

# **Preliminary Assessment and Site Inspection Report for Bimetallic Ridge Mines**

**Catherine Mine (aka Silver Butte Mine)  
Brown Bear Mine (aka Silver Butte Mine, Silver Hill, Erickson)  
Hope and Faith Shaft  
Iron Mask Mine**

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Bonner County



**State of Idaho  
Department of Environmental Quality**

**January 2013**



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Iron Mask Mine**

Bonner County

January 2013



**Prepared by  
Idaho Department of Environmental Quality  
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## **Acknowledgments**

DEQ would like to thank Idaho Department of Lands for permitting access to the mine site.



STATE OF IDAHO  
DEPARTMENT OF  
ENVIRONMENTAL QUALITY

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C.L. "Butch" Otter, Governor  
Curt Fransen, Director

January 10, 2013

Mr. Ken Marcy  
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12928 SW 276<sup>th</sup> Street  
Vashon, WA 98070

Subject: Preliminary Assessment and Site Inspection (PA/SI) Report for the Bimetallic Ridge Mines, Bonner County, Idaho

Dear Mr. Marcy:

The Department of Environmental Quality (DEQ) has a cooperative agreement with Region 10 of the United States Environmental Protection Agency (EPA) to provide technical support for completion of preliminary assessments at various mines on private or state lands. This set of four mines is located on state administered patented lands. DEQ completed field inspections and site assessment work in the summer of 2012. Attached you will find the PA/SI for the Bimetallic Ridge Mines. Below is a summary of the conclusions and recommendations for the agencies involved.

Four separate mines, the Catherine, Hope and Faith Shaft, Iron Mask, and Brown Bear were assessed in state owned Section 36 in the Pend Oreille Mining District. No impacts to human health or the environment were found at the Iron Mask Mine. The Hope and Faith Shaft has a safety issue due to the abrupt open shaft, but no other impacts to human health or the environment were found.

The Catherine Mine has a single waste dump with lead and arsenic concentrations confirmed above lead and arsenic human health and wildlife risk levels. The single adit discharge is not significant enough to impact water quality. The waste dump with risk threshold exceedances is small and isolated far from roads or ATV trails. Considerable re-grading work was completed at Catherine adits 1 and 2, waste dump, and apparent capping with clean soil.

The Brown Bear Mine has several adits. Two waste dumps associated with adits 3 and 7 exceed human health risk levels for lead. These two features are remotely located from roads and ATV trails and cover a small, <0.25 acre area. Some zinc in excess of water quality standards is loaded to the unnamed stream that drains the watershed in which the Brown Bear Mine is located. However, concentrations are sufficiently low and entry points sufficiently high in the watershed

Mr. Ken Marcy  
January 10, 2013  
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that it is doubtful there is much impact on biota before metals are diluted by other discharge to concentrations below the standards.

Surface water, ground water, air, and soil exposure pathways for the contaminants present are either not present or so small as to be insignificant. Domestic wells, drinking water sources, residences, schools, and daycare facilities are all removed from the mine sites by one to four miles. Sensitive species and wetlands do not appear to be issues.

Based on the weight of evidence, the four mine sites in Section 36 of Bimetallic Ridge near Sagle, Idaho can be removed from the list of sites posing a threat to human health or the environment. No remedial actions are recommended. The safety hazard associated with the Hope and Faith Shaft will be communicated to IDL. However, the agency has likely calculated the cost to benefit of installing an exclusion structure in such a remote location and rejected installation.

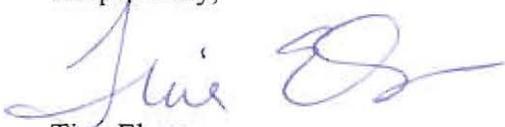
Based on existing conditions and uses, historic information, data observations made during the site visit, analysis of the mine wastes, potential pathways of contaminants to receptors, and potential exposures to ecological and human receptors, **DEQ has made a No Remedial Action Planned (NRAP) determination for the Bimetallic Ridge mines.**

A link to the Preliminary Assessment and Site Inspection Report for the site can also be found on DEQ's Preliminary Assessment Web page at:

<http://www.deq.idaho.gov/waste-mgmt-remediation/remediation-activities/mining-preliminary-assessments.aspx>

If you have any questions about these sites, the report, or DEQ's recommendations, please do not hesitate to call me at (208) 373-0563.

Respectfully,



Tina Elayer  
Mine Waste Specialist

attachments

cc: Jim Brady, Idaho Department of Lands, CDA Office  
Eric Wilson, Idaho Department of Lands, Boise Office  
Bimetallic Ridge PA File

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## List of Acronyms

amsl	above mean sea level
ATV	all-terrain vehicle
BHERA	Bunker Hill Superfund Site Ecological Risk Assessment
BLM	United States Bureau of Land Management
CWA	Clean Water Act
cy	cubic yards
DEQ	Idaho Department of Environmental Quality
DQO	data quality objective
EPA	United States Environmental Protection Agency
ESA	Endangered Species Act
FPXRF	field portable x-ray fluorescence
GIS	geographic information system
GLO	General Land Office
gpm	gallons per minute
HHSLs	human health medium-specific screening levels
HRS	Hazard Ranking Score
IDFG	Idaho Department of Fish and Game
IDL	Idaho Department of Lands
IDTLs	initial default target levels
IGS	Idaho Geological Survey
MCL	maximum contaminant level
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
NAIP	National Agriculture Imagery Program
NOAA	National Oceanic and Atmospheric Administration
NRAP	No Remedial Action Planned
PA	preliminary assessment
PPE	probable point of entry
ppm	parts per million
PWS	public water system
QA/QC	quality assurance/quality control
RCRA	Resource Conservation and Recovery Act
SI	site inspection
SVL	Silver Valley Laboratories, Inc.
SWA	source water assessments

TDL	target distance limit
TMDL	total maximum daily load
USFS	United States Forest Service
USGS	United States Geological Survey

# 1 Introduction

This report presents the results of the preliminary assessment and site inspection (PA/SI) for the Bimetallic Ridge mines. The United States Environmental Protection Agency (EPA) Region 10 has a cooperative agreement with the Idaho Department of Environmental Quality (DEQ) to provide technical support for completing preliminary assessments at various mines on private, state, or mixed ownership (public and private) lands. DEQ also completes site assessments in response to complaints or information about sites possibly contaminated with hazardous waste. These sites include abandoned mines, rural airfields that have served as bases for aerial spraying, old landfills, illegal dumps, and abandoned industrial facilities with known or suspected releases.

In February 2002, DEQ initiated a Preliminary Assessment Program to evaluate and prioritize assessment of such 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, like those found in Bimetallic Ridge, can be cost-effectively assessed on a watershed basis.

See the following webpage for additional information about DEQ's Preliminary Assessment Program: <http://www.deq.idaho.gov/waste-mgmt-remediation/remediation-activities/mining-preliminary-assessments.aspx>.

Bimetallic Ridge is part of Pend Oreille Mining District located in Township 56 North, Range 2 West, Section 36 of Bonner County, Idaho (Figure 1). Section 36 is located along the ridge and has four named mine developments. The section is owned by the state and managed by the Idaho Department of Lands (IDL). The section is part of the federal land grant of Sections 16 and 36 of each township in the state made at the declaration of statehood to support public education. The IDL manages the section for timber values and in the past has provided mineral leases. Bimetallic Ridge includes Catherine Mine, Brown Bear Mine, Hope and Faith Shaft, and Iron Mask Mine. DEQ visited the claims and performed a site assessment on July 25-26, 2012. DEQ did not purposely or knowingly trespass on any private holdings. Two of the four mine developments involve multiple adits accessing what appears as veins of mineralization located near the surface.

The four mine developments were assessed by the Idaho Geological Survey's (IGS) efforts to identify, assess and catalog significant mining impacts for the U.S. Forest Service (USFS) in the late 1990s. The IGS did locate most of the mining features of Section 36. However, the survey took minimal substrate or water quality data to characterize environmental impacts of the mine development. No screening tool, such as a field portable x-ray fluorescence (FPXRF) photometer, was used to screen waste piles metal content and only one waste pile and one water sample were collected and analyzed.

While the IGS survey was underway, the mineral leases with IDL were being abandoned. As part of the abandonment, IDL required considerable cleanup of solid waste and equipment littered around the sites and some re-grading of waste piles and re-building of roads. Mine waste dumps, especially those at Catherine Mine adits 1 and 2 and Brown Bear adit 1 were greatly



Figure 1. Topographic overview map of the Bimetallic Ridge mines.

(Source: USGS 100K Quad Maps)

modified in the efforts. Several buildings were demolished. Later, IDL restricted access to three mine adits with the installation of bat gates. Access to the section is restricted by a gate.

The four sites assessed and reported in this document were thoroughly screened and, where necessary, samples were collected to provide analytical results. Sufficient site screening and analytical data has been gathered to assess the risk posed by the four mine developments on Section 36 of Bimetallic Ridge.

During the site assessments, DEQ used references from several different documents, including United States Geological Survey (USGS) maps, county tax rolls, and historical reports. These documents often have numerous spellings for claim names, town sites, and/or geographic features. DEQ retained the source’s spelling and usage.

## 2 Ownership

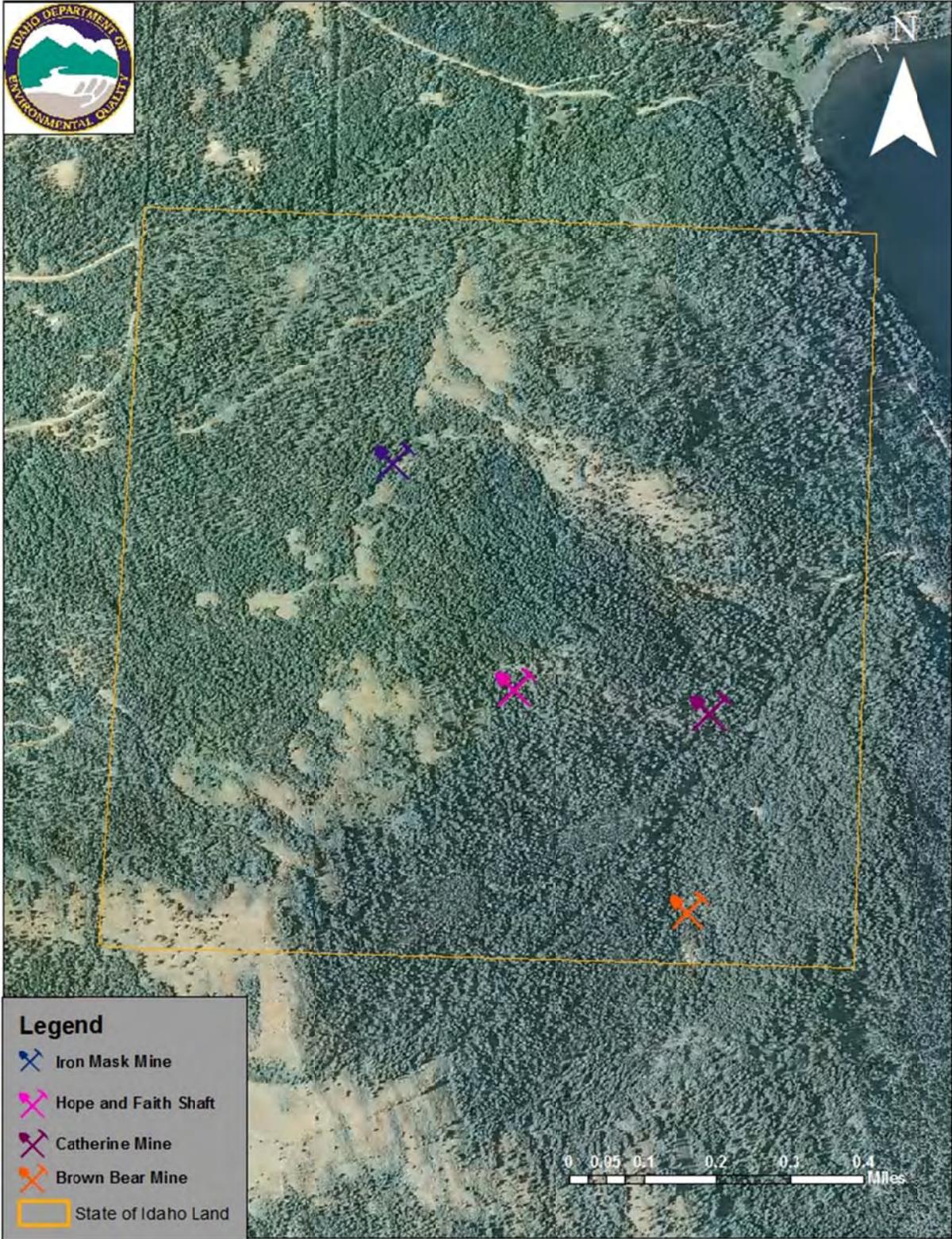
DEQ does not warrant the ownership research or location of property boundaries contained in this report. The information regarding ownership and property boundaries was obtained from the Bonner County Assessor’s Office and the United States Bureau of Land Management (BLM) General Land Office (GLO) records (Figure 2). The four mine sites are located in Section 36, Township 56 North, Range 2 West in Bonner County. The section is owned by the State of Idaho and managed by IDL.

The Catherine Mine is located in the east central part of the section with six adits and additional exploration features trending generally westward in the section (Figure 2). Brown Bear Mine’s adit 1 is relatively close by, but to the south of the Catherine Mine with a series of eight additional adits trending off to the southern edge of the section. The Hope and Faith Shaft is a single feature located very close to the center of the section. The Iron Mask Mine is composed of three tightly grouped adits on the northwestern edge of the section.

For the ownership described below, the *Partial Determination* is meant to convey a very brief summary of DEQ’s assessment of individual claims and parcels relative to human health and ecological risk factors associated with toxicological responses to mine wastes. A determination of *No Remedial Action Planned*, or NRAP, means that based on current conditions at the site, DEQ did not find any significant evidence indicating the potential of adverse toxicological effects to human or ecological receptors on the parcel of land and no additional work is necessary to manage those potential effects. This determination says nothing about risks associated with physical hazards such as open adits, open shafts, high walls, or unstable ground.

A *Calculate HRS* determination indicates that DEQ has found sufficient evidence to warrant a Hazard Ranking System (HRS) score calculation by EPA’s contractors. It also indicates that DEQ has concluded and recommended that additional site assessment and/or remedial actions are necessary to prevent adverse effects to human or ecological receptors. The conclusions and recommendations for the Bimetallic Ridge sites assessed are in Section 11 of this report.

<u>Owner</u>	<u>Mine Name</u>	<u>Parcel Number</u>	<u>Partial Determination</u>
Idaho Dept. of Lands 3284 W. Industrial Loop Coeur d’Alene, Idaho 83815	Catherine Brown Bear Hope and Faith Iron Mask	RP56N02W3600001A	NRAP



**Figure 2. Aerial photograph overlain by Bonner County parcel data for State of Idaho.**  
(Source: 2009 Natural Color 1-meter National Agriculture Imagery Program [NAIP] Idaho)

### 3 Location

Access to the Bimetallic Ridge mines was granted to DEQ by the State of Idaho. The data and observations made during the site visit were used to come to specific conclusions regarding this property and to some extent regarding cumulative effects of all public and private mining properties in the watershed.

The Bimetallic Ridge mines are located approximately 2.3 air miles northwest of Lake Pend Oreille. Approximately 10 miles west of the Bimetallic Ridge mines is the nearest town of Cocolalla. Elevation ranges from 3000-3600 feet above mean sea level (amsl). The mines are located less than a mile away from Mirror Lake.

To access the Bimetallic Ridge mines, drive approximately two miles past Cocolalla Lake on Highway 95. Turn east onto E Dufort Road. Stay on E Dufort Road for approximately 5.5 miles to FS road 2233 (Talache Road) on the south side.

### 4 Mine Site History

DEQ uses historical research for several purposes. Initially, historical information highlights potential contaminants of concerns, the magnitude of waste sites, and potentially dangerous physical hazards such as open adits and shafts. DEQ also uses the information to properly identify mine and mill facilities, unravel inconsistencies that may exist in property boundaries and ownership, and identify historical land uses that coincide with mining.

The historical information helps DEQ understand the relative levels of production, commodities, and potential waste types necessary to prepare for site assessment field work. As indicated in the history, the Bimetallic Ridge mines encompass additional areas besides the four mines identified in this preliminary assessment.

DEQ realizes many of the mine sites described in the histories are particularly important to both the federal government and State of Idaho. This information documents the relative importance of historic mining districts and workings as they are re-evaluated from the perspective of economics, multiple land use, human health, and ecological risks.

Numerous sources were used during the “desktop” research prior to visiting the site. DEQ could not improve or expand upon these reports by writing additional historical or geological text; therefore they are directly quoted below.

Since around the turn of the twentieth century, considerable exploration and some actual mining occurred at the Catherine and Brown Bear sites. During 1964, Silver Butte Mining formed to develop the Catherine and Brown Bear leases. Considerable drift development and core drilling occurred in the sites. The properties were leased to a number of mining firms including Imperial Silver, Cominco American Inc., and F.C. Gold Silver during the 1970s. Various amounts of exploration occurred on the leases with little production. The Brown Bear and Catherine reverted back to Silver Butte Mining.

The Iron Mask Mine was claimed in 1886 and was variously worked at the upper level for forty years. Mine water problems necessitated the lower adit 56 vertical feet downhill. Additional development work in the 1950's located additional promising ore. Additional development occurred in the late 1960's and early 1970's. By the 1970's the state lease was controlled by Silver Butte Mining. The ore taken from the Iron Mask Mine was transported to the Tacoma Smelter for processing.

The Hope and Faith Shaft was reported as part of the Iron Mask Mine even though its location is 1,800 feet distance to the southeast of the Iron Mask. The Hope and Faith shaft was reported to be driven 25 feet in the Erikson vein and some ore was taken from it in the early 1900's. The Hope and Faith shaft appears to be a completely separate mine development site than the Iron Mask Mine (Waddell and Albee, 1958, p 5-6).

## 5 Climatology

Climate information provided in this section is based on a climatological summary for Bayview, Idaho which was obtained from the National Oceanic and Atmospheric Administration (NOAA), National Climatic Data Center. The climatological data collected at the Bayview Model Station (100667) (elevation 2,075 amsl), is for the period of 1947 through 2012. Each site for which this data is used is subject to more localized meteorological conditions that result from difference in elevation, orientation of slopes in watershed, vegetation, and other factors.

The region is characterized by short, cool, dry summers and very cold winters. The total annual precipitation measured at the Bayview Model Station averages 24.2 inches. The majority of precipitation occurs as snow. Total annual snowfall averages 37.1 inches with most snowfall occurring in December and January. The driest months are July, August, and September.

Based on records from 1947 to 2012, the average annual temperature measured at the Bayview Model Station is 45°F. The lowest temperature recorded for this period was -30°F in 1950. The highest temperature for this period of record was 101°F in 2007. January is the coldest month with an average temperature of 21°F. July is the hottest month with an average temperature of 79°F.

## 6 General Geology

The mines of Section 36 are part of a broader area geology that is the west limb of a north-south trending geosyncline of the Precambrian Belt Supergroup. The area contains from oldest to youngest the Revett, St. Regis, and Wallace units, but the mines of Section 36 are confined to Revett and St. Regis rocks. Several intrusions of granitic materials during the late Mesozoic period and a great deal of associated regional faulting indicate the period of mineralization. Several lamprophyre dikes are reported in the mine workings. Predominant minerals present are silver, lead, and zinc with small amounts of gold and copper. The Mirror Lake fault is the closest north-south feature with the ore veins aligned roughly perpendicular to it along lesser faults. The Catherine and Brown Bear Mines mineralization was located in St. Regis formations. The Hope and Faith Shaft is located at a contact between the St. Regis and Revett. The Iron Mask Mine is in Revett rocks. The veins associated with the Catherine and Brown Bear Mines cross numerous fault and shear zones. As a result, ore bodies are distributed discontinuously and varied greatly in size.

The mixed coniferous forest covering most of the section has generated forest podzols. At the mine workings waste rock from the mineral extraction activities has been variously distributed on the landscape. Typically it is spread downhill of an adit in a long narrow plume of varying depth dependent on the degree of slope. In some locations (Catherine adits 1 and 2 and Brown Bear Adit 1) the waste rock has been re-graded to create road or pad structures or used as borrow material for road building. Some pad areas may have been capped with natives soils borrowed

elsewhere. The waste rock substrate contains metals contamination of concern. No mills operated in Section 36. Mine tailings were not expected or encountered during the assessments.

Figure 3 is a map of the major lithology in the vicinity of the Bimetallic Ridge mines.

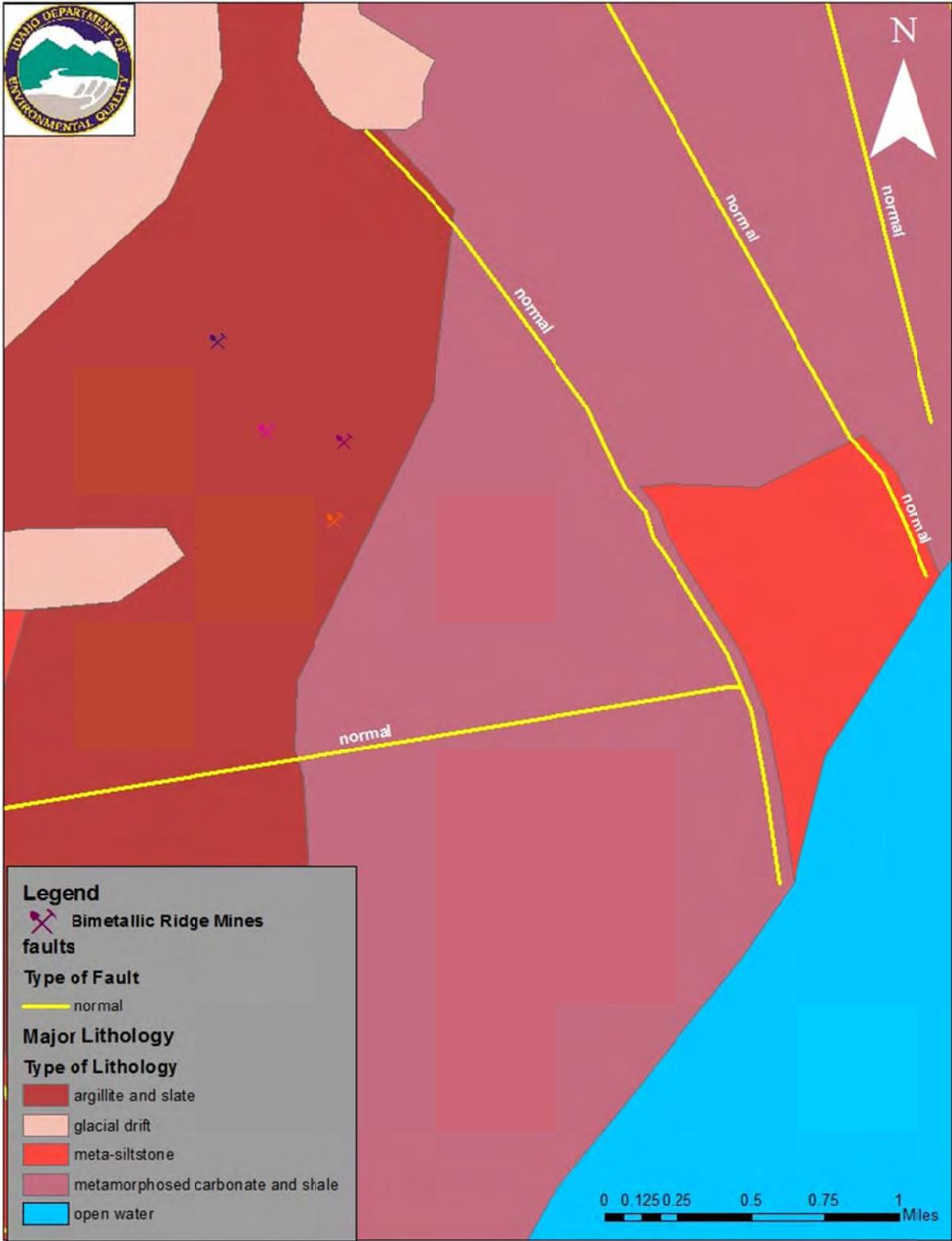


Figure 3. Map of major lithology in the vicinity of the Bimetallic Ridge Mines.

(Source: ArcSDE.deqgis83.DBO.major lithology)

## 7 Current and Potential Future Land Uses

Section 36 is a state owned section managed primarily for timber production in support of Idaho's education trust fund. Other forest resources such as wildlife and recreational opportunities occur on the section. Large and small wildlife typical of North Idaho's montane forests is present on the site. Evidence of off road vehicle use is evident from road and all-terrain vehicle (ATV) trails. The mineral leases were dropped in the late 1990s and no residences remain on the property. Primary use of the property, except for short periods of forest practices, is recreational uses such as hunting and ATV use. Since wildlife and human recreation are the primary users of the property, risk screening levels of 500 milligrams per kilogram (mg/kg) for lead and 200 mg/kg for arsenic were applied. The lead screening concentration is that associated with wildlife because it is more conservative than the 700 ppm human health criterion. The arsenic screening level is the wildlife value as well because the human health criterion of 4 ppm is typically not attainable at most locations in the state and certainly not in a mineralized area.

There are no water wells on the property. The nearest domestic, single residence water well is located approximately 2,128 feet from the Catherine adits. Figure 6 in Section 10.3 provides the location of the water wells within a four mile radius of the site. Streams in the section which may harbor some small fish are small, steep tributaries of Mirror Lake. Adit drainages do enter these streams in at least three locations. The cadmium, lead, and zinc water quality standards, at a water hardness of 25 milligrams per liter (mg/L) calcium carbonate, were used to screen water quality results.

## 8 Mine Site Conditions

The following photographs and descriptions were gathered and observed during DEQ's field visit to Bimetallic Ridge on July 25-26, 2012. In 2000 IDL worked with the USFS to install bat gates on five mine adits in this area.

### 8.1 Catherine Mine

The Catherine Mine is located in the east central area of Section 36. The mine has six historic adits. Four of these adits are still recognizable on the landscape, while the lower two were either buried or collapsed. The waste rock of these features was re-graded such that their general vicinity can be located but not the actual features. From the locations of Catherine adits 1 and 2, which are those furthest to the east, the adits trend in a northwest upslope in a line likely following a vein of mineralization. In addition to the adits, a large pit and some side hill cuts appear to be the result of prospecting activities.

The following photos of the Catherine adits are not in the order of the IGS site inspection report (Kauffman et al. 2003). Only four of the six adits were observed by DEQ staff. The adits are numbered 1-4 in this report. The correlation to the IGS numbered adits will be identified in the photo log.

As it was not located at the time of DEQ's site visit, Catherine adit 1 is assumed to be covered. Photo 1 shows the area where Catherine adit 1 was identified by the IGS. The area is overgrown and there is a healthy layer of vegetation covering the area where the adit and waste dump were

identified. The waste dump has been modified by bulldozer work. This area is referred to as CAAD1 on the sample location map (Figure 5 in Section 9).



**Photo 1. View of area on the north side of the road where Catherine Adit 1 was located.**

DEQ was unable to locate Catherine adit 2 (Photo 2) as identified by the IGS. This area is still identified as CAAD1 on the sample location map (Figure 4 in Section 9).



**Photo 2. View of area on the south side of the road where Catherine adit 2 was located.**

Photo 3 shows the area where Catherine waste dump 2 was identified by the IGS. The whole area above the unnamed creek has been modified by bulldozer work. The area below the road into the creek drainage contains a large amount of debris. The debris appears to range in age from 1950s to 1980s. There is a substantial amount of junk in the creek bed. The debris includes numerous 30-gallon barrels, old cars, gas cans, car parts, chairs, sinks, old heaters, 5-gallon cans, and other type of scrap (metal and plastic).



**Photo 3. View of area on the south side of the road where Catherine waste dump 2 was located.**

The disturbed area where the Catherine waste dumps were located is heavily overgrown (see vegetation above car body in Photo 4). The road is located approximately 30 feet above the car body. The whole disturbed area covers several acres.



**Photo 4. Car body appears to be stabilizing the bank of the unnamed creek.**

The area in Photo 5 is labeled as CAAD1 and CAAD2 on the sample location map (Figure 4 in Section 9). In the IGS site inspection report (Kauffman et al. 2003) the area is referred to as Catherine adits 1, 2, and 3.



**Photo 5. Debris on the creek bank below Catherine adits 1, 2, and 3.**

It appears that trash may be mobile during heavy rain events (Photo 6). There is evidence of rilling from the creek bank to the creek.



**Photo 6. Trash near the unnamed creek.**



**Photo 7. Car body in floodplain of unnamed creek.**



**Photo 8. Debris in the unnamed creek.**

Surface water sample BBPPE1SW1 and sediment sample BBPPE1SD1 were collected from this unnamed creek (Photo 9) below the majority of mine workings. Parameters were also collected from the creek. The sample location was selected in an area away from where most of the debris was concentrated. There was still a minor amount of debris around the sample area.



**Photo 9. Samples BBPPE1SW1 and BBPPE1SD1 were collected from this unnamed creek.**

The second adit observed by DEQ in the Catherine Mine drainage may have been identified as adit 3 in the IGS site inspection report (Kauffman et al. 2003). DEQ named this adit CAAD2 on the sample location map (Figure 4 in Section 9). This adit had a stream of water flowing at less than one gpm at the time of DEQ's site visit. The water was ponding in front of the adit and appeared to go subsurface within a few feet. Surface water sample CAAD3SW1 was collected from the seep (no picture available).

The following adits are located in a gully on the northwest side of the main access road west of Catherine adits 1 and 2 and north of adit 3. The workings observed were relatively minor. DEQ refers to the adit in Photo 10 as CAAD3 on the sample location map (Figure 4 in Section 9). The IGS site inspection report calls it adit 4.



**Photo 10. View of partially collapsed Catherine adit 4.**

Soil sample CAWD6XRFSS1 was collected for QA/QC from the waste dump shown in Photo 11.



**Photo 11. View from the southwest of CAAD3 waste dump.**

DEQ named the adit in Photo 12 CAAD4 on the sample location map (Figure 4 in Section 9). The IGS site inspection report (Kauffman et al. 2003) refers to it as Catherine adit 5 or 6. The adit is open and located on a steep hill.



**Photo 12. View of Catherine adit 5 or 6.**

Because an arsenic value greater than 200 mg/kg on the FPXRF reading triggered collection of a sample, soil sample CAWD5SS1 was collected from the waste dump in Photo 13.



**Photo 13. CAAD4 adit waste dump.**

## **8.2 Hope and Faith Shaft**

The Hope and Faith Shaft is a single feature located just to the south of the center of Section 36. The shaft dips into the earth at a greater than 45 degree angle. It is open which poses a fall risk to an unwary individual approaching it. However, the shaft is isolated and well off an ATV trail to its north and likely seldom visited. A second prospect feature or possibly a building dugout is located immediately north of the shaft.



**Photo 14. Hope and Faith Shaft.**

At the time of the assessment no water was observed in the shaft. There were no indications of water traveling from the shaft, from the surface, or in the area down gradient in the form of seeps. The area is located at a higher elevation than the rest of the workings where there are no surface water features.



**Photo 15. Close-up of Hope and Faith Shaft.**

Very little waste rock is located around the shaft (approximately 37 cubic yards [cy]). The lack of waste rock suggests the shaft does not penetrate too deep into the ground. All mine wastes associated with the Hope and Faith Shaft are waste rock. No evidence of milling operations and associated tailings were found on the site.

The FPXRF assessment of the waste rock yielded average readings on three tests of 106 mg/kg lead, 24 mg/kg arsenic, and 79 mg/kg zinc. Based on this screening level assessment, the mine waste at the Hope and Faith Shaft is not a risk to human health or the environment. However, the open shaft is a potential safety risk to a hunter or some other area user that might unwittingly stumble into it.

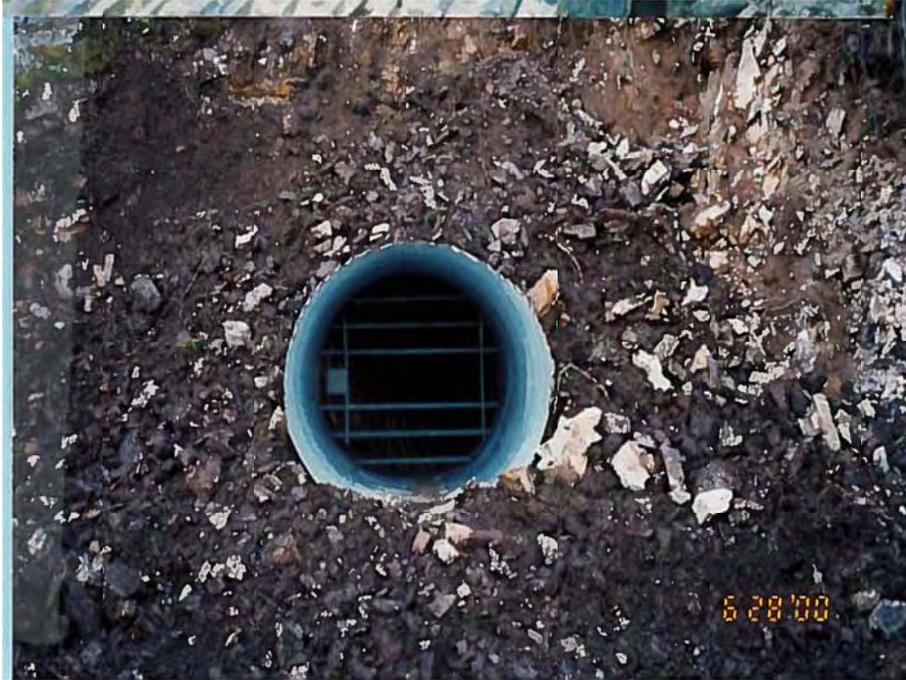


**Photo 16. Hope and Faith Shaft waste dump.**

### **8.3 Iron Mask Mine**

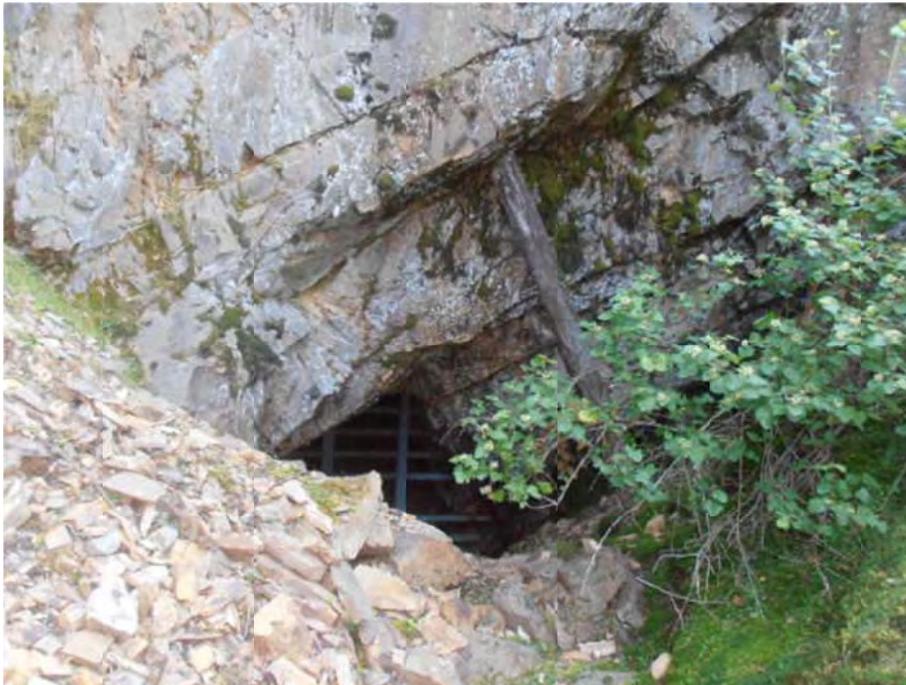
The Iron Mask Mine is located in the northwest quarter of Section 36. Lead-silver ore was reported shipped to the Tacoma Smelter from the mine but in the small amount of some 900 tons. The mine is composed of three tightly bunched adits. Iron Mask adit 3 is quite small and adits 1 and 2 have substantial waste dumps. The two larger adits have exclusion gates installed by IDL. Potential petroleum and other wastes present during IGS's visit to the mine were removed presumably after the leases were abandoned. No water is draining from any of the Iron Mask adits.

No water was observed at Iron Mask adit 1 at the time of DEQ's site assessment and the gate appeared in good condition.



**Photo 17. Iron Mask adit 1 (IDL photo 6/28/2000).**

No water was observed in the upper Iron Mask adit. It was also fitted with a bat gate.



**Photo 18. View to the south of the upper Iron Mask adit.**

Photo 19 shows a prospect cut is located approximately 50 feet east of the lower Iron Mask adit.



**Photo 19. View to the west of the Iron Mask Mine prospect cut.**

As shown in Photo 20, the Iron Mask Mine waste dump associated with the upper adit is well vegetated.



**Photo 20. Iron Mask Mine upper adit waste dump.**

## 8.4 Brown Bear Mine

The Brown Bear Mine is located in the southeast quarter of Section 36. Brown Bear adit 1, located to the south of Catherine adits 1 and 2, is the most northerly mine feature. Brown Bear adit 1 is open with a bat gate.



**Photo 21. Brown Bear adit 1.**

The Brown Bear waste dump associated with Brown Bear adit 1 is one of the most significant features. The adit 1 waste dump was formerly much larger. It has a considerable void from borrow activities. The borrowed material likely contributed to the re-grading efforts at the Catherine Mine site (adits 1 and 2) and to general upgrade of the road system in Section 36. The disturbed area covers approximately one acre. Brown Bear adit 1 is referred to as BBAD1 on the sample location map (Figure 5 in Section 9). No photo is available of Brown Bear adit 1 waste dump.

Brown Bear adit 2 (BBAD2 on Figure 5 in Section 9) is collapsed with water flowing at a rate of approximately one gallon per minute (gpm). The area is well vegetated and shows signs of hunting. Surface water sample BB2AD1SW1 was collected from the adit drainage. A duplicate water sample BBDUPSW1 was collected and water parameters were also collected.



**Photo 22. View to the south of Brown Bear adit 2.**

Brown Bear adit 3 (BBAD3 on Figure 5 in Section 9) is collapsed with no evidence of flowing water.



**Photo 23. View to the south of Brown Bear adit 3.**



**Photo 24. View to south of small cabin on the west side of Brown Bear adit 3 waste dump.**



**Photo 25. Generator located by cabin on west side of Brown Bear adit 3 waste dump.**

The area between Brown Bear adit 3 and waste dump 3 is heavily vegetated and signs of animals bedding down can be seen (Photo 26). Waste dump 3 (Photo 27) contains approximately 5,185 cubic yards of waste rock. Given the size of the waste dump, a composite soil sample BBWD3SS1 was collected.



**Photo 26. View facing southwest of top of Brown Bear waste dump 3.**



**Photo 27. North facing view of slope of Brown Bear waste dump 3.**

As shown in Photo 28, Brown Bear adit 4 (BBAD4 on Figure 5 in Section 9) is open with no evidence of water.



**Photo 28. View facing south of Brown Bear adit 4.**

Brown Bear waste dump 4 is approximately 200-300 cubic yards of mainly country rock. The top and toe of the waste dump (Photo 29) are heavily vegetated with mature trees and a layer of more than two inches of duff. No sulfides were observed. No water was observed on or around the waste dump.



**Photo 29. View facing east from the top of Brown Bear waste dump 4.**



**Photo 30. Remnants of cabin on Brown Bear waste dump 4.**



**Photo 31. View facing northwest of the slope of Brown Bear waste dump 4.**

As shown in Photo 32, no water was observed at Brown Bear adit 5 (BBAD5 on Figure 5 in Section 9). The adit opening is very small and right below a tree (Photo 33).



**Photo 32. View to the south/southwest of Brown Bear adit 5.**



**Photo 33. Close-up view of Brown Bear adit 5.**

Photo 34 shows Brown Bear waste dump 5 which contains less than 50 cubic yards of waste rock and is heavily vegetated.



**Photo 34. View facing southeast of Brown Bear waste dump 5.**

As shown in Photo 35 and Photo 36, Brown Bear adit 6 (BBAD6 on Figure 5 in Section 9) appears to be collapsed. There is a small opening along the outcrop and shallow workings. Boulders have slumped in front of the adit opening limiting access. No water was observed.



**Photo 35. Brown Bear collapsed adit 6.**



**Photo 36. View to the south of Brown Bear adit 6.**

Brown Bear waste dump 6 is spread out and appears to be the waste dump for adit 6 and also a pair of adits labeled BBAD7 on the sample location map (Figure 5 in Section 9). The total area encompasses less than 3,000 feet and is heavily vegetated with mature trees on top (Photo 37). There is lush vegetation with moss and duff on the top and the toe of the waste dump. It also looks like a road may have ran along the top of the waste dump.



**Photo 37. Brown Bear waste dump 6.**

Brown Bear adit 7 (BBAD7 on Figure 5 in Section 9) is the uppermost set of adits in this drainage. There are two short openings along a vein or shear parallel to the bedding. The upper right adit appears to be a stope (Photo 38 and Photo 39). The lower opening appears shallow and caved in after approximately three feet (Photo 40).



**Photo 38. View to the south of the lower collapsed Brown Bear adit 7 and possible stope (upper right of photo).**



**Photo 39. View facing south of lower Brown Bear adit 7.**



**Photo 40. View to the south of the upper opening of Brown Bear adit 7.**

Brown Bear adit 7 has little waste associated with it, but that material did exceed a screening criterion. Therefore, soil sample XRFLABSMPL318 was collected below the adit. The waste dump associated with adit 7 is also located on a steep slope below a small adit feature and is nearly a quarter of a mile from the closest maintained road.

The next set of adits and waste dumps are located in a small drainage approximately a quarter of a mile west of Brown Bear adits 2 through 7. Access is extremely limited as the roads are overgrown with mature vegetation.

Photo 41 shows collapsed Brown Bear adit 8 (BBAD8 on Figure 4 in Section 9) which has less than one gpm of discharge flowing from it. Surface water sample BB8AD1SW1 was collected from the seep. Parameters were not collected from the seep.



**Photo 41. View to the west of collapsed Brown Bear adit 8.**

Brown Bear waste dump 8 associated with adit 8 contains less than 50 cubic yards of waste rock. The disturbed area encompasses less than 0.1 acre and is heavily vegetated (Photo 42).



**Photo 42. View facing northeast on top of Brown Bear waste dump 8.**



**Photo 43. Remnants of a cabin on Brown Bear waste dump 8.**

Approximately 200 feet further up the drainage and west of Brown Bear adit 8 is another adit which DEQ identified as Brown Bear adit 9 (BBAD9 on Figure 4 in Section 9). The adit is collapsed and a trickle of water was observed. Surface water sample BBAD9SW1 was collected from the seep. Parameters were not collected from the seep. Background soil sample BBBGSS1 was collected from above the adit approximately 20 feet further west and in an area where there were no signs of disturbance.



**Photo 44. View facing south of Brown Bear adit 9.**

A pond is located approximately 10 feet northeast of Brown Bear adit 9 (Photo 45). A waste dump or some type of dam feature allows the pond to exist. Surface water sample BBBGSW1 and sediment sample BBBGSD1 were collected from the unnamed creek that feeds this pond. Parameters were also collected from the creek.



**Photo 45. Pond northeast of Brown Bear adit 9.**

Northeast of the dam for the pond the FPXRF readings were below levels of detection for arsenic and lead. Zinc levels were negligible.



Photo 46. View facing northeast of the dam for the pond near Brown Bear adit 9.

## 9 Sample Collection and Analysis

The following section discusses the types of samples collected and the results from the analysis. This section also includes how data quality objectives (DQOs) were achieved.

### 9.1 Collection

Seventeen samples were collected from the Bimetallic Ridge mines:

- Soil (BBBGSS1)—Background soil sample
- Soil (BBWD3SS1)—Brown Bear waste dump 3
- Soil (CAWD5SS1)—Catherine waste dump 5
- Soil (CAWD6XPSS1)—Catherine waste dump 6, FPXRF screening sample
- Soil (XRFLABSMPL318)—FPXRF screening sample, QA/QC
- Sediment (BBBGSD1)—Background sediment sample
- Sediment (BBPPE1SD1)—Unnamed creek at probable point of entry (PPE)
- Surface water (BBPPE1SW1)—Unnamed creek at PPE
- Surface water (BBAD9SW1)—Brown Bear adit 9
- Surface water (BB2AD1SW1)—Brown Bear adit 2
- Surface water (BB2PPESW1)—Adit seep at PPE to unnamed creek
- Surface water (BBDUPSW1)—Duplicate of sample BB2AD1SW1
- Surface water (BBAD8SW1)—Brown Bear adit 8
- Surface water (BBBGSW1)—Background water sample

- Surface water (CAAD3SW1)—Catherine adit 3
- Surface water (BBFBSW1)—Quality Assurance/Quality Control (QA/QC) field blank water sample
- Surface water (BB1AD1SW1)—Brown Bear adit 1

The soil samples were sieved at the sample location and placed in a properly marked Ziploc bag. The sample was then placed in a similarly marked cloth bag and recorded on the chain-of-custody form prior to shipping to Silver Valley Laboratories, Inc. (SVL). The portion of the sample that passed through a 9 mesh sieve was sent for laboratory analysis.

After the sample was bagged and tagged, nitrile gloves and disposable plastic spoons were discarded into a sealable waste bag. The soil and sediment samples were delivered to SVL by DEQ staff and drying and sieving of the media were requested.

Prior to collecting field samples for water quality analysis, a gloved technician labeled and triple rinsed laboratory-prepared sample bottles before filling the bottles with grab samples. The bottles were acidified with 10 milliliters of nitric acid, closed, dried, and placed in a cooler with ice.

In accordance with EPA chain-of-custody procedures, DEQ submitted the surface water samples to SVL in Kellogg, Idaho, for analysis of the Resource Conservation and Recovery Act (RCRA) suite of eight heavy metals along with copper, zinc, manganese, iron, and antimony. A copy of the laboratory report is included as Appendix A. A summary of the laboratory results is included in the tables in Sections 9.2 and 9.3. Figure 4 and Figure 5 show the soil and surface water sample locations.

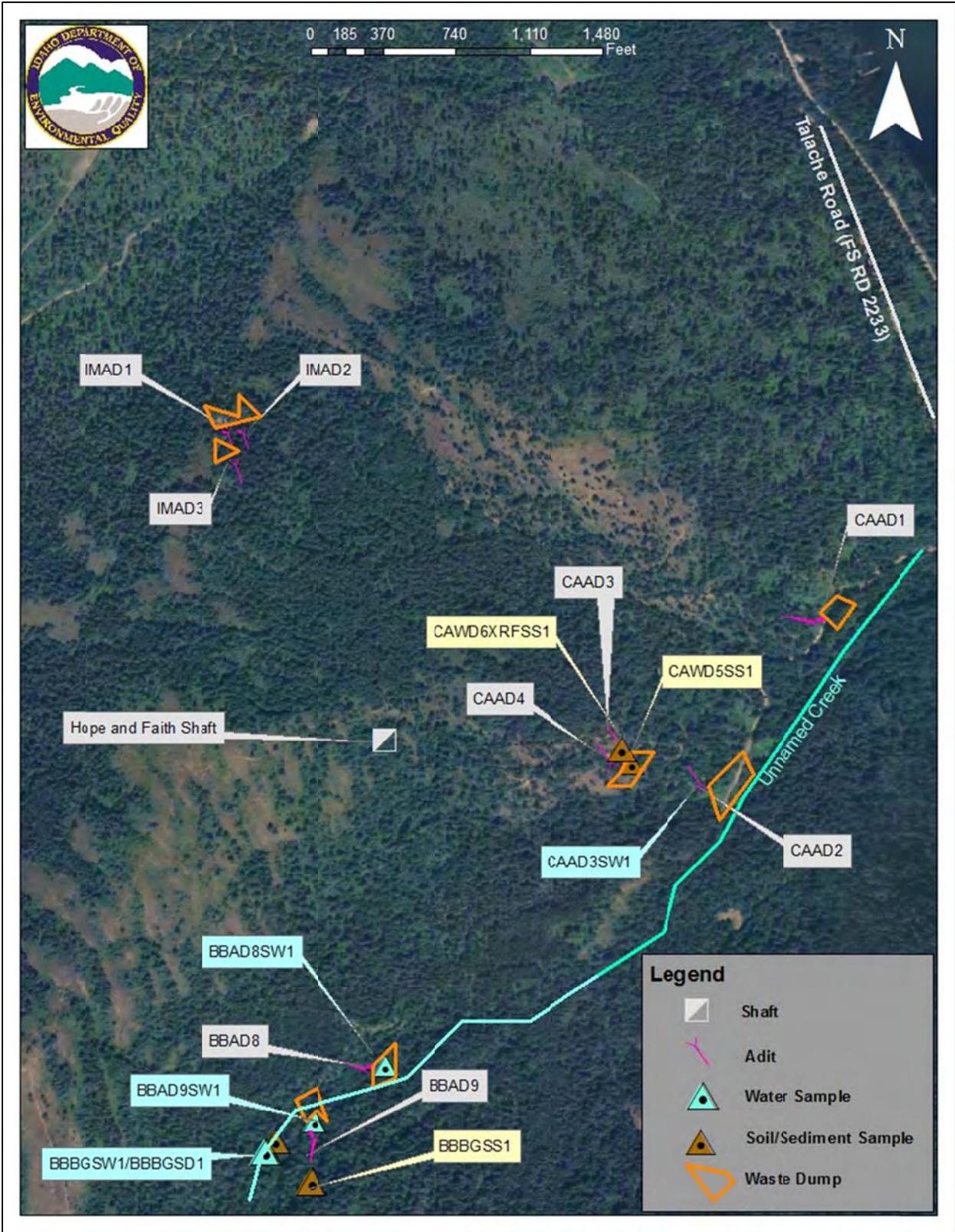


Figure 4. Sample locations and features of the Iron Mask (IM) adits, Hope and Faith Shaft, Brown Bear (BB) adits 8 and 9, and Catherine (CA) adits.

(Source: 2004 Natural Color 1-meter National Agriculture Imagery Program [NAIP] Idaho)

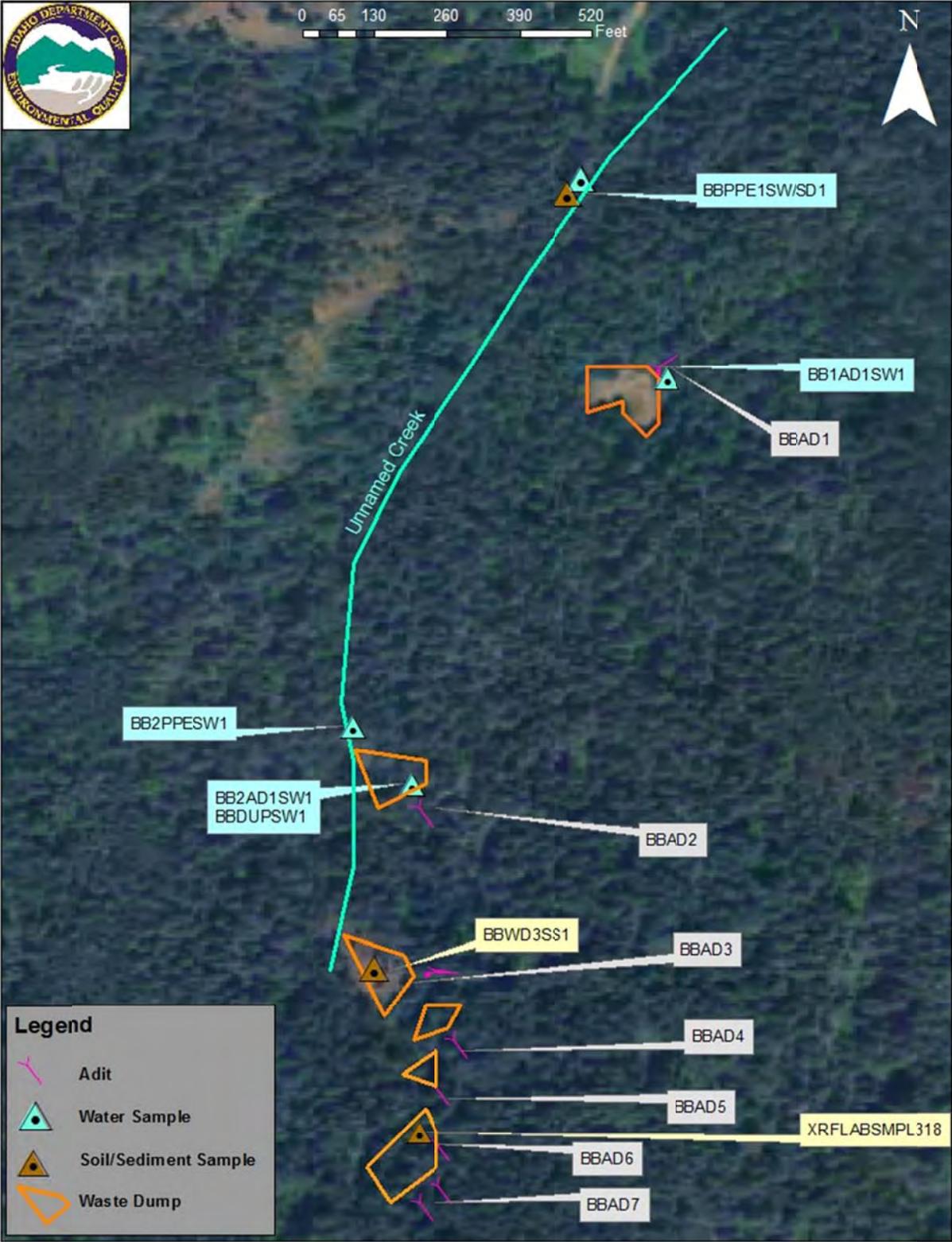


Figure 5. Sample locations and features of Brown Bear (BB) adits 1 through 7.

(Source: 2004 Natural Color 1-meter National Agriculture Imagery Program [NAIP] Idaho)

## 9.2 Soil Sample Analysis

Soil and sediment samples (BBBGSS1, BBBGSD1, BBWD3SS1, BBPPE1SD1, CAWD5SS1, CAWD6XRFS1 and XRFLABSMPLE318) were analyzed at SVL utilizing EPA 6000/7000 method 6010B for all metals except mercury, where method 7471A was used. Laboratory analytical results were compared to and are discussed below relative to Idaho’s initial default target levels (IDTLs), EPA Region 6 human health screening levels (HHSLs), and BLM’s wildlife and livestock *Risk Management Criteria for Metals at BLM Mining Sites* (BLM 2004).

The IDTLs are risk-based target levels that have been developed by DEQ for certain chemicals using conservative input parameters, a target acceptable risk of  $10^{-5}$ , and a hazard quotient of 1. These levels, although used for comparison even at remote locations, are more applicable to sites where “unrestricted uses,” such as residential development, are expected. Similarly, the EPA Region 6 HHSLs are human health-based risk levels derived for screening where residents are at risk for exposure.

All mine wastes associated with the Catherine Mine are waste rock. No evidence of milling operations and associated tailings were found on the site. The waste rock from Catherine adits 1 and 2 was re-graded and likely augmented with waste rock from Brown Bear waste dump 1. The work was likely completed as the leases were abandoned, because the earlier recorded visit by the IGS presents a very different scene at this location. The re-grading and capping was likely required to meet IDL lease provisions. The wastes appear capped with borrow soils from across the road. The FPXRF measurements taken from the remnants of these waste dumps are at background level for lead, arsenic, and zinc as expected for a mine waste feature capped with borrow soil.

Table 1 summarizes FPXRF and chemical analysis of the Catherine Mine waste dumps. IGS sampling of the adit 1 waste dump demonstrated slightly higher metals and arsenic, while a water sample collected did not contain zinc in levels above the water quality standards and cadmium concentration results are questionable. Arsenic and lead were not measured in the IGS water sample.

**Table 1. FPXRF and chemical analysis of Catherine Mine waste dumps.**

Adit Number	FPXRF Lead (mg/kg)	FPXRF Arsenic (mg/kg)	FPXRF Zinc (mg/kg)	Analysis of Lead (mg/kg)	Analysis of Arsenic (mg/kg)	Analysis of Zinc (mg/kg)
2	7	6	58	--	--	--
3	167	33	147	--	--	--
4	137	24	107	--	--	--
5	290	<b>235</b>	118	<b>1,390</b>	<b>913</b>	139
6	311	136	154	--	--	--

Metals and arsenic concentrations assessed above the FPXRF screening levels were found only at Catherine adit 5 of the five remaining Catherine adits. An arsenic value larger than 200 mg/kg on the FPXRF reading triggered the collection of soil sample CAWD5SS1 for chemical analysis. The analysis demonstrated that both lead and arsenic are above levels of concern.

However, an estimated 333 cubic yards of waste rock is present. The Catherine adit 5 waste dump is isolated from any road or trail and must be actively sought out. Since the lead and arsenic exceedance are one and a half and three times the risk levels, respectively, on a steep area of loose rock with no vegetation and covering less than three hundredths of an acre, little human health or environmental protection would be gained by capping this single remote waste pile.

All mine wastes associated with the Iron Mask Mine are waste rock. No evidence of milling operations and associated tailings were found on the site. The FPXRF assessment of the waste rock of the three waste dumps yielded the average lead, arsenic, and zinc concentrations (Table 2).

**Table 2. FPXRF analysis of the Iron Mask Mine waste dumps.**

<b>Adit Number</b>	<b>FPXRF Lead (mg/kg)</b>	<b>FPXRF Arsenic (mg/kg)</b>	<b>FPXRF Zinc (mg/kg)</b>
1	123	57	66
2	193	62	127
3	246	79	110

None of these values exceeded the screening criteria for lead and arsenic; therefore, samples were not collected for chemical analysis. Based on the FPXRF data the waste rock located at the Iron Mask Mine is not a threat to human health and the environment. Entrance safety and mining related petroleum waste issues were addressed by IDL during and after the lease abandonments.

Nine additional Brown Bear adits and waste dumps of varying size (Table 3) trend to the south and west upslope in a line likely following a vein of mineralization. The waste dumps at adits 1 and 3 are the most significant features. The adit 1 waste dump was formerly much larger. The waste dump has a considerable void from borrow activities. The borrowed material likely contributed to the re-grading efforts at the Catherine Mine site (adits 1 and 2) and to general upgrade of the road system in Section 36. The adits are variably open or collapsed.

**Table 3. Brown Bear Mine waste dump volumes and adit conditions.**

Brown Bear Waste Dumps	Volume (yd <sup>3</sup> )	Adit Condition
Adit 1	<1,500	Open with exclusion device
Adit 2	700	Collapsed
Adit 3	5,185	Collapsed
Adit 4	17	Open
Adit 5	44	Open
Adit 6	11	Open
Adit 7	0	Open
Adit 8	56	Collapsed
Adit 9	0	Collapsed

Adit 1 is accessible by road and has an exclusion device installed. The additional adits are progressively more remote and accessible only by brushed in roads.

Adit 9 is collapsed with a seep. This seep went subsurface within a few feet of the adit. The seep may contribute to the pond located next to the adit. No waste dump was found associated with adit 9 and very little with adit 7.

All mine wastes associated with the Brown Bear Mine are waste rock. No evidence of milling operations and associated tailings were found on the site. The average FPXRF values for lead, arsenic and zinc of the Brown Bear waste dumps are provided in Table 4. Waste rock at adit 7 was the only material which exceeded a FPXRF screen criterion. However, given the size of the waste dump at adit 3 (< 5,000 yd<sup>3</sup>), a sample of the material was collected for chemical analysis. The chemical analysis of the adit 3 waste material exceeds the wildlife standard for lead and slightly exceeded the human health standard. Although large in volume, the waste dump covers roughly 0.16 acres on a steep slope, and is poorly vegetated. Wildlife use of such a small unproductive area is unlikely. The waste dump is about 0.2 miles from the closest developed road and is reached by hiking through heavily brushed over roads. The waste dump location most likely limits visitation by most individuals. Adit 7 has little waste material associated with it, but that material does exceed a screening criterion. The waste dump associated with adit 7 is also located on a steep slope below a small adit feature, which is nearly a quarter mile from the closest maintained road. Wildlife use and human visitation of the adit 7 waste dump is even more unlikely for the reasons stated above for adit 3.

**Table 4. FPXRF and chemical analysis of Brown Bear Mine waste dumps.**

Adit Number	FPXRF Lead (mg/kg)	FPXRF Arsenic (mg/kg)	FPXRF Zinc (mg/kg)	Analysis of Lead (mg/kg)	Analysis of Arsenic (mg/kg)	Analysis of Zinc (mg/kg)
1	193	51	200	--	--	--
2	149	36	91	--	--	--
3	324	120	178	<b>785</b>	194	339
4	128	49	222	--	--	--
5	422	154	229	--	--	--
6	426	115	199	--	--	--
7	<b>745</b>	139	130	<b>NA</b>	<b>NA</b>	<b>NA</b>
8	187	44	213	--	--	--
9	10	4	31	--	--	--

Table 5 summarizes laboratory analytical results for the soil samples collected. Table 6 summarizes laboratory analytical results for the sediment samples collected.

**Table 5. Bimetallic Ridge Mines soil sample analysis (in milligrams per kilogram [mg/kg]).**

Metals	IDTLs (mg/kg)	HHSLs (mg/kg)	Background Soil Sample BBBGSS1 (mg/kg)	Waste Dump Soil Sample BBWD3SS1 (mg/kg)	Waste Dump Soil Sample CAWD5SS1 (mg/kg)	QA/QC Soil Sample CAWD6XRFFS1 (mg/kg)	QA/AC Soil Sample XRFLABSMPLE318 (mg/kg)
Antimony	<b>4.77</b>	<b>31</b>	<2.0	87.9	1,390	161	<2.0
Arsenic	<b>0.391</b>	<b>23</b>	<2.5	194	913	232	<b>6.5</b>
Barium	<b>896</b>	1,600	400	75.0	673	1,130	340
Cadmium	<b>1.35</b>	39	<0.20	<b>5.44</b>	<b>5.23</b>	<b>4.05</b>	<0.20
Chromium	<b>7.9</b>	210	<b>10.2</b>	<b>10.6</b>	<b>10.3</b>	<b>116</b>	<b>28.0</b>
Copper	<b>921</b>	2,900	19.0	707	990	1,040	30.8
Iron	—	<b>55,000</b>	17,500	38,400	<b>80,600</b>	<b>60,600</b>	26,100
Lead	<b>49.6</b>	—	10.0	<b>785</b>	<b>1,390</b>	<b>579</b>	18.9
Manganese	<b>223</b>	<b>3,600</b>	<b>1,090</b>	3,680	4,560	4,400	<b>671</b>
Selenium	<b>2.03</b>	23	<4.0	<4.0	<b>10.1</b>	<b>4.5</b>	<4.0
Silver	<b>0.189</b>	<b>390</b>	<0.50	<b>358</b>	<b>1,150</b>	<b>472</b>	<b>1.31</b>
Zinc	886	390	85.3	339	139	242	70.2
Mercury	<b>0.00509</b>	23	<b>0.059</b>	<b>3.12</b>	<b>13.9</b>	<b>3.80</b>	<b>0.052</b>

Note: **Orange** shaded values exceeded Idaho initial default target levels (IDTLs); **yellow** shaded values exceeded human health screening levels (HHSLs); and **pink** shaded values exceeded both IDTLs and HHSLs. Limits exceeded are indicated in **bold**.

**Table 6. Bimetallic Ridge Mines sediment sample analysis (in milligrams per kilogram [mg/kg]).**

Metals	IDTLs (mg/kg)	HHSLs (mg/kg)	Background Sediment Sample from Unnamed Creek BBBGSD1 (mg/kg)	PPE to Unnamed Creek Sample BBPPESD1 (mg/kg)
Antimony	4.77	31	<2.0	<2.0
Arsenic	0.391	23	<2.5	<2.5
Barium	896	1,600	708	167
Cadmium	1.35	39	<0.20	<0.20
Chromium	<b>7.9</b>	210	48.5	6.82
Copper	921	2,900	17.7	17.8
Iron	—	55,000	16,800	8,140
Lead	49.6	—	10.6	17.2
Manganese	<b>223</b>	3,600	387	305
Selenium	2.03	23	<4.0	<4.0
Silver	<b>0.189</b>	390	<0.50	1.68
Zinc	886	390	31.3	39.4
Mercury	<b>0.00509</b>	23	0.060	0.042

Note: **Orange** shaded values exceeded Idaho initial default target levels (IDTLs); **yellow** shaded values exceeded human health screening levels (HHSLs); and **pink** shaded values exceeded both IDTLs and HHSLs. Limits exceeded are indicated in **bold**.

Table 7 identifies the type of species where the metals analysis exceeded the BLM benchmarks. As an example, soil sample BBWD3SS1 exceeded the BLM benchmark for the following metals: arsenic, cadmium, lead, zinc, and mercury for the robin.

**Table 7. Wildlife and livestock risk management criteria for metals in soils (all in milligrams per kilogram [mg/kg]).**

Metals	Elk	Mule Deer	Deer Mine	Cottontail Rabbits	Canada Goose	Mallard	Robin	Cattle	Sheep	Median Values	BBBGSS1 (mg/kg)	BBWD3SS1 (mg/kg)	CAWD5SS1 (mg/kg)
Antimony											<2.0	87.9	1,390
Arsenic	<b>328</b>	<b>200</b>	<b>230</b>	<b>438</b>	<b>61</b>	<b>116</b>	<b>4</b>	<b>419</b>	<b>275</b>	<b>275</b>	<2.5	<b>194</b>	<b>913</b>
Barium											400	75.0	673
Cadmium	<b>3</b>	<b>3</b>	7	6	<b>2</b>	<b>1</b>	<b>0.3</b>	15	12	8	<0.20	<b>5.44</b>	<b>5.23</b>
Chromium											10.2	10.6	10.3
Copper	<b>131</b>	<b>102</b>	<b>640</b>	<b>358</b>	<b>161</b>	<b>141</b>	<b>7</b>	<b>413</b>	<b>136</b>	<b>136</b>	<b>19.0</b>	<b>707</b>	<b>990</b>
Iron											17,500	38,400	80,600
Lead	<b>127</b>	<b>106</b>	<b>142</b>	<b>172</b>	<b>34</b>	<b>59</b>	<b>6</b>	<b>244</b>	<b>125</b>	<b>125</b>	<b>10.0</b>	<b>785</b>	<b>1,390</b>
Manganese											1,090	3,680	4,560
Selenium											<4.0	<4.0	10.1
Silver											<0.50	358	1,150
Zinc	<b>275</b>	<b>222</b>	419	373	<b>271</b>	<b>196</b>	<b>43</b>	1,082	545	307	<b>85.3</b>	<b>339</b>	<b>139</b>
Mercury	<b>11</b>	<b>11</b>	<b>2</b>	15	<b>6</b>	<b>4</b>	<b>1</b>	45	<b>8</b>	<b>8</b>	0.059	<b>3.12</b>	<b>13.9</b>

Source: BLM 2004

Note: **Shaded values** indicate metals concentrations exceeded a BLM risk management criteria. Criteria exceeded are indicated in **bold**.

### 9.3 Water Quality Sample Analysis

Significant interaction occurs between surface water and ground water systems, with the latter being more influential on the former. However, as discussed below and as indicated by field parameters and laboratory analyses, although metals are present locally, buffering capacity in host rock in the water column stifles migration of metals through the local surface water and ground water systems.

A water sample was collected from the active drainage from Catherine Mine adit 3 (CAAD2 on Figure 4). Analysis of the sample revealed cadmium, lead, and arsenic below the levels of detection, while zinc was 27.9 microgram per liter ( $\mu\text{g/L}$ ) above the water quality standard (26.4  $\mu\text{g/L}$ ) at an assumed hardness of 25 mg/L calcium carbonate. Entrance of this water into an active stream course would dilute zinc well below the aquatic biota standard.

Water drainage was found from or associated with Brown Bear adits 1, 2, 8, and 9. Adit drainage itself was only found in adits 1, 8, and 9 (Table 8). Direct adit drainage from adit 2 was not found, but suspected because a surface flow feature near the collapsed adit and the presence of a stream flowing from beneath its associated waste dump. Adits 1, 8, and 9 do not exceed cadmium, lead, or arsenic ingestion standards. The chronic aquatic biota criterion for zinc is exceeded by adit 1, if a hardness of 25 mg/L calcium carbonate is assumed.

**Table 8. Cadmium, lead, zinc, and arsenic concentration of Brown Bear adit water and associated receiving water.**

Adit Number	Cadmium ( $\mu\text{g/L}$ )	Lead ( $\mu\text{g/L}$ )	Zinc ( $\mu\text{g/L}$ )	Arsenic ( $\mu\text{g/L}$ )
1	<2	<7.5	<b>30</b>	<2.5
1 (duplicate)	<2	<7.5	<b>58.7</b>	<2.5
8	<2	<7.5	18.8	<2.5
9	<2	<7.5	<10	<2.5

The metals and arsenic and, in one case, the sediment of receiving waters was assessed with water and sediment samples (Table 9). Cadmium and arsenic concentrations in water and sediment are uniformly below the level of detection. Arsenic concentration in sediment is below the 9.3 mg/kg risk level for fish and aquatic wildlife determined by the Bunker Hill Superfund Site Ecological Risk Assessment (BHERA). Lead concentration in sediment is below the 35 mg/kg risk level in the BHERA. Zinc concentrations in the receiving water of Brown Bear adit 2 does exceed the chronic zinc water quality standard of 26.4  $\mu\text{g/L}$  assuming the hardness is near 100 mg/L calcium carbonate. Brown Bear adit 2 has some impact on stream water quality; however, it is a small tributary high in the watershed. The contribution of this metal is likely rapidly diluted downstream as the smaller streams merge to form a stream capable of supporting significant aquatic biota.

**Table 9. Water and sediment samples from the Brown Bear Mine adits with drainage and appropriate background samples.**

Sample	Cadmium (µg/L)	Lead (µg/L)	Zinc (µg/L)	Arsenic (µg/L)
Water				
Adit 1 receiving water	<2	<7.5	<5	<2.5
Adit 2 receiving water	<2	<7.5	12.5	<2.5
Adit 2 receiving water (duplicate)	<2	<7.5	88.9	<2.5
Adit 1 receiving water (background)	<2	12.2	44.4	<2.5
Sediment				
Adit 1 stream sediment	<2	17.2	39.4	<2.5
Adit 1 stream sediment (background)	<2	10	85.3	<2.5

The values shown in Table 10 and Table 11 are unremarkable because the pathway is incomplete to the river and no receptors are located in close proximity. The tables are on the following pages. Below are the notes associated with Table 10 and Table 11:

*Note:* (T)—Standard in Total, (H)—Hardness dependent Cd, Cu, Pb, Ag, Zn at 100 mg/L

*Note:* Shaded values indicate exceedances of DEQ's water quality standards. Criteria exceeded are indicated in bold.

<sup>a</sup> Secondary Standard Maximum Contaminant Level (MCL) – non-enforceable guideline.

<sup>b</sup> Action level.

<sup>c</sup> No units apply.

<sup>d</sup> §141.13(a) One turbidity unit (TU), as determined by a monthly average pursuant to §141.22, except that five or fewer turbidity units may be allowed if the supplier of water can demonstrate to the State that the higher turbidity does not do any of the following:

- (1) Interfere with disinfection;
- (2) Prevent maintenance of an effective disinfectant agent throughout the distribution system; or
- (3) Interfere with microbiological determinations.

§141.13(b) Five turbidity units based on an average for two consecutive days pursuant to §141.22.

**Table 10. Total recoverable metals analysis in Bimetallic Ridge Mines. (Concentrations expressed in milligrams per liter [mg/L] unless otherwise noted.)**

Description	DEQ Ground Water Standard(T)	DEQ Drinking Water Standard MCL	DEQ Cold Water Biota Standard Acute	DEQ Cold Water Biota Standard Chronic	BBBGSW1	BB1AD1SW1	BB2AD1SW1	BB2PPESW1	BB8AD1SW1 (BBAD8SW1)
Antimony	0.006	0.006	—	—	<0.020	<0.020	<0.020	<0.020	<0.020
Arsenic	0.05	0.01	0.34	0.15	<0.025	<0.025	<0.025	<0.025	<0.025
Barium	2	2	—	—	0.976	0.420	0.319	0.263	0.383
Cadmium	0.005	0.005	0.00013 (H)	0.0006 (H)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Chromium (Total)	<b>0.1</b>	<b>0.1</b>	—	—	<b>0.131</b>	<0.0060	<0.0060	<0.0060	<0.0060
Copper	1.3 <sup>a</sup>	1.3 <sup>b</sup>	<b>0.017 (H)</b>	<b>0.0011 (H)</b>	<b>0.020</b>	<b>0.068</b>	<b>0.020</b>	<b>0.010</b>	<b>0.024</b>
Iron	<b>0.3<sup>a</sup></b>	<b>0.3<sup>a</sup></b>	—	—	<b>16.5</b>	<b>1.27</b>	<b>1.87</b>	<b>1.42</b>	<b>2.61</b>
Lead	0.015	0.15	0.065 (H)	<b>0.00025 (H)</b>	<b>0.0122</b>	<0.0075	<0.0075	<0.0075	<0.0075
Manganese	<b>0.05</b>	<b>0.05<sup>a</sup></b>	—	—	<b>0.830</b>	<b>0.206</b>	<b>0.0975</b>	0.0476	<b>0.728</b>
Selenium	0.05	0.05	0.02 (T)	0.005 (T)	<0.040	<0.040	<0.040	<0.040	<0.040
Silver	0.1 <sup>a</sup>	0.1 <sup>a</sup>	<b>0.0034 (H)</b>	—	<0.0050	<b>0.0470</b>	<0.0050	<0.0050	<0.0050
Zinc	5 <sup>a</sup>	5 <sup>a</sup>	0.12 (H)	0.12 (H)	0.0444	0.0587	0.0300	0.0125	0.0188
Mercury	0.002	0.002	—	—	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
pH	6.5 – 8.5 <sup>c</sup>	6.5 – 8.5 <sup>a</sup>	—	6.5 – 9.0 su	5.54	n/a	8.49	8.07	n/a
Conductivity	—	—	—	—	.026	n/a	.250	.248	n/a
Turbidity	—	<sup>d</sup>	Not >50 NTU instantaneous	Not >50 NTU instantaneous and no >25 NTU over a 10 day period	3	n/a	32	123	n/a
Dissolved Oxygen	—	—	—	>6 ppm	8.14	n/a	9.49	9.35	n/a
Temperature	—	—	—	Cold water aquatic life 22°C or less or a maximum daily average not >19°C  Salmonid spawning 13°C or less with a maximum daily average not >9°C	7.4°C	n/a	8.5 C	11.3°C	n/a
Salinity	—	—	—	—	0	n/a	0	0	n/a

**Table 11. Total recoverable metals analysis in Bimetallic Ridge Mines. (Concentrations expressed in milligrams per liter [mg/L] unless otherwise noted.)**

Description	DEQ Ground Water Standard(T)	DEQ Drinking Water Standard MCL	DEQ Cold Water Biota Standard Acute	DEQ Cold Water Biota Standard Chronic	BB9AD1SW1 (BBAD9SW1)	BBPPE1SW1	CAAD3SW1 (CA3AD1SW1)	BBDUPSW1	BBFBSW1
Antimony	0.006	0.006	—	—	<0.020	<0.020	<0.020	<0.020	<0.020
Arsenic	0.05	0.01	0.34	0.15	<0.025	<0.025	<0.025	<0.025	<0.025
Barium	2	2	—	—	0.251	0.0995	0.288	0.423	<0.0020
Cadmium	0.005	0.005	0.00013 (H)	0.0006 (H)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Chromium (Total)	0.1	0.1	—	—	<0.0060	<0.0060	<0.0060	0.0074	<0.0060
Copper	1.3 <sup>a</sup>	1.3 <sup>b</sup>	<b>0.017 (H)</b>	<b>0.0011 (H)</b>	<0.010	<b>0.010</b>	<b>0.023</b>	<b>0.053</b>	<0.010
Iron	<b>0.3<sup>a</sup></b>	<b>0.3<sup>a</sup></b>	—	—	<b>0.410</b>	<0.060	<b>2.35</b>	<b>5.96</b>	<0.060
Lead	0.015	0.15	0.065 (H)	0.00025 (H)	<0.0075	<0.0075	<0.0075	<0.0075	<0.0075
Manganese	0.05	0.05 <sup>a</sup>	—	—	0.0352	<0.0040	<0.040	<0.040	<0.040
Selenium	0.05	0.05	0.02 (T)	0.005 (T)	<0.040	<0.040	<0.040	<0.040	<0.040
Silver	0.1 <sup>a</sup>	0.1 <sup>a</sup>	0.0034 (H)	—	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Zinc	5 <sup>a</sup>	5 <sup>a</sup>	0.12 (H)	0.12 (H)	<0.0100	0.0100	0.0279	0.0889	<0.0100
Mercury	0.002	0.002	—	—	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
pH	6.5 – 8.5 <sup>c</sup>	6.5 – 8.5 <sup>a</sup>	—	6.5 – 9.0 su	n/a	8.49	6.95	n/a	n/a
Conductivity	—	—	—	—	n/a	.250	.033	n/a	n/a
Turbidity	—	<sup>d</sup>	Not >50 NTU instantaneous	Not >50 NTU instantaneous and no >25 NTU over a 10 day period	n/a	32	n/a	n/a	n/a
Dissolved Oxygen	—	—	—	>6 ppm	n/a	9.49	15.04	n/a	n/a
Temperature	—	—	—	Cold water aquatic life 22°C or less or a maximum daily average not >19°C  Salmonid spawning 13°C or less with a maximum daily average not >9°C	n/a	8.5 C	17.7 C	n/a	n/a
Salinity	—	—	—	—	n/a	0	0	n/a	n/a

## 9.4 Quality Assurance/Quality Control

FPXRF screening, duplicate, and trip (field) blank samples were collected in conjunction with the sampling efforts at the Bimetallic Ridge mines.

Three FPXRF screening soil samples (XRFLABSMPLE318, CAWD5SS1, and CAWD6XRFSS1) were collected in conjunction with the surface soil sampling effort. Sample CAWD5SS1 was collected because of an exceedance in arsenic on the FPXRF.

Sample CAWD6XRFSS1 was collected as a duplicate to the FPXRF reading #298. Table 12 illustrates the relationship between the reading and the sample.

**Table 12. FPXRF reading #298 compared to CAWD6XRFSS1.**

Analyte	XRF reading #298 (mg/kg)	Sample CAWD6XRFSS1
Zinc	160	242
Arsenic	183	232
Lead	392	579

One water trip blank sample (BBFBSW1) was transported with the water samples.

One duplicate water sample (BBDUPSW1) was collected for the surface water sampling effort.

The QA/QC samples were delivered to SVL by DEQ staff in conjunction with the soil and surface water samples.

The analytical results of the duplicate sample (BBDUPSW1) were comparable to the results of the original sample (BB2AD1SW1).

The field blank (BBFBSW1) was not collected in conjunction with surface water sampling activities at the Bimetallic Ridge mines and did not exhibit concentrations of target compounds or analytes.

## 10 Pathways and Receptors

The purpose of the PA/SI is to identify sources of contamination, like waste dumps or adits with water emitting and discharging into a surface water pathway. Four types of pathways exist: groundwater, surface water, air, and soil. These types of pathways may lead to receptors, which may be human or ecological.

The following sections identify environmental hazards as they pertain to pathways and types of exposures to the receptors.

### 10.1 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 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.

Section 36 is located on Bimetallic Ridge, an upland outcrop underlain by Precambrian Belt Supergroup bedrock. Soils are shallow northern forest podzols. Near the surface ground water is closely associated with the single surface drainage associated with the Catherine and Brown Bear Mines. If a viable ground water pathway of metals pollution were functional, more metals than observed should have been found in the receiving waters. Since exceedances were not found or were small in stream analysis, a viable shallow ground water pathway does not appear to exist.

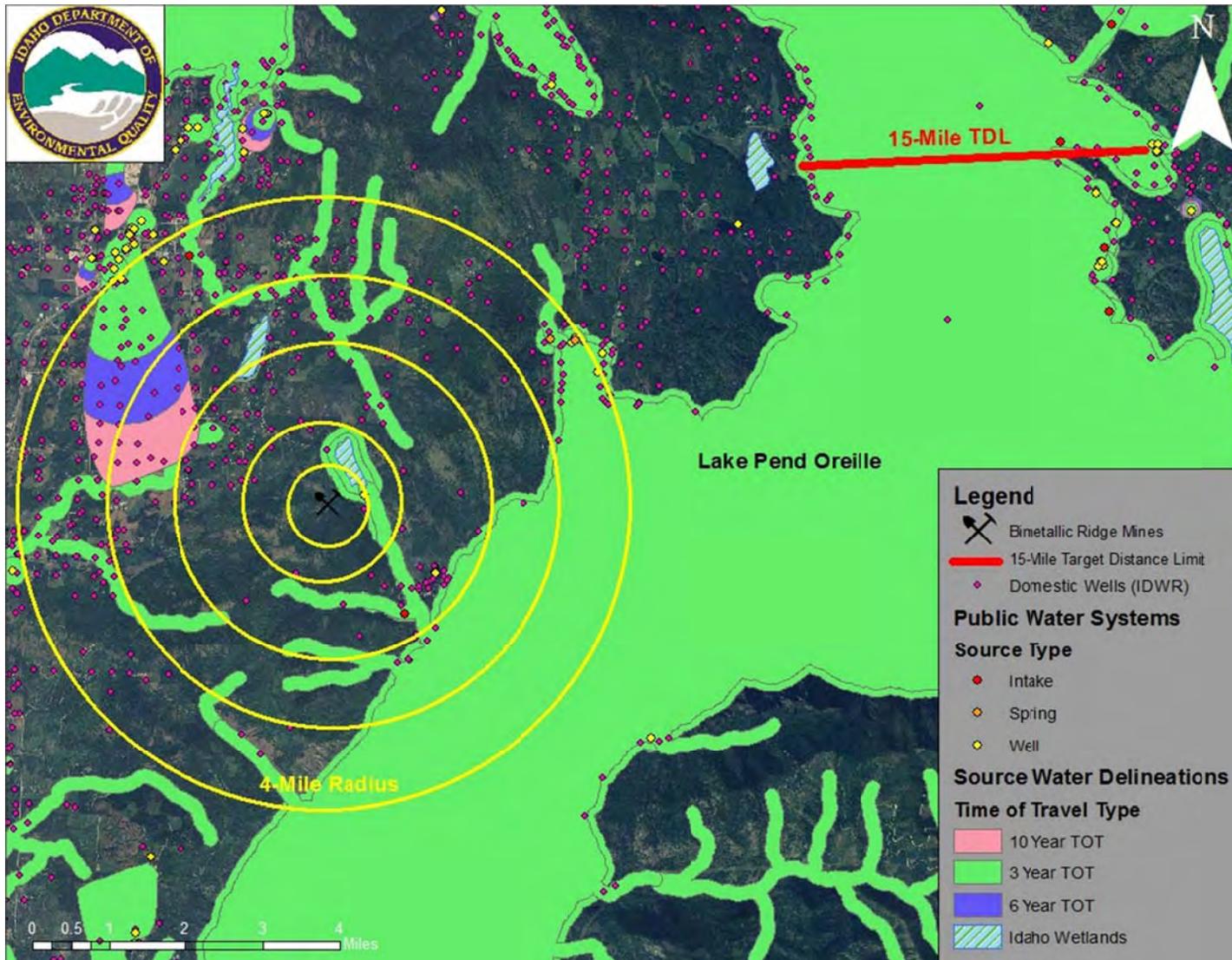
The regional ground water system is likely housed within the fissures of the Belt rock formations. Section 36 would contribute a minority of water to the regional system and far less from the mine areas in question. Adjacent domestic water wells of record are provided in Figure 6. Most of these likely draw from more surficial ground water features local to the wells and remote from Section 36. Any ground water pathway for the metals is remote.

## 10.2 Surface Water Pathways

The surface water migration pathway target distance limit (TDL) begins at the PPE of surface water runoff from a site to a surface water body and extends downstream for 15 miles. A map showing the source water delineation, including the 15-mile surface water TDL for Bimetallic Ridge, is shown in Figure 6.

The Iron Mask Mine and Hope and Faith Shaft are on mountain slopes not associated with surface water discharge features. No drainages from the shaft or the mine adits occur. There is little metals pollutant source and no pathway to surface water from these two mine sites.

The Catherine and Brown Bear Mines are located in the headwaters of a small unnamed stream that enters Mirror Lake to the east along its western shore. The stream likely harbors some significant aquatic life in its lower reaches. The only Catherine Mine adit (CAAD2) discharging water to this stream exceeded only the chronic zinc water quality standard, but only by a little over a microgram per liter. The zinc contribution from the small adit discharge would be rapidly diluted in the stream. Brown Bear adits 1 and 2 (BBAD1 and BBAD2) contribute only zinc to the stream in concentrations exceeding the zinc chronic aquatic biota standard. Receiving waters of Brown Bear adit 1 appear to dilute its zinc concentration below the zinc chronic aquatic biota standard. Brown Bear adit 2 discharges through the waste dump associated with it which increases zinc concentration to two fold of the zinc chronic aquatic biota standard. However, the small stream discharge below the adit 2 discharge is likely rapidly diluted below the standard within a few hundred yards downstream by confluence with other headwater discharges. It is unlikely the metals loading from the Brown Bear adits significantly affects cold water aquatic life in the unnamed stream that drains the area the mine occupies in Section 36.



**Figure 6. Map of the domestic wells, public water systems, and source water delineation, including the 15-mile surface water TDL for the Bimetallic Ridge mines.**

There are two significant wetlands located within the four mile radius.

(Sources: Spatial Database Engine Feature Dataset, Idaho DEQ GIS ArcSDE 9.2 Geodatabase, 2009 Natural Color 1-meter NAIP Idaho)

### 10.3 Domestic Wells and Public Water Supplies

There are no domestic wells or drinking water supplies located in Section 36. The nearest domestic well is less than a one-half mile from the mines in Section 31. Even if water from the adit discharges was in the source water to this well or any other in the vicinity, exceedances of maximum contaminant levels were not found in the discharges for contaminants of concern.

There are approximately 100 domestic wells and 11 public water systems (pws) within the four mile radius. However, six domestic wells and three of the public water systems are located within the Mirror Creek watershed.

The following information was available for the Ponderosa Terrace Estates. No source water assessments (SWAs) were available for the other two public water systems; Talache Water Association (Intake) PWS No. ID1090137 and Camp Stidwell (Well) PWS No. ID1090177.

The following paragraphs were taken from DEQ's 2002 Source Water Assessment to provide historical information relative to the Ponderosa Terrace Estates (Wells #1 and 2 PWS # ID1090101).

Ponderosa Terrace Estates is located in rural Bonner County, Idaho near Talache on Lake Pend Oreille. Drinking water for the housing development is supplied by two wells drawing from different depths in shale formation on the western shore of the lake. The system serves 18 residential connections. Well #1 is only 38 feet deep. The system chlorinates its water to treat persistent microbial contamination that may originate in the shallow ground water table Well #1 pumps from. Based on lead and copper sample results from the time when it was the sole source, Well #1 may need to be evaluated for corrosivity. Well #2, drilled in December 2000, is 605 feet deep. A sample from Well #2 tested in February 2001 had a Langlier Index of minus 2.883, also indicating a potential for corrosivity.

The recharge zone delineated for the Ponderosa Terrace Estates wells covers 3 acres divided into 0-3, 3-6 and 6-10-year time of travel zones. The primary direction of ground water flow is from north to south.

A ground water susceptibility analysis of the Ponderosa Terrace Estates wells ranked Well #1 at high for microbial contamination. Well #1 is ranked moderately susceptible to other classes of regulated contaminants. Well #2 ranked moderately susceptible to microbial and chemical contamination. Risk factors associated with local geology added the most points to the final susceptibility scores for both wells. With the bacterial contamination problem mostly resolved through disinfection, the inability of the system to provide an adequate amount of water year round, inconsistent maintenance and operations, and financial difficulties present a greater challenge to the system and its customers than water quality issues.

The hydrologic sensitivity score for Ponderosa Terrace Estates Well #1 is 6 points out of 6 points possible. The score for Well #2 is 5 points. These scores reflect natural geologic conditions in the recharge zone as a whole and at the well sites. Information for this part of the analysis is derived from the soil classification inside the delineation boundaries and from the soil profile reported on the well log.

The upper layers of soil in the Ponderosa Terrace Estates recharge zone are well drained to moderately well drained. Porous soils are less able to inhibit migration of contaminants toward the wells than soils that drain slowly. 4 feet of topsoil cover the shallow water table that Well #1 draws from, then 4 feet of boulders. Well #2 draws from deeper water tables that are protected by a confining shale layer, and isolated from the shallower water table by the deep outer casing and clay seal mentioned above.

#### **10.4 Air Quality Pathways**

The mine waste dumps located at the four Section 36 Bimetallic Ridge mine sites are generally very small features. The largest two waste dumps make up less than a quarter-acre combined and the rest likely less than another half-acre. There are 15 features scattered across Section 36. Metals and arsenic concentrations in excess of accepted human health and ecological risk values occurred on only 3 of the 15 features. In addition, the waste dumps are comprised of a large portion of rocks in excess of two inches. The waste dumps are, in most cases, surrounded by dense mixed coniferous forest vegetation. All of these factors militate against wind erosion and distribution of the small amount of metals contamination. Based on these facts, the air pathway is not a likely pathway for the contaminants to reach humans or the general environment.

#### **10.5 Soil Exposures**

Exposure to the surface of the three waste dumps that exceed metals and/or arsenic risk levels is possible, but improbable for humans. All three waste dumps with concentrations exceeding or potentially exceeding human health risk concentrations are remote from the roads or trails, which is gated by IDL to limit access. No residences exist on the section and the nearest residence is three-quarters of a mile from the nearest contamination.

Exposure of the wildlife abundant on the section of mixed forest is possible. However, the three contaminated waste dumps comprise in aggregate less than a third of an acre of surface in the 640 acre section. Although those waste dumps are exposed, they are steep and harbor little vegetation for cover or feed. They are degraded areas where wildlife is less likely to occupy for any period.

#### **10.6 Residences, Schools, and Day Care Facilities**

The nearest residence is roughly three-quarters of a mile from the mine sites. No schools or day care facilities are located within four miles of the mine sites. The nearest such facilities are likely in Sagle nearly four miles by direct line to the northwest.

#### **10.7 Wetlands**

There are no classified wetlands in Section 36 of Bimetallic Ridge. The relief of the ridge precludes wetlands. However, Brown Bear adit 9, which is a water filled depression, has been adopted by the local elk as a wallow. Fortunately, metals analysis of the water failed to find metals above the level of detection. There are two wetlands located within the four mile radius; however, the larger wetland is in a different watershed. The smaller wetland is Mirror Lake,

located less than one half mile from the mine. The total area of this wetland is 352,744 meters and covers approximately 35.814 hectares.

## 10.8 Sensitive, Rare, and Threatened Plant and Animal Species

No endangered, threatened, or species of special concern are known to inhabit Section 36. There is one species, the Townsend's big-eared bat (*Corynorhinus townsendii*), that is listed as No Status in the Endangered Species Act (ESA). It is always possible that such a species might use a section of unpopulated state forest land on a temporary basis any place in north Idaho. The small surficial area and lack of useful habitat associated with the waste dumps would be protective of any such species of concern as it is of all other wildlife.

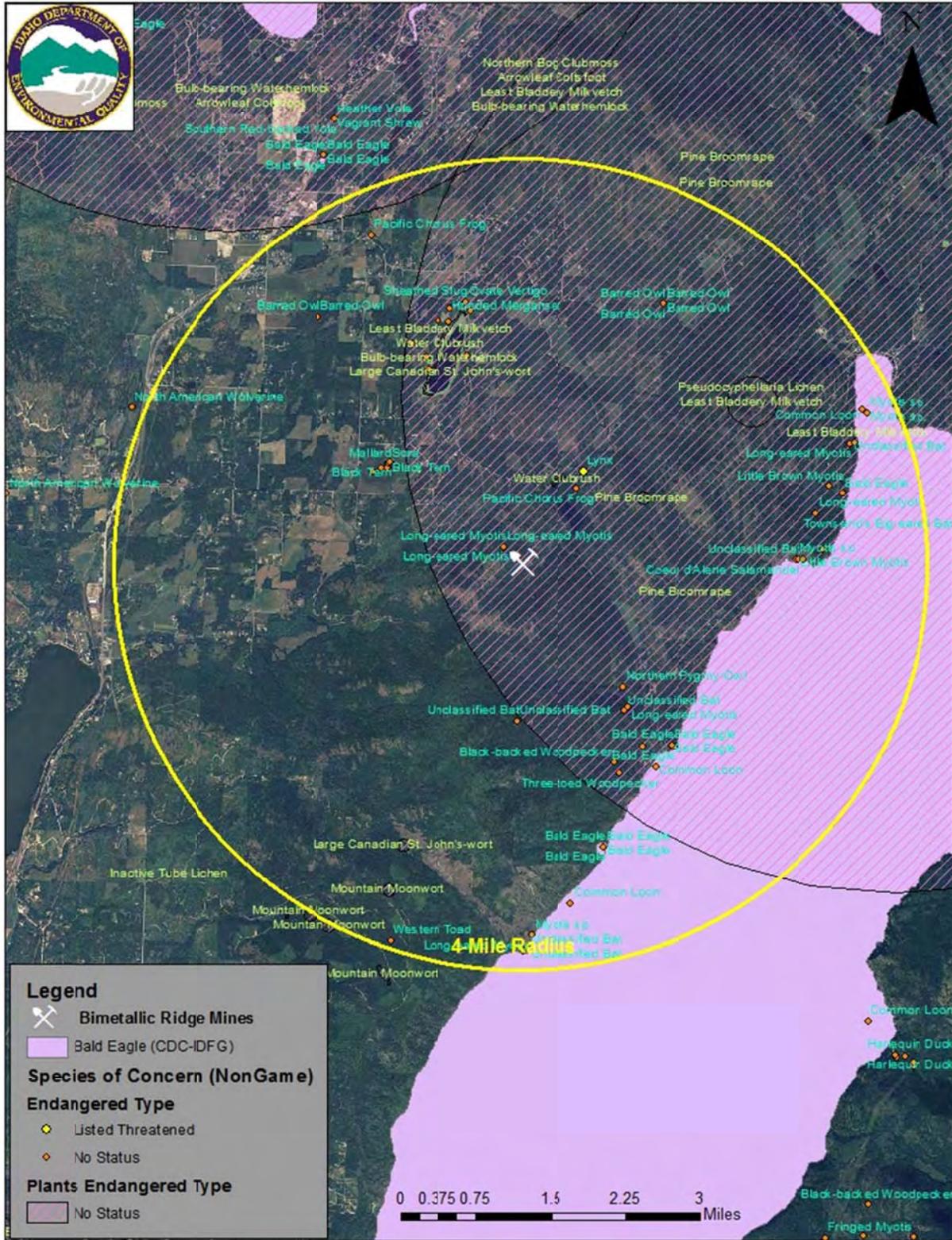
Most of the sensitive species have huge ranges that overlap onto the Bimetallic Ridge Mines. Due to the size of those ranges, these species may not receive significant exposure time or doses to heavy metals.

It is possible one or all of these plant species could grow on soils with elevated metals. Seven rare or sensitive plant species are documented to exist within the 4-mile radius of the Bimetallic Ridge mines (Figure 7):

- Least bladderly milkvetch (*Astragalus microcystis*)
- Bulb-bearing waterhemlock (*Cicuta bulbifera*)
- Large Canadian St. John's-wort (*Hypericum majus*)
- Water club-rush (*Schoenoplectus subterminalis*)
- Pseudocyphellaria lichen (*Pseudocyphellaria anomala*)
- Pine broomrape (*Orobanche pinorum*)
- Mountain moonwort (*Botrychium montanum*)

Below is a list of animals of concern listed within the 4-mile radius of the Bimetallic Ridge mines. The nongame animals, with the exception of the lynx, are listed as “species of concern” and have no status. However, due to the lack of tailing impoundments, presence of well-vegetated dumps, and unremarkable water chemistry results, a significant source for exposure is unlikely (Figure 7).

- Listed threatened:
  - Lynx (*Lynx canadensis*)
- No status:
  - Pacific chorus frog (*Pseudacris regilla*)
  - Barred owl (*Strix varia*)
  - Northern alligator lizard (*Elgaria coerulea*)
  - Common goldeneye (*Bucephala clangula*)
  - Red-necked grebe (*Podiceps grisegena*)
  - Hooded merganser (*Lophodytes cucullatus*)
  - Sheathed slug (*Zacoleus idahoensis*)
  - Ovate vertigo (*Vertigo ovata*)
  - Robust lancetooth (*Haplotrema vancouverense*)



**Figure 7. Sensitive plant and animal species in and around the Bimetallic Ridge mines.**

(Sources: Spatial Database Engine Feature Dataset, Animal Conservation Database Idaho DEQ GIS ArcSDE 9.2 Geodatabase, 2009 Natural Color 1-meter NAIP Idaho)

- Western glass-snail (*Vitrina pellucida*)
- Idaho forest snail (*Allogona ptychophora*)
- Black tern (*Chlidonias niger*)
- Columbia spotted frog (*Rana luteiventris*)
- American beaver (*Castor canadensis*)
- Western toad (*Bufo boreas*)
- Great blue heron (*Ardea herodias*)
- Pied-billed grebe (*Podilymbus podiceps*)
- Cinnamon teal (*Anas cyanoptera*)
- Wilson's snipe (*Gallinago delicata*)
- Sora (*Porzana carolina*)
- Mallard (*Anas platyrhynchos*)
- Blue-winged teal (*Anas discors*)
- Canada goose (*Branta canadensis*)
- Virginia rail (*Rallus limicola*)
- Bald eagle (*Haliaeetus leucocephalus*)
- Little brown myotis (*Myotis lucifugus*)
- Unclassified bat (*Chiroptera*)
- Coeur d'Alene salamander (*Plethodon idahoensis*)
- Myotis sp. (*Myotis*)
- Townsend's big-eared bat (*Corynorhinus townsendii*)
- Long-eared myotis (*Myotis evotis*)
- Three-toed woodpecker (*Picoides dorsalis*)
- Black-backed woodpecker (*Picoides arcticus*)
- Common loon (*Gavia immer*)

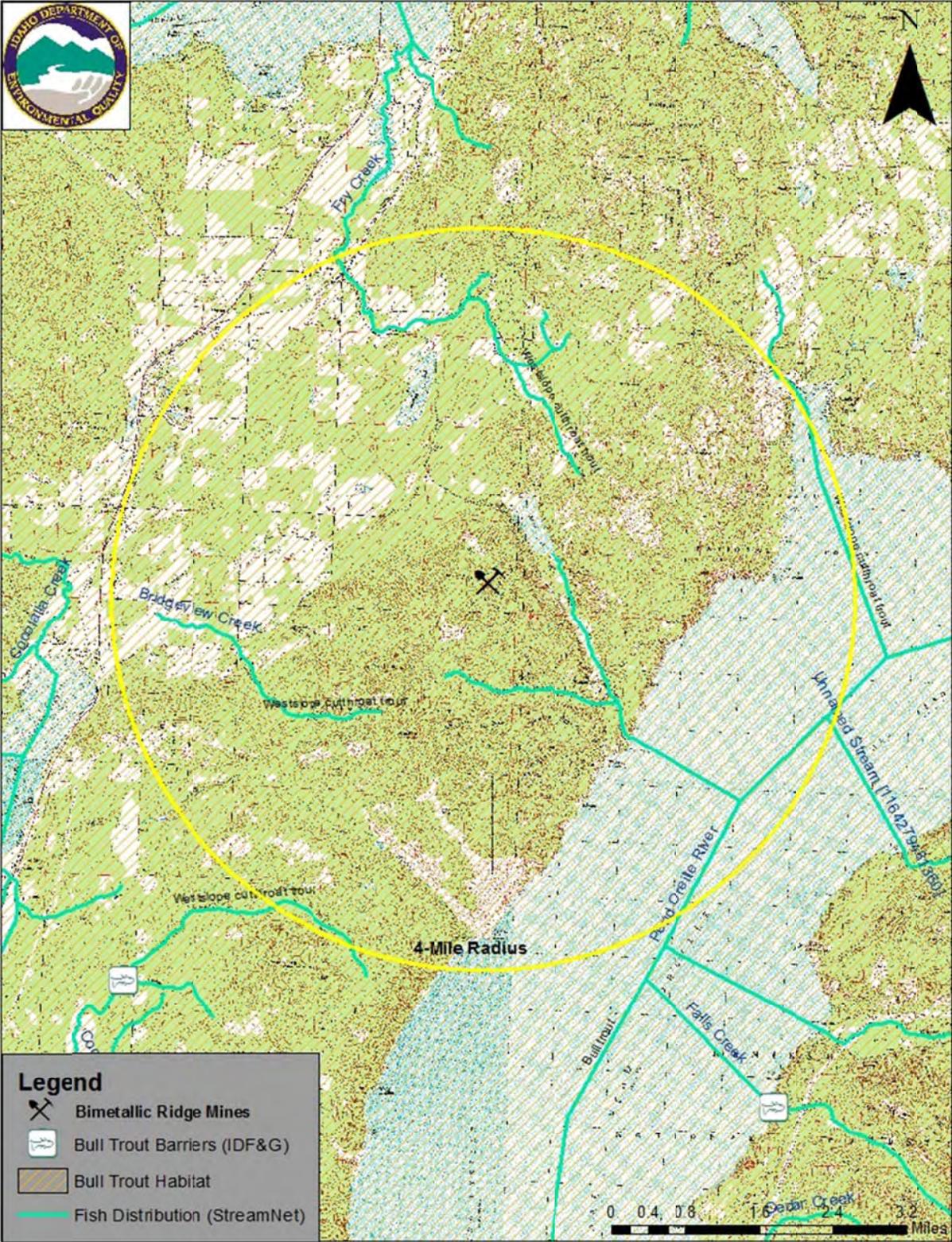
## 10.9 Fisheries

The following fish species have been observed by Idaho Department of Fish and Game (IDFG) within the 4-mile radius of the Bimetallic Ridge mines (Figure 8).

This area is classified as “known occupied for the bull trout.”

- Westslope cutthroat trout (*Oncorhynchus clarki lewisi*)
- Bull trout (*Salvelinus confluentus*)

Results of the water chemistry analysis for the Bimetallic Ridge mines are not remarkable. Surface water sample BBPPE1SW1 was collected in the stream after most of the mining influences. Copper exceeded the DEQ Acute Cold Water Biota Standard by 9 times. However, the background concentration from surface water sample BBBGSW1 was 0.020 mg/L and once the water reaches the PPE it is at 0.010 mg/L. The contribution of this metal is likely rapidly diluted downstream as the smaller streams merge to form a stream capable of supporting significant aquatic biota.



**Figure 8. Fisheries within a 4-mile radius and in the vicinity of the Bimetallic Ridge mines.**

(Sources: Idaho DEQ GIS ArcSDE 9.3.1 Geodatabase; USGS 100K Quad Maps)

## 10.10 Sensitive Waterways

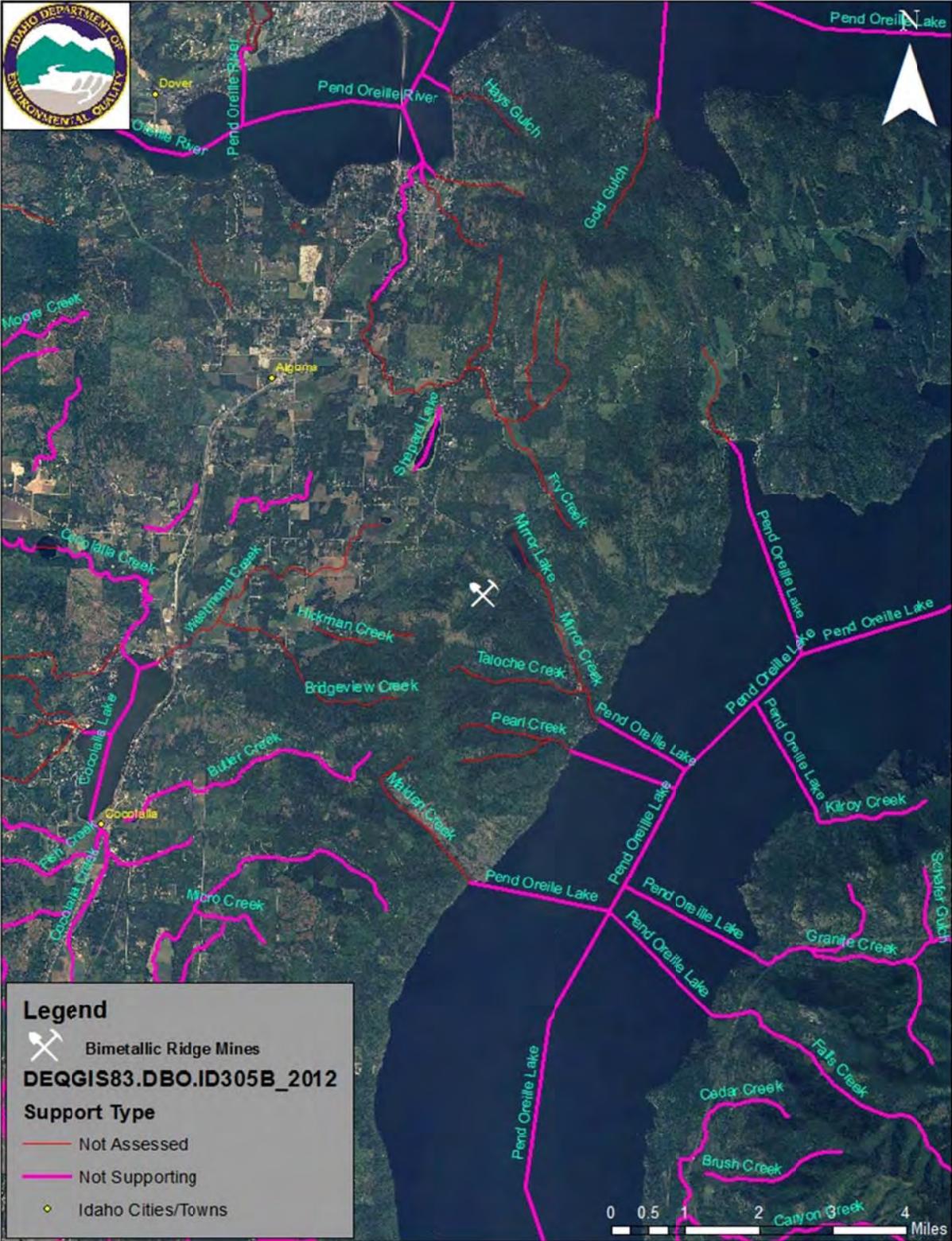
The Clean Water Act (CWA) requires the state to prepare a report, listing (1) the current conditions of all state waters and (2) those waters that are impaired and need a total maximum daily load (TMDL). The first list is called the §305(b) list and the second is the §303(d) list. Both lists are named in accordance with the sections of the CWA where they are defined; together they are known as the Integrated Report. Although they are maintained as separate lists and presented separately in the Integrated Report, impaired waters are just some of the state's waters, so waters on the §303(d) list are actually a subset of those on the §305(b) list.

Mirror Creek (ID17010214PN018\_02) is a tributary to Pend Oreille Lake (ID17010214PN018L\_0L); both water bodies are contained in the Pend Oreille Lake HUC. Both are listed on the State of Idaho 305(b) list for impaired waters. Mirror Creek was not assessed. Pend Oreille Lake is listed as not supporting cold water aquatic life, salmonid spawning, and secondary contact recreation due to mercury, phosphorous (total), and other flow regime alterations.

Figure 9 illustrates the §305(b)-listed streams in the area.

## 10.11 Livestock Receptors

There is no grazing allotment in the area. No evidence of livestock being pastured on a long term basis was noted at the Bimetallic Ridge mines. Therefore, pathways or exposures for livestock are minimal including those pathways to horses used by packers for hunting and recreation.



**Figure 9. State of Idaho §305(b) map for impaired waters.**  
Pend Oreille Lake is listed as not supporting cold water aquatic life, salmonid spawning, and secondary contact recreation due to mercury, phosphorous (total), and other flow regime alterations. (Source: DEQ.GIS.ArcSDE 9.3 Geodatabase, NAIP 2004)

## 11 Summary and Conclusions

Four separate mines, the Catherine, Hope and Faith Shaft, Iron Mask, and Brown Bear were assessed in state owned Section 36 in the Pend Oreille Mining District. No impacts to human health or the environment were found at the Iron Mask Mine. The Hope and Faith Shaft has a safety issue due to the abrupt open shaft, but no other impacts to human health or the environment were found.

The Catherine Mine has a single waste dump with lead and arsenic concentrations confirmed above lead and arsenic human health and wildlife risk levels. The single adit discharge is not significant enough to impact water quality. The waste dump with risk threshold exceedances is small and isolated far from roads or ATV trails. Considerable re-grading work was completed at Catherine adits 1 and 2, waste dump, and apparent capping with clean soil.

The Brown Bear Mine has several adits. Two waste dumps associated with adits 3 and 7 exceed human health risk levels for lead. These two features are remotely located from roads and ATV trails and cover a small, <0.25 acre area. Some zinc in excess of water quality standards is loaded to the unnamed stream that drains the watershed in which the Brown Bear Mine is located. However, concentrations are sufficiently low and entry points sufficiently high in the watershed that it is doubtful there is much impact on biota before metals are diluted by other discharge to concentrations below the standards.

Surface water, ground water, air, and soil exposure pathways for the contaminants present are either not present or so small as to be insignificant. Domestic wells, drinking water sources, residences, schools, and daycare facilities are all removed from the mine sites by one to four miles. Sensitive species and wetlands do not appear to be issues.

Based on the weight of evidence, the four mine sites in Section 36 of Bimetallic Ridge near Sagle, Idaho can be removed from the list of sites posing a threat to human health or the environment. No remedial actions are recommended. The safety hazard associated with the Hope and Faith Shaft will be communicated to IDL. However, the agency has likely calculated the cost to benefit of installing an exclusion structure in such a remote location and rejected installation.

Based on existing conditions and uses, historic information, data observations made during the site visit, analysis of the mine wastes, potential pathways of contaminants to receptors, and potential exposures to ecological and human receptors, DEQ has made a No Remedial Action Planned (NRAP) determination for the Bimetallic Ridge mines.

## 12 References

- BLM (US Bureau of Land Management). 2004. *Risk Management Criteria for Metals at BLM Mining Sites*. Denver, CO: BLM, National Science and Technology Center. Technical Note 390. BLM/RS/ST-97/001 + 1703.
- BLM (US Bureau of Land Management). 2011. *Land Patent Details—BLM GLO Records*.
- DEQ (Idaho Department of Environmental Quality). 2002. Ponderosa Terrace Estates (PWS No. 1090101) Source Water Assessment. Boise, ID: DEQ.
- DEQ (Idaho Department of Environmental Quality). 2011. *Idaho's 2010 Integrated Report*. Boise, ID: DEQ. Available at:  
<http://www.deq.idaho.gov/water-quality/surface-water/monitoring-assessment/integrated-report.aspx#2012-IR>.
- DEQ (Idaho Department of Environmental Quality). 2011. Safe Drinking Water Information System (SDWIS).
- Kauffman J., E.H. Bennett, and V.E. Mitchell. 2003. *Site Inspection Report for the Abandoned and Inactive Mines in Idaho on U.S. Forest Service Lands (Region 1), Idaho Panhandle National Forest: Volume IX, Section A: Sandpoint Ranger District, Bonner and Boundary Counties, Idaho*. Moscow, ID: Idaho Geological Survey. Staff Report 03-21. Prepared for the US Forest Service Under Participating Agreement No. FS-01-96-14-2800.
- Waddell, G.G. and H.F. Albee. 1958. Field Examination Report, Docket No. DMEA-4989 (9copper-silver), Iron Mask Mining Co., Inc., Iron Mask Mine, Bonner County Idaho: Defense Minerals Exploration Administration Memorandum dated June 4, 1958, 6 p.
- WRCC (Western Regional Climate Center). 2012. <http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?id0667>

### 12.1 GIS Coverages

- Animal Conservation Database. Using: ArcMap GIS. Version 10. Redlands, CA: Environmental Systems Research Institute, Inc., 1992–1999.
- IDFG (Idaho Department of Fish and Game). 2002. Fisheries information GIS layer.
- IDWR (Idaho Department of Water Resources). 1997. COVERAGE IDOWN—Idaho Surface Ownership.
- IDWR (Idaho Department of Water Resources). 2010. GIS shapefile of well database.
- Major Lithology (DEQGIS83.DBO). Using: ArcMap GIS. Version 10. Redlands, CA: Environmental Systems Research Institute, Inc., 1992–1999.

NAIP (National Agricultural Imagery Program). 2004. Using: ArcMap GIS. Version 10.  
Redlands, CA: Environmental Systems Research Institute, Inc., 1992–1999.

NAIP (National Agricultural Imagery Program). 2009. Using: ArcMap GIS. Version 10.  
Redlands, CA: Environmental Systems Research Institute, Inc., 1992–1999.

USGS (US Geological Society). 100K Quad Map. Using: ArcMap GIS. Version 10. Redlands,  
CA: Environmental Systems Research Institute, Inc., 1992-1999.

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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

W260710

FOR SVL USE ONLY  
SVL JOB #

Report to Company: DECO  
 Contact: Tina Elayer  
 Address: 1410 N Hilton  
Boise, ID 83706  
 Phone Number: 208-313-0563  
 FAX Number:  
 E-mail: Tina.elayer@deco.com

Invoice Sent To: Same  
 Contact:  
 Address:  
 Phone Number:  
 FAX Number:  
 PO#:

TEMP on Receipt:  
 Table 1. -- Matrix Type  
 1 = Surface Water, 2 = Ground Water  
 3 = Soil/Sediment, 4 = Rinseate, 5 = Oil  
 6 = Waste, 7 = Other

8.2°

Project Name: Primetallie Ridge  
 Sampler's Signature: Juni [Signature]

Indicate State of sample origination: TD USACE?  Yes  No

Sample ID	Collection		Misc.	Preservative(s)	Analyses Required								Rush Instructions (Days)	Comments	
	Date	Time			Collected by: (Init.)	Matrix Type (From Table 1)	No. of Containers	Unpreserved	HNO <sub>3</sub> Filtered	HNO <sub>3</sub> Unfiltered	HCl	H <sub>2</sub> SO <sub>4</sub>			NaOH
BBPPE1 SW1	7/21/12	2:30 TE	1			X									Totals on water metals Please dry and sieve all soil + sediment samples -80 sieve
BBAD9 SW1	7/21/12	2:19 RE	1			X									
BB2AD1 SW1	7/21/12	9:10 TE	1			X									
BB2PPE SW1	7/21/12	8:52 TE	1			X									
BBDD9 SW1	7/21/12	9:20 TE	1			X									
BBAD8 SW1	7/21/12	1:40 TE	1			X									
BBB67 SW1	7/21/12	2:50 TE	1			X									
BBPPE1 SD1	7/21/12	3:35 TE	3	X											
BBB67 SS1	7/21/12	2:04 RE	3	X											
XRF Lab Smpl 318	7/21/12	11:16 TE	3	X											

Relinquished by: Juni [Signature] Date: 7/21/12 Time: 9:47a Received by: [Signature] Date: 7/27/12 Time: 8:47

\* Sample Reject:  Return  Dispose  Store (30 Days) White: LAB COPY Yellow: CUSTOMER COPY SVL-COC 9/05

\* Sample ID on Bag is XRF Lab Smpl - 7-27-12



# CHAIN OF CUSTODY RECORD

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

Page 2 of 2

W260710

FOR SVL USE ONLY
SVL JOB #
TEMP on Receipt:

Report to Company: DEG

Contact: Tina Blayer

Address: 1410 N. Hilton  
Pocatello, ID 83204

Phone Number: 783-373-0563

FAX Number: \_\_\_\_\_

E-mail: Tina.blayer@deg.idaho.gov

Invoice Sent To: Same

Contact: \_\_\_\_\_

Address: \_\_\_\_\_

Phone Number: \_\_\_\_\_

FAX Number: \_\_\_\_\_

PO#: \_\_\_\_\_

8.20

Table 1 - Matrix Type

1 - Surface Water, 2 - Ground Water

3 - Soil/Sediment, 4 - Runoff, 5 - Oil

6 - Waste, 7 - Other

Project Name: Bimetallic Ridge

Sampler's Signature: Juan E. J.

Indicate State of sample origination: UD USACE?  Yes  No

Sample ID	Collection		Misc.	Preservative(s)							Analyses Required	Comments		
	Date	Time		Collected by: (Init.)	Matrix Type (From Table 1)	No. of Containers	Unpreserved	HNO <sub>3</sub> , Filtered	HNO <sub>3</sub> , Unfiltered	HCl			H <sub>2</sub> SO <sub>4</sub>	NaOH
1. BBWD3SS1	7/21/12	12:13 PM	RE	3	1	X								Total metals on water Please dry and sieve all soil + sediment samples - 80 sieve
2. BBBGSD1	7/21/12	2:00 PM	TE	3	1	X								
3. CAWD5SS1	7/25/12	1:00 PM	TE	3	1	X								
4. CAAD3SW1	7/25/12	2:28 PM	TE	1	1			X						
5. BBFB SW1	7/20/12	4:36 PM	TE	1	1	X								
6. CAWOLEXCFSS1	7/25/12	1:44 PM	RE	3	1	X								
7. BBAD1SW1	7/21/12	5:12 PM	TE	1	1			X						
8.														
9.														
10.														

Relinquished by: Juan E. J. Date: 7/21/12 Time: 8:47 AM Received by: CR Seery Date: 7/27/12 Time: 8:47

**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: 7/27/12 By: CR Seely  
 SVL Work No: W260710

Item	Description	V	VC	NV	NA	Comments
1	Client or project name	✓				IDEQ
2	Date and time of receipt at lab	✓				7-27-12 8:47
3	Received by	✓				Crystal Seely
4	Temperature blank or cooler temperature	✓				Temp. 2°C
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 vial)	✓				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 & data)				✓	
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: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



Sample Receipt Confirmation

Work Order

Date Due: 10-Aug-12 (10 day TAT)

Received: 27-Jul-12 08:47

W2G0710

Client: IDEQ (Boise)
Project: Boise

Project Manager: Christine Meyer

Report To: IDEQ (Boise)
Tina Elayer
1410 N. Hilton
Boise, ID 83706
Phone: 208- 373-0480
Fax: -

Invoice To: IDEQ (Boise)
Tina Elayer
1410 N. Hilton
Boise, ID 83706
Phone: 208- 373-0480
Fax: -

Cooler information for Default Cooler Temp: 8.2°C Q6: Cooler temp outside 0-6°C Yes
Custody Seals No Containers Intact Yes COC/Labels Agree Yes Preservation Confirmed Yes Received On Ice No

Sample Information and analyses assigned Comments Removed Analyte

W2G0710-01 BBPPE1SW1 [Surface Water] 26-Jul-12 15:30 Mountain
IDEQ - Boise RCRA +
Cu/Fe/Mn/Zn/Sb

W2G0710-02 BBAD9SW1 [Surface Water] 26-Jul-12 14:19 Mountain
IDEQ - Boise RCRA +
Cu/Fe/Mn/Zn/Sb

W2G0710-03 BB2AD1SW1 [Surface Water] 26-Jul-12 09:10 Mountain
IDEQ - Boise RCRA +
Cu/Fe/Mn/Zn/Sb

W2G0710-04 BB2PPESW1 [Surface Water] 26-Jul-12 08:52 Mountain
IDEQ - Boise RCRA +
Cu/Fe/Mn/Zn/Sb

W2G0710-05 BBDUPSW1 [Surface Water] 26-Jul-12 09:20 Mountain
IDEQ - Boise RCRA +
Cu/Fe/Mn/Zn/Sb

W2G0710-06 BBAD8SW1 [Surface Water] 26-Jul-12 13:40 Mountain
IDEQ - Boise RCRA +
Cu/Fe/Mn/Zn/Sb

W2G0710-07 BBBGSW1 [Surface Water] 26-Jul-12 14:00 Mountain
IDEQ - Boise RCRA +
Cu/Fe/Mn/Zn/Sb

W2G0710-08 BBPPE1SD1 [Soil] 26-Jul-12 15:35 Mountain
IDEQ - Boise RCRA + Sieve #80 Percent Solids
Cu/Fe/Mn/Zn/Sb soil

W2G0710-09 BBBGSS1 [Soil] 26-Jul-12 14:09 Mountain
IDEQ - Boise RCRA + Sieve #80 Percent Solids
Cu/Fe/Mn/Zn/Sb soil

W2G0710-10 XRFLABSMPL 316 [Soil] 26-Jul-12 11:16 Mountain
IDEQ - Boise RCRA + Sieve #80 Percent Solids
Cu/Fe/Mn/Zn/Sb soil

SAMPLE ID IS XRFLABSMPL

W2G0710-11 BBWD3SS1 [Soil] 26-Jul-12 12:13 Mountain
IDEQ - Boise RCRA + Sieve #80 Percent Solids
Cu/Fe/Mn/Zn/Sb soil

W2G0710-12 BBBGSD1 [Soil] 26-Jul-12 14:20 Mountain
IDEQ - Boise RCRA + Sieve #80 Percent Solids
Cu/Fe/Mn/Zn/Sb soil



Sample Receipt Confirmation

Work Order

Date Due: 10-Aug-12 (10 day TAT)

Received: 27-Jul-12 08:47

W2G0710

Client: IDEQ (Boise)	Project Manager: Christine Meyer
Project: Boise	

Sample information and analyses assigned	Comments	Removed Analyte
W2G0710-13 CAWD5SS1 [Soil] 25-Jul-12 13:20 Mountain IDEQ - Boise RCRA + Sieve #80 Cu/Fe/Mn/Zn/Sb soil		Percent Solids
W2G0710-14 CAAD3SW1 [Surface Water] 25-Jul-12 14:43 Mountain IDEQ - Boise RCRA + Cu/Fe/Mn/Zn/Sb		
W2G0710-15 BBFBSW1 [Surface Water] 26-Jul-12 16:31 Mountain IDEQ - Boise RCRA + Cu/Fe/Mn/Zn/Sb		
W2G0710-16 CAWD6XRFSS1 [Soil] 25-Jul-12 13:14 Mountain IDEQ - Boise RCRA + Cu/Fe/Mn/Zn/Sb		
W2G0710-17 BB1AD1SW1 [Surface Water] 26-Jul-12 17:22 Mountain IDEQ - Boise RCRA + Cu/Fe/Mn/Zn/Sb		

Analysis groups included in this work order			
<u>IDEQ - Boise RCRA + Cu/Fe/Mn/Zn/Sb</u>			
T 7470A Hg	TR 6010B Ag	TR 6010B As	TR 6010B Ba
TR 6010B Cd	TR 6010B Cr	TR 6010B Cu	TR 6010B Fe
TR 6010B Mn	TR 6010B Pb	TR 6010B Sb	TR 6010B Se
TR 6010B Zn			
<u>IDEQ - Boise RCRA + Cu/Fe/Mn/Zn/Sb soil</u>			
Percent Solids	T 6010B Ag	T 6010B As	T 6010B Ba
T 6010B Cd	T 6010B Cr	T 6010B Cu	T 6010B Fe
T 6010B Mn	T 6010B Pb	T 6010B Sb	T 6010B Se
T 6010B Zn	T 7471A Hg		

Solid samples will be analyzed on an as-received, wet-weight basis unless otherwise instructed.

Work Order Comments:

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_



**Sample Receipt Confirmation**

**Work Order**

Date Due: 10-Aug-12 (10 day TAT)

Received: 27-Jul-12 08:47

**W2G0710**

Client: <b>IDEQ (Boise)</b>	Project Manager: <b>Christine Meyer</b>
Project: <b>Boise</b>	

	W2G0710-01 BBPPE1SW1 Water	W2G0710-02 BBAD0SW1 Water	W2G0710-03 BB2AD1SW1 Water	W2G0710-04 BB2PPESW1 Water	W2G0710-05 BBDUPSW1 Water	W2G0710-06 BBAD8SW1 Water	W2G0710-07 BBBGSW1 Water	W2G0710-08 BBPPE1SD1 Solid
Sieve #80								X
T 6010B Ag								X
T 6010B As								X
T 6010B Ba								X
T 6010B Cd								X
T 6010B Cr								X
T 6010B Cu								X
T 6010B Fe								X
T 6010B Mn								X
T 6010B Pb								X
T 6010B Sb								X
T 6010B Se								X
T 6010B Zn								X
TR 6010B Ag	X	X	X	X	X	X	X	
TR 6010B As	X	X	X	X	X	X	X	
TR 6010B Ba	X	X	X	X	X	X	X	
TR 6010B Cd	X	X	X	X	X	X	X	
TR 6010B Cr	X	X	X	X	X	X	X	
TR 6010B Cu	X	X	X	X	X	X	X	
TR 6010B Fe	X	X	X	X	X	X	X	
TR 6010B Mn	X	X	X	X	X	X	X	
TR 6010B Pb	X	X	X	X	X	X	X	
TR 6010B Sb	X	X	X	X	X	X	X	
TR 6010B Se	X	X	X	X	X	X	X	
TR 6010B Zn	X	X	X	X	X	X	X	
T 7470A Hg	X	X	X	X	X	X	X	
T 7471A Hg								X

	W2G0710-09 BBBGS1 Solid	W2G0710-10 XRFLABSMP L 318 Solid	W2G0710-11 BBWD3SS1 Solid	W2G0710-12 BBBGS01 Solid	W2G0710-13 CAWD5SS1 Solid	W2G0710-14 CAAD3SW1 Water	W2G0710-15 BBFBSW1 Water	W2G0710-16 CAWD8XRFS S1 Solid
Sieve #80	X	X	X	X	X			
T 6010B Ag	X	X	X	X	X			
T 6010B As	X	X	X	X	X			
T 6010B Ba	X	X	X	X	X			
T 6010B Cd	X	X	X	X	X			
T 6010B Cr	X	X	X	X	X			
T 6010B Cu	X	X	X	X	X			
T 6010B Fe	X	X	X	X	X			
T 6010B Mn	X	X	X	X	X			
T 6010B Pb	X	X	X	X	X			
T 6010B Sb	X	X	X	X	X			
T 6010B Se	X	X	X	X	X			
T 6010B Zn	X	X	X	X	X			
TR 6010B Ag						X	X	X
TR 6010B As						X	X	X
TR 6010B Ba						X	X	X
TR 6010B Cd						X	X	X
TR 6010B Cr						X	X	X
TR 6010B Cu						X	X	X
TR 6010B Fe						X	X	X
TR 6010B Mn						X	X	X
TR 6010B Pb						X	X	X
TR 6010B Sb						X	X	X
TR 6010B Se						X	X	X
TR 6010B Zn						X	X	X
T 7470A Hg						X	X	
T 7471A Hg	X	X	X	X	X			



**Sample Receipt Confirmation**

**Work Order**

Date Due: 10-Aug-12 (10 day TAT)

**W2G0710**

Received: 27-Jul-12 08:47

Client: **IDEQ (Boise)**

Project Manager: **Christine Meyer**

Project: **Boise**

	W2G0710-17 BB1AD1SW1 Water
TR 6010B Ag	X
TR 6010B As	X
TR 6010B Ba	X
TR 6010B Cd	X
TR 6010B Cr	X
TR 6010B Cu	X
TR 6010B Fe	X
TR 6010B Mn	X
TR 6010B Pb	X
TR 6010B Sb	X
TR 6010B Se	X
TR 6010B Zn	X
IT 7470A Hg	X



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

Project Name: Boise  
Work Order W2G0710  
Reported: 15-Aug-12 11:46

## ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Sampled By	Date Received
BBPPE1SW1	W2G0710-01	Surface Water	26-Jul-12 15:30	TE	27-Jul-2012
BBAD9SW1	W2G0710-02	Surface Water	26-Jul-12 14:19	RE	27-Jul-2012
BB2AD1SW1	W2G0710-03	Surface Water	26-Jul-12 09:10	TE	27-Jul-2012
BB2PPESW1	W2G0710-04	Surface Water	26-Jul-12 08:52	TE	27-Jul-2012
BBDUPSW1	W2G0710-05	Surface Water	26-Jul-12 09:20	TE	27-Jul-2012
BBAD8SW1	W2G0710-06	Surface Water	26-Jul-12 13:40	TE	27-Jul-2012
BBBGSW1	W2G0710-07	Surface Water	26-Jul-12 14:00	TE	27-Jul-2012
BBPPE1SD1	W2G0710-08	Soil	26-Jul-12 15:35	TE	27-Jul-2012
BBBGSS1	W2G0710-09	Soil	26-Jul-12 14:09	RE	27-Jul-2012
XRFLABSMPL 318	W2G0710-10	Soil	26-Jul-12 11:16	TE	27-Jul-2012
BBWD3SS1	W2G0710-11	Soil	26-Jul-12 12:13	RE	27-Jul-2012
BBBGSD1	W2G0710-12	Soil	26-Jul-12 14:20	TE	27-Jul-2012
CAWD5SS1	W2G0710-13	Soil	25-Jul-12 13:20	TE	27-Jul-2012
CAAD3SW1	W2G0710-14	Surface Water	25-Jul-12 14:43	TE	27-Jul-2012
BBFBSW1	W2G0710-15	Surface Water	26-Jul-12 16:31	TE	27-Jul-2012
CAWD6XRFSS1	W2G0710-16	Soil	25-Jul-12 13:14	RE	27-Jul-2012
BB1AD1SW1	W2G0710-17	Surface Water	26-Jul-12 17:22	TE	27-Jul-2012

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 supersedes 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.

(Q6) SVL received the following containers outside of published EPA guidelines for preservation temperatures (0-6°C).

The guidelines do not pertain to nitric-preserved metals.

## Default Cooler (Received Temperature: 8.2°C)

Laboratory ID	Container	Client ID	Laboratory ID	Container	Client ID
W2G0710-01 A	Nitric HDPE	BBPPE1SW1	W2G0710-02 A	Nitric HDPE	BBAD9SW1
W2G0710-03 A	Nitric HDPE	BB2AD1SW1	W2G0710-04 A	Nitric HDPE	BB2PPESW1
W2G0710-05 A	Nitric HDPE	BBDUPSW1	W2G0710-06 A	Nitric HDPE	BBAD8SW1
W2G0710-07 A	Nitric HDPE	BBBGSW1	W2G0710-08 A	Bag, cloth	BBPPE1SD1
W2G0710-08 B	Manila Pulverize	BBPPE1SD1	W2G0710-09 A	Bag, cloth	BBBGSS1
W2G0710-09 B	Manila Pulverize	BBBGSS1	W2G0710-10 A	Bag, cloth	XRFLABSMPL 318
W2G0710-10 B	Manila Pulverize	XRFLABSMPL 318	W2G0710-11 A	Bag, cloth	BBWD3SS1
W2G0710-11 B	Manila Pulverize	BBWD3SS1	W2G0710-12 A	Bag, cloth	BBBGSD1
W2G0710-12 B	Manila Pulverize	BBBGSD1	W2G0710-13 A	Bag, cloth	CAWD5SS1
W2G0710-13 B	Manila Pulverize	CAWD5SS1	W2G0710-14 A	Nitric HDPE	CAAD3SW1
W2G0710-15 A	Nitric HDPE	BBFBSW1	W2G0710-16 A	Bag, cloth	CAWD6XRFSS1
W2G0710-16 B	Manila Pulverize	CAWD6XRFSS1	W2G0710-17 A	Nitric HDPE	BB1AD1SW1

SVL holds the following certifications.

AZ-0538, CA-2080, FL(NELAC):E87993, ID:ID00019 & ID00965 (Microbiology), NV:ID000192007A, WA-1268

Work order Report Page 1 of 22



IDEQ (Boise) 1410 N Hilton Boise, ID 83706	<b>Project Name: Boise</b> Work Order: <b>W2G0710</b> Reported: 15-Aug-12 11:46
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Client Sample ID: **BBPPE1SW1**

SVL Sample ID: **W2G0710-01 (Surface Water)**

Sample Report Page 1 of 1

Sampled 26-Jul-12 15:30  
Received 27-Jul-12  
Sampled By: TE

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
<b>Metals (Total)</b>										
EPA 7470A	Mercury	< 0.00020	mg/l	0.00020	0.000054		W231077	DJA	07/31/12 15:00	
<b>Metals (Total Recoverable)</b>										
EPA 6010B	Antimony	< 0.020	mg/L	0.020	0.009		W231027	AS	08/09/12 17:59	
EPA 6010B	Arsenic	< 0.025	mg/L	0.025	0.007		W231027	AS	08/09/12 17:59	
EPA 6010B	Barium	0.0995	mg/L	0.0020	0.0006		W231027	AS	08/09/12 17:59	
EPA 6010B	Cadmium	< 0.0020	mg/L	0.0020	0.0006		W231027	AS	08/09/12 17:59	
EPA 6010B	Chromium	< 0.0060	mg/L	0.0060	0.0015		W232359	TJK	08/10/12 16:05	
EPA 6010B	Copper	< 0.010	mg/L	0.010	0.003		W231027	TJK	08/10/12 13:11	
EPA 6010B	Iron	< 0.060	mg/L	0.060	0.022		W232359	TJK	08/10/12 16:05	
EPA 6010B	Lead	< 0.0075	mg/L	0.0075	0.0027		W231027	AS	08/09/12 17:59	
EPA 6010B	Manganese	< 0.0040	mg/L	0.0040	0.0014		W231027	AS	08/09/12 17:59	
EPA 6010B	Selenium	< 0.040	mg/L	0.040	0.013		W231027	AS	08/09/12 17:59	
EPA 6010B	Silver	< 0.0050	mg/L	0.0050	0.0014		W231027	AS	08/09/12 17:59	
EPA 6010B	Zinc	< 0.0100	mg/L	0.0100	0.0026		W231027	AS	08/09/12 17:59	

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

**John Kern**  
Laboratory Director



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Kellogg ID 83837-0929

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

**Project Name: Boise**  
Work Order: **W2G0710**  
Reported: **15-Aug-12 11:46**

Client Sample ID: **BBAD9SW1**

SVL Sample ID: **W2G0710-02 (Surface Water)**

Sample Report Page 1 of 1

Sampled: 26-Jul-12 14:19  
Received: 27-Jul-12  
Sampled By: RE

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
<b>Metals (Total)</b>										
EPA 7470A	Mercury	< 0.00020	mg/L	0.00020	0.000054		W231077	DJA	07/31/12 15:05	
<b>Metals (Total Recoverable)</b>										
EPA 6010B	Antimony	< 0.020	mg/L	0.020	0.009		W231027	AS	08/09/12 18:05	
EPA 6010B	Arsenic	< 0.025	mg/L	0.025	0.007		W231027	AS	08/09/12 18:05	
EPA 6010B	Barium	0.251	mg/L	0.0020	0.0006		W231027	AS	08/09/12 18:05	
EPA 6010B	Cadmium	< 0.0020	mg/L	0.0020	0.0006		W231027	AS	08/09/12 18:05	
EPA 6010B	Chromium	< 0.0060	mg/L	0.0060	0.0015		W232359	TJK	08/10/12 16:11	
EPA 6010B	Copper	< 0.010	mg/L	0.010	0.003		W231027	TJK	08/10/12 13:16	
EPA 6010B	Iron	0.410	mg/L	0.060	0.022		W232359	TJK	08/10/12 16:11	
EPA 6010B	Lead	< 0.0075	mg/L	0.0075	0.0027		W231027	AS	08/09/12 18:05	
EPA 6010B	Manganese	0.0352	mg/L	0.0040	0.0014		W231027	AS	08/09/12 18:05	
EPA 6010B	Selenium	< 0.040	mg/L	0.040	0.013		W231027	AS	08/09/12 18:05	
EPA 6010B	Silver	< 0.0050	mg/L	0.0050	0.0014		W231027	AS	08/09/12 18:05	
EPA 6010B	Zinc	< 0.0100	mg/L	0.0100	0.0026		W231027	AS	08/09/12 18:05	

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

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Laboratory Director



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IDEQ (Boise)  
1410 N Hilton  
Boise, ID 83706

**Project Name: Boise**  
Work Order: **W2G0710**  
Reported: 15-Aug-12 11:46

Client Sample ID: **BB2AD1SW1**

SVL Sample ID: **W2G0710-03 (Surface Water)**

Sample Report Page 1 of 1

Sampled: 26-Jul-12 09:10  
Received: 27-Jul-12  
Sampled By: TE

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
<b>Metals (Total)</b>										
EPA 7470A	Mercury	< 0.00020	ug/l.	0.00020	0.000054		W231077	DJA	07/31/12 15:07	
<b>Metals (Total Recoverable)</b>										
EPA 6010B	Antimony	< 0.020	mg/l.	0.020	0.009		W231027	AS	08/09/12 18:22	
EPA 6010B	Arsenic	< 0.025	mg/l.	0.025	0.007		W231027	AS	08/09/12 18:22	
EPA 6010B	Barium	0.319	mg/L	0.0020	0.0006		W231027	AS	08/09/12 18:22	
EPA 6010B	Cadmium	< 0.0020	mg/L	0.0020	0.0006		W231027	AS	08/09/12 18:22	
EPA 6010B	Chromium	< 0.0060	mg/L	0.0060	0.0015		W232359	TJK	08/10/12 16:17	
EPA 6010B	Copper	0.020	ug/l.	0.010	0.003		W231027	TJK	08/10/12 13:32	
EPA 6010B	Iron	1.87	mg/l.	0.060	0.022		W232359	TJK	08/10/12 16:17	
EPA 6010B	Lead	< 0.0075	mg/l.	0.0075	0.0027		W231027	AS	08/09/12 18:22	
EPA 6010B	Manganese	0.0975	mg/L	0.0040	0.0014		W231027	AS	08/09/12 18:22	
EPA 6010B	Selenium	< 0.040	mg/l.	0.040	0.013		W231027	AS	08/09/12 18:22	
EPA 6010B	Silver	< 0.0050	mg/L	0.0050	0.0014		W231027	AS	08/09/12 18:22	
EPA 6010B	Zinc	0.0300	mg/L	0.0100	0.0026		W231027	AS	08/09/12 18:22	

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

**John Kern**  
Laboratory Director



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IDEQ (Boise)  
1410 N Hilton  
Boise, ID 83706

Project Name: **Boise**  
Work Order: **W2G0710**  
Reported: 15-Aug-12 11:46

Client Sample ID: **BB2PPESW1**

SVL Sample ID: **W2G0710-04 (Surface Water)**

Sample Report Page 1 of 1

Sampled 26-Jul-12 08:52  
Received 27-Jul-12  
Sampled By TE

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
<b>Metals (Total)</b>										
EPA 7470A	Mercury	< 0.00020	mg/L	0.00020	0.000054		W231077	DJA	07/31/12 15:13	
<b>Metals (Total Recoverable)</b>										
EPA 6010B	Antimony	< 0.020	mg/L	0.020	0.009		W231027	AS	08/09/12 18:28	
EPA 6010B	Arsenic	< 0.025	mg/L	0.025	0.007		W231027	AS	08/09/12 18:28	
EPA 6010B	Barium	0.263	mg/L	0.0020	0.0006		W231027	AS	08/09/12 18:28	
EPA 6010B	Cadmium	< 0.0020	mg/L	0.0020	0.0006		W231027	AS	08/09/12 18:28	
EPA 6010B	Chromium	< 0.0060	mg/L	0.0060	0.0015		W232359	TJK	08/10/12 16:35	
EPA 6010B	Copper	< 0.010	mg/L	0.010	0.003		W231027	TJK	08/10/12 13:38	
EPA 6010B	Iron	1.42	mg/L	0.060	0.022		W232359	TJK	08/10/12 16:35	
EPA 6010B	Lead	< 0.0075	mg/L	0.0075	0.0027		W231027	AS	08/09/12 18:28	
EPA 6010B	Manganese	0.0476	mg/L	0.0040	0.0014		W231027	AS	08/09/12 18:28	
EPA 6010B	Selenium	< 0.040	mg/L	0.040	0.013		W231027	AS	08/09/12 18:28	
EPA 6010B	Silver	< 0.0050	mg/L	0.0050	0.0014		W231027	AS	08/09/12 18:28	
EPA 6010B	Zinc	0.0125	mg/L	0.0100	0.0026		W231027	AS	08/09/12 18:28	

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

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Laboratory Director



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IDEQ (Boise)  
1410 N Hilton  
Boise, ID 83706

**Project Name: Boise**  
Work Order **W2G0710**  
Reported: 15-Aug-12 11:46

Client Sample ID: **BBDUPSW1**

SVL Sample ID: **W2G0710-05 (Surface Water)**

Sample Report Page 1 of 1

Sampled: 26-Jul-12 09:20  
Received: 27-Jul-12  
Sampled By: TE

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
<b>Metals (Total)</b>										
EPA 7470A	Mercury	0.00020	mg/L	0.00020	0.000054		W231077	DJA	07/31/12 15:14	
<b>Metals (Total Recoverable)</b>										
EPA 6010B	Antimony	< 0.020	mg/L	0.020	0.009		W231027	AS	08/09/12 18:34	
EPA 6010B	Arsenic	< 0.025	mg/L	0.025	0.007		W231027	AS	08/09/12 18:34	
EPA 6010B	Barium	0.423	mg/L	0.0020	0.0006		W231027	AS	08/09/12 18:34	
EPA 6010B	Cadmium	< 0.0020	mg/L	0.0020	0.0006		W231027	AS	08/09/12 18:34	
EPA 6010B	Chromium	0.0074	mg/L	0.0060	0.0015		W232359	TJK	08/10/12 16:40	
EPA 6010B	Copper	0.053	mg/L	0.010	0.003		W231027	TJK	08/10/12 13:43	
EPA 6010B	Iron	5.96	mg/L	0.060	0.022		W232359	TJK	08/10/12 16:40	
EPA 6010B	Lead	< 0.0075	mg/L	0.0075	0.0027		W231027	AS	08/09/12 18:34	
EPA 6010B	Manganese	0.271	mg/L	0.0040	0.0014		W231027	AS	08/09/12 18:34	
EPA 6010B	Selenium	< 0.040	mg/L	0.040	0.013		W231027	AS	08/09/12 18:34	
EPA 6010B	Silver	< 0.0050	mg/L	0.0050	0.0014		W231027	AS	08/09/12 18:34	
EPA 6010B	Zinc	0.0889	mg/L	0.0100	0.0026		W231027	AS	08/09/12 18:34	

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

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Laboratory Director



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

**Project Name: Boise**  
Work Order: **W2G0710**  
Reported: 15-Aug-12 11:46

Client Sample ID: **BBAD8SW1**

SVL Sample ID: **W2G0710-06 (Surface Water)**

Sample Report Page 1 of 1

Sampled: 26-Jul-12 13:40  
Received: 27-Jul-12  
Sampled By: TE

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
<b>Metals (Total)</b>										
EPA 7470A	Mercury	< 0.00020	mg/L	0.00020	0.000054		W231077	DJA	07/31/12 15:17	
<b>Metals (Total Recoverable)</b>										
EPA 6010B	Antimony	< 0.020	mg/L	0.020	0.009		W231027	AS	08/09/12 18:52	
EPA 6010B	Arsenic	< 0.025	mg/L	0.025	0.007		W231027	AS	08/09/12 18:52	
EPA 6010B	Barium	0.383	mg/L	0.0020	0.0006		W231027	AS	08/09/12 18:52	
EPA 6010B	Cadmium	< 0.0020	mg/L	0.0020	0.0006		W231027	AS	08/09/12 18:52	
EPA 6010B	Chromium	< 0.0060	mg/L	0.0060	0.0015		W232359	TJK	08/10/12 16:46	
EPA 6010B	Copper	0.024	mg/L	0.010	0.003		W231027	TJK	08/10/12 13:49	
EPA 6010B	Iron	2.61	mg/L	0.060	0.022		W232359	TJK	08/10/12 16:46	
EPA 6010B	Lead	< 0.0075	mg/L	0.0075	0.0027		W231027	AS	08/09/12 18:52	
EPA 6010B	Manganese	0.728	mg/L	0.0040	0.0014		W231027	AS	08/09/12 18:52	
EPA 6010B	Selenium	< 0.040	ng/L	0.040	0.013		W231027	AS	08/09/12 18:52	
EPA 6010B	Silver	< 0.0050	mg/L	0.0050	0.0014		W231027	AS	08/09/12 18:52	
EPA 6010B	Zinc	0.0188	mg/L	0.0100	0.0026		W231027	AS	08/09/12 18:52	

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

**John Kern**  
Laboratory Director



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IDEQ (Boise)  
1410 N Hilton  
Boise, ID 83706

**Project Name: Boise**  
Work Order: **W2G0710**  
Reported 15-Aug-12 11:46

Client Sample ID: **BBBGSW1**

SVL Sample ID: **W2G0710-07 (Surface Water)**

Sample Report Page 1 of 1

Sampled: 26-Jul-12 14:00  
Received: 27-Jul-12  
Sampled By: TE

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
<b>Metals (Total)</b>										
EPA 7470A	Mercury	< 0.00020	mg/L	0.00020	0.000054		W231077	DJA	07/31/12 15:19	
<b>Metals (Total Recoverable)</b>										
EPA 6010B	Antimony	< 0.020	mg/L	0.020	0.009		W231027	AS	08/09/12 18:57	
EPA 6010B	Arsenic	< 0.025	mg/L	0.025	0.007		W231027	AS	08/09/12 18:57	
EPA 6010B	Barium	0.976	mg/L	0.0020	0.0006		W231027	AS	08/09/12 18:57	
EPA 6010B	Cadmium	< 0.0020	mg/L	0.0020	0.0006		W231027	AS	08/09/12 18:57	
EPA 6010B	Chromium	0.131	mg/L	0.0060	0.0015		W232359	TJK	08/10/12 17:04	
EPA 6010B	Copper	0.020	mg/L	0.010	0.003		W231027	TJK	08/10/12 14:05	
EPA 6010B	Iron	16.5	mg/L	0.060	0.022		W232359	TJK	08/10/12 17:04	
EPA 6010B	Lead	0.0122	mg/L	0.0075	0.0027		W231027	AS	08/09/12 18:57	
EPA 6010B	Manganese	0.830	mg/L	0.0040	0.0014		W231027	AS	08/09/12 18:57	
EPA 6010B	Selenium	< 0.040	mg/L	0.040	0.013		W231027	AS	08/09/12 18:57	
EPA 6010B	Silver	< 0.0050	mg/L	0.0050	0.0014		W231027	AS	08/09/12 18:57	
EPA 6010B	Zinc	0.0444	mg/L	0.0100	0.0026		W231027	AS	08/09/12 18:57	

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

**John Kern**  
Laboratory Director



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

**Project Name: Boise**  
Work Order: **W2G0710**  
Reported: 15-Aug-12 11:46

Client Sample ID: **BBPPE1SD1**

SVL Sample ID: **W2G0710-08 (Soil)**

Sample Report Page 1 of 1

Sampled: 26-Jul-12 15:35  
Received: 27-Jul-12  
Sampled By: TE

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
<b>Metals (Total) by EPA 6000/7000 Methods</b>										
EPA 6010B	Antimony	< 2.0	mg/kg	2.0	0.7		W232093	TJK	08/13/12 12:02	
EPA 6010B	Arsenic	< 2.5	mg/kg	2.5	0.8		W232093	TJK	08/13/12 12:02	
EPA 6010B	Barium	167	mg/kg	0.200	0.019		W232093	TJK	08/13/12 12:02	
EPA 6010B	Cadmium	< 0.20	mg/kg	0.20	0.04		W232093	TJK	08/13/12 12:02	
EPA 6010B	Chromium	6.82	mg/kg	0.60	0.13		W232093	TJK	08/13/12 12:02	
EPA 6010B	Copper	17.8	mg/kg	1.00	0.29		W232093	TJK	08/13/12 12:02	
EPA 6010B	Iron	8140	mg/kg	6.0	1.9		W232093	TJK	08/13/12 12:02	
EPA 6010B	Lead	17.2	mg/kg	0.75	0.35		W232093	TJK	08/13/12 12:02	
EPA 6010B	Manganese	305	mg/kg	0.40	0.09		W232093	TJK	08/13/12 12:02	
EPA 6010B	Selenium	< 4.0	mg/kg	4.0	1.5		W232093	TJK	08/13/12 12:02	
EPA 6010B	Silver	1.68	mg/kg	0.50	0.05		W232093	TJK	08/13/12 12:02	
EPA 6010B	Zinc	39.4	mg/kg	1.00	0.21		W232093	TJK	08/13/12 12:02	
EPA 7471A	Mercury	0.042	mg/kg	0.033	0.008		W231347	DJA	08/06/12 11:37	

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

**John Kern**  
Laboratory Director



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

**Project Name: Boise**  
Work Order: **W2G0710**  
Reported 15-Aug-12 11:46

Client Sample ID: **BBBGSS1**

SVL Sample ID: **W2G0710-09 (Soil)**

Sample Report Page 1 of 1

Sampled 26-Jul-12 14:09  
Received 27-Jul-12  
Sampled By: RE

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
<b>Metals (Total) by EPA 6000/7000 Methods</b>										
EPA 6010B	Antimony	< 2.0	mg/kg	2.0	0.7		W232093	TJK	08/13/12 12:08	
EPA 6010B	Arsenic	< 2.5	mg/kg	2.5	0.8		W232093	TJK	08/13/12 12:08	
EPA 6010B	Barium	400	mg/kg	0.200	0.019		W232093	TJK	08/13/12 12:08	
EPA 6010B	Cadmium	< 0.20	mg/kg	0.20	0.04		W232093	TJK	08/13/12 12:08	
EPA 6010B	Chromium	10.2	mg/kg	0.60	0.13		W232093	TJK	08/13/12 12:08	
EPA 6010B	Copper	19.0	mg/kg	1.00	0.29		W232093	TJK	08/13/12 12:08	
EPA 6010B	Iron	17500	mg/kg	6.0	1.9		W232093	TJK	08/13/12 12:08	
EPA 6010B	Lead	10.0	mg/kg	0.75	0.35		W232093	TJK	08/13/12 12:08	
EPA 6010B	Manganese	1090	mg/kg	0.40	0.09		W232093	TJK	08/13/12 12:08	
EPA 6010B	Selenium	< 4.0	mg/kg	4.0	1.5		W232093	TJK	08/13/12 12:08	
EPA 6010B	Silver	< 0.50	mg/kg	0.50	0.05		W232093	TJK	08/13/12 12:08	
EPA 6010B	Zinc	85.3	mg/kg	1.00	0.21		W232093	TJK	08/13/12 12:08	
EPA 7471A	Mercury	0.059	mg/kg	0.033	0.008		W231347	DJA	08/06/12 11:39	

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: Boise**  
Work Order **W2G0710**  
Reported: 15-Aug-12 11:46

Client Sample ID: **XRFLABSMPL 318**  
SVL Sample ID: **W2G0710-10 (Soil)**

Sampled: 26-Jul-12 11:16  
Received: 27-Jul-12  
Sampled By: TE

**Sample Report Page 1 of 1**

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
<b>Metals (Total) by EPA 6000/7000 Methods</b>										
EPA 6010B	Antimony	< 2.0	mg/kg	2.0	0.7		W232093	TJK	08/13/12 12:14	
EPA 6010B	Arsenic	6.5	mg/kg	2.5	0.8		W232093	TJK	08/13/12 12:14	
EPA 6010B	Barium	340	mg/kg	0.200	0.019		W232093	TJK	08/13/12 12:14	
EPA 6010B	Cadmium	< 0.20	mg/kg	0.20	0.04		W232093	TJK	08/13/12 12:14	
EPA 6010B	Chromium	28.0	mg/kg	0.60	0.13		W232093	TJK	08/13/12 12:14	
EPA 6010B	Copper	30.8	mg/kg	1.00	0.29		W232093	TJK	08/13/12 12:14	
EPA 6010B	Iron	26100	mg/kg	6.0	1.9		W232093	TJK	08/13/12 12:14	
EPA 6010B	Lead	18.9	mg/kg	0.75	0.35		W232093	TJK	08/13/12 12:14	
EPA 6010B	Manganese	671	mg/kg	0.40	0.09		W232093	TJK	08/13/12 12:14	
EPA 6010B	Selenium	< 4.0	mg/kg	4.0	1.5		W232093	TJK	08/13/12 12:14	
EPA 6010B	Silver	1.31	mg/kg	0.50	0.05		W232093	TJK	08/13/12 12:14	
EPA 6010B	Zinc	70.2	mg/kg	1.00	0.21		W232093	TJK	08/13/12 12:14	
EPA 7471A	Mercury	0.052	mg/kg	0.033	0.008		W231347	DJA	08/06/12 11:41	

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: Boise**  
Work Order: **W2G0710**  
Reported: 15-Aug-12 11:46

Client Sample ID: **BBWD3SS1**

SVL Sample ID: **W2G0710-11 (Soil)**

Sample Report Page 1 of 1

Sampled: 26-Jul-12 12:13  
Received: 27-Jul-12  
Sampled By: RE

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
<b>Metals (Total) by EPA 6000/7000 Methods</b>										
EPA 6010B	Antimony	87.9	mg/kg	2.0	0.7		W232093	TJK	08/13/12 12:20	
EPA 6010B	Arsenic	194	mg/kg	2.5	0.8		W232093	TJK	08/13/12 12:20	
EPA 6010B	Barium	75.0	mg/kg	0.200	0.019		W232093	TJK	08/13/12 12:20	
EPA 6010B	Cadmium	5.44	mg/kg	0.20	0.04		W232093	TJK	08/13/12 12:20	
EPA 6010B	Chromium	10.6	mg/kg	0.60	0.13		W232093	TJK	08/13/12 12:20	
EPA 6010B	Copper	707	mg/kg	1.00	0.29		W232093	TJK	08/13/12 12:20	
EPA 6010B	Iron	38400	mg/kg	6.0	1.9		W232093	TJK	08/13/12 12:20	
EPA 6010B	Lead	785	mg/kg	0.75	0.35		W232093	TJK	08/13/12 12:20	
EPA 6010B	Manganese	3680	mg/kg	0.40	0.09		W232093	TJK	08/13/12 12:20	
EPA 6010B	Selenium	< 4.0	mg/kg	4.0	1.5		W232093	TJK	08/13/12 12:20	
EPA 6010B	Silver	358	mg/kg	5.00	0.51		W233079	DT	08/15/12 09:46	
EPA 6010B	Zinc	339	mg/kg	1.00	0.21		W232093	TJK	08/13/12 12:20	
EPA 7471A	Mercury	3.12	mg/kg	0.165	0.040	5	W231347	DJA	08/06/12 11:46	D2

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

**John Kern**  
Laboratory Director



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

**Project Name: Boise**  
Work Order: **W2G0710**  
Reported: 15-Aug-12 11:46

Client Sample ID: **BBBGSD1**

SVL Sample ID: **W2G0710-12 (Soil)**

Sample Report Page 1 of 1

Sampled: 26-Jul-12 14:20  
Received: 27-Jul-12  
Sampled By: TE

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
<b>Metals (Total) by EPA 6000/7000 Methods</b>										
EPA 6010B	Antimony	< 2.0	mg/kg	2.0	0.7		W232093	TJK	08/13/12 12:38	
EPA 6010B	Arsenic	< 2.5	mg/kg	2.5	0.8		W232093	TJK	08/13/12 12:38	
EPA 6010B	Barium	708	mg/kg	0.200	0.019		W232093	TJK	08/13/12 12:38	
EPA 6010B	Cadmium	< 0.20	mg/kg	0.20	0.04		W232093	TJK	08/13/12 12:38	
EPA 6010B	Chromium	48.5	mg/kg	0.60	0.13		W232093	TJK	08/13/12 12:38	
EPA 6010B	Copper	17.7	mg/kg	1.00	0.29		W232093	TJK	08/13/12 12:38	
EPA 6010B	Iron	16800	mg/kg	6.0	1.9		W232093	TJK	08/13/12 12:38	
EPA 6010B	Lead	10.6	mg/kg	0.75	0.35		W232093	TJK	08/13/12 12:38	
EPA 6010B	Manganese	387	mg/kg	0.40	0.09		W232093	TJK	08/13/12 12:38	
EPA 6010B	Selenium	< 4.0	mg/kg	4.0	1.5		W232093	TJK	08/13/12 12:38	
EPA 6010B	Silver	< 0.50	mg/kg	0.50	0.05		W232093	TJK	08/13/12 12:38	
EPA 6010B	Zinc	31.3	mg/kg	1.00	0.21		W232093	TJK	08/13/12 12:38	
EPA 7471A	Mercury	0.060	mg/kg	0.033	0.008		W231347	DJA	08/06/12 11:47	

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: Boise**  
Work Order: **W2G0710**  
Reported: 15-Aug-12 11:46

Client Sample ID: **CAWD5SS1**

SVL Sample ID: **W2G0710-13 (Soil)**

Sample Report Page 1 of 1

Sampled: 25-Jul-12 13:20  
Received: 27-Jul-12  
Sampled By: TE

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
<b>Metals (Total) by EPA 6000/7000 Methods</b>										
EPA 6010B	Antimony	1390	mg/kg	2.0	0.7		W232093	TJK	08/13/12 12:44	
EPA 6010B	Arsenic	913	mg/kg	2.5	0.8		W232093	TJK	08/13/12 12:44	
EPA 6010B	Barium	673	mg/kg	0.200	0.019		W232093	TJK	08/13/12 12:44	
EPA 6010B	Cadmium	5.23	mg/kg	0.20	0.04		W232093	TJK	08/13/12 12:44	
EPA 6010B	Chromium	10.3	mg/kg	0.60	0.13		W232093	TJK	08/13/12 12:44	
EPA 6010B	Copper	990	mg/kg	1.00	0.29		W232093	TJK	08/13/12 12:44	
EPA 6010B	Iron	80600	mg/kg	6.0	1.9		W232093	TJK	08/13/12 12:44	
EPA 6010B	Lead	1390	mg/kg	0.75	0.35		W232093	TJK	08/13/12 12:44	
EPA 6010B	Manganese	4560	mg/kg	0.40	0.09		W232093	TJK	08/13/12 12:44	
EPA 6010B	Selenium	10.1	mg/kg	4.0	1.5		W232093	TJK	08/13/12 12:44	
EPA 6010B	Silver	1150	mg/kg	5.00	0.51		W233079	DT	08/15/12 10:03	
EPA 6010B	Zinc	139	mg/kg	1.00	0.21		W232093	TJK	08/13/12 12:44	
EPA 7471A	Mercury	13.9	mg/kg	1.65	0.400	50	W231347	DJA	08/06/12 11:54	D2

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

**John Kern**  
Laboratory Director



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

**Project Name: Boise**  
Work Order **W2G0710**  
Reported: 15-Aug-12 11:46

Client Sample ID: **CAAD3SW1**

SVL Sample ID: **W2G0710-14 (Surface Water)**

Sample Report Page 1 of 1

Sampled: 25-Jul-12 14:43  
Received: 27-Jul-12  
Sampled By: TE

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
<b>Metals (Total)</b>										
EPA 7470A	Mercury	< 0.00020	mg/L	0.00020	0.000054		W231077	DJA	07/31/12 13:21	
<b>Metals (Total Recoverable)</b>										
EPA 6010B	Antimony	< 0.020	mg/L	0.020	0.009		W231027	AS	08/09/12 19:03	
EPA 6010B	Arsenic	< 0.025	mg/L	0.025	0.007		W231027	AS	08/09/12 19:03	
EPA 6010B	Barium	0.288	mg/L	0.0020	0.0006		W231027	AS	08/09/12 19:03	
EPA 6010B	Cadmium	< 0.0020	mg/L	0.0020	0.0006		W231027	AS	08/09/12 19:03	
EPA 6010B	Chromium	< 0.0060	mg/L	0.0060	0.0015		W232359	TJK	08/10/12 17:10	
EPA 6010B	Copper	0.023	mg/L	0.010	0.003		W231027	TJK	08/10/12 14:11	
EPA 6010B	Iron	2.35	mg/L	0.060	0.022		W232359	TJK	08/10/12 17:10	
EPA 6010B	Lead	< 0.0075	mg/L	0.0075	0.0027		W231027	AS	08/09/12 19:03	
EPA 6010B	Manganese	0.302	mg/L	0.0040	0.0014		W231027	AS	08/09/12 19:03	
EPA 6010B	Selenium	< 0.040	mg/L	0.040	0.013		W231027	AS	08/09/12 19:03	
EPA 6010B	Silver	< 0.0050	mg/L	0.0050	0.0014		W231027	AS	08/09/12 19:03	
EPA 6010B	Zinc	0.0279	mg/L	0.0100	0.0026		W231027	AS	08/09/12 19:03	

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

**John Kern**  
Laboratory Director



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

**Project Name: Boise**  
Work Order: **W2G0710**  
Reported: 15-Aug-12 11:46

Client Sample ID: **BBFBSW1**

SVL Sample ID: **W2G0710-15 (Surface Water)**

Sample Report Page 1 of 1

Sampled: 26-Jul-12 16:31  
Received: 27-Jul-12  
Sampled By: TE

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
<b>Metals (Total)</b>										
EPA 7470A	Mercury	< 0.00020	mg/L	0.00020	0.000054		W232054	DJA	08/07/12 11:21	
<b>Metals (Total Recoverable)</b>										
EPA 6010B	Antimony	< 0.020	mg/L	0.020	0.009		W231027	AS	08/09/12 19:09	
EPA 6010B	Arsenic	< 0.025	mg/L	0.025	0.007		W231027	AS	08/09/12 19:09	
EPA 6010B	Barium	< 0.0020	mg/L	0.0020	0.0006		W231027	AS	08/09/12 19:09	
EPA 6010B	Cadmium	< 0.0020	mg/L	0.0020	0.0006		W231027	AS	08/09/12 19:09	
EPA 6010B	Chromium	< 0.0060	mg/L	0.0060	0.0015		W232359	TJK	08/10/12 17:15	
EPA 6010B	Copper	< 0.010	mg/L	0.010	0.003		W231027	TJK	08/10/12 14:16	
EPA 6010B	Iron	< 0.060	mg/L	0.060	0.022		W232359	TJK	08/10/12 17:15	
EPA 6010B	Lead	< 0.0075	mg/L	0.0075	0.0027		W231027	AS	08/09/12 19:09	
EPA 6010B	Manganese	< 0.0040	mg/L	0.0040	0.0014		W231027	AS	08/09/12 19:09	
EPA 6010B	Selenium	< 0.040	mg/L	0.040	0.013		W231027	AS	08/09/12 19:09	
EPA 6010B	Silver	< 0.0050	mg/L	0.0050	0.0014		W231027	AS	08/09/12 19:09	
EPA 6010B	Zinc	< 0.0100	mg/L	0.0100	0.0026		W231027	AS	08/09/12 19:09	

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

**John Kern**  
Laboratory Director



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

**Project Name: Boise**  
Work Order: **W2G0710**  
Reported 15-Aug-12 11:46

Client Sample ID: **CAWD6XRFSS1**

SVL Sample ID: **W2G0710-16 (Soil)**

Sample Report Page 1 of 1

Sampled 25-Jul-12 13:14  
Received 27-Jul-12  
Sampled By: RE

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
<b>Metals (Total) by EPA 6000/7000 Methods</b>										
EPA 6010B	Antimony	161	mg/kg	2.0	0.7		W232093	TJK	08/13/12 12:50	
EPA 6010B	Arsenic	232	mg/kg	2.5	0.8		W232093	TJK	08/13/12 12:50	
EPA 6010B	Barium	1130	mg/kg	0.200	0.019		W232093	TJK	08/13/12 12:50	
EPA 6010B	Cadmium	4.05	ug/kg	0.20	0.04		W232093	TJK	08/13/12 12:50	
EPA 6010B	Chromium	116	mg/kg	0.60	0.13		W232093	TJK	08/13/12 12:50	
EPA 6010B	Copper	1040	mg/kg	1.00	0.29		W232093	TJK	08/13/12 12:50	
EPA 6010B	Iron	60600	mg/kg	6.0	1.9		W232093	TJK	08/13/12 12:50	
EPA 6010B	Lead	579	mg/kg	0.75	0.35		W232093	TJK	08/13/12 12:50	
EPA 6010B	Manganese	4400	mg/kg	0.40	0.09		W232093	TJK	08/13/12 12:50	
EPA 6010B	Selenium	4.5	ug/kg	4.0	1.5		W232093	TJK	08/13/12 12:50	
EPA 6010B	Silver	472	ug/kg	5.00	0.51		W232303	AS	08/13/12 14:06	
EPA 6010B	Zinc	242	mg/kg	1.00	0.21		W232093	TJK	08/13/12 12:50	
EPA 7471A	Mercury	3.80	mg/kg	0.330	0.080	10	W232378	STA	08/10/12 14:00	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	<b>Project Name: Boise</b> Work Order: <b>W2G0710</b> Reported: 15-Aug-12 11:46
--	---

Client Sample ID: **BB1AD1SW1**

SVL Sample ID: **W2G0710-17 (Surface Water)**

Sample Report Page 1 of 1

Sampled: 26-Jul-12 17:22  
 Received: 27-Jul-12  
 Sampled By: TE

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
<b>Metals (Total)</b>										
EPA 7470A	Mercury	< 0.00020	mg/L	0.00020	0.000054		W231077	DJA	07/31/12 15:22	
<b>Metals (Total Recoverable)</b>										
EPA 6010B	Antimony	< 0.020	mg/L	0.020	0.009		W231027	AS	08/09/12 19:15	
EPA 6010B	Arsenic	< 0.025	mg/L	0.025	0.007		W231027	AS	08/09/12 19:15	
EPA 6010B	Barium	0.420	mg/L	0.0020	0.0006		W231027	AS	08/09/12 19:15	
EPA 6010B	Cadmium	< 0.0020	mg/L	0.0020	0.0006		W231027	AS	08/09/12 19:15	
EPA 6010B	Chromium	< 0.0060	mg/L	0.0060	0.0015		W232359	TJK	08/10/12 17:21	
EPA 6010B	Copper	0.068	mg/L	0.010	0.003		W231027	TJK	08/10/12 14:22	
EPA 6010B	Iron	1.27	mg/L	0.060	0.022		W232359	TJK	08/10/12 17:21	
EPA 6010B	Lead	< 0.0075	mg/L	0.0075	0.0027		W231027	AS	08/09/12 19:15	
EPA 6010B	Manganese	0.206	mg/L	0.0040	0.0014		W231027	AS	08/09/12 19:15	
EPA 6010B	Selenium	< 0.040	mg/L	0.040	0.013		W231027	AS	08/09/12 19:15	
EPA 6010B	Silver	0.0470	mg/L	0.0050	0.0014		W231027	AS	08/09/12 19:15	
EPA 6010B	Zinc	0.0587	mg/L	0.0100	0.0026		W231027	AS	08/09/12 19:15	

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: Boise**  
Work Order: **W2G0710**  
Reported: 15-Aug-12 11:46

**Quality Control - BLANK Data**

Method	Analyte	Units	Result	MDL	MRL	Batch ID	Analyzed	Notes
<b>Metals (Total)</b>								
EPA 7470A	Mercury	mg/L	<0.00020	0.000054	0.00020	W231077	31-Jul-12	
EPA 7470A	Mercury	mg/L	<0.00020	0.000054	0.00020	W232054	07-Aug-12	
<b>Metals (Total) by EPA 6000/7000 Methods</b>								
EPA 6010B	Antimony	mg/kg	<2.0	0.7	2.0	W232093	13-Aug-12	
EPA 6010B	Arsenic	mg/kg	<2.5	0.8	2.5	W232093	13-Aug-12	
EPA 6010B	Barium	mg/kg	<0.200	0.019	0.200	W232093	13-Aug-12	
EPA 6010B	Cadmium	mg/kg	<0.20	0.04	0.20	W232093	13-Aug-12	
EPA 6010B	Chromium	mg/kg	<0.60	0.13	0.60	W232093	13-Aug-12	
EPA 6010B	Copper	mg/kg	<1.00	0.29	1.00	W232093	13-Aug-12	
EPA 6010B	Iron	mg/kg	<6.0	1.9	6.0	W232093	13-Aug-12	
EPA 6010B	Lead	mg/kg	<0.75	0.35	0.75	W232093	13-Aug-12	
EPA 6010B	Manganese	mg/kg	<0.40	0.09	0.40	W232093	13-Aug-12	
EPA 6010B	Selenium	mg/kg	<4.0	1.5	4.0	W232093	13-Aug-12	
EPA 6010B	Silver	mg/kg	<0.50	0.05	0.50	W232093	13-Aug-12	
EPA 6010B	Silver	mg/kg	<0.50	0.05	0.50	W232303	13-Aug-12	
EPA 6010B	Silver	mg/kg	<0.50	0.05	0.50	W233079	15-Aug-12	
EPA 6010B	Zinc	mg/kg	<1.00	0.21	1.00	W232093	13-Aug-12	
EPA 7471A	Mercury	mg/kg	<0.033	0.008	0.033	W231347	06-Aug-12	
EPA 7471A	Mercury	mg/kg	<0.033	0.008	0.033	W232378	10-Aug-12	

**Metals (Total Recoverable)**

EPA 6010B	Antimony	mg/L	<0.020	0.009	0.020	W231027	09-Aug-12	
EPA 6010B	Arsenic	mg/L	<0.025	0.007	0.025	W231027	09-Aug-12	
EPA 6010B	Barium	mg/L	<0.0020	0.0006	0.0020	W231027	09-Aug-12	
EPA 6010B	Cadmium	mg/L	<0.0020	0.0006	0.0020	W231027	09-Aug-12	
EPA 6010B	Chromium	mg/L	<0.0060	0.0015	0.0060	W232359	10-Aug-12	
EPA 6010B	Copper	mg/L	<0.010	0.003	0.010	W231027	10-Aug-12	
EPA 6010B	Iron	mg/L	<0.060	0.022	0.060	W232359	10-Aug-12	
EPA 6010B	Lead	mg/L	<0.0075	0.0027	0.0075	W231027	09-Aug-12	
EPA 6010B	Manganese	mg/L	<0.0040	0.0014	0.0040	W231027	09-Aug-12	
EPA 6010B	Selenium	mg/L	<0.040	0.013	0.040	W231027	09-Aug-12	
EPA 6010B	Silver	mg/L	<0.0050	0.0014	0.0050	W231027	09-Aug-12	
EPA 6010B	Zinc	mg/L	<0.0100	0.0026	0.0100	W231027	09-Aug-12	

**Quality Control - LABORATORY CONTROL SAMPLE Data**

Method	Analyte	Units	LCS Result	LCS True	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
<b>Metals (Total)</b>									
EPA 7470A	Mercury	mg/L	0.00462	0.00500	92.4	80 - 120	W232054	07-Aug-12	
EPA 7470A	Mercury	mg/L	0.00473	0.00500	94.6	80 - 120	W231077	31-Jul-12	
<b>Metals (Total) by EPA 6000/7000 Methods</b>									
EPA 6010B	Antimony	mg/kg	93.4	100	93.4	80 - 120	W232093	13-Aug-12	
EPA 6010B	Arsenic	mg/kg	89.1	100	89.1	80 - 120	W232093	13-Aug-12	
EPA 6010B	Barium	mg/kg	98.8	100	98.8	80 - 120	W232093	13-Aug-12	
EPA 6010B	Cadmium	mg/kg	92.7	100	92.7	80 - 120	W232093	13-Aug-12	
EPA 6010B	Chromium	mg/kg	99.5	100	99.5	80 - 120	W232093	13-Aug-12	
EPA 6010B	Copper	mg/kg	104	100	104	80 - 120	W232093	13-Aug-12	
EPA 6010B	Iron	mg/kg	99.5	1000	99.5	80 - 120	W232093	13-Aug-12	
EPA 6010B	Lead	mg/kg	92.0	100	92.0	80 - 120	W232093	13-Aug-12	
EPA 6010B	Manganese	mg/kg	98.4	100	98.4	80 - 120	W232093	13-Aug-12	
EPA 6010B	Selenium	mg/kg	81.8	100	81.8	80 - 120	W232093	13-Aug-12	
EPA 6010B	Silver	mg/kg	4.94	5.00	98.7	80 - 120	W232093	13-Aug-12	

SVL holds the following certifications

AZ:0538, CA 2080, FL(NELAC):E87993, ID ID00019 & ID00965 (Microbiology), NV ID000192007A, WA:1268



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

**Project Name: Boise**  
Work Order: **W2G0710**  
Reported: 15-Aug-12 11:46

**Quality Control - LABORATORY CONTROL SAMPLE Data (Continued)**

Method	Analyte	Units	LCS Result	LCS True	% Rec	Acceptance Limits	Batch ID	Analyzed	Notes
<b>Metals (Total) by EPA 6000/7000 Methods (Continued)</b>									
EPA 6010B	Silver	mg/kg	5.34	5.00	107	80 - 120	W232303	13-Aug-12	
EPA 6010B	Silver	mg/kg	4.40	5.00	88.0	80 - 120	W233079	15-Aug-12	
EPA 6010B	Zinc	mg/kg	89.2	100	89.2	80 - 120	W232093	13-Aug-12	
EPA 7471A	Mercury	mg/kg	0.908	0.833	109	80 - 120	W231347	06-Aug-12	
EPA 7471A	Mercury	mg/kg	0.788	0.833	94.6	80 - 120	W232378	10-Aug-12	

Method	Analyte	Units	LCS Result	LCS True	% Rec	Acceptance Limits	Batch ID	Analyzed	Notes
<b>Metals (Total Recoverable)</b>									
EPA 6010B	Antimony	mg/L	0.978	1.00	97.8	80 - 120	W231027	09-Aug-12	
EPA 6010B	Arsenic	mg/L	0.967	1.00	96.7	80 - 120	W231027	09-Aug-12	
EPA 6010B	Barium	mg/L	1.01	1.00	101	80 - 120	W231027	09-Aug-12	
EPA 6010B	Cadmium	mg/L	0.975	1.00	97.5	80 - 120	W231027	09-Aug-12	
EPA 6010B	Chromium	mg/L	1.02	1.00	102	80 - 120	W232359	10-Aug-12	
EPA 6010B	Copper	mg/L	0.945	1.00	94.5	80 - 120	W231027	10-Aug-12	
EPA 6010B	Iron	mg/L	9.73	10.0	97.3	80 - 120	W232359	10-Aug-12	
EPA 6010B	Lead	mg/L	0.974	1.00	97.4	80 - 120	W231027	09-Aug-12	
EPA 6010B	Manganese	mg/L	0.969	1.00	96.9	80 - 120	W231027	09-Aug-12	
EPA 6010B	Selenium	mg/L	0.967	1.00	96.7	80 - 120	W231027	09-Aug-12	
EPA 6010B	Silver	mg/L	0.0514	0.0500	103	80 - 120	W231027	09-Aug-12	
EPA 6010B	Zinc	mg/L	0.955	1.00	95.5	80 - 120	W231027	09-Aug-12	

**Quality Control - MATRIX SPIKE Data**

Method	Analyte	Units	Spike Result	Sample Result (R)	Spike Level (S)	% Rec	Acceptance Limits	Batch ID	Analyzed	Notes
<b>Metals (Total)</b>										
EPA 7470A	Mercury	mg/L	0.00109	<0.00020	0.00100	109	75 - 125	W232054	07-Aug-12	
EPA 7470A	Mercury	mg/L	0.00107	<0.00020	0.00100	107	75 - 125	W231077	31-Jul-12	

Method	Analyte	Units	Spike Result	Sample Result (R)	Spike Level (S)	% Rec	Acceptance Limits	Batch ID	Analyzed	Notes
<b>Metals (Total) by EPA 6000/7000 Methods</b>										
EPA 6010B	Antimony	mg/kg	48.2	<2.0	100	48.2	75 - 125	W232093	13-Aug-12	M2
EPA 6010B	Arsenic	mg/kg	89.8	4.7	100	85.2	75 - 125	W232093	13-Aug-12	
EPA 6010B	Barium	mg/kg	110	16.7	100	93.5	75 - 125	W232093	13-Aug-12	
EPA 6010B	Cadmium	mg/kg	84.7	<0.20	100	84.7	75 - 125	W232093	13-Aug-12	
EPA 6010B	Chromium	mg/kg	134	46.6	100	87.1	75 - 125	W232093	13-Aug-12	
EPA 6010B	Copper	mg/kg	254	149	100	105	75 - 125	W232093	13-Aug-12	
EPA 6010B	Iron	mg/kg	20300	29600	1000	R > 4S	75 - 125	W232093	13-Aug-12	M3
EPA 6010B	Lead	mg/kg	87.8	2.64	100	85.1	75 - 125	W232093	13-Aug-12	
EPA 6010B	Manganese	mg/kg	1090	1020	100	R > 4S	75 - 125	W232093	13-Aug-12	M3
EPA 6010B	Selenium	mg/kg	82.2	<4.0	100	79.9	75 - 125	W232093	13-Aug-12	
EPA 6010B	Silver	mg/kg	4.49	<0.50	5.00	89.9	75 - 125	W232093	13-Aug-12	
EPA 6010B	Silver	mg/kg	5.28	<0.50	5.00	104	75 - 125	W232303	13-Aug-12	
EPA 6010B	Silver	mg/kg	385	358	50.0	R > 4S	75 - 125	W233079	15-Aug-12	M3
EPA 6010B	Zinc	mg/kg	143	65.9	100	77.2	75 - 125	W232093	13-Aug-12	
EPA 7471A	Mercury	mg/kg	78.8	93.0	0.167	R > 4S	75 - 125	W231347	06-Aug-12	D2,M3
EPA 7471A	Mercury	mg/kg	4.15	3.80	0.167	R > 4S	75 - 125	W232378	10-Aug-12	D2,M3

Method	Analyte	Units	Spike Result	Sample Result (R)	Spike Level (S)	% Rec	Acceptance Limits	Batch ID	Analyzed	Notes
<b>Metals (Total Recoverable)</b>										
EPA 6010B	Antimony	mg/L	1.00	<0.020	1.00	100	75 - 125	W231027	09-Aug-12	
EPA 6010B	Arsenic	mg/L	0.976	<0.025	1.00	97.6	75 - 125	W231027	09-Aug-12	
EPA 6010B	Barium	mg/L	1.29	0.251	1.00	104	75 - 125	W231027	09-Aug-12	
EPA 6010B	Cadmium	mg/L	0.992	<0.0020	1.00	99.2	75 - 125	W231027	09-Aug-12	
EPA 6010B	Chromium	mg/L	1.01	<0.0060	1.00	100	75 - 125	W232359	10-Aug-12	
EPA 6010B	Copper	mg/L	0.986	<0.010	1.00	98.2	75 - 125	W231027	10-Aug-12	
EPA 6010B	Iron	mg/L	1.4	1.87	10.0	95.0	75 - 125	W232359	10-Aug-12	
EPA 6010B	Lead	mg/L	0.1	<0.0075	1.00	101	75 - 125	W231027	09-Aug-12	

SVL holds the following certifications:

AZ:0538, CA 2080, FL(NELAC):E87993, ID:ID00019 & ID00265 (Microbiology), NV:ID000192007A, WA:1268



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

**Project Name: Boise**  
Work Order: **W2G0710**  
Reported: 15-Aug-12 11:46

**Quality Control - MATRIX SPIKE Data (Continued)**

Method	Analyte	Units	Spike Result	Sample Result (R)	Spike Level (S)	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
<b>Metals (Total Recoverable) (Continued)</b>										
EPA 6010B	Manganese	mg/L	1.02	0.0352	1.00	98.2	75 - 125	W231027	09-Aug-12	
EPA 6010B	Selenium	mg/L	0.371	<0.040	1.00	97.1	75 - 125	W231027	09-Aug-12	
EPA 6010B	Silver	mg/L	0.1527	<0.0050	0.0500	105	75 - 125	W231027	09-Aug-12	
EPA 6010B	Zinc	mg/L	0.248	<0.0100	1.00	94.8	75 - 125	W231027	09-Aug-12	

**Quality Control - MATRIX SPIKE DUPLICATE Data**

Method	Analyte	Units	MSD Result	Spike Result	Spike Level	RPD	RPD Limit	Batch ID	Analyzed	Notes
<b>Metals (Total)</b>										
EPA 7470A	Mercury	mg/L	0.00106	0.00107	0.00100	0.9	20	W231077	31-Jul-12	
EPA 7470A	Mercury	mg/L	0.00105	0.00109	0.00100	3.8	20	W232054	07-Aug-12	
<b>Metals (Total) by EPA 6000/7000 Methods</b>										
EPA 6010B	Antimony	mg/kg	51.3	48.2	100	6.1	20	W232093	13-Aug-12	
EPA 6010B	Arsenic	mg/kg	95.7	89.8	100	6.3	20	W232093	13-Aug-12	
EPA 6010B	Barium	mg/kg	115	110	100	4.5	20	W232093	13-Aug-12	
EPA 6010B	Cadmium	mg/kg	83.9	84.7	100	4.9	20	W232093	13-Aug-12	
EPA 6010B	Chromium	mg/kg	141	134	100	5.2	20	W232093	13-Aug-12	
EPA 6010B	Copper	mg/kg	264	254	100	4.0	20	W232093	13-Aug-12	
EPA 6010B	Iron	mg/kg	31300	30300	1000	3.5	20	W232093	13-Aug-12	
EPA 6010B	Lead	mg/kg	90.8	87.8	100	3.4	20	W232093	13-Aug-12	
EPA 6010B	Manganese	mg/kg	1140	1090	100	4.6	20	W232093	13-Aug-12	
EPA 6010B	Selenium	mg/kg	84.6	82.2	100	2.8	20	W232093	13-Aug-12	
EPA 6010B	Silver	mg/kg	4.79	4.49	5.00	6.3	20	W232093	13-Aug-12	
EPA 6010B	Silver	mg/kg	5.30	5.28	5.00	0.4	20	W232303	13-Aug-12	
EPA 6010B	Silver	mg/kg	359	385	50.0	4.2	20	W233079	15-Aug-12	
EPA 6010B	Zinc	mg/kg	150	143	100	4.6	20	W232093	13-Aug-12	
EPA 7471A	Mercury	mg/kg	81.0	78.8	0.167	1.5	20	W231347	06-Aug-12	D2,M3
EPA 7471A	Mercury	mg/kg	4.00	4.15	0.167	3.7	20	W232378	10-Aug-12	D2

**Metals (Total Recoverable)**

EPA 6010B	Antimony	mg/L	0.957	1.00	1.00	4.4	20	W231027	09-Aug-12	
EPA 6010B	Arsenic	mg/L	0.936	0.976	1.00	4.1	20	W231027	09-Aug-12	
EPA 6010B	Barium	mg/L	1.22	1.29	1.00	5.3	20	W231027	09-Aug-12	
EPA 6010B	Cadmium	mg/L	0.955	0.992	1.00	3.8	20	W231027	09-Aug-12	
EPA 6010B	Chromium	mg/L	0.996	1.01	1.00	0.9	20	W232359	10-Aug-12	
EPA 6010B	Copper	mg/L	0.941	0.986	1.00	4.7	20	W231027	10-Aug-12	
EPA 6010B	Iron	mg/L	11.2	11.4	10.0	1.2	20	W232359	10-Aug-12	
EPA 6010B	Lead	mg/L	0.959	1.01	1.00	5.4	20	W231027	09-Aug-12	
EPA 6010B	Manganese	mg/L	0.979	1.02	1.00	3.8	20	W231027	09-Aug-12	
EPA 6010B	Selenium	mg/L	0.933	0.971	1.00	4.0	20	W231027	09-Aug-12	
EPA 6010B	Silver	mg/L	0.0501	0.0527	0.0500	5.0	20	W231027	09-Aug-12	
EPA 6010B	Zinc	mg/L	0.939	0.948	1.00	0.9	20	W231027	09-Aug-12	



IDEQ (Boise)  
1410 N Hilton  
Boise, ID 83706

**Project Name: Boise**  
Work Order: **W2G0710**  
Reported: **15-Aug-12 11:46**

**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) by EPA 6000/7000 Methods**

EPA 6010B	Antimony	mg/kg	87.1	<2.0	100	87.1	75 - 125	W232093	13-Aug-12	
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**Notes and Definitions**

- 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