1.11.8.23
New "Keystone Mine"

KEYSTONE MINE
PRELIMINARY ASSESSMENT REPORT
CUSTER COUNTY, IDAHO

STATE OF IDAHO

IDEPARTMENT OF ENVIRONMENTAL QUALITY

December 2003

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

1.11.8.23

UNITED S..TES ENVIRONMENTAL PROTECTION A..NCY
REGION 10
1200 Sixth Avenue
Seattle, WA 98101

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D.E.Q. STATE WASTE
MANAGEMENT & REMEDIATION DIVISION

May 25, 2004

Reply To
Attn Of: ECL-115

Arthur Chambers Trust
c/o First Interstate Bank
P.O. Box 810490
Dallas, TX 75381

To whom it may concern:

The Idaho Department of Environmental Quality (DEQ) has completed a report summarizing the findings of a visit conducted at the Keystone 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,

Ken 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

Acronym	Definition
amsl	above mean sea level
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
TDL	Target Distance Limit
TMDL	Total Maximum Daily Load

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 Keystone 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 Keystone Mine 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.

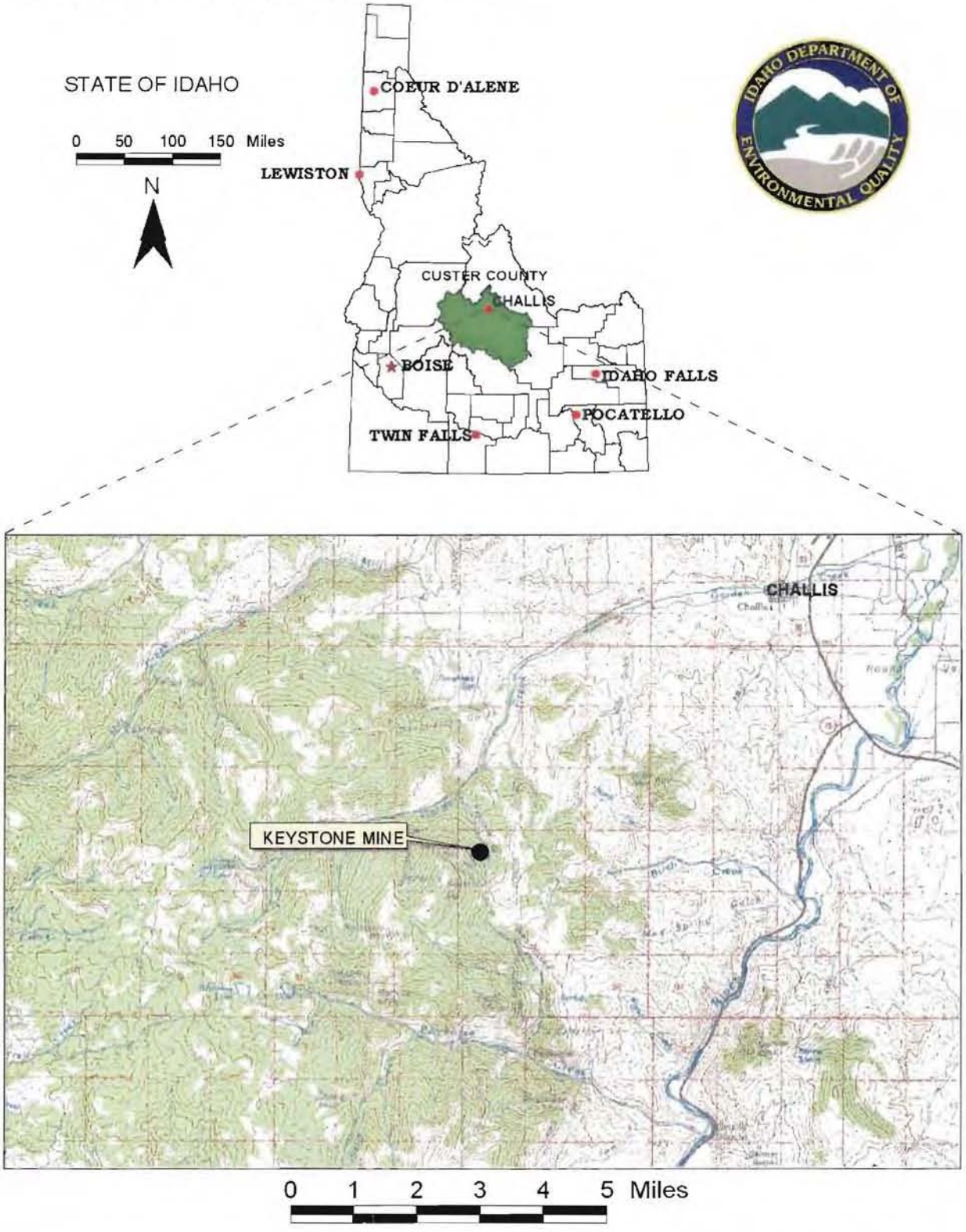
Conducting the PA included reviewing existing site information, collecting receptor information within the site's range of influence, determining regional characteristics, and conducting a site visit. This document includes a discussion of site background information (Section 2), a discussion of migration/exposure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

2. SITE BACKGROUND

2.1 SITE LOCATION

Site Name:	Keystone Mine
CERCLIS ID No.:	
Location:	Custer County, Idaho
Latitude:	44° 26' 42"N
Longitude:	114° 19' 56"W
Legal Description:	Section 22, Township 13N, Range 18E, Boise Meridian
Congressional District:	Idaho
Site Owner:	Arthur Chambers Trust c/o First Interstate Bank P.O. Box 810490 Dallas, TX 75381

FIGURE 1 Site Vicinity Map of Keystone Mine



2.2 SITE DESCRIPTION/OWNERSHIP HISTORY

The Keystone Mine is located within the Bayhorse Mining District in Custer County, Idaho, approximately 6.5 miles southwest of Challis, Idaho, and 3 miles north-northwest of the former townsite of Bayhorse, Idaho (Figure 2-1). Keystone Mountain was originally discovered and claimed in 1877, but the claims were subsequently relocated between 1885 and 1895, and four of these claims were patented in 1899 by the Clayton Mining & Smelting Company (Chambers, 1966). In 1947, 1948 and 1963, 23 unpatented claims, located adjacent to the patented ground, were registered by Arthur Chambers. In 1947, Mr. Chambers optioned the Greyhound Lode, Crater Lode, Silver Copper Number 2 Lode and Silver Copper Number 3 Lode patents from the Joseph Rodgers Estate.

On February 23, 1950, Mr. Chambers acquired the four patented claims from the Joseph Rodgers Estate. According to the Custer County Clerk Office, on April 1, 1981 the Arthur E. Chambers Trust became the owner of record which is currently being managed by First Interstate Bank of Dallas, Texas.



Photo 1
1st Level Adit, tunnel collapsed beyond portal (center)

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 Keystone was developed entirely within the Bayhorse Dolomite and included approximately 900 feet of underground workings (Chambers, 1966). The ore deposits in the Bayhorse district appear as elongated lenses or ovoid pipe-like bodies, occurring as veinlets, disseminations, breccia fillings, and massive or discontinuous replacements (Worl, et all, 1989). Chambers

suggests "All sulfide and fluorspar ore bodies known on Keystone Mountain are in the upper part of the red sandy member of the Bayhorse Dolomite near the contact with Ramshorn Slate" (1966, p.104).

The mineral deposits of the Keystone consist chiefly of silver, lead and copper with lesser fluorite values. The principal ore minerals are tetrahedrite and galena. Quartz and tetrahedrite occurs as narrow veins, in breccia, and within boxwork zones, while galena appears in open spaces (ibid.). Quartz is the chief gangue mineral with fluorite subordinate.

Historical production records are lacking since Clayton Mining & Smelting Company records are no longer available. "Two small shipments totaling 20 tons were made to the Bayhorse smelter in 1882 and 1883 and these assayed 180 ounces of silver to the ton. Six tons were shipped in 1887 averaged 100.34 ounces of silver to the ton. A later leasor, Arthur Fox, shipped 4 to 5 tons in the nineteen twenties that averaged 120 ounces of silver to the ton, 30 percent copper, and 48 percent lead" (Chambers, 1966, pp.108-09).

2.4 DEQ ACTIONS

DEQ conducted a site visit on July 9, 2003. The owner of the property, Arthur E. Chambers Trust, was not present during the site visit. The site was not fenced and easily accessible from Forest Road 262, which branches off from Forest Road 052, the old Challis Wagon Road. The Keystone is not accessible from the old townsite of Bayhorse to the south, due to private property ownership by Umont Mining Company. However, the Garden Creek Road to the north enjoins the Custer Motorway to Challis. Site features include two adits (collapsed) and associated waste rock dumps, an airshaft and numerous bulldozed cuts and excavations above the uppermost adit.

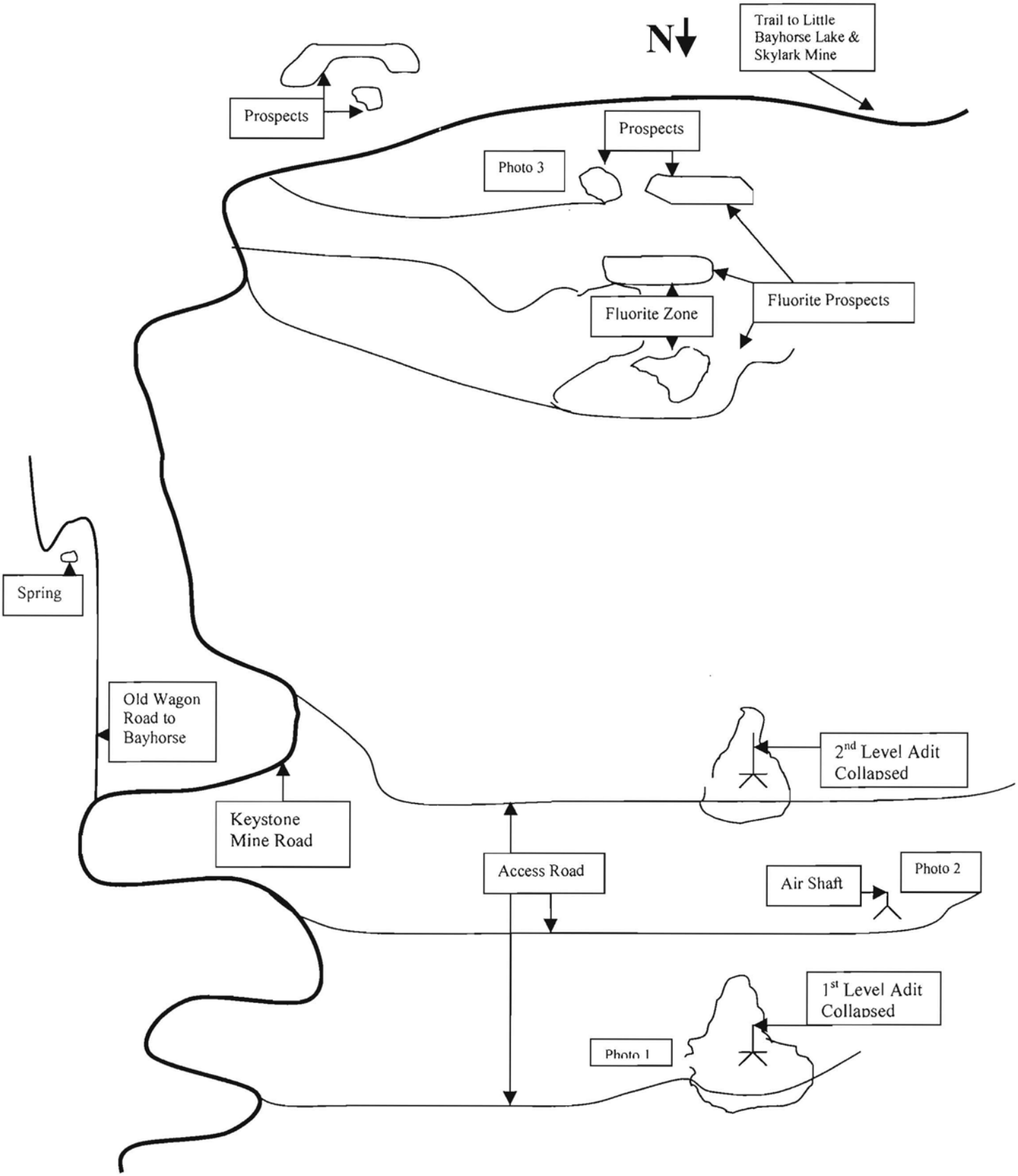


Photo 2
Airshaft opening between 1st & 2nd level adits



Photo 3
Fluorite prospect: bulldozer "cut", top of site

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, snowmobilers, motorcyclists and residents of summer homes. There are estimated to be ten (10) permanent residents; four at a residence at the junction of the Custer Motorway and Garden Creek Road and six reside at the Living Springs Ranch on the Custer Motorway. The Living Springs Ranch operates a Christian camp during the summer months and may house up to an additional 200 people (USBC, 2000).

3.1 GROUND WATER MIGRATION PATHWAY

The Keystone ore body is located high on the north plunging, east end of the Bayhorse anticline and is confined by an upper slate formation and interbedded slate member (Chambers, 1966). The country rock is calcareous or dolomitic and contains various amounts of sand or silt. The impervious shale zones, now metamorphosed as slates, "trapped ascending ore-forming solutions in the underlying carbonate strata" (Worl, et al, 1989, p.62). Post-mineral silicification cemented the brecciated ore zones, thus limiting subsequent solution movement.

"The structural history of Keystone Mountain closely parallels the history of the area near Bayhorse. The main anticlinal arch is overturned to the east at higher stratigraphic horizons, but is more symmetrical toward the center of the anticline" (Chambers, 1966, p.107). Shear zones, joint sets, steep faults and brecciated zones controlled these ore-forming solutions and "thrust faults followed the mineralized faults" (ibid.).

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 Keystone, most precipitation replenishes soil moisture, evaporates, or is transpired by vegetation. Little is left to maintain streamflow or to recharge aquifers (Whitehead, 1994). No soil survey data is available for the site, but the highly silicified host rocks suggests that low to moderate infiltration rates would be expected.

No precipitation data is available for the Keystone. Therefore, precipitation data, maintained from 1931 through 1996, was used from Challis located 6.5 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 are two (2) drinking water wells located within a 4-mile radius. Two wells were installed at the Living Waters Ranch, located 3.5 miles northwest from Keystone (IDWR, 2003). These wells were drilled in volcanic rock and encountered suitable flows at 38 feet below ground surface (bgs).

3.2 AIR MIGRATION PATHWAY

One residence located approximately three miles north and a second located approximately four miles north-northeast from the Keystone Mine, are the nearest permanent residences. The Bayhorse campground, which lies approximately 3.5 miles west from Keystone, includes seven campsites.

The site is comprised of numerous road cuts into the Bayhorse Dolomite. The waste rock dumps are consolidated and weathering appears to have had little impact. The dolomite is exposed as outcrops and ledges on the slopes of Keystone Mountain. The site did not appear to contain any millworks or tailings ponds. Consequently, the likelihood of aerial dispersal from the former waste rock dumps appears remote.

3.3 SOIL EXPOSURE PATHWAY

The Keystone is easily accessible from the adjacent Forest Road 262, but the steep and rocky road (4WD advised) could discourage access. During DEQ's preliminary assessment of the Skylark Mine conducted on August 12, 2003, three motorcyclists were encountered who indicated that they had traversed the Keystone Mountain trail to Skylark. They mentioned visiting the Keystone Mine site during their travels.

There are no workers or residences within 200 feet from the site. No schools or day-care facilities are located within 200 feet from the site.

Soil survey data for the site is unavailable, but lithologically, the terrain is highly silicified and indurated. Based upon direct observation, the likelihood of soil exposure from waste rock dumps appears remote.

3.4 SURFACE WATER MIRGRATION PATHWAY

The Keystone Mine lies on the northeastern slope of Keystone Mountain. No surface water bodies were identified at the site, though gullies appear to channel snowmelt eastward to Keystone Gulch. A perennial spring, located approximately 0.50 miles south-southeast and upgradient from the mine, appeared to be tapped for local consumption. Water pipes emanating from the spring were partially traced toward summer cabins in Keystone Gulch. It is unknown whether these cabins utilize the spring for potable water.

The city of Challis, Idaho utilizes Garden Creek to supplement its drinking water needs. Figure 3-3 delineates the site of Challis' drinking water intake within the TDL. Traversing 0.25 miles northeast from the Keystone Mine, the surface water pathway (Keystone Gulch) is encountered. Keystone Gulch merges with Garden Creek at 1.0 miles, Daugherty Gulch enjoins Garden Creek at 3.5 miles, and Garden Creek merges with Hannah Slough at 10.5 miles. Hannah Slough traverses north until it merges with the Salmon River at 11.75 miles. Several unnamed streams enjoin the Salmon River, as it continues north to reach the downstream distance at 15.0 miles from the site.

"The Garden Creek sub-watershed is approximately 50,000 acres in surface area and is located directly above the city of Challis, Idaho. This sub-watershed is often considered with Challis Creek because of their similarities of geology, soils, and hydrology (USDA

FS, 1999b). Garden Creek, however, is relatively small and has no perennial tributaries. Stream gradients can vary from 5% to greater than 10%. Garden Creek flows directly through the city of Challis, and supplements the municipal water supply for the city during some summer months. The stream channel below the USDA FS boundary has been extensively altered and channeled, particularly within the City of Challis.

The land area on both sides of Garden Creek below the National Forest boundary is entirely private. Much of this land is used for irrigated agriculture and residential development. There are approximately 46 water rights claims for Garden Creek water including the city's drinking water supplementation. Collection of drinking water is achieved through an infiltration basin or gallery buried below a sand filtration layer below the stream channel. The water is made safe for drinking by further filtration away from the stream channel. Challis drinking water is known to be of high quality and there have been no water quality issues identified in periodic testing to maintain certification by DEQ" (DEQ^2, 2003, pp.20-21).

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 (FWS, 2003). Commercial and subsistence fishing are not conducted within the surface water Target Distance Limit (TDL). Sport fishing occurs downstream on the Salmon River. Fish catch data, however, could not be determined.

Elk and deer were noted by direct observation in Keystone Gulch. The gray Wolf (*canis lupus*) is listed as a threatened species and known to populate 100% of the area within a 4-mile radius of the mine.

Owing to the siliceous composition of the "ore" encountered at the Keystone Mine, the likelihood of surface water exposure appears remote. "There is no data available that indicates that the Keystone mine has had an impact on water quality in Garden Creek" (DEQ^2, 2003, p. 21).

4.0 SUMMARY AND CONCLUSIONS

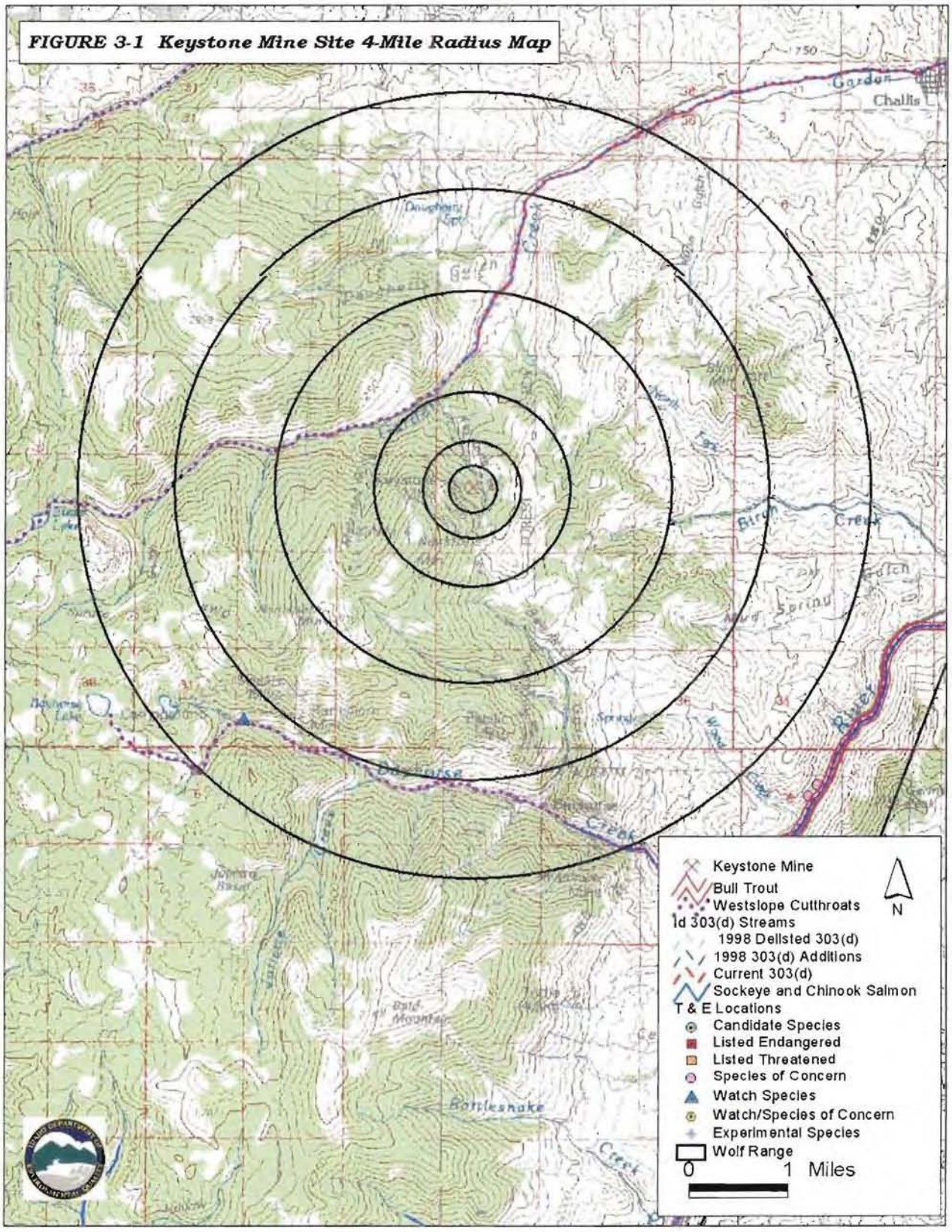
Keystone Mine consists of shafts, adits and bulldozed exploration cuts and lies on the northeast flank of Keystone Mountain above Keystone Gulch. The mine was in production from 1882 through 1930 producing 4,700 ounces of Silver, 2,400 pounds of copper, and 3,800 pounds of lead. Elements associated with various minerals found at the Keystone Mine include fluorine, beryllium, silver, lead and copper (Chambers, 1966). Direct observation failed to identify the remains of milling operations. The mine is located at approximately 8,000 feet amsl, approximately 0.3 miles west of Keystone Gulch.

Ground Water Pathway: There are no drinking water wells within 0.0-1.0 miles of the Keystone. The nearest wells lie 3.5 miles northeast from the site. Considering the siliceous dolomitic composition of the host rock and complexity of local stratigraphy, ground water mobility from the Keystone to secondary targets appears remote.

Surface Water Pathway: "There is no data available that indicates that the Keystone mine has had an impact on water quality in Garden Creek. Garden Creek is in full support of beneficial uses above and below Keystone Gulch to just above the City of Challis, where the stream is periodically dewatered" (DEQ[2], p. 21).

Soil Exposure Pathway: Lithologically, the terrain is highly silicified and indurated. Based upon direct observation, the likelihood of soil exposure from waste rock dumps appears remote.

Air Migration Pathway: The highly silicified host rocks and fluorite ore material is not readily amenable to aerial dispersion. Consequently, the likelihood of release appears to be remote.


FIGURE 3-1 Keystone Mine Site 4-Mile Radius Map
Keystone Mine
Bull Trout
Westslope Cutthroats
ld 303(d) Streams
1998 Delisted 303(d)
1998 303(d) Additions
Current 303(d)
Sockeye and Chinook Salmon
T & E Locations
Candidate Species
Listed Endangered
Listed Threatened
Species of Concern
Watch Species
Watch/Species of Concern
Experimental Species
Wolf Range
0
1 Miles
N
Garden
Challis
Birch Creek
Bear Valley Creek
Rattlesnake
Creek

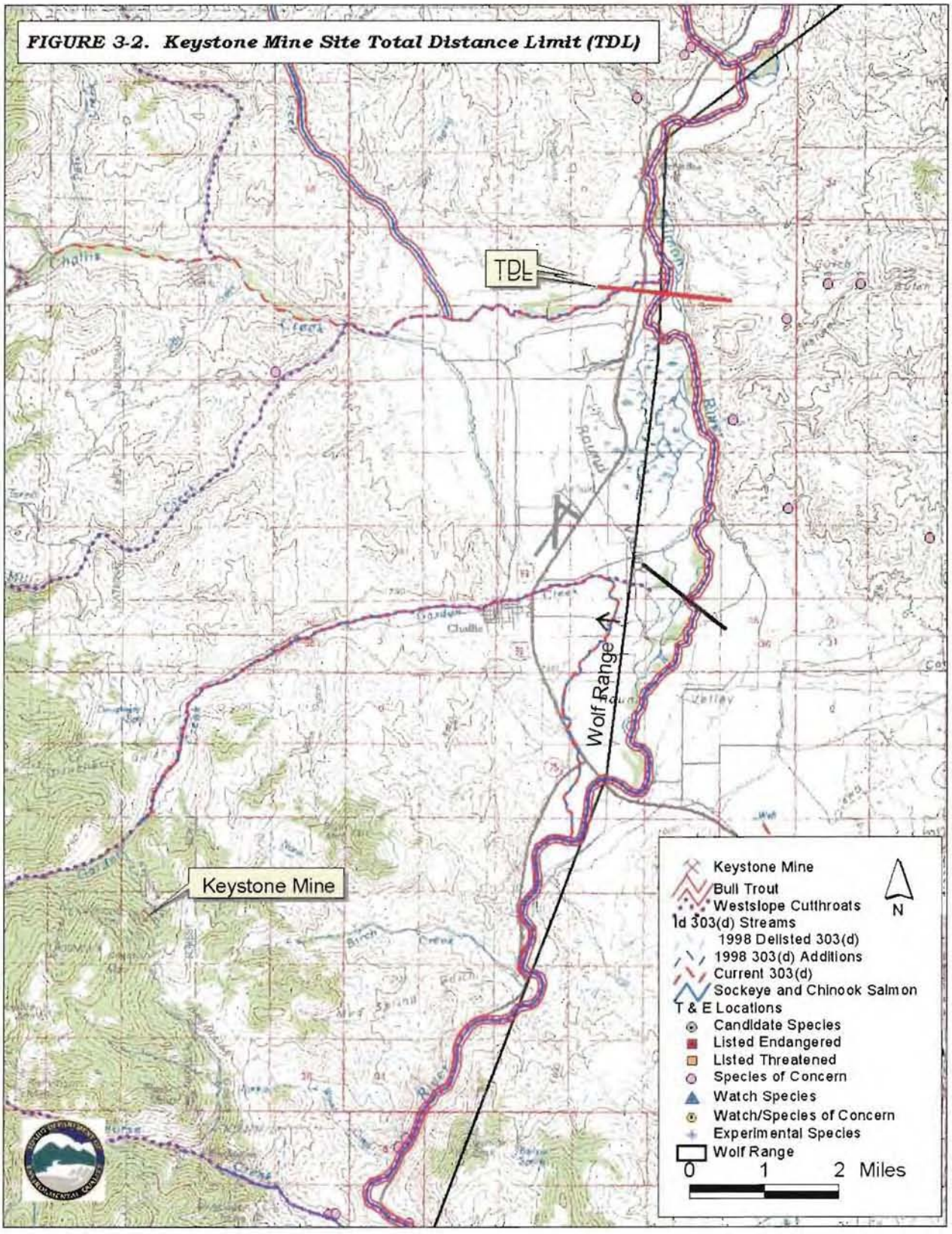
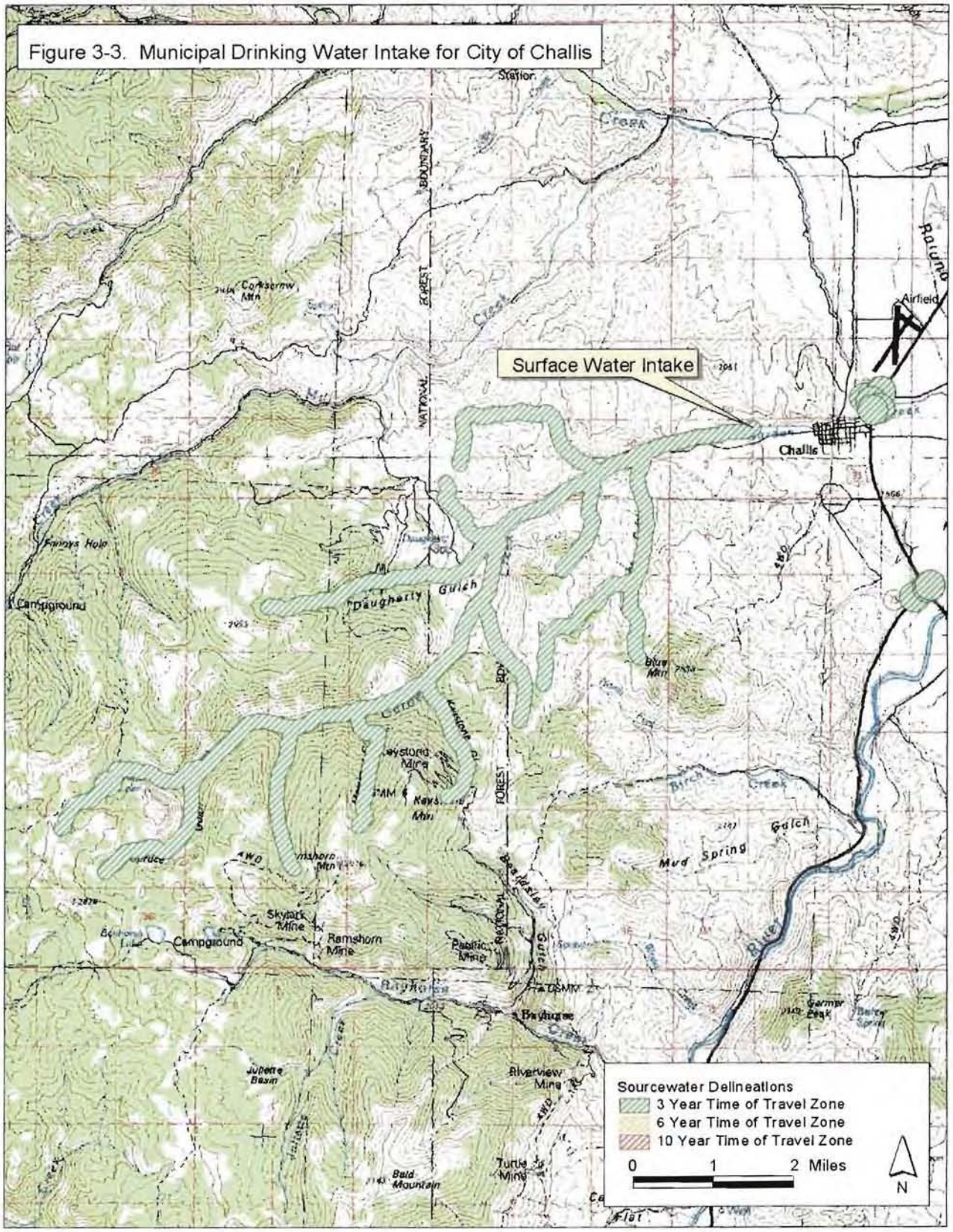


FIGURE 3-2. Keystone Mine Site Total Distance Limit (TDL)


Figure 3-3. Municipal Drinking Water Intake for City of Challis
Surface Water Intake
Challis
Airfield
Daugherty Gulch
Mud Spring Gulch
Skyark Mine
Campground
Ramshorn Mine
Pacific Mine
Riverview Mine
Turtle Mine
Bald Mountain
Sourcewater Delineations
3 Year Time of Travel Zone
6 Year Time of Travel Zone
10 Year Time of Travel Zone
0 1 2 Miles
N

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http://www.wrcc.dri.edu/htmlfiles/id/id.ppt.ext.html

APPENDIX A

PHOTO LOG

KEYSTONE MINE

Photo 1	View to south-southwest, partially collapsed portal; tunnel extends less than 20 feet before collapse is evident, portal timbers and waste dump in foreground.
Photo 2	View to southwest, airshaft opening, tunnel extends approximately 15 feet before shaft is reached. Depth of shaft unknown but good air circulation was encountered.
Photo 3	View to northwest, bulldozed prospect "cut", abundant fluorite float located within the cut.