Boulder Basin Claims

In the Boulder Creek Drainage

A.K.A. Boulder Group Mines: Sunset, Climax, Calamine, Mascot, Revenue, Triumph, Summit, Daisy, Mint, Champion, Trapper, Tip Top, Sullivan, Puritan, Crown Point

Golden Glow Mines: Louisa, Bazouk, Ophir, Ohio, Sunrise

Preliminary Assessment Report

Blaine County
State of Idaho

Department of Environmental Quality

December 2008

Submitted to:
U. S. Environmental Protection Agency
Region 10
1200 Sixth Avenue
Seattle, WA 98101

STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

1410 North Hilton • Boise, Idaho 83706 • (208) 373-0502

C.L. "Butch" Otter, Governor
Toni Hardesty, Director

December 19, 2008

Boulder Group LTD Partnership
c/o C. Castle
4823 Wocus Road
Klamath Falls, Oregon 97601

RE: Site Assessment of the Boulder and Golden Glow Mine Claims.

Dear Ms. Castle:

The Idaho Department of Environmental Quality (IDEQ) has completed a review of historical mining data and geological information at the above referenced sites. Subsequent to that review, IDEQ conducted a site visit of the Boulder Group and Golden Glow Mines. During the site visit, mining facilities were mapped and sampled to complete the analysis necessary to complete a final Preliminary Assessment (PA) report.

Preliminary Assessments are conducted according to the Federal Comprehensive Environmental Response, Compensation and Liabilities Act. The reasons to complete a Preliminary Assessment include:

1) To identify those sites which are not CERCLIS caliber because they do not pose a threat to public health or the environment (No Remedial Action Planned (NRAP));

2) To determine if there is a need for removal actions or other programmatic management of sites;

3) To determine if a Site Investigation, which is a more detailed site characterization, is needed; and/or

4) To gather data to facilitate later evaluation of the release through the Hazard Ranking System (HRS)

IDEQ has also completed PAs under contract with the U.S. Environmental Protection Agency in order to identify risks to human health and the environment, and to make recommendations to land owners regarding how risks might be managed under current site conditions and in future use scenarios.

Based on existing conditions and uses, historic information, data observations made during the site visit, and analysis of the mine wastes, potential pathways of contaminants to receptors, and potential exposures to ecological and human receptors, IDEQ has determined that No Remedial Action is Planned (NRAP) for the referenced properties and mine sites. However, should site conditions or uses change in the future, owners of these properties would be well advised to conduct additional site assessment work and incorporate risk management in their development and/or operating plans. IDEQ has noted numerous physical hazards on the properties, specifically the open shaft and an adit on the Mascot and Triumph claims, which are beyond the scope of IDEQ's risk analysis. However, these openings are extremely dangerous and should be permanently closed or have access to them restricted.

Laboratory results of soils samples collected at the Boulder Basin recreational area indicate there is a risk to human health risk receptors, specifically recreationists. There was evidence of people camping in the area (fire rings, trailhead register) and with the lead levels greatly exceeding the Initial Default Target Levels (IDTLs) and the EPA Human Health Screening Levels (HHSLs), measures should be taken to reduce or eliminate the risk.

Attached is a "focused" Preliminary Assessment Report of the properties and mine facilities. The report contains copies of historic mining reports, geologic information, data results, and maps of the properties, along with a brief checklist of how IDEQ came to its recommendation that the property status is NRAP.

IDEQ very much appreciates your cooperation and approval for our access, and looks forward to addressing any questions you may have regarding our findings.

Sincerely,

Bruce A. Schuld
Mine Waste Projects Coordinator
Waste Management and Remediation Division

BAS:TE:tg

Attachment

cc: Ken Marcie – U.S. Environmental Protection Agency
Jeff Gabardi – USDA Sawtooth National Forest
Megan Stelma – Blaine County
file

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1410 North Hilton • Boise, Idaho 83706 • (208) 373-0502

C.L. "Butch" Otter, Governor
Toni Hardesty, Director

December 19, 2008

Patricia L. Swenson
REV Trust
2119 NE Wasco St.
Portland, Oregon 97232

RE: Site Assessment of the Boulder and Golden Glow Mine Claims.

Dear Ms. Swenson:

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List of Acronyms

Acronym	Definition
303 (d)	Section of the Clean Water Act in Idaho
AMSL	Above mean sea level
ATV	All Terrain Vehicle (a.k.a. four-wheeler)
bgs	below ground surface
IDEQ	Idaho Department of Environmental Quality
EPA	United States Environmental Protection Agency
gpm	Gallons per minute
PA	Preliminary Assessment
ppm	parts per million
TDL	Target Distance Limit
TMDL	Total Maximum Daily Loads
USBM	United States Bureau of Mines
USFS	United States Forest Service
USGS	US Geological Survey

Section 1. Introduction

This document presents the results of the Preliminary Assessment (PA) of the Boulder and Golden Glow groups patented mining claims. The Department of Environmental Quality (IDEQ) was contracted by Region 10 of the United States Environmental Protection Agency (EPA) to provide technical support for completion of PAs at various historical mining areas within the Warm Springs Mining District in Blaine County, Idaho.

IDEQ often receives complaints or information about sites that may be contaminated with hazardous waste. These sites can include abandoned mines, rural airfields that have served as bases for aerial spraying, old landfills, illegal dumps, and abandoned industrial facilities that have known or suspected releases.

In February 2002, IDEQ 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 may pose a substantial threat to human health or the environment. Priority was also given to mining districts where groups or clusters of sites could be assessed on a watershed basis.

For additional information about the Preliminary Assessment Program, see the following:

http://www.IDEQ.idaho.gov/waste/prog_issues/mining/pa_program.cfm

Access to evaluate the patented claims in the Boulder and Golden Glow Groups was granted by Patricia L. Swenson and Boulder Group LTD Partnership. Attempts were made to contact the Boulder Lake Lodge LLC, but no reply has been received. The claims within USFS and State lands are public property and permission is not necessary when water quality issues are a concern on public lands. Access to the Boulder and Golden Glow groups' area is gained by traveling northwest 13 miles from Ketchum, Idaho on Highway 75. From the highway the mines are located at the head of Forest Road 158 in Boulder Basin approximately 4.5 miles north of Highway 75.

Forest Road 158 is a heavily used off-road vehicle (ORV) trail. The Boulder Group and Golden Glow groups are interspersed throughout the basin and on the steep faces of the Boulder peaks. The southern-most portion of the two groups appears to have been developed within the Ohio, Puritan, and Crown Point patented mine claims. The end of the road is on Forest Service administered lands on the western edge of an old mining town identified as Boulder City on Forest Service maps.

An article from the Idaho Mountain Express describes portions of the Boulder Basin deeded to public ownership, “Boulder Basin back in public ownership”, September 10, 2004;

As a memorial to their daughter, (Sarah Campbell) *Lincoln, Neb., residents Doug and Mary Campbell teamed up with the Wes Wills family of Twin Falls to donate 50 acres of private land to the national forest system... The 50-acre donation includes three patented mining claims,* (Tip Top, Trapper, and Sullivan) *among 20 that are scattered throughout the basin and on the flanks and summit of Boulder Peak. But the three donated claims include the Boulder Basin floor and, once in public ownership, effectively block mining access to the remaining 17, said Intermountain Region Mining Engineer Jeff Gabardi... The 50 acres of donated land contain the remains of old Boulder City, including the historic mill, four cabins and other mining structures. Boulder City was the second town established in the Wood River Valley, and in its heyday, it boasted a store, hotel, post office, corral, saloon, cabins, and ore processing mill and a number of mines. Active mining took place from the 1800s through the 1980s.*

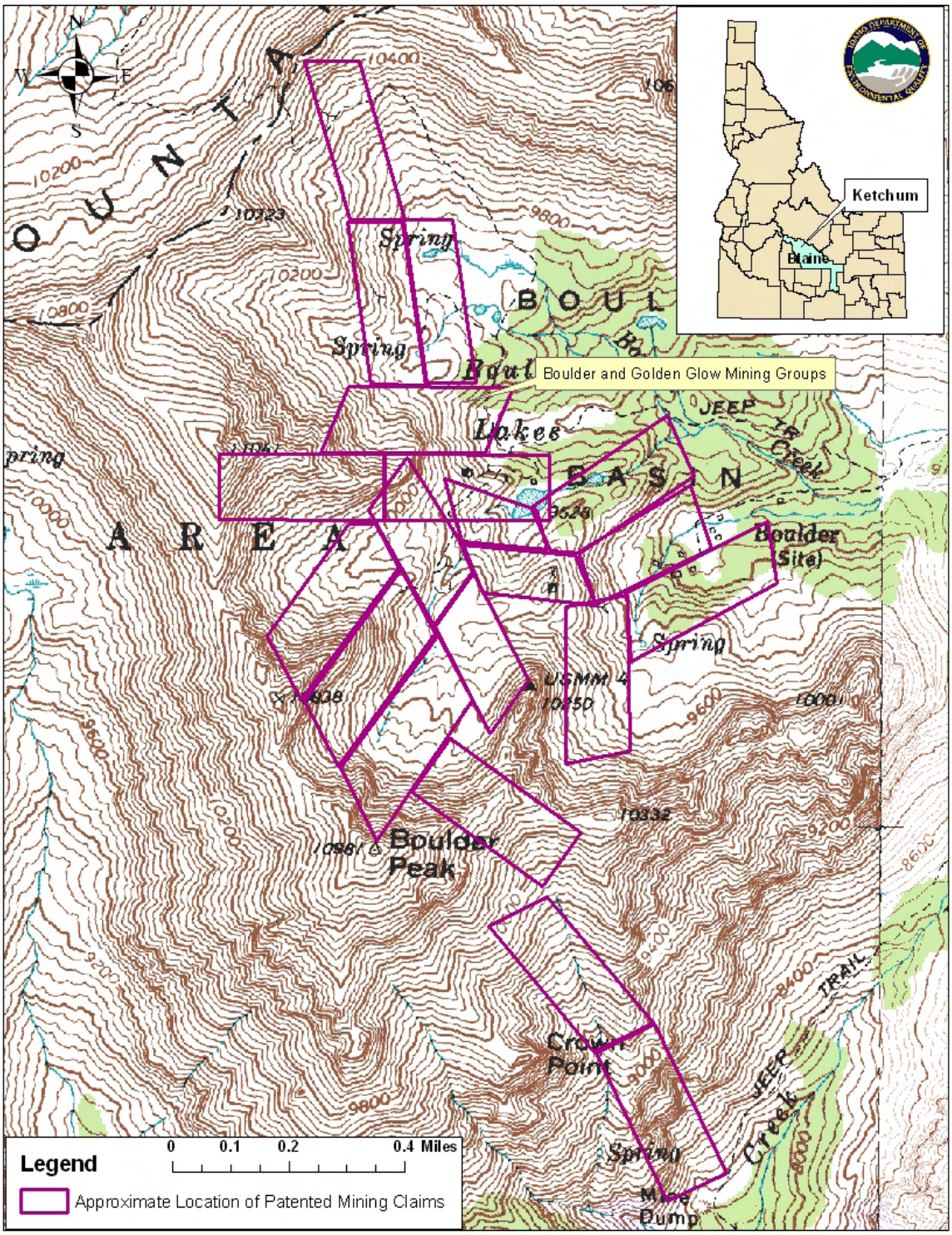


Figure 1. Topographic overview map of the Boulder and Golden Glow Group claims (Source USGS 7.5 Minute Quads).

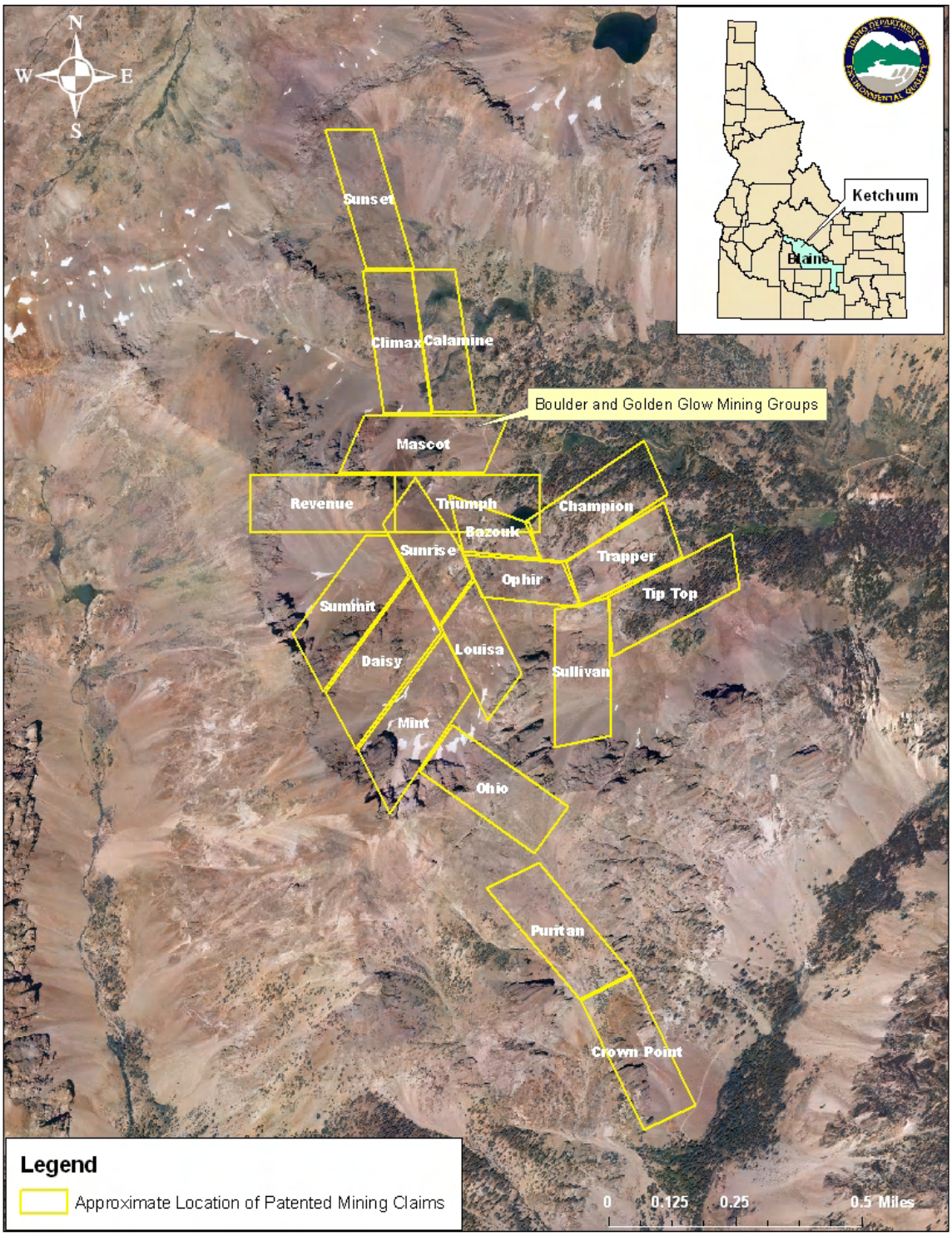


Figure 2. Aerial map of the Boulder and Golden Glow Group claims (Source NAIP 2004).

Section 2. Ownership

The Boulder Basin and Golden Glow claim groups are divided into 20 individual claims. The claims are illustrated on a topographic base map on Figure 1; individual claim names are illustrated on the claim group map on Figure 2. This section identifies the owners of record for the Boulder and Golden Glow claim groups. A summary of the owners and associated claims for each owner is tabulated below. The relative percent of ownership and listed owners is not warranted by the Idaho Department of Environmental Quality (IDEQ). The following names and addresses of owners and their ownership were obtained from the tax rolls at the Blaine County Tax Assessor's Office.

Contacts:	Mine:	Claims and Ownership:
Boulder Lake Lodge LLC P.O. Box 3496 Ketchum, Idaho 83340	Boulder Group	Triumph Champion
Boulder Group LTD Partnership c/o C. Castle 4823 Wocus Road Klamath Falls, Oregon 97601	Boulder Group Golden Glow	Sunrise Sunset Summit Calamine Daisy Climax Revenue Mascot Mint Louisa Ohio
Patricia L. Swenson REV Trust 2119 NE Wasco St. Portland, Oregon 97232	Golden Glow	Bazouk Ophir
USFS C/O Ketchum Ranger District P.O. Box 2356 Ketchum, Idaho 83340	Boulder Group	Trapper Tip Top Sullivan
State of Idaho Department of Lands P.O. Box 83720 Boise, Idaho 83720-0050	Boulder Group	Puritan Crown Point

Section 3. Mine Site History

The Boulder Basin contains a well documented history as it was one of the earliest developed mining districts in the Wood River area. The following information illustrates what was discovered and the amount of production from the late 1800s to the early 1980s when production was halted.

From the Idaho State Historical Society Reference Series, "Boulder Basin Mines", information provided by Larry Jones (November 1996);

After serving as an Army Bannock War scout in 1878, William Schultz returned to Upper Wood River in search of new mineral wealth. He had noticed some interesting possibilities there, particularly in Boulder Basin. Before winter snow drove him out in 1878, he had located several important lode claims with high values in lead-silver and cooper [sic]. *That kind of mining barely was commencing in Idaho, but he spent his entire career after 1878 developing and expanding his Boulder Basin prospects. Returning there after a winter in Nevada, he expanded his initial prospects a year prior to a major mining rush to Wood River in 1880. Fortunately for his enterprise, his ore could be processed without any need for a smelter. Within two more years, forty-two claims had been located in Boulder Basin, and major development of those properties was underway. Yields as high as forty to sixty ounces of silver per ton of ore made those mines attractive, while some lead-silver values (70% lead) ran as high as 100 ounces of silver as well. By 1882, Boulder had a hotel, store, corral, and saloon, along with a post office that ran from August 1, 1881 to August 28, 1885. Fifteen people worked there that winter, and operations continued to expand.*

Significant new discoveries in June and July of 1884, supplying three tons of high value ore each day for pack mules to haul out from that isolated camp, greatly increased Boulder Basin's operations. Because of their steep rocky slopes, cliffs with valuable mineral outcrops above Boulder Basin could be developed into mines with relatively modest expense and effort. Veins a thousand feet deep could be reached through an access tunnel only a thousand feet long--a remarkable opportunity rarely available in mining country. This situation occurred in a camp at an exceptionally high altitude for mining in Idaho. Difficulties of access restricted production there to exceptionally valuable deposits. But enough unusually high grade resources were available to maintain activity there during summer seasons when access was possible.

Finally in 1888, when an average of 1 ½ carloads of ore were still being shipped out for processing, an international collapse in silver prices led to a suspension of Boulder Basin production early in July. By that time, only about 1 ½ carloads of ore per week were coming from lodes there, because of marginal possibilities for profit.

Victoria E. Mitchell and the Idaho Geological Survey describe how production in Boulder Basin originated from property in the Golden Glow and Boulder Consolidated groups, which are adjoining claim blocks in Boulder Basin near the northern boundary of Blaine County (Figure 2).

The Golden Glow group was first located in 1879 and relocated in 1882 (Umpleby, 1915). The present group (consisting of the Ophir, Bazouk, Louisa, Ohio, and Sunrise claims) was patented between 1883 and 1892. The Golden Glow Mining Company also held easement rights on the Trapper, Tip Top, and Sullivan claims, which were patented in 1891 (Van Noy and others, 1986). In 1912, the Boulder Group consisted of twenty-three unpatented claims surrounding the Golden Glow claims and extending down the slope of the creek (Umpleby, 1915). The present group, which is only half of the earlier claim block, was patented in 1929. These claims include the Champion, Revenue, Climax, Mint, Mascot, Triumph, Calamine, Summit, Sunset, Daisy, Puritan, and Crown Point.

In the Fourteenth Annual Report of the Mining Industry of Idaho for the year 1912, the Inspector of Mines Robert N. Bell described;

At Boulder Creek, above Ketchum, the Golden Glow Mining Company have been pushing development on an interesting group of claims carrying some rich shoots of smelting mineral. One of these shoots is 140 feet long and one to eight feet wide, containing values from 30 to 70 per cent lead in the form of galena, with occasional splotches of gray copper ore. Four carloads of crude hand-picked mineral shipped from this property in 1911 had an average sampling value of $100.00 per ton, of which $12.00 was in gold.

There is a total of 2,000 feet of tunnel work on the group, and a raise is now being made to intercept the main ore shoot at considerable depth below which it was worked in the upper tunnel, and some profitable shipments may be expected from this group another year.

The Boulder Creek Mines incorporation in the same vicinity encountered a nice streak of high grade zinc ore in their long development tunnel during the year and additional drifting and cross-cutting are likely to disclose some profitable ore bodies, as the present ore discoveries give evidence of the permanency of the mineral in the vein to considerable depth.

According to Van Noy and others (1986) *Accessible parts of the Boulder Mines have indicated and inferred reserves totaling about 4,000 tons (3,600 t), containing 0.05 oz gold per ton (1.7 g/t), 21.7 oz silver per ton (744 g/t), 8.7 percent lead, and 1.5 percent zinc. An additional several thousand tons of potential silver and lead resources are estimated to occur at the Boulder mines and other mines in the district. No significant concentration of gold or other detrital minerals was found on the placer claims.*

Jeff Gabardi provided information in an email that George Castle, "*loaded and hauled off tailings from below the stamp mill and from several waste rock dumps in the 1940's. The "waste material" was shipped to a smelter in Utah. Due to an increase in the metals prices at the time, the tailings and waste rock became "ore" so they could be processed for precious and base metals at a profit. This reprocessing of "waste material" may have indirectly reduced some long term water quality concerns by removing the unoxidized rock that once exposed to the surface water could generate water quality concerns."*

Section 4. Climate

Climate information provided in this section is based on a climatological summary for Ketchum, Idaho which was obtained from the Western Regional Climate Center. The climatological data was collected at the Ketchum Ranger Station (elevation 5,890 feet amsl), and is for the period of 1973 through 2007. For comparison the evaluation at the floor of Boulder Basin is approximately 9,100 feet. 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 area around the site is characterized by short cool dry summers and very cold winters. The total annual precipitation measured at the Ketchum Ranger Station averages 18.38 inches. The majority of precipitation occurs as snow. Total annual snowfall averages 113.0 inches with most snowfall occurring in December and January. The driest months are June, July, and August.

Based on records from 1973 to 2007, the average annual temperature measured at the Ketchum Ranger District is 43 degrees Fahrenheit (F). The lowest temperature recorded for this period was -37 degrees F in 1990. The highest temperature for this period of record was 98 degrees F in 2002. January is the coldest month with an average temperature of 18.1 degrees F. July is the hottest month with an average temperature of 62 degrees F.

Section 5. General Geology

Figure 3 illustrates the lithology and structural geology of the Boulder Basin. Michael Ratchford provided valuable information about the geology of the Boulder Basin;

The floor of the Boulder Basin is underlain principally by massive quartzite (Pwq) and subordinate, interbedded, limestone and sandstone of Unit-6 in the Wood River Formation. Numerous dikes, sills and small plugs of Tertiary andesite, dacite and rhyolite porphyry constitute roughly 50 percent of the surface exposures. The main mine workings within the study area are located in the floor of the basin and are hosted within thick massive quartzite of the Wood River Formation that is cut by northeast-trending, southeast-dipping, high-angle, Tertiary faults and brittle shear zones. These structures also cut andesite and dacite porphyry, whereas rhyolite porphyry cross-cuts or intrudes the fault and shear planes. As all three porphyries are Eocene age, the faulting and mineralization in the principal mine workings are wholly confined to the Eocene.

The principal ore mineral in the Boulder Basin mines is argentiferous galena with submicroscopic inclusions of freibergite (?) and pyrargyrite (?). These minerals are associated with varying amounts of pyrite, hematite, limonite, sphalerite, chalcopyrite, malachite, covellite, cerussite (?), and bornite... Quartz and calcite are the primary gangue minerals. Sulfides are exposed intermittently as discontinuous lenses and stringers in fault gouge and breccia with minor to negligible disseminations in the adjacent wall rock.

Mineralization is confined to high-level faults and brittle shear planes that cut the sedimentary rocks, although some minor pyrite and galena were noted in andesite porphyry from a mine dump at the Boulder site. These veined ore deposits were emplaced by fissure, open-space filling, and replacement mechanisms.

5.1 Stratigraphy and Lithology

According to Ratchford (2002), *Both the* (Devonian) *Milligen and* (Pennsylvanian to Permian) *Wood River Formations are host rocks for ore deposits in and adjacent to Boulder Basin. The Milligen stratigraphic section is incomplete in the study area due to erosion, faulting, assimilation by Tertiary intrusions, and lack of exposures. The structural and stratigraphic relations of the Milligen Formation are poorly understood, due to a complicated deformational history, repetition of similar lithologies throughout the Milligen stratigraphy, and limited age constraints.*

Sandberg and others (1975) divided the Milligen Formation into a carbonaceous and phyllitic lower member and a more siliceous and heterogenous upper member. Most of the Milligen Formation in Boulder Basin is near the top of the stratigraphic section, on the basis of lithostratigraphic comparisons of similar stratigraphic intervals throughout the Milligen terrane... The Milligen stratigraphic section in Boulder Basin is primarily dark-green, fissile shale that is interbedded with lesser black chert, gray sandy limestone, gray calcareous

quartzite, and black phyllite. The green shale is the primary host rock for mineralization in Milligen strata.

The stratigraphic section in the Wood River Formation is composed of layers starting with matrix-supported, multilithic, chert-pebble conglomerate followed by blue-gray, highly fossiliferous limestone, with principal lithologies in an alternating succession of brown- to maroon- weathering, fine to medium grained, calcareous sandstone and siltite interbedded with light- to dark-gray sandy limestone and fine-grained, siliceous and calcareous gray quartzite. Gray massive quartzite is the primary host rock.

5.2 Structure

Ratchford (1989, p.125) noted the following in regards to the structure of the rocks;

A flat-lying Tertiary fault is mineralized in the western cirque headwall of the Boulder Basin located on the Sunset claim... Tertiary andesite, dacite, and rhyolite porphyry, Challis Volcanics and quartzite of unit-6 of the Wood River Formation are highly sheared and brecciated along this fault.

Another group of northeast-trending, Tertiary faults and brittle shear zones are located southeast of Boulder Basin and encompass the Crown Point, Puritan, and Snug prospects. These faults and shears cut banded metaquartzite (Pmq) and massive quartzite (Pwq) of the Wood River Formation, as well as Tertiary andesite and dacite porphyry.

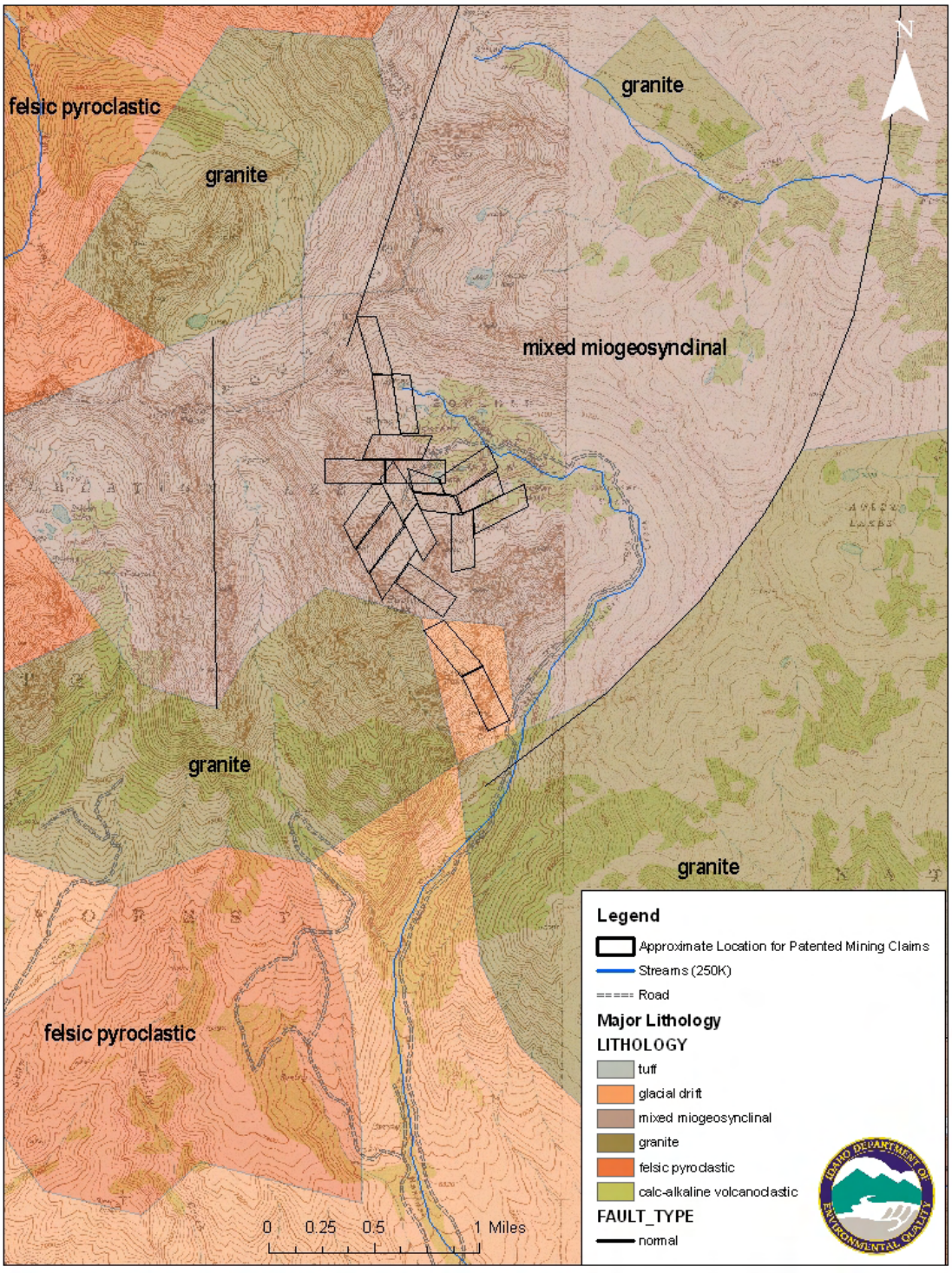


Figure 3. Geologic map of the Boulder Basin area (Source USGS, 1995).

Section 6. Current and Future Potential Beneficial Uses

Current land uses in the area include camping, biking, hiking, hunting, horseback riding and off-road vehicle (ORV) touring. There are multiple fire-rings located in the Boulder Basin meadow east of the mill site and waste rock dumps from the Ophir and Trapper claims. There are no indications of active mining operations.

Due to its remoteness and the potential for avalanches, it is unlikely that full time residences would be developed on the Boulder and Golden Glow groups patented mining claims. There is a potential for development of seasonal housing such as hunting cabins, or housing and mine buildings if mineral values made it conducive to redevelop operations of these claims. However, access to these claims would be an issue as the Forest Service owns the only access road to the mines. There have been no communications with land owners that indicate that there is any desire to develop these claims in the future.

Section 7. Site Conditions and Waste Characterization

Generally speaking, the mine workings in the Boulder Basin are high in elevation and skirt ridgelines. No evidence of springs or drainage was noted from the open or caved adits observed during the field reconnaissance. Small active tributaries of upper Boulder Creek were observed beneath the workings of the Sullivan and Trapper claims. Water samples were collected from the background area of the waste dumps and in the stream below the claims.

Accuracy for the location of mine openings and waste dumps on the claim is questionable because mapping was conducted using GPS, county maps, and patented plat maps, none of which have been tied together by a land survey. Therefore IDEQ does not warrant information presented on the maps or diagrams contained in this PA.

Due to the large number of mining claims in the area, three blocks were created. The first block of mine claims at the entry of the Boulder Basin (Ohio, Puritan, and Crown Point) were the first observed. The Ohio and Puritan are located on steep rock faces with limited access. The southeastern portion of the Crown Point claim nearest to Boulder Creek includes a portion of Forest Road 158. The USGS Easley Hot Springs topographic map calls out a “Mine Dump” at this location near the road. The dump is located immediately adjacent west of the road as illustrated in Photo 1. The orange-brown color of the dump is conspicuous in contrast to the surrounding gray country rock talus slope. The dump surface is primarily composed of reddish-brown, fine grained oxidized material with lesser amounts of gray, silicified rock fragments. A sulfide odor was apparent in the vicinity of the dump, and foot traffic readily produced dust on the dump surface.

The adit (Adit #5) is mentioned in historical documents as being part of a Hardrock Tunnel driven from the Crown Point claim toward the main ore zone...but was never completed. (Mitchell, p.18) A soil sample was taken because of the close proximity to the road and evidence of recreational vehicles on the road to the dump. The adit (Adit #5) is collapsed. The Boulder Creek stream channel runs east of the dump, approximately 300 feet from the dump area. The area between the dump and the creek is composed of large angular country rock talus and a well established riparian buffer zone. No evidence was found of the oxidized material eroding across the road and towards the creek.

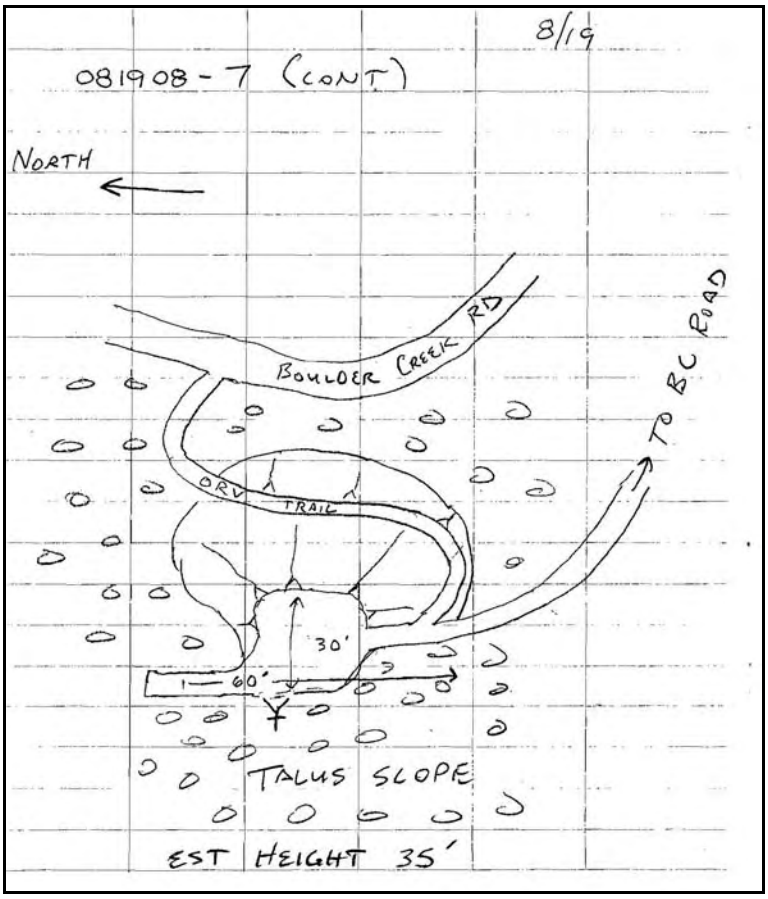


Figure 4. Sketch of Adit #5.



Photo 1. Mine dump and collapsed Adit #5 on southeast portion of Crown Point claim. View to southwest.



Photo 2. View of collapsed Adit #5 on the Crown Point patent claim.

The second mining claim block observed included the Sunset, Climax, Calamine, Mascot, Revenue, and Triumph claims. Of these, the first three were located on steep outcrop and slope faces with no trail or road access. Several small exploratory adits and pits were observed on these claims. Due to the lack of ready access, no additional characterization work was performed on these claims.

The Mascot claim is traversed by an ORV trail at the northeast corner of the claim. An open adit (Adit #1) was observed in the southeast corner, possibly on USFS property. Adit #1 consists of an inclined shaft approximately ten feet deep, beyond which the adit is collapsed. Bent steel ore car rails extend onto the apron below the adit. An ORV trail is located on top of the tailings adjacent to the adit. Adit #1 and immediate vicinity are shown in Photos 3 and 4.

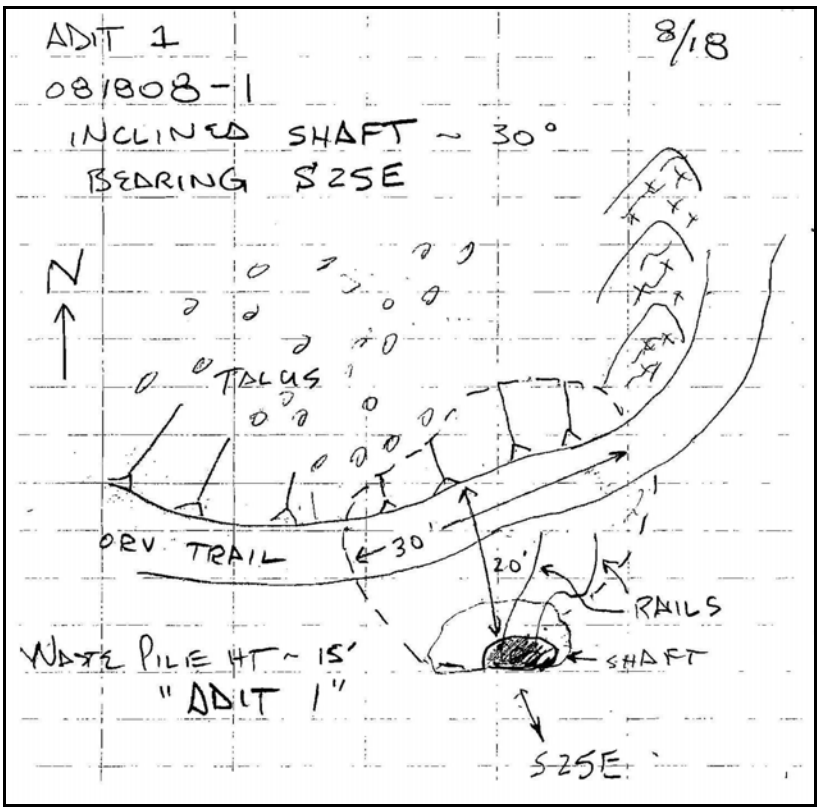


Figure 5. Sketch of Adit #1.



Photo 3. View of exposed Adit #1 on ORV road.



Photo 4. Close-up of exposed Adit #1 shaft in Upper Boulder Basin.

The second adit (Adit #4), possibly on the Triumph or Mascot claim, is located just north of a hairpin turn on the ORV road ascending east of Boulder Lake. This adit is approximately 400 feet west-southwest and up-slope from Adit #1 described above. A short scramble from the ORV road along the top of the dump gains access to the adit. The horizontal adit extends at least 40 feet into the mountain. The adit is intercepted by two open, vertical shafts approximately 25 feet from the entrance. The first shaft was spanned by wooden planks to allow access to the second shaft. Garbage and food container refuse was observed inside this adit, suggesting recent occupation. Photo 5 shows the mouth of the adit, and Photo 6 shows the shafts in the adit floor.



Photo 5. Unnamed Adit #4, possibly on Mascot or Triumph claim, note traces of refuse in adit.



Photo 6. Unnamed Adit #4, Planks lying across first shaft in adit.

The third block of claims observed included the Sunrise, Summit, Daisy, Mint, Bazouk, Ophir, Louisa, Sullivan, Trapper, Tip-Top and Champion claims. The majority of the mining activity was centered on this claim block. The most significant features are located on the Trapper and Tip Top claims, and include a collapsed shaft, two large dumps, remnants of an aerial tram, and a mill. The lower tram station pad, tram cable, and dumps are visible in Photo 10. The adit and dumps are accessible via an ORV trail.

The workings are located on the east-facing slope of a prominent feature labeled as "9880" on the Easley Springs topographic map. Within the context of this report, this feature is referred to as Hill 9880.

It is apparent from the degree of disturbance that Hill 9880 was the focus of exploration and production activity. In addition to the working described above, the area surrounding Hill 9880 in the Champion, Trapper, Triumph, Bazouk, Tip-Top and Sunrise claims is pocked with numerous adits and shallow pits as illustrated in Photos 7 and 8. The adits are located on the steep rock faces of Hill 9880 (Photo 7) and are virtually inaccessible without technical climbing gear. The shallow pits observed were less than six feet deep. There are many of these pits located west of Hill 9880 and accessible from ORV roads.

The remainder of the claims in this block, the Revenue, Summit, Daisy, Mint, Ophir, Louisa, and Sullivan claims are located on steep outcrop faces and talus slopes. Direct access to these claims was not performed in this reconnaissance.

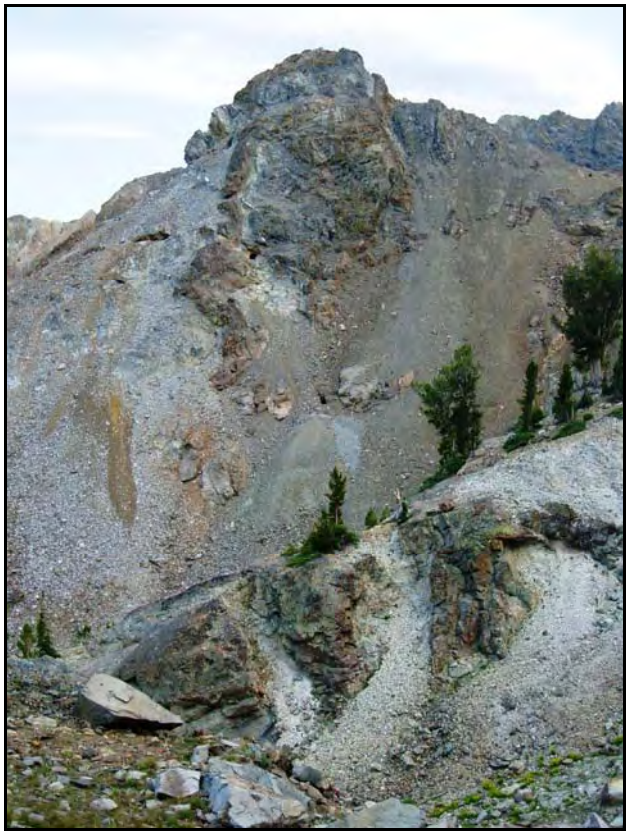


Photo 7. Northwest side of Hill 9880. View to southeast.



Photo 8. Detail of northwest side of Hill 9880. Note two adits (dark holes) and small dumps on steep slope face.



Photo 9. Side-view of upper dump on the Trapper claim facing north. The shaft, located on photo left near the packs, is collapsed.



Photo 10. View southwest from lower tram pad (receiving station). Note the aerial tram cable leading to the main adit and two waste dumps. The upper dump is gray, the lower dump is reddish brown.

The dumps are clearly separable by color. The upper dump is covered with light gray rock, the lower dump is covered with reddish-brown rock. Photo 9 shows a lateral view of the shaft area and upper dump. An old timber-frame ore loading bin is located on the lower dump.

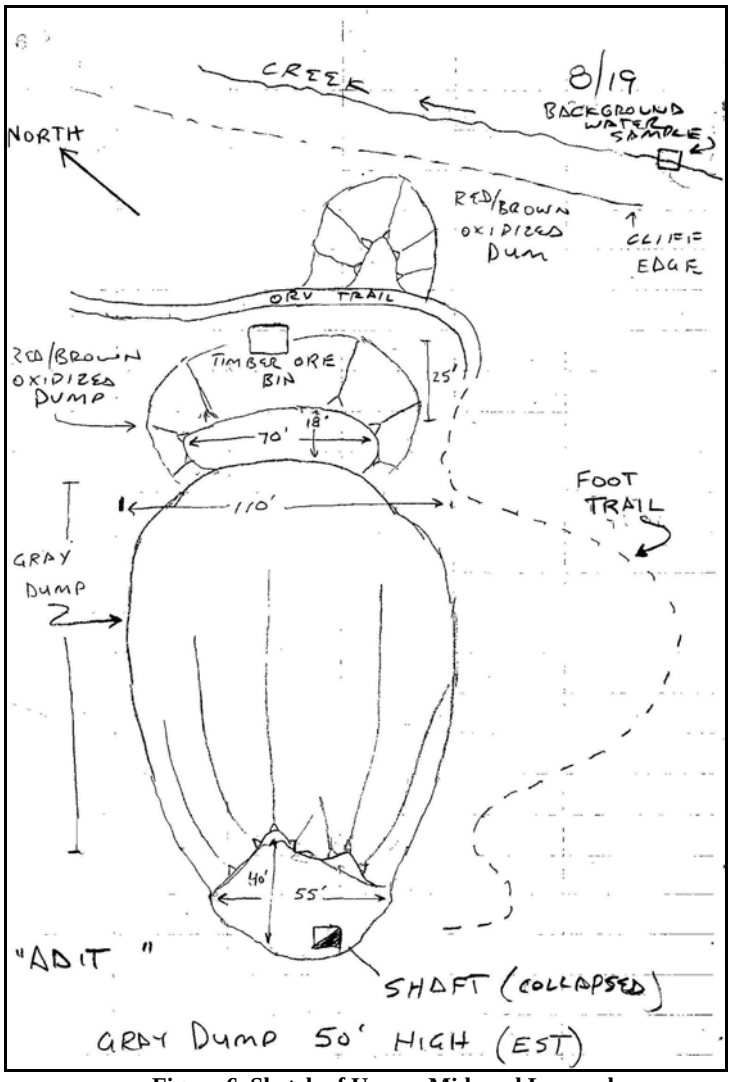


Figure 6. Sketch of Upper, Mid, and Lower dumps.

A small tributary of upper Boulder Creek was observed below the lower dump. Two water samples were collected from this creek above and below the areas disturbed by mining activity. Rockslides and avalanches have transported reddish-brown oxidized rock fragments similar in composition to the lower dump material into the creek. Because there is abundant natural outcrop of this material, it is difficult to differentiate what portion of the reddish-brown rock in the creek bottom originated from the workings and what is naturally-occurring.

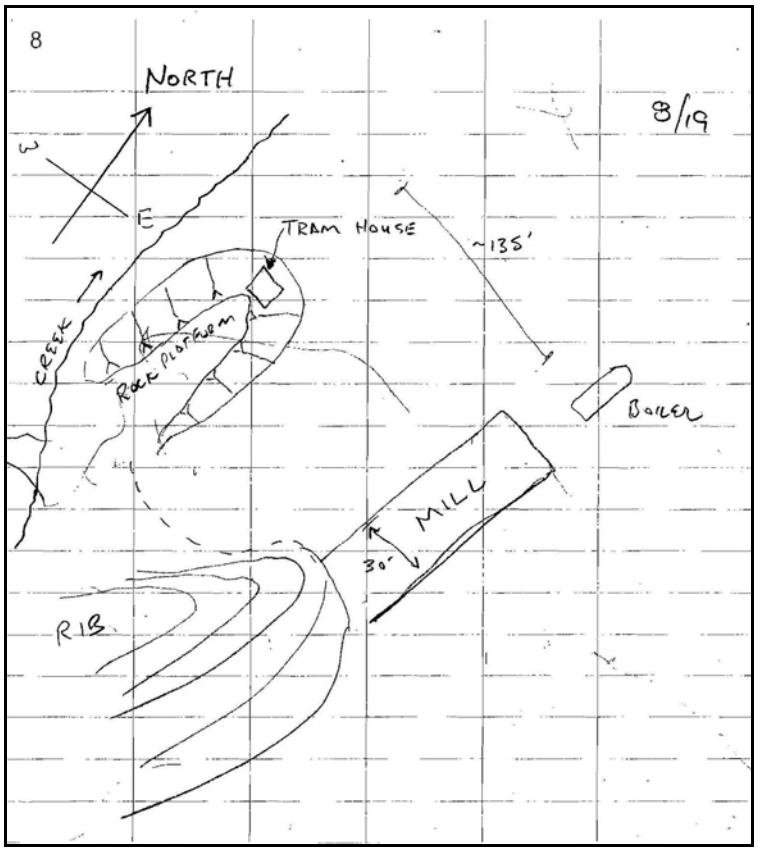


Figure 7. Sketch of lower tram receiving station.



Photo 11. View of mill facing southwest.

The mill consists of a three-story, wood frame structure in poor condition (Photo 11). The roof and portions of the walls have collapsed. Large metal screening drums are braced in overhead positions on the upper floors, and building debris including studs with protruding nails, metal drive-train components and flues were observed in and around the mill. The mill is easily accessible by a number of ORV roads and foot trails. Pictures of this mill site are on display at the SNRA Headquarters near Ketchum, and Forest Service brochures encourage people to explore the area.



Photo 12. View facing southeast from Trapper claim tram receiving station dump. Note remnants of the mill on the right side of the photo.

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Photo 13. View west to Boulder Basin (center-right in trees), main dumps on Trapper claim (gray spot on photo left, and Hill 9880 profiled in the saddle in the upper left).

There are multiple fire-rings in the floodplain area below the mill site. The creek cuts through the toe of the dumps and meanders out into the meadow where Boulder City was located. There are multiple ORV tracks in the camping area and on the dumps, as shown in Photo 12.

There was no evidence of open adits found in the Lower Boulder Basin area contrary to historical documentation. In a phone conservation with Jeff Gabardi (SNRA), information was provided that the USFS went out to their land in July of 2004 and collapsed and foamed the adits.

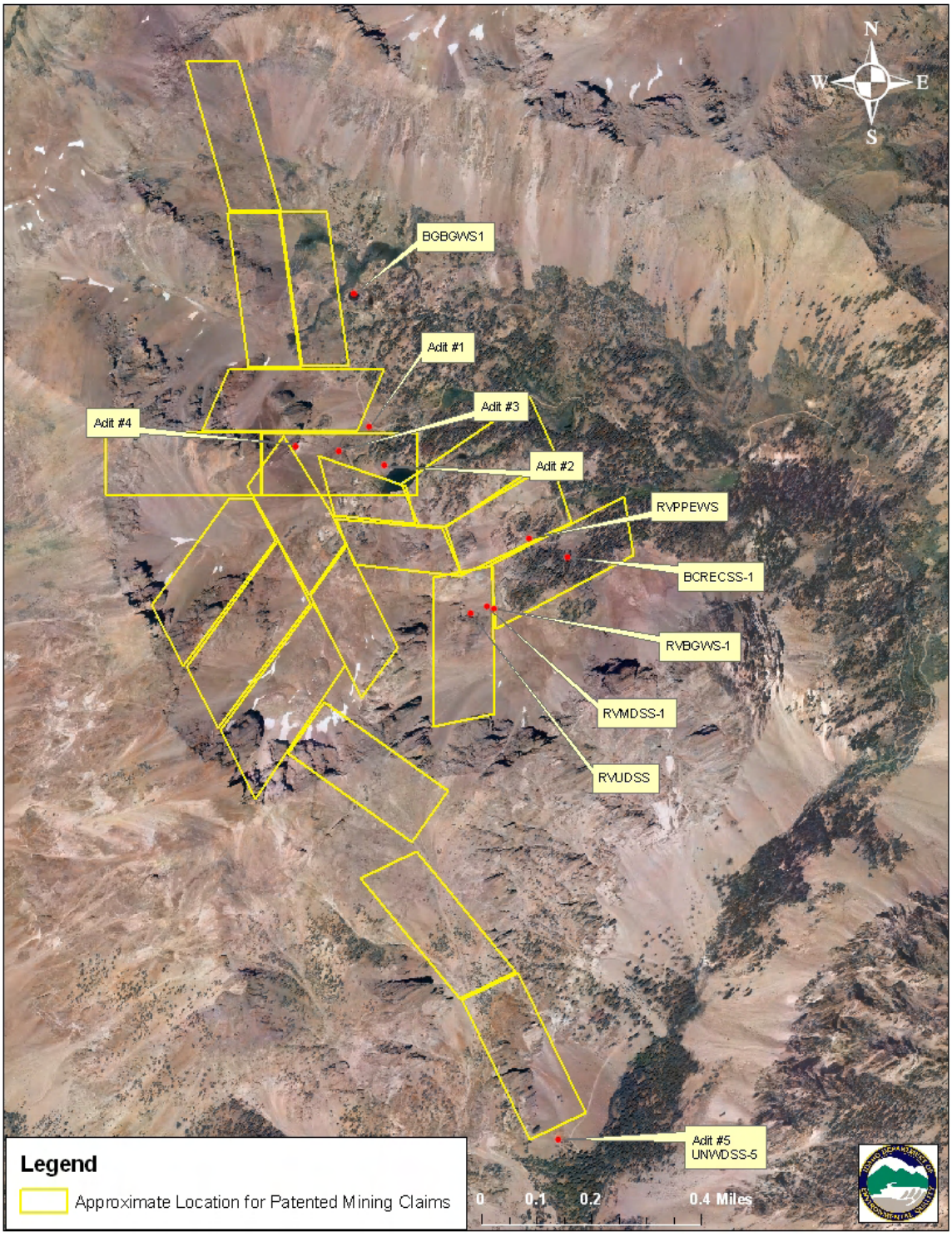


Figure 8. Aerial map with sampling locations (Source NAIP 2004).

7.1 Sample Collection

A total of 4 soil samples and 3 water samples were collected for laboratory analysis. A matrix identifying sample number, location, sampling rationale and field parameters is provided in Tables 1-3. Sample locations are indicated on Figure 8.

The soil samples were sieved prior to shipping to the laboratory. Material passing the +10 mesh was retained for laboratory analysis. Laboratory equipment in direct contact with the samples was decontaminated before screening began, and between each sample.

The soil and surface water samples were submitted in accordance with EPA Chain-of-Custody procedures to Silver Valley Laboratories, Inc. in Kellogg, Idaho for analysis of RCRA 8 Suite + copper and zinc. A copy of the laboratory report is included as Appendix A. A summary of the laboratory results is included in Tables 1 and 2.

A brief narrative of the sample locations and pertinent observations is included in the following section.

The first soil sample was a surface grab sample collected from the Crown Point dump (UNWDSS-5). The analysis is contained in Table 1. Sample UNWDSS-5 was coarse (+50% +10 mesh) light gray to orange, and contained no visible organic materials. The sample was collected in an area of the dump where some sulfide material was noted. The sample is, perhaps, representative of the vein material, but not the host rock material that dominates the other waste rock dumps.

One background water sample was taken from the lake in the Upper Boulder Basin (BGBGWS-1).

The remaining samples were collected from the area of recreation in and above the Boulder City town site. The following samples with an RV prefix were collected from what was designated in the field as the Revenue claim. These sampling locations are actually on the patented Trapper and Tip-Top claims. The first surface grab soil sample in this area (RVUDSS) was collected from the Upper dump which is the largest dump in the Boulder Basin. This dump contains approximately 1,356 cubic yards of gray silicified waste rock. Visible sulfides in hand specimens from this dump included pyrite, chalcopyrite, sphalerite, and galena. The sample was mainly fine grained to sandy with over 50% passing the 10 mesh screen. There were no signs of organics and some indications of sulfide or oxide ore. The sample was taken from the top of the slope.

The second surface grab soil sample (RVMDSS-1) was collected from the mid dump below the upper dump. This dump contains approximately 1,000 cubic yards of waste rock. Soil sample RVMDSS-1 contained a mixture of gray host rock with red and brown oxidized staining which is perhaps, representative of the vein material, but not the host rock material that dominates the Boulder Basin rock dumps. The sample was mainly fine to coarse grained with over 60% passing the 10 mesh screen. There were no signs of organics and few indications of sulfide or oxide ore.

The third surface grab soil sample (BCRECSS-1) was collected from the Boulder City recreational area where evidence of numerous ORVs were observed. The soil sample was taken from the coarse gravel pile on the flat area east of the mill. The gravels were angular and well sorted, and appeared to be mine process waste material. The gravels appeared to be organized in large gravel bars, suggestive of mechanized transport and disposal. The sample was mainly coarse grained with over 30% passing the 10 mesh screen. There were no signs of organics and some indications of sulfide or oxide ore.

Two water samples were collected in the Boulder City area. The first surface water sample (RVBGWS-1) was collected from a spring that runs above the upper dump and through the lowest dump into the recreational area. The water appeared to be clear and had no discoloration or odor.

The second surface water sample (RVPPEWS) was collected from the stream below the dumps. This area was deemed the probable point of entry (PPE) as it runs into the recreational area.

7.2 Sample Analysis

Essentially, the mine waste soil concentrations for total arsenic, total cadmium (except RVUDSS1), total lead, total mercury, total selenium, total silver, and total zinc (RVMDSS1, BCRECSS1) exceed Idaho's *Initial Default Target Levels* (IDTLs). These IDTLs are risk-based target levels for certain chemicals that have been developed by IDEQ using conservative input parameters, a target acceptable risk of 10^{-6}, and a *Hazard Quotient* of 1. An exceedence of the IDTLs indicates that if pathways are complete, and receptors can get a prolonged exposure to contaminants from the site, then additional site assessment work may be necessary to qualify true risk under current site conditions. An exceedence of the IDTLs may also be indicative of risks that may evolve under new site conditions if the site conditions change such as development for residential uses.

Table 1: Total Recoverable Metals Analysis (mg/kg) Soil Samples

Boulder Basin Soil Samples

Description	IDTLs	EPA Region 6 HHSLs	Sample No. UNWDSS5	Sample No. RVMDSS1	Sample No. BCRECSS1	Sample No. RVUDSS1
	Units:	Mg/Kg				
Arsenic	0.391	22	**38.4**	**305**	**83.1**	**<2.5**
Barium	896	16000	31.8	70.6	53.5	27.4
Cadmium	1.35	39	**2.73**	**61.5**	**75.9**	0.35
Chromium	2130	210	41.0	33.9	43.7	19.8
Copper	921	2900	41.5	**2920**	**4780**	26.2
Lead	49.6	400	**54.7**	**55,600**	**62,800**	**82.2**
Mercury	0.00509	23	**0.662**	**6.52**	**3.15**	**0.222**
Selenium	2.03	390	**9.5**	**155**	**190**	**<4.0**
Silver	0.189	390	**5.39**	**474**	**602**	**<0.50**
Zinc	886	23,000	54.9	**9170**	**12,900**	69.4

***** Method Detection Limit (MDL)

Total arsenic, total cadmium (except RVUDSS1), total copper (RVMDSS1, BCRECSS1), total lead, total mercury, total selenium, total silver, and total zinc (RVMDSS1, BCRECSS1) also exceed EPA region 6's Preliminary Remedial Goals. These numbers, although used for comparison even at remote locations, are more applicable in locations where these types of contaminants are determined to be readily available to receptors, where exposures might produce an acute or chronic toxicological effect in a population.

Table 2: Total Recoverable Metals Analysis (mg/L) Water Samples

Boulder Basin Water Samples

	IDTLs MCL by default, (RB)Risk Based	EPA Region 6 HHSLs Residential Water MCL	IIDEQ Cold Water Biota Standard Acute	IIDEQ Cold Water Biota Standard Chronic	Sample No.	Sample No.	Sample No.
Description	Units: Mg/L				BGBGWS1	RVPPEWS1	RVBGWS1
Arsenic	.01	.01	0.34	0.15	<0.025	<0.025	<0.025
Barium	2.00	2.00	N/A	N/A	0.0055	0.0075	0.0833
Cadmium	.005	.005	0.0013 (H)	0.0006 (H)	<0.0020	0.0069	<0.0020
Chromium (Total)	.1	N/A	N/A	N/A	<0.0060	<0.0060	<0.0060
Copper	1.30	1.30	0.017 (H)	0.011 (H)	<0.010	0.108	<0.010
Lead	.015	.015	0.065 (H)	0.0025 (H)	<0.0075	**0.807**	<0.0075
Mercury	.002	.002	N/A	N/A	<0.00020	<0.00020	<0.00020
Selenium	.05	.05	0.020 (T)	0.005 (T)	<0.040	<0.040	<0.040
Silver	.0521 (RB)	N/A	0.00034 (H)	N/A	<0.0050	<0.0050	<0.0050
Zinc	3.13 (RB)	N/A	0.120 (H)	0.120 (H)	<0.0100	0.487	<0.0100

- **Secondary MCL (T) – Standard in Total (H) – Hardness dependent @ 100 mg/L. Values highlighted in Green exceeds all screening levels.**

Table 3: Field Parameters for Boulder Basin

Field Parameters		
Parameters	Upper Boulder Basin Lake	Spring above Boulder City
pH	8.8 std. units	7.31 std. units
Specific Conductance	.018 µsiemen/cm	.072 µsiemen/cm
Turbidity	2 NTU	105 NTU
Dissolved Oxygen	6.4 mg/L	9.67 mg/L
Temperature	23ºC	5ºC

While the soil samples exhibited high concentrations of constituents of concern, the majority seem to remain in and on the dumps. One exception is found in the samples around the Boulder City recreational site below the main dumps on the Trapper claim. Sample RVMDSS1 (the mid-dump above the recreational site) has 55,600 mg/kg of lead. The next sample BCRECSS1 (area of recreation below the dumps and mill) has 62,800 mg/kg of lead. The background water sample from the stream above the dumps shows <0.0075 mg/L whereas the water sample from below the dumps shows 0.807 mg/L. There is a potential for contamination to occur in acute doses to people who may recreate in this area.

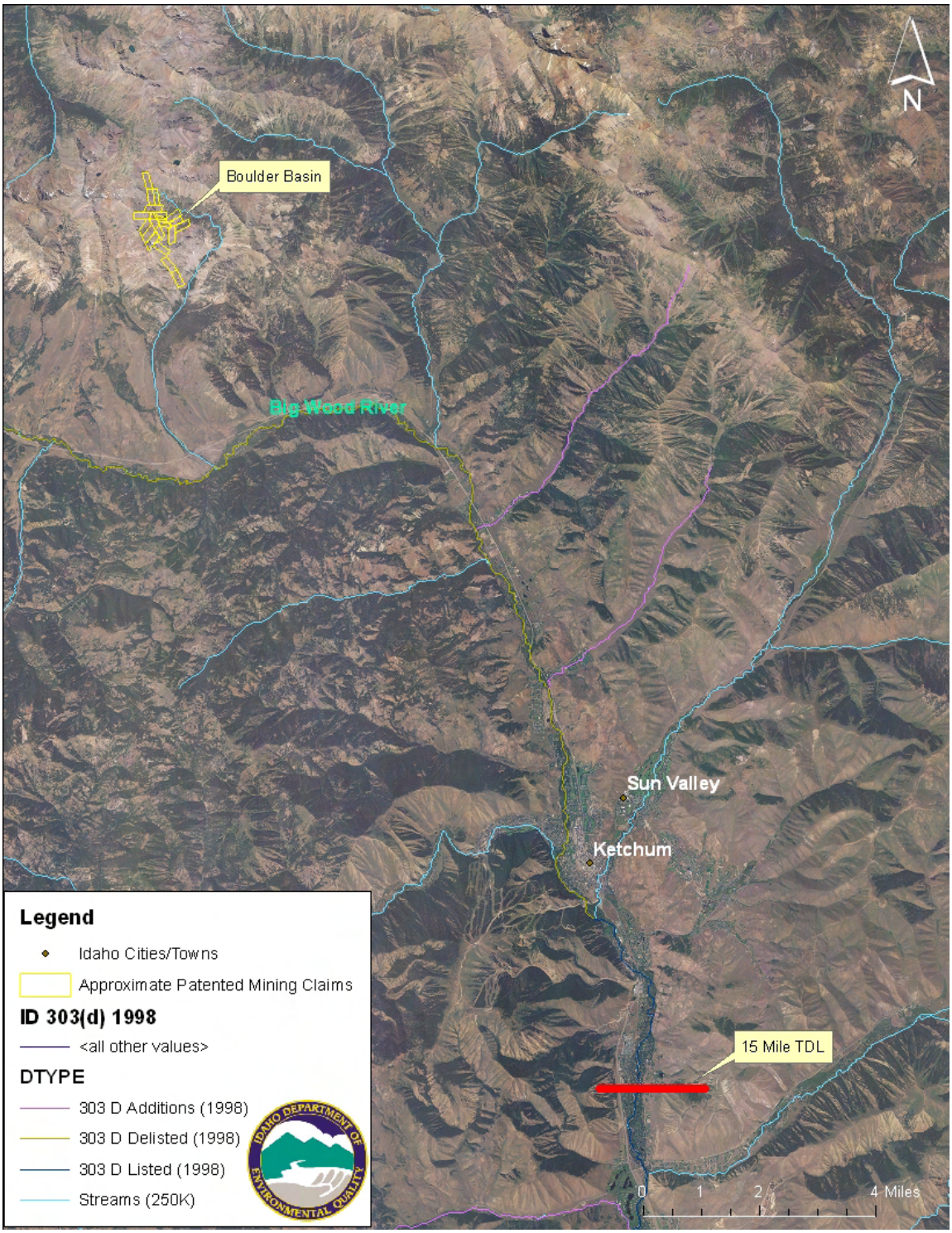


Figure 9. Surface water 15-mile Target Distance Limit (TDL) from the preliminary assessment site (Source NAIP 2004).

Section 8. Pathway and Environmental Hazards

8.1 Surface Water Pathways

There does not appear to be significant erosion features on any of the mine dumps, and there is no indication that large quantities of the mine wastes have made their way from the open pits and mine waste dumps into the ephemeral drains below any of the claims, with the exception of the elevated lead concentrations in the recreational area. The nearest perennial drain appears to be Boulder Creek, which is approximately 2 miles below the lowest waste dump. Therefore, there does not appear to be a significant surface water pathway.

8.2 Ground Water Pathways

Although there may be some infiltration of meteoric waters, the surface areas of the mine waste dumps and the extent of the underground workings, which are near the ridge top, are insignificant when compared to the ground water recharge area of the entire sub-watershed. Therefore, the ground water pathway appears insignificant.

8.3 Air Quality Pathways

Generally speaking, mine waste on dumps was very coarse with very few fines that might be subject to suspension on the wind. In fact during the site visit, the normal afternoon thermal activity did not seem to cause any suspension at all. Therefore, it appears there is no complete airborne pathway.

8.4 Soil Exposure

When compared to the Idaho *Initial Default Target Levels* (IDTLs) for "unrestricted uses", particularly residential, at the mines soil exposure is considered to be elevated for all receptors, due to the high concentrations measured in the soil samples. These IDTLs are risk-based target levels for certain chemicals that have been developed by IDEQ using conservative input parameters, a target acceptable risk of 10^{-6}, and a *Hazard Quotient* of 1. These values are designed to aid in the development of clean-up and remediation goals that would allow the closure of a site based on the risks associated with various receptors for specific media to be less than 10^{-6}.

According to IDEQ's Risk Evaluation Manual (REM) if pathways are complete, or pathways are anticipated to become complete, and the IDTL's are exceeded for any constituents, two options should be considered:

1. Adopt the IDTLs as the cleanup levels and develop a *Risk Management Plan* (RMP)
2. Perform a more detailed, site-specific evaluation, which includes developing site-specific background concentrations for comparative purposes.

There are indications these waste dumps are frequented by human receptors. The register at the head of the Boulder Basin trail had 28 signatures in the span of 4 days. Signs of ORV tracks and refuse are readily apparent on the dumps and in the accessible open adits.

8.5 Domestic Wells and Public Water Supplies

There are only three domestic drinking water supplies and no public drinking water supplies within a four mile radius of the mine. The two domestic drinking water supplies are located approximately 3.5 miles from the site are more likely affected by watershed wide sources of contaminants than by these mine sites.

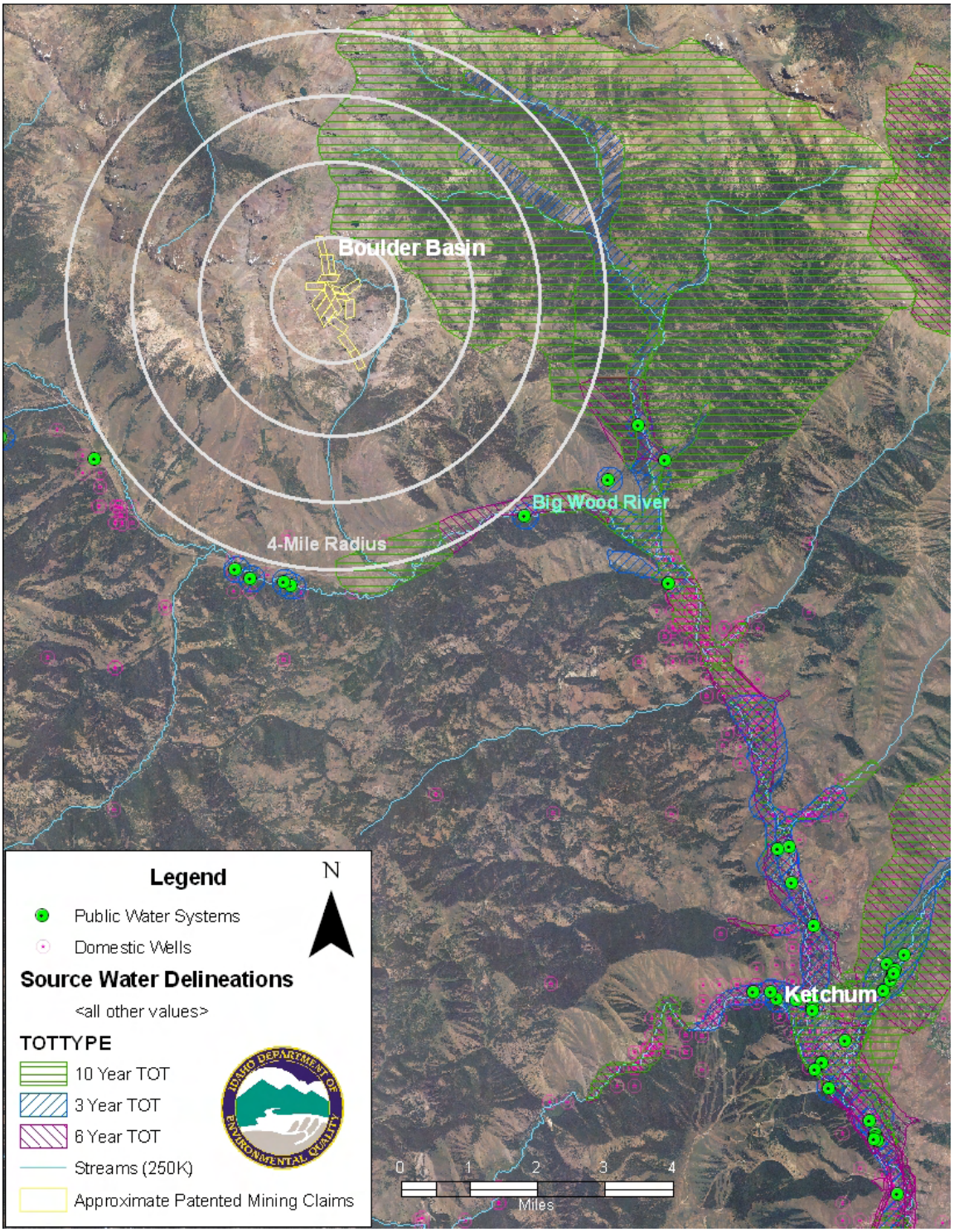


Figure 10. Domestic wells and public water system wells located within a 4-mile radius of the Boulder Basin Mines (Source NAIP 2004).

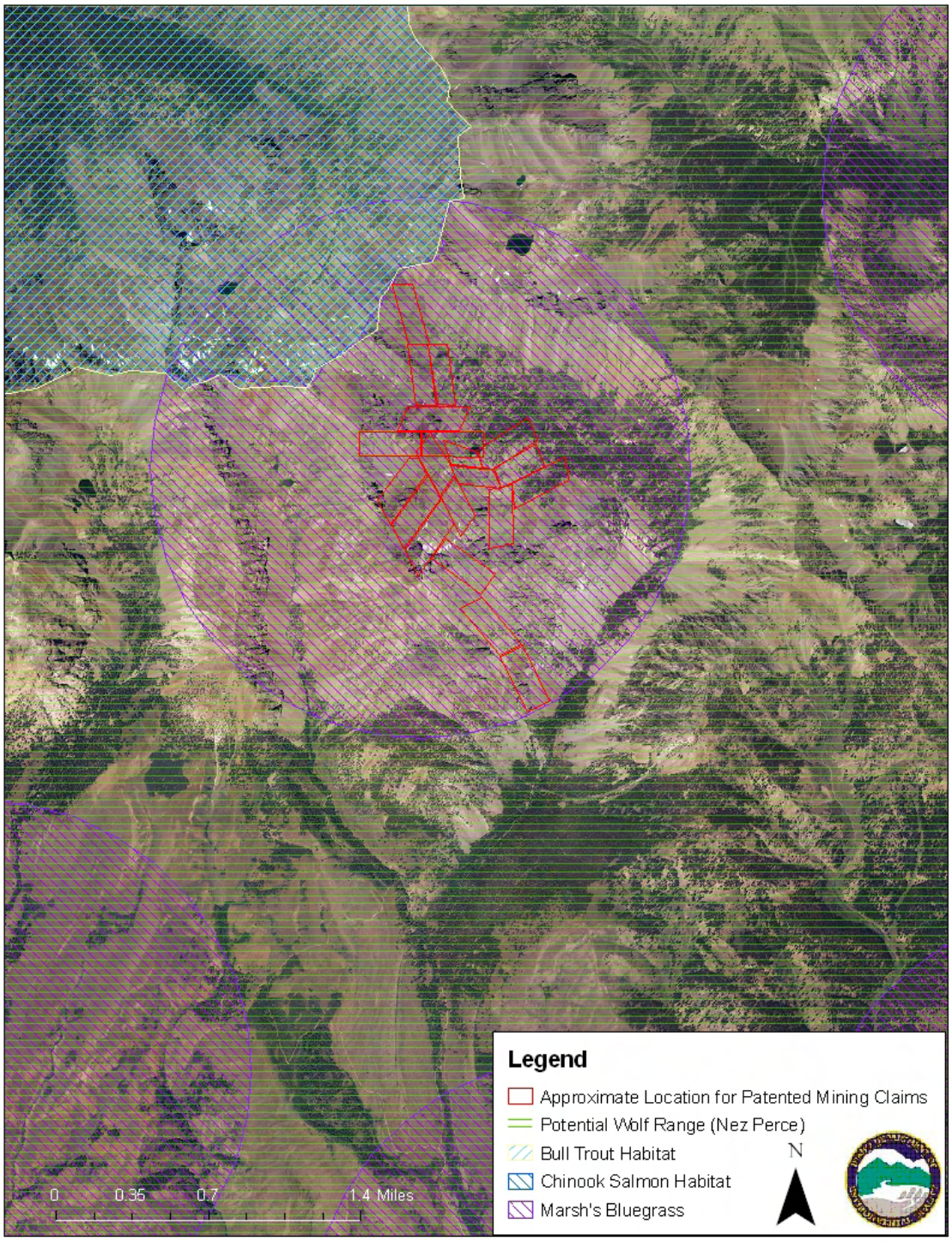


Figure 11. Sensitive species identified in the vicinity of the preliminary assessment site (Source NAIP 2004).

8.6 Sensitive Species (Plant and Animal)

Although the site is located within a defined range and habitat for wolves and a defined range for Marsh's Bluegrass, the size of the dumps relative to the total range is very minuscule and therefore unlikely to be a significant source for exposure.

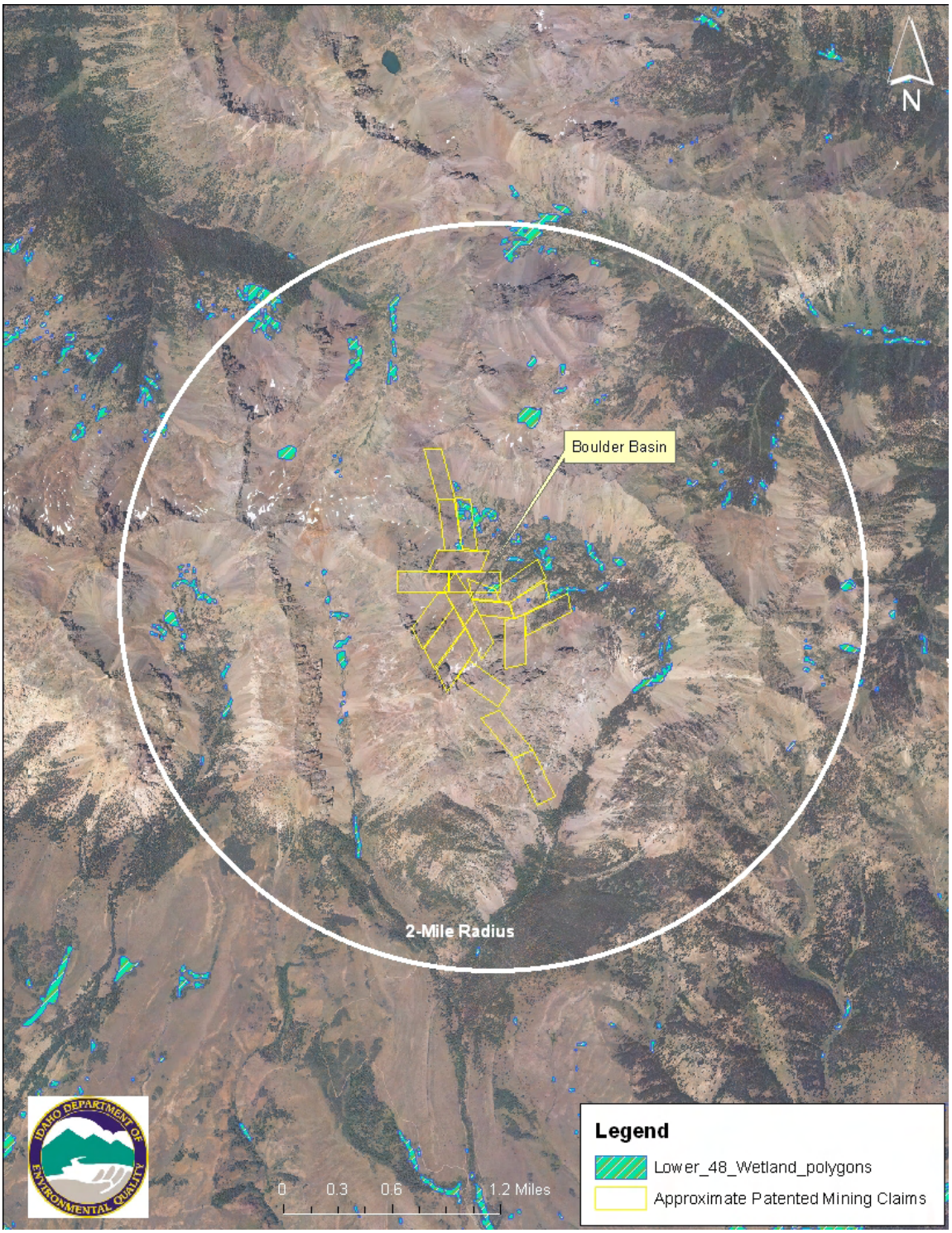


Figure 12. Wetlands located within 2-mile radius of the Boulder Basin and 15-mile Target Distance Limit (TDL) (Source NAIP 2004).

8.7 Wetlands

There are significant wetlands along Boulder Creek approximately ¾ mile below the mine sites. However, there was no appreciable evidence of erosion of mine dumps and no delivery to the ephemeral drain apparent. Therefore, it appears that there was no overland delivery of mine wastes to Boulder Creek below.

8.8 Fisheries

Fish presence/absence studies have not been conducted on Boulder Creek to confirm any fish species that may reside in this stream. There were no fish visually observed in Boulder Creek. Redband rainbow trout [*Oncorhynchhus mykiss* gairdneri], mountain whitefish [Prosopium williamsoni], wood river sculpin [Cottus leiopomus], and brook trout [Salvelinus foninalis] are present within the Big Wood River (IDFG, 2000).

8.9 Sensitive Waterways

There are no Clean Water Act 303(d) listed streams immediately down gradient from the site, which might be adversely affected by contaminant delivery from the site.

8.10 Residences, Schools and Day Care Facilities

The nearest residence is approximately 3.5 miles due east of the mine site.

The nearest Day Care or School Facility is more than 6 miles due east of the mine site.

8.11 Livestock Receptors

There are no indications that the area is used for livestock grazing. However, there are indications that hunters have seasonally grazed horses and mules on a seasonal basis.

Section 9. Summary and Conclusions

Based on existing conditions and uses, historic information, data observations made during the site visit, and analysis of the mine wastes, potential pathways of contaminants to receptors, and potential exposures to ecological and human receptors, IDEQ has determined that No Remedial Action is Planned (NRAP) for the referenced properties and mine sites. However, should site conditions or uses change in the future, owners of these properties would be well advised to incorporate more detailed site assessment and perhaps risk management in their development and/or operating plans. IDEQ has noted numerous physical hazards on the properties, specifically the open adits (Adit #1 and Adit #4) on the Forest Service property and the Triumph claim respectively. These are beyond the scope of IDEQ's risk analysis. However, these openings are extremely dangerous and should be permanently closed or have access to them restricted.

The Boulder Basin recreational area sample results are of concern because of the human health risk receptors. There was evidence of people camping in the area (fire rings, trailhead register) and with the lead levels greatly exceeding the Initial Default Target Levels (IDTLs) and the EPA Human Health Screening Levels (HHSLs), measures should be taken to reduce or eliminate the risk.

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