Nay Aug Mine

aka

Nay-Aug, Nay-Aug Group, Sutherland, Contact, Chief & Chief Extension

Preliminary Assessment Report

Blaine County
State of Idaho

Department of Environmental Quality

December 2009

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

STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

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

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

December 30, 2009

Daniel Henry
308 North 2nd Avenue
Hailey, Idaho 83333

RE: Site Assessment of the Nay Aug Mine aka Chief Extension, Sutherland, Contact, Nay Aug, and Chief, patented mining claims.

Dear Mr. Henry:

In 2009 the Idaho Department of Environmental Quality completed research and a site visit to the above referenced claims and mines. The information and DEQ's discussion of the information generated during that research and site visit is attached as a Preliminary Assessment Report. DEQ has made the following conclusions and recommendations:

- Although the current site conditions and associated risks do not warrant regulatory remedial action, the owner should employ a more comprehensive system of water management, particularly BMPs, to stabilize or reduce erosion of mine wastes and maintain the site.

- DEQ is recommending to the owner consider closing mine openings as these are dangerous physical hazards. The most dangerous openings are: the declined shaft adjacent to Adit 1, the stope above Adit 2 and the four open adits, numbered 1, 2, 3 and 4. Although property access is restricted, unauthorized visitors to the site are at risk.

- Additionally, DEQ is recommending that hazardous materials such as diesel fuel and gasoline be appropriately contained or removed. Fuels, containers, batteries etc. that are regulated under the Resource Conservation and Recovery Act should be properly managed.

- DEQ observed large volumes of solid wastes or refuse which are exposed to the elements. This site is not an approved and licensed solid waste disposal site nor is it being managed as such. Therefore, DEQ recommends that the owner, take appropriate steps to properly store or dispose of these materials.

In conclusion, DEQ is recommending to EPA that there is no calculation of a Hazard Ranking Score for the Nay Aug Mine and the miscellaneous workings within Nay Aug Gulch, and that No Remedial Action is Planned (NRAP) for the site.

If, however, the claims are considered for development for residential use additional site assessment, risk analysis and risk management is warranted.

DEQ very much appreciates your cooperation and your approval for our access. I look forward to addressing any questions you may have regarding our findings. You may contact me at (208) 373-0554.

Sincerely,

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

BAS:TE:tg G:\Waste & Remediation\Bruce Schuld\Nay Aug Mine

Attachment

cc: Ken Marcie, Environmental Protection Agency
file

STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

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

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

December 30, 2009

Jeff Gabardi
USDA Forest Service
Sawtooth National Forest
2647 Kimberly Road East
Twin falls, Idaho 83301

RE: Site Assessment of the Nay Aug Mine aka Chief Extension, Sutherland, Contact, Nay Aug, and Chief, patented mining claims.

Dear Mr. Gabardi:

In 2009 the Idaho Department of Environmental Quality completed research and a site visit to the above referenced claims and mines. The information and DEQ's discussion of the information generated during that research and site visit is attached as a Preliminary Assessment Report.

In conclusion, DEQ is recommending to EPA that there is no calculation of a Hazard Ranking Score for the Nay Aug Mine and the miscellaneous workings within Nay Aug Gulch, and that No Remedial Action is Planned (NRAP) for the site.

If, however, the claims are considered for development for residential use additional site assessment, risk analysis and risk management is warranted.

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List of Acronyms

Acronym	Definition
amsl	above mean sea level
BLM	United States Department of the Interior, Bureau of Land Management
BMP	Best Management Practice
DEQ	Department of Environmental Quality
EPA	United States Environmental Protection Agency
E & E	Environment & Ecology, Inc.
gpm	gallons per minute
IDTL	Initial Default Target Levels
IGS	Idaho Geological Survey
MCL	Maximum Concentration Limit
PPE	Probable Point of Entry
HHSL	Human Health Medium-Specific Screening Levels
TCLP	Toxicity Characteristic Leaching Procedure
TDL	Target Distance Limit
TMDL	Total Maximum Daily Load
USFS	United States Department of Agriculture, Forest Service

Section 1. Introduction

The Idaho Department of Environmental Quality (DEQ) was contracted by Region 10 of the United States Environmental Protection Agency (EPA) to provide technical support for completion of preliminary assessments at various mines within the Mineral Hill Mining District in Blaine County, Idaho.

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 Preliminary Assessment Program to evaluate and prioritize assessment of such potentially contaminated sites. Due to accessibility and funding considerations, priority is given to sites where potential contamination poses the most substantial threat to human health or the environment.

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

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

This document presents the results of the preliminary assessment (PA) of the Nay Aug mining properties located within the Nay Aug Gulch sub-drainage. The Nay Aug Mine has historical references while the remaining workings, presumably located on unpatented claims and occupying the lower east flank of the gulch, do not.

Access to the Nay Aug patents was given by Daniel Henry in March of 2009. Public access and use of the area is restricted by the owner's locked gate in the lower reaches of Nay Aug Gulch near its junction with NFD 100 Road. However, a trail leads into Nay Aug Gulch from the north and west.

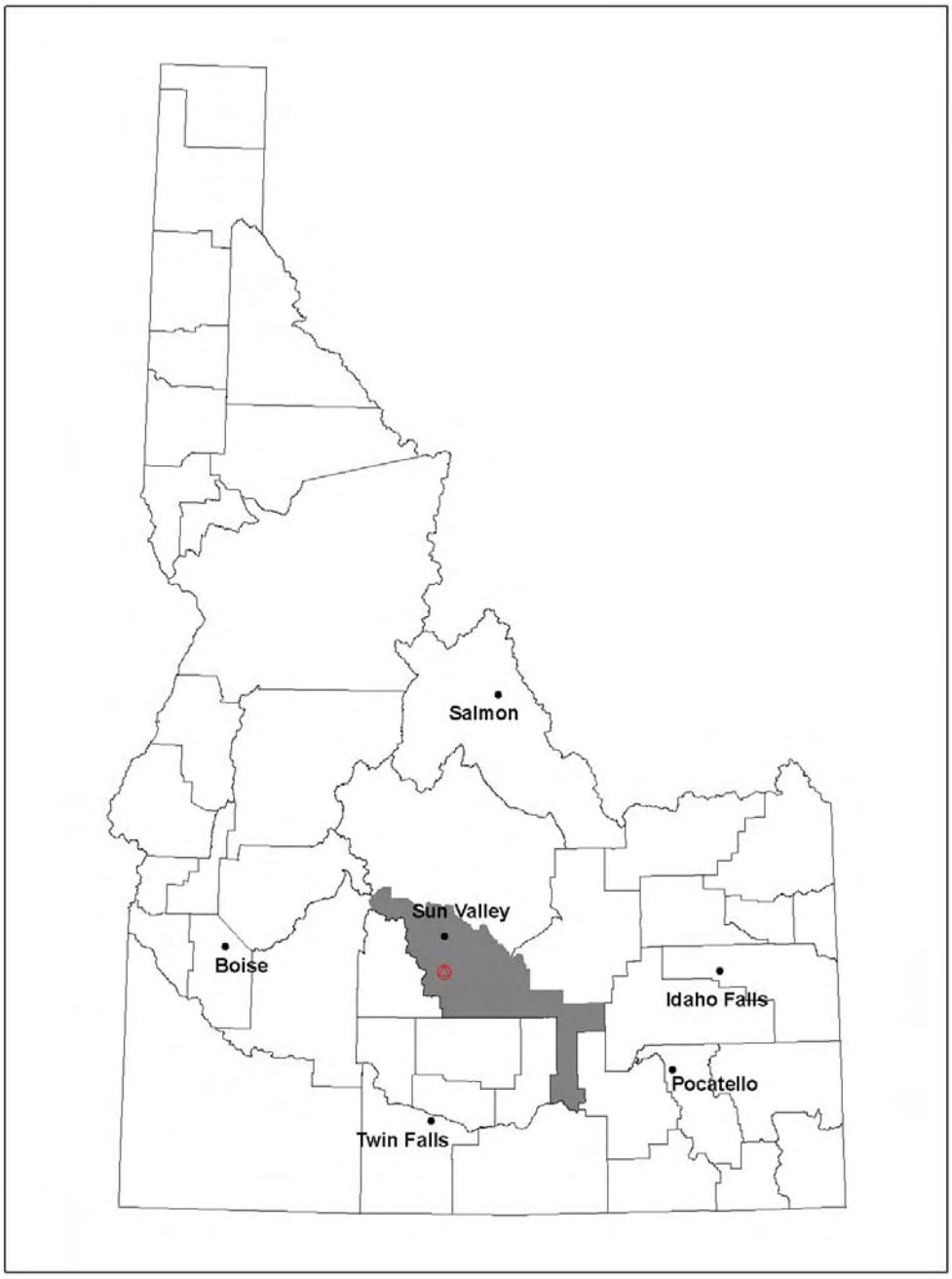


Figure 1. Location of Nay Aug Gulch (Source: Idaho DEQ ArcSDE 9.2 Geodatabase, County Boundaries).

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 Blaine County Tax Assessor's Office in Hailey, Idaho. The poor juxtaposition of the claims' boundaries that will be observed in this report's figures are plotted according to the Blaine County Tax Assessor's data base, and are indicative of probable errors that 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 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"** or "**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 that 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.

Owner	Claim	Parcel Number	Partial Determination
USFS Box 2356 Ketchum, ID 833340	All Section 29, except Chief Extension	RP03N170290030	NRAP NRAP
	All Section 30, except Sutherland, Contact, Nay Aug Chief	RP03N170300030	NRAP NRAP NRAP NRAP NRAP
Daniel Henry 308 North 2nd Ave Hailey, ID 83333	Sutherland Contact Nay Aug Chief Chief Extension	RP1M0000000110	NRAP NRAP NRAP NRAP NRAP

Section 3. Overview

The Nay Aug Mine is located in Nay Aug Gulch, a tributary to the Deer Creek sub-drainage, approximately six miles west of Hailey, Idaho, in Sections 29 & 30 of Township 3 North, Range 17 East of the Boise Meridian, at Latitude DD: 43.5614, Longitude. DD: -114.46533. The mine sites are located on private lands and on public lands administered by the USDA Forest Service.

The most direct route to the Nay Aug from Hailey is obtained by driving north on Highway 75 for approximately 2.1 miles to the Deer Creek Road [NFD 097], then west for approximately 6.5 miles to the junction of NFD 100 Road. One turns right, proceeding north up Panther Gulch for approximately 0.7 miles until reaching a fork. Take the right-hand fork up Nay Aug Gulch for approximately 0.5 miles to a locked gate. Access through the locked gate is provided by owner.

Section 4. Climate

Climate information provided in this section is based on a climatological summary for Hailey, Idaho which was obtained from the National Oceanic and Atmospheric Administration (NOAA), National Climatic Data Center. The climatological data collected at the Hailey Airport (elevation 5,328 amsl), is for the period of 1951 through 1980. 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 Hailey Airport averages 16.2 inches. The majority of precipitation occurs as snow. Total annual snowfall averages 78.2 inches with most snowfall occurring in December and January. The driest months are July, August and September.

Based on records from 1951 to 1980, the average annual temperature measured at the Hailey Airport is 43 degrees Fahrenheit (F). The lowest temperature recorded for this period was – 28 degrees F in 1962. The highest temperature for this period of record was 100 degrees F in 1953. January is the coldest month with an average temperature of 19.5 degrees F. July is the hottest month with an average temperature of 67 degrees F (WRCC, 2009).

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

Section 5. Historical Perspective

Nay Aug Gulch contains multiple prospects and mine workings. The Nay Aug Mine, consisting of the Sutherland, Contact, Nay Aug and Chief claims were patented in 1891 by the Standard Mining Company. The Chief Extension claim was patented in 1911 by the Wood River Zinc Company. In 1930, J.B. Umpleby, L.G. Westgate and C. Ross referred to the Nay Aug Group when describing the six patented claims. In their report to the Department of Interior they said:

> *The Nay-Aug group, which comprising six patented claims said to have produced about $150,000,…the mine was worked during the early days, but its period of maximum production was from 1904 to 1916. It has not been worked in recent years.* (p.161)

Contributed by E. Daft at the Ketchum smelter (ibid, p. 162), are summarized as:

The Ketchum smelter listed production from 1884 – 1895
Tons of Ore – 664.8
Silver - 54,698.3 fine ounces
Lead – 778,151 pounds

Later production recorded by USGS 1905 - 1920
Tons of Ore – 6,508
Gold – 1,112.69 fine ounces
Silver - 189,513 fine ounces
Lead – 3,000,177 pounds
Zinc – 318,796 pounds
Copper – 1,566 pounds

During 1915-16, 485 tons of concentrates were generated from 3,077 tons of ore. Remnants of an ore bin, a collapsed wooden structure (office?), a jig and jig tails observed below Waste Dump 5, suggest the likely location of the concentrating operation.

Section 6. General Geology

Numerous geology and mineral resource studies of the Wood River and adjacent areas have been performed. Geologic studies have been conducted to investigate mineral deposits (Lindgren, 1900 & 1933; Umpleby et al, 1930; Anderson and Wagner, 1946; Anderson et al, 1950; Hall et al, 1978; Wavra and Hall, 1989; Link and Worl, 2001; Worl and Lewis, 2001); individual formations and units (Hall et al, 1974; Sandberg et al, 1975; Wavra and Hall, 1986; Worl and Johnson, 1995); quadrangles (Batchelder and Hall, 1978; Mitchell et al, 1991; Kiislgaard et al, 2001) and to compile regional information (Rember and Bennett, 1979). Preliminary and environmental assessment investigations have been conducted to assess current and potential impacts from historic mining in the region (Mitchell and Gillerman, 2005; DEQ, 2002 & 2006; DEQ & USEPA, 2006 & 2007).

> *The Hailey-Bellevue mineral belt is underlain by a varied assemblage of sedimentary and igneous rocks, which, except for volcanics of mid-Tertiary age and some still younger unconsolidated sedimentary rocks, are all older than the ore deposits. The earlier rocks include fairly wide exposures of the Milligen and Wood River formations that host many of the ore deposits in the Wood River region. They also host rather large intrusive bodies of diorite and quartz monzonitic rock which are regarded as outliers of the Idaho batholith. There is a younger group of intrusive rocks which are of more pertinent interest because of their close association with the mineralization.…In addition to the Milligen formation (Mississippian age) and the Wood River formation (Pennsylvanian age), the area contains some strata in and beneath a series of Tertiary volcanics (Oligocene) and much poorly consolidated and unconsolidated slope wash, terrace gravels, and stream alluvium of Quaternary age.*
>
> Anderson, 1950, p. 2

6.1 Structure

Anderson (1950, p. 7) went on to note that, "The folding within the area is comparatively simple and consequently faulting constitutes the outstanding feature." Fryklund (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.*

To the north and west of the mine, a thrust fault separates the overlying sediments with the underlying intrusives. According to Umpleby (1930), quartz monzonite intrusives and limestone host the mineralized veins at Nay Aug Mine. Figure 2 shows the generalized geology of the Nay Aug Mine area.

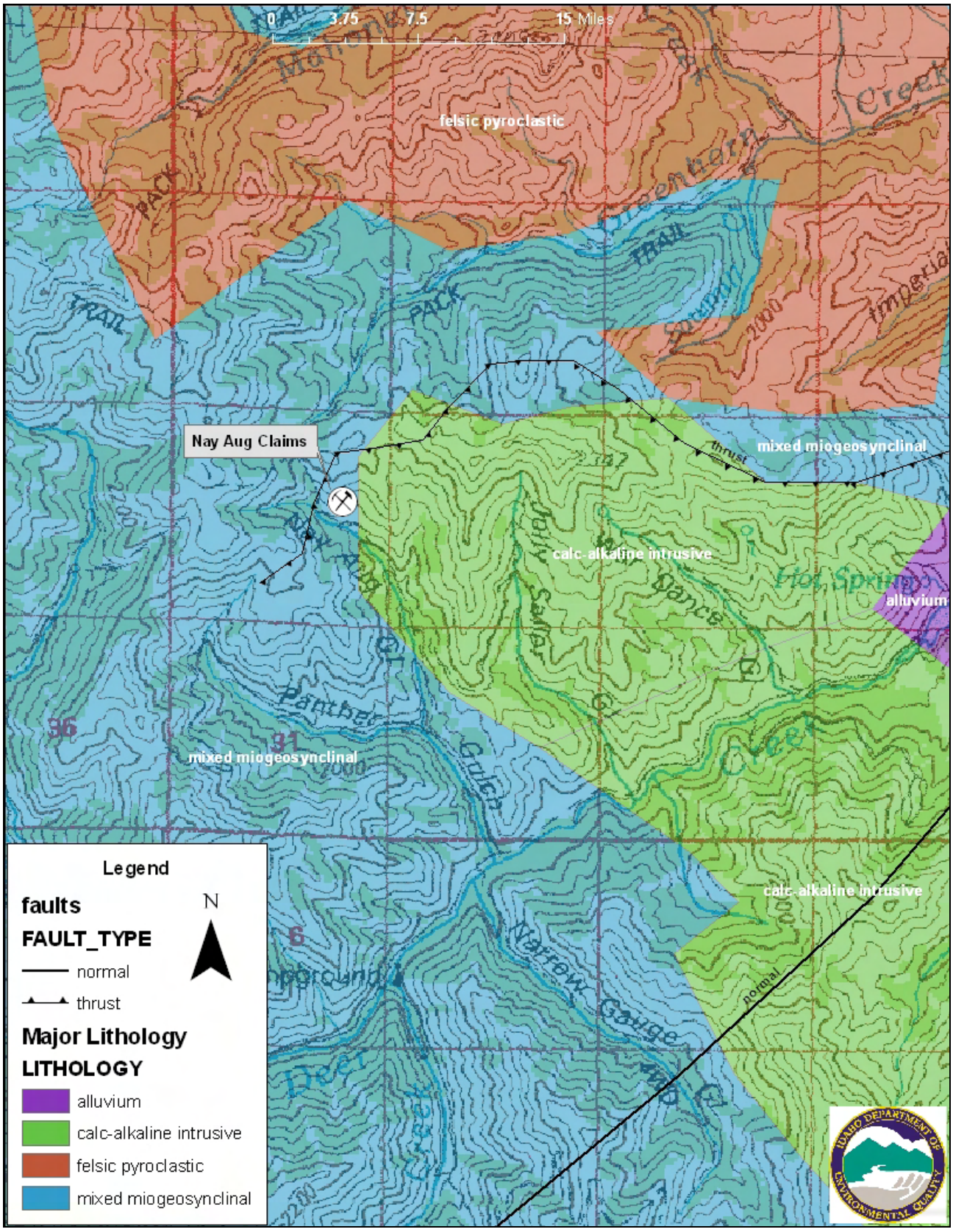


Figure 2. Geology of the Nay Aug Mine area. (Map source: USGS 24k).

6.2 Site Geology

In 1930, J.B. Umpleby, L.G. Westgate and C. Ross briefly described the geology and workings of the Nay Aug Mine.

> *...The vein is of particular interest because it cuts directly across the contact between quartz monzonite and limestone. Two of the three ore shoots occur in the quartz monzonite, and the other passes from the limestone at the surface to the quartz monzonite in depth.*
>
> *The mine is developed by seven tunnels to a depth at the face of the lowest of nearly 600 feet. This tunnel, 2,400 feet in length, passes the east and middle ore shoots and lacks only 150 feet of reaching a point where the west one should be found. Beyond a point 280 feet from the portal it follows the lode continuously. The lode is marked in most places by clearly defined walls that stand from 4 to 6 feet apart and inclose a gouge of crushed quartz monzonite locally replaced by a band of ore, in most places next to the hanging wall but in the middle shoot on the seventh level next to the footwall. These bands of ore range in width from 2 to 18 inches, rarely to 3 feet. They are made up of galena, pyrite, sphalerite, chalcopyrite, and a little arsenopyrite in a quartz-siderite gangue. The ore streak in most places is exceptionally clean, with a little concentrating ore alongside. The better ore is said to contain 40 to 50 ounces of silver to the ton.*
>
> *The limits of the shoots are rather indefinite, and it has been possible to work only portions of them at a profit. In general, however, the stope length of the middle and east shoots as exposed on level 7 may be considered to be 300 and 150 feet respectively. The west shoot, the largest and most persistent of all, is about 600 feet long on level 5, but this figure includes barren segments of irregular shape and unequal size. Above level 7 the east and middle shoots have been largely worked out, and above level 5 the west shoot has been mined. Between the shoots the fissure may be indicated by slight iron stains but does not otherwise show evidence of mineralization.*
>
> *The vein strikes northwest and dips steeply southwest. It is offset by six transverse faults, each of which dips northeast and causes a horizontal displacement of the fissure of 6 to 30 feet.* (pp. 162-163).

Section 7. Current and Potential Future Land Uses

7.1 Current Land Uses

Current land uses in the Deer Creek sub-drainage and adjacent tributary areas include biking, hiking, hunting, horseback riding and off-road vehicle (ORV) touring. As detailed in Section 3 of this report, the most direct route approaches the gulch from Deer Creek.

Public access to the former mine's road is restricted by the owner's locked gate in the lower reaches of Nay Aug Gulch near its junction with NFD 100 Road. However, a pack trail winding from the northwest leads across the Sutherland claim into Greenhorn Gulch. Ready access to the old mine road is afforded from the pack trail. During the DEQ site visit a motorcyclist was observed traversing a lesser trail from the direction of War Dance Gulch. Such evidence of ORV usage along the trail suggests public access to the Nay Aug properties may be occurring. Additionally, Mr. Henry has discovered that numerous acts of vandalism have occurred at his property.

7.2 Future Land Use

Future land use could potentially include some year-round and/or seasonal homes on the private parcels of property in the sub-basin, owing to its close proximity to Hailey. It appears likely that unauthorized access to the property may increase as the local populations and recreation industry expands.

Section 8. Site Conditions and Waste Characterization

During the site visit at the Nay Aug Mine DEQ staff designated identification of mine facilities in the order in which they were encountered and may not correlate to historical accounts. DEQ chose to commence the investigation from the ridgeline separating Nay Aug Gulch from Greenhorn Gulch. The old mine road bore evidence of ORV activity.

Figure 3 illustrates the locations of workings and associated waste rock dumps, structures, and mill site. Soil, sediment and water sample locations are shown in Figure 4.

DEQ performed the site assessment for the Nay Aug mine and mill site on July 28-29, 2009. Generally speaking, the claims lie along the eastern flank of Nay Aug Gulch, while the mill site appears to be located on public land administered by the USDA Forest Service. The mill area contains the remains of a jig with some enclosed tails; a collapsed ore bin and other structure debris.

The investigation team noted five adits, four of which were open; one open stope; one open declined shaft; one prospect excavation; several closed minor prospects and associated waste dumps. The largest of the waste dumps (# 3) was estimated to contain <3000 cubic yards of material. Adit # 5, though caved, had a moderate discharge. All of the remaining workings appeared dry.

Additional workings lie to the southeast of the Chief Extension claim on public lands. One small prospect and one caved adit whose waste dump was estimated to contain <500 cubic yards were briefly investigated. Both of these workings were dry. DEQ was not able to locate any historical or production information regarding these undocumented workings.

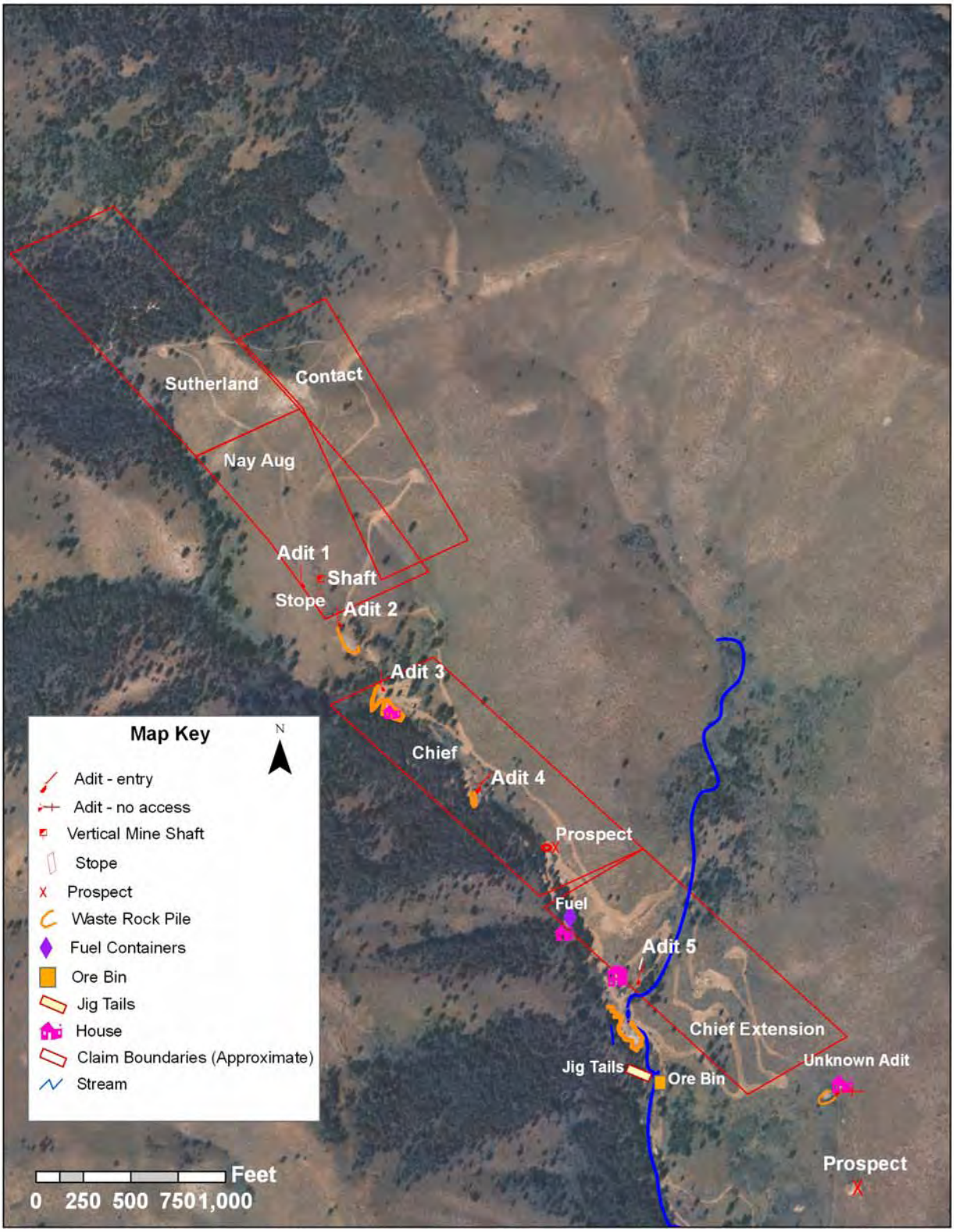


Figure 3. Nay Aug workings and mill site (Map source: NAIP 2004).

Workings

The uppermost section of the old road cuts through the sedimentary outcrop. Quartz stringers were noted, but mineralization appeared insignificant (Photo 1).



Photo 1. View to SE. Road cut exposes quartz stringers, on the ridge between Nay Aug and Greenhorn gulches

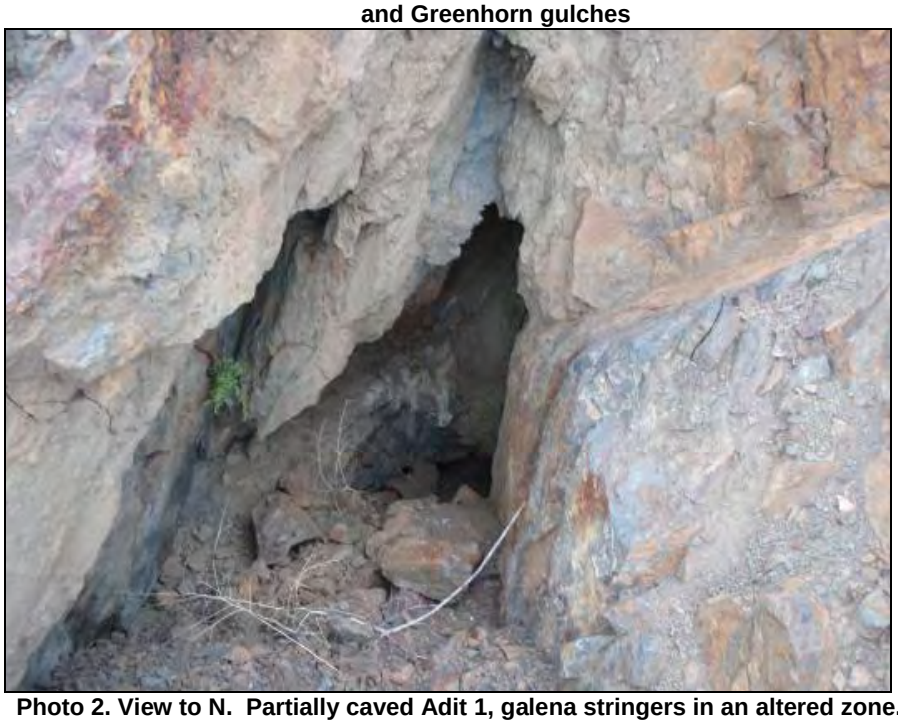


Photo 2. View to N. Partially caved Adit 1, galena stringers in an altered zone. The adit is a dangerous physical hazard that should be closed or otherwise managed to control access.

Adit 1 is located on the rocky spine of the hillside east of the gulch. The adit was driven into the mineralized outcrop (Photo 2).

Minimal waste rock was observed at the adit and at the adjacent declined shaft (not pictured). Less than 20 cubic yards of waste rock, much of it spread as veneer covered the slope. An opening was noted “on strike” between Adit 1 and the lower Adit 2 (Photo3). It is unclear whether this feature is a result of stope mining conducted from Adit 2 or as a result of subsidence. The stope is a physical hazard for those hiking or hunting on the mine site.



Photo 3. View to SSE. Open stope (?) down slope from Adit 1. The opening is dangerous and should be closed to prevent injury.

Adit 2 appears to be driven into the down-dip extension of the alteration zone. The portal is mostly caved, but a door had been erected at the adit entrance (Photo 4). At some point the door was opened and subsequent sloughing prevents its closure.



Photo 4. View to NNW. Open portal door at Adit 2. Strong animal odors emanated from portal.

The old road makes a sharp turn at Adit 2. The volume of excavated material from the working could not be estimated, due to the road building activity. However, it was estimated that 250 cubic yards of waste rock lies on the steep slope below Adit 2. Sulfide mineralization was not observed on the landing area or adjacent to the adit.



Photo 5. View to NNW. The entrance to Adit 3 is partially blocked by mounded soil. Remnant rail and timbers were observed within the tunnel. Access to Adit 3 should be barred or restricted due to the physical hazard it presents.

The entrance to Adit 3 measured five by five feet and appeared to extend several feet without evidence of collapse (Photo 5). Illumination into the adit revealed rusting rails and timbering, but the passable length of tunnel was not determined. The adit was dry.

Waste Dump 3 is bi-lobed shaped and was estimated to contain <3,000 cubic yards of material. The smaller lobe of the dump extends about 110 feet southwest from the portal across Nay Aug Gulch, while the main lobe extends about 225 feet southward, situated between the creek bottom and the old road. A small structure was erected on a portion of the dump (Photo 6). DEQ collected a soil sample (NA WD3 SS2) from near the toe of the dump.



Photo 6. View to W. Toe of Waste Dump 3; height at crown 30 ft.; <3,000 yd$^{3;}$ structure (upper right).



Photo 7. View to NE. Collapsed portal of Adit 4; open at headwall in fracture zone. Access to Adit 4 should be barred or restricted due to the physical hazard it presents.

Adit 4 lies along the east side of the gulch bottom. Adit 4 was driven into a fracture zone, characterized by Umpleby and others (1930) as quartz monzonite. A narrow opening lies at the headwall beyond the collapsed portal (Photo 7). The adit opening measured four feet wide and 2.5 feet high. Small animal tracks and scat were observed near the entrance.

Waste Dump 4 is small, estimated to contain <250 cubic yards of material (Photo 8). The dump extends across the gulch bottom to the old road. Sulfide mineralization was not observed.



Photo 8. View to S. Waste Dump 4; crosses gulch extends to old mine road (upper center).

An open prospect pit is located approximately 500 feet southeast of Adit 4. The prospect which is readily accessible from an adjacent road was marked with caution flagging (Photo 9). The prospect was estimated to measure 50 feet wide with a depth of at least 12 feet. A minor waste rock pile of <5 cubic yards did not appear to contain any sulfide mineralization.



Photo 9. View to SE. Prospect pit in fracture zone, located SE of Adit 4. The prospect is about 10 feet deep with a steep headwall (left). The hazard fencing should be repaired.

Adit 5 lies just east of the old road, near the mouth of an unnamed, steep sloped tributary to Nay Aug Gulch (Photo 10). The adit which is totally collapsed (not pictured) was observed discharging into surface water from the adjacent gulch. Sediment and water samples were collected from base of the collapsed adit.



Photo 10. View to NW. Portion of Waste Dump 5 adjacent to pond (upper right), minor iron staining.

The comingled stream is routed through a man-made pond, which was estimated at 1,500 square feet of area (Photo 11). The depth of the pond was not measured, but it appeared shallow. Water was not sampled from the pond, but from its overflow below Waste Dump 5. Historically, water from the pond was directed through a culvert to a flume then into the jig (Photo 12).



Photo 11. View to SSE. Shallow retention pond on landing near Adit 5; constructed from waste rock.

The scope of waste dump material reflective of Adit 5 operations is not clearly defined. No doubt, waste rock was utilized to construct the pond and extend landing areas. Waste material was estimated at <1,000 cubic yards. Some iron staining and oxidation was noted on the dump.



Photo 12. View to W. Remains of culvert and flume from pond. Soil sample (NA WD5 SS1) was collected from this section of the waste dump.



Photo 13. View to SSE. Flume structure (left); jig (right); collapsed ore bin (upper left).

The mill site is located approximately 50 feet south of Waste Dump 5. As previously discussed, the mill area appears to be located on public lands, rather than private. The site consists of a collapsed ore bin and adjacent structure and a jig (Photos 13 - 15). Further examination of the streambed to determine the volume of tailings was not conducted. However, additional tailings from the milling operations are presumed to exist along the creek below the mill.



Photo 14. View to E. Jig remains. Sample NG-JT SS-1 was collected from fines.



Photo 15. View to E. Collapsed ore bin and structure (?).

An unknown adit was observed near the southeastern boundary of the Chief Extension claim. A metal-roofed cabin in very good condition was sited immediately adjacent to the collapsed portal of the adit. The waste dump was estimated to contain <500 cubic yards of material (Photo 16). Additional workings were located further down Nay Aug gulch on public lands, but these were not examined.



Photo 16. View to SSE. Unknown waste dump, located on public lands beyond the Chief Extension claim.



Photo 17. View to E. Multiple small containers marked as gasoline and/or diesel fuel, stored on the ground and in small shed (upper left), located on the western approach to Waste Dump 4. Several containers were at least 50% full. The fuel should be stored in a bermed and lined containment area.

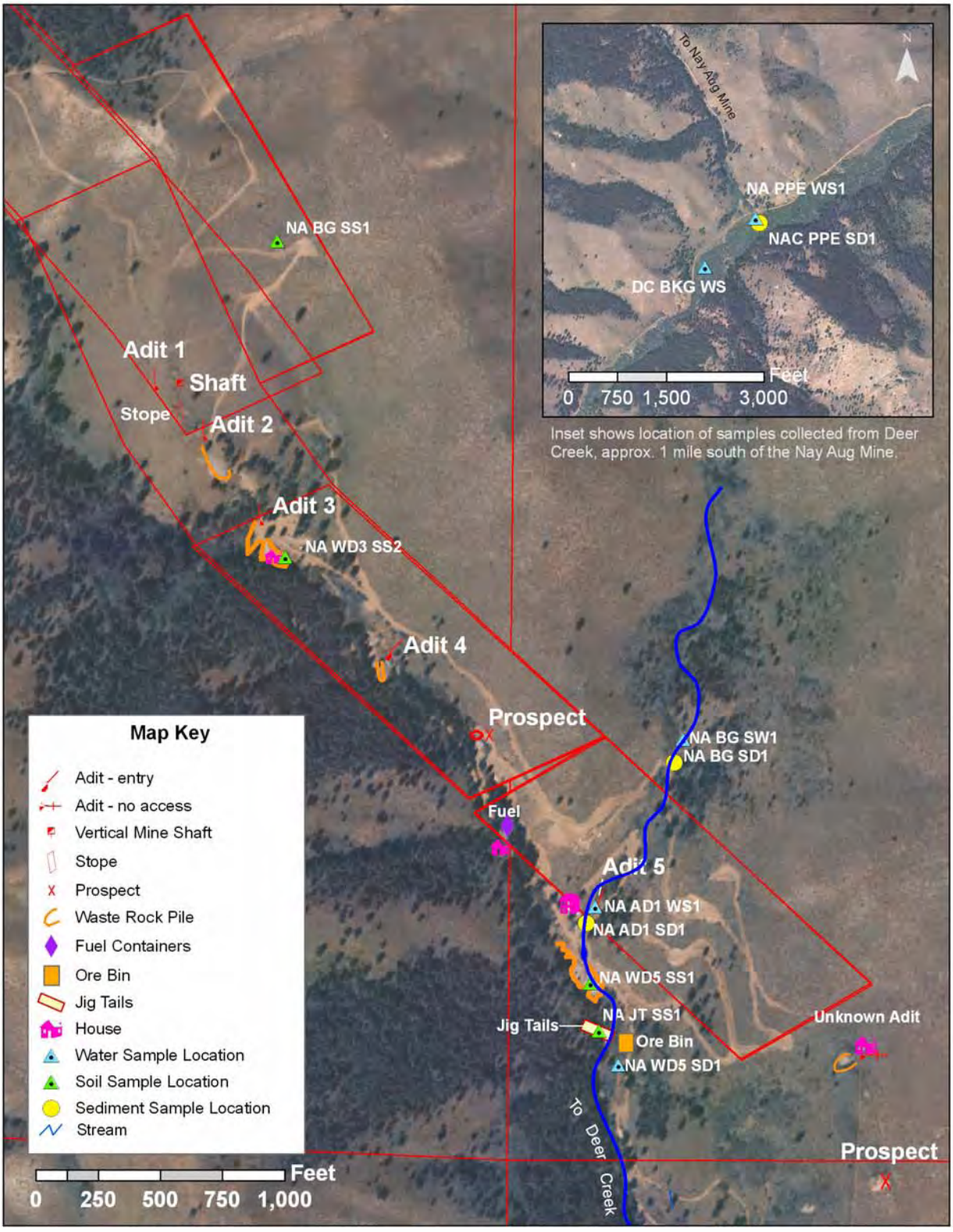


Figure 2: Map of Sampling Locations and Workings (Map source: NAIP 2004).

Section 9. Soil and Sediment Sample Collection

Sample locations are illustrated on Figure 4. Field note descriptions and sample markings were designated as "Nay Aug (NG)" and "Deer Creek (DC)". A background soil sample [NA BG SS-1], collected near the head of Nay Aug Gulch was deemed applicable for screening level comparisons to the lower elevation facilities.

It should be noted that soil and sediment samples designated as NAWD3SS2 and NAAD1SD1 were not consistent with proper sample designations. The reader is cautioned to pay particular attention to the accurate sample descriptions and locations illustrated on Figure 4.

Soil samples were collected from the two largest waste dumps, # 3 and # 5. The sample taken from Waste Dump 3 was incorrectly labeled as "NA WD3 SS2". DEQ only collected one sample at this location. Though the dimensions of Waste Dump 5 were not significant, its proximity to milling operations required the collection of soil sample NA WD5 SS1.

At the mill site some tails remained in the jig and these were sampled as sample NA JT SS1.

Each soil sample collected was, initially approximately ten (10) pounds in size. Each sample location (except stream sediment samples) was excavated several inches with the material discarded. Then the sample hole was excavated approximately 6" more to extract a sample. Waste dumps and tailings had at least three locations within a few square yards sampled and composited. Samples were placed in a large sterile plastic bowl from which coarse (+1") rock and woody debris were hand picked an disposed. The samples were then screened over a 10 mesh sieve and placed in a sterile plastic zip lock bag. The bag was appropriately marked with the sample identification, location description, date and samplers. It was then placed in a cloth sample bag which was marked exactly the same way. Sample descriptions were entered into field log books for this analysis. The samples were documented on a Chain of Custody Form for submittal to SVL laboratories. Once samples were taken to DEQ's field office, they were placed in secure storage to await shipping.

9.1 Soil

Table 1 summarizes laboratory analytical results for surface soil samples which presented as NABGSS1, NAWD3SS2, NAWD5SS1 and NAJTSS1.

Levels of total arsenic exceeded both Idaho's *Initial Default Target Levels* (IDTL) and EPA Region 6's Preliminary Human Health Screening Levels (HHSL) in each of these samples. Only NAJTSS1 exceeded the IDTL for total antimony. Total cadmium, iron, manganese, mercury, selenium and silver exceeded IDTLs in each of these samples. Generally speaking, NAJTSS1 showed the highest concentration of metals, though NAWD3SS1 showed higher total manganese and selenium levels.

The 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^{-5}, and a *Hazard Quotient* of 1. These numbers, although used for comparison even at remote locations, are more applicable to sites

where it is expected to see “unrestricted uses” such as residential development. Similarly, the Region 6 HHSLs are human health based risk derived for screening where residents are at risk for exposure. These concentrations are not unusual for a location or facility in a historic mining district, in particular, the Hailey Ketchum area.

9.2 Sediment

Table 2 summarizes laboratory analytical results for sediment samples numbered: NABGSD1, NAAD1SD1, NAWD5SD1, DCBKGSD1 and NACPPESD1. Sediment samples were collected in conjunction with each water sample taken. These are: NAAD1SD1, collected immediately below Adit 5; NAWD5SD1, collected immediately below the jig mill; and NACPPESD1 collected from Nay Aug Gulch at its terminus with Deer Creek.

Table 1: DEQ Soils Samples Total Recoverable Metals Analysis (mg/kg).

Description	DEQ Initial Default Threshold Level (IDTL) values	EPA Region 6 Human Health Screening Criteria	Nay Aug Gulch Background Soil Sample	Waste Dump # 3 Soil Sample	Waste Dump # 5 Soil Sample	Jig Tailings Sample
			NABGSS-1	NAWD3SS2	NAWD5SS1	NAJTSS1
Antimony	4.77	314	<2.0	3.9	<2.0	34.2
Arsenic	0.391	21.65	41.6	*590	*1110	*1560
Barium	896	15642	230	30.7	25.3	58.9
Cadmium	1.35	39	4.16	*17.1	6.47	*211
Chromium	NSC	NSC	54	23.5	3.91	5.79
Copper	921	2,900	73.1	86.3	14.7	*632
Iron	5.76	55,000	24800	43000	37000	38500
Lead	49.6	400	32.7	*3410	*480	*25700 D2
Manganese	223	3,239	374	597	795	787
Mercury	0.00509	23	0.163	*1.45	*1.4	*21.7 D10
Selenium	2.03	391	<4.0	*11.4	<4.0	<4.0
Silver	0.189	391	0.98	*18	2.3	148
Zinc	886	23,464	525	*3900	1220	*83000 D2
	At or Exceeds IDTLs					
*	At or Exceeds Background Levels by 3 times					
	At or exceeds EPA Region 6 HHSLs					

Note: MDL for Ag, Hg and Se exceeds IDTL value
D2 – sample diluted by a factor of 20 for analysis; D10 - sample diluted by a factor of 100 for analysis
NSC – no soil criteria

Table 2: DEQ Sediment Samples Total Recoverable Metals Analysis (mg/kg).

	DEQ Initial Default Threshold Level (IDTL) values	EPA Region 6 Human Health Screening Criteria	Nay Aug Gulch Background Sediment Sample	Adit 5 Sediment Sample	Waste Dump # 5 Sediment Sample	Deer Creek Background Sediment Sample	Nay Aug PPE Sediment Sample
Description			NABGSD1	(recorded as Adit 1) NAAD1SD1	NAWD5SD1	DCBKGSD1	NAPPESD1
Antimony	4.77	314	<2.0	<2.0	<2.0	<2.0	<2.0
Arsenic	0.391	21.65	16	15.6	*63.1	20.9	20.0
Barium	896	15642	68.5	83.5	54.7	63.1	58.5
Cadmium	1.35	39	<0.20	0.56	*2.78	<0.20	*2.62
Chromium	NSC	NSC	11	19.4	9.89	10.8	12.3
Copper	921	2,900	3.31	8.15	11.7	6.02	6.25
Iron	5.76	55,000	14800	20300	15700	7710	12400
Lead	49.6	400	5.69	12.7	*249	*122	*94.3
Manganese	223	3,239	311	340	400	126	198
Mercury	0.00509	23	<0.033	<0.033	*0.10	<0.033	0.048
Selenium	2.03	391	<4.0	<4.0	<4.0	<4.0	<4.0
Silver	0.189	391	<0.50	<0.50	*2.53	<0.50	<0.50
Zinc	886	23,464	45.4	*701	*1810	74.7	*727
	At or Exceeds IDTLs						
*	At or Exceeds Background Levels by 3 times						
	At or exceeds EPA Region 6 HHSLs						

Note: MDL for Ag, Hg and Se exceeds IDTL value; NSC – no screening criteria value listed

Section 10. Surface Water Sample Collection

Table 3 summarizes laboratory analytical results for surface water samples collected including: a background sample collected from an unnamed tributary to Nay Aug Gulch; the discharge of Adit 5; a spring below Waste Dump 5 and the mill site; the Probable Point of Entry (PPE) where Nay Aug Creek enters Deer Creek; and from Deer Creek upstream of Nay Aug Creek.

10.1 Surface Water Sample Description

It should be noted that water quality samples designated as NAAD1WS1, NAWD5WS1, NACPPEWS1 and DCBKGWS1 were not labeled consistent with proper sample designations. The reader is cautioned to pay particular attention to the written sample descriptions and locations illustrated on Figure 5 which were validated as accurate.

Sample **NABG SW1** was collected upstream from Adit 5 from spring water flowing in the unnamed gulch, approximately 500 feet NNE of Adit 5. The sample was not filtered, but preservative was added to the sample container. No field parameters were measured.

The surface water sample collected from the discharge at Adit 5 was incorrectly recorded in field notes as NA AD1 WS1. Proper sample labeling procedures were not followed in this case, resulting in possible confusion for the reader. To clarify, "NAAD1WS1" was not collected at Adit 1. The water was clear and odorless, and there was no discoloration associated with the water. Aquatic plant life appeared healthy. No field parameters were measured.

Sample **NA WD5 WS1** was collected downstream of Waste Dump 5 and the mill site. The water was clear and had no discoloration or odor. No field parameters were measured.

Sample **NAC PPE WS1** was collected from the outfall of the Nay Aug Gulch creek. Field parameters taken at this point are as follows: pH = 7.8; Conductivity = 361 µS/cm; Dissolved Oxygen = 9.03 %; Turbidity = 10; and Temperature = 9.8^{o} C.

Sample **DC BKG WS1** was collected from Deer Creek upstream of Nay Aug Gulch for use as a background sample. Field parameters taken at this point are as follows: pH = 7.8; Conductivity = 223 µS/cm; Dissolved Oxygen = 6.58-7.46 %; Turbidity = 10; and Temperature = 9.8^{o} C.

10.2 Results

The background water sample shows an elevated level of iron, though downstream samples indicated reduced concentrations. Sample analyses indicate elevated levels of zinc from the Adit 5 discharge, the stream below Waste Dump 5 and the probable point of entry (PPE) at Deer Creek. These values exceed the DEQ cold water biota standards for Acute and Chronic criteria. The extent to which cold water biota may be affected by the elevated zinc levels was not determined by DEQ.

Table 3: DEQ Surface Water Samples Total Recoverable Metals Analysis (mg/L).
(Standards in "dissolved" unless stated)

Nay Aug Gulch

Description	DEQ Ground Water Standard (T)	DEQ Drinking Water Standard MCL	DEQ Cold Water Biota Standard Acute	DEQ Cold Water Biota Standard Chronic	Background Sample Unnamed gulch NABGSW1	Adit No. 5 Discharge NA AD1 WS1	Discharge below Waste Dump No. 5 NA WD5 WS1	Nay Aug PPE at Deer Creek NACPPE WS1	Deer Creek Background DCBKGWS1
Antimony	0.006	0.006			<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
Barium	2	2			0.0298	0.0125	0.0223	0.0530	0.0151
Cadmium	0.005	0.005	0.00082 (H)	0.00037 (H)	<0.0020	0.0049	0.0039	<0.0020	<0.0020
Chromium (Total)	0.1	0.1			<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
Iron	0.3*				0.605	0.261	<0.060	0.202	<0.060
Lead	0.015	0.015	0.014 (H)	0.00054 (H)	<0.0075	<0.0075	<0.0075	<0.0109	<0.0075
Manganese	0.05*				0.0391	0.0127	<0.0050	0.0094	<0.0040
Selenium	0.05	0.05	0.018 (T)	0.005 (T)	<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
Zinc	5*		0.035 (H)	0.032 (H)	<0.0100	0.975	0.685	0.180	0.0180

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

Section 11. Pathways and Environmental Hazards

11.1 Ground Water Pathway

During the cleanup activities of the nearby mines, specifically the Minnie Moore and Triumph mines, some of 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 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.

For the purposes of completing Preliminary Assessments, Source Water Assessments (completed for local public drinking water supplies) were used to identify any known affects to those systems. Although 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 affects 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 2000). Each source water assessment:

- Defines the zone of contribution, which is that portion of the watershed or subsurface area contributing water to the well or surface water intake (**source area delineation**).
- Identifies the significant potential sources of drinking water contamination in those areas (**contaminant source inventory**).
- Determines the likelihood that the water supply will become contaminated (**susceptibility analysis**).

Each assessment is summarized in a report that describes the above information and provides maps of the location of the public water system, the source area delineation, and the locations of potential contaminant sources. Idaho began developing source water assessments in 1999, and in May 2003 met its obligation under the amendments of the Safe Drinking Water Act by completing delineations for all 2100+ public water systems that were active in Idaho as of August 1999 (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, Idaho.

The information extrapolated from these source water assessment 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 depend on the delineation method used, local hydrogeology, and volume of water pumped from the well or surface water intake.

DEQ used a refined computer model approved by EPA to determine the 3-year (Zone 1B), 6-year (Zone 2), and 10-year (Zone 3) time of travel associated with the Big Wood River Aquifer and its sources (DEQ 2000). This information is illustrated in Figure 6.

This process involves collecting, recording, and mapping existing data and geographical information system (GIS) coverage to determine potential contaminant sources (e.g., gas stations) within the delineated source water assessment area. The potential contaminant source inventory is one of three factors used in the susceptibility analysis to evaluate the overall potential risk to the drinking water supply (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. The Sun Valley Water and Sewer District operates and maintains nine wells in two groupings (DEQ 2000). The City of Ketchum drinking water system consists of seven wells in two groupings. The City of Hailey's drinking water system consists of six wells and a spring (DEQ 2000).The City of Bellevue drinking water system consists of two wells and three springs (DEQ 2000).

Generally speaking, public drinking waters systems in the Big Wood River Valley are rated as moderate to high (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. 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 2000). There is no long term or recurring water chemistry problems in the City of Hailey's drinking water sources. Manganese, zinc, chromium, and mercury have been detected in Hailey's wells, but all were well below MCLs (DEQ 2001). Currently, there are no data that indicate that any metal concentrations have exceeded MCLs in the Bellevue drinking water systems (DEQ 2000).

Based upon domestic well information, the closest resident is 2.7 miles to the east on Deer Creek Road near Clarendon Hot Springs, where three wells are located. The well locations are illustrated in Figure 5. According to the US Census Bureau (2000) the average household size in Hailey is 2.4 persons per household.

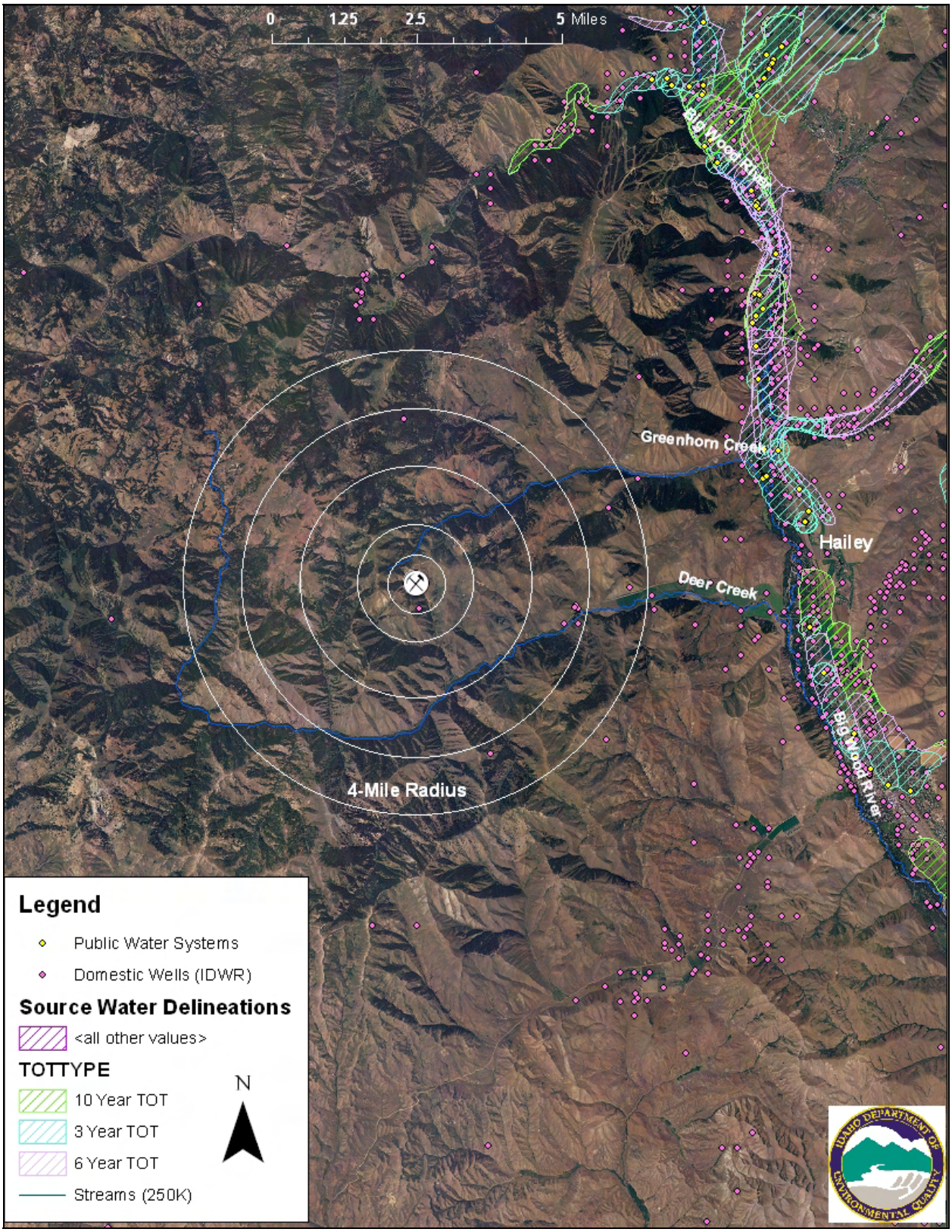


Figure 3. Drinking Water Well locations and source water delineations (Map source: NAIP 2004).

11.2 Surface Water Pathway

Surface Water

It appears that during seasonal (spring) runoff, waters from upper Nay Aug Gulch and secondary drainages become partially impounded by the western lobe of Waste Dump 3. It appears that water resurfaces down slope of the waste dump. Shallow rills were noted at the point where the gulch crosses the old road. The narrow landing of Waste Dump 4 appeared marginally eroded by the intermittent flow. From this point to its intersection with the flow from the unnamed tributary and Adit 5 drainage, the gulch bottom is defined by a narrow, shallow bed. Consequently, the upper reaches of Nay Aug Gulch are characterized as an ephemeral drain. A spring was located in an unnamed drainage approximately 0.5 miles northeast of Adit 5 produce a moderate flow.

Discharge from beneath the collapse of Adit 5 joins with spring water from the unnamed gulch. This comingled water flows into a shallow man-made pond (Photo 11). Its outfall generally flows along the east side of Waste Dump 5 into the gulch. A secondary stream flows westward across the dump, but its flow appeared insufficient to maintain a surface expression in the bottom of the gulch.

Nay Aug Gulch drains southward for approximately 0.75 miles where it joins Panther Creek which in turn flows for another 0.75 miles before joining Deer Creek. The probable point of entry (PPE) of mine and mill runoff into Deer Creek is approximately 1.5 miles to the south of the claims. The east flowing Deer Creek continues approximately 6.5 miles where it merges with the Big Wood River. The remainder of the 15-mile Target Distance Limit (TDL) lies within this river's drainage. These relationships are illustrated in Figure 7. The Big Wood River is an EPA CWA §303(d) listed stream.

Although there is significant evidence of erosion and discharge to the ephemeral and perennial waters of Nay Aug Gulch, there is no evidence that these discharges significantly contribute to metals concentrations in Deer Creek.

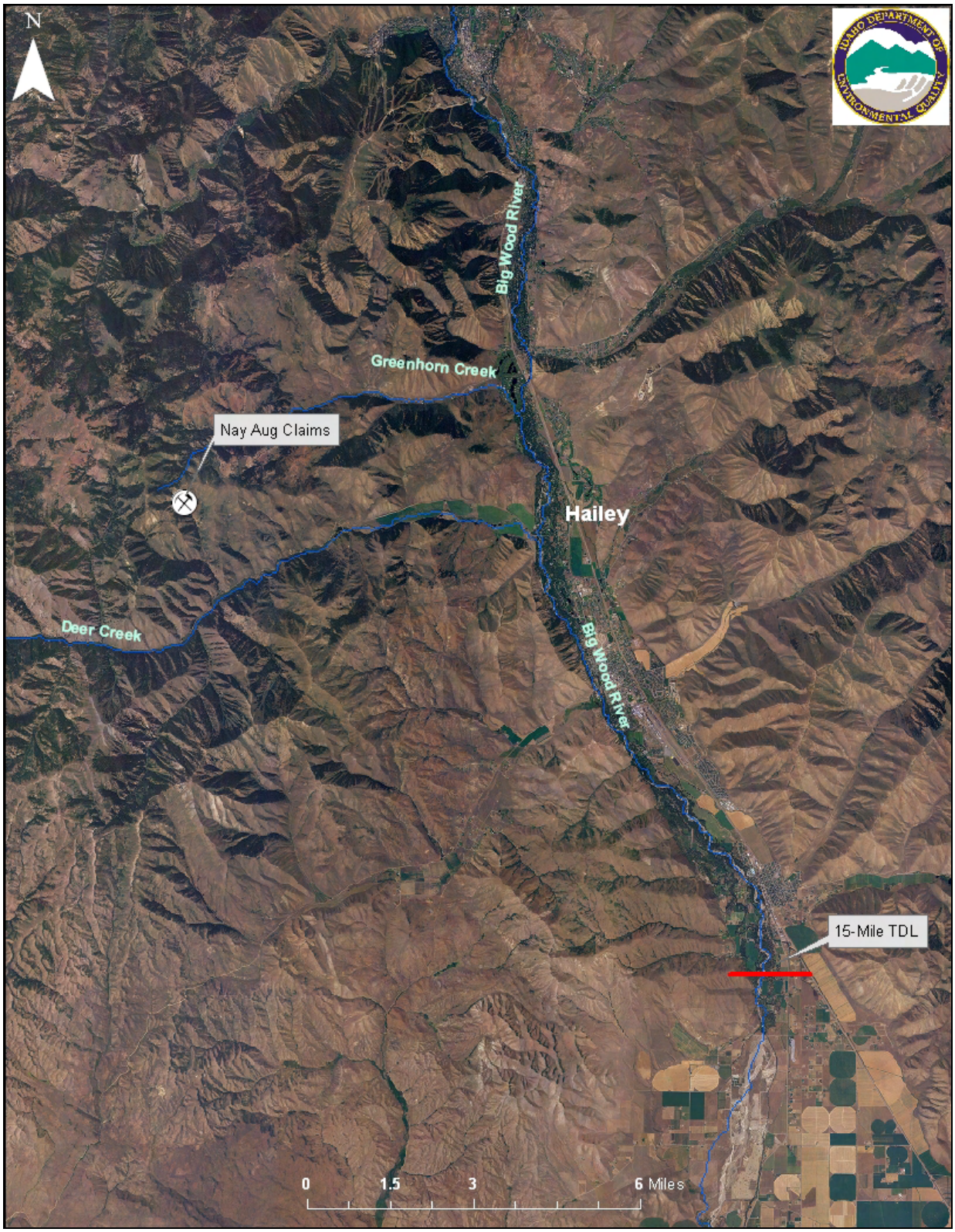


Figure 4: Map of the 15-Mile Target Distance Limit (TDL) (Map source: NAIP 2004).

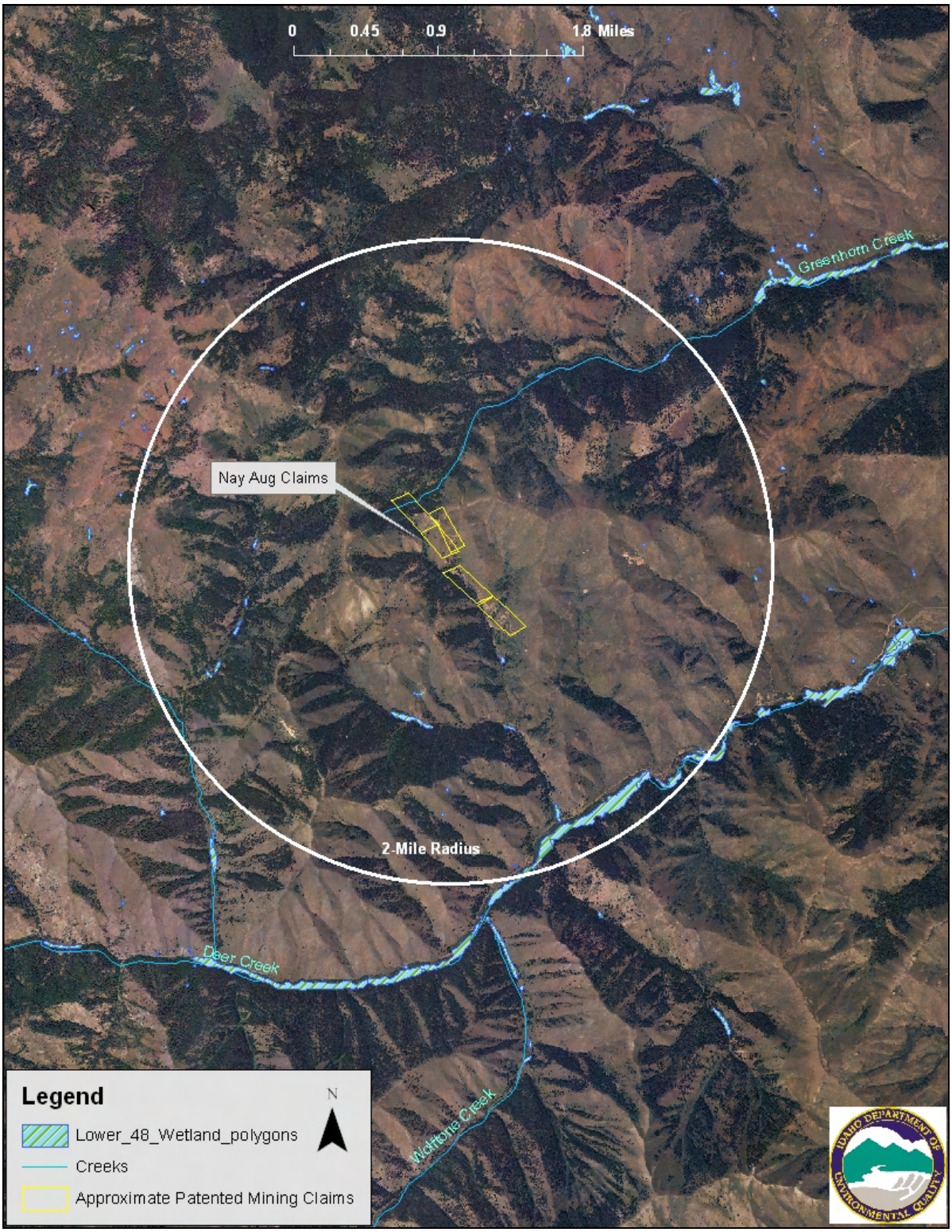


Figure 5: Map of Wetlands within 2-mile radius of the Nay Aug Mine (Map source: NAIP 2004).

11.3 Air Quality Pathway

The main access to the Nay Aug is restricted by a gate. Therefore, ORVs do not have ready access to waste dumps and mine workings where fugitive dust emissions occur. Alternate, less accessible trails connect to the uppermost section of the old road, however. The delivery of dust from the mine site to local residents is not likely because of the distance (2.7 miles) to those residents. Dust emissions from the mill site are not likely due to the addition of dense vegetative cover surrounding the tailings in the gulch bottom.

11.4 Soil Exposure Pathway

Relative to soil exposure DEQ's Risk Evaluation Manual states that 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.

A cumulative risk and hazard index analysis was completed by DEQ staff using Idaho's Risk Evaluation Manual. The analysis was performed for arsenic, cadmium, mercury, selenium, silver, and zinc concentration detected in the soil samples collected at Waste Dump 3, at Waste Dump 5, and from the mill site (jig tails).

Waste Dump 3
The soil exposure pathways not currently complete for residential or construction worker receptors. However, the non-residential receptor pathway is potentially complete for recreational users at this Nay Aug mine site. The residential pathway for hypothetical future residential receptors on the mine site is also potentially complete if the claims are developed for residential housing.

Results of the analysis showed a cumulative risk of 6.49×10^{-5} and a cumulative hazard index of 1.70.The primary driver for both the risk and hazard index is arsenic with a risk of 6.49×10^{-5} and a hazard quotient of 1.53. Remedial action levels are typically set between 1×10^{-4} and 1×10^{-6} for risk and/or a hazard index of 1. Based on this analysis, there is some human health risk and hazard associated with frequent recreational use of Waste Dump 3 through inhalation, dermal contact and ingestion of site soils.

Waste Dump 5
The soil exposure pathways not currently complete for residential or construction worker receptors. However, the non-residential receptor pathway is potentially complete for recreational users at this Nay Aug mine site. The residential pathway for hypothetical future residential receptors on the mine site is also potentially complete if the claims are developed for residential housing.

Results of the analysis showed a cumulative risk of 1.22×10^{-4} and a cumulative hazard index of 3.02. The primary driver for both the risk and hazard index is arsenic with a risk of 1.22×10^{-4} and a hazard quotient of 2.88. Remedial action levels are typically set between 1×10^{-4} and 1×10^{-6} for risk and/or a hazard index of 1. Based on this analysis, there is some human health risk and hazard

associated with frequent recreational use of Waste Dump 5 through inhalation, dermal contact and ingestion of site soils.

Jig Mill

The soil exposure pathways not currently complete for residential or construction worker receptors. However, the non-residential receptor pathway is potentially complete for recreational users at this Nay Aug Gulch mill site. The residential pathway for hypothetical future residential receptors on the mill site is also potentially complete if the claims are developed for residential housing.

Results of the analysis showed a cumulative risk of $1.72 \text{ X } 10^{-4}$ and a cumulative hazard index of 4.80. The primary driver for both the risk and hazard index is arsenic with a risk of $1.72 \text{ X } 10^{-4}$ and a hazard quotient of 4.05. Remedial action levels are typically set between $1 \text{ X}10^{-4}$ and $1 \text{ X}10^{-6}$ for risk and/or a hazard index of 1. Based on this analysis, there is some human health risk and hazard associated with frequent recreational use of the Jig Mill tailings through inhalation, dermal contact and ingestion of site soils.

11.5 Domestic Wells and Public Water Supplies

There are seven domestic water wells within a four mile radius of the mine and one well used for irrigation (stock watering) which is located approximately 0.45 miles south of the Chief Extension claim. The nearest domestic well located approximately 2.7 miles down hydraulic gradient from the site is more likely affected by watershed wide sources of contaminants than by this mine site.

11.6 Residences, Schools and Day Care Facilities

There are not any residences, schools or day care facilities within 200 feet of the mine site. The nearest residence is approximately 2.7 miles southeast of the Nay Aug mine site.

11.7 Wetlands

Approximately 13 miles of riparian and associated wetlands exist along Deer Creek approximately 1.5 miles down stream of the mill site to the 15-mile TDL. However, there is a small retention pond, estimated at 1,500 square feet, located near Waste Dump 5, but its frontage is significantly less than 0.1 mile (Figure 7). Drainages at the mine are moderately vegetated and defined stream channels are apparent in only a few locations within Nay Aug Gulch. Overland transportation of mine and mill waste entering Nay Aug Gulch may occur seasonally, but their subsequent deposition was not readily identified along the lower reaches of the gulch.

11.8 Sensitive Species (Plant and Animal)

Although the site is located within a defined range and habitat for wolves, the size of the dumps relative to the total range is very small and therefore unlikely to be a significant source for exposure. Bugleg Goldenweed (*Haplopappus insecticruris*) was the only IDF&G listed species of concern (F&G, 2002) within a 4-mile radius of the mining site. Bugleg Goldenweed is a sensitive

species that grows in gravelly to heavy clay soil in sagebrush-grass meadows, rolling sagebrush hills, and dry flats (Figure 8).

11.9 Fisheries

Fish presence/absence studies have not been conducted in Nay Aug Gulch to confirm any fish species that may reside in this stream. However, visual observations in Deer Creek confirm the presence of brook trout [Salvelinus foninalis]. Redband rainbow trout [*Oncorhynchhus mykiss* gairdneri], mountain white fish [Prosopium williamsoni], wood river sculpin [Cottus leiopomus], and brook trout [Salvelinus foninalis] are present within the Big Wood River (IDFG, 2000). Commercial or subsistence fishing does not occur within the 15-mile Target Distance Limit (TDL), but sport fishing does.

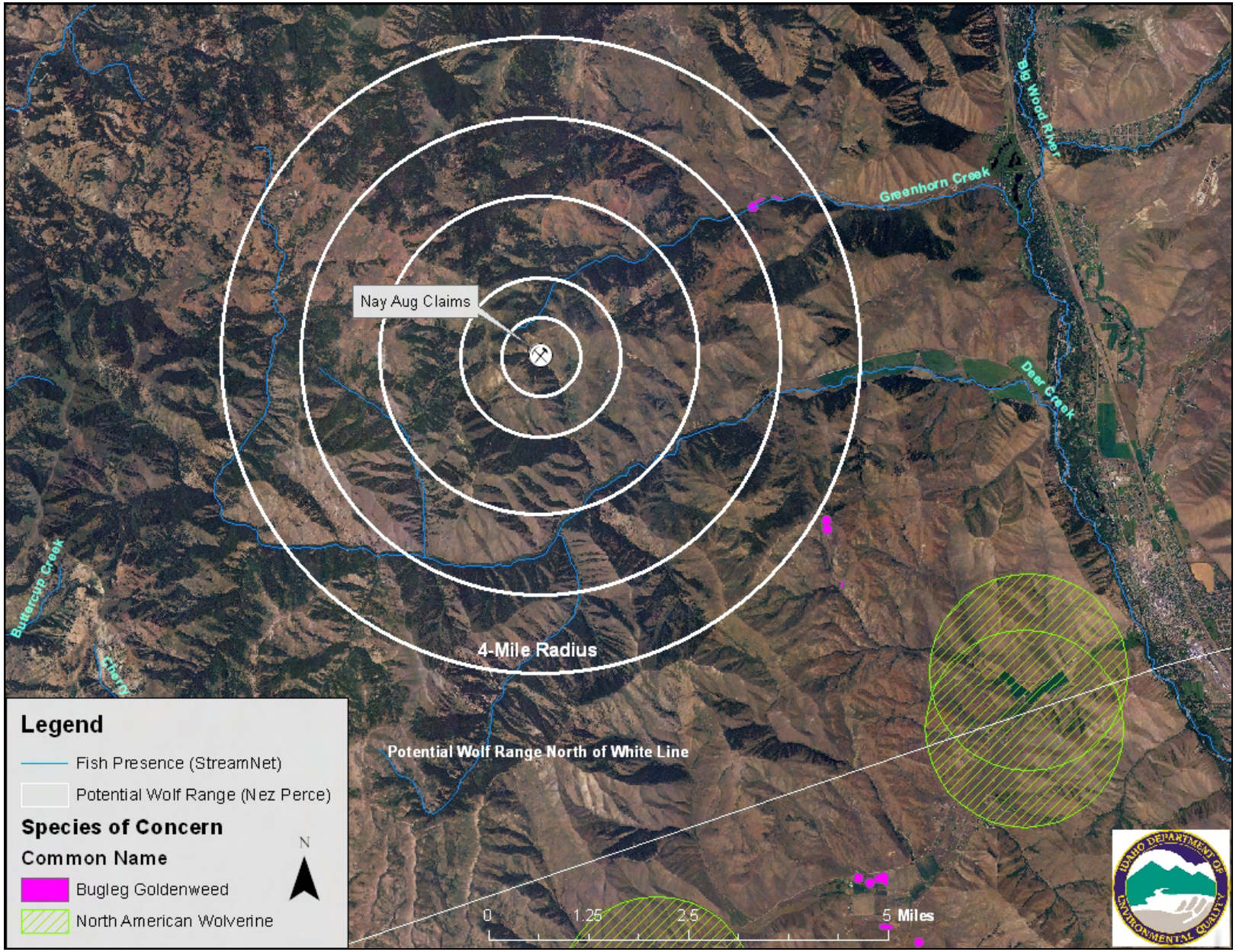


Figure 8. Sensitive species identified in the vicinity of the preliminary assessment site (Map source: NAIP 2004).

11.10 Sensitive Waterways

Deer Creek and the Big Wood Rivers are both Clean Water Act 303(d) listed streams down gradient from the site, which might be adversely affected by contaminant delivery from the site. However, the low flow currently observed draining Nay Aug Gulch coupled with spring runoff and runoff from the mine and mill site would provide only a small percentage to total stream flow.

11.11 Livestock Receptors

There was no indication that the area is used for livestock grazing. However, the mining claim and mill site fall within the BLM's Deer Creek grazing allotment.

11.12 Physical Hazards

Although not a function of human health and ecological risk analysis, or the CERCLA site assessment protocols, DEQ made observations about numerous mine openings. Based on those observations, DEQ suggests that the mine and property owner consider these dangerous physical hazards, and that they should be actively managed or closed to restrict unauthorized public access. Some of the more distinctive and most dangerous openings are the shaft and stope located on the Nay Aug claim and the adits located on the Nay Aug and Chief patented claims. Additionally, DEQ noted the storage of several fuel containers (Photo 17). Based upon previous instances of vandalism at the site, the potential exists for the intentional release of flammable and/or hazardous materials to the environment. These containers should be removed or properly stored and secured.

Section 12. Summary and Conclusions

Although the current site conditions and associated risks do not warrant regulatory remedial action, the owner should employ a more comprehensive system of water management, particularly BMPs, to stabilize or reduce erosion of mine wastes and maintain the site.

DEQ is recommending to the owner consider closing mine openings as these are dangerous physical hazards. The most dangerous openings are: the declined shaft adjacent to Adit 1, the stope above Adit 2 and the four open adits, numbered 1, 2, 3 and 4. Although property access is restricted, unauthorized visitors to the site are at risk.

Additionally, DEQ is recommending that hazardous materials such as diesel fuel and gasoline be appropriately contained or removed.

DEQ observed large volumes of solid wastes or refuse which are exposed to the elements. This site is not an approved and licensed solid waste disposal site nor is it being managed as such. Therefore, DEQ recommends that the owner, take appropriate steps to properly store or dispose of these materials.

In conclusion, DEQ is recommending to EPA that there is no calculation of a Hazard Ranking Score for the Nay Aug Mine and the miscellaneous workings within Nay Aug Gulch, and that No Remedial Action is Planned (NRAP) for the site.

If, however, the claims are considered for development for residential use additional site assessment, risk analysis and risk management is warranted.

Section 13. References

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