

SPRINGFIELD SCHEELITE MINE

AKA: White Mare Group, White Mare #1, White Mare #2, White Mare #3, White Mare #4, White Mare #5, White Mare #6, White Mare #7, White Mare #8, White Mare #9, White Mare #10, White Mare #11, Old Faithful, Beulah, and Emma unpatented claims

PRELIMINARY ASSESSMENT REPORT

Valley County
State of Idaho



Department of Environmental Quality

July 2010

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

July 14, 2010

Mr. Dean Morgan
Salmon-Challis National Forest
Challis - Yankee Fork Ranger District
HC 63 Box 1669, Hwy 93
Challis, ID 83226

RE: Site Assessment of the Springfield Scheelite Mine, Valley County, Idaho.

Dear Mr. Morgan:

The Idaho Department of Environmental Quality (DEQ) has completed a review of historical mining data and geological information at the above referenced site. Subsequent to that review, DEQ conducted a site visit of the Springfield Scheelite Mine. During the site visit, mining facilities were mapped and sampled to complete the analysis necessary to finalize the Preliminary Assessment (PA) report.

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

- 1) To identify those sites which are not CERCLIS caliber because they do not pose a threat to public health or the environment (No Remedial Action Planned (NRAP));
- 2) To determine if there is a need for removal actions or other programmatic management of sites;
- 3) To determine if a Site Investigation, which is a more detailed site characterization, is needed; and/or
- 4) To gather data to facilitate later evaluation of the release through the Hazard Ranking System (HRS).

DEQ completes 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. DEQ has also utilized State General Funds so it can joint venture site assessments with federal land management agencies as it did with the U.S. Forest Service on the Springfield project.

DEQ is recommending that from a CERCLA perspective the status of this mine and claims should be designated as No Remedial Action Planned (NRAP). DEQ is making this recommendation based on existing uses and conditions, historic information, and data analysis.

However, because of the instability and erosion of mine wastes and tailings and their potential implications to sensitive receptors, this site may be prioritized for some type of reclamation or stabilization under the Clean Water Act by the U.S. Forest Service or DEQ's Surface Water Program.

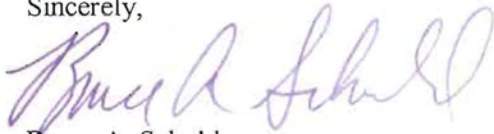
Due to remoteness of this location and the fact it is located in the Idaho Primitive Area, it is doubtful residential development will happen in the future. Currently there is an active unpatented mining claim on the Springfield Scheelite Mine site which may hinder the recommendation to close Adit 1.

The dust from the tailings impoundments may pose a risk to recreationists, if they are in the area for long periods of time. It is DEQ's recommendation that site access is restricted to prevent undue exposures to tailings.

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

Attachment

cc: Craig Shepard – DEQ Boise Regional Office
Ken Marcy – U.S. Environmental Protection Agency
Maggie L. Baker – U.S. Forest Service Intermountain Region
Kathy Zirbser – U.S. Forest Service Intermountain Region
Holly Ambrose- U.S. Forest Service Intermountain Region
Cynda Herrick – Valley County Planning and Zoning
File

This page intentionally left blank.

Table of Contents

List of Acronyms	5
Section 1. Introduction.....	7
Section 2. Ownership.....	9
Section 3. Overview.....	11
3.1 Location	11
3.2 Directions to the Mine	11
Section 4. Mine Site History.....	15
Section 5. Climate.....	17
Section 6. General Geology	19
Section 7. Current and Potential Future Land Uses.....	21
7.1 Current Land Uses	21
7.2 Future Land Use.....	21
Section 8. Site Conditions and Waste Characterization.....	23
Section 9. Sample Collection and Analysis	39
9.1 Soils Analysis.....	40
9.2 Sediment Analysis	41
9.3 Surface Water Analysis.....	41
Section 10. Pathways and Environmental Hazards.....	45
10.1 Ground Water Pathways	45
10.2 Surface Water Pathways	45
10.3 Domestic Wells and Public Water Supplies	45
10.4 Air Quality Pathways.....	48
10.5 Soil Exposure	48
10.6 Residences, Schools, and Day Care Facilities	48
10.7 Wetlands	48
10.8 Sensitive Species (Plant and Animal).....	50
10.9 Fisheries	50
10.10 Sensitive Waterways.....	50
10.11 Livestock Receptors.....	50
Section 11. Summary and Conclusions	53
Section 12. References.....	55

List of Figures

Figure 1. Topographic overview map of Springfield Scheelite Mine claims (Map source: USGS 24k Quads).....	12
Figure 2. Aerial map of the Springfield Scheelite Mine claims. (Map source: NAIP 2004).....	13
Figure 3. Geologic map of the Springfield Scheelite Mine area (Map source: USGS 24k).....	20
Figure 4. Map of the Springfield Scheelite Mine (Figure 63 from Cater and others, 1973).	25
Figure 5. Sample Locations for the Springfield Scheelite Mine (Map source: USGS 24k).	37
Figure 6. 15-Mile Target Distance Limit (TDL) (Map source: NAIP 2004).....	46
Figure 7. Domestic wells and public water system wells located outside of 4-mile radius ring, there are no wells located in the 4-mile radius (Map source NAIP 2004).....	47
Figure 8. Wetlands located by 2-mile radius of the Springfield Scheelite Mine and 15-Mile Target Distance Limit (TDL) (Map source: NAIP 2004).....	49
Figure 9. Sensitive species and waterways within 4-mile radius and in the vicinity of the Springfield Scheelite Mine.	51

List of Tables

Table 1. Total Recoverable Metals Analysis	40
Table 2. Total Recoverable Metals Analysis	41
Table 3. DEQ Water Samples Total Recoverable and Dissolved Metals Analysis (mg/L).	43
Table 4. DEQ Water Samples Total Recoverable and Dissolved Metals Analysis (mg/L).	44

List of Acronyms

amsl	above mean sea level
bgs	below ground surface
BLM	Bureau of Land Management
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
DEQ	Idaho Department of Environmental Quality
EPA	United States Environmental Protection Agency
E & E	Environment & Ecology, Inc.
GIS	Geographic Information System
gpm	gallons per minute
HHSLs	Human Health Medium-Specific Screening Levels
IDTL	Initial Default Target Level
IGS	Idaho Geological Survey
MCL	Maximum Concentration Limit
NAIP	National Agriculture Imagery Program
PA	Preliminary Assessment
PPE	probable point of entry
ppm, mg/kg, mg/L	parts per million, milligrams per kilograms, milligrams per Liter
RCRA	Resource Conservation Recovery Act
SI	Site Inspection
SQAP	Sampling and Quality Assurance Plan
TAL	Target Analyte List
TDL	Target Distance Limit

TMDL	Total Maximum Daily Load
USFS	United States Forest Service
USGS	U.S. Geological Survey
VCP	Voluntary Cleanup Program

Section 1. Introduction

This document presents the results of the Preliminary Assessment (PA) for the Springfield Scheelite Mine. The Department of Environmental Quality (DEQ) is contracted by Region 10 of the United States Environmental Protection Agency (EPA) to provide technical support for completion of preliminary assessments at various mines on private or state lands. DEQ also budgeted general fund monies to support site assessments of federal facilities such as the Springfield Mine in the Yellow Pine Mining District in Valley County, Idaho.

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

In February 2002, DEQ initiated a Preliminary Assessment Program to evaluate and prioritize assessment of such potentially contaminated sites. Due to accessibility and funding considerations, priority is given to sites where potential contamination poses the most substantial threat to human health or the environment. Priority is also given to mining districts where groups or clusters of sites can 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

The Springfield Scheelite Mine is located on unpatented mining claims and lands administered by the United States Forest Service (USFS). In 2009 DEQ participated with the USFS in a site visit at the Springfield Scheelite Mine.

This page intentionally left blank.

Section 2. Ownership

DEQ does not warrant the ownership research or location of property boundaries contained in this report. The information regarding ownership and property boundaries was obtained from the Valley County tax assessor's office in Cascade, Idaho. The poor juxtaposition of the claims' boundaries observed in this report's figures are plotted according to the Valley County tax assessor's database, and are indicative of errors that may exist in the recorded surveys of the properties.

Within the following ownership descriptions the “**Partial Determination**” is meant to convey a very brief summary of DEQ's assessment of individual claims and parcels relative to human health and ecological risk factors associated with toxicological responses to mine wastes. A determination of No Remedial Action Planned or “**NRAP**” means that based on current conditions at the site DEQ did not find any significant evidence that would indicate the potential of adverse toxicological 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 DEQ has determined that there is sufficient evidence to warrant calculation of a **Hazard Ranking Score (HRS)** by EPA's contractors. It also indicates DEQ 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 Springfield Scheelite mine consists of 15 unpatented mining claims, constituting the White Mare group. The land is owned by the USFS.

Owner	Claims	Parcel Number	Partial Determination
United States Forest Service Intermountain Region 324 25th Street Ogden, UT 84401	All Claims	N/A	No Remedial Action Planned

This page intentionally left blank.

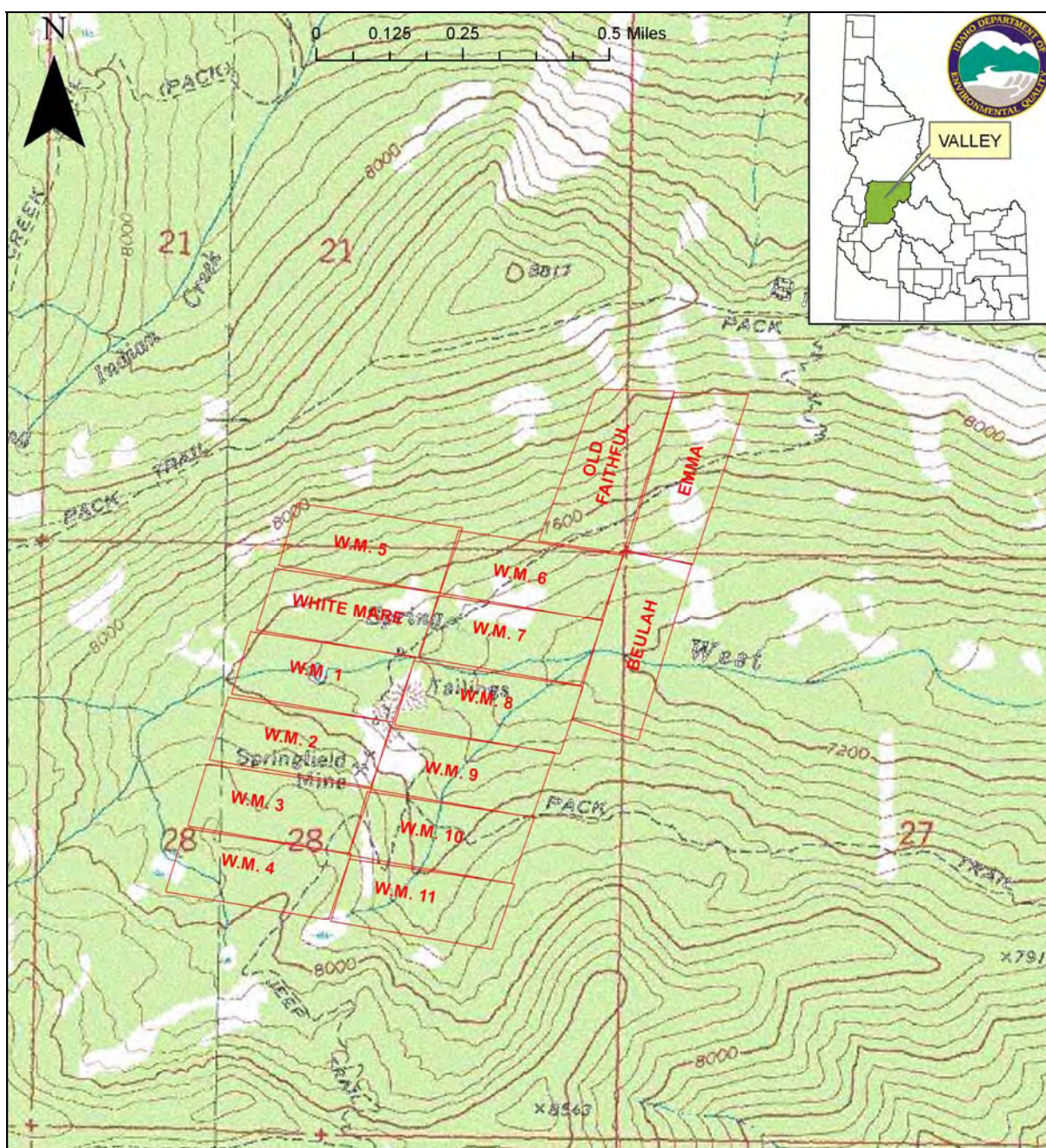
Section 3. Overview

3.1 Location

The Springfield Scheelite Mine is located at an altitude of 7,800 feet near the head of the West Fork of Springfield Creek in Valley County, Idaho, in Section 28 of Township 17 North, Range 09 East of the Boise Meridian, at Latitude DD: 44.782778, Longitude DD: -115.366944. The mine can be located on the Big Chief Creek 7.5-minute topographic quadrangle in an access corridor in the Frank Church-River of No Return Wilderness Area. The mine site location is illustrated in Figures 1 and 2.

3.2 Directions to the Mine

Access to the mine is limited because of its remote location. Go east on Warm Lake Road northeast from the town of Cascade until reaching the NF 488 road. This road becomes NF 467 TRL. Continue for approximately 9.5 miles and turn left on Johnson Creek Road NF 413. At the Twin Bridges there is a turn out area for the Trapper Creek trailhead, NFD 440. This road ends a few miles in and turns into a jeep trail. The trail continues for 12 miles east to the Springfield Scheelite mine. High clearance vehicles are recommended from the intersection of Johnson Creek and NFD 440. Off road vehicles (ORVs) or hiking is recommended once NFD 440 ends.



Restriction of Liability: Neither the State of Idaho nor the Department of Environmental Quality, nor any of their employees make any warranty, or assume and legal liability or responsibility for the accuracy, completeness or usefulness, of any information or data provided. The data could include technical inaccuracies or typological errors. IDEQ may update, modify, or revise the data used at anytime, without notice. 4/20/2010

Figure 1. Topographic overview map of Springfield Scheelite Mine claims (Map source: USGS 24k Quads).

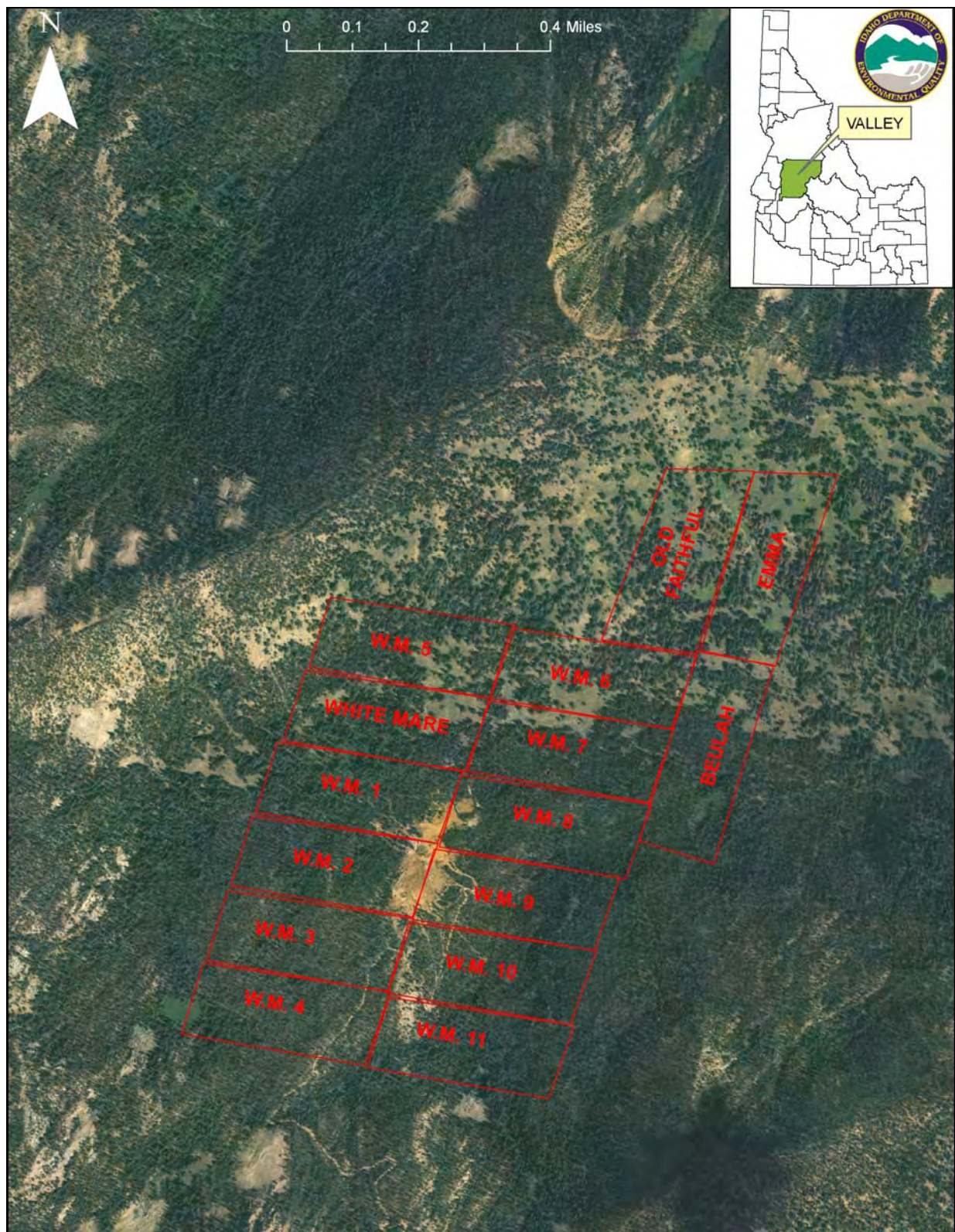


Figure 2. Aerial map of the Springfield Scheelite Mine claims. (Map source: NAIP 2004).

This page intentionally left blank.

Section 4. Mine Site History

The White Mare claims, which cover the Springfield Scheelite Mine, were located by Lafe Cox in 1945. Bradley Mining Company leased the claims in 1947 and completed 1,900 linear feet of exploratory diamond drilling. A government subsidy for tungsten stimulated Bradley to begin mining in 1953.

Scheelite ore from a talus deposit was first treated in a simple gravity mill at the mine. The concentrates from the gravity mill were trucked to Stibnite for electric separation (USBM). During the summer and fall, the talus was processed at a rate of 60-75 tons per day (tpd). The rough concentrate contained 15-20 percent (Tungsten Oxide) WO_3 . In August 1953, exploratory drilling under a Defense Minerals Exploration Administration contract delimited an irregularly shaped tactite body.

In 1954, Bradley built a 75-tpd gravity mill to process the rest of the talus and the ore from the tactite body. The average grade of the mill feed was 0.35 percent WO_3 . Bradley Mining Co. processed 12,000 tons of crude ore during the summer. About 8 tons of low grade material (9 percent WO_3) was shipped to the Salt Lake Tungsten Company for treatment, and a total of 1,522 units of high grade scheelite concentrate (over 70 percent WO_3) were purchased by the government.

In 1955, Bradley Mining Co. produced 10,683 tons of tungsten ore averaging 0.4 percent WO_3 from the Springfield Mine. About 2,159 units' WO_3 in high grade concentrate and a small tonnage of lower quality material were recovered (USBM). The mill was dismantled and removed at the end of the mining season.

Total production from the mine was over 39,000 tons of ore which yielded over 5,940 short ton units of WO_3 (A short ton unit equals 20 pounds WO_3 and contains 15.862 pounds of tungsten). An estimated 151,000 tons of scheelite-bearing rock still remains. This material, which includes the remaining talus and a small remnant of the unmined tactite body, contains an average of 0.30 percent WO_3 (or 45,300 units of WO_3). In addition, the mill tailings total about 27,000 tons of crushed material averaging an estimated 0.10 percent WO_3 (2,700 units of WO_3). This gives an estimated total of 178,000 tons of all types of tungsten-bearing materials remaining on the property. This material averages 0.27 percent WO_3 (48,000 units of WO_3).

Cater and others, 1973

In the late 1980s, the claims were still owned by Lafe and Emma Cox (McHugh and others, 1991).

This page intentionally left blank.

Section 5. Climate

Climate information provided in this section is based on a climatological summary for Yellow Pine, Idaho which was obtained from the National Oceanic and Atmospheric Administration (NOAA), National Climatic Data Center. The climatological data collected at the Yellow Pine 7 S station (elevation 5,110 amsl), is for the period of 1970 through 2005. Each site for which this data is used is subject to more localized meteorological conditions that result from difference in elevation, orientation of slopes in watershed, vegetation, and other factors.

The region is characterized by short cool dry summers and very cold winters. The total annual precipitation measured at the Yellow Pine 7 S station averages 26.87 inches. The majority of precipitation occurs as snow. Total annual snowfall averages 104.5 inches with most snowfall occurring in December and January. The driest months are July, August, and September.

Based on records from 1970 to 2005, the average annual temperature measured at the Yellow Pine 7 S station is 40 degrees Fahrenheit (F). The lowest temperature recorded for this period was -9.4 degrees F in 1979. The highest temperature for this period of record was 86.9 degrees F in 1971. December is the coldest month with an average temperature of 21 degrees F. July is the hottest month with an average temperature of 59 degrees F.

This page intentionally left blank.

Section 6. General Geology

According to Cater et al, the Pistol Creek district in the southwest corner of the primitive area includes the entire drainage of Pistol Creek and a small area draining into the Middle Fork (Salmon River). Most of this district is underlain by the Idaho batholith and related mixed rocks, but Challis Volcanics crop out along the north edge and locally elsewhere. *Small masses of Yellow Jacket Formation and Hoodoo Quartzite are scattered throughout the district, mostly as inclusions in the batholith. Tertiary dikes are numerous and widespread. A road to some mines roughly follows the southern edge of the district, and another road, now closed, to the Springfield Scheelite mine provides access to the northwest corner of the district* (Cater, et al. p. 42).

Numerous deposits, both placer and lode, have been worked in the Pistol Creek district, the most productive being the Springfield Scheelite mine, which was active during 1953-1955. About 25,200 tons of colluvium containing about 0.35 percent of WO_3 were mined from this deposit; this material yielded concentrates containing about 5,940 short ton units of WO_3 . The ore body beneath the colluvium is a scheelite-pyrrhotite deposit which B.F. Leonard (U.S. Geological Survey, 1964, p. A4) described as “a high-temperature replacement of garnet-pyroxene skarn developed from carbonate rocks including alaskitic facies of the Idaho batholith.” (Cater, et al. p. 43).

The country rock in the mined area is mostly quartz monzonite, and the deposit is in an irregularly shaped remnant of a tactite body derived from sedimentary rocks that were intensely metamorphosed and shattered during emplacement of the Idaho batholith. The tactite is composed of approximately 20 percent carbonate rocks, 25 percent quartz and silicate minerals, 50 percent pyrrhotite, and less than 1 percent chalcopyrite and scheelite. Drilling indicates that the tactite body is a thin lenticular mass less than 400 feet long, about 255 feet wide, and a maximum of 50 feet thick, lying roughly parallel to the slope of the present surface (Cater, et al. pp. 211, 212).

The mines in the northwestern part of the Middle Fork Ranger district are hosted by intrusive rocks of Cretaceous or Tertiary age. The Springfield Scheelite Mine is a contact-metamorphic tungsten deposit hosted in a roof pendant contained within the Idaho Batholith (Cater, et al., 1973).

A geologic map for this area is shown in Figure 3.

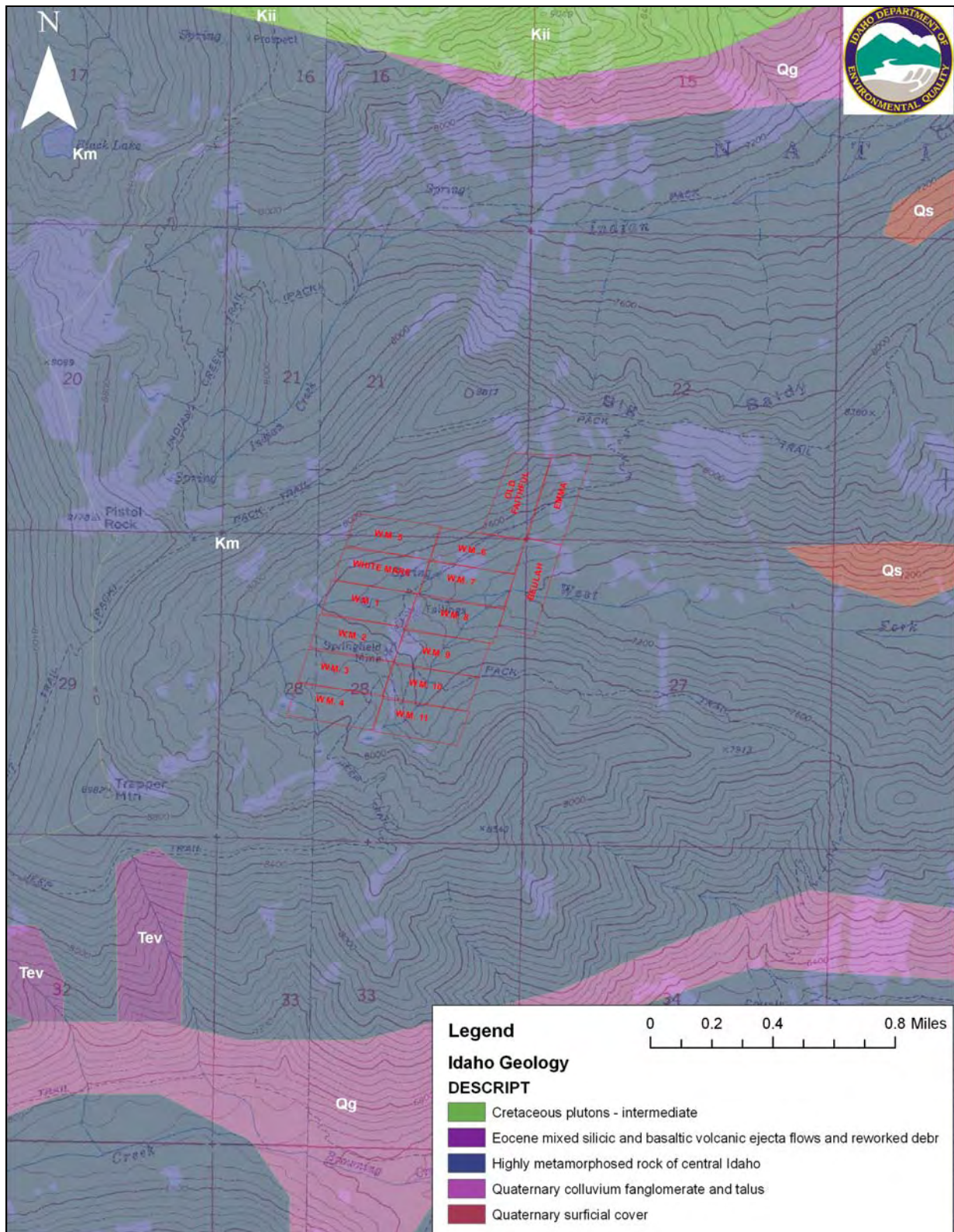


Figure 3. Geologic map of the Springfield Scheelite Mine area (Map source: USGS 24k).

Section 7. Current and Potential Future Land Uses

7.1 Current Land Uses

Current land uses in the West Fork Springfield Creek sub-drainage and adjacent tributary areas include recreational activities such as horseback riding, hiking, hunting and off-road vehicle (ORV) touring. The area is restricted to off road vehicles below the Springfield mine.

There is also an active unpatented mining claim for the Springfield mine and when DEQ and the USFS performed their site visit the lessees were cutting down overgrowth from the jeep trail to create access for their vehicle into the mine site.

Public access to the Springfield Scheelite mine is unrestricted. During the DEQ site visit to the Springfield Scheelite mine properties, ORV users were riding on the trails north of the mine site.

7.2 Future Land Use

Future land use may include mining and timber. The area is in a remote location on lands administered by the USFS, so it is very unlikely that residential development will happen in the future. This area was declared by the USFS as the Idaho Primitive Area in 1931. The River of No Return Wilderness was created in 1980 which borders the site along the east side and is governed by the provisions set forth in the Wilderness Act of 1964. This Act requires the management of human caused impacts and protection of the area's wilderness character insuring it is, "unimpaired for the future use and enjoyment as wilderness" (Public Law 88-577 16 U.S.C. 1131-1136).

This page intentionally left blank.

Section 8. Site Conditions and Waste Characterization

An Idaho Geological Survey (IGS) geologist visited the site in 1994. According to the IGS records, *“sulfur-bearing minerals in the ore were breaking down to sulfuric acid in the tailings area, and the fumes were strongly noticeable. Other features noted at that time included two adits, at least one of which was open and the remains of the mill buildings”* (Mitchell, p.8).

Another site visit was conducted in 2003 by a USGS geologist. The report describes the Springfield Scheelite Mine as a, *“Large site with a 100’ high wall, large waste pile and many buildings. This site is stable but many things could be cleaned up. The adit mid high-wall has water that is precipitating Iron Oxide sludge inside”* (Yantis, p. 1).

DEQ and the USFS completed a field visit for the site assessment of the Springfield Scheelite Mine site on August 24, 2009. The area itself is approximately 15 acres located on the south-facing slope in the West Fork Springfield Creek sub-drainage.

Forest fires in 2007 burned the historic structures at the Springfield Scheelite Mine. The investigation team noticed two adits, three tailings impoundments, burned remnants of mining structures, waste piles, a small pond, a creek, and a hunting camp by the mine site.

Photo 1 illustrates the conditions of the jeep trail and how it is almost inaccessible for vehicles to enter the area. DEQ did witness a Jeep Scrambler on this trail, and in 1994 IGS drove a truck into the site. Since the fire there are many downed trees and other obstacles to maneuver around. Off road vehicles (ORVs) enter the area from this trail.



Photo 1. Jeep trail into the mine area. (Photo by Andy Mork 8/09)



Photo 2. Detailed view south to highwall of the Springfield Scheelite Mine. (Photo by Andy Mork 8/09)

There was a seep noted emitting from the high wall (Photos 2 & 3). However, a surface water pathway was not observed connecting this seep to the West Fork of Springfield creek.

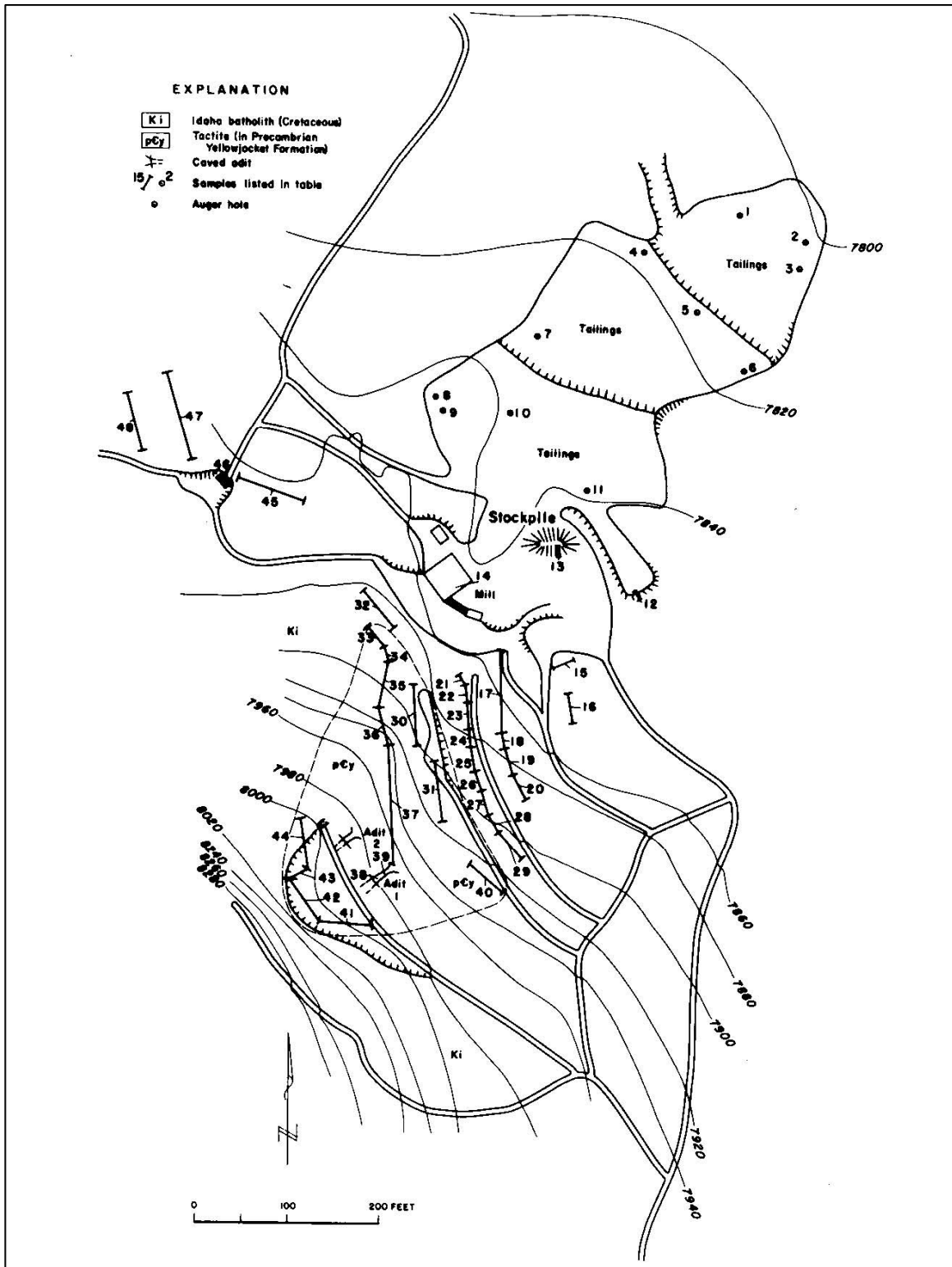


Figure 4. Map of the Springfield Scheelite Mine (Figure 63 from Cater and others, 1973).



Photo 3. High wall detail and seep. (Photo by Andy Mork 8/09)

Adit 1 is located in the center of the high wall in Photo 2 and Figure 4. Both filtered and unfiltered surface water samples were collected from the adit (SMADITT, SMADITD) although there was no evidence of the water discharging from the adit. The second adit was inaccessible for the DEQ staff as the rock was extremely unstable on the high wall.



Photo 4. Close-up view of Adit 1. (Photo by Andy Mork 8/09)



Photo 5. View inside open adit 1 at the Springfield Scheelite Mine. (Photo by Andy Mork 8/09)

The mill site has been reduced to a pile of burnt rubbish. No buildings remain on the site.



Photo 6. View north of mill site and tailings, adit is left-center out of view. (Photo by Andy Mork 8/09)



Photo 7. Shed remnants. (Photo by Andy Mork 8/09)



Photo 8. View south to upper tailings impoundment and high wall. (Photo by Andy Mork 8/09)

A strong sulfur smell appears to emanate from the tailings impoundments. DEQ staff observed surface erosion on the tailings impoundments in the form of channels. Rills have developed in the tailings and wastes.



Photo 9. Central portion of the upper tailings impoundment. (Photo by Andy Mork 8/09)

There is an abundance of fine grained sediments in the central portion of the upper tailings impoundment. Photos 9 & 10 show the mined talus area located above the upper tailings impoundment.



Photo 10. Middle tailings impoundment, DEQ staff taking XRF measurements. (Photo by Andy Mork 8/09)

The forest fire in 2007 caused some chemical reactions which created an yellow to ocher colored (iron oxide) stain on the ground in areas.



Photo 11. Burnt log and color change. (Photo by Andy Mork 8/09)



Photo 12. Erosion channel from Middle to Lower Tailings. (Photo by Andy Mork 8/09)

A deep erosional channel begins on the western edge of the middle tailings impoundment and runs along the lower portion into the lower tailings impoundment (Photo 12) where it splits into two channels following along the northern and southern parts of the middle tailings impoundment, as seen in Photo 13.



Photo 13. Inflow onto lower tailings from middle tailings. (Photo by Andy Mork 8/09)



Photo 14. Lower tailings erosion channels. (Photo by Andy Mork 8/09)

Photo 14 shows how the lower tailings impoundment is uneven and does not exhibit signs of sheet flow.



Photo 15. Discharge channel and pathway from breach in Lower Tailings. (Photo by Andy Mork 8/09)

The discharge channel in Photo 15 flows to the probable point of entry along the West Fork of Springfield Creek.



Photo 16. Discharge pathway below lower tailings. (Photo by Andy Mork 8/09)

At the time of the field inspection there was no water flowing through the discharge channels. However, there is evidence of large amounts of water flowing through these channels into the West Fork of Springfield Creek.



Photo 17. Discharge pathway below lower tailings. (Photo by Andy Mork 8/09)

The depth of the tailings deposition below the tailings impoundment was variable. Photo 18 shows the depth to native soil of about six inches.



**Photo 18. Soil profile in burn area impacted by tailings runoff, hammer resting on ground surface.
(Photo by Andy Mork 8/09)**



Photo 19. PPE-1 West Fork of Springfield Creek. (Photo by Andy Mork 8/09)

The probable point of entry (PPE) into the West Fork of Springfield Creek is best shown in photo 19. DEQ collected the water and sediment samples SMPPE1SW and SMPPE1SED1.



Photo 20. White stain on rock near PPE-1. (Photo by Andy Mork 8/09)

The white stain on the rocks was extremely noticeable at PPE-1, Photo 20. There was no evidence of the staining further down the creek at PPE-3. The locations of PPE-1, PPE-2, and PPE-3 as well as sample site locations are shown in Figure 5.



Photo 21. PPE-2 West Fork of Springfield Creek. (Photo by Andy Mork 8/09)

There was evidence of another minor discharge channel west of PPE-1. DEQ staff decided to sample the creek below. This sample set contained a water and sediment sample (SMPPE2SW, SMPPE2SED). See Figure 5 for sample locations.

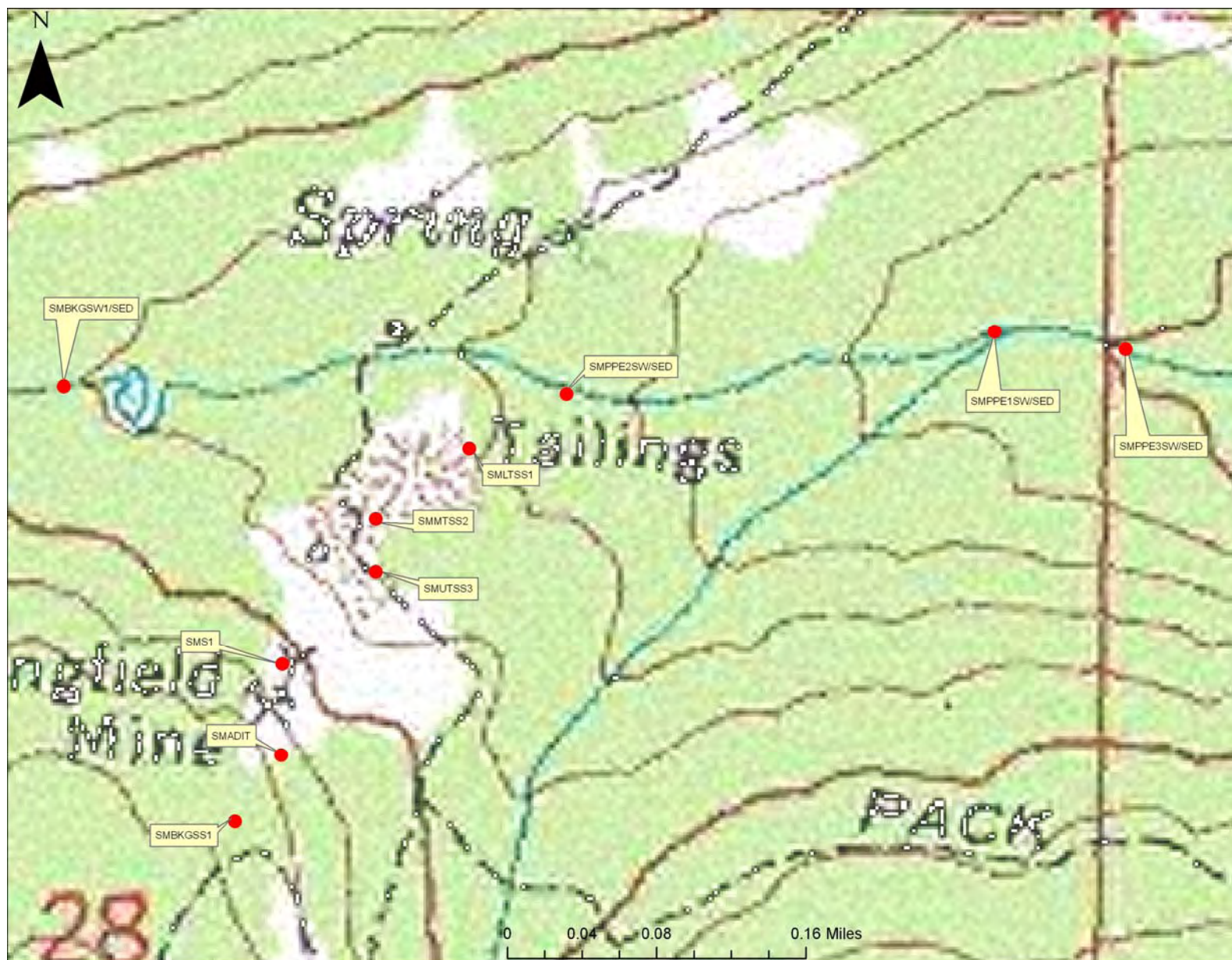


Figure 5. Sample Locations for the Springfield Scheelite Mine (Map source: USGS 24k).

This page intentionally left blank.

Section 9. Sample Collection and Analysis

A total of five soil, four sediment, and ten water samples (filtered and unfiltered) were collected from the Springfield Scheelite Mine. A matrix identifying sample number, location, and sampling rationale is provided in Tables 1-4. Sample locations are indicated on Figure 5.

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

The soil and surface water samples were submitted in accordance with EPA Chain-of-Custody procedures to Silver Valley Laboratories, Inc. in Kellogg, Idaho for analysis of RCRA 8 Suite + copper and zinc. A copy of the laboratory report is included as Appendix A. A summary of the laboratory results is included in Tables 1-4.

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

One background soil sample was collected from above the Springfield Scheelite Mine (SMBKGSS1). This sample was light tan in color and was a mixture of fine dust and silt. It contained less than 2% organics.

Three background samples were taken for water and sediment above the pond northwest of the Springfield Scheelite Mine (SMBKGSW1, SMBKGSW2, SMBKGSED1). SMBKGSW1 was filtered, SMBKGSW2 was not. The water appeared clear and the sediment sample, SMBKGSED1 consisted of grayish-tan gravels, fine grains, and silt. There was approximately less than 20% organics.

The remaining samples were collected from the West Fork of Springfield Creek, the tailings impoundments, remnants of the mill site, and the one adit (SMADIT) that contained water.

The DEQ staff collected the first set of samples from the West Fork of Springfield Creek: SMPPE1, SMPPE2, and SMPPE3. One filtered water, one unfiltered water, and one sediment sample was collected from each of these sample locations. SMPPE1SED1 was a mixture of fine grains, silt, and cobbles. They were reddish and dark brown in color and contained less than 10% organics. SMPPE2SED1 also contained the same kind of material as SMPPE1SED1. SMPPE3SED1 contained a mixture of fine grains, silt, and cobbles with less than 10% organics. The material was dark brown, tan, and contained about 2% organics.

The next set of samples were collected from the tailings impoundments, they are labeled as: SMLTSS1, SMMTSS2, SMUTSS3. There was also a sample collected from the mill site labeled as SMS1. SMLTSS1 was an orange rust color, with darker orange and tan material comprised of fine powder and silt. There was a distinct sulfide odor. There was less than 2% organics.

SMMTSS2 was a bright orange color that contained a mixture of fine powder and silt. There were less than 2% organics. SMUTSS3 was an orange rust colored mixture of fine powder and silt with a very strong sulfide odor. This sample also contained less than 2% organics.

9.1 Soils Analysis

Table 1 summarizes laboratory analytical results for soil samples collected. The background soil sample SMBKGSS1 exceeded the initial default target levels (IDTLs) for arsenic, iron, manganese, mercury, and silver. The human health medium-specific screening level (HHSL) was also exceeded for arsenic in the background soil sample.

Sample SMS1 exhibited levels above the HHSL with arsenic and iron. This was the only sample to also exceed the background on arsenic. This is where the mill site was located.

SMLTSS1 and SMMTSS2 both exceeded the HHSL for arsenic and iron.

SMUTSS3 only exceeded the HHSL for iron.

Table 1. Total Recoverable Metals Analysis							
Springfield Scheelite Mine Soil Samples							
	IDTLs	HHSLs	Background				
			Sample No.				
Description	Units: mg/Kg		SMBKGSS1	SMS1	SMLTSS1	SMMTSS2	SMUTSS3
Antimony	4.77	314	<2.0	4.2	2.9	<2.0	<2.0
Arsenic	0.391	21.65	62.8	88.9	32.4	26.7	12.3
Barium	896	15,642	84.6	68.1	17.2	70.0	30.7
Cadmium	1.35	39	0.22	3.65	3.24	1.32	1.28
Chromium	NSC	NSC	10.9	14.1	3.84	3.00	0.90
Copper	921	2,900	130	370	426	251	242
Iron	5.76	55,000	38,500	220,000	226,000	162,000	162,000
Lead	49.6	400	12.5	10.8	8.72	<0.75	1.00
Manganese	223	3,239	703	251	180	584	301
Mercury	0.00509	23	0.035	0.137	<0.033	0.042	<0.033
Selenium	2.03	391	<4.0	7.1	14.6	19.7	14.1
Silver	0.189	391	0.51	0.65	1.59	1.74	1.82
Zinc	886	23,464	56.6	32.9	14.2	17.1	8.74

Notes: **Bold** – value above IDTLs

- value above HHSLs

Blue – values above background

9.2 Sediment Analysis

Table 2 summarizes laboratory analytical results for sediment samples collected. The background sediment sample SMBKGSED1 exceeded the IDTLs for arsenic, iron, manganese, mercury, and silver.

SMPPE1SED1, SMPPE2SED1, and SMPPE3SED1 all exceeded the HHSL for arsenic. SMPPE1SED1 also exceeded the HHSL for iron.

SMPPE3SED1 was collected from the lowest reach of the West Fork of Springfield Creek.

Table 2. Total Recoverable Metals Analysis						
Springfield Scheelite Mine Sediment Samples						
	IDTLs	HHSLs	Background	Sample No.		
Description	Units: mg/Kg		SMBKGSED1	SMPPE1SED1	SMPPE2SED1	SMPPE3SED1
Antimony	4.77	314	<2.0	<2.0	<2.0	<2.0
Arsenic	0.391	21.65	18.9	61.6	28.1	34.9
Barium	896	15,642	30.4	13.1	28.3	29.7
Cadmium	1.35	39	<0.20	1.54	<0.20	<0.20
Chromium	NSC	NSC	1.47	1.45	2.30	2.16
Copper	921	2,900	<1.00	318	68.6	66.9
Iron	5.76	55,000	5,020	166,000	44,200	17,400
Lead	49.6	400	2.57	<0.75	0.81	1.87
Manganese	223	3,239	273	185	229	618
Mercury	0.00509	23	<0.033	<0.033	<0.033	<0.033
Selenium	2.03	391	<4.0	5.2	<4.0	<4.0
Silver	0.189	391	<0.50	1.17	0.50	<0.50
Zinc	886	23,464	1.00	13.0	15.7	27.8

Notes: **Bold** – value above IDTLs - value above HHSLs Blue – values above background

9.3 Surface Water Analysis

Tables 3 and 4 summarize laboratory analytical results for surface water samples collected including: a background sample collected from the West Fork of Springfield Creek above the PPEs; the discharge of Adit 1; and the probable point of entries along the West Fork of Springfield Creek below the tailings impoundments.

It should be noted that the water quality sample labeled as SMADIT, did not conform to the sample designations protocols. This inconsistency, however, does not affect the usefulness of the sample data.

Sample SMBKGSW (total and dissolved) was collected from the West Fork of Springfield Creek above the pond and tailings impoundments. The water was clear and there was no evidence of white staining on rocks. Field parameters taken at this point are as follows: pH = 7.52; Conductivity = 0.047 µS/cm; Dissolved Oxygen = 10.05 %; Turbidity = 17; and Temperature = 9.8° C.

Sample SMADIT was collected from the portal of Adit 1. A filtered and unfiltered sample was collected and nitric acid was used as a preservative that was added to the sample containers. Field parameters taken at this point are as follows: pH = 2.96; Conductivity = 0.976 $\mu\text{S}/\text{cm}$; Dissolved Oxygen = 6.28 %; Turbidity = 8.8; and Temperature = 6.0° C.

Sample SMPPE1SW (total and dissolved) was collected downstream of the tailings impoundments on the West Fork of Springfield Creek at a point where the tailings sediment enter. The water was clear. Field parameters taken at this point are as follows: pH = 7.65; Conductivity = 0.052 $\mu\text{S}/\text{cm}$; Dissolved Oxygen = 9.95 %; Turbidity = 12; and Temperature = 12.5° C.

Sample SMPPE2SW (total and dissolved) was collected from the upper portion of the West Fork of Springfield Creek above SMPPE1SW. The water was clear. Field parameters taken at this point are as follows: pH = 7.58; Conductivity = 0.051 $\mu\text{S}/\text{cm}$; Dissolved Oxygen = 8.59 %; Turbidity = 33; and Temperature = 12.3° C.

Sample SMPPE3SW (total and dissolved) was collected from the West Fork of Springfield Creek down gradient of SMPPE1SW at the downstream limit of the white staining. The water was clear. Field parameters taken at this point are as follows: pH = 7.8; Conductivity = 223 $\mu\text{S}/\text{cm}$; Dissolved Oxygen = 6.58-7.46 %; Turbidity = 10; and Temperature = 9.8° C.

The background water sample shows no elevated levels of constituents. Sample analyses indicate elevated levels of iron and manganese from Adit 1. Sample SMPPE2SW shows a slight elevation in iron in the total sample but falls below the DEQ Drinking Water Standard in the dissolved sample. Sample SMPPE3SW shows a slight elevation in manganese in the total sample and still remains above the DEQ Ground Water Standard when dissolved. There are no standards for iron and manganese to exceed the DEQ cold water biota standards for acute and chronic criteria.

Table 3. DEQ Water Samples Total Recoverable and Dissolved Metals Analysis (mg/L).

Springfield Scheelite Mine Surface Water Samples

	DEQ Ground Water Standard (T)	DEQ Drinking Water Standard MCL	DEQ Cold Water Biota Standard Acute	DEQ Cold Water Biota Standard Chronic	Background Sample Total SMBKGSW1 (T)	Background Sample Dissolved SMBKGSW2 (D)	Springfield Creek Sample Total SMPPE1SW (T)	Springfield Creek Sample Dissolved SMPPE1SW (D)	Springfield Creek Sample Total SMPPE2SW2 (T)	Springfield Creek Sample Dissolved SMPPE2SW1 (D)
Description										
Antimony	0.006	0.006			<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Arsenic	0.01	0.01	0.36	0.19	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Barium	2	2			0.0080	0.0027	0.0080	0.0069	0.0109	0.0069
Cadmium	0.005	0.005	0.00082 (H)	0.00037 (H)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Chromium (Total)	0.1	0.1			<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060
Copper	1.3		0.0046 (H)	0.0035 (H)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Iron	0.3*				0.066	<0.060	0.075	<0.060	0.356	<0.060
Lead	0.015	0.015	0.014 (H)	0.00054 (H)	<0.0075	<0.0075	<0.0075	<0.0075	<0.0075	<0.0075
Manganese	0.05*				0.0098	<0.0040	0.0164	<0.0040	0.0299	<0.0040
Mercury					N/A	<0.00020	N/A	<0.00020	N/A	<0.00020
Selenium	0.05	0.05	0.018 (T)	0.005 (T)	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Silver	0.1*		0.00032 (H)		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Zinc	5*		0.035 (H)	0.032 (H)	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100

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

Table 4. DEQ Water Samples Total Recoverable and Dissolved Metals Analysis (mg/L).

Springfield Scheelite Mine Surface Water Samples

	DEQ Ground Water Standard (T)	DEQ Drinking Water Standard MCL	DEQ Cold Water Biota Standard Acute	DEQ Cold Water Biota Standard Chronic	Background Sample Total SMBKGSW1 (T)	Background Sample Dissolved SMBKGSW2 (D)	Springfield Creek Sample Total SMPPE3SW2 (T)	Springfield Creek Sample Dissolved SMPPE3SW1 (D)	Springfield Creek Sample Total SMADIT (T)	Springfield Creek Sample Dissolved SMADIT (D)
Description										
Antimony	0.006	0.006			<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Arsenic	0.01	0.01	0.36	0.19	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Barium	2	2			0.0080	0.0027	0.0107	0.0101	0.0128	0.0108
Cadmium	0.005	0.005	0.00082 (H)	0.00037 (H)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Chromium (Total)	0.1	0.1			<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060
Copper	1.3		0.0046 (H)	0.0035 (H)	<0.010	<0.010	<0.010	<0.010	0.028	0.020
Iron	0.3*				0.066	<0.060	0.060	<0.060	69.4	46.6
Lead	0.015	0.015	0.014 (H)	0.00054 (H)	<0.0075	<0.0075	<0.0075	<0.0075	<0.0075	<0.0075
Manganese	0.05*				0.0098	<0.0040	0.0509	0.0502	3.91	2.79
Mercury					N/A	<0.00020	N/A	<0.00020	N/A	<0.00020
Selenium	0.05	0.05	0.018 (T)	0.005 (T)	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Silver	0.1*		0.00032 (H)		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Zinc	5*		0.035 (H)	0.032 (H)	<0.0100	<0.0100	<0.0100	<0.0100	0.0124	<0.0146

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

Section 10. Pathways and Environmental Hazards

10.1 Ground Water Pathways

In areas where historic mines are located in proximity to residential areas contamination of drinking water systems may come from two types of mine sources (ore bodies and waste dumps) and along three pathways, as illustrated by the following three scenarios. First, heavy metals are leached from tailings piles and waste rock 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.

However, there are no domestic water supplies or systems located within a four mile radius of the mine.

10.2 Surface Water Pathways

The surface water migration pathway target distance limit (TDL) begins at the probable point of entry of surface water runoff from a site to a surface water body and extends downstream for 15 miles. The surface water TDL for the Springfield Scheelite Mine is presented in Figure 6.

The probable point of entry starts at the West Fork of Springfield Creek and drains into Little Pistol Creek. Eventually Little Pistol Creek runs into Pistol Creek and joins the Middle Fork of the Salmon River.

10.3 Domestic Wells and Public Water Supplies

There are no domestic wells, public water system wells or their zones of capture located within the four mile radius of the Springfield Scheelite Mine (Figure 7). The nearest domestic well is located approximately 6.5 miles down hydraulic gradient from the site on Pistol Creek. One public water system supplies the Boundary Creek campground approximately 18.5 miles south of the Springfield Scheelite Mine on Boundary Creek. The USFS Boundary Creek drinking water system consists of a single spring source, which rated a low susceptibility to inorganic compounds, volatile organic compounds, synthetic organic compounds, and microbial contaminants (USFS Boundary Creek Campground Source Water Assessment Final Report, June 5, 2001).



Figure 6. 15-Mile Target Distance Limit (TDL) (Map source: NAIP 2004).

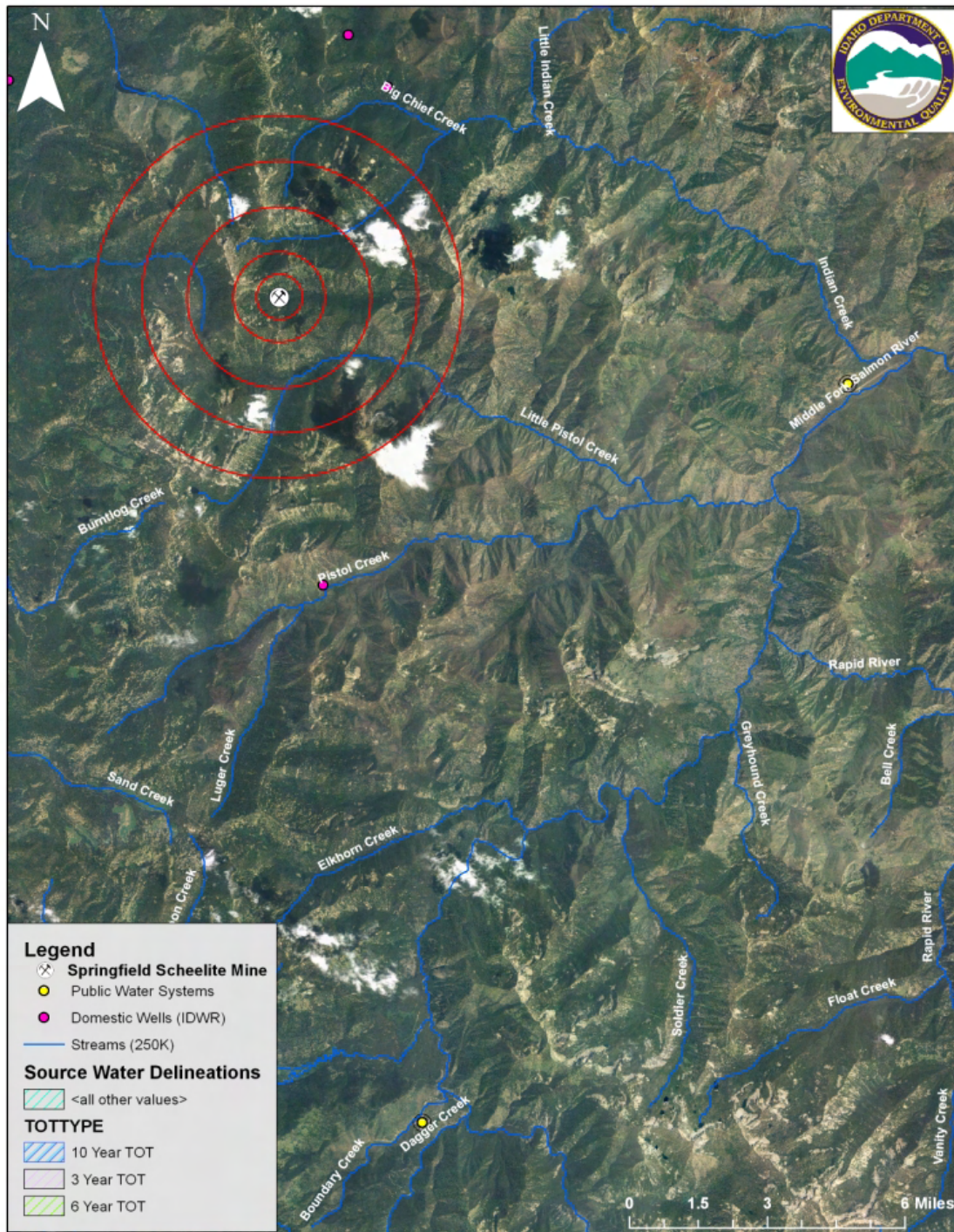


Figure 7. Domestic wells and public water system wells located outside of 4-mile radius ring, there are no wells located in the 4-mile radius (Map source NAIP 2004).

10.4 Air Quality Pathways

Access is unrestricted to off-road vehicles (ORVs) which travel through the tailings impoundments to camping areas by the West Fork of Springfield Creek at which time the most likely pathway would be relative to fugitive dust emissions. The delivery of significant dust from the mine site to local residents is not likely because of the distance (~ 6 miles) to those residents.

10.5 Soil Exposure

According to DEQ's Risk Evaluation Manual, if pathways are determined to be "complete" or if pathways are anticipated to become complete as a result of future uses, and the IDTLs are exceeded for any constituents, two options should be considered:

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

The soil exposure pathways are not complete for residential exposure because infrequent recreational exposures may occur but are not deemed to be of concern for recreational scenarios.

10.6 Residences, Schools, and Day Care Facilities

The nearest residence is approximately 6.5 miles south of the Springfield Scheelite Mine. There are no schools or day care facilities within 200 feet of this mine site.

10.7 Wetlands

There are no wetlands located in the immediate area of the Springfield Scheelite Mine (Figure 8). The nearest wetland area, the Upper Salmon and Upper Middle Fork Salmon Hydrologic Unit Code (HUC), is located approximately 2.5 miles southwest and up gradient of the Springfield Scheelite Mine (USFWS, 2009).



Figure 8. Wetlands located by 2-mile radius of the Springfield Scheelite Mine and 15-Mile Target Distance Limit (TDL) (Map source: NAIP 2004).

10.8 Sensitive Species (Plant and Animal)

No sensitive plant species are located within the 4-mile radius of the Springfield Scheelite Mine site (Figure 9).

The site is located within a defined range and habitat for Nez Perce and Gray Wolves. However, the size of the tailings impoundments relative to the total range is very small and therefore unlikely to be a significant source for exposure.

Boreal Owls (*Aegolius funereus*) and Fishers (*martes pennanti*) are listed as sensitive species and have been observed within a 4-mile radius of the Springfield Scheelite Mine site.

10.9 Fisheries

Bull Trout and Sockeye Salmon have been found in Trapper Creek (located in the northwest corner of 4-mile radius on map) and the Middle Fork of the Salmon River. Bull Trout and Chinook Salmon (spring run) can be found in Little Pistol Creek, which is the closest stream down gradient of the mine site. Bull trout are present in Pistol Creek (IDFG 2000).

10.10 Sensitive Waterways

Johnson Creek and Elkhorn Creek are both Clean Water Act 303(d) listed streams down gradient from the Springfield Scheelite Mine, which might be adversely affected by contaminant delivery from the site. However, the West Fork of Springfield Creek drains into Little Pistol Creek which drains into Pistol Creek and then into the Middle Fork of the Salmon River before reaching the 303(d) listed Elkhorn Creek. There may be no connection to Johnson Creek since it is in a different drainage system and most of the streams that may lead to it are ephemeral.

10.11 Livestock Receptors

There was no indication that the area is used for livestock grazing. The Springfield Scheelite Mine area does not fall within a grazing allotment with the Bureau of Land Management.

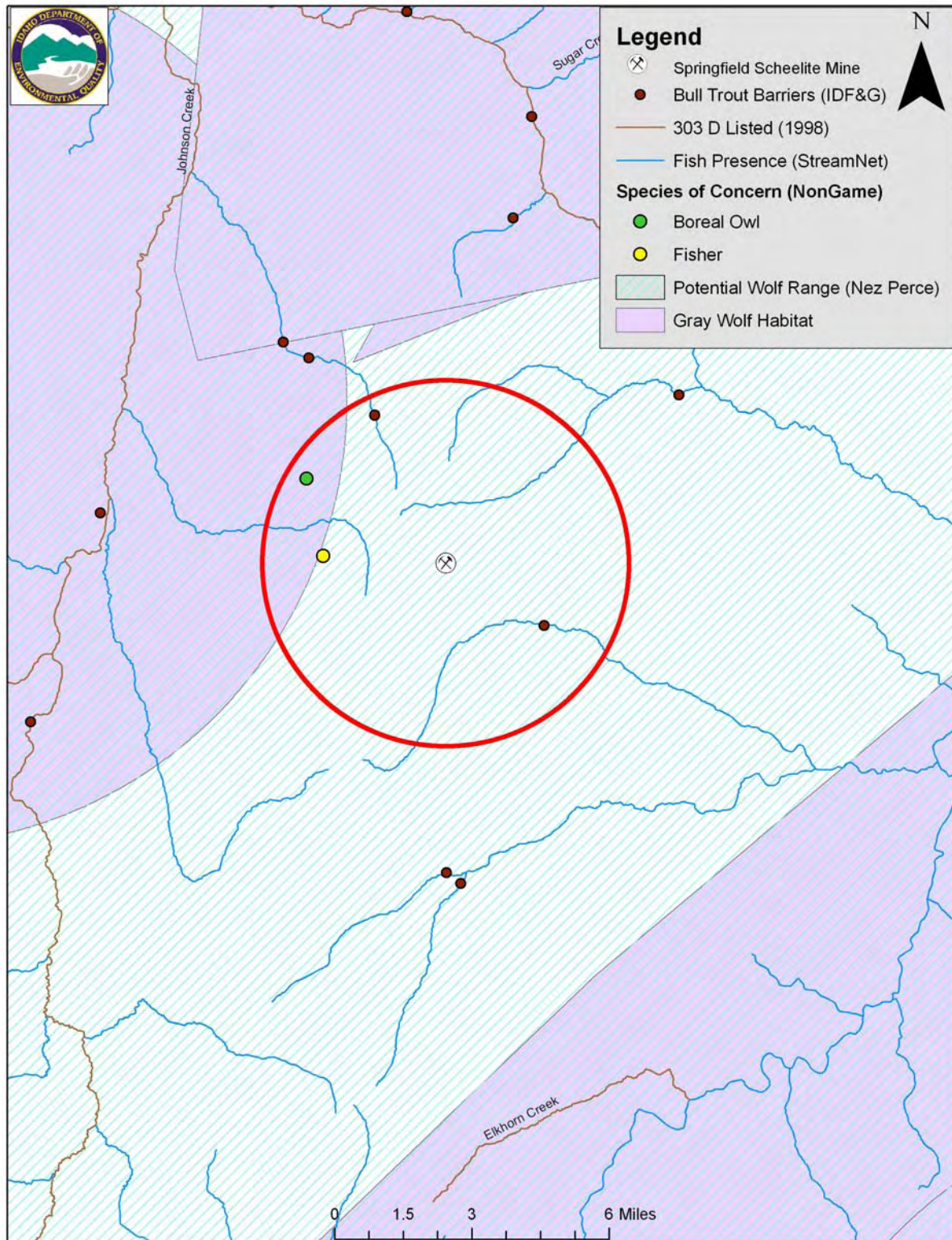


Figure 9. Sensitive species and waterways within 4-mile radius and in the vicinity of the Springfield Scheelite Mine.

This page intentionally left blank.

Section 11. Summary and Conclusions

DEQ is recommending that from a programmatic standpoint according to CERCLA the status of these mines and claims is designated as No Remedial Action Planned (NRAP). DEQ is making this recommendation based on existing uses and conditions, historic information, and data analysis. However, because of the instability and erosion of mine wastes and tailings and their potential implications to sensitive receptors, this site may be prioritized for some type of reclamation or stabilization under the Clean Water Act by the USFS or DEQ's Surface Water Program.

Due to remoteness of this location and the fact it is located in the Idaho Primitive Area, it is doubtful residential development will happen in the future. Currently there is an active unpatented mining claim on the Springfield Scheelite Mine which may hinder the recommendation to close Adit 1.

The dust from the tailings impoundments may pose a risk to recreationists, if they are in the area for long periods of time. The road into the mine site should be blocked off from motor vehicles to prevent contamination from the tailings impoundments.

This page intentionally left blank.

Section 12. References

- Bureau of Land Management, 2008, *Land Patent Details* – BLM GLO Records.
<http://www.glorerecords.blm.gov/PatentSearch/Detail.asp?Accession=IDIDAA+046037&Index=1&QryID=41620.75&DetailTab=1>
- Bureau of Land Management, 2009, Grazing Allotments, Digital Special Database, Idaho State Offices, Engineering and Geographic Science
- Cater, F.W., D.M. Pinckney, W.B. Hamilton, R.L. Parker, R.D. Weldin, T.J. Close, N.T. Zilka, 1973, Mineral resources of the Idaho Primitive Area and vicinity, Idaho: U.S. Geological Survey Bulletin 1304, 431 p.
- Moye, Falma J. 1994, Site inspection report for the abandoned and inactive mines in Idaho on U.S. Forest Service Lands (Region 4), Challis National Forest, Middle Fork Ranger District, Idaho.
- Idaho Department of Environmental Quality (DEQ), 2000. 1998 303(d) list.
- Idaho Department of Environmental Quality, 2010. Safe Drinking Water Information System (SDWIS).
- Idaho Department of Fish and Game (IDF&G), 2000.
- Idaho Division of Environmental Quality, 2001, Idaho Source Water Assessment Final Report, June, 6 p.
- IDF&G, 2002. http://www2.state.id.us/fishgame/info/cdc/plants/vasc_plants&status_n-r.htm
- IDWR, 1997. COVERAGE IDOWN -- Idaho Surface Ownership.
- IDWR, 2002. GIS shapefile of well database.
- IDWR, 2008. <http://www.idwr.idaho.gov/water/well/search.htm>
- McHugh, E.L., H.W. Campbell, M.C. Horn, and T.J. Close, 1991, Mineral resource appraisal of the Challis National Forest, Idaho: U.S. Bureau of Mines Mineral Land Assessment Open-File Report 6-91, 319 p.
- United States Fish and Wildlife Service (USFWS), 2009. Classification of Wetlands and Deep Water Habitat of the United States. Accessed December 4, 2009.
<http://www.fws.gov/wetlands/Data/webatx/atx.html>
- United States Geological Survey (USGS), 1991. Digital map file of major land uses in the United States.
- U.S. Geological Survey (USGS)/U.S. Bureau of Mines (USBM) Minerals Yearbook chapters for Idaho, 1900-1990.
- Western Regional Climate Center (WRCC), 2006. <http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?idypin>
- Wilderness.net*. Web. <http://www.wilderness.net/index.cfm?fuse=nwps&sec=legisact>.