

**RAMSHORN MINE  
PRELIMINARY ASSESSMENT REPORT  
CUSTER COUNTY, IDAHO**

**STATE OF IDAHO  
DEPARTMENT OF ENVIRONMENTAL QUALITY**

December 2003

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



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 10  
1200 Sixth Avenue  
Seattle, WA 98101

January 30, 2004

Reply To  
Attn Of: ECL-115

Umont Mining Inc.  
c/o Barbara Bachman  
Seventy Niagara Services  
P.O. Box 1335  
Williamsville, NY 14231-1335

Dear Ms. Bachman:

The Idaho Department of Environmental Quality (DEQ) has completed a report summarizing the findings of a visit conducted at the Ramshorn Mine site in July, 2003. A copy of the report, called a Preliminary Assessment, is enclosed.

Based on a review of this assessment, EPA has determined that no further action is warranted at the site. A no further action designation means that no additional steps under the Federal Superfund Program will be taken at the site unless new information warranting further Superfund consideration is discovered. EPA's no further action designation does not relieve your facility from complying with appropriate Idaho state regulations.

In accordance with EPA's decision regarding the tracking of no further action sites, the above named site will be removed from the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) data base and placed in a separate archival data base as a historical record. Archived sites may be returned to the CERCLIS site inventory if new information necessitating further Superfund consideration is discovered.

We appreciate your cooperation during the site visit. If you have any questions, please feel free to contact me at (206)553-2782.

Sincerely,

A handwritten signature in black ink, appearing to read "Kerr Marcy", written over a circular scribble.

Kerr Marcy  
Site Assessment Manager

Enclosure

cc: Bruce Schuld, Idaho Department of Environmental Quality  
Monica Lindeman, US EPA, ECL-115  
Craig Conant, EPA SF Records Center, ECL-076

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## LIST OF ACRONYMS

<u>Acronym</u>	<u>Definition</u>
amsl	above mean sea level
ATV	All Terrain Vehicle (a.k.a. 4-wheeler)
bgs	below ground surface
DEQ	Idaho Department of Environmental Quality
EPA	United States Environmental Protection Agency
gpm	gallons per minute
PPE	Probable Point of Entry
ppm	parts per million
TDL	Target Distance Limit

## 1. INTRODUCTION

The 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 a preliminary assessment (PA) at the Ramshorn Mine site located near Challis, Idaho, in Custer County. DEQ completed PA activities in accordance with the goals listed below.

The specific goals for the Ramshorn PA, identified by the DEQ, are to:

- Determine the potential threat to public health or the environment posed by the site.
- Determine the potential for a release of hazardous constituents into the environment.
- Determine the potential for placement of the site on the National Priorities List.

Conducting the PA included reviewing existing site information, collecting receptor information within the site's range of influence, determining regional characteristics, and conducting a site visit. This document includes a discussion of site background information (Section 2), a discussion of migration/exposure pathways and potential targets (Section 3), and a list of pertinent references. Photographic documentation is included in Appendix A and sample analyses are included in Appendix B.

2. SITE BACKGROUND

2.1 SITE LOCATION

Site Name: Ramshorn Mine

CERCLIS ID No.:

Location: Custer County, Idaho

Latitude: 44° 24' 35"N

Longitude: 114° 21' 34"W

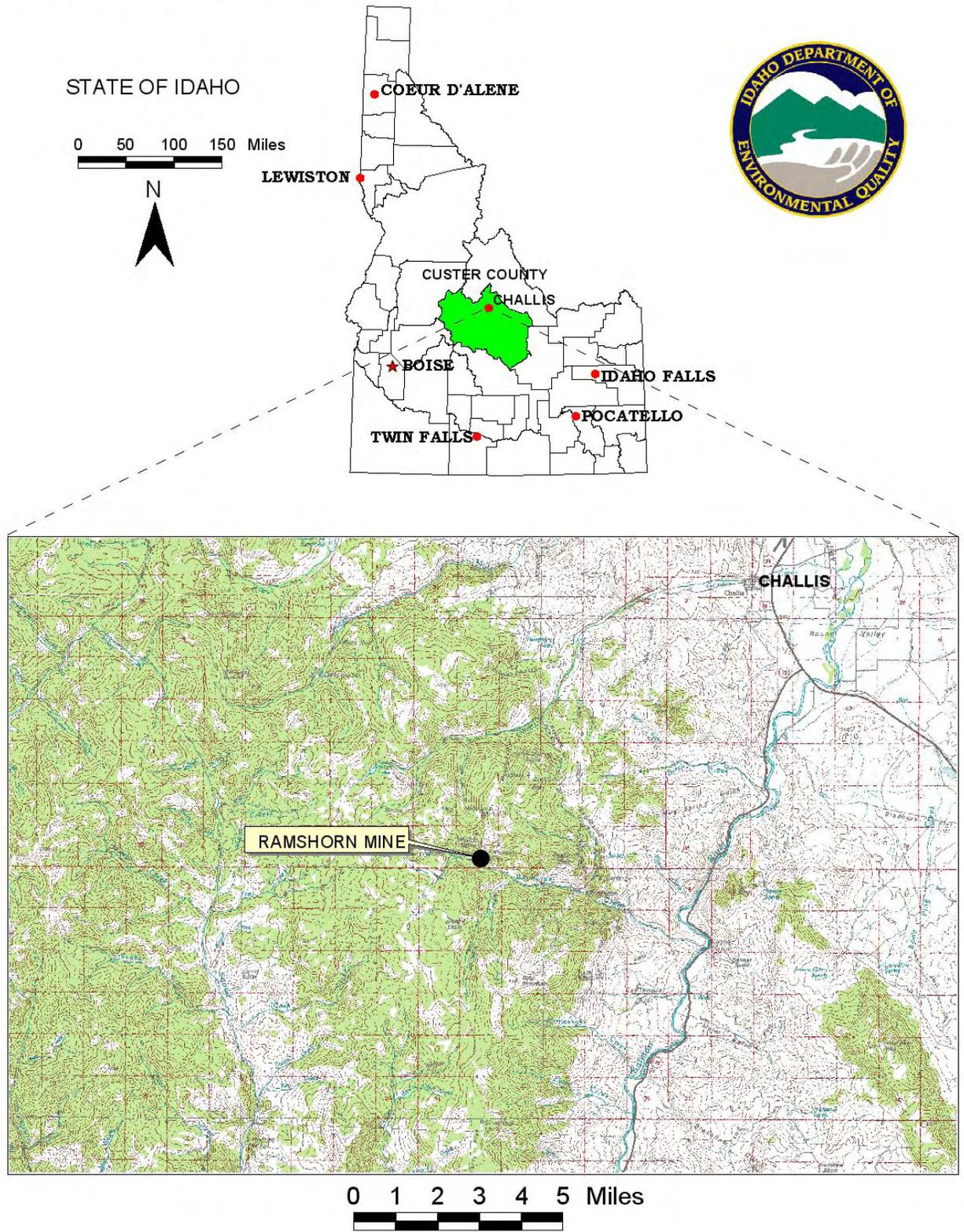
Legal Description: Section 32, Township 13N, Range 18E, Boise Meridian

Congressional District: Idaho

Site Owner: Umont Mining Inc.  
c/o Barbara Bachman  
Seventy Niagara Services  
P.O. Box 1335  
Williamsville, NY 14231-1335

Site Contact: Kirk Hansen  
HC 68, Box 300  
E. Fork Road  
Clayton, Idaho 83447  
(208) 838-2383

**FIGURE 1 Site Vicinity Map of Ramshorn Mine**



## 2.2 SITE DESCRIPTION/OWNERSHIP HISTORY

The Ramshorn Mine (Ramshorn) is located within the Bayhorse Mining District in Custer County, Idaho, approximately 34 miles northeast of Stanley, Idaho, 11 miles southwest of Challis, Idaho, and 2.5 miles west-northwest of the former townsite of Bayhorse, Idaho (Figure 2-1). The Ramshorn, which is comprised of six claims patented between 1887 and 1906 (Mitchell, 1999), consisted of 17 tunnels and intermediate levels accounting for 6.5 miles of workings with a vertical extent of approximately 1,700 feet (Ross, 1937). The upper workings of the Ramshorn lie at an elevation of 9,200 feet above mean sea level (amsl).

At the time of the site visit, only three of the tunnels or adits were discernible. According to the current lessee, Kirk Hansen, exploration activities conducted by Inspiration Development Corp from 1979 through 1981, obliterated the surface expression of most of the early workings.



**Photo 1**

Upper Ramshorn Mine: tram shed top center, bunkhouse top right & Skylark Mine top left

Originally located by a prospector traveling with two bay horses in 1864, mining in the Bayhorse area did not commence until W.A. Norton and S. A. Boone located a lode on September 1, 1873 (Wells, 1983). Ownership history of the Ramshorn began with its discovery by Tom Cooper and Charley Blackburn in 1877. Unable to develop it due to its remote location, it was quickly sold to a group that included E.W. Jones of Idaho City and A.J. McNab of Salmon (*ibid.*). However, Strahorn (1881, p.49) identified Ramshorn's

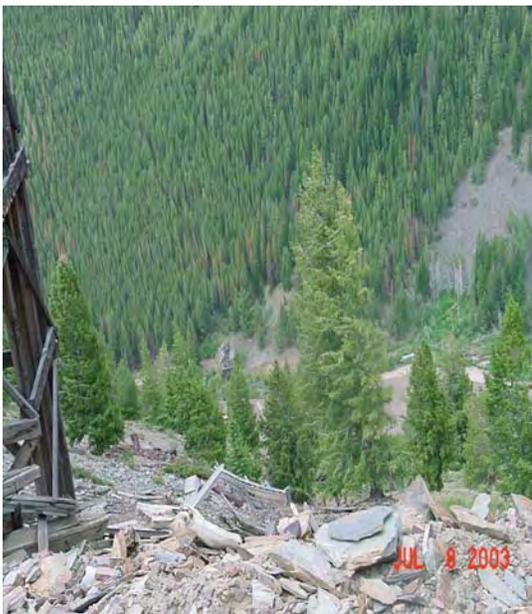
owners as “Messrs. J.E.W. Jones, N.E. Linsley, and other residents of Salt Lake City”. In 1880, because of high transportation costs, a 30-ton smelter was constructed in the town site of Bayhorse (Wells, 1983). John T. Gilmer and O.J. Salisbury purchased the Ramshorn in 1882 and expanded the smelter and added a 30-stamp mill at the mine.



**Photo 2**

Possible remains of portal shed, adjacent to lower Ramshorn adit (Post Boy tunnel)

The following year, a Halliday wire-rope aerial tramway was constructed to transport ore from the mine to wagons serving the smelter (ibid.). The tram was extended to include the Skylark workings, located uphill from the Ramshorn.



**Photo 3**

Ramshorn tramway from upper adit level to ore terminal building on Bayhorse Creek



**Photo 4**

Tramway supports leading to upper adit

The Bayhorse smelter operated all year long until 1888, when operations were reduced to a four to five month period. Operations ceased in 1897, when it was permanently closed and later dismantled (Umpleby, 1913). A small mill was constructed near the old smelter site in 1905, but its operation was limited (Ross, 1937). Between 1897 and 1917, little activity occurred at the Ramshorn, though 636 tons of stockpiled ore were shipped in 1902 (ibid.). Bell (1900) credited the Ramshorn with \$3,000,000 in production with a comparable value in blocked out ore reserves. Average ore values were 100 ounces of silver and 3 percent copper per ton, occurring in “well-defined shoots from 6 inches to 6 feet wide and from 50 to 300 feet long. Selected ore from the mine ran from 500 to 1,000 ounces of silver and 10 to 20 percent copper per ton” (Mitchell, 1999, p.12).

The Ramshorn was operated through joint venture between the Ramshorn Mining & Smelting and Aetna Mining & Investment Companies until the Ramshorn Mines Company was incorporated on July 14, 1919. During the same year the Ramshorn mill was refurbished, expanded to include a 50-ton flotation plant and equipped with electric power from the company’s own water-powered plant. Additionally, a reduction plant was constructed and described as “50-80 ton Flotation and (or) Gravity Flotation Plant. Other mill equipment included a gyratory crusher, primary and secondary rolls, a ball mill, a Dorr classifier, sand and slime tables, Fagergren and Janney floatation cells, an American vacuum filter, and a dryer” (Mitchell, 1999, p.14).

Though the mine operated all year, the mill only operated during summer and fall months (Mitchell, 1999). In 1923, a loading station was added to the tramway to handle ore from the lower Post Boy tunnel.



**Photo 5**

View from tramway loading shed, located at middle adit level (Post Boy tunnel), across tailings pile, tailings pond (center), across Bayhorse Creek (vegetation) to ore terminus building.

By 1925, the Ramshorn was the leading producer in the Bayhorse district but when the owners shifted operations to lessees in 1926, production was greatly reduced. From 1939 to 1949, W.B. Swigert of Challis leased the Ramshorn. In 1940, the mill was dismantled and sold but the lessees shipped several hundred tons of silver ore and copper-lead-silver ore. Ore production steadily declined from 938 tons in 1941 to only 53 tons in 1950 (ibid.).

In 1950, Salisbury, Swigert and Leo Eager formed a new company, Bayhorse Mines, Inc., to operate the property under lease. Bayhorse Mines constructed a 100-ton per day gravity separation and flotation mill and began limited operation on June 1951. Bayhorse Mines devoted subsequent years to development work and maintenance of the workings, though sub-lessors worked old stopes for a 230-ton mill run in 1955. No work was conducted between 1956 and 1958. In 1959, Umont Mining, Inc. entered into lease and option agreements and conducted exploration activities until 1962. Mitchell (1999, p.19) suggests that Umont “apparently abandoned its interest shortly after that”. In 1964, L & B Investment Company produced 295 tons of jig concentrate from the Ramshorn dump. In 1979, Inspiration Development Company leased the Ramshorn and adjacent Bayhorse properties from Bayhorse Minerals, Inc (?) for exploration but discontinued its option the following year when additional ore reserves were not identified (ibid.). According to the Custer County Assessor, however, Umont Mining is the owner of record of these patented claims.

## 2.3 SITE OPERATIONS AND WASTE CHARACTERISTICS

The Bayhorse anticline is “one of the largest and longest anticlines in this part of Idaho” (Ross, 1937, p.75). The northern portion of the anticline encompasses the Bayhorse district and includes the Ramshorn Slate (Ordovician), the Bayhorse Dolomite (lower Ordovician-Cambrian) and the Garden Creek Phyllite (Cambrian) formations. The Ramshorn which was developed entirely within the Ramshorn Slate and within the northern zone of contact metamorphism that surrounds Nevada Mountain (?), shows ore mineral uniformity throughout the vertical extent that has been mined (Chambers, 1966). The ore deposits in the Bayhorse district are elongated lenses or ovoid pipe-like bodies, occurring as veinlets, disseminations, breccia fillings, and massive or discontinuous replacements (Worl, et al, 1989).

The mineral deposits of the Ramshorn consist chiefly of silver, lead and copper with lesser zinc values. Oxidized ores formerly comprised a large portion of the district though all appeared to have been exploited during the early years (e.g., 1880-1897). The principal ore mineral is tetrahedrite though galena was also mined and both are argentiferous. Other minerals include sphalerite, pyrite, arsenopyrite and chalcopyrite while siderite is the primary gangue mineral (Ross, 1937).

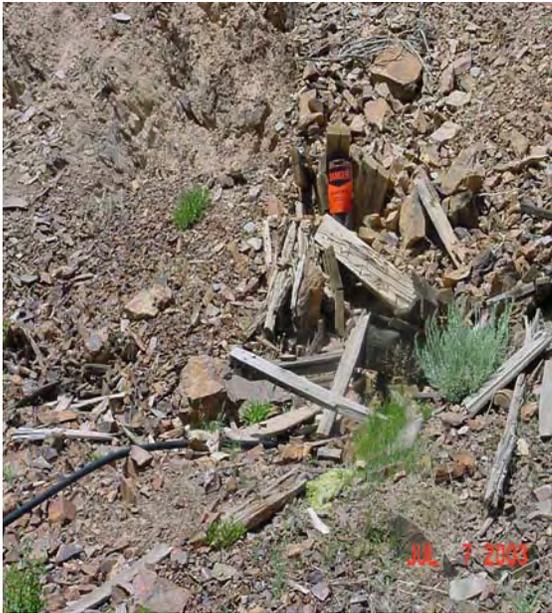
Historical production records before 1902 are lacking, but Umpleby (1913) estimated that the production between 1877 and 1897 accounted for \$3,000,000. The total recorded production between 1902 and 1970 "yielded 152.05 ounces of gold, 2,442,085 ounces of silver, 1,065,439 pounds of copper, 5,976,862 pounds of lead, and 37,196 pounds of zinc" (Mitchell, 1999, p.20).

The U. S. Geological Survey (USGS) conducted the only previous known work near the Ramshorn between 1965 and 1988. Unconsolidated sediments survey data was compiled by the USGS for the Rock Analysis Storage System (RASS) database, at several locations within the Bayhorse Mining District. These data represent geochemical analyses of sediment samples.

One RASS sample was collected along Bayhorse Creek below the lower adit and downstream from the tailings pile. Metals analysis indicated 10 ppm silver, 200 ppm arsenic, 20 ppm cadmium, 300 ppm chromium, 100 ppm copper, 300 ppm lead, and 200 ppm zinc. Other RASS samples collected near the Bayhorse townsite indicated significant increases in metal concentrations, perhaps due to subsequent enrichment.

## 2.4 DEQ ACTIONS

DEQ conducted a site visit on July 7-8, 2003. Initially, on July 7<sup>th</sup>, DEQ assessed the lower workings of the Ramshorn that included a large volume tailings pile, a tailings pond, two adits, the crumbled remains of a small portal shed, a tramway ore loading station and a tramway terminus ore shed. Accessed by an unimproved (4x4) road, the 2<sup>nd</sup> level or middle Ramshorn adit was explored first.



**Photo 6**

View to north, middle adit (collapsed), black drain hose at lower left.



**Photo 7**

View to west, drain hose at right center, ore loading shed in left background.

DEQ identified a collapsed adit, posted with a warning sign. Emanating from the base of the adit was a two-inch rubber hose that apparently was used to drain water from the workings. Approximately 400 feet downhill from this adit, a second collapsed adit was identified. This is referred to as the lower Ramshorn adit. The remains of a portal shed including foundations, scattered boards and narrow-gauge rails were discovered adjacent to the lower adit. A waste rock dump, measuring approximately 100 cubic yards was

positioned beneath the ruins. Multiple tiers of tailings were piled at the base of the slope, aligned vertically with the adits and lying beneath the Ramshorn's tramway. Enclosed within the upper tailings pile is a tailings pond, measuring approximately 5,200 square feet. The tailings, extending to the margins of Bayhorse Creek, are bisected in places by the Bayhorse Creek Road, maintained by the U.S. Forest Service (USFS). DEQ estimated the tailings to comprise approximately 2.5 million cubic yards of material. The remains of the tramway terminus shed, from which ore was loaded upon wagons for transport to the smelter, was identified on the west side of Bayhorse Creek.

On July 8<sup>th</sup>, the DEQ located a gated upper access road that lies near the junction of the Bayhorse Campground and Little Bayhorse Lake roads. Traversing this road, DEQ encountered mining activity near the uppermost workings of the Ramshorn. Kirk Hansen, employed by the Ramshorn's owner (Umont Mining Company) as caretaker for the old Bayhorse town site, was onsite conducting mining activities at the upper Ramshorn adit level. Mr. Hansen is leasing the Ramshorn to extract slate material for use as dimension and/or ornamental stone. Mr. Hansen's company, The Rock Works, employs a tracked excavator to dislodge slabs of Ramshorn Slate which are then stacked on wooden pallets and transported off site. At the time of DEQ's visit, Mr. Hansen and two coworkers were actively extracting slate from an outcrop located adjacent to the western margin of the uppermost adit. The Rock Works constructed a small office and facilities for their operations and apparently were not using any of the historical structures during current operations. Based upon the site's elevation and climate, it is likely that Mr. Hansen's operations are limited to June through October timeframes.



**Photo 8**

View downslope from Skylark Mine (close-up). Tram cable supports, loading shed and terminus shed (across road) at left center; upper adit sorting shed at left of The Rock Works' operation; extensive tailings pile adjacent to road.



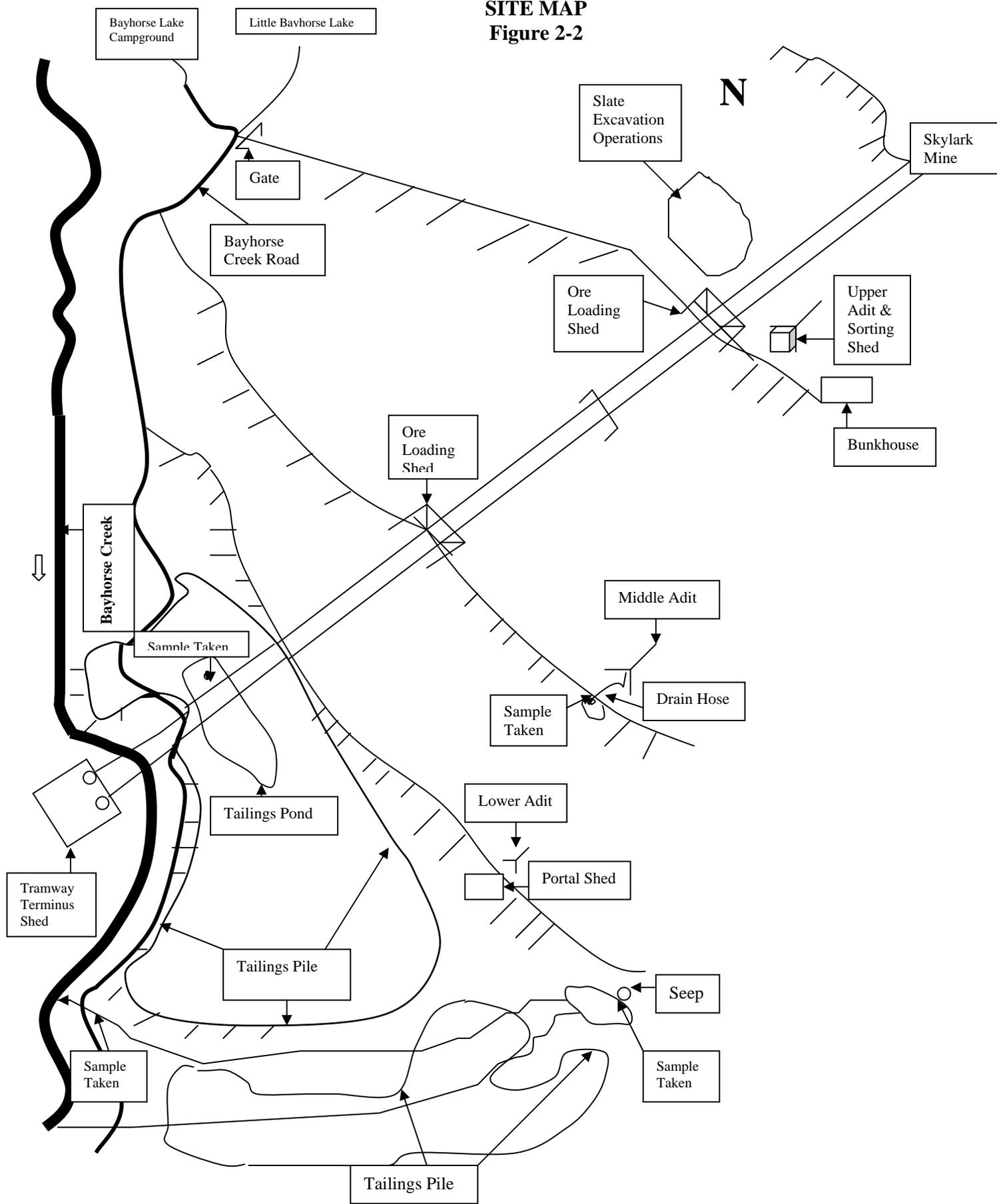
**Photo 9**

Ramshorn bunkhouse, upper adit level, Rock Works' slate stacked on pallets

The upper Ramshorn workings includes one collapsed adit whose portal is faced by an ore sorting shed, a boardinghouse and the upper tram loading station. Although the Ramshorn's loading operations ceased at this level, the tramway continued uphill to the Skylark Mine, which apparently leased access to the tramway for its ore shipment, as well. Four additional adits were driven above these workings, though their exact location could not be determined due to the lack of surface expression. Topographic maps (Topozone, 2003) locate the uppermost adit at an elevation of 8,950 feet amsl.

Overall, the site is easily accessed from the adjacent Bayhorse Creek Road. Motorcycle and ATV tracks were noted amid the tailings pile and along the access road to the middle adit level. Though a locked gate blocked the access road to the upper workings where Mr. Hansen was conducting slate mining operations, the steep terrain and abundant talus slopes pose the greatest barrier to casual access.

**SITE MAP**  
**Figure 2-2**



### 3. MIGRATION/EXPOSURE PATHWAYS AND TARGETS

The following sections describe migration/exposure pathways and potential targets within the site's range of influence (Figures 3-1 and 3-2). Receptors in the area have been identified as seasonal recreationists including occasional tourists, hikers, campers, hunters and snowmobilers. Three (3) employees of The Rock Works are mining slate within 200 feet of the upper Ramshorn adit. Mr. Hansen is also identified as the caretaker for the town site of Bayhorse, but he resides in Clayton.

#### 3.1 GROUND WATER MIGRATION PATHWAY

The Ramshorn lies within slates that form the western limb of the Bayhorse anticline and are confined by upper quartzite and lower dolomite formations. The country rock is fine grained, the slaty cleavage is well developed and the ore bodies follow fissures which parallel the slaty cleavage, nearly obliterating the bedding planes (Umpleby, 1913). The Ramshorn has extensive underground workings (approximately 6.5 miles) on several levels, though most are completely caved. The Ramshorn veins occupy faults that trend northerly and deep steeply to the east at the lower levels (Chambers, 1966). Though most of the ore shoots parallel the faults, mineralized stringers were identified crosscutting cleavage (Umpleby, 1913).

Due to contact metamorphism with a core of granite beneath the anticline (Bell, 1903) and structure within the Ramshorn slate formation, primary porosity is expected to be very low with groundwater flow controlled by fractures, joints, faults and slaty cleavage surfaces related to folding. In the absence of groundwater monitoring wells in the area, ground water is assumed to exist within fractures and joints in the bedrock and within the unconsolidated deposits. In the arid and the semiarid parts of the Basin and Range, which includes the Ramshorn, most precipitation replenishes soil moisture, evaporates, or is transpired by vegetation. Little is left to maintain streamflow or to recharge aquifers (Whitehead, 1994).

No precipitation data is available for the Ramshorn. Therefore, precipitation data, maintained from 1931 through 1996, was used from Challis located seven miles northeast and at an elevation of 5,288 feet amsl. The mean annual precipitation is 7.40 inches, and the 100-year, 24-hour event is 1.85 inches (WRCC, 2003).

There is one drinking water well located within the 4-mile Target Distance Limit (TDL). The USFS installed a very shallow well (e.g., 11 feet bgs) at Bayhorse Campground, approximately 1.5 miles from the mine (IDWR, 2003). However, according to USFS personnel, this well was not operational at the time of DEQ's site visit (verbal communication, July 7, 2003).

#### 3.2 AIR MIGRATION PATHWAY

The USFS Bayhorse Campground lies approximately 1.5 miles west from Ramshorn and includes seven campsites. At the time of DEQ's site visit, approximately 20 vacationers were staying at the campground.

Additionally, DEQ observed three (3) employees of The Rock Works operating a slate excavation enterprise near the upper Ramshorn adit. The Rock Works mines the slate during a 40 hour per week schedule and expects to operate from June through September.

The site is situated within a steep-walled canyon, comprised of unconsolidated rock detritus and slate talus covers most of the slope. Vegetation is sparse, mainly conifer trees dot intermittent stream channels. Medium to fine-grained tailings deposits and salt-like precipitate deposits in the tailings pond lie at the base of the slope below the adits. The tailings extend to Bayhorse Creek and are bisected in places by the Bayhorse Creek Road. At these bisections, tailings particulates are aerially dispersed via vehicular traffic. Overall, the tailings pile appears well compacted and the likelihood of aerial dispersal from the majority of the tailings piles appears remote.

### 3.3 SOIL EXPOSURE PATHWAY

The Ramshorn property is not fenced and is easily accessible from the adjacent Bayhorse Road, but the steep canyon terrain and ample slaty talus could discourage casual access. Three unimproved (4x4) access roads lead to the lower, middle and upper adit levels. Only the upper adit level is protected by a locked gate. Direct evidence of motorcycle and ATV tracks among the workings indicate the relative ease of access.

There are three (3) workers employed within 200 feet from the upper workings of the site. There are not any residences nor are any schools or day-care facilities located within 200 feet from the site.

The DEQ collected a soil sample from the tailings pond area. Sample analysis of the stained soil revealed the presence of arsenic, lead and silver (Appendix B).

### 3.4 SURFACE WATER MIGRATION PATHWAY

Soil survey data was compiled by the USGS for the site is unavailable, but direct observation indicates medium to fine-grained silty-sand exists in shallow horizons across the slopes. Based upon direct observation of discharge from the middle Ramshorn adit, a moderate to high infiltration rate is expected.

The DEQ collected a water sample directly from the drain-hose emanating from the middle adit. Sample analysis did not reveal any constituents of concern (Appendix B).



**Photo 10**  
Close-up of drainpipe flow from middle adit.



**Photo 11**  
Drainage onto ground, infiltration of slope is complete within six feet of release.

A seep was discovered approximately 300 feet east and 100 feet downslope from the Post Boy tunnel. This seep appeared to drain many of the Ramshorn workings, as the flow was estimated to exceed 300 gallons per minute. The rocks and soil below the seep were covered with a yellowish stain and algae appeared abundant.



**Photo 12**  
Water flowing from Seep, abundant vegetation.



**Photo 13**  
Close-up (photo 12) of yellow staining

The main seepage route bisects a waste rock and tailings pile. Smaller volume flows were noted incising the lateral portions of the pile. The water flows approximately 150 feet through culverts to Bayhorse Creek.



**Photo 14**

Primary route of flow from Seep (center)



**Photo 15**

Seepage through rock and tailings piles

The DEQ collected water samples directly from the mouth of the seep, in the seep discharge immediately above the culvert leading to Bayhorse Creek, in Bayhorse Creek downstream from the culvert's discharge, and upstream of the Ramshorn's tailings piles, to establish background. The analyses identified an elevation of arsenic levels from the mouth of the seep to the discharge point above the culvert (Appendix B). The increase in arsenic could be attributed to the passage of the drainage through waste rock piles.

Bayhorse Creek is a V-shaped, steep gradient stream littered with boulders in its upper reaches, while its lower reaches traverse grazing and agricultural fields and feature beaver dammed ponds.

Commercial and subsistence fishing are not conducted within the surface water Target Distance Limit (TDL). Sport fishing may occur on Bayhorse Creek, as rainbow trout were observed in the stream. However, direct observation did not illuminate the presence of fishing activity. Direct observation revealed sports fishing activity down stream on the Salmon River. Fish catch data, however, could not be determined.

Known to populate the Salmon River, the bull trout (*Salvelinus confluentus*) are listed as a threatened species, while sockeye (*Oncorhynchus (=Salmo) nerka*) and Chinook salmon (*Oncorhynchus (=Salmo) tshawytscha*) are listed as both threatened and endangered species (NWS, 2003).

The gray Wolf (*canis lupus*) is listed as a threatened species and known to populate 100 percent of the area within a 4-mile radius of the mine. The North American Wolverine (*Gulo gulo luscus*) is listed as a watch specie and known to populate the area 0.6 miles west from the Ramshorn (ibid.).

Bayhorse Creek and the Salmon River are located within the site's TDL. Approximately, 4.5 miles down stream from the Ramshorn Mine beaver ponds were constructed within the Bayhorse channel. Though direct observation failed to identify a beaver population, the ponds appeared fresh and encompassed approximately 2.5 acres.

The use of surface water for watering of livestock and irrigation is evident below the old town site of Bayhorse. Elk, deer and golden eagles were noted by direct observation.

There are no drinking water intakes within the TDL. Traversing southeast, the surface water pathway is enjoined by Juliette Creek at 1.0 miles, by Beardsley Gulch 2.76 miles, and several unnamed creeks before Bayhorse Creek merges with the Salmon River at 6.1 miles. Traversing north-northeast, the Salmon River continues within the TDL where it is enjoined by Wood Creek at 8.1 miles and by Birch Creek at 12 miles from the site.

The lower 3.25 miles of the Salmon River within the TDL has been designated by DEQ under the Total Maximum Daily Load (TMDL) program as a 303(d) listed stream. The TMDL pollutants of concern are sediment and temperature.

One Probable Point of Entry (PPE) is the erosion of the tailings piles during higher flow of Bayhorse Creek. Maintenance of the Bayhorse Creek Road where it bisects the tailings pile could directly impact the riparian margin along the creek. Likewise, vehicular traffic causes aerial dispersal of tailings particulate to the creek.

A second PPE is the water emanating from the base of the slope beneath workings of the Ramshorn. The high volume of seepage suggests that many of the underground workings of the Ramshorn connect and drain to this point. Flow from the seep bisects waste rock dumps prior to discharge into Bayhorse Creek.

Figure 3-1

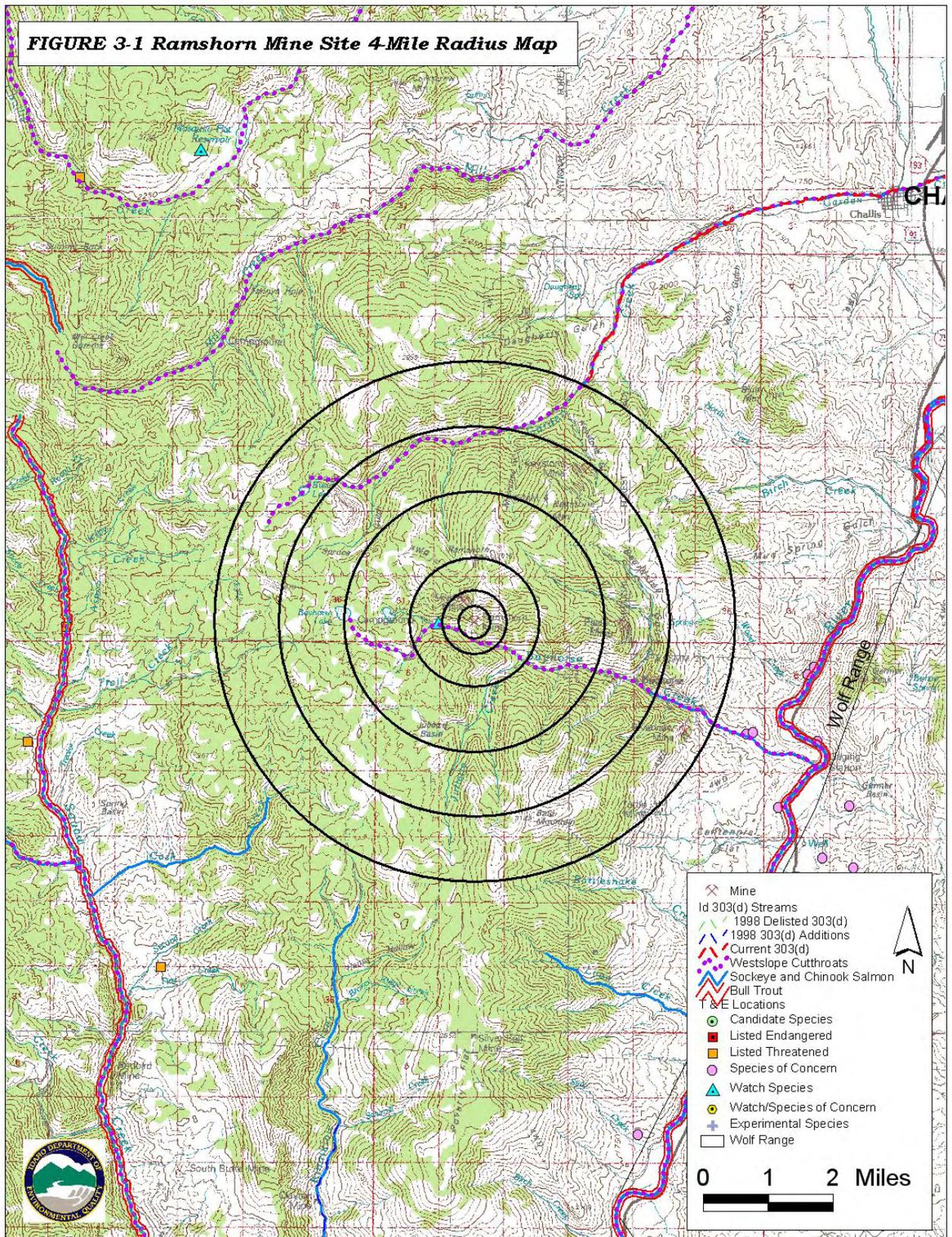
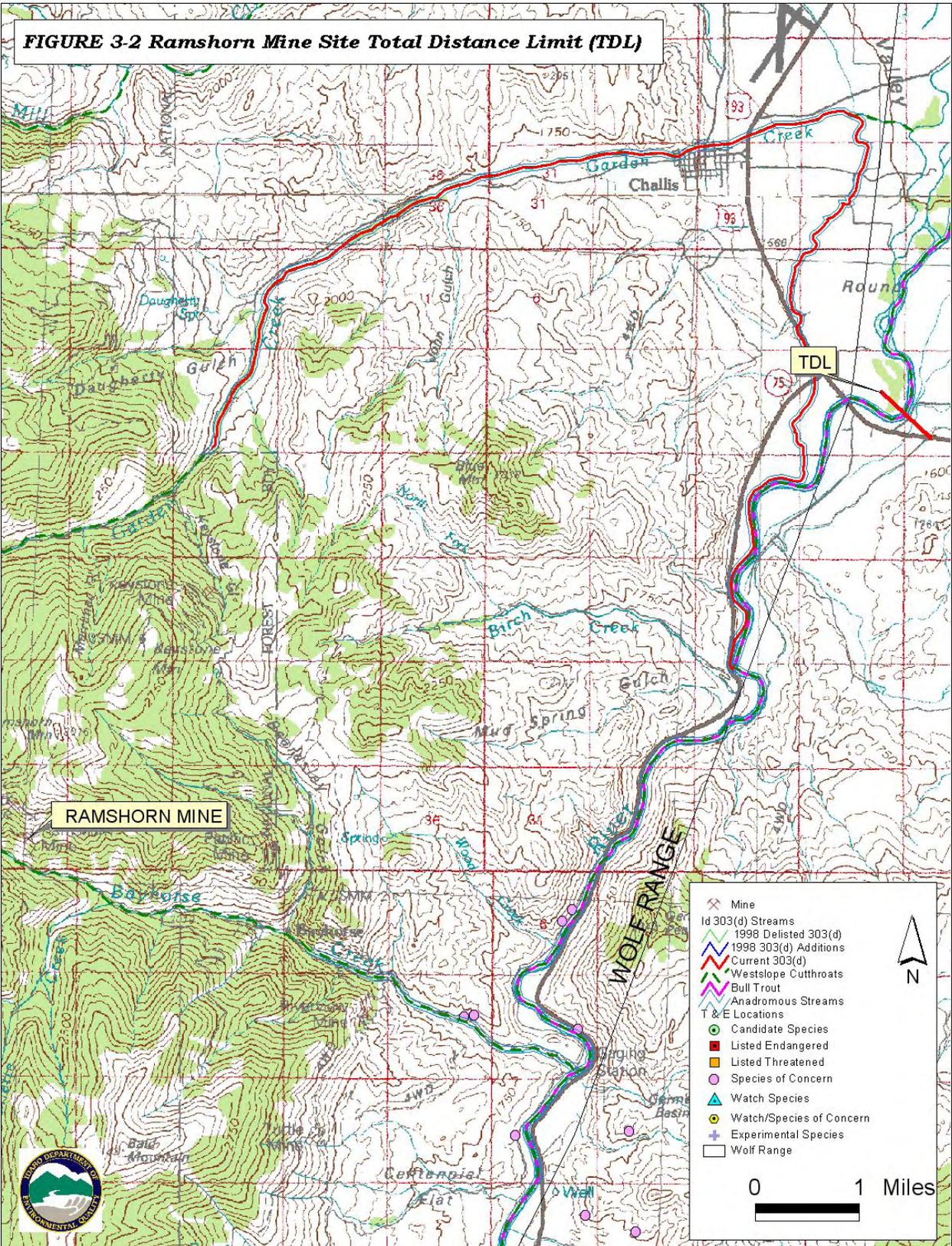


FIGURE 3-2



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## APPENDIX A

### PHOTO LOG

#### RAMSHORN MINE

- Photo 1 View to north, tramway loading shed (top center), bunkhouse (top right) and Skylark Mine buildings (top left).
- Photo 2 Possible remains of portal shed at Post Boy tunnel (lower adit).
- Photo 3 View to southeast, from upper adit to tramway terminus shed on Bayhorse Creek (note: steep slope).
- Photo 4 View to north-northwest, tramway frame supports still carry cables.
- Photo 5 View to south, from tramway loading shed at Post Boy tunnel level, across tailings pile and pond (center).
- Photo 6 View to north, middle adit (collapsed), black drain hose at lower left.
- Photo 7 View to west, drain hose at right center, ore loading shed in left background.
- Photo 8 View downslope from Skylark Mine, close-up of The Rock Works' excavation operation at Ramshorn.
- Photo 9 View to east, Ramshorn bunkhouse, upper adit level, Rock Works' slate stacked on pallets.
- Photo 10 Close-up drain hose flow from middle adit.
- Photo 11 Drainage onto ground (photo 10), infiltration of slope is complete within six feet of release from drain hose.
- Photo 12 Water flowing from seep in slope beneath Ramshorn Mine.
- Photo 13 Close-up (photo 12) of yellowish stains on rocks and soil. Abundant algae noted.
- Photo 14 Primary route of flow from seep (thick vegetation follows course), bisects waste rock and tailings piles.
- Photo 15 Seepage through waste rock and tailings piles.

**APPENDIX B**  
ANALYTICAL DATA