

Preliminary Assessment and Site Inspection Report for Buckskin Mine (aka Buckskin East, Early Bird)

Custer County



**State of Idaho
Department of Environmental Quality**

October 2015



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Report for Buckskin Mine
(aka Buckskin East, Early Bird)**

Custer County

October 2015



Prepared by
Idaho Department of Environmental Quality
Mine Waste Program
1410 N. Hilton
Boise, Idaho 83706



STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

1410 North Hilton • Boise, ID 83706 • (208) 373-0502
www.deq.idaho.gov

C. L. "Butch" Otter, Governor
John H. Tippetts, Director

October 30, 2015

Mr. Ken Marcy
U.S. Environmental Protection Agency Region 10
12928 SW 276th Street
Vashon, WA 98070

Subject: Preliminary Assessment and Site Inspection Report for the Buckskin Mine,
Custer County, Idaho

Dear Mr. Marcy:

The Idaho Department of Environmental Quality (DEQ) completed the enclosed Preliminary Assessment and Site Inspection (PA/SI) for the Buckskin Mine under a cooperative agreement with Region 10 of the United States Environmental Protection Agency (EPA). Under this cooperative agreement, DEQ provides technical support for completion of preliminary assessments.

The Buckskin Mine is located on private property and this assessment was conducted with landowner permission. A representative of the property owner accompanied DEQ during the site visit on August 5, 2015. Soil, sediment, and surface water sampling was conducted to assess possible contamination originating from the mine site.

Based on existing conditions and uses, historic information, data observations made during the site visit, potential pathways of contaminants to receptors, and potential exposures to ecological and human receptors, DEQ recommends **No Remedial Action Planned (NRAP)** for the current recreational-only land use.

This PA/SI report can also be found on DEQ's preliminary assessment web page:
<http://www.deq.idaho.gov/preliminary-assessments>.

If you have any questions, please feel free to give me a call at (208) 373-0296 or email
dana.swift@deq.idaho.gov.

Sincerely,

A handwritten signature in black ink that reads "Dana Swift".

Dana Swift
Mine Waste Project Coordinator

Enclosures

cc: William F. Rigby
Kathryn Robertson
Diane Kiehn
Gary Billman, Idaho Department of Lands

Acknowledgments

DEQ would like to thank William F. Rigby and Kathryn Robertson for permitting access to Buckskin Mine and Diane Kiehn for accompanying DEQ on the site visit.

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List of Acronyms

amsl	above mean sea level
ATV	all-terrain vehicle
CWA	Clean Water Act
DEQ	Idaho Department of Environmental Quality
EPA	United States Environmental Protection Agency
FSP	Field Sampling Plan
GIS	geographic information system
g/L	grams per liter
MCL	maximum contaminant level
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MS/MSD	matrix spike/matrix spike duplicate
mV	millivolts
NRAP	No Remedial Action Planned
NTU	nephelometric turbidity unit
ORP	oxidation reduction potential
PA	preliminary assessment
PPE	probable point of entry
PWS	public water system
QAPP	Quality Assurance Project Plan
QA/QC	quality assurance/quality control
RPD	relative percent difference
RSLs	regional screening levels
SI	site inspection
su	standard units
SVL	SVL Analytical, Inc.
SWA	source water assessment
TDL	target distance limit
TDS	total dissolved solids
TMDL	total maximum daily load
µs/cm	micro-Siemens per centimeter
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
XRF	X-ray Fluorescence Spectrometry

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1 Introduction

This report presents the preliminary assessment and site inspection (PA/SI) results for the Buckskin Mine site in Custer County, Idaho. Under a cooperative agreement with the United States Environmental Protection Agency (EPA) Region 10, the Idaho Department of Environmental Quality (DEQ) provides technical support for performing the PA/SI process at various mine and industrial sites located on private, state, or mixed ownership (public and private) lands. Additional information about DEQ's PA program can be found at: <http://www.deq.idaho.gov/preliminary-assessments>.

DEQ initiated the PA program in February 2002 to prioritize and assess potentially contaminated sites. Due to accessibility and funding considerations, priority is given to sites where potential contamination poses the most substantial threat to human health or the environment. In recent years, this priority focuses DEQ's efforts in areas where residential and recreational developments are encroaching on historic mining districts. Priority is also given to mining districts where groups or clusters of sites can be cost-effectively assessed on a watershed basis.

The purpose of this PA/SI is to assess the threat posed to human health and the environment and determine the need for additional investigation at the Buckskin Mine site. This PA/SI was performed at the request of the property owner. During the 2015 field season, surface water, sediment, and soil samples for the mine site were evaluated.

The PA/SI process is presented in the following sections:

- Section 2, **Site Description**, compiles desktop research information to present the location, ownership, general geology, and climatology for the site. Desktop research also includes compiling the operational history of past mining activities and current and potential future land uses.
- Section 3, **Sample Collection and Analysis**, describes the sampling locations and presents the analytical results.
- Section 4, **Migration/Exposure Pathways and Targets**, presents observations and potential targets for the surface water pathway, soil exposures, ground water pathway, and air pathway.
- Section 5, **Conclusions and Recommendations**, presents a summary of the PA/SI conclusions and recommendations based on the current conditions at the site.

2 Site Description

The site description for the Buckskin Mine includes the following information: location and ownership (Section 2.1), general geology (Section 2.2), climatology (Section 2.3), operational history of past mining activities (Section 2.4), and current and potential future land uses (Section 2.5). As part of the desktop research, DEQ uses references from historic reports which often have

different spellings for claim names, town sites, and/or geographic features. DEQ retains the spelling and usage from the original source documents.

2.1 Location and Ownership

The Buckskin Mine site is on private property located in the Valley Creek Mining District within the Sawtooth National Recreation Area in Custer County Idaho (Figure 1). Buckskin Mine is located in Section 33, Township 12 North, Range 12 East. The Idaho Geological Survey provides the following coordinates for the site: Latitude 44.3284385971 and Longitude -115.074548517 (WGS84; IGS 2015). The Buckskin Mine patented lands comprise 54.45 acres and is located at 7,201 feet above mean sea level (amsl; USGS 2015).

The site is located approximately 10.5 miles northwest of Stanley, Idaho. To access, take Highway 21 north from Stanley. Turn right on Valley Creek Road (aka NF-304). Stay to the left and continue on NF-304. The mine is located west of the road, approximately one mile north of Highway 21.

This assessment was conducted at the request of the property owner. The Buckskin Mine patented lands are owned by William F. Rigby (parcel number RP9912N12E2732). All adjacent land is owned by the U.S. Forest Service (USFS). Sampling for this assessment was conducted on private property. DEQ does not warrant the ownership research or location of property boundaries contained in this report. Information regarding ownership and property boundaries was obtained from the parcel maps for Custer County (Idaho State Tax Commission, 2015).

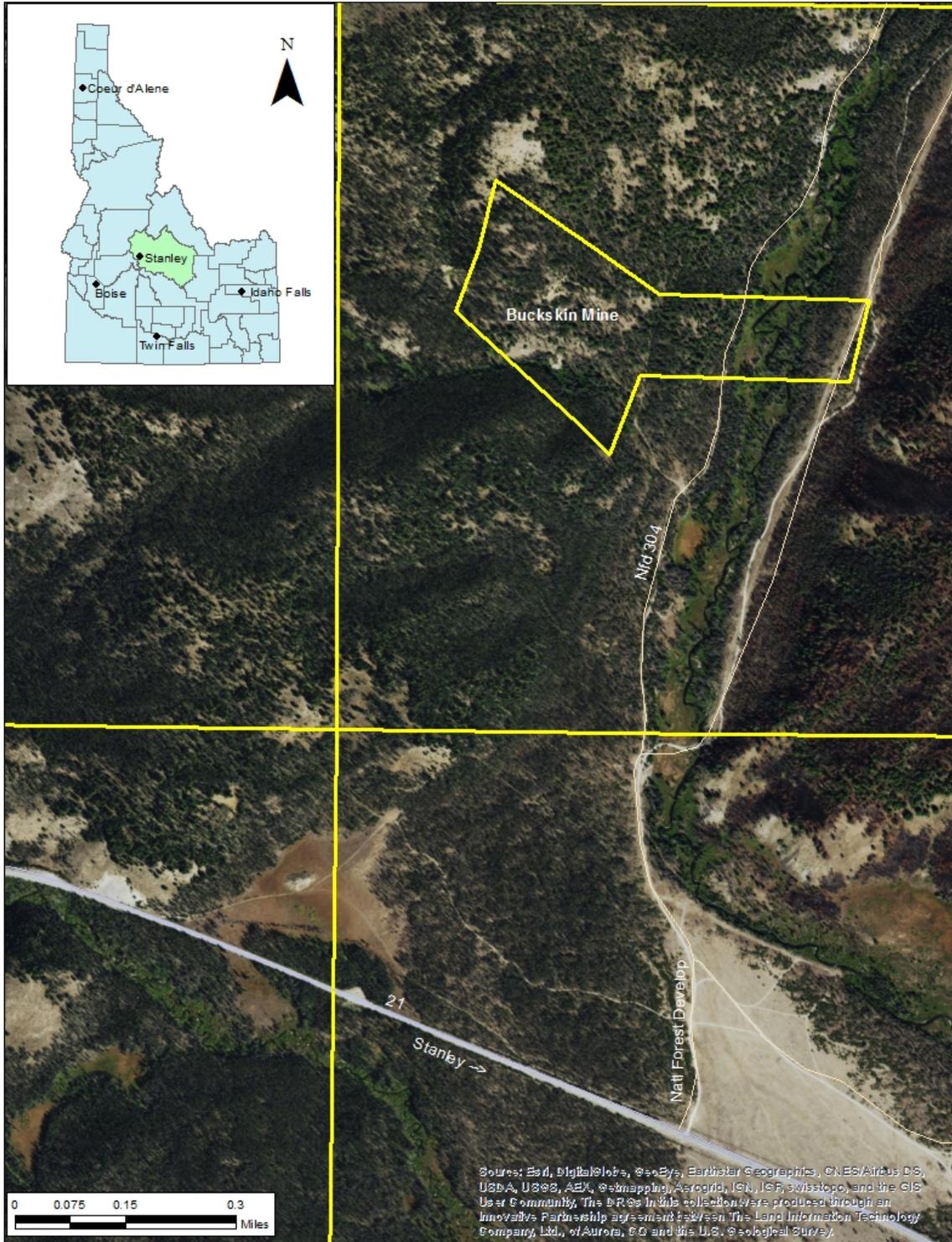


Figure 1. Aerial overview map of the Buckskin Mine site with parcel boundaries outlined in yellow.

2.2 General Geology

A map of the major lithology for the Buckskin Mine site is shown in Figure 2. The following information from the U.S. Geological Survey (USGS) Bulletin 1545-E *Economic Appraisal of the Eastern Part of the Sawtooth National Recreation Area, Idaho* (Van Noy, et.al 1986) was used to identify the composition of geology and lithology for the area. Since DEQ cannot improve or expand upon information included in historic reports, this information is quoted directly. The tables and figures referenced in this quote have not been duplicated in this report.

The greatest density of workings and the only patented lode claims in the Valley Creek district are in the area that extends from Potato Mountain at the headwaters of Stanley Creek to the Buckskin Mine (pl.3; fig.34).

The area is underlain by quartz monzonite of the Idaho batholith which is intruded by numerous dikes and northeasterly trending quartz veins that are the major source of the placer gold found along Stanley Creek and other tributaries of Valley Creek.

The Valley Creek mine, in the northern part of the Valley Creek district, 13 mi (21 km) northwest of Stanley (pl.3, No. 3), is the most important mine in the district.

The geologic setting of the Buckskin mine is similar to that of the Valley Creek mine, but significant differences exist in the strike of some veins (figs. 82 and 84), the composition of the mineralized material, and the degree of oxidation. The higher silver/gold ratios and mercury contents (table 23 and fig. 84) suggest that the silver-rich Buckskin veins may grade down into richer gold ones like those in the Valley Creek mine. Sulfide minerals were not seen in the Valley Creek mine, but pyrite is abundant locally in the veins west of the Buckskin claim and galena was seen in some workings. The depth of oxidation inferred from the geophysical data is 130 ft (40 m) south of the Buckskin claim, as compared to 150 ft (46 m) in the Valley Creek mine area.

Most samples collected by the U.S. Geological Survey represent the highest grade material available. The highest silver content on the Vera claim (fig. 84, K-8) represents material that contains about nine times as much silver as the next richest sample. Other samples from the same bulldozer cut, however, have a greenish-yellow silver bloom and a high content of silver.

2.3 Climatology

Climate information is based on a summary for Stanley, Idaho obtained from the Western Regional Climate Center (<http://www.wrcc.dri.edu/climatedata/climsum/>). The climatological data is collected at the Stanley Model Station (108676) (elevation 6,253 amsl) which is approximately 10.5 miles southeast of the Buckskin Mine site.

The region is characterized by short, cool, dry summers and cold winters. Based on data collected from 1916 to 2015, total annual precipitation averages 13.6 inches with a total annual snowfall of 74.8 inches. The driest months of the year are July and August.

The average annual high temperature is 52.0°F and the average annual low temperature is 18.1°F. July is the hottest month with an average temperature of 78.6°F. January is the coldest month with an average temperature of -0.9°F.

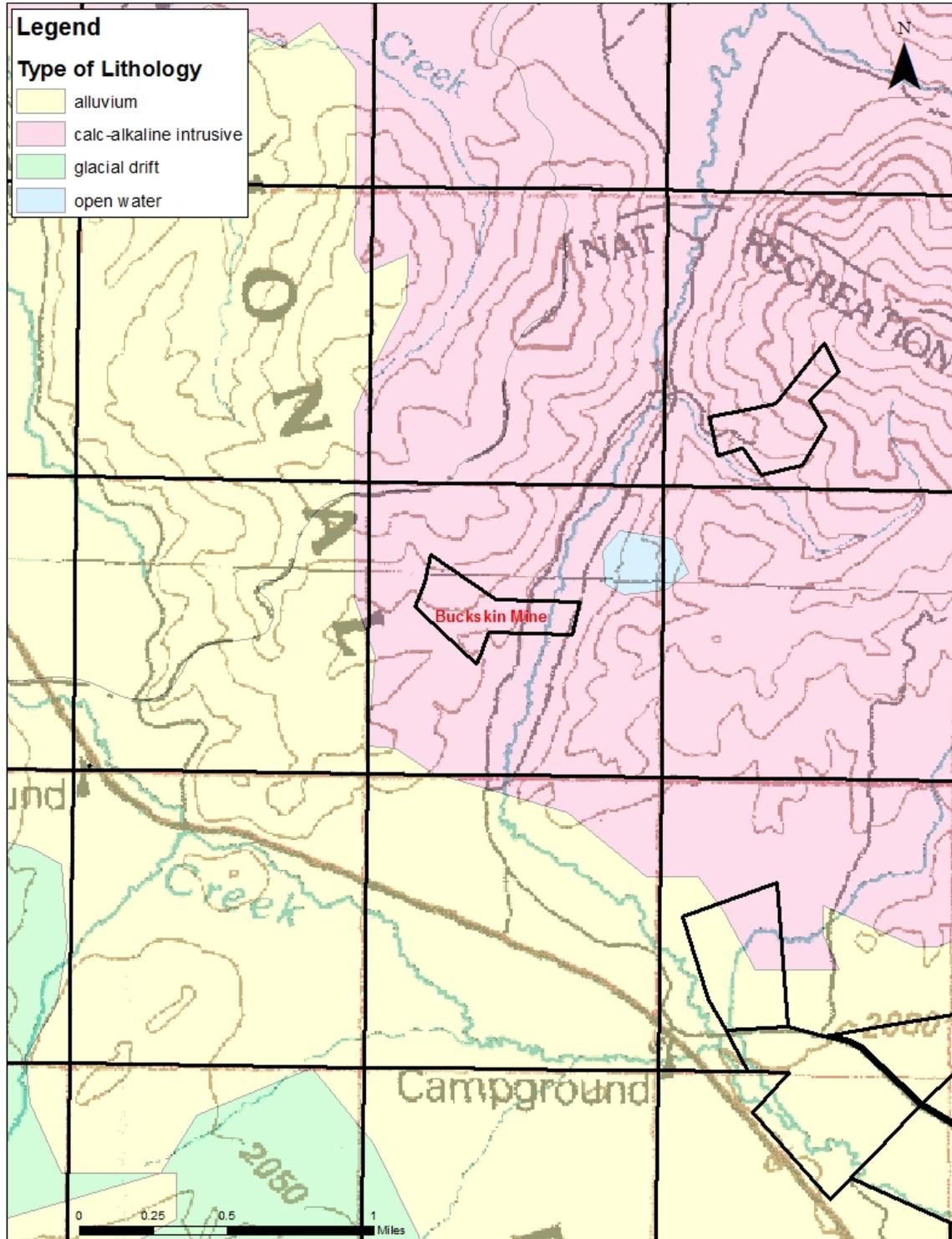


Figure 2. Map of major lithology in the vicinity of the Buckskin Mine.

2.4 Operational History of Past Mining Activities

Information about the operational history of past mining activities helps DEQ understand the levels of production, commodities, and potential waste types at the site. This information documents the relative importance of historic mining districts and workings as they are reevaluated from the perspective of economics, multiple land use, human health risks, and ecological risks. DEQ uses historical research for several purposes: identify the potential contaminants of concern, estimate the magnitude of waste at the site, locate potentially dangerous physical hazards such as open adits and shafts, and identify historical land uses that coincide with mining. This information is necessary to prepare for the SI field work.

Numerous sources were used during desktop research prior to visiting the site. Since DEQ cannot improve or expand upon information included in historic reports, this information is quoted directly from the USGS Bulletin 1545-E *Economic Appraisal of the Eastern Part of the Sawtooth National Recreation Area, Idaho* (Van Noy, et.al 1986). The tables and figures referenced in this quote have not been duplicated in this report.

The Buckskin mine (pl. 3, No. 5) is 0.25 miles (0.4 km) west of Valley Creek and 1.25 miles (2 km) southwest of the Valley Creek Mine. The Buckskin, Buckskin East, and Early Bird claims were patented in 1890, following initial discovery on the Buckskin claim in 1883. At the time the property was patented, mine workings on the Early Bird claim apparently consisted of 565 ft (172 m) of adits, 183 ft (56 m) of drifts, and 116 ft (35 m) of shafts (Mineral Survey No. 861). The main adit on the Early Bird claim probably was driven to cross cut the mineralized zone at depth. The workings, caved at the time of our investigation, are south and 150 ft (46 m) lower in elevation than the principal open pit workings on the Buckskin claim.

Mine workings (fig. 84) were dug on northwest-trending quartz veins in a zone of highly altered and fractured quartz monzonite that is traceable for 1,800 ft (550 m) at the outcrop. Four quartz veins crop out on the Buckskin claim. The quartz veins are 1-3.2 ft (0.3-1 m) thick, strike N. 50° – 65° E. generally, and dip steeply. One vein strikes N. 80° W. Vugs in the quartz contain hematite and pyrite. Galena was observed in a few prospect pits.

Local residents report that most of the gold has come from the Buckskin claim. Ore from the mine was milled at the Valley creek mill during 1940-1942 (table 20) and apparently was the source of much of the silver produced from the district in those years.

Six hundred feet (180 m) west of the principal workings on the Buckskin claims are two short adits on opposite sides of a small stream. The adits follow a vertical quartz vein that strikes N. 80° W. (fig. 84, M-91-93). Bulldozer cuts west of the adits expose quartz veins intermittently for 600 ft (180 m). Samples with the best gold and silver values are from veins in the western bulldozer cut (M-95). The quartz veins are 0.9-2.5 ft (0.3-0.75 m) thick and contain iron oxides and as much as 20 percent pyrite. Samples collected by the U.S. Bureau of Mines from the veins and the altered wall rock averaged 0.08 oz gold per ton (2.7 g/t) and 2.2 oz silver per ton (75 g/t), but much higher values are present locally (table 23, samples K-8, K-197 and K-199).

Seven hundred feet (210 m) north of the western adits, up the small gulley, are three adits on a partially exposed shear zone that strikes N. 80° E. and dips 70°-75° NW. (fig. 84). The adit east of the creek is caved. The two adits west of the gulley are connected by a raise. The shear zone exposed in the working is as much as 5 ft (1.5 m) wide. Quartz with hematite-filled casts and pyrite occurs as lenses 0.1-2 ft (0.03-0.6 m) thick along the hanging wall, and some quartz contains as much as 20 percent pyrite. Assays of samples from the mineralized zone in the adits and from stockpiles averaged 0.04 oz gold per ton (1.4 g/t) and 2.6 oz silver per ton (89 g/t). One sample (fig. 84, K-15) of pyrite-rich vein quartz contained 0.583 oz gold per ton (20 g/t) and 6.38 oz silver per ton (219 g/t).

About 1,000 ft (300 m) west of the three adits, dumps of a group of old workings contain quartz with hematite-filled casts (fig 84). Some quartz fragments as much as 1 ft (0.3 m) thick contain galena. Alinement of the principal workings indicates a northwest-trending vein. Selected samples (M-29-M-31) taken from the dumps averaged 0.01 oz gold per ton (0.34 g/t), 17.7 oz silver per ton (607 g/t), and 2.2 percent lead.

The four veins exposed on the Buckskin claim are estimated to contain 80,000 tons (73,000 t) of mineralized rock that has a weighted average of 0.11 oz gold per ton (3.8 g/t), 4.12 oz silver per ton (141.2 g/t), and 1.97 percent lead. The two veins developed by the two groups of adits along the small south-flowing gully west and northwest of the Buckskin claim contain an estimated 15,000-30,000 tons (14,000-27,000 t) of mineralized rock with a weighted average of 0.06 oz gold per ton (2.1 g/t), 2.4 oz silver per ton (82.3 g/t), and 2.8 percent lead. The mineralized vein in the northwest corner of the mapped area (fig 84), samples sites M-29-31), is not well enough defined to permit resource estimates to be made.

2.5 Current and Potential Future Land Uses

There are currently no permanent residents at the Buckskin Mine site. Although this site is located on private property, public access is unrestricted and the site is surrounded by USFS property. Current land uses could include recreational activities such as hiking, backpacking, camping, hunting, horseback riding, biking, and all-terrain vehicle (ATV) touring. These current uses are likely to continue into the future. Potential future land uses could also include residential developments.

3 Sample Collection and Analysis

DEQ staff, accompanied by Diane Kiehn who was representing the property owner William F. Rigby, visited the Buckskin Mine on August 5, 2015. The weather was approximately 60°F, partly cloudy, and light rain. Photographs, sample collection information, field parameters, and analytical results are presented in this section. The field crew did not purposely or knowingly trespass on any private holdings during field work.

Sampling and laboratory analysis was conducted in accordance with DEQ's Quality Assurance Project Plan (QAPP) for Mine Sites Addressed under the PA Program (DEQ 2015a) and the Field Sampling Plan (FSP) for Buckskin Mine (DEQ 2015b). All samples were collected, handled, and stored in accordance with the QAPP/FSP and submitted to SVL Analytical, Inc. (SVL) in Kellogg, Idaho.

Soil, sediment, and surface water samples were collected by DEQ in the immediate vicinity of Buckskin Mine (Figure 3). A summary of the laboratory results and field parameters are presented in Tables 1 and 2. All samples were analyzed for total metals. A copy of the laboratory report is included as Appendix A. Field observations and laboratory results are discussed in the context of migration/exposure pathways and targets in Section 4.

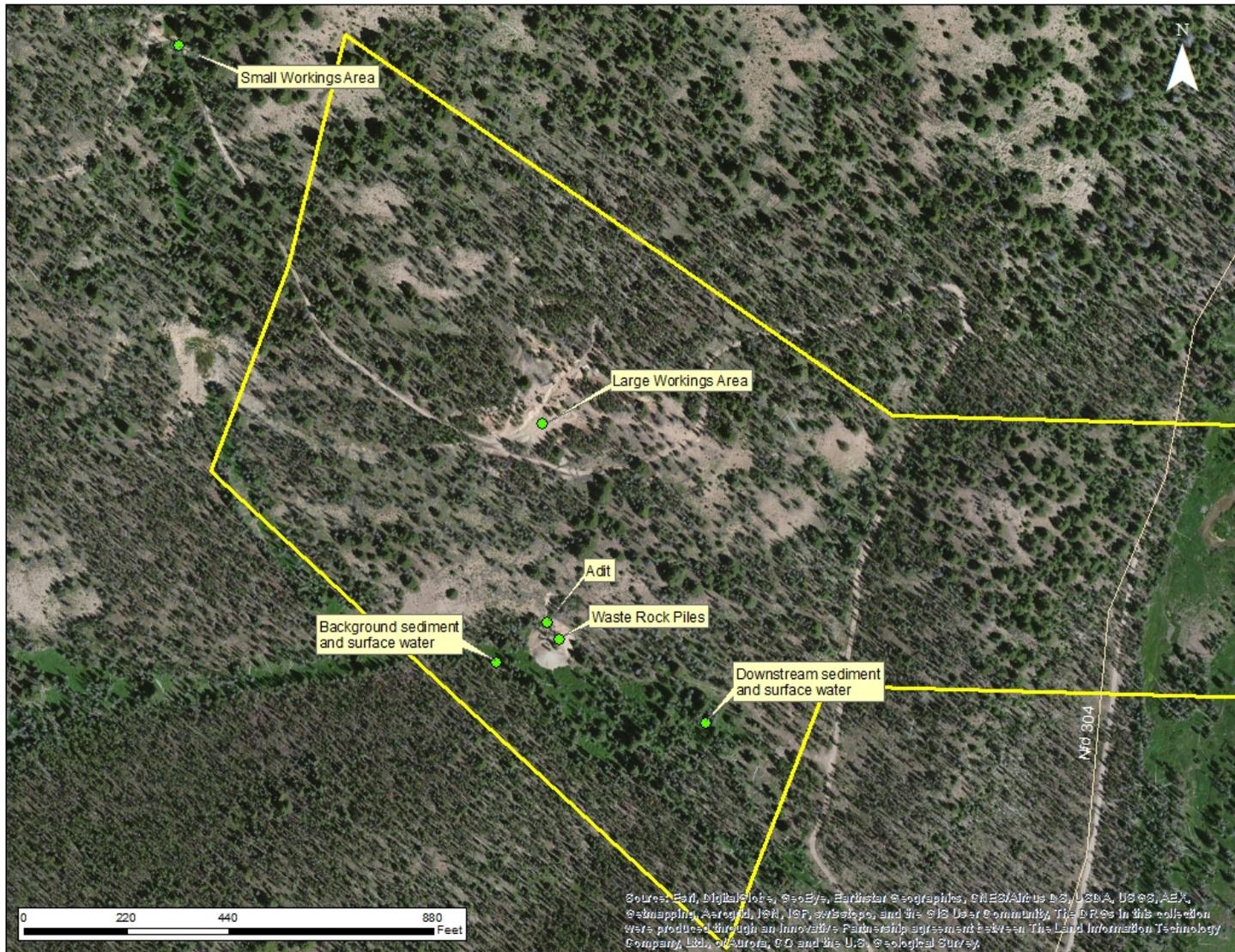


Figure 3. Sample locations and features of the Buckskin Mine site.

Table 1. Soil and sediment analytical results for Buckskin Mine samples collected on August 5, 2015.

Analyte	EPA RSL for Resident Soil ^a (mg/kg)	EPA RSL for Industrial Soil ^a (mg/kg)	Mean Concentrations in Custer County ^b (mg/kg)	Waste Rock Pile BS-WP-SS1 (mg/kg)	Background Sediment BS-BG-SD1 (mg/kg)	Downstream of Adit Sediment BS-DS-SD1 (mg/kg)	Downstream of Adit Duplicate Sediment BS-DS-SD2 (mg/kg)
Antimony (Sb)	31	470		153	<2.0	<2.0	3.4
Arsenic (As)	0.68	3.0	14.978	4,860	14.9	7.76	28.1
Barium (Ba)	15,000	220,000		49.6	57.3	28.4	48.2
Cadmium (Cd)	71	980		49.2	3.21	3.42	16.0
Chromium (Cr)				1.60	1.90	2.03	5.60
Copper (Cu)	3,100	47,000	22.967	253	2.86	4.31	12.6
Iron (Fe)	50,000	820,000		58,600	7,580	4,020	8,640
Lead (Pb)	400	800	59.945	13,800	45.7	28.7	73.0
Manganese (Mn)	1,800	26,000	742.720	605	342	58.4	326
Selenium (Se)	390	5,800	0.456	<0.30	<0.30	<0.30	1.01
Silver (Ag)	390	5,800		92.2	0.78	1.12	2.53
Zinc (Zn)	23,000	350,000	157.111	991	144	107	199
Mercury (Hg)	9.4	40	0.229	8.42	<0.033	0.053	0.223

Shaded values exceed regional screening levels (RSLs).

Bold = Three times greater than background concentrations when comparing: 1) the waste rock pile to mean concentrations in Custer County and 2) the downstream sediment sample to the background sediment sample.

a = Based on a target hazard quotient of 1.0. <http://www2.epa.gov/risk/risk-based-screening-table-generic-tables>

b = Significant digits shown as reported by USGS. Mean concentrations are not available for Sb, Ba, Cd, Cr, Fe, and Ag. <http://mrddata.usgs.gov/geochem/county.php?place=f16037&el=Pb&rf=northwestern>

Table 2. Surface water analytical and field parameter results for Buckskin Mine samples collected on August 5, 2015 (in mg/L unless otherwise noted in table).

Analyte/ Parameter	EPA	EPA	DEQ	DEQ	Adit	Background BS-BG-SW1	Downstream of Adit BS-DS-SW1	Downstream of Adit Duplicate BS-DS-SW2	Field Blank BS-DS-SW3
	Drinking Water Standard MCL	RSL for Tapwater	Cold Water Biota Standard Acute	Cold Water Biota Standard Chronic					
Antimony (Sb)	0.006	0.0078	—	—		<0.020	<0.020	<0.020	<0.020
Arsenic (As)	0.01	0.000052	0.34	0.15		0.00335	0.00565	0.00509	<0.00300
Barium (Ba)	2	3.8	—	—		0.0102	0.0029	0.0030	<0.0020
Cadmium (Cd)	0.005	0.0092	0.00067 to 0.00200 (H)	0.00035 to 0.00075 (H)		<0.0020	<0.0020	<0.0020	<0.0020
Chromium (Cr)	0.1	—	—	—		<0.0060	<0.0060	<0.0060	<0.0060
Copper (Cu)	1.0 ^a	0.8	0.0079 to 0.0267 (H)	0.0056 to 0.0171 (H)		<0.0100	<0.0100	<0.0100	<0.0100
Iron (Fe)	0.3 ^a	14	—	—		0.405	0.138	0.223	<0.060
Lead (Pb)	0.015 ^b	0.015	0.026 to 0.108 (H)	0.0010 to 0.0042 (H)		<0.00300	<0.00300	<0.00300	<0.00300
Manganese (Mn)	0.05 ^a	0.43	—	—		0.0174	0.0073	0.0116	<0.0040
Mercury (Hg)	0.002	0.00063	—	—		<0.00020	<0.00020	<0.00020	<0.00020
Selenium (Se)	0.05	0.1	0.02 (T)	0.005 (T)		<0.0030	<0.0030	<0.0030	<0.0030
Silver (Ag)	0.1 ^a	0.094	0.0008 to 0.0078 (H)	—		<0.0050	<0.0050	<0.0050	<0.0050
Zinc (Zn)	5 ^a	6	0.058 to 0.175 (H)	0.059 to 0.177 (H)		0.010	<0.010	<0.010	<0.010
Temperature (°C) ^c	—	—	—	Cold water aquatic life 22°C or less or a maximum daily average not >19°C ^d Salmonid spawning 13°C or less with a maximum daily average not >9°C	14.1	10.6	9.20	—	—
pH (su)	6.5 – 8.5 ^a	—	—	6.5 – 9.0	5.86	6.1	5.85	—	—
Oxidation Reduction Potential (mV)	—	—	—	—	173	199	252	—	—
Conductivity (µs/cm)	—	—	—	—	0.049	0.026	0.059	—	—
Turbidity (NTU)	b	—	Not >50 NTU instantaneous	Not >50 NTU instantaneous and no >25 NTU over a 10 day period	90	12.7	5.5	—	—
Dissolved Oxygen	—	—	—	>6 ppm	11.9	16.0	15.33	—	—

Shaded values exceed standards and RSLs.

Note: (T)-Standard in Total, (H)-Hardness dependent for Cd, Cu, Pb, Ni, Ag, Zn, range presented based on calculated values for all samples (excluding background).

All samples were analyzed for total metals. Concentrations expressed in milligrams per liter [mg/L] unless otherwise noted. Only field parameters were collected near the adit; no analytical samples. mg/L=milligrams per liter; MCL=maximum contaminant level; su=standard units; mV=millivolts; µs/cm=micro-Siemens per centimeter; NTU=nephelometric turbidity unit; g/L=grams per liter

^a Secondary Standard MCL – non-enforceable guideline.

^b Action level regulated by treatment technique.

^c Only a snapshot temperature reading was collected. A daily temperate average was not collected.

- *Waste Rock Piles* (Photo 1): Two waste rock piles are present. One pile contains light brown rock and is approximately 1,000 to 2,000 cubic yards. The other pile contains dark brown rock and is approximately 1,500 to 3,000 cubic yards. XRF field readings from both piles showed higher readings for the dark brown pile; therefore, a soil sample (BS-WP-SS1) was collected from this pile. A sample was not collected from the light brown pile.
- *Adit* (Photos 2 and 3): An adit is present with water draining and ponding down the slope. Field parameter readings were collected; however, no sample was collected because samples were collected from the downgradient creek instead. A water line originates in this ponded water and runs down the hill between the waste rock piles (Photos 4 and 5). The final discharge point of the water line is unknown.
- *Background Sediment and Surface Water Samples* (Photo 6): Sediment (BS-BG-SD1) and surface water (BS-BG-SW1) samples were collected at this location.
- *Downstream of Adit* (Photo 7): Sediment (BS-DS-SD1 and BS-DS-SD2), surface water (BS-DS-SW1 and BS-DS-SW2), and field blank (BS-DS-SW3) samples were collected at this location. Stream flow at this location is the same or slightly more than the flow from the adit.
- *Large Workings Area* (Photos 8-10): Collapsed large opening. No water is present at this location. No evidence of erosion from the waste rock piles. No samples collected.
- *Small Workings Area* (Photo 11): Similar observations as the large workings area. No water present at this location and no evidence of erosion from the waste piles; therefore, no samples were collected.



Photo 1. Buckskin Mine waste rock piles; dark brown pile in foreground, light brown pile in background.



Photo 2. Buckskin Mine adit.



Photo 3. Location of field parameters collected in ponded water below adit.



Photo 4. Water line originating from ponded adit drainage.



Photo 5. Water line running down the hill between the waste rock piles.



Photo 6. Background sediment and surface water sample location.



Photo 7. Downgradient sediment and surface water sample location.



Photo 8. Collapsed opening in large workings area of Buckskin Mine.



Photo 9. Buckskin Mine large workings area.



Photo 10. Buckskin Mine large workings area.



Photo 11. Buckskin Mine small workings area.

4 Migration/Exposure Pathways and Targets

The purpose of this PA/SI is to evaluate the Buckskin Mine to identify if any releases or potentials for release are present to pathways and targets. Pathways and exposure routes that may

lead to human or ecological receptors include: surface water pathways and soil exposure (Section 4.1), ground water pathways (Section 4.2), and air pathways (Section 4.3).

4.1 Surface Water Pathways and Soil Exposures

The surface water migration pathway target distance limit (TDL) begins at the probable point of entry (PPE) of surface water runoff from a site to a surface water body and extends downstream for 15 miles. The PPE for the Buckskin Mine is the location of adit drainage to the unnamed creek which then flows into Valley Creek. The path for the 15-mile TDL follows Valley Creek until it empties into the Salmon River and ends along the Salmon River near the confluence with Elkhorn Creek (Figure 4). Other surface water features, such as wetlands and high mountain lakes, are not present within a 2-mile radius of the mine site (Figure 4). The open water area shown on the geologic map (Figure 2) could not be confirmed with the location of surface water features (Figure 4); however, that open water area is located upgradient of Buckskin Mine.

No water is present at the locations of the waste rock piles, large workings area, and small workings area. In addition, there is no evidence of erosion from the waste dumps. Analysis of the surface water pathway, soil exposure, and targets for this PA/SI includes evaluation of analytical results for soil, sediment, and surface water (Sections 4.1.1); sensitive waterways (Section 4.1.2), and identification of sensitive, rare, and threatened plant and animal species (Section 4.1.3).

4.1.1 Soil, Sediment, and Surface Water Analytical Results

Soil and sediment laboratory analytical results were compared to the following criteria: 1) EPA regional screening levels (RSLs) for residential and industrial soil and 2) background concentrations (mean concentrations in Custer County for the waste rock pile and site-specific background concentrations for sediment; Table 1). The industrial RSLs may be more applicable to the current use status of this site; however, if residential development is considered in the future, then the residential RSLs should be followed.

Surface water laboratory analytical results were compared to the following criteria: 1) EPA drinking water standards, 2) EPA RSLs for tapwater, 3) DEQ cold water biota standards for acute and chronic, and 4) site-specific background concentrations. Drinking water standards and RSLs for tapwater are used to protect public health by limiting the levels of contaminants present in drinking water. These criteria are most applicable to sites where “unrestricted uses,” such as residential development, are expected; therefore, they provide a conservative threshold for remote locations. The cold water biota standards are used to protect and restore the quality of Idaho’s surface waters.

The following observations are based on the analytical laboratory results:

- *Waste Rock Pile:* A soil sample (BS-WP-SS1) was collected from the dark brown waste rock pile. Concentrations of antimony, arsenic, iron, and lead were above the residential RSLs and arsenic and lead were also above the industrial RSLs. Five of the metals (arsenic, copper, lead, zinc and mercury) were three times greater than the mean concentrations in Custer County. At the time of this site visit, no water was running through the waste dumps and there was no evidence of excessive erosion.

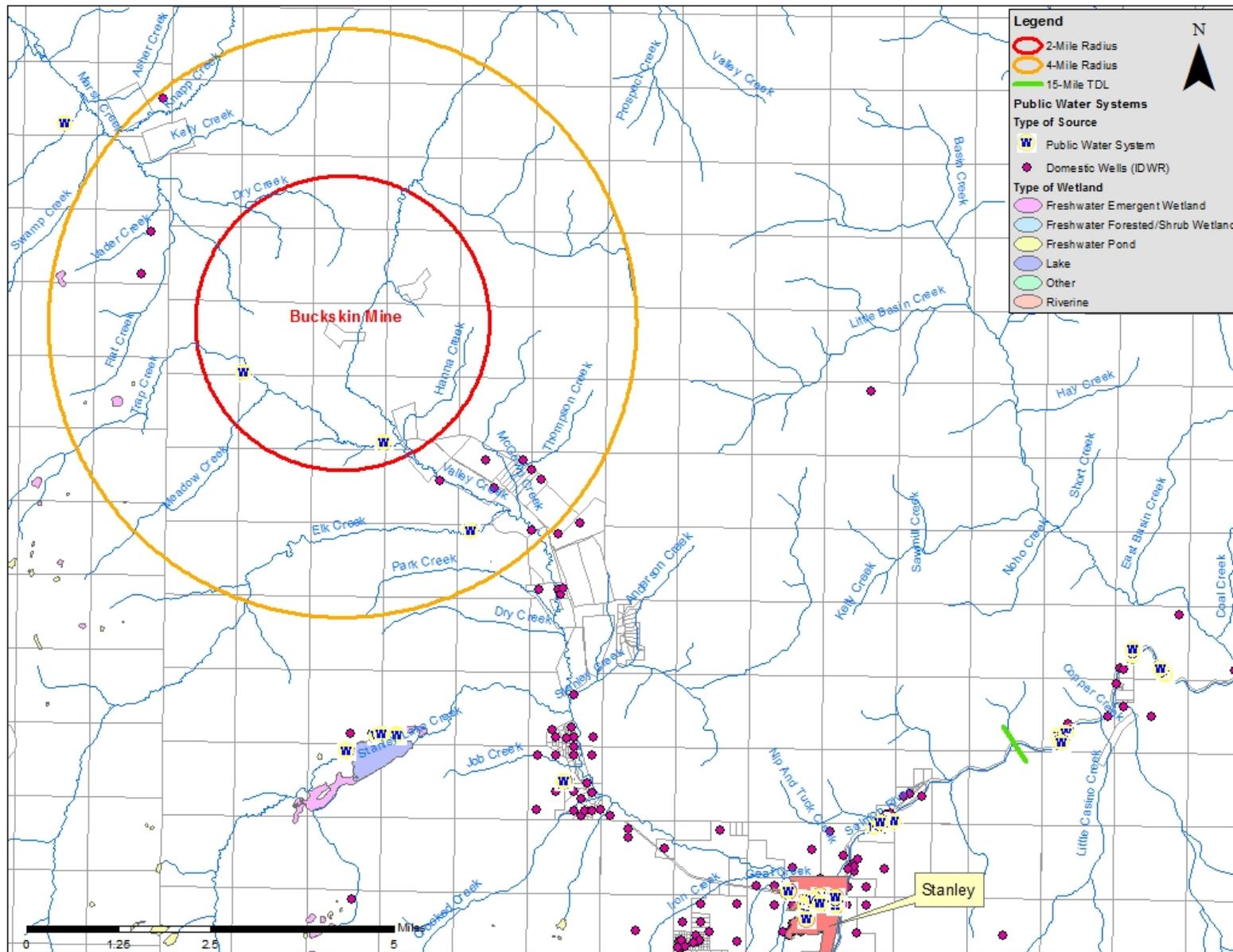


Figure 4. Map of the features supporting evaluation of the surface water and ground water pathways in the area of the Buckskin Mine.

Some of these metal detections are consistent with the observations included in a mineral resources study conducted by the USGS and US Bureau of Mines in 1971 and 1972 (USGS, 1986). This study included the following observations specific to Buckskin Mine and the immediate surrounding region: veins in the Valley Creek-Buckskin belt are particularly enriched in arsenic; deposits in the Buckskin-Valley Creek mine area are high in arsenic, gold, and lead, but low in selenium and bismuth; veins that contain the highest mercury values typically contain high values of silver and antimony or arsenic; and copper was produced as a by-product in small amounts at Buckskin Mine.

- *Sediment Samples:* Arsenic is the only metal detected above residential and industrial RSLs in sediment at both the background and downstream locations. Cadmium was detected at a concentration three times greater than background.
- *Surface Water Samples:* The only analyte detected above the standards was iron which was detected above the maximum contaminant level (MCL) in the background surface water sample. Parameters measured in the field at each sampling location included temperature, pH, oxidation reduction potential (ORP), conductivity, turbidity, dissolved oxygen, and total dissolved solids (TDS). Evaluation of field parameters demonstrate that the water at the sampling sites is slightly acidic (pH = 5.85 to 6.1) with low turbidity observed in the unnamed creek.
- *Quality Assurance/Quality Control (QA/QC):* Samples collected for evaluating QA/QC include one field blank and duplicate samples for sediment and surface water. The field blank was collected at the site using distilled water. None of the target analytes were detected in the field blank. The analytical results for the duplicate sediment sample (Table 1) show that none of the analytes measured met the relative percent difference (RPD) goal of 20 percent or the maximum allowable RPD of 50 percent. The variability in these results is likely attributed to the field sample collection method. Duplicate samples were collected using the replicate method where samples were taken one immediately following the other; rather than being collected as split subsamples drawn from the same initial volume. For the sediment analyses, all laboratory QC samples for blanks were nondetect and matrix spike/matrix spike duplicate (MS/MSD) sample results fell within the acceptance limits for percent recovery and met the RPD goal of 20 percent. Therefore, the differences in the sediment duplicate samples are likely representative of variabilities in field conditions and sample locations. The analytical results for the duplicate surface water (Table 2) sample show that the RPD goal of 20 percent was met for arsenic and barium and the maximum RPD of 50 percent was met for iron and manganese.

4.1.2 Sensitive Waterways

The Clean Water Act (CWA) requires that the State of Idaho prepare an Integrated Report listing: (1) current conditions of all state waters (§305(b) list) and (2) waters that are impaired and need a total maximum daily load (TMDL; §303(d) list). §305(b)-listed streams, are shown on Figure 5. Valley Creek (ID17060201SL051_03, ID17060201SL051_04, and ID17060201SL053_03) was not sampled as part of this PA/SI. Valley Creek is a tributary to the Salmon River (Upper Salmon River subbasin hydrologic unit code 17060201) and contained in the Upper Salmon River hydrologic unit code.

As listed in the final 2012 Integrated Report, Valley Creek from East Fork of Valley Creek to Meadow Creek is identified as fully supporting for both cold water aquatic life, salmonid spawning, and secondary contact recreation; Valley Creek from Meadow Creek to Stanley Creek has not been assessed; and Valley Creek from Stanley Creek to the Salmon River is identified as fully supporting for both cold water aquatic life and secondary contact recreation.

4.1.3 Sensitive, Rare, and Threatened Plant and Animal Species

Sensitive species can have large habitat ranges that overlap the vicinity of the Buckskin Mine site. Based on the resource list obtained during a search of the Information for Planning and Conservation System (USFWS 2015), the following species are identified for Custer County:

- Birds: Yellow-Billed Cuckoo, *Coccyzus americanus*, threatened species.
- Mammals: Canada Lynx, *Lynx canadensis*, threatened species.
- Fish: Bull Trout, *Salvelinus confluentus*, threatened species-designated critical habitat and Steelhead, *Oncorhynchus mykiss*, designated critical habitat.
- Plants: Whitebark Pine, *Pinus albicaulis*, candidate species.

4.2 Ground Water Pathways

In areas where historic mines are close to residential areas, contamination of drinking water systems may come from two types of mine sources (ore bodies and waste dumps) and along three ground water pathways illustrated by the following three scenarios:

- Heavy metals can leach from tailing piles and waste rock dumps, enter ephemeral or perennial drains, and contaminate the area's shallow ground water system.
- Heavy metals can leach from the local ore bodies and be transported through the geologic structure to the shallow ground water.
- Heavy metals can leach out of the ore bodies and be discharged from the underground workings as adit water, which is then conveyed through ephemeral and perennial drains to the shallow ground water system.

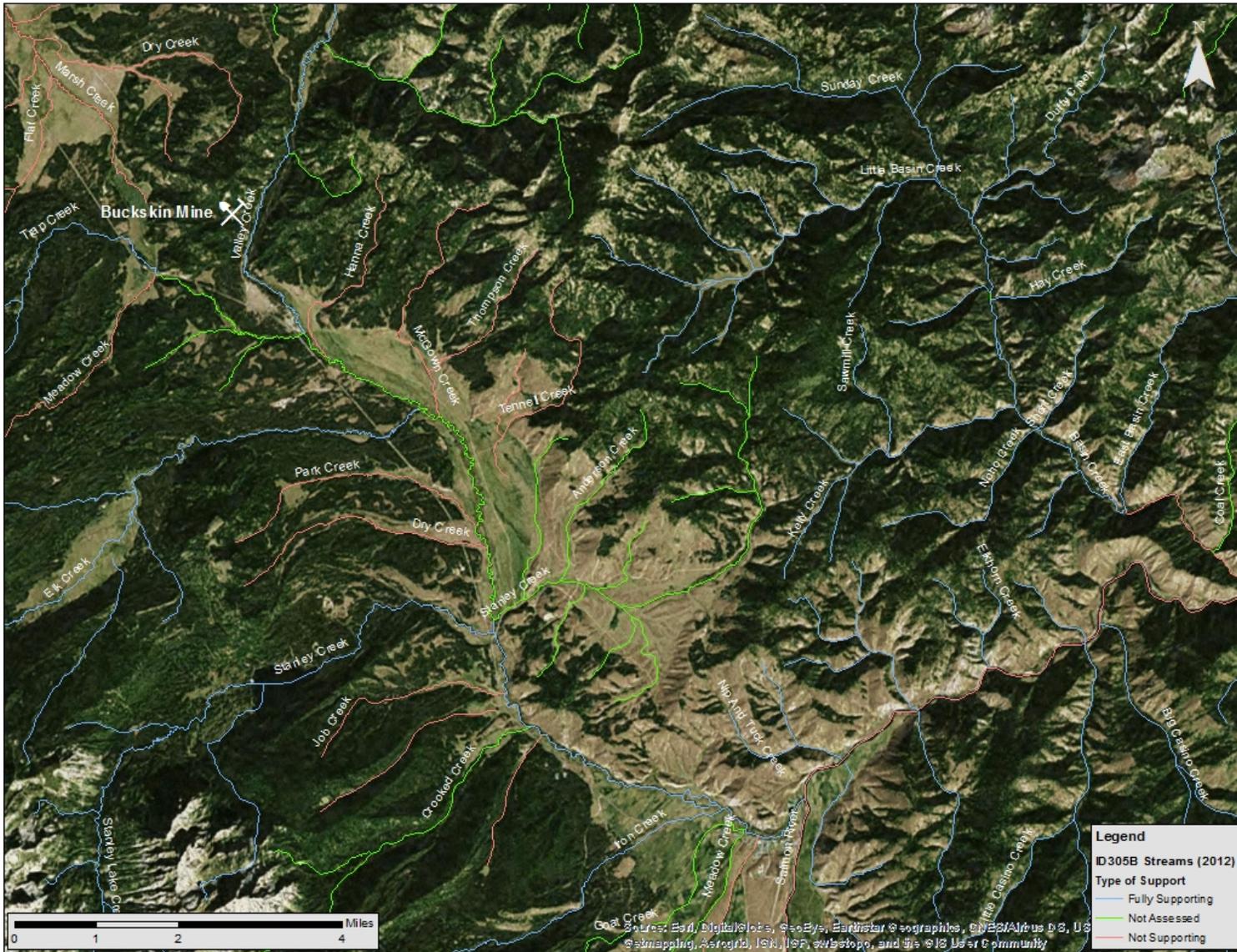


Figure 5. State of Idaho §305(b)-listed streams in the vicinity of the Buckskin Mine.

Potential drinking water systems within the 4-mile radius of the Buckskin Mine site include three public water systems (PWS) and 11 domestic wells (Figure 4). Source water assessment (SWA) summary reports have not been completed for the three public water systems (USFS Sheeptail Creek Camp Ground [PWS#ID7190087], USFS Trap Creek Picnic Ground [PWS#ID7190096], or USFS Elk Creek Picnic Ground [PWS#ID7190067]). None of the three public water systems are located along Valley Creek. Two of the 11 domestic wells are located along Valley Creek below the mine site within the 4-mile radius.

Given the lack of domestic wells and PWS in the immediate vicinity of the mine site, the potential for exposure from ground water pathways is minimal to non-existent. The ground water pathway was not assessed as part of this PA/SI.

4.3 Air Pathways

All of the mine waste remaining at Buckskin Mine is waste rock from underground workings since no milling operations took place at the mine site. The waste dump piles are surrounded by vegetation; therefore, fugitive dust is likely limited in this area. The nearest residence is approximately three miles southeast of the Buckskin Mine. No schools or day care facilities are located within four miles of the mine sites.

Given these observations, the air pathway was not assessed as part of this PA/SI since it is not a likely pathway of contaminant release to humans or the environment.

5 Conclusions and Recommendations

The purpose of this PA/SI is to assess the threat posed to human health and the environment and determine the need for additional investigation or remediation at the Buckskin Mine site. The following conclusions and recommendations are based on the surface water, sediment, and soil samples collected for the mine site during the August 5, 2015 site visit.

- Several metals were detected in the sample collected from the waste rock pile; however, migration of soils from the piles via the surface water, soil exposure, and air pathways appear to be limited.
 - During the site visit, there was no evidence of excessive erosion. No water was running through the waste dumps at the time of this site visit, the waste rock is from underground workings and no milling operations took place, and area is surrounded by vegetation.
 - Two metals (arsenic and cadmium) detected in the waste rock pile were also detected in sediments (at levels above the RSLs and background) in the unnamed creek located downgradient from the adit drainage. However, there were no detections of concern in the surface water samples.
- No concerns were observed for the ground water and air pathways at this time.

- The current land uses include recreational activities. If future land uses include residential development, further characterization of development areas in relation to the waste rock piles, former working areas, and other historic mining features should be performed. In addition, DEQ recommends removing the water line originating from the ponded water downgradient of the adit.
- Persons recreating in this area should be aware of the hazards of historic mining areas, especially health risks associated with prolonged exposures to metals. A summary of health and safety information includes:
 - Do not camp or recreate near old mining structures or mining waste piles or dumps.
 - Keep dirt away from your mouth to prevent ingestion of metals. Wash your hands with soap and water before eating, drinking, or smoking. Frequently clean toys used by babies, toddlers, and children. Eat on a clean surface, not on the ground.
 - Stay out of old mine adits and structures. Rotting wood, unstable rock, oxygen-depleted air, falling debris, dust, and mining wastes are potential dangers.
- Recommend working with Idaho Department of Lands for safe closure of the adit.

Based on existing conditions and uses, historic information, data observations made during the site visit, potential pathways of contaminants to receptors, and potential exposures to ecological and human receptors, DEQ recommends **No Remedial Action Planned (NRAP)** for the current recreational-only land use.

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6 References

- DEQ. Source Water Assessments in Idaho. Available at: <http://www.deq.idaho.gov/water-quality/source-water/assessments.aspx>
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- DEQ. 2015a. Statewide Generic Quality Assurance Project Plan (QAPP): Mine Sites Addressed under the Preliminary Assessment Program. TRIM record number 2012BER8. Version 3. June 11, 2015.
- DEQ. 2015b. Field Sampling Plan: Buckskin Mine, Custer County, Addressed under the Preliminary Assessment Program. TRIM record number 2015BEQ83. Version 1. July 2015.
- Idaho State Tax Commission. GIS/Cartography: County Parcel Maps. Custer County. Accessed October 6, 2015. <http://tax.idaho.gov/gis/parcelmaps.cfm>
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- USGS (United States Geological Survey) Mineral Resource Data System (MRDS). 2015. Available at: http://mrdata.usgs.gov/mrds/show-mrds.php?dep_id=10070966
- USGS. 1986. *Mineral Resources of the Eastern Part of the Sawtooth National Recreation Area, Custer and Blaine Counties, Idaho*. Geological Survey Bulletin 1545.
- Van Noy, R.M., J. Ridenour, N.T. Zilka, F.E. Federspiel, R.K. Evans, E.T. Tuchek, and A.B. McMahan. 1986. "Economic Appraisal of the Eastern Part of the Sawtooth National Recreation Area, Idaho." United States Geological Survey Bulletin 1545-E.
- Western Regional Climate Center. 2015. Available at: <http://www.wrcc.dri.edu/>

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Appendix A. Laboratory Sample Reports

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CHAIN OF CUSTODY RECORD

SVL Analytical, Inc. • One Government Gulch • Kellogg, ID 83837 • (208) 784-1258 • FAX: (208) 783-0891

W5 H0168
FOR SVL USE ONLY
SVL JOB #

Page 1 of 1

TEMP on Receipt:

Table 1. -- Matrix Type

- 1 = Surface Water, 2 = Ground Water
- 3 = Soil/Sediment, 4 = Rinstate, 5 = Oil
- 6 = Waste, 7 = Other.

Report to Company: IDEQ
 Contact: Dana Swift
 Address: 1410 N. Hilton Boise, ID 83706
 Phone Number: 208-373-0296
 FAX Number: 208-373-0154
 E-mail: dana_swift@eq.ideo.gov

Invoice Sent To: IDEQ
 Contact: Dana Swift
 Address: Same
 Phone Number: _____
 FAX Number: _____
 PO#: _____

Project Name: Buckskin Mine
 Sampler's Signature: [Signature]

Indicate State of sample origination: ID

USACE? Yes No

Sample ID	Collection Date Time	Misc. Matrix Type (From Table 1)	Preservative(s)	Analyses Required				Rush Instructions (Days)	Comments
				HNO ₃ Unfiltered	HNO ₃ Filtered	H ₂ SO ₄	NaOH		
1 BS-BG-SD1	8/5/15 11:35 RH	3 1		X					Soil/Sediment samples: Air dry and filter to 2mm. Total Metals for both soil surface water and sediment: Ba, Cd, Cr, Ag, Cu, Fe, Mn, Zn, Sb, Se, Hg, As, Pb
2 BS-BG-SW1	11:35 DC	1 1		X					
3 BS-DS-SW1	12:15 DC	1 1		X					
4 BS-DS-SD1	12:15 RH	3 1		X					
5 BS-DS-SW2	12:15 DC	1 1		X					
6 BS-DS-SD2	12:15 RH	3 1		X					
7 BS-DS-SW3	12:15 DC	1 1		X					
8 BS-WP-SS1	11:09 RH	3 1		X					
9									
10									

Relinquished by: Dana Swift Date: 8/6/15 Time: 10:30
 Relinquished by: _____ Date: _____ Time: _____
 Received by: _____ Date: 8/7/15 Time: 15:50
 Received by: _____ Date: _____ Time: _____

* Sample Reject: Return Dispose Store (30 Days)

- The ID on the sample container is BS-BG-SW-1 -> 8/7/15
- The ID on the sample container is BS-DS-SW-1 -> 8/7/15
- The ID on the sample container is BS-DS-SW-2 -> 8/7/15

SAMPLE RECEIPT/CHAIN-OF -CUSTODY CHECKLIST

The following items were checked for completeness, correctness, and compliance to project specifications using the Chain-of-Custody (COC) and other supporting information.

Date of acceptance: 8/7/15

By: CP Seely

SVL Work No: WS 140168

Item	Description	V	VC	NV	NA	Comments
1	Client or project name	✓				IDEQ
2	Date and time of receipt at lab	✓				8-7-15 15:50
3	Received by	✓				M. Duce
4	Temperature blank or cooler temperature				✓	Temp. - °C. Soil # HN03
5	Were the sample(s) received on ice				✓	NO
6	Custody tape/bottle seals				✓	NO
7	Condition of samples upon receipt (leaking; bubbles in VOA vials)	✓				Good
8	Sample numbers/IDs agree with COC	✓				
9	Sample date & time agree with COC	✓				
10	Number of containers for each sample	✓				
11	The correct preservative for the analysis requested	✓				
12	Did an SVL employee preserve sample(s) upon receipt				✓	
13	Type of container for each sample / volume received	✓				
14	Analysis requested for each sample	✓				
15	Sample matrix description	✓				
16	COC properly completed & legible	✓				
17	Corrections properly made (Initials & date)				✓	
18	Additional comments or records of sample condition or treatment (unlisted or missing samples at laboratory, aliquot taken, sample hold, samples subcontracted, communications between client and laboratory)				✓	
19	Shipper's air bill	✓				

V- Verified VC- Verified Corrections Made NV-Not Verified NA- Not Applicable

Additional Comments: _____



IDEQ (Boise)
1410 N. Hilton
Boise, ID 83706

Project Name: Buckskin 2015
Work Order: **W5H0168**
Reported: 25-Aug-15 12:40

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Sampled By	Date Received	Notes
BS-BG-SD1	W5H0168-01	Soil	05-Aug-15 11:35	RH	07-Aug-2015	
BS-BG-SW1	W5H0168-02	Surface Water	05-Aug-15 11:35	DC	07-Aug-2015	
BS-DS-SW1	W5H0168-03	Surface Water	05-Aug-15 12:15	DC	07-Aug-2015	
BS-DS-SD1	W5H0168-04	Soil	05-Aug-15 12:15	RH	07-Aug-2015	
BS-DS-SW2	W5H0168-05	Surface Water	05-Aug-15 12:15	DC	07-Aug-2015	
BS-DS-SD2	W5H0168-06	Soil	05-Aug-15 12:15	RH	07-Aug-2015	
BS-DS-SW3	W5H0168-07	Surface Water	05-Aug-15 12:15	DC	07-Aug-2015	
BS-WP-SS1	W5H0168-08	Soil	05-Aug-15 11:09	RH	07-Aug-2015	

Solid samples are analyzed on an as-received, wet-weight basis, unless otherwise requested.

Sample preparation is defined by the client as per their Data Quality Objectives.

This report supercedes any previous reports for this Work Order. The complete report includes pages for each sample, a full QC report, and a notes section.

The results presented in this report relate only to the samples, and meet all requirements of the NELAC Standards unless otherwise noted.



IDEQ (Boise)
1410 N. Hilton
Boise, ID 83706

Project Name: Buckskin 2015
Work Order: **W5H0168**
Reported: 25-Aug-15 12:40

Client Sample ID: **BS-BG-SD1**

SVL Sample ID: **W5H0168-01 (Soil)**

Sample Report Page 1 of 1

Sampled: 05-Aug-15 11:35
Received: 07-Aug-15
Sampled By: RH

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) (Sieved)										
EPA 6020A	Arsenic	14.9	mg/kg Dry	0.300	0.058	2	W533085	KWH	08/19/15 09:59	D1,M2
EPA 6020A	Lead	45.7	mg/kg Dry	0.100	0.008	2	W533085	KWH	08/19/15 09:59	D1,M3
EPA 6020A	Selenium	< 0.30	mg/kg Dry	0.30	0.09	2	W533085	KWH	08/19/15 09:59	D1,M2
Metals (Total) by EPA 6000/7000 Methods (Sieved)										
EPA 6010C	Antimony	< 2.0	mg/kg Dry	2.0	0.7		W533183	SA	08/17/15 12:30	
EPA 6010C	Barium	57.3	mg/kg Dry	0.20	0.07		W533182	SMB	08/21/15 10:04	
EPA 6010C	Cadmium	3.21	mg/kg Dry	0.20	0.07		W533182	SMB	08/21/15 10:04	
EPA 6010C	Chromium	1.90	mg/kg Dry	0.60	0.16		W533182	SMB	08/21/15 10:04	
EPA 6010C	Copper	2.86	mg/kg Dry	1.00	0.28		W533182	SMB	08/21/15 10:04	
EPA 6010C	Iron	7580	mg/kg Dry	6.0	4.5		W533182	SMB	08/21/15 10:04	M3
EPA 6010C	Manganese	342	mg/kg Dry	0.40	0.27		W533182	SMB	08/21/15 10:04	M2
EPA 6010C	Silver	0.78	mg/kg Dry	0.50	0.22		W533182	SMB	08/21/15 10:04	
EPA 6010C	Zinc	144	mg/kg Dry	1.0	0.7		W533182	SMB	08/21/15 10:04	M2
EPA 7471B	Mercury	< 0.033	mg/kg Dry	0.033	0.005		W534275	DB	08/24/15 16:14	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



IDEQ (Boise)
1410 N. Hilton
Boise, ID 83706

Project Name: Buckskin 2015
Work Order: **W5H0168**
Reported: 25-Aug-15 12:40

Client Sample ID: **BS-BG-SW1**

SVL Sample ID: **W5H0168-02 (Surface Water)**

Sample Report Page 1 of 1

Sampled: 05-Aug-15 11:35
Received: 07-Aug-15
Sampled By: DC

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total)										
EPA 245.1	Mercury	< 0.00020	mg/L	0.00020	0.00004		W534266	DB	08/24/15 13:16	
Metals (Total Recoverable--reportable as Total per 40 CFR 136)										
EPA 200.7	Antimony	< 0.020	mg/L	0.020	0.005		W533063	STA	08/17/15 13:08	
EPA 200.7	Barium	0.0102	mg/L	0.0020	0.0003		W533063	STA	08/17/15 13:08	
EPA 200.7	Cadmium	< 0.0020	mg/L	0.0020	0.0004		W533063	STA	08/17/15 13:08	
EPA 200.7	Chromium	< 0.0060	mg/L	0.0060	0.0005		W533063	STA	08/17/15 13:08	
EPA 200.7	Copper	< 0.0100	mg/L	0.0100	0.0012		W533063	STA	08/17/15 13:08	
EPA 200.7	Iron	0.405	mg/L	0.060	0.024		W533063	STA	08/17/15 13:08	
EPA 200.7	Manganese	0.0174	mg/L	0.0040	0.0012		W533063	STA	08/17/15 13:08	
EPA 200.7	Silver	< 0.0050	mg/L	0.0050	0.0010		W533063	STA	08/17/15 13:08	
EPA 200.7	Zinc	0.010	mg/L	0.010	0.002		W533063	STA	08/17/15 13:08	
EPA 200.8	Arsenic	0.00335	mg/L	0.00300	0.00027	2	W533084	KWH	08/21/15 06:51	
EPA 200.8	Lead	< 0.00300	mg/L	0.00300	0.000031	2	W533084	KWH	08/21/15 06:51	
EPA 200.8	Selenium	< 0.0030	mg/L	0.0030	0.0006	2	W533084	KWH	08/21/15 06:51	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



IDEQ (Boise)
1410 N. Hilton
Boise, ID 83706

Project Name: Buckskin 2015
Work Order: **W5H0168**
Reported: 25-Aug-15 12:40

Client Sample ID: **BS-DS-SW1**

SVL Sample ID: **W5H0168-03 (Surface Water)**

Sample Report Page 1 of 1

Sampled: 05-Aug-15 12:15
Received: 07-Aug-15
Sampled By: DC

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
--------	---------	--------	-------	----	-----	----------	-------	---------	----------	-------

Metals (Total)

EPA 245.1	Mercury	< 0.00020	mg/L	0.00020	0.00004		W534266	DB	08/24/15 13:18	
-----------	---------	-----------	------	---------	---------	--	---------	----	----------------	--

Metals (Total Recoverable--reportable as Total per 40 CFR 136)

EPA 200.7	Antimony	< 0.020	mg/L	0.020	0.005		W533063	STA	08/17/15 13:14	
EPA 200.7	Barium	0.0029	mg/L	0.0020	0.0003		W533063	STA	08/17/15 13:14	
EPA 200.7	Cadmium	< 0.0020	mg/L	0.0020	0.0004		W533063	STA	08/17/15 13:14	
EPA 200.7	Chromium	< 0.0060	mg/L	0.0060	0.0005		W533063	STA	08/17/15 13:14	
EPA 200.7	Copper	< 0.0100	mg/L	0.0100	0.0012		W533063	STA	08/17/15 13:14	
EPA 200.7	Iron	0.138	mg/L	0.060	0.024		W533063	STA	08/17/15 13:14	
EPA 200.7	Manganese	0.0073	mg/L	0.0040	0.0012		W533063	STA	08/17/15 13:14	
EPA 200.7	Silver	< 0.0050	mg/L	0.0050	0.0010		W533063	STA	08/17/15 13:14	
EPA 200.7	Zinc	< 0.010	mg/L	0.010	0.002		W533063	STA	08/17/15 13:14	
EPA 200.8	Arsenic	0.00565	mg/L	0.00300	0.00027	2	W533084	KWH	08/21/15 07:03	
EPA 200.8	Lead	< 0.00300	mg/L	0.00300	0.000031	2	W533084	KWH	08/21/15 07:03	
EPA 200.8	Selenium	< 0.0030	mg/L	0.0030	0.0006	2	W533084	KWH	08/21/15 07:03	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



IDEQ (Boise)
1410 N. Hilton
Boise, ID 83706

Project Name: Buckskin 2015
Work Order: **W5H0168**
Reported: 25-Aug-15 12:40

Client Sample ID: **BS-DS-SD1**
SVL Sample ID: **W5H0168-04 (Soil)**

Sampled: 05-Aug-15 12:15
Received: 07-Aug-15
Sampled By: RH

Sample Report Page 1 of 1

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) (Sieved)										
EPA 6020A	Arsenic	7.76	mg/kg Dry	0.300	0.058	2	W533085	KWH	08/19/15 10:04	D1
EPA 6020A	Lead	28.7	mg/kg Dry	0.100	0.008	2	W533085	KWH	08/19/15 10:04	D1
EPA 6020A	Selenium	< 0.30	mg/kg Dry	0.30	0.09	2	W533085	KWH	08/19/15 10:04	D1
Metals (Total) by EPA 6000/7000 Methods (Sieved)										
EPA 6010C	Antimony	< 2.0	mg/kg Dry	2.0	0.7		W533183	SA	08/17/15 12:37	
EPA 6010C	Barium	28.4	mg/kg Dry	0.20	0.07		W533182	SMB	08/21/15 10:16	
EPA 6010C	Cadmium	3.42	mg/kg Dry	0.20	0.07		W533182	SMB	08/21/15 10:16	
EPA 6010C	Chromium	2.03	mg/kg Dry	0.60	0.16		W533182	SMB	08/21/15 10:16	
EPA 6010C	Copper	4.31	mg/kg Dry	1.00	0.28		W533182	SMB	08/21/15 10:16	
EPA 6010C	Iron	4020	mg/kg Dry	6.0	4.5		W533182	SMB	08/21/15 10:16	
EPA 6010C	Manganese	58.4	mg/kg Dry	0.40	0.27		W533182	SMB	08/21/15 10:16	M2
EPA 6010C	Silver	1.12	mg/kg Dry	0.50	0.22		W533182	SMB	08/21/15 10:16	
EPA 6010C	Zinc	107	mg/kg Dry	1.0	0.7		W533182	SMB	08/21/15 10:16	M2
EPA 7471B	Mercury	0.053	mg/kg Dry	0.033	0.005		W534275	DB	08/24/15 16:20	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



IDEQ (Boise)
1410 N. Hilton
Boise, ID 83706

Project Name: Buckskin 2015
Work Order: **W5H0168**
Reported: 25-Aug-15 12:40

Client Sample ID: **BS-DS-SW2**

SVL Sample ID: **W5H0168-05 (Surface Water)**

Sample Report Page 1 of 1

Sampled: 05-Aug-15 12:15
Received: 07-Aug-15
Sampled By: DC

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
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Metals (Total)

EPA 245.1	Mercury	< 0.00020	mg/L	0.00020	0.00004		W534266	DB	08/24/15 13:20	
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Metals (Total Recoverable--reportable as Total per 40 CFR 136)

EPA 200.7	Antimony	< 0.020	mg/L	0.020	0.005		W533063	STA	08/17/15 13:17	
EPA 200.7	Barium	0.0030	mg/L	0.0020	0.0003		W533063	STA	08/17/15 13:17	
EPA 200.7	Cadmium	< 0.0020	mg/L	0.0020	0.0004		W533063	STA	08/17/15 13:17	
EPA 200.7	Chromium	< 0.0060	mg/L	0.0060	0.0005		W533063	STA	08/17/15 13:17	
EPA 200.7	Copper	< 0.0100	mg/L	0.0100	0.0012		W533063	STA	08/17/15 13:17	
EPA 200.7	Iron	0.223	mg/L	0.060	0.024		W533063	STA	08/17/15 13:17	
EPA 200.7	Manganese	0.0116	mg/L	0.0040	0.0012		W533063	STA	08/17/15 13:17	
EPA 200.7	Silver	< 0.0050	mg/L	0.0050	0.0010		W533063	STA	08/17/15 13:17	
EPA 200.7	Zinc	< 0.010	mg/L	0.010	0.002		W533063	STA	08/17/15 13:17	
EPA 200.8	Arsenic	0.00509	mg/L	0.00300	0.00027	2	W533084	KWH	08/21/15 07:04	
EPA 200.8	Lead	< 0.00300	mg/L	0.00300	0.000031	2	W533084	KWH	08/21/15 07:04	
EPA 200.8	Selenium	< 0.0030	mg/L	0.0030	0.0006	2	W533084	KWH	08/21/15 07:04	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



IDEQ (Boise)
1410 N. Hilton
Boise, ID 83706

Project Name: Buckskin 2015
Work Order: **W5H0168**
Reported: 25-Aug-15 12:40

Client Sample ID: **BS-DS-SD2**

SVL Sample ID: **W5H0168-06 (Soil)**

Sample Report Page 1 of 1

Sampled: 05-Aug-15 12:15
Received: 07-Aug-15
Sampled By: RH

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) (Sieved)										
EPA 6020A	Arsenic	28.1	mg/kg Dry	0.300	0.058	2	W533085	KWH	08/19/15 10:06	D1
EPA 6020A	Lead	73.0	mg/kg Dry	0.100	0.008	2	W533085	KWH	08/19/15 10:06	D1
EPA 6020A	Selenium	1.01	mg/kg Dry	0.30	0.09	2	W533085	KWH	08/19/15 10:06	D1
Metals (Total) by EPA 6000/7000 Methods (Sieved)										
EPA 6010C	Antimony	3.4	mg/kg Dry	2.0	0.7		W533183	SA	08/17/15 12:40	
EPA 6010C	Barium	48.2	mg/kg Dry	0.20	0.07		W533182	SMB	08/21/15 10:19	
EPA 6010C	Cadmium	16.0	mg/kg Dry	0.20	0.07		W533182	SMB	08/21/15 10:19	
EPA 6010C	Chromium	5.60	mg/kg Dry	0.60	0.16		W533182	SMB	08/21/15 10:19	
EPA 6010C	Copper	12.6	mg/kg Dry	1.00	0.28		W533182	SMB	08/21/15 10:19	
EPA 6010C	Iron	8640	mg/kg Dry	6.0	4.5		W533182	SMB	08/21/15 10:19	
EPA 6010C	Manganese	326	mg/kg Dry	0.40	0.27		W533182	SMB	08/21/15 10:19	
EPA 6010C	Silver	2.53	mg/kg Dry	0.50	0.22		W533182	SMB	08/21/15 10:19	
EPA 6010C	Zinc	199	mg/kg Dry	1.0	0.7		W533182	SMB	08/21/15 10:19	
EPA 7471B	Mercury	0.223	mg/kg Dry	0.033	0.005		W534275	DB	08/24/15 17:06	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



IDEQ (Boise)
1410 N. Hilton
Boise, ID 83706

Project Name: Buckskin 2015
Work Order: **W5H0168**
Reported: 25-Aug-15 12:40

Client Sample ID: **BS-DS-SW3**

SVL Sample ID: **W5H0168-07 (Surface Water)**

Sample Report Page 1 of 1

Sampled: 05-Aug-15 12:15
Received: 07-Aug-15
Sampled By: DC

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
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Metals (Total)

EPA 245.1	Mercury	< 0.0020	mg/L	0.0020	0.00004		W534266	DB	08/24/15 13:23	
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Metals (Total Recoverable--reportable as Total per 40 CFR 136)

EPA 200.7	Antimony	< 0.020	mg/L	0.020	0.005		W533063	STA	08/17/15 13:20	
EPA 200.7	Barium	< 0.0020	mg/L	0.0020	0.0003		W533063	STA	08/17/15 13:20	
EPA 200.7	Cadmium	< 0.0020	mg/L	0.0020	0.0004		W533063	STA	08/17/15 13:20	
EPA 200.7	Chromium	< 0.0060	mg/L	0.0060	0.0005		W533063	STA	08/17/15 13:20	
EPA 200.7	Copper	< 0.0100	mg/L	0.0100	0.0012		W533063	STA	08/17/15 13:20	
EPA 200.7	Iron	< 0.060	mg/L	0.060	0.024		W533063	STA	08/17/15 13:20	
EPA 200.7	Manganese	< 0.0040	mg/L	0.0040	0.0012		W533063	STA	08/17/15 13:20	
EPA 200.7	Silver	< 0.0050	mg/L	0.0050	0.0010		W533063	STA	08/17/15 13:20	
EPA 200.7	Zinc	< 0.010	mg/L	0.010	0.002		W533063	STA	08/17/15 13:20	
EPA 200.8	Arsenic	< 0.00300	mg/L	0.00300	0.00027	2	W533084	KWH	08/21/15 07:06	
EPA 200.8	Lead	< 0.00300	mg/L	0.00300	0.000031	2	W533084	KWH	08/21/15 07:06	
EPA 200.8	Selenium	< 0.0030	mg/L	0.0030	0.0006	2	W533084	KWH	08/21/15 07:06	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



IDEQ (Boise)
1410 N. Hilton
Boise, ID 83706

Project Name: Buckskin 2015
Work Order: **W5H0168**
Reported: 25-Aug-15 12:40

Client Sample ID: **BS-WP-SS1**

SVL Sample ID: **W5H0168-08 (Soil)**

Sample Report Page 1 of 1

Sampled: 05-Aug-15 11:09
Received: 07-Aug-15
Sampled By: RH

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) (Sieved)										
EPA 6020A	Arsenic	4860	mg/kg Dry	7.50	1.45	50	W533085	KWH	08/19/15 10:10	D1,D2
EPA 6020A	Lead	13800	mg/kg Dry	1.00	0.200	50	W533085	KWH	08/19/15 10:10	D1,D2
EPA 6020A	Selenium	< 0.30	mg/kg Dry	0.30	0.09	2	W533085	KWH	08/19/15 10:07	D1
Metals (Total) by EPA 6000/7000 Methods (Sieved)										
EPA 6010C	Antimony	153	mg/kg Dry	2.0	0.7		W533183	SA	08/17/15 12:43	
EPA 6010C	Barium	49.6	mg/kg Dry	0.20	0.07		W533182	SMB	08/21/15 10:22	
EPA 6010C	Cadmium	49.2	mg/kg Dry	0.20	0.07		W533182	SMB	08/21/15 10:22	
EPA 6010C	Chromium	1.60	mg/kg Dry	0.60	0.16		W533182	SMB	08/21/15 10:22	
EPA 6010C	Copper	253	mg/kg Dry	1.00	0.28		W533182	SMB	08/21/15 10:22	
EPA 6010C	Iron	58600	mg/kg Dry	6.0	4.5		W533182	SMB	08/21/15 10:22	
EPA 6010C	Manganese	605	mg/kg Dry	0.40	0.27		W533182	SMB	08/21/15 10:22	
EPA 6010C	Silver	92.2	mg/kg Dry	0.50	0.22		W533182	SMB	08/21/15 10:22	
EPA 6010C	Zinc	991	mg/kg Dry	1.0	0.7		W533182	SMB	08/21/15 10:22	
EPA 7471B	Mercury	8.42	mg/kg Dry	0.330	0.053	10	W534275	DB	08/24/15 17:08	D2

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



IDEQ (Boise)
1410 N. Hilton
Boise, ID 83706

Project Name: Buckskin 2015
Work Order: **WSH0168**
Reported: 25-Aug-15 12:40

Quality Control - BLANK Data

Method	Analyte	Units	Result	MDL	MRL	Batch ID	Analyzed	Notes
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Metals (Total)

EPA 245.1	Mercury	mg/L	<0.00020	0.00004	0.00020	W534266	24-Aug-15	
EPA 6020A	Arsenic	mg/kg	<0.300	0.058	0.300	W533085	19-Aug-15	D1
EPA 6020A	Lead	mg/kg	<0.100	0.008	0.100	W533085	19-Aug-15	D1
EPA 6020A	Selenium	mg/kg	<0.30	0.09	0.30	W533085	19-Aug-15	D1

Metals (Total) by EPA 6000/7000 Methods

EPA 6010C	Antimony	mg/kg	<2.0	0.7	2.0	W533183	17-Aug-15	
EPA 6010C	Barium	mg/kg	<0.20	0.07	0.20	W533182	21-Aug-15	
EPA 6010C	Cadmium	mg/kg	<0.20	0.07	0.20	W533182	21-Aug-15	
EPA 6010C	Chromium	mg/kg	<0.60	0.16	0.60	W533182	21-Aug-15	
EPA 6010C	Copper	mg/kg	<1.00	0.28	1.00	W533182	21-Aug-15	
EPA 6010C	Iron	mg/kg	<6.0	4.5	6.0	W533182	21-Aug-15	
EPA 6010C	Manganese	mg/kg	<0.40	0.27	0.40	W533182	21-Aug-15	
EPA 6010C	Silver	mg/kg	<0.50	0.22	0.50	W533182	21-Aug-15	
EPA 6010C	Zinc	mg/kg	<1.0	0.7	1.0	W533182	21-Aug-15	
EPA 7471B	Mercury	mg/kg	<0.033	0.005	0.033	W534275	24-Aug-15	

Metals (Total Recoverable--reportable as Total per 40 CFR 136)

EPA 200.7	Antimony	mg/L	<0.020	0.005	0.020	W533063	17-Aug-15	
EPA 200.7	Barium	mg/L	<0.0020	0.0003	0.0020	W533063	17-Aug-15	
EPA 200.7	Cadmium	mg/L	<0.0020	0.0004	0.0020	W533063	17-Aug-15	
EPA 200.7	Chromium	mg/L	<0.0060	0.0005	0.0060	W533063	17-Aug-15	
EPA 200.7	Copper	mg/L	<0.0100	0.0012	0.0100	W533063	17-Aug-15	
EPA 200.7	Iron	mg/L	<0.060	0.024	0.060	W533063	17-Aug-15	
EPA 200.7	Manganese	mg/L	<0.0040	0.0012	0.0040	W533063	17-Aug-15	
EPA 200.7	Silver	mg/L	<0.0050	0.0010	0.0050	W533063	17-Aug-15	
EPA 200.7	Zinc	mg/L	<0.010	0.002	0.010	W533063	17-Aug-15	
EPA 200.8	Arsenic	mg/L	<0.00300	0.00027	0.00300	W533084	21-Aug-15	
EPA 200.8	Lead	mg/L	<0.00300	0.000031	0.00300	W533084	21-Aug-15	
EPA 200.8	Selenium	mg/L	<0.0030	0.0006	0.0030	W533084	21-Aug-15	

Quality Control - LABORATORY CONTROL SAMPLE Data

Method	Analyte	Units	LCS Result	LCS True	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
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Metals (Total)

EPA 245.1	Mercury	mg/L	0.00499	0.00500	99.8	85 - 115	W534266	24-Aug-15	
EPA 6020A	Arsenic	mg/kg	2.20	2.50	88.1	80 - 120	W533085	19-Aug-15	D1
EPA 6020A	Lead	mg/kg	2.30	2.50	92.1	80 - 120	W533085	19-Aug-15	D1
EPA 6020A	Selenium	mg/kg	2.06	2.50	82.6	80 - 120	W533085	19-Aug-15	D1

Metals (Total) by EPA 6000/7000 Methods

EPA 6010C	Antimony	mg/kg	93.6	100	93.6	80 - 120	W533183	17-Aug-15	
EPA 6010C	Barium	mg/kg	96.1	100	96.1	80 - 120	W533182	21-Aug-15	
EPA 6010C	Cadmium	mg/kg	96.7	100	96.7	80 - 120	W533182	21-Aug-15	
EPA 6010C	Chromium	mg/kg	93.2	100	93.2	80 - 120	W533182	21-Aug-15	
EPA 6010C	Copper	mg/kg	93.5	100	93.5	80 - 120	W533182	21-Aug-15	
EPA 6010C	Iron	mg/kg	955	1000	95.5	80 - 120	W533182	21-Aug-15	
EPA 6010C	Manganese	mg/kg	96.0	100	96.0	80 - 120	W533182	21-Aug-15	
EPA 6010C	Silver	mg/kg	4.65	5.00	92.9	80 - 120	W533182	21-Aug-15	
EPA 6010C	Zinc	mg/kg	92.8	100	92.8	80 - 120	W533182	21-Aug-15	
EPA 7471B	Mercury	mg/kg	0.915	0.833	110	80 - 120	W534275	24-Aug-15	

Metals (Total Recoverable--reportable as Total per 40 CFR 136)

EPA 200.7	Antimony	mg/L	0.952	1.00	95.2	85 - 115	W533063	17-Aug-15	
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SVL holds the following certifications:

AZ:0538, CA:2080, ID:ID00019 & ID00965 (Microbiology), NV:ID000192007A, UT(TNI):ID000192015-1, WA:C573



IDEQ (Boise)
1410 N. Hilton
Boise, ID 83706

Project Name: Buckskin 2015
Work Order: **WSH0168**
Reported: 25-Aug-15 12:40

Quality Control - LABORATORY CONTROL SAMPLE Data (Continued)

Method	Analyte	Units	LCS Result	LCS True	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
Metals (Total Recoverable--reportable as Total per 40 CFR 136) (Continued)									
EPA 200.7	Barium	mg/L	0.926	1.00	92.6	85 - 115	W533063	17-Aug-15	
EPA 200.7	Cadmium	mg/L	0.947	1.00	94.7	85 - 115	W533063	17-Aug-15	
EPA 200.7	Chromium	mg/L	0.939	1.00	93.9	85 - 115	W533063	17-Aug-15	
EPA 200.7	Copper	mg/L	0.948	1.00	94.8	85 - 115	W533063	17-Aug-15	
EPA 200.7	Iron	mg/L	9.52	10.0	95.2	85 - 115	W533063	17-Aug-15	
EPA 200.7	Manganese	mg/L	0.929	1.00	92.9	85 - 115	W533063	17-Aug-15	
EPA 200.7	Silver	mg/L	0.0445	0.0500	89.0	85 - 115	W533063	17-Aug-15	
EPA 200.7	Zinc	mg/L	0.927	1.00	92.7	85 - 115	W533063	17-Aug-15	
EPA 200.8	Arsenic	mg/L	0.0236	0.0250	94.5	85 - 115	W533084	21-Aug-15	
EPA 200.8	Lead	mg/L	0.0231	0.0250	92.5	85 - 115	W533084	21-Aug-15	
EPA 200.8	Selenium	mg/L	0.0241	0.0250	96.5	85 - 115	W533084	21-Aug-15	

Quality Control - MATRIX SPIKE Data

Method	Analyte	Units	Spike Result	Sample Result (R)	Spike Level (S)	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
EPA 245.1	Mercury	mg/L	0.00100	<0.00020	0.00100	100	70 - 130	W534266	24-Aug-15	
EPA 245.1	Mercury	mg/L	0.00096	<0.00020	0.00100	95.9	70 - 130	W534266	24-Aug-15	
EPA 6020A	Arsenic	mg/kg	13.5	14.9	2.50	R > 4S	75 - 125	W533085	19-Aug-15	D1,M2
EPA 6020A	Lead	mg/kg	35.3	45.7	2.50	R > 4S	75 - 125	W533085	19-Aug-15	D1,M3
EPA 6020A	Selenium	mg/kg	2.06	<0.30	2.50	76.5	75 - 125	W533085	19-Aug-15	D1

Metals (Total) by EPA 6000/7000 Methods

EPA 6010C	Antimony	mg/kg	86.0	<2.0	100	84.4	75 - 125	W533183	17-Aug-15	
EPA 6010C	Barium	mg/kg	152	57.3	100	94.9	75 - 125	W533182	21-Aug-15	
EPA 6010C	Cadmium	mg/kg	98.3	3.21	100	95.1	75 - 125	W533182	21-Aug-15	
EPA 6010C	Chromium	mg/kg	95.0	1.90	100	93.1	75 - 125	W533182	21-Aug-15	
EPA 6010C	Copper	mg/kg	98.3	2.86	100	95.4	75 - 125	W533182	21-Aug-15	
EPA 6010C	Iron	mg/kg	8660	7580	1000	108	75 - 125	W533182	21-Aug-15	
EPA 6010C	Manganese	mg/kg	424	342	100	81.5	75 - 125	W533182	21-Aug-15	
EPA 6010C	Silver	mg/kg	5.26	0.78	5.00	89.7	75 - 125	W533182	21-Aug-15	
EPA 6010C	Zinc	mg/kg	236	144	100	92.5	75 - 125	W533182	21-Aug-15	
EPA 7471B	Mercury	mg/kg	0.353	<0.033	0.333	98.6	75 - 125	W534275	24-Aug-15	

Metals (Total Recoverable--reportable as Total per 40 CFR 136)

EPA 200.7	Antimony	mg/L	0.948	<0.020	1.00	94.8	70 - 130	W533063	17-Aug-15	
EPA 200.7	Antimony	mg/L	0.938	<0.020	1.00	93.8	70 - 130	W533063	17-Aug-15	
EPA 200.7	Barium	mg/L	0.938	0.0102	1.00	92.8	70 - 130	W533063	17-Aug-15	
EPA 200.7	Barium	mg/L	0.972	0.0553	1.00	91.6	70 - 130	W533063	17-Aug-15	
EPA 200.7	Cadmium	mg/L	0.940	<0.0020	1.00	94.0	70 - 130	W533063	17-Aug-15	
EPA 200.7	Cadmium	mg/L	0.924	<0.0020	1.00	92.4	70 - 130	W533063	17-Aug-15	
EPA 200.7	Chromium	mg/L	0.933	<0.0060	1.00	93.3	70 - 130	W533063	17-Aug-15	
EPA 200.7	Chromium	mg/L	0.919	<0.0060	1.00	91.8	70 - 130	W533063	17-Aug-15	
EPA 200.7	Copper	mg/L	0.947	<0.0100	1.00	94.7	70 - 130	W533063	17-Aug-15	
EPA 200.7	Copper	mg/L	0.929	<0.0100	1.00	92.9	70 - 130	W533063	17-Aug-15	
EPA 200.7	Iron	mg/L	9.96	0.405	10.0	95.5	70 - 130	W533063	17-Aug-15	
EPA 200.7	Iron	mg/L	9.42	<0.060	10.0	93.7	70 - 130	W533063	17-Aug-15	
EPA 200.7	Manganese	mg/L	0.944	0.0174	1.00	92.6	70 - 130	W533063	17-Aug-15	
EPA 200.7	Manganese	mg/L	0.916	<0.0040	1.00	91.5	70 - 130	W533063	17-Aug-15	
EPA 200.7	Silver	mg/L	0.0435	<0.0050	0.0500	87.0	70 - 130	W533063	17-Aug-15	
EPA 200.7	Silver	mg/L	0.0432	<0.0050	0.0500	86.4	70 - 130	W533063	17-Aug-15	
EPA 200.7	Zinc	mg/L	0.930	0.010	1.00	92.0	70 - 130	W533063	17-Aug-15	
EPA 200.7	Zinc	mg/L	0.895	<0.010	1.00	89.5	70 - 130	W533063	17-Aug-15	

SVL holds the following certifications:

AZ:0538, CA:2080, ID:ID00019 & ID00965 (Microbiology), NV:ID000192007A, UT(TNI):ID000192015-1, WA:C573



IDEQ (Boise)
1410 N. Hilton
Boise, ID 83706

Project Name: Buckskin 2015
Work Order: **WSH0168**
Reported: 25-Aug-15 12:40

Quality Control - MATRIX SPIKE Data (Continued)

Method	Analyte	Units	Spike Result	Sample Result (R)	Spike Level (S)	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
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Metals (Total Recoverable--reportable as Total per 40 CFR 136) (Continued)

EPA 200.8	Arsenic	mg/L	0.0263	0.00335	0.0250	91.6	70 - 130	W533084	21-Aug-15	
EPA 200.8	Lead	mg/L	0.0237	<0.00300	0.0250	90.4	70 - 130	W533084	21-Aug-15	
EPA 200.8	Selenium	mg/L	0.0241	<0.0030	0.0250	96.4	70 - 130	W533084	21-Aug-15	

Quality Control - MATRIX SPIKE DUPLICATE Data

Method	Analyte	Units	MSD Result	Spike Result	Spike Level	%R	RPD	RPD Limit	Batch ID	Analyzed	Notes
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Metals (Total)

EPA 245.1	Mercury	mg/L	0.00098	0.00100	0.00100	98.0	2.0	20	W534266	24-Aug-15	
EPA 6020A	Arsenic	mg/kg	15.6	13.5	2.50	R > 4S	14.7	20	W533085	19-Aug-15	D1,M2
EPA 6020A	Lead	mg/kg	41.7	35.3	2.50	R > 4S	16.5	20	W533085	19-Aug-15	D1,M3
EPA 6020A	Selenium	mg/kg	1.98	2.06	2.50	73.4	3.8	20	W533085	19-Aug-15	D1,M2

Metals (Total) by EPA 6000/7000 Methods

EPA 6010C	Antimony	mg/kg	85.0	86.0	100	83.4	1.2	20	W533183	17-Aug-15	
EPA 6010C	Barium	mg/kg	140	152	100	82.2	8.7	20	W533182	21-Aug-15	
EPA 6010C	Cadmium	mg/kg	96.0	98.3	100	92.8	2.4	20	W533182	21-Aug-15	
EPA 6010C	Chromium	mg/kg	93.9	95.0	100	92.0	1.1	20	W533182	21-Aug-15	
EPA 6010C	Copper	mg/kg	96.8	98.3	100	93.9	1.5	20	W533182	21-Aug-15	
EPA 6010C	Iron	mg/kg	7810	8660	1000	R > 4S	10.4	20	W533182	21-Aug-15	M3
EPA 6010C	Manganese	mg/kg	391	424	100	48.9	8.0	20	W533182	21-Aug-15	M2
EPA 6010C	Silver	mg/kg	5.07	5.26	5.00	85.9	3.7	20	W533182	21-Aug-15	
EPA 6010C	Zinc	mg/kg	208	236	100	64.3	12.7	20	W533182	21-Aug-15	M2
EPA 7471B	Mercury	mg/kg	0.355	0.353	0.333	99.2	0.5	20	W534275	24-Aug-15	

Metals (Total Recoverable--reportable as Total per 40 CFR 136)

EPA 200.7	Antimony	mg/L	0.956	0.938	1.00	95.6	2.0	20	W533063	17-Aug-15	
EPA 200.7	Barium	mg/L	0.988	0.972	1.00	93.2	1.6	20	W533063	17-Aug-15	
EPA 200.7	Cadmium	mg/L	0.943	0.924	1.00	94.3	2.0	20	W533063	17-Aug-15	
EPA 200.7	Chromium	mg/L	0.937	0.919	1.00	93.6	2.0	20	W533063	17-Aug-15	
EPA 200.7	Copper	mg/L	0.950	0.929	1.00	95.0	2.3	20	W533063	17-Aug-15	
EPA 200.7	Iron	mg/L	9.56	9.42	10.0	95.1	1.5	20	W533063	17-Aug-15	
EPA 200.7	Manganese	mg/L	0.930	0.916	1.00	92.9	1.6	20	W533063	17-Aug-15	
EPA 200.7	Silver	mg/L	0.0440	0.0432	0.0500	88.0	1.9	20	W533063	17-Aug-15	
EPA 200.7	Zinc	mg/L	0.912	0.895	1.00	91.2	1.8	20	W533063	17-Aug-15	
EPA 200.8	Arsenic	mg/L	0.0261	0.0263	0.0250	91.0	0.6	20	W533084	21-Aug-15	
EPA 200.8	Lead	mg/L	0.0238	0.0237	0.0250	90.6	0.3	20	W533084	21-Aug-15	
EPA 200.8	Selenium	mg/L	0.0231	0.0241	0.0250	92.4	4.2	20	W533084	21-Aug-15	

Quality Control - POST DIGESTION SPIKE Data

Method	Analyte	Units	Spike Result	Sample Result (R)	Spike Level (S)	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
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Metals (Total)

EPA 6020A	Arsenic	mg/kg	30.4	14.9	20.0	77.6	75 - 125	W533085	19-Aug-15	D1
EPA 6020A	Lead	mg/kg	60.8	45.7	20.0	75.3	75 - 125	W533085	19-Aug-15	D1
EPA 6020A	Selenium	mg/kg	14.7	<0.30	20.0	72.7	75 - 125	W533085	19-Aug-15	D1,M2

Metals (Total) by EPA 6000/7000 Methods

EPA 6010C	Manganese	mg/kg	340	342	4.00	-60.7	75 - 125	W533182	21-Aug-15	M3
EPA 6010C	Zinc	mg/kg	148	144	10.0	41.0	75 - 125	W533182	21-Aug-15	M3



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Notes and Definitions

D1	Sample required dilution due to matrix.
D2	Sample required dilution due to high concentration of target analyte.
M2	Matrix spike recovery was low, but the LCS recovery was acceptable.
M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to spike level. The LCS was acceptable.
LCS	Laboratory Control Sample (Blank Spike)
RPD	Relative Percent Difference
UDL	A result is less than the detection limit
R > 4S	% recovery not applicable, sample concentration more than four times greater than spike level
<RL	A result is less than the reporting limit
MRL	Method Reporting Limit
MDL	Method Detection Limit
N/A	Not Applicable
