Abandoned-Inactive Mines on Lolo National Forest-Administered Land

Open-File Report MBMG 476
April 2003

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Prepared for the U.S. Department of Agriculture
Forest Service-Region 1

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1.0 Introduction

To fulfill its obligations under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), the Northern Region of the U.S. Forest Service (USFS) desires to identify and characterize the abandoned and inactive mines with environmental, health, and/or safety problems that are on or affecting National Forest System lands. The Northern Region of the USFS administers National Forest System lands in Montana and parts of Idaho and North Dakota. Concurrently, the Montana Bureau of Mines and Geology (MBMG) collects and distributes information about the geology, mineral resources, and ground water of Montana. Consequently, the USFS and the MBMG determined that an inventory and preliminary characterization of abandoned and inactive mines in Montana would be beneficial to both agencies and entered into a series of participating agreements to accomplish this work. The first forest inventoried was the Deerlodge National Forest, followed by the Helena National Forest, then the Beaverhead, the Kootenai, and the Lewis and Clark Forests (table 1). Initial inventories on the Custer and Gallatin National Forests were completed in 2000. The Flathead was completed in 2001. The Lolo and Bitterroot National Forests were scheduled to be inventoried last in 2001 and 2002.

Table 1. List of previous inventories and open-file report (OFR) numbers.

National Forest-Volume	Drainage(s)	MBMG OFR #
Deerlodge-Volume I	Basin Creek	321
Deerlodge-Volume II	Cataract Creek	344
Deerlodge-Volume III	Flint Creek and Rock Creek	345
Deerlodge-Volume IV	Upper Clark Fork River	346
Deerlodge-Volume V	Jefferson River	347
Helena-Volume I	Upper Missouri River	352
Helena-Volume II	Blackfoot-Little Blackfoot Rivers	368
Beaverhead	Entire Forest	379
Kootenai	Entire Forest	395
Lewis and Clark	Entire Forest	413
Custer	Entire Forest	421
Gallatin	Entire Forest	428
Flathead	Entire Forest	451
Bureau of Land Management	Entire State	365

1.1 Project Objectives

In 1992, the USFS and MBMG entered into the first of these agreements to identify and characterize abandoned and inactive mines on or affecting National Forest System lands in Montana. The objectives of this discovery process, as defined by the USFS, were:

1. Utilize a formal, systematic program to identify the "universe" of sites with possible human health, environmental, and/or safety problems that are either on or affecting National Forest System lands.

2. Identify the human health and environmental risks at each site based on site characterization factors, including screening-level soil and water data that have been obtained and analyzed in accordance with EPA quality-control procedures.

3. Based on site-characterization factors, including screening-level sample data where appropriate, identify those sites that are not affecting National Forest System lands, and can therefore be eliminated from further consideration.

4. Cooperate with other state and federal agencies, and integrate the Northern Region program with their programs.

5. Develop and maintain a data file of site information that will allow the region to pro-actively respond to governmental and public interest group concerns.

In addition to the USFS objectives, the MBMG objectives also included gathering new information on the economic geology and hydrogeology associated with these abandoned and inactive mines. Enacted by the Legislative Assembly of the State of Montana (Section 75-607, R.C.M., 1947, Amended), the scope and duties of the MBMG include “the collection, compilation, and publication of information on Montana's geology, mining, milling, and smelting operations, and ground-water resources; investigations of Montana geology emphasizing economic mineral resources and ground-water quality and quantity.”

1.2 Abandoned and Inactive Mines Defined

For the purposes of this study, mines, mills, or other processing facilities related to mineral extraction and/or processing are defined as abandoned or inactive as follows:

A mine is considered abandoned if there are no identifiable owners or operators for the facilities, or if the facilities have reverted to federal ownership.

A mine is considered to be inactive if there is an identifiable owner or operator of the facility, but the facility is not currently operating and there are no approved authorizations or permits to operate.

1.3 Health and Environmental Problems at Mines

Abandoned and inactive mines may host various safety, health, and environmental problems that may include metals that contaminate ground water, surface water, and soils; airborne dust from abandoned tailings impoundments; sedimentation in surface waters from eroding mine and mill waste; unstable waste piles with the potential for catastrophic failure; and physical hazards associated with mine openings and dilapidated structures. Although all problems were examined at least visually (appendix I–Field Form), the hydrologic environment appears typically to be affected to the greatest extent. Therefore, this investigation focused most heavily on impacts to surface water and ground water from the mines.

Metals are often transported from a mine by water (ground-water or surface-water runoff), either by being dissolved, suspended, or carried as part of the bedload. When sulfides are present, acid can form, which in turn increases the metal solubility. This condition, known as acid-mine drainage (AMD), is a significant source of metal releases at many of the mine sites in Montana.

1.3.1 Acid-Mine Drainage

Trexler and others (1975) identified six components that govern the formation of metal-laden acid-mine waters. They are as follows:

1) availability of sulfides, especially pyrite,
2) presence of oxygen,
3) water in the atmosphere,
4) availability of leachable metals,
5) availability of water to transport the dissolved constituents, and
6) mine characteristics that affect the other five elements.

Most geochemists would add to this list availability of minerals such as calcite, which can neutralize the acidity. These six components occur not only within the mines but can exist within mine dumps and mill-tailings piles making waste material sources of contamination as well.

Acid-mine drainage is formed by the oxidation and dissolution of sulfides, particularly pyrite (FeS_2) and pyrrhotite ($Fe_{1-x}S$). Other sulfides play a minor role in acid generation. Oxidation of iron sulfides forms sulfuric acid (H_2SO_4), sulfate ($SO_4^{=}$), and reduced iron (Fe^{2+}). Mining of sulfide-bearing rock exposes the sulfide minerals to atmospheric oxygen and oxygen-bearing water. Consequently, the sulfide minerals are oxidized, and acid-mine waters are produced.

The rate-limiting step of acid formation is the oxidation of the reduced iron. This oxidation rate can be greatly increased by iron-oxidizing bacteria (*Thiobacillus ferrooxidans*). The oxidized iron produced by biological activity is able to promote further oxidation and dissolution of pyrite, pyrrhotite, and marcasite (FeS_2–a dimorph of pyrite).

Once formed, the acid can dissolve other sulfide minerals, such as arsenopyrite (FeAsS), chalcopyrite ($CuFeS_2$), galena (PbS), tetrahedrite ($[CuFe]_{12}Sb_4S_{13}$), and sphalerite ([Zn,Fe]S) to produce high concentrations of copper, lead, zinc, and other metals. Aluminum can be leached by the dissolution of aluminosilicates common in soils and waste material found in Montana. The dissolution of any given metal is controlled by the solubility of that metal.

1.3.2 Solubilities of Selected Metals

At a pH above 2.2, ferric hydroxide ($Fe[OH]_3$) precipitates to produce a brown-orange stain in surface waters and forms a similarly colored coating on rocks in affected streams. Other metals, such as copper, lead, cadmium, zinc, and aluminum, if present in the source rock, may co-precipitate or adsorb onto the ferric hydroxide (Stumm and Morgan, 1981). Alunite ($KAl_3[SO_4]_2[OH]_6$) and jarosite ($KFe_3[SO_4]_2[OH]_6$) will precipitate at pH less than 4, depending on $SO_4^{=}$ and K^+ activities (Lindsay, 1979). Once the acid conditions are present, the solubility of the metal governs its fate and transport:

Manganese solubility is strongly controlled by the redox state of the water and is limited by several minerals such as pyrolusite and manganite; under reduced conditions, pyrolusite (MnO_2) is dissolved and manganite (MnO[OH]) is precipitated. Manganese is found in mineralized environments as rhodochrosite ($MnCO_3$) and its weathering products.

Aluminum solubility is most often controlled by alunite ($KAl_3[SO_4]_2[OH]_6$) or by gibbsite ($Al[OH]_3$), depending on pH. Aluminum is one of the most common elements in rock-forming minerals such as feldspars, micas, and clays.

Silver solubility is strongly affected by the activities of halides such as Cl^-, F^-, Br^-, and I^-. Redox and pH also affect silver solubility but to a lesser degree. Silver substitutes for other cations in common ore minerals such as tetrahedrite and galena and is found in the less common hydrothermal minerals pyrargyrite (Ag_3SbS_2) and proustite (Ag_3AsS_3).

Arsenic tends to precipitate and adsorb with iron at low pH, and de-sorb or dissolve at higher pH. Thus, once oxidized, arsenic will be present in solution in higher pH waters. At a pH between 3 and 7, the dominant arsenic compound is a monovalent arsenate, $H_2AsO_4^-$. Arsenic is abundant in metallic mineral deposits as arsenopyrite (FeAsS), enargite (Cu_3AsS_4), and tennantite ($Cu_{12}As_4S_{13}$), to name a few.

Cadmium solubility data are limited. In soils, cadmium solubility is controlled by the carbonate species octavite ($CdCO_3$) at a soil pH above 7.5 and by strengite ($Cd_3[PO_4]_2$) at a soil pH below 6. In soils, octavite is the dominant control on solubility of cadmium. In water, at low partial pressures of H_2S, $CdCO_3$ is easily reduced to CdS.

Copper solubility in natural waters is controlled primarily by the carbonate content; malachite ($Cu_2[OH]_2CO_3$) and azurite ($Cu_3[OH]_2[CO_3]_2$) control solubility when CO_3 is

available in sufficient concentrations. In soil, copper complexes readily with soil iron to form cupric ferrite. Other compounds in soil such as sulfate and phosphates also may control copper solubility. Copper is present in many ore minerals, including chalcopyrite ($CuFeS_2$), bornite (Cu_5FeS_4), chalcocite (Cu_2S), and tetrahedrite ($Cu_{12}Sb_4S_{13}$).

Mercury readily vaporizes under atmospheric conditions and thus is most often found in concentrations well below the 25 µg/L equilibrium concentration. The most stable form of mercury in soil is its elemental form. Mercury is found in low-temperature hydrothermal ores as cinnabar (HgS), in epithermal (hot springs) deposits as native mercury (Hg), and as Hg in human-made deposits where mercury was used in the processing of gold ores.

Lead concentrations in natural waters are controlled by lead carbonate, which has an equilibrium concentration of 50 µg/L at a pH between 7.5 and 8.5. As with other metals, concentrations in solution increase with decreasing pH. In sulfate soils with a pH less than 6, anglesite ($PbSO_4$) controls solubility while cerussite, a lead carbonate ($PbCO_3$), controls solubility in buffered soils. Lead occurs in the common ore mineral galena (PbS).

Zinc solubility is controlled by the formation of zinc hydroxide and zinc carbonate in natural waters. At a pH greater than 8, the equilibrium concentration of zinc in waters with a high bicarbonate content is less than 100 µg/L. Franklinite ($[Zn, Fe, Mn][Fe, Mn]_2O_4$) may control solubility at pH less than 5 in water and soils, and the solubility is strongly affected by sulfate concentrations. Thus, production of sulfate from AMD may ultimately control solubility of zinc in water affected by mining. Sphalerite (ZnS) is common in mineralized systems.

1.3.3 The Use of pH and SC to Identify Problems

In mine evaluation studies similar to this one, pH and specific conductance (SC) have sometimes been used to distinguish "problem" mine sites from those that have no adverse water-related impacts. The general assumption is that low pH (<6.8) and high SC (variable) indicate a problem, and that neutral or higher pH and low SC indicate no problem.

Limiting data collection only to pH and SC largely ignores the various controls on solubility and can lead to erroneous conclusions. Arsenic, for example, is most mobile in waters with higher pH values (>7), and its concentration strongly depends on the presence of dissolved iron. Cadmium and lead also may exceed standards in waters having pH values within acceptable limits.

Reliance on SC as an indicator of site conditions also can lead to erroneous conclusions. The SC value of a sample represents 55–75 percent of the total dissolved solids (TDS), depending on the concentration of sulfate. Without knowing the sulfate concentration, an estimate of TDS based on SC has a 25 percent possible-error range. Further, without having a “statistically significant” number of SC data for a study area, it is hard to define what constitutes a high or low SC value.

Thus, a water sample with a near-neutral pH and a moderate SC could be interpreted to mean that no adverse impacts have occurred when one or more dissolved-metal species may exceed standards. With this in mind, the evaluation of a mine site for adverse impacts on water and soil must include the collection of samples for analysis of trace elements, as well as major cations and anions.

1.4 Methodology

1.4.1 Data Sources

The MBMG began this inventory effort by completing a literature search for all known mines in Montana. Published location(s) of the mines were plotted on USFS maps. From the maps, an inventory was developed of all known mines located on or that could affect National Forest System lands in Montana. The following data sources were used:

1) the MILS (mineral industry location system) database [U.S. Bureau of Mines (USBM)],
2) the MRDS (mineral resource data systems) database [U.S. Geological Survey (USGS)],
3) published compilations of mines and prospects data,
4) state publications on mineral deposits,
5) USGS publications on the general geology of some quadrangle maps,
6) recent USGS/USBM mineral resource potential studies of proposed wilderness areas, and
7) MBMG mineral property files.

During subsequent field visits, the MBMG located numerous mines and prospects for which no previous information existed. Conversely, other mines for which data existed could not be located in the field.

1.4.2 Pre-Field Screening

Field crews visited only sites with the potential to release hazardous substances and sites that lacked information to make that determination without a field visit. For problems to exist, a site must have a source of hazardous substances and a method of transport from the site. Most metal mines contain a source for hazardous substances, but the common transport mechanism, water, is not always present. Sites on dry ridgetops were assumed to have no mechanism for water transport and mines described in the literature as small prospects were considered to have inconsequential hazardous-materials sources; thus, neither type was visited.

In addition, the MBMG and the USFS developed screening criteria (table 2) to determine if a site had the potential to release hazardous substances or posed other environmental or safety hazards. The first page of the Field Form (appendix I) contains the screening criteria. If any of the answers were “yes” or unknown, the site was visited. Personal knowledge of a site and published

information were used to answer the questions. USFS mineral administrators used these criteria to "screen out" several sites using their knowledge of an area.

Table 2. Screening criteria.

Yes	No		
__	__	1.	Mill site or tailings present
__	__	2.	Adits with discharge or evidence of a discharge
__	__	3.	Evidence of or strong likelihood for metal leaching or AMD (water stains, stressed or lack of vegetation, waste below water table, etc.)
__	__	4.	Mine waste in flood plain or shows signs of water erosion
__	__	5.	Residences, high public-use area, or environmentally sensitive area (as listed in HRS) within 200 feet of disturbance
__	__	6.	Hazardous wastes/materials (chemical containers, explosives, etc.)
__	__	7.	Open adits/shafts, highwalls, or hazardous structures/debris

If the answers to questions 1 through 6 were <u>all</u> "NO" (based on literature, personal knowledge, or site visit), then the site was not investigated further. Question 7 pertained to physical hazards only and was not a criterion for a site visit.

Mine sites that were not visited were retained in the database along with the data source(s) consulted (appendix II). However, these sites were often viewed from a distance while visiting another site. In this way, the accuracy of the consulted information was often verified.

Placer mines were not studied as part of this project. Although mercury was used in amalgamation of placer gold, the complex nature of placer deposits makes detection of mercury difficult and is beyond the scope of this inventory. Due to their oxidized nature, placer deposits are not likely to contain other anomalous concentrations of heavy metals. Limestone and building-stone quarries, gravel pits, and phosphate mines were considered to be free of anomalous concentrations of hazardous substances and were not examined.

<u>1.4.3 Field Screening</u>

Sites that could not be screened out as described above were visited. All visits were conducted in accordance with a health and safety plan that was developed for each forest. An MBMG geologist usually made the initial field visit and gathered information on environmental degradation, hazardous mine openings, presence of historical structures, and land ownership. Some site locations were refined using conventional field methods or by Global Positioning System (GPS) data. Each site's location was defined by latitude/longitude and by tract-section-Township-Range as indicated in figure 1.

At sites for which sparse geologic or mining data existed, MBMG geologists characterized the geology, collected samples for geochemical analysis, evaluated the deposit, and described workings and processing facilities present.

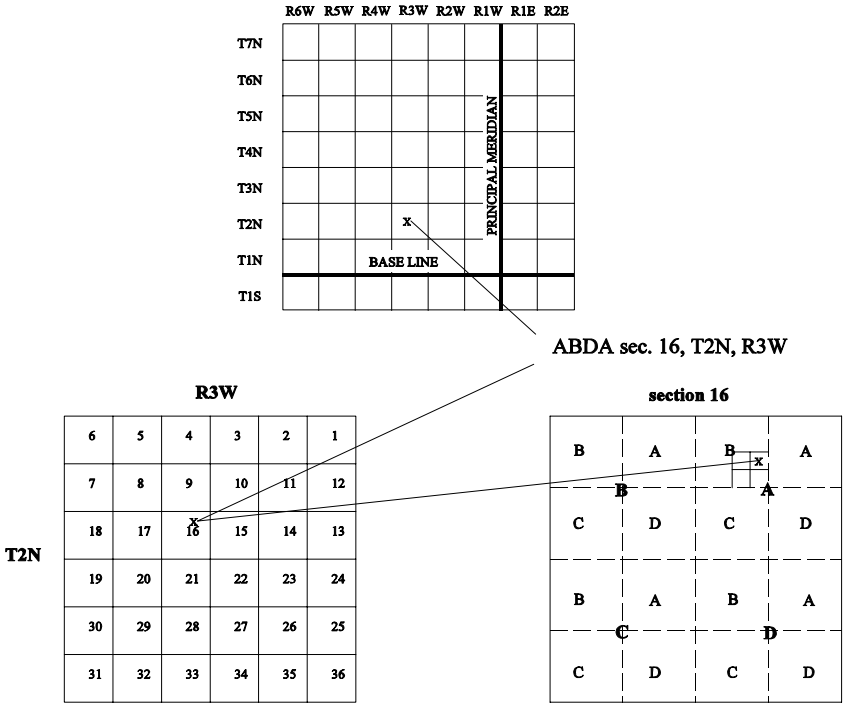


Figure 1. The location of a mine is found as shown using a counterclockwise progression of decreasing quarters of a section of land. The resulting tracts in this case are ABDA.

Sites with potential environmental problems were studied more extensively. The selection of these sites was made during the initial field visit using the previously developed screening criteria (table 2). In other words, if at least one of the first six screening criteria was met, the site was studied further. Sites that were not studied further are included in appendix III.

On public lands, sites with ground-water discharge, flowing surface water, or contaminated soils (as indicated by impacts on vegetation) were mapped by the geologist using a Brunton compass and tape. The maps show locations of the workings, exposed geology, dumps, tailings, surface water, and geologic sample locations.

1.4.3.1 Collection of Geologic Samples

The geologist took the following samples, as appropriate:

1) select samples–specimens representing a particular rock type taken for assay;

2) composite samples–rock and soil taken systematically from a dump or tailings pile for assay, representing the overall composition of material in the source; and

3) leach samples–duplicates of selected composite samples for testing leachable metals (EPA Method 1312).

The three types of samples were used, respectively, to characterize the economic geology of the deposit, to examine the value and metal content of dumps and tailings, and to verify the availability of metals for leaching when exposed to water. Assay samples were only taken to provide some information on the types of metals present and a rough indication of their concentrations. Outcrops and mine waste were not sampled extensively enough to provide reliable estimates of tonnages, grades, or economic feasibility.

1.4.4 Field Methods

An MBMG hydrogeologist visited all of the sites that the geologist determined had the potential for environmental problems. A hydrogeologist also visited the sites that only had evidence of seasonal water discharges, possible sedimentation, airborne dust, mine hazards, or stability problems and determined if there was a potential for significant environmental problems. The hydrogeologist then determined whether sampling was warranted and if so, selected soil and water sampling locations.

1.4.4.1 Selection of Sample Sites

This project focused on the impact of mining on surface water, ground water, and soils. The reasoning behind this approach was that a mine disturbance may have high total metal concentrations yet may be releasing few metals into the surface water, ground water, or soil. Conversely, another disturbance could have lower total metal content but be releasing metals in concentrations that adversely impact the environment.

The hydrogeologist selected and marked water and/or soil sampling locations based on field parameters (SC, pH, Eh, etc.) and observations (erosion and staining of soils/streambeds), and chose sample locations that would provide the best information on the relative impact of the site to surface water and soils. If possible, surface-water sample locations were chosen that were upstream, downstream, and at any discharge points associated with the site. Soil sample locations were selected in areas where waste material was obviously impacting natural material.

In most cases where applicable, a composite-sample location across a soil/waste mixing area was selected. In addition, all sample sites were located to assess conditions on National Forest System lands; therefore, samples sites were located on National Forest System lands to the extent that ownership boundaries were known.

Because monitoring wells were not installed as part of this investigation, the evaluations of impacts to ground water were based solely upon strategic sampling of surface water and soils. Background water-quality data are restricted to upstream surface-water samples; background soil samples were not collected. Laboratory tests were used to determine the propensity of waste material to release metals and may lend additional insight into possible ground-water contamination at a site.

1.4.4.2 Collection of Water and Soil Samples

Sampling crews collected soil and water samples, and took field measurements (stream flow) in accordance with the following:

Sampling and Analysis Plan (SAP)–These plans are site specific, and they detail the type, location, and number of samples and field measurements to be taken.

Quality Assurance Project Plan (QAPP) (Metesh, 1992)–This plan guides the overall collection, transportation, storage, and analysis of samples, and the collection of field measurements.

MBMG Standard Field Operating Procedures (SOP)–The SOP specifies how field samples and measurements will be taken.

1.4.4.3 Marking and Labeling Sample Sites

Sample-location stakes were placed as close as possible to the actual sample location and labeled with a sample identification number. The visiting hydrogeologist wrote a sampling and analysis plan (SAP) for each mine site or development area that was then approved by the USFS project manager. Each sample location was plotted on the site map or topographic map and described in the SAP; each sample site was given a unique seven-character identifier based on its location, sample type, interval, and relative concentration of dissolved constituents. The characters of the unique sample identifier were defined as follows:

D DA T L I C where:

D: Drainage area–determined from topographic map

DA: Development area (dominant mine)

T: Sample type: T-Tailings, W-Waste Rock, D-Soil, A-Alluvium, L-Slag, S-Surface Water, G-Ground Water

L: Sample location (1-9)

I: Sample interval (default is 0)

C: Sample concentration (High, Medium, Low) determined by the hydrogeologist, based on field parameters.

1.4.4.4 Existing Data

Data collected in previous investigations were neither qualified nor validated under this project. The quality-assurance managers and project hydrogeologists determined the usability of such data.

1.4.5 Analytical Methods

The MBMG Analytical Division performed the laboratory analyses and conformed, as applicable, to the following:

> Contract Laboratory Statement of Work, Inorganic Analyses, Multi-media, Multi-concentration. March 1990, SOW 3/90, Document Number ILM02.0, U.S. EPA, Environmental Monitoring and Support Laboratory, Las Vegas, NV.
>
> Method 200.8 Determination of Trace Metals in Water and Waste by Inductively Coupled Plasma and Mass Spectrometry: U.S. EPA.
>
> Method 200.7 Determination of Trace Metals in Water and Waste by Inductively Coupled Plasma and Mass Spectrometry: U.S. EPA.

If a contract laboratory procedure did not exist for a given analysis, the following method was used:

> Test Methods for Evaluating Solid Waste-Physical/Chemical Methods, SW-846, 3rd edition, U.S. EPA, Washington, D.C.
>
> EPA Method 1312 Acid-rain Simulation Leach Test Procedure-Physical/Chemical Methods, SW-846, 3rd edition, U.S. EPA, Washington, D.C., Appendix G.

All analyses performed in the laboratory conformed to the MBMG Laboratory Analytical Protocol (LAP).

1.4.6 Standards

EPA and various state agencies have developed human health and environmental standards for concentrations of various metals. To put the metal concentrations that were measured into some perspective, they were compared to these developed standards. However, it is understood that metal concentrations in mineralized areas may naturally exceed these standards.

1.4.6.1 Soil Standards

There are no federal standards for metal concentrations and other constituents in soils; acceptable limits are often based on human and/or environmental risk assessments for an area. Because no assessments of this kind have been done, metals concentrations in soils were compared to the limits postulated by the EPA and the Montana Department of Health and Environmental Sciences (MDHES) (now Department of Environmental Quality) for sites within the Clark Fork River basin in Montana. The proposed standard for lead in soils is 1,000 mg/Kg to 2,000 mg/Kg, and for arsenic in residential areas is 80 to 100 mg/Kg. The Clark Fork Superfund Background Levels (Harrington- MDHES, written commun., 1993) are listed in table 3.

Table 3. Clark Fork Superfund Background Levels (mg/Kg) for soils.

Reference	As	Cd	Cu	Pb	Zn
U.S. Mean soil	6.7	0.73	24.0	20.0	58
Helena Valley Mean soil	16.5	0.24	16.3	11.5	46.9
Missoula Lake Bed Sediments	-	0.2	25.0	34.0	105
Blackfoot River	4.0	<0.1	13.0	-	-
Phytotoxic Concentration	100	100	100	1,000 (500)*	500

*A more recent level of 500 mg/Kg for lead was provided for state superfund programs (Judy Reese, MDEQ, written commun., 1999). The 1,000 level was an upper limit for lead and not used at Code of Federal Regulations (CFR) sites.

For reference, Reese also provided Clark Fork Superfund phytotoxicity levels listed in table 4.

Table 4. Various levels of toxicity for lead (ARWWS : Anaconda Regional Water and Waste Standards, a part of the Anaconda National Priorities List).

Source		ppm
ARWWS ecological RA (Risk Assessment)	low pH<6.5	94 (Natural Resource Damage #)
ARWWS ecological RA	low pH>6.5	179 (Natural Resource Damage #)
ARWWS ecological RA	high pH<6.5	250
ARWWS ecological RA	high pH>6.5	250
Kabata-Pendias & Pendias (1992)		100-400
CH2MHill (1987)		1,000

1.4.6.2 Water-Quality Standards

The Safe Drinking Water Act (SDWA) directs EPA to develop standards for potable water. Some of these standards are mandatory (primary), and some are desired (secondary). The standards established under the SDWA are often referred to as primary and secondary maximum contaminant levels (MCLs). The maximum contaminant level is defined as "the maximum permissible level of a contaminant in water which is delivered to any user of a public water system" (EPA, 1999). Similarly, the Clean Water Act (CWA) directs EPA to develop water-quality standards (acute and chronic) that will protect aquatic organisms. These standards may vary with water hardness and are often referred to as the Aquatic Life Standards. The primary and secondary MCLs along with the acute and chronic Aquatic Life Standards for selected metals are listed in table 5. In some state investigations, the standards are applied to samples collected as total-recoverable metals. Because total-recoverable-metals concentrations are difficult if not impossible to reproduce, this investigation used dissolved-metals concentrations.

1.4.7 Analytical Results

The results of the sample analyses were used to estimate the nature and extent of potential impact to the environment and human health. Selected results for each site are presented in the discussion; a complete listing of water-quality, soil-chemistry data is presented in appendix IV.

The data for this project were integrated with existing data and incorporated into a new MBMG abandoned-inactive mines database. It is designed to be the most complete compilation available for information on the location, geology, production history, mine workings, references, hydrogeology, and environmental impact of each of Montana's mining properties. The data fields in the current database are compatible with the MBMG geographic information system (GIS) package.

Table 5. Water-quality standards.

	PRIMARY MCL[1] (mg/L)	SECONDARY MCL[2] (mg/L)	AQUATIC LIFE ACUTE[3,4] (mg/L)	AQUATIC LIFE CHRONIC[3,5] (mg/L)
Aluminum		0.05-0.2	0.75	0.087
Arsenic	0.05 / 0.01 [9]		0.34	0.15
Barium	2			
Cadmium	0.005		0.0043[6]	0.0022[6]
Chromium	0.1		1.7[6,7]	0.21[6,7]
Copper	1.3[8]	1.0	0.013[6]	0.009[6]
Iron		0.3		1
Lead	0.015[8]		0.065[6]	0.0025[6]
Manganese		0.05		
Mercury	0.002		0.0014	0.00077
Nickel			0.47[6]	0.52[6]
Silver		0.1	0.0034[6]	
Zinc		5	0.12[6]	0.12[6]
Chloride		250	860	230
Fluoride	4.0	2.0		
Nitrate	10 (as N)			
Sulfate		250		
pH (Standard Units)		6.5-8.5		6.5-9.0

(1) 40 CFR 141; revised through 7/1/99.
(2) 40 CFR 143; revised through 7/1/99.
(3) Priority Pollutants, EPA Region VIII, April 1999.
(4) Maximum concentration not to be exceeded more than once every 3 years.
(5) 4-day average not to be exceeded more than once every 3 years.
(6) Hardness dependent. Values are calculated at 100 mg/L.
(7) Cr^{+3} species.
(8) Action level, EPA Current Drinking Water Standards, National Primary and Secondary Drinking Water Regulations, April, 1999.
(9) The Safe Drinking Water Act, as amended in 1996, requires EPA to revise the existing drinking water standard for arsenic. As of February 2002, the standard is 0.01 mg/L or 10 ppb.

2.0 Lolo National Forest

Approximately 2.1 million acres are administered by the USFS, Lolo National Forest (LNF). The area lies west of the Continental Divide in western Montana (figure 2) and includes areas both north and south of Interstate 90 and east and west of Highway 93. The regional office is located in Missoula, Montana, with the Supervisor's office also in Missoula, and district offices are located in Missoula, Ninemile, Plains/Thompson Falls, Seeley Lake, and Superior. The majority of the LNF-administered land is on three-quarters of the Wallace 1° x 2° quadrangle; the remainder is on the northeast quarter of the Hamilton 1° x 2° quadrangle and the southwestern half of the Choteau and northwestern part of the Butte 1° x 2° quadrangles. Lolo National Forest-administered land lies predominantly within parts of Mineral, Sanders, and Missoula counties with some mines in Granite County also. Wilderness areas designated in the LNF include the Rattlesnake Wilderness and National Recreation Area north of Missoula, and the Welcome Creek Wilderness southeast of Missoula. The northern portion of the Thompson Falls/Plains ranger district is checkerboard ownership with both Plum Creek Timber land and State of Montana land.

The topography is typical of southwestern Montana's Basin and Range province, grading from semiarid grass/sagebrush-vegetated valleys to coniferous forests and alpine peaks above timberline. The Sapphire, John Long, Bitterroot, and Coeur d'Alene (northern Bitterroot) mountain ranges lie within the Lolo National Forest boundary. Typical highest mountain elevations of the LNF-administered land range from 8,500 ft at Quigg Peak in the Sapphires to 9,500 ft at Lolo Peak in the Bitterroots to 6,032 ft at Dominion Peak in the northern Bitterroots on the Montana/Idaho border. Valley elevations are about 2,460 ft at Thompson Falls and Plains to 3,200 ft at Missoula to 4,150 ft at Seeley Lake.

2.1 History of Mining

As with many of the other metal mining areas in the state, the mining districts in the Lolo National Forest were discovered and most intensely mined from the 1860's to the turn of the 20th Century. By 1870, most of the major mining districts had been discovered. A resurgence of mining started in 1926 and lasted until about 1944. Exploration and mining activity generally focused on precious metals although copper, lead, zinc, antimony, sand and gravel, and building stone have also been produced (Crowley, 1963; Wallace and Hosterman, 1956). Many of the mining districts are associated with the major northwest-trending geologic structures: the Osburn Fault, the Ninemile Fault, and the Silver Creek Fault to the south of Interstate 90.

Mining began with the discovery of placer gold deposits in the 1860's. Many streams were placered but production statistics are generally unavailable since most of the activity was in the 1880's to early 1900's, before records were kept by the U.S. Bureau of Mines. The Ninemile and tributary placers were discovered in 1874 and production from 1908 to 1957 was estimated at

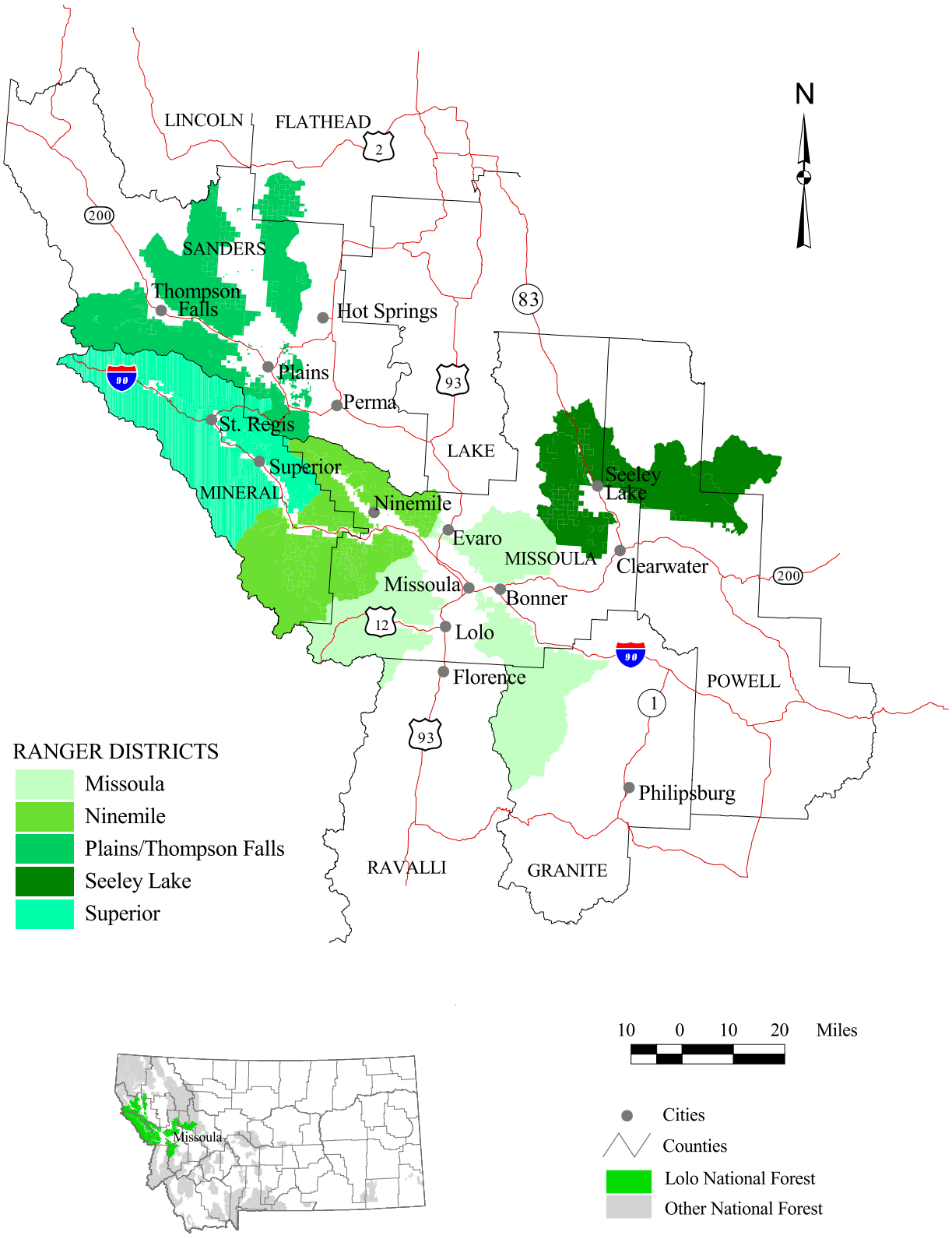


Figure 2. Location of the Lolo National Forest in western Montana.

$480,000 (Sahinen, 1957). Other placer deposits were located along many of the small drainages of the St. Regis River.

Hard-rock mining consisted of numerous small underground mines explored mainly for gold and silver, especially south of the I-90 corridor, but also to the north of I-90 for polymetallics such as copper, lead and zinc. At present, the most significant mineral deposits actively being worked in the Lolo National Forest are those associated with the placer mines. No lode mines in the categories "with production of greater than 100 tons per day" or "less than 100 tons per day" were listed within the Lolo National Forest boundaries (McCulloch, 2001). Placers included the Buddy Ellis placer near the mouth of Favorite Gulch on McCormick Creek, the Cedar Creek placer south of Superior (Brockbank's) with development but no production, and another, smaller deposit known as the "lower Cedar Creek placer" between Montreal and Rabbit Creeks near the old settlement of Cinkers. Quartz Creek, on I-90 near Quartz, is located on patented land but is surrounded by LNF-administered land. In recent years, it has been intermittently productive. The Tammy Lynn placer, mined by Max Johnson, is a past producer and the gold was recovered from bench gravels and flood debris on hillsides. It is also private, but it is near LNF-administered land.

Another intermittently active deposit includes the U.S. Antimony Smelter and Refinery at Stibnite Hill on Prospect Creek in Sanders County. The company last listed annual production at 7,000,000 pounds with a processing capacity of 15 tons per day (tpd). Presently, the antimony smelted here is not produced from Montana ores, but in the past, many mines were associated with the site.

2.1.1 Production

The total value (at the time they were mined) of minerals produced from all mines within the Lolo National Forest boundaries, as summarized in table 6, was probably in the millions of dollars with the majority from gold placer mines. These figures do not reflect the cost of mining and milling the metals so the actual profit from these mines would be much less. The estimated values reflect the prices of commodities at the time of production and not current prices.

Table 6. Production from some of the primary mining districts of the Lolo National Forest.

Mining district	Gold (oz)	Silver (oz)	Copper (lb)	Lead (lb)	Zinc (lb)	Other commodities
Prospect Creek	39*	8,348*	1,660*	448,497*	207,000*	(1908-1958)* Value = $93,361
Osburn Fault			2,046,963+	7,932,958+	8,086,827+	(1901-1953)+
Ninemile & Kennedy	23,222 (minimum)					Value = $480,000**
Thompson River	3*	27,118*	143,535*	115,602*	5,700*	(1906-1961) Value = $52,722*
Plains	33*	1,755*	561*	1,428*	–	(1906-1949)*
Eddy/Swamp Creek	No record*				–	
Revais Creek	1,277*	5,752*	1,392,791*	22 *	–	(1906-1961) Value = $242,296*

Production statistics from: * Crowley (1963); ** Sahinen (1957); + Campbell (1960).

The summaries below are from Sahinen (1935) unless otherwise noted:

Granite County:
Welcome Creek - >$30,000 in placer gold. Active 1891 to 1930's. Source–Belt rocks intruded by granite.
Alps (Bonita) district - "production unimportant"; major mines Golcoreda, Gold Bug and Rainy Day. Source–Belt rocks near granitic intrusives.

Mineral County:
Cedar, Quartz and Trout Creek districts - $2,000,000 gold, placer predominantly but some lode, Discovered 1869. Associated with veins in igneous dikes.
Denemora (Big Elk or Saltese) district - in Belt shales and limestones and associated with Wishards sill; copper, lead, gold mines include: Boston-Colby, Agnes, Richmond, Bald Mountain, Switchback.
Iron Mountain district - production from the 1890's. >$500,000 in dividends + costs, fissure vein in shale; lead, zinc, silver. From 1909-1953, total of 19 oz gold, 389,355 oz silver, 5,274 pounds copper, 5,385,741 pounds lead, and 7,535,084 pounds zinc (Campbell, 1960).
Packer Creek district - associated with Osburn Fault; fissure veins; mines include the Last Chance (>$200,000 produced), Ben Hur, Tarbox, Meadow Mountain, Syndicate, Silver Cable, Bryan; lead, zinc, copper, gold.
Rock Island district - also associated with Osburn Fault. Belt rocks (sandstones, shales, limestones). As replacements and fissure veins.
St. Regis district - production from 1920's to 1935 and later, Belt rocks, placers and veins; St. Lawrence, Rock Island, Lenora, Amazon Dixie, Oro Fino mines.

Missoula County:
Alps district - (not in Sahinen, may be same as Granite County).
Ninemile and Kennedy Creeks - placer mining with lode mining since 1874, several million dollars, McCormick, Dutch, Beecher, and Kennedy creeks.
Petty Creek district - minor placer, no production reported for many years. Lode includes Copper-Smith Mine. Also one beryl occurrence.
Woodman district - west of Lolo, Lawyer's Combination; gold, copper. Belt shales and limestones cut by diorites, ore in veins.

Sanders County:
Prospect Creek district - Belt rocks (quartzite, slate, argillites), ore in veins associated with basic dikes, includes antimony veins. Last active in the 1960's. Mostly a lead-zinc district with one gold mine and also antimony deposits. Only two placer mines with 2 troy ounces recorded produced between 1906 and 1958 (Crowley, 1963). It is 10 miles southwest of Thompson Falls.
Seepy Creek (Belknap), Spring Gulch, Revais Creek (Dixon), and Thompson River districts - all associated with Belt rocks, these are peripheral to LNF-administered land. Some platinum was reported in the Revais Creek / Dixon district.
Plains district - also known as Burns or Swamp Creek district.
Eddy Creek-Swamp Creek districts - no information.

2.1.2 Milling

Knowledge of the history of milling developments is essential for interpreting mill sites, understanding tailings characteristics, and determining the potential for the presence of hazardous substances. Mills, usually adjacent to the mine, produce two materials: 1) a product that is either the commodity or a concentrate that is shipped off site to other facilities for further refinement, and 2) mill waste, which is called tailings.

In the 1800's, almost all mills treated ore by crushing and/or grinding to a fairly coarse size followed by concentration using gravity methods. Polymetallic sulfide ores were concentrated and shipped to be smelted (usually to sites off USFS-administered land). Gold was commonly removed from free-milling ores at the mill by mercury amalgamation. Cyanidation arrived in the United States about 1891, and because it resulted in greater recovery rates, it revolutionized gold extraction in many districts. Like amalgamation, cyanidation also worked only on free-milling ores, but it required a finer particle size. About 1910, froth flotation became widely used to concentrate sulfide ores. This process required that the ore be ground and mixed with reagents to liberate the ore-bearing minerals from the barren rock.

In summary, there were 2 fundamental processes used for ore concentration: gravity and flotation, and 3 main processes used for commodity extraction: amalgamation, cyanidation, and smelting. Each combination of methods produced tailings of different size and composition, each used different chemicals in the process, and each was associated with a different geologic environment.

A total of 28 mills and mill sites, and one smelter were associated with LNF-administered land; most were actually on patented claims. The largest mills and the greatest amount of tailings were associated with the Iron Mountain Mine and the Nancy Lee Mine (reportedly a 125-ton flotation mill). A second mill associated with the Nancy Lee is at Slowey, north of the Clark Fork River. These mills are on private land. Other mills were identified either from literature or from ruins of the mill building, but few or no tailings were found at the sites. Smaller mills include those found at the Cajun Queen (a portable ball mill and shaker table), the Gold Mountain Mines mill on Lime Creek, east of Deep Creek (ball/rod mill and jig tailings), and the Silver Streak/Golden Sunset (unknown mill type). The Alps mining district had several small mills: at the East Fork of Brewster Creek, and at the Argo and Alps mines. The Ninemile and the Martina mines had small stamp mills that used amalgamation for gold recovery. The U.S. Antimony smelter and refinery is on the Driveway Peak quadrangle. The smelter is associated with the antimony mines at Stibnite Hill.

2.2 Geology

The geology of the Lolo National Forest (LNF) has been described in numerous reports; only a few of the more recent reports will be mentioned here. A general geologic map of the western and northern parts of the LNF was compiled by Gott and Cathrall (1979) after a more detailed map by Hobbs and others (1965). Harrison and others (1986) published a map at 1:250,000 scale of the Wallace 1° x 2° quadrangle. More recently Lonn and McFaddan (1999) published their interpretation of the Belt geology of a part of the Wallace 1° x 2° quadrangle. A brief description of the forest geology summarized from the above reports and maps is presented here.

Geologic units of the Lolo National Forest vary from Precambrian sedimentary rocks of the Belt Supergroup to Quaternary alluvium (figure 3). The oldest rocks are Precambrian ‘Y’ Proterozoic rocks including the Wallace, St. Regis, Revett and Burke Formations, intruded by the later Proterozoic Wishards sill. The youngest deposits consist of unconsolidated Quaternary alluvium. These units generally occur along the major drainages and within valley bottoms. Remnants of glacial deposits include channel and terrace gravels, distinguished from glacial and glaciofluvial deposits.

2.3 Economic Geology

The Lolo National Forest-administered land includes all or part of many mining districts. Most of the mining districts are located in the Clark Fork watershed, specifically in the middle Clark Fork watershed. The primary resources here are gold and silver, with lesser lead, copper and zinc. All are found related to the Precambrian Belt Supergroup and the regional structures that largely

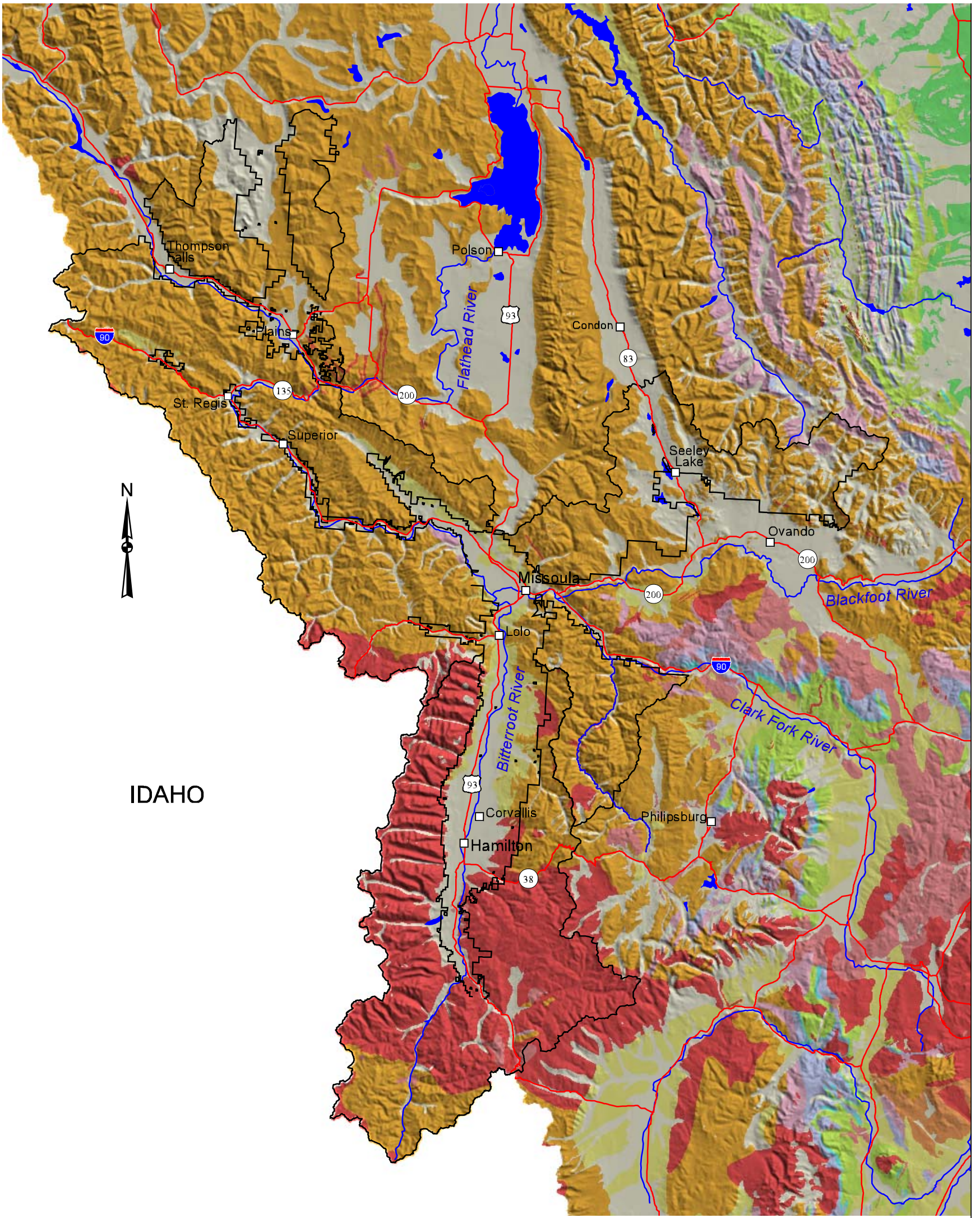


Figure 3. Generalized geologic map of the Lolo National Forest (modified from Ross and others, 1955).

control the emplacement of deposits. Minor mineral occurrences include a few scattered beryl (beryllium) deposits, a fairly significant antimony deposit at Stibnite Hill, and other small occurrences listed but not proven to be present.

2.4 Hydrology and Hydrogeology

The Lolo National Forest includes parts of the Blackfoot, Bitterroot, and upper, middle and lower Clark Fork river drainages. Average annual precipitation ranges from about 13 inches in the Missoula and Stevensville valleys to over 29 inches in the mountains near the Haugen/De Borgia area. Most precipitation occurs as snow from November to February. Snowfall varies greatly from about 30 inches near Stevensville, to 113 inches near De Borgia. Maximum temperatures are similar throughout the area with maximums reached usually in July and August. Minimum daily temperatures are also very similar throughout the area. Summaries are listed on the Western Regional Climate Center website (http://www.wrcc.dri.edu/), with information gathered by National Environmental Satellite, Data, and Information Service (NESDIS), an office of the National Oceanic and Atmospheric Administration (NOAA) (table 7).

Table 7. Summaries of the climate of selected cities.

City/area	Ave. total precip. (in.)	Ave. snowfall (in.)	Max. temp. (°F)	Min. temp. (°F)
Stevensville	12.6	30	83	14
Missoula	13.6	47	83	15
Lolo Hot Springs	24.2	103	82	13
Thompson Falls	20	39	86	18
Superior	16.7	39	86	17
De Borgia	29.5	113	82	15

Bitterroot River

The Bitterroot River originates in western Montana at the Idaho border and drains northward into the Clark Fork River at Missoula, Montana. The drainage has an area of 2,814 square miles above the U.S. Geological Survey gage station near Missoula, Montana (USGS water resources website, 2003, http://water.usgs.gov/). The minimum flow over a 16-year period of record is 754 cfs; the mean for the same period was 1,167 cfs, and the maximum flow was 2,030 cfs.

The flow of the Bitterroot is unregulated by any dams. The water is used primarily for irrigation and domestically.

Clark Fork River

The Clark Fork River originates in Butte, Montana, as Silver Bow Creek and drains westward to Missoula, Montana. At Missoula, Montana, the drainage area upstream is 5,009 square miles and the annual mean discharge is 1,716 cfs. The flow varies from a low annual mean of 1,030 cfs to a high annual mean of 4,470 cfs for the period of record from 1894 to 1999 (USGS water resources website, 2003). The Clark Fork at St. Regis has a drainage area of 10,709 square miles and a mean annual flow of 3,935 cfs. At St. Regis, the Clark Fork has a minimum annual flow of 1,950 and a maximum of 12,000 cfs. At Plains, Montana the drainage basin has increased in size to 19,958 square miles. Here the mean annual flow is 11,710, the minimum annual flow is 4,460 and the maximum annual flow is 31,800 cfs.

Uses of the water from the Clark Fork include domestic and public water supplies, industrial applications, and irrigation.

St. Regis River

The St. Regis River originates at the Idaho/Montana border near Lookout Pass and drains eastward to the Clark Fork River at St. Regis. The basin has a drainage area of 303 square miles above its confluence with the middle Clark Fork basin. The mean annual flow is 344 cfs, the minimum annual flow is 88 cfs, and the maximum is 1,370 cfs based on 21 years of records, from 1959 to 1974.

No dams are present on the St. Regis and water use is limited.

2.5 Summary of the Lolo National Forest Investigation

A total of 262 sites were initially identified in or near the Lolo National Forest (LNF) by using the USBM MILS database as a basic reference. A variety of other sources were used to gather specific information on the sites. Sahinen (1935), in his MS thesis, summarized the mining districts of the state. Sahinen (1957), in MBMG Bulletin 8, summarized the mineral deposits and mines in Missoula and Ravalli counties. Crowley (1963) wrote on the mines and mineral deposits of Sanders County in MBMG Bulletin 34. Lyden (1948, 1987) was the authority for placer deposits that were worked prior to the 1950's. Another source of information is Wallace and Hosterman (1956) in their study of the geology of western Mineral County, in which they show numerous mine locations with summaries. Campbell (1960) concentrated on the area around St. Regis and Superior describing the mineral deposits and geology there. Hobbs and others (1965) studied the Coeur d'Alene district. Early work included Calkins and Jones (1912), emphasizing the area around Coeur d'Alene, Idaho to Superior, Montana.

Wilderness area studies included: Banister and others (1983), Sapphires RARE II Area in Granite and Ravalli counties; Close (1982), the mineral resources of the Welcome Creek Wilderness; and Mayerle (1983), a study of the Rattlesnake RARE II area north of Missoula.

The Stibnite Hill area was the focus of study for several theses: Bratney (1977), Clendenin (1973), and Marin (1976).

Table 8 summarizes the inventory process for the Lolo National Forest. Of the 307 sites identified on the Forest, 162 were screened out, 109 were visited by MBMG staff, and 19 sites were sampled. Also, at the time of this study, the area around the Stibnite Hill antimony mines on Prospect Creek was considered active and so was not included in the inventory.

Table 8. Summary of Lolo National Forest investigation.

Total Number of Abandoned/Inactive Mines Sites that were:	
PART A-Field Form	
Located in the general area from MILS	262
Deleted as a duplicate site	0
Added by MBMG from literature or field visits	45
	307
PART B-Field Form (Screening Criteria)	
Screened out by LNF minerals administrator or by description in literature in the office	162
Unable to locate/inaccurate location	27
No access	9
Visited by MBMG geologist	109
Screened out by geologist after visit	-90
PART C-Field Form	
Sampled (Water and/or Soil)	19

The numbers in table 8 are accurate to the extent that the database is updated and will change, reflecting current progress in database entry.

Individual discussions of each of the 19 sites referred to and sampled by the hydrogeologists are included in this report on the Lolo National Forest. Some sites were on private lands and were sampled collectively at sites located on LNF-administered land. Short descriptions of the 307 sites inventoried as possibly affecting LNF-administered land are given in appendix III of this volume.

2.6 Mining Districts versus Watersheds versus Ranger Districts

The Lolo National Forest includes at least twelve mining districts as defined by several authors including Sahinen (1935), Sahinen (1957), and Crowley (1963). These boundaries are subject to

interpretation and change, and often the same district is known by various names, as in the case of the Rock Island, Osburn Fault, Deer Creek, St. Regis or Ward–all names for the same district. Some mines are not located in traditional districts, so for the purposes of this study, all the mines studied have been organized by drainage basin and by ranger district. Drainages are a convenient way to separate the National Forest-administered land into manageable areas for discussion of geology, hydrogeology, and potential cumulative environmental impacts from mining activity on the drainage. In this report, sites are organized first by drainages and then by ranger districts within the drainage. Locations of inventoried sites are based on ranger districts within the watershed boundary clearly outlining the drainages on the figures. Individual sampled sites are listed in the text according to the drainage that they are in and roughly from upstream to downstream in accordance with the way sites were discussed in previous reports.

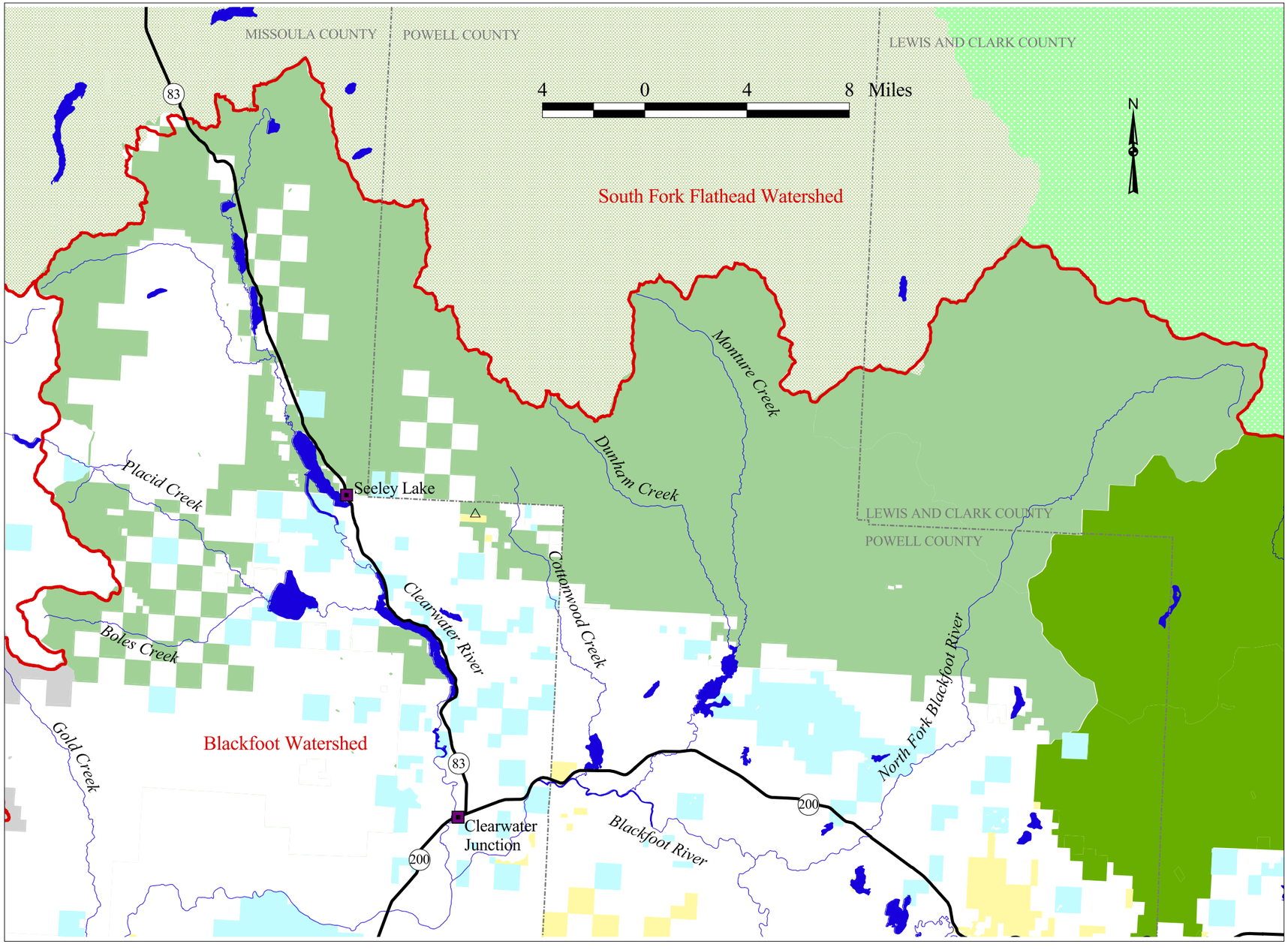
3.0 Blackfoot, Flint Creek/Rock Creek, Upper Clark Fork, and Bitterroot Drainages

The Lolo National Forest is drained by parts of the Blackfoot and Bitterroot Rivers, and the upper, middle and lower Clark Fork drainage basins; the majority of the mining activity has been in the Clark Fork basin. The land administered by the Lolo National Forest includes most of the rugged mountainous terrain in the lower and middle Clark Fork River drainage.

The sites listed in bold in the tables exhibited one or more environmental problems and are discussed in the following sections. The mines in these drainages are presented generally upstream to downstream. The summary figures in the following text are organized by Ranger District because of the scale at which it is best to display the approximate locations of the mine sites. The watershed boundaries are drawn on the figures but the tables are organized by both watershed and Ranger District. Only that part of the watershed that is in proximity to LNF-administered land is plotted.

The Blackfoot River watershed that is coincident with the LNF-administered land, encompassing the Seeley Lake Ranger District, had only one mine listed in the MILS database. The mine is located within the Seeley Lake Ranger District boundary. The site was screened out by MBMG staff because the location was only general and the ownership was unknown.

The Missoula Ranger District (figure 5) is located within the upper Clark Fork, the Blackfoot, the Middle Fork of the Clark Fork, and the Bitterroot watersheds. All five sites in the Blackfoot watershed were screened out in the office. In the Bitterroot watershed, five additional sites were listed with only one visited. The Flint Creek-Rock Creek watershed had 28 mine sites of which 13 were visited and one was sampled. The upper Clark Fork drainage had one additional mine listed in the database but it was also screened out.



EXPLANATION

- Cities/Towns
- Inventoried site

Highways
- Interstate
- Montana Roads
- Secondary
- U.S. Route

- Watershed boundary
- County boundary
- Streams/Rivers
- Major lakes

Ranger districts
- Missoula
- Seeley Lake

Adjacent National Forests
- Flathead
- Helena
- Lewis and Clark

- BLM
- State
- Private and other

Figure 4. The Seeley Lake Ranger District had only one mine (the Susan Mine) listed in the MBMG Abandoned and Inactive Mines database.

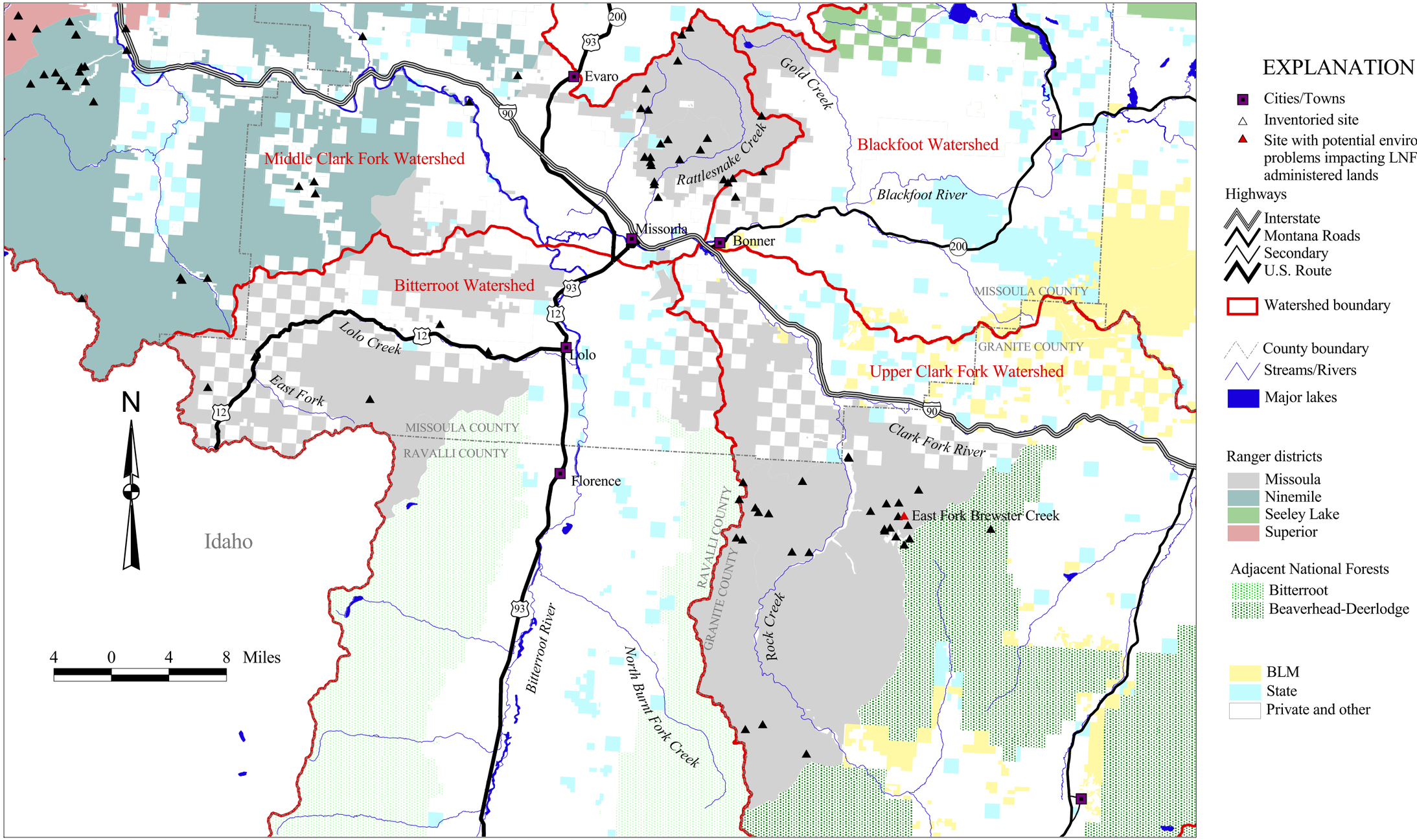


Figure 5. The Missoula Ranger District had only one site that was sampled; it was in the upper Clark Fork watershed.

Table 9. The list of mines in the Blackfoot River watershed separated into Missoula and Seeley Lake Ranger Districts. No mines in the Blackfoot River drainage were sampled.

MINE NAME	MBMG ID	OWNER	VISIT	HAZARD	T	R	S	TRACT	24K TOPO	COMMENTS
MISSOULA RANGER DISTRICT										
Juniper Prospect	MI002952	NF	N	NE	13N	18W	2		BLUE POINT	Screened out: No access. 18-ft adit described in USBM MLA-OFR 79-83. Copper prospect.
Limestone Prospect	MI002958	NF	N	NE	14N	18W	34		BLUE POINT	Screened out: Commodity limestone. No workings (Mayerle and others, 1983).
Sheep Mountain Prospect	MI002964	NF	N	NE	14N	17W	30		BLUE POINT	Screened out: Barite Prospect. No workings (Mayerle and others, 1983).
Unnamed Limestone Prospect	MI002946	NF	N	NE	14N	18W	27		BLUE POINT	Screened out: Unnamed limestone prospect. An 81-ft & a 38-ft long cut (Mayerle & others, 1983)
Unnamed Prospect	MI002940	NF	N	NE	14N	18W	27		BLUE POINT	Screened out: Unnamed silver prospect. 2 shallow 5-ft long trenches (Mayerle and others, 1983).
SEELEY LAKE RANGER DISTRICT										
Susan Mine	MI005607	M	N	NE	16N	14W	4		SEELEY LAKE EAST	Screened out: Inaccurate location (±1 km). May be on Morrell Mountain 7.5' quadrangle.

(Owner: NF-National Forest, P-Private, S-State, M-Mixed or unknown; Visit: , Y-visited; N-not visited; Hazard: Y-hazard, NE-not evaluated)

Table 10. The abandoned-inactive mines of the Bitterroot River drainage in the Missoula Ranger District.

MINE NAME	MBMG ID	OWNER	VISIT	HAZARD	T	R	S	TRACT	24K TOPO	COMMENTS
MISSOULA RANGER DISTRICT										
Four V's Claims	MI005603	NF	N	NE	11N	24W	22		LOLO HOT SPRINGS	Screened Out: Smokey quartz claims; unlikely to impact Forest.
Ward Lode Mine	MI005995	NF	Y	NE	11N	22W	21	DADB	DICK CREEK	Reclaimed but with a seep remaining. Return when snow has melted. Visited 06/05/01.
Granite Hot Springs / Lolo	MI006007	P	N	NE	11N	23W	7	A	LOLO HOT SPRINGS	Screened Out: Private land, geothermal.
Lawyers Combination	MI005523	M	N	NE	12N	21W	29		CAMP CREEK	Unable to visit; no access.
Chickaman Mine	MI005527	P	N	NE	12N	21W	35	DADC	BLUE MOUNTAIN	Screened out: private, surrounded by Plum Creek Timber land.

(Owner: NF-National Forest, P-Private, S-State, M-Mixed or unknown; Visited: Y-visited; N-not visited; Hazard: Y-hazard, NE-not evaluated)

Table 11. The abandoned-inactive mines of the Upper Clark Fork River Watershed / Flint Creek-Rock Creek drainages in the Missoula Ranger District. Bolded entries were sampled and are described in this report.

MINE NAME	MBMG ID	OWNER	VISIT	HAZARD	T	R	S	TRACT	24K TOPO	COMMENTS
MISSOULA RANGER DISTRICT										
Alps Mine	GR000860	M	Y	N	10N	16W	26	CCBD	SPINK POINT	Visited 10/17/00 by MBMG staff. Mostly private. Sampled by DSL-AMRB in 1993.
Argo Mine and Mill	GR003509	P	Y	Y	10N	16W	35	ACDA	SPINK POINT	Visited by MBMG staff in summer 1992. Lolo National Forest but administered by Deerlodge National Forest.
B and J Claim	GR003026	N	N	N	10N	17W	10		IRIS POINT	Unable to visit. One adit reported in USBM MLA OFR 17-82.
Bagdad Mine / Mark V Mining	GR000248	N	N	Y	07N	17W	14	B	STONY CREEK	Active in the 1950's and 1980's. No apparent access.
Bet Claims	GR002971	N	N	N	10N	18W	36		CLEVELAND MOUNTAIN	Screened out: no workings according to USBM MLA OFR 17-82. Silver-tungsten property.
Big Springs Creek / Big Spring Crk	GR003144	N	N	N	07N	17W	6		SAWMILL SADDLE	Screened out: placer. Active in the 1930's. Recorded that 10 oz gold recovered.
Boulder Placer Prospect	GR003584	N	N	N	07N	17W	1		SAWMILL SADDLE	Screened out: general location in several sections w/ uranium, thorium, gold, niobium, & columbium.
Brewster Creek	GR003159	N	Y	N	10N	16W	23	C	SPINK POINT	Visited general area. Small amount of placer mining activity.
Brewster Creek Unnamed Adit	GR008030	N	Y	N	10N	16W	15	C	SPINK POINT	One caved adit on south side of Brewster Creek with few remaining timbers.
Brewster Spar Mine	GR003586	N	N	N	10N	16W	12		RAVENNA	Screened out: inaccurate location and fluorspar mine.
E.F. Brewster Creek Mill	**GR008063**	**N**	**Y**	**N**	**10N**	**16W**	**23**	**ACDB**	**SPINK POINT**	**Mill site but no tailings observed. Sampled 07/2001.**
Edelman Mine	GR008108	N	Y	N	10N	16W	14	CBAB	SPINK POINT	On Brewster Creek by old cabin. No hazards.
Ellen M. Claims	GR002986	N	Y	N	10N	18W	23	AAAA	CLEVELAND MOUNTAIN	Visited by MBMG staff on 05/24/01; numerous prospects only (>30 holes). No hazards.
Gold Bug	GR003451	M	Y	Y	10N	16W	26	AABA	SPINK POINT	Visited 10/19/00. Open stope or raise. Steep sides.
Harvey Creek	GR003174	N	N	N	10N	15W	23		HARVEY POINT	Screened out: placer, very small operation.
Hidden Treasure Mine / Group	GR000044	M	Y	Y	10N	16W	27		SPINK POINT	Group of 15 patented claims; may be some workings on LNF-land. One open adit 6' high X 4' wide X 40' long.

MINE NAME	MBMG ID	OWNER	VISIT	HAZARD	T	R	S	TRACT	24K TOPO	COMMENTS
Hungry Horse and Big Dipper Placer	GR003011	N	N	N	10N	17W	20		CLEVELAND MOUNTAIN	Screened out: two recent discovery pits and older placer workings (USBM MLA OFR 17-82).
J. Jay No. 2 Claim	GR002976	N	N	N	10N	18W	12	C	ELK MOUNTAIN	Screened out: Seven pits and trenches and a caved shaft (USBM MLA OFR 17-82).
Jumbo Mine	GR000086	N	Y	Y	10N	16W	27	BDBC	SPINK POINT	Visited by MBMG 10/18/00. One open adit, at least 100' long; one with 3' X 2' opening. Seeps only.
Lucky Hancock Claim	GR003006	N	N	N	10N	17W	19		CLEVELAND MOUNTAIN	Screened out: two pits according to USBM MLA OFR 17-82, p. 9.
Midnight Placer Claims	GR003031	M	Y	N	09N	17W	2		GRIZZLY POINT	Visited 10/15/00 by MBMG.
Miss Fortune Placer Claims	GR003016	N	N	N	10N	18W	35		CLEVELAND MOUNTAIN	Screened out: gold placer with 8 pits, a sluice box and a small dam (USBM MLA OFR 17-82).
N. Pacific Ry. Prospect	GR000380	P	N	N	11N	16W	31		IRIS POINT	Screened out: commodity is barite, private, no other references.
Rainy Day Mine	GR003406	M	Y	Y	10N	16W	27	BDCC	SPINK POINT	Area visited 10/18/00. Mill reported in literature. Open adits; may be same as Jumbo?
Rock Creek	GR003641	P	N	N	11N	16W	31		IRIS POINT	Screened out: barium occurrence, private. (Barite veins and replacements in dolomite. MINOBRAS)
Unnamed Adit (Lower Brewster)	GR008005	N	Y	Y	10N	16W	21		SPINK POINT	Adits caved but there is a highwall associated with the site.
Unnamed Placer Deposit	GR000296	N	N	N	10N	17W	19		CLEVELAND MOUNTAIN	Screened out: scattered placers in the Welcome Creek Wilderness.
Unnamed Pumice Deposit	GR000818	P	N	N	10N	16W	25		SPINK POINT	Screened out: private ownership, commodity is pumice.
Welcome Creek	GR003154	N	N	N	09N	17W	4		GRIZZLY POINT	Screened out: general location of placer in Welcome Creek Wilderness.

(Owner: NF-National Forest, P-Private, S-State, M-Mixed or unknown; Visited: Y-visited; N-not visited; Hazard: Y-hazard, NE-not evaluated)

3.1 East Fork of Brewster Creek Mill and Adit

3.1.1 Site Location and Access

An unnamed mill on the East Fork of Brewster Creek (figures 6 and 7) is located approximately 28 miles map distance from Missoula. It is accessible by driving 9 miles via National Forest Primary Route 102, turning east (left) on the road up Brewster Creek at Quigley (Forest Route 4308), and then on an unnumbered road that follows the East Fork Brewster Creek to the east. The mill site is most easily accessible by four-wheel-drive vehicle but in good road conditions is accessible by two-wheel drive. The mill is located in tracts ACDB sec. 23, T.10N., R.16W., at an elevation of 4,829 ft on the Spink Point 7.5-min. quadrangle, all on LNF-administered land.

The unnamed adit is located about 1,500 ft northeast of the Alps Mine on the Spink Point 7.5-min. quadrangle in tracts CACC sec. 26, T.10N,. R.16W., at an elevation of 6,240 ft. The adit is on a patented claim but a small discharge flows downhill across the public access road (Forest Route 4308) where it was sampled.

3.1.2 Site History - Geologic Features

This area was known as the Alps (or Bonita) mining district. Brewster Creek was placered in 1935, 1938, and 1940 yielding 2.4 oz, 9 oz, and 5 oz of gold, respectively (Lyden, 1948). The commodities at the Alps Mine were reported to be gold and tungsten from “sulfide gold ore” and wolframite (Trauerman and Reyner, 1950).

The mines around Brewster Creek are mainly in the Middle Proterozoic Snowslip and the Mount Shields formations. The Butte 1° x 2° quadrangle geologic map (Wallace and others, 1986) shows a thrust fault separating the two units in the area. The country rock at the mill site was primarily a maroon siltite with ripple marks.

A description of this mill was not recognized in any of the literature on the area. The present site consists of an old concrete foundation, some metal debris and timbers. There are no patented claims within a mile of the site. The Gold Bug Mine is upstream on the East Fork of Brewster Creek and less than a mile to the southeast of the mill. It is conceivable that the mill may be associated with the Gold Bug Mine. A 100-stamp mill was built to process the Gold Bug and Golconda ores (Trauerman and Reyner, 1950). Trauerman and Reyner (1950) describe oxidized gold-copper ore from the Goldbug and Golconda claims as being treated in an amalgamation mill in 1934 and 1935. Whether or not these mill descriptions refer to the East Fork Brewster Creek Mill is unknown.

The unnamed adit also had no information on it in literature. It may have been associated with the Alps Group.

3.1.3 Environmental Condition

The total disturbed area at the East Fork of Brewster Creek is approximately 5 acres. The mill site sits in the canyon bottom along the East Fork of Brewster Creek. It appears that the mill burned in the past. The tailings are in contact with the creek but there are no visible adverse effects to the vegetation or water quality. Two earthen dams are located downstream of the mill site; the upper one is breached.

The adit is on private land in a group of three patented claims. The area was physically disturbed by mining but no negative environmental effects were noted.

Separate from the discharging adit but less than a mile to the southeast, the Argo Mine and Mill area, on the Harvey Creek drainage, was sampled by Pioneer Technical Services (PTS) in 1994 for the Montana Department of State Lands-Abandoned Mines Reclamation Bureau. Analytical results showed elevated barium, lead and mercury associated with the tailings; elevated mercury in the waste rock; and the MCL for antimony and chronic life criteria for lead were exceeded in the adit discharge. PTS sampled the Alps Mine in 1993 and found elevated arsenic, mercury and iron in the waste rock; and they found one discharging adit (pH=4.13) that had no direct pathway to surface water.

3.1.3.1 Site Features - Sample Locations

A water-quality sample was collected from a site about 200 ft upstream of the mill on the East Fork of Brewster Creek (BUMS10L). Downstream from this site, sample BUMS20L was taken. The flow rates at these locations were approximately 15 gpm at the upstream sample site and 1.5 cfs (673 gpm) at the downstream sample site. Upstream, the field pH was 7.96 (lab=7.27) and the specific conductance was 45.8 (lab=83) µmhos/cm. This sample was taken approximately 200 ft upstream of the mill foundation. Downstream, East Fork of Brewster Creek pH was 7.83 (lab=7.3) and specific conductance was 24.3 (lab=53) µmhos/cm. Both sites' characteristics were relatively similar. Composite soil/tailings samples were taken from the two abandoned ponds at the mill site. BUMD10H was a vertical profile composite in the upstream pond. BUMD20H was a horizontal profile with a sample interval every 10 ft for 60 ft. A horizontal profile in the downstream pond was taken every 10 ft for 30 ft. Samples were collected on July 23, 2001.

The adit discharge was estimated at about 1 gpm with a pH of 3.97 (lab=3.73) and specific conductance of 146 in the field and 159 measured in the lab. The sample was taken as the small flow crossed the road. Site features and sample locations are shown in figures 6 and 7; photographs are shown in figures 7a and 7b.

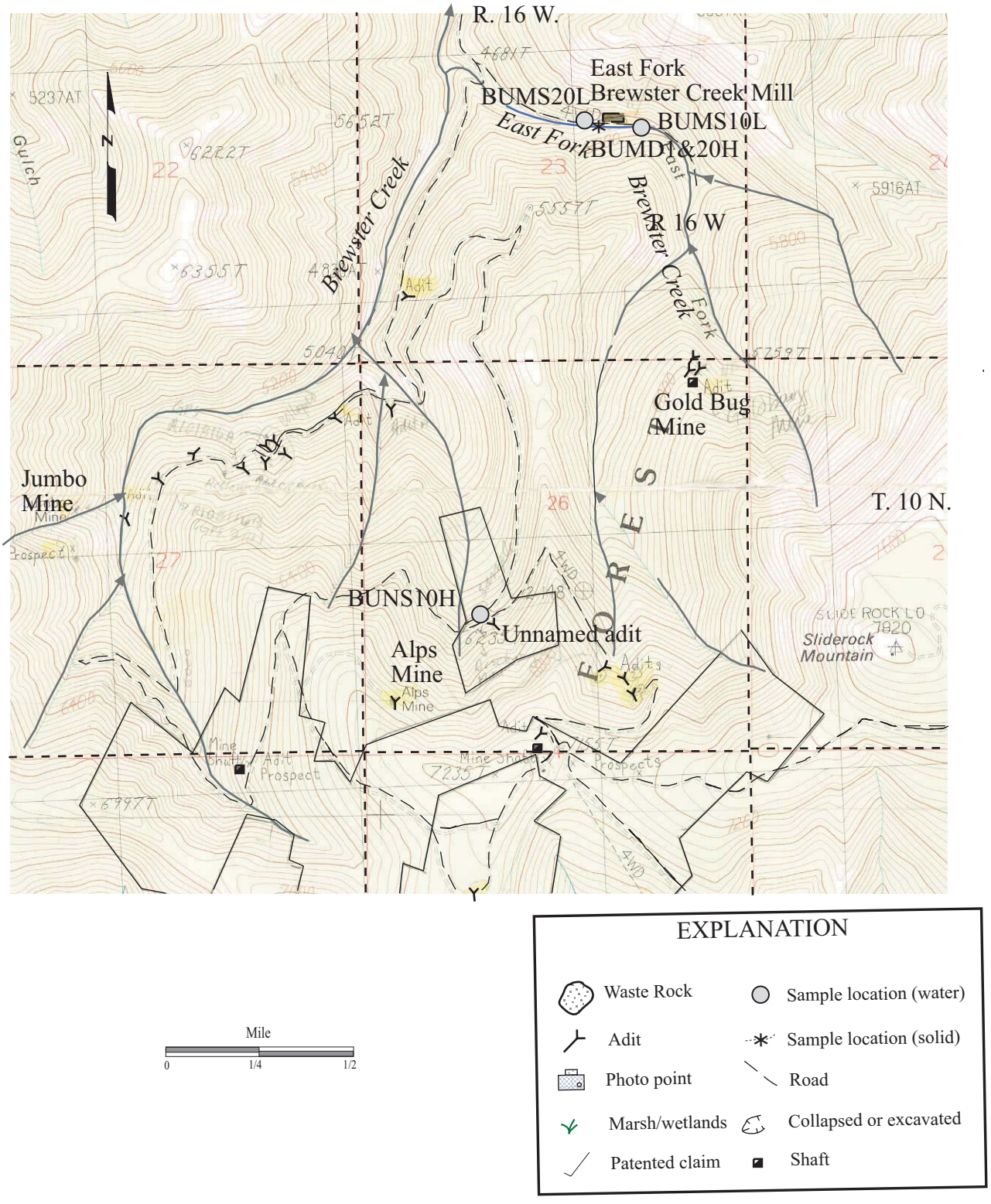


Figure 6. The generalized site map from the Spink Point 7.5-min. quadrangle shows the location of the mill site on the East Fork Brewster Creek and the unnamed adit near the Alps Mine.

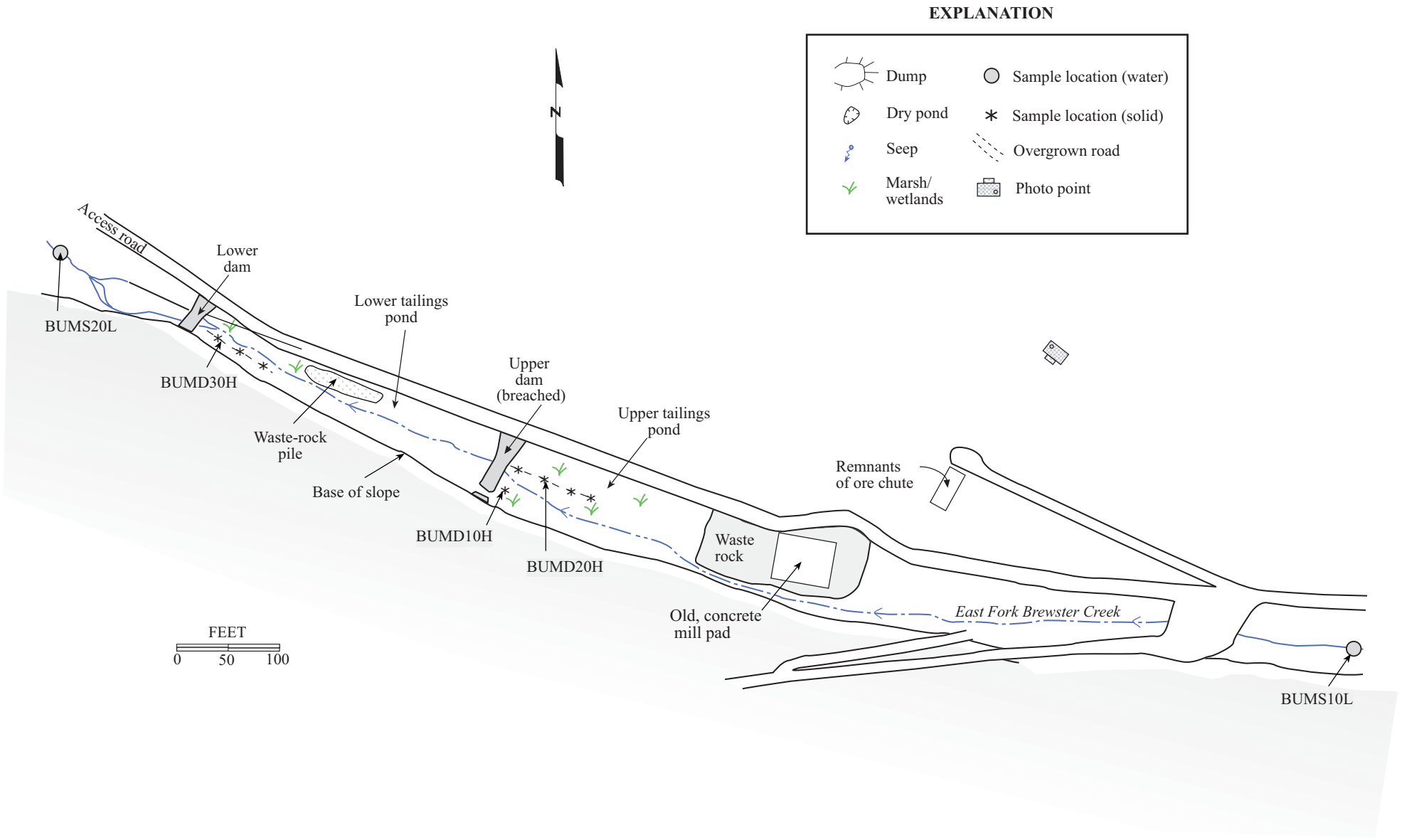


Figure 7. The mill on the East Fork of Brewster Creek had two dams that created catch ponds, which were mapped and sampled 10/20/00 and 07/23/01.

Figure 7a. East Fork of Brewster Creek mill site looking to the west, as mapped on 10/20/00. Only the concrete foundations remain. The creek flows from left to right in the upper portion of the photo.

Figure 7b. The tailings-pond dam at the East Fork of Brewster Creek mill site was breached, as mapped on 10/20/00.

3.1.3.2 Soil

None of the samples exceeded the phytotoxic concentration limits for soils. The laboratory detection limit for cadmium was too high to tell if the samples exceeded the Clark Fork background levels. Arsenic levels were above the Clark Fork Superfund background levels in all three samples but well below the phytotoxic limit of 100 mg/Kg.

Table 12. Soil sampling results at the East Fork Brewster Creek mill site (mg/Kg).

Sample Location	As	Cd	Cu	Pb	Zn
BUMD10H - vertical composite of upstream pond	4.82[1]	<2.3	7.25	2.34	12.7
BUMD20H - horizontal profile of upstream pond	11.5[1]	<2.4	44.7[1]	7.26	17.1
BUMD30H - horizontal profile of downstream pond	9.86[1]	<2.7	134[1]	13.7[1]	14.1

(1) Exceeds one or more Clark Fork Superfund background levels (table 3).

3.1.3.3 Water

The pH of the adit discharge as measured in the lab was 3.73 and the field pH was 3.87. The adit sample's specific conductance was higher than the East Fork of Brewster Creek but not exceedingly high at 150 µmhos/cm. The discharge flowed at only 1 gpm and never reached an active drainage. The secondary maximum contaminant level and chronic aquatic life criteria in aluminum were exceeded in the adit discharge (table 13).

The upstream and downstream samples on the East Fork of Brewster Creek both had pH values of approximately 7.9 (field) and 7.3 (lab). The water ran clear and cold in the East Fork Brewster Creek. There were no exceedences in the samples taken from Brewster Creek.

Table 13. East Fork of Brewster Creek mill site water-quality exceedences.

Sample Site	Al	As	Ba	Cd	Cr	Cu	Fe	Pb	Mn	Hg	Ni	Ag	Zn	Cl	F	NO_3	SO_4	pH
BUMS10L-upstream																		
BUMS20L-downstream																		
BUNS10H-adit discharge	S,C																	S

Exceedence codes:
S= Secondary MCL
C= Aquatic life - chronic
Note: The analytical results are listed in appendix IV.

3.1.3.4 Vegetation

The vegetation in the area was not visibly affected by the mill tailings. Shrubs and grasses grew next to the stream channel. The mined area near the adit on the patented claims was disturbed but the lodgepole pine forest was not dead or dying. There was no staining or sedimentation noted at either site. Mosses, cow parsnip, stinging nettles, and grasses grew next to the stream at the upgradient sample. Mosses, ferns, monkey flower, alders, and stinging nettles grew at the downstream sample site.

3.1.3.5 Summary of Environmental Conditions

Aluminum was the only exceedence in the adit discharge, but the flow was exceedingly small at less than 1 gpm. All three soil samples exceeded Clark Fork Superfund background levels in arsenic, with two samples exceeding one or more acceptable levels in copper; none exceeded any standards in cadmium and zinc.

3.1.4 Structures

One ore-loading platform remained at the mill site on the East Fork Brewster Creek. The concrete foundations of a substantial mill were the only remnants of the mill building. A few pieces of scrap iron also remained.

The adit was on patented land and so was not evaluated for structures. There was a partially standing cabin at the bend in the road less than ⅛-mile up the road from the mill. It appeared as if it had had a recent transient occupant in 2001.

3.1.5 Safety

The safety of the private, patented land was not evaluated. The mill site appeared to have some visitation but is generally not easily accessed. The waste-rock dump is steep and unstable for climbing. No other hazards were noted.

4.0 Middle Clark Fork Watershed including the Ninemile Drainage

There are approximately 198 mine sites in the Middle Fork of the Clark Fork watershed. The breakdown by ranger district includes: 20 sites in the Missoula Ranger District, 46 sites in the Ninemile Ranger District, 7 sites in the Plains Ranger District and 125 sites in the Superior Ranger District.

In the Missoula Ranger District, 8 sites were visited; all were dry. In the Ninemile Ranger District, 12 sites were visited, 2 of which were sampled, and 34 were screened out. Only one site was visited and sampled in Plains Ranger District; the other 7 were screened out. The Superior had 47 mines visited, of which 13 were sampled. Table 14 summarizes general information about all the sites; the sites sampled are shown in bold. The sampled sites are discussed below beginning with those in the Ninemile Ranger District. Figure 8 shows the locations of the two sampled mines in the Ninemile as well as those with no environmental concerns.

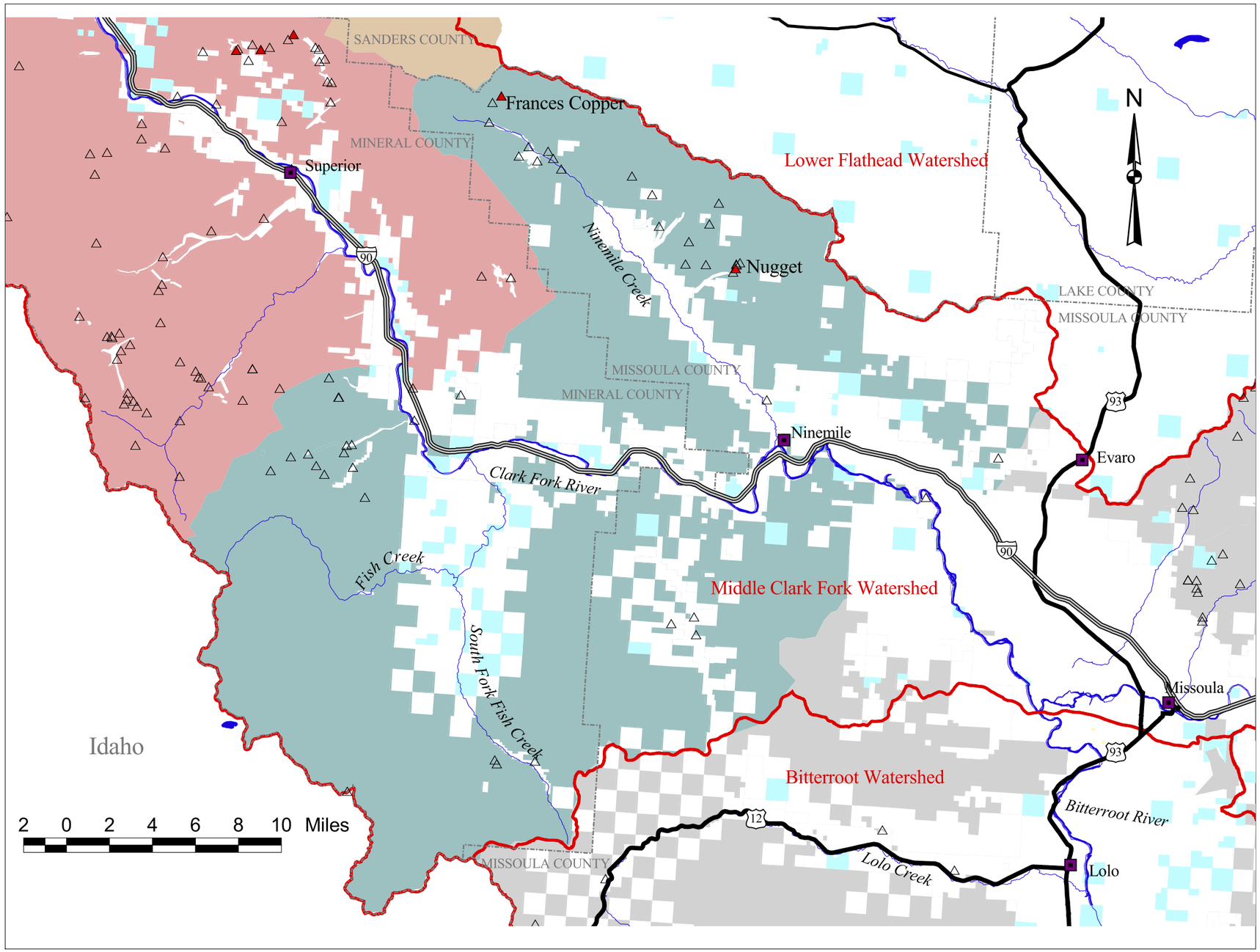


Figure 8. The Ninemile Ranger District lies within a portion of the middle Clark Fork watershed and contains two mines of environmental concern to Lolo National Forest-admimnistered land.

Table 14. The abandoned-inactive mines of the Middle Clark Fork River drainage. Bolded entries were sampled and are described in this report.

MINE NAME	MBMG ID	OWNER	VISIT	HAZARD	T	R	S	TRACT	24K TOPO	COMMENTS
MISSOULA RANGER DISTRICT										
Bonanza Lime Prospect	MI002886	N	Y	Y	14N	19W	3	ADBA	STUART PEAK	Visited 05/23/01. One open adit with a 5-ft by 6-ft opening. Dry, with unvegetated waste dump.
Calumet	MN008191	P	Y	N	13N	25W	31	C	LOZEAU	Placer. Visited by R.B. McCulloch, MBMG. Active.
Copper Prospect	MI002898	N	N	N	15N	18W	6		STUART PEAK	Screened out: no workings (Mayerle and others, 1983). Unnamed copper prospect.
Frenchman's Prospect	MI002892	N	Y	Y	14N	19W	14	DABC	NORTHEAST MISSOULA	Open inclined shaft, ~35 ft deep, overgrown pits, trenches and a collapsed adit.
Gold Prospect	MI002598	N	N	N	14N	19W	13		NORTHEAST MISSOULA	Screened out: no references, inaccurate location.
Gold Prospect	MI002904	N	Y	N	14N	19W	35	ACBB	NORTHEAST MISSOULA	Visited by MBMG 05/21/01. At least 6 trenches and pits along ridge. All dry.
Holliday	MI002658	M	N	N	14N	19W	22		NORTHEAST MISSOULA	Screened out: few shallow pits and trenches (Mayerle and others, 1983; Sahinen, 1957)
Index Granite Prospect	MI002880	N	N	N	15N	19W	27		STUART PEAK	Screened out: chip samples in a diabase dike with no associated workings (Mayerle and others, 1983).
Lime Kiln Prospect	MI002862	N	N	N	14N	18W	17		NORTHEAST MISSOULA	Screened out: a 33-ft cut and a 20-ft lime kiln, commodity is lime (Mayerle and others, 1983).
Looks Grim Prospect	MI002868	N	Y	N	14N	19W	4	BACC	STUART PEAK	Visited area 05/23/01. Unable to locate main 202 ft adit found by Mayerle and others (1983).
Mineral Peak Prospect	MI002970	N	N	N	14N	18W	1		WAPITI LAKE	Screened out: Unnamed prospect with no associated workings (Mayerle and others, 1983).
Montana Power Co. Barite Prospect	MI002934	N	Y	N	14N	18W	17	DCDB	NORTHEAST MISSOULA	Visited 5/22/01. Observed from Rattlesnake Creek trail. On dry hillside, cut only.
Rattlesnake Creek Barite	MI005687	N	Y	N	14N	19W	35		NORTHEAST MISSOULA	Visited area. No workings noted. Commodity is barite.
Sanders Lake Silica Prospect	MI002874	N	N	N	15N	19W	13		STUART PEAK	Screened out: silica deposit with no associated workings (Mayerle and others, 1983).

MINE NAME	MBMG ID	OWNER	VISIT	HAZARD	T	R	S	TRACT	24K TOPO	COMMENTS
Silica Prospect	MI002604	N	N	N	14N	18W	21		NORTHEAST MISSOULA	Screened out: unnamed silica prospect.
Silicon Prospect	MI002592	N	N	N	14N	19W	27		NORTHEAST MISSOULA	Screened out: unnamed silica deposit.
Silicon Prospect	MI002856	N	N	N	15N	19W	1		STUART PEAK	Screened out: no workings (Mayerle and others, 1983). Unnamed silicon prospect.
Swede Prospect	MI002922	N	Y	Y	14N	18W	19	CBDA	NORTHEAST MISSOULA	Visited 05/22/01. One open adit, one collapsed adit. No discharge.
Unnamed Prospect	MI002910	N	N	N	14N	19W	35		NORTHEAST MISSOULA	Screened out: seems to be same site as Holliday (MI002658).
Unnamed Prospect	MI002928	N	N	N	14N	19W	26		NORTHEAST MISSOULA	Screened out: only reference is Mayerle and others (1983). No workings.
NINEMILE RANGER DISTRICT										
Babcocks - North St. Patricks Peak	MN008184	N	Y	N	14N	26W	12	B	ST PATRICK PEAK	Visited by R.B. McCulloch. One adit; one shaft.
Betty Placer	MN003312	N	Y	N	12N	24W	17	BBBD	WHITE MOUNTAIN	Placer on LNF-administered land. Very little disturbance.
Big Nugget Placer	MN005963	N	N	N	15N	26W	24		LOZEAU	Screened out: placer. May be same as Meadow Creek Placer; same location.
Boulder Gold Placer	MN005775	N	N	N	14N	26W	2		ST. PATRICK PEAK	Screened out: placer, very small operation.
Coffee Pot Lode / Kerris Green	MN003327	N	Y	N	14N	25W	17	BBDC	ST. PATRICK PEAK	Visited by R.B. McCulloch, 2001. Surface excavation only. Active.
Copper King	MN005939	M	Y		12N	24W	10	CCCB	LUPINE CREEK	Private, but visible from Fish Creek Road (FR 343). No effects to LNF-administered land.
Coppersmith	MI005695	P	N	N	13N	23W	10	A	PETTY MOUNTAIN	Screened out: private. Little development work done (Sahinen, 1957).
Diamond Mountain Gravel	MI002796	P	N	N	14N	21W	3		FRENCHTOWN	Screened out: gravel quarries near Frenchtown, unlikely to impact LNF-administered land.

MINE NAME	MBMG ID	OWNER	VISIT	HAZARD	T	R	S	TRACT	24K TOPO	COMMENTS
Eileen Marsha Placer Mine	MI005455	M	N	N	16N	23W	2		MCCORMICK PEAK	Screened out: placer mine.
F.D. Placer	MN005971	N	Y	N	12N	24W	17	B	WHITE MOUNTAIN	Visited general area, no effects to LNF-administered land.
Favorite Gulch Mine	MI002610	N	N	N	16N	23W	14		MCCORMICK PEAK	Adit symbol on topo map. No access.
Frances Copper/Joe Wallit (Waylett)	**MI006019**	**N**	**Y**	**Y**	**17N**	**24W**	**8**	**BBDB**	**KNOWLES**	**Eroding waste dumps; highwalls, seep at toe of waste dump.**
Hauttula Prospect	MI005511	N	Y	N	16N	23W	13	AADD	MCCORMICK PEAK	Visited 10/15/01. Dry collapsed adit, S.60°E.; iron-stained argillite.
Ida A. Placer	MI005491	N	N	N	16N	23W	15		MCCORMICK PEAK	Screened out: placer mine.
Josephine	MI005551	M	N	N	16N	23W	4	C	STARK NORTH	No access, private land with gate below.
Kennedy Creek Mines	MI005587	N	N	N	16N	23W	13		MCCORMICK PEAK	General description: See Nugget, Lost Cabin, and Hauttula mines.
La Chambre Placer Mine	MI005459	M	N	N	17N	24W	22		HORSEHEAD PEAK	Visited general area. Placer mine. Inaccurate location.
Lost Cabin (Kennedy)	MI002496	N	Y	N	16N	23W	13	ADBD	MCCORMICK PEAK	Visited 10/15/01. Collapsed adit, S75W; waste dump along Kennedy Creek.
M & C Claims	MN003287	M	N	N	14N	26W	2		LOZEAU	Screened out: silica is commodity.
Marion Creek Placer	MI002742	P	N	N	17N	23W	33		STARK NORTH	Screened out: placer, mostly private and no access.
Mattie V	MI002568	M	Y	N	17N	24W	22		HORSEHEAD PEAK	Visited general area. Mattie V may be a placer and appears to be located on private land.
McFarland Creek Placer Mine	MN005855	N	N	N	14N	25W	6		ST. PATRICK PEAK	Screened out: placer, may be all private.
Meadow Creek Placer	MN003317	N	N	N	15N	25W	24		TARKIO	Screened out: placer, inaccurate location.
Meadow Creek Placer	MN006051	N	N	N	15N	25W	24		LOZEAU	Screened out: placer.
Nine Mile Mine / Cronk Adit	MI005959	M	N	N	17N	24W	21		HORSEHEAD PEAK	Screened out: all workings are private, adjacent to the San Martina claims.
Nine Mile Operation	MI002586	M	N	N	16N	23W	13		MCCORMICK PEAK	Screened out: general description and location.

MINE NAME	MBMG ID	OWNER	VISIT	HAZARD	T	R	S	TRACT	24K TOPO	COMMENTS
Nine Mile Placer / Ninemile Creek	MI005575	M	Y	N	17N	24W	18		HORSEHEAD PEAK	Visited general area. Placer. Little or no effects to LNF-administered land.
Nugget Mine	**MI002538**	**N**	**Y**	**Y**	**16N**	**23W**	**13**	**DABB**	**MCCORMICK PEAK**	**Sampled 10/15/01; open adit; adit discharge.**
Old Sierra	MN005951	N	N	N	14N	26W	9		STRAIGHT PEAK	Screened out: inaccurate location (±5 km), only USBM production file for reference.
Petty Creek Placer	MI005731	M	N	N	13N	23W	2		PETTY MOUNTAIN	Screened out: placer. Annual yield less than 10 ounces (Lyden, 1948).
Pine Creek	MI002694	N	N	N	17N	23W	29		STARK NORTH	Screened out: placer, general location.
Quartz Creek Placers	MN006047	M	N	N	15N	26W	31		LOZEAU	Screened out: placers, general location.
Robin L. Placer	MI002646	M	N	N	17N	24W	21		HORSEHEAD PEAK	Visited general area. Inaccurate location. Placer.
S. Fork of Trout Creek Placer	MN003252	N	N	N	14N	27W	11		STRAIGHT PEAK	Screened out: general location, 800 acres of unpatented placer mining claims.
San Martina Mine	MI005943	P	N	N	17N	24W	21		HORSEHEAD PEAK	Screened out: private, patented claims. Adjacent to the Ninemile Mine.
Shoestring Property	MI005531	N	Y	Y	17N	24W	7	ADCC	HORSEHEAD PEAK	One partially open adit; open at least 15-20 ft back.
Snowbird Mine (Snowshoe)	MN003062	N	N	N	12N	25W	19	CD	SCHLEY MOUNTAIN	Screened out: fluorine-rare earth mine. Open pit.
Swastika Placer	MN005871	M	N	N	15N	25W	27	BCD	LOZEAU	Screened out: placer.
Torgelson Property	MI005691	P	N	N	15N	22W	17		ALBERTON	Screened out: commodity is clay on private land.
Triangle Mine	MN006079	M	N	N	14N	26W	3		LOZEAU	Screened out: placer.
Tucker Gulch Placer	MN006055	N	N	N	14N	26W	1		LOZEAU	Screened out: placer.
Twin Creeks Placer	MI005571	M	N	N	17N	24W	26		STARK NORTH	Screened out: placer, primarily on private land.
Unnamed Gold	MI005655	N	N	N	16N	23W	10		MCCORMICK PEAK	Screened out: inaccurate location; in secs. 10, 15, and 16, T16N, R23W. No other references.
Unnamed Pumice	MI005623	N	N	N	17N	23W	36		MCCORMICK PEAK	Screened out: pumice occurrence.
Unnamed Pumice	MI005627	M	N	N	15N	20W	30		FRENCHTOWN	Screened out: commodity is pumice, general location.

MINE NAME	MBMG ID	OWNER	VISIT	HAZARD	T	R	S	TRACT	24K TOPO	COMMENTS
White Cap Prospect	MI005539	M	N	N	13N	23W	12		PETTY MOUNTAIN	Screened out: commodity is beryllium. Inaccurate location. Prospects only.
PLAINS RANGER DISTRICT										
Montezuma	SA001326	N	N	N	18N	26W	12		QUINNS HOT SPRINGS	Screened out: inaccurate location (±1 km), no references.
No. 10 Tunnel	SA005428	M	N	N	18N	25W	9		QUINNS HOT SPRINGS	Most likely on private; drove by but unable to locate. 20-foot adit originally.
Quinns Hot Springs	SA001260	P	N	N	18N	25W	9	D	QUINNS HOT SPRINGS	Screened out: commercial hot springs on private land.
Red Bluff Quarry	SA004768	M	N	N	18N	26W	14		QUINNS HOT SPRINGS	Screened out: sandstone quarry, little or no effects to LNF-administered land.
Stobie-Hermiston / S&H Mining Co.	**SA008183**	**N**	**Y**	**N**	**18N**	**26W**	**8**	**DCCC**	**KEYSTONE PEAK**	**Reported by R.B. McCulloch, MBMG. Visited 10/16/01; Sampled.**
Unnamed Arsenic & Cobalt	SA005298	N	N	N	18N	25W	4		QUINNS HOT SPRINGS	Prospect only, as described by Crowley (1963).
Unnamed Silver & Lead	SA005443	M	N	N	18N	25W	9		QUINNS HOT SPRINGS	Screened out: inaccurate location, may be the same as No. 10 Tunnel.
SUPERIOR RANGER DISTRICT										
Agnes Property	MN003332	N	Y	Y	19N	31W	27	A	SALTESE	One open adit. Flooded but no discharge.
Aladdin Mine	MN005891	N	Y	Y	17N	29W	5	DAAB	DE BORGIA SOUTH	One partially open adit with slight (<1 gpm) discharge; not enough to sample.
Amador Mine	MN005895	M	Y	N	16N	27W	28	DDA	ILLINOIS PEAK	Visited 08/23/01, streamside waste but not in contact with active stream at the time of visit.
Amazon-Dixie (Sildex, Copper Queen)	MN003352	P	Y	Y	19N	32W	5	ADCA	LOOKOUT PASS	Visited general area, patented land. One adit discharge but does not affect LNF-administered land.
American Gold Mine - Oh Boy Group	MN005835	P	Y	N	15N	27W	8	DCBA	ILLINOIS PEAK	Private, viewed from road. Developed about 1892-1894. Two collapsed adits up the road (to the south).
Belle of the Hills	MN008462	P	Y	Y	17N	26W	1	CCDD	QUINNS HOT SPRINGS	Mostly reclaimed, one 30-40-ft highwall remains at shaft (?). Large waste piles remain on private land.
Ben Hur	MN008111	P	Y	N	20N	31W	34	ADAC	SALTESE	Private, viewed from road. No effects to LNF-administered land.

MINE NAME	MBMG ID	OWNER	VISIT	HAZARD	T	R	S	TRACT	24K TOPO	COMMENTS
Big Creek	MN003187	P	N	N	19N	30W	26		HAUGAN	Screened out: placer. Visited general area.
Big Sunday Creek Adit	**MN008059**	**N**	**Y**	**N**	**19N**	**31W**	**33**	**CDAC**	**ADAIR**	**One discharging adit.**
Black Traveler	MN005819	N	Y	Y	19N	30W	4	BCBA	HAUGAN	Highwalls only. Berms for runoff in place. Some slope failure.
Bonanza Group	MN003277	N	N	N	15N	26W	17		LANDOWNER MOUNTAIN	Screened out: inaccurate location (±1 km).
Borax Creek Adit	MN008087	N	Y	N	19N	32W	4	ADCC	LOOKOUT PASS	One collapsed adit east side of Borax Creek and north side of St. Regis River.
Boston Colby	MN008112	N	N	N	19N	31W	15		SALTESE	Unable to locate.
Bryan	MN003067	P	N	N	20N	31W	28	D	SALTESE	Screened out: private, patented claims. Active logging operation in 2001.
Buffalo Mine / Buffalo Vein	MN003232	N	N	N	18N	31W	36	AABC	MCGEE PEAK	Visited general area; viewed open cut on steep slope with binoculars. No hazards.
Buster & J. B. Claims	MN006083	M	N	N	17N	27W	21		WILSON GULCH	Screened out: no references, inaccurate location. Probably unpatented claims.
Cajun Queen	MN008142	N	Y	N	15N	27W	7	ACDD	ILLINOIS PEAK	Portable ball mill, no tailings; open cut and two collapsed adits; compressor and dozer.
Cedar Creek Placer / Superior Mines	MN005839	P	N	N	15N	27W	17		ILLINOIS PEAK	Screened out: placer and was active in 2001. Brockbank's Placer.
Cedar Creek Placer Mines	MN006059	M	N	N	16N	27W	13		SUPERIOR	Screened out: general location and only placer workings.
Cinkers Mine	MN005831	N	Y	N	15N	27W	4	DADA	ILLINOIS PEAK	Unable to locate any lode deposit, placer was located.
Copper Gulch Adit	**MN008109**	**N**	**Y**	**N**	**19N**	**32W**	**5**	**CDCD**	**LOOKOUT PASS**	**Sampled 07/25/01. One adit discharge.**
Copper Rock Mine	MN005807	N	N	N	19N	30W	1	ABC	DE BORGIA NORTH	Not visited, no access.
Crown Silver Group	MN005967	N	N	N	20N	31W	19		SALTESE	Screened out: No references, inaccurate location.
Crystal Lake Adits	**MN008092**	**N**	**Y**	**N**	**18N**	**30W**	**21**	**DCAC**	**MCGEE PEAK**	**Visited 07/25/01. One discharging adit.**
Darby Mining & Milling Company	MN003372	M	N	N	17N	26W	2		QUINNS HOT SPRINGS	Screened out: inaccurate location (±5 km); may be duplicate of Little Anaconda or Hopkins Mine.

MINE NAME	MBMG ID	OWNER	VISIT	HAZARD	T	R	S	TRACT	24K TOPO	COMMENTS
Deadwood Gulch Prospect	MN003192	N	Y	Y	18N	26W	20	CADC	KEYSTONE PEAK	Two adits, one shaft and several trenches. One open adit and one shaft. Slight moist area near adit but not enough to sample.
Deep Creek Mine	MN003197	N	Y	N	15N	27W	23	AABA	LANDOWNER MOUNTAIN	One caved adit and several prospects north of Deep Creek. Visited 08/23/01.
Deep Creek Placer	MN008196	F	N	N	15N	27W	24		LANDOWNER MOUNTAIN	Screened out: placer, visited general area, no effects.
Deer Creek Placer	MN003207	N	Y	N	18N	30W	15		MCGEE PEAK	General location. Hand-worked placer ground with large boulders.
Dillon Mill site	MN008463	M	Y	Y	17N	26W	12	BBBC	QUINNS HOT SPRINGS	One potentially hazardous structure (ore bin), one steep waste-rock dump on private land.
Dry Creek Mine	MN005795	N	N	N	17N	27W	28	ACC	WILSON GULCH	Screened out: trenches only as reported by MBMG staff - R.B. McCulloch.
Dry Fork Dry Creek	MN008180	M	N	N	16N	27W	27		WILSON GULCH	Screened out: no access.
East Coeur D'Alene Mine	MN005811	N	Y	Y	19N	30W	10	ABAC	HAUGAN	Shaft approximately 25 ft deep. Visited.
East Coeur D'Alene Silver	MN003212	M	N	N	17N	27W	1		KEYSTONE PEAK	Screened out: no references and inaccurate location.
Forest Route 434 Adit	MN008031	N	Y	N	16N	25W	24	DABB	HORSEHEAD PEAK	One collapsed adit north of FR 434. Visited 06/19/01 by MBMG staff.
Freezeout Creek Placer	MN008151	N	Y	N	15N	27W	28	D	ILLINOIS PEAK	Visited 08/23/01, placer only.
Galligar Mine	MN003202	P	Y	N	19N	31W	2	CDDD	SALTESE	15 ft north of Forest Route 288, visible from road, no hazards.
Gildersleeve Barite Prospect	MN008149	N	Y	Y	15N	27W	28	CCAB	ILLINOIS PEAK	Open cut with highwalls.
Gildersleeve Mine (Bonanza Group)	MN003222	M	Y	Y	15N	27W	29	ABAB	ILLINOIS PEAK	Active claims, visited 08/22/01 with Gloria (Gildersleeve) and Louis Weaver.
Gildersleeve Placer	MN005983	N	N	N	15N	27W	29	A	ILLINOIS PEAK	Visited general area. Closed in 1989. Reclaimed.
Gold Crown	MN005915	N	N	N	17N	28W	20		TORINO PEAK	Screened out: Wallace and Hosterman's (1956) map shows open pit.
Gold Mountain Mines	MN006027	N	Y	N	15N	27W	14	DBCA	LANDOWNER MOUNTAIN	Two adits, caved. Actively claimed in 2001.
Gold of the Patriarchs	MN008195	N	Y	N	15N	27W	14		LANDOWNER MOUNTAIN	Active claim in 2001. Ball mill and jig tailings present. Caved adits and cabins.

MINE NAME	MBMG ID	OWNER	VISIT	HAZARD	T	R	S	TRACT	24K TOPO	COMMENTS
Goldbug Mine (Tawney)	MN006039	N	N	N	17N	29W	4		DE BORGIA SOUTH	Screened out: inaccurate location; may be duplicate of the New Lenore Mine.
Graham Copper Prospect	MN005787	P	N	N	19N	27W	34		ST. REGIS	Visited general area. Adit shown in sec. 04 on St. Regis quadrangle. Unknown if this is same mine.
Hemlock Prospect	MN003072	P	Y	N	19N	31W	2	CBDC	SALTESE	Access from north only, all private.
Highbar Placer	MN005863	M	N	N	15N	25W	16		LOZEAU	Screened out: inaccurate location and is only a placer mine.
Hoodoo Mine	MN005899	N	N	N	19N	31W	10		SALTESE	Screened out: no access and no references except it is plotted on USGS Bulletin 1027-M (Wallace and Hosterman, 1956) map.
Hopkins Mine	MN005843	P	Y	Y	18N	26W	35	CDD	QUINNS HOT SPRINGS	Open adits along Pardee Creek Road (FR 97); southeast-trending adit is on private so not visited.
Hub Lake Mine	MN008137	N	Y	Y	18N	30W	35	DBAB	MCGEE PEAK	Visited 08/20/01, one intact adit. No discharge.
Hungary Gulch Mine	MN008193	N	Y	N	15N	27W	14	BCC	LANDOWNER MOUNTAIN	Visited 08/23/01. No disturbance noted. Cabin at spring. Topo map shows open pit.
Illinois Peak Adits	MN008141	N	Y	Y	15N	28W	25	ACD	ILLINOIS PEAK	3 collapsed, 2 partially open adits, 1 with evidence of discharge but too small of flow to sample.
Iron Mountain	**MN003227**	**M**	**Y**	**N**	**17N**	**26W**	**12**	**CCDD**	**IDAHO GULCH**	**Priority site for USFS clean-up. Sampled upstream/downstream of private land.**
Jack	MN006067	N	N	N	18N	28W	19		BOYD MOUNTAIN	Screened out: inaccurate location (±1 km).
K & K Mine	MN003282	N	N	N	18N	30W	22		MCGEE PEAK	Unable to locate. Inaccurate location (±1 km). Searched general area.
Keith Property	MN003182	N	Y	N	18N	28W	11	BBCD	BOYD MOUNTAIN	One open cut, prospects only.
Last Chance	**MN003337**	**M**	**Y**	**N**	**20N**	**31W**	**34**	**ABA**	**SALTESE**	**One discharging adit, one seep, waste in contact with stream.**
Last Chance	MN005987	N	N	N	16N	28W	16		TORINO PEAK	Screened out: inaccurate location (±5 km) and no references.
Little Anaconda Group (Velvet Adit)	MN006099	M	Y	Y	18N	26W	35	BDCA	QUINNS HOT SPRINGS	All adits and shafts on private; discharge never reaches active drainage.
Little Joe Creek Placer	MN006071	N	N	N	17N	28W	9		BOYD MOUNTAIN	Screened out: placer, inaccurate location, and no recorded production (Lyden, 1948).
Little Pittsburg / Keesey Tunnel	MN003242	P	N	N	17N	27W	1	BBAD	KEYSTONE PEAK	Screened out: private.

MINE NAME	MBMG ID	OWNER	VISIT	HAZARD	T	R	S	TRACT	24K TOPO	COMMENTS
Lost Gulch Placer (Wagner's)	MN005979	N	N	N	16N	28W	24	A	WILSON GULCH	Screened out: placer.
Lucky Jack / Wilson Gulch	MN003057	N	N	N	16N	28W	1	B	WILSON GULCH	Screened out: prospect trenches only according to R.M. Corn (1953). Fluorite prospect.
Lucky Strike	MN005919	N	N	N	17N	29W	4		DE BORGIA SOUTH	Screened out: inaccurate location; may be duplicate of New Lenore.
Magi Mine / Lime Gulch Prospect	MN003052	N	Y	N	17N	27W	31	AAAA	WILSON GULCH	Visited 07/26/01. Dry prospects with exploration/development roads.
Meadow Mountain	MN003367	M	Y	N	20N	31W	36	CABC	HAUGAN	One discharging adit. Very small flow.
Minnick Mine	MN003292	N	N	N	18N	30W	5		MCGEE PEAK	Unable to locate. May be adit viewed from across drainage (from road on west side of Rivers Creek).
Monarch Mine	MN003217	N	Y	N	18N	28W	9		BOYD MOUNTAIN	Unable to locate; visited general area. Found cabin and mine roads.
Montana Barite Pit	MN006091	P	N	N	17N	26W	34		SUPERIOR	Screened out: barite deposit.
Mountain Gem Mine	MN005799	M	N	N	17N	26W			SUPERIOR	Screened out: Inaccurate location (±5 km), no references except CRIB.
Mullen Barite	MN006095	N	Y	N	18N	28W	9	BDCD	BOYD MOUNTAIN	Open cuts only. Some highwalls left. Commodity is barite.
Nancy Lee Mill/ Slowey	MN005991	P	N	Y	17N	27W	15	BBD	WILSON GULCH	Screened out: private, information from Pioneer Technical Services Report (1995).
Nancy Lee Mill site	MN008464	P	Y	N	17N	26W	5	BA	KEYSTONE PEAK	Partial remediation on downstream portion by DSL-AMRB. Planned remediation in 2002.
Nancy Lee Mine (King, Queen, ...etc.)	MN005903	N	Y	Y	18N	26W	31		KEYSTONE PEAK	Mill site under separate entry. One discharging adit.
Nancy Lee-Vulcan Tunnel	**MN009113**	**N**	**Y**	**N**	**18N**	**26W**	**31**	**DCBC**	**KEYSTONE PEAK**	**One discharging adit.**
New Lenore Mine	MN005827	N	Y	N	17N	29W	4	CBDD	DE BORGIA SOUTH	Three adits, all caved or mostly caved. One adit with slight discharge but not enough to sample.
Nite Owl Mine	MN003262	N	Y	Y	18N	26W	33	CABD	KEYSTONE PEAK	Visited 06/21/01; one open adit northwest of Forest Route 7861.
North Fork Claims 1, 2 & 3	MN005931	M	N	N	15N	27W	29		ILLINOIS PEAK	Screened out: inaccurate location (±1 km). No references. May be part of the Gildersleeve.

MINE NAME	MBMG ID	OWNER	VISIT	HAZARD	T	R	S	TRACT	24K TOPO	COMMENTS
Oregon Creek Placer	MN006063	M	N	N	16N	27W	21	D	WILSON GULCH	Screened out: placer.
Packer Creek Barite Deposits	MN003247	M	N	N	19N	31W	2		SALTESE	Screened out: barite deposits, general location, prospects only.
Pardee Creek	MN005955	M	N	N	18N	26W	35		QUINNS HOT SPRINGS	Screened out: drove general area; no impacts. General location of barite occurrence.
Prosperity Mine	**MN003237**	**N**	**Y**	**Y**	**18N**	**26W**	**32**	**DADD**	**KEYSTONE PEAK**	**One discharging adit. Discharge seeps into ground near edge of waste dump.**
Redemption 1 & 2	MN003357	N	N	N	15N	27W	7		ILLINOIS PEAK	Screened out: inaccurate location, visited general area 08/22/01; paired with Silver Streak claims.
Richmond Lexington Mining & Milling	MN006087	M	N	N	18N	28W	25		ST. REGIS	Screened out: inaccurate location (±5 km), 700 ft adit near town of St. Regis.
Rivers Creek Mine	MN003297	N	N	N	18N	30W	5		MCGEE PEAK	Inaccurate location (±1 km); unable to locate. Viewed possible mine from west side.
Rock Island	**MN005911**	**N**	**Y**	**Y**	**19N**	**29W**	**4**	**CBBC**	**DE BORGIA NORTH**	**Visited and sampled 10/17/01. 2 collapsed and dry adits, one open (3 ft by 5 ft) and discharging.**
Saltese Consolidated Mine	**MN005803**	**N**	**Y**	**N**	**19N**	**30W**	**4**	**BDBC**	**HAUGAN**	**Adit discharge, mine waste in floodplain.**
Saltese Metals Mine	MN005791	M	N	N	19N	31W	14		SALTESE	Screened out: general location, may be patented claims.
Santa Rita Group	MN003257	M	N	N	18N	26W	32		KEYSTONE PEAK	Location inaccurate, may be patented claims.
Silver Bell Property	MN003267	N	N	N	17N	28W	18		TORINO PEAK	Unable to visit. Location from Wallace and Hosterman (1956) shows two adits.
Silver Cable	**MN005923**	**P**	**Y**	**Y**	**20N**	**32W**	**24**	**CBBB**	**SALTESE**	**Discharges on private so sampled downstream only.**
Silver Cliff	MN008163	N	Y	N	15N	27W	29	DAAD	ILLINOIS PEAK	Recent work with a Bobcat; trench or prospect only.
Silver Creek Mine	MN003302	M	N	N	19N	31W	14		SALTESE	Screened out: inaccurate location (somewhere in sec. 14), plots on private.
Silver King Mine	MN005851	N	Y	Y	15N	27W	7	DBAA	ILLINOIS PEAK	Adit is partially collapsed; seasonal small discharge but not flowing at time of visit (08/22/01).
Silver Quest	MN008080	M	Y	N	19N	32W	6	D	LOOKOUT PASS	Visited 07/13/01. Mostly private. One adit on southeast side of St. Regis River may be on National Forest.
Silver Strand Property	MN003272	N	Y	N	19N	32W	11	ACAC	LOOKOUT PASS	Two collapsed adits between Forest Route 4208 and Interstate 90.
Silver Streak (Golden Sunset)	MN005927	N	Y	N	15N	27W	8	BCBA	ILLINOIS PEAK	Visited 08/22/01; mill dry and no noticeable tailings.

MINE NAME	MBMG ID	OWNER	VISIT	HAZARD	T	R	S	TRACT	24K TOPO	COMMENTS
Skyline Mine	MN006075	N	N	N	14N	27W	4		ILLINOIS PEAK	Screened out: optical silica; little or no effect to LNF-administered land.
South Amador	MN008146	N	Y	N	16N	27W	33	AACC	ILLINOIS PEAK	Waste dump not in contact with active stream at the time of this visit.
Spar Mine (Spar Group) / Bear Creek	MN003047	N	Y	Y	17N	27W	31	BBDB	WILSON GULCH	One open adit (overhang).
Spitfire Mine	MN003307	N	Y	Y	19N	27W	35	CCDD	ST. REGIS	Two partially open adits; highwall. All dry.
St. Lawrence Mine	**MN005867**	**N**	**Y**	**Y**	**18N**	**31W**	**9**	**AABB**	**ADAIR**	**Two discharging adits, seep at toe of waste dump, visited 07/12/01.**
Stemwinder Placer	MN003347	N	N	N	15N	26W	17		LANDOWNER MOUNTAIN	Screened out: placer. Inaccurate location (±1 km).
Sunrise Creek Placer	MN003322	N	N	N	15N	26W	21		LANDOWNER MOUNTAIN	Screened out: placer.
Syndicate Prospect	MN003342	N	Y	N	20N	31W	28	BCCB	SALTESE	Visited by MBMG 08/09/01; remote location, adit with small dump and prospects.
Taft	MN008127	N	N	N	19N	32W	12	C	SALTESE	Unable to locate, approximate location only.
Tammany - Clara 1&2, Lookout Frac.	MN005907	P	Y	Y	16N	24W	20	BDCC	HORSEHEAD PEAK	All adits on private, patented land, some open.
Tarbox-Mineral King	**MN006103**	**M**	**Y**	**Y**	**20N**	**31W**	**35**	**ADDB**	**HAUGAN**	**Waste dump in contact with tributary to Packer Creek, seeps, adit discharge.**
Texas Mine	MN005823	N	Y	N	19N	29W	5	CBDD	DE BORGIA NORTH	Visited 10/17/01. Two caved adits, trenches, all dry and collapsed.
Trout Creek Placer	MN005875	M	N	N	15N	27W	35		LANDOWNER MOUNTAIN	Screened out: placer, general location (placered for 4.5 miles), largely private.
True Fissure	MN005879	N	N	N	19N	29W	7	CAC	DE BORGIA NORTH	Not visited, no access.
Tunnel No 1 Adit	MN008106	N	Y	N	19N	32W	3	CDAA	LOOKOUT PASS	One collapsed adit southeast of railroad Tunnel No. 1.
Unnamed Cedar Creek Adits	MN008168	M	Y	N	15N	27W	17	B	ILLINOIS PEAK	Two caved adits on east side of Forest Route 388, one private, one USFS.
Unnamed Gravel Pit	MN005815	P	N	N	19N	30W	21	A	HAUGAN	Screened out: gravel pits north of Interstate 90; private.
Unnamed Gravel Pit	MN005847	N	N	N	18N	29W	13		BOYD MOUNTAIN	Screened out: sand/gravel pit on ridge.
Unnamed Quarry	MN005859	P	N	N	17N	27W	13		SUPERIOR	Screened out: quarry, private, little or no impact to LNF-administered land.

MINE NAME	MBMG ID	OWNER	VISIT	HAZARD	T	R	S	TRACT	24K TOPO	COMMENTS
Unnamed Trout Creek Mines	MN008201	N	N	N	15N	27W	24	B	LANDOWNER MOUNTAIN	Screened out: reported by R.B. McCulloch, MBMG, dry.
Upper Keesey Prospect	MN005883	N	Y	Y	18N	26W	19	DBCC	KEYSTONE PEAK	Two open adits, one collapsed adit. All dry.
Upper Keystone Adits	**MN008004**	**N**	**Y**	**Y**	**18N**	**26W**	**27**	**CDDB**	**KEYSTONE PEAK**	**One open but gated adit, 1-2 gpm discharge, waste in contact with small tributary.**
Upper Oregon Gulch Placer	MN008176	N	N	N	15N	28W	1	C	ILLINOIS PEAK	Screened out: placer.
Valentine Mine	MN005779	N	Y	Y	19N	29W	5	CADB	DE BORGIA NORTH	Visited 10/17/01. Partially open adit, 4-ft by 2-ft opening, and adit is open at least 20 ft back.
Victor Mancini Property	MN005935	M	N	N	16N	26W	8		SUPERIOR	Screened out: barite deposit.
Wabash	MN003377	N	Y	N	20N	31W	36	CBCB	HAUGAN	Open cut, may have been adit at one point.
Ward Creek Placer	MN006031	N	N	N	18N	29W	23		DE BORGIA SOUTH	Screened out: placer, inaccurate location (4 miles along Ward Creek).
Waterhole Claims	MN005887	N	N	N	19N	30W	18	C	HAUGAN	Screened out: open pit only, uranium claims, and access cut off by Interstate 90.
Windfall Creek Placers	MN006043	M	N	N	15N	26W	20		LANDOWNER MOUNTAIN	Screened out: placer.
Wolf Prospect	MN003362	M	N	N	18N	28W	10		BOYD MOUNTAIN	Screened out: plots on private land. No access. Location from USGS Bulletin 1027-M (1956).

(Owner: NF-National Forest, P-Private, S-State, M-Mixed or unknown; Visit:, Y-visited, N-not visited; Hazard: Y-hazard, NE-not evaluated)

4.1 Frances Copper Mine

4.1.1 Site Location and Access

The Frances Copper Mine is designated as a "strip mine" on the southern edge of the Knowles 7.5-min. quadrangle in tract B sec. 8, T.17N., R.24W., at an elevation of 4,500 ft to 4,600 ft. It lies to the north of the southwest flowing St. Louis Creek. The site can be reached via the Ninemile road (Forest Route 412) turning north on Forest Route 412 just past "Old Town" toward Siegel Pass. Forest Route 5498 turns to the east and then, in about 1.7 miles, a small spur cuts back to the west (Forest Route 17432). The mine is represented by an open-pit symbol on the Forest Service map. It is entirely on LNF-administered land.

In summer months, access is possible by two-wheel drive, but four-wheel drive is advisable at the other times of the year. The mine is not readily visible to the occasional traveler but at the time of this visit, someone was camping near the waste piles.

4.1.2 Site History - Geologic Features

The mine has been referred to as the Frances Copper Mine (Sahinen, 1957), the Frances Mine (Lawson, 1975) owned by J.L. Waylett, and, in 1995, it was mistakenly referred to as "Joe Wallit Mine" in the Pioneer Technical Services report to DSL-AMRB. The commodities were listed as copper, silver, gold, lead, and antimony in the MILS database. No production figures were found but Sahinen (1957) listed 0.18 percent copper, and a trace of gold and silver in a 30-ft-long grab sample.

Sahinen (1957) included this area in the Ninemile mining district. St. Louis Gulch was listed as one of the placers mined since 1874. The mine was worked with a bulldozer and also by diamond drilling by Thomas, Miller, Waylett, and O'Clare. The host rock was reportedly a quartzite fault breccia with a gray-white clay matrix. Chalcopyrite was listed as the ore mineral in a quartz gangue. The open cut mining method exposed an 8-in.-thick footwall zone dipping 72°S., bordered by a white clay zone (Sahinen, 1957). A second working was described on Squaw Creek about 1.6 miles down from the primary cut. This cut was not located in this study and no Squaw Creek was named on the topographic map. Lange and Gignoux (1999) wrote "the deposit is in a fault breccia within the quartz-rich clastic beds of the Ravalli Group of the Belt Supergroup". This breccia strikes east and dips approximately 70°S. (Lange and Gignoux, 1999).

Unpublished MBMG mineral property files state that Waylett and Simon began producing from the Frances in December 1973 with 500 ft trenched, 150,000 tons stripped, and 3,000 short tons of ore shipped in 1974. The mine was listed as "developing and producing" with a 50-ton-per-day mill capacity according to Lawson (1975). No further information about the operation of the mine after 1975 was found.

4.1.3 Environmental Condition

The site has a very large open cut and a pond with standing water. Overflow from the pond discharges to St. Louis Creek through a PVC pipe located on the south side of the pond. The middle portions of the waste-rock dumps were being actively eroded by East Fork of St. Louis Creek, and the lower edges of the waste-rock dumps were being eroded by the main trunk of St. Louis Creek. A seep emerges from the toe of one of the waste-rock dumps.

4.1.3.1 Site Features - Sample Locations

The site was visited on 06/07/01. A water sample was taken upstream on St. Louis Creek (SFCS10L) about 200 ft upstream from the large open cut and upstream from all mine disturbances, and another was taken upstream on the East Fork of St. Louis Creek (SFCS20L). Both creeks had a flow of abut 3 cfs. A downstream sample (SFCS30L) was taken on St. Louis Creek immediately below the waste-rock dumps and mine. Water samples were also taken from the 1.5-gpm seep at the toe of the waste dump (SFCS20L), from the overflow pipe from the pond (SFCS50H), and from a natural seep to the northwest of the pond (SFCS60H). A recent heavy snow melt contributed to the flow on the day of sampling.

Three soil/waste rock samples were taken at the Frances Copper Mine. SFCW10H was brown clay and argillite fragments with no visible sulfides but with minor malachite and azurite; the sample was from the edge of the waste-rock dump and included 20 25-ft intervals. SFCS20H was a vertical composite with three 2-ft intervals on the west side and six 2-ft intervals on the east side of the erosional channel made by East Fork of St. Louis Creek. SFCW30H was taken along the eroding bank on the edge of the waste-rock dump. Site features and sample locations are shown in figure 9; photographs are shown in figures 9a and 9b.

2.6.3.2 Soil

The samples collected at the Frances Copper Mine were primarily waste that was actively being eroded into the creek. All three samples exceeded the phytotoxic limit for copper. Copper results (table 15) exceeded the phytotoxic concentration of 100 mg/Kg by 10 times in the sample from the westernmost lobe of the lower dump.

Table 15. Soil sample results at the Frances Copper Mine (mg/Kg).

Sample Location	As	Cd	Cu	Pb	Zn
SFCW10H-horizontal / dump 1	30.7[1]	<2.3	895[1,2]	62.4[1]	83.4[1]
SFCW20H-vertical	19.7[1]	<2.3	668[1,2]	32.6[1]	56.2[1]
SFCW30H-horizontal / dump 2	39.3[1]	<2.3	1190[1,2]	22.8[1]	56.4[1]

(1) Exceeds one or more Clark Fork Superfund background levels (table 3).
(2) Exceeds phytotoxic levels (table 3).

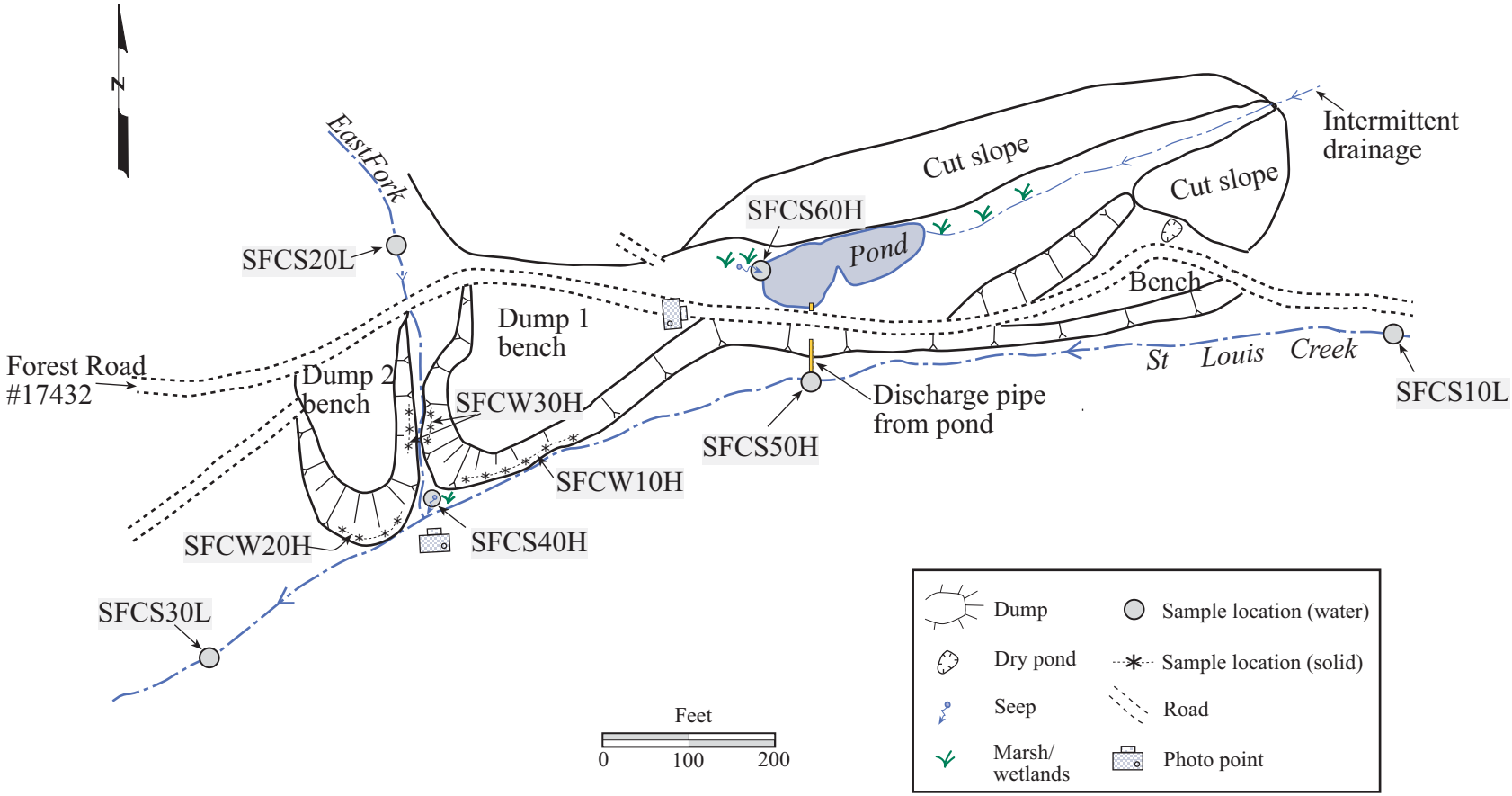


Figure 9. The Frances Copper Mine, in the Ninemile mining district, had standing water in a pond, a seep from the toe of a waste dump, and streams eroding the waste dumps.

Figure 9a. An overview of the Frances Copper Mine shows the open cut and the small pond (in the left foreground). The waste-rock dumps are off the photo to the right.

Figure 9b. The East Fork of St. Louis Creek actively erodes the waste-rock dumps along both sides.

4.1.3.3 Water

The Frances Copper Mine samples had only two exceedences; the arsenic standard of 10 µg/L was just barely exceeded in the sample from the pond overflow and manganese was slightly over three times the secondary MCL of 0.05 mg/L in the seep at the toe of the waste dump (table 16). Iron concentration came close to the 0.30 limit at 0.28 but did not exceed it. The pH readings were all between 6.97 and 7.95; specific conductance measurements were from about 50 µmhos/cm in the streams to about 200-300 µmhos/cm in the mine-related samples.

Table 16. Frances Copper Mine water-quality exceedences.

Sample Site	Al	As	Ba	Cd	Cr	Cu	Fe	Pb	Mn	Hg	Ni	Ag	Zn	Cl	F	NO_3	SO_4	pH
SFCS10L-upstream																		
SFCS20L-upstream																		
SFCS30L-downstream																		
SFCS40H-seep at toe									S									
SFCS50H-overflow from pond		P*																
SFCS60H-natural seep																		

Exceedence codes:
P-Primary MCL; *-exceeds new standard.
S - Secondary MCL
Note: The analytical results are listed in appendix IV.

4.1.3.4 Vegetation

The vegetation at the Frances Copper Mine was not adversely impacted by the remaining mine material. Small lodgepole pines are revegetating the waste-rock dumps. No dead, dying, or stunted vegetation was noted. The steeper slopes of the open cut did not support vegetation. A fire in 2000 burned close to the site but did not impact the mined area directly. The creeks were bordered with healthy alders, bushes, and cedars.

4.1.3.5 Summary of Environmental Conditions

This is a relatively small site but does have mine waste actively eroding into St. Louis Creek. A slight exceedence in arsenic was noted as well as manganese in the water samples. Bear tracks were noted in mud in the roadway at the time of the site visit. They were tentatively identified as grizzly bear; grizzlies were noted to be in the Ninemile area in newspaper articles at the time.

4.1.4 Structures

No structures remained at the Frances Copper Mine. No footings, foundations, or lumber were found at the site to indicate that there were ever any buildings there.

4.1.5 Safety

The steep slope of the main cut could be considered a safety hazard to visitors. It was estimated at 35° slope and was 40 ft high.

4.2 Nugget Mine

4.2.1 Site Location and Access

The Nugget Mine is located on the McCormick Peak 7.5-min. quadrangle in tracts DABB sec. 13, T.16N., R.23W., at an elevation of 4,070 ft. It is on Kennedy Creek and is located entirely on LNF-administered land. Secondary Forest Route 387 leads to the property after taking off to the northeast from Primary Forest Route 412. Much of the valley downstream from the mine has been patented.

4.2.2 Site History - Geologic Features

The Nugget Mine is near the Lost Cabin Group and the Hauttula prospect. The Kennedy Creek mines are also described in the area and probably include all the previously mentioned mines.

A 1"=20' map in the MBMG mineral property files shows an approximately 140-ft adit (Adit A) with two drifts in sheared and tightly folded argillite host rock. The mine workings totaled 1,100 to 1,200 ft as of 1978, according to a letter in the mineral property files from the Nugget Mining Company. These same records show yearly maintenance work from 1975 to 1988 by Frank Morbeck, Nugget Mining Company. Their ownership may extend back to the late 1960's.

The open adit trends N.5°W. and has been fenced. The waste rock was mainly dark gray and reddish argillite with iron staining. Minor quartz with some chalcopyrite and copper oxides (malachite?) was found on the dump also. Lange and Gignoux (1999) described most of the quartz veins in this area as hosted by the Proterozoic Belt Prichard Formation. The centimeter-scale veins strike northwest and dip steeply. The deposits along this part of the valley are associated with, and northeast of, the northwest-trending Ninemile Fault.

4.2.3 Environmental Condition

The site has one discharging adit. The discharge flows into a pond that then discharges into Kennedy Creek. The pond is constructed on top of the waste-rock dump.

Pioneer Technical Services (1995) sampled the adit discharge and upstream/downstream on Kennedy Creek. They found no MCL/MGCL exceedences in their samples but did find acute aquatic life criteria exceedences of copper and zinc in the adit discharge and chronic aquatic life exceedences in mercury and lead in the adit discharge. Exceedences found in the creek could not be attributed directly to the site because of the effects of the upstream mining activity.

4.2.3.1 Site Features - Sample Locations

Water-quality samples were collected from the stream and from the one adit discharge (KNGS10H) on LNF-administered land. The upstream sample was KNGS30M and the downstream sample was KNGS20M. No soil samples were taken. Samples were collected on October 15, 2001. Site features and sample locations are shown in figure 10; photographs are shown in figures 10a and 10b.

4.2.3.2 Soil

No soil samples were taken from the Nugget Mine. The waste-rock dumps were sampled by Pioneer Technical Services in 1993. They found elevated levels (at least three times background) of arsenic, lead, and copper. Pioneer's stream sediment samples also documented releases of copper and lead.

4.2.3.3 Water

The concentrations of analytes in the upstream (KNGS30M) and downstream sample (KNGS20M) did not exceed water-quality standards (table 17). KNGS30M had a pH of 8.42, a specific conductance of 113.1 µmhos/cm, and the temperature was 6.4°C (44°F). The downstream sample had a pH of 8.8, an SC of 116.2 µmhos/cm, and the temperature was 7.5°C (45.5°F); streamflow was approximately 0.5 cfs (224 gpm).

The zinc value (3,730 µg/L) in the adit discharge was well above the acute (120-210 µg/L) and chronic (110-190 µg/L) aquatic life standards but not above the secondary MCL of 5,000 µg/L. All three samples showed copper values above the detection limit (5.03, 7.32, and 3.41 µg/L) but were below the aquatic (18-34 µg/L) and chronic (12-21 µg/L) life criteria, and were well below the secondary MCL of 1,000 µg/L. The downstream sample had the lowest concentration of the three.

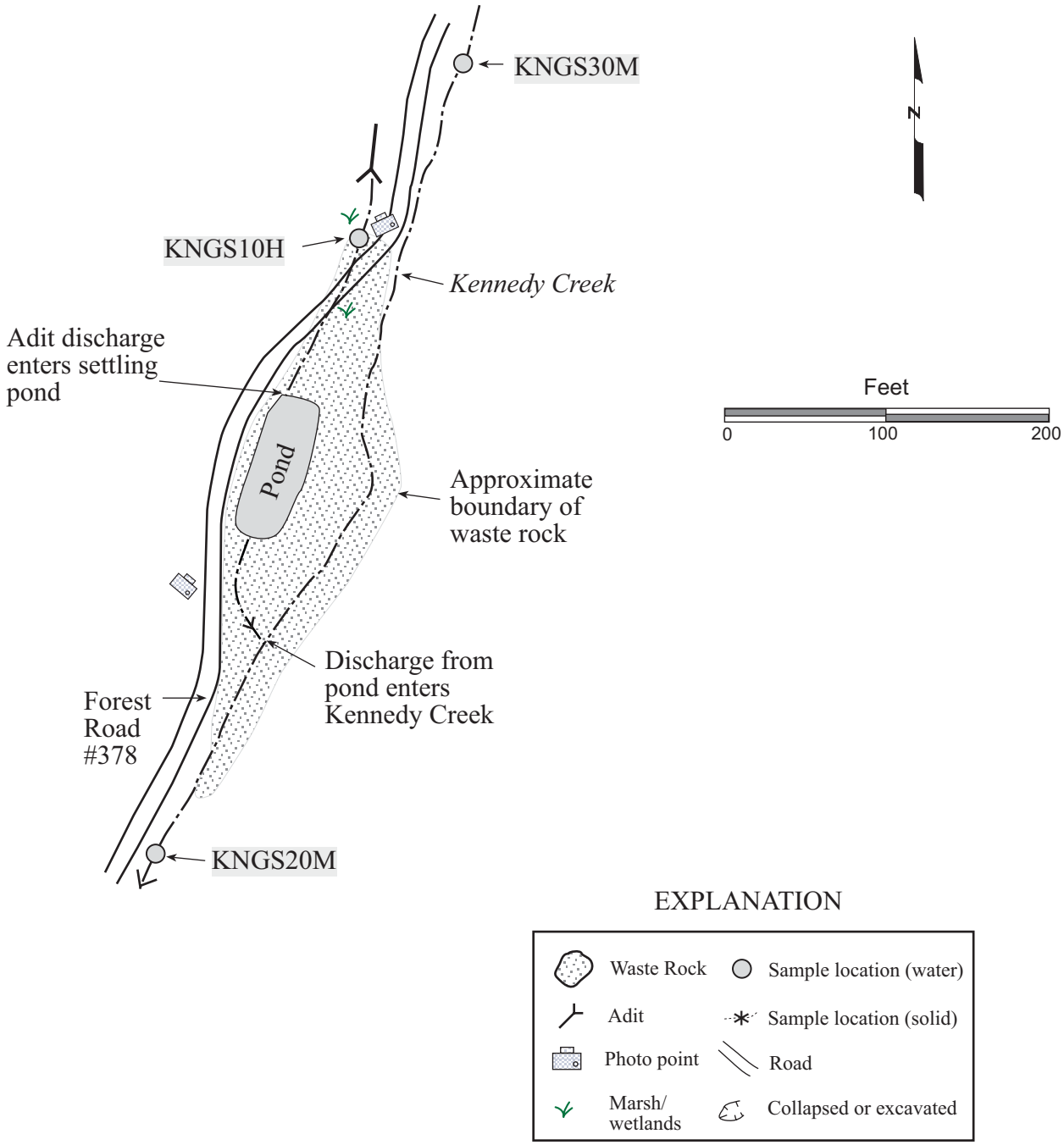


Figure 10. The Nugget Mine discharged about 1.5 gpm from an open adit, as sampled on 10/15/01.

Figure 10a. The Nugget Mine adit where the discharge was sampled (KNGS10H).

Figure 10b. The Nugget Mine waste rock surrounds a settling pond located downgradient from the discharging adit. Discharge from the pond flows into Kennedy Creek.

Table 17. Nugget Mine water-quality exceedences.

Sample Site	Al	As	Ba	Cd	Cr	Cu	Fe	Pb	Mn	Hg	Ni	Ag	Zn	Cl	F	NO_3	SO_4	pH
KNGS20H-adit discharge													A,C					
KNGS30M- upstream																		
KNGS20M-downstream																		

Exceedence codes:

A - Aquatic Life Acute

C - Aquatic Life Chronic

Note: The analytical results are listed in appendix IV.

4.2.3.4 Vegetation

The vegetation did not appear stressed. There was some iron-stained scum in the creek with the mosses reddish stained. The waste-rock dump is mostly unvegetated but does have some lodgepole pine, spruces, knapweed, and grasses. Grasses grew along the adit-discharge channel.

4.2.3.5 Summary of Environmental Conditions

The adit discharge of 1.5 gpm exceeded the acute and chronic life criteria for zinc. No upstream or downstream exceedences were noted in Kennedy Creek.

4.2.4 Structures

No structures remained at the site. The adit had a few boards and chicken-wire at the portal.

4.2.5 Safety

One open adit was noted and was considered hazardous even though it was fenced. A few odd boards secured the adit along with some chicken-wire. A faded “keep out” sign was painted on the boards at the portal.

Superior Ranger District

The mines of the Superior Ranger District are widely dispersed throughout the area although some concentrations of mines occur. Many are associated with the Osburn Fault along the northwest portion of the district. Fourteen mines were sampled. Sixty-seven mines were visited out of a total of 127 mines inventoried in the Superior Ranger District. Many of the mines were placers and so were screened out in the office. The mines are primarily associated with Precambrian Belt rocks of the Wallace, St. Regis, Revett, and Burke formations. Structural features associated with the deposits are often the west-north-west-trending regional faults. A few of the sites, including the St. Lawrence, are near the Wishards sill, which is south of the Silver Creek Fault and southwest of the St. Regis River. Figure 11 is a depiction of the mines within boundaries of the Superior Ranger District, in the middle Clark Fork River watershed.

EXPLANATION

- Cities/Towns
- Site with potential environmental problems impacting LNF-administered lands
- Inventoried site

Highways
- Interstate
- Montana Route
- U.S. Route

- County boundary
- Watershed boundary
- Streams/Rivers
- Major lakes

Ranger districts
- Ninemile
- Thompson Falls
- Superior

- State
- Private and other

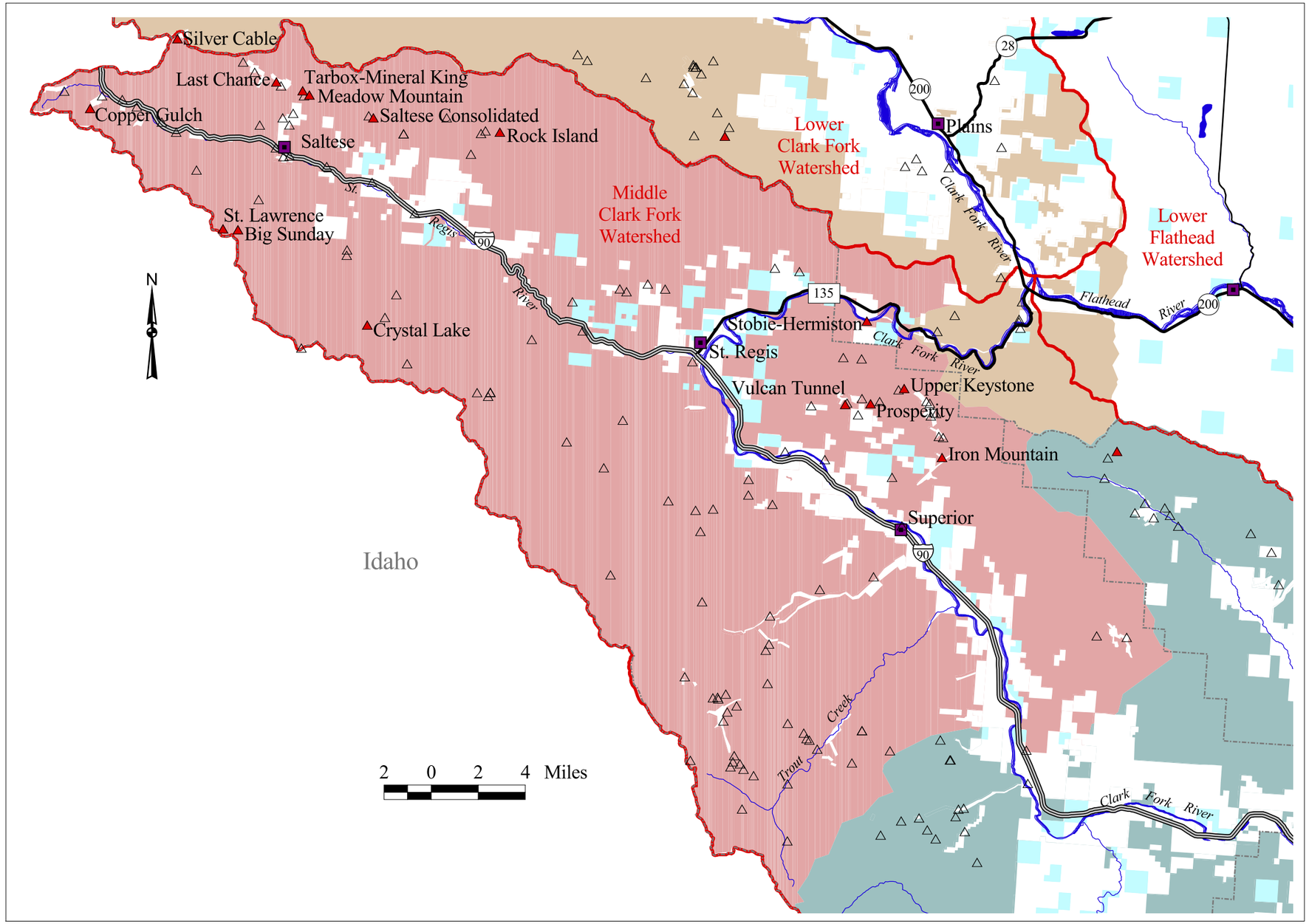


Figure 11. The Superior Ranger District hosted several mines with environmental concerns; many along the Osburn Fault.

4.3 Silver Cable Mine

4.3.1 Site Location and Access

The Silver Cable Mine is a group of patented claims on the Montana-Idaho border near the Sanders County and Mineral County divide, about 1 mile north of Mullan Pass. The claims are in tracts CBBB sec. 24, T.20N., R.32W., at elevations of 5,400 ft to 5,800 ft. Most of the claims and workings are on the Saltese 7.5-min. quadrangle although they extend onto the Lookout Pass 7.5-min. quadrangle. The mine is about 7 miles east of Mullan, Idaho.

MBMG staff accessed the site by taking the Taft exit on I-90 to the Randolph Creek Road (Forest Route 286) then traveling north and east, crossing Brimstone Creek, and then turning north on Forest Route 430 at Mullen Pass. Forest Route 430 was washed out south of the mine, near the Forest Service boundary at the south edge of the patented claims.

4.3.2 Site History - Geologic Features

The Silver Cable Group of seven (or sometimes considered eight) patented claims is the westernmost mine in Montana associated with the Osburn Fault. It is in the Packer Creek mining district, sometimes referred to as the Coeur d'Alene mining district. Calkins and Jones (1912) included the Silver Cable in the Packer Creek area, with descriptions of the fissure veins associated with the Osburn Fault. Reported production (mainly zinc) from the Silver Cable Mine was in 1919, 1926 and 1928 (Montana DEQ Mine Waste Cleanup Bureau Historical Narratives website, 2002, http://www.deq.state.mt.us/rem/mwc/hist_nar.asp). Newspaper articles in the MBMG mineral property files quote that the mine had been discovered in 1911 and that it had high-grade galena.

An article in the Wallace (Idaho) *Miner* dated 10/08/1987 described work at the time on the Silver Cable. The workings consisted of a partially flooded winze, a west raise to an intermediate level, a second intermediate level, "No. 2" and "No. 3" tunnels, with two crosscuts off the No. 3 tunnel (240 ft and 3,000 ft). MBMG mineral property files have records of assessment work and development by the Silver Cable Mining Co. (Frank Morbeck) from 1980 to 1988.

The deposit is hosted by the Proterozoic Belt St. Regis Formation faulted with right-lateral movement against the Burke Formation to the north (Lonn and McFaddan, 1999). Harrison and others (1986) mapped a much more complex configuration in the area with a series of small faults which juxtaposed strata including the Revett Formation. These associated mines have galena as a common ore mineral with ankerite and quartz as gangue minerals (Wallace and Hosterman, 1956). Other minerals described at the Silver Cable include tetrahedrite, sphalerite, chalcopyrite, and pyrite. The vein here dips southeast (approximately 35°-40°) and strikes N.45°E. The mine originally had three levels with the upper levels partly oxidized and the lower levels containing lead carbonates. Although the years of production are known, no production records were found for the Silver Cable.

4.3.3 Environmental Condition

Large, unvegetated waste dumps appeared to be eroding but were confined to the patented land. Rills and gullies had formed on the waste-rock dump slopes and a large fan of waste had washed downslope from the piles. A fairly large adit discharge also could be seen on the patented claim but it never flowed across the LNF-administered land so it couldn't be sampled. There were tire tracks and erosional paths on and near the waste-rock piles on private land.

4.3.3.1 Site Features - Sample Locations

One water-quality sample (BSCS10L) was collected from Brimstone Creek on LNF-administered land downstream from all mining activity. Upstream and adit discharge samples were not taken because the flows were on private land. Samples were collected on August 8, 2001. Site features and sample locations are shown in figure 12; photographs are shown in figures 12a and 12b.

4.3.3.2 Soil

No soil samples were taken from the Silver Cable Mine because the mine dumps were entirely on private, patented land. The dumps were eroding but all erosional deposits were on the patented claims.

4.3.3.3 Water

The concentrations of lead and zinc in the downstream sample (BSCS10L) exceeded water-quality standards (table 18). The lead concentration was only slightly elevated and exceeded only the chronic aquatic life standard. The zinc concentration (880 µg/L) was well above the acute and chronic aquatic life standards but well below the secondary MCL of 5,000 µg/L.

Table 18. Silver Cable Mine water-quality exceedences.

Sample Site	Al	As	Ba	Cd	Cr	Cu	Fe	Pb	Mn	Hg	Ni	Ag	Zn	Cl	F	NO_3	SO_4	pH
BSCS10L - downstream								C					A,C					

Exceedence codes:
A - Aquatic Life Acute
C - Aquatic Life Chronic

Note: The analytical results are listed in appendix IV.

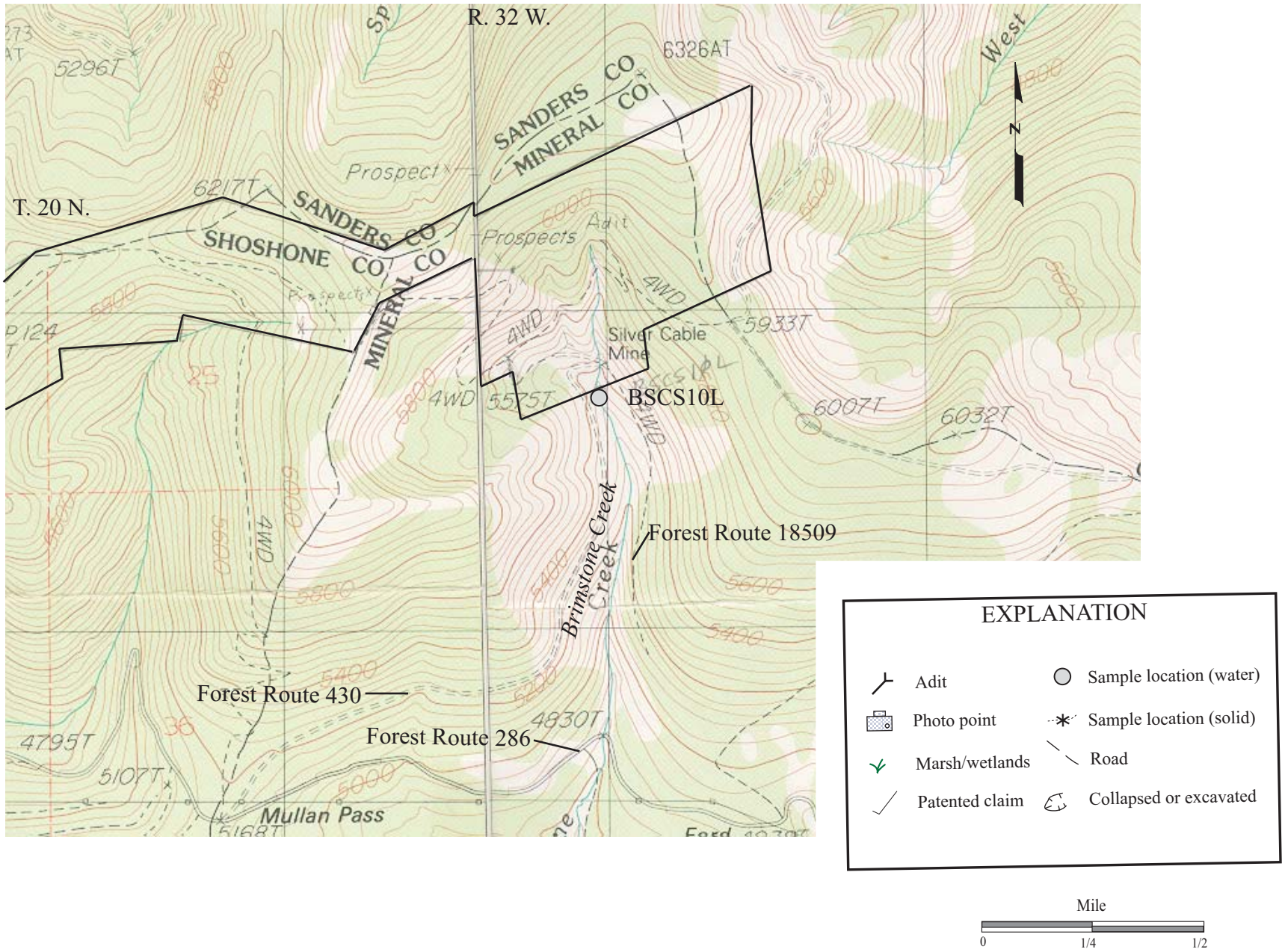


Figure 12. The Silver Cable Mine is primarily on patented land but was sampled on 08/08/01downstream on LNF-administered land.

Figure 12a. The Silver Cable Mine's waste rock was being eroded into the roadbed, but the road was on the patented claim.

Figure 12b. The Silver Cable Mine sample site (BSCS10L) on Brimstone Creek, downstream from the mine site.

4.3.3.4 Vegetation

Vegetation on LNF-administered land was not affected by the mining activity in the area. Almost all disturbances were on patented land which had been recently logged in addition to the past mining activity.

4.3.3.5 Summary of Environmental Conditions

LNF-administered land had minimal, if any, impacts from the mining activity on the patented claims.

4.3.4 Structures

An intact ore bin was noted on the east side of the patented claims. Some collapsed timbers and loose boards were observed near the portal of the discharging adit. No further inspection of the patented claims was made other than that which could be seen from LNF-administered land.

4.3.5 Safety

No safety concerns were noted on LNF-administered land. Tire tracks traversing the loose, steep waste rock piles indicate that the area gets some use by recreationists. At the time of this inventory, 4-wheel-drive vehicles were observed crossing the slopes uphill from the mine workings.

4.4 Last Chance Mine

4.4.1 Site Location and Access

Improved roads lead to the mine and are easily passable in the snow-free months. The Last Chance Mine is accessed via Forest Route 286 north from the Taft exit on I-90, then to the east by Forest Route 7759 which follows near the transmission line. A small spur road turns to the north just before 7759 crosses Last Chance Gulch. This road passes through a small clearcut where it is gated and then dead-ends at the mine.

Other roads, Route 288, then Forest Route 6316, lead directly north of Saltese to the mine area but were not public access at the time of this inventory and so were not able to be used. They would provide more direct access, however.

The mine is located in tracts ABA sec. 34, T.20N., R.31W., at an elevation of 4,160 ft on the Saltese 7.5-min. quadrangle. Patented mining claims are associated with the site, but the

discharging adit is on LNF-administered land. In 2001, the site had evidence of a recent survey, probably in conjunction with the logging on the private claims.

4.4.2 Site History - Geologic Features

Calkins and Jones (1912) wrote a summary of the Last Chance from which the following is taken. Original workings included one shaft, open cuts, and two tunnels having an intermediate level with the main tunnel trending N.70°E. Drifts and stopes followed the branching vein after 275 ft in the main tunnel. The Burke Formation's quartzites are described as being complexly folded and faulted; dips are varied. The lead-silver mine had ore minerals including primarily galena, pyrite, tetrahedrite, and stibnite in a quartz/siderite gangue. Ore was "high-grade" and production was reported to be greater than $200,000, primarily before a forest fire burned the portal's timbering in 1910.

Wallace and Hosterman (1956) reported the Last Chance had seven levels by the mid-1950's but categorized the lithology as the Revett quartzite with lesser argillite. A fault contact with Wallace argillites was described near the main tunnel. Production was noted in 1940, 1943, and 1951 totaling 312 tons shipped in those years.

In 1956, the mine was owned by Day Mines, Incorporated (Wallace and Hosterman, 1956). MBMG mineral property records show Jupiter Mining of Wallace, Idaho owned the mine in 1970 and 1972 but did assessment and leasing work only. No other ownership information was found.

The geologic setting of the mine is on the Osburn Fault with the Burke Formation to the north and the Burke and Revett formations in fault contact to the south (Lonn and McFaddan, 1999).

4.4.3 Environmental Condition

The Last Chance has a disturbed area of approximately 500 ft by 1,000 ft. There was one discharging adit with a low flow (about 5 gpm) and another with a small damp area (less than 1 gpm) near the portal, and evidence of occasional water in a depression. Three other adits were completely caved and dry. The largest waste dump was actively being eroded and undercut by Last Chance Creek. Rills and gullies were evident on the slopes and sparse vegetation was present to hold the material in place.

4.4.3.1 Site Features - Sample Locations

The discharging adit (sample LLCS10L) was taken about 15 ft from the collapsed adit's former portal. An upstream sample (LLCS20L) and a downstream sample (LLCS30L) were taken to test water quality of Last Chance Creek. The upstream sample was collected about 200 ft upstream from the end of the recognizable road. The downstream sample was collected immediately south

of the recently surveyed corner of the patented claim on LNF-administered land. A composite soil sample (LLCW10H) was taken along the toe of the largest waste-rock dump. The site was sampled on 08/08/01. Site features and sample locations are shown in figure 13; photographs are shown in figures 13a and 13b.

4.4.3.2 Soil

The solid sample at the Last Chance was taken at the contact of the stream and the waste dump. It consisted of a mixture of soil and the waste that was eroding into the creek. The waste was light gray fine-grained quartzite with minor iron staining. Mineralization was mostly quartz with minor manganese oxide staining; there was trace pyrite and chalcopyrite.

Table 19. Soil sampling results at the Last Chance Mine (mg/Kg).

Sample Location	As	Cd	Cu	Pb	Zn
LLCW10H-composite	68.6[1]	<2.0	12.3	104[1]	59.8[1]

(1) Exceeds one or more Clark Fork Superfund background levels (table 3).

4.4.3.3 Water

Only the iron and manganese values in the adit discharge exceeded the secondary MCLs (table 20). The iron concentration was 0.83 mg/L and exceeded the water-quality standard of 0.3 but was below the acute aquatic life criteria standard of 1 mg/L. The manganese value of 1.58 mg/L was over 30 times the standard of 0.05 mg/L. The 5-gpm adit discharge flowed down the adit channel and then ponded near the original portal. Very little entered the flowing surface water in the creek.

The upstream and downstream samples had copper concentrations (3.01 µg/L and 3.66 µg/L, respectively) above the laboratory detection limit but well below the acute and chronic aquatic life criteria values of 18-34 µg/L and 12-21 µg/L, respectively. Arsenic was detected upstream (1.34 µg/L) and downstream (2.03 µg/L), but both concentrations were well below the standards. Zinc concentration also increased in the downstream sample, from below the laboratory detection limit upstream to 3.72 µg/L downstream.

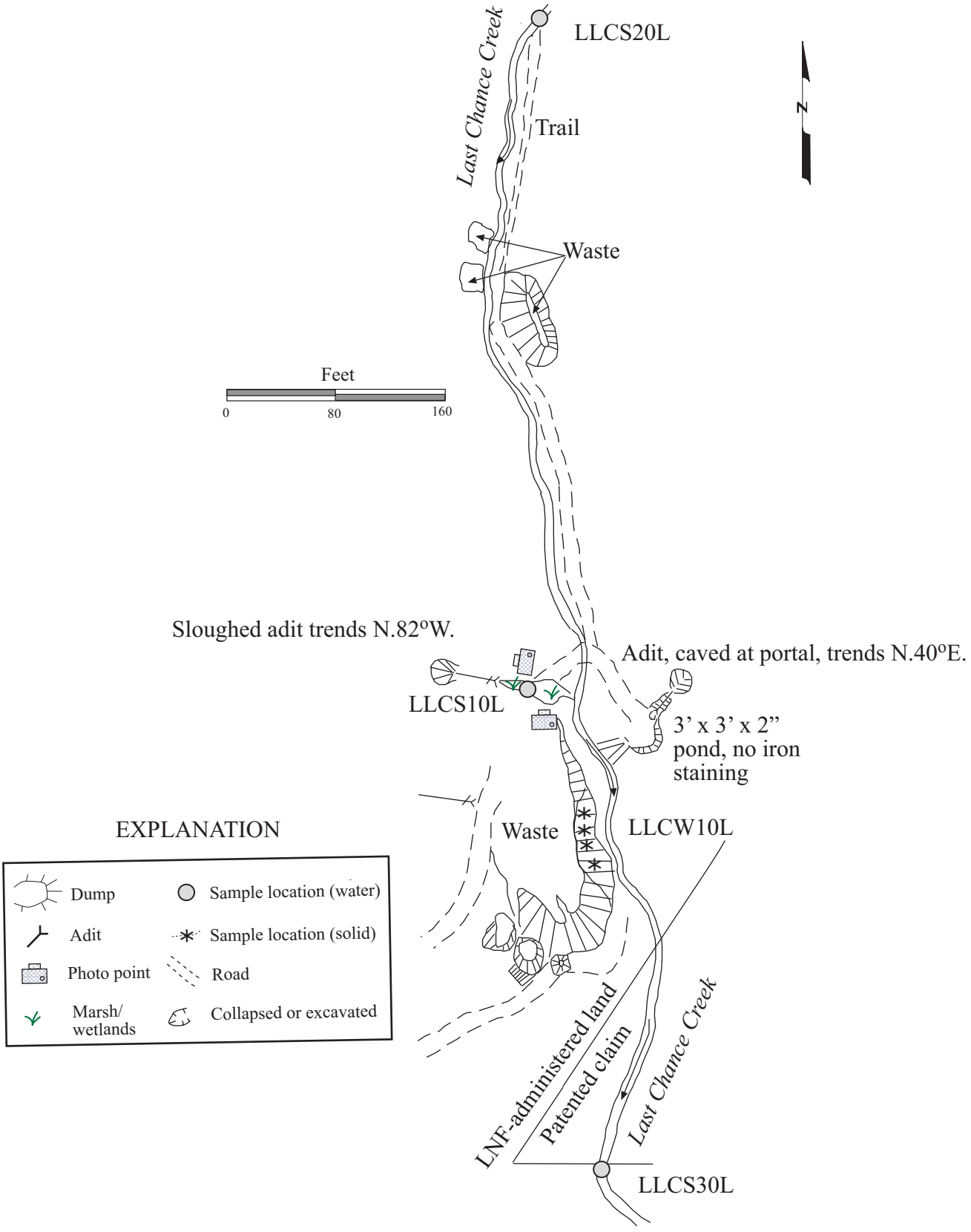


Figure 13. The adits at the Last Chance Mine leaked water and the largest discharge was sampled on 08/08/01.

Figure 13a. The Last Chance adit discharged a flow that stained the channel a bright orange color.

Figure 13b. The Last Chance waste dump had a low probability of failure on most slopes but was being undercut on the east side by Last Chance Creek.

Table 20. Last Chance Mine water-quality exceedences.

Sample Site	Al	As	Ba	Cd	Cr	Cu	Fe	Pb	Mn	Hg	Ni	Ag	Zn	Cl	F	NO_3	SO_4	pH
LLCS10L-adit discharge							S		S									
LLCS20L-upstream																		
LLCS30L-downstream																		

Exceedences:

S - Secondary MCL

Note: The analytical results are listed in appendix IV.

4.4.3.4 Vegetation

No effects to the vegetation were noted. The adit-discharge channel was overgrown with sedges, alders, small pine trees and equisetum. The waste dump was sparsely to moderately vegetated in some areas, possibly a function of the steepness of the slope. The other waste rock was moderately to well vegetated with alders, fir trees, grasses, and foxglove.

4.4.3.5 Summary of Environmental Conditions

The site is small with a 5-gpm discharge that does not appear to affect the surface water. The eroding waste-rock dump is a source of sediment to the creek but does not appear to have an effect on water quality.

4.4.4 Structures

No structures remained at the Last Chance Mine. Some sawn lumber and timbers were scattered near the waste-rock dumps but it was uncertain if they were the remains of buildings. One intact building is represented by a symbol on the Saltese 7.5-min. topographic map but was not noted during this inventory.

4.4.5 Safety

No open workings or hazardous structures were noted at the Last Chance. A locked gate near the turnoff from Forest Route 7759 prevented unauthorized vehicular traffic to the mine.

4.5 Tarbox-Mineral King Mine

4.5.1 Site Location and Access

The Tarbox is one of the largest mines in a series of sites associated with the Osburn Fault. It lies on the north side of Forest Route 7759, which follows the topographic expression of the fault. The route directly north from Saltese on Forest Route 288 was inaccessible because of private land. The Tarbox Mine was visited by traveling north from the Taft exit on I-90. Forest Route 286 follows Randolph Creek north, then the Tarbox can be reached by turning east on Forest Route 7709 and then through a locked gate on 7759.

The site is located on the Haugan and Saltese 7.5-min. quadrangles. The adits to the west are on the Saltese quadrangle and the waste-rock dumps to the east of the workings are on the Haugan quadrangle. The mine is in sec. 35, T.20N., R.31W., at an approximate elevation of 4,000 ft, and is entirely on LNF-administered land.

4.5.2 Site History - Geologic Features

Historically, claim names associated with the Tarbox Mine include: Tamarack, Mamoth (sic), Hercules, Daxon, Danevirke, Pierce Jr., Alice Cary, Ada, Standard, Black Rock, Chance Fraction, Tarbox Fraction, Mamie Evelyn Fraction, Bunker Hill, Kate, Mountain View, Midway, Morning, Yellow Jacket, Jumbo No. 1, Hecla, Blue Bird, Jumbo No. 2, Ada Millsite, and Alice (Hall, 1920). Four other claims, north of the Tamarack and Mamoth, were the Gold Dollar, Last Dollar, Trade Dollar, and Silver Dollar. Summarizing from the Hall report, the Tarbox originally consisted of the Alice Cary, filed by E.K. Tarbox in 1886, and the Ada, filed by Tarbox and William Daxon in 1897. From 1910 until 1915, the property was reportedly idle after a devastating forest fire destroyed the mine (although one newspaper article stated that Richard Daxon had resumed operation in 1911). The mine was then operated from 1915 until 1919 when Hall's paper was written.

Pre-1910 workings consisted of at least two tunnels (one on the Alice Cary and one on the Mountain View), cuts and shafts, and the main shaft that was sunk to the 400-ft level with a winze from the 400-ft level to the 600-ft level. Vertical workings, including the primary 723-ft shaft, winzes and raises, totaled 1,203 ft in 1920. Tunnels totaled 300 ft and levels off the main shaft totaled 4277.5 ft. Ore and waste were hoisted through the main shaft; ore was dumped east of the shaft and muck or waste was dumped west of the shaft. Water had to be pumped from the 1,000-ft level to keep the workings dry.

A brief description of the Tarbox was made by Calkins and Jones (1912), and another by Wallace and Hosterman (1956). According to the latter, the Tarbox was owned by the Mineral King Mining Company of Missoula. The shaft at that time was 800 ft deep, with levels down to 1,000 ft below the collar. They reported that the mine had been allowed to flood in 1922 and no work had been done since that time. A mill at the site was not mentioned in any of the references.

Lonn and McFaddan (1999) mapped the mine as associated with the Osburn Fault but differed from previous mapping in that they described the lithologies as Burke Formation to the north and Revett Formation to the south along the right-lateral fault.

The host rock at the Tarbox is a quartzite, either Burke (?) or Revett Formation of the Proterozoic Belt Ravalli (?) Group, that was brecciated between the "North" and "South" veins. These veins were described in Hall (1920) as "true fissures", with bedding planes sheared both horizontally and vertically. Minerals present included quartz, iron carbonate (siderite), galena, lead carbonates, chlorite(?), and sphalerite. Strike of the veins was approximately S.75°E. and N.75°W. The "North" vein dipped 60°S. and was 10-40 ft wide. It extended 900 ft in vertical depth. The "South" vein was 30-80 ft wide and was approximately vertical. Minerals listed in Young and others (1962) included galena, sphalerite, pyrite, chalcopyrite, arsenopyrite, covellite, and ankerite. Similar mineralization was found in the Silver Cable, the Rock Island, the Meadow Mountain and the Last Chance mines.

4.5.3 Environmental Condition

A small adit discharge never reached the active drainage of the West Fork of Packer Creek. Iron staining is evident in the creek near the area where the waste piles are cut by the creek. The highly iron-stained and iron-cemented ore piles to the east of the Tarbox workings were being eroded by the West Fork of Packer Creek. A small seep emerged from the base of the piles but the flow was too small to sample in this inventory.

4.5.3.1 Site Features - Sample Locations

The remains of two adits and two shafts were west of Packer Creek and one collapsed adit was found east of the creek. Adit A01 trended N.75°W., was collapsed and had a slight discharge. The small trickle from this easternmost adit was sampled (PTBS20M) 10 ft from where a trench comes in. The adit A02 to the west discharged a slight amount that was present in the trench to the north for about 75 ft but disappeared underground about 100 ft from the creek. There was not enough water to sample. The adit was totally collapsed with about a 75-ft highwall. The main shaft appeared as if had been reclaimed recently; the timbering and possibly the headframe had been burned in the past.

A sample (PTBS10L) upstream from adit A02 on the West Fork of Packer Creek and a sample (PTBS40L) that was upstream of all mining activity on Packer Creek were used as background values. Downstream samples on the West Fork of Packer Creek (PTBS30M) and Packer Creek proper (PTBS50L) measured the impacts of the mining activity. One composite waste/soil sample from the ore dump (PTBW10H) was taken along the lower edge of the pile where the West Fork of the stream was actively eroding the rock. The site was inventoried and sampled on 08/08/01. Site features and sample locations are shown in figures 14 and 15; photographs are shown in figures 15a and 15b.

4.5.3.2 Soil

A sample was taken along the erosional edge where the tributary to Packer Creek cut into the partially iron-cemented waste-rock dump. The arsenic, copper, lead and zinc levels all exceeded the Clark Fork Superfund background levels and phytotoxic levels of 100, 1,000, and 500, respectively (table 21).

Table 21. Soil sampling results at the Tarbox Mine (mg/Kg).

Sample Location	As	Cd	Cu	Pb	Zn
PTBW10H - soil/waste along dump edge	3,810[1,2]	10.7[1]	241[1,2]	4,230[1,2]	6,447[1,2]

(1) Exceeds one or more Clark Fork Superfund background levels (table 3).
(2) Exceeds phytotoxic levels (table 3).

4.5.3.3 Water

Zinc concentrations exceeded the acute and chronic aquatic life criteria in the adit discharge sample and in the sample taken immediately downstream of the waste-ore rock dump (table 22). Manganese also exceeded the secondary MCL in the same two samples and iron concentrations were above the secondary MCL in the downstream sample. The pH measurements in the five samples were all between 7.19 and 7.63. The water in Packer Creek showed no effects of the mining activity on the West Fork of Packer Creek. It was clear, cold and cascading over a bouldery bed.

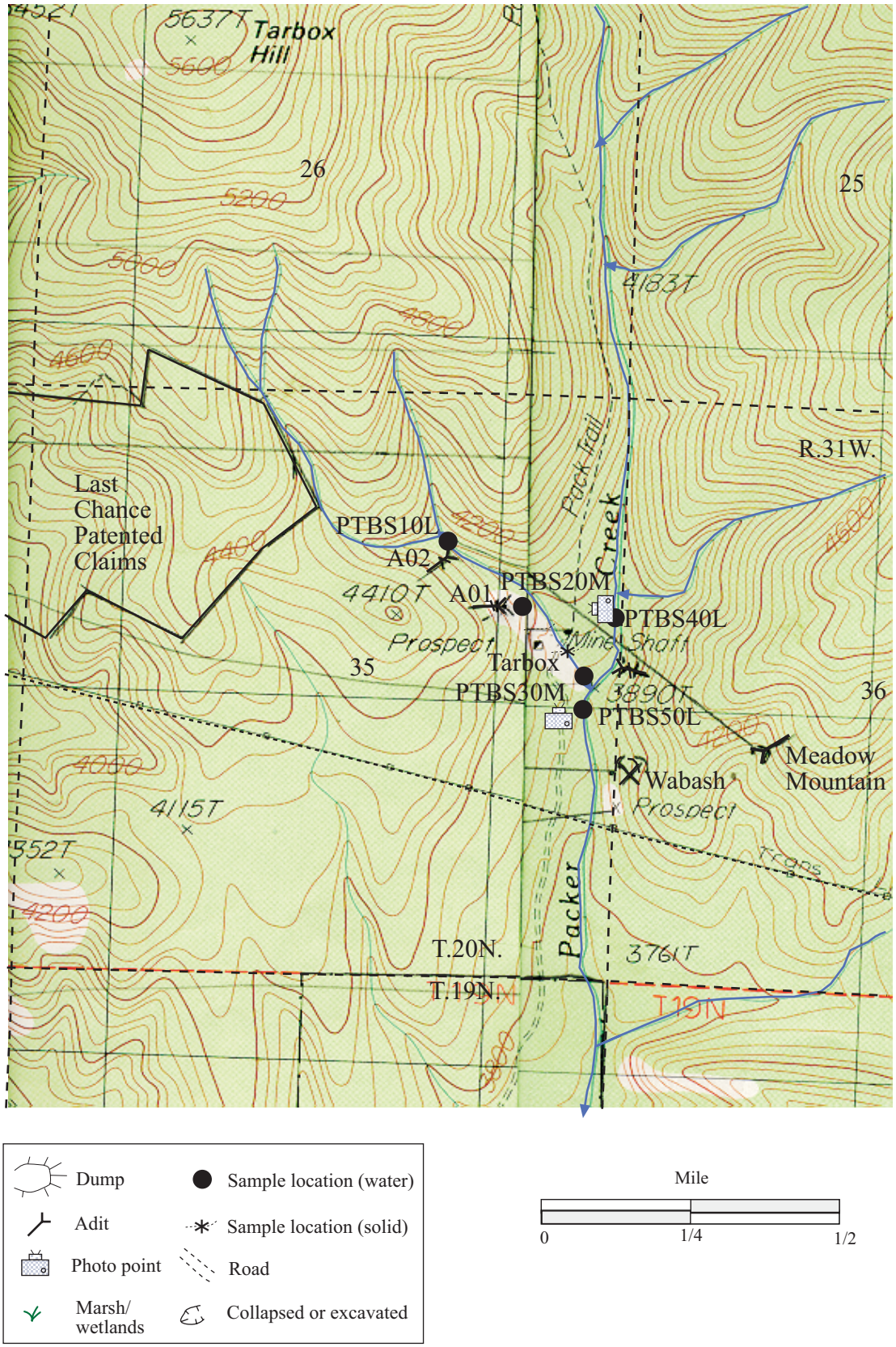


Figure 14. The Tarbox-Mineral King Mine is located on the West Fork of Packer Creek; it had an eroding waste dump and small discharges from the adits, as inventoried on 08/08/01.

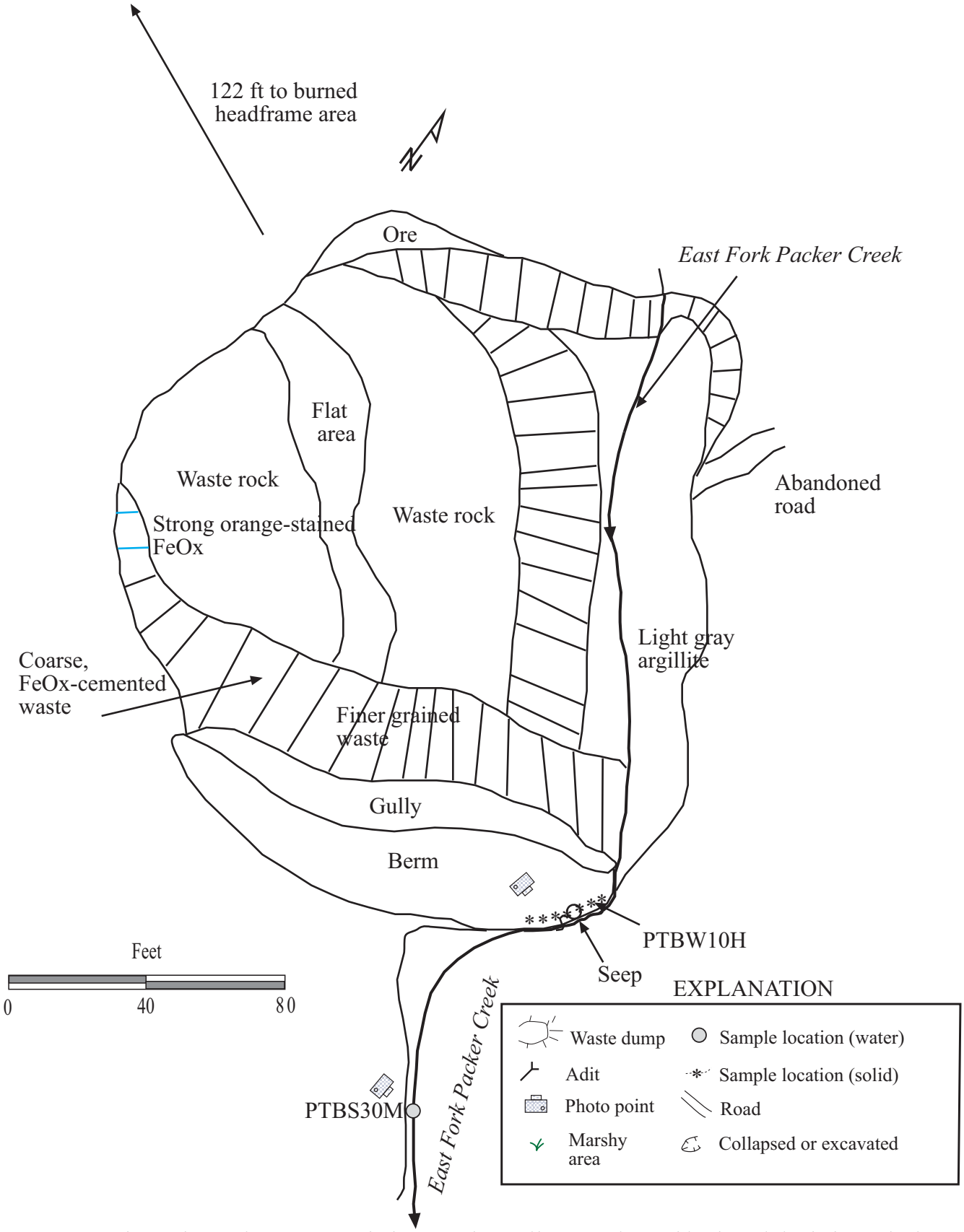


Figure 15. The Tarbox Mine waste-rock dump and ore pile were situated in the original channel of the East Fork of Packer Creek as inventoried on 08/08/01.

Figure 15a. The West Fork of Packer Creek, downstream of the Tarbox mine site, had an orange- stained substrate resulting from iron oxides. The waste-rock dump as well as the discharges were upstream from this sample site.

Figure 15b. The waste-rock dump at the Tarbox was partially cemented with iron oxides and was in contact with the West Fork of Packer Creek.

Table 22. Tarbox Mine water-quality exceedences.

Sample Site	Al	As	Ba	Cd	Cr	Cu	Fe	Pb	Mn	Hg	Ni	Ag	Zn	Cl	F	NO_3	SO_4	pH
PTBS10L-upstream on West Fork Tarbox Crk.																		
PTBS20M-adit discharge									S				A,C					
PTBS30M-downstream on West Fork							S		S				A,C					
PTBS40L-upstream on Packer Creek																		
PTBS50L-downstream on Packer Creek																		

Exceedence codes:

S - Secondary MCL
A - Aquatic Life Acute
C - Aquatic Life Chronic

Note: The analytical results are listed in appendix IV.

4.5.3.4 Vegetation

Vegetation was healthy at the Tarbox and, except for the iron-cemented ore pile, the waste-rock dumps and workings were being naturally revegetated. The upstream sample was taken in an area where ferns, alders, echinacea, spruce, pine and fir trees lined the banks. A thinned forest was to the north. The adit discharge at the second adit had sedges growing in it. The waste dumps here were well vegetated on the top and moderately vegetated on the sides with up to 1-inch-diameter pine trees. Surrounding vegetation consisted of grasses and pine forest.

4.5.3.5 Summary of Environmental Conditions

The adit discharges at the Tarbox were minor contributors to the environmental condition of the site. The streamside waste-rock and ore were a more obvious problem to the downstream water quality.

4.5.4 Structures

Seven dwelling houses, an office building, a boarding house with cellar, a log bunkhouse, a log barn, a chicken house, a sawmill, a blacksmith shop, a boiler house, a “dry” house, a carpenter shed, a shaft house and a powder magazine were once present at the Tarbox (Hall, 1920). One old office building was noted in a 1955 unpublished report by a Superior Oil Company (Uranium

Division, MBMG mineral property files) geologist but it has since burned. No structures remained anywhere on the property in 2001. Pioneer Technical Services' (1995) report noted that the headframe was present in 1993. Remnants of burned timbers remained. Two old iron boilers were south of the road that passed by the Tarbox.

4.5.5 Safety

No open adits or shafts were present at the Tarbox. The ore pile to the east of the property was steep and partially cemented by iron oxides. It was a possible hazard because of the steepness and the sharp pieces of ore.

4.6 Meadow Mountain Mine

4.6.1 Site Location and Access

The Meadow Mountain Mine was reached via Forest Route 7759 and is east of the Tarbox. It lies in tracts CABC sec. 36, T.20N., R.31W., at an elevation of 4,120 ft on the Haugan 7.5-min. quadrangle. Forest Route 7759 passes the Wabash prospect and then heads east. Small spur roads (FS97543 and 97542) were constructed to the north from FS18691 to access logging operations. An old overgrown mining road leads to the north, west of an unnamed intermittent drainage that is a tributary of Packer Creek, to a place where there is a flat area to park. Access is by hiking this road less than ⅛ mile to the collapsed adit at the Meadow Mountain. Other abandoned and overgrown logging and mine-related roads cross the slopes uphill from the discharging adit.

4.6.2 Site History - Geologic Features

Calkins and Jones (1912) reported that there were a total of 5 adits at the Meadow Mountain. Most of the adits were small and were located along the drainage. The mine is another associated with the Osburn Fault Zone, similar to those at the Ben Hur and Tarbox. Calkins and Jones (1912) associated the Meadow Mountain with the northwest-striking Burke Formation, placing it in the breccia associated with the Osburn Fault. They described two veins: a pyrite-dominant low-grade vein to the south and a galena dominant, highly faulted vein, to the south. The Meadow Mountain is briefly mentioned in Wallace and Hosterman (1956) as being owned by the Mineral King Mining Company of Missoula, Montana. At that time, the two levels were partly inaccessible; the N.30°E. driven tunnel was caved 150 ft from the portal (No. 2 level) and the N.40°E. level was caved 140 ft from the portal (No. 1 level). Today, they are both totally caved. Commodities listed in the 1960 (Crowley, 1961) mining directory were gold, silver, lead, and copper. No production records were found.

Lonn and McFaddan's (1999) mapping also placed the Meadow Mountain in the Burke Formation immediately north of the Osburn Fault, agreeing with Calkins and Jones (1912).

4.6.3 Environmental Condition

The Meadow Mountain's main feature is the collapsed adit with a <5-gpm discharge. The adit discharge never enters the surface water directly but probably the water where it emerges from the toe of the waste-rock dump is the headwaters of the small unnamed tributary of Packer Creek. The waste-rock dumps have started to be revegetated. The small flow in the intermittent drainage re-emerged near the area where there was an area to park.

4.6.3.1 Site Features - Sample Locations

No upstream sample was taken because the drainage was dry upgradient from the discharging adit. One adit discharge sample (PMMS10H) was taken in the small pond where the discharge pooled near the portal. A downstream sample (PMMS20H) was taken to the north of the grassy, revegetated road. The drainage was flowing intermittently at the surface. It was inventoried on 08/09/01. Site features and sample locations are shown in figure 16; photographs are shown in figures 16a and 16b.

4.6.3.2 Soil

No soil samples were taken at the Meadow Mountain because no erosional agent was present. The waste rock was revegetated and the piles were very stable.

4.6.3.3 Water

The water-quality sample at the Meadow Mountain's adit discharge had exceedences in iron and manganese (table 23). The field pH measured 7.24 standard units but the lab pH fell just below the standard at 6.45. The flow from the Meadow Mountain was estimated at 2.5 gpm; the flow never entered the surface water drainage near the adit. It flowed out onto the waste dump where it infiltrated into the nearby roadbed and then re-emerged near the toe of the waste-rock dump. The water then flowed at the surface to sample site PMMS20H.

The downstream sample had no exceedences. It, too, had a very small flow estimated at 3 gpm. The flow infiltrated into the ground just past where the downstream sample was taken.

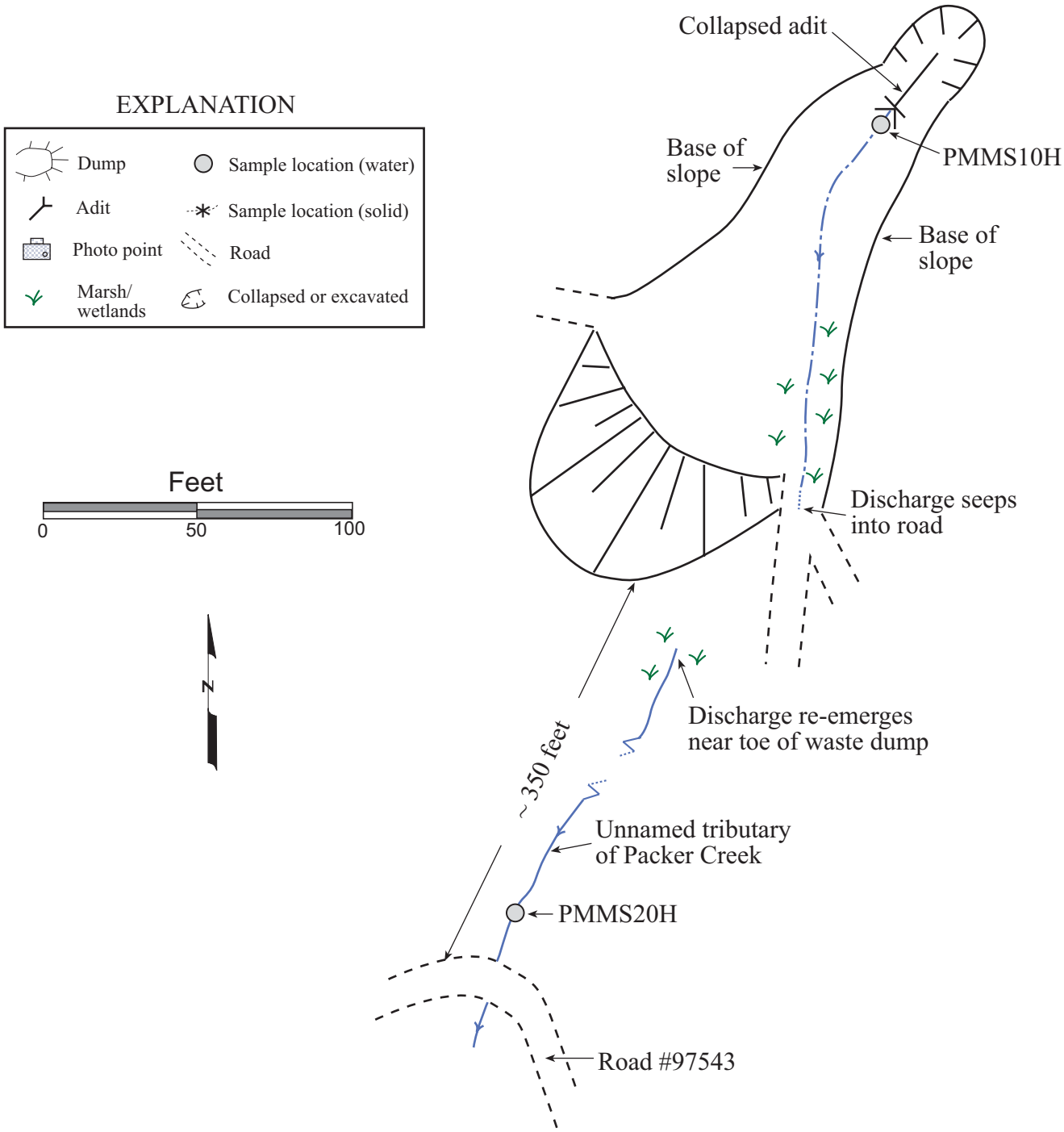


Figure 16. The Meadow Mountain Mine had a brightly iron-stained adit discharge. The flow at the time of sampling was estimated at 2.5 gpm.

Figure 16a. The Meadow Mountain Mine adit discharge, looking toward where it emerged from the collapsed adit.

Figure 16b. The Meadow Mountain Mine adit discharge, looking toward the waste-rock dump where it completely infiltrated into the ground.

Table 23. Meadow Mountain Mine water-quality exceedences.

Sample Site	Al	As	Ba	Cd	Cr	Cu	Fe	Pb	Mn	Hg	Ni	Ag	Zn	Cl	F	NO_3	SO_4	pH
PMMS10H-adit discharge							S,A		S									S*
PMMS20H-downstream																		

Exceedence codes:
S - Secondary MCL
A - Acute aquatic life standard
* - Either the laboratory or field pH exceeded secondary MCL standard.
Note: The analytical results are listed in appendix IV.

4.6.3.4 Vegetation

No effects to the vegetation due to mining were noted.

4.6.3.5 Summary of Environmental Conditions

The Meadow Mountain is a minor player in the impacts in the Packer Creek drainage. The surface water appeared to flow intermittently.

4.6.4 Structures

No hazardous structures were present and no ruins were noted except for one totally collapsed cabin downhill from the mine.

4.6.5 Safety

No safely concerns were noted at the Meadow Mountain. The adits were completely caved and no structures were present. The last ¼-mile to the adits is accessible only on foot.

4.7 Saltese Consolidated

4.7.1 Site Location and Access

The Saltese Consolidated is on the Haugan 7.5-min. quadrangle in tracts BDBC sec. 4, T.19N., R.30W., at an elevation of 4,140 ft. Access is north of Haugan via Road 288 which turns north at Forest Route 3845. The road is driveable from Haugan by 2-wheel drive under good road conditions. The road degrades past the Saltese Consolidated and leads into some recently logged

areas. The adit is about 1,100 ft southeast from the open-cut at the Black Traveler. It is entirely on LNF-administered land.

4.7.2 Site History - Geologic Features

The only reference to the Saltese Consolidated is USGS Bulletin 1027-M (Wallace and Hosterman, 1956). The geologic map locates the mine just north of the Osburn Fault with the adit in the Revett and Burke formations. The Wallace Formation is faulted to the south and covered by "older gravels" that are possibly Pleistocene. The Saltese Consolidated is shown on Lonn and McFaddan's (1999) map as being located where the Burke Formation grades into the Revett Formation north of the Osburn Fault. The St. Regis Formation is mapped south of the fault in this area.

The Black Traveler, to the west, is shown on Lonn and McFaddan's map as being south of the fault as is the East Coeur d'Alene Mine to the east. The Saltese Consolidated is included in the "deposits near the Osburn Fault zone" along with the Silver Cable, Bryan, Last Chance-Ben Hur, Hemlock, Galligar, Tarbox, Wabash, Meadow Mountain, Black Traveler, East Coeur d'Alene, Copper Rock, True Fissure, Monarch, Wolf, and Keith mines (Wallace and Hosterman, 1956).

4.7.3 Environmental Condition

This site is less than 5 acres, with two collapsed adits, one of which is leaking water. The discharge flows across and erodes the waste-rock dump located in the drainage bottom.

4.7.3.1 Site Features - Sample Locations

Two water samples were taken, one at the discharging adit and one downstream from the site. The stream originated at the adit so there was no upstream (background) sample. The adit discharge sample (TSCS10L) was taken from the overgrown road bed where the discharge flowed across the road. The downstream sample (TSCS20L) was taken approximately 200 ft below the adit on a tributary of East Fork of Timber Creek. A composite waste sample (TSCW10H) was taken along the erosional channel formed by the discharge. The site was inventoried on 08/07/01. Site features and sample locations are shown in figure 17; photographs are shown in figures 17a and 17b.

4.7.3.2 Soil

The solid sample at the Saltese Consolidated was a composite collected along the erosional gully formed by runoff and the adit discharge. The copper concentration was just below the phytotoxic limit, but was above the Clark Fork Superfund background levels. The lead level was well below

the phytotoxic limit of 1,000 mg/Kg but exceeded the Clark Fork Superfund background levels (table 24).

Table 24. Soil sampling results at the Saltese Consolidated (mg/Kg).

Sample Location	As	Cd	Cu	Pb	Zn
TSCW10H-waste dump	<1.0	<2.0	99[1]	57.7[1]	31.4

(1) Exceeds one or more Clark Fork Superfund background levels (table 3).
(2) Exceeds phytotoxic levels (table 3).

4.7.3.3 Water

The 10-gpm flow at the Saltese Consolidated had no exceedences (table 25). The water was clear and cold and was ponded on the road that passed over the waste dump. The downstream sample also had no exceedences and the analysis was almost identical to the adit discharge sample. The water flowing through the waste-rock dump did not appear to pick up any metals.

Table 25. Saltese Consolidated Mine water-quality exceedences.

Sample Site	Al	As	Ba	Cd	Cr	Cu	Fe	Pb	Mn	Hg	Ni	Ag	Zn	Cl	F	NO_3	SO_4	pH
TSCS10L-adit discharge																		
TSCS20L-downstream																		

Note: The analytical results are listed in appendix IV.

4.7.3.4 Vegetation

Vegetation at the Saltese Consolidated was well established. The adit-discharge channel had vegetation growing up to the water's edge, including monkey flower, sedges and grasses. The downstream sample site had lush ferns and mosses. The caved adit's slope also had some natural revegetation.

4.7.3.5 Summary of Environmental Conditions

This mine is a relatively small site and the water-quality analyses showed there were no exceedences.

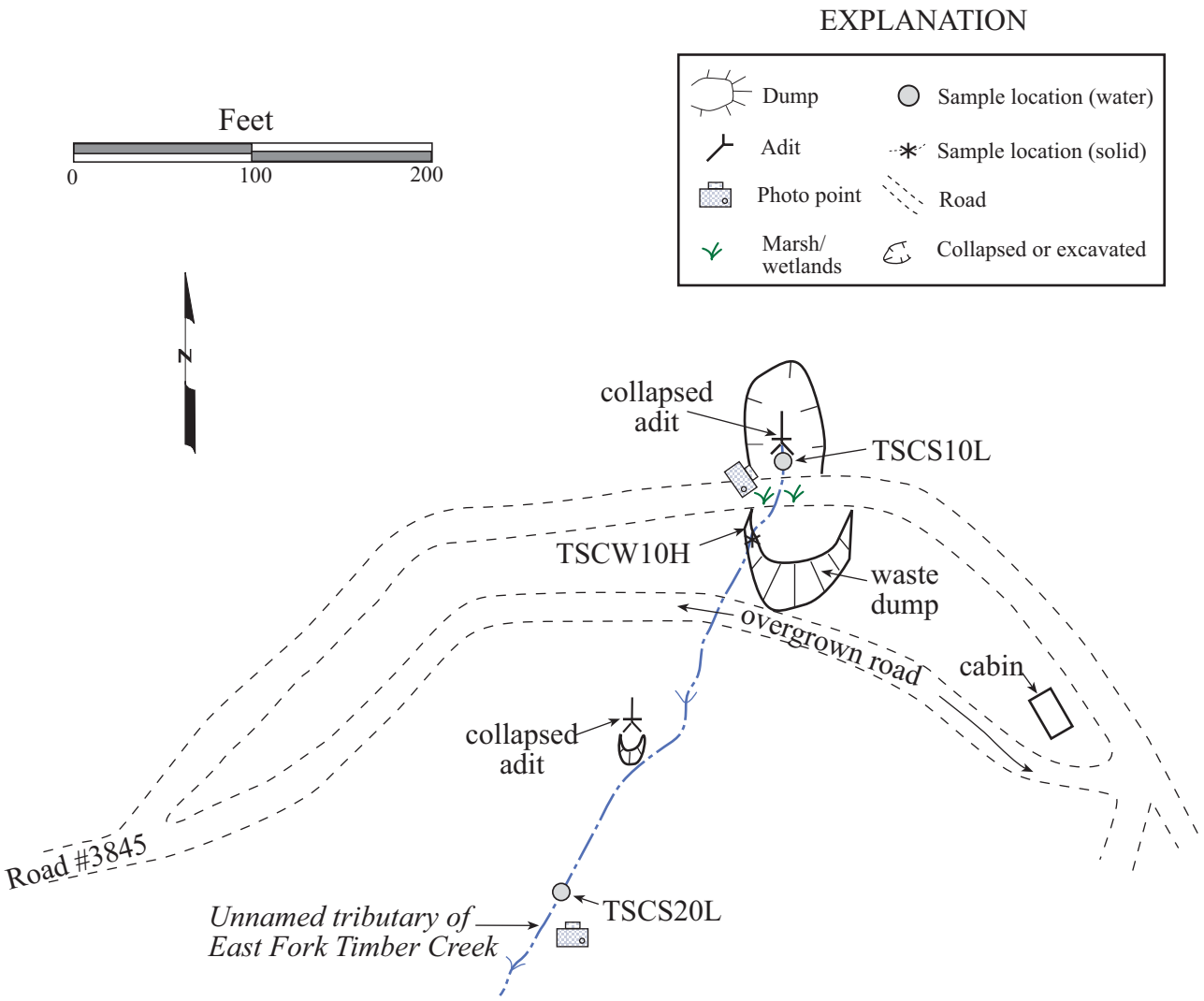


Figure 17. The Saltese Consolidated mine discharged about 10 gpm, as visited 08/07/01. Two water samples and a solid waste sample were collected.

Figure 17a. The Saltese Consolidated Mine's adit discharge forms the headwaters of a tributary of the East Fork of Timber Creek.

Figure 17b. The Saltese Consolidated downstream sample site had ferns and mosses growing along it.

4.7.4 Structures

One cabin was left standing to the east of the upper adit (figure 17) at the Saltese Consolidated. It was on LNF-administered land. The structure was log construction and the metal shingles on the roof were largely intact. No windows or doors remained and the southeast corner was slightly collapsed.

4.7.5 Safety

No safety concerns with the mine workings were noted. The cabin to the east was largely intact and could be considered a hazardous structure.

4.8 Rock Island Mine

4.8.1 Site Location and Access

The Rock Island Mine is located on the east side of the head of Rock Creek on the De Borgia North 7.5-min. quadrangle. The site is approximately 4.5 miles northeast of De Borgia and access was via Forest Route 444 off the Twelvemile Creek Road and then on Forest Route 378. Rock Creek flows south to join the St. Regis River east of De Borgia near Twelvemile Creek. An alternative route is via Highway 200 and then south on Forest Route 352 out of Thompson Falls, then west on Forest Route 3813. The mine is in tracts CBBC sec. 04, T.19N., R.29W., at an elevation of about 5,200 ft and is on land administered by the LNF.

4.8.2 Site History - Geologic Features

The mine is situated at least two miles north of the Osburn Fault and is in the vicinity of the Texas and Valentine mines. Wallace and Hosterman (1956) show it to be hosted by the Proterozoic Belt Wallace Formation. Structurally, it is associated with the regional Savenac Syncline. Lonn and McFaddan (1999) mapped the lower (informal) member of the Wallace Formation as the host rock but differ from previous mappers by bounding the area by major thrust faults to the south and north; an unnamed right-lateral fault (parallel to the Osburn Fault) was mapped between the two thrust plates. The Wallace Formation in the area strikes NW-SE and dips 60°-70°SW., according to Lonn and McFaddan (1999); Wallace and Hosterman (1956) described the beds of the Wallace as being overturned. The vein's strike was described as east-west, dipping 30-40°S.; it had a shoot that was exposed in the raise. Young and others (1962) measured the 2-ft-wide vein as N.33°E., dipping 68°NW. where they sampled it in the mine.

Wallace and Hosterman (1956) described the original workings as originally consisting of three levels; the upper two levels were connected by a 90-ft raise. Production was minimal; 1-2 car loads of ore had been shipped in 1956. Ore minerals were galena, chalcopyrite, pyrite and pyrrhotite. Gangue was cerussite, malachite, azurite, chrysocolla and limonite. Mineralization

occurred in a quartz vein in a fault zone and was somewhat pod-like. Young and others (1962) described the ore minerals as galena, sphalerite, chalcopyrite, and pyrite associated with a quartz and iron oxide gangue. USBM MILS database listed the commodities as lead-zinc-copper.

The upper adit had abundant malachite, manganese oxides, azurite (?), and quartz in the host rock on the dump. The middle adit had some track rails remaining on the waste-rock dump. The host rock here was grayish argillite, and had malachite, quartz, and iron and manganese oxides. The lower waste-rock dump had sheared argillite that trended S.60°E., dipping 60°S.

4.8.3 Environmental Condition

This remote site has one discharging adit, and one area of standing water. The discharge that combines with the flow from the drainage infiltrates the waste-rock dump and re-emerges past the toe of the dump. The waste-rock dumps are primarily argillite host rock and few sulfides were noted. They are not in contact with the active drainage in the area.

4.8.3.1 Site Features - Sample Locations

The site consisted of an upper disturbed area with a collapsed adit and possibly a collapsed shaft. The disturbed area is 125 ft by 125 ft, not including the waste-rock dump. Adit A01 trends N.20°W., and its dump was mostly unvegetated. The middle adit (A02) had its portal near the toe of the upper adit's dump. It was collapsed, dry, and trended N.10°W. The lowermost adit (A03) was open and discharging. The gate at the portal was busted and the remaining opening was about 3 ft by 5 ft. This adit trended N.15°E. Downhill from the discharging adit's dump is another area with water. There is a cut slope but no obvious adit; there is what appeared to be a waste dump downhill from the road. This area had no stressed vegetation. A fourth adit (A04) was collapsed but had been timbered almost to the edge of the main road. It trended N.35°E. It was visited August 17, 2001. Site features and sample locations are shown in figure 18; photographs are shown in figures 18a and 18b.

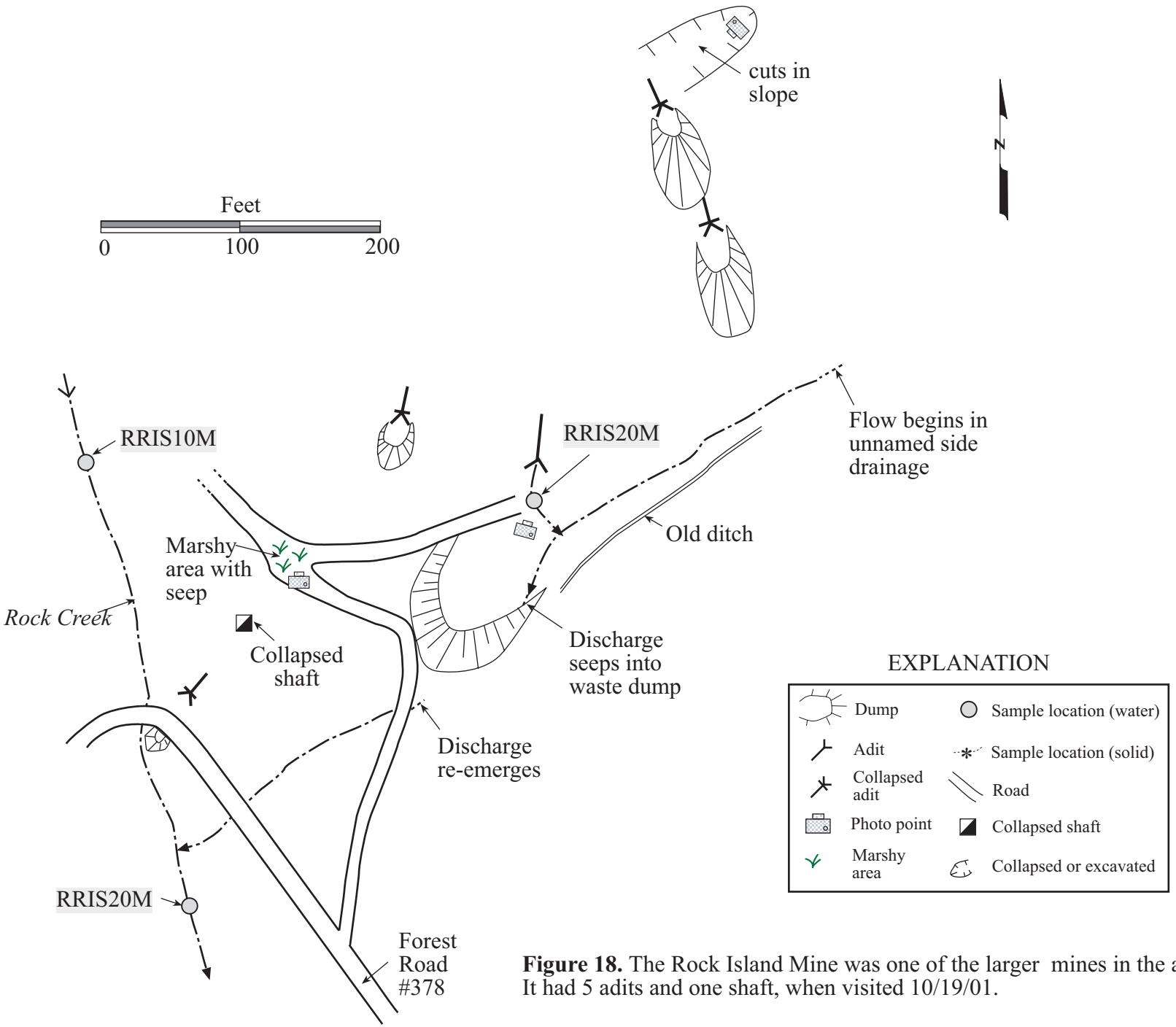


Figure 18. The Rock Island Mine was one of the larger mines in the area. It had 5 adits and one shaft, when visited 10/19/01.

Figure 18a. A possible collapsed adit at the Rock Island Mine was in a marshy area with a seep. The source of the water was uncertain.

Figure 18b. Adit A01 at the Rock Island Mine was sampled (RRIS20M) where the adit discharged and flowed into the side drainage.

4.8.3.2 Soil

No soil samples were taken. No impacts to LNF-administered land were noted in conjunction with the waste rock.

4.8.3.3 Water

The creek flowed approximately 0.25 cfs (112 gpm) upstream and downstream. The adit discharged only 0.5 gpm. There were no exceedences in any of the three samples (table 26). The pH measurements ranged from 7.39 to 8.21; the specific conductance measurements ranged from 168 to 191 µmhos/cm.

Table 26. Rock Island Mine water-quality exceedences.

Sample Site	Al	As	Ba	Cd	Cr	Cu	Fe	Pb	Mn	Hg	Ni	Ag	Zn	Cl	F	NO_3	SO_4	pH
RRIS10M-upstream																		
RRIS20M-adit discharge																		
RRIS30M-downstream																		

Note: The analytical results are listed in appendix IV.

4.8.3.4 Vegetation

The vegetation at the Rock Island was healthy and did not appear affected by the mining activity. Pine, larch, spruce and fir trees grew adjacent to the mine workings and were naturally revegetating the disturbed areas. Small shrubs and other undergrowth also grew near and on the waste. Grasses and shrubs grew along the adit-discharge channel and surrounding the marshy area where there was standing water. The waste-rock dumps were primarily barren but were locally revegetating with trees and shrubs.

4.8.3.5 Summary of Environmental Conditions

The Rock Island is typical of the mines associated with the Belt rocks in this area and the impacts of the mining are local. They are restricted to the disturbance immediately surrounding the mine.

4.8.4 Structures

No structures were associated with the Rock Island Mine.

4.8.5 Safety

The lowermost adit was open with a 3 ft by 5 ft portal remaining. The site had been secured by a wooden gate, but it was busted at the time of this inventory. The adit was accessible and was considered hazardous.

4.9 Copper Gulch

4.9.1 Site Location and Access

The unnamed mine in Copper Gulch is located about ¾ mile south and west of the Amazon-Dixie Mine which is south of the St. Regis River just east of Lookout Pass. The discharging adit is not directly associated with the Amazon-Dixie but because it is in the same general vicinity, some of the information about the Amazon-Dixie has been included.

The original road paralleling Copper Gulch is closed to all but ATV's and foot traffic via Forest Service Trail 265 about 0.9 miles from Forest Route 4208. The trail cuts the toe of the waste-rock dump and the mine is readily visible from the trail. The mine is shown by an adit symbol on the Lookout Pass 7.5-min. quadrangle in tracts CDCD sec. 5, T.19N., R.32W., at an elevation of 4,840 ft. It is entirely on LNF-administered land.

4.9.2 Site History - Geologic Features

The Copper Gulch adit is hosted by south- to southwest-dipping (20° to 30°) Precambrian Wallace Formation (Wallace and Hosterman, 1956). The Amazon-Dixie Mine is associated with, and south of, a southern splay of the west- to northwest-trending Silver Creek Fault. Lonn and McFaddan (1999) also show the adit hosted in the lower part of the Belt Wallace Formation.

No direct information could be found on the Copper Gulch adit. At one time, the Amazon-Dixie at the mouth of Copper Gulch, at Silex, included fifteen claims and four mill sites. The Amazon-Dixie was associated with seven "Leslie" claims adjoining (MBMG unpublished mineral property files). It is possible that the Leslie Mine could be the unnamed adit in Copper Gulch. The Amazon-Dixie had an estimated 4-5 miles of underground workings. The area was worked starting in 1908 and the property was consolidated as the Leslie Copper Mining Company in 1921. It was inactive for a period after 1928 (Gilbert, 1935).

Mineralization at the Amazon-Dixie was galena and chalcopyrite in a fissure vein with ore shoots described as being in the St. Regis Formation on the 700-ft level and the Revett quartzite on the 1,500 ft level. Some molybdenite was described in the area. The "Iron Crown" mine was described in the general area but no further information could be found on it to ascertain its location. The Rockcreek Silver-Lead Company was listed as the owner in 1965 (Geach and others, 1966). The Amazon-Dixie Mining Company of Wallace, Idaho, last performed exploration work in the area from the 1970's until 1982.

4.9.3 Environmental Condition

The unnamed Copper Gulch adit is a single working that is highly visible adjacent to the trail to Copper Lake. The adit discharge is small and never reached the Copper Gulch creek via the surface.

4.9.3.1 Site Features - Sample Locations

One sample of the adit discharge was taken near its source. Copper Gulch was not sampled because the discharge never reached the active drainage. Also, numerous natural seeps contribute to the flow of the creek and these probably add more to the flow than the adit discharge does. It was visited on 07/25/01. Site features and sample locations are shown in figure 19; photographs are shown in figures 19a and 19b.

4.9.3.2 Soil

No soil samples were taken because the waste dump was blocky and no impact to LNF-administered land was noted. The waste-rock dump was not in contact with surface water.

4.9.3.3 Water

No exceedences were noted in the adit discharge sample (table 27). Most analytes were near or below the detection limit. At 2.18 µg/L, zinc was detected but was near the detection limit and was well below even the chronic aquatic life standard of 110-190 µg/L. The pH was near neutral at 7.5 to 7.6 standard units and specific conductance ranged from 133 µmhos/cm in the field to 207 µmhos/cm measured in the lab.

Table 27. Copper Gulch mine water-quality exceedences.

Sample Site	Al	As	Ba	Cd	Cr	Cu	Fe	Pb	Mn	Hg	Ni	Ag	Zn	Cl	F	NO_3	SO_4	pH
CCGS10M-adit discharge																		

Note: The analytical results are listed in appendix IV.

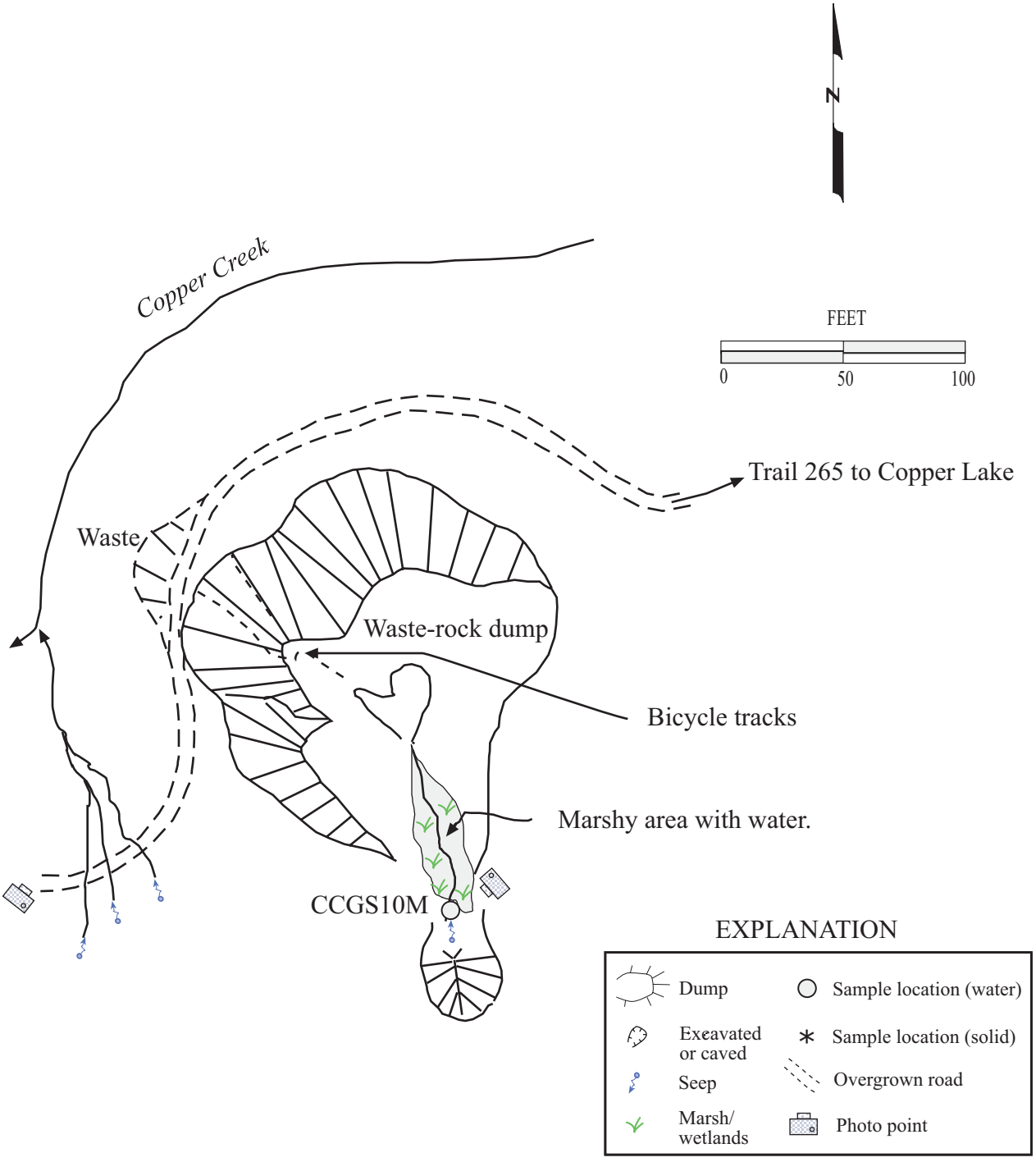


Figure 19. The mine near Copper Lake had both an adit discharge and numerous natural seeps, as mapped 07/25/01.

Figure 19a. Copper Gulch had a large, highly visible waste dump and was adjacent to Forest Trail 265.

Figure 19b. Copper Gulch's adit discharge was sampled in a small pool near the point of origin at the adit.

4.9.3.4 Vegetation

The vegetation adjacent to the Copper Gulch adit appeared exceedingly healthy and lush. The natural springs in the area had verdant foliage associated with them. The waste-rock dump was unvegetated on the steep sides probably due to the steepness and lack of organic material.

4.9.3.5 Summary of Environmental Conditions

Although the Copper Gulch adit discharged water, the environmental impacts were negligible. The area had many naturally occurring springs and the adit discharge probably had the same source. The springs form a small tributary to Copper Gulch north of the adit. The adit discharge ponded on the waste dump and then went into the subsurface. It never reached the active drainage.

4.9.4 Structures

No structures remained at the Copper Gulch adit, if they were ever present. The camp may have been worked from the base at the Amazon-Dixie Mine.

4.9.5 Safety

Mountain bike or dirt bike tracks were noted on the steep sides of the waste-rock dump. The dump is highly visible with the established Forest Service maintained trail (Trail 265) cutting across the toe of the dump. The adit was caved enough to not be attractive to enter; it did have a small opening at the portal. A small hole (1 ft by 1 ft) in the corner of the timbered portal remained into a 5-ft by 5-ft adit but the adit was entirely caved a few feet back. Four timber sets remained standing inside the opening and an iron gate was crushed.

4.10 St. Lawrence Mine and Big Sunday Creek Adit

4.10.1 Site Location and Access

The St. Lawrence Mine is approximately 4.5 miles south of Saltese, immediately north of the Montana-Idaho state line. Access is via Forest Route 305 and then Forest Route 9122 to Silver Lake. A strictly 4-wheel-drive road on the southeast side of the lake leads directly to the mine. It is in tracts DD sec. 32, T.19N., R.31W., and tracts AB sec. 05, T.18N., R.31W.

The Big Sunday adit is in tracts CDA sec. 33, T.19N., R.31W. to the west of Big Sunday Creek which is the next drainage east of Silver Creek. Access to this mine was restricted to hiking an old closed-off mining road that was blocked by blowdown and was revegetating with pine trees. The road is a spur off Forest Route 305. The Big Sunday and the St. Lawrence mines are in close

proximity to each other and similar geologically and so are described together. There is no evidence that the two mines were worked by the same company or are otherwise related.

4.10.2 Site History - Geologic Features

The St. Lawrence Mine is shown on Wallace and Hosterman's (1956) geologic map as being hosted by Precambrian Wallace Formation that has an east-west-trending vein. The Wallace trends northwest-southeast and dips shallowly (10°-40°) to the southwest. According to this map, the St. Lawrence is located between the Silver Creek Fault to the north and the Gilt Edge Fault to the south. Adjacent mines to the south in Idaho that may be related include the Richmond, Monitor, Stewart, and Copper Edge. Lonn and McFaddan (1999) mapped the middle member of the Precambrian Belt Wallace Formation at the St. Lawrence. A Tertiary-Cretaceous diorite-gabbro dike is mapped immediately north of Silver Lake and follows the topography along the Idaho/Montana border for at least 12 miles. No evidence of the diorite was on either mine's waste-rock dumps. The unnamed adit on Big Sunday Creek was in similar rock, a gray-green argillite. The rocks at this adit dipped 20°W. and had a strike of S.60°E. The adit trended N.55°W.

4.10.3 Environmental Condition

The St. Lawrence Mine sits directly upstream from Silver Lake which is the headwaters of Silver Creek; the creek flows into the St. Regis River at Saltese. The mine waste-rock dumps are evident from the lake's dispersed campsites. The discharges enter into the stream flow that helps to feed the lake.

The Big Sunday adit is a lone working located approximately 500 ft west of Big Sunday Creek. The small adit discharge flows into the drainage formed by the collapsed adit and then infiltrates into the ground. It never reaches the active drainage of Big Sunday Creek. No sulfides were noted on the waste-rock dump.

4.10.3.1 Site Features - Sample Locations

Four samples were collected from the St. Lawrence Mine site. An upstream sample (SSLS10L) was taken where water emerged from a loose pile of boulders adjacent to the upper collapsed adit. This was the headwaters in this area for Silver Creek. An adit discharge sample (SSLS20L) was taken where the water emerged from the lower adit. A third sample (SSLS30M) was taken where a seep or spring flowed from the toe of the waste-rock dump down from the lower adit. The downstream sample (SSLS40L) was taken immediately downstream from the lower adit's waste-rock dump (figure 19).

The adit discharge (BBSS10L) was sampled at the Big Sunday Mine. No samples were taken from Big Sunday Creek because the adit discharge was small and never reached the active

drainage. All samples were taken on 07/21/01. Site features and sample locations are shown in figure 20; photographs are shown in figures 20a and 20b.

4.10.3.2 Soil

Sample SSLW10H was a composite taken downhill from the lower waste dump at the St. Lawrence Mine. It was primarily black soil with some waste fragments mixed in. The arsenic values were two times the phytotoxic limit (table 28). The copper value was over six times the phytotoxic limit. Lead and zinc exceeded one or more of the Clark Fork Superfund background levels but were well below the phytotoxic limits of 1,000 and 500 mg/Kg, respectively.

Table 28. Soil sampling results at the St. Lawrence Mine (mg/Kg).

Sample Location	As	Cd	Cu	Pb	Zn
SSLW10H-downhill from waste-rock dump	223[1,2]	<2.2	643[1,2]	5.39[1]	5.72[1]

(1) Exceeds one or more Clark Fork Superfund background levels (table 3).
(2) Exceeds phytotoxic levels (table 3).

4.10.3.3 Water

The upstream and downstream samples at the St. Lawrence had no exceedences but the adit discharge sample exceeded the chronic aquatic life standard for copper (table 29). The sample from the seep at the toe of the waste-rock dump exceeded the primary MCL that was proposed for arsenic. It measured 13.3 µg/L. There were no exceedences at the Big Sunday.

Table 29. St. Lawrence Mine and Big Sunday Creek adit water-quality exceedences.

Sample Site	Al	As	Ba	Cd	Cr	Cu	Fe	Pb	Mn	Hg	Ni	Ag	Zn	Cl	F	NO_3	SO_4	pH
SSLS10L-upstream																		
SSL20L-adit discharge								C										
SSLS30M-seep at toe		P*																
SSLS40L-downstream																		
BBSS10L-Big Sunday adit discharge																		

Exceedence codes: P - Primary MCL * - exceeds new standard
C - Chronic aquatic life criteria
Note: The analytical results are listed in appendix IV.

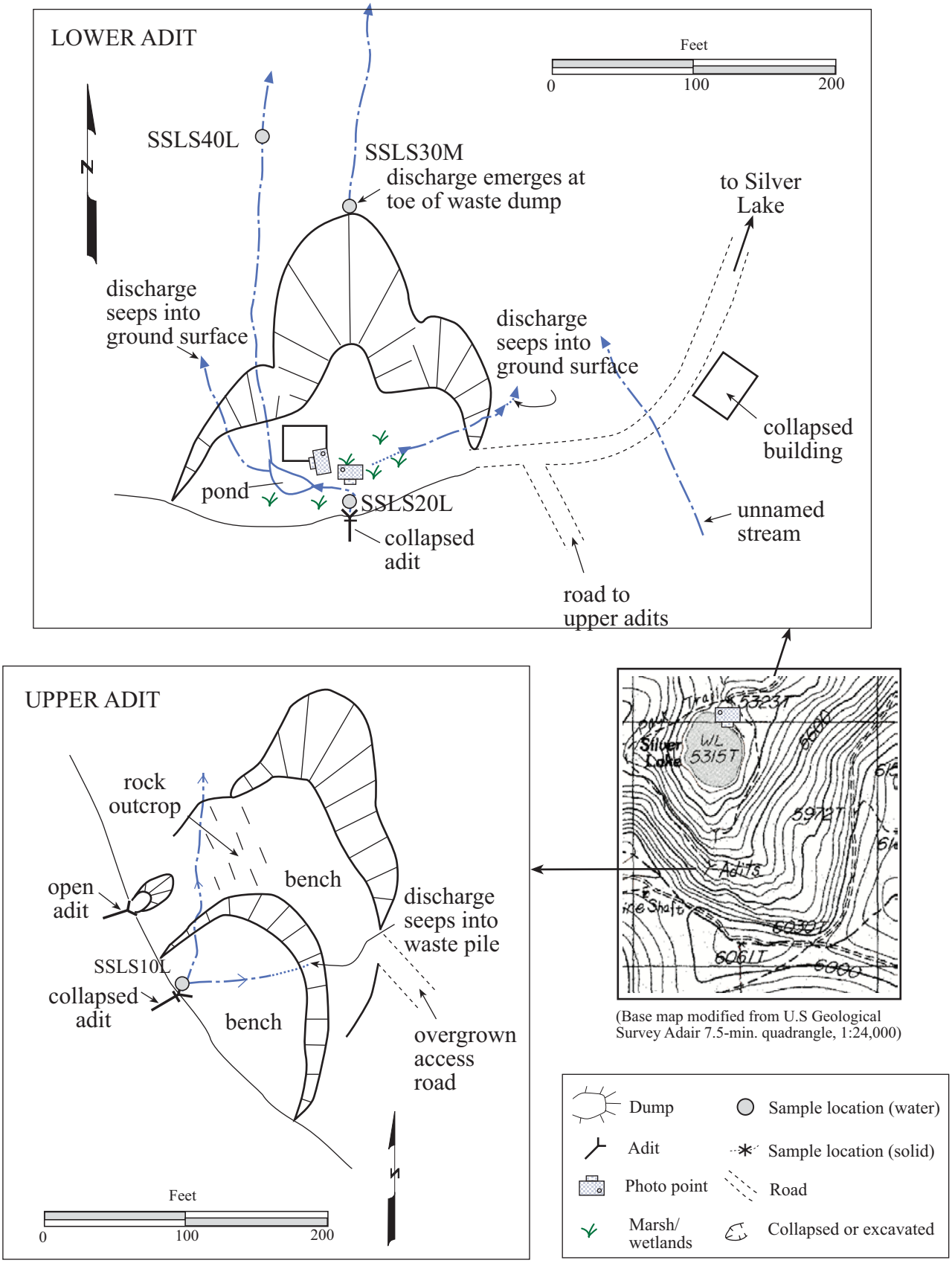


Figure 20. The St. Lawrence area had two adit discharges, a seep, and eroding waste-rock dumps, as mapped 07/12/01.

Figure 20a. The lower adit discharge at the St. Lawrence Mine, site of sample SSLS20L.

Figure 20b. Ponded water on the waste dump and staging area beyond the lower discharging adit at the St. Lawrence Mine.

Figure 20c. Two waste dumps appear as light colored patches in the forest at the St. Lawrence Mine, looking south from Silver Lake.

Figure 20d. Big Sunday Mine waste-rock dump was uphill from Big Sunday Creek. The adit discharge was to the left in the photo and infiltrated into the waste rock.

4.10.3.4 Vegetation

No noticeable effects to the vegetation were seen at the St. Lawrence Mine site. The waste-rock dumps were naturally revegetating. The Big Sunday adit was also naturally revegetating, although the lack of soil cover inhibited growth on the waste-rock dumps.

The dumps at the Big Sunday were moderately well vegetated, primarily with a variety of penstemon. The area around the sample site on the adit-discharge channel was verdant with raspberries, sunflowers, and alders.

4.10.3.5 Summary of Environmental Conditions

At the St. Lawrence Mine, a slightly elevated level of arsenic in the seep discharge at the toe of the lower waste-rock dump exceeded the primary MCL. Lead levels in the lower adit's discharge exceeded the chronic aquatic life standard. Snowmelt and runoff may play a part in the erosion of the waste-rock dumps. Silver Lake is not in contact with the mine site's waste or discharges. The Big Sunday Mine's adit discharge never reached the active drainage; the waste-rock dumps were blocky and no sulfides were noted on the dump.

4.10.4 Structures

One collapsed mill building was located west of the lower adit at the St. Lawrence Mine. It was completely flattened and appeared to have been a fairly large structure. Rusting metal shingles and weathered boards remained.

No structures were noted at the Big Sunday Mine. There was no evidence of any structures ever existing there.

4.10.5 Safety

One adit in the upper workings was completely open but appeared to have been driven a relatively short distance. No timbering was in the adit. Evidence of a recent visitor was noticed by the tire tracks on the lower dumps. The site is easily reached by 4-wheel drive (in summer months) or by hiking from Silver Lake.

4.11 Crystal Lake Adit

4.11.1 Site Location and Access

The Crystal Lake adit is in tracts DCDB sec. 21, T.18N., R.30W., entirely on LNF-administered land on the McGee Peak 7.5-min. quadrangle. Access is from De Borgia via Forest Route 236 to

the south and then by hiking the 1½ miles to the lake via Trail 269. A discharging adit is west of the trail past which remnants of an old building are almost totally obscured by undergrowth.

4.11.2 Site History - Geologic Features

Wallace and Hosterman (1956) describe a "Deer Creek" mine in the approximate location as the mine sampled here but it is not certain that they are exactly the same. They describe the vein being mined for gold as quartz with a little chalcopyrite and pyrite. It was reported that it produced very little gold. The map in Wallace and Hosterman's report shows the Deer Creek Mine just south of the northwest-trending Crittenden Peak Fault in the Belt Revett or Burke Formation. Lonn and McFaddan (1999) also show this area as Revett Formation and near the axis of an anticline. Unlike Wallace and Hosterman, they do not show a major fault going through this area.

4.11.3 Environmental Condition

The adit discharge was small and never reached Deer Creek as surface flow. The waste-rock dump is not in contact with any surface water. The dump is composed entirely of a gray quartzite with minor, local quartz veining.

4.11.3.1 Site Features - Sample Locations

Several dry adits were found near the overflow channel from Crystal Lake. One caved adit had timbers remaining but they were level with the ground surface. About 800 ft downhill from the lake is a totally caved adit with a small discharge; another adit about 15 ft north is collapsed and dry. One sample of the adit discharge (DCLS10L) was taken near its source where it pooled. Deer Creek was not sampled because the discharge never reached the active drainage. Also, numerous natural seeps add more to the flow of the creek than the adit discharge does.

The waste-rock dump was almost entirely gray quartzite or argillite with minor quartz vein fragments. It was about 200 ft long by 80 ft wide by about 2-3 ft high. A dry channel led down from the lake and past the dump. The site was visited on 07/25/01. Site features and sample locations are shown in figure 21; photographs are shown in figures 21a and 21b.

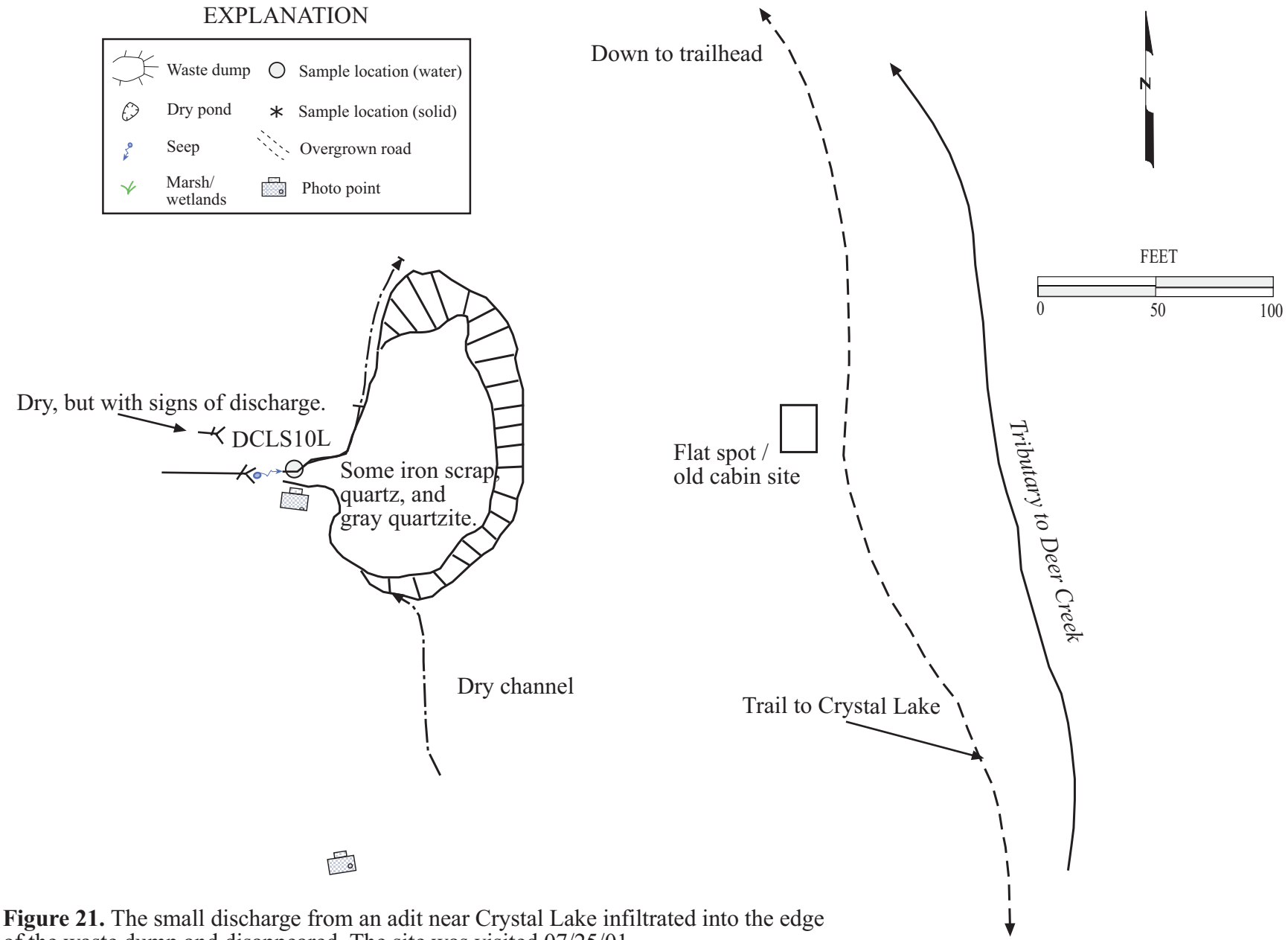


Figure 21. The small discharge from an adit near Crystal Lake infiltrated into the edge of the waste dump and disappeared. The site was visited 07/25/01.

Figure 21a. One of the dry adits near Crystal Lake was almost entirely obliterated with only a few timbers showing.

Figure 21b. Near the portal, the discharging adit at Crystal Lake formed a small pond that was sampled (DCLS10L) on 07/25/01.

4.11.3.2 Soil

No soil samples were taken because the waste dump was blocky and no impact to LNF-administered land was noted. The waste-rock dump was not in contact with surface water.

4.11.3.3 Water

No exceedences were noted in the adit-discharge sample. Most analytes were near or below the detection limit (table 30).

Table 30. Crystal Lake Mine water-quality exceedences.

Sample Site	Al	As	Ba	Cd	Cr	Cu	Fe	Pb	Mn	Hg	Ni	Ag	Zn	Cl	F	NO_3	SO_4	pH
DCLS10L-adit discharge																		

Note: The analytical results are listed in appendix IV.

4.11.3.4 Vegetation

No effects to the vegetation of the area were noted. The collapsed adit was partially obscured by the undergrowth along the discharge channel. Bracken fern, mountain maple, and mosses were some of the plants that grew in the vicinity of the adit. The waste-rock dump was moderately well vegetated with pines and spruce.

4.11.3.5 Summary of Environmental Conditions

This mine is a very minor site and appears to contribute very little to the environmental condition of the area. The waste-rock dump is stable and has little or no adverse effect to the environment.

4.11.4 Structures

The remains of one mine-related building can barely be seen west of the trail to Crystal Lake. Only the foundation and some logs can be discerned. It was just a flat spot that appeared to have had a cabin at one time.

4.11.5 Safety

No safety issues were identified. The adits near the lake are all collapsed with only some depressions and remaining timbers indicating where they were. The discharging adit was totally collapsed. Some scrap iron was on the waste-rock dump. Remnants of possible mining activity

were found down the trail towards the trailhead. They included an iron pipe and some scattered boards.

4.12 Upper Keystone Mine

4.12.1 Site Location and Access

The upper Keystone adits are in tracts CDDB, sec. 27, T.18N., R.26W., at an elevation of 4,600 ft on Keystone Peak 7.5-min. quadrangle. They are entirely on LNF-administered land. They are accessed via the La Vista exit on I-90, north of the highway on Forest Route 7868, which follows Keystone Creek. The road is gated about a mile past the small community of Keystone. Access from there was by hiking the old mining and logging road, Forest Route 18532.

4.12.2 Site History - Geologic Features

No written references to the site were found. It may have been known as the Wilson or, more recently, the Dodd silver lode (Mike Cole, Superior Ranger District, pers. comm., 2001). Concrete used in the mill construction had “KIT, 1975" written in it.

The rock at the portal was schist. It dipped 55°S.

4.12.3 Environmental Condition

The upper Keystone adits had an adit discharge and eroding waste-rock dumps. The buildings at the mine were in poor condition.

4.12.3.1 Site Features - Sample Locations

An upstream sample was taken at a small spring development upgradient from the discharging adit. The sample was from the first place that enough water was present to sample. Water from a seep or spring was captured by placing a piece of black plastic across a dam made by a board and a piece of PVC pipe.

One sample (KUKS20H) was taken from the adit-discharge channel in a spot that was 8 in. wide and 1 in. deep; flow could barely be discerned. A downstream sample (KUKS30H) was taken downstream of the road and downstream of the waste-rock dump. It was about 25 ft from the junction of the small adit discharge and Keystone Creek. The flow ran about 10-20 gpm. One soil-waste composite was taken along the southwest side of the waste dump that was in contact with the stream. The composite consisted of a sample taken every 15 ft.

The site was visited and sampled on 06/21/01. Site features and sample locations are shown in figure 22; photographs are shown in figures 22a, 22b, 22c, and 22d.

4.12.3.2 Soil

Four of the five analytes for soil at the Upper Keystone exceeded one or more Clark Fork Superfund background levels but none were higher than the phytotoxic limits (table 31).

Table 31. Soil sampling results at the Upper Keystone Mine (mg/Kg).

Sample Location	As	Cd	Cu	Pb	Zn
KUKW10H- soil/waste along waste-rock dump edge	13.4[1]	<2.1	7.09[1]	250[1]	61.3[1]

(1) Exceeds one or more Clark Fork Superfund background levels (table 3).
(2) Exceeds phytotoxic levels (table 3).

4.12.3.3 Water

The adit discharge slightly exceed the new arsenic standard (table 32). No other standards were exceeded. The discharge was a contributor to the headwaters of Keystone Creek. The adit discharge was estimated at less than 1 gpm and the captured seep/spring at 2-3 gpm. The downstream sample had no exceedences even after it flowed past the waste-rock dump.

Table 32. Upper Keystone Mine water-quality exceedences.

Sample Site	Al	As	Ba	Cd	Cr	Cu	Fe	Pb	Mn	Hg	Ni	Ag	Zn	Cl	F	NO_3	SO_4	pH
KUKS10H-upstream																		
KUKS20H-adit discharge		P*																
KUKS30H-downstream																		

Exceedence codes:
P-Primary MCL *- exceeds new standard.
Note: The analytical results are listed in appendix IV.

4.12.3.4 Vegetation

No dead or dying vegetation was noted at the Upper Keystone adits. The waste-rock dump was poorly vegetated. The discharge channel had equisetum and grasses lining the banks.

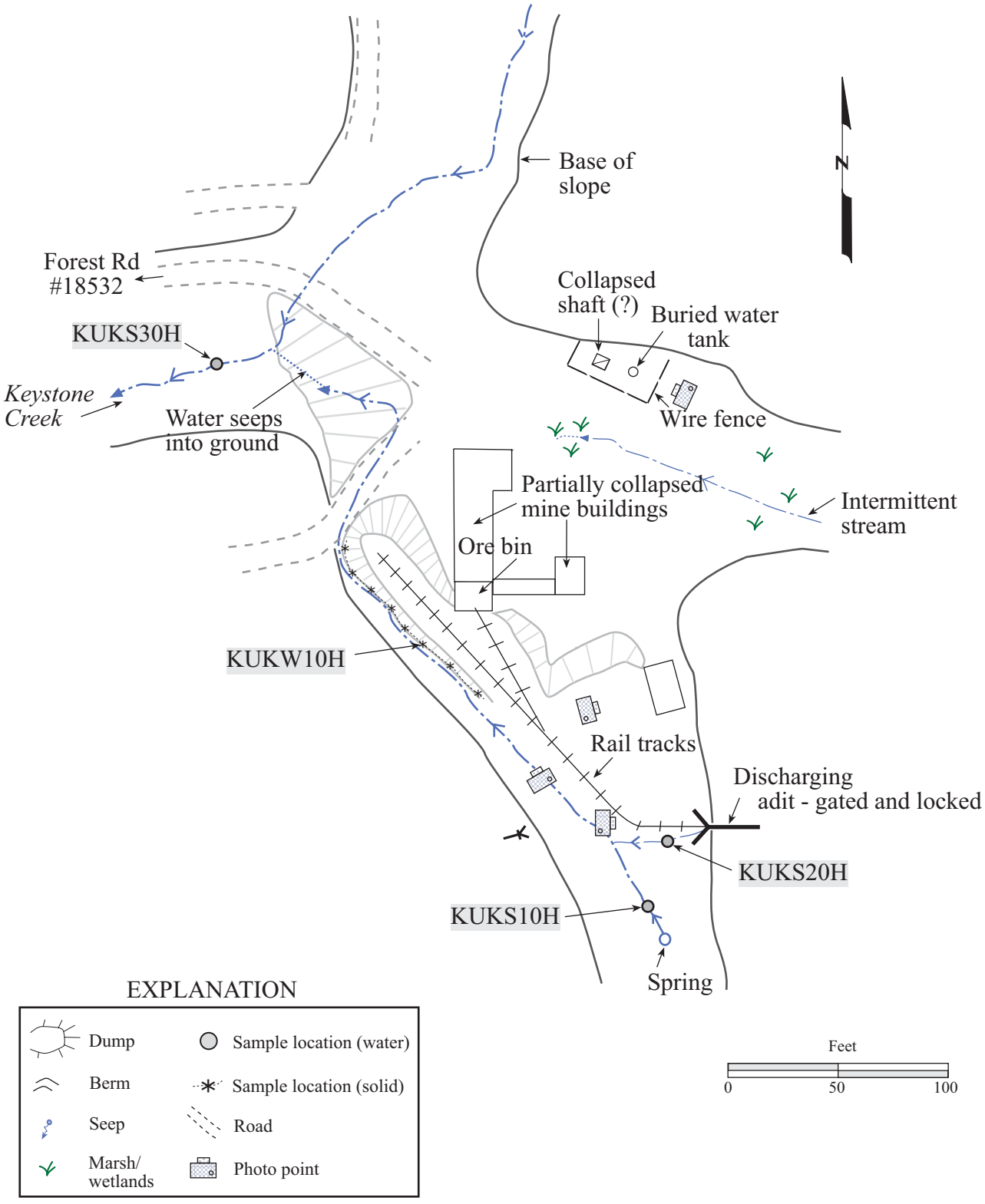


Figure 22. The Upper Keystone Mine consisted of a discharging gated adit, a streamside waste-rock dump, and potentially hazardous buildings.

Figure 22a. The Upper Keystone Mine adit was open but had a locked gate when visited on 06/21/01.

Figure 22b. Upper Keystone Mine waste dump had tracks and an ore bin. The discharge ran along the southwest side of the dump. (Left side in photo.)

Figure 22c. The Upper Keystone Mine buildings were in poor condition.

Figure 22d. The Upper Keystone Mine had a fenced structure, perhaps a shaft.

4.12.3.5 Summary of Environmental Conditions

The Upper Keystone Mine does not have many water-related environmental problems. The deteriorating buildings are unsightly and trash is scattered about. Trash included recent pop bottles and cans, six empty drums, empty 5-gal. oil cans, plastic and metal shingles, old timbers, galvanized conduit, hoses, PVC pipe, and an abandoned horse van.

4.12.4 Structures

The mill at the Keystone adit was still standing but was in poor condition. Two other buildings were beginning to show the effects of the harsh climate and were mostly collapsed. The construction was 2"x4" lumber with unpeeled posts as supports, a concrete floor, and some plywood.

4.12.5 Safety

As stated above, the mill was still standing but was in poor condition. The walls were unstable and there were scattered boards and nails at the site. The adit's portal was locked at the time of this visit, but could be easily entered with bolt cutters. Two other buildings were in a fair to poor state of repair. There was possibly one fenced and flooded working (shaft?) of unknown depth. An 8-ft-diameter pipe was set upright in the ground and water partially filled it; boards and timbers covered it and it was fenced with barbed wire. An abandoned truck that was used for unknown purposes was on site; it was labeled "C–L Arabian Horses".

Two other adits were adjacent to the road leading to the upper adit but not immediately adjacent to the main site. One was completely collapsed with a stack of lumber opposite the portal; the other stood open with an unstable portal and standing water.

4.13 Prosperity Mine

4.13.1 Site Location and Access

The Prosperity Mine is downstream from the upper Keystone adits. It was reached by exiting I-90 at LaVista, turning west on the north side of the highway and then turning north on Forest Route 7868. The mine is located about a quarter mile northeast of the small community of Keystone, on the Keystone Peak 7.5-min. quadrangle in tracts DADD sec. 32, T.18N., R.26W. The site is a few hundred feet west of Forest Route 7868 and is shown as an adit symbol on the topographic map. The old mine road that leads to up to the site is closed by blown-down trees. It has been included in the Keystone mining district and is entirely on LNF-administered land.

4.13.2 Site History - Geologic Features

No production records could be found for the Prosperity. Mineral property files records at the MBMG indicate that it was worked from 1966 to 1970 by Prosperity Mines, Inc. and was owned by the Par-D Mining and Development Corp., both of Missoula, MT. These records indicate that a 500-ft crosscut was completed in 1966. MBMG Bulletin 95 (Lawson, 1975) listed the commodities as silver, copper, and lead and the mine as inactive in 1974. USBM MILS records also refer to the mine as the Keystone Mine.

4.13.3 Environmental Condition

The adit at the Prosperity discharged a small stream of water (estimated at less than 1 gpm) that flowed across the waste-rock dump and then infiltrated into the ground near the western edge of the dump. The water was largely stagnant. It appeared as if the site had been recently partially recontoured. A small pile of waste remained with trees growing out of it but the rest of the waste had been flattened out and a small berm created along the discharge channel.

4.13.3.1 Site Features - Sample Locations

One water sample (KPRS10H) was taken approximately 25 ft from where the water left the adit where the discharge pooled on the waste-rock dump. No upstream or downstream samples were taken because the drainage was dry. One composite soil sample (KPRW10H) was taken from the active discharge channel for approximately 100 ft. The site was visited and sampled on 06/21/01. Site features and sample locations are shown in figure 23; photographs are shown in figures 23a and 23b.

4.13.3.2 Soil

No phytotoxic levels were exceeded in the soil sample (table 33), but lead and zinc levels were above at least one Clark Fork Superfund background level. The soil was black, loamy and had some silt, sand and pebbles. The composite sample consisted of 12 sample points at 15 ft intervals taken about 1 ft from the channel.

Table 33. Soil sampling results at the Prosperity Mine (mg/Kg).

Sample Location	As	Cd	Cu	Pb	Zn
KPRW10H-along discharge channel	<1.4	<2.9	11	53.7[1]	31.2[1]

(1) Exceeds one or more Clark Fork Superfund background levels (table 3).

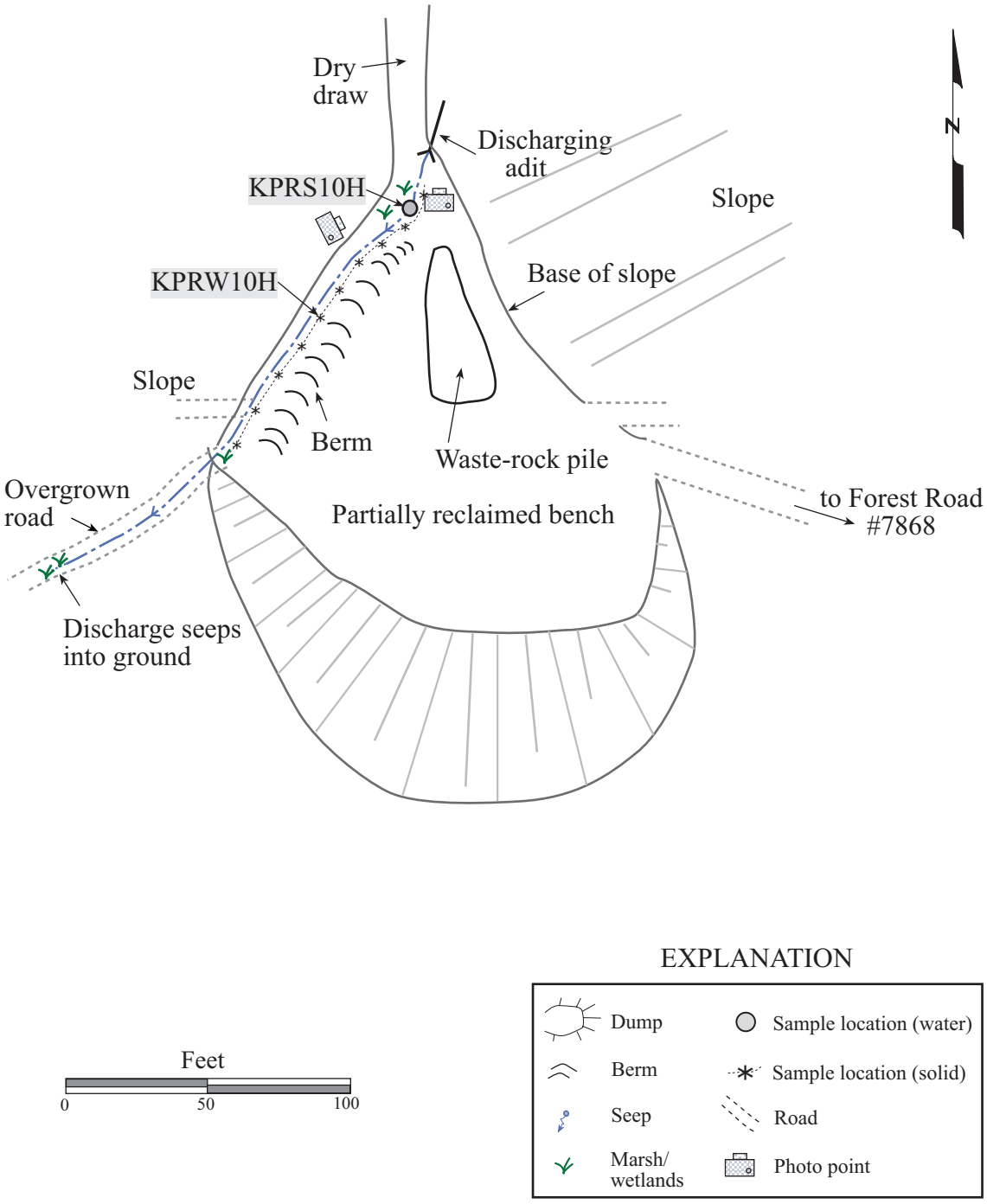


Figure 23. The Prosperity Mine had one discharging adit, which was open but gated when visited on 06/21/01.

Figure 23a. Prosperity Mine's adit was gated and had a unique arched portal, as visited on 06/21/01.

Figure 22b. The adit discharge at the Prosperity Mine flowed sluggishly along the top of the waste-rock dump.

4.13.3.3 Water

No water-quality standards were exceeded in the adit discharge sample (table 34). The water was clear with some algae, but the adit-discharge channel was bright orange iron stained. A fine orange precipitate coated the bed. The water flowed out of the adit and formed a pool (5 ft wide by 3 in. deep) about 15 ft from the portal. The flow had been re-routed along the edge of the waste-rock dump. It goes into the subsurface about 35 ft after dropping over the edge of the dump.

Table 34. Prosperity Mine water-quality exceedences.

Sample Site	Al	As	Ba	Cd	Cr	Cu	Fe	Pb	Mn	Hg	Ni	Ag	Zn	Cl	F	NO_3	SO_4	pH
KPRS10H-adit discharge																		

Note: The analytical results are listed in appendix IV.

4.13.3.4 Vegetation

No environmental problems with vegetation were noted. The forest included mainly pine and spruce. The waste-rock dump was revegetating with grasses and small lodgepole pine trees. The discharge channel had equisetum and grasses lining the bank.

4.13.3.5 Summary of Environmental Conditions

This is a relatively small site with the adit discharge having only local effects. Some reclamation work has been completed at the site including flattening and possibly removing some of the waste-rock dump, re-seeding the dump, and berming the adit-discharge channel. Knapweed and yellow clover with some ponderosa pines have starting to grow on the revegetated waste.

4.13.4 Structures

No structures remain at the Prosperity Mine. The timbering at the portal was unique. It consisted of the usual square-set timbers but with an upper deck that had vertical supports with an arch across the top, set into the hillside.

4.13.5 Safety

The adit at the Prosperity was open but was gated with wooden boards. “Keep out” and “no trespassing” signs were nailed to the red-painted crossed timbers at the portal. It could be accessed by crawling either over or through the timbers. It was secured against the casual

sightseer. The adit is partially caved past the gate; there is a 1-ft by 1-ft hole over the muck pile. Some of the lagging at the portal is buckled. A 35-ft highwall was adjacent to the portal.

4.14 Vulcan Tunnel (Nancy Lee Mine)

4.14.1 Site Location and Access

The tunnel is located in tracts DCBC sec. 31, T.18N., R.26W., at an elevation of 3,981 ft on the Keystone Peak 7.5-min. quadrangle. It is on mixed patented and LNF-administered land. This site was sampled at the request of Forest Service personnel because it had not been previously sampled in their studies. It is associated with the Nancy Lee Mine.

It was reached via the La Vista exit on I-90 and then Forest Route 7868 that follows Keystone Creek to the northeast. Turn west (left) on Forest Route 18606. The road is gated about a quarter mile from the turnoff, but with a key the road is passable to the hairpin turn at the North Fork of Mill Gulch (about 0.4 mi from the gate to the closed road), just before the Nancy Lee adit and buildings. From the hairpin turn, a small overgrown road follows the intermittent drainage to the northwest.

4.14.2 Site History - Geologic Features

The tunnel is shown on the mine map for the Nancy Lee (Campbell, 1960). No other mention of the name in literature was found. Campbell listed the Nancy Lee in the Keystone mining district. Ore at the Nancy Lee was taken from veins in and near the Osburn Fault Zone in the Burke and Revett formations. Campbell (1960) described the lithology in the area as being dolomitic quartzites and phyllites.

The Vulcan Tunnel trends to the southwest which is opposite direction of the main workings to the north of North Fork of Mill Gulch that trend northeast (the 640-level lower tunnel, the Ivanhoe Tunnel, the Jeldness Shaft, the Nancy Lee Tunnel, etc.) This working may have been an exploratory tunnel only.

4.14.3 Environmental Condition

The brightly iron stained adit discharge emerges about 3 ft from the portal of a collapsed adit, pools near the portal, and then sinks into the ground about 15 ft from where it started. There is no indication that the discharge reaches the active drainage (the North Fork of Mill Gulch) and no evidence was seen that it ever did.

4.14.3.1 Site Features - Sample Locations

The site consists of a collapsed adit producing a small discharge and a waste-rock dump. The adit discharge was sampled, with a duplicate sample taken for QA/QC. The samples were MVTS10H and MVTS20H. The site was inventoried on July 24, 2001.

USFS staff sampled discharge at the mine administration area in 1988. This sample (Keystone Creek LO-07-M01 [Nancy Lee 1]) is included in the water-quality table for comparison. Site features and sample locations are shown in figure 24; photographs are shown in figures 24a and 24b.

4.14.3.2 Soil

No soil or waste samples were taken. The waste-rock dump was moderately revegetated and no erosion into the drainage was noted.

4.14.3.3 Water

Iron, manganese, and sulfate levels exceeded the secondary MCL and the iron level exceeded the acute aquatic life criteria (table 35).

Table 35. Vulcan Tunnel (Nancy Lee Mine) water-quality exceedences.

Sample Site	Al	As	Ba	Cd	Cr	Cu	Fe	Pb	Mn	Hg	Ni	Ag	Zn	Cl	F	NO_3	SO_4	pH
LO-07-M01-from 1988																		
MVTS10H-adit discharge							S,A		S								S	
MVTS20H-duplicate							S,A		S								S	

Exceedence codes:
S - Secondary MCL
A-Acute aquatic life standard
Note: The analytical results are listed in appendix IV.

4.14.3.4 Vegetation

Grass grew along the discharge channel on the waste-rock dump. Only a few evergreen trees were dead adjacent to the discharge channel. Pines and fir trees were the most common vegetation at the site.

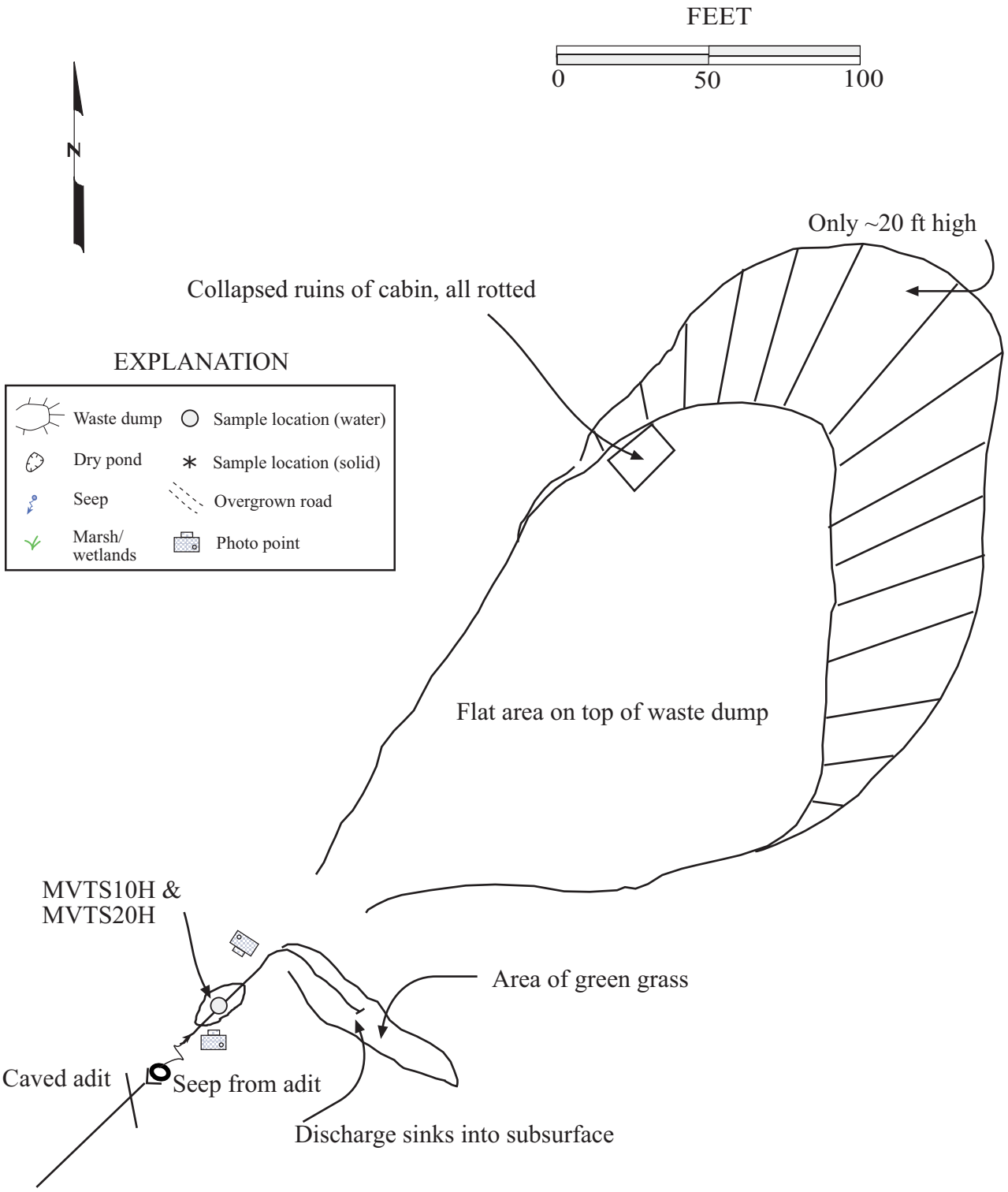


Figure 24. The small discharge at the Vulcan Tunnel at the Nancy Lee mine site soaked into the ground less than 50 ft from the adit, as mapped 07/24/01.

Figure 24a. Discharge from the Vulcan Tunnel emerged from a collapsed adit and ponded in front of the portal.

Figure 24b. Vulcan Tunnel's adit discharge had an oily sheen on the brightly orange-stained water.

4.14.3.5 Summary of Environmental Conditions

The effects of the discharge from the Vulcan Tunnel are largely local. The area around the discharge channel was barren; the channel substrate had no mosses or other aquatic plants growing in it.

4.14.4 Structures

No structures were noted at the site. It was probably worked from the main camp at the Nancy Lee Mine.

4.14.5 Safety

The adit was completely caved. No safety issues were noted.

4.15 Iron Mountain Mine

4.15.1 Site Location and Access

The Iron Mountain Mine is almost all on private property and so water was sampled upstream and downstream on LNF-administered land. It is located on the Idaho Gulch 7.5-min. quadrangle in secs. 12 and 13, T.17N., R.26W., at the junction of Flat Creek and Hall Gulch, which enters from the west. Access is by improved gravel road, Forest Route 194, 4.5 miles north from Superior. It is easily accessible and at the time of this inventory the area had evidence of recreational use and of use by mushroom pickers in 2001.

4.15.2 Site History - Geologic Features

Young and others (1962) listed galena, sphalerite, boulangerite, silver-bearing tetrahedrite, arsenopyrite, pyrite, marcasite, and quartz as the vein minerals. The mine exploited the vein fillings in schistose Belt rocks. Campbell (1960) wrote a summary of the Iron Mountain Mine as a part of his description of the St. Regis-Superior area. The following is a summary of his work. The fissure veins hosted by the Belt Wallace Formation in the area dip steeply and strike from N.50°W. to west. The rocks of the area are intensely sheared and have a distinctive cleavage. The ore shoots in the area were divided into the “lead” and the “zinc” veins. Campbell also published a series of detailed maps and cross sections of the underground workings that were originally from American Smelting and Refining Co.

According to the DEQ Mine Waste Cleanup Bureau website (http://www.deq.state.mt.us/Rem/mwc/hist_nar.asp), the Iron Mountain Mine was discovered and first worked on a small scale in 1888. It was developed by 4 levels: 200, 400, 700 and 1,600 ft, and by a shaft connecting

the 700-ft level to the 2,200-ft level. The early phase of operation spanned from 1888 to 1897. The later years of operation at the Iron Mountain Mine included 1909 to 1930 and from 1947 to 1953, according to a newspaper article (Montana Standard, Feb. 19, 2002).

According to Calkins and MacDonald (1909), the mine started producing about 1889 and yielded over half a million dollars profit over and above the expenses of building 15 miles of road, a 200-ton mill, and mine development. The Federal Mining and Smelting Company bought the property in 1915. Lessees operated the mine from 1925 to 1928.

4.15.3 Environmental Condition

The area has been of concern because the Superior water supply is partially taken from the Flat Creek drainage. The adit discharge is brightly orange stained and is readily visible from the road but is entirely on private land.

4.15.3.1 Site Features - Sample Locations

A collapsed adit that discharged bright orange water (figure 25a) and its waste-rock dumps were visible from the road but were on private property and so were not sampled. The mill ruins and its tailings were also on patented claims; they were not investigated further.

One sample (FIMS10H) was taken upstream of the site on Flat Creek about 300 ft upstream from the LNF property boundary. Another (FIMS20H) was taken downstream about 0.1 mi from the mill site, immediately adjacent to the road, and a third was a duplicate of the downstream sample taken for quality assurance. The site was sampled 06/20/01. Site features and sample locations are shown in figure 25; photographs are shown in figures 25a and 25b.

4.15.3.2 Soil

No soil samples were taken because the waste-rock dumps were on private property. Pioneer Technical Services (1995) collected samples of the tailings and the waste rock and both had concentrations three times background in arsenic, manganese, antimony, mercury, lead, and zinc. Additionally, the tailings had concentrations three times background in copper, cadmium, and iron.

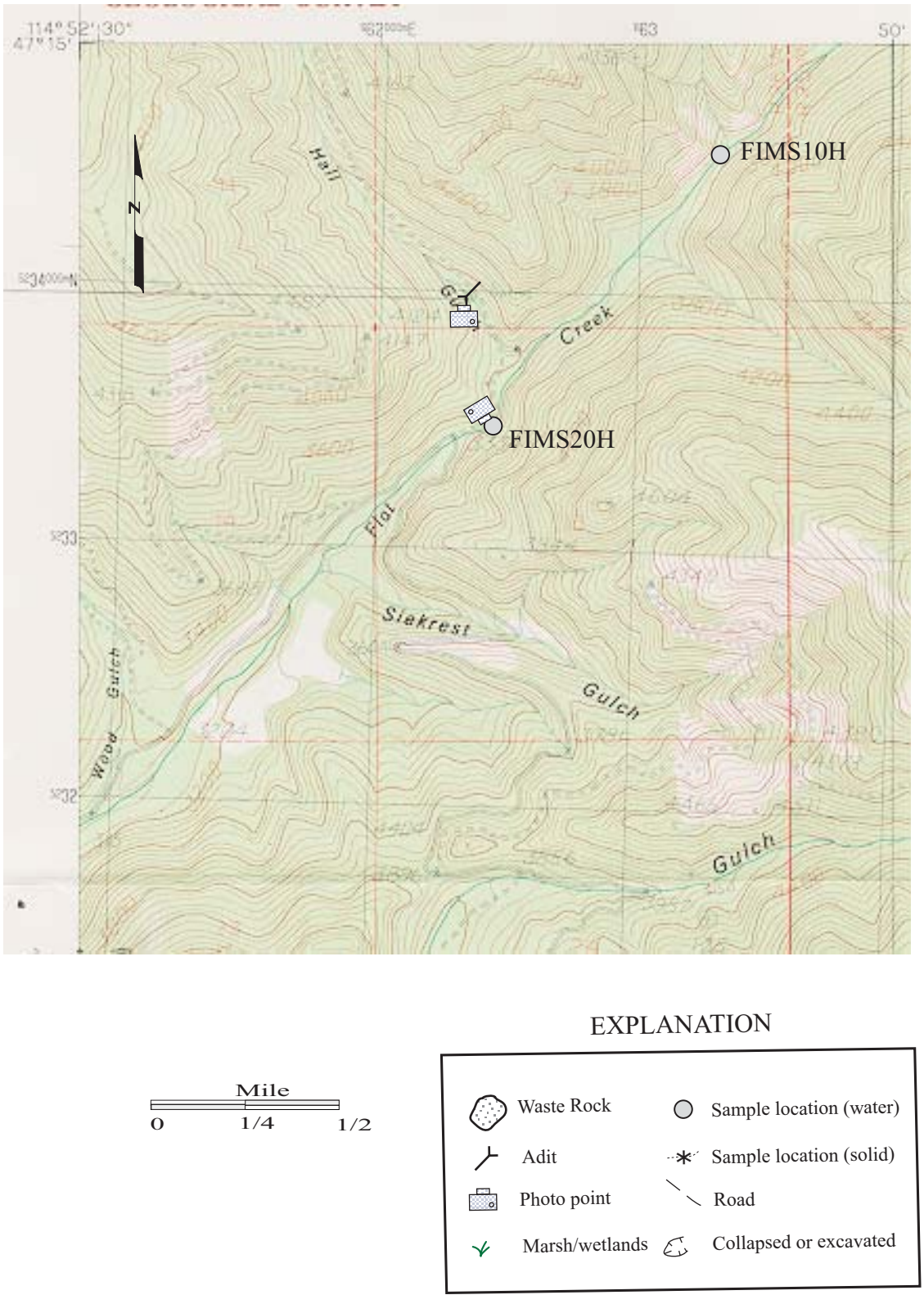


Figure 25. The Iron Mountain Mine discharged brightly orange stained water onto private land. The creek upstream and downstream from the mine, on LNF-administered land was sampled on 06/20/01.

Figure 25a. Iron Mountain Mine's orange discharge flowed across the waste rock and ponded at the edge of the flat staging area, as seen from above on Forest Route 194.

Figure 25b. The Iron Mountain Mine area was sampled on Flat Creek downstream of the mine on public access.

4.15.3.3 Water

The flow in Flat Creek was estimated at 5 cfs. The only water-quality exceedence was of zinc in the downstream duplicate sample (table 36). The concentration was just above the chronic aquatic life standard of 110-190 µg/L. The other downstream sample was just under the standard. Zinc was the only metal that appreciably increased in the downstream samples compared to the upstream sample. Two other samples (FLATCRK and SUPERSP) were taken in 1996 in conjunction with another program at the Montana Bureau of Mines and Geology and were included as additional downstream samples. Again, zinc was the only metal that showed a large increase as compared to the upstream sample. Lead concentrations in the current study were below the detection limit, but, in a previous study, lead concentrations in the downstream sample exceeded the chronic aquatic life standard.

Table 36. Iron Mountain Mine water-quality exceedences.

Sample Site	Al	As	Ba	Cd	Cr	Cu	Fe	Pb	Mn	Hg	Ni	Ag	Zn	Cl	F	NO_3	SO_4	pH
FIMS10H-upstream																		
FIMS20H-downstream																		
FIMS30H-duplicate													C					
FLATCRK-downstream								C					A,C					
SUPERSP-spring																		

Exceedence codes:
C-Chronic aquatic life standard
A-Acute aquatic life standard
Note: The analytical results are listed in appendix IV.

4.15.3.4 Vegetation

Vegetation upstream and downstream on LNF-administered land was not affected. The forested area surrounding the site was burned in the summer of 2000 but the immediately adjacent land was unburned.

4.15.3.5 Summary of Environmental Conditions

The majority of the disturbances at the Iron Mountain are on private, patented land.

4.15.4 Structures

No structures were on LNF-administered land.

4.15.5 Safety

All potential physical hazards were on private, patented land. The old mill site was mostly gone and the adit was collapsed.

4.16 Stobie-Hermiston Mine

4.16.1 Site Location and Access

The Stobie-Hermiston Mine, also called S&H Mining, is located on the south side of the Clark Fork River across from the Donlan Station. It is in tract C sec. 8, T.18N., R.26W., at approximately 2,600 ft elevation on the Keystone Peak 7.5-min. quadrangle. Two collapsed adits are both on LNF-administered land. A discharging adit is adjacent to Forest Service Pack Trail #223T. A dry, caved adit is uphill from the trail about 40 ft. Access is by crossing the Clark Fork River and hiking the pack trail that runs along the southern bank. No passable roads are in the vicinity on the southern side of the river.

4.16.2 Site History - Geologic Features

The one discharging adit trends S.18°W. The waste on the dump is dark gray argillite with no obvious mineralization. The second collapsed adit was dry and trends S.27°W. The size of the waste-rock dump suggests an approximately 60 ft of workings.

Harrison, Griggs, and Wells (1986) place the adits in the Precambrian Burke Formation and, regionally, south of the east-west St. Mary's Fault which is north of the Clark Fork River in this area. The northwest-trending Ninemile Fault is projected toward this general area, but is not directly associated with the mine (Harrison, Griggs, and Wells, 1986).

4.16.3 Environmental Condition

This site is remote and has only two caved adits, one of which was discharging 3-5 gpm. The discharge flows down the waste-rock dump and flows into the Clark Fork River.

4.16.3.1 Site Features - Sample Locations

Only one sample was taken (CSHS10H) from the discharging adit in front of the portal. The pH was 7.98 and the specific conductance was 201.6 µmhos/cm. The temperature of the water was 8.0°C (46.4°F). The site was visited October 16, 2001. Site features and sample locations are shown in figure 26; photographs are shown in figures 26a and 26b.

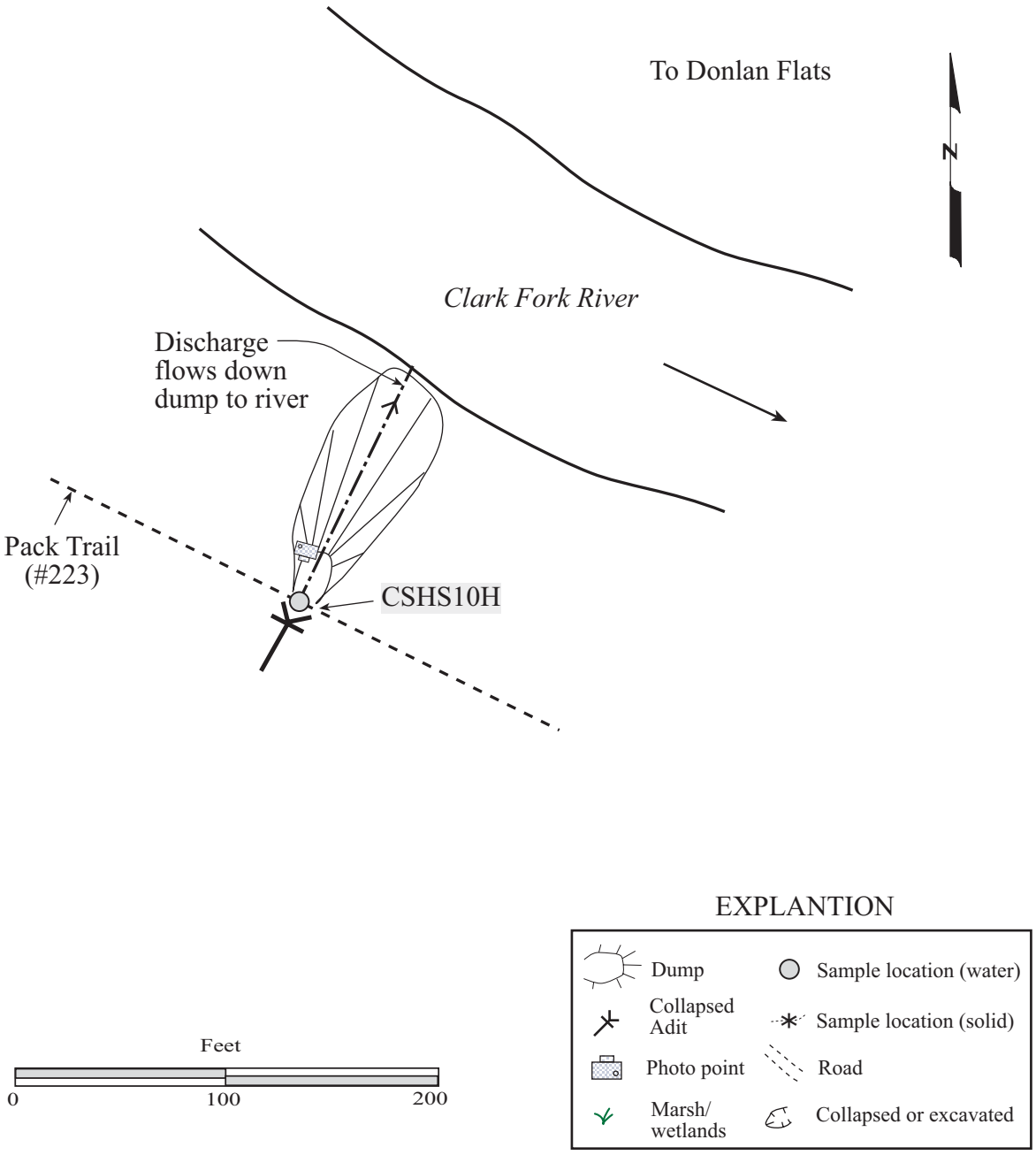


Figure 26. The Stobie-Hermiston or S&H Mine was remote and had a small discharge that was sampled on 10/16/01.

Figure 26a. Stobie-Hermiston Mine had a collapsed cabin that was nearly flattened.

Figure 26b. The Stobie-Hermiston Mine's adit discharge flowed over the waste-rock dump and down toward the Clark Fork River.

4.16.3.2 Soil

No soil sample was taken. There was no indication that metals were leaching; in fact, there were no indicators of mineralization at all on the waste-rock dump.

4.16.3.3 Water

No water-quality exceedences were found at the Stobie-Hermiston (table 37). The water appeared clear and cold. The discharge was estimated at 4 gpm. A sample from the same site (SMW1) from previous sampling by MBMG mining engineer Robin McCulloch in 1988 was included in the water-quality table. It also had no exceedences.

Table 37. Stobie-Hermiston Mine water-quality exceedences.

Sample Site	Al	As	Ba	Cd	Cr	Cu	Fe	Pb	Mn	Hg	Ni	Ag	Zn	Cl	F	NO_3	SO_4	pH
SMW1-adit discharge																		
CSHS10H-adit discharge																		

Note: The analytical results are listed in appendix IV.

4.16.3.4 Vegetation

The waste-rock dump is overgrown and extends down to the edge of the river. Mosses, alders, and cedar trees grew on the dump.

4.16.3.5 Summary of Environmental Conditions

The Stobie-Hermiston is a very insignificant mine in this area. The 3-5 gpm discharge had no water-quality exceedences and its contribution to the Clark Fork River is minuscule.

4.16.4 Structures

One collapsed log cabin remains near the second adit (A02). The roof is totally gone and only about 4 or 5 rows of logs remain intact.

4.16.5 Safety

No safety issues were identified at the Stobie-Hermiston. Both adits are caved, the cabin is in ruins, and the site is relatively remote with restricted access.

5.0 Lower Clark Fork Watershed (including the Plains Ranger District)

There are approximately 64 mine sites in the Lower Fork of the Clark Fork watershed associated with LNF-administered land. All are in the Thompson Falls/Plains Ranger District, of which only two were sampled.

Table 38 summarizes general information about all the sites; the sites sampled are shown in bold. The sampled sites are discussed below. The locations of the mines are shown in figure 27.

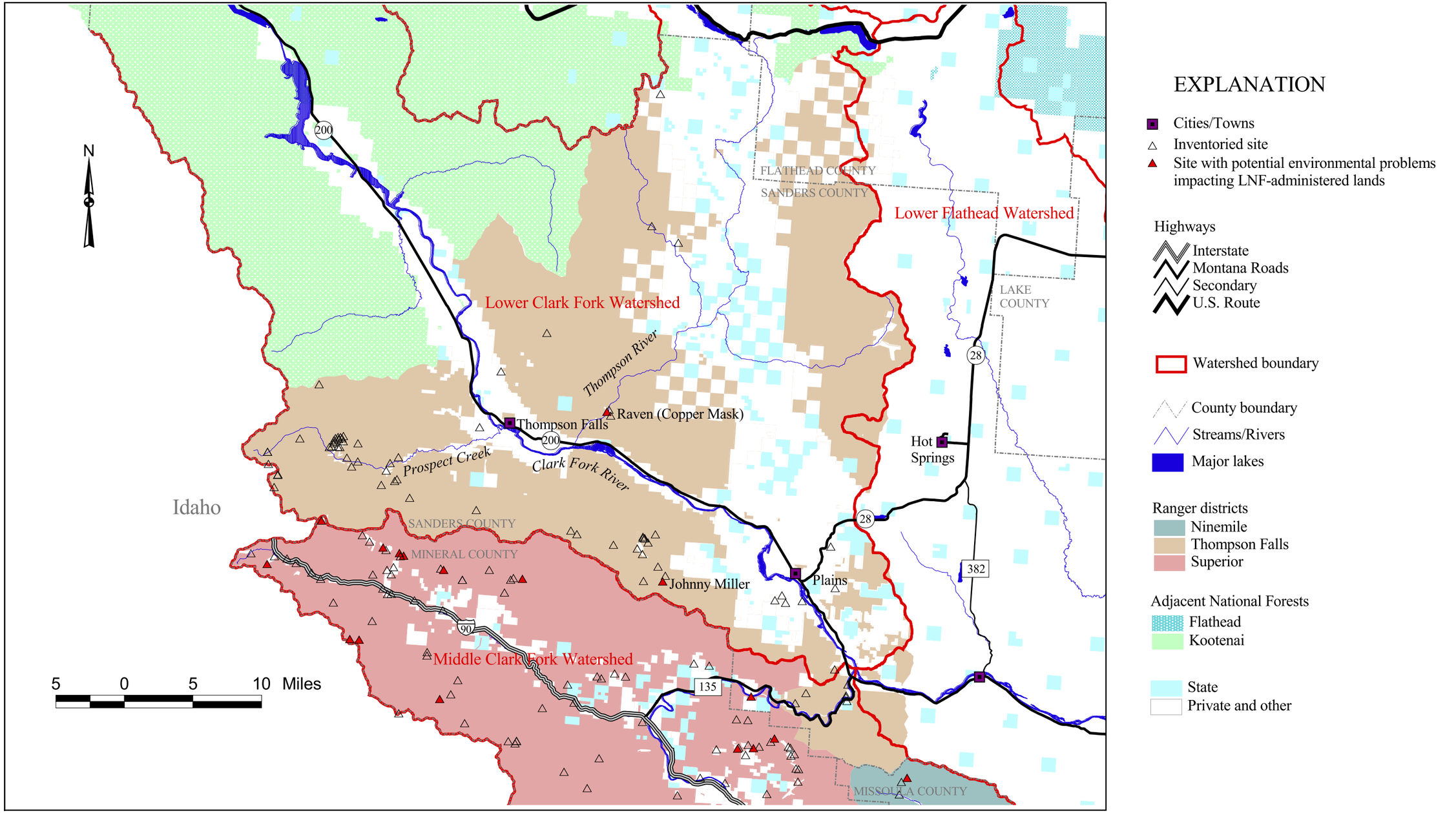


Figure 27. The Thompson Falls/Plains Ranger District is predominantly in the lower Clark Fork River watershed. Two mine sites were sampled during this inventory.

Table 38. List of mines in the Lower Clark Fork River Drainage in the Thompson Falls/Plains Ranger District.

MINE NAME	MBMG ID	OWNER	VISIT	HAZARD	T	R	S	TRACT	24K TOPO	COMMENTS
THOMPSON FALLS/PLAINS RANGER DISTRICT										
Annie Laurie	SA005308	N	N	N	20N	29W	13		PENROSE PEAK	Adit on Northup Creek, no access.
Antimony Mines	SA009004	M	N	N	21N	31W	20		DRIVEWAY PEAK	Screened out: general location and description.
Arlington	SA005138	N	N	N	21N	32W	28		THOMPSON PASS	Unable to visit. North slope of Glidden Creek.
Barto	SA005258	N	N	N	22N	32W	36	C	THOMPSON PASS	Unable to visit. On North Fork of Clear Creek.
Bay Chief; Bay Chief Extension	SA005313	P	N	N	20N	28W	14	D	SUNSET PEAK	Screened out: patented, private claims.
Black Jack Lode	SA005113	M	N	N	21N	31W	19	D	DRIVEWAY PEAK	Screened out: patented lode claim.
Bonanza Mine	SA004733	M	N	N	20N	27W	31		SUNSET PEAK	Screened out: inaccurate location (±1 km). May be same as Eddy Creek.
Bull Frog	SA005348	N	N	N	20N	32W	9		THOMPSON PASS	Unable to visit.
Cherry Creek Mine	SA005303	N	N	N	20N	29W	24		PENROSE PEAK	Adit on Cherry Creek, no access.
Coeur D' Alene Star Mine	SA005208	M	N	N	20N	28W	13		SUNSET PEAK	Screened out: inaccurate location; listed in secs. 12 and 13, T.20N., R.28W.; no other references.
Cooper Creek / Copper Creek	SA005358	N	N	N	20N	32W	5	A	THOMPSON PASS	Unable to visit.
Copper King (Mascot)	SA005393	M	N	N	22N	28W	33	DBC	EDDY MOUNTAIN	Private, two patented claims.
Daisy Creek	SA008001	M	N	N	24N	27W	30		RICHARDS PEAK	Screened out: prospect pits only as described in Stanley (1984). Cu-Pb-Ag occurrence in Bonner Fm.
Dee Creek Adit	SA008213	N	Y	N	20N	28W	25	DDAC	SUNSET PEAK	Adit is caved and dry.
Eddy Creek	SA001344	M	N	N	20N	28W	14		SUNSET PEAK	Screened out: inaccurate location, description of a general area.
Elda Lode	SA005078	P	N	N	21N	31W	20		DRIVEWAY PEAK	Screened out: patented lode claim.
Eliza Lode	SA005128	P	N	N	21N	31W	17	B	DRIVEWAY PEAK	Screened out: patented lode claim.
Ellis Lode	SA005118	P	N	N	21N	31W	19	A	DRIVEWAY PEAK	Screened out: patented lode claim.
Eureka Lode	SA005123	P	N	N	21N	31W	20	B	DRIVEWAY PEAK	Screened out: patented lode claim.

MINE NAME	MBMG ID	OWNER	VISIT	HAZARD	T	R	S	TRACT	24K TOPO	COMMENTS
Everson Gulch Adit	SA008630	F	N	N	21N	31W	21	D	DRIVEWAY PEAK	Adit on Everson Gulch; not in original database; unable to visit; may be active.
Excelsior Lode	SA005038	M	N	N	21N	31W	20		DRIVEWAY PEAK	Screened out: patented lode claim.
Favorite Lode	SA005098	M	N	N	21N	31W	20		DRIVEWAY PEAK	Screened out: patented lode claim.
Fishtrap Quarries	SA005198	N	N	N	24N	28W	26		FISHTRAP LAKE	Screened out: quarry, ornamental stone. Unlikely to affect Forest land.
Glidden Gulch Prospects	SA009010	N	N	N	21N	32W	23	C	THOMPSON PASS	Unable to visit. Not in original database.
Green Mountain Mine	SA005783	P	N	N	20N	28W	14	D	SUNSET PEAK	Screened out: patented, private claim.
Happy Boy Prospect	SA005363	N	N	N	21N	31W	33	B	DRIVEWAY PEAK	Screened out: inaccurate location, no apparent access. 2 adits (275 ft and 150 ft).
Idaho Montana Mining co	SA005293	N	N	N	21N	32W	33		THOMPSON PASS	Most workings on the Idaho side.
Iron Daisy /Princess Mining Co	SA005368	N	Y	N	20N	31W	3	BBDB	DRIVEWAY PEAK	Visited 10/18/01. Mill site present, no tailings in contact with creek.
Janstan Group	SA004693	N	N	N	21N	32W	2		THOMPSON PASS	Screened out: inaccurate location, no references.
Johnny Miller	**SA005088**	**N**	**Y**	**N**	**20N**	**27W**	**31**	**CDCA**	**SUNSET PEAK**	**Discharging adit; large blocks of waste adjacent to stream.**
Kendoy	SA001302	M	N	N	19N	25W	32		QUINNS HOT SPRINGS	Screened out: graphite occurrence, accuracy of ±1 km.
Little Comet Lode	SA005133	N	N	N	21N	31W	17		DRIVEWAY PEAK	Screened out: patented lode claim.
Lower Letterman	SA005068	P	N	Y	19N	26W	3		PLAINS	Information from DSL-AMRB (1995). Outside of Forest.
Mammont Lode	SA005083	P	N	N	21N	31W	19		DRIVEWAY PEAK	Screened out: patented lode claim.
Midday Lode	SA005093	P	N	N	21N	31W	20	C	DRIVEWAY PEAK	Screened out: patented lode claim.
Morning View Lode	SA005103	P	N	N	21N	31W	20		DRIVEWAY PEAK	Screened out: patented lode claim.
Mineronjou, Eddy and Russell Groups	SA005338	P	N	N	20N	28W	23		SUNSET PEAK	Screened out: private, patented claims. General location.
Monia / Sales Prospect	SA001278	P	N	N	25N	28W	1	ACAD	MANTRAP FORK	In Lolo National Forest on private land. Reference : Crowley; F.A. (1963, p. 44-45).
Montana Premier (Letterman)	SA004828	P	N	Y	19N	26W	3	BCD	PLAINS	Information from DSL-AMRB (1995). Outside of Forest.

MINE NAME	MBMG ID	OWNER	VISIT	HAZARD	T	R	S	TRACT	24K TOPO	COMMENTS
Montana Standard Mine	SA001248	P	N	N	21N	31W	35	A	DRIVEWAY PEAK	Screened out: patented lode claims. Mill site noted in literature.
Montro Gold Mines	SA005178	S	N	Y	19N	26W	4		PLAINS	Information from DSL-AMRB (1995). Outside of Forest.
Nellie Mine	SA008609	N	N	N	21N	31W	36		DRIVEWAY PEAK	Screened out: visited general area. Inaccurate location (±1 km).
North Dee Creek Adit	SA008220	N	N	N	20N	28W	26		SUNSET PEAK	Adit on unnamed north fork of Dee Creek.
Paul Bunyon	SA005333	N	N	N	22N	29W	3		MOUNT HEADLEY	Unable to visit. Remote location. North of Cube Iron Mountain.
Prospect Creek Adit	SA008224	N	Y	Y	21N	31W	25	CC	DRIVEWAY PEAK	Open adit with 10-ft by 7-ft opening. Standing water in adit; does not discharge.
Prospect Creek Placer	SA005233	N	N	N	21N	31W	28		DRIVEWAY PEAK	Screened out: placer claim; one placer miner in 1914 (Lyden, 1948).
R & M #1 Prospect	SA001332	N	N	N	19N	28W	1	B	SUNSET PEAK	Screened out: prospect only, short adit on Swamp Creek 1.5 miles west of Johnny Miller.
Raven Mine (Copper Mask)	**SA001428**	**M**	**Y**	**Y**	**22N**	**28W**	**33**	**CDA**	**EDDY MOUNTAIN**	**Visited 10/18/01; three open adits and one or more caved adits. One discharge.**
Russell Group	SA005433	P	N	N	20N	28W	14		SUNSET PEAK	Screened out: private, patented claims.
Shamrock Mine	SA005373	N	N	N	21N	31W	25		DRIVEWAY PEAK	Screened out: prospects and caved workings only.
Silver and Lead Prospect	SA004633	P	N	N	20N	25W	18		PARADISE	Screened out: outside of Forest boundaries, little or no impact to Forest.
Silver and Copper Prospect	SA004638	P	N	N	20N	25W	31		PARADISE	Screened out: outside of Forest boundaries; little or no effect to Forest.
Silver King / Belle Stowe	SA005353	N	Y	Y	21N	28W	4	AAC	EDDY MOUNTAIN	Two open adits, one collapsed adit. Standing water only.
Silver Peak Group	MN005975	N	N	N	20N	32W	10		SEVEN POINT MOUNTAIN	Screened out: inaccurate location. Lat-long plots on Table Top Mtn; sec-Township-Range plots on Seven Point Mtn.
State Group	SA005213	N	N	N	20N	28W	21		PENROSE PEAK	Possibly duplicate of the Russell Group; very inaccurate location.
Station Millsite Claim	SA005108	M	N	N	21N	31W	20		DRIVEWAY PEAK	Screened out: patented mill site claim.
Stibnite Hill Mine	SA001482	N	N	N	21N	31W	17		DRIVEWAY PEAK	Screened out: general location of the entire district. See individual mine names.
St. George Lode	SA005073	P	N	N	21N	31W	20	B	DRIVEWAY PEAK	Screened out: patented lode claim.

MINE NAME	MBMG ID	OWNER	VISIT	HAZARD	T	R	S	TRACT	24K TOPO	COMMENTS
Sullivan Hill Tuff	SA005343	P	N	N	21N	30W	12		TABLE TOP MOUNTAIN	Screened out: tuff occurrence, also accuracy of ±10 km in MILS database.
Swan Prospect	SA005328	N	N	N	20N	32W	4		THOMPSON PASS	Inaccurate location, (±1 km); no references.
Thompson Falls Mining Company	SA005243	M	N	N	20N	31W	2		DRIVEWAY PEAK	Screened out: possibly same as Iron Daisy; in same location.
Unnamed Bentonite	SA005438	P	N	N	22N	29W	19		MOUNT HEADLEY	Screened out: bentonite occurrence, unlikely to affect LNF-administered land.
Unnamed Mines	SA005193	N	N	N	20N	28W	23		PENROSE PEAK	Adit on South Fork Eddy Creek, no access.
U.S. Antimony Smelter & Refinery	SA004713	M	N	N	21N	31W	29	D	DRIVEWAY PEAK	Screened out: active operation, U.S. Antimony Corporation.

(Owner: NF - National Forest, P - Private, S - State, M - Mixed; Visit: N - not visited, Y - visited; Hazard: Y - hazard, NE -not evaluated)

5.1 Johnny Miller Mine

5.1.1 Site Location and Access

The Johnny Miller Mine (named after owner John W. Miller) is on the Sunset Peak 7.5-min. quadrangle on the West Fork of Swamp Creek. Access is via Forest Route 217 out of Plains, then by Trail 1400 which was hiked to the mine site. It is labeled as the "Miller" on the LNF-map. It is in tracts CDCA sec. 31, T.20N., R.27W., at an elevation of about 3,780 ft.

5.1.2 Site History - Geologic Features

Crowley (1963) described the mine as consisting of "several caved adits and a few shallow shafts" and included the following descriptions. The large adit near the creek was estimated at 800 to 1,000 ft in length. It was driven in black to dark gray argillite of the Belt Pritchard Formation. The mine worked at least two narrow veins (from 2 to 12 inches wide), that strike from N.35°W. to N.40°W., and dip about 70°SW. Mineralization included white quartz, siderite, galena, pyrite, arsenopyrite, and hematite.

The rock exposed in the inclined shaft is steeply dipping; the strike is N.33°W., dipping 62°. The inclined shaft was driven N.20°W.

5.1.3 Environmental Condition

The Johnny Miller has one discharging, collapsed adit. The inclined shaft, west of the discharging adit and at the end of a road that goes up the hillside, was dry.

5.1.3.1 Site Features - Sample Locations

Swamp Creek flowed from west to east past the waste-rock dump but was not directly in contact with it. A collapsed adit north of the road discharged in a small channel that then infiltrated into the ground, emerging about 50 ft downhill. The discharge then soaked into the ground again, but there was a small channel to Swamp Creek where it may seasonally flow. The partially open inclined shaft was dry.

The adit was sampled (SJMS10H). The flow was estimated at 5 gpm but the amount was difficult to judge because the discharge was dispersed over the dump. An upstream (SJMS20L) and a downstream (SJMS30L) sample were taken. The site was sampled on 10/16/01. Site features and sample locations are shown in figure 28; photographs are shown in figures 28a and 28b.

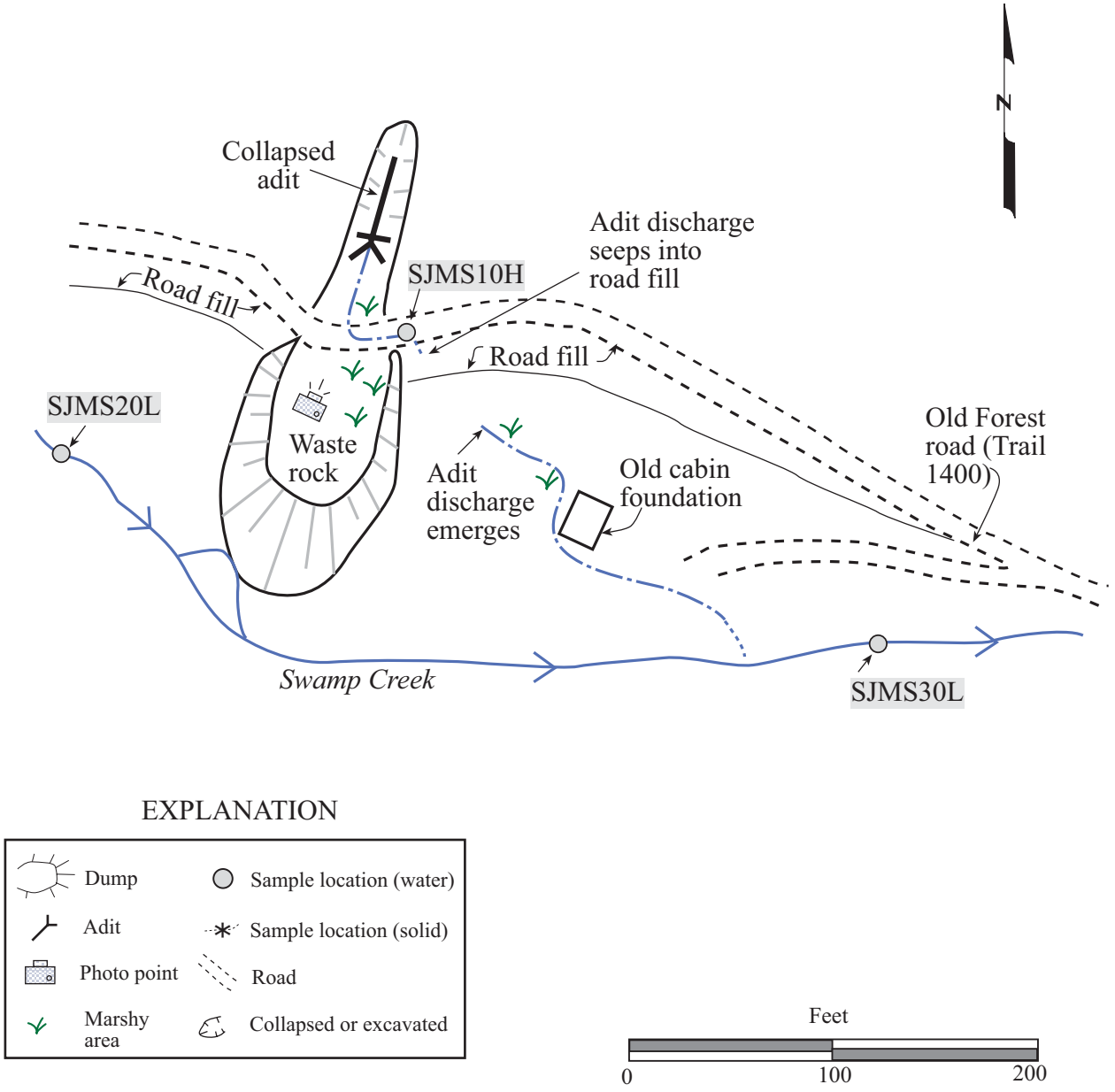


Figure 28. The Johnny Miller Mine was sampled upstream and downstream on Swamp Creek as well as at the adit discharge on 10/16/01.

Figure 28a. Johnny Miller Mine's adit discharge was sampled on 10/16/01.

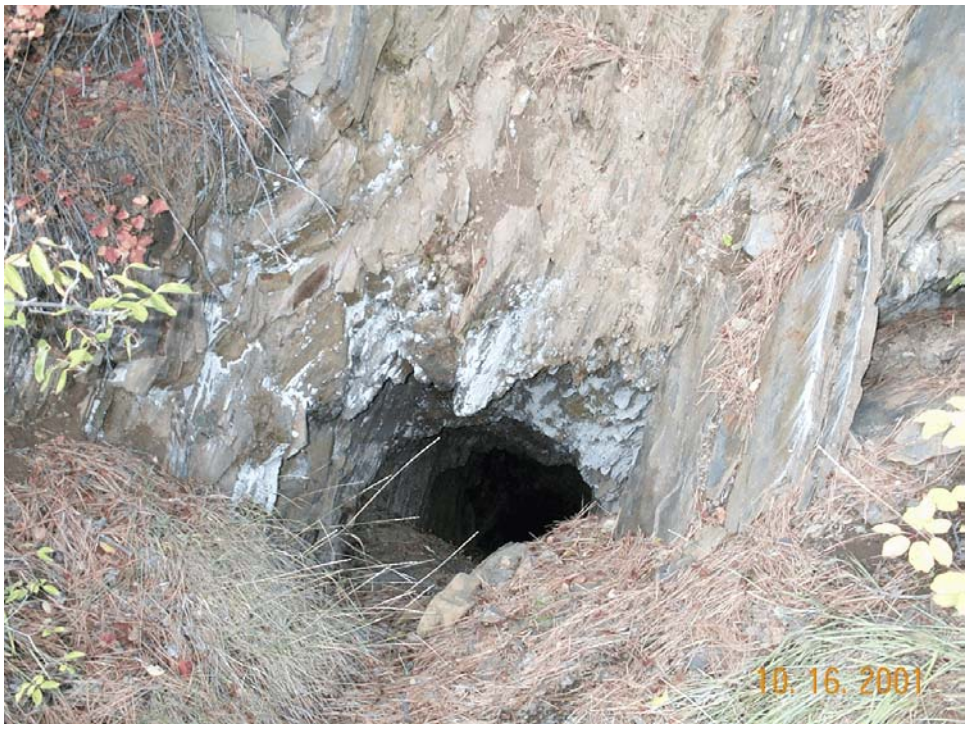


Figure 28b. Johnny Miller Mine had an open inclined shaft that was not secured.

5.1.3.2 Soil

No soil sample was taken. Large waste-rock fragments were adjacent to the creek, but they were generally 6 inches or more across, so sedimentation was not a problem.

5.1.3.3 Water

The arsenic standard was exceeded in the sample from the 5-gpm adit discharge (table 39). This was not surprising considering the presence of arsenopyrite on the waste-rock dump and that 0.825 percent arsenic was reported in a sample by Crowley (1963). The zinc level (6.1 µg/L) was higher in the adit discharge sample than in the upstream and downstream samples but was well below the established standard. Most other results were at or below the detection limits. The pH in the adit discharge sample was 8.11, the SC was 207 µmhos/cm, and the temperature was 9.3°C (48.7°F).

Table 39. Johnny Miller Mine water-quality exceedences.

Sample Site	Al	As	Ba	Cd	Cr	Cu	Fe	Pb	Mn	Hg	Ni	Ag	Zn	Cl	F	NO_3	SO_4	pH
SJMS20L-upstream																		
SJMS10H-adit discharge		P*																
SJMS30L-downstream																		

Exceedence codes:
P-primary MCL *-exceeds new criteria
Note: The analytical results are listed in appendix IV.

5.1.3.4 Vegetation

The vegetation in the area was not affected by the mining. Grasses grew on the waste-rock dump where the discharge dispersed. The area was generally cedar, fir and pine forest.

5.1.3.5 Summary of Environmental Conditions

The arsenic standard exceedence in the adit discharge was the only environmental problem noted. At 40.4 µg/L, it was well above the new secondary MCL for arsenic. It did not raise the downstream sample results above the standard, however.

5.1.4 Structures

No structures were present at the Johnny Miller Mine.

5.1.5 Safety

One inclined shaft was west of the discharging adit, at the end of the road that goes up the hillside. The shaft was open for approximately 50 ft and was inclined about 45° into the hill.

5.2 Raven Mine (Copper Mask)

5.2.1 Site Location and Access

The Raven Mine, also known as the Copper Mask, is located in tracts CDA sec. 33, T.22N., R.28W., at an elevation of 3,000 ft on the Eddy Mountain 7.5-min. quadrangle. The mine is on the west side of the Thompson River and is accessed by driving the Forest Road FH 56 about 3½ miles north of Highway 200. It is 1¾ miles northeast of Snider. The site is on LNF-administered land, just southwest of the two patented claims at the Copper King.

5.2.2 Site History - Geologic Features

The Raven Mine is considered to be in the Thompson River mining district. The commodities were listed as copper and gold in the USBM MILS database. Most information on the Raven that is summarized here was taken from MBMG Bulletin 34 (Crowley, 1963). Originally mined in the 1880's, production from the mine was not recorded until 1919 under the name "Copper Mask" and continued under that name until 1959 when the Raven Mining Company took over and changed the name. The mine was operated under that name from 1959 to 1961, when Crowley was researching for his report. The Raven Mining Company built a concentrating mill which utilized crushers and jigs. Crowley reported partial production figures from the Raven as 85 tons of ore yielding 1 oz gold, 5,695 oz silver, and 33,173 pounds copper, from 1919 to 1934.

The geology at the Raven Mine was described as quartzites and argillites with most of the mineralization in the quartzites. The host rock in the area has been mapped as the Precambrian Belt Supergroup Revett and Burke Formations (Harrison, Griggs, and Wells, 1986). Crowley (1963) identified a narrow, N.60-68°W.-trending, 54-80°SW.-dipping, quartz-filled, fissure vein, that he described as being in the Ravalli Formation. Mineralization was controlled by "relatively strong steeply-dipping faults" that were most favorable to ore deposition where they passed through the more brittle quartzites. Minerals included pyrite, chalcopyrite, silver-bearing tetrahedrite, bornite, covellite, chrysocolla, malachite, tenorite, azurite, secondary chalcocite, limonite, wittichenite (a sulfosalt, Cu_3BiS_3) (?), galena and enargite (Crowley, 1963).

Four adits were identified at the Raven Mine. Crowley (1963) estimated that the four workings, from lowest to highest, were 600, 290, 470, and 150 ft long. Adit A01, at the end of an access road, was dry, open and accessible. The host rock is gray quartzite with some iron staining and local malachite coatings. The adit trended N.40°W. Adit A02 was directly upslope from adit A01. It trended N.42°W., and was open. A small stope was immediately inside the portal. There was no obvious waste-rock dump at this adit which was driven into the cliff. There were malachite crusts on the bedrock. Adit A03 trended N.20°W., was shorter than the other adits and also had minor malachite crusts on the fractures. Adit A04 was downhill from A03 and below the road. It was dry and open, with no obvious signs of mineralization. There were two other possible adits at the site as evidenced by an ore chute high on the cliff above Adit A02. A second ore bin was on the lower road; this may have had an adit associated with it also.

The main adit was near the buildings just northwest of the Thompson River Road. It was accessible, and discharging. It had a large dump with an ore bin at the base. The dump was unvegetated with minor malachite, quartz, and iron oxides.

5.2.3 Environmental Condition

The Raven Mine is characterized by adits driven into the steep hillside. Only one adit had a slight discharge.

5.2.3.1 Site Features - Sample Locations

The adit discharge was sampled (TRAS10M) on 08/18/01. The flow was estimated at 1 gpm. Site features and sample locations are shown in figure 29; photographs are shown in figures 29a and 29b.

5.2.3.2 Soil

No soil samples were taken.

5.2.3.3 Water

Most analytes were at or below detection limits (table 40). Arsenic was slightly above the detection limit at 1.73 µg/L; zinc was 7.66 µg/L higher than the detection limit but well below any water-quality standards. Nitrate was also detected at 0.17 mg/L but was also well below the primary MCL of 10 mg/L. The field pH was 7.95; the lab pH was 7.56. The field SC was 133 µmhos/cm and the lab SC was 171 µmhos/cm. The water appeared clear and felt cold.

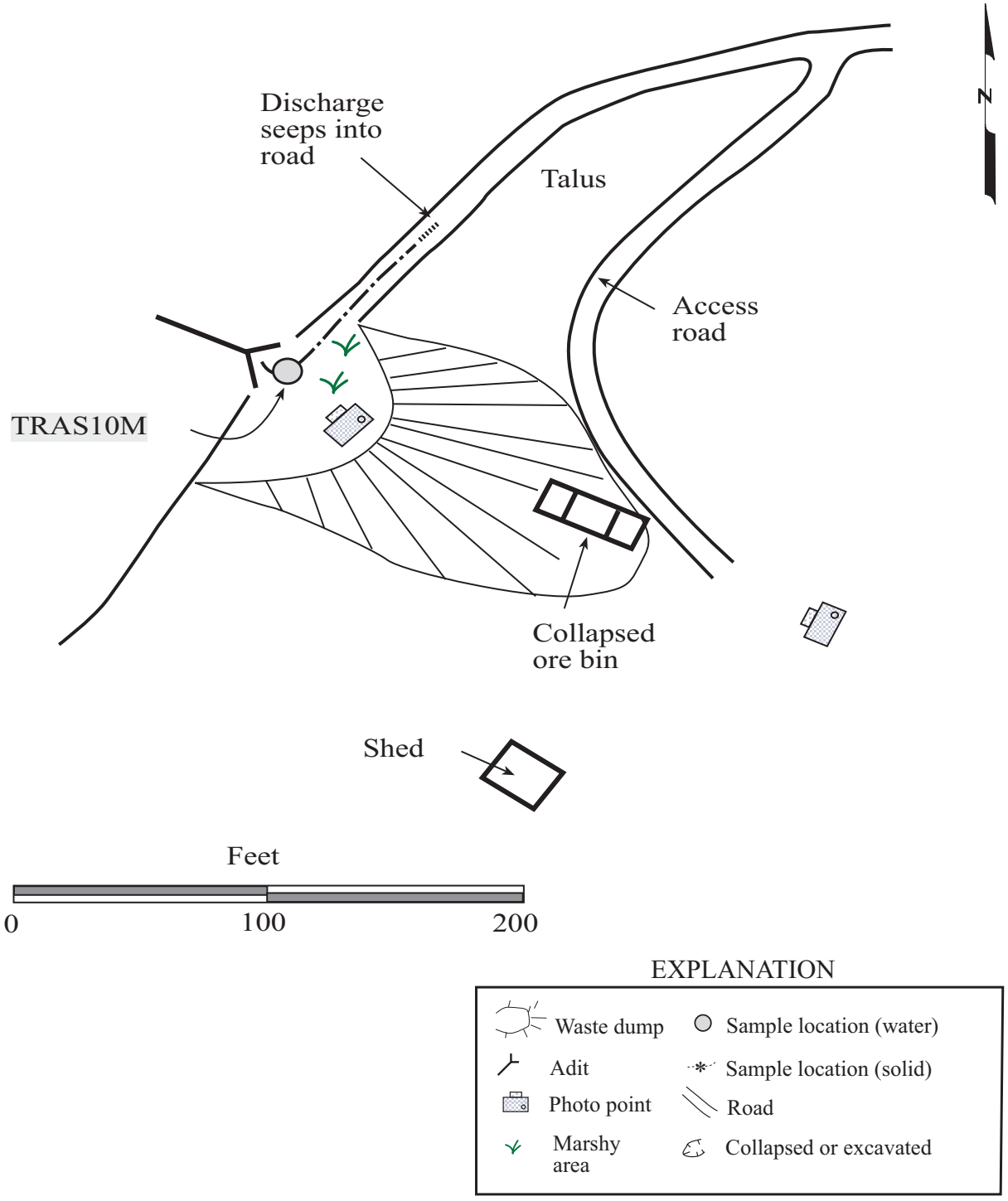


Figure 29. The Raven or Copper Mask Mine, northwest of the Thompson River, discharged water at a rate of 1 gpm. It was sampled in one location upgradient from the place where it soaked into the ground.

Figure 29a. One of the open adits at the Raven Mine.

Figure 29b. Raven Mine main adit and ore chute on dump.

Table 40. Raven Mine water-quality exceedences.

Sample Site	Al	As	Ba	Cd	Cr	Cu	Fe	Pb	Mn	Hg	Ni	Ag	Zn	Cl	F	NO_3	SO_4	pH
TRAS10M-adit discharge																		

Note: The analytical results are listed in appendix IV.

5.2.3.4 Vegetation

No adverse environmental effects on the vegetation were noted in the mine area. The slopes surrounding the adits were steep and rocky. The waste-rock dumps were unvegetated to moderately well vegetated, but this was because of the lack of soil rather than the presence of metals.

5.2.3.5 Summary of Environmental Conditions

The largest and lowermost adit at the Raven discharged about 1 gpm; all others were dry. The effects of the discharge were local only.

5.2.4 Structures

There was one ore bin remaining at the base of the largest waste-rock pile. Another was collapsed. One-tar-paper covered shack was in fair to poor condition.

5.2.5 Safety

One adit (A01), at the end of the access road, was open and dry. It had steel haulage tracks on the dump and into the adit. The waste-rock dump was a part of a steep talus slope. The adit was open at least 50 ft and possibly more. A second adit, directly uphill from the first, trended N.42°W. and was open. It appeared to have a small stope about 10 ft high inside the adit. This adit was open at least 30 ft. A third adit (A03) was about 20 ft in total length. The fourth adit was directly downhill from adit A03 and the access road; it was open and dry. Evidence of an ore bin on the hill indicated another adit was on the hillside.

6.0 Summary of Mining Impacts on LNF-Administered Land.

A total of 109 sites were visited with potential environmental impacts noted at 19 of them (table 41). The Saltese Consolidated Mine, the Rock Island Mine, the Copper Gulch adit, the Big Sunday adit, the Prosperity Mine, the S&H (or Stobie-Hermiston) Mine, and the Raven Mine had no exceedences in their discharges. Many of the mine discharges never reached the active drainage for the area because of their small volume.

The Tarbox Mine's downstream sample had exceedences in manganese, iron, and zinc. There was an erosion problem there. The nearby Meadow Mountain Mine also had exceedences in manganese and iron but, again, this discharge never reached an active drainage.

The Silver Cable had exceedences in lead and zinc downstream on LNF-administered land. This inventory did not sample the private land but it is reasonable to expect that the water quality there is even more impacted. The Silver Cable Mine had an adit discharge on private land and also had an erosion problem on the south side.

The small, local discharge at the Vulcan Tunnel had exceedences in iron, manganese, and sulfates. The water is limited in its extent; it soaked into the waste-rock dump and does not enter the active drainage.

The Flat Creek drainage had an exceedence in zinc in only the duplicate of the downstream sample but also had exceedences in zinc and lead in previous sampling done downstream of the mine.

The new arsenic standard of 10 µg/L was exceeded in the sample from the Johnny Miller Mine but the results, at 40.4 µg/L, did not exceed the previous arsenic standard of 50 µg/L. In contrast, the Keystone adit discharge exceeded the new standard by only 0.2 µg/L at 10.2 µg/L.

The following table is organized with the most "upstream" mine sites first followed by successively more downstream samples in a drainage. The sites are also from upstream to downstream on the major drainage, the Clark Fork River.

Table 41. Summary of water-quality exceedences in the Lower and Middle Clark Fork, and drainages. Note: The analytical results are listed in appendix IV.

Exceedence codes:
P-Primary MCL; * - exceeds new arsenic standard.; S-Secondary MCL; A-Aquatic Life Acute; C-Aquatic Life Chronic; S*-either field or lab pH does not meet pH standards

Sample Site	Al	As	Ba	Cd	Cr	Cu	Fe	Pb	Mn	Hg	Ni	Ag	Zn	Cl	F	NO_3	SO_4	pH
E. Fork Brewster Creek - upstream of mill																		

Sample Site	Al	As	Ba	Cd	Cr	Cu	Fe	Pb	Mn	Hg	Ni	Ag	Zn	Cl	F	NO_3	SO_4	pH
E. Fork Brewster Creek - downstream of mill																		
Brewster Creek adit	S,C																	S,C
Frances Copper - upstream St. Louis Crk																		
Frances Copper - upstream E. Fork																		
Frances Copper - downstream St. Louis																		
Frances Copper - seep at toe									S									
Frances Copper - overflow from pond		P*																
Frances Copper - natural seep																		
Nugget - adit discharge													A,C					
Nugget - upstream																		
Nugget - downstream																		
Silver Cable - downstream								C					A,C					
Last Chance - adit discharge							S		S									
Last Chance - upstream																		
Last Chance - downstream																		
Tarbox - upstream on West Fork Tarbox Crk.																		
Tarbox - adit discharge									S				A,C					
Tarbox - downstream on West Fork							S		S				A,C					

Sample Site	Al	As	Ba	Cd	Cr	Cu	Fe	Pb	Mn	Hg	Ni	Ag	Zn	Cl	F	NO_3	SO_4	pH
Tarbox - upstream on Packer Creek																		
Tarbox - downstream on Packer Creek																		
Meadow Mountain - adit discharge							S,A		S									S*
Meadow Mountain - downstream																		
Saltese Consolidated - adit discharge																		
Saltese Consolidated - downstream																		
Rock Island - upstream																		
Rock Island - adit discharge																		
Rock Island - downstream																		
Copper Gulch - adit discharge																		
St. Lawrence - upstream																		
St. Lawrence - adit discharge								C										
St. Lawrence - seep at toe		P*																
St. Lawrence - downstream																		
Big Sunday - adit discharge																		
Crystal Lake - adit discharge																		
Keystone - upstream																		

Sample Site	Al	As	Ba	Cd	Cr	Cu	Fe	Pb	Mn	Hg	Ni	Ag	Zn	Cl	F	NO_3	SO_4	pH
Keystone - adit discharge		P*																
Keystone - downstream																		
Prosperity - adit discharge																		
Nancy Lee - from 1988																		
Vulcan Tunnel - adit discharge							S,A		S								S	
Vulcan Tunnel - adit discharge duplicate							S,A		S								S	
Iron Mountain - upstream																		
Iron Mountain - downstream																		
Iron Mountain - duplicate													C					
Flat Creek - downstream								C					A,C					
SUPERSP - spring																		
S&H - adit discharge																		
Stobie–Hermiston - adit discharge																		
Johnny Miller - upstream																		
Johnny Miller-adit discharge		P*																
Johnny Miller - downstream																		
Raven - adit discharge																		

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Appendix I
USFS-MBMG Field Form

PART A

(To be completed for all identified sites)

LOCATION AND IDENTIFICATION

ID# _____ Site Name(s) _____
FS Tract # _____ FS Watershed Code _____
Forest _____ District _____
Location based on: GPS___ Field Map___ Existing Info___ Other_____
Lat_____ Long_____ xutm_____ yutm_____ zutm_____
Quad Name _____ Principal Meridan _____
Township _____ Range _____ Section _____ ¼_____ ¼_____ ¼_____
State _____ County _____ Mining District _____

Ownership of *all* disturbances:

_____ National Forest (NF)
_____ Mixed private and National Forest (or unknown)
_____ Private.

If private only, impacts from the site on National Forest Resources are
____Visually apparent ____Likely to be significant ____Unlikely or minimal

If all disturbances are private and impacts to National Forest Resources are unlikely or minimal - STOP

PART B

(To be completed for all sites on or likely effecting National Forest lands)

SCREENING CRITERIA

Yes	No	
_____	_____	1. Mill site or Tailings present
_____	_____	2. Adits with discharge or evidence of a discharge
_____	_____	3. Evidence of or strong likelihood for metal leaching, or AMD (water stains, stressed or lack of vegetation, waste below water table, etc.)
_____	_____	4. Mine waste in floodplain or shows signs of water erosion
_____	_____	5. Residences, high public use area, or environmentally sensitive area (as listed in HRS) within 200 feet of disturbance
_____	_____	6. Hazardous wastes/materials (chemical containers, explosives, etc)
_____	_____	7. Open adits/shafts, highwalls, or hazardous structures/debris
_____	_____	8. Site visit *(If yes, take picture of site)*, Film number(s) _____

If yes, provide name of person who visited site and date of visit
Name: _____ Date: _____
If no, list source(s) of information (If based on personal knowledge, provide name of person interviewed and date):

_____

If the answers to questions 1 through 6 are all No - STOP

PART C

(To be completed for all sites not screened out in Parts A or B)

Investigator _____ Date _____
Weather _____

1. GENERAL SITE INFORMATION

Take panoromic picture(s) of site, Film Number(s) _____
Size of disturbed area(s) _____acres Average Elevation _____feet
Access: _____No trail _____Trail _____4wd only _____Improved road
_____Paved road
Name of nearest town (by road): _____
Site/Local Terrain: _____Rolling or flat _____Foothills _____Mesa _____Mountains
_____Steep/narrow canyon
Local undisturbed vegetation (*Check all that apply*): _____Barren or sparsely vegetated
_____weeds/grasses _____Brush _____Riparian/marsh _____Deciduous trees
_____Pine/spruce/fir
Nearest wetland/bog: ____On site, ____0-200 feet, ____200 feet - 2 miles, ____> 2 miles
Acid Producers or Indicator Minerals: ____Arsenopyrite, ____Chalcopyrite, ____Galena,
____Iron Oxide, ____Limonite, ____Marcasite, ____Pyrite, ____Pyrrhotite,
____Sphalerite, ____Other Sulfide
Neutralizing Host Rock: ____Dolomite, ____Limestone, ____Marble, ____Other Carbonate

2. OPERATIONAL HISTORY

Dates of significant mining activity_____

MINE PRODUCTION

Commodity(s)							
Production (ounces)							

Years that Mill Operated_____
Mill Process: ____Amalgamation, ____Arrastre, ____CIP (Carbon-in-Pulp), ____Crusher only,
____Cyanidation, ____Flotation, ____Gravity, ____Heap Leach, ____Jig Plant,
____Leach, ____Retort, ____Stamp, ____ No Mill, ____Unknown

MILL PRODUCTION

Commodity(s)							
Production (ounces)							

3. HYDROLOGY

Name of nearest Stream _____ which flows into _____
Springs (*in and around mine site*): ____ Numerous ____ Several ____ None
Depth to Groundwater _____ ft, Measured at: ____shaft/pit/hole ____well ____wetland
Any waste(s) in contact with active stream ____Yes ____No

4. TARGETS *(Answer the following based on general observations only)*

Surface Water
Nearest surface water inake _____miles, Probable use _____
Describe number and uses of surface water intakes observed for 15 miles downstream of site: _____

Wells
Nearest well _____miles, Probable use _____
Describe number and use of wells observed within 4 miles of site:

Population
Nearest dwelling _____miles, Number of months/year occupied _____ months
Estimate number of houses within 2 miles of the site (*Provide estimates for 0-200ft, 200ft-1mile, 1-2miles, if possible*)

Recreational Usage
Recreational use on site: ____High *(Visitors observed or evidence such as tire tracks, trash, graffiti, fire rings, etc.; and good access to site)*, __ Moderate *(Some evidence of visitors and site is accessible from a poor road or trail)*, __ Low *(Little, if any, evidence of visitors and site is not easily accessible)*
Nearest recreational area _____miles, Name or type of area: _____

5. SAFETY RISKS

_____Open adit/shaft, _____Highwall or unstable slopes, _____Unstable structures,
_____Chemicals, _____Solid waste including sharp rusted items, _____Explosives

6. MINE OPENINGS

Include in the following chart all mine openings located on or partially on National Forest lands. Also, include mine openings located entirely on private land if a point discharge from the opening crosses onto National Forest land. In this case, enter data for the point at which the discharge flows onto National Forest land; you do not need to enter information about the opening itself.

TABLE 1 - ADITS, SHAFTS, PITS, AND OTHER OPENINGS

Opening Number						
Type of Opening						
Ownership						
Opening Length (ft)						
Opening Width (ft)						
Latitude (GPS)						
Longitude (GPS)						
Condition						
Ground water						
Water Sample #						
Photo Number						

Comments (*When commenting on a specfic mine opening, reference opening number used in Table 1*):

_____

_____

_____

_____

_____

_____

Codes Applicable for all entries: NA= Not applicable, UNK=Unknown, OTHER=Explain in comments, NO=NO or none

Type of opening: ADIT=Adit, SHAFT=Shaft, PIT=Open Pit/Trench, HOLE=Prospect Hole, WELL=Well

Ownership: NF=National Forest, MIX=National Forest and Private (Also, for unknown), PRV=Private

Condition (*Enter all that apply*): INTACT=Intact, PART=Partially collapsed or filled, COLP=Filled or collapsed, SEAL=Adit plug, GATE=Gated barrier,

Ground water (*Water or evidence of water discharging from opening*): NO=No water or indicators of water, FLOW=Water flowing, INTER=Indicators of intermittant flow, STAND= Standing water only (*In this case, enter an estimate of depth below grade*)

7. MINE/MILL WASTE

Include in the following chart all mine/mill wastes located on or partially on National Forest lands. Also, include mine/mill wastes located entirely on private land if is visually effecting or is very likely to be effecting National Forest resources. In this case enter data for the point at which a discharge from the waste flows onto National Forest land, or where wastes has migrated onto National Forest land; only enter as much information about the waste as relevant and practicable.

TABLE 2 - DUMPS, TAILINGS, AND SPOIL PILES

Waste Number						
Waste Type						
Ownership						
Area (acres)						
Volume (cu yds)						
Size of Material						
Wind Erosion						
Vegetation						
Surface Drainage						
Indicators of Metals						
Stability						
Location with respect to Floodplain						
Distance to Stream						
Water Sample #						
Waste Sample #						
Soil Sample #						
Photo Number						

Codes Applicable for all entries: NA= Not applicable, UNK=Unknown, OTHER=Explain in comments, NO=NO or none

Waste Type: WASTE=Waste rock dump, MILL=Mill tailings, SPOIL=Overburden or spoil pile, HIGH=Highwall, PLACER=Placer or hydraulic deposit, POND=Settling pond or lagoon, ORE=Ore Stockpile, HEAP=Heap Leach

Ownership: NF=National Forest, MIX=National Forest and Private (*Also, for unknown*), PRV=Private

Size of material (*If composed of different size fractions, enter the sizes that are present in significant amounts):* FINE=Finer than sand, SAND=sand, GRAVEL=>sand and <2", COBBLE=2"-6", BOULD=>6"

Wind Erosion, Potential for: HIGH=Fine, dry material that could easily become airborne, airborne dust, or windblown deposits, MOD=Moderate, Some fine material, or fine material that is usually wet or partially cemented; LOW=Little if any fines, or fines that are wet year-round or well cemented.

Vegetation (*density on waste*): DENSE=Ground cover > 75%, MOD=Ground cover 25% - 75%, SPARSE=Ground cover < 25%, BARREN=Barren

Surface Drainage (*Include all that apply*): RILL=Surface flow channels mostly < 1' deep, GULLY=Flow channels >1' deep, SEEP=Intermittant or continuous discharge from waste deposit, POND=Seasonsal or permanent ponds on feature, BREACH=Breached, NO=No indicators of surface flow observe

Indicators of Metals (*Enter as many as exist*): NO=None, VEG=Absence of or stressed vegetation, STAIN=yellow, orange, or red precipitate, SALT=Salt deposits, SULF=Sulfides present

Stability: EMER=Imminent mass failure, LIKE=Potential for mass failure, LOW=mass failure unlikely

Location w/respect to Stream: IN=In contact with normal stream, NEAR=In riparian zone or floodplain, OUT=Out of floodplain

8. SAMPLES

Take samples only on National Forest lands.

TABLE 3 - WATER SAMPLES FROM MINE SITE DISCHARGES

Sample Number						
Date sample taken						
Sampler (*Initials*)						
Discharging From						
Feature Number						
Indicators of Metal Release						
Indicators of Sedimentation						
Distance to stream (ft)						
Sample Latitude						
Sample Longitude						
Field pH						
Field SC						
Flow (*gpm*)						
Method of measurement						
Photo Number						

Comments: (*When commenting on a specfic water sample, reference sample number used in Table 3*):

_____

_____

_____

_____

Codes Applicable for all entries: NA= Not applicable, UNK=Unknown, OTHER=Explain in comments, NO=NO or none

Discharging From: ADIT=Adit, SHAFT=Shaft, PIT=Pit/Trench, HOLE=Prospect Hole, WASTE=Waste rock dump, MILL=Mill tailings, SPOIL=Overburden or spoil pile, HIGH=Highwall, PLACER=Placer or hydraulic deposit, POND=Settling pond or lagoon, WELL=Well

Feature Number: Corresponding number from Table 1 or Table 2 (*Opening Number or Waste Number*)

Indicators of Metal Release (*Enter as many as exist*): NO=None, VEG=Absence of, or stressed vegetation/ organisms in and along drainage path, STAIN=yellow, orange, or red precipitate, SALT= Salt deposits, SULF=Sulfides present, TURB=Discolored or turbid discharge

Indicators of Sedimentation *(Enter as many as exist)*: NO=None, SLIGHT=Some sedimentation in channel, banks and channel largely intact, MOD=Sediment deposits in channel, affecting flow patterns, banks largely intact, SIGN=Sediment deposits in channel and/or along stream banks extending to nearest stream

Method of Measurement: EST=Estimate, BUCK=Bucket and time, METER=Flow meter

TABLE 4 - WATER SAMPLES FROM STREAM(S)

Location relative to mine site/features	Upstream (Background)	Downstream		
Sample Number				
Date sample taken				
Sampler (Initials)				
Stream Name				
Indicators of Metal Release				
Indicators of Sedimentation				
Sample Latitude				
Sample Longitude				
Field pH				
Field SC				
Flow (gpm)				
Method of measurement				
Photo Number				

Comments: *(When commenting on a specfic water sample, reference sample number used in Table 4)*:

Codes Applicable for all entries: NA= Not applicable, UNK=Unknown, OTHER=Explain in comments, NO=NO or none

Indicators of Metal Release *(Enter as many as exist)*: NO=None, VEG=Absence of, or stressed streamside vegetation/organisms in and along drainage path, STAIN=yellow, orange, or red precipitate, SALT=Salt deposits, SULF=Sulfides present, TURB=Discolored or turbid discharge

Indicators of Sedimentation *(Enter as many as exist)*: NO=None, SLIGHT=Some sedimentation in channel, natural banks and channel largely intact, MOD=Sediment deposits in channel, affecting stream flow patterns, natural banks largely intact, SIGN=Sediment deposits in channel and/or along stream banks extending ½ a mile or more downstream

Method of Measurement: EST=Estimate, BUCK=Bucket and time, METER=Flow meter

TABLE 5 - WASTE SAMPLES

Sample Number				
Date of sample				
Sampler (*Initials*)				
Sample Type				
Waste Type				
Feature Number				
Sample Latitude				
Sample Longitude				
Photo Number				

Comments: (*When commenting on a specfic waste or soil sample, reference sample number used in Table 5*):

_____

_____

_____

_____

_____

Codes Applicable for all entries: NA= Not applicable, UNK=Unknown, OTHER=Explain in comments, NO=NO or none

Sample Type: SING=Single sample, COMP=composite sample (enter length)

Waste Type: WASTE=Waste rock dump, MILL=Mill tailings, SPOIL=Overburden or spoil pile, HIGH=Highwall, PLACER=Placer or hydraulic deposit, POND=Settling pond or lagoon sludge, ORE=Ore Stockpile, HEAP=Heap Leach

Feature Number: Corresponding number from Table 2 (*Waste Number*)

TABLE 6 - SOIL SAMPLES

Sample Number				
Date of sample				
Sampler (*Initials*)				
Sample Type				
Sample Latitude				
Sample Longitude				
Likely Source of Contamination				
Feature Number				
Indicators of Contamination				
Photo Number				

Comments: (*When commenting on a specfic waste or soil sample, reference sample number used in Table 6*):

_____

_____

_____

_____

_____

Codes Applicable for all entries: NA= Not applicable, UNK=Unknown, OTHER=Explain in comments, NO=NO or none

Sample Type: SING=Single sample, COMP=composite sample (enter length)

Likely Source of Contamination: ADIT=Adit, SHAFT=Shaft, PIT=Open Pit, HOLE=Prospect Hole, WASTE=Waste rock dump, MILL=Mill tailings, SPOIL=Overburden or spoil pile, PLACER= Placer or hydraulic deposit, POND=Settling pond or lagoon, ORE=Ore Stockpile, HEAP=Heap Leach

Feature Number: Corresponding number from Table 1 or 2 (*Opening or Waste Number*)

Indicators of Contamination (*Enter as many as exist*): NO=None, VEG=Absence of vegetation, PATH=Visible sediment path, COLOR=Different color of soil than surrounding soil, SALT=Salt crystals

9. HAZARDOUS WASTES/MATERIALS

TABLE 7 - HAZARDOUS WASTES/MATERIALS

Waste Number				
Type of Containment				
Condition of Containment				
Contents				
Estimated Quantity of Waste				

Comments: (*When commenting on a specfic hazardous waste or site condition, reference waste number used in Table 7*):

_____

_____

_____

_____

_____

Codes Applicable for all entries: NA= Not applicable, UNK=Unknown, OTHER=Explain in comments, NO=NO or none

Type of Containment: NO=None, LID=drum/barrel/vat with lid, AIR=drum/barrel/vat without lid, CAN=cans/jars, LINE=lined impoundment, EARTH=unlined impoundment

Condition of Containment: GOOD=Container in good condition, leaks unlikely, FAIR=Container has some signs of rust, cracks, damage but looks sound, leaks possible, POOR=Container has visible holes, cracks or damage, leaks likely, BAD=Pieces of containers on site, could not contain waste

Contents: from label if available, or guess the type of waste, e.g., petroleum product, solvent, processing chemical.

Estimated Quantity of Waste: Quantity still contained and quantity released

10. STRUCTURES

For structures on or partially on National Forest lands.

TABLE 8 - STRUCTURES

Type						
Number						
Condition						
Photo Number						

Comments:

_____

_____

_____

Codes Applicable for all entries: NA= Not applicable, UNK=Unknown, OTHER=Explain in comments, NO=NO or none

Type: CABIN=Cabin or community service (*store, church, etc.*), MILL=mill building, MINE=building related to mine operation, STOR=storage shed, FLUME=Ore Chute/flume or tracks for ore transport

Number: Number of particular type of structure all in similar condition or length in feet

Condition: GOOD=all components of structure intact and appears stable, FAIR=most components present but signs of deterioration, POOR=major component (*roof, wall, etc*) of structure has collapsed or is on the verge of collapsing, BAD=more than half of the structure has collapsed

11. MISCELLANEOUS

Are any of the following present? (Check all that apply): _____Acrid Odor, _____Drums, _____Pipe, _____Poles, _____Scrap Metal, _____Overhead wires, _____Overhead cables, _____Headframes, _____Wooden Structures, _____Towers, _____Power Substations, _____Antennae, _____Trestles, _____Powerlines, _____Transformers, _____Tramways, _____Flumes, _____Tram Buckets, _____Fences, _____Machinery, _____Garbage

Describe any obvious removal actions that are needed at this site:

_____

_____

_____

_____

General Comments/Observations (not otherwise covered)

_____

_____

_____

_____

_____

_____

_____

12. SITE MAP

Prepare a sketch of the site. Indicate all pertinent features of the site and nearby environment. Include all significant mine and surface water features, access roads, structures, etc. Number each important fearue at the mine site and use these number throughout this form when referring to a particular feature (Tables 1 and 2). Sketch the drainage routes off the site into the nearest stream.

13. RECORDED INFORMATION

Owner(s) of patented land
Name: _____
Address: _____
Telephone Number: _____

Claimant(s)
Name: _____
Address: _____
Telephone Number: _____

Surface Water (*From water rights*)
Number of Surface Water Intakes within 15 miles downstream of site used for:
_____Domestic, _____Municipal, ___ Irrigation, ___ Stock,
Commerical/Industrial, ____ Fish Pond, ___ Mining,
Recreation, _____Other

Wells (*From well logs*)
Nearest well _____miles
Number of wells within 0-¼ miles _____¼-½ miles _____½-1 mile _____1-2 miles
_____2-3 miles _____3-4 miles of site

Sensitive Environments
List any sensitive environments (as listed in the HRS) within 2 miles of the site or along receiving stream for 15 miles downstream of site (*wetlands, wilderness, national/state park, wildlife refuge, wild and scenic river, T&E or T&E habitat, etc*):

_____
_____
_____

Population (*From census data*)
Population within _____0-¼ miles _____¼-½ miles _____½-1 mile _____1-2 miles
_____2-3 miles _____3-4 miles of site

Public Interest
Level of Public Interest: _____Low, _____Medium, _____High
Is the site under regulatory or legal action? _____Yes, _____No

Other sources of information (MILs #, MRDS #, other sampling data, etc):

_____
_____
_____
_____
_____

Appendix II
List of Sites in the Lolo National Forest

MBMG ID	NAME	LAT	LONG	T	R	SEC	TRACT	TOPOGRAPHIC MAP	VISIT	OWNERSHIP	RANGER DISTRICT
MN003332	AGNES PROPERTY	47.3777	115.533	19N	31W	27	A	SALTESE	Y	N	SUPERIOR
MN005891	ALADDIN MINE	47.2619	115.3081	17N	29W	5	DAAB	DE BORGIA SOUTH	Y	N	SUPERIOR
GR000860	ALPS MINE	46.5875	113.5825	10N	16W	26	CCBD	SPINK POINT	Y	M	MISSOULA
MN005895	AMADOR MINE	47.1106	115.0093	16N	27W	28	DDA	ILLINOIS PEAK	Y	M	SUPERIOR
MN003352	AMAZON-DIXIE (SILDEX, COPPER QUEEN)	47.4378	115.6922	19N	32W	5	ADCA	LOOKOUT PASS	Y	P	SUPERIOR
MN005835	AMERICAN GOLD MINE - OH BOY GROUP	47.0686	115.0364	15N	27W	8	DCBA	ILLINOIS PEAK	Y	P	SUPERIOR
SA005308	ANNIE LAURIE	47.4886	115.235	20N	29W	13		PENROSE PEAK	N	N	PLAINS
SA009004	ANTIMONY MINES	47.5645	115.5994	21N	31W	20		DRIVEWAY PEAK	N	M	PLAINS
GR003509	ARGO MINE AND MILL	46.5797	113.5697	10N	16W	35	ACDA	SPINK POINT	Y	P	PHILIPSBURG
SA005138	ARLINGTON	47.5472	115.7158	21N	32W	28		THOMPSON PASS	N	N	PLAINS
GR003026	B AND J CLAIM	46.6383	113.7231	10N	17W	10		IRIS POINT	N	N	MISSOULA
MN008184	BABCOCKS - NORTH ST. PATRICKS PEAK	46.9903	114.8364	14N	26W	12	B	ST PATRICK PEAK	Y	N	NINEMILE
GR000248	BAGDAD MINE / MARK V MINING	46.3642	113.6961	07N	17W	14	B	STONY CREEK	N	N	MISSOULA
SA005258	BARTO	47.6225	115.6439	22N	32W	36	C	THOMPSON PASS	N	N	PLAINS
SA005313	BAY CHIEF; BAY CHIEF EXTENSION	47.4875	115.1222	20N	28W	14	D	SUNSET PEAK	N	P	PLAINS
MN008462	BELLE OF THE HILLS	47.2542	114.8556	17N	26W	1	CCDD	QUINNS HOT SPRINGS	Y	P	SUPERIOR
MN008111	BEN HUR	47.4535	115.5199	20N	31W	34	ADAC	SALTESE	Y	P	SUPERIOR
GR002971	BET CLAIMS	46.5761	113.8058	10N	18W	36		CLEVELAND MOUNTAIN	N	N	MISSOULA
MN003312	BETTY PLACER	46.8058	114.6503	12N	24W	17	BBBD	WHITE MOUNTAIN	Y	N	NINEMILE
MN003187	BIG CREEK	47.3764	115.3811	19N	30W	26		HAUGAN	N	P	SUPERIOR
MN005963	BIG NUGGET PLACER	47.0428	114.8278	15N	26W	24		LOZEAU	N	N	NINEMILE
GR003144	BIG SPRINGS CREEK / BIG SPRING CRK	46.3914	113.7619	07N	17W	6		SAWMILL SADDLE	N	N	MISSOULA
MN008059	BIG SUNDAY CREEK ADIT	47.3569	115.5508	19N	31W	33	CDAC	ADAIR	Y	N	SUPERIOR
SA005113	BLACK JACK LODE	47.565	115.6139	21N	31W	19	D	DRIVEWAY PEAK	N	M	PLAINS
MN005819	BLACK TRAVELER	47.4383	115.4328	19N	30W	4	BCBA	HAUGAN	Y	N	SUPERIOR
MN003277	BONANZA GROUP	47.0581	114.9142	15N	26W	17		LANDOWNER MOUNTAIN	N	N	SUPERIOR
MI002886	BONANZA LIME PROSPECT	47.0033	113.9792	14N	19W	3	ADBA	STUART PEAK	Y	N	MISSOULA
SA004733	BONANZA MINE	47.4481	115.0833	20N	27W	31		SUNSET PEAK	N	M	PLAINS
MN008087	BORAX CREEK ADIT	47.4364	115.6725	19N	32W	4	ADCC	LOOKOUT PASS	Y	N	SUPERIOR
MN008112	BOSTON COLBY	47.4125	115.5203	19N	31W	15		SALTESE	N	N	SUPERIOR
MN005775	BOULDER GOLD PLACER	46.9958	114.845	14N	26W	2		ST. PATRICK PEAK	N	N	NINEMILE
GR003584	BOULDER PLACER PROSPECT	46.3856	113.7867	07N	17W	1		SAWMILL SADDLE	N	N	MISSOULA
GR003159	BREWSTER CREEK	46.6081	113.5806	10N	16W	23	C	SPINK POINT	Y	N	MISSOULA
GR008030	BREWSTER CREEK UNNAMED ADIT	46.6203	113.5989	10N	16W	15	C	SPINK POINT	Y	N	MISSOULA
GR003586	BREWSTER SPAR MINE	46.6358	113.5528	10N	16W	12		RAVENNA	N	N	MISSOULA
MN003067	BRYAN	47.4611	115.5464	20N	31W	28	D	SALTESE	N	P	SUPERIOR
MN003232	BUFFALO MINE / BUFFALO VEIN	47.2825	115.4808	18N	31W	36	AABC	MCGEE PEAK	N	N	SUPERIOR

MBMG ID	NAME	LAT	LONG	T	R	SEC	TRACT	TOPOGRAPHIC MAP	VISIT	OWNERSHIP	RANGER DISTRICT
SA005348	BULL FROG	47.5106	115.7014	20N	32W	9		THOMPSON PASS	N	N	PLAINS
MN006083	BUSTER & J. B. CLAIMS	47.2178	115.0403	17N	27W	21		WILSON GULCH	N	M	SUPERIOR
MN008142	CAJUN QUEEN	47.0733	115.0552	15N	27W	7	ACDD	ILLINOIS PEAK	Y	N	SUPERIOR
MN008191	CALUMET	47.0117	114.8114	13N	25W	31	C	LOZEAU	Y	P	MISSOULA
MN005839	CEDAR CREEK PLACER / SUPERIOR MINES	47.0581	115.0481	15N	27W	17		ILLINOIS PEAK	N	P	SUPERIOR
MN006059	CEDAR CREEK PLACER MINES	47.1489	114.9642	16N	27W	13		SUPERIOR	N	M	SUPERIOR
SA005303	CHERRY CREEK MINE	47.4853	115.2253	20N	29W	24		PENROSE PEAK	N	N	PLAINS
MI005527	CHICKAMAN MINE / LO LO CHICKMAIN	46.7511	114.1931	12N	21W	35	DADC	BLUE MOUNTAIN	N	P	MISSOULA
MN005831	CINKERS MINE	47.0847	115.0081	15N	27W	4	DADA	ILLINOIS PEAK	Y	N	SUPERIOR
SA005208	COEUR D' ALENE STAR MINE	47.4911	115.1033	20N	28W	13		SUNSET PEAK	N	M	PLAINS
MN003327	COFFEE POT LODE / KERRIS GREEN	46.9767	114.795	14N	25W	17	BBDC	ST. PATRICK PEAK	Y	N	NINEMILE
SA005358	COOPER CREEK / COPPER CREEK	47.5236	115.6975	20N	32W	5	A	THOMPSON PASS	N	N	PLAINS
MN008109	COPPER GULCH ADIT	47.4289	115.7028	19N	32W	5	CDCD	LOOKOUT PASS	Y	N	SUPERIOR
MN005939	COPPER KING	46.8069	114.6108	12N	24W	10	CCCB	LUPINE CREEK	Y	M	NINEMILE
SA005393	COPPER KING (MASCOT)	47.6189	115.1894	22N	28W	33	DBC	EDDY MOUNTAIN	N	M	PLAINS
MI002898	COPPER PROSPECT	47.0883	113.925	15N	18W	6		STUART PEAK	N	N	MISSOULA
MN005807	COPPER ROCK MINE	47.4408	115.3572	19N	30W	1	ABC	DE BORGIA NORTH	N	N	SUPERIOR
MI005695	COPPERSMITH	46.9053	114.4858	13N	23W	10	A	PETTY MOUNTAIN	N	P	NINEMILE
MN005967	CROWN SILVER GROUP	47.3939	115.5953	20N	31W	19		SALTESE	N	N	SUPERIOR
MN008092	CRYSTAL LAKE ADITS	47.3008	115.4189	18N	30W	21	DCAC	MCGEE PEAK	Y	N	SUPERIOR
SA008001	DAISY CREEK	47.8	115.1	24N	27W	30		RICHARDS PEAK	N	M	PLAINS
MN003372	DARBY MINING & MILLING COMPANY	47.2678	114.8689	17N	26W	2		QUINNS HOT SPRINGS	N	M	SUPERIOR
MN003192	DEADWOOD GULCH PROSPECT	47.3022	114.9394	18N	26W	20	CADC	KEYSTONE PEAK	Y	N	SUPERIOR
SA008213	DEE CREEK ADIT	47.4572	115.0958	20N	28W	25	DDAC	SUNSET PEAK	Y	N	PLAINS
MN003197	DEEP CREEK MINE	47.0502	114.967	15N	27W	23	AABA	LANDOWNER MOUNTAIN	Y	N	SUPERIOR
MN008196	DEEP CREEK PLACER	47.0494	114.9642	15N	27W	24		LANDOWNER MOUNTAIN	N	F	SUPERIOR
MN003207	DEER CREEK PLACER	47.3222	115.3931	18N	30W	15		MCGEE PEAK	Y	N	SUPERIOR
MI002796	DIAMOND MOUNTAIN GRAVEL	47.0008	114.2431	14N	21W	3		FRENCHTOWN	N	P	NINEMILE
MN008463	DILLON MILLSITE	47.2547	114.8597	17N	26W	12	BBBC	QUINNS HOT SPRINGS	Y	M	SUPERIOR
MN005795	DRY CREEK MINE	47.2075	115.0394	17N	27W	28	ACC	WILSON GULCH	N	N	SUPERIOR
MN008180	DRY FORK DRY CREEK	47.2025	115.0156	16N	27W	27		WILSON GULCH	N	M	SUPERIOR
GR008063	E.F. BREWSTER CREEK MILLSITE	46.6089	113.5721	10N	16W	23	ACDB	SPINK POINT	Y	N	MISSOULA
MN005811	EAST COEUR D ALENE MINE	47.4281	115.3978	19N	30W	10	ABAC	HAUGAN	Y	N	SUPERIOR
MN003212	EAST COEUR D'ALENE SILVER	47.4281	115.3978	17N	27W	1		KEYSTONE PEAK	N	M	SUPERIOR
SA001344	EDDY CREEK	47.4861	115.1194	20N	28W	14		SUNSET PEAK	N	M	PLAINS
GR008108	EDELMAN MINE	46.6217	113.5808	10N	16W	14	CBAB	SPINK POINT	Y	N	MISSOULA
MI005455	EILEEN MARSHA PLACER MINE	47.1758	114.4733	16N	23W	2		MCCORMICK PEAK	N	M	NINEMILE

MBMG ID	NAME	LAT	LONG	T	R	SEC	TRACT	TOPOGRAPHIC MAP	VISIT	OWNERSHIP	RANGER DISTRICT
SA005078	ELDA LODE	47.5636	115.6122	21N	31W	20		DRIVEWAY PEAK	N	P	PLAINS
SA005128	ELIZA LODE	47.5686	115.6042	21N	31W	17	B	DRIVEWAY PEAK	N	P	PLAINS
GR002986	ELLEN M. CLAIMS	46.6167	113.8139	10N	18W	23	AAAA	CLEVELAND MOUNTAIN	Y	N	MISSOULA
SA005118	ELLIS LODE	47.5672	115.6119	21N	31W	19	A	DRIVEWAY PEAK	N	P	PLAINS
SA005123	EUREKA LODE	47.5686	115.6081	21N	31W	20	B	DRIVEWAY PEAK	N	P	PLAINS
SA008630	EVERSON GULCH ADIT	47.5636	115.5764	21N	31W	21	D	DRIVEWAY PEAK	N	F	PLAINS
SA005038	EXCELSIOR LODE	47.5583	115.6167	21N	31W	20		DRIVEWAY PEAK	N	M	PLAINS
MN005971	F.D. PLACER	46.8033	114.6481	12N	24W	17	B	WHITE MOUNTAIN	Y	N	NINEMILE
MI002610	FAVORITE GULCH MINE	47.1483	114.4742	16N	23W	14		MCCORMICK PEAK	N	N	NINEMILE
SA005098	FAVORITE LODE	47.5583	115.6072	21N	31W	20		DRIVEWAY PEAK	N	M	PLAINS
SA005198	FISHTRAP QUARRIES	47.8156	115.1436	24N	28W	26		FISHTRAP LAKE	N	N	PLAINS
MN008031	FOREST ROUTE 434 ADIT	47.1308	114.6947	16N	25W	24	DABB	HORSEHEAD PEAK	Y	N	SUPERIOR
MI005603	FOUR V'S CLAIMS	46.6972	114.6	11N	24W	22		LOLO HOT SPRINGS	N	N	MISSOULA
MI006019	FRANCES COPPER/JOE WALLIT (WAYLETT)	47.2528	114.6869	17N	24W	8	BBDB	KNOWLES	Y	N	NINEMILE
MN008151	FREEZEOUT CREEK PLACER	47.0236	115.0153	15N	27W	28	D	ILLINOIS PEAK	Y	N	SUPERIOR
MI002892	FRENCHMAN'S PROSPECT	46.97	113.9583	14N	19W	14	DABC	NORTHEAST MISSOULA	Y	N	MISSOULA
MN003202	GALLIGAR MINE	47.4283	115.5089	19N	31W	2	CDDD	SALTESE	Y	P	SUPERIOR
MN008149	GILDERSLEEVE BARITE PROSPECT	47.0273	115.0254	15N	27W	28	CCAB	ILLINOIS PEAK	Y	N	SUPERIOR
MN003222	GILDERSLEEVE MINE (BONANZA GROUP)	47.0358	115.0353	15N	27W	29	ABAB	ILLINOIS PEAK	Y	M	SUPERIOR
MN005983	GILDERSLEEVE PLACER	47.0317	115.0361	15N	27W	29	A	ILLINOIS PEAK	N	N	SUPERIOR
SA009010	GLIDDEN GULCH PROSPECTS	47.5639	115.6672	21N	32W	23	C	THOMPSON PASS	N	N	PLAINS
GR003451	GOLD BUG	46.5997	113.5656	10N	16W	26	AABA	SPINK POINT	Y	M	MISSOULA
MN005915	GOLD CROWN	47.2186	115.1806	17N	28W	20		TORINO PEAK	N	N	SUPERIOR
MN006027	GOLD MOUNTAIN MINES	47.0555	114.8383	15N	27W	14	DBCA	LANDOWNER MOUNTAIN	Y	N	SUPERIOR
MN008195	GOLD OF THE PATRIARCHS	47.0538	114.9701	15N	27W	14		LANDOWNER MOUNTAIN	Y	N	SUPERIOR
MI002598	GOLD PROSPECT	46.9747	113.9478	14N	19W	13		NORTHEAST MISSOULA	N	N	MISSOULA
MI002904	GOLD PROSPECT	46.9314	113.9642	14N	19W	35	ACBB	NORTHEAST MISSOULA	Y	N	MISSOULA
MN006039	GOLDBUG MINE (TAWNEY)	47.2625	115.2953	17N	29W	4		DE BORGIA SOUTH	N	N	SUPERIOR
MN005787	GRAHAM COPPER PROSPECT	47.3578	115.0294	19N	27W	34		ST. REGIS	N	P	SUPERIOR
MI006007	GRANITE HOT SPRINGS / LOLO	46.7308	114.5342	11N	23W	7	A	LOLO HOT SPRINGS	N	P	MISSOULA
SA005783	GREEN MOUNTAIN MINE	47.4861	115.1222	20N	28W	14	D	SUNSET PEAK	N	P	PLAINS
SA005363	HAPPY BOY PROSPECT	47.5386	115.5833	21N	31W	33	B	DRIVEWAY PEAK	N	N	PLAINS
GR003174	HARVEY CREEK	46.6	113.4444	10N	15W	23		HARVEY POINT	N	N	MISSOULA
MI005511	HAUTTULA PROSPECT	47.1511	114.4408	16N	23W	13	AADD	MCCORMICK PEAK	Y	N	NINEMILE
MN003072	HEMLOCK PROSPECT	47.4326	115.5159	19N	31W	2	CBDC	SALTESE	Y	P	SUPERIOR
GR000044	HIDDEN TREASURE MINE / GROUP	46.5961	113.5914	10N	16W	27		SPINK POINT	Y	M	MISSOULA

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MN005863	HIGHBAR PLACER	47.0525	114.755	15N	25W	16		LOZEAU	N	M	SUPERIOR
MI002658	HOLLIDAY	46.9558	113.9806	14N	19W	22		NORTHEAST MISSOULA	N	M	MISSOULA
MN005899	HOODOO MINE	47.4267	115.5375	19N	31W	10		SALTESE	N	N	SUPERIOR
MN005843	HOPKINS MINE / SWEENEY AND HOPKINS	47.2697	114.8639	18N	26W	35	CDD	QUINNS HOT SPRINGS	Y	P	SUPERIOR
MN008137	HUB LAKE MINE	47.2774	115.3776	18N	30W	35	DBAB	MCGEE PEAK	Y	N	SUPERIOR
MN008193	HUNGARY GULCH MINE	47.0594	114.9861	15N	27W	14	BCC	LANDOWNER MOUNTAIN	Y	N	SUPERIOR
GR003011	HUNGRY HORSE AND BIG DIPPER PLACER	46.6039	113.7697	10N	17W	20		CLEVELAND MOUNTAIN	N	N	MISSOULA
MI005491	IDA A. PLACER	47.1478	114.4944	16N	23W	15		MCCORMICK PEAK	N	N	NINEMILE
SA005293	IDAHO MONTANA MINING CO	47.5344	115.7131	21N	32W	33		THOMPSON PASS	N	N	PLAINS
MN008141	ILLINOIS PEAK ADITS	47.0307	115.0771	15N	28W	25	ACD	ILLINOIS PEAK	Y	N	SUPERIOR
MI002880	INDEX GRANITE PROSPECT	47.0244	113.9844	15N	19W	27		STUART PEAK	N	N	MISSOULA
SA005368	IRON DAISY /PRINCESS MINING CO	47.5269	115.5147	20N	31W	3	BBDB	DRIVEWAY PEAK	Y	N	PLAINS
MN003227	IRON MOUNTAIN	47.2411	114.8553	17N	26W	12	CCDD	IDAHO GULCH	Y	M	SUPERIOR
GR002976	J. JAY NO. 2 CLAIM	46.6339	113.8097	10N	18W	12	C	ELK MOUNTAIN	N	N	MISSOULA
MN006067	JACK	47.3075	115.2106	18N	28W	19		BOYD MOUNTAIN	N	N	SUPERIOR
SA004693	JANSTAN GROUP	47.5472	115.7158	21N	32W	2		THOMPSON PASS	N	N	PLAINS
SA005088	JOHNNY MILLER	47.442	115.0868	20N	27W	31	CDCA	SUNSET PEAK	Y	N	PLAINS
MI005551	JOSEPHINE	47.1722	114.5228	16N	23W	4	C	STARK NORTH	N	M	NINEMILE
GR000086	JUMBO MINE	46.5947	113.5997	10N	16W	27	BDBC	SPINK POINT	Y	N	MISSOULA
MI002952	JUNIPER PROSPECT	46.9208	113.8439	13N	18W	2		BLUE POINT	N	N	MISSOULA
MN003282	K & K MINE	47.3067	115.4025	18N	30W	22		MCGEE PEAK	N	N	SUPERIOR
MN003182	KEITH PROPERTY	47.3389	115.1339	18N	28W	11	BBCD	BOYD MOUNTAIN	Y	N	SUPERIOR
SA001302	KENDOY	47.3619	114.8103	19N	25W	32		QUINNS HOT SPRINGS	N	M	PLAINS
MI005587	KENNEDY CREEK MINES	47.15	114.4442	16N	23W	13		MCCORMICK PEAK	N	N	NINEMILE
MN008032	KEYSTONE ADIT	47.2836	114.9017	18N	26W	34	CDDB	KEYSTONE PEAK	Y	N	
MI005459	LA CHAMBRE PLACER MINE	47.2178	114.6372	17N	24W	22		HORSEHEAD PEAK	N	M	NINEMILE
MN003337	LAST CHANCE	47.4558	115.5247	20N	31W	34	ABA	SALTESE	Y	M	SUPERIOR
MN005987	LAST CHANCE	47.1486	115.1667	16N	28W	16		TORINO PEAK	N	N	SUPERIOR
MI005523	LAWYERS COMBINATION	46.7753	114.2661	12N	21W	29		CAMP CREEK	N	M	MISSOULA
MI002862	LIME KILN PROSPECT	46.9783	113.89	14N	18W	17		NORTHEAST MISSOULA	N	N	MISSOULA
MI002958	LIMESTONE PROSPECT	46.9347	113.8561	14N	18W	34		BLUE POINT	N	N	MISSOULA
MN006099	LITTLE ANACONDA GROUP (VELVET ADIT)	47.2772	114.8739	18N	26W	35	BDCA	QUINNS HOT SPRINGS	Y	M	SUPERIOR
SA005133	LITTLE COMET LODE	47.57	115.5997	21N	31W	17		DRIVEWAY PEAK	N	N	PLAINS
MN006071	LITTLE JOE CREEK PLACER	47.2508	115.1656	17N	28W	9		BOYD MOUNTAIN	N	N	SUPERIOR
MN003242	LITTLE PITTSBURG / KEESEY TUNNEL	47.2692	114.985	17N	27W	1	BBAD	KEYSTONE PEAK	N	P	SUPERIOR
MI002868	LOOKS GRIM PROSPECT	47.0044	113.9903	14N	19W	4	BACC	STUART PEAK	Y	N	MISSOULA
MI002496	LOST CABIN (KENNEDY)	47.1494	114.4439	16N	23W	13	ADBD	MCCORMICK PEAK	Y	N	NINEMILE

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MN005979	LOST GULCH PLACER (WAGNER'S)	47.1353	115.0767	16N	28W	24	A	WILSON GULCH	N	N	SUPERIOR
SA005068	LOWER LETTERMAN	47.4286	114.8936	19N	26W	3		PLAINS	N	P	PLAINS
GR003006	LUCKY HANCOCK CLAIM	46.6047	113.785	10N	17W	19		CLEVELAND MOUNTAIN	N	N	MISSOULA
MN003057	LUCKY JACK / WILSON GULCH	47.1814	115.0831	16N	28W	1	B	WILSON GULCH	N	N	SUPERIOR
MN005919	LUCKY STRIKE	47.2628	115.2953	17N	29W	4		DE BORGIA SOUTH	N	N	SUPERIOR
MN003287	M & C CLAIMS	47.0033	114.8536	14N	26W	2		LOZEAU	N	M	NINEMILE
MN003052	MAGI MINE / LIME GULCH PROSPECT	47.1967	115.0725	17N	27W	31	AAAA	WILSON GULCH	Y	N	SUPERIOR
SA005083	MAMMONT LODE	47.5617	115.6142	21N	31W	19		DRIVEWAY PEAK	N	P	PLAINS
MI002742	MARION CREEK PLACER	47.1931	114.5317	17N	23W	33		STARK NORTH	N	P	NINEMILE
MI002568	MATTIE V	47.2131	114.6317	17N	24W	22		HORSEHEAD PEAK	Y	M	NINEMILE
MN005855	MCFARLAND CREEK PLACER MINE	46.9964	114.8089	14N	25W	6		ST. PATRICK PEAK	N	N	NINEMILE
MN006051	MEADOW CREEK PLACER	47.0428	114.8272	15N	25W	24		LOZEAU	N	N	NINEMILE
MN003367	MEADOW MOUNTAIN	47.4489	115.4918	20N	31W	36	CABC	HAUGAN	Y	M	SUPERIOR
SA005093	MIDDAY LODE	47.5633	115.6122	21N	31W	20	C	DRIVEWAY PEAK	N	P	PLAINS
GR003031	MIDNIGHT PLACER CLAIMS	46.5672	113.7078	09N	17W	2		GRIZZLY POINT	Y	M	MISSOULA
MI002970	MINERAL PEAK PROSPECT	47.0036	113.8122	14N	18W	1		WAPITI LAKE	N	N	MISSOULA
SA005338	MINERONJOU, EDDY AND RUSSELL GROUPS	47.4819	115.1139	20N	28W	23		SUNSET PEAK	N	P	PLAINS
MN003292	MINNICK MINE	47.3456	115.4439	18N	30W	5		MCGEE PEAK	N	N	SUPERIOR
GR003016	MISS FORTUNE PLACER CLAIMS	46.5778	113.815	10N	18W	35		CLEVELAND MOUNTAIN	N	N	MISSOULA
MN003217	MONARCH MINE	47.3369	115.1778	18N	28W	9		BOYD MOUNTAIN	Y	N	SUPERIOR
SA001278	MONIA / SALES PROSPECT	47.9553	115.145	25N	28W	1	ACAD	MANTRAP FORK	N	P	PLAINS
MN006091	MONTANA BARITE PIT	47.1944	114.8894	17N	26W	34		SUPERIOR	N	P	SUPERIOR
MI002934	MONTANA POWER CO. BARITE PROSPECT	46.9661	113.8994	14N	18W	17	DCDB	NORTHEAST MISSOULA	Y	N	MISSOULA
SA004828	MONTANA PREMIER (LETTERMAN)	47.4361	114.9	19N	26W	3	BCD	PLAINS	N	P	PLAINS
SA001248	MONTANA STANDARD MINE	47.5372	115.5292	21N	31W	35	A	DRIVEWAY PEAK	N	P	PLAINS
SA001326	MONTEZUMA	47.335	114.8525	18N	26W	12		QUINNS HOT SPRINGS	N	N	PLAINS
SA005178	MONTRO GOLD MINES	47.4306	114.9103	19N	26W	4		PLAINS	N	S	PLAINS
SA005103	MORNING VIEW LODE	47.5581	115.6039	21N	31W	20		DRIVEWAY PEAK	N	P	PLAINS
MN005799	MOUNTAIN GEM MINE	47.2258	114.9022	17N	26W			SUPERIOR	N	M	SUPERIOR
MN006095	MULLEN BARITE	47.3353	115.1711	18N	28W	9	BDCD	BOYD MOUNTAIN	Y	N	SUPERIOR
GR000380	N. PACIFIC RY. PROSPECT	46.6653	113.6581	11N	16W	31		IRIS POINT	N	P	MISSOULA
MN005991	NANCY LEE MILL/ SLOWEY	47.2378	115.0069	17N	27W	15	BBD	WILSON GULCH	N	P	SUPERIOR
MN008464	NANCY LEE MILLSITE	47.2653	114.9392	17N	26W	5	BA	KEYSTONE PEAK	Y	P	SUPERIOR
MN005903	NANCY LEE MINE (KING, QUEEN, ...	47.2725	114.9506	18N	26W	31		KEYSTONE PEAK	Y	N	SUPERIOR
SA008609	NELLIE MINE	47.5289	115.5114	21N	31W	36		DRIVEWAY PEAK	N	N	PLAINS
MN005827	NEW LENORE MINE	47.26	115.2972	17N	29W	4	CBDD	DE BORGIA SOUTH	Y	N	SUPERIOR
MI005959	NINE MILE MINE / CRONK ADIT	47.2133	114.6658	17N	24W	21		HORSEHEAD PEAK	N	M	NINEMILE

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MI002586	NINE MILE OPERATION	47.1444	114.4469	16N	23W	13		MCCORMICK PEAK	N	M	NINEMILE
MI005575	NINE MILE PLACER / NINEMILE CREEK	47.2347	114.6972	17N	24W	18		HORSEHEAD PEAK	Y	M	NINEMILE
MN003262	NITE OWL MINE	47.275	114.9192	18N	26W	33	CABD	KEYSTONE PEAK	Y	N	SUPERIOR
SA005428	NO. 10 TUNNEL	47.3336	114.79	18N	25W	9		QUINNS HOT SPRINGS	N	M	PLAINS
SA008220	NORTH DEE CREEK ADIT	47.4693	115.1211	20N	28W	26		SUNSET PEAK	N	N	PLAINS
MN005931	NORTH FORK CLAIMS 1, 2 & 3	47.0283	115.0381	15N	27W	29		ILLINOIS PEAK	N	M	SUPERIOR
MI002538	NUGGET MINE	47.1469	114.4446	16N	23W	13	DABB	MCCORMICK PEAK	Y	N	NINEMILE
MN005951	OLD SIERRA	46.9903	114.8894	14N	26W	9		STRAIGHT PEAK	N	N	NINEMILE
MN006063	OREGON CREEK PLACER	47.1292	115.0103	16N	27W	21	D	WILSON GULCH	N	M	SUPERIOR
MN003247	PACKER CREEK BARITE DEPOSITS	47.4361	115.5061	19N	31W	2		SALTESE	N	M	SUPERIOR
MN005955	PARDEE CREEK	47.2761	114.8706	18N	26W	35		QUINNS HOT SPRINGS	N	M	SUPERIOR
SA005333	PAUL BUNYON	47.695	115.295	22N	29W	3		MOUNT HEADLEY	N	N	PLAINS
MI008130	PAYING TELLER	46.9161	113.9575	13N	19W	2		NORTHEAST MISSOULA	N	M	MISSOULA
MI005731	PETTY CREEK PLACER	46.9108	114.4639	13N	23W	2		PETTY MOUNTAIN	N	M	NINEMILE
MI002694	PINE CREEK	47.2047	114.5528	17N	23W	29		STARK NORTH	N	N	NINEMILE
SA008224	PROSPECT CREEK ADIT	47.5454	115.5238	21N	31W	25	CC	DRIVEWAY PEAK	Y	N	PLAINS
SA005233	PROSPECT CREEK PLACER	47.5444	115.5744	21N	31W	28		DRIVEWAY PEAK	N	N	PLAINS
MN003237	PROSPERITY MINE	47.2731	114.9278	18N	26W	32	DADD	KEYSTONE PEAK	Y	N	SUPERIOR
MN006047	QUARTZ CREEK PLACERS	47.0108	114.8164	15N	26W	31		LOZEAU	N	M	NINEMILE
SA001260	QUINNS HOT SPRINGS	47.3294	114.7881	18N	25W	9	D	QUINNS HOT SPRINGS	N	P	PLAINS
SA001332	R & M #1 PROSPECT	47.4411	115.1167	19N	28W	1	B	SUNSET PEAK	N	N	PLAINS
GR003406	RAINY DAY MINE	46.5928	113.5994	10N	16W	27	BDCC	SPINK POINT	Y	M	MISSOULA
MI005687	RATTLESNAKE CREEK BARITE	46.9286	113.9644	14N	19W	35		NORTHEAST MISSOULA	Y	N	MISSOULA
SA001428	RAVEN MINE (COPPER MASK)	47.6164	115.1924	22N	28W	33	CDA	EDDY MOUNTAIN	Y	M	PLAINS
SA004768	RED BLUFF QUARRY	47.3236	114.8681	18N	26W	14		QUINNS HOT SPRINGS	N	M	PLAINS
MN003357	REDEMPTION 1 & 2	47.0728	115.0597	15N	27W	7		ILLINOIS PEAK	N	N	SUPERIOR
MN006087	RICHMOND LEXINGTON MINING & MILLING	47.2925	115.1025	18N	28W	25		ST. REGIS	N	M	SUPERIOR
MN003297	RIVERS CREEK MINE	47.3492	115.4439	18N	30W	5		MCGEE PEAK	N	N	SUPERIOR
MI002646	ROBIN L. PLACER	47.22	114.6567	17N	24W	21		HORSEHEAD PEAK	N	M	NINEMILE
GR003641	ROCK CREEK	46.6642	113.6567	11N	16W	31		IRIS POINT	N	P	MISSOULA
MN005911	ROCK ISLAND	47.4339	115.3047	19N	29W	4	CBBC	DE BORGIA NORTH	Y	N	SUPERIOR
SA005433	RUSSELL GROUP	47.4861	115.12	20N	28W	14		SUNSET PEAK	N	P	PLAINS
MN003252	S. FORK OF TROUT CREEK PLACER	46.9822	114.9786	14N	27W	11		STRAIGHT PEAK	N	N	NINEMILE
MN005803	SALTESE CONSOLIDATED MINE	47.4372	115.4281	19N	30W	4	BDBC	HAUGAN	Y	N	SUPERIOR
MN005791	SALTESE METALS MINE	47.4072	115.5122	19N	31W	14		SALTESE	N	M	SUPERIOR
MI005943	SAN MARTINA MINE	47.2108	114.6472	17N	24W	21		HORSEHEAD PEAK	N	P	NINEMILE

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MI002874	SANDERS LAKE SILICA PROSPECT	47.0544	113.94	15N	19W	13		STUART PEAK	N	N	MISSOULA
MN003257	SANTA RITA GROUP	47.2761	114.9364	18N	26W	32		KEYSTONE PEAK	N	M	SUPERIOR
SA005373	SHAMROCK MINE	47.5522	115.5117	21N	31W	25		DRIVEWAY PEAK	N	N	PLAINS
MI002964	SHEEP MOUNTAIN PROSPECT	46.9478	113.8058	14N	17W	30		BLUE POINT	N	N	MISSOULA
MI005531	SHOESTRING PROPERTY	47.2481	114.6953	17N	24W	7	ADCC	HORSEHEAD PEAK	Y	N	NINEMILE
MI002604	SILICA PROSPECT	46.9506	113.9717	14N	18W	21		NORTHEAST MISSOULA	N	N	MISSOULA
MI002592	SILICON PROSPECT	46.9558	113.9722	14N	19W	27		NORTHEAST MISSOULA	N	N	MISSOULA
MI002856	SILICON PROSPECT	47.0808	113.9361	15N	19W	1		STUART PEAK	N	N	MISSOULA
SA004638	SILVER AND COPPER PROSPECT	47.4475	114.8183	20N	25W	31		PARADISE	N	P	PLAINS
SA004633	SILVER AND LEAD PROSPECT	47.4911	114.8294	20N	25W	18		PARADISE	N	P	PLAINS
MN003267	SILVER BELL PROPERTY	47.2339	115.2183	17N	28W	18		TORINO PEAK	N	N	SUPERIOR
MN005923	SILVER CABLE	47.4792	115.6236	20N	32W	24	CBBB	SALTESE	Y	P	SUPERIOR
MN008163	SILVER CLIFF	47.0306	115.0292	15N	27W	29	DAAD	ILLINOIS PEAK	Y	N	SUPERIOR
MN003302	SILVER CREEK MINE	47.4078	115.5064	19N	31W	14		SALTESE	N	M	SUPERIOR
SA005353	SILVER KING / BELLE STOWE	47.6128	115.1861	21N	28W	4	AAC	EDDY MOUNTAIN	Y	N	PLAINS
MN005851	SILVER KING MINE	47.0723	115.0545	15N	27W	7	DBAA	ILLINOIS PEAK	Y	N	SUPERIOR
SA005975	SILVER PEAK GROUP	47.5086	115.6556	20N	32W	10		THOMPSON PASS	N	N	PLAINS
MN008080	SILVER QUEST	47.4389	115.7292	19N	32W	6	D	LOOKOUT PASS	Y	M	SUPERIOR
MN003272	SILVER STRAND PROPERTY	47.4236	115.6325	19N	32W	11	ACAC	LOOKOUT PASS	Y	N	SUPERIOR
MN005927	SILVER STREAK (GOLDEN SUNSET)	47.0758	115.0476	15N	27W	8	BCBA	ILLINOIS PEAK	Y	N	SUPERIOR
MN006075	SKYLINE MINE	47.0011	115.0242	14N	27W	4		ILLINOIS PEAK	N	N	SUPERIOR
MN003062	SNOWBIRD MINE (SNOWSHOE)	46.7781	114.7928	12N	25W	19	CD	SCHLEY MOUNTAIN	N	N	NINEMILE
MN008146	SOUTH AMADOR	47.1064	115.0122	16N	27W	33	AACC	ILLINOIS PEAK	Y	N	SUPERIOR
MN003047	SPAR MINE (SPAR GROUP) / BEAR CREEK	47.195	115.0892	17N	27W	31	BBDB	WILSON GULCH	Y	N	SUPERIOR
MN003307	SPITFIRE MINE	47.3567	115.0053	19N	27W	35	CCDD	ST. REGIS	Y	N	SUPERIOR
SA005073	ST. GEORGE LODE	47.5664	115.6069	21N	31W	20	B	DRIVEWAY PEAK	N	P	PLAINS
MN005867	ST. LAWRENCE MINE	47.3567	115.5653	18N	31W	9	AABB	ADAIR	Y	N	SUPERIOR
SA005213	STATE GROUP	47.4769	115.1672	20N	28W	21		PENROSE PEAK	N	N	PLAINS
SA005108	STATION MILLSITE CLAIM	47.5572	115.6206	21N	31W	20		DRIVEWAY PEAK	N	M	PLAINS
MN003347	STEMWINDER PLACER	47.0581	114.9142	15N	26W	17		LANDOWNER MOUNTAIN	N	N	SUPERIOR
SA001482	STIBNITE HILL MINE	47.5675	115.6017	21N	31W	17		DRIVEWAY PEAK	N	N	PLAINS
SA008183	STOBIE-HERMISTON / S&H MINING CO.	47.3272	114.9369	18N	26W	8	DCCC	KEYSTONE PEAK	Y	N	PLAINS
SA005343	SULLIVAN HILL TUFF	47.5903	115.3889	21N	30W	12		TABLE TOP MOUNTAIN	N	P	PLAINS
MN003322	SUNRISE CREEK PLACER	47.0461	114.8861	15N	26W	21		LANDOWNER MOUNTAIN	N	N	SUPERIOR
MI005607	SUSAN MINE	47.1731	113.3761	16N	14W	4		SEELEY LAKE EAST	N	M	SEELEY LAKE
SA005328	SWAN PROSPECT	47.5242	115.6967	20N	32W	4		THOMPSON PASS	N	N	PLAINS
MN005871	SWASTIKA PLACER	47.0308	114.7514	15N	25W	27	BCD	LOZEAU	N	M	NINEMILE

MBMG ID	NAME	LAT	LONG	T	R	SEC	TRACT	TOPOGRAPHIC MAP	VISIT	OWNERSHIP	RANGER DISTRICT
MI002922	SWEDE PROSPECT	46.9553	113.9292	14N	18W	19	CBDA	NORTHEAST MISSOULA	Y	N	MISSOULA
MN003342	SYNDICATE PROSPECT	47.4672	115.5583	20N	31W	28	BCCB	SALTESE	Y	N	SUPERIOR
MN008127	TAFT	47.4178	115.6178	19N	32W	12	C	SALTESE	N	N	SUPERIOR
MN005907	TAMMANY - CLARA 1&2, LOOKOUT FRAC.	47.1311	114.6658	16N	24W	20	BDCC	HORSEHEAD PEAK	Y	P	SUPERIOR
MN006103	TARBOX-MINERAL KING	47.4514	115.4986	20N	31W	35	ADDB	HAUGAN	Y	M	SUPERIOR
MN005823	TEXAS MINE	47.4322	115.3229	19N	29W	5	CBDD	DE BORGIA NORTH	Y	N	SUPERIOR
SA005243	THOMPSON FALLS MINING COMPANY	47.5217	115.535	20N	31W	2		DRIVEWAY PEAK	N	M	PLAINS
MI005691	TORGELSON PROPERTY	47.06	114.4058	15N	22W	17		ALBERTON	N	P	NINEMILE
MN006079	TRIANGLE MINE	47.0006	114.8706	14N	26W	3		LOZEAU	N	M	NINEMILE
MN005875	TROUT CREEK PLACER	47.0197	114.9822	15N	27W	35		LANDOWNER MOUNTAIN	N	M	SUPERIOR
MN005879	TRUE FISSURE	47.4181	115.3311	19N	29W	7	CAC	DE BORGIA NORTH	N	N	SUPERIOR
MN006055	TUCKER GULCH PLACER	47.0058	114.8186	14N	26W	1		LOZEAU	N	N	NINEMILE
MN008106	TUNNEL NO 1 ADIT	47.4324	115.6578	19N	32W	3	CDAA	LOOKOUT PASS	Y	N	SUPERIOR
MI005571	TWIN CREEKS PLACER	47.2064	114.6231	17N	24W	26		STARK NORTH	N	M	NINEMILE
SA004713	U.S. ANTIMONY SMELTER & REFINERY	47.5475	115.5917	21N	31W	29	D	DRIVEWAY PEAK	N	M	PLAINS
GR008005	UNNAMED ADIT (LOWER BREWSTER)	46.6119	113.6214	10N	16W	21		SPINK POINT	Y	N	MISSOULA
SA005298	UNNAMED ARSENIC & COBALT	47.3469	114.7883	18N	25W	4		QUINNS HOT SPRINGS	N	N	PLAINS
SA005438	UNNAMED BENTONITE	47.6508	115.3622	22N	29W	19		MOUNT HEADLEY	N	P	PLAINS
MN008168	UNNAMED CEDAR CREEK ADITS	47.0641	115.045	15N	27W	17	B	ILLINOIS PEAK	Y	M	SUPERIOR
SA004773	UNNAMED FLAGSTONE QUARRY	47.4317	114.8681	19N	26W	2		PARADISE	N	P	PLAINS
MI005655	UNNAMED GOLD	47.1631	114.4925	16N	23W	10		MCCORMICK PEAK	N	N	NINEMILE
MN005815	UNNAMED GRAVEL PIT	47.3947	115.4247	19N	30W	21	A	HAUGAN	N	P	SUPERIOR
MN005847	UNNAMED GRAVEL PIT	47.3261	115.2225	18N	29W	13		BOYD MOUNTAIN	N	N	SUPERIOR
MI002946	UNNAMED LIMESTONE PROSPECT	46.9392	113.8494	14N	18W	27		BLUE POINT	N	N	MISSOULA
SA005193	UNNAMED MINES	47.4747	115.13	20N	28W	23		PENROSE PEAK	N	N	PLAINS
GR000296	UNNAMED PLACER DEPOSIT	46.6092	113.7897	10N	17W	19		CLEVELAND MOUNTAIN	N	N	MISSOULA
MI002910	UNNAMED PROSPECT	46.9558	113.9806	14N	19W	35		NORTHEAST MISSOULA	N	N	MISSOULA
MI002928	UNNAMED PROSPECT	46.9478	113.9703	14N	19W	26		NORTHEAST MISSOULA	N	N	MISSOULA
MI002940	UNNAMED PROSPECT	46.9375	113.8625	14N	18W	27		BLUE POINT	N	N	MISSOULA
MI005623	UNNAMED PUMICE	47.1903	114.4653	17N	23W	36		MCCORMICK PEAK	N	N	NINEMILE
MI005627	UNNAMED PUMICE	47.0303	114.1742	15N	20W	30		FRENCHTOWN	N	M	NINEMILE
GR000818	UNNAMED PUMICE DEPOSIT	46.5861	113.5622	10N	16W	25		SPINK POINT	N	P	MISSOULA
MN005859	UNNAMED QUARRY	47.2344	114.9681	17N	27W	13		SUPERIOR	N	P	SUPERIOR
SA005443	UNNAMED SILVER & LEAD	47.3353	114.79	18N	25W	9		QUINNS HOT SPRINGS	N	M	PLAINS
MN008201	UNNAMED TROUT CREEK MINES	47.0439	114.9561	15N	27W	24	B	LANDOWNER MOUNTAIN	N	N	SUPERIOR
MN005883	UPPER KEESEY PROSPECT	47.3022	114.9572	18N	26W	19	DBCC	KEYSTONE PEAK	Y	N	SUPERIOR
MN008004	UPPER KEYSTONE ADITS	47.2847	114.8964	18N	26W	27	CDDB	KEYSTONE PEAK	Y	N	SUPERIOR

MBMG ID	NAME	LAT	LONG	T	R	SEC	TRACT	TOPOGRAPHIC MAP	VISIT	OWNERSHIP	RANGER DISTRICT
MN008176	UPPER OREGON GULCH PLACER	47.0853	115.0883	15N	28W	1	C	ILLINOIS PEAK	N	N	SUPERIOR
MN005779	VALENTINE MINE	47.4341	115.3187	19N	29W	5	CADB	DE BORGIA NORTH	Y	N	SUPERIOR
MN005935	VICTOR MANCINI PROPERTY	47.1597	114.9133	16N	26W	8		SUPERIOR	N	M	SUPERIOR
MN009113	VULCAN TUNNEL (ASSOC W/ NANCY LEE)	47.2714	114.9522	18N	26W	31	DCBC	KEYSTONE PEAK	Y	N	SUPERIOR
MN003377	WABASH	47.4481	115.4969	20N	31W	36	CBCB	HAUGAN	Y	N	SUPERIOR
MN006031	WARD CREEK PLACER	47.2994	115.2592	18N	29W	23		DE BORGIA SOUTH	N	N	SUPERIOR
MI005995	WARD LODE MINE	46.6956	114.3619	11N	22W	21	DADB	DICK CREEK	Y	N	MISSOULA
MN005887	WATERHOLE CLAIMS	47.4028	115.4697	19N	30W	18	C	HAUGAN	N	N	SUPERIOR
GR003154	WELCOME CREEK	46.5667	113.7328	09N	17W	4		GRIZZLY POINT	N	N	MISSOULA
MI005539	WHITE CAP PROSPECT	46.8989	114.4608	13N	23W	12		PETTY MOUNTAIN	N	M	NINEMILE
MN006043	WINDFALL CREEK PLACERS	47.0364	114.9217	15N	26W	20		LANDOWNER MOUNTAIN	N	M	SUPERIOR
MN003362	WOLF PROSPECT	47.3414	115.1511	18N	28W	10		BOYD MOUNTAIN	N	M	SUPERIOR

Appendix III
Description of Mines and Mill Sites
Lolo National Forest

Agnes Mine Saltese 7.5-min. MN003332

The Agnes Mine was visited by MBMG geologists on 08/07/01. Access was by hiking a trail off the Silver Creek road (Forest Route 305) south of Saltese. The trail is to the east near a 4,538-ft elevation knob and then south down to Big Sunday Creek. The adits at the Agnes are on the east side of the creek. One adit trending S.20°E. was totally collapsed. The waste-rock dumps had gray argillite, with some iron staining, small quartz veins and no sulfides. There were two inch diameter trees growing on the first dump. Another adit with a large, pine-duff-covered waste-rock dump (10- to 12-inch trees growing on this one) visible from the trail, was collapsed. A third adit was N.25°E.-trending, open (4-ft by 4-ft portal was partially collapsed with a berm at the entrance) and flooded, but no water was discharging from the adit. It was open at least 40 ft back and the original adit dimensions were 4 ft by 5 ft. It is about 100 ft from the trail. Two partially collapsed cabins were adjacent to the creek.

The Agnes was described as an isolated galena occurrence in an area known for copper mineralization (Calkins and Jones, 1914). The vein (up to 8 ft wide) was composed of siderite and quartz with some galena and chalcopyrite.

Aladdin Mine De Borgia South 7.5-min. MN005891

The Aladdin mine was visited by MBMG geologists on 07/11/01. It was accessed by hiking downhill from Forest Route 1185 (after following Forest Route 431 (Twomile Creek) from I-90 and then going west on Forest Route 1180). The adit and prospect are located downhill from a large meadow and are just inside the forested area below the meadow.

The prospect was 10' by 10' by 5' deep. The lower sluffed portion of the adit trends S.75°W. and the upper part trends S.60°W. The upper portion of the adit follows a massive white quartz vein (with pyrite and chalcopyrite) that dips 60°SW. The upper part of the adit was open for only 5 feet but had an overhang. The 12-inch wide vein was faulted and offset near the portal. A small discharge issued from the lower portal but disappeared into the ground in less than 5 feet; the flow was less than 1 gpm and so was not enough volume to sample. Wallace and Hosterman (1956) described the intrusive as a diorite and the veins as occupying shears in or adjacent to the diorite.

Alps Mine and Mill Spink Point 7.5-min. GR000860

The Alps Mine was visited on 10/17/00 by MBMG geologists. It lies primarily on LNF-administered land. It had a large waste-rock dump, a collapsed adit with no opening, and no apparent adit discharge. There was snow on the ground during this inventory so a small discharge may have existed but was covered. Pioneer Technical Services inventoried the site in 1993 and estimated the waste rock at 14,023 cubic yards. They sampled an adit discharge but found no MCL or MCLG exceedences; the pH was 4.13, however. They also identified an open shaft and two open adits on site.

The Alps mining district was organized in 1889 and originally consisted of the Alps, Golconda, and Aetna claims. In 1889, the shaft was 42 ft deep. The Alps Group later consisted of 5 patented claims and 15 unpatented claims. A report from 1940 listed the workings as consisting of a 300-ft crosscut, a 300-ft drift on a vein and a 150-ft raise to the surface. A 10-stamp mill was listed as being at the site. There was a reported 200-ton-per-day flotation mill on site in 1949 (MBMG mineral property files, unpublished reports).

Amador Mine Illinois Peak 7.5-min. MN005895

The Amador was visited on 08/23/01 by MBMG geologists. Even though Cedar Creek flowed past the waste-rock dump, the dump was not being eroded because of the large fragment size. The adit as plotted on the topographic map could not be found. No open adits or shafts were located. Most of the disturbances were on patented land on a series of five patented claims that extend northwest to southeast. The Amador was described in Campbell (1960).

Amador South Illinois Peak 7.5-min. MN008146

A second caved adit and waste-rock dump was found about 1,800 ft south of the Amador Mine's main workings. The adit was completely obliterated and the waste-rock dump, although immediately west of Cedar Creek, was not being actively eroded by it.

Amazon-Dixie Mine Lookout Pass 7.5-min. MN003352
The Amazon-Dixie is also known by the name Copper Queen and is labeled on the Lookout Pass 7.5-min. quadrangle as the Sildex mine. It is located in ADCA sec. 04, T.19N., R.32W., and is within a block of at least 11 patented claims. The disturbance is entirely on patented land but it was reported that the adit had a large discharge but that it never reached the creek. The adit has a large waste dump (several hundred tons) and the adit is open but gated. The waste dump is visible from I-90 and the mine is easily accessible from Forest Route 4208. Another adit is located up the trail to Copper Lake but is described as a separate mine (Copper Gulch) because it is not on patented ground; it may have been worked at the same time as the Amazon-Dixie, however. The property was described as "developing" in 1964 and in 1975 in MBMG mining directories but no other information was given. Wallace and Hosterman (1956) stated that the workings were inaccessible; they associated the mine with the Silver Lake Fault.

Annie Laurie Penrose Peak 7.5-min. SA005193
Although this site was shown with an adit symbol on the Penrose Peak 7.5-min. quadrangle, no access was found to it. The MILS database described it as in sec. 13, T.20N., R.29W., and it plots on Northup Creek. It was not visited because of lack of time and resources to get to the remote location. The MILS database had no references to it; the commodity was listed in MILS as copper.

Argo Mine and Mill Spink Point 7.5-min. GR003509
The Argo Mine was visited in the summer of 1992 by an MBMG geologist as a part of the Deerlodge National Forest inventory. The site is in the Lolo National Forest boundary but is administered by the Deerlodge National Forest. Most workings are private.

There were several cabin ruins in the area. Very extensive workings were found in pink-purple quartzite with quartz-siderite-pyrite-chalcopyrite veins and minor quartz-pyrite breccia. Interpretation of the geology of the area was limited because of the very poor exposures of the rocks. Many pits and trenches extend over the area. The mill with vats had burned but several tons of tailings were uphill from it. A >10-gallon discharge came from the open but flooded adit. Pioneer Technical Services (for DSL-AMRB) in 1994 sampled the adit and found the MCL for antimony and the chronic aquatic life criteria for lead were exceeded in the adit discharge. MBMG did not sample this site because it was on private land.

American Gold Mining - Oh Boy Group Illinois Peak 7.5-min. MN005835
This site was described as consisting of an 800-ft tunnel, last operated in 1930 (Trauerman and Waldron, 1940). The adit is on private patented land along Cedar Creek. No effects to LNF-administered land were noted.

Arlington Thompson Pass 7.5-min. SA005138
The Arlington Mine, in the Prospect Creek mining district (NW¼ sec. 28, T.21N., R.32W.), consisted of two adits, the upper one 175 ft long and the lower one driven 900 ft by 1910 (Crowley, 1963). The upper adit was caved in 1961 but the lower adit had been extended to 1,300 ft. Mineralization consisted of shear zones with sparse quartz veinlets containing pyrite, galena, chalcopyrite, and sphalerite hosted in thin-bedded argillite. The site was screened out because of poor access (at least a two-mile hike) and limited time in which to finish the inventory.

B & J Claim Iris Point 7.5-min. GR003026
The B&J was screened out because of the small size of the mine (one adit) and the remote location. The reference for it was the Welcome Creek Wilderness Study (Close, 1982). It was described as a "shear zone in argillaceous quartzite".

Babcock's Mine St. Patrick Peak 7.5-min. MN008184
This mine was reported by R. McCulloch (pers. comm., 2001) as consisting of a caved shaft and an adit on a ridge a mile north of St. Patrick Peak. The shaft is on the 6,020-ft-elevation ridge and the adit reportedly is to the northwest at an elevation of 5,600 ft. No discharges were reported by McCulloch. The workings are on a northwest-trending structure that predominates in the area.

Bagdad Mine Stony Creek 7.5-min. GR000248
This recently operated mine is in Williams Gulch, and apparently had limited access and so was not visited. It was active in 1988 when Mark V Mining was operating it. The mine was later at least partially reclaimed. It was discovered in 1893 in Precambrian quartzite and the ore was in quartz-filled shears.

Barto Thompson Pass 7.5-min. SA005258
The Barto Mine is listed in the MILS database as an antimony prospect. The Thompson Pass quadrangle shows an adit immediately north of the North Fork Clear Creek and this is assumed to be the Barto. There is a Barto adit in the Stibnite Hill Antimony deposit and this may be a duplicate site (Crowley, 1963). The only other reference to it was the USGS CRIB (Computerized Resources Information Bank) database. It is located on a dry ridge and was screened out as having little or no environmental effects on LNF-administered lands.

Bay Chief Sunset Peak 7.5-min. SA005313
Located to the northwest of Eddy Creek, this is part of the Russel Group as shown in Crowley (1963). It is a patented, private claim and so was screened out in this inventory.

Belle of the Hills Quinns Hot Springs 7.5-min. MN008462
The Belle of the Hills Mine is located on Hall Gulch, a tributary to Flat Creek, and was visited on 06/20/01 by MBMG geologists. The workings are on private claims and on LNF-administered land (although most are on private). The areas at the adits' portals have been reclaimed; all portals are dry and collapsed. One shaft had a 30- to 40-ft near-vertical highwall remaining. Pioneer Technical Services (1995) listed the site in their 1993 inventory to DSL-AMRB. They found an estimated 7,770 cu yards of waste rock with elevated metals levels but no discharges or streamside waste. In 1993, three adits and one shaft were still open.

Ben Hur Saltese 7.5-min. MN008111
The Ben Hur is on private, patented land. The general area was visited on 08/09/01. A small seep that soaked into the ground 10 ft from the collapsed portal was observed. The site had little or no impact to LNF-administered land. The mine is one associated with the Osburn Fault Zone along the West Fork of Packer Creek.

Bet Claims Cleveland Mountain 7.5-min. GR002971
This site was screened out because Close (1982) described no workings at the site. According to Close, the claims cover a gossan-capped contact zone in dolomitic rocks intruded by granite.

Betty Placer White Mountain 7.5-min. MN003312
This site was visited on 06/06/01 by MBMG geologists; it is in sec. 8, T.12N., R.24W., on the White Mountain 7.5.-min. quadrangle. A tributary of Cache Creek that enters from the northwest had been placered as observed in the steep cut banks downhill from the Cache Creek Trail No. 317, off of the South Fork of Fish Creek. The main Cache Creek showed no obvious signs of placering. It was listed as developing in 1974 (Lawson, 1975).

Big Creek Haugan 7.5-min. MN003187
This site was screened out because it was a placer, and also was an inaccurate location. The general area was driven during this inventory and no effects to LNF-administered land were noted. Wallace and Hosterman (1956) stated that this placer was mined by hand methods and probably wasn't large. Big Creek is a tributary to the St. Regis River, which it enters just east of Haugan.

Big Nugget Placer Lozeau 7.5-min. MN005963
This site was screened out because it was a placer. There were no references for it. It plots near the Meadow Creek Placer and may be the same one.

Big Springs Creek Quigg Peak or Sawmill Saddle 7.5-min. GR003144
According to Lyden (1948), the placer on this northeastward-flowing tributary to Rock Creek was only intermittently active in the 1930's. It was originally mislocated on the Stony Peak 7.5-min. quadrangle but must either be on the

Quigg Peak or Sawmill Saddle quads. It was screened out and not visited because it was a placer and had an inaccurate location.

Big Sunday Creek Adit Adair 7.5-min. MN008059
There was one discharging adit at this site which was not in the MILS database but was represented by an adit symbol on the Adair quadrangle. See the complete write-up in this report.

Black Jack Lode and Millsite Driveway Peak 7.5-min. SA005113
See Stibnite Hill Antimony Deposit.

Black Traveler Haugan 7.5-min. MN005819
This site was visited on 08/07/01 by MBMG geologists. It was referred to in Lawson (1975, 1976) as the Black Traveler and Buloring mines, a copper-silver prospect. It was an open cut, 500 ft from east to west at the largest extent. There was a 75-ft highwall. One-ft to 3-ft-deep gullies were eroded in the soft waste-rock dump. A small basin was in the center of the disturbance; it appeared as if it had seasonal runoff. A large gully was eroding waste rock into the basin. Waste rock was also washing down the slope and some mass movement was noted. The entire disturbance was barren except for scattered patches of small lodgepole pines. The bedrock had some malachite and quartz; black manganese oxide coated the gray argillite. No sulfides were seen.

Bonanza Group Landowner Mountain 7.5-min. MN003277
This site was screened out because there was only one reference to it (Lawson, 1975). Lawson stated that the Bonanza Group was being "developed" by George Gildersleeve of Superior, MT. It was located in sec. 17, T.15N., R.26W., and the accuracy was ±1 km. No workings were noted. The location is the same as the Stemwinder Placer in the MILS database.

Bonanza Lime Prospect Stuart Peak 7.5-min. MI002886
The Bonanza Lime Prospect consists of one caved adit, a 16-ft cut, and a 212-ft-long adit (Mayerle, 1983). The open (5.5-ft by 6.5 ft-portal) adit was visited by MBMG on 05/23/01; the adit trends S.80°E. It had no discharge and the unvegetated waste-rock dump was on the talus slope below the adit. Quartz and quartz-calcite veins follow a shear zone in diabase. The veins also have pyrite, and chalcopyrite, with sparse malachite and azurite blebs. One collapsed cabin was at the base of the slope. There is no obvious path to the adit from the Grant Creek trail (Trail 516T) and private land to the south inhibits visitation along the trail. The mine lies in tracts ADBA sec. 03, T.14N., R.19W., on the Stuart Peak 7.5-min. quadrangle.

Bonanza Mine Sunset Peak 7.5-min. SA004733
This mine was screened out because it had no references listed for it, and the location was ±1 km (it plotted in the middle of the section). The general area was visited and two adits were found in tract C, sec. 13; both were dry and caved. It was not determined if these were the Bonanza Mine or not.

Borax Creek Adit Lookout Peak 7.5-min. MN008087
An adit symbol is shown on the Lookout Pass 7.5-min. quadrangle in tracts ADCC sec. 04, T.19N., R.32W. It was visited on 07/13/01 by MBMG staff. One totally collapsed adit on the west side of Borax Creek was found. Remains of two timber sets marked the portal, and timbers and other lumber remained on the waste dump. The collapsed portion had a 30-ft highwall. Only siltstone was found on the waste dump; no quartz or sulfides were noted.

Boston Colby Saltese 5.5-min. MN008112
The Boston Colby was described as being "about a half mile west of Saltese between the Northern Pacific and the Chicago, Milwaukee and Puget Sound Railway tracks" (Calkins and Jones, 1914). The area was searched by driving along the old railroad grade but no remainders of the mine were found. It was reported that the workings consisted of a 900-ft adit driven S.20°W., and another 450 ft of drifts along the vein starting about 500 ft from the portal.

Boulder Gold Placer St. Patrick Peak 7.5-min. MN005855
The Boulder Gold Placer was screened out and not visited because it is a placer deposit. It plots on the St. Patrick Peak 7.5-min. quadrangle in sec. 02, T.14N., R.26W.

Boulder Placer Prospect Sawmill Saddle 7.5-min. GR003584
This is a general location, in secs. 5 and 6, T.7N., R.17W., and sec. 5, T.7N., R.18W., on the Sawmill Saddle 7.5-min. quadrangle. It is listed as a uranium, thorium, gold, niobium, and columbium prospect with an accuracy of ±1 km. It was screened out for all these reasons.

Brewster Creek Spink Point 7.5-min. GR003159
This site was screened out because it was a placer. Lyden (1948) described the yields from Brewster Creek as: 1935 - 2.5 oz gold; 1938 - total of 9 oz gold; and 1940 - one claim, 5 oz gold.

Brewster Spar Mine Ravenna 7.5-min. GR003586
This site was screened out because it had only a general location (±1 km) and it was listed as a gold, silver, fluorine, and fluorospar mine. It plotted on the Ravenna 7.5-min. quadrangle in sec. 12, T.10N., R.16W.

Bryan Saltese 7.5-min. MN003067
The Bryan Mine area was visited but the workings were on patented land, and the area was being logged at the time of the inventory (08/09/01). Calkins and Jones (1914) described the mine as consisting of three adits with a raise from the lowest one to the one above. It is associated with the Osburn Fault; the sericitic quartzite host rock is folded, crumpled, and faulted.

Buffalo Vein McGee Peak 7.5-min. MN003232
The Buffalo vein was described in Wallace and Hosterman (1956) as containing galena, chalcopyrite, and free gold, but they did not visit it. The area in which the mine is located was scanned with binoculars from Forest Route 391 but because of its small extent, no attempt was made to visit the vein. One open cut in an outcrop along the steep slope could be discerned from the ridge road.

Bullfrog Thompson Pass 7.5-min. SA005348
The Bullfrog Mine consisted of at least one adit that was 580 ft long and another adit that was started prior to 1963 (Crowley, 1963). A water-filled winze is described located about 70 ft from the portal. The adit was driven N.75°W., near the Idaho-Montana border at the head of a tributary to Summit Creek. The site was not visited because of the poor access and limited time to do the inventory. The site was estimated to have little to no effects to LNF-administered land.

Buster and JB Claims Wilson Gulch 7.5-min. MN006083
These claims were screened out because of an inaccurate location in the MILS database and no other references to it. MILS plotted it in sec. 21, T.17N., R.27W. There are no roads into this section and no indication of where to look for the claims.

Cajun Queen Illinois Peak 7.5-min. MN008142
The Cajun Queen was located in a small tributary to Mary Ann Gulch in the Cedar Creek mining district, and was visited on 08/22/01. It may have originally been a part of the Silver Streak claims. There was a 100-ft by 100-ft cut with 40-ft highwalls. The cut appeared as if the mining was trying to trace a shear zone. The rocks were chalky white with quartz veins, a trace of malachite, and local minor iron staining. A cabin lay to the east. A bulldozer, large compressor, 55-gallon drums of iron balls, 5-gallon buckets, and a ball mill and shaker table were abandoned at the site. “John Kraemer, 1980, Cajun Queen #1” was written on a location notice near the cabin. The site is shown by a prospect symbol and a cabin symbol on the Illinois Peak 7.5-min. quadrangle.

Calumet Lozeau 7.5-min. MN008191
The Calumet was a placer on Quartz Creek active in 2001 (R. McCulloch, pers. comm., 2001). It was not visited or inventoried.

Cedar Creek Placer Mines Superior 7.5-min. MN006059
This site was initially screened out because it was a placer. It is also the general location of a large placered stretch along Cedar Creek and included many individual placers. The area has been mined since 1869 and has produced at least $2,000,000 in gold (Lyden, 1948).

Cherry Creek Mine Penrose Peak 7.5-min. SA005303
This mine plotted in sec. 24, T.20N., R.29W., but no access was found to it. It was not visited because of the lack of time and resources. The only reference to it in the MILS database stated that it was a copper mine.

Chickaman Mine Blue Mountain 7.5-min. MI005527
The Chickaman Mine is located on private land and is surrounded by Plum Creek Timber Company land and so was not visited as a part of this inventory. It is on the Blue Mountain 7.5-min. quadrangle in sec. 35, T.12N., R.21W. It originally consisted of three adits in argillite with oxidized ore consisting of quartz, limonite, malachite, and "copper pitch" (Sahinen, 1957). No production records were found. A stock certificate in the MBMG mineral property files listed the company as the "Lo Lo Chickmain Mining Company".

Cinkers Mine Illinois Peak 7.5-min. MN005831
The Cinkers Mine was visited on 08/22//01 by MBMG geologists. No workings were found except for placer spoils. Two cabins, one stone and one wooden frame, both in good condition, were near Forest Route 320.

Cleveland Cleveland Mountain 7.5-min. RA002354
The Cleveland Mine is located in tracts ACAB, sec. 23, T.10N., R.18W., and was visited on 05/24/01 by MBMG staff. Two caved adits were located; one had a 10-to 20-ft highwall. One adit was estimated at greater than 100 ft original length and the other approximately 50-60 ft total length. There was abundant white quartz on the waste-rock dump with minor sulfides and oxides. All workings were caved and dry.

The Cleveland is described in MBMG Bulletin 8 (Sahinen, 1957) in the Eightmile District in an argillite with quartz, limonite, specular hematite, magnetite, with some carbonate. Close (1982) included one trench and three caved adits within the mine site. Geology was described in the USBM-MLA report as "northeast-trending fracture zone with quartz veins and pods in quartzite and argillite".

Coeur d'Alene Star Mine Sunset Peak 7.5-min. SA005208
Located in secs. 12 and 13, T.20N., R.28W., this mine is referenced in Crowley and others (1961) and listed as developing for lead and silver. It was screened out because of its inaccurate location.

Coffee Pot Lode St. Patrick Peak 7.5-min. MN003327
This site is located in sec. 17, T.14N., R.25W., as noted in Lawson (1975), although the data in MILS incorrectly plotted it in sec. 18. The site has been visited by MBMG staff, Dick Berg and Robin McCulloch, at different times. Mineralization includes beryl, rutile, a yttrium phosphate, quartz and siderite in veinlets in a Belt quartzite (Dick Berg, pers. comm., 2001). The workings consist of an open cut along the road. It has been active since 1999 and was active in 2001 at the time of this study. There are no effects to LNF-administered land.

Cooper Creek Thompson Pass 7.5-min. SA005358
According to Crowley (1963), the Cooper Creek Mining Company worked three adits that were caved at the time. They were located along the Thompson Falls-Burke, Idaho, road near where the powerline crosses. Alternate names included the Copper Creek or Cooper Creek claims, or the Monte Cristo and King group. The site was screened out because of the small nature of the described workings (a 100-ft long drift along a ledge). Gilbert (1935) described an 800-ft adit.

Copper Gulch Mine Lookout Pass 7.5-min. MN008099
This mine consisted of a single discharging adit and waste-rock dump. See the main text of this report for the summary.

Copper King Mine Lupine Creek 7.5-min. MN005939
Most of these workings are on private land although a small amount of disturbance could be on LNF-administered land. The mine is visible immediately north of Forest Route 343, the South Fork Fish Creek Road. It is in sec. 10, T.12N., R.24W., on the Lupine Creek 7.5-min. quadrangle. The equipment is from a fairly recent operation (early 1990's), the area is posted with "no trespassing" signs, and no activity was noted at the time of this visit on 06/06/01.

Copper King / Mascot Eddy Mountain 7.5-min. SA005393
This mine is on two patented claims on the northwest side of the Thompson River immediately south of the Copper King campground. All disturbances were on private land. No effects to LNF-administered land were noted. See Crowley (1963) for a summary of this site.

Copper Prospect Stuart Peak 7.5-min. MI002898
This site was screened out in the office based on the description in Mayerle (1983). It was also described in Wallace and Lidke (1980). The commodity was copper-silver; no workings were described at the site. It plots in sec. 06, T.15N., R.18W., on the Stuart Peak 7.5-min. quadrangle.

Copper Rock Mine De Borgia North 7.5-min. MN005807
The Copper Rock Mine was not visited as a part of this inventory because of a lack of access. It plots in sec. 1, T.19N., R.30W., less than a quarter mile north of Goat Mountain, and southeast of Cameron Peak. No roads lead to the area. The only mention of it is in Wallace and Hosterman (1956) where it is described as being associated with the Osburn Fault.

Coppersmith Mine Petty Mountain 7.5-min. MI005695
The Coppersmith Mine is entirely on private land north of Eds Creek and so was screened out in the office. Sahinen (1957) described the Coppersmith as a small site with one adit and a small waste-rock dump driven in greenish-gray argillite. Minerals on the dump included quartz with some limonite.

Crown Silver Group Saltese 7.5-min. MN005967
The Crown Silver Group was screened out because of a lack of references to it and inaccurate location. It tentatively plotted on Dominion Creek south of Taft.

Crystal Lake Mine McGee Peak 7.5-min. MN008130
This site was visited because of local accounts of mines in the area. No references were found for the mines and it was not originally in the MILS database. One discharging adit was found and sampled. Several other adits were caved and dry. See the main text of this report for the summary.

Daisy Creek Prospect Richards Peak 7.5-min. SA008001
The Daisy Creek prospect was the subject of Stanley's (1984) M.S. thesis, written in conjunction with the Anaconda Minerals Company. He briefly describes the property as being in sec. 30, T.24N., R.27W., and latitude 47°48' and longitude 115°06'. It is a stratabound Cu-Pb-Ag occurrence in Bonner Formation (Belt - Missoula Group) quartzites. Stanley described the workings as "several small, barely recognizable pits".

The site was screened out and not visited because it consisted of prospect pits only. It was last worked in the 1930's and then was explored by the Anaconda Minerals Company in the early 1980's.

Darby Mining and Milling Keystone Peak 7.5-min. MN003372
This site was screened out because of the inaccurate location (±5 km). The only reference is vague (Gilbert, 1935); it may be a duplicate of the Hopkins or Little Anaconda mines. It is described as 2,000 ft of workings on unpatented claims three miles east of Keystone.

Deadwood Gulch Prospect Keystone Peak 7.5-min. MN003192
This site was visited on 07/09/01 by MBMG geologists. Three open adits and a caved shaft were found north of Deadwood Gulch, a tributary to Slowey Gulch. One adit was less than 10 ft long; it trended due east. Another adit was open with some sloughing at the portal; it trended S.80°E. The opening was 4 ft high and 8 ft wide. It was driven in sheared phyllite with quartz boudins. The waste-rock dump was adjacent to the creek but there was no real contact between the two. Also, there was a small seep area near the portal but there was not enough water to sample. There was standing water in the adit and the adit was open at least 30 ft. A road led up to a third, upper adit near the top of the ridge. It trended N.50°E., and was partially open but caved at the portal near the timber and lagging. This adit was dry and was intact (4 ft wide by 6 ft high) past the 3-ft by 4-ft opening. The site was accessed only by foot, up the overgrown road from the switchback on Forest Route 389. Campbell (1960) described the geology and workings at the Deadwood Gulch prospect.

Deep Creek Landowner Mountain 7.5-min. MN003197
This site originally referred to a placer but only lode mines were found in the area. Lyden (1948) described the placering in conjunction with the more extensive work done along Trout Creek and Windfall Creek. The source of the gold according to Lyden was the gold-bearing veins of the lode mines.

A major adit along Deep Creek was visited on 08/23/01. It trended N.70°E. The portal was totally collapsed with boards marking the former entrance. The waste dump was not in contact with the creek. Several other adits and prospects were both northwest and southeast of the largest adit; they were all collapsed. The site is represented by an adit symbol on the Landowner Mountain 7.5-min. quadrangle in AABA sec.23, T.15N., R.27W.

Deer Creek Placer McGee Peak 7.5-min. MN003207
This property was described as encompassing almost the entire length of Deer Creek, which flows into the St. Regis River west of De Borgia (Lyden, 1948). No workings were exactly located in the area but Wallace and Hosterman (1956) described it being worked by hand, with “large piles of hand-sorted boulders” reflecting the difficulty of mining in the area. They stated that placer claims were patented on Deer Creek, but no patented land is shown on the Forest Service map. Lyden (1948) also states that 9 lode claims were staked near the head of Deer Creek. The area was not inventoried because it is a placer and the location was inaccurate (±1 km). It was, however, visited in reaching the mines in the upper end. Incidently, large boulder piles were seen along the drainage but no environmental problems were noted.

Diamond Mountain Gravel Frenchtown 7.5-min. MI002796
The Diamond Mountain gravel quarries are located in sec. 3, T.14N., R.21W., on the Frenchtown 7.5-min. quadrangle. The site was screened out in the office because the commodity was gravel and it was on private land.

Dillon Millsite Quinns Hot Springs 7.5-min. MN008463
The Dillon millsite was visited on 06/20/02 by MBMG geologists. A hazardous ore bin and a steep waste-rock dump were on the west side of Forest Route 194; the mill foundations and a partially open adit were on the east side. The adit had cold air blowing from it. The structures and workings were on private, patented land. Hall Gulch was not flowing at the time of the inventory. Pioneer Technical Services (1995) sampled the waste rock in 1993. They estimated the volume of the waste rock to be 3,000 cu yards; elevated levels of arsenic, copper, manganese, antimony, cadmium, mercury, lead, and zinc were found.

Dry Creek Mine Wilson Gulch 7.5-min. MN005795
This site was screened out because, according to Robin McCulloch, MBMG, it consisted of trenches only, with some copper oxides. There were no other references to it. The prospect plots in sec. 28, T.17N., R.27W.

Dry Fork - Dry Creek Wilson Gulch 7.5-min. MN008180
This site had no access because of private land between it and Forest Route 342. It was added to the database because of the adit symbol that was shown on the topographic map. It is in tract D sec. 27, T.17N., R.27W.

East Coeur d'Alene Mine Haugan 7.5-min. MN005811
The East Coeur d'Alene Mine was visited on 08/10/01 by MBMG geologists. A 10-ft by 10-ft by 25-ft deep shaft was found west of Savenac Creek. It was about 15 ft north of the Hawk Mountain Trail and was accessible only by foot. It was dry with no streamside waste, but was considered potentially hazardous.

East Coeur d'Alene Mine Keystone Peak 7.5-min. MN00 3212
This site was screened out because the location was very general (in sec. 01, T.17N., R.27W., and also in T.18N., R.26W.). The only reference to it was the USGS CRIB database.

East Fork of Brewster Creek Spink Point 7.5-min. GR008063
This millsite was not in the MILS database. Tailings were in contact with the creek, so the creek was sampled upstream and downstream. The complete description is in the main text of this report.

Eddy Creek Mine Sunset Peak 7.5-min. SA001344
This site was screened out because it had an inaccurate location and it may be a general description. According to Crowley (1963), there was an "Eddy" mine but the report does not give an exact location. It may be a duplicate of the mine owned by the State Mining Company that operated in the 1970's (unpublished MBMG mineral property files).

Edelman Mine Spink Point 7.5-min. GR008108
The Edelman Mine is shown by a shaft symbol on the Spink Point 7.5-min. quadrangle but a shaft could not be found where it was plotted. A cabin and a shed were still standing. An old ditch extends uphill from the cabin, and boards along it appear to be a part of an old flume. The mine may have been a placer and piles of slightly rounded river rock (placer spoils?) may have been mistaken for a shaft by the map makers.

Eileen Marsha Placer Mine McCormick Peak 7.5-min. MI005455
This site was screened out because it was a placer. Crowley and others (1961) described it as being in the Nine Mile district in sec. 2, T.16N., R.23W., and developing by Earl Dotson of Hermosa Beach, CA.

Elda Lode Driveway Peak 7.5-min. SA005078
See Stibnite Hill Antimony Deposit.

Eliza Lode Driveway Peak 7.5-min. SA005128
See Stibnite Hill Antimony Deposit.

Ellen M. Claims Cleveland Mountain 7.5-min. GR002986
The Ellen M. Claims were inventoried on 05/24/01. Workings consisted of trenches only, with at least 26 excavations along ¼ mile of Cooney Ridge/Cleveland Summit trail. Close (1982) wrote a short description inferring a northeast-trending silicified zone and describing the workings as "fourteen pits and trenches".

Ellis Lode Driveway Peak 7.5-min. SA005118
See Stibnite Hill Antimony Deposit.

Eureka Lode Driveway Peak 7.5-min. SA005123
See Stibnite Hill Antimony Deposit.

Excelsior Lode Driveway Peak 7.5-min. SA005038
See Stibnite Hill Antimony Deposit.

F.D. Placer White Mountain 7.5-min. MN005971
This site was visited on 06/06/01 by MBMG geologists; it is in sec. 17, T.12N., R.24W., on the White Mountain 7.5-min. quadrangle. A tributary of Cache Creek that enters from the northwest had been placered as observed in the steep cut banks downhill from the Cache Creek Trail No. 317, off the South Fork of Fish Creek. The main Cache

Creek showed no obvious signs of placering; evidence may have been naturally masked by erosion. The MILS database had no references for the site. It is close to, or is the same as, the Betty Placer.

Favorite Gulch Mine McCormick Peak 7.5-min. MI002610
This site was screened out because of the lack of access. No references could be found for it; it was located from the symbol on the topographic map.

Favorite Lode Driveway Peak 7.5-min. SA005098
See Stibnite Hill Antimony Deposit.

Fishtrap Quarries Fishtrap Lake 7.5-min. SA005198
This site was screened out because it is an ornamental stone quarry with little or no effects on LNF-administered land. It is shown as a quarry symbol near the Fishtrap Campground and Work Center on the Fishtrap Lake 7.5-min. quadrangle in sec. 26, T.24N., R.28W. It was listed as producing in 1970 and 1974 (Hanson and others, 1970; Lawson, 1975).

Four V's Claims Lolo Hot Springs 7.5-min. MI005603
The commodity for this group of claims is listed as smokey quartz (Hansen and others, 1970). The site is considered as being unlikely to impact LNF-administered land. The accuracy is ±1 km and so the location is relegated to sec. 22, T.11N., R.24W., on the Lolo Hot Springs 7.5-min. quadrangle.

Frances Copper Mine Knowles 7.5-min. MI006019
This mine was inventoried and sampled on 06/07/01. Three large waste-rock dumps were eroding and a small pond had a discharge to St. Louis Creek. A small seep emerged from the toe of one of the dumps. The write-up is in the main text of this report.

Freezeout Creek Placer Illinois Peak 7.5-min. MN00 8151
This site was visited on 08/22/01 by MBMG geologists. It was a fairly large placer at one time with banks 4- to 10-ft high. Many of the side drainages were placered. The prospect marked on the map is a small pond formed by placering. It was less than 1 ft deep and was 10 ft by 25 ft wide; no effects were noted to LNF-administered land.

Frenchman's Prospect Northeast Missoula 7.5-min. MI002892
This mine lies up the westernmost fork of Spring Gulch in sec. 14, T.14N., R.19W., on the Northeast Missoula 7.5-min. quadrangle, just off a trail (actually an old road) starting at the Rattlesnake Creek recreation area. One open, hazardous shaft, approximately 35-ft deep occurs on the hillside above the lower workings. It is inclined approximately 65° to the west and the shear zone exposed in it trends N.25°W. The opening is about 10 ft by 10 ft. There were also overgrown pits, trenches, and a collapsed adit at the site. The small drainage to the east had a small intermittent flow of water when visited 05/22/01. Mayerle (1983) described the geology as quartz lenses in argillites and quartzites. This report describes a caved 50-ft adit, a 35-ft deep shaft, 5 cuts, 1 trench, and 2 pits.

Galligar Mine Saltese 7.5-min. MN003202
The Galligar Mine is located north of Route 288, north of Saltese on private land. One collapsed, dry adit was found adjacent to the road on 08/07/01. Reference to the Galligar was in Wallace and Hosterman (1956).

Gildersleeve (Bonanza Group) Mine Illinois Peak 7.5-min. MN003222
This property consists of still-active claims held by the Gildersleeve family.

Gildersleeve Barite Prospect Illinois Peak 7.5-min. MN008149
The barite prospect was visited on 08/22/01 by MBMG geologists. This is also referred to as the Freezeout Creek barite. It consisted of one long cut or trench, about 275 ft long with another trench 75 ft to the north. A 30-ft highwall was on the west side. The rock was a micaceous argillite with traces of green copper oxide, barite, oxidized pyrite cubes, and 1- to 3-ft veins. Locally, 1-inch veins had iron oxides on the edges (after sulfides) and quartz (and

possibly barite) in the center. Veins were sometimes broken and contorted. A large fold was exposed in the west wall of the cut. The site was dry and had no effects on LNF-administered land.

Gildersleeve Placer Illinois Peak 7.5-min. MN005983
This site was screened out because it was still active, mostly private, and was a placer. The general area was visited and no effects to LNF-administered land were noted.

Gold Bug Spink Point 7.5-min. GR003451
The Gold Bug was visited by MBMG geologists on 10/19/00. It had open shafts and several collapsed or mostly collapsed adits, but no environmental concerns. One shaft or raise was 50 ft deep, had a 6-ft by 6-ft opening, was steep sided and unfenced; a second shaft or raise that was 20 ft down the hill was only 30 ft deep but had a 20-ft by 20-ft opening, was steep sided and unfenced. A partially collapsed log cabin with "Gold Bug No. 2" on the door was near one of the collapsed adits.

Gold Crown Torino Peak 7.5-min. MN005915
Wallace and Hosterman (1956) show the Gold Crown as an open pit on Jordan Creek (a tributary to the South Fork of Little Joe Creek) on the map accompanying their report. They do not describe it in the text. It was screened out because of the probability of its being a small open pit or prospect. It is hosted in Precambrian Wallace Formation.

Goldbug (Tawney) Mine De Borgia South 7.5-min. MN006039
The Goldbug or Tawney Mine was active in 1974 (Lawson, 1975) and 1975 (Lawson, 1976) but the only location described was in sec. 04, T.17N., R.29W. The general area was visited and the only mine found in sec. 04 was the New Lenore. The Goldbug (Tawney), the New Lenore, and the Lucky Strike Mine may actually be the same site.

Gold Mountain Mines Landowner Mountain 7.5-min. MN006027
This site was visited on 08/23/01 by MBMG staff. No open adits or environmental problems were noted. Three adits and other prospects were found. They generally trended N.50°W. to N.70°W. The host rock was an altered diorite dike with locally intense iron staining. A totally collapsed adit was north of (practically on) the road and a second adit was directly above it. A recent claim notice was nailed to a tree in a plastic bag, but it was not affixed so it could be removed and read. The upper, collapsed adit (or open cut) had a large pile of rock from an exposed quartz vein on the dump. Quartz veins contained pyrite and were heavily iron stained (with "cube iron"). There was one old ore car and some iron tracks at the third, lowermost adit (downhill from the road). All workings were completely collapsed and dry.

Memoir 15 (Gilbert, 1935) listed the property under the name "Gold Hill Mine" as well as Gold Mountain Mines, Inc. At that time, the property consisted of a 400-ft adit and open cuts. The mill used the amalgamation process with a Wilfley table for concentration. Gold Mountain Mines was noted in MBMG Memoir 31 (Trauerman and Reyner, 1950) when it consisted of 1,000 ft of tunnels and two open pits. It also had a 50-ton-per-day flotation mill associated with it and was last operated in 1939. According to Trauerman and Reyner (1950), the mine was originally located in 1904 and was acquired in 1931 by Gold Mountain Mines, Inc. The gold and silver ore was contained in the pyrite.

Gold Prospect Northeast Missoula 7.5-min. MI002598
This site was screened out in the office because of the lack of any references to it, and because it is only a prospect. It plotted on a ridge in sec. 13, T.14N., R.19W., on the Northeast Missoula 7.5-min. quadrangle.

Gold Prospect Northeast Missoula 7.5-min. MI002904
A line of prospect pits and trenches have been dug along the ridge between Sawmill Gulch and Spring Gulch in sec. 35, T.14N., R.19W., on the Northeast Missoula 7.5-min. quadrangle. All are shallow and dry and are dug in argillite with minor quartz veins.

Granite Hot Springs (Lolo) Lolo Hot Springs 7.5-min. MI006007
This site is a commercial hot springs and is on private land. It was screened out and not visited as a part of the USFS abandoned and inactive mines program. The three springs are on the Lolo Hot Springs 7.5-min. quadrangle in sec. 7, T.11N., R.23W.

Green Mountain Mine Penrose Peak 7.5-min. SA005783
Located in T.20N., R.28W., in the Rock Island mining district according to Geach and others (1966), this site was screened out because of the inaccurate location. There is a Green Mountain patented claim in the Russel Group on the boundary between the Penrose Peak 7.5-min. quadrangle and the Sunset Peak 7.5-min. quadrangle in sec. 14. It is on private, patented land.

Happy Boy Prospect Driveway Peak 7.5-min. SA005363
The Happy Boy could not be located. It was described in Crowley (1963) as consisting of two adits in the NW¼ sec. 33, T.21N., R.31W. The adits were 275 ft (upper) and 150 ft (lower) long.

Harvey Creek Placer Harvey Creek 7.5-min. GR003174
The Harvey Creek Placer has been intermittently worked. There was some production prior to 1904 and then further work was done in the 1940's (Trauerman and Waldron, 1940). It was not visited because of the small nature of the deposit and because it was a placer. It plots on the Harvey Creek 7.5-min. quadrangle in sec. 23, T.10N., R.15W. It is on Lolo National Forest-administered land but is administered by the Beaverhead-Deerlodge National Forest.

Hauttula Prospect McCormick Peak 7.5-min. MI005511
This site was visited by MBMG geologists on 10/15/01. It was described by Sahinen (1957) as being a copper prospect about a half mile upstream from the Lost Cabin Group. The adit was originally 150 ft long. A log cabin, one collapsed adit, and an iron-stained, gray argillite waste-rock dump were located.

Hemlock Mine Saltese 7.5-min. MN003072
The Hemlock Mine or prospect is located on private land but is very close to LNF-administered land on the West Fork of Packer Creek. It was accessed by driving south on Forest Route 6216 from Forest Route 7759 in the Last Chance/Ben Hur Mine area. As viewed from LNF-administered land, the shaft was mostly caved but a 10-ft-deep working remained. The road was blocked at the mine's waste-rock dump.

Hidden Treasure Mine Spink Point 7.5-min. GR000044
The Hidden Treasure Mine was visited by MBMG geologists on 10/18/00. It was listed as a group of 15 patented claims containing 4 tunnels operated by the Alps Mining and Milling Company (Trauerman and Reyner, 1950). An open adit with a portal 6 ft high and 4 ft wide was accessible along the Forest Service Road 17770. It extended back at least 40 ft, had a few collapsed timbers on the sill, and was dry. The waste-rock dump had quartz veining with limonite stain. The area had numerous other adits, pits and trenches.

Highbar Placer Lozeau 7.5-min. MN005863
This site was screened out because of its inaccurate location in the USBM MILS database (±5 km), it plots outside of the Forest boundary, the only reference is USGS CRIB database, and it is a placer gold deposit.

Holliday Northeast Missoula 7.5-min. MI002658
The Holliday Mine is described in Sahinen (1957) as consisting of shallow pits and trenches on the divide east of Grant Creek. The assay by Sahinen included trace gold, 1 ounce per ton silver, 4.7 percent lead, and 1.1 percent zinc from a white quartz/galena vein in argillite. The mine was screened out because of the minor nature of the workings and the ridgetop location. It plots in sec. 22, T.14N., R.19W., on the Northeast Missoula 7.5-min. quadrangle. It may be the same as Unnamed Prospect MI002910.

Hopkins Mine Quinns Hot Springs 7.5-min. MN005843
The Hopkins Mine is on private, patented land and was screened out of the inventory. The general area was visited on 06/20/01. Four open adits (15 ft to 30 ft long) were adjacent to Forest Route 97 (Pardee Creek Road) and were

easily visible. It is unknown if these adits are the same property as the Hopkins Mine. The Hopkins was described as a 2,000-ft tunnel and a 500-ft shaft (Trauerman and Reyner, 1950).

Hoodoo Mine Saltese 7.5-min. MN005899
The location of the Hoodoo Mine is shown on Wallace and Hosterman's plate 48 (1956), but no other references to it were found. It was screened out because there was no access up the drainage in which it was located.

Hub Lake Mine McGee Peak 7.5-min. MN008137
The Hub Lake Mine is on the slope above the western shore of Hub Lake. The site was visited by MBMG geologists 08/20/01 by hiking about 3 miles on Trail 280A. It consists of a single, open adit trending N.82°W. and was estimated to be about 200 ft long. The portal was 5 ft wide by 6 ft high. The adit was easily visible from the trail. There was no discharge, but there was some standing water inside the adit. The waste-rock dump was partially revegetated and was near, but not in contact with, the drainage or the lake. The dump did not seem large enough to represent the excavated rock from the mine. Part of it may have been eroded by avalanches. The host rock is gray quartzite with minor, thin (<1 inch) quartz veins. A large fold and faults could be seen on the hillside uphill from the mine.

Hungary Gulch Mine Landowner Mountain 7.5-min. MN008193
The general area that is marked with an open-pit symbol on the Landowner Mountain 7.5-min. quadrangle in sec. 14, T.15N., R.27W., was visited on 08/23/01. Ruins of a cabin are located near the spring in the drainage along with some black plastic pipe. The drainage was walked up to an elevation well above where the open pit symbol was marked and no disturbance was noted. No environmental effects were noted.

Hungry Horse and Big Dipper Placer Cleveland Mountain 7.5-min. GR003011
This site was screened out because of its description by Close (1982) as "two recent discovery pits and numerous older placer workings".

Ida A. Placer McCormick Peak 7.5-min. MI005491
This site was screened out because it was a placer. Lawson (1975) described it in the Nine Mile district in sec. 15, T.16N., R.23W. It was listed as producing in 1974.

Idaho-Montana Mining Company Thompson Pass 7.5-min. SA005293
This site was screened out because it had no references to it in the MILS database. It was listed as an antimony occurrence. The accuracy was ±1 km. It was included in the Prospect Creek mining district.

Illinois Peak Adits Illinois Peak 7.5-min. MN008141
This area was visited on 08/21/01 by MBMG geologists. Prospects and at least five adits are scattered in the basin and along the ridge at the head of Illinois Gulch. One had a discharge but there was not enough volume to sample. Three adits were totally caved, one had a 1- by 1-ft opening, and another had a 4- by 5-ft opening and was 15 ft long. The waste-rock dumps were blocky and not visibly eroding into the drainage. No environmental problems were noted. The adits were driven into green-gray quartzite with oxidized pyrite cubes disseminated. Quartz veins ranged from ½ inch to 4 inches wide.

Index Granite Prospect Stuart Peak 7.5-min. MI002880
This site was screened out because no workings were associated with the prospect (Mayerle, 1983). It was described as being in a 300-ft-thick "fractured diabase dike". It plotted in sec. 27, T.15N., R.19W., on the Stuart Peak 7.5-min. quadrangle less than a mile northeast of the Missoula Snow Bowl ski area.

Iron Daisy Driveway Peak 7.5-min. SA005368
The Iron Daisy was visited on 10/18/01 by MBMG geologists. Three old cabins south of the adit were in poor condition and were originally of board-on-board construction. The mill building had totally collapsed. There were four lobes to the waste-rock piles from the adit. The adit trended about N.76°W. There was white quartz on the waste-rock dumps with trace amounts of pyrite. Workings here consisted of a 60-ft shaft, and four adits from 200 ft

to 1,800 ft long (Crowley, 1963). It was operated by the Princess Mining Company and the Thompson Falls Mining Company. The host rock was described as the Prichard Formation argillite. Mineralization included milky white quartz veins with “clusters” of galena, sphalerite, and pyrite.

Iron Mountain Idaho Gulch 7.5-min. MN003227
The Iron Mountain Mine was one of the larger producers in the Lolo National Forest. Most of the property is on private, patented claims so upstream and downstream samples were taken on Flat Creek. See the main text for the complete write-up.

Jack Boyd Mountain 7.5-min. MN006067
This site was screened out because of its inaccurate location (±1 km). According to the USBM MILS database, it plots in the middle of sec. 19, T.18N., R.28W., but has no other information about it.

J. Jay No. 2 Claim Elk Mountain 7.5-min. GR002976
This site was screened out in the office because it was described in Close (1982) as consisting of seven pits and trenches and a caved shaft. It is in the Welcome Creek Wilderness area. The commodity was listed as gold and silver.

Janstan Group Thompson Pass 7.5-min. SA004693
This site was screened out because of the inaccurate location and lack of references to it. It plots from the location listed in the MILS database in an area with no access. Possibly, it may actually be the prospects shown on the Thompson Pass quadrangle in sec. 12, T.21N., R.32W.

Johnny Miller Sunset Peak 7.5-min. SA005088
The Johnny Miller was sampled by MBMG staff. See the main text of this report for the summary.

Josephine Mine Stark North 7.5-min. MI005551
The Josephine Mine consists of a shaft in sec. 4, T.16N., R.23W. It was not visited because of lack of public access. It is entirely on LNF-administered land but the road along Josephine Creek is private. R. McCulloch, MBMG, reported no environmental problems associated with the mine.

Jumbo Mine Spink Point 7.5-min. GR000086
The Rainy Day Mine and the Jumbo were found in close proximity to each other and may have been considered the same at times. There were numerous adits in the area and evidence of prospecting as recently as 1987. The mine is labeled on the Spink Point 7.5-min. quadrangle. It was visited by MBMG geologists on 10/18/00. They identified a millsite (associated with the Rainy Day?) and several open or partially open adits as well as collapsed adits.

Juniper Prospect Blue Point 7.5-min. MI002952
The reference for this site is USBM OFR-MLA 79-83 which described it as an 18-ft-long adit with minor copper mineralization (Mayerle, 1983). Mineralization was in quartz veins in quartzite and argillaceous quartzite. An assay from Mayerle (1983) ran 0.001 percent copper. It was not visited because of access problems and the small nature of the workings.

K & K Mine McGee Peak 7.5-min. MN003282
The K & K Mine was described as being in sec. 22, T.18N., R.30W. (Lawson, 1975, 1976), in the Deer Creek mining district. No other references to the mine were found. MBMG geologists were unable to find any evidence of the mine.

Keith Property Boyd Mountain 7.5-min. MN003182
Visited on 07/10/01, one caved adit and on open cut on a hillside were found. The open cut was about 150 ft long exposing rubbly colluvium and gray argillite. An adit trending N.62°W. was cut into the hillside; it was totally caved. There was a small, damp, marshy area less than 5 ft in diameter at the base, but no flowing water was seen.

Kendoy Quinns Hot Springs 7.5-min. SA001302
This site was screened out because it was a graphite deposit, the location accuracy was ±1 km, and no references could be found for it besides the MILS database.

Kennedy Creek Mines McCormick Peak 7.5-min. MI005587
This site was screened out because it is a general location for several individual mines in the area.

Keystone Adit Keystone Peak 7.5-min. MN008032
This unnamed adit was found during the inventory of the Keystone mining district. The 3- by 6-ft portal was open but has some sloughed rock partially blocking it. The original size of the tunnel was about 8 ft wide and 6 ft high. There was standing water in the adit but no discharge. There was a small damp spot in front of the adit. It lies to the southeast of Keystone Creek, almost a mile past the Forest Service gate on the road. The adit was driven about east-southeast and was still open an estimated 75 ft in. No quartz vein or sulfides were noted; the host rock was a kinky schist. This adit may have been worked by the same company as the ones farther up the drainage (Upper Keystone), but no references could be found to substantiate this.

Last Chance Torino Peak 7.5-min. MN005987
This site was screened out because it had an accuracy of ±5 km and the only reference to it was a USBM production file. The commodity was listed as gold.

Last Chance Saltese 7.5-min. MN003337
This site was sampled as a part of this inventory and the summary is in the main text of this report.

Lawyer's Combination Camp Creek 7.5-min. MI005523
The Lawyer's Combination is described in MBMG Bulletin 8 (Sahinen, 1957) as developed by a 40-ft vertical shaft and three adits (35 ft, 130 ft, and a lower one of unknown length). Summarizing from this report, ore was shipped in 1916, 1917, and 1922 producing an unknown amount of copper and silver. Mineralization consisted of milky quartz, limonite, malachite, chalcocite, chalcopyrite, and pyrite, with some ankerite and calcite.

The mine was not visited because of the private land to the south. A minor amount of the mining disturbance may be on LNF-administered land but the majority is on private land.

Lime Kiln Prospect Northeast Missoula 7.5-min. MI002862
The Lime Kiln prospect was referenced in Mayerle (1983) and consisted of a 33-ft cut and a lime kiln. It was screened out in the office because the commodity was lime and the working was a small pit. It plots in sec. 16, T.14N., R.18W., on the Northeast Missoula 7.5-min. quadrangle.

Limestone Prospect Blue Point 7.5-min. MI002958
This site was screened out in the office based on the description in Mayerle (1983). The commodity was limestone, and there were no workings. It plots in sec. 34, T.14N., R.18W., on the Blue Point 7.5-min. quadrangle.

Little Anaconda Quinns Hot Springs 7.5-min. MN006099
This group of mines is also partly on the Keystone Peak 7.5-min. quadrangle. The workings are on private, patented claims and have little or no effects on LNF-administered land. Pioneer Technical Services (1995) found one discharging adit and waste-rock dumps that were eroding into the small unnamed tributary to Pardee Creek. The volume of the waste-rock dumps was 9,230 cu yards; elevated levels of arsenic, cadmium, copper, mercury, nickel, barium, cobalt, iron, manganese, and lead were found in the waste. Campbell (1960) described the group as consisting of two adits and one shaft. Production was recorded for 1942 and 1952, and totaled 138 short tons. The mines were driven along veins in the Belt Wallace Formation's argillite and quartzites. Minerals from the vein included "pyrite, galena, sphalerite, and chalcopyrite in a gangue of quartz, barite, and minor amounts of calcite."

Little Comet Lode Driveway Peak 7.5-min. SA005133
See Stibnite Hill Antimony Deposit.

Little Joe Creek Placer Boyd Mountain 7.5-min. MN006071
This site was screened out in the office because it is a placer. Lyden (1948) described it as being 8 miles southwest of St. Regis. There was no recorded production.

Little Pittsburg Mine Keystone Peak 7.5-min. MN003242
The Little Pittsburg Mine was screened out because it is on private land. Campbell (1960) published the mine description and a map of the workings. It includes the Keesey Tunnel. Gilbert (1935) described the workings as consisting of "6,000 ft of drifts and crosscuts, 90 ft of raises, 60 ft of winzes".

Looks Grim Prospect Stuart Peak 7.5-min. MI002868
The Looks Grim prospect was visited on 05/23/01 by MBMG staff. The 202-ft adit, as described by Mayerle (1983), could not be located. The area was searched but only the caved 22-ft adit, the surface cuts, and old overgrown roads were located. An argillite (almost a schist) outcrop with quartz vein on the ridge marks the trend of the workings. The prospect lies on the Stuart Peak 7.5-min. quadrangle in BACC sec. 03, T.14N., R.19W.

Lost Cabin Group McCormick Peak 7.5-min. MI002496
This site was visited by MBMG geologists on 10/15/01. Two collapsed adits and one large streamside waste-rock dump were found. The adits trended N.56°W. and S.75°W. The waste rock was iron-stained gray argillite. The waste-rock dump along Kennedy Creek was about 100 ft long. The site was sampled by Pioneer Technical Services (1995) in 1993. Their sampling found no MCL/MCLG exceedences and no observed releases of metals in the surface water. They did find that the acute and chronic aquatic life standards for copper were exceeded. Stream sediment sampling also showed releases of copper, mercury and lead that were attributable to the site.

Lost Gulch Placer Wilson Gulch 7.5-min. MN005979
This site was screened out because it was a placer and was determined to have little or no effects to LNF-administered land. Robin McCulloch (MBMG) described the site and associated it with two parallel northwest-trending structures the run through the area. He described it as "Wagner's Placer". It is located in sec. 24, T.16N., R.28W.

Lower Letterman Plains 7.5-min. SA005068
This site is a part of the Letterman or Montana Premier Mine. It was studied separately by Pioneer Technical Services for DSL-AMRB in 1993. They found 423 cu yards of waste with elevated levels of mercury and lead. Also, they identified two hazardous stopes and an open adit. It was screened out from this inventory because of the previous work by Pioneer. It is also primarily on private land.

Lucky Hancock Claim Cleveland Mountain 7.5-min. GR003006
Screened out in the office after being described in Close (1982) as consisting of two pits. Geology was described as a "northwest-trending quartz vein in quartz diorite". Assumed to have little or no effect to LNF-administered land. Commodity was listed as silver.

Lucky Jack / Wilson Gulch Prospect Wilson Gulch 7.5-min. MN003057
Cambell (1960) described this deposit in tract B, sec. 1, T.16N., R.28W., south of the Spar Mine. It was screened out because of the description provided by Robin McCulloch (MBMG). The workings were originally large open cuts or trenches on the hillside (Campbell, 1960) and McCulloch reported that these were largely sloughed and barely discernable. The trenches are about 1 mile south of the Bear Creek deposit.

The geology associated with the mineralization includes a 50- to 75-ft wide breccia zone with ankerite and fluorite but with no milky white quartz as is common in the other deposits in the area. Campbell (1960) drew a plan map of the original workings showing the brecciated dolomite and quartzite of the Precambrian Wallace Formation. The commodity was fluorine.

Lucky Star Cleveland Mountain 7.5-min. GR003001
The Lucky Star claim consisted of two caved adits (Close, 1982) but they were not located when the general area

was visited on 05/21/01 by MBMG staff. The southern half of sec. 23, T.10N., R.18W., was searched but no adits were found. Close described them as exploring a possible "northeast-trending silicified zone in quartzite and argillite."

Lucky Strike De Borgia South 7.5-min. MN005919
The Lucky Strike is listed in the MILS database as having an accuracy of ±1 km and with no other references. It plots in the same sec. 04, T.17N., R.29W., as the New Lenore and the Goldbug (Tawney). The general area was visited and the Lucky Strike was screened out as a duplicate of the New Lenore. It plots on the De Borgia South 7.5-min. quadrangle.

M & C Claims Lozeau 7.5-min. MN003287
This site was screened out because the commodity was listed as silica in the MILS database. It plots along Quartz Creek and had only one reference to it (Lawson, 1975) who described it as "developing" in 1974.

Magi Mine /Lime Gulch Prospect Wilson Gulch 7.5-min. MN003052
This mine was visited 07/26/01 by MBMG staff. The workings were on a dry hillside; there was a dry 25-ft open cut and a possible collapsed adit north of Forest Route 342 in secs. 30 and 31, T.17N., R.27W. Campbell (1960) describes the Lime Gulch prospect as having a trench and a 200-ft adit. The commodity was fluorine and it was found with quartz, carbonate, and ankerite in scattered pods hosted in Precambrian Wallace Formation.

Mammont Lode Driveway Peak 7.5-min. SA005083
See Stibnite Hill Antimony Deposit.

Marion Creek Placer Stark North 7.5-min. MI002742
This site was screened out because it is a placer. It is also largely private with no public access. It is a tributary to Ninemile Creek.

McFarland Creek Gold Placer St. Patrick Peak 7.5-min. MN005855
The McFarland Creek Gold Placer was screened out and not visited because it lies predominantly on private land and is a placer deposit. It plots on the St. Patrick Peak 7.5-min. quadrangle in sec. 06, T.14N., R.26W.

Meadow Creek Placer Tarkio 7.5-min. MN003317
This site plots on the Tarkio 7.5-min. quadrangle in sec. 24, T.15N., R.25W., near Round Mountain at the junction of Nemote and Miller Creeks. Although the accuracy is listed as ±10 meters in MILS, the references for it (Lawson 1975, 1976) only describe it as being in sec. 24. It is also listed as developing in 1974 and 1975. The site was screened out because it was a placer. It was later deleted as a duplicate of the following entry (MN006051).

Meadow Creek Placer Lozeau 7.5-min. MN006051
This site was screened out because it was a placer. This entry plots in sec. 24, T.15N., R.26W., and plots on Meadow Creek unlike the previously described Meadow Creek placer.

Meadow Mountain Haugan 7.5-min. MN003367
This site consisted of two adits and prospects. One of the adits discharged a small orange stream of water. The complete write-up in is the main text of the report.

Midday Lode Driveway Peak 7.5-min. SA005093
See Stibnite Hill Antimony deposit.

Midnight Placer Claims Grizzly Point 7.5-min. GR003031
The Midnight Placer Claims were visited by MBMG staff on 10/15/00. No impacts to LNF-administered land were noted. Close (1982) described the workings as a small hydraulic excavation with a water ditch, a caved shaft, and many small pits. The deposition of gold was in terrace and stream alluvium deposits.

Mineral Peak Prospect Wapiti Lake 7.5-min. MI002970
This site was screened out in the office because of the description in Mayerle (1983). There were no workings at the prospect. It consists of thin quartz veins in a quartzite that is associated with a limonite- and manganese-stained, N.25°W.-trending, near-vertical fault.

Mineronjou, Eddy, and Russel(l) Groups Sunset Peak and Penrose Peak 7.5-min. SA005338
These are private, patented claims at the head of Eddy Creek. The Russel(l) Group consists of the Morning Star, Morning Star Extension, Morning Star No. 2, Silver Tip, Bay Chief, Bay Chief Extension, Bay Chief 3, Ben Hur, Ravalli, Green Mountain, Independence, Champion, Humming Bird, Blue Bird, Pansy, Mary, Homestake, Coeur d'Alene Star 1-5, as well as Fractions No. 1 and 2. No claim names or locations from the Eddy or Mineronjou Groups were found. These were screened out because of the private land position.

Minnick Mine McGee Peak 7.5-min. MN003292
The Minnick Mine and the River Creek Mine had the same location (sec. 5, T.18N., R.30W.) in the MILS database but were both listed in the same publications (Lawson, 1975, 1976) so it is assumed that they are separate mines. The area was searched but MBMG geologists were unable to locate the mines.

Miss Fortune Placer Claims Cleveland Mountain 7.5-min. GR003016
This site was screened out because of the description in Close (1982) of eight pits, a sluice and dam at the placer. It was located in lake-fill deposits.

Monarch Mine Boyd Mountain 7.5-min. MN003217
The area where the site plotted was visited on 07/10/01 by MBMG staff but we were unable to locate the mine. It is described as being related to the Osburn Fault Zone between the True Fissure to the west and the Wolf to the east. The area where it was plotted was walked but no mine workings were found.

Montana Barite Pit Superior 7.5-min. MN006091
This site was screened out. It was plotted on private land, and the commodity was barite. The accuracy of the location from the MILS database was ±1 km.

Montana Power Barite Prospect Northeast Missoula 7.5-min. MI002934
This site was screened out in the office because it consists of a bulldozer cut and a hand-dug cut (Mayerle, 1983) and the commodity was barite. The hillslope where it is located was observed from the Rattlesnake Creek trail and no effects were noted. It plots in sec. 17, T.14N., R.18W., on the Northeast Missoula 7.5-min. quadrangle.

Montana Premier (Letterman) Plains 7.5-min. SA004828
Montana Premier Gold Mining Corporation (T.S. Letterman, president) was the operator at this mine which is located outside the LNF-property boundary. In 1940, it consisted of 180 patented claims and 70 unpatented claims (Trauerman and Waldron, 1940). Commodities included gold, silver, and lead. It was worked until 1940, when the workings consisted of 2,000 ft of tunnels, shafts, raises, drifts, and trenches (Trauerman and Reyner, 1950).

For this inventory, it was screened out because it was on private land. The lower Letterman is a separate record and was studied by Pioneer Technical Services for Montana DSL-AMRB (1995).

Montana Standard Haugan 7.5-min. SA001248
The Montana Standard, in the Prospect Creek mining district, was screened out because it is located on a large group of patented mining claims. Original development included 3 adits and a winze (Crowley, 1963); the adits' lengths were 1,800 ft, 600 ft, and 100 ft. Minerals in the veins included sphalerite, galena, and pyrite, with quartz gangue, and trace chalcopyrite. The Ravalli (or Burke) Formation's quartzites and argillites host the fissure-filling veins (Crowley, 1963). Diorite dikes occur in the area but do not seem related to the mineralization.

Montezuma Quinns Hot Springs 7.5-min. SA001326
This site was screened out because it had an inaccurate location (±1 km) and no references to it. It plots on a ridge between Squaw Creek and Fourteenmile Creek, north of the Clark Fork River.

Montro Gold Mines Plains 7.5-min. SA005178
This site was screened out because it is on private land, outside the LNF-property boundary. It also was previously studied by Pioneer Technical Services in 1993 for Montana DSL-AMRB. They found a collapsed discharging adit, 6,300 cu yards of waste rock with elevated levels of copper, mercury, antimony, iron, and lead, and one open adit.

Morning View Lode Driveway Peak 7.5-min. SA005103
See Stibnite Hill Antimony Deposit.

Mountain Gem Mine Superior 7.5-min. MN005799
This site was screened out from the inventory because the accuracy of the location from the MILS database was ±5 km. The only reference to it was the USGS CRIB database. The commodities listed were silver, zinc, and lead.

Mullan Barite Boyd Mountain 7.5-min. MN006095
This site was visited 07/10/01 by MBMG staff. The commodity was barite and it was operated as recently as 1978 (Lawson, 1979). The site is shown on the topographic map as open pits. It has been partially reclaimed with flat, graded areas bounded by some rubbly 20-ft highwalls remaining. The site was dry.

Nancy Lee Mine Keystone Peak 7.5-min MN005903
The Nancy Lee Mine site had been partially reclaimed and further remediation was planned at the time of this inventory. MBMG only sampled the Vulcan Tunnel at the request of the Forest Service because of the previous studies that had been conducted in the area. Pioneer Technical Services (1995) conducted preliminary sampling at the Nancy Lee.

Nancy Lee Mill at Slowey Wilson Gulch 7.5-min. MN005991
This site was not visited because it is entirely on private land, north of the Clark Fork River at the mouth of Slowey Gulch. It has been inventoried and sampled by Pioneer Technical Services (1995); the tailings were reclaimed by Montana Department of Environmental Quality - Mine Waste Cleanup Bureau.

Nancy Lee Millsite Keystone Peak 7.5-min. MN008464
This mill and its tailings were in the process of being cleaned up when the area was inventoried in 2001. The lower portion of the tailings had been remediated and plans called for the removal of the tailings on USFS land in 2002 and 2003. It was not sampled because of the previous studies in the area. Pioneer Technical Services (1995) described 16,333 cu yards of tailings with elevated levels of arsenic, cadmium, copper, mercury, lead, zinc, barium, cobalt, iron, manganese, and antimony.

Nellie Mine Driveway Peak 7.5-min. SA008609
This site was screened out because of an inaccurate location (±1 km) and because of a lack of references to it. It plotted on the west side of Daisy Creek in the Prospect Creek mining district. The general area was visited and no workings were found.

New Lenore Mine DeBorgia South 7.5-min. MN005827
The New Lenore mine plots in sec. 04, T.17N., R.29W., on the De Borgia South 7.5-min. quadrangle. Several adits were located when the area was visited on 07/11/01. The upper adit, located in a large open cut south of the two-track road southwest of Forest Route 1185 and northeast of the cabin associated with the mine, had a small seep associated with it. The flow seeped into the ground and was not enough to sample. The adit strikes N.15°W., and is almost totally collapsed and buried by rock from the highwall. The opening is 1 ft by 6 ft and is not accessible. The workings in this area explored salt-and-pepper textured intrusives in gray-green argillites. Massive, 2- to 3-ft wide white quartz veins with cubic oxidized pyrite crop out at the northeast corner of the open cut.

A middle adit, to the southeast of the open cut, trends N.65°W., and was caved at the portal but had a wooden gate that may have had open workings beyond it. It was not considered accessible. A third adit was to the southeast of the second, along an overgrown road down the hill. It was totally collapsed with timbers marking the portal. It trending N.47°W. Vein on the dump was quartz, chalcopyrite, specular hematite (?), "cube iron", and epidote. A fourth adit was uphill from the two-track road leading to the cabin. It was totally sloughed and was dry.

A possible mill building was found on the northeast side of Coyle Creek; it was totally flattened and no equipment remained. A log cabin at the upper open cut and adit was still standing in the summer of 2001, but leaned downhill.

Two other entries in the MILS database plot in sec. 04, (the Lucky Strike and the Goldbug (Tawney). It is possible that they are the same mine as the New Lenore.

N. Pacific Ry Prospect Iris Point 7.5-min. GR000380
This site was screened out because it was a barite prospect and it plotted on private land.

Nite Owl Keystone Peak 7.5-min. MN003262
The Nite Owl Mine was visited 06/21/01 by MBMG geologists. It was found about three quarters of a mile past Keystone on the west side of Route 7868 just before the switchback. The adit was open (6 ft by 6 ft) with "post and pole" timber lagging. It was open for nine timber sets but some areas were caved. The steep waste-rock dump from the mine was also to the west of the road; the toe was immediately adjacent to the road. Campbell (1960) described geology at the Nite Owl as "foliated quartzite of the Burke or Revett formations." It produced 193 oz silver, 5,178 lbs lead, and 22,607 lbs of zinc.

Nine Mile Operation McCormick Peak 7.5-min. MI002586
This site was screened out because it was a general location for the placers in the area.

No. 10 Tunnel Quinns Hot Springs 7.5-min. SA005428
The area of the No. 10 Tunnel in the Plains mining district was visited on 10/16/01 but the workings could not be seen from the east side of the Clark Fork River. It is marked on the topographic map as an adit and is shown on the northwest side of the river adjacent to the railroad tracks. Crowley (1963) described the site as a 20-ft-long adit in a gabbro sill in a quartzitic argillite. It explored a bedding plane vein composed of quartz, galena, pyrite, native silver, and sphalerite.

North Fork Claims Illinois Peak 7.5-min. MN005931
This site was screened out because it was a general location on the North Fork of Cedar Creek. There were no references for it.

Nugget Mine McCormick Peak 7.5-min. MI002538
This site was sampled as a part of this inventory; the results are in the main text.

Old Sierra Straight Peak 7.5-min. MN005951
An accuracy of ±5 km is listed in the MILS database for this location. It was screened out because of the inaccurate location and the lack of references to it. The only reference listed in MILS was a USBM production file.

Oregon Creek Placer Wilson Gulch 7.5-min. MN006063
This site was screened out because it was a placer. It is at the junction of Oregon Creek and Lost Creek, north of Cayuse Saddle. It is mainly on private land. It was listed as producing in 1973 (Lawson, 1974) but was of unknown status in 1969 (Hansen and others, 1970) and in 1975, it was listed as inactive (Lawson, 1976). The location plots in secs. 21 and 22, T.16N., R.27W.

Packer Creek Barite Deposits Saltese 7.5-min. MN003247
This site was screened out because it was a general location (secs. 2 and 3, T.19N., R.31W.). Calkins and Jones (1914) described the site as several shallow prospects along a one-ft-wide vein with barite, limonite, and siderite.

Pardee Creek Quinns Hot Springs 7.5-min. MN005955
This site was screened out because the commodity was barite (Minobras, 1975) and the location was very general (sec. 35, T.18N., R.26W.).

Paul Bunyon Mount Headley 7.5-min. SA005333
This site, west of Four Lakes Creek and Cube Iron Mountain, was screened out because of lack of access and the probable small nature of the site. There were no references found for it. The MILS database had an accuracy of ±10 meters for it and listed it as a copper-silver occurrence.

Petty Mountain Placer Petty Mountain 7.5-min. MI005731
This site was screened out in the office because it was a placer. Lyden (1948) described it as intermittently worked from 1904 to 1946 with annual recovery less than 10 ounces.

Pine Creek Stark North 7.5-min. MI002694
This site was screened out because it is a general location (secs. 28 and 29, T.17N., R.23W.). The MILS database had no references to it but did list the commodities as copper, gold, and silver.

Placer Mine Cleveland Mountain 7.5-min. RA007126
Located in sec. 28, T.10N., R.18W., this placer is on State of Montana land (Threemile Wildlife Management Area). It was only briefly visited, with very little evidence of placering remaining. A small hole (<3 ft) had recently been dug into the hillside. Little or no effect to LNF-administered land was noted.

Placer Mine Cleveland Mountain 7.5-min. RA007129
Located in sec. 28, T.10N., R.18W., this placer was visited on 05/25/01. It consisted of a series of small (<4 ft deep) pits along Forest Route 640. No effects were noted to LNF-administered land except for the physical disturbance of small placer rock piles and excavations (one of which was being used as a trash dump for the dispersed campsite nearby).

Prospect Creek Placer Driveway Peak 7.5-min. SA005233
This site was screened out because it was a placer. No production was recorded and the location was very general (Lyden, 1948).

Prosperity Mine Keystone Peak 7.5-min. MN003237
The Prosperity Mine consisted of a single adit with a partially reclaimed waste-rock dump and a small discharge. It was sampled as a part of this inventory. See the main text for the summary.

Quinns Hot Springs Quinns Hot Springs 7.5-min. SA001260
This site was screened out because it is a geothermal spring, it is on private land, and it is determined to have little or no effects on LNF-administered land.

R & M #1 Sunset Peak 7.5-min. SA001332
Crowley (1963) described this mine as a “short adit” about 1.5 miles west of the Johnny Miller; it was relocated from the location in the MILS database. The mine was accessed by a trail along the West Fork of Swamp Creek (Crowley, 1963). It was not located in this inventory although the trail was hiked. Mineralization was described by Crowley as a milky quartz vein containing pods of galena and arsenopyrite hosted by argillite. The vein ranged from 5 ft wide to several splits that were 1 to 2 ft wide. The bedding-plane vein trended N.47°W., dipping 37° SW.

Rainy Day Mine Spink Point 7.5-min. GR003406
The Rainy Day Mine was visited by MBMG geologists on 10/18/00. There was a millsite, an adit with a discharge (but not enough flow to sample and it never reached the active drainage), and several open or partially open adits present. This site was difficult to distinguish from those workings associated with the Jumbo Mine. There were at least 7 collapsed adits in the area and a millsite. The mines were entirely on LNF-administered land.

Rattlesnake Creek Barite — Northeast Missoula 7.5-min. — MI005687
The general location of this mine was visited but no workings were noted. The commodity was barite and there were no references in the MILS database to it. It plots on the Northeast Missoula 7.5-min. quadrangle in sec. 35, T.14N., R.19W.

Raven Mine — Eddy Mountain 7.5-min. — SA001428
This site was inventoried and sampled by MBMG staff. See main text for the summary.

Red Bluff Quarry — Quinns Hot Springs 7.5-min. — SA004768
This site was screened out; it was a sandstone quarry. The accuracy was ±1 km.

Redemption 1 & 2 — Illinois Peak 7.5-min. — MN003357
The general area where the Redemption claims were plotted was visited but no workings were found. Workings were found at the Silver Streak to the north and east of where the Redemption plotted and at the Silver King to the east. The reference to the Redemption claims (Geach and others, 1966) lists both the Redemption and the Silver Streak claims in sec. 7, T.15N., R.27W.

Rivers Creek Mine — McGee Peak 7.5-min. — MN003297
The area where the Rivers Creek Mine was plotted was searched on 07/25/01 but MBMG geologists were unable to find any evidence of it. The location was described as being in sec. 5, T.18N., R.30W., by Lawson (1975, 1976). This mine and the Minnick Mine plotted at the same location. A possible mine disturbance in a clearing was viewed from the road across the valley, but no access to the area was found.

Rock Creek — Iris Point 7.5-min. — GR003641
This site was screened out because it was a general barite occurrence (Elevatorski (Minobras), 1975). It was described as being "barite veins and replacements in dolomite" in sec. 31, T.11N., R.16W.

Rock Island Mine — De Borgia North 7.5-min. — MN005911
This mine was sampled as a part of this inventory. See the main text for the write-up on it.

Russell Group — Sunset Peak 7.5-min. — SA005433
The Russell Group is a group of 24 patented claims and fractions of claims in the Eddy Creek mining district. Crowley (1963) described it as being in sec. 16 and 21, T.20N., R.28W., but the patented claims appear on the topographic map of the area in secs. 14 and 23. Eleven of the claims were formerly owned by the State Mining Company. Mineralization includes galena, pyrite, chalcopyrite, and tetrahedrite. The ore is hosted in northwest-striking quartz veins (up to 8 ft wide) that cut through both diorite and argillite but with the veins becoming "pod-like" in the diorite. All workings plotted on private, patented claims, so the site was screened out.

St. George Lode — Driveway Peak 7.5-min. — SA005073
See Stibnite Hill Antimony Deposit.

St. Lawrence Mine — Adair 7.5-min. — MN005867
The St. Lawrence Mine had two discharging adits, a seep from the base of one of the waste-rock dumps, and streamside wastes. See the complete write-up in this report.

Saltese Consolidated — Haugan 7.5-min. — MN005803
This mine consisted of two collapsed adits, one of which had a small discharge. See the main text for the summary of the results.

Saltese Metals Mines — Saltese 7.5-min. — MN005791
This site includes the general locations of claims in the Saltese area: Boston Colby property, New York and Brooklyn Mine, and Hugo 1. It was screened out because of the general location description.

Sanders Lake Silica Prospect Stuart Peak 7.5-min. MI002874
This site was screened out because no workings were associated with this quartz-filled fault zone (Mayerle, 1983). The commodity was listed as silica. It plots on the Stuart Peak 7.5-min. quadrangle in sec. 13, T.15N., R.19W.

Santa Rita Group Keystone Peak 7.5-min. MN003257
The Santa Rita Group was described as being "immediately north-northwest of the abandoned village at Keystone" (Campbell, 1960). It supposedly had several adits between Pack Gulch and Keystone Creek. The area was driven but no workings were found; we were unable to locate the Santa Rita Group. Two caved and dry adits were located to the west of Pack Gulch but they did not fit the description by Campbell.

Scott's Pit Paradise 7.5-min. SA004728
This site was screened out because it plotted on private land outside LNF-administered land. The accuracy from the MILS database was ±500 meters. It was a sand and gravel pit.

Shamrock Mine Driveway Peak 7.5-min. SA005373
The Shamrock Mine was screened out because the workings were reported to be caved in 1961 (Crowley, 1963). The area was viewed from the road and no environmental effects could be seen.

The lengths of the tunnels were 285 ft, 1,116 ft, and 1,812 ft. They were all connected by three-compartment shafts. There was a small 5-stamp mill built at the mouth of Shamrock Gulch. Crowley (1963) also stated that in 1961 only some iron-stained quartz was found on the waste-rock dumps; no sulfides were noted.

Sheep Mountain Prospect Blue Point 7.5-min. MI002964
This site was screened out in the office based on the description in Mayerle (1983). The commodity was barite and no workings were noted, only an outcrop of red quartzite. It plots in sec. 30, T.14N., R.17W., on the Blue Point 7.5-min. quadrangle

Silica Prospect Northeast Missoula 7.5-min. MI002604
This site was screened out because the commodity was silica and there were no references to it in the MILS database. It plots on the Northeast Missoula 7.5-min. quadrangle in sec. 23, T.14N., R.19W.

Silicon Prospect Northeast Missoula 7.5-min. MI002592
This site was screened out because the commodity was silicon and there were no references to it in the MILS database. It plots on the Northeast Missoula 7.5-min. quadrangle in sec. 23, T.14N., R.19W.

Silicon Prospect Stuart Peak 7.5-min. MI002856
This site was screened out because the commodity was silicon; Mayerle (1983) described it as a 1,000 ft long quartz vein with no associated workings. It plots on the Stuart Peak 7.5-min. quadrangle in sec. 01, T.15N., R.19W.

Silver and Copper Prospect Paradise 7.5-min. SA004638
This site was screened out because it plotted on private land outside LNF-administered land. The accuracy from the MILS database was ±10 meters.

Silver and Lead Prospect Paradise 7.5-min. SA004633
This site was screened out because it plotted on private land outside LNF-administered land. The accuracy from the MILS database was ±1 kilometer.

Silver Bell Property Torino Peak 7.5-min. MN003267
The Silver Bell is located south of the North Fork of Little Joe Creek entirely on LNF-administered land. Wallace and Hosterman (1956) describe the workings as exploring a diorite dike emplaced in the Precambrian Wallace Formation. Quartz veins with rare galena, chalcopyrite, and sphalerite pods filled tension cracks in the dike. The site was screened out because of the small nature of the workings. Wallace and Hosterman show two small adits on their map and describe the site as a prospect.

Silver Cable Saltese 7.5-min. MN005923
The Silver Cable Mine was almost entirely on private, patented land. It was sampled on LNF-administered land downstream from the mine. The complete write-up is in the main text.

Silver Cliff Prospect Illinois Peak 7.5-min. MN008163
The Silver Cliff Prospect was visited on 08/22/01 by MBMG geologists. It was an active claim in 1996 filed by Fern Gildersleeve and Gloria Weaver. The cut was 60 ft long and had 10-ft highwalls. It was 25 ft wide and trended N.20°W.

Silver Creek Mine Saltese 7.5-min. MN003302
The Silver Creek Mine is described as being in sec. 14, T.19N., R.31W. (Lawson, 1975, 1976), but no more detailed description could be found. The site was screened out because of the inaccurate location.

Silver King Mine Illinois Peak 7.5-min. MN005851
The Silver King Mine was visited on 08/22/01 by MBMG geologists. One adit was found north of Mary Ann Gulch as plotted on the topographic map. It had evidence of a seasonal discharge but there was no visible flow at the time of this visit. There were no effects to the vegetation in the area. The adit was timbered with a 4-ft by 5-ft opening at the portal, but was caved inside down to a 1- by 1-ft opening. The adit then is open for another 15 ft and then is completely caved. The highwall above the adit is 15 ft high. The rock is light gray, micaceous argillite, almost talc-like.

Silver King / Belle Stowe Eddy Mountain 7.5-min. SA005353
The Silver King is on the southeast side of the Thompson River. It was inventoried on 10/18/01 when MBMG staff found standing water only in the adit. Crowley (1963) described the commodities as silver, copper, and lead. There were three adits at the Silver King, with 3,000 ft of drifts and 200 ft of stoping up 80 ft (Crowley, 1963). Minerals included tetrahedrite, pyrite, chalcopyrite, along with trace bornite, galena, and sphalerite. Production intermittently from the years 1916 to 1950 as listed in Crowley was no gold, 15,272 oz silver, 13,089 lbs copper, 110,332 lbs lead, and 5,300 lbs zinc.

Silver Peak Group Thompson Pass 7.5-min. SA005975
This site was screened out because of an inaccurate location. The lat/long plots in sec. 12 on Table Top Mountain but the section-township-range plots on the Thompson Pass 7.5-min. quadrangle between Chipmunk Creek and Summit Creek, both south of Cooper Creek. This is probably the more likely location because it is a more heavily mined area.

Silver Quest Lookout Pass 7.5-min. MN008080
The Silver Quest Group of patented claims lies near the headwaters of the St. Regis River on the north side of the drainage. The site was visited by MBMG geologists on 07/13/01. Only one, or possibly two, adits were found on the patented claims. They were small and totally collapsed. One adit, also totally collapsed, was located on the southeast side of the river and south of the trail to St. Regis Lake where it crosses the river. The adit trends approximately S.80°E., and the waste dump can be seen from the trail. No hazards and no environmental concerns were noted.

Silver Strand Lookout Pass 7.5-min. MN003272
The Silver Strand property was visited on 07/13/01 by MBMG staff. No open adits or other hazards were identified. The USGS (Wallace and Hosterman, 1956) described the property as being 2 miles west of Randolph Creek. Two collapsed adits were located northwest of the I-90 rest area and west of Shamrock Creek, between the Interstate and Forest Route 4208. One collapsed cabin was also at the site. Wallace and Hosterman (1956) identified chalcopyrite with some malachite and azurite, with some galena reportedly present. The property is associated with the Silver Creek Fault.

Silver Streak Illinois Peak 7.5-min. MN005927
The Silver Streak was visited on 08/22/01 by MBMG geologists. Two adits were west of the trail (an old mining road) going north from the Silver King and the Cajun Queen claims. Another adit trending N.10°W. was at the end

of the trail/road where there was also ruins of a small mill and ore bin. The waste rock from the main adit was gray-green quartzite (?) with fractured, white quartz chunks from veins, commonly as 8 inch to 1 ft pieces. Oxidized pyrite cubes were scattered throughout the quartzite. There were collapsed cabins east of the adit. All the adits were completely caved and dry except for one that had a very small seep. No tailings were found downhill from the mill.

Skyline Mine Illinois Peak 7.5-min. MN006075
This site was screened out because it was an optical quartz prospect and most likely did not affect LNF-administered land. It was described in Lawson (1976) as being developed in the Quartz Creek mining district in sec. 4, T.14N., R.27W.

Snowbird Mine Schley Mountain 7.5-min. MN003062
The Snowbird Mine is a fluorite-rare earth deposit on the Schley Mountain 7.5-min. quadrangle near the Idaho Border near the head of Cedar Log Creek. It was screened out because it was an open-pit mine.

South Fork of Trout Creek Placer Straight Peak 7.5-min. MN003252
This is a general location of placering located in secs. 2, 3, 10, 11, 14, and 23, T.14N., R.27W., on the Straight Peak 7.5 min. quadrangle. It was screened out in the office because of the general nature of the location. It was described by Trauerman and Reyner (1949) as consisting of 800 acres of unpatented claims.

Spar Mine or Bear Creek Deposit Wilson Gulch 7.5-min. MN003047
This site in tract B, sec. 31, T.17N., R.27W., north of Dry Creek, was visited 07/26/01 by MBMG geologists. A 1-by 3-ft opening was present but it was only about 8 ft in depth. The outcrop that was explored is visible from the road and a poor, partially overgrown road leads up to it. It is a white replacement deposit grading into a tan limestone with light purple fluorite. There are two caved adits to the west that were open when described by Campbell (1960). Another caved adit to the east is west of the overgrown road that leads to the main pit.

R.M. Corn (1953) described the Dry Creek fluorite deposits in his Bachelor's thesis and S.R. Sanford further studied the area in his 1972 Master's thesis. In addition to the fluorite, minerals present include: pegmatitic quartz, ankerite, calcite, including accessory pyrite, geothite, xenotime (yttrium phosphate) (reported by Sanford) and chalcopyrite, tetrahedrite, and galena (by Corn). The deposit is structurally located on the NW limb and near the crest of an overturned anticline (Sanford, 1972) but is also somewhat stratigraphically controlled by Wallace Formation bedding. Also, local brecciation indicates a forceful emplacement of the quartz-fluorite-ankerite pods as hydrothermal fluids.

Spitfire Mine St. Regis 7.5-min. MN003307
The Spitfire mine consisted of two adits and a series of open cuts and trenches with benches of waste. Extensive exploration along the outcrop included surface cuts in the upper area. One open adit and one mostly caved adit remain. The site was dry and no environmental problems were noted. The property lies on both LNF-administered land to the north and State of Montana land to the south. The road is gated at the junction with Highway 135 from St. Regis. The mine plots on the St. Regis 7.5-min. quadrangle in sec. 35, T.19N, R.27W., and sec. 2, T.18N., R.27W.

The rock has been described as a remnant of Revett Formation that has been faulted to the north and south (McCulloch, pers. comm., 2001). Veins are shattered white quartz healed with maroon silica. Mineralization also includes copper oxides, sphalerite, pyrite, and hematite in discontinuous fragments within the quartz.

State Group Penrose Peak 7.5-min. SA005213
This group was mined by the State Mining Company of Yardly, Washington, for silver and lead in 1960 (Crowley and others, 1961). It is located in the Eddy Creek mining district in secs. 16 and 21, T.20N., R.28W. As described in MILS, the property plots near Cherry Peak, almost 2 miles west of the Russell, Eddy, and Mineronjou Groups. The site was screened out because of the lack of access, the inaccurate location, and the lack of information on it.

Station Millsite Driveway Peak 7.5-min. SA005108
See Stibnite Hill Antimony Deposit.

Stemwinder Placer Landowner Mountain 7.5-min. MN003347
Described as being in the Cedar Creek district, this placer was operated in the 1970's by George Gildersleeve of Superior, MT (Hansen and others, 1971; Lawson, 1976). It is in the Trout Creek drainage in sec. 17, T.15N., R.26W. It was screened out because it was a placer and because of the inaccurate location (±1 km).

Stibnite Hill Antimony Deposit Driveway Peak 7.5-min. SA001482
The Stibnite Hill deposit was screened out because it was active when this inventory was conducted. This site consists of a large group of patented and unpatented claims north of Prospect Creek and along Antimony Creek. Claims include Station, Excelsior, Mammont, Ellis, Eureka, Eliza, Little Comet, Elda, St. George, Favorite, Midday, and Morning View (Crowley, 1963). Other claims include the Black Jack, Norway, Babbit, Midas, Stibnite, and Mowich. Other mine names associated with the area include the Barto and I-90. Most disturbances were on patented claims. The area has been mined since 1884 for antimony, silver, and gold. The host rock is Prichard Formation argillites and quartzites. A northwest-trending anticline may have had some structural control over ore emplacement and fault formation. Minerals associated with the deposit include quartz, stibnite, pyrite, sphalerite, and arsenopyrite.

Stobie-Hermiston (S & H Mining) Keystone Peak 7.5-min. SA008183
The Stobie-Hermiston was claimed by Herb Stobie and Walt Hermiston (Robin McCulloch, MBMG, pers. comm.). Two adits were found on the south side of the Clark Fork River, south of Donlan. Both were caved and one was discharging a small amount of water. The complete description for this site is in the main text of this report.

Sullivan Hill Tuff Table Top Mountain 7.5-min. SA005343
This site was screened out for many reasons: it was a tuff (stone) deposit, it had an accuracy of ±10 km in the MILS database, and there were no references to it.

Sunrise Creek Placer Landowner Mountain 7.5-min. MN003322
This site was screened out because it was a placer and no environmental effects were expected. Only one reference to it was found in MBMG Bulletin 95 (Lawson, 1975) when C & H Company of Superior, MT, was developing it. It is located in sec. 21, T.15N., R.26W., with an accuracy of ±1 km.

Superior Mines / Cedar Creek Placers Illinois Peak 7.5-min. MN005839
This site was screened out because it plotted where Brockbank's active placer mine was in 2001. According to Trauerman and Reyner (1950), the Superior Mines succeeded the Cedar Creek Mining Company and the Kansas City Commercial Company. The majority of the land along Cedar Creek in this area is private, patented claims.

Susan Mine Seeley Lake East 7.5-min. MI005607
This site was screened out because it had an inaccurate location (±1 km). The only reference to it was Trauerman and Reyner (1950) in which they referred to it as an inactive silver-copper mine in sec. 4, T.16N., R.14W. The ownership is unknown; it may lie on private land.

Swan Prospect Thompson Pass 7.5-min. SA005328
This site was screened out because it had no references to it in the MILS database and the accuracy was ±1 km. It may be the same as the Cooper Creek prospects.

Swastika Placer Lozeau 7.5-min. MN005871
Gilbert (1935) described the location of this placer as being 1 mile west of Tarkio which would make this placer mine located on the Lozeau 7.5-min. quadrangle. The property consisted of 16½ patented claims worked by a trommel on the edge of the Clark Fork River in an area previously noted as the Texas Bar. The site was screened out because it was a placer.

Swede Prospect Northeast Missoula 7.5-min. MI002922
The Swede prospect was visited on 05/22/01. It consisted of two adits located on the slope east of Rattlesnake Creek. The collapsed upper adit trends N.15°W., in argillite, and was high on the slope above the second adit which was open. The lower adit was driven N.10°E., for approximately 70 ft. The opening is 3 ft high by 4 ft wide. There was

no discharge from either adit. Mayerle (1983) described the lower adit as being in a NW-striking diabase dike with disseminated pyrite and small quartz veins.

The adits are in sec. 19, T.14N., R.18W., on the Northeast Missoula 7.5-min. quadrangle. The site is accessed by a very indistinct trail in the southwest corner of the section just northeast of the main Rattlesnake Creek recreational trail and the smaller Spring Gulch trail. The open adit may be a concern because of its close proximity to the heavily used recreational trails, but its location is not easily found.

Syndicate Prospect Saltese 7.5-min. MN003342
The Syndicate was visited by MBMG geologists on 08/09/01. It was accessed by a steep trail along the west side of Rat Creek north of Forest Route 7759. A transmission line access road to the north may be an easier way to access the mine but a gate was locked at the time of this inventory. There were two collapsed adits (the second adit, 15 ft south of the main adit, was more of a prospect), and a waste-rock dump with white quartzite and minor iron staining. The adits were dry but the waste rock dump was in contact with the creek. There was no obvious mineralization; there were little or no effects to LNF-administered land. Calkins and Jones (1914) described the workings as a 225-ft adit with several drifts. The adit was driven along a 3- to 6-ft-wide quartz-sericite vein.

Taft Saltese 7.5-min. MN008127
The Taft prospect was referred to in Calkins and Jones (1914) as a prospect on the south bank of the St. Regis River a mile west of Taft. They describe a S.60°E. tunnel that explored a fissure. The site was screened out because of a lack of access and to the small nature of the working. The general area was visited but no signs of a mine were seen.

Tarbox-Mineral King Haugan 7.5-min. MN006103
This site consisted of streamside wastes, seeps, and at least two caved adits and a caved shaft. See the complete write-up in the main text.

Texas Mine De Borgia North 7.5-min. MN005823
The Texas Mine was visited on 10/17/01 by MBMG staff. No open adits were found and all workings were dry. It is located in CBDD, sec. 5, T.19N., R.29W. Dozer cuts and trenches were found along the access road. Some quartz stringers were in the cuts. Bedrock was reddish-gray argillite. Material on the waste-rock dumps was oxide stained, possible manganese as well as iron, and had quartz veins. There were no obvious sulfides. A number of shallow pits were near the adits. There were no structures or hazards.

Similar to the Valentine Mine and the Rock Island Mine, the Texas Mine is 2 miles north of the Osburn Fault (Wallace and Hosterman, 1956).

Thompson Falls Mining Company Driveway Peak 7.5-min. SA005243
The location of this operation (sec. 36, T.21N., R.31W., and secs. 2 and 3, T.20N., R.31W.) in the Prospect Creek mining district coincides with the location for the Iron Daisy. The property consisted of a 60-ft shaft, 4 adits (200 ft to 1,800 ft long) and a 50-ton-per-day concentrating mill. It was determined that this must be a duplicate of the Iron Daisy.

Torgelson Property Alberton 7.5-min. MI005691
This site was screened out because it is a clay prospect on private land in sec. 17, T.15N., R.22W., on the Alberton 7.5-min. quadrangle. The only reference in the USBM MILS database was the USGS CRIB database. The accuracy of its location was ±1 km.

Triangle Mine Lozeau 7.5-min. MN006079
This site was screened out because it was a placer. It is in the Quartz Creek district and was active as late as 1975 (Lawson, 1976). It plots in sec. 04, T.14N., R.26W., on the Lozeau 7.5-min. quadrangle.

Trout Creek Placers Landowner Mountain 7.5-min. MN005875
This site was screened out because it was a placer, was mostly private, and because no environmental effects were

noted. The general area was visited. The placers of Trout Creek and its tributaries were discovered in 1872 and over $500,000 worth of gold was recovered (Lyden, 1948). Lode mines in the area were the probable source for the gold. Hydraulicking and sluicing were the methods of recovery.

True Fissure De Borgia North 7.5-min. MN005879
The True Fissure was not visited because of a lack of access. It plots on the East Fork of Twin Creek in sec. 7, T.19N., R.29W.

Tucker Gulch Placer Lozeau 7.5-min. MN006055
This site was screened out because it was a placer. It is on a tributary to Quartz Creek between two northwest-trending structures. The gold was from the small gold-quartz veins in the area (Lyden, 1948).

Tunnel No. 1 Adit Lookout Pass 7.5-min. MN008106
One collapsed and dry adit was found southeast of Tunnel No.1 on Forest Route 4208. It is located on the Lookout Pass 7.5-min. quadrangle in sec. 03, T.19N., R.32W. No references were found for this adit and it was not listed in the original MILS database.

Twin Creeks Placer Stark North 7.5-min. MI005571
This site was screened out because it is a placer. It is primarily on private land along a tributary southwest of Ninemile Creek. One reference stated that it was being developed in 1965 by Victor Demin of Missoula (Geach and others, 1966).

Unnamed Arsenic and Cobalt Quinns Hot Springs 7.5-min. SA005298
This site was screened out because it had a general location (±1 km). It was described as an occurrence in a gabbro sill of no economic importance (Crowley, 1963, p. 24-25).

Unnamed Bentonite Mount Headley 7.5-min. SA005438
This site was screened out because it was a bentonite occurrence and was outside the LNF-administered land boundary on private land.

Unnamed Flagstone Quarry Paradise 7.5-min. SA004773
This site was screened out for many reasons: the commodity was sandstone and flagstones, it was plotted outside the LNF-property boundary on private land, and the location was inaccurate.

Unnamed Gold McCormick Peak 7.5-min. MI005655
This site was screened out because it is a general location. It was described in the MILS database as being in secs. 10, 15, and 16, T.16N., R.23W.

Unnamed Gravel Pit Haugan 7.5-min. MN005815
This site was screened out in the office because it was a sand and gravel operation according to USBM MILS, and plotted on private land.

Unnamed Gravel Pit Boyd Mountain 7.5-min. MN005847
This site was screened out in the office because it was a sand and gravel operation according to USBM MILS, and plotted on a ridge.

Unnamed Limestone Prospect Blue Point 7.5-min. MI002946
This site was screened out in the office based on the description in Mayerle (1983). The commodity was limestone and the workings were described as 81-ft and 38-ft long cuts. It plots in sec. 27, T.14N., R.18W., on the Blue Point 7.5-min. quadrangle.

Unnamed Mine - Penrose Peak Penrose Peak 7.5-min. SA005193
This entry was a general location listed as being in secs. 14, 23, 24, and 26, T.20N., R.28W. It may be the same

general location as the State Group, also partially found on the Sunset Peak 7.5-min. quadrangle. The only reference in the MILS database to it was a 1956 map. One adit symbol is shown in tract C of sec. 23 on LNF-administered land.

Unnamed Placer Deposit Cleveland Mountain 7.5-min. GR000296
This entry was screened out in the office as being a general placer location, described by Close (1982) as "placer workings scattered along most of the stream".

Unnamed Prospect Northeast Missoula 7.5-min. MI002910
This unnamed prospect plots in the same location as the Holliday Mine and they may be the same. No other references to it could be found in the MILS database. The location given in the MILS database is sec. 35, T.14N., R.19W., on the Northeast Missoula 7.5-min. quadrangle. It was screened out in the office because of the limited information on it and the small nature of the workings at the Holliday.

Unnamed Prospect Northeast Missoula 7.5-min. MI002928
This site was screened out in the office based on the description in Mayerle (1983). It plots in sec. 35, T.14N., R.19W., on the Northeast Missoula 7.5-min. quadrangle.

Unnamed Prospect Blue Point 7.5-min. MI002940
This site was screened out in the office based on the description in Mayerle (1983). The commodity was silver and the workings were described as two shallow 5-ft-long trenches. It plots in sec. 27, T.14N., R.18W., on the Blue Point 7.5-min. quadrangle.

Unnamed Pumice Frenchtown 7.5-min. MI005627
This site is located on the Frenchtown 7.5-min. quadrangle, in secs. 30, 31, 32, 19 and 7, T.15N., R.20W. The site was screened out because the commodity is pumice, and the location is very general.

Unnamed Pumice McCormick Peak 7.5-min. MI005623
This site was screened out because it was a pumice deposit. It was listed as being located in sec. 36, T.17N., R.23W.

Unnamed Pumice Deposit Spink Point 7.5-min. GR000818
This site was screened out because the commodity was pumice, the location was very general, and no references except the USGS CRIB database could be found for it.

Unnamed Silver and Lead Quinns Hot Springs 7.5-min. SA005443
This site was screened out because it had an inaccurate location (±1 km) and no references to it. It plots near the No. 10 Tunnel, northwest of the Clark Fork River.

Unnamed Quarry Superior 7.5-min. MN005859
This site was screened out because it was a quarry on private land.

Upper Keesey Prospect Keystone Peak 7.5-min. MN005883
The Upper Keesey prospect was visited on 07/09/01 by MBMG geologists. Three adits were found adjacent to Forest Route 389 in sec. 19, T.18N., R.26W. One of the adits, with a wooden slat gate, trended N.10°W. in colluvium and bedrock about 10 ft north of the road. The portal was sloughed but was open 3 ft by 3 ft. It then opened up into a full 6- by 6-ft adit. Another adit further up the road trended N.20°E. and was partially open. It was also about 10 ft north of the road. The portal was collapsed for the first 20 ft. The opening to the adit was caved to a 1-ft-high by 5-ft-wide space. Cold air was blowing out of the adit. A third adit was spotted on the way down to Slowey Gulch on a switchback. It was totally caved, trended N.80°W., and had no recognizable waste-rock dump. The primary reference to the mine was Campbell (1960).

Upper Keystone Adit Keystone Peak 7.5-min. MN008004
This site was visited on 06/21/02 by MBMG geologists. It lies about a mile and a quarter past the gate on Forest

Route 18532, which parallels Keystone Creek. The site is at the end of the road. It had a discharging adit and a streamside waste-rock dump. The sampling results and the complete write-up are in the main text of this report.

Upper Oregon Gulch Adit Illinois Peak 7.5-min. MN008176
This site was screened out because it was a placer.

U.S. Antimony Smelter and Refinery Driveway Peak 7.5-min. SA004713
See Stibnite Hill Antimony Deposit.

Valentine Mine De Borgia North 7.5-min. MN005779
The Valentine Mine was visited on 10/17/01 by MBMG staff. It is in tracts CADB, sec. 05, T.19N., R.29W. It had at least one partially open adit (opening 4 ft wide by 2 ft high). The adit was open for at least 20 ft but it was too dark to see beyond that. There was no discharge. Bedrock was a reddish-tan and gray argillite with iron stainings along the laminations and bedding. The rock is mostly flat lying. The trend of the adit is S.85°E. and the entrance was mostly obscured by alders and pine trees.

The collapsed remains of a cabin and some metal debris (tracks) were on top of the waste-rock dump. The dump was large; it extended over 100 ft from the portal. Sparse vegetation was growing on the dump; pine trees were as large as 8 inches in diameter. There was minor quartz on the dump but no sulfides. The mine is 2 miles north of the Osburn Fault (Wallace and Hosterman, 1956).

Victor Mancini Property Superior 7.5-min. MN005935
This site was screened out because the commodity was barite, there were no references found for it, and the accuracy of the location from the MILS database was ±1 km.

Vulcan Tunnel Keystone Peak 7.5-min. MN009113
The Vulcan Tunnel was one adit associated with the Nancy Lee Mine. It was sampled as a part of this inventory. See the main text of the report for the summary.

Wabash Haugan 7.5-min. MN003377
The Wabash was visited 08/09/01 by MBMG geologists. An open cut was found which may have been an adit at one point. It trended N.75°E. The site was being naturally revegetated with pines, spruce, and bushes. It was north of and adjacent to Forest Route 18691, just east of the Tarbox Mine. Wallace and Hosterman (1956) described it as one tunnel bearing N.55°E. which was caved 150 ft from the portal. The mine was driven in “altered and crumpled argillites and quartzites of the Wallace Formation”.

Ward Creek Placer De Borgia South 7.5-min. MN006031
The Ward Creek placer is described as consisting of patented claims along 4 miles of Ward Creek starting at the mouth (although they are no longer private). The site was screened out because of the inaccurate location described in Lyden (1948) and because it was a placer with no workings noted in literature. It plots on the De Borgia South 7.5-min. quadrangle along Ward Creek

Ward Lode Mine Dick Creek 7.5-min. MI005995
The Ward Lode Mine was visited 06/05/01 immediately after a summer snowstorm. The site had been partially reclaimed. The trench walls had been sloped back at the time of this visit. No adit discharge was noted but it may have been covered by the recent snow. The mine had been inventoried by Pioneer Technical Services (1995) in 1993. They found no mill tailings, 321,200 cu yards of waste, and one discharging adit. The only other reference to the Ward Lode was Lawson (1975) who stated that it was developing in 1974.

Waterhole Claims Haugan 7.5-min. MN005887
This site was screened out because it was reported to be uranium claims shown as an open pit on the Forest Service topographic map. The access road has been cut off by I-90, so access is limited. The site is south of Cruzane Gulch and north of I-90 and the St. Regis River. Weis and others (1958) described this occurrence as autunite in fractures

of a shear zone in the Belt quartzites of the area. No workings were noted and the description of the area indicates that the exploration never led to any development.

Welcome Creek Grizzly Point 7.5-min. GR003154
This site was screened out because it is a general location encompassing six sections and was a placer deposit. It is described in Lyden (1948) as having small-scale operations from the late 1800's until 1941. Estimates of production prior to 1911 were $30,000 in gold. A source for the gold may be Tertiary intrusive veins.

Windfall Creek Placer Landowner Mountain 7.5-min. MN006043
Windfall Creek Placer was screened out because it was a placer and no environmental problems were anticipated. Lyden (1948) stated that the gold from Windfall Creek was exceptionally pure. The source was probably gold-bearing veins of the lode mines in the area. Lyden also stated that placering commonly involved hydraulicking and sluicing. The Windfall Creek placers were the largest producers of gold in the district. This site is located near the section lines of sec. 20 and 29, T.15N., R.26W. Windfall Creek drains into Trout Creek from the south. Although the accuracy in MILS was ±10 m, the location is general; it was also located in secs. 19, 28, 29, and 33, T.15N., R.26W.

White Cap Prospect Petty Mountain 7.5-min. MI005539
This site was screened out because it is a beryllium prospect, and it had an inaccurate location. It is likely on private land as plotted from the description in Pattee and others (1968). The reported beryllium crystals were taken from two quartz-feldspar pegmatite bodies in the Belt Missoula Group.

Wolf Prospect Boyd Mountain 7.5-min. MN003362
This site was screened out in the office because it plots on private land and has no access. It is only briefly mentioned in USGS Bulletin 1027-M (Wallace and Hosterman, 1956) as being one of many mines associated with the Osburn Fault. The map from this publication shows the adit directly on Wolf Creek in sec. 10, T.18N., R.28W.

Appendix IV
Soil and Water Analytical Results
Lolo National Forest

Appendix IV. Soil sample results for the Lolo National Forest.

Mine and Sample	Lab ID	Ag C Q mg/Kg	As C Q mg/Kg	Ba C Q mg/Kg	Cd C Q mg/Kg	Cr C Q mg/Kg	Cu C Q mg/Kg	Ni C Q mg/Kg	Pb C Q mg/Kg	Zn C Q mg/Kg	Hg ug/g
Unnamed Brewster Creek Mine											
BUMD10H	2002S0047	<1.2	4.82	615	<2.3	<2.3	7.25	2.85	2.34	12.7	<1
BUMD20H	2002S0048	<1.2	11.5	1220	<2.4	3.31	44.7	3.79	7.26	17.1	<1
BUMD30H	2002S0049	<1.4	9.86	574	<2.7	<2.7	134	<2.7	13.7	14.1	<1
Frances Copper											
SFCW10H	2001S0101	<1.1	30.7	68	<2.3	3.3	895	9.06	62.4	83.4	NR
SFCW20H	2001S0100	1.96	19.7	63.8	<2.3	4.88	668	7.86	32.6	56.2	NR
SFCW30H	2001S0099	1.47	39.3	58.4	<2.3	3.42	1190	7.03	22.8	56.4	NR
Last Chance											
LLCW10H	2002S0051	<1.0	68.6	43.3	<2.0	<2.0	12.3	<2.0	104	59.8	<1
Tarbox											
PTBW10H	2002S0052	8.75	3810	20	10.7	<2.6	241	<2.6	4230	6447	<1
Saltese Consolidated											
TSCW10H	2002S0050	<1.0	<1.0	63.6	<2.0	<2.0	99	6.95	57.7	31.4	<1
Upper Keystone Gulch											
KUKW10H	2001S0103	1.84	13.4	12.8	<2.1	<2.1	7.09	7.4	250	61.3	NR
Prosperity Mine											
KPRW10H	2001S0102	<1.4	<1.4	205	<2.9	<2.9	11	6.2	53.7	31.2	NR
St. Lawrence Mine											
SSLW10H	2002S0046	<1.1	223	13.1	<2.2	<2.2	643	12.1	5.39	5.72	<1

******THESE ARE NOT DETERMINED YET. DATA HAVE NOT BEEN QUALIFIED AS OF 04/29/03.**

C - Concentration qualifier

B - Detected but below method detection limit.

U - Analyzed for but below instrument detection limit.

Q - Quality of data qualifier

N - Spike sample recovery not within control limits.

*** - Duplicate sample not within control limits.**

ICP - Outside of calibrated range of ICP

Appendix IV. Water-quality chemistry for the Lolo National Forest.

[ug/L = micrograms/liter; mg/L = milligrams/liter; < = below method detection limit; P = primary drinking water standard exceeded; S = secondary drinking water standard exceeded
A = acute aquatic standard exceeded; C = chronic aquatic standard exceeded; * - exceeds new arsenic standard; SC = specific conductance in micromhos/centimeter;
gpm = gallons per minute; NR = analyte not reported; not analyzed for by laboratory, SU = standard pH units.]

Bottle Number	Site Name	Al ug/L	As ug/L	Ba ug/L	Cd ug/L	Cr ug/L	Cu ug/L	Fe mg/L	Pb ug/L	Mn mg/L	Hg ug/L	Ni ug/L	Ag ug/L	Zn ug/L	Cl mg/L	F mg/L	NO3_n mg/L	SO4 mg/L	SiO2 mg/L	field_pH SU	field_SC umhos/cm	lab_SC umhos/cm	lab_pH SU	Disch. gpm
East Fork of Brewster Creek mill - sample date 07/23/01																								
BUMS10L	upstream	<30	<1	231	<2	<2	<2	0.006	<2	0.013	<1	<2	<1	<2	<.5	<.05	0.06	<2.5	8.57	7.96	45.8	83	7.27	15
BUMS20L	downstream	<30	<1	195	<2	<2	<2	<.005	<2	<.001	<1	<2	<1	<2	<.5	<.05	0.05	<2.5	8.02	7.83	24.3	53	7.3	448
BUNS10H	unnamed mine discharge	563 S C	<1	31.3	<2	<2	<2	0.1	<2	<.001	<1	13.4	<1	9.62	<.5	0.1	<.05	59.9	16.4	3.87 S	146	159	3.73 S	1
Frances Copper Mine - sample date 06/07/01																								
SFCS10L	upstream	<30	<1	3.32	<2	<2	<2	0.01	<2	<.001	NR	<2	<1	<2	0.5	<.05	0.07	4.61	12	7.63	53.7	53.7	6.97	1800
SFCS20L	upstream	<30	<1	<2	<2	<2	<2	<.005	<2	<.001	<1	<2	<1	<2	<.5	<.05	<.05	4.49	16.2	7.68	48.6	45.9	7.07	1344
SFCS30L	downstream	<30	<1	2.95	<2	<2	<2	0.02	<2	0.01	<1	<2	<1	<2	<.5	<.05	<.05	4.68	13.2	7.67	57.5	58.8	7.08	3136
SFCS40H	seep at toe of dump	<30	1.4	9.74	<2	<2	<2	0.28	<2	0.16 S	NR	<2	<1	85.1	0.35	<.05	<.05	11.8	12.4	7.45	212.3	201	7.03	1.5
SFCS50H	overflow from pond	<30	10.8 *	19.7	<2	<2	7.31	<.005	<2	0.03	<1	<2	<1	<2	<.5	<.05	<.05	21.7	7.74	7.88	294.4	253	7.62	3.5
SFCS60H	natural seep	<30	1.56	26.9	<2	<2	2.58	<.005	<2	0.003	NR	<2	<1	<2	<.5	0.48	<.05	3.82	15.6	7.95	205	421	7.91	<1
Nugget Mine - sample date 10/15/01																								
KNGS10H	adit discharge	<30	1.1	11	<2	<2	5.03	0.051	<2	0.025	<1	11.1	<1	3730 S A C	0.79	0.09	<.05	45.1	13.9	7.27	354	158.9	7.01	1.5
KNGS30M	upstream	<30	1.26	6.81	<2	<2	7.32	0.005	<2	<.001	<1	<2	<1	6.08	0.77	<.05	<.05	8.58	14.7	8.42	113	114.5	7.59	224
KNGS20M	downstream	<30	1.32	6.98	<2	<2	3.41	<.005	<2	<.001	<1	<2	<1	104	0.82	0.06	<.05	9.36	14.3	8.8	116.2	116.9	7.65	224
Silver Cable Mine - sample date 08/08/01																								
BSCS10L	downstream	<30	<1	23.5	2.09	<2	<2	<.005	5.4 C	<.001	<1	<2	<1	880 A C	<.5	<.05	<.05	3.65	6.5	7.66	54.3	59.2	7.08	660
Last Chance Mine - sample date 08/08/01																								
LLCS10L	adit discharge	<30	<1	61.2	<2	<2	<2	0.825 S	<2	1.58 S	<1	<2	<1	<2	<.5	<.05	<.05	<2.5	8.9	7.21	94.8	94.8	6.74	5
LLCS20L	upstream	<30	1.34	30.3	<2	<2	3.01	<.005	<2	<.001	<1	<2	<1	<2	<.50	<.05	<.05	<2.5	9.45	7.43	35.2	34.6	6.97	2240
LLCS30L	downstream	<30	2.03	27.6	<2	<2	3.66	<.005	<2	0.008	<1	<2	<1	3.72	<.5	<.05	<.05	<2.5	9.36	7.65	38.6	37.1	7.05	1344
Tarbox Mine - sample date 08/08/01																								
PTBS10L	upstream on W. Frk	<30	<1	6.89	<2	<2	<2	0.019	<2	0.002	<1	<2	<1	<2	<.5	<.05	<.05	<2.5	13.7	7.48	37.4	37.5	6.79	5
PTBS20M	adit discharge	<30	1.43	6.44	<2	<2	<2	0.28	<2	0.57 S	<1	2.39	<1	382 A C	<.50	<.05	<.05	11	10.9	7.19	112	108	6.58	<1
PTBS30M	downstream on W. Frk	<30	7.21	13.1	<2	<2	<2	0.369 S	<2	0.693 S	<1	<2	<1	498 A C	<.5	<.05	<.05	18	11.3	7.26	164.2	160	7	50
PTBS40L	upstream on Packer	<30	<1	15.2	<2	<2	<2	<.005	<2	0.002	<1	<2	<1	<2	<.5	<.05	<.05	<2.5	7.19	7.66	27.7	30.1	7.07	4480
PTBS50L	downstream on Packer	<30	<1	15.4	<2	<2	<2	<.005	<2	<.001	<1	<2	<1	2.06	<.5	<.05	<.05	<2.5	7.33	7.63	28.9	29.8	7.06	4800
Meadow Mountain Mine - sample date 08/09/01																								
PMMS10H	adit discharge	<30	7.47	11	<2	<2	<2	2.37 S A	<2	2.47 S	<1	4.49	<1	101	<.5	0.07	<.05	37.4	7.95	7.24	360.1	344	6.45 S	2.5
PMMS20H	downstream	<30	<1	4.78	<2	<2	<2	0.014	<2	0.002	<1	<2	<1	7.15	<.50	0.06	<.05	28.1	10.6	8.15	318.7	306	7.96	3
Saltese Consolidated mine - sample date 08/07/01																								
TSCS10L	adit discharge	<30	<1	2.25	<2	<2	<2	<.005	<2	<.001	<1	<2	<1	<2	<.50	<.05	<.05	<2.5	18.4	8.14	59.5	55.7	6.77	10
TSCS20L	downstream	<30	<1	17.4	<2	<2	<2	0.01	<2	0.002	<1	<2	<1	<2	<.5	<.05	<.05	<2.5	18	7.97	60.4	60.4	7.12	10
Rock Island Mine - sample date 10/19/01																								
RRIS10M	upstream	<30	<1	4	<2	<2	<2	0.008	<2	<.001	<1	<2	<1	<2	<.5	<.05	<.05	<2.5	6.34	8.18	170.6	167.9	7.92	112
RRIS20M	adit discharge	<30	6.39	<2	<2	<2	<2	0.014	<2	0.008	<1	<2	<1	15.9	<.5	<.05	<.05	3.64	6.93	8.21	191	190.3	7.39	0.5
RRIS30M	downstream	<30	<1	3.38	<2	<2	<2	0.009	<2	<.001	<1	<2	<1	2.23	<.5	<.05	<.05	<2.5	6.72	8.17	173.9	176.8	8.17	112

[ug/L = micrograms/liter; mg/L = milligrams/liter; < = below method detection limit; P = primary drinking water standard exceeded; S = secondary drinking water standard exceeded
A = acute aquatic standard exceeded; C = chronic aquatic standard exceeded; * - exceeds new arsenic standard; SC = specific conductance in micromhos/centimeter;
gpm = gallons per minute; NR = analyte not reported; not analyzed for by laboratory, SU = standard pH units.]

Bottle Number	Site Name	Al ug/L	As ug/L	Ba ug/L	Cd ug/L	Cr ug/L	Cu ug/L	Fe mg/L	Pb ug/L	Mn mg/L	Hg ug/L	Ni ug/L	Ag ug/L	Zn ug/L	Cl mg/L	F mg/L	NO3_n mg/L	SO4 mg/L	SiO2 mg/L	field_pH SU	field_SC umhos/cm	lab_SC umhos/cm	lab_pH SU	Disch. gpm
Copper Gulch - sample date 07/25/01																								
CCGS10M	adit discharge	<30	5.7	61.8	<2	<2	<2	0.011	<2	0.01	<1	<2	<1	2.18	0.15	0.21	<.05	7.64	5.43	7.68	133.2	207	7.53	2.5
Big Sunday Creek and St. Lawrence mines - sample date 07/12/01																								
BBSS10L	Big Sunday adit discharge	<30	<1	<2	<2	<2	<2	0.015	<2	<.001	<1	<2	<1	6.19	<.5	<.05	<.05	<2.5	11	8.09	73.4	64.2	7.2	5
SSLS10L	upper St. L adit discharge	<30	1.33	3.22	<2	<2	<2	<.005	7.1 C	<.001	<1	<2	<1	<2	<.5	<.05	<.05	<2.5	9.68	8.21	79	76.7	7.48	7
SSLS20L	lower St. L adit discharge	<30	6.02	<2	<2	<2	<2	0.007	<2	<.001	<1	<2	<1	<2	<.5	<.05	<.05	<2.5	7.84	8.19	92.2	83.5	7.15	12
SSLS30M	seep at toe of dump	<30	13.3 *	2.13	<2	<2	<2	0.006	<2	<.001	<1	<2	<1	2.61	<.5	<.05	<.05	<2.5	7.3	8.03	102.8	91.2	7.16	?
SSLS40L	downstream	<30	6.01	<2	<2	<2	<2	0.006	<2	<.001	<1	<2	<1	<2	<.5	<.05	<.05	<2.5	7.58	8.28	90.5	78.8	7.42	20
Deer Creek - Crystal Lake adits - sample date 07/25/01																								
DCLS10L	adit discharge	<30	<1	<2	<2	<2	<2	0.009	<2	0.001	<1	<2	<1	<2	<.5	<.05	<.05	<2.5	8	7.81	25.6	60	7.16	2.5
Keystone Gulch Adits - sample date 06/21/01																								
KUKS10H	upstream	<30	1.1	4.32	<2	<2	<2	0.022	<2	<.001	<1	<2	<1	<2	0	0.43	<.05	9.74	9.02	7.97	414	378	7.97	2.5
KUKS20H	adit discharge	<30	10.2 *	51.6	<2	<2	<2	0.03	<2	0	<1	3.71	<1	<2	<.5	0.48	<.05	24.3	5.74	8.12	470	470	8.26	4
KUKS30H	downstream	<30	<1	6.43	<2	<2	<2	0.027	<2	<.001	<1	<2	<1	<2	<.5	0.56	<.05	10.6	8.21	8.1	445	434	8.09	15
Prosperity Mine - sample date 06/21/01																								
KPRS10H	adit discharge	<30	<1	33.6	<2	<2	<2	0.013	<2	0.01	<1	2.19	<1	<2	0.84	0.06	<.05	101	7.77	8.04	570	566	7.71	<1
Nancy Lee mine site Vulcan Tunnel - sample date 07/24/01																								
MVTS10H	adit discharge	<150	<5	50.8	<10	<10	<10	8.91 S A	<10 ?	0.64 S	<1	<10	<5	<10	7.08	0.92	<.05	305 S	6.02	6.6	1140	1523	6.89	1
MVTS20H	adit discharge (duplicate) -- sample date 11/22/88	<150	<5	49.7	<10	<10	<10	8.73 S A	<10 ?	1.23 S	<1	<10	<5	<10	7.08	0.9	<.05	311 S	6.04	6.6	1140	1590	6.86	1
LO-07-M01	seepage from adit	<30	3	NR	<2	<2	<2	12 S A	<40	7.85 S	<.04	<10	<2	47	3.3	0.1	0.38	286 S	10.6	NR	NR	11.67	6.81	NR
Iron Mountain Mine - sample date 06/20/01																								
FIMS10H	upstream	<30	1.26	38.2	<2	<2	<2	0.01	<2	<.001	<1	<2	<1	<2	<.5	<.05	<.05	3.21	10.4	8.46	246	245	8.05	2240
FIMS20H	downstream	<30	1.93	38	<2	<2	<2	0.02	<2	0	<1	<2	<1	105	<.5	<.05	<.05	6.31	10.5	8.31	266	250	8.11	2240
FIMS30H	downstream -- sample date 06/18/96	<30	2.17	38.1	<2	<2	<2	0.02	<2	0	<1	<2	<1	112 C	<.5	<.05	<.05	6.55	10.4	8.31	266	258	8.09	2240
FLATCRK	downstream	<30	3.7	42.6	<2	<2	<2	0.04	12	0.01	NR	4.8	<1	258.7 A C	0.66	<1	0.16	14.5	11.6	NR	NR	303	7.98	NR
SUPERSP	downstream spring	<30	<1	42.9	<2	<2	<2	<.003	<2	<.002	NR	4.9	<1	19.2	0.77	<1	0.23	20	11.3	NR	NR	330	7.8	NR
Stobie-Hermiston Mine - sample date 10/16/01																								
CSHS10H	adit discharge - sample date 06/02/92	<30	<1	115	<2	<2	<2	0.023	<2	0.019	<1	<2	<1	7.07	<.5	0.09	<.05	9.24	10.4	7.98	201.6	207	7.72	4
SMW1	adit discharge	<50	1	156	<1	2	5	0.02	<1	0	<0.1	1	<0.1	20	0.99	0.04	0.06	12.9	11.8	7.34	132	216	7.54	NR
Johnny Miller Mine - sample date 10/16/01																								
SJMS10H	adit discharge	<30	40.4 *	<2	<2	<2	<2	0.008	<2	<.001	<1	<2	<1	2.01	<.5	0.13	<.05	22.1	11.1	8.11	207	209	7.95	5
SJMS20L	upstream	<30	1.81	37.8	<2	<2	<2	<.005	<2	<.001	<1	<2	<1	6.1	<.5	<.05	<.05	<2.5	11.8	8.08	34	42.5	7.15	224
SJMS30L	downstream	<30	2.05	36.6	<2	<2	<2	<.005	<2	<.001	<1	<2	<1	<2	<.5	<.05	<.05	<2.5	12.2	7.76	36.2	47.1	6.96	224
Raven Mine - sampled date 10/18/01																								
TRAS10M	adit discharge	<30	1.73	24.2	<2	<2	<2	0.008	<2	<.001	<1	<2	<1	7.66	<.5	0.05	0.17	5.04	14.7	7.95	133	171	7.56	1