Ontario Mine

aka Sunday Mill Site aka North Star, Ervine, Sunday, Niagara, Hub No.2, and Ontario patented mining claims

Preliminary Assessment Report

Blaine County
State of Idaho

Idaho Department of Environmental Quality

December 23, 2009

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

STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

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

December 30, 2009

Bert Bowler
1990 South Stone Ridge Way
Boise, Idaho 83712

RE: Site Assessment of the Ontario Mine aka Sunday Mill Site and North Star, Ervine, Sunday, Niagara, Hub No.2, and Ontario patented mining claims, aka Bowler Group.

Dear Mr. Bowler:

The Idaho Department of Environmental Quality (DEQ) has completed a review of historical mining data and geological information at the above referenced sites. During this review DEQ found that these claims were part of what had been historically called the Ontario Mine. Subsequent to that review, DEQ conducted a site visit of the North Star, Ervine, Sunday, Niagara, Hub No.2, and Ontario claims (properties). 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 (CERCLA). 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)

DEQ 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. The Ontario Mine includes three major workings and numerous shallow prospects. Surface water samples from the Sunday, Ervine, and North Star patented claims have elevated concentrations of antimony, arsenic, total cadmium, chromium, iron, total lead, total mercury, and manganese, total silver and total zinc. However, the all pathways to sensitive ecological receptors appear incomplete or di minimus.

Erosion of the waste dumps is prevalent, and most certainly contributes to sediment delivery to the perennial Rooks Creek. This sediment may pose a physical impairment to Rooks Creek, but there is no evidence that these releases increase metals loading in the stream. Slope stabilization, water management

and promotion of top soil development of large waste dumps might effectively abate this production and delivery.

DEQ identified seven (7) physical hazards, specifically open adits and shafts. These are dangerous and should be managed or closed to restrict access.

DEQ's Source Water Assessments were used to evaluate potential affects of this mine on public drinking water supplies. No direct affect was determined.

Based on the data and observations analyzed by DEQ, DEQ recommends that if these properties are developed, particularly for residential purposes, a more thorough site characterization is conducted, and if necessary development plans should include risk management provisions.

Based on existing conditions, uses, and historic information DEQ has determined and is recommending to EPA that the sites status are designated No Remedial Action is Planned (NRAP).

DEQ 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:tg

Attachment

cc: Ken Marcie – U.S. Environmental Protection Agency
Megan Stelma – Blaine County
file

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Section 1. Ownership

The following names and addresses of owners and their relative percentage of ownership were obtained from the tax rolls at the Blaine County Tax Assessor's Office (Blaine County, 2006). The relative per cent of ownership and listed owners is not warranted by the Idaho Department of Environmental Quality (DEQ).

1.1 Ownership

Contacts/Owners (1/3 each)	**Claims/Parcel Number**		**Partial Determinations**
Bert Bowler	North Star	RP1M0000000200	
Ed Bowler	Ervine	RP1M0000000200	
William Bowler	Sunday	RP1M0000000200	
1990 Stone Ridge Way	Niagara	RP1M0000000200	
Boise, Idaho 83712	Hub No. 2	RP1M0000000200	
	Ontario	RP1M0000000200	

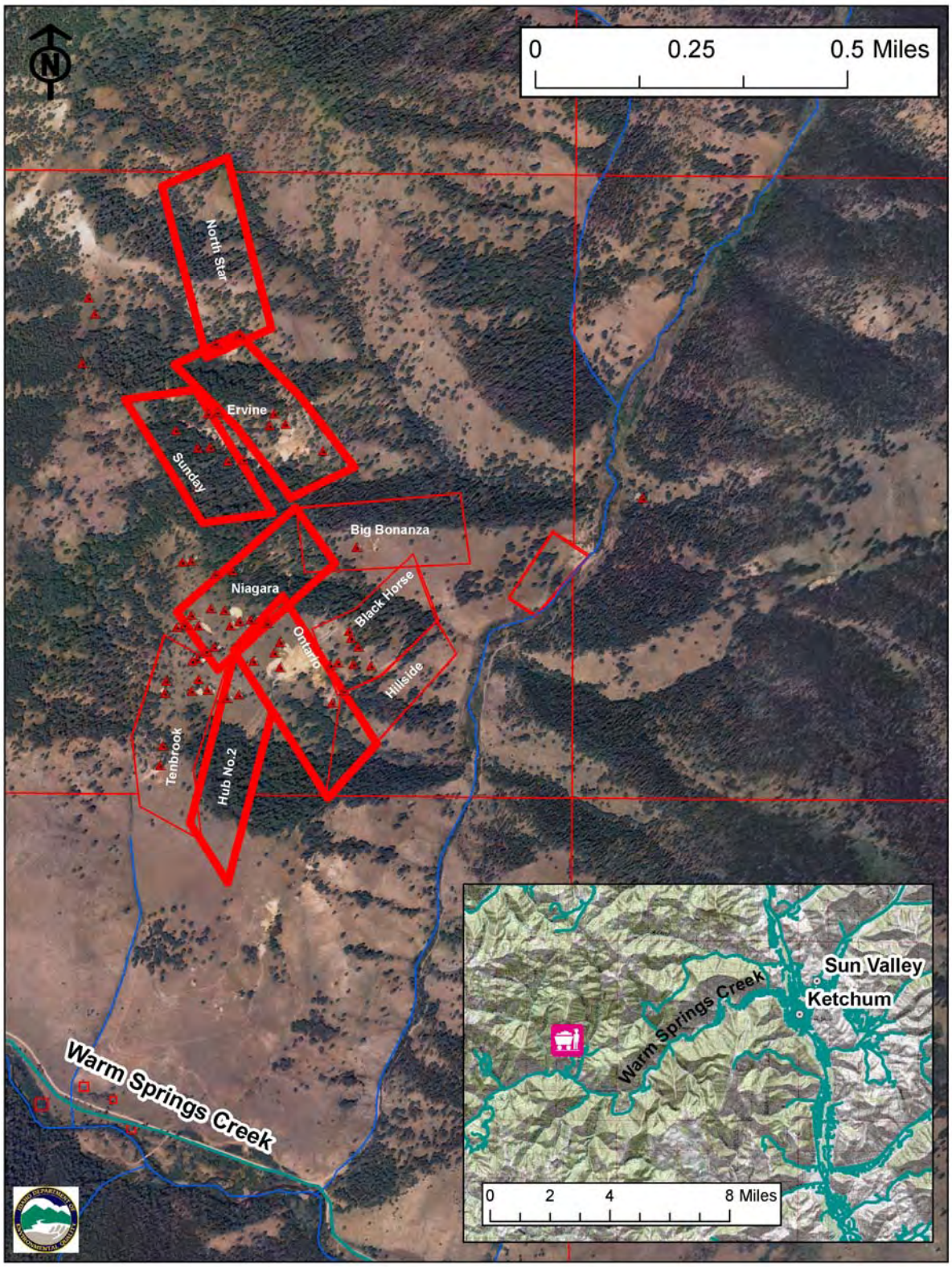


Figure 1. Site map of Ontario Mine. Site is approximately 12 miles west of Sun Valley, Idaho on Warm Springs Road, and approximately 1 mile north along Rooks Creek (Map source: NAIP 2004).

Section 2. Introduction

This document presents the results of the Preliminary Assessment (PA) of the Ontario Mine aka Sunday Mill Site and North Star, Ervine, Sunday, Niagara, Hub No. 2, and Ontario patented mining claims (a.k.a. Bowler Claims). The DEQ was contracted by Region 10 of the United States Environmental Protection Agency (EPA) to provide technical support for completion of PAs at various mines within the Warm Springs Mining District in Blaine County, Idaho.

DEQ 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, DEQ initiated a PA 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. 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.deq.idaho.gov/waste/prog_issues/mining/pa_program.cfm

Access to assess the Ontario Mine was provided by Mr. Bert Bowler (co-owner). Access to the these properties is gained by traveling west from Ketchum, Idaho on Warms Springs Road, also known as Forest Development Road 227. The Warm Springs Road is paved for a few miles beyond of the Big Wood River after which it turns into an improved gravel road. Warwick Hot Springs sub-division is encountered at approximately nine miles up Warm Springs Road, then Rooks Creek Road at 11.25 miles. The Ontario Mine can be accessed by two methods.

Access Alternative One: Turn onto Rooks Creek Road heading northerly for approximately 1.1 miles until reaching the ruins of the Sunday Mill site. A bridge across Rooks Creek accessing the old mine road has been removed, but the creek is fairly easy to cross. One continues along the ruins to the north where an old road is located. One switchback is present near the beginning of the road, and then the road traverses the hillside in a southwesterly and uphill direction for approximately 0.5 mile before reaching the southernmost claim, the Ontario (Figure 3).

In the lowermost portion of the Rooks Creek drainage the Rooks Creek road lies within a very constricted drainage bottom occupying a portion of the floodplain for a short distance. The road fords Rooks Creek a short distance up the canyon and is located immediately adjacent to the stream channel for approximately 250 feet past the ford. This road segment is very narrow, situated on a steep slope, and is difficult to maintain and navigate. Because of its proximity to the stream this road segment directly contributes sediment to Rooks Creek, damages riparian habitat and contributes to stream channel instability. Every year the ford captures a portion of Rooks Creek resulting in water running down the road for about 200 feet before re-entering the

stream channel. Depending upon the severity of runoff the flooded road segment may be difficult if not impossible to navigate in the spring. The ford itself is difficult to navigate because of its rocky nature and steepness on the north side (USFS, 2006).

Access Alternative Two: From the intersection of Rooks Creek Road and Warm Springs Road, a partially overgrown two-track can be accessed by proceeding along Warm Springs Road approximately 100 meters in the upstream direction. The two-track is present on the north side of the road and is visible on the grassy hillside as it winds uphill, staying on the east side of the main ridge. The Ontario Claim is located approximately 1.25 miles up this two-track.

Section 3. Mine Site History

3.1 Historical Mine Articles

The Ontario Mine claims were patented between 1884 and 1914. Park (1990) and Umpleby (1914) historic reports (following) have been partially excerpted by DEQ relative to the Ontario mine.

> *The Ontario mine... was active from 1881-1887 and produced nearly $1,000,000 from lead-silver ore....Actual grade and tonnage figures were not available. The production may also include other mines located near the Ontario mine. The mine workings consisted of several adits driven along E-trending structures and along contacts of alkali-granite and limestones of the Wood River Formation, and numerous prospects aligned along E-trending structural zones* (Park, 1990, p. 52).

> *The Ontario mine is opened by tunnels aggregating several thousand feet of work both in the granite and in the Paleozoic sedimentary rock. Two systems of veins, each offset by numerous normal faults, have been explored. At the time of visit, however, all the tunnels were inaccessible except one, and that one, which is in granite, was caved at a point 500 feet from the portal. Ore on the dump shows the vein to contain fine-grained galena, arsenopyrite, pyrite, and a little sphalerite and chalcopyrite in a quartz gangue. Specimens taken from the dump show that replacement of the granite was involved in the formation of the ore. Pyrite seems to have wandered farthest into the walls, but small patches of all the other minerals are abundant in specimens of the sericitized granite.* (Umpleby, 1914)

Production values for the Ontario's ore are as follows: copper - (1,001-5,000) lbs; zinc - (500,001-2,000,000) lbs; lead - (500,001-2,000,000) lbs; silver - (50,001-100,000) oz; and gold - (101-500) oz (IGS, 2007). Apparently, the value ranges were provided to protect confidentiality.

Section 4. Geology and Mineral Deposits

4.1 Stratigraphy and Lithology

The underlying geology consists of Paleozoic sedimentary and Cretaceous igneous rocks. The middle member of the Pennsylvanian-Permian Wood River Formation is represented in the area. This member is comprised of "thick-bedded micritic or siliceous sandstone, siltite, and subordinate silty limestones" (Park, 1990, p. 11). The site is bordered by the Rooks Creek stock, a satellite granitic pluton associated with the Idaho batholith.

As illustrated in Figure 2, most of the mineralization appears to have occurred along the contact between Cretaceous Porphyritic Granite and Pennsylvanian/Permian Wood River Formation and in association to dikes.

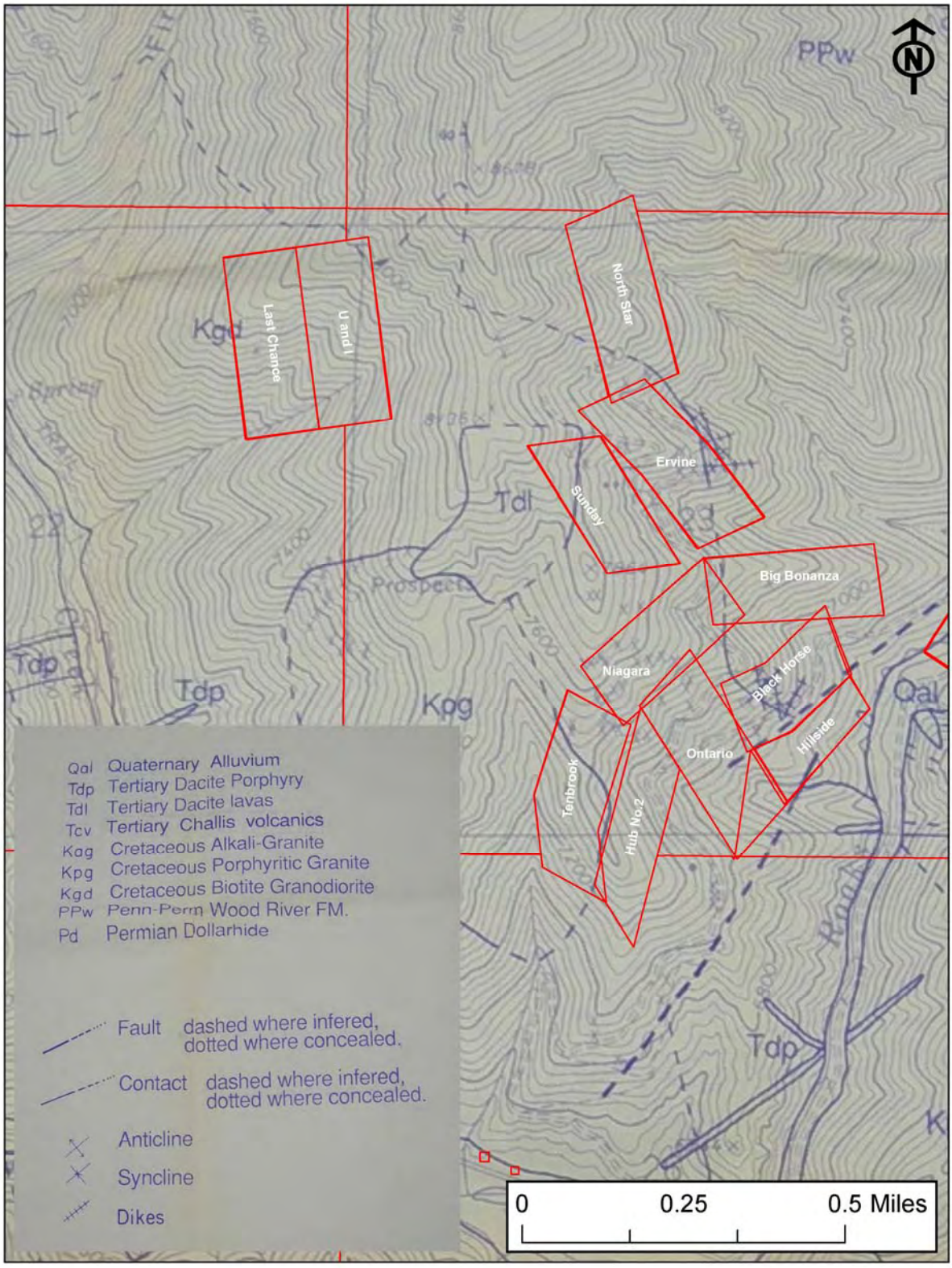


Figure 2 Geologic map of Bowler Claim vicinity. (Map source: adapted from Park (1990)).

4.2 Mineralization

Mineralogy of the Rook Creek area has been described by a number of authors, whose interpretations are explicitly incorporated below.

> *Two distinct ages and styles of mineralization occur in association with the Rooks Creek stock. The oldest of these is Cretaceous lead-zinc skarn mineralization that is exposed in two locations on the contact of the biotite granodiorite and thick-bedded sandy and silty limestones of the Pennsylvanian-Permian Wood River Formation...The mineralization is characterized by galena-sphalerite-pyrrhotite ore mineral assemblage in a gangue of quartz and siderite. Mineralization is confined to structures, which is typical of lead-zinc skarns (Einaudi and others, 1981), near the contact. Outside of the ore horizon, contact metamorphism of the limestones resulted in the recrystallization of quartz and calcite and the formation of abundant tremolite.*
>
> *The second style of mineralization in the area is NE- to E-trending shear zone hosted lead-silver-zinc vein deposits associated with the emplacement of alkali-granite of Cretaceous age. This style of mineralization was seen at the Ontario mine and a large area surrounding the Ontario mine...The shear zone-hosted mineralization is characterized by quartz-sericite-pyrite alteration and vein mineralogy, including quartz, pyrite, sphalerite, galena, chalcopyrite, stibnite, and geocronite* (Park, 1990, p.50).
>
> *Mineralization is characterized by quartz veins with associated sulfides. Sulfide minerals include pyrite, sphalerite, galena, chalcopyrite, stibnite and arsenopyrite. Host rocks are altered to quartz, sericite, and pyrite. Crosscutting relationships indicate that there were two episodes of mineralization* (ibid, p. 61).

4.3 Structure

Anderson, et al. (1950, pp. 65-66) noted the following in regards to the structure of the rocks:

> *The most obvious and significant structural features of the area are the major faults or fault zones which divide the area into a number of distinct blocks...The age of the oldest faults are to be placed as pre-intrusive and possibly all the major faulting is pre-intrusive...All of the major faults are probably pre-mineral as well as pre-intrusive.*

Section 5. Current and Future Potential Beneficial Uses

Current land uses in the area include biking, hiking, hunting, horseback riding, and camping. Off-road vehicles have been banned in the area, but at least some all-terrain vehicle activity is still occurring, possibly during hunting season. There are no indications of active mining operations. The USFS and Blaine County provide maintenance for the Rooks Creek trail system

According to the DEQ water quality standards (DEQ, 2009), the Big Wood River has four beneficial uses including cold water biota, salmonid spawning, primary contact recreation (swimming, etc.), and domestic water supply. Rooks Creek and Warm Springs Creek are not specifically listed in Idaho's Water Quality Standards, but observations along both bodies of water indicate the same beneficial uses apply to both streams.

Due to its remoteness and the potential for avalanches, it is very unlikely that full time residences will be developed on these 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. The land owner indicated no desire to develop these claims in the future (personal communication Mr. Bowler, 2009).

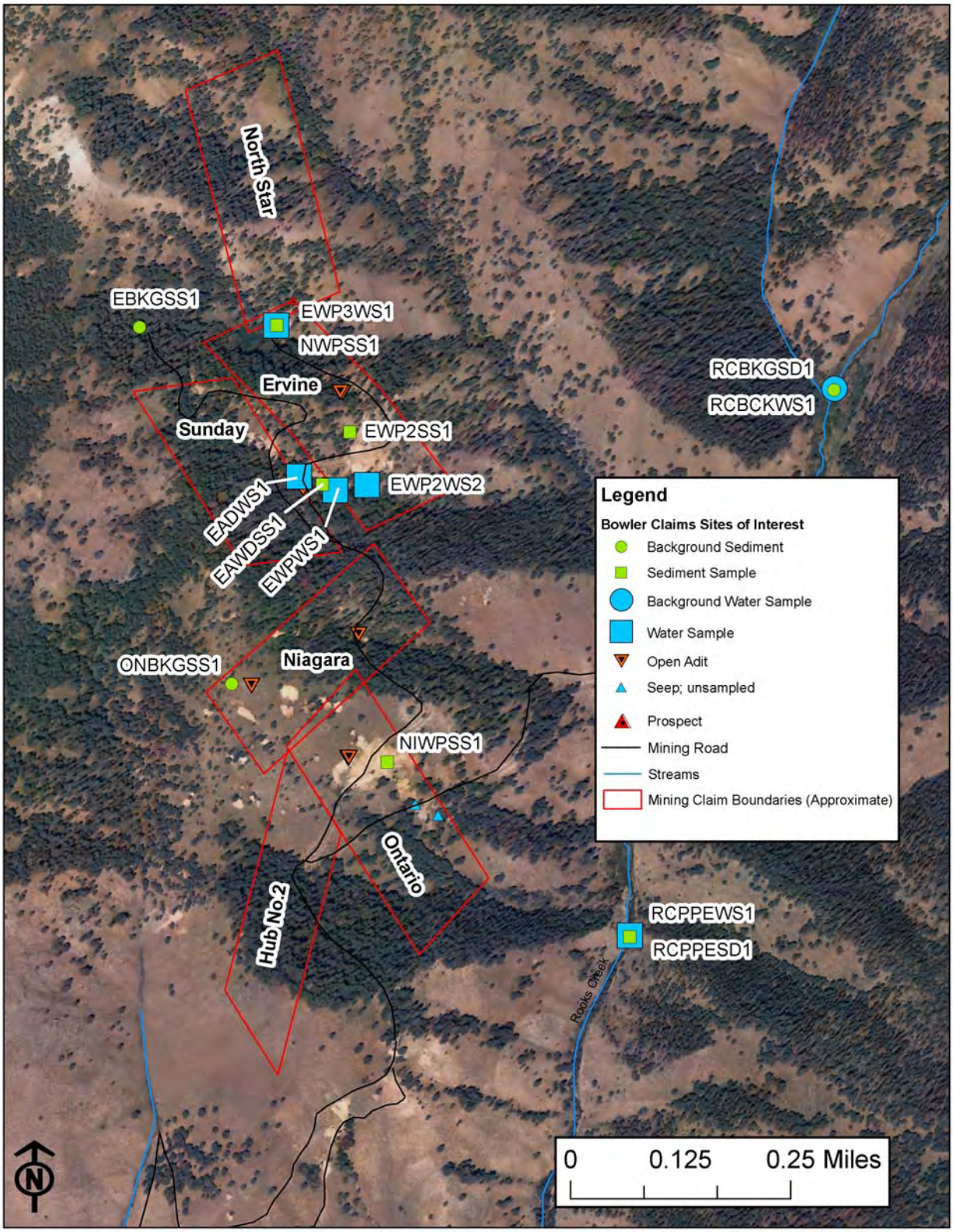


Figure 3. Location of mining roads, sample sites, seeps, and open adits identified during DEQ site visit to Ontario Mine (Map source: NAIP 2004 with Blaine County Parcel overlay).Site Conditions and Waste Characterization

Generally speaking, the workings of the Ontario Mine are not very visible from Warm Springs Creek Road or from Rooks Creek Road, as they blend into the landscape. A former bridge crossing near the Sunday mill site has been removed, and access to the old mine road leading to these properties is only possible by fording of the creek. Although Rooks Creek appears to be a popular recreational area, the stream banks did not appear to be impacted by off-road vehicles (ATV), horse, bicycles, or foot, indicating very little stream crossing activity. Additionally, the presence of fallen trees across the old mining roads, and the absence of tire ruts and horse scat along the mining roads indicate that very little activity occurs in this area.

There is evidence of springs or drainage from six of the caved adits or prospects. There is no evidence, in the ephemeral drains immediately beneath the workings, of riparian or wetland communities, though these communities are represented along Warm Spring Creek which lies approximately 0.8 mile to the south. Six waste rock samples and four surface water samples were collected from the Ontario, Ervine, Sunday, and North Star claims. Additionally, two water samples were collected from Rooks Creek, up gradient and down gradient of any potential influence from the Ontario Mine. The locations of these sites can be seen in Figure 3.

Accuracy for the location of prospects, waste dumps, and claim boundaries might not be located exactly on maps within this report because GPS data, county maps, and patented plat maps have not been tied together by a land survey. Therefore, DEQ does not warrant any of the maps, or diagrams contained in this Preliminary Assessment.

The Ontario Claim patent contained more than ten waste dumps and it appears that stopes were used to access multiple levels, producing approximately 10-12,000 cubic yards of waste rock. The area of disturbance measures approximately 3.2 acres, and has been worked by a bulldozer since mining ended. Sulfide mineralization is present within waste rock piles in the form of pyrite, galena, and sphalerite. Disturbed soil emanated a distinctive sulfide smell. One soil sample (NIWPSS1) was collected on what was thought to be a waste dump on the Niagara Claim, however, the dump was on the Ontario. Therefore its sample designation was not accurate. A small seep was present at the two most downgradient locations of the mine. The seep water reentered the ground within a very short distance. There was insufficient water present to collect a non-turbid sample. At the uphill side of the site, two openings, one vertical and one horizontal, are present that extend to an unknown depth (Photo 1).

The Sunday Mill Site and patented claim is located within the headwaters of an unnamed tributary to Rooks Creek. According to the plat map, a blacksmith shop, boarding house and office were located on the claim (BLM, 2006). There is very little remains of these facilities Approximately 6 adits were used to access the ore, producing roughly 7,000-10,000 cubic yards of waste rock which is distributed over an area of approximately 1.25 acres. One adit remains partially open and easily accessible. A collapsed adit adjacent to the draw is producing water (water sample EADWS1), which flows over and permeates a waste rock pile (soil sample EAWDSS1). The water that infiltrates the waste rock pile reemerges at seeps located at the toe of the waste rock pile (water sample EWPWS1), where it rejoins the overland flow and creates perennial flow in the draw for approximately 650 feet.

The Ervine Claim is located adjacent to the Sunday Claim on a ridge to the northeast. Mineralization occurred along a north-northwest strike within a northwest trending ridge. Based upon waste rock volumes, the nearly vertical mineralized zone was accessed primarily where mineralization intercepted

the surface on the south-facing side of the ridge (Photo 6). Approximately 1.25 acres of disturbed area totaling approximately 5,000 – 7,000 cubic yards of volume is present, which has been altered by bull dozing activity. A soil sample (EWP2SS1) was taken at a representative location on the waste rock pile. Water sample EWP2WS2 was collected from a seep emanating from the toe of the waste rock pile. As mining activity chased the mineralized zone back into the topography, it was accessed from the backside (north-facing side) of the ridge. As many as a dozen collapsed adits are present within the pine trees (Photo 9). Two of the adits remain open and accessible to an unknown depth (Photo 10).

The North Star Claim contains two or three adits, which have produced approximately 3-5,000 cubic yards of waste rock over an approximate area of 0.5 acres. Water sample EWP3WS1 and soil sample NWPSS1 were collected on the lowermost waste rock pile at a collapsed adit's seep (Photo 12). Sulfide mineralization was present upon the waste rock, and moist soil emanated sulfide smells.

The Niagara and Hub No. 2 claims both contained very small (<500 cubic yards) waste dumps that contained almost solely country rock. No soil or water samples were taken from either location. Additionally, more than 25 other prospects are located throughout the Ontario Mine (USGS topoquad).

Rills and gullies are present in many locations throughout the Ontario Mine. The erosion was present not only within disturbed areas, but also along the perimeter of waste piles where concentrated overland flow was eroding native soil. The result is that fine sediment, what young plants need to make a foothold, has been removed by overland flow in many locales, making it more difficult for plants to reintroduce themselves.

Section 6. Pathway and Environmental Hazards

6.1 Climate

No precipitation data is available for the Ontario Mine. Therefore, precipitation data, maintained from 1948 through 1972, was used from a recording station located approximately 1mile south of Sun Valley at an elevation of 5,980 feet amsl. The mean annual precipitation is 17.26 inches, and the 100-year, 24-hour event is 2.16 inches (WRCC, 2007). 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.

6.2 Air Pathway

Concentrations of metals in wind borne fugitive dust have been the driving force behind other cleanups in the former mining properties of the Wood River area, particularly at the Triumph Mine Site and the Minnie Moore tailings impoundment. At the time of DEQ's site visit on September 16 and 17, 2009, all of the waste dumps appeared moderately vegetated and their waste dumps moderately consolidated, except for those at Ervine and Ontario Claims. These two waste dumps are on south-facing hillsides and large enough and thick enough that vegetation cannot yet make good rooting and survive the dry summers. However, both of these locations are fairly protected from direct wind impacts due to the higher topography surrounding them. Additionally, precipitation events have consolidated or replaced the material reducing its ability to be transported by wind. Consequently, the likelihood of aerial dispersion of particulates is expected to be minor, despite recent events associated with the Castle Rock Fire.

6.3 Groundwater Pathway

During the cleanup activities of the Minnie Moore mine located near Bellevue, Idaho, 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 effects to those systems. Although DEQ'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 influence that this and adjoining mines have on local private wells.

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 (DEQ 2006). 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 (DEQ 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 DEQ 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 (DEQ 2000). The size and shape of the source water assessment area depends on the delineation method used, local hydrogeology, and volume of water pumped from the well or surface water intake.

This process involves collecting, recording, and mapping existing data to determine potential contaminant sources (e.g., gas stations) within the delineated source water assessment area. This 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 (DEQ 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 (DEQ 2000).

There are numerous public and private drinking water supplies in the Big Wood River Basin (IDWR 2008). The Sun Valley Water and Sewer District operates and maintains nine wells in two groupings (DEQ 2006). 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 (DEQ 2006).The City of Bellevue's drinking water system consists of two wells and three springs (DEQ 2006).

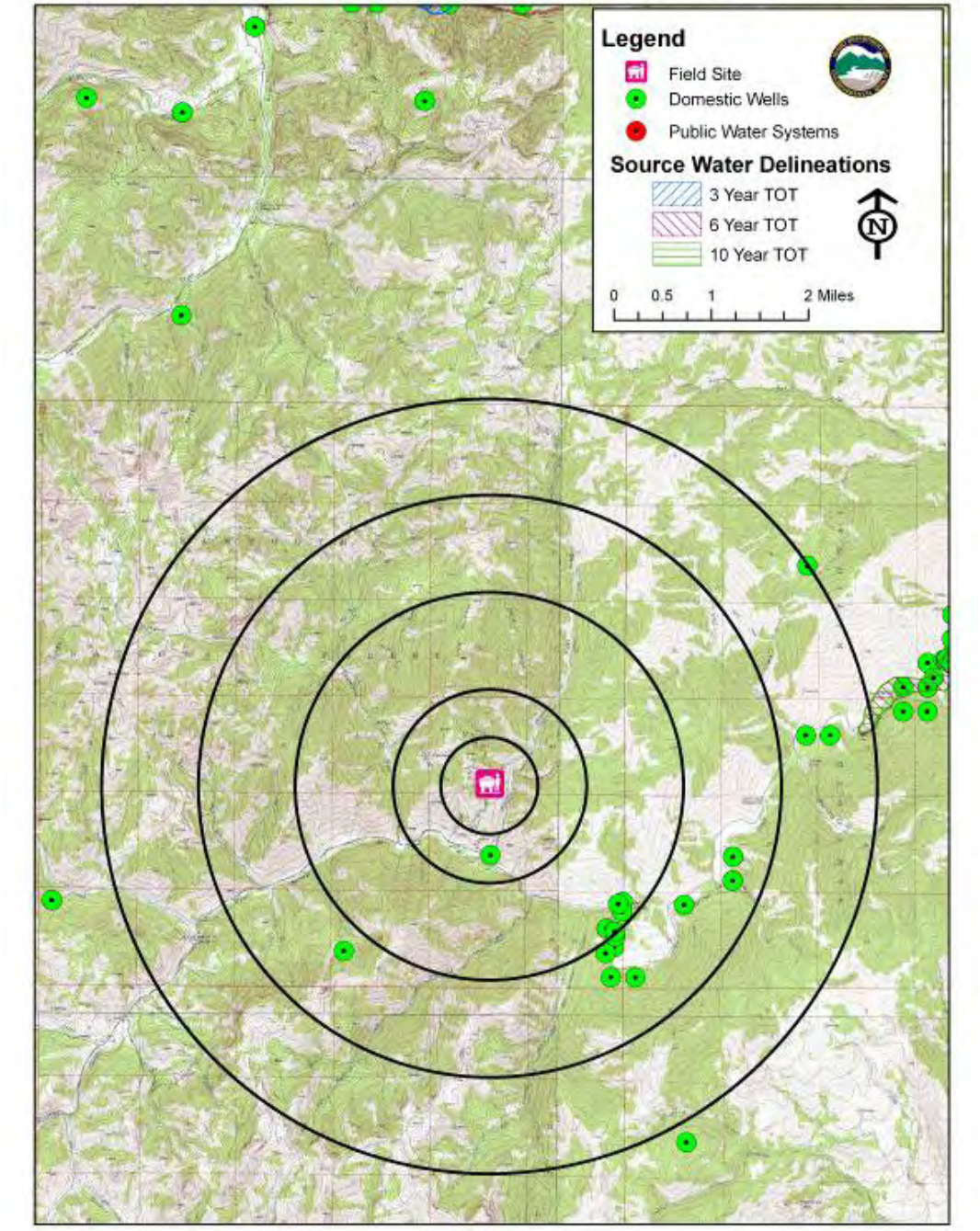


Figure 4. Location of Domestic Ground Water Wells, Public Water System Wells, and Source Water Delineations within a 4-mile Radius of Ontario Mine (Map source: USGS, 1995).

Generally speaking, public drinking water systems in the Big Wood River Valley are rated as moderate to high susceptibility (DEQ 2000). Multiple factors affect the likelihood of movement of contaminants from the sources to the aquifer, which lead 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. More specifically, there are no long-term or recurring water chemistry problems in the Sun Valley Water and Sewer District drinking water sources. One well in the Sun Valley system has had one instance (August 1991) when cadmium exceeded maximum contaminant level (MCL) (DEQ 2006). 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 (DEQ 2006). 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 (DEQ 2006). Currently, there are no data that indicate that any metal concentrations have exceeded MCLs in the Bellevue drinking water systems (DEQ 2006).

6.4 Surface Water Pathway

The Ontario Mine lie along the flank of a ridge approximately 400 vertical feet above Rooks Creek. There were six seeps/springs identified on these properties. Ephemeral drains occupy the slopes beneath and adjacent to the claims. These ephemeral drains appear to discharge into Rooks Creek.

There are no drinking water intakes within the 15-mile Target Distance Limit (TDL). The following TDL in-water segment was calculated from the lowest elevation workings on the Hillside claim. The ephemeral drains merge with Rooks Creek to the southeast at approximately 0.3 miles. Rooks Creek flows to the south to its confluence with Warm Springs Creek at 1.25 miles. Warm Springs Creek continues to the east where it is confluenced by Warfield Creek at 1.75 miles, by Red Warrior Creek at 2.3 miles, by West Fork of Warm Springs Creek at 6.1 miles and numerous other unnamed tributaries and thermal springs before merging with the Big Wood River at 13.75 miles. The Big Wood River continues to the south for the remainder of the 15-mile TDL (Figure 5).

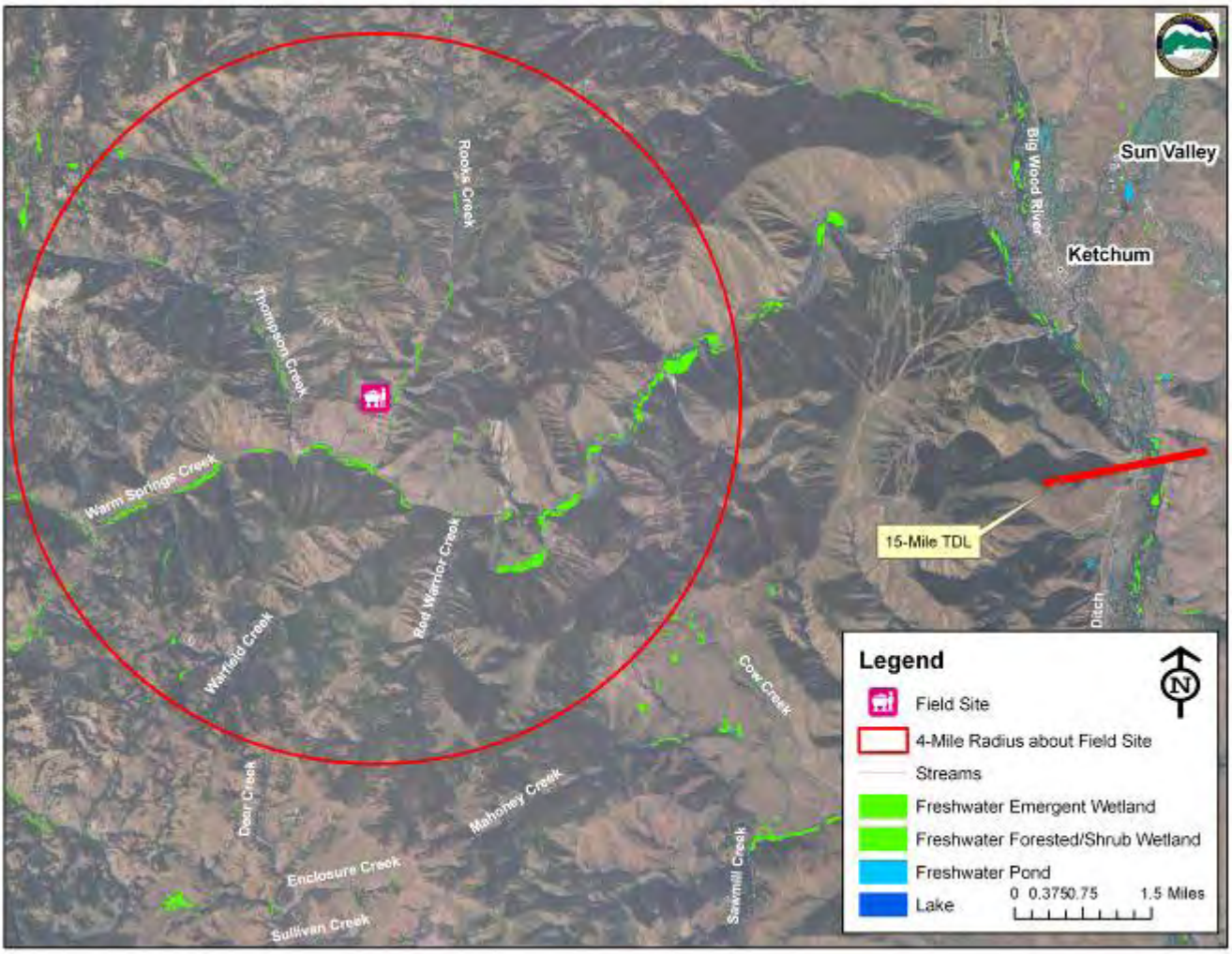


Figure 5. Location of Wetlands within 4-Mile Radius and 15 mile Target Distance Limit (TDL) of Ontario Mine (Map source: NAIP 2004).

Surface water samples were collected from Rooks Creek, up gradient (RCBCKWS1) and down gradient (RCPPEWS1) of the Ontario Mine in an effort to detect any influence from the mines. Although zinc is slightly elevated in both samples' the rest of the metals concentrations are nearly identical and fall well below the cold water acute and chronic standards (Table 1). In most cases, where a metal was present in the surface water samples above detection limits the concentration was higher in the up gradient sample. Zinc is the only metal where the concentrations are slightly above the Cold Water Biota standard in the downgradient sample is greater than the up gradient sample. Therefore, it appears that Rooks Creek's base flow is not adversely affected by metals contamination emanating from the Ontario Mine with the potential exception of zinc which was above the acute and chronic cold water biota standard in the downgradient sample.

A small seep was present at the two most downgradient locations of the Ontario Claim. The seep water reentered the ground within a very short distance. There was insufficient water present to collect a non-turbid sample.

On the Sunday claim a collapsed adit adjacent to the draw is producing water (water sample EADWS1), which flows over and permeates a waste rock pile (soil sample EAWDSS1). The water that infiltrates the waste rock pile reemerges at seeps located at the toe of the waste rock pile (water sample EWPWS1), where it rejoins the overland flow and creates perennial flow in the draw for approximately 650 feet.

The Ervine Claim is located adjacent to the Sunday Claim on a ridge to the northeast. Water sample EWP2WS2 was collected from a seep (<5 gallons/minute) emanating from the toe of the waste rock pile.

The North Star Claim contains two or three adits, which have produced approximately 3-5,000 cubic yards of waste rock over an approximate area of 0.5 acres. Water sample EWP3WS1 and soil sample NWPSS1 were collected on the lowermost waste rock pile at a collapsed adit's seep (Photo 12). Sulfide mineralization was present upon the waste rock, and moist soil emanated sulfide smells.

The Niagara and Hub No. 2 claims both contained very small (<500 cubic yards) waste dumps that contained almost solely country rock. No soil or water samples were taken from either location. Additionally, more than 25 other prospects are located throughout the Ontario Mine (USGS topoquad).

Rills and gullies are present in many locations throughout the Ontario Mine. The erosion was present not only within disturbed areas, but also along the perimeter of waste piles where concentrated overland flow was eroding native soil. However, there is no apparent overland connection between the sediment production on site and the perennial Rooks Creek below.

The Rooks Creek drainage has been affected by the Castle Rock Fire. Debris flows and sediment discharges have been documented by the U.S. Forest Service in the Rooks Creek drainage (USFS, 2007). Snow pack run-off will likely release additional areas of exposed soil and debris for transport through the drainage until vegetation returns and slopes are stabilized. In the immediate vicinity of the Ontario Mine, the Sunday and Ervine Claims have been most affected by the fire. Almost all of the timber on the north-facing side of Ervine Claim's ridge has been burnt, including many shallow roots. Along Rooks Creek, the wide riparian swath will act as a vegetated buffer, capturing sediment if debris flows occur, and preventing it from affecting the stream. During the site visit, no debris flows from the Ontario Mine appeared to be affecting Rooks Creek.

Table 1 Surface Water Total Recoverable Metals Analysis (mg/L) (Standards in "dissolved" unless stated)

	DEQ Ground Water Standard	DEQ Drinking Water Standard	DEQ Cold Water Biota Standard	DEQ Cold Water Biota Standard	Rooks Creek above mill site/ Ontario Mine	Rooks Creek below mill site/ Ontario Mine	Sunday Claim from adit
	Mg/L	Mg/L	Mg/L	Mg/L	mg/L	mg/L	mg/L
Description			Acute	Chronic	RCBCKWS1	RCPPEWS1	EADWS1
Antimony	0.006	0.006			<0.02	<0.020	<0.02
Arsenic	0.05	0.01	0.36	0.19	<0.025	<0.025	<0.025
Barium	2	2			0.0302	0.0298	0.0338
Cadmium	0.005	0.005	0.00082 (H)	0.00037 (H)	<0.0020	<0.0020	**0.0367**
Chromium	0.1	0.1			<0.0060	<0.0060	<0.0060
Copper	1.3	1.3	0.0046 (H)	0.0035 (H)	<0.010	<0.010	<0.010
Iron	0.3*	0.3*			0.147	0.082	0.265
Lead	0.015	0.015	0.014 (H)	0.00054 (H)	<0.0075	<0.0075	0.0147
Manganese	0.05*	0.05*			0.0136	0.0087	0.0489
Selenium	0.05	0.05	0.018 (T)	0.005 (T)	<0.040	<0.040	<0.040
Silver	0.1*	0.1*	0.00032 (H)		<0.005	<0.005	<0.005
Zinc	5*	5*	0.035 (H)	0.032 (H)	<0.01	**0.0367**	**5.61**

* secondary MCL (T) – Standard in Total (H) – Hardness dependent * 25 mg/L **Bold** – above standard

	DEQ Ground Water Standard Mg/L	DEQ Drinking Water Standard Mg/L	DEQ Cold Water Biota Standard Mg/L	DEQ Cold Water Biota Standard Mg/L	Sunday Claim from waste pile mg/L	Ervine Claim from waste pile mg/L	North Star Claim from adit mg/L
Description			**Acute**	**Chronic**	**EWPWS1**	**EWP2WS2**	**EWP3WS3**
Antimony	0.006	0.006			<0.02	<0.02	<0.02
Arsenic	0.05	0.01	0.36	0.19	<0.025	<0.025	<0.025
Barium	2	2			0.0253	0.0209	0.0163
Cadmium	0.005	0.005	0.00082 (H)	0.00037 (H)	**0.0636**	**0.134**	**0.121**
Chromium	0.1	0.1			<0.0060	<0.0060	<0.0060
Copper	1.3	1.3	0.0046 (H)	0.0035 (H)	<0.010	<0.010	<0.010
Iron	0.3*	0.3*			0.111	**0.5**	<0.06
Lead	0.015	0.015	0.014 (H)	0.00054 (H)	<0.0075	**0.21**	**0.0959**
Manganese	0.05*	0.05*			**0.0714**	0.0219	0.0091
Selenium	0.05	0.05	0.018 (T)	0.005 (T)	<0.040	<0.040	<0.040
Silver	0.1*	0.1*	0.00032 (H)		<0.005	<0.005	<0.005
Zinc	5*	5*	0.035 (H)	0.032 (H)	**4.41**	**9.8**	**9.67**

* secondary MCL (T) – Standard in Total (H) – Hardness dependent * 25 mg/L **Bold** – above standard

6.5 Soil Pathway

The mine waste samples collected from the Ontario Mine show concentrations for total antimony, arsenic, total cadmium, chromium, iron, total lead, total mercury, manganese, total silver and total zinc that exceed Idaho's *Initial Default Target Levels* (IDTLs) (

Table 2). These IDTLs are risk-based target levels for certain chemicals that have been developed by DEQ using conservative input parameters, a target acceptable risk of 10^{-6}, and a *Hazard Quotient* of 1.

The mine waste concentrations for antimony, arsenic and total lead also exceed EPA Region 6's Human Health Medium Specific Screening Levels (HHSL) (EPA 2007). The HHSL 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, and where exposures might produce an acute or chronic toxicological effect in a population.

Metal exceedences indicate that additional site characterization and risk management may be warranted. As the claim sites are remotely located beyond where most human receptors would go, and where future development is unlikely, risks are likely de minimus. However, if development is planned for these properties, additional site characterization and risk management is recommended.

Table 2 Soil and Sediment Samples Total Recoverable Metals Analysis (mg/kg)

Soil and Sediment Data	IDTLs	EPA Region 6 HHSLs	sample description	sample description	sample description	sample description	sample description
			Rooks Creek Upstream Sediment Sample	Rooks Creek Downstream Sediment Sample	Ontario Claim Soil Sample	Ontario Claim Background Soil Sample	Ervine Claim Soil Sample
Description	mg/kg	mg/kg	RCBKGSD-1	RCPPESD-1	NIWPSS1	ONBKGSS1	EWP2SS1
Antimony	4.77	31	<0.2	2.2	**71.7**	**12.6**	**104**
Arsenic	0.391	23	**4.3**	**18.9**	**404**	**76.3**	**554**
Barium	1,320	15,000	71.4	150	261	147	89.9
Cadmium	4.63	39	<0.2	3.92	1.38	**6.81**	**15.4**
Chromium	11.2	230	**20.9**	**17.7**	4.1	4.2	3.56
Copper	2,200	2,900	19	22.8	60.9	20.5	154
Iron	5.76	55,000	**8,270**	**9,260**	**45,800**	**18,600**	**33,400**
Lead	49.6	400	9.66	**187**	**8,700**	**1,150**	**56,900**
Mercury	0.785	23	0.057	0.073	**1.97**	0.06	**1.45**
Manganese	223	3,500	102	**438**	**258**	**509**	**1,010**
Selenium	5.51	390	<4.0	<4	<4	<4	<4
Silver	3.98	390	<0.5	1	**58.1**	3.57	**185**
Zinc	2,840	23,000	29.6	1,130	946	801	**6,300**

Bold – where above standard

Soil and Sediment Data	IDTLs	EPA Region 6 HHSLs	sample description	sample description	sample description
			Sunday Claim Soil Sample	North Star Claim Soil Sample	Ervine/North Star Background Soil Sample
Description	mg/kg	mg/kg	EAWDSS1	NWPSS1	EBKGSS1
Antimony	4.77	31	**33.1**	<2.0	3.4
Arsenic	0.391	23	**348**	**54.9**	**23.6**
Barium	1,320	15,000	87.7	33.7	232
Cadmium	4.63	39	<0.2	2.05	3.08
Chromium	11.2	230	2.26	0.79	11.6
Copper	2,200	2,900	8.95	26	10.9
Iron	5.76	55,000	**41,300**	**21,100**	**19,900**
Lead	49.6	400	**7,860**	**1,140**	**399**
Mercury	0.785	23	0.15	0.242	0.063
Manganese	223	3,500	74.3	**272**	**594**
Selenium	5.51	390	<4	<4	<4
Silver	3.98	390	**48.3**	**4.9**	0.96
Zinc	2,840	23,000	778	508	600

Bold – where above standard

6.6 Residences Schools and Day Care Facilities

There are no residences, schools or day-care facilities within 200 feet of the Ontario Mine. The nearest residence is located approximately 1 mile south-southeast on Warm Springs Road. Warm Springs Creek lies adjacent and to the south of the residence. Several residences, located along Warm Springs Road near Warwick Hot Springs, are within 2 miles to the southeast from the claims.

Warwick Hot Springs is located directly beside Warm Springs Road within 2 miles of the claims. The hot springs appear to be used on a regular basis by locals and area visitors, based on the parking area, signage, and occupancy of the spring noted during DEQ's site visit.

6.7 Sensitive Species and Wetlands

The national wetland data base (United States Fish and Wildlife Service, accessed 2008) indicates that wetlands exist along Warm Springs Creek and the Big Wood River downstream from the Ontario Mine (Figure 5). The riparian areas within Rooks Creek and downgradient from the workings did not appear to have suffered any phytotoxic affects.

"Species of concern" such as the Western Toad, Long-eared Myotis, Townsend's Big-Eared Bat, and Flammulated Owl have been identified within the Warm Springs sub-drainage and within a 4-mile radius of the properties (Idaho Department of Fish and Game 2002) (Figure 6).

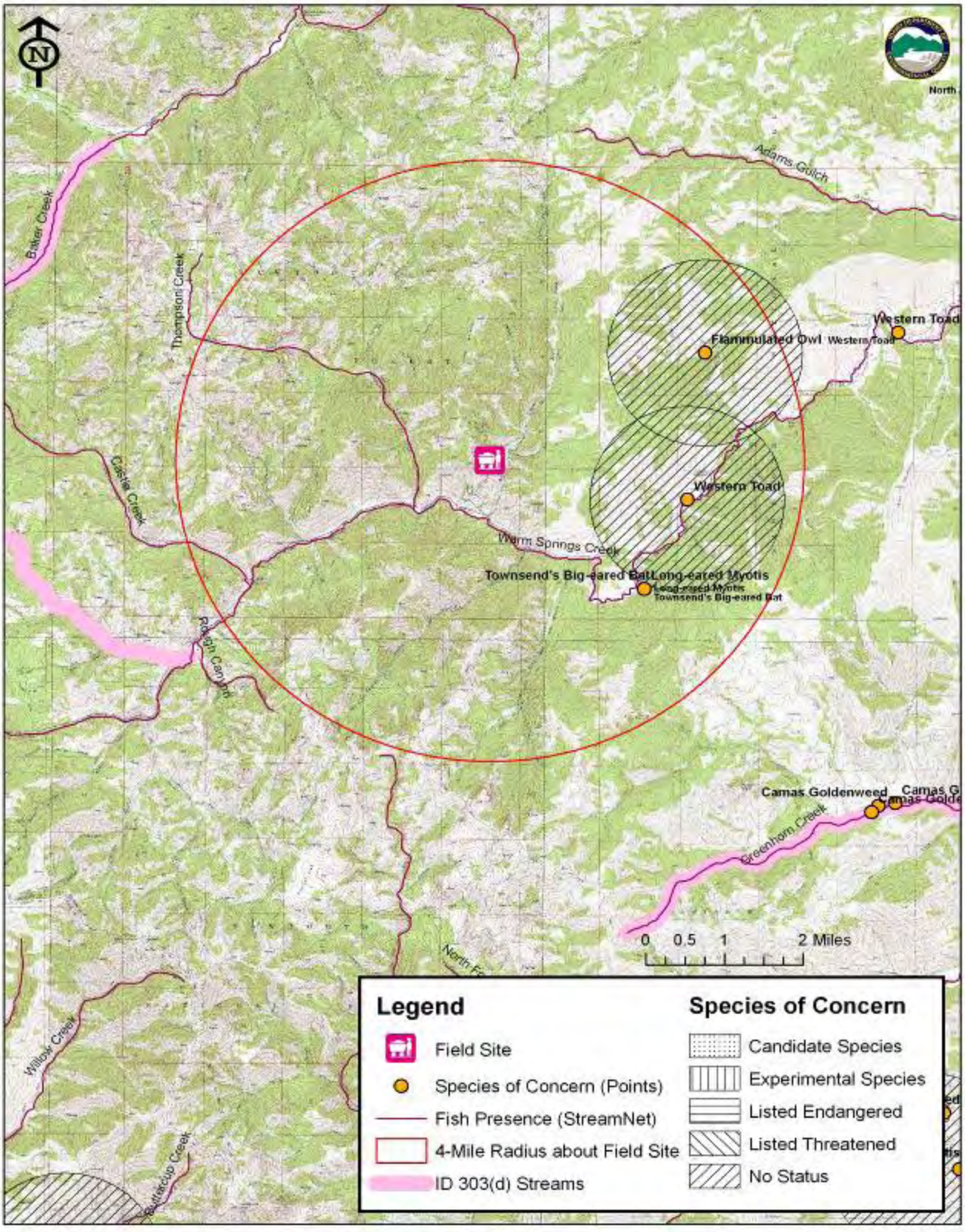


Figure 6. Locations and Names of Threatened or Endangered Species or Streams within 4-mile Radius of Ontario Mine (Map source: USGS 1995).

A DEQ fish survey has collected Wood River Sculpin within Rock Creek, down stream of the Ontario Mine. Sculpins are species which have been documented to be sensitive to pH and heavy metals (Welsh, S.A. and Perry, S.A.. 1997, Maret, R. and MacCoy, D.E.. 2002). Their presence within the creek indicates that any potential impacts from mining are not significantly affecting sensitive fish assemblages. Additionally, DEQ has collected Rainbow Trout and Brook Trout from Rooks Creek large enough to consider eating (DEQ, 2005).

On August 16, 2007 a lightning storm ignited a fire near Castle Rock Peak, southwest of Ketchum, Idaho. The fire, known as the "Castle Rock Fire", burned more than 48,000 acres before containment on September 4, 2007. The Rooks Creek drainage including both private holdings and lands administered by the U.S. Forest Service was impacted by the fire (USFS, 2007). The extent to which the fire impacted the Ontario Mine was not determined by DEQ.

Forest Grouse were observed on the Ontario Mine, as well as evidence of Mule Deer and Rocky Mountain Elk, each of which are hunted each fall in this area. Approximately a dozen grouse were observed during field work, and each was within a short flight of surface water present on the Ontario Mine. Numerous elk and deer tracks were present on waste piles and at previously noted springs and seeps. Due to the 2007 forest fire burning much of the forest within many square miles, unburned areas, such as those within the Ontario Mine, might be hosting more animals than prior to the fire. Hunters, their animals (bird dogs, mules, etc.), and the animals they pursue are exposing themselves to waste piles and waters that emanate from them.

Section 7. Conclusions and Recommendations

The Ontario Mine includes three major workings and numerous shallow prospects. Surface water samples from the Sunday, Ervine, and North Star patented claims have elevated concentrations of antimony, arsenic, total cadmium, chromium, iron, total lead, total mercury, and manganese, total silver and total zinc. However, the all pathways to sensitive ecological receptors appear incomplete or di minimus.

Erosion of the waste dumps is prevalent, and most certainly contributes to sediment delivery to the perennial Rooks Creek. This sediment may pose a physical impairment to Rooks Creek, but there is no evidence that these releases increase metals loading in the stream. Slope stabilization, water management and promotion of top soil development of large waste dumps might effectively abate this production and delivery.

DEQ identified seven (7) physical hazards, specifically open adits and shafts. These are dangerous and should be managed or closed to restrict access.

DEQ's Source Water Assessments were used to evaluate potential affects of this mine on public drinking water supplies. No direct affect was determined.

Based on the data and observations analyzed by DEQ, DEQ recommends that if these properties are developed, particularly for residential purposes, a more thorough site characterization is conducted, and if necessary development plans should include risk management provisions.

Based on existing conditions, uses, and historic information DEQ has determined and is recommending to EPA that the sites status are designated No Remedial Action is Planned (NRAP).

Section 8. Site Photos



Photo 1 Ontario Mine; facing south (downhill) from top of workings. Disturbed area is 600 feet long from top to bottom. A vertical shaft (shown in picture) and a nearby horizontal adit present physical hazards.



Photo 2. Ontario Claim facing west at mid-slope. Distance across is 300 feet. Vegetation has begun to grow back on barren soils. More hill slope stabilization will promote faster plant recovery.



Photo 3. Sunday Claim facing north. Water sample EWPWS1 was taken at the toe of the slope and soil sample EAWDSS1 was taken at the crest of the waste pile.



Photo 4. Photo facing west of Ervine waste pile in foreground and Sunday waste pile in the background. An open adit is present on the Sunday waste pile just on the far side of the draw.



Photo 5. Photo facing west and uphill from Sunday Claim waste pile that is visible in Photo 4, illustrating additional workings on the claim. More waste piles are present in the trees to the left (south) of the view. To the back right of the view (northwest) are the former locations of the blacksmith shop, office, and boarding house.



Photo 6. Photo of Ervine facing north. Waste pile is approximately 60 meters wide and 250 feet long. Soil sample EWP2SS1 was taken at the upper middle of the disturbed area.



Photo 7. Photo of Ervine facing northwest. Waste pile is approximately 60 meters wide and 80 meters long. Soil sample EWP2SS1 was taken at the upper middle of the disturbed area.



Photo 8. Photo facing northeast from a waste pile on Sunday Claim towards Ervine Claim. Disturbed area on Ervine Claim measures approximately 60 meters wide left to right, and 80 meters long, top to bottom.



Photo 9. Figure taken on the north-facing side of ridge on Ervine Claim illustrating burnt trees and numerous workings. This situation is present for approximately 200 meters along ridge towards North Star Claim, which can be seen in the background.



Photo 10. Figure illustrating two open adits at Ervine Claim. Based upon observations from the opening, they are open to at least 15 feet below ground, and no attempt appears to have yet been made to close them.



Photo 11. Photo facing northwest towards North Star Claim. Disturbed area measures approximately 90 meters wide and 30 meters long. Soil sample NWPSS1 and water sample EWP3WS1 were taken from an area on the left side of the photo near a seep that is hidden behind the large burnt tree trunk in the foreground.



Photo 12 Photo of North Star Claim. Vegetated area near foreground is the location of soil sample NWPSS1 and water sample EWP3WS1.

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