# Black Spar Mine

**aka**

**Silver Spar Mine**

**(Black Spar, True Blue, USA, Black Spar Fraction, White Spar, Edna M Fraction, Sunnyside, Good Hope, Silver Wedge, Geneva, Lost Ben Ross, Little Joe, Moonlight, Dorothy I, Bogard, May, Silver Tip, Little Wonder, Great Northern, Lucky Boy Patented Mining Claims)**

# Preliminary Assessment Report

Blaine County
State of Idaho

## Department of Environmental Quality

October 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

October 27, 2008

Mr. Frank Everett
Barlow Development, LLC
10801 Main St. Ste. 220
Bellevue, WA 98004

RE: Site Assessment of the **Black Spar Mine**(aka Silver Spar Mine, aka patented Mining Claims Black Spar, True Blue, USA, Black Spar Fraction, White Spar, Edna M Fraction, Sunnyside, Good Hope, Silver Wedge, Geneva, Lost Ben Ross, Little Joe, Moonlight, Dorothy I, Bogard, May, Silver Tip, Little Wonder, Great Northern, and Lucky Boy)

Dear Mr. Everett:

The Idaho Department of Environmental Quality (IDEQ) has completed a review of historical mining data and geological information of the above referenced mining claims. Subsequent to that review, IDEQ conducted a site visit of the Black Spar Mine. During this site visit, mining facilities were mapped and sampled to complete a Preliminary Assessment (PA).

PAs are conducted according to the Federal Comprehensive Environmental Response, Compensation and Liabilities Act (CERCLA). The reasons to complete a PA 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 also completed PAs under contract with the U.S. Environmental Protection Agency in order to identify risks to human health and the environment, and make recommendations to land owners regarding how risks might be managed, if necessary.

Based on existing conditions and uses and historic information, mine and mill wastes and spring water samples were collected during the site visits. Subsequent to our analysis IDEQ has determined that No Remedial Actions should be Planned (NRAP) for these properties. Furthermore, EPA should not calculate a hazard ranking Score for this site.

Please call me if you have any comments, questions, or I may be of any other assistance. We very much appreciate any feedback you can give us relative to our services.

Sincerely,

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

BAS:BG:tg

Attachment

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

## Section 1 Introduction

The Idaho 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 preliminary assessments at various mines within the Mineral Hill 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 poses the most substantial threat to human health or the environment.

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

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

This document presents the results of the preliminary assessment (PA) of the Black Spar Mine (aka Silver Spar Mine, aka Black Spar, True Blue, USA, Black Spar Fraction, White Spar, Edna M Fraction, Sunnyside, Good Hope, Silver Wedge, Geneva, Lost Ben Ross, Little Joe, Moonlight, Dorothy I, Bogard, May, Silver Tip, Little Wonder, Great Northern, Lucky Boy Patented Mining Claims.

Access to the Black Spar Mine was given by Frank Everett. The public can access and use the area by way of National Forest Road NF-134 across the surrounding public lands which are administered by the U.S. Department of Agriculture Forest Service (USDA). Although NF-134 cuts through the property along Copper Creek (Copper Creek trail), vehicular access is prohibited beyond the intersection with Mormon Hill Road. An unimproved road connects with the Copper Creek trail and extends west up Black Spar Canyon; allowing pedestrian access to the mine workings located in this drainage. The mine location within the state of Idaho is illustrated in Figure 1.

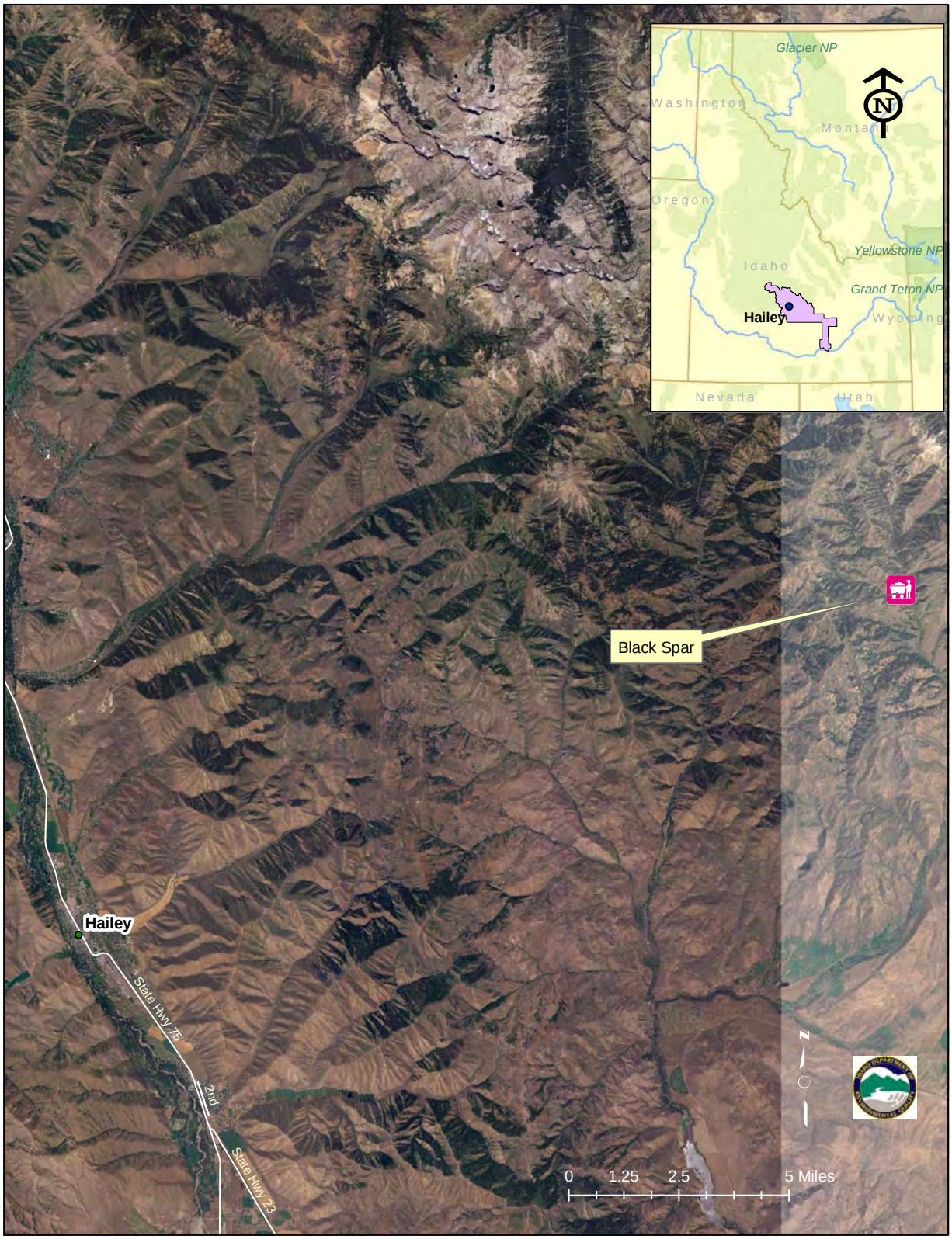



**Figure 1. Location of the Black Spar Mine within the State of Idaho.**

## Section 2 Ownership

IDEQ 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 Blaine County Tax Assessor's Office in Hailey, Idaho.

Within the following ownership descriptions the **"Partial Determination"** is meant to convey a very brief summary of IDEQ'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 IDEQ did not find any significant evidence that would indicate the potential of adverse effects to human or ecological receptors on the parcel of land. This determination says nothing about risks associated with physical hazards such as open adits, open shafts, high walls, or unstable ground. "**Partial Determination"** of "**calculate HRS**" indicates that IDEQ has determined that there is sufficient evidence to warrant calculation of a Hazard Ranking Score (HRS) by EPA's contractors. It also indicates that IDEQ has made significant conclusions and recommendations that additional site assessment and/or remedial actions are necessary to prevent adverse affects to human or ecological receptors. These conclusions and recommendations are contained in the final section of this report. The layout of the mine claims is shown in Figure 2. IDEQ does not warrant the locations of the claim boundaries, the boundaries were plotted based on electronic files obtained from the Blaine County Tax Assessor's Office.

**Owner**
Barlow Development, LLC
10801 Main St. Ste. 220
Bellevue, WA 98004

| Claim | Parcel Number | Partial Determination |
|---|---|---|
| Black Spar | RP1M0000001480 | Major Workings (NRAP) |
| True Blue | RP1M0000001480 | Major Workings (NRAP) |
| USA | RP1M0000001480 | Major Workings (NRAP) |
| Black Spar Fraction | RP1M0000001470 | Major Workings (NRAP) |
| White Spar | RP1M0000001480 | Minor Workings (NRAP) |
| Edna M Fraction | RP1M0000001470 | No Workings (NRAP) |
| Sunnyside | RP1M0000001480 | No Workings (NRAP) |
| Good Hope | RP1M0000001480 | No Workings (NRAP) |
| Silver Wedge | RP1M0000001480 | No Workings (NRAP) |
| Geneva | RP1M0000001480 | No Workings (NRAP) |
| Lost Ben Ross | RP1M0000001480 | No Workings (NRAP) |
| Little Joe | RP1M0000001480 | No Workings (NRAP) |
| Moonlight | RP1M0000001480 | No Workings (NRAP) |
| Dorothy I | RP1M0000001480 | No Workings (NRAP) |
| Bogard | RP1M0000001480 | No Workings (NRAP) |
| May | RP1M0000001480 | No Workings (NRAP) |
| Silver Tip | RP1M0000001480 | No Workings (NRAP) |
| Little Wonder | RP1M0000001480 | No Workings (NRAP) |

| | | |
|---|---|---|
| Great Northern | RP1M0000001480 | No Workings (NRAP) |
| Lucky Boy | RP1M0000001480 | No Workings (NRAP) |

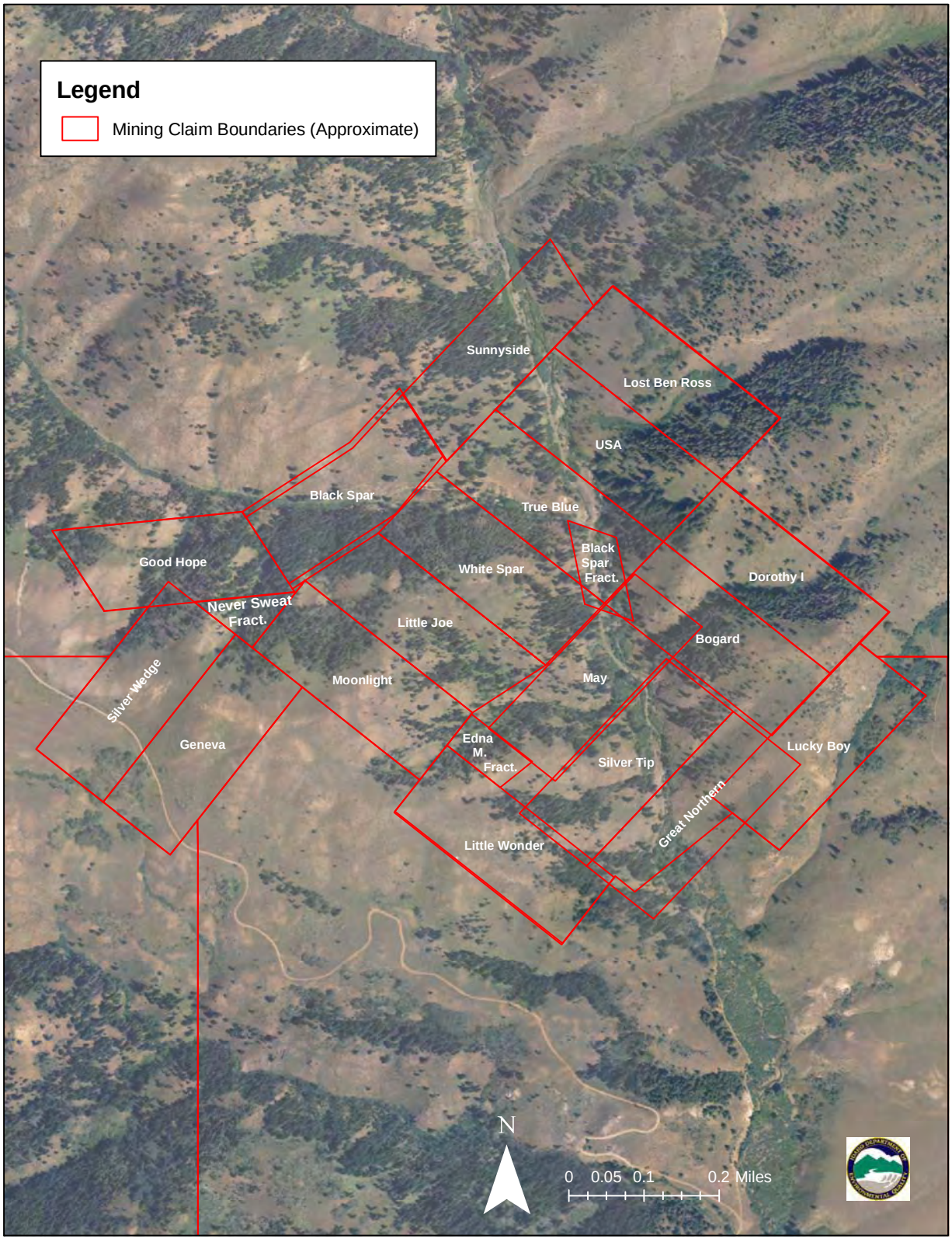



**Figure 2. Approximate mining claim property boundaries at Black Spar Mine.**

## Section 3 Overview

The Black Spar Mine is located in the area around the confluence of Copper Creek and Black Spar Creek. The location of the Black Spar Mine at the creek intersection is approximately Latitude 43.631628 N and Longitude -113.941854 W, within Section 34 T04N R21E. The closest town to the mine site is the City of Hailey, approximately thirty-five miles by road. The facilities are located entirely on private land; they are surrounded by public lands administered by the USDA Forest Service.

The former mine can be reached from Hailey by driving southeast on ID-75, then east and northeast along Muldoon Canyon Road, then north along NF-134 to a parking area at the junction of NF-134 and Mormon Hill Road. The public has off-road access to the mine via Forest Service roads. There are no locked gates or posted signs in proximity to the mine site.

Local waters are dominated by surface water and near surface ground water which is recharged via seasonal precipitation. Annual precipitation for Hailey, Idaho, located approximately twenty miles to the southeast, is 16 inches, predominately during the winter months, with an average annual snowfall of 81 inches (WRCC, 2006).

Dry-season rainfall occurs almost exclusively in relatively short bursts, usually related to thunderstorm activity. It is expected that except for rare flash flood-type events, almost all dry-season rainfall events would be completely absorbed by the soils and plants, without much, if any, contribution to the ground water.

## Section 4 Historical Perspective

In 1983, Burke C. Williams described the Black Spar Mine. In his report entitled "The Silver Spar Property, a Presentation to Silver Spar Inc. he said:

> *The Silver Spar* [Black Spar] *Mine area was discovered by prospectors in the 1880's. Originally the area was known as the Blackspar Mine (Presley, 1975). The original three claims staked were the Blackspar Lode, Silver Wedge Lode and the Good Hope Load. These three clams were patented around 1891. Very little is known about the Silver Spar Property from 1891 to 1921.*
>
> *The Silver Spar Mining Company was formed around 1921. Mr. B.M. Rodgers of Idaho Falls, Idaho had the controlling ownership of the company. Dr. Dwight Lenzi of Idaho Falls was the president. The Silver Spar Mining Company controlled the property for approximately thirty years. Over the thirty years most of the development work was done under B.M. Rodgers' direction and money.*
>
> *As a result of Mr. Rodgers' work, sixteen more claims were patented by 1935. The development work accomplished during Mr. Rodgers' era was done in such a manner as to crosscut the major veins or shear zones in the area. It appears that little effort was ever made to develop these or zones.*
>
> *Mr. Rodgers was considered an eccentric and did not have a high regard for professional engineers and geologists. It is said that Rodgers was holding off on production of the Silver Spar Property until the price of silver reached one dollar per ounce. Mr. Rodgers died in 1953 before he could see the property go into production (Presley, 1975)…*
>
> *The Silver Spar Property was leased in the early 1960's for an unknown period of time. One of the lessees was Mr. Bob Lenzi, son of Dr. Dwight Lenzi, president of Silver Spar Mining Company. Minor development work was performed under the lease and approximately 27 tons of ore was shipped to the smelter in Helena, Montana. This was done to help raise operating capital for continued development. This is the only known ore to have been produced from the property (Flint, 1963).*
>
> *In 1969 the property was purchased by Silver Spar Incorporated, a Texas corporation that was formed primarily to develop the Silver Spar Property…*

*The Phelps Dodge Corporation conducted field work on the property and immediate area in 1980. After reviewing the results of their field data, Phelps Dodge withdrew their interest in the Silver Spar Property before entering into any acquisition agreement. No reason was given for their withdrawal.*

*FRM Minerals, Inc. entered into a lease option agreement with advance minimum royalties on September 30, 1981. Field sampling and geophysical work was conducted between the months of October 1981 and February 1982. On February 22, 1982, FRM Minerals dropped their lease option agreement with Silver Spar Incorporated.*

In 1998, Jeffery A. Gabardi of the Sawtooth National Forest described the Black Spar property. In his report entitled "Mineral Resource Evaluation Report for Silver Spar Land Exchange" he said:

*…the original three patented claims (Black Spar, Silver Wedge, and Good Hope) were located and patented by Black Spar Mining and Milling Company (BSMMC). According to the mineral plats, BSMMC had driven two adits on the Black Spar Lode claim prior to 1882. These adits, the South Drift (300 ft) and North Drift (460) are now caved at the portal. The company had also constructed a boarding house (20x30 ft) and a bunk house (16x24 ft) for the miners. Mr. B.M. Rodgers purchased the claims in 1921 from BSMMC. He patented 16 more claims in 1924 and organized the Silver Spar Mining Company…Under Mr. Rodgers' guidance, a "number of operators" explored the property. They sunk the White Spar Shaft (200 ft) between the South and North Drifts, and later (1940's) drove the Old Slayton Adit (reportedly 2160 ft) to intersect the White Spar Shaft at the 100 ft. level (Williams 1983)… Mr. Bob Lenzi leased the property in the early 1960's and shipped 27 tons of ore to the ASARCO smelter in East Helena, Montana. He said the smelter notified him that his ore had not arrived at the smelter and that they had no record of it. Thus to date, the claims have no recorded production.*

*In 1969, the property was sold to Silver Spar Inc., a Texas corporation…Silver Spar Inc. leased the claims to Phelps Dodge Corporation in 1980 and FRM Minerals Inc. in 1981. Hecla Mining Company was in contact with Silver Spar Inc. in 1981 but is unknown if a formal lease agreement was made.*

## Current Site Conditions

The Black Spar Mine may be accessed from Hailey by driving southeast on ID-75, then east and northeast along Muldoon Canyon Road, then north along NF-134 to a parking area at the junction of NF-134 and Mormon Hill Road. The road north from the parking area along Copper Creek is closed to vehicles, and the mine is accessible only accessible on foot and perhaps off-road vehicles.

During the visitation of the Black Spar Mine, IDEQ staff began identification of mine facilities from north to south. The site visit began approximately a mile north of the parking area at the Wichita Falls Crosscut (Figure 3).

Figure 3 is a site map created from GPS locations taken during the 2007 site visit. Figure 4 is a mine map of the property provided by Jeff Gabardi of the Sawtooth National Forest. The map is titled "Silver Spar Claim and Workings, Silver Spar, Inc. Blaine County, Idaho, 3/1/83." The map was modified from the "Lenzi Map" and was surveyed by James Spofford in July 1923.




**Figure 3. Site Sketch of Black Spar Mine.**

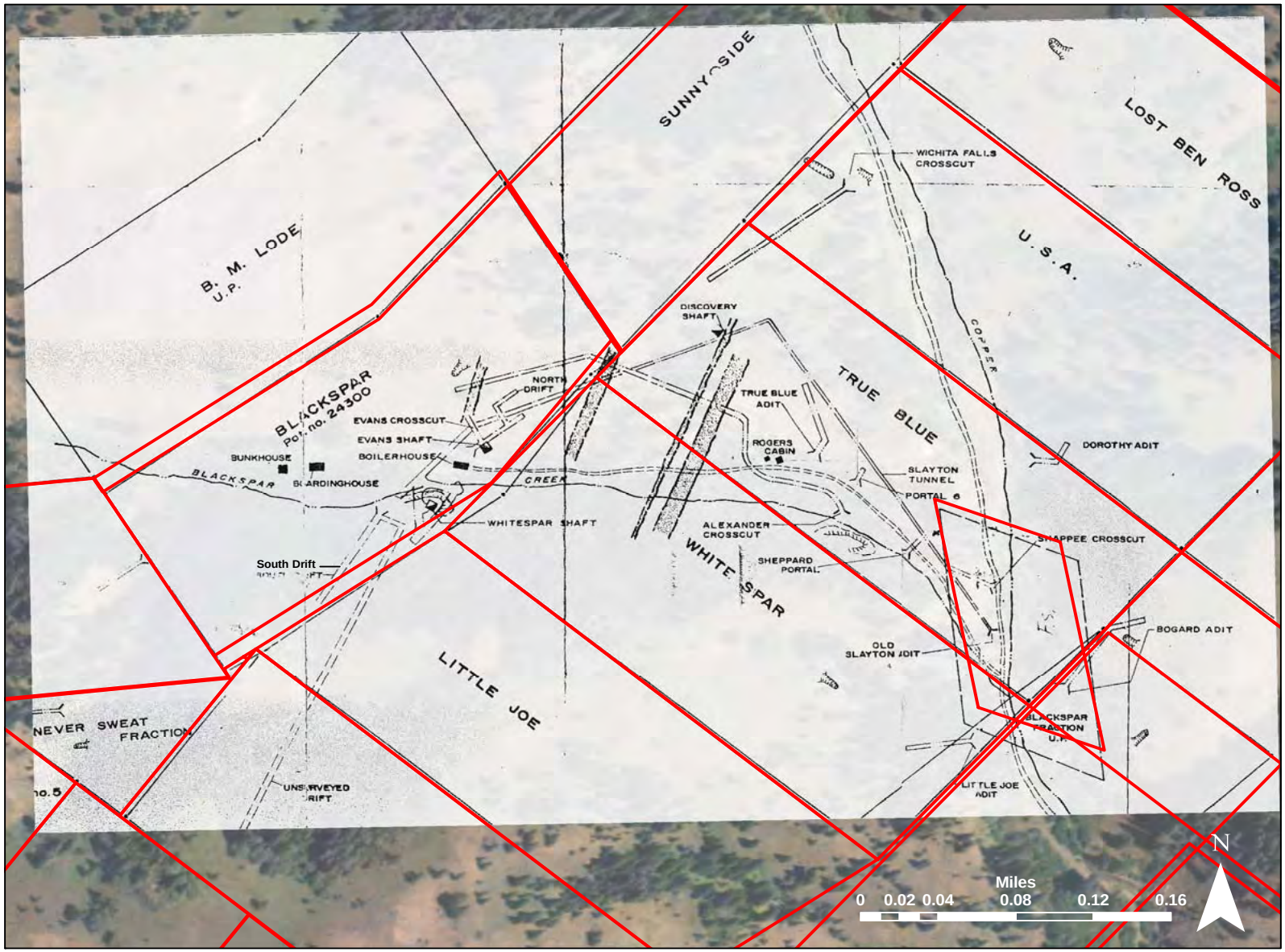



**Figure 4. Mine Map provided by Jeff Gabardi, Sawtooth National Forest. Adapted from Lenzi map 03/01/1983.**

**Wichita Falls Crosscut**

There is an open adit with a bat gate that prevents human entry. Waste rock from the crosscut has been re-graded with stream alluvium to serve as a road/trail bed, and the material showed only minor iron staining and no mineralization. Coconut fiber mats used in the reclamation/re-grading are starting to fail. No seepage was observed from this opening.



*Looking west from Copper Creek towards the Wichita Falls Crosscut, reworked waste and alluvium and failing erosion control are visible in the foreground.*



*The Wichita Falls Crosscut adit remains open; however, a bat gate prevents human entry. No drainage was observed at this opening.*

**Shappee Crosscut**

The entrance into the Shappee Crosscut was closed with a backhoe in 2006 by Sawtooth National Forest employees. It appears that the closure has settled and the opening is now accessible. Drainage was observed emanating from this opening. The drainage has eroded a low spot which now is an artificial wetland that parallels Copper Creek. No waste piles were evident.



*Looking west from the Copper Creek trail towards Shappee Crosscut, the partially caved adit and remnant timbers are visible. The wetland area visible in foreground is created by discharge from the opening.*



*Entry into the Shappee Crosscut is possible behind the partial collapse.*



*Drainage at Shappee Crosscut as it exits the partial collapse debris. There was no apparent discoloration or stressed vegetation associated with the drainage.*



*Drainage from Shappee Crosscut has eroded a channelized low along Copper Creek trail that has developed into a wetland area.*

**Old Slayton Adit**

The Old Slayton Adit is collapsed just inside of the entry preventing human access. No drainage was observed at this opening. There is some remnant track and timber near the opening. No waste piles were evident, and any waste from this feature appears to have been used as road or platform material. There was no iron staining or mineralization of the material in the area.



*The Old Slayton Adit is collapsed and prevents human entry. Remnant pipe is visible in the foreground.*



*Remnant track is visible in front of the Old Slayton Adit (timbers are visible left of the tree). Track appears to be sticking out of a landing constructed of waste rock and alluvium.*

**Evans Shaft**

The Evans Shaft appears to be completely collapsed and human entry is not possible. A remnant head frame remains at the shaft. No drainage or waste associated with this shaft was identifiable. Rock material near the head frame appeared to be rhyolite that lacked iron staining and mineralization.



*Head frame at the collapsed Evans Shaft. The shaft appeared to be completely collapsed and entry is not possible.*

**White Spar Shaft**

The White Spar Shaft was closed with a foam plug by Sawtooth National Forest employees in 2006. The shaft is located between two collapsed adits, and an abundance of remnant timbers. Approximately 100 $yds^3$ of waste material is located below this area. The material appears to be composed of white to light brown barite, gray carbonaceous argillite, and light brown rhyolite. The material has not been differentiated into separate piles, and did not show any signs of staining or mineralization.



*Looking west at remnant timbers and mining debris located at the White Spar Shaft. The plugged shaft is visible as a depression below the timbers. More debris was observed further west that appeared to be related to the collapsed South Drift. Investigators were unable to locate the South Drift entrance.*



*The White Spar Shaft was plugged with foam by Sawtooth National Forest employees in 2006.*



*Collapsed portal adjacent to the White Spar Shaft.*

**Black Spar Creek**

Mining equipment and debris litter Black Spar Creek between Evans Shaft and White Spar Shaft. In general these features do not pose any exposure risk, however they do pose some physical hazards.



*Collapsed Rodgers' cabin. No containers or chemicals were observed in or near the cabin .*



*A bulldozer sits on the south side of Black Spar Creek (within the stream channel).*



*Three boilers are located in Black Spar Creek (two of which are pictured above). The boilers appear to be wood-fueled and no associated diesel tanks were observed.*



*Mine waste in Black Spar Canyon. Mine waste was placed in Black Spar Creek and has been washed downstream by periodic flooding. The material appeared to be white to light gray barite and calcareous argillite. There is no staining or mineralization. The total amount of waste from all mine workings is estimated to be not more than 1000 yds$^3$.*

## Section 6 Geology

The geology of the Little Wood River (Muldoon) district consists of Eocene Challis Volcanics, Quaternary basalt flows, Pleistocene morainic outwash, and Holocene stream alluvium that unconformably overlie Paleozoic metasediments of the Devonian Milligan Formation, the Mississippian Copper Basin Formation, and the Permian Wood River Formation (Williams, 1983) (Figure 5).

Ross, 1962 states that the metasediments in the Black Spar area are within the Copper Basin Formation, which is composed of quartzitic sandstone and siltstone with argillite, conglomerate and limestone occurring at various horizons. The Copper Basin Formation has been metamorphosed with some partial recrystallization, and estimates of the formation thickness range from 8,00 feet to as much as 15,000 feet thick (Williams, 1983). In the Black Spar area, the sedimentary rocks consist primarily of gray limestone with intermixed shaley and quartzitic beds overlain by massive quartzite and graywacke with some quartzitic breccia (Howell, 1981). In the immediate property area, the lower unit of the Copper Basin formation is present, which consists of limestone intermixed with shale and quartzite (Williams, 1983).

Occurring west of Copper Creek are the Eocene Challis volcanics. In the vicinity of the Black Spar property, the volcanics consist of primarily of latite and stratified hornblende-andesite flows (Sanford, 2005). Some flow breccia is present along Black Spar Creek (Williams, 1983).

Along Copper Creek and the Black Spar Creek drainage there are Quaternary terrace gravels and alluvium. At the confluence of the creeks there is an alluvial fan of flood debris that has resulted from flood events in the early 1980's and again in the 1990's. The debris appears to be intermixed with both rounded and angular rock. The angular rock may have been waste rock from the underground workings that has been eroded from Black Spar Creek into Copper Creek.

### Structure

According to Anderson (1946), Copper Creek follows the Copper Creek Fault which is a normal fault that can be traced for more than 10 miles and has a displacement estimated at 4,000 feet. The strike of the fault is approximately N30$^{o}$W and dips steeply to the southwest. The Eocene Challis Volcanics on the west side of Copper Creek (and the fault) have moved down in relation the Paleozoic sediments on the east side of the creek. Faulting is believed to have occurred in the late Tertiary to early Quaternary time. Another normal fault of unknown displacement occurs along Black Spar Creek striking N75$^{o}$W (Williams, 1983). Vertical displacement along this fault, referred to as the Black Spar Fault, does not appear to be extensive since the Challis Volcanics occur on both sides of the fault. There are indications that this fault might have been the conduit for the Black Spar mineralization.

The Black Spar Claim Group is located on mineralization at the intersection of Black Spar Creek with Copper Creek. The mineralization is hosted in light brown latite and rhyolite lavas of the Tertiary Challis Volcanics and at depth in the grey to black Paleozoic sedimentary and metasedimentary rocks. Mineralization in the Challis Volcanics portion occurs along shear zones and fractures at the intersection of the Copper Creek and Black Spar Faults. Hydrothermal

veins of quartz, barite and sulfide minerals fill the shears and fractures. Contact boundaries are usually sharp, but "some hydrothermal metamorphism is evidenced by alteration of the volcanic rock in the vicinity of quartz veins to sericite and propylitized areas. These veins contain moderate to low economic values of silver and gold. There are also more complex veins of tetrahedrite, minor chalcopyrite, galena, and sphalerite. Theses veins commonly display gradation with rocks of the Challis volcanic series and are generally larger that the hydrothermal veins. Complex veins may contain moderate to high-grade economic values. Both vein types may be from late emanations of the magma source of the Challis volcanic series. Several broad zones of surface anomalies containing potentially economic levels of silver may be related to supergene enrichment of disseminated, small veins and veinlets" (Williams, 1983).

The mineralization within the Paleozoic Milligan and Copper Basin Formations was described by Anderson (1946), as replacement deposits along bedding planes in the calcareous limestone and quartzites. The deposits consist of lead-silver-barite minerals in shallow oxidized and enriched zones. The barite may have formed later as a result of lower temperatures during regional metamorphism of the Copper Basin Formation (Williams, 1983).

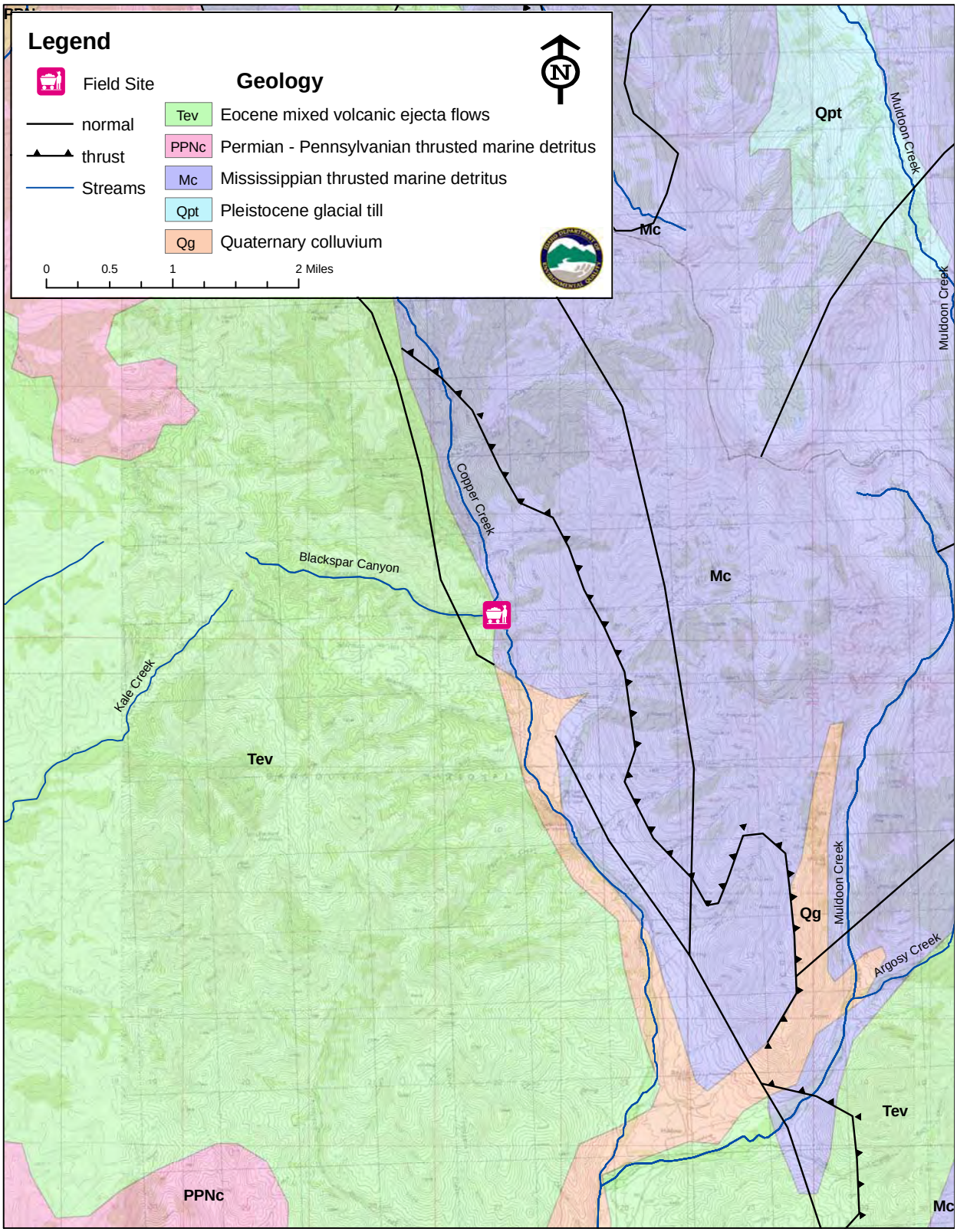



**Figure 5. Geology of the Black Spar Area.**

## Section 7 Current and Potential Future Land Uses

Current land uses in the area include biking, hiking, hunting, horseback riding and off-road vehicle touring. The Black Spar Mine is accessible from the Cooper Creek trail and possibly from Mormon Hill Road on off-road trails.

### Fish Species Observed

Fish presence/absence studies have been conducted in Black Spar Canyon and Copper Creek to confirm any fish species that may reside in this stream. Wood River sculpin [Cottus leiopomus] and rainbow trout [*Oncorhynchhus mykiss*] are present in Black Spar Creek. Copper Creek also has Wood River sculpin and rainbow trout present, as well as Brook trout [Salvelinus foninalis] (StreamNet, 2008). Commercial or subsistence fishing does not occur within the 15-mile downstream distance, but sport fishing does.

### Apparent Wetlands

Wetland surveys near the site were reviewed (USFWS, 2007) along with aerial photographs. These indicate that the nearest wetlands are in Muldoon Creek at the mouth of Muldoon Creek and the South Fork Muldoon Creek located approximately 12 miles downstream of the site. No mining related material was traceable all the way from Black Spar Mine to Muldoon Creek (Figure 6).

### Future Land Use

Future land use could potentially include some year-round and/or seasonal homes on the private parcels of property.

It is likely that recreational use of the site will increase as the local populations and recreation industry expands.

The site will also likely continue to provide grazing values to wildlife.

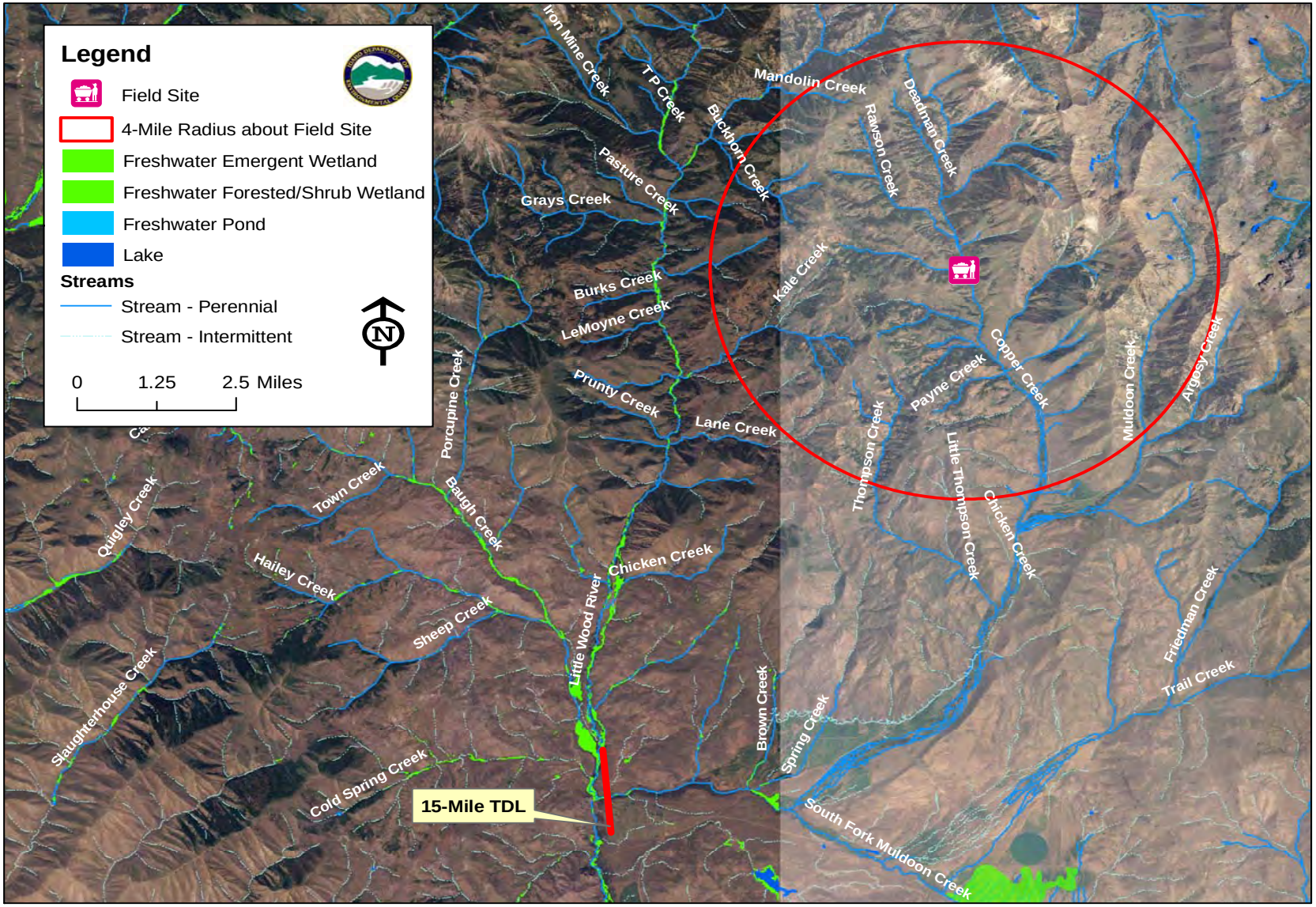



**Figure 6. Wetlands near Black Spar Mine.**

## Section 8 Waste Sampling and Characterization

### Sample Collection

Waste

No soil samples were collected during the 2007 site visit. Suspected waste rock along Copper Creek was reworked with native alluvium and colluvium for use as road and landing material. Along Black Spar Creek, rock debris consists of intermixed angular and rounded alluvium. Although the amount and general location of the material suggest that a portion of the debris is from the underground mine workings, flood events in the 1980's and 1990's has transported and mixed natural and mine-waste sediments so as to hider differentiation. Only waste near the White Spar Shaft is readily distinguishable from alluvium. The total volume of waste rock at the site is approximately 1,000 $yds^3$.

No evidence of acid drainage was visible and there was no discoloration or iron staining near the mine entries, on the sediments or in the creeks. In 1996, Jeff Gabardi of the Sawtooth National forest inspected the waste dumps and concluded that the waste is primarily composed of limestone and barite with some calcareous sandstone and shale present. The waste does not contain sulfide ores and discharge water was observed at a pH of 8.0.

Water

Three water samples were collected at the Black Spar Mine. Two samples were taken in Copper Creek; upstream and downstream of the mine. One sample was taken from the discharge issuing out of the Shappee Crosscut (Figure 7).

### Water Sample Description

Sample **BS-BG SW1** was collected upstream from the Wichita Falls Crosscut to serve as a background sample. No field parameters were measured.

Sample **BS-A2 SW1** was collected from the discharge issuing out of the Shappee Crosscut. The water was clear and odorless, and there was no discoloration associated with the water. Aquatic plant life appeared healthy. No field parameters were measured.

Sample **BS-SW2** was collected downstream of all mine features, near the parking area at NF-134 and Mormon Hill Road. The water was clear and had no discoloration or odor. Field parameters taken at this point are as follows: pH = 8.08, Conductivity = 159 µS/cm, Dissolved Oxygen = 9.86% and Temperature = 14.6 $^oC$.




**Figure 7. Water sample collection locations.**

**Sample Analysis**

Generally speaking water analysis indicates that the water at the Black Spar Mine is of good quality. Furthermore, none of the samples exceeded water quality standards for the constituents tested (Table 1).

Water

Background sample **BS-BG SW1,** which was collected upstream of the Black Spar Mine site on Copper Creek, had no heavy metals concentrations which exceeded IDTLs. Only total Barium was measured above laboratory detection limits with a concentration of 0.0376 mg/L. This concentration is far below any quality standards and would not trigger any level of concern for this remote area.

Sample **BS-A2 SW1**, which was collected at the Shappee Crosscut discharge point, had no heavy metals concentrations which exceeded IDTLs. Only total Barium and total Lead were measured above laboratory detection limits with concentrations of 0.0293 mg/L and 0.008 mg/L, respectively. These concentrations are far below any water quality standards and would not trigger any level of concern for this remote area.

Sample **BS-SW2,** which was collected downstream of the Black Spar Mine site on Copper Creek, had no heavy metals concentrations which exceeded IDTLs. Only total Barium was measured above laboratory detection limits with a concentration of 0.0498 mg/L. This concentration is far below any quality standards and would not trigger any level of concern for this remote area.

## Table 1. Black Spar Mine Water Samples

**Black Spar Mine**

| | IDEQ Ground Water Standard | IDEQ Drinking Water Standard | IDEQ Cold Water Biota Standard | IDEQ Cold Water Biota Standard | Copper Creek Background Sample | Shappee Crosscut Mine Drainage | Copper Creek Downstream Sample |
|---|---|---|---|---|---|---|---|
| | (T) | MCL | Acute | Chronic | | | |
| Description | | | | | BS-BG SW1 | BS-A2 SW1 | BS-SW2 |
| Arsenic | 0.05 | 0.01 | 0.36 | 0.19 | <0.025 | <0.025 | <0.025 |
| Barium | 2 | 2 | | | 0.0376 | 0.0293 | 0.0498 |
| Cadmium | 0.005 | 0.005 | 0.00082 (H) | 0.00037 (H) | <0.0020 | <0.0020 | <0.0020 |
| Chromium (Total) | 0.1 | 0.1 | | | <0.0060 | <0.0060 | <0.0060 |
| Copper | 1.3 | | 0.0046 (H) | 0.0035 (H) | <0.010 | <0.010 | <0.010 |
| Lead | 0.015 | 0.015 | 0.014 (H) | 0.00054 (H) | <0.0075 | 0.008 | <0.0075 |
| Selenium | 0.05 | 0.05 | 0.018 (T) | 0.005 (T) | <0.040 | <0.040 | <0.040 |
| Silver | 0.1* | | 0.00032 (H) | | <0.0040 | <0.0040 | <0.0040 |
| Zinc | 5* | | 0.035 (H) | 0.032 (H) | <0.0100 | <0.0100 | <0.0100 |

## Section 9 Pathway and Environmental Hazard Assessment

Pathway and environmental hazards were assessed for groundwater, surface water, and soil/air exposure. The findings from these assessments are presented in the following.

### Ground Water

Ground water flow is expected to be controlled structurally within faults and fractured zones in the country rock and be expressed at the surface as springs. However, the flow from the Shappee Crosscut indicates that the limited underground workings at the Black Spar Mine have some influence on local ground water flow. Other than the adit discharge, no other springs were noted or mapped in the area of the mine.

Shallow ground water and surface waters are inextricably related in Black Spar Canyon and Copper Creek Canyon, as both are bounded by bedrock and flow through or on top of the valley fill colluvium. The amount of recharge of regional aquifers by surface and ground water in the Black Spar area is unknown.

According to Idaho Department of Water Resources July 2002 records only one drinking water well is located within a 4-mile radius of the site, which supplies the USFS Garfield Guard station (Figure 8). The well is located within the Copper Creek drainage approximately 1.7 miles down gradient of the site. There is no well log for this well; however it is shallow and appears to derive shallow groundwater from alluvium. There are no known issues with this well. No wells were sampled.

During the cleanup activities of the nearby mines, such as Triumph and the Minnie Moore Mill site, the first concerns were related to potential human health risks as a result of contamination of public and private drinking water supplies. Generally speaking, contamination of drinking water systems was thought likely to occur from two types of sources (ore bodies and waste dumps) and along three pathways, as illustrated by the following three scenarios. First, heavy metals are leached from mine waste dumps, enter ephemeral or perennial drains and then contaminate the area's shallow ground water system. Second, heavy metals leach from the local ore bodies and are transported through the geologic structure to the shallow ground water. Third, heavy metals could leach out of the ore bodies, and be discharged from the underground workings as adit water, that is then conveyed through ephemeral and perennial drains to the shallow ground water systems.

For the purposes of completing Preliminary Assessments, Source Water Assessments (completed for local public drinking water supplies) were used to identify any known affects to those systems. Although IDEQ's Source Water Assessments were used to evaluate potential affects of this mine on public drinking water supplies no inferences can be made about the affects that this and adjoining mines have on local private wells.

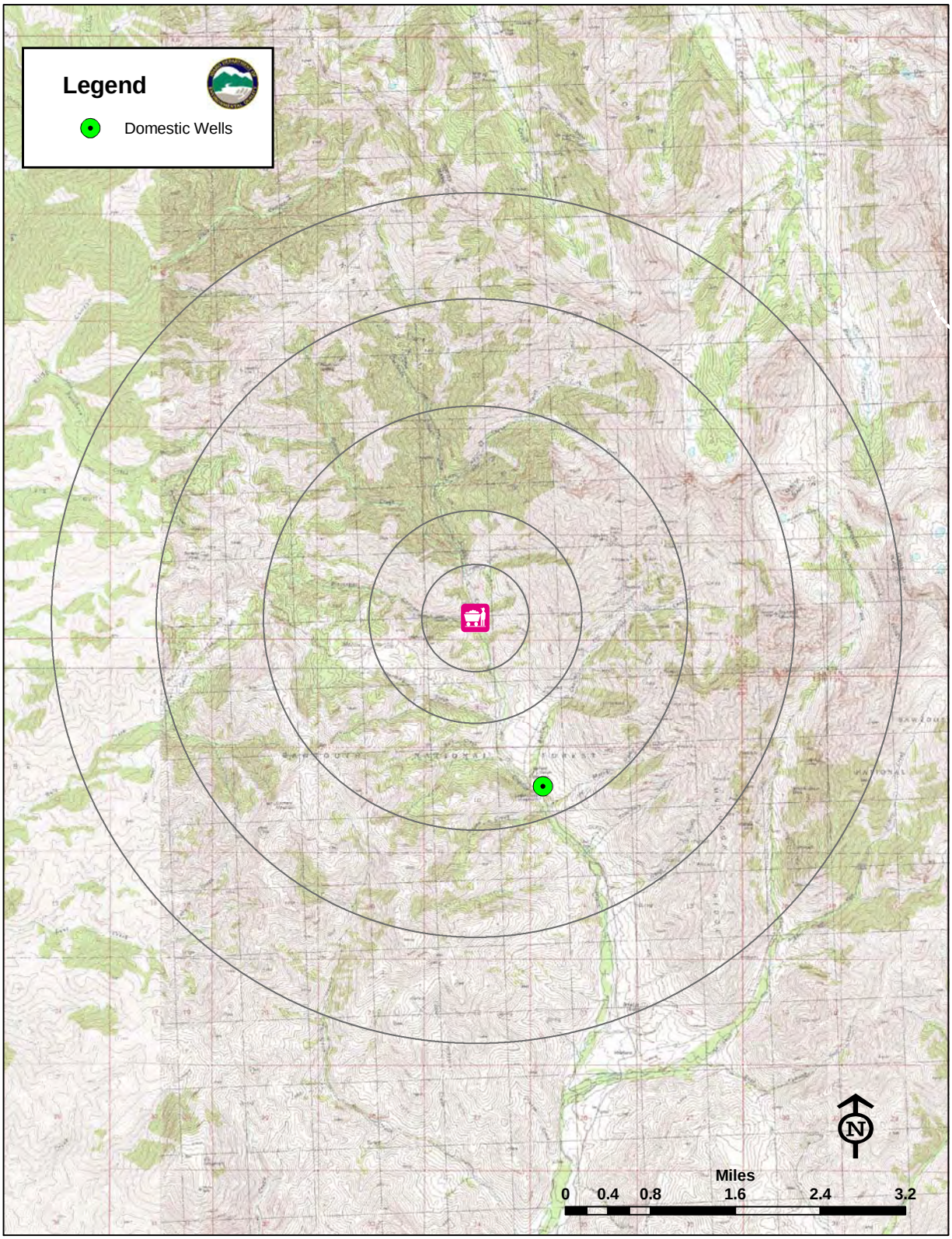



**Figure 8. Wells located near the Black Spar Mine.**

Source water assessments provide information on the potential contaminant threats to public drinking water sources. In the Big Wood River Valley Idaho, most of those sources (>95%) are ground water (IDEQ 2000). Each source water assessment:

- Defines the zone of contribution, which is that portion of the watershed or subsurface area contributing water to the well or surface water intake (source area delineation).

- Identifies the significant potential sources of drinking water contamination in those areas (contaminant source inventory).

- Determines the likelihood that the water supply will become contaminated (susceptibility analysis**).**

Each assessment is summarized in a report that describes the above information and provides maps of the location of the public water system, the source area delineation, and the locations of potential contaminant sources. Idaho began developing source water assessments in 1999, and in May 2003 met its obligation under the amendments of the Safe Drinking Water Act by completing delineations for all 2100+ public water systems that were active in Idaho as of August 1999 (IDEQ 2000). Source water assessments for new public drinking water systems are being developed as those systems come online. Each public water system is provided with two copies of its final assessment report. Four source water assessments for drinking water supplies have been used in this Preliminary Assessment Process to evaluate the potential impacts to both public and private drinking water supplies in and around Sun Valley, Ketchum, Hailey and Bellevue.

The information extrapolated from these reports is based on data that existed at the time of their writing, and the professional judgment of IDEQ staff. Although reasonable efforts were made to present accurate information, no guarantees, including expressed or implied warranties of any kind are made with respect to these reports or this Preliminary Assessment by the State of Idaho or any of its agents who also assume no legal responsibility for accuracy of presentation, comments or other information in these publications or this Preliminary Assessment report. The results should not be used as an absolute measure of risk, and they should not be used to undermine public confidence in public drinking water systems.

The Source Area delineation process establishes the physical area around a well or surface water intake that becomes the focal point of the source water assessment. The process includes mapping the boundaries of the zone of contribution (the area contributing water to the well or to the surface water intake) into time of travel zones (TOT) indicating the number of years necessary for a particle of water to reach a well or surface water intake (IDEQ 2000). The size and shape of the source water assessment area depend on the delineation method used, local hydrogeology, and volume of water pumped from the well or surface water intake.

IDEQ used a refined computer model approved by EPA to determine the 3-year (Zone 1B), 6-year (Zone 2), and 10 year (Zone 3) time of travel associated with the Big Wood River Aquifer and its sources (IDEQ 2000). There are no public supply wells or Source Area capture zones within a 4-mile radius of the site. This information is illustrated in Figure 8.

This process involves collecting, recording, and mapping existing data and geographical information system (GIS) coverage to determine potential contaminant sources (e.g., gas stations) within the delineated source water assessment area. The potential contaminant source inventory is one of three factors used in the susceptibility analysis to evaluate the overall potential risk to the drinking water supply (IDEQ 2000). The inventory process goal is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of ground water or surface water contamination.

This susceptibility analytical process determines the susceptibility of each public water system well or surface water intake to potential contamination within the delineated source water assessment area. It considers hydrogeologic characteristics, land use characteristics, potentially significant contaminant sources, and the physical integrity of the well or surface water intake. The outcome of the process is a relative ranking into one of three susceptibility categories: high, moderate, and low. The rankings can be used to set priorities for drinking water protection efforts (IDEQ 2000).

There are numerous public and private drinking water supplies in the Big Wood River Basin. The Sun Valley Water and Sewer District operates and maintains nine wells in two groupings (IDEQ 2000). The City of Ketchum drinking water system consists of seven wells in two groupings. The City of Hailey's drinking water system consists of six wells and a spring (IDEQ 2000).The City of Bellevue drinking water system consists of two wells and three springs (IDEQ 2000).

Generally speaking, public drinking water systems in the Big Wood River Valley are rated as moderate to high (IDEQ 2000). Multiple factors affect the likelihood of movement of contaminants from the sources to the aquifer, which led to this moderate to high score. Soils in the area are poorly to moderately drained. The vadose zone is predominantly gravel, which increases the score. On the valley floors the average depth to ground water is twenty to fifty feet.

To date, routine water quality monitoring of public drinking water indicates that there are no significant volumes of heavy metals migrating through the regional or localized ground water systems. There is no current, long term or recurring water chemistry problems in the City of Ketchum's drinking water sources. Arsenic, nickel, antimony, barium, selenium, chromium, cyanide and nitrate have been detected in Ketchum's wells, but all were well below MCLs (IDEQ 2000). There is no long term or recurring water chemistry problems in the City of Hailey's drinking water sources. Manganese, zinc, chromium, and mercury have been detected in Hailey's wells, but all were well below MCLs (IDEQ 2001). Currently, there are no data that indicate that any metal concentrations have exceeded MCLs in the Bellevue drinking water systems (IDEQ 2000).

**Surface Water**

There were three observed surface water flows at the Black Spar Mine: discharge from the Shappee Crosscut, Black Spar Creek and Copper Creek. The mine water discharges from the Shappee Crosscut approximately 400 feet north of the confluence of Black Spar Creek and

Copper Creek. Chemical analysis of the mine water discharge indicates that the effluent contains almost no measurable concentrations of metals.

Black Spar Creek drains eastward towards the south-flowing Copper Creek, which then joins Muldoon Creek approximately 5 mile from the site. Waste from underground workings in Black Spar Gulch has been placed into the Black Spar Creek Drainage, and historic flooding has transported much of this sediment downstream to Copper Creek. Black Spar Creek and Copper Creek are not currently listed on the EPA CWA §303(d) list of impaired streams. The nearest EPA CWA §303(d) listed stream is the South Fork Muldoon Creek approximately 12 miles downstream from the site.

Commercial or subsistence fishing does not occur within the 15-mile downstream distance, but sport fishing does. Redband rainbow trout [*Oncorhynchhus mykiss* gairdneri], mountain whitefish [Prosopium williamsoni], Wood River sculpin [Cottus leiopomus], and brook trout [Salvelinus foninalis] are, however, present within Muldoon Creek (IDFG, 2000).

There are no surface water intakes for drinking water or any type of industry within the 15-mile TDL. One drinking water well is located within the 4-mile radius of the site, and it is discussed in the previous Groundwater Pathway section.

**Soil Exposure and Air**

Access to the mine site is restricted to off-road traffic from FS 134. Human and ecological receptors may be exposed to soils and mine waste by inhalation, dermal contact and ingestion. As with most of the mine sites in the Big Wood River area, strong winds on hot summer afternoons suspends fugitive dust in the air, which may be inhaled. Visitors may also have direct contact with wastes while exploring the site.

**Potential Receptors**

Potential receptors include hikers, hunters, anglers, cattlemen, and trail riders (motorized and non-motorized). Sheep graze the surrounding area, but their presence within the mine site is minimal. Outdoor enthusiasts remain the highest percentage of human receptors, as they frequent the area for a number of recreational activities. The land within a two (2) mile radius of the site is primarily public land administered by the USDA Forest Service.

**Schools, Day-Care Facilities, Private Residences**

There are no schools, day-care facilities, or private residences within 200 feet of the site, however, BLM or Forest Service workers, in addition to the outdoor recreation enthusiasts, may occasionally be within 200 feet of the site.

**Plant and Animal Species of Concern**

Camas Goldenweed and Wedge-leaf Saxifrage were the only IDF&G listed species of concern (F&G, 2002) within a 4-mile radius of the mining site. Gray Wolves and North American

Wolverines may also range in this area. Due to the much greater area of range for these animals compared to the size of the waste dumps, it is unlikely that individual animals would experience sufficient doses to be at risk (Figure 9).

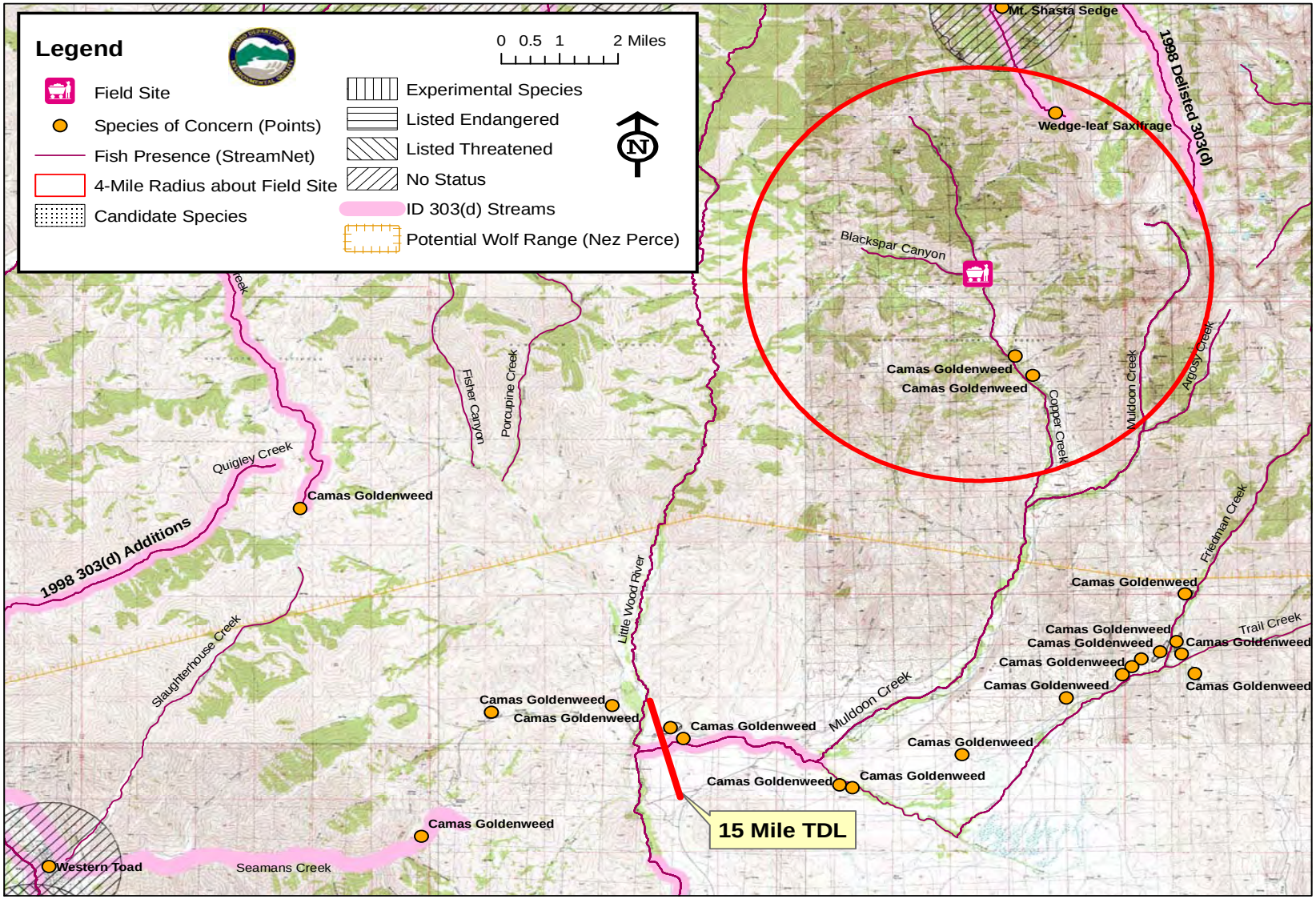



**Figure 9. Species of Concern and 303(d) streams in the Black Spar Mine area.**

## Section 10 Summary, Conclusions and Recommendations

Based on the waste rock type, water sample analysis, remoteness of the site, minimal area of exposure and few receptors, IDEQ is recommending to EPA that there is no calculation of a Hazard Ranking Score for the Black Spar Mine and that No Remedial Action is Planned for the site. However, IDEQ is also recommending to the owner, that any mine openings are closed as these are very dangerous hazards particularly since they are accessible by an ORV trail.

### Presence of Wetlands

Official wetland surveys and aerial photographs of the area indicate no wetlands exist on the site. Based observations and available wetlands data, existing wetlands in Muldoon Creek and downstream are probably not significantly impacted by this site.

### Impacts on Water Quality

No overland connections were observed between seasonal runoff and nearby surface or ground water systems. Furthermore, source water assessments indicate that there are no adverse impacts to public or private drinking water supplies from mining in the area. If future development encroaches on the site, new wells drilled at the site would not be likely impacted by heavy metals from the site.

### Potential Exposure for Wildlife, Livestock, and Vegetation

Potential exposure to heavy metals from the waste material to wildlife and vegetation from the site is not present. Results from water testing do not show elevated metal concentrations, and it is unlikely that significant exposure to heavy metals occurs from the mine workings.

### Potential Exposure for Humans

Human activity around the site is moderate to high due to the recreational values of the area. This site is visited by mountain bikers, hikers, hunters, snowmobile operators, off-road four wheeling, and various other outdoor recreation enthusiasts. However, there is no indication of elevated heavy metals at the site, and exposure is unlikely.

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