPM	TI_%	U_PPM	V_PPM	Y_PPM	YB_PPM	ZN_PPM
T98R-33(123-127)	15	0.3	<100	56	17	2	251
T98R-33(143-147)	16	0.294	<100	57	15	2	303
T98R-33(163-167)	14	0.269	<100	52	13	2	272
T98R-33(183-187)	12	0.231	<100	50	12	1	232
T98R-34(8-12)	9	0.247	<100	58	16	2	1380
T98R-34(28-32)	8	0.253	<100	54	16	2	537
T98R-34(48-52)	15	0.241	<100	60	16	2	286
T98R-34(68-72)	11	0.194	<100	62	20	2	503
T98R-34(88-92)	12	0.263	<100	51	16	2	64
T98L-35(0-4)	7	0.165	<100	48	13	2	1020
T98L-35(18-22)	10	0.17	<100	52	13	2	1500
T98L-35(38-42)	13	0.276	<100	58	23	3	322
T98L-35(58-62)	13	0.241	<100	53	18	2	128
T98L-35(78-82)	12	0.3	<100	51	15	2	75
T98L-35(98-102)	14	0.263	<100	50	17	2	54
T98L-35(118-122)	13	0.319	<100	53	14	2	44
T98L-35(143-147)	12	0.281	<100	55	18	2	35
T98L-35(168-172)	11	0.269	<100	55	16	2	34
T98L-35(183-187)	13	0.288	<100	58	19	2	35
T98L-36(0-4)	10	0.165	<100	40	12	1	4230
T98L-36(18-22)	7	0.112	<100	29	9	1	3640
T98L-36(23-27)	10	0.135	<100	36	13	1	3030
T98L-36(38-42)	10	0.088	<100	27	7	<1	2870
T98L-36(63-67)	10	0.1	<100	24	8	<1	1100
T98L-36(83-87)	10	0.112	<100	26	8	<1	1080
T98L-36(98-102)	<6	0.106	<100	28	8	<1	1440
T98L-36(118-122)	7	0.118	<100	27	8	<1	2340
T98L-36(138-142)	11	0.135	<100	28	9	<1	2610
T98L-36(158-162)	8	0.123	<100	31	9	<1	3750
T98L-36(178-182)	7	0.118	<100	29	10	1	4250
T98L-36(193-197)	6	0.118	<100	29	10	1	5370
T98L-37(0-4)	9	0.2	<100	51	15	2	1690
T98L-37(18-22)	10	0.159	<100	49	11	2	1640
T98L-37(38-42)	11	0.217	<100	53	17	2	942
T98L-37(58-62)	14	0.259	<100	56	19	2	603

*Other analyses (Appendix #): D =USGS-EDXRF, E =EWU,
F =CHEMEX, H =ACZ, ---- = none.

Appendix G. Chemical composition of samples analyzed by ICP-AES at XRAL Labs in Golden, CO using 4 acid dissolution (Appendix_G.xls, Appendix_G.dbf).

Sample No.	Site ID	Depth interval, top (cm)	Depth interval, bottom (cm)	*Other Analyses (appendix #)	Ag (ppm)	Al (%)	As (ppm)	Au (ppm)	Ba (ppm)	Be (ppm)	Bi (ppm)	Ca (%)	Cd (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cu (ppm)
SAMPLE_NO.	SITE_ID	INT_TOP_CM	INT_BT_M_CM	OTHR_ANALYS	AG_PPM	AL_(%)	AS_PPM	AU_PPM	BA_PPM	BE_PPM	BI_PPM	CA_(%)	CD_PPM	CE_PPM	CO_PPM	CR_PPM	CU_PPM
T98L-37(98-102)	T98L-37	98	102	----	<2	6.4	<10	<8	464	2	<50	0.229	<2	82	5	96	19
T98L-37(118-122)	T98L-37	118	122	----	<2	6.3	<10	<8	485	2	<50	0.213	<2	77	5	94	17
T98L-37(138-142)	T98L-37	138	142	----	<2	7.0	<10	<8	591	2	<50	0.281	2	93	8	78	23
T98L-37(168-172)	T98L-37	168	172	----	<2	9.4	<10	<8	794	2	<50	0.428	<2	83	5	44	16
T98L-38(0-4)	T98L-38	0	4	----	11	6.1	36	<8	665	2	<50	0.273	7	75	5	86	77
T98L-38(18-22)	T98L-38	18	22	----	16	6.2	137	<8	685	2	<50	0.357	38	71	8	89	116
T98L-38(43-47)	T98L-38	43	47	----	18	5.4	90	<8	679	2	<50	0.373	33	61	9	78	112
T98L-38(63-67)	T98L-38	63	67	----	2	4.6	21	<8	397	1	<50	0.200	8	58	4	73	26
T98L-38(88-92)	T98L-38	88	92	----	<2	6.3	14	<8	473	2	<50	0.247	6	95	5	93	27
T98L-38(113-117)	T98L-38	113	117	----	<2	7.1	14	<8	501	2	<50	0.225	4	92	6	79	23
T98L-38(138-142)	T98L-38	138	142	----	<2	6.5	<10	<8	450	2	<50	0.218	3	106	5	72	25
T98L-38(163-167)	T98L-38	163	167	----	<2	5.2	13	<8	402	2	<50	0.243	6	78	5	68	29
T98L-38(188-192)	T98L-38	188	192	----	<2	6.9	<10	<8	580	2	<50	0.256	<2	79	5	82	16
T98M-39(0-4)	T98M-39	0	4	----	<2	5.8	<10	<8	417	2	<50	0.304	<2	83	6	71	22
T98M-39(18-22)	T98M-39	18	22	----	<2	6.1	<10	<8	418	2	<50	0.298	3	90	4	81	19
T98M-39(38-42)	T98M-39	38	42	----	<2	7.4	<10	<8	499	2	<50	0.148	<2	111	5	79	8
T98M-39(58-62)	T98M-39	58	62	----	<2	8.4	<10	<8	578	2	<50	0.163	<2	89	4	32	13
T98M-39(78-82)	T98M-39	78	82	----	<2	8.2	<10	<8	655	2	<50	0.177	<2	105	7	88	12
T98M-39(93-97)	T98M-39	93	97	----	<2	8.2	<10	<8	669	2	<50	0.179	<2	98	4	77	14
T98M-39(110-114)	T98M-39	110	114	----	<2	9.1	<10	<8	762	2	<50	0.207	<2	115	5	78	11
T98M-39(133-137)	T98M-39	133	137	----	<2	8.7	<10	<8	813	2	<50	0.957	<2	87	5	53	25
T98M-39(143-147)	T98M-39	143	147	----	<2	7.9	<10	<8	830	2	<50	1.177	<2	50	5	61	21
T98M-39(161-165)	T98M-39	161	165	----	<2	7.9	<10	<8	709	2	<50	0.182	<2	85	7	85	14
T98M-39(170-174)	T98M-39	170	174	----	<2	7.7	<10	<8	699	3	<50	0.162	<2	101	6	41	12
T98M-39(198-202)	T98M-39	198	202	----	<2	8.3	<10	<8	736	2	<50	0.150	<2	103	11	89	16
T98M-40(0-4)	T98M-40	0	4	----	8	6.1	27	<8	567	2	<50	0.488	8	75	6	76	55
T98M-40(18-22)	T98M-40	18	22	----	<2	5.8	<10	<8	470	2	<50	0.226	4	91	4	82	26
T98M-40(38-42)	T98M-40	38	42	----	<2	4.9	<10	<8	320	2	<50	0.163	2	101	3	79	24
T98M-40(58-62)	T98M-40	58	62	----	<2	5.6	<10	<8	358	2	<50	0.126	<2	86	5	71	18
T98M-40(88-92)	T98M-40	88	92	----	<2	6.3	<10	<8	403	2	<50	0.137	<2	86	3	71	20
T98M-40(98-102)	T98M-40	98	102	----	<2	6.7	<10	<8	435	2	<50	0.131	<2	104	5	79	9
T98M-40(123-127)	T98M-40	123	127	----	<2	6.8	<10	<8	526	2	<50	0.133	<2	109	3	72	11
T98M-40(143-147)	T98M-40	143	147	----	2	7.7	14	<8	638	3	<50	0.278	<2	95	8	112	103
T98M-40(173-177)	T98M-40	173	177	----	<2	8.9	16	<8	775	2	<50	0.704	<2	79	7	49	54
T98M-40(188-192)	T98M-40	188	192	----	<2	8.1	<10	<8	824	2	<50	1.167	<2	67	5	54	25

*Other analyses (Appendix #): D =USGS-EDXRF, E =EWU, F =CHEMEX, H =ACZ, ---- = none.

Appendix G. Chemical composition of samples analyzed by ICP-AES at XRAL Labs in Golden, CO using 4 acid dissolution (Appendix_G.xls, Appendix_G.dbf).

Sample No.	Eu (ppm)	Fe (%)	Ga (ppm)	Ho (ppm)	K (%)	La (ppm)	Li (ppm)	Mg (%)	Mn (ppm)	Mo (ppm)	Na (%)	Nb (ppm)	Nd (ppm)	Ni (ppm)	P (ppm)	Pb (ppm)	Sc (ppm)	Sn (ppm)	Sr (ppm)	Ta (ppm)
SAMPLE_NO.	EU_PPM	FE_(%)	GA_PPM	HO_PPM	K_(%)	LA_PPM	LI_PPM	MG_(%)	MN_PPM	MO_PPM	NA_(%)	NB_PPM	ND_PPM	NI_PPM	P_PPM	PB_PPM	SC_PPM	SN_PPM	SR_PPM	TA_PPM
T98L-37(98-102)	<2	1.41	18	<4	1.56	35	38	0.415	638	4	0.450	12	35	17	0.045	51	11	<50	47	<40
T98L-37(118-122)	<2	1.43	24	<4	1.75	35	36	0.485	455	3	0.490	11	34	16	0.040	93	10	<50	48	<40
T98L-37(138-142)	<2	1.58	<4	<4	1.94	39	35	0.562	487	<2	0.598	<4	42	17	0.064	90	12	<50	63	<40
T98L-37(168-172)	<2	1.91	29	<4	2.93	35	43	0.722	153	<2	1.193	6	34	17	0.016	17	11	<50	106	<40
T98L-38(0-4)	2	4.25	21	<4	2.15	36	30	0.615	1670	4	0.505	11	34	16	0.110	3570	12	<50	51	<40
T98L-38(18-22)	2	4.42	15	<4	2.13	33	27	0.550	2230	5	0.545	10	32	21	0.080	3990	11	<50	61	<40
T98L-38(43-47)	<2	5.90	6	<4	1.85	29	24	0.530	3950	5	0.545	8	25	12	0.050	5020	10	<50	61	<40
T98L-38(63-67)	<2	2.08	8	<4	1.02	27	21	0.300	545	3	0.260	<4	29	15	0.080	744	9	<50	36	<40
T98L-38(88-92)	<2	2.02	21	<4	1.24	36	30	0.355	471	4	0.295	7	37	20	0.135	352	13	<50	40	<40
T98L-38(113-117)	<2	1.83	25	<4	1.58	36	37	0.475	342	<2	0.396	17	32	17	0.060	412	11	<50	43	<40
T98L-38(138-142)	<2	1.71	17	<4	1.34	33	31	0.384	256	<2	0.305	<4	40	19	0.060	532	10	<50	41	<40
T98L-38(163-167)	<2	1.59	11	<4	1.30	26	26	0.356	266	<2	0.336	5	25	14	0.062	644	9	<50	45	<40
T98L-38(188-192)	<2	1.70	27	<4	2.02	31	39	0.573	98	<2	0.466	11	25	15	0.048	246	10	<50	54	<40
T98M-39(0-4)	<2	1.69	18	<4	1.51	34	32	0.462	316	<2	0.470	<4	42	18	0.164	479	9	<50	49	<40
T98M-39(18-22)	<2	1.56	17	<4	1.37	33	28	0.363	97	<2	0.503	13	37	15	0.131	377	10	<50	54	<40
T98M-39(38-42)	<2	1.45	28	<4	1.82	41	43	0.447	54	<2	0.444	14	38	15	0.055	17	11	<50	40	<40
T98M-39(58-62)	<2	1.56	20	<4	2.10	43	46	0.479	52	3	0.473	5	43	15	0.031	20	13	<50	44	<40
T98M-39(78-82)	<2	1.54	17	<4	2.34	39	48	0.564	46	<2	0.529	8	42	14	0.022	8	13	<50	47	<40
T98M-39(93-97)	<2	1.68	28	<4	2.51	41	49	0.649	54	<2	0.583	4	45	15	0.023	20	13	<50	53	<40
T98M-39(110-114)	<2	2.03	32	<4	2.87	44	48	0.678	63	<2	0.694	6	38	15	0.010	17	13	<50	63	<40
T98M-39(133-137)	<2	2.00	16	<4	1.72	22	31	0.385	208	2	1.911	4	24	13	0.024	4	8	<50	214	<40
T98M-39(143-147)	2	1.62	27	<4	2.01	23	33	0.337	298	2	2.831	5	30	7	0.026	8	7	<50	257	<40
T98M-39(161-165)	<2	1.97	35	<4	2.94	49	45	0.794	72	3	0.646	11	51	13	0.008	18	13	<50	56	<40
T98M-39(170-174)	<2	1.92	25	<4	2.91	51	44	0.796	74	<2	0.670	<4	48	14	0.008	21	12	<50	54	<40
T98M-39(198-202)	3	2.18	30	<4	3.13	50	48	0.847	71	<2	0.669	5	48	18	0.008	20	13	<50	53	<40
T98M-40(0-4)	<2	2.53	11	<4	1.69	33	27	0.480	693	4	0.715	6	32	15	0.095	2350	11	<50	85	<40
T98M-40(18-22)	<2	1.64	17	<4	1.52	35	28	0.410	204	4	0.455	10	30	15	0.095	652	11	<50	47	<40
T98M-40(38-42)	<2	1.13	24	<4	1.01	33	19	0.250	141	2	0.270	7	36	17	0.105	26	10	<50	34	<40
T98M-40(58-62)	<2	1.12	19	<4	1.17	34	26	0.294	115	<2	0.278	<4	33	16	0.091	34	9	<50	31	<40
T98M-40(88-92)	<2	1.22	28	<4	1.40	34	33	0.344	100	2	0.364	16	42	15	0.070	77	10	<50	38	<40
T98M-40(98-102)	<2	1.42	20	<4	1.43	33	34	0.403	61	<2	0.335	15	28	15	0.040	16	10	<50	35	<40
T98M-40(123-127)	<2	1.41	11	<4	1.80	34	37	0.470	48	<2	0.440	15	41	13	0.031	23	11	<50	43	<40
T98M-40(143-147)	<2	1.93	45	<4	2.31	46	42	0.658	276	<2	0.602	<4	58	22	0.039	736	13	<50	68	<40
T98M-40(173-177)	<2	1.98	25	<4	2.41	34	39	0.567	339	3	1.609	6	43	12	0.024	400	10	<50	156	<40
T98M-40(188-192)	2	1.62	18	<4	2.16	27	30	0.424	291	3	2.593	<4	27	7	0.034	9	7	<50	255	<40

*Other analyses (Appendix #): D =USGS-EDXRF, E =EWU,
F =CHEMEX, H =ACZ, ---- = none.

Appendix G. Chemical composition of samples analyzed by ICP-AES at XRAL Labs in Golden, CO using 4 acid dissolution (Appendix_G.xls, Appendix_G.dbf).

Sample No.	Th (ppm)	Ti (%)	U (ppm)	V (ppm)	Y (ppm)	Yb (ppm)	Zn (ppm)
SAMPLE_NO.	TH_PPM	TI_%	U_PPM	V_PPM	Y_PPM	YB_PPM	ZN_PPM
T98L-37(98-102)	14	0.25	<100	57	19	2	695
T98L-37(118-122)	13	0.25	<100	57	15	2	471
T98L-37(138-142)	13	0.31	<100	67	20	3	676
T98L-37(168-172)	<6	0.363	<100	65	14	2	94
T98L-38(0-4)	11	0.217	<100	59	19	3	655
T98L-38(18-22)	12	0.217	<100	56	17	3	2000
T98L-38(43-47)	10	0.182	<100	48	14	2	2420
T98L-38(63-67)	11	0.159	<100	40	18	2	608
T98L-38(88-92)	16	0.217	<100	58	25	3	675
T98L-38(113-117)	9	0.262	<100	57	18	2	473
T98L-38(138-142)	14	0.246	<100	59	19	2	390
T98L-38(163-167)	<6	0.206	<100	50	16	2	402
T98L-38(188-192)	<6	0.257	<100	60	13	2	102
T98M-39(0-4)	<6	0.226	<100	48	17	2	217
T98M-39(18-22)	7	0.253	<100	49	18	2	128
T98M-39(38-42)	16	0.289	<100	56	17	2	70
T98M-39(58-62)	14	0.339	<100	69	21	2	59
T98M-39(78-82)	14	0.309	<100	68	16	2	37
T98M-39(93-97)	<6	0.325	<100	69	16	2	46
T98M-39(110-114)	8	0.352	<100	76	15	2	191
T98M-39(133-137)	<6	0.383	<100	40	15	2	82
T98M-39(143-147)	<6	0.349	<100	28	19	3	57
T98M-39(161-165)	21	0.31	<100	73	18	2	72
T98M-39(170-174)	<6	0.297	<100	72	17	2	71
T98M-39(198-202)	16	0.273	<100	75	15	2	78
T98M-40(0-4)	6	0.247	<100	54	20	2	587
T98M-40(18-22)	10	0.212	<100	52	21	2	329
T98M-40(38-42)	11	0.188	<100	47	24	3	308
T98M-40(58-62)	8	0.2	<100	46	16	2	259
T98M-40(88-92)	22	0.241	<100	51	16	2	184
T98M-40(98-102)	<6	0.249	<100	54	16	2	83
T98M-40(123-127)	17	0.281	<100	57	15	2	38
T98M-40(143-147)	20	0.335	<100	80	23	3	112
T98M-40(173-177)	13	0.39	<100	53	16	2	114
T98M-40(188-192)	10	0.385	<100	36	19	2	64

*Other analyses (Appendix #): D =USGS-EDXRF, E =EWU,
F =CHEMEX, H =ACZ, ---- = none.

Appendix G. Chemical composition of samples analyzed by ICP-AES at XRAL Labs in Golden, CO using 4 acid dissolution (Appendix_G.xls, Appendix_G.dbf).

Sample No.	Site ID	Depth interval, top (cm)	Depth interval, bottom (cm)	*Other Analyses (appendix #)	Ag (ppm)	Al (%)	As (ppm)	Au (ppm)	Ba (ppm)	Be (ppm)	Bi (ppm)	Ca (%)	Cd (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cu (ppm)
SAMPLE_NO.	SITE_ID	INT_TOP_CM	INT_BT_M_CM	OTHR_ANALYS	AG_PPM	AL_(%)	AS_PPM	AU_PPM	BA_PPM	BE_PPM	BI_PPM	CA_(%)	CD_PPM	CE_PPM	CO_PPM	CR_PPM	CU_PPM
T98L-41(0-4)	T98L-41	0	4	----	9	5.7	58	<8	728	2	<50	0.457	18	70	19	74	55
T98L-41(18-22)	T98L-41	18	22	----	20	6.7	166	<8	768	2	<50	0.147	12	73	8	86	122
T98L-41(38-42)	T98L-41	38	42	----	24	6.1	72	<8	795	2	<50	0.184	24	63	9	60	145
T98L-41(63-67)	T98L-41	63	67	----	<2	3.7	11	<8	279	1	<50	0.236	19	58	5	68	28
T98L-41(88-92)	T98L-41	88	92	----	<2	5.8	<10	<8	497	1	<50	0.215	<2	88	4	49	9
T98L-41(103-107)	T98L-41	103	107	----	<2	6.4	<10	<8	545	2	<50	0.243	<2	105	4	48	8
T98L-42(0-4)	T98L-42	0	4	----	9	5.2	129	<8	644	2	<50	0.252	22	67	21	74	61
T98L-42(8-12)	T98L-42	8	12	----	20	6.2	273	<8	769	2	<50	0.158	11	75	8	90	136
T98L-42(18-22)	T98L-42	18	22	----	14	6.6	42	<8	736	2	<50	0.294	12	84	7	85	89
T98L-42(43-47)	T98L-42	43	47	----	<2	5.9	17	<8	538	2	<50	0.289	5	79	6	84	18
T98L-42(63-67)	T98L-42	63	67	----	<2	6.5	14	<8	478	2	<50	0.200	<2	88	5	82	17
T98L-42(88-94)	T98L-42	88	94	----	<2	6.8	<10	<8	542	2	<50	0.168	<2	92	6	80	14
T98L-42(108-112)	T98L-42	108	112	----	14	3.4	136	<8	756	1	<50	0.219	19	54	12	47	115
T98M-43(0-4)	T98M-43	0	4	----	5	6.7	37	<8	586	2	<50	1.139	12	55	11	72	47
T98M-43(8-12)	T98M-43	8	12	----	17	6.4	124	<8	785	2	<50	0.179	13	73	12	85	120
T98M-43(18-22)	T98M-43	18	22	----	6	6.8	23	<8	855	2	<50	0.347	7	87	9	88	47
T98M-43(38-42)	T98M-43	38	42	----	<2	7.3	13	<8	717	2	<50	0.252	<2	95	9	94	19
T98M-43(58-62)	T98M-43	58	62	----	<2	6.9	16	<8	660	2	<50	0.210	<2	93	8	90	20
T98M-43(83-87)	T98M-43	83	87	----	<2	7.1	20	<8	654	2	<50	0.221	<2	129	11	79	21
T98M-43(98-102)	T98M-43	98	102	----	<2	7.2	<10	<8	686	2	<50	0.280	<2	89	12	29	23
T98M-43(118-122)	T98M-43	118	122	----	<2	7.1	<10	<8	669	2	<50	0.284	<2	99	12	77	17
T98M-43(138-142)	T98M-43	138	142	----	<2	7.0	15	<8	692	2	<50	0.328	<2	89	11	63	17
T98M-43(161-165)	T98M-43	161	165	----	<2	6.9	<10	<8	654	2	<50	0.330	<2	100	11	79	15
T98M-43(178-182)	T98M-43	178	182	----	<2	6.7	<10	<8	648	2	<50	0.370	<2	92	11	71	17
T98M-43(188-192)	T98M-43	188	192	----	<2	6.9	<10	<8	674	2	<50	0.382	<2	78	10	62	15
93ABM02(11-22)	93ABM02	11	22	D, F	18	3.8	164	<8	623	1	<50	0.184	21	72	13	78	116
93ABM04(76-142)	93ABM04	76	142	D, F	<2	5.7	10	<8	551	2	<50	0.231	3	91	8	142	22
93SBC10(70-90)	93SBC10	70	90	D, F	38	3.9	94	<8	903	1	<50	0.215	16	72	10	245	284
93SBK17(152-230)	93SBK17	152	230	D, F	4	5.4	20	<8	617	2	<50	0.105	19	73	7	145	31
93SBK17(25-68)	93SBK17	25	68	D, F	65	2.8	71	<8	1140	1	<50	0.200	78	47	13	209	421
93SBK18(7-10)	93SBK18	7	10	D, F	69	4.0	74	<8	1520	1	<50	0.373	46	66	12	230	382
93SBB20(0-5)	93SBB20	0	5	D, F	15	3.7	268	<8	515	1	<50	0.200	21	57	12	106	89
93SBB22(19-26)	93SBB22	19	26	D, F	28	4.2	169	<8	886	2	<50	0.194	10	71	11	132	148
93SBB23(46-53)	93SBB23	46	53	D, F	22	3.7	176	<8	757	1	<50	0.168	39	70	16	111	171
93SBK18(26-82)	93SBK18	26	82	D, F	103	3.1	67	<8	1550	1	<50	0.257	62	57	8	69	695

*Other analyses (Appendix #): D =USGS-EDXRF, E =EWU, F =CHEMEX, H =ACZ, ---- = none.

Appendix G. Chemical composition of samples analyzed by ICP-AES at XRAL Labs in Golden, CO using 4 acid dissolution (Appendix_G.xls, Appendix_G.dbf).

Sample No.	Eu (ppm)	Fe (%)	Ga (ppm)	Ho (ppm)	K (%)	La (ppm)	Li (ppm)	Mg (%)	Mn (ppm)	Mo (ppm)	Na (%)	Nb (ppm)	Nd (ppm)	Ni (ppm)	P (ppm)	Pb (ppm)	Sc (ppm)	Sn (ppm)	Sr (ppm)	Ta (ppm)
SAMPLE_NO.	EU_PPM	FE_(%)	GA_PPM	HO_PPM	K_(%)	LA_PPM	LI_PPM	MG_(%)	MN_PPM	MO_PPM	NA_(%)	NB_PPM	ND_PPM	NI_PPM	P_PPM	PB_PPM	SC_PPM	SN_PPM	SR_PPM	TA_PPM
T98L-41(0-4)	<2	4.63	16	<4	2.13	31	27	0.620	8380	5	0.450	5	28	17	0.125	2120	10	<50	51	<40
T98L-41(18-22)	3	5.78	11	<4	2.56	37	27	0.465	1120	6	0.355	9	32	11	0.070	3390	12	<50	35	<40
T98L-41(38-42)	4	8.07	14	<4	2.45	33	24	0.485	6110	7	0.280	8	30	8	0.040	6610	10	<50	29	<40
T98L-41(63-67)	<2	1.85	11	<4	0.75	20	13	0.240	1090	3	0.230	<4	19	15	0.130	290	8	<50	29	<40
T98L-41(88-92)	<2	1.41	18	<4	1.78	44	30	0.450	206	4	0.670	6	36	19	0.015	30	10	<50	61	<40
T98L-41(103-107)	<2	1.83	26	<4	2.35	56	37	0.602	123	<2	0.807	<4	42	12	0.011	24	9	<50	69	<40
T98L-42(0-4)	<2	6.44	15	<4	1.94	29	26	0.535	5260	5	0.405	9	26	16	0.145	2200	10	<50	40	<40
T98L-42(8-12)	3	8.34	11	<4	2.43	37	26	0.460	1300	8	0.310	11	33	10	0.110	4830	11	<50	31	<40
T98L-42(18-22)	2	3.60	20	<4	2.23	39	31	0.560	1250	4	0.595	10	33	18	0.050	4810	12	<50	61	<40
T98L-42(43-47)	<2	1.92	19	<4	1.82	41	31	0.540	249	4	0.670	6	40	15	0.070	522	11	<50	61	<40
T98L-42(63-67)	<2	2.17	22	<4	1.75	43	31	0.535	178	4	0.530	6	37	18	0.050	63	13	<50	51	<40
T98L-42(88-94)	2	2.12	16	<4	2.13	45	38	0.608	138	<2	0.599	7	41	16	0.027	40	11	<50	50	<40
T98L-42(108-112)	4	11.30	<4	<4	1.42	24	17	0.562	10580	5	0.189	<4	27	<3	0.022	6030	4	<50	26	<40
T98M-43(0-4)	<2	3.59	24	<4	1.94	25	26	0.660	2700	5	1.315	11	23	12	0.095	1620	11	<50	148	<40
T98M-43(8-12)	3	6.87	15	<4	2.58	35	27	0.500	5280	6	0.320	8	33	11	0.095	5110	12	<50	34	<40
T98M-43(18-22)	<2	3.10	26	<4	2.26	46	35	0.715	1240	5	0.635	9	44	19	0.160	2060	13	<50	67	<40
T98M-43(38-42)	<2	2.99	23	<4	2.42	51	38	0.755	501	5	0.660	<4	42	18	0.090	46	13	<50	61	<40
T98M-43(58-62)	3	2.82	26	<4	2.30	50	37	0.735	355	4	0.630	6	48	18	0.070	28	14	<50	55	<40
T98M-43(83-87)	<2	2.89	<4	7	2.41	47	40	0.703	499	<2	0.665	<4	43	16	0.059	158	11	<50	57	<40
T98M-43(98-102)	<2	2.97	18	<4	2.26	50	39	0.722	344	4	0.709	<4	45	17	0.052	21	11	<50	66	<40
T98M-43(118-122)	<2	2.69	21	<4	2.42	52	39	0.677	384	3	0.736	9	51	13	0.042	20	10	<50	69	<40
T98M-43(138-142)	2	2.66	18	<4	2.38	49	37	0.679	528	<2	0.746	4	53	16	0.037	22	10	<50	75	<40
T98M-43(161-165)	<2	2.55	22	<4	2.34	47	36	0.672	423	2	0.769	<4	50	14	0.030	22	10	<50	77	<40
T98M-43(178-182)	<2	2.47	28	<4	2.30	48	36	0.665	311	<2	0.780	<4	42	14	0.027	40	10	<50	82	<40
T98M-43(188-192)	<2	2.48	20	<4	2.43	45	33	0.641	359	<2	0.879	9	54	13	0.029	21	9	<50	87	<40
93ABM02(11-22)	3	9.17	4	<4	1.57	33	20	0.465	8350	10	0.260	8	33	8	0.040	4030	7	<50	30	<40
93ABM04(76-142)	<2	2.41	27	<4	2.00	44	29	0.600	920	14	0.610	<4	38	15	0.055	296	10	<50	57	<40
93SBC10(70-90)	4	9.59	<4	<4	1.60	31	22	0.645	9310	24	0.265	6	29	12	0.035	11180	7	<50	33	<40
93SBK17(152-230)	<2	3.10	15	<4	2.29	37	29	0.440	2550	13	0.495	8	37	13	0.035	1130	9	<50	52	<40
93SBK17(25-68)	2	13.50	<4	<4	1.32	20	14	0.530	13850	24	0.105	4	22	5	0.020	17330	5	<50	20	<40
93SBK18(7-10)	4	10.80	5	<4	1.42	28	20	0.390	11490	23	0.490	5	26	8	0.045	21510	7	<50	63	<40
93SBB20(0-5)	3	9.61	<4	<4	1.44	30	15	0.325	7910	12	0.250	7	24	8	0.055	3020	7	<50	32	<40
93SBB22(19-26)	4	11.70	<4	<4	1.62	33	20	0.425	4350	12	0.265	10	33	8	0.050	9340	8	<50	34	<40
93SBB23(46-53)	4	11.70	<4	<4	1.56	33	16	0.305	11540	13	0.190	7	33	11	0.040	6740	7	<50	32	<40
93SBK18(26-82)	4	11.20	5	<4	1.30	24	17	0.580	11890	8	0.165	<4	24	3	0.030	32730	6	<50	40	<40

*Other analyses (Appendix #): D =USGS-EDXRF, E =EWU,
F =CHEMEX, H =ACZ, ---- = none.

Appendix G. Chemical composition of samples analyzed by ICP-AES at XRAL Labs in Golden, CO using 4 acid dissolution (Appendix_G.xls, Appendix_G.dbf).

Sample No.	Th (ppm)	Ti (%)	U (ppm)	V (ppm)	Y (ppm)	Yb (ppm)	Zn (ppm)
SAMPLE_NO.	TH_PPM	TI_%	U_PPM	V_PPM	Y_PPM	YB_PPM	ZN_PPM
T98L-41(0-4)	11	0.188	<100	49	13	2	1520
T98L-41(18-22)	12	0.182	<100	57	15	3	1280
T98L-41(38-42)	10	0.153	<100	50	14	2	2510
T98L-41(63-67)	8	0.129	<100	35	15	2	1820
T98L-41(88-92)	10	0.306	<100	50	15	2	166
T98L-41(103-107)	<6	0.326	<100	55	17	2	70
T98L-42(0-4)	8	0.17	<100	45	15	2	2240
T98L-42(8-12)	10	0.176	<100	56	15	2	1880
T98L-42(18-22)	12	0.247	<100	56	17	2	1700
T98L-42(43-47)	9	0.264	<100	48	18	2	355
T98L-42(63-67)	12	0.282	<100	53	20	2	217
T98L-42(88-94)	11	0.273	<100	59	17	2	201
T98L-42(108-112)	<6	0.122	155	32	8	<1	2030
T98M-43(0-4)	7	0.259	<100	55	14	2	1000
T98M-43(8-12)	13	0.188	<100	56	14	3	1360
T98M-43(18-22)	15	0.27	<100	63	19	2	812
T98M-43(38-42)	16	0.294	<100	67	21	3	402
T98M-43(58-62)	20	0.282	<100	65	23	3	155
T98M-43(83-87)	15	0.277	<100	62	21	3	209
T98M-43(98-102)	18	0.32	<100	63	20	3	77
T98M-43(118-122)	13	0.286	179	58	17	2	67
T98M-43(138-142)	7	0.317	<100	60	20	3	69
T98M-43(161-165)	15	0.297	<100	57	17	2	58
T98M-43(178-182)	8	0.32	<100	58	18	2	58
T98M-43(188-192)	11	0.275	<100	54	16	2	99
93ABM02(11-22)	9	0.147	<100	35	12	1	2790
93ABM04(76-142)	10	0.294	<100	48	20	2	247
93SBC10(70-90)	9	0.182	<100	37	14	1	2120
93SBK17(152-230)	9	0.206	<100	45	15	2	985
93SBK17(25-68)	<6	0.088	<100	25	12	1	8990
93SBK18(7-10)	8	0.165	<100	35	14	1	4760
93SBB20(0-5)	10	0.17	<100	36	12	1	2270
93SBB22(19-26)	13	0.147	<100	39	16	2	2890
93SBB23(46-53)	11	0.135	<100	34	11	1	4720
93SBK18(26-82)	7	0.1	<100	27	10	1	4580

*Other analyses (Appendix #): D =USGS-EDXRF, E =EWU,
F =CHEMEX, H =ACZ, ---- = none.

Appendix G. Chemical composition of samples analyzed by ICP-AES at XRAL Labs in Golden, CO using 4 acid dissolution (Appendix_G.xls, Appendix_G.dbf).

Sample No.	Site ID	Depth interval, top (cm)	Depth interval, bottom (cm)	*Other Analyses (appendix #)	Ag (ppm)	Al (%)	As (ppm)	Au (ppm)	Ba (ppm)	Be (ppm)	Bi (ppm)	Ca (%)	Cd (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cu (ppm)
SAMPLE_NO.	SITE_ID	INT_TOP_CM	INT_BT_M_CM	OTHR_ANALYS	AG_PPM	AL_(%)	AS_PPM	AU_PPM	BA_PPM	BE_PPM	BI_PPM	CA_(%)	CD_PPM	CE_PPM	CO_PPM	CR_PPM	CU_PPM
93SBL27B(23-34)	93SBL27B	23	34	D, F	20	3.5	252	<8	619	1	<50	0.152	21	77	16	126	154
93SBL26(6-12)	93SBL26	6	12	D, F	17	5.6	194	<8	603	2	<50	0.310	53	69	18	303	296
93SBL31(146-160)	93SBL31	146	160	D, F	16	3.2	98	<8	542	1	<50	0.394	26	56	14	119	128
93SBL32(10.5-16)	93SBL32	11	16	D, F	6	6.3	19	<8	738	2	<50	0.294	5	88	9	84	51
93SBL31(185-200)	93SBL31	185	200	D, F	18	3.3	84	<8	530	1	<50	0.457	28	62	13	374	227
94Gid2(0-30)	94Gid2	0	30	E, H	15	4.1	122	<8	649	1	<50	0.336	22	69	8	233	107
94Gid2(0-30)	94Gid2	0	30	E, H	13	4.0	109	<8	570	1	<50	0.331	19	64	9	191	102
94Gid2(0-30)	94Gid2	0	30	E, H	16	4.0	112	<8	645	1	<50	0.326	21	68	8	213	103
94Gid2(250-280)	94Gid2	250	280	E, H	44	3.8	67	<8	1210	1	<50	0.630	99	69	13	113	241
94Gid2(250-280)	94Gid2	250	280	E, H	36	3.8	69	<8	1060	1	<50	0.641	98	69	15	105	258
94Gid2(30-60)	94Gid2	30	60	E, H	19	3.8	132	<8	655	1	<50	0.268	37	70	9	149	107
94Gid2(30-60)	94Gid2	30	60	E, H	16	3.9	133	<8	638	1	<50	0.272	38	73	11	148	114
94Gid2(60-90)	94Gid2	60	90	E, H	20	2.7	405	<8	516	<1	<50	0.320	30	51	17	134	104
94Gid2(60-90)	94Gid2	60	90	E, H	15	2.8	401	<8	479	<1	<50	0.331	31	58	20	134	124
94Gid3(244-284)	94Gid3	244	284	E, H	<2	5.1	18	<8	500	1	<50	0.168	2	84	11	38	17
94Gid3(244-284)	94Gid3	244	284	E, H	<2	5.3	16	<8	497	2	<50	0.176	<2	82	14	64	17
94Gid3(3-12)	94Gid3	3	12	E, H	19	3.5	110	<8	638	1	<50	0.179	25	62	11	185	115
94Gid3(3-12)	94Gid3	3	12	E, H	17	3.6	116	<8	627	1	<50	0.181	25	64	13	153	127
94Gid4(31-63)	94Gid4	31	63	E, H	38	4.0	106	<8	1020	1	<50	0.142	18	72	8	117	217
94Gid4(31-63)	94Gid4	31	63	E, H	34	4.2	100	<8	983	2	<50	0.144	18	77	10	115	246
94Gid6(0-20)	94Gid6	0	20	E, H	26	4.7	103	<8	805	1	<50	0.273	16	69	11	163	131
94Gid6(0-20)	94Gid6	0	20	E, H	18	5.0	111	<8	804	2	<50	0.288	16	80	13	153	147
94VC1(10-20)	94VC1	10	20	E, H	10	3.9	50	<8	437	1	<50	0.189	19	55	6	69	72
94VC1(10-20)	94VC1	10	20	E, H	8	3.9	51	<8	436	1	<50	0.187	19	55	8	97	79
94VC1(140-150)	94VC1	140	150	E, H	39	2.4	58	<8	969	<1	<50	0.814	135	45	14	77	240
94VC1(140-150)	94VC1	140	150	E, H	28	2.3	58	<8	456	1	<50	0.823	131	48	17	76	276
94VC1(150-160)	94VC1	150	160	E, H	51	3.2	76	<8	1280	1	<50	0.830	132	50	15	80	238
94VC1(180-190)	94VC1	180	190	E, H	46	2.9	67	<8	1110	1	<50	0.767	109	52	15	76	218
94VC1(180-190)	94VC1	180	190	E, H	37	3.2	63	<8	289	1	<50	0.829	114	54	18	77	262
94VC1(190-200)	94VC1	190	200	E, H	56	2.3	55	<8	832	<1	<50	0.646	173	42	14	83	408
94VC1(200-207)	94VC1	200	207	E, H	44	2.1	56	<8	736	<1	<50	0.719	167	42	13	96	397
94VC1(200-207)	94VC1	200	207	E, H	50	2.0	47	<8	691	<1	<50	0.688	166	43	13	87	388
94VCD3(67-100)	94VCD3	67	100	E, H	<2	5.6	11	<8	540	2	<50	0.215	<2	85	11	43	14
94VCD3(67-100)	94VCD3	67	100	E, H	<2	5.5	11	<8	493	2	<50	0.208	<2	87	12	28	13
94VCK1(0-33)	94VCK1	0	33	E, H	17	3.5	82	<8	540	1	<50	0.263	34	59	9	84	100

*Other analyses (Appendix #): D =USGS-EDXRF, E =EWU, F =CHEMEX, H =ACZ, ---- = none.

Appendix G. Chemical composition of samples analyzed by ICP-AES at XRAL Labs in Golden, CO using 4 acid dissolution (Appendix_G.xls, Appendix_G.dbf).

Sample No.	Eu (ppm)	Fe (%)	Ga (ppm)	Ho (ppm)	K (%)	La (ppm)	Li (ppm)	Mg (%)	Mn (ppm)	Mo (ppm)	Na (%)	Nb (ppm)	Nd (ppm)	Ni (ppm)	P (ppm)	Pb (ppm)	Sc (ppm)	Sn (ppm)	Sr (ppm)	Ta (ppm)
SAMPLE_NO.	EU_PPM	FE_(%)	GA_PPM	HO_PPM	K_(%)	LA_PPM	LI_PPM	MG_(%)	MN_PPM	MO_PPM	NA_(%)	NB_PPM	ND_PPM	NI_PPM	P_PPM	PB_PPM	SC_PPM	SN_PPM	SR_PPM	TA_PPM
93SBL27B(23-34)	4	9.94	<4	<4	1.43	32	17	0.355	9400	12	0.220	<4	29	11	0.030	5360	7	<50	29	<40
93SBL26(6-12)	3	6.42	5	<4	2.04	34	22	0.520	4870	19	0.380	7	30	28	0.045	4410	10	<50	48	<40
93SBL31(146-160)	3	9.10	8	<4	1.40	26	15	0.520	8980	7	0.205	7	24	12	0.025	5630	6	<50	31	<40
93SBL32(10.5-16)	<2	2.89	24	<4	2.06	44	31	0.650	1030	5	0.645	6	38	15	0.145	2120	13	<50	65	<40
93SBL31(185-200)	3	9.59	<4	<4	1.38	29	15	0.530	9250	31	0.220	4	25	14	0.030	6100	6	<50	33	<40
94Gid2(0-30)	3	8.64	7	<4	1.53	33	20	0.555	6770	20	0.435	5	30	7	0.060	4300	7	<50	50	<40
94Gid2(0-30)	3	8.46	6	<4	1.49	30	21	0.510	6560	18	0.435	7	28	14	0.050	4210	5	<50	51	<40
94Gid2(0-30)	3	8.31	<4	<4	1.50	31	19	0.550	6610	19	0.425	5	33	8	0.060	4280	7	<50	49	<40
94Gid2(250-280)	5	12.00	<4	<4	1.49	31	20	0.760	12710	12	0.245	5	31	7	0.035	17200	7	<50	44	<40
94Gid2(250-280)	5	12.40	<4	<4	1.48	31	25	0.735	12690	14	0.255	6	31	21	0.030	17740	5	<50	45	<40
94Gid2(30-60)	3	8.31	12	<4	1.51	32	19	0.550	6790	14	0.325	6	30	8	0.055	4550	7	<50	38	<40
94Gid2(30-60)	3	8.76	6	<4	1.51	33	23	0.550	6910	16	0.335	6	31	15	0.050	4870	6	<50	40	<40
94Gid2(60-90)	4	12.40	<4	<4	1.12	22	12	0.550	11770	13	0.160	<4	23	7	0.035	3200	5	<50	23	<40
94Gid2(60-90)	<2	13.00	<4	<4	1.14	25	15	0.570	12120	13	0.170	<4	25	17	0.035	3610	4	<50	26	<40
94Gid3(244-284)	<2	2.52	20	<4	2.02	41	26	0.575	892	3	0.475	<4	36	12	0.035	397	9	<50	45	<40
94Gid3(244-284)	<2	2.66	13	<4	2.07	42	34	0.595	920	3	0.500	<4	40	14	0.035	430	8	<50	48	<40
94Gid3(3-12)	3	10.60	<4	<4	1.50	29	16	0.420	10610	13	0.240	<4	26	5	0.025	3950	6	<50	29	<40
94Gid3(3-12)	4	11.20	<4	<4	1.54	30	20	0.430	10630	17	0.250	9	32	13	0.025	4340	5	<50	31	<40
94Gid4(31-63)	4	10.70	<4	<4	1.63	34	21	0.325	6470	10	0.265	8	33	6	0.035	12960	7	<50	32	<40
94Gid4(31-63)	4	11.00	<4	<4	1.66	35	25	0.325	6560	11	0.280	10	33	14	0.035	13960	6	<50	34	<40
94Gid6(0-20)	3	7.67	7	<4	1.73	36	22	0.485	6200	12	0.465	11	33	12	0.085	7300	9	<50	52	<40
94Gid6(0-20)	3	8.16	5	<4	1.80	38	29	0.510	6450	16	0.505	11	35	17	0.090	8100	7	<50	56	<40
94VC1(10-20)	2	6.36	16	<4	1.79	27	19	0.510	5610	6	0.270	7	27	6	0.020	2490	6	<50	31	<40
94VC1(10-20)	2	6.51	9	<4	1.78	30	24	0.530	5580	5	0.280	6	29	12	0.020	2780	5	<50	31	<40
94VC1(140-150)	2	16.10	<4	<4	1.03	18	13	0.800	17120	11	0.120	10	18	<3	0.015	13430	4	<50	37	<40
94VC1(140-150)	3	16.00	<4	<4	1.01	18	17	0.780	16780	13	0.120	13	23	15	0.015	13950	3	<50	37	<40
94VC1(150-160)	3	15.30	<4	<4	1.35	20	17	0.875	17820	13	0.130	8	23	8	0.025	19220	5	<50	42	<40
94VC1(180-190)	3	14.80	<4	<4	1.22	20	15	0.775	15820	16	0.135	7	17	5	0.025	17280	5	<50	37	<40
94VC1(180-190)	3	16.00	<4	<4	1.29	23	20	0.825	16710	15	0.145	10	24	17	0.025	19270	4	<50	41	<40
94VC1(190-200)	3	17.00	<4	<4	0.99	19	12	0.865	20740	11	0.100	10	21	<3	0.020	15310	5	<50	29	<40
94VC1(200-207)	3	17.30	<4	<4	0.95	21	12	0.920	22120	21	0.095	13	26	<3	0.015	13260	4	<50	30	<40
94VC1(200-207)	3	17.70	<4	<4	0.90	19	12	0.885	21110	16	0.090	10	21	<3	0.015	12640	5	<50	29	<40
94VCD3(67-100)	<2	1.89	20	<4	2.07	44	30	0.600	110	4	0.570	5	38	14	0.030	22	10	<50	53	<40
94VCD3(67-100)	<2	1.88	14	<4	2.02	43	34	0.575	112	3	0.570	6	38	16	0.030	23	9	<50	53	<40
94VCK1(0-33)	3	9.32	6	<4	1.57	27	17	0.600	9120	12	0.220	5	23	6	0.025	2780	6	<50	28	<40

*Other analyses (Appendix #): D =USGS-EDXRF, E =EWU,
F =CHEMEX, H =ACZ, ---- = none.

Appendix G. Chemical composition of samples analyzed by ICP-AES at XRAL Labs in Golden, CO using 4 acid dissolution (Appendix_G.xls, Appendix_G.dbf).

Sample No.	Th (ppm)	Ti (%)	U (ppm)	V (ppm)	Y (ppm)	Yb (ppm)	Zn (ppm)
SAMPLE_NO.	TH_PPM	TI_%	U_PPM	V_PPM	Y_PPM	YB_PPM	ZN_PPM
93SBL27B(23-34)	12	0.135	<100	34	12	1	2970
93SBL26(6-12)	<6	0.2	<100	48	15	2	4720
93SBL31(146-160)	9	0.129	<100	31	10	1	6030
93SBL32(10.5-16)	12	0.3	<100	57	20	3	418
93SBL31(185-200)	<6	0.159	<100	32	16	2	3840
94Gid2(0-30)	6	0.188	<100	38	14	2	1940
94Gid2(0-30)	11	0.194	<100	36	13	1	1940
94Gid2(0-30)	10	0.188	<100	38	14	1	1900
94Gid2(250-280)	10	0.141	<100	36	15	2	12720
94Gid2(250-280)	10	0.163	<100	36	18	2	13910
94Gid2(30-60)	12	0.165	<100	35	13	1	3710
94Gid2(30-60)	10	0.15	<100	37	13	<1	4160
94Gid2(60-90)	8	0.094	<100	24	11	1	4020
94Gid2(60-90)	12	0.1	<100	25	10	<1	4620
94Gid3(244-284)	11	0.282	<100	44	15	2	310
94Gid3(244-284)	12	0.275	<100	47	14	2	368
94Gid3(3-12)	11	0.159	<100	31	13	1	3520
94Gid3(3-12)	13	0.163	<100	33	12	<1	4020
94Gid4(31-63)	10	0.153	<100	37	14	2	3580
94Gid4(31-63)	14	0.15	<100	39	14	1	3950
94Gid6(0-20)	10	0.229	<100	43	16	2	1430
94Gid6(0-20)	12	0.219	<100	46	16	1	1650
94VC1(10-20)	6	0.135	<100	31	9	2	2660
94VC1(10-20)	10	0.131	<100	32	9	2	3050
94VC1(140-150)	8	0.088	<100	26	11	1	16320
94VC1(140-150)	10	0.075	<100	27	11	<1	17500
94VC1(150-160)	<6	0.094	<100	31	14	1	15800
94VC1(180-190)	9	0.094	<100	28	12	1	13540
94VC1(180-190)	12	0.1	104	30	13	1	15850
94VC1(190-200)	7	0.112	<100	24	11	1	20890
94VC1(200-207)	11	0.106	<100	23	12	1	20230
94VC1(200-207)	8	0.118	<100	22	12	1	19810
94VCD3(67-100)	13	0.294	<100	49	18	2	64
94VCD3(67-100)	12	0.313	<100	48	18	2	66
94VCK1(0-33)	6	0.147	<100	31	10	1	4680

*Other analyses (Appendix #): D =USGS-EDXRF, E =EWU,
F =CHEMEX, H =ACZ, ---- = none.

Appendix G. Chemical composition of samples analyzed by ICP-AES at XRAL Labs in Golden, CO using 4 acid dissolution (Appendix_G.xls, Appendix_G.dbf).

Sample No.	Site ID	Depth interval, top (cm)	Depth interval, bottom (cm)	*Other Analyses (appendix #)	Ag (ppm)	Al (%)	As (ppm)	Au (ppm)	Ba (ppm)	Be (ppm)	Bi (ppm)	Ca (%)	Cd (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cu (ppm)
SAMPLE_NO.	SITE_ID	INT_TOP_CM	INT_BT_M_CM	OTHR_ANALYS	AG_PPM	AL_(%)	AS_PPM	AU_PPM	BA_PPM	BE_PPM	BI_PPM	CA_(%)	CD_PPM	CE_PPM	CO_PPM	CR_PPM	CU_PPM
94VCK1(0-33)	94VCK1	0	33	E, H	13	3.6	90	<8	530	1	<50	0.278	37	56	12	123	111
94VCK1(233-267)	94VCK1	233	267	E, H	23	2.9	78	<8	639	<1	<50	0.415	47	52	11	127	119
94VCK1(233-267)	94VCK1	233	267	E, H	17	3.1	78	<8	622	1	<50	0.449	47	55	13	127	132
94VCK2(300-333)	94VCK2	300	333	E, H	21	3.0	121	<8	680	1	<50	0.431	41	50	14	100	117
95PCK1(260-262)	95PCK1	260	262	E, H	39	4.0	146	<8	1220	2	<50	0.583	72	68	15	100	189
95PCK1(297-326)	95PCK1	297	326	E, H	94	4.8	57	<8	1200	2	<50	0.457	98	80	11	97	325
95PCK1(415-418)	95PCK1	415	418	E, H	3	5.1	24	<8	575	2	<50	0.236	5	83	7	176	24
95PCK1(415-418)	95PCK1	415	418	E, H	<2	5.1	29	<8	565	2	<50	0.236	5	90	6	99	24
95PCUD2(0-25)	95PCUD2	0	25	E, H	96	5.0	78	<8	1240	2	<50	0.462	99	68	13	101	332
95VCD3(402-423)	95VCD3	402	423	E, H	74	5.0	54	<8	822	2	<50	0.362	69	68	9	138	238
95VCD3(195.5-214)	95VCD3	195.5	214	E, H	34	2.8	62	<8	736	<1	<50	0.504	82	48	11	83	208
95VCD3(195.5-214)	95VCD3	195.5	214	E, H	27	2.8	73	<8	774	1	<50	0.515	88	46	11	83	205
95VCUD1(266-286)	95VCUD1	266	286	E, H	32	3.5	55	<8	783	1	<50	0.520	87	54	11	79	215
95VCUD1(25-50)	95VCUD1	25	50	E, H	9	3.8	45	<8	450	1	<50	0.158	11	51	6	86	57
96K114E(140-160)	96K114E	140	160	E, H	23	3.7	123	<8	803	1	<50	0.294	27	65	11	58	131
96K114E(140-160)	96K114E	140	160	E, H	19	3.6	108	<8	699	1	<50	0.288	26	56	12	58	133

*Other analyses (Appendix #): D =USGS-EDXRF, E =EWU, F =CHEMEX, H =ACZ, ---- = none.

Appendix G. Chemical composition of samples analyzed by ICP-AES at XRAL Labs in Golden, CO using 4 acid dissolution (Appendix_G.xls, Appendix_G.dbf).

Sample No.	Eu (ppm)	Fe (%)	Ga (ppm)	Ho (ppm)	K (%)	La (ppm)	Li (ppm)	Mg (%)	Mn (ppm)	Mo (ppm)	Na (%)	Nb (ppm)	Nd (ppm)	Ni (ppm)	P (ppm)	Pb (ppm)	Sc (ppm)	Sn (ppm)	Sr (ppm)	Ta (ppm)
SAMPLE_NO.	EU_PPM	FE_(%)	GA_PPM	HO_PPM	K_(%)	LA_PPM	LI_PPM	MG_(%)	MN_PPM	MO_PPM	NA_(%)	NB_PPM	ND_PPM	NI_PPM	P_PPM	PB_PPM	SC_PPM	SN_PPM	SR_PPM	TA_PPM
94VCK1(0-33)	3	10.20	5	<4	1.65	30	22	0.615	9770	15	0.240	5	27	14	0.025	3080	5	<50	30	<40
94VCK1(233-267)	3	9.98	<4	<4	1.31	23	14	0.580	10680	15	0.135	<4	19	6	0.020	5590	5	<50	27	<40
94VCK1(233-267)	4	10.80	<4	<4	1.38	23	18	0.585	11320	15	0.145	6	23	13	0.015	6050	4	<50	29	<40
94VCK2(300-333)	3	10.90	<4	<4	1.37	24	13	0.585	11370	15	0.130	<4	22	7	0.020	5250	5	<50	26	<40
95PCK1(260-262)	4	12.50	6	<4	1.71	29	19	0.730	13590	11	0.155	9	27	9	0.030	12260	7	<50	37	<40
95PCK1(297-326)	4	8.02	12	<4	1.85	38	23	0.645	7350	10	0.375	7	38	18	0.050	31970	9	<50	50	<40
95PCK1(415-418)	<2	2.97	21	<4	2.06	43	30	0.625	1390	5	0.490	<4	38	14	0.035	780	9	<50	46	<40
95PCK1(415-418)	<2	2.92	21	<4	2.04	43	28	0.610	1350	5	0.485	<4	38	15	0.035	767	9	<50	46	<40
95PCUD2(0-25)	4	9.78	17	<4	1.94	33	25	0.700	9220	13	0.295	5	35	12	0.045	34950	9	<50	43	<40
95VCD3(402-423)	3	6.52	7	<4	1.94	33	24	0.635	5430	8	0.375	8	28	13	0.035	22150	10	<50	45	<40
95VCD3(195.5-214)	4	12.30	6	<4	1.24	18	13	0.660	13710	10	0.135	10	18	6	0.020	8280	5	<50	26	<40
95VCD3(195.5-214)	4	12.60	<4	<4	1.29	20	15	0.680	14170	6	0.140	9	24	5	0.020	8620	5	<50	28	<40
95VCUD1(266-286)	3	10.50	12	<4	1.53	24	18	0.680	11180	11	0.185	4	23	5	0.020	10370	6	<50	34	<40
95VCUD1(25-50)	2	5.24	10	<4	1.78	28	19	0.490	4460	4	0.290	5	23	8	0.020	2530	6	<50	35	<40
96K114E(140-160)	2	9.85	6	<4	1.50	31	19	0.625	9460	7	0.265	7	29	12	0.035	7650	7	<50	35	<40
96K114E(140-160)	3	9.88	<4	<4	1.45	28	21	0.575	9100	7	0.265	9	26	17	0.030	7620	5	<50	35	<40

*Other analyses (Appendix #): D =USGS-EDXRF, E =EWU,
F =CHEMEX, H =ACZ, ---- = none.

Appendix G. Chemical composition of samples analyzed by ICP-AES at XRAL Labs in Golden, CO using 4 acid dissolution (Appendix_G.xls, Appendix_G.dbf).

Sample No.	Th (ppm)	Ti (%)	U (ppm)	V (ppm)	Y (ppm)	Yb (ppm)	Zn (ppm)
SAMPLE_NO.	TH_PPM	TI_%	U_PPM	V_PPM	Y_PPM	YB_PPM	ZN_PPM
94VCK1(0-33)	12	0.144	<100	33	10	<1	5440
94VCK1(233-267)	7	0.106	<100	25	9	<1	6180
94VCK1(233-267)	10	0.113	<100	27	9	<1	6920
94VCK2(300-333)	7	0.106	<100	27	10	1	5450
95PCK1(260-262)	10	0.112	<100	35	12	1	9260
95PCK1(297-326)	13	0.182	<100	42	15	2	11690
95PCK1(415-418)	14	0.288	<100	47	16	2	750
95PCK1(415-418)	13	0.276	<100	45	16	2	690
95PCUD2(0-25)	11	0.165	<100	44	15	2	12140
95VCD3(402-423)	11	0.2	<100	43	14	2	8430
95VCD3(195.5-214)	8	0.106	<100	24	9	<1	10470
95VCD3(195.5-214)	7	0.1	<100	25	9	<1	11130
95VCUD1(266-286)	10	0.123	<100	31	11	1	10490
95VCUD1(25-50)	7	0.135	<100	31	9	2	1860
96K114E(140-160)	9	0.141	<100	35	11	1	3260
96K114E(140-160)	13	0.138	<100	34	11	1	3400

*Other analyses (Appendix #): D =USGS-EDXRF, E =EWU,
F =CHEMEX, H =ACZ, ---- = none.

Appendix H. Chemical composition of samples analyzed by ICP-AES at ACZ Labs in Steamboat Springs, CO using nitric acid dissolution (Appendix_H.xls, Appendix_H.dbf).

Sample No.	Site ID	Depth interval, top (cm)	Depth interval, bottom (cm)	*Other Analyses (Appendix #)	As (ppm)	Cd (ppm)	Fe (%)	Pb (ppm)	Mn (ppm)	Zn (ppm)
SAMPLE_NO.	SITE_ID	INT_TOP_CM	INT_BT_M_CM	OTHR_ANALYS	AS_PPM	CD_PPM	FE_%	PB_PPM	MN_PPM	ZN_PPM
94Gid2(0-30)	94Gid2	0	30	E,G	116	16.8	8.89	4380	7150	2390
94Gid2(30-60)	94Gid2	30	60	E,G	130	34.2	9.17	4750	7580	4790
94Gid2(60-90)	94Gid2	60	90	E,G	433	28.2	13.2	3470	12500	5300
94Gid2(250-280)	94Gid2	250	280	E,G	63.1	83.7	12.9	17600	13700	16700
94Gid3(3-12)	94Gid3	3	12	E,G	108	22.4	11.8	4320	11800	4730
94Gid3(244-284)	94Gid3	244	284	E,G	12.5	1.5	1.9	380	872	362
94Gid4(31-63)	94Gid4	31	63	E,G	107	16.1	11	13100	6810	4390
94Gid6(0-20)	94Gid6	0	20	E,G	101	12.8	7.85	7500	6660	1790
94VC1(10-20)	94VC1	10	20	E,G	52.5	14.7	6.4	2640	6050	3470
94VC1(140-150)	94VC1	140	150	E,G	76.4	119	17.7	14300	18700	21500
94VC1(150-160)	94VC1	150	160	E,G		138	15.5	20200	19200	20700
94VC1(180-190)	94VC1	180	190	E,G	69	102	16.9	19200	17800	18500
94VC1(190-200)	94VC1	190	200	E,G	80.2	165	19.3	15500	21900	27100
94VC1(200-207)	94VC1	200	207	E,G		174	19.3	13600	24300	26900
94VCD3(67-100)	94VCD3	67	100	E,G			1.13	26.3	73.8	64.8
94VCK1(0-33)	94VCK1	0	33	E,G	46.4	30.1	9.79	2820	9800	5920
94VCK1(233-267)	94VCK1	233	267	E,G	74	43.1	11	5910	11700	8120
94VCK2(300-333)	94VCK2	300	333	E,G	116	38	11.6	5450	12300	7030
95PCK1(260-262)	95PCK1	260	262	E,G	141	65	13.8	12600	14800	11800
95PCK1(297-326)	95PCK1	297	326	E,G	16.1	92.8	8.01	32900	8130	15100
95PCK1(415-418)	95PCK1	415	418	E,G	19.3	4	2.3	697	1290	752
95PCUD2(0-25)	95PCUD2	0	25	E,G	51.2	90.1	9.33	35800	9760	15400
95VCD3(195.5-214)	95VCD3	195.5	214	E,G	70.2	76.8	13.4	9300	15400	14400
95VCD3(402-423)	95VCD3	402	423	E,G	13.9	64.8	6.12	23200	5870	10700
95VCUD1(25-50)	95VCUD1	25	50	E,G	37	9.4	4.61	2200	4260	1950
95VCUD1(266-286)	95VCUD1	266	286	E,G		74.3	11.2	10500	12100	13500
96K114E(140-160)	96K114E	140	160	E,G	103	25	10	7400	9860	3620

*Other analyses (Appendix #): E =EWU, G =XRAL.

Appendix J.

List of digital files associated with this report.

Text, figures and tables of this report in PDF format

- * of01-139.pdf

Tables in MS Excel format

- * of01-139_appendix_b.xls
- * of01-139_appendix_c.xls
- * of01-139_appendix_d.xls
- * of01-139_appendix_e.xls
- * of01-139_appendix_f.xls
- * of01-139_appendix_g.xls
- * of01-139_appendix_h.xls

Tables in dBase4 format

- * of01-139_appendix_b.dbf
- * of01-139_appendix_c.dbf
- * of01-139_appendix_d.dbf
- * of01-139_appendix_e.dbf
- * of01-139_appendix_f.dbf
- * of01-139_appendix_g.dbf
- * of01-139_appendix_h.dbf

Metadata for Open-File Report OF01-139

- * of01-139.met.txt