GOOD LUCK LODE & MILL SITE, GOLD BOTTOM MINE, JAY GOULD MINE, AND MAYFLOWER MINE

A.k.a. May Queen, May, Saturn, Modoc Chief, Modick Chief, Good Luck, Hawk, Winona, Highland Chief, Evergreen, Jay Gould Ext., Jay Gould, McLelen, McLelan, Mayflower, Grand Central, War Eagle, and Emma Patented Mine Claims

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, 2008

Mary Centaurus
6 West Lake Place
Antioch, California 94509

RE: Site Assessment of the Good Luck Lode & Mill Site, Gold Bottom Mine, Jay Gould Mine, and Mayflower Mine (a.k.a. May Queen, May, Saturn, Modoc Chief, Modick Chief, Good Luck, Hawk, Winona, Highland Chief, Evergreen, Jay Gould Ext., Jay Gould, McLelen, McLelan, Mayflower, Grand Central, War Eagle, and Emma Patented Mine Claims)

Dear Ms. Centaurus:

In 2006 the Idaho Department of Environmental Quality (DEQ) and the U.S. Environmental Protection Agency (EPA) completed a watershed assessment in the Croy Creek area. Subsequent to that work, DEQ has begun to evaluate and summarize information regarding specific mines and patented claims (sites) in the watershed. Attached is a Preliminary Assessment (PA) report that has been completed for the above referenced mines and patented claims.

In that PA, DEQ is recommending to EPA that the status of these sites is designated as No Remedial Action Planned (NRAP). DEQ is making this recommendation based on existing uses and conditions, historic information, and data analysis. In summation, DEQ has determined that currently there are no significant human health and ecological risks from water and wastes at these sites.

However, DEQ recommends that if these sites are targeted for residential development, further investigations and risk analysis should be conducted. Additional risk analysis based on this desired use will likely indicate that significant risk management with have to be incorporated in development and use plans.

In addition, there are numerous mine openings and physical hazards that may pose a risk to recreationists and future residents, if any. These mine openings should be properly managed to or restricted to prevent injuries.

I look forward to addressing any questions you may have regarding our reports. 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\Good Luck Gold Bottom Jay Gould and Mayflower mines.

attachment

cc: Ken Marcie, Environmental Protection Agency
file

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C.L. "Butch" Otter, Governor
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December 30, 2008

J.B. Haggin
c/o Madera Nevada Corp.
1850 MT Diablo BLVD Ste 108
Walnut Creek, California 94956

RE: Site Assessment of the Good Luck Lode & Mill Site, Gold Bottom Mine, Jay Gould Mine, and Mayflower Mine (a.k.a. May Queen, May, Saturn, Modoc Chief, Modick Chief, Good Luck, Hawk, Winona, Highland Chief, Evergreen, Jay Gould Ext., Jay Gould, McLelen, McLelan, Mayflower, Grand Central, War Eagle, and Emma Patented Mine Claims)

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

December 30, 2008

Mr. John A. Davies
214 N 2nd Avenue
Hailey, Idaho 83333

RE: Site Assessment of the Good Luck Lode & Mill Site, Gold Bottom Mine, Jay Gould Mine, and Mayflower Mine (a.k.a. May Queen, May, Saturn, Modoc Chief, Modick Chief, Good Luck, Hawk, Winona, Highland Chief, Evergreen, Jay Gould Ext., Jay Gould, McLelen, McLelan, Mayflower, Grand Central, War Eagle, and Emma Patented Mine Claims)

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

December 30, 2008

Mary Anne Schad
P.O. Box 1436
Eureka, Montana 59917

RE: Site Assessment of the Good Luck Lode & Mill Site, Gold Bottom Mine, Jay Gould Mine, and Mayflower Mine (a.k.a. May Queen, May, Saturn, Modoc Chief, Modick Chief, Good Luck, Hawk, Winona, Highland Chief, Evergreen, Jay Gould Ext., Jay Gould, McLelen, McLelan, Mayflower, Grand Central, War Eagle, and Emma Patented Mine Claims)

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

December 30, 2008

Mr. Dan Henry
308 N 2nd Avenue
Hailey, Idaho 83333

RE: Site Assessment of the Good Luck Lode & Mill Site, Gold Bottom Mine, Jay Gould Mine, and Mayflower Mine (a.k.a. May Queen, May, Saturn, Modoc Chief, Modick Chief, Good Luck, Hawk, Winona, Highland Chief, Evergreen, Jay Gould Ext., Jay Gould, McLelen, McLelan, Mayflower, Grand Central, War Eagle, and Emma Patented Mine Claims)

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file

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

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

December 30, 2008

Mike Browne
USDOI – Bureau of Land Management
1387 S. Vinnell Way
Boise, Idaho 83352

RE: Site Assessment of the Good Luck Lode & Mill Site, Gold Bottom Mine, Jay Gould Mine, and Mayflower Mine (a.k.a. May Queen, May, Saturn, Modoc Chief, Modick Chief, Good Luck, Hawk, Winona, Highland Chief, Evergreen, Jay Gould Ext., Jay Gould, McLelen, McLelan, Mayflower, Grand Central, War Eagle, and Emma Patented Mine Claims)

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

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

December 30, 2008

Apaches Mines Co.
c/o Clysta Buerge
8501 Spring Hill Drive NW
Albany, Oregon 97321

RE: Site Assessment of the Good Luck Lode & Mill Site, Gold Bottom Mine, Jay Gould Mine, and Mayflower Mine (a.k.a. May Queen, May, Saturn, Modoc Chief, Modick Chief, Good Luck, Hawk, Winona, Highland Chief, Evergreen, Jay Gould Ext., Jay Gould, McLelen, McLelan, Mayflower, Grand Central, War Eagle, and Emma Patented Mine Claims)

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

December 30, 2008

Atlas Mine & Mill Supply
North 1115 Havana Street
Spokane, WA 99202

RE: Site Assessment of the Good Luck Lode & Mill Site, Gold Bottom Mine, Jay Gould Mine, and Mayflower Mine (a.k.a. May Queen, May, Saturn, Modoc Chief, Modick Chief, Good Luck, Hawk, Winona, Highland Chief, Evergreen, Jay Gould Ext., Jay Gould, McLelen, McLelan, Mayflower, Grand Central, War Eagle, and Emma Patented Mine Claims)

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file

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List of Acronyms

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

Section 1. Introduction

This document presents the results of the Preliminary Assessment (PA) for the Good Luck Lode & Mill Site, Gold Bottom Mine, Jay Gould Mine, and Mayflower Mine. The Department of Environmental Quality (DEQ) is contracted by Region 10 of the United States Environmental Protection Agency (EPA) to provide technical support for completion of preliminary assessments at various mines 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 include abandoned mines, rural airfields that have served as bases for aerial spraying, old landfills, illegal dumps, and abandoned industrial facilities that have known or suspected releases.

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

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

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

In 2006 DEQ participated in a site visit at the Good Luck Lode & Mill Site, Gold Bottom Mine, Jay Gould Mine, and Mayflower Mine, with sampling conducted by Ecology and Environment Inc. (E&E, 2007). DEQ is assimilating the information collected during that site visit and sampling with available historic and geological data collected during desk top research.

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"** of "**calculate HRS**" indicates that DEQ has determined that there is sufficient evidence to warrant calculation of a Hazard Ranking Score (HRS) by EPA's contractors. It also indicates 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(s)	Claims	Parcel Number	Partial Determination
Apache Mines Co. James Buerge C/O Clysta Buerge 8501 Spring Hill Dr. NW Albany, Oregon 97321	Mayflower War Eagle Grand Central Emma	RP1M0000000070	**NRAP** **NRAP** **NRAP** **NRAP**
Atlas Mine and Mill Supply North 1115 Havana St. Spokane, Washington 99202	Jay Gould Extension	RP1M0000001290	**NRAP**
BLM 400 W F St. Shoshone, Idaho 83352	Good Luck Lode & Mill Site Gold Bottom	RP1M0000001080 RP02N170150000	**NRAP** **NRAP**
Dan Henry 308 N. 2nd Ave. Hailey, Idaho 83333	Jay Gould	RP1M0000001540	**NRAP**

Owner(s)	**Claims**	**Parcel Number**	**Partial Determination**
John A. Davies 214 N. 2nd Ave. Hailey, Idaho 833333	McLelan (McLelen)	RP1M0000000680	**NRAP**
Mary Anne Schad P.O. Box 1436 Eureka, Montana 59917	Highland Chief ½ May Queen ½ Evergreen ½	RPM0000000440	**NRAP** **NRAP** **NRAP**
Mary Centaurus 6 West Lake Place Antioch, California 94509	Highland Chief ½ May Queen ½ Evergreen ½	RP1M0000001450	**NRAP** **NRAP** **NRAP**
J. B. Haggin C/O Madera Nevada Corp. 1850 MT Diablo BLVD, Ste 108 Walnut Creek, California 94596	Winona Hawk Modick (Modoc) Chief May Saturn	RP1M0000000770	**NRAP** **NRAP** **NRAP** **NRAP** **NRAP**

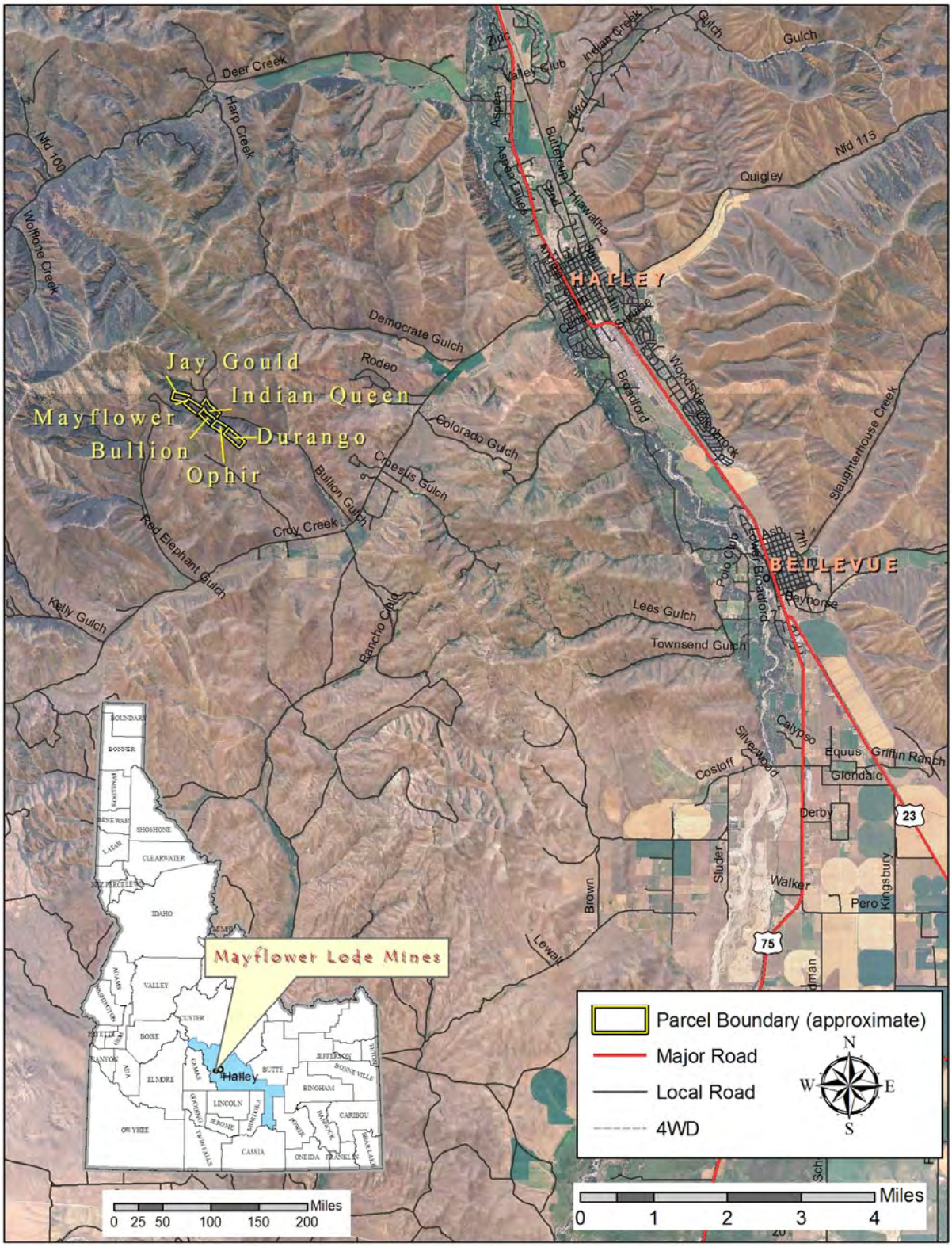

Figure 1. Location of the Mayflower Lode mines with USFS parcel overlay (Map source: Fair 100k, Sunv 100k, NAIP 2004).

Section 3. Overview

The Good Luck Lode & Mill Site, Gold Bottom Mine, Jay Gould Mine, and Mayflower Mine are located in Bullion Gulch, a tributary to the Croy Creek sub-drainage, approximately six miles west of Hailey, Idaho. The Good Luck Lode & Mill Site and Gold Bottom mine are located in Section 15 of Township 2 North, Range 17 East of the Boise Meridian, at Latitude 43.503464, Longitude -114.419528, and Latitude 43.500042, Longitude -114.417372, respectively. This mill site and mine are on BLM land. The Jay Gould and Mayflower mines are located in Section 22 of Township 2 North, Range 17 East of the Boise Meridian, at Latitude 43.498361, Longitude -114.419569 and Latitude43.496303, Longitude -114.415547, respectively. Both of these mine sites are located on private land.

The most direct route to the Good Luck Lode & Mill Site, Gold Bottom, Jay Gould, and Mayflower mines is obtained by driving west from Highway 75 in Hailey onto Bullion Street. At the Big Wood River bridge the road's name changes to Croy Creek Road. One continues west for approximately 4 miles to the junction of Bullion Gulch Road. One turns right, proceeding north up Bullion Gulch, only the lowest 0.5 miles of this road is paved. High-clearance vehicles are recommended beyond this point. One continues on the dirt road for approximately 2.2 miles until reaching a fork. One takes the left-hand fork and continues for another 0.1 miles where a second left-hand fork is encountered. One takes the left fork which leads into the gulch, crossing at the base of the Jay Gould Mine's lower waste dump. Although this road is marginally accessible, foot access is recommended.

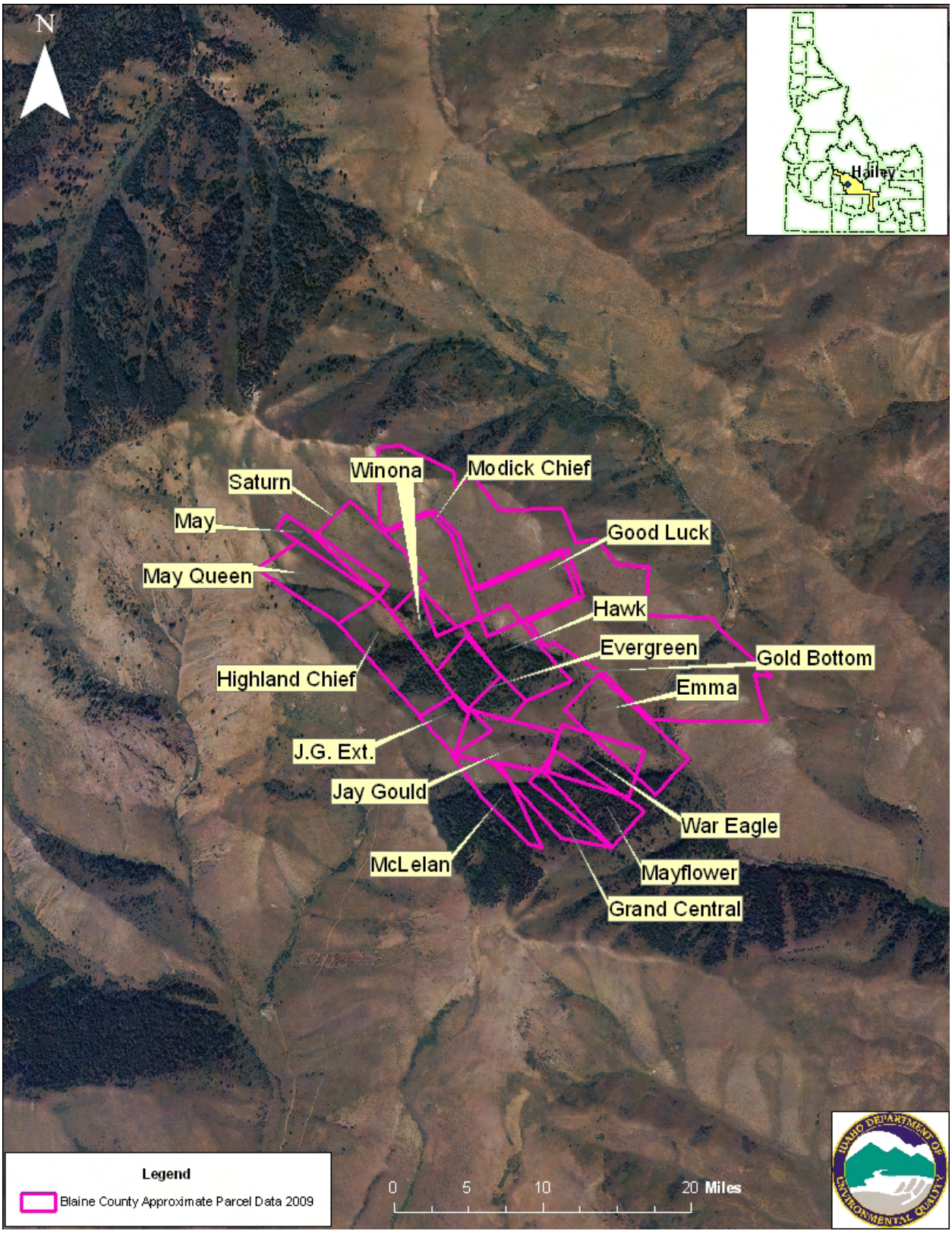

Figure 2. Location of claims (Map source: Fair 100k, Sunv 100k, NAIP 2004).

Section 4. Mine Site History

Several mines lie within or adjacent to Bullion Gulch, once designated as the “Bullion District”. Many of the higher producing mines were located within the Mayflower fault zone. The Mayflower, Jay Gould, Bullion, Ophir and Durango mines trace the Mayflower vein. Most of these mines were interconnected. Description information about the Good Luck Lode & Mill Site and the Gold Bottom mine were not available.

The Evergreen and May Queen claims were patented in 1887 and 1888, respectively, by the Wood River Gold and Silver Mine. The Hawk, May, Saturn, and Winona (1885) claims were patented in 1886 by Walter P. Jenney. The Modoc (Modick) Chief was patented in 1886 by Thomas Gibbons and Walter P. Jenney. The Highland Chief claim was patented in 1888 by the Elk Mountain Silver Mining Company. The Jay Gould claim was patented in 1884 by Stephen V. White. The Jay Gould Extension was patented in 1883 by Robert C. Chambers, John J. Daly, and William McQueen. The Mayflower and Grand Central claims were patented in 1882 by Eudora Shaughnessy. The McLelen (McLelan) claim was patented in 1886 by John M. Cannady, John S. Horner, and A.J. Rothermel. The War Eagle claim was patented in 1890 by Mayflower Consolidated Silver. The Emma claim was patented in 1887 by Robert Chambers and Daniel Harrington (GLO, 2009). No patent information was available in the BLM GLO records database for the Good Luck Lode & Mill Site and Gold Bottom claims.

The mines on the Mayflower lode operated almost continuously from 1880 to 1898.

According to the E & E Report 2007;

> *From 1882 to 1902, Jay Gould produced 40,019 tons of ore, yielding 4.78 ounces of gold, 422,565 ounces of silver, and 5,283,000 pounds of lead. Including the apache workings, several thousand tons of production were recorded during the 1907 – 1917, 1925, 1933 – 1935, and 1948 – 1951 periods, yielding silver, lead, zinc, copper, and gold.*
>
> *From 1882 to 1902, Mayflower produced 3,606 tons of ore, yielding 545,393 ounces of silver and 4,308,000 pounds of lead* (Link and Worl 2001; Worl and Lewis 2001).

Table 1: Production values for the Mayflower Mine, most productive years (from records of E. Daft and the Ketchum smelter):

Date	Tons (ore)	Silver (fine ounces)	Lead (pounds)
1883	1,233.5	205,566.1	1,649,119
1884	927.00	164,307.3	1,106,705
1885	270.8	44,100.0	322, 907
1886	588.4	51,859.67	715,044

The total production up to 1898, as estimated by Mr. W. H. Watts of Hailey, is given by Lindgren as $1,100,000 for the Mayflower Mine. According to E. Daft, the gross value of production from the Mayflower up to 1887 equaled $899,525.00 (Umpleby and others 1930).

Umpleby and others (1930) report the Bullion and other mines on the Mayflower lode were held under lease by the Bunker Hill & Sullivan Mining & Concentrating Co., which started work in 1921 and continued until 1924 without discovering any commercial grade ore bodies.

Section 5. 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.

Section 6. General Geology

Numerous geology and mineral resource studies of the Wood River and adjacent areas have been accomplished. 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).

According to Umpleby et al, The country rock of the Mayflower and associated lodes belongs to the Wood River formation. Most of the rock in and near the principal workings is dark calcareous shale, with varying amounts of siliceous and calcareous material but with beds of sufficiently striking and constant characteristics to be useful as horizon markers (Umpleby et al, 1930, p. 141)

The Jay Gould and Mayflower mines lie within the Mayflower fault zone and are generally characterized by quartzite with undifferentiated sandstones, limestones and argillites of the Wood River formation. Figure 2 shows the generalized geology of Bullion mine area.

> *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

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

In discussion of the Red Elephant and Bullion areas Link and Worl (2001) described geologic and historic information relating to stratigraphy and mineralization relationships within Dollarhide sedimentary sequences in the Mineral Hill district.

The Bullion mineralized area...is underlain by the lower and middle members of the Pennsylvanian and Permian Dollarhide Formation, which is folded into upright and west-overturned map scale folds….The lower member of the Dollarhide Formation, hosts most of the mineralized rock (Skipp and others, 1994). Fryklund (1950), following Umpleby and others (1930), labeled these rocks as Wood River Formation, though he notes, "it is possible that Milligen formation is also present" (p. 64). An unpublished map (circa 1970) of W.E. Hall labels the dark-colored rocks in the Bullion area as Milligen Formation. Hall (1985) showed the rocks as Dollarhide Formation, and Wavra and Hall (1989) showed them as upper member, Dollarhide Formation.

The lower member of the Dollarhide Formation in the Bullion area contains fine- to medium-grained sandstone, black siltite and black limestone or marble. A distinctive lithology in the lower member is channelized disorganized conglomerate that contains mainly intrabasinal soft-sediment clasts of siltstone and sandstone. The lower member occupies both sides of Bullion Gulch and the central part of Red Elephant Gulch. The rocks east of Bullion Gulch are mapped as being stratigraphically high in lower member Dollarhide Formation, because the middle member quartzite is not present. They are intruded on the east by the Deer Creek stock.

In the Bullion area the middle member of the Dollarhide Formation (regionally about 300 m [984 ft] thick) contains silicified sandstone that crops out as light-gray to brown quartzite that forms the high ridge between Red Elephant and Bullion Gulches. These rocks were shown as Wood River Formation on the map of Hall (1985). The mineralized veins of the Bullion area do not extend southward into the middle member Dollarhide Formation. The middle member, much less silicified, is also present in west-dipping beds on the ridge of Kelly Mountains (Link and Worl, 2001, pp. 12 & 14).

6.1 Structure

Fryklund (1950, pp. 65-66) noted the following in regards to the general structure of the rocks and more specifically, those associated with the Mayflower Mine:

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.

The Mayflower fault zone strikes approximately N. 50° W. roughly paralleling the strike of the bedding through which it passes, dips at the surface vary from 70-85 degrees to the southeast. Maximum dips underground are much flatter and average perhaps 50 degrees with some dips as low as 30 degrees.

On the surface the fault zone may be traced as a discontinuous iron gossan which varies from 5-75 feet in width. The discontinuous outcrop in the Bullion claim, and the underground structure sections show that there are parallel and overlapping fault planes which constitute the Mayflower fault zone.

On the east, the fault zone cannot be traced on the surface from the Bullion Claim to the Durango Shaft, nor can it be traced westward beyond the central portion of the Jay Gould claim although there are prospect pits in the Jay Gould Extension Claim which possibly are on the Mayflower lode.

According to Link and Worl, and Worl and Lewis (2001):

Ore is in lenticular bodies as thick as 50 feet and several hundred feet long formed from fissure filling and replacement of black calcareous argillite country rock. Some of the ore bodies are flat-laying lenses extending away from the fissure zone. Vein material is generally within distinct walls as much as 12 feet apart, but locally vein walls are indistinct, and the vein is defined by disseminated calcite, siderite, and pyrite in argillite.

Ore consists of galena, tetrahedrite, sphalerite, and minor chalcopyrite in a gangue of siderite and minor quartz and post-ore calcite. About 40 feet of oxidation exists, and the surface expressions are siliceous gossans. Higher grade ore averaged 90 to 125 ounces of silver per ton and 50 to 65 percent lead.

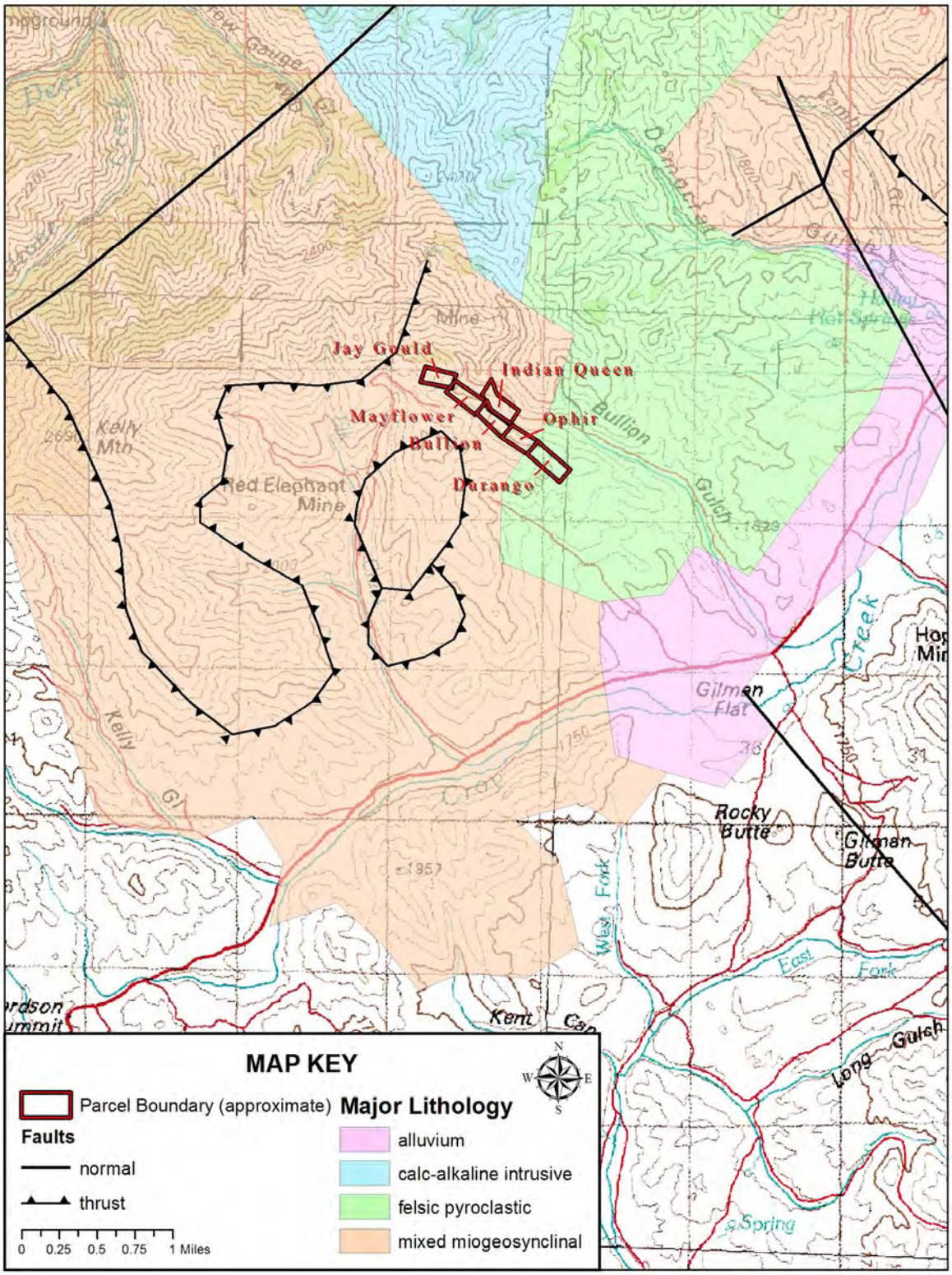

Figure 3. Geology of the Bullion Gulch area (Map source: USGS 24k).

Section 7. Current and Potential Future Land Uses

7.1 Current Land Uses

Current land uses in the Croy Creek sub-drainage and adjacent tributary areas include residential housing and recreational activities such as biking, hiking, hunting, horseback riding and off-road vehicle (ORV) touring. Only in the lower most portion of Bullion Gulch has residential housing. Occupancy appears to be seasonal for these residences, however. As detailed in the Section 3 of this report, the most direct route approaches Bullion Gulch from Croy Creek.

Public access to the Bullion Gulch workings, which are quite extensive, is unrestricted. During several DEQ site visits to Bullion Gulch properties, mountain bikers and hikers were frequently observed throughout the entire reach of the gulch.

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. It appears likely that access to the properties may increase as the local populations and recreation industry expands.

Section 8. Site Conditions and Waste Characterization

The Idaho Geologic Survey (IGS) visited the site in 1994 that resulted in a site report, and DEQ with E&E (2007) conducted a site inspection in July 2006 that was reported in E&E's Croy Creek Site Inspection Report (2007). During DEQ and E&E's visit, they collected five backgrounds soil samples, nine waste rock dump samples, three surface water samples, and five probable points of entry sediment samples. The two accounts have some inconsistencies in the size and number of mine workings. The E&E report may contain descriptions of mine workings and sample locations on the Good Luck Lode & Mill Site, Gold Bottom, Jay Gould or Mayflower mines, that are inaccurate, but which are based on the parcel boundary as shown on Blaine County's parcel map (2009) and Plate 20 in Umpleby and others (1930). Figures 5, 6, and 7 are a site drawings developed by E&E that shows the relative location of mine workings and sample locations. The following description of the Gold Bottom, Jay Gould and Mayflower mines is from the E&E report which included a summary of the IGS visit.

> *Gold Bottom Mine. The Gold Bottom Mine contained one waste rock pile (Waste Rock Pile 1) and one adit (Adit 1;* Figure 5*). The waste rock pile was not sampled since it was less than 2,000 cubic yards and, therefore; did not meet in the minimum size requirements for sampling as established in the SQAP. The volume of the sampled source; and its associated sample number and analytical results are presented below:*
> *Adit 1 – At the time of sampling, this adit was flowing at a rate of approximately 3 to 5 gpm. The pH measured 6.94 and conductivity was 0.501 mS/cm. One co-located surface water/sediment sample set (GBAD01SW and GBAD01SD) was collected at the adit portal.*
> *Waste Rock Pile 1 – This waste rock pile measured approximately 35 feet in length by 35 feet in width, having a thickness of approximately 10 feet on land with an approximate 15 degree slope. The estimated volume of this source is calculated to be 23 cubic yards.*
>
> *Jay Gould Mine/ Apache Mill. A large dump above what is believed to be the Mayflower Mine is probably the Jay Gould Mine. The dump has a caved adit and is dry. There are several small dumps above this one. The Jay Gould and Mayflower were on the same vein and close together. A jeep trail ends at the Jay Gould Tunnel and associated dump. A modest flow of water discharges from the tunnel in limestone. Flow rate at this adit is estimated to be approximately 5 gpm. The adit has a 2-foot high opening, obscured by vegetation.*
>
> *A large iron boiler sits below the Jay Gould dump next to the remnants of what appear to be very old tailings along the drainage. Most of the tailings appear to have been excavated out of the bottom of the drainage, presumably by the Apache Mining Company.*
>
> *Major physical hazards at the site include two open shafts and a stope, all located on the steep, talus, and dump-covered ridge west of the adit and north of the gulch that extends west up to the OK Tunnel dump. The OK Tunnel was mapped as part of the Red Elephant Mine site investigation in 1997.*

The Apache Mill is a large area of jig and flotation mill tailings which cover approximately 20 acres. There was no flowing water at the time of the site visit. The footings of the old mill and an old building are at the site. Water in the stream in Bullion Gulch is impounded in a pond behind a ranch house at the mouth of the gulch. A marshy area separates the tailings from the pond. There are many thousands of tons of mill tailings in this drainage (Summarized from the IGS site visit).

Mayflower Mine. The mine is at a sharp turn in the road to the Jay Gould Mine. The Mayflower was a major producing mine with thousands of feet of underground workings. An open adit had a trickle of flow. The dumps cover approximately 2 acres. Parts of an old compressor are located at the base of the main dump. The War Eagle Tunnel may be part of the Mayflower Mine.

The War Eagle Tunnel consists of a large dump and a dry, caved adit. Parts of an old gas engine and a windlass are on the dump (Summarized from the IGS site visit).

E&E, 2007

The Jay Gould Mine contained one waste rock pile (Waste Rock Pile 1) and one adit (Adit 1; Figure 6-14). The volume of the sampled sources and their associated sample numbers and analytical results are presented below:

- ***Waste Rock Pile 1 –*** *This waste rock pile measured approximately 120 feet in length by 60 feet in width, having a thickness of approximately 50 feet on land with an approximate 40 degree slope. The estimated volume of this source is calculated to be 1,778 cubic yards. Three waste rock samples (JGWR01SS, JGWR02SS, and JGWR03SS) were collected from this source. Analytical results from sample JGWR01SS indicate the presence of nine TAL metals at significant concentrations with respect to background concentrations (Table 6-4). Analytical results from sample JGWR03SS indicate the presence of six TAL metals at significant concentrations with respect to background concentrations (Table 6-4). All three samples contained antimony, lead, manganese, mercury, silver, and zinc at significant concentrations.*
- ***Adit 1 –*** *At the time of sampling, this adit was flowing at a rate of approximately 3 to 5 gpm. The pH measured 7.81, and conductivity was 0.753 mS/cm. One co-located surface water/sediment sample set (JGAD01SW and JGAD01SD) was collected at the adit portal. Analytical results of sample JGAD01SW did not indicate the presence of any TAL metals at significant concentrations with respect to background concentrations (Table 6-5). Analytical results from sample JGAD01SD indicate the presence of three TAL metals at significant concentrations with respect to background concentrations (Table 6-6).*

The Mayflower Mine contained three waste rock piles (Waste Rock Piles 1, 2, and 3), one adit (Adit 1), and one shaft (Shaft 1; Figures 6-15 and 6-16). Adit 1 was dry and was not sampled. Further, due to its small size, Waste Rock Pile 2 was not sampled. The volume of the sampled sources and their associated sample numbers and analytical results are presented below:

- ***Waste Rock Pile 1*** *– This waste rock pile measured approximately 480 feet in length by an average of 80 feet in width, having an average thickness of approximately 20 feet on land with an approximate 25 degree slope. The*

estimated volume of this source is calculated to be 2,370 cubic yards. Three waste rock samples (MYWR01SS, MYWR02SS, and MYWR03SS) were collected from this source. Analytical results from sample MYWR01SS indicate the presence of eight TAL metals at significant concentrations with respect to background concentrations (Table 6-4). Analytical results from sample MYWR02SS indicate the presence of nine TAL metals at significant concentrations with respect to background concentrations (Table 6-4). Analytical results from sample MYWR03SS indicate the presence of ten TAL metals at significant concentrations with respect to background concentrations (Table 6-4). All three samples contained antimony, cadmium, lead, manganese, mercury, silver, and zinc at significant concentrations.

- ***Waste Rock Pile 3*** *–This waste rock was not measured by the field team. The field team estimated the volume to be approximately 47,000 cubic yards. Three waste rock samples (LMWR01SS, LMWR02SS, and LMWR03SS) were collected from this source. Analytical results from sample LMWR01SS indicate the presence of arsenic, mercury, and silver at significant concentrations with respect to background concentrations (Table 6-4). Analytical results from sample LMWR02SS indicate the presence of nine TAL metals at significant concentrations with respect to background concentrations (Table 6-4). Analytical results from sample LMWR03SS indicate the presence of nine TAL metals at significant concentrations with respect to background concentrations (Table 6-4). All three samples contained arsenic, mercury, and silver at significant concentrations.*

As previously stated, Waste Rock Pile 2 was not sampled; however, its measurement and its volume is provided below:

- ***Waste Rock Pile 2*** *– This waste rock pile measured approximately 10 feet in length by 30 feet in width, having a thickness of approximately 15 feet on land with an approximate 30 degree slope. The estimated volume of this source is calculated to be 17 cubic yards.*

E&E, 2007

Section 9. Soil Sample Collection

A total of nine soil samples were collected from the Jay Gould and Mayflower mines. No soil samples were collected from the Good Luck Lode & Mill Site and Gold Bottom mine. Three soil samples were collected from the Jay Gould Mine and six soil samples were collected from the Mayflower Mine in 2006 during the E&E site inspection.

Soil samples included one background, and nine waste rock samples. The four probable points of entry (PPE) samples taken were sediment and will be discussed in section 9.2. The background soil sample (BGBG02SS) was collected from a location up gradient of mines/mills in Bullion Gulch. The background soil sample was collected from 0 to 6 inches below ground surface (bgs). Sample BGBG02SS consisted of dry light brown sandy silt with some fine gravel and a slight amount of organics.

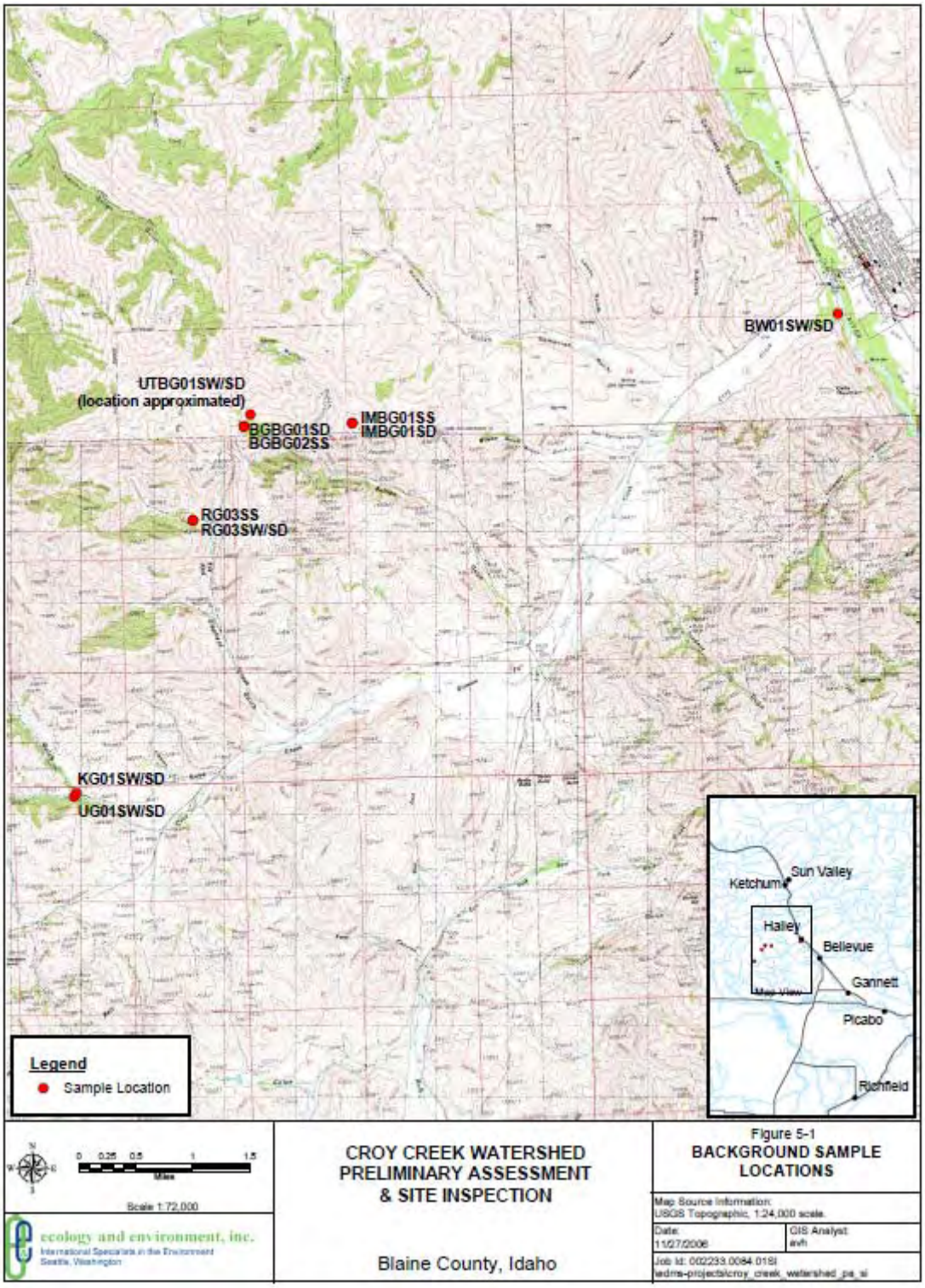

Figure 4. Background sample locations for Bullion Gulch (Source: E & E report).

E & E's sample naming convention is as follows:

The first two letters represent the mine
- JG – Jay Gould Mine

The next two letters are a description of the sample type
- BG – background
- WR – waste rock
- PP – probable point of entry

The numbers are a sequential numbering system

And the final two letters represent the sampled media
- SS – soil
- SD – sediment

So sample JGWR02SS was the second soil sample collected at the Jay Gould from a waste rock dump.

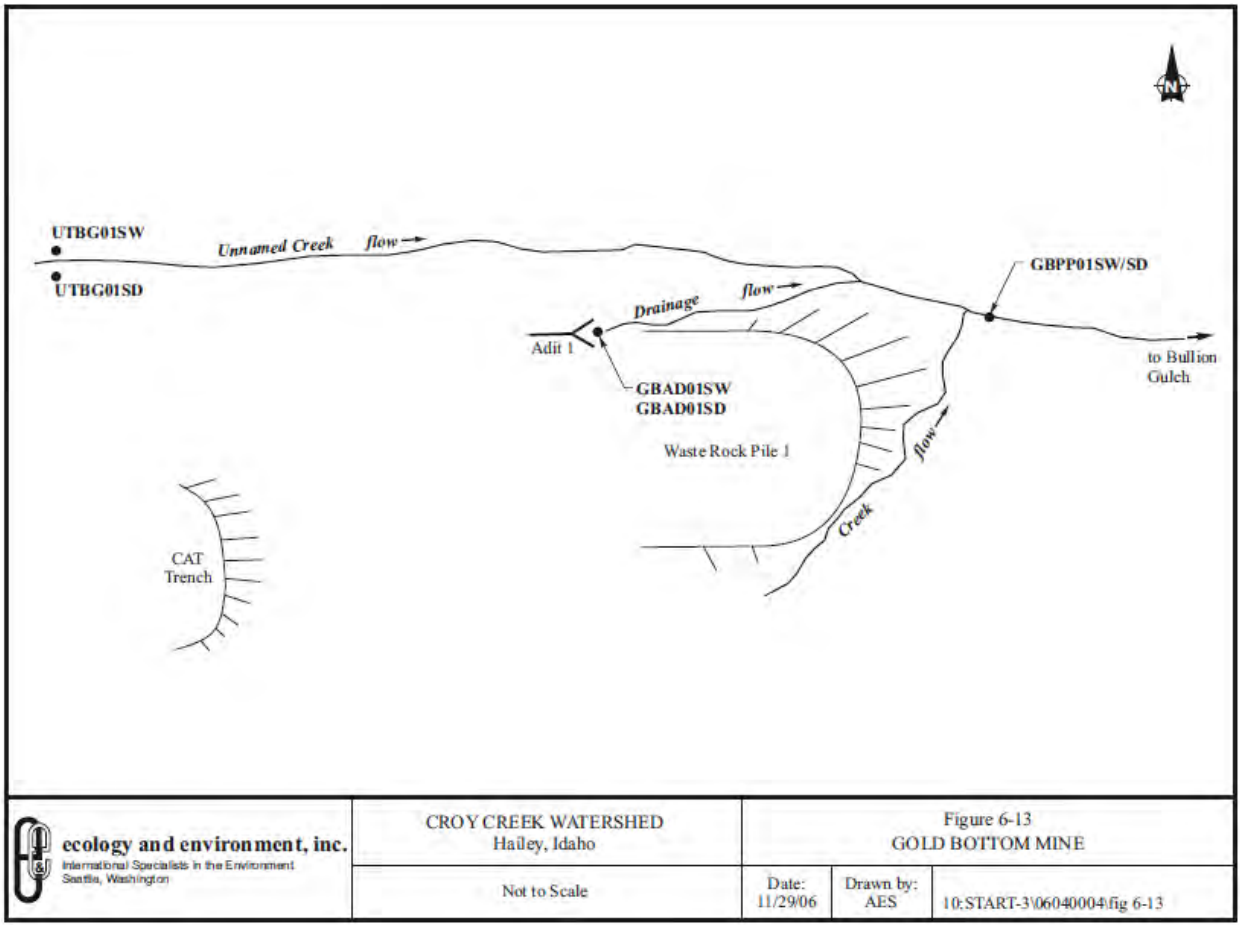

Figure 5. Background Sample Locations for the Gold Bottom Mine (Source: E & E report).

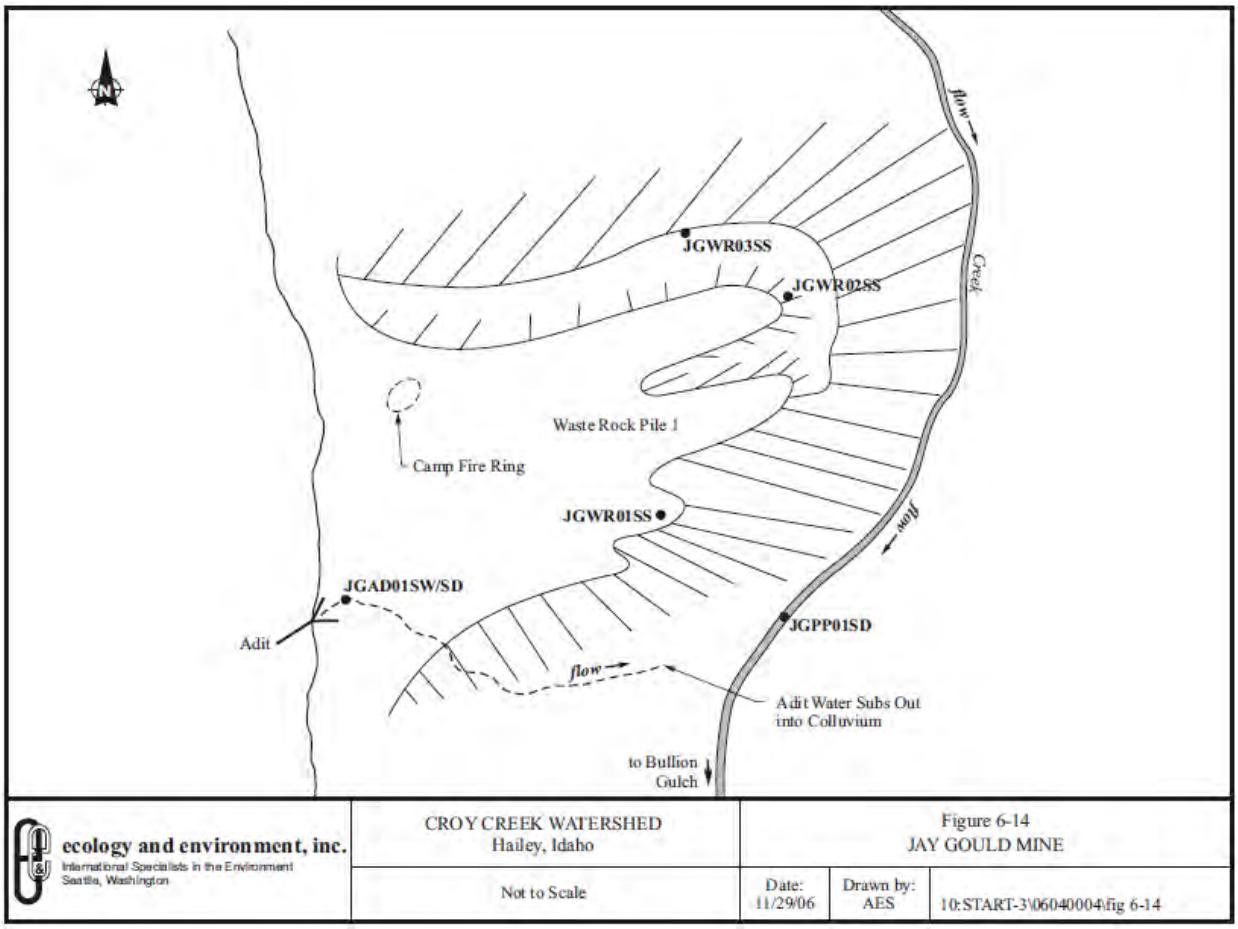

Figure 6. Map of sampling locations, adits, and waste rock dumps at the Jay Gould Mine (Source: E & E report).

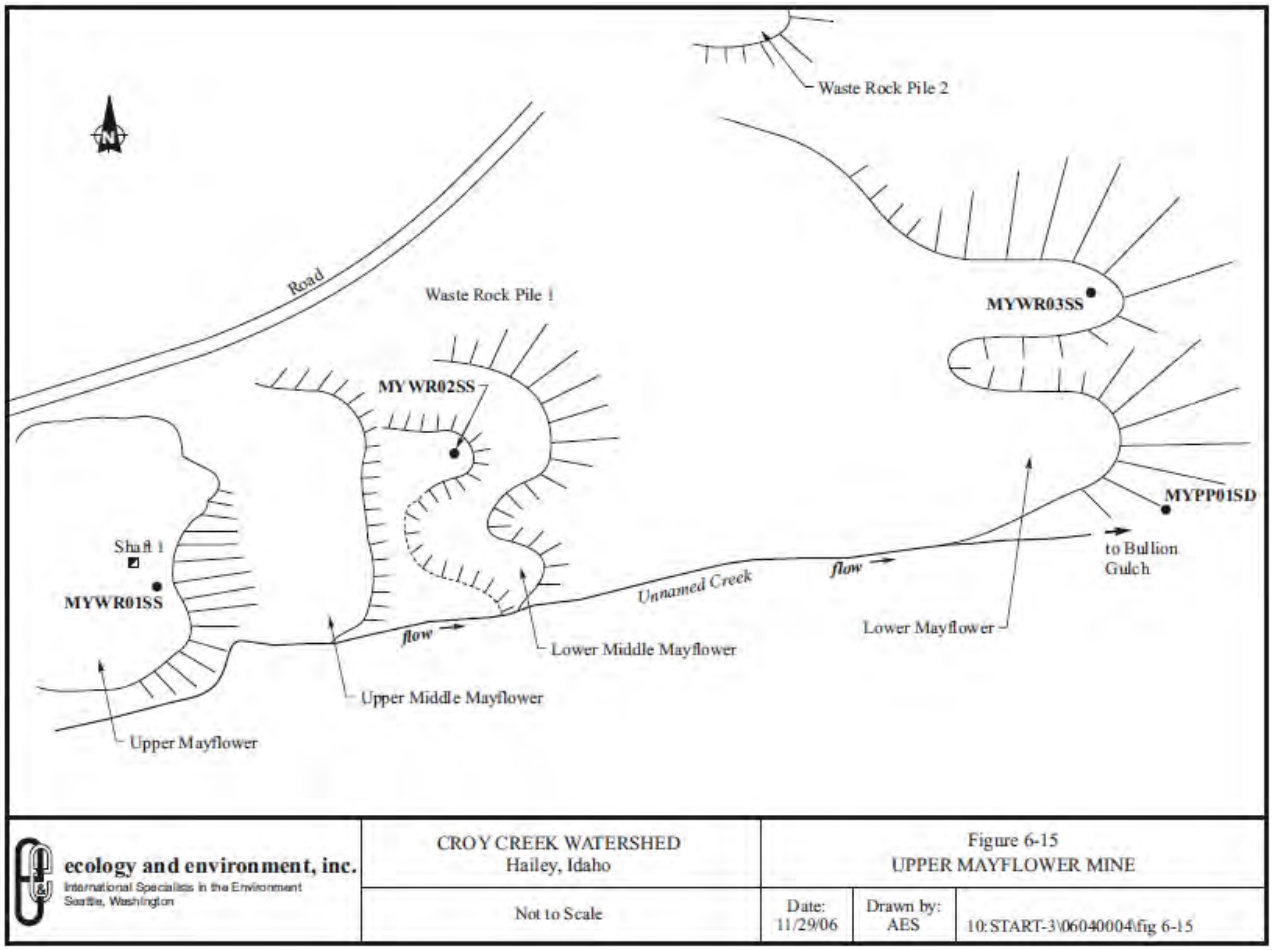

Figure 7. Map of sampling locations, adits, and waste rock dumps at the Upper Mayflower Mine (Source: E & E report).

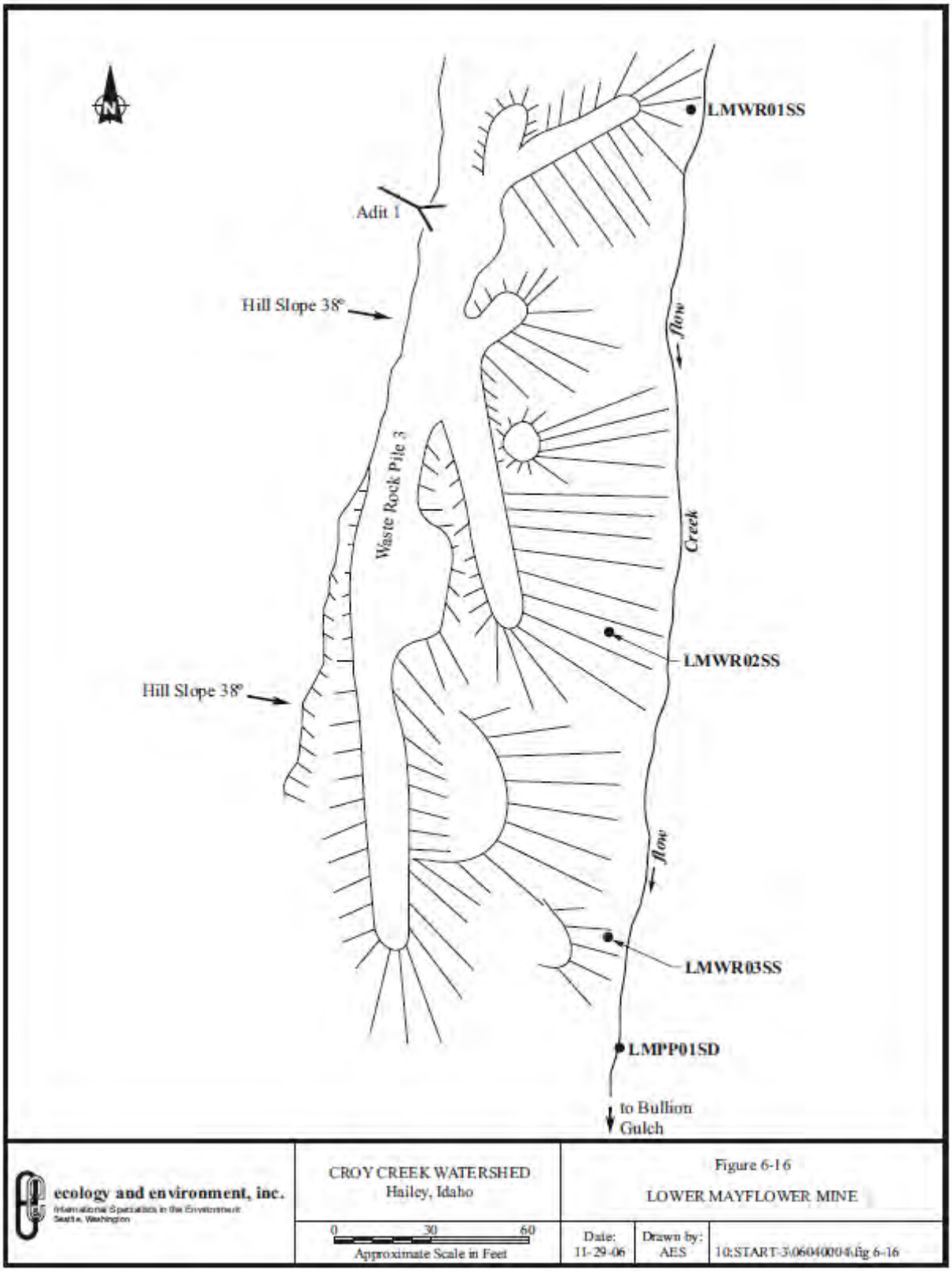

Figure 8. Map of sampling locations, adits, and waste rock dumps at the Lower Mayflower Mine.

9.1 Soils Analysis

Levels of total arsenic, cadmium, iron, lead, magnesium, manganese, mercury, and silver exceeded Idaho's *Initial Default Target Levels* (IDTLs) for all samples, including background at the Jay Gould mine. Selenium and zinc were below the IDTLs in the background samples, but exceeded the IDTLs in all of the soil samples from the Jay Gould mine. Sample JGWR02SS exceeded IDTL for thallium.

Total arsenic exceeded EPA Region 6's Preliminary Human Health Screening Levels (HHSLs) for all samples, including background. Sample JGWR03SS exceeded the HHSL for iron. Total lead exceeded HHSL for all of the samples, excluding background. Samples JGWR01SS, JGWR02SS, and JGWR03SS exceeded the HHSL for manganese.

Sample JGWR01SS exhibited levels at three times the background in the following constituents: antimony, arsenic, calcium, copper, lead, manganese, mercury, selenium, silver, and zinc.

Sample JGWR02SS exhibited levels at three times the background in the following constituents: antimony, arsenic, cadmium, calcium, copper, lead, magnesium, manganese, mercury, selenium, silver, thallium, and zinc.

Sample JGWR03SS exhibited levels at three times the background in the following constituents: antimony, calcium, lead, magnesium, manganese, mercury, selenium, silver, and zinc.

Table 2 summarizes laboratory analytical results for surface soil and sediment samples collected from the Jay Gould Mine.

Levels of total arsenic, cadmium, iron, lead, magnesium, manganese, mercury, and silver exceeded Idaho's *Initial Default Target Levels* (IDTLs) for all samples, including background at the upper Mayflower mine. Antimony, selenium, thallium, and zinc were below the IDTLs in the background samples, but exceeded the IDTLs in all of the soil samples from the upper Mayflower Mine.

Total arsenic exceeded EPA Region 6's Preliminary Human Health Screening Levels (HHSLs) for all samples, including background. Samples MYWR01SS and MYWR02SS exceeded the HHSL for iron. Total lead and manganese exceeded the HHSL for all of the samples, excluding background. Sample MYWR02SS exceeded the HHSL for thallium.

Sample MYWR01SS exhibited levels at three times the background in the following constituents: antimony, cadmium, calcium, copper, iron, lead, magnesium, manganese, mercury, selenium, silver, thallium, and zinc.

Sample MYWR02SS exhibited levels at three times the background in the following constituents: antimony, arsenic, cadmium, lead, manganese, mercury, silver, and zinc.

Sample MYWR03SS exhibited levels at three times the background in the following constituents: antimony, arsenic, cadmium, copper, lead, manganese, mercury, silver, and zinc.

Table 3 summarizes laboratory analytical results for surface soil and sediment samples collected from the upper Mayflower Mine.

Levels of total arsenic, cadmium, iron, lead, magnesium, manganese, mercury, and silver exceeded Idaho's *Initial Default Target Levels* (IDTLs) for all samples, including background at the lower Mayflower mine. Antimony was below the IDTL in the background samples, but exceeded the IDTL in all of the soil samples from the lower Mayflower Mine.

Samples LMWR01SS and LMWR03SS exceeded IDTLs for selenium, thallium, and zinc.

Total arsenic exceeded EPA Region 6's Preliminary Human Health Screening Levels (HHSLs) for all samples, including background. Sample LMWR03SS exceeded the HHSL for iron. Total lead exceeded the HHSL for all of the samples, excluding background. Sample LMWR01SS and LMWR03SS exceeded the HHSL for manganese.

Sample LMWR01SS exhibited levels at three times the background in the following constituents: antimony, arsenic, cadmium, calcium, lead, magnesium, manganese, mercury, silver, thallium, and zinc.

Sample LMWR02SS exhibited levels at three times the background in the following constituents: arsenic, calcium, mercury, and silver.

Sample LMWR03SS exhibited levels at three times the background in the following constituents: antimony, arsenic, cadmium, calcium, copper, lead, manganese, mercury, selenium, silver, thallium, and zinc.

Table 4 summarizes laboratory analytical results for surface soil and sediment samples collected from the lower Mayflower Mine.

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 area.

Table 2: Total Recoverable Metals Analysis

Jay Gould Soil/Sediment Samples									
		EPA Region 6 HHSLs	Background		Sample No.				
Description	IDTLs Units: mg/Kg		BGBG02SS	BGBG01SD	JGWR01SS	JGWR02SS	JGWR03SS	JGAD01SD	JGPP01SD
Aluminum	NSC	76,000	15,000	13,500	7,440	8,640	8,300	1,600	7,110
Antimony	4.77	314	2.0JL	2.1 JL	**12.7 JL**	**29.6 JL**	**24.3 JL**	**6.0 JL**	4.6 JL
Arsenic	0.391	21.65	**76.4**	**57.2**	**298**	**573**	**161**	**31.8**	**114**
Barium	896	15,642	127	139	21.4	8.7 JQ	16.1 JQ	5.7 JQ	54.2
Beryllium	1.63	150	0.99	0.92	0.58 U	0.57 U	0.54 U	0.090 U	0.51 U
Cadmium	1.35	39	**6.3**	**9.8**	**14.5**	**19.6**	**18.1**	**12.2**	**20.9**
Calcium	NSC	NSC	5,290	8,250	32,300	18,100	39,900	8,480	45,100
Chromium	NSC	NSC	29.2	25.8	42.1	28.2	45.5	9.7	38.3
Cobalt	NSC	900	9.5	9.3	3.8 JQ	2.9 JQ	2.7 JQ	0.49 JQ	3.7 JQ
Copper	921	2,900	53.6	46.6	249	203	40.7	48.8	44.3
Iron	5.76	55,000	**24,700**	**24,500**	**49,700**	**10,700**	**58,800**	**6,680**	**49,700**
Lead	49.6	400	**221 JL**	**223 JL**	**9,010 JL**	**9,760 JL**	**15,400 JL**	**1,680 JL**	**1,800 JL**
Magnesium	223	NSC	**5,230 JL**	**4,510 JL**	**12,200 JL**	**14,300 JL**	**18,700 JL**	**2,510 JL**	**14,800 JL**
Manganese	223	3,239	**907**	**1,160**	**7,920**	**24,600**	**12,200**	**628**	**12,300**
Mercury	0.00509	23	**0.10 U**	**0.16 U**	**1.6**	**1.2**	**0.77**	**0.24**	**0.29**
Nickel	59.1	1,600	50.5	48.2	26.3	21.4	22.0	4.3 JQ	29.1
Potassium	NSC	NSC	2800	2900	244 JQ	227 JQ	176 JQ	183 JQ	514
Selenium	2.03	391	1.3 JQ (3.65 SQL)	1.9 JQ (5.56 SQL)	**6.5**	**17.6 U**	**7.1 U**	NA	**6.6 U**
Silver	0.189	391	**1.5**	**1.8**	**144**	**145**	**65.6**	**22.3**	**14.0**
Sodium	NSC	NSC	96.2 U	NA	127 U	98.4 U	143 U	NA	NA
Thallium	1.55	5.5	1.1 JQ (2.54 SQL)	1.1 JQ (3.97 SQL)	1.2 JQ	**4.0 JQ**	1.5 JQ	NA	1.5 JQ
Vanadium	NSC	390	140	56.0	41.3	14.0	17.7	5.5 JQ	24.0
Zinc	886	23,464	718	822	**2,800**	**3,320**	**3,270**	**832**	**2,970**

Notes: **Bold – value above IDTLs** ☐ - value above HHSLs Blue – values above background J – The associated value is an estimated quantity
K - Unknown bias L - Low bias Q - The detected concentration is below the method reporting limit/contract required quantitation limit, but is above the method quantitation limit. NA – Not Analyzed, U - The material was analyzed for, but was not detected above the level of the associated value

Table 3: Total Recoverable Metals Analysis

Upper Mayflower Soil/Sediment Samples								
			Background		Sample No.			
Description	IDTLs Units: mg/Kg	EPA Region 6 HHSLs	BGBG02SS	BGBG01SD	MYWR01SS	MYWR02SS	MYWR03SS	MYPP01SD
Aluminum	NSC	76,000	15,000	13,500	5,220	4,820 JL	6,960 JL	8,670 JL
Antimony	4.77	314	2.0JL	2.1 JL	**19.3 JL**	**19.7 JL**	**37.5 JL**	**26.5 JL**
Arsenic	0.391	21.65	**76.4**	**57.2**	**118**	**771 JL**	**1,620 JL**	**474 JL**
Barium	896	15,642	127	139	11.6 JQ	69.3	16.8 JQ	71.9
Beryllium	1.63	150	0.99	0.92	0.48 U	0.20 JQ	0.37 JQ	0.43 JQ
Cadmium	1.35	39	**6.3**	**9.8**	**33.4**	**27.6**	**35.8**	**29.8**
Calcium	NSC	NSC	5,290	8,250	38,300	1,960 JL	8,670 JL	22,200 JL
Chromium	NSC	NSC	29.2	25.8	25.8	52.4 JL	54.3 JL	29.2 JL
Cobalt	NSC	900	9.5	9.3	1.6 JQ	3.8 JQ	2.3 JQ	3.4 JQ
Copper	921	2,900	53.6	46.6	225	110	333	238
Iron	5.76	55,000	**24,700**	**24,500**	**141,000**	**59,600 JL**	**39,500 JL**	**37,600 JL**
Lead	49.6	400	**221 JL**	**223 JL**	**18,800 JL**	**14,900 JL**	**8,040 JL**	**16,100 JL**
Magnesium	223	NSC	**5,230 JL**	**4,510 JL**	**15,700 JL**	**3,990 JL**	**10,400 JL**	**8,120 JL**
Manganese	223	3,239	**907**	**1,160**	**33,400**	**8,510 JL**	**6,000 JL**	**7,020 JL**
Mercury	0.00509	23	**0.10 U**	**0.16 U**	**1.4**	**4.2**	**3.3**	**2.5**
Nickel	59.1	1,600	50.5	48.2	18.3	22.8 JL	29.2 JL	21.6 JL
Potassium	NSC	NSC	2,800	2,900	101 JQ	133 JQ	183 JQ	1,190
Selenium	2.03	391	1.3 JQ (3.65 SQL)	1.9 JQ (5.56 SQL)	**17.6 U**	**3.5 UJL**	**3.4 JL**	**2.0 JL**
Silver	0.189	391	**1.5**	**1.8**	**155**	**43.4**	**142**	**128**
Sodium	NSC	NSC	96.2 U	NA	168 U	181 U	152 U	NA
Thallium	1.55	5.5	1.1 JQ (2.54 SQL)	1.1 JQ (3.97 SQL)	**5.0 JQ**	**3.2 JL**	**3.1 JL**	**2.7 JL**
Vanadium	NSC	390	140	56.0	11.6	38.0 JL	20.0 JL	18.6 JL
Zinc	886	23,464	718	822	**6050**	**7650 JL**	5540 JL	5050 JL

Notes: **Bold – value above IDTLs** - value above HHSLs Blue – values above background J – The associated value is an estimated quantity K - Unknown bias L - Low bias Q - The detected concentration is below the method reporting limit/contract required quantitation limit, but is above the method quantitation limit. NA – Not Analyzed, U - The material was analyzed for, but was not detected above the level of the associated value

Table 4: Total Recoverable Metals Analysis

Lower Mayflower Soil/Sediment Samples								
			Background		Sample No.			
Description	IDTLs Units: mg/Kg	EPA Region 6 HHSLs	BGBG02SS	BGBG01SD	LMWR01SS	LMWR02SS	LMWR03SS	LMPP01SD
Aluminum	NSC	76,000	15,000	13,500	4,060 JL	6,360 JL	4,000 JL	4,830 JL
Antimony	4.77	314	2.0JL	2.1 JL	**30.9 JL**	**5.6 JQ**	**29.3 JL**	**22.7 JL**
Arsenic	0.391	21.65	**76.4**	**57.2**	**4,000 JL**	**383 JL**	**558 JL**	**451 JL**
Barium	896	15,642	127	139	5.3 JQ	13.4 JQ	18.6 JQ	80.6
Beryllium	1.63	150	0.99	0.92	0.29 JQ	0.25 JQ	0.24 JQ	0.31 JQ
Cadmium	1.35	39	**6.3**	**9.8**	**21.3**	**4.7**	**46.0**	**51.6**
Calcium	NSC	NSC	5,290	8,250	32,400 JL	36,800 JL	44,700 JL	29,600 JL
Chromium	NSC	NSC	29.2	25.8	28.7 JL	39.6 JL	25.0 JL	26.8 JL
Cobalt	NSC	900	9.5	9.3	1.2 JQ	2.1 JQ	0.47 JQ	1.3 JQ
Copper	921	2,900	53.6	46.6	95.8	24.5	162	135
Iron	5.76	55,000	**24,700**	**24,500**	**23,400 JL**	**9,530 JL**	**70,100 JL**	**92,500 JL**
Lead	49.6	400	**221 JL**	**223 JL**	**6,240 JL**	**526 JL**	**9,170 JL**	**12,800 JL**
Magnesium	223	NSC	**5,230 JL**	**4,510 JL**	**13,700 JL**	**8,540 JL**	**7,860 JL**	**8,760 JL**
Manganese	223	3,239	**907**	**1,160**	**4,260 JL**	**569 JL**	**18,500 JL**	**25,200 JL**
Mercury	0.00509	23	**0.10 U**	**0.16 U**	**2.1**	**0.42**	**1.8**	**0.40**
Nickel	59.1	1,600	50.5	48.2	19.8 JL	19.4 JL	14.3 JL	20.9 JL
Potassium	NSC	NSC	2,800	2,900	144 JQ	179 JQ	123 JQ	310 JQ
Selenium	2.03	391	1.3 JQ (3.65 SQL)	1.9 JQ (5.56 SQL)	**3.3 UJL**	1.2 JQ	**7.0 UJL**	**7.0 UJL**
Silver	0.189	391	**1.5**	**1.8**	**70.8**	**8.1**	**98.8**	**145**
Sodium	NSC	NSC	96.2 U	NA	130 U	70.9 U	198 JQ	NA
Thallium	1.55	5.5	1.1 JQ (2.54 SQL)	1.1 JQ (3.97 SQL)	**3.7 JL**	0.78 JQ	**3.7 JQ**	**6.2 JL**
Vanadium	NSC	390	140	56.0	11.0 JL	14.3 JL	11.3 JL	16.6 JL
Zinc	886	23,464	718	822	**3,450 JL**	594 JL	**7,090 JL**	**6,790 JL**

Notes: **Bold – value above IDTLs** **-** value above HHSLs Blue – values above background J – The associated value is an estimated quantity
K - Unknown bias L - Low bias Q - The detected concentration is below the method reporting limit/contract required quantitation limit, but is above the method quantitation limit. NA – Not Analyzed, U - The material was analyzed for, but was not detected above the level of the associated value

9.2 Sediment

Tables 2, 3, and 4 summarizes laboratory analytical results for one background sediment sample, two sediment samples from the Jay Gould, one sediment sample from the upper Mayflower Mine, and one sediment sample from the lower Mayflower Mine. The Gold Bottom Mine table 5 is located after the sediment discussion because no soil samples were collected.

Sample BGBG01SD was collected in the area of the Bay State Mine and consisted of dark brown silt to fine sand with a moderate amount of organics and no odor. This sample exceeded the IDTLs for arsenic, cadmium, iron, lead, magnesium, manganese, mercury, and silver. The background sample also exceeded the HHSL for arsenic.

Sample UTBG01SD was a background sample collected in the area near the Gold Bottom Mine. The characteristics of this sample were not described in the E & E report. This sample exceeded the IDTLs for arsenic, cadmium, iron, lead, magnesium, manganese, and silver. The background sample also exceeded the HHSL for arsenic. Mercury was not available for analysis in this sample.

Sample GBAD01SD exceeded the IDTLs for arsenic, cadmium, iron, lead, magnesium, mercury, and silver. Arsenic exceeded the HHSL.

Sample GBPP01SD exceeded the IDTLs for antimony, arsenic, cadmium, iron, lead, magnesium, manganese, mercury, and thallium. Arsenic exceeded the HHSL.

Sample GBAD01SD exhibited levels at three times the background in the following constituents: barium and potassium. The background sample UTBG01SD was used to analyze the barium.

Sample JGAD01SD exceeded the IDTLs for antimony, arsenic, cadmium, iron, lead, magnesium, manganese, mercury, selenium, silver, and zinc.

Sample JGPP01SD exceeded the IDTLs for arsenic, cadmium, iron, lead, magnesium, manganese, mercury, selenium, silver, and zinc.

Samples MYPP01SD and LMPP01SD exceeded the IDTLs for antimony, arsenic, cadmium, iron, lead, magnesium, manganese, mercury, selenium, silver, thallium, and zinc.

Sample JGAD01SD exceeded both IDTLs and HHSLs for arsenic and lead.

Sample JGPP01SD exceeded both IDTLs and HHSLs for arsenic, lead, magnesium, and manganese.

Sample MYPP01SD exceeded both IDTLs and HHSLs for arsenic, lead, and manganese.

Sample LMPP01SD exceeded both IDTLs and HHSLs for arsenic, cadmium, lead, manganese, and thallium.

Sample JGAD01SD exhibited levels at three times the background in the following constituents: arsenic, lead, and silver.

Sample JGPP01SD exhibited levels at three times the background in the following constituents: cadmium, calcium, iron, lead, magnesium, manganese, selenium, silver, and zinc.

Sample MYPP01SD exhibited levels at three times the background in the following constituents: antimony, arsenic, cadmium, calcium, copper, lead, manganese, mercury, silver, and zinc.

Sample LMPP01SD exhibited levels at three times the background in the following constituents: antimony, arsenic, cadmium, calcium, copper, iron, lead, manganese, mercury, selenium, silver, thallium, and zinc.

Table 5: Total Recoverable Metals Analysis

Gold Bottom Mine Sediment Samples

Description	IDTLs Units: mg/Kg	EPA Region 6 HHSLs	Background UTBG01SD	BGBG01SD	GBAD01SD	GBPP01SD
Aluminum	NSC	76,000	6,150	13,500	11,200	6,360
Antimony	4.77	314	1.9 JL	2.1 JL	1.6 JL	**5.0 JL**
Arsenic	0.391	21.65	**37.3**	**57.2**	**34.1**	**64.6**
Barium	896	15,642	33.7	139	108	53.9
Beryllium	1.63	150	NA	0.92	0.92	0.75
Cadmium	1.35	39	**4.7**	**9.8**	**4.6**	**6.2**
Calcium	NSC	NSC	10,500	8,250	6,530	11,300
Chromium	NSC	NSC	16.3	25.8	28.2	24.1
Cobalt	NSC	900	NA	9.3	5.2 JQ	5.5 JQ
Copper	921	2,900	31.5	46.6	37.3	33.4
Iron	5.76	55,000	**22,200**	**24,500**	**18,200**	**32,000**
Lead	49.6	400	**73.9 JL**	**223 JL**	**158 JL**	**169 JL**
Magnesium	223	NSC	**3,140 JL**	**4,510 JL**	**2,900 JL**	**3,600 JL**
Manganese	223	3,239	**393**	**1,160**	203	**443**
Mercury	0.00509	23	NA	**0.16 U**	**0.099 JQ**	**0.084 JQ**
Nickel	59.1	1,600	40.3	48.2	40.7	50.1
Potassium	NSC	NSC	419 JQ	2900	1,420	463 JQ
Selenium	2.03	391	NA	1.9 JQ (5.56 SQL)	NA	1.3 JQ
Silver	0.189	391	**0.33 JQ (1.3 SQL)**	**1.8**	**1.3 JQ**	**0.53 JQ**
Sodium	NSC	NSC	NA	NA	NA	NA
Thallium	1.55	5.5	NA	1.1 JQ (3.97 SQL)	NA	**3.0 U**
Vanadium	NSC	390	70.1	56.0	47.3	82.4
Zinc	886	23,464	456	822	437	640

Notes: **Bold – value above IDTLs** - value above HHSLs Blue – values above background J – The associated value is an estimated quantity K - Unknown bias L - Low bias Q - The detected concentration is below the method reporting limit/contract required quantitation limit, but is above the method quantitation limit. NA – Not Analyzed, U - The material was analyzed for, but was not detected above the level of the associated value

Section 10. Surface Water Sample Collection

Table 6 summarizes laboratory analytical results for the surface water samples collected from the Gold Bottom and Jay Gould mine sites.

One background surface water sample (UTBG01SW) was collected from an unnamed tributary to Bullion Gulch in the area of the Gold Bottom Mine. The sample had a pH of 7.76 and a conductivity of 0.604 mS/cm. This sample was used for comparison to all surface water samples collected in the Bullion Gulch drainage basin (E & E, p.5-3).

Analytical results of sample UTBG01SW indicate the presence of three Target Analyte List (TAL) metals in this sample including lead, manganese, and zinc.

One surface water sample was collected from the Jay Gould mine, labeled by E & E as Adit 1. At the time of sampling, this adit was flowing at a rate of approximately 3 to 5 gpm. The pH measured 7.81, and conductivity was 0.753 mS/cm. One co-located surface water/sediment sample set (JGAD01SW and JGAD01SD) was collected at the adit portal (E & E, p. 6-6).

Analytical results of sample JGAD01SW did not indicate the presence of any TAL metals at significant concentrations with respect to background concentrations.

Two surface water samples were collected at the Gold Bottom Mine (GBAD01SW and GBPP01SW). Sample GBAD01SW had a pH of 6.94 and a conductivity of 0.501 mS/cm. GBPP01SW had a pH of 7.0 and a conductivity of 0.380 mS/cm.

Analytical results of sample GBAD01SW did not indicate the presence of any TAL metals at significant concentrations with respect to background concentrations (E & E, Table 6-5).

Analytical results of sample GBPP01SW did not indicate the presence of any TAL metals at significant concentrations with respect to background concentrations (E & E, Table 7-3).

Table 6: DEQ Water Samples Total Recoverable Metals Analysis (mg/L)
(Standards in "dissolved" unless stated)

Gold Bottom and Jay Gould Mines

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 tributary (Gold Bottom area) UTBG01SW	Gold Bottom Adit Water Sample GBAD01SW	Gold Bottom PPE Water Sample GBPP01SW	Jay Gould Mine Adit Water Sample JGAD01SW
Aluminum	0.200				0.287	0.2 U	0.2 U	0.2 U
Antimony	0.006	0.006			0.0017	0.0083 JQ	0.0083 JQ	0.003
Calcium					87.400	67.2	66.1	88.3
Iron	0.3*				0.470	0.1 U	0.0421 JQ	0.1U
Lead	0.015	0.015	0.014 (H)	0.00054 (H)	0.014	0.01 U	0.01 U	0.0064 JQ
Magnesium					3.580	3.18JQ	3.12 U	15.4
Manganese	0.05*				0.047	0.015 U	0.0036 JQ	0.0012 JQ
Zinc	5*		0.035 (H)	0.032 (H)	0.081	0.0328 JQ	0.0318 JQ	0.0922

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

Key:
J = The associated value is an estimated quantity.
µg/L = micrograms per liter.
Q = The detected concentration is below the method reporting limit/contract required quantitation limit, but is above the method quantitation limit.

Section 11. Pathways and Environmental Hazards

11.1 Ground Water Pathways

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 4.

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).

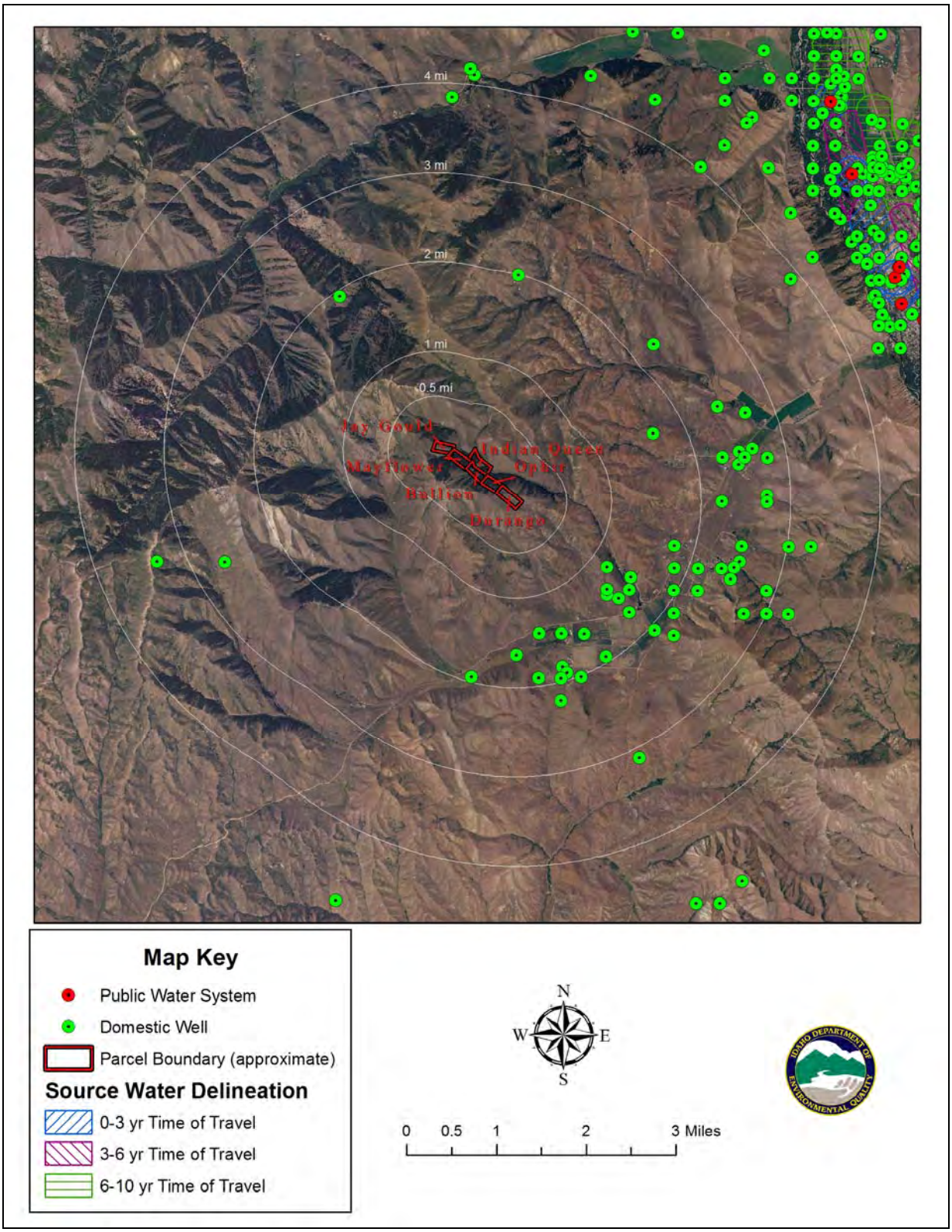

Figure 9. Drinking water well locations and source water delineations (Map source: Fair 100k, Sunv 100k, NAIP 2004).

11.2 Surface Water Pathways

The surface water migration pathway target distance limit (TDL) begins at the probable point to entry of surface water runoff from a site to a surface water body and extends downstream for 15 miles. The surface water TDL for the Bullion Gulch sub-drainage is presented in Figure 10.

Bullion Gulch is an ephemeral drain through most of its reach. Bullion Gulch drains toward the south-southeast from the Durango tunnel. The ephemeral drain enters an ephemeral tributary which originates near the Idahoan and Arizona mines. At this point a small (0.64 acres) wetland was observed. These relationships are illustrated in Figure 10. The Big Wood River is an EPA CWA §303(d) listed stream.

The probable point of entry (PPE) of mine and mill runoff into Croy Creek is approximately 1.5 miles to the south where Bullion Gulch enters Croy Creek. The 15-mile target distance limit (TDL) is approximately 7.5 miles south of Hailey on the Big Wood River. The city of Hailey sites at about mile 6 of the TDL. There are no surface water intakes for public drinking water systems within the 15-mile TDL. None of the mines are within a floodplain (FEMA 1998).

Although there is significant evidence of erosion and discharge to the ephemeral and perennial waters of Bullion Gulch, there is no evidence that these discharges are significant in volume of metals concentrations.

11.3 Air Quality Pathways

The mine road allows easy access to the Jay Gould and surrounding mines. Access is unrestricted to off-road vehicles (ORVs) which travel to the waste rock piles at which time the most likely pathway would be relative to fugitive dust emissions. The delivery of significant dust from the mine site to local residents is not likely because of the distance (~2 miles) to those residents.

11.4 Soil Exposure

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

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

The soil exposure pathways are not complete for residential or construction worker receptors at the Jay Gould mine. At the Mayflower mine the soil exposure pathway is not complete for residential receptors or construction worker. The non-residential receptor

pathway is potentially complete for recreational users at the Jay Gould and Mayflower mines. The residential pathway for hypothetical future residential receptors on these mine sites is also potentially complete if the claims are developed for residential housing.

A cumulative risk and hazard index analysis was completed by DEQ staff using Idaho's Risk Evaluation Manual (REM). Remedial action levels are typically set between 1 $X10^{-4}$ and 1 $X10^{-6}$ for risk and/or a hazard index of 1. For samples collected from the Jay Gould and Mayflower mines, DEQ analyzed for antimony, arsenic, cadmium, lead, manganese, mercury, selenium, silver, and zinc concentrations.

Jay Gould Mine

1. Results of the analysis showed a cumulative risk of 3.28 X 10^{-5} at the Waste Dump #1 and a cumulative hazard index of 1.23 for non-residential receptors. Both the risk and hazard indices are larger for the hypothetical future residential receptor. The primary driver for both the risk and hazard index is arsenic with a risk of 1.24 X 10^{-5} and a hazard quotient of 0.77. Based on this analysis the human health risk and hazard associated are slightly elevated with frequent recreational use of the Waste Dump 1 through inhalation, dermal contact and ingestion of site soils.
2. Results of the analysis showed a cumulative risk of 6.31 X 10^{-5} at the Waste Dump #2 and a cumulative hazard index of 2.43 for non-residential receptors. Both the risk and hazard indices are larger for the hypothetical future residential receptor. The primary driver for both the risk and hazard index is arsenic with a risk of 6.31 X 10^{-5} and a hazard quotient of 1.49. Based on this analysis there is some human health risk and hazard associated with frequent recreational use of the Waste Dump 2 through inhalation, dermal contact and ingestion of site soils.
3. Results of the analysis showed a cumulative risk of 1.77 X 10^{-5} at the Waste Dump #3 and a cumulative hazard index of 1.04 for non-residential receptors. Both the risk and hazard indices are larger for the hypothetical future residential receptor. The primary driver for both the risk and hazard index is arsenic with a risk of 1.77 X 10^{-5} and a hazard quotient of 0.42. Based on this analysis the human health risk and hazard associated are slightly elevated with frequent recreational use of the Waste Dump 3 through inhalation, dermal contact and ingestion of site soils.

Mayflower Mine (Upper**)**

1. Results of the analysis showed a cumulative risk of 1.30 X 10^{-5} at Waste Dump #1 and a cumulative hazard index of 1.86 for non-residential receptors. Both the risk and hazard indices are larger for the hypothetical future residential receptor. The primary driver for the risk index is arsenic with a risk of 1.30 X 10^{-5}, but the primary driver for the hazard index is manganese with a hazard quotient of 1.04. Based on this analysis the human health risk and hazard associated are slightly elevated with frequent recreational use of Waste Dump 1 through inhalation, dermal contact and ingestion of site soils.
2. Results of the analysis showed a cumulative risk of 8.45 X 10^{-5} at Waste Dump #2 and a cumulative hazard index of 2.55 for non-residential receptors. Both the risk and hazard indices are larger for the hypothetical future residential receptor. The primary driver for both the risk and hazard index is arsenic with a risk of 8.45 X 10^{-5} and a hazard quotient of 2.00. Based on this analysis there is some human health risk and hazard associated

with frequent recreational use of Waste Dump 2 through inhalation, dermal contact and ingestion of site soils.

3. Results of the analysis showed a cumulative risk of 1.78 X 10^{-4} at Waste Dump #3 and a cumulative hazard index of 4.67 for non-residential receptors. Both the risk and hazard indices are larger for the hypothetical future residential receptor. The primary driver for both the risk and hazard index is arsenic with a risk of 1.78 X 10^{-4} and a hazard quotient of 4.20. Based on this analysis, there is a moderately elevated human health risk and hazard associated with frequent recreational use of Waste Dump 3 through inhalation, dermal contact and ingestion of site soils.

Mayflower Mine (Lower)

1. Results of the analysis showed a cumulative risk of 4.40 X 10^{-4} at Waste Dump #1 and a cumulative hazard index of 10.70 for non-residential receptors. Both the risk and hazard indices are larger for the hypothetical future residential receptor. The primary driver for the risk index is arsenic with a risk of 4.40 X 10^{-4}. However, the primary driver for the hazard index is manganese with a hazard quotient of 10.40. Based on this analysis, there is a moderately elevated human health risk and hazard associated with frequent recreational use of Waste Dump 1 through inhalation, dermal contact and ingestion of site soils.
2. Results of the analysis showed a cumulative risk of 4.21 X 10^{-5} at Waste Dump #2 and a cumulative hazard index of 1.06 for non-residential receptors. Both the risk and hazard indices are larger for the hypothetical future residential receptor. The primary driver for both the risk and hazard index is arsenic with a risk of 4.21 X 10^{-5} and a hazard quotient of 0.99. Based on this analysis, there is some human health risk and hazard associated with frequent recreational use of Waste Dump 2 through inhalation, dermal contact and ingestion of site soils.
3. Results of the analysis showed a cumulative risk of 6.15 X 10^{-5} at the Waste Dump #3 and a cumulative hazard index of 2.38 for non-residential receptors. Both the risk and hazard indices are larger for the hypothetical future residential receptor. The primary driver for both the risk and hazard index is arsenic with a risk of 6.15 X 10^{-5} and a hazard quotient of 1.45. 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.

11.5 Domestic Wells and Public Water Supplies

There are approximately 120 domestic, commercial and municipal water wells within a four mile radius of the mines. No public water system wells or their zones of capture are located within a 4-mile radius of the Gold Bottom, Jay Gould, and Mayflower mines (Figure 9). The nearest domestic well is located approximately 1.5 miles down hydraulic gradient from the site near the mouth of Bullion Gulch. The six or so domestic wells locate at or near the mouth of Bullion Gulch are the most likely wells to be impacted by historic mining activities within Bullion Gulch. Analytical data pertaining to these wells were not available. DEQ recommends that owners of the wells have their well water tested on a regular basic for metals.

11.6 Residences, Schools and Day Care Facilities

The nearest residence is approximately 2.7 miles southeast of the Mayflower Mine, which is the southern most mine of the group discussed in the Preliminary Assessment. There are not any schools or day care facilities within 200 feet of any of these mine sites.

11.7 Wetlands

Significant wetlands exist along Croy Creek 2-3 miles down stream of the mill site to the 15-mile TDL on the Big Wood River (Figure 10). However, there are no wetlands in the immediate area of the Gold Bottom, Jay Gould, and Mayflower mines. The nearest wetland area, which is characterized as freshwater forest/shrub wetland, is located approximately 300 yards southeast of the Mayflower mine (USFWS, 2009).

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. Camas Golden weed (*Haplopappus insecticruris*) and Long-legged Myotis (*Myotis volans*) are listed as sensitive species located within a 4-mile radius of the claims.

11.9 Fisheries

Redband rainbow trout [*Oncorhynchhus mykiss* gairdneri], wood river sculpin [Cottus leiopomus], and brook trout [Salvelinus foninalis] are present within Greenhorn. 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).

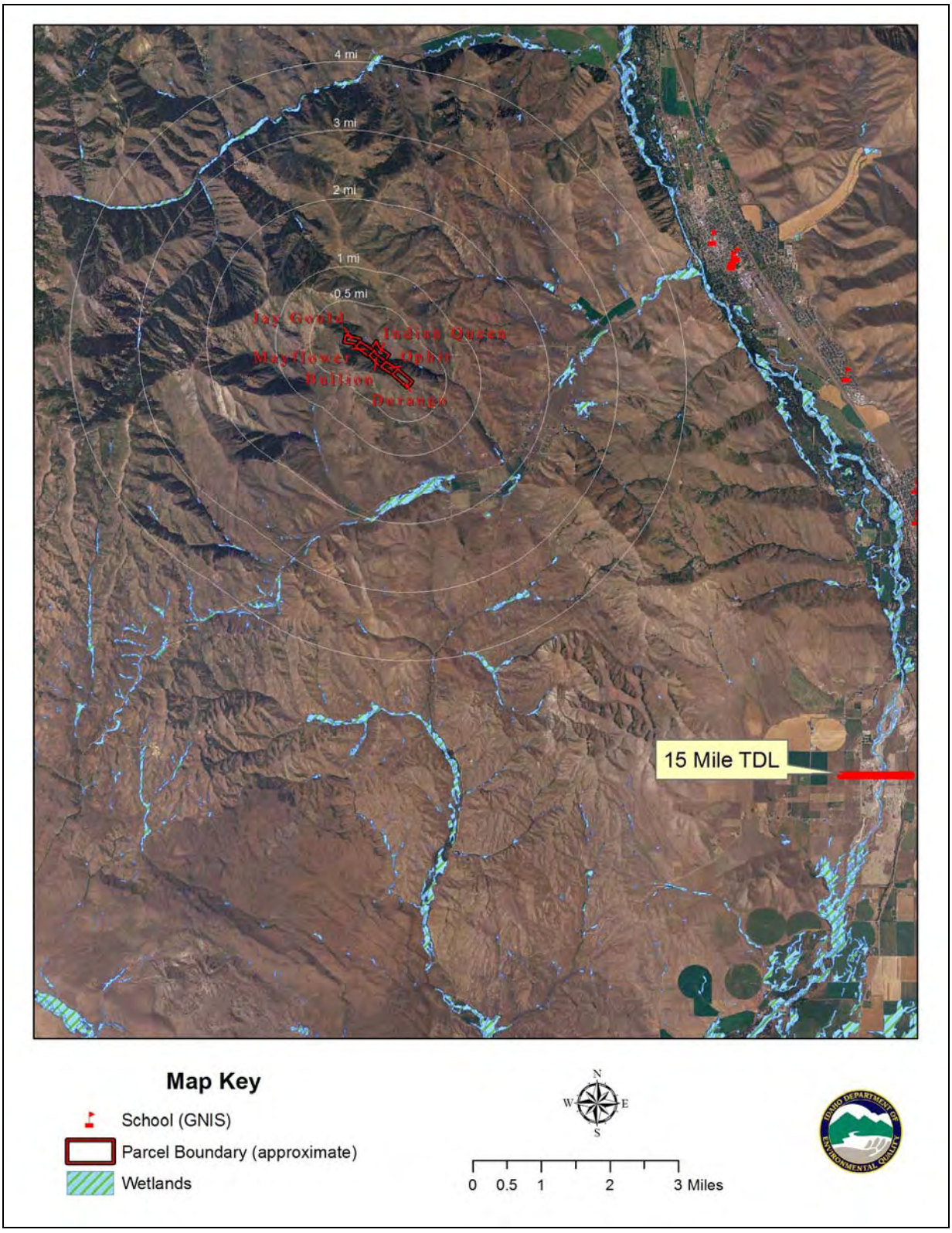

Figure 10. Wetlands and 15-Mile TDL map (Map source: Fair 100k, Sunv 100k, NAIP 2004).

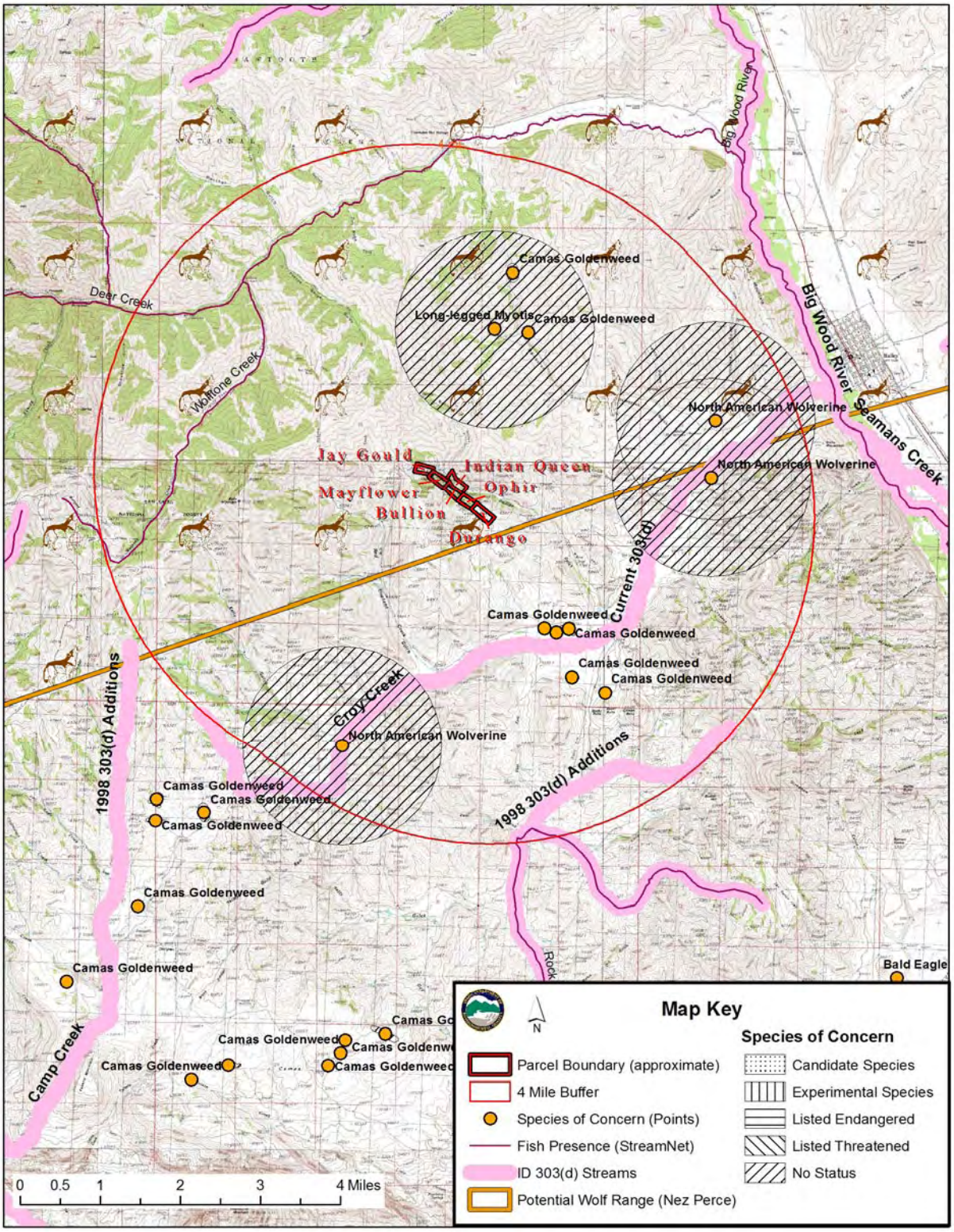

Figure 11. Sensitive species near the Mayflower Lode mines (Map source: Fair 100k, Sunv 100k, USGS 24K Topo).

11.10 Sensitive Waterways

Croy Creek and the Big Wood Rivers are both Clean Water Act 303(d) listed streams down gradient from the Gold Bottom, Jay Gould, and Mayflower mines, which might be adversely affected by contaminant delivery from the site. However, the ephemeral stream draining Bullion Gulch likely only flows during spring runoff and runoff from the mine 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 Gold Bottom, Jay Gould, and Mayflower mines fall within the BLM's Bullion grazing allotment, indicating the potential for grazing to occur on the property.

Section 12. Summary and Conclusions

DEQ is recommending that the status of these mines and claims is designated as No Remedial Action Planned (NRAP). DEQ is making this recommendation based on existing uses and conditions, historic information, and data analysis.

However, DEQ recommends that if these sites are targeted for residential development, further investigations and risk analysis should be conducted. Additional risk analysis based on this desired use will likely indicate that significant risk management will have to be incorporated in development and use plans.

In addition, there are numerous mine openings and physical hazards that may pose a risk to recreationists and future residents, if any. These mine openings should be properly managed or restricted to prevent injuries.

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