

Mine Inventory

By E. Paul Martin

Chapter D3 of

Integrated Investigations of Environmental Effects of Historical Mining in the Basin and Boulder Mining Districts, Boulder River Watershed, Jefferson County, Montana

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Contents

Abstract.....	129
Introduction	129
Methodology.....	129
Data	129
Discussion.....	135
References Cited	135

Figures

1. Map showing mine inventory for Boulder River watershed study area.....	130
---------------------------------------------------------------------------	-----

Tables

1. Site-specific data for mines and prospects in the Boulder River watershed study area	131
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Chapter D3

Mine Inventory

By E. Paul Martin

Abstract

An inventory of inactive and historical mines and mine-related sites in the Boulder River watershed study area was compiled from existing State and Federal sources. Site locations were spatially verified using digital orthophoto quadrangles to ensure an accurate geographically referenced inventory. The inventory also provides, where available, descriptive information, compiled from published sources, that supports the environmental evaluation of the effect of historical mining in the study area. This information includes the presence and the pH of flowing water from an adit, the presence and estimated volume of mine waste and mill tailings, and estimates of past production. These data provide site-specific information about potential anthropogenic contributions of deposit-related trace elements observed within the watershed.

Introduction

This chapter describes the mine inventory compiled for the Boulder River watershed study area. One of the most important facets of characterizing watersheds affected by historical mines is determining the location of as well as information about the mines, mills, and other mine-related sites. Every site in the watershed represents a potential source of deposit-related trace elements that could affect water quality and ecosystem health through direct drainage, seepage, erosion, or runoff. Within the Boulder River watershed, abundant and comprehensive data are available from several previous investigations. However, these data had not previously been compiled into one database, and many of the inventoried sites had only approximate locations.

The objective of this inventory is to create a database of mine-related sites that are accurately positioned and attributed in order to provide information to answer important questions about mine-site and stream remediation. The inventory combines geographically referenced locations and descriptive information in a format that lays the foundation for answering environmental and remediation questions using geographic information system (GIS) technology. The inventory comprises significant mines and mine-related sites in the Basin Creek, Cataract Creek, and High Ore Creek basins (major

tributaries of the Boulder River), and in the areas drained by the portion of the Boulder River from the mouth of Basin Creek to High Ore Creek. (See Church, Nimick, and others, this volume, Chapter B, fig. 2.)

Methodology

The process used to determine the representative location for a mine-related site included the following steps. Data from the State of Montana, United States Department of Agriculture (USDA) Forest Service, Bureau of Land Management (BLM), and U.S. Geological Survey (USGS) databases provided an initial site data and localities list. These data were combined into one digital layer, and each site location was resolved to one representative point based on 1993 and 1998 digital orthophoto quadrangles (DOQs). Some mine-related sites contained multiple adits, shafts, and prospects, yet only one point location was captured to “best” represent the inventory site. Also, in some cases, the site location had to be determined strictly from a written description because not all of the historical data were georeferenced. Using digital orthophoto quadrangle (DOQ) image plots containing the resolved mine locations, USDA Forest Service and USGS personnel in Montana verified and revised the localities of the mine-related sites based on limited site visits, survey plats, and local knowledge of the area. Field inventories conducted by the Montana Bureau of Mines and Geology (Metesh and others, 1994, 1995, 1996; Marvin and others, 1997; Roby and others, 1960), the Montana Department of State Lands (1995), the Montana Department of Environmental Quality (1997), and the U.S. Geological Survey (Elliott and others, 1992) represent the sources for the descriptive data.

Data

Figure 1 shows 143 mine-related sites included in the inventory. Factors for inclusion or exclusion in the inventory focused on a site’s contribution to environmental degradation, the physical hazard risk, past production volumes, and simply whether a site had a known name. The number for each site in figure 1 references a unique identifier for the study. Within the

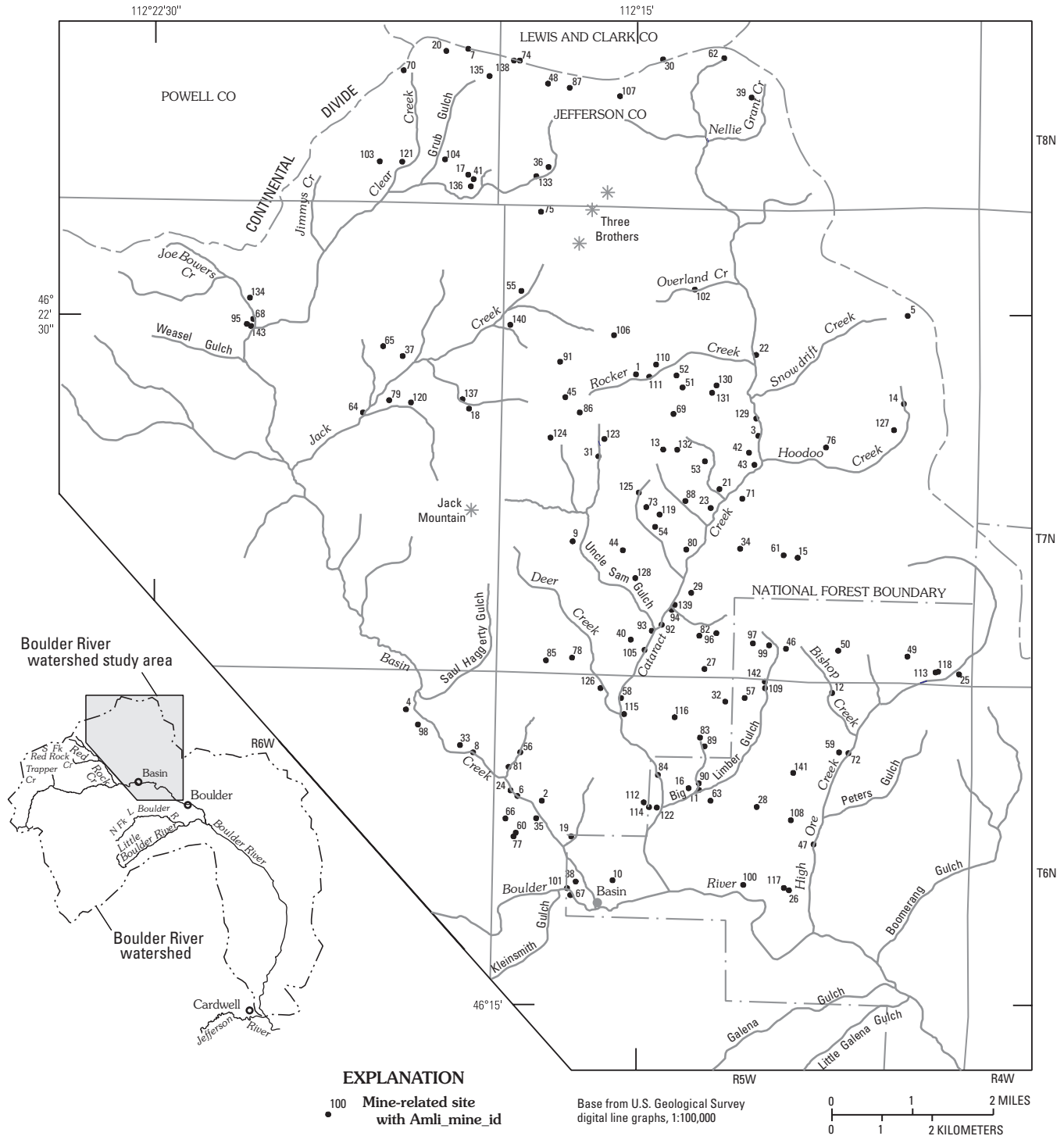


Figure 1. Mine inventory for Boulder River watershed study area.

mines database, this identifier is an item called Amli_mine_id and allows mine-related sites to be associated with scientific data and selected field sample sites. (See Rich and others, this volume, Chapter G, for a complete explanation of this relationship and how to access the mine inventory and project databases.)

Table 1 presents the descriptive information for each site in the inventory. The name field is self-explanatory. The next fields are the unique identifier just referenced and the geographic coordinates. The location status field provides a relative measure of how accurately the site has been positioned. The shafts and adits fields give an indication of the extent of

Table 1. Site-specific data for mines and prospects in the Boulder River watershed study area.

[Aml_i_mine_id in the database is Site No. (fig. 1); verif., verified; apprx., approximated; gpm, gallons per minute; undeterm., value not known; quantities expressed in units used in original data; tons, 2,000 pounds; yd³, cubic yard; --, no data. Blank spaces for flow rate and pH reflect the logical extension of a value of zero for the number of flowing adits or “no data” for the number of flowing adits. Production: very large, greater than \$5,000,000 or greater than 250,000 tons of ore; large, \$500,000 to \$5,000,000 or 25,000 to 250,000 tons of ore; medium, \$50,000 to \$499,000 or 2,500 to 24,000 tons of ore; small, less than \$50,000 or less than 2,500 tons of ore. Production data from Elliott and others (1992)]

Site name	Site No. (fig. 1)	W. longitude	N. latitude	Location status	Shafts	Adits	No. of flowing adits	Flow rate	pH	Mill existence	Dump quantity	Tailings quantity	Past production
Ada	1	112 15 4.451	46 21 45.312	verif.	1	8	multiple	west adit, <0.5 gpm east adit, --	6.67 2.57	no	1,500 tons	--	medium
Adelaide	2	112 16 25.629	46 17 9.374	verif.	--	2	0			no	--	--	undeterm.
Apollo	3	112 13 9.840	46 21 6.840	verif.	--	1	--			--	--	--	small
Aurora	4	112 18 33.120	46 18 6.840	verif.	--	5	0			no	--	--	small
Bakama	5	112 10 52.765	46 22 25.637	verif.	--	1	0			--	--	--	small
Basin Belle	6	112 16 48.482	46 17 12.195	verif.	--	2	0			no	2,000 tons	--	small
Basin Creek	7	112 17 45.423	46 25 17.565	apprx.	--	--	--			--	--	--	very large
Basin Creek Placer	8	112 17 30.120	46 17 39.840	apprx.	--	--	--			--	--	--	--
Basin Gold & Silver	9	112 16 0.840	46 19 57.000	apprx.	--	--	--			--	--	--	--
Basin Mill/Atwater Complex	10	112 15 18.860	46 16 18.769	verif.	--	--	--			yes	--	--	--
Big Limber	11	112 13 59.880	46 17 17.880	apprx.	--	--	--			--	--	--	--
Bishop Creek	12	112 11 57.715	46 18 21.774	apprx.	--	1	1	--	--	--	--	--	--
Black Bear	13	112 14 38.040	46 20 57.120	verif.	1	2	2	--	--	no	3,000 tons	--	small
Blue Diamond-Occidental	14	112 10 55.075	46 21 28.896	verif.	--	3	2	Blue Diamond = 2 gpm Occidental = 7 gpm	6.55 --	no	1,000 tons 900 tons	--	undeterm.
Boulder Chief	15	112 12 31.599	46 19 48.616	verif.	1	2	1	0.1 gpm	2.63	yes	14,225 yd ³	138 yd ³	small
Boulder Vestal	16	112 14 9.592	46 17 18.893	apprx.	--	1	--			--	--	--	small
Buckeye	17	112 17 41.413	46 23 50.974	verif.	1	multiple	0			yes	6,130 yd ³	20,750 yd ³	medium
Bullion	18	112 17 39.106	46 21 21.458	verif.	1	4	2 (1 sampled)	7 gpm	2.58	yes	42,150 yd ³	4,200 yd ³	medium
Buster	19	112 15 57.829	46 16 46.635	apprx.	--	--	--			--	--	--	undeterm.
Carlson	20	112 18 5.700	46 25 11.959	verif.	--	--	--			--	--	--	--
Cataract	21	112 13 50.880	46 20 24.000	verif.	2	3	2	--	--	yes	--	--	--
Cataract Creek Placer	22	112 13 13.080	46 21 59.040	verif.	--	--	--			--	--	--	--
Cataract Tailings	23	112 13 53.040	46 20 17.160	verif.	--	--	--			--	--	1,000 tons	--
Columbus	24	112 16 54.822	46 17 15.693	verif.	--	3	0			no	--	--	--
Comet	25	112 10 0.120	46 18 34.920	verif.	2	--	--			yes	214,000 yd ³	500,000 yd ³	very large
Comstock Group	26	112 12 35.015	46 16 14.072	verif.	--	1	--			--	--	--	small
Condor Lodes	27	112 13 56.585	46 18 35.971	verif.	1	1	--			--	--	--	undeterm.
Copper King Prospect	28	112 13 6.094	46 17 7.453	apprx.	--	--	--			--	--	--	small
Cracker	29	112 14 9.960	46 19 24.960	verif.	--	1	1	12 gpm	7.39	no	4,000 tons	--	small
Crescent	30	112 14 44.160	46 25 18.120	verif.	2	1	1	5 gpm	3.15	yes	8,460 yd ³	840 yd ³	small
Crystal	31	112 15 38.160	46 20 52.080	verif.	multiple	2	1	36 gpm	3.21	no	--	--	large

Table 1. Site-specific data for mines and prospects in the Boulder River watershed study area.—Continued

Site name	Site No. (fig. 1)	W. longitude	N. latitude	Location status	Shafts	Adits	No. of flowing adits	Flow rate	pH	Mill existence	Dump quantity	Tailings quantity	Past production
Custer	32	112 13 36.840	46 18 15.120	verif.	1	1	0			--	--	--	medium
Daily West	33	112 17 42.458	46 17 44.402	verif.	--	2	0			--	300 tons	--	small
Della Prospect	34	112 13 25.155	46 19 53.847	verif.	--	--	--			--	--	--	undeterm.
Doris	35	112 16 30.609	46 16 57.986	verif.	--	2	0			--	4,470 yd ³	--	small
Double Shaft	36	112 16 28.823	46 23 58.126	verif.	4	--	--			no	--	--	undeterm.
Dumortierite Prospect	37	112 18 41.650	46 21 54.704	apprx.	--	--	--			no	--	--	small
East Katie	38	112 15 52.972	46 16 17.553	verif.	1	--	--			--	--	--	small
Eldorado and Plateau	39	112 13 21.000	46 24 45.000	verif.	4	1	0			no	--	--	small
Elmer	40	112 15 5.425	46 18 54.133	verif.	--	1	0			--	--	--	undeterm.
Enterprise	41	112 17 38.340	46 23 49.534	verif.	1	1	1	--	3.18	--	22,930 yd ³	--	small
Eva May	42	112 13 18.335	46 20 55.908	verif.	1	1	1	5 gpm	6.67	yes	92,000 yd ³	11,000 yd ³	large
Eva May Tailings	43	112 13 13.080	46 20 48.120	verif.	--	--	--			--	--	--	--
Evening Star & Golden Assets	44	112 15 14.117	46 19 51.716	verif.	--	--	--			--	--	--	--
First Shot	45	112 16 9.840	46 21 29.880	verif.	--	--	--			--	--	--	small
Freeburg	46	112 12 41.160	46 18 49.781	verif.	--	--	--			--	--	--	--
Golconda/Reliance	47	112 12 10.840	46 16 43.878	verif.	--	2	--			no	--	--	small
Golden Glow/Lula Bell	48	112 16 30.561	46 24 51.941	verif.	--	2	--			no	--	--	undeterm.
Golden Thread	49	112 10 48.290	46 18 45.904	apprx.	--	--	--			--	--	--	small
Gray Eagle	50	112 11 52.627	46 18 49.037	verif.	1	4	1	--	6.98	--	73,000 yd ³	--	large
Gray Lead	51	112 14 20.989	46 21 37.343	verif.	--	2	1	3 gpm	7.39	yes	--	800 tons	small
Great Shield Uranium	52	112 14 26.880	46 21 45.000	apprx.	--	--	--			--	--	--	--
Hanna	53	112 13 59.160	46 20 49.920	apprx.	--	--	--			--	--	--	undeterm.
Hattie Ferguson	54	112 14 50.102	46 19 57.704	verif.	1	4	2	0.5 gpm 2.9 gpm	7.02 7.09	no	--	--	medium
Hawkeye	55	112 16 52.292	46 22 37.938	verif.	--	1	1	--	--	no	--	--	undeterm.
Hector	56	112 16 46.352	46 17 40.388	verif.	--	2	--			no	100 tons	--	undeterm.
Hiawatha	57	112 13 18.836	46 18 17.682	verif.	1	3	--			--	--	--	medium
Hidden Treasure	58	112 15 13.599	46 18 16.391	apprx.	--	--	--			--	--	--	small
High Ore	59	112 11 50.459	46 17 43.494	verif.	--	1	--			--	--	--	small
Highland	60	112 16 49.280	46 16 48.478	verif.	--	5	--			--	--	--	--
Ida M.	61	112 12 44.629	46 19 50.040	verif.	0	1	1	2 gpm	5.43	no	--	--	small
Ida May	62	112 13 46.999	46 25 10.141	verif.	1	0	0			--	--	--	small
Independence	63	112 13 49.080	46 17 11.040	apprx.	--	--	--			--	--	--	--
Jack Creek Mill Tailings	64	112 19 17.659	46 21 17.864	verif.	--	--	--			--	--	23,000 yd ³	--
Jack Creek Ridge	65	112 18 59.886	46 22 0.864	verif.	--	--	--			--	--	--	--
Jessie	66	112 16 59.117	46 16 57.573	verif.	--	--	--			--	--	--	--

Table 1. Site-specific data for mines and prospects in the Boulder River watershed study area.—Continued

Site name	Site No. (fig. 1)	W. longitude	N. latitude	Location status	Shafts	Adits	No. of flowing adits	Flow rate	pH	Mill existence	Dump quantity	Tailings quantity	Past production
Jib Tailings	67	112 15 57.820	46 16 8.780	verif.	--	--	--			--	--	--	--
Joe Bower's	68	112 21 1.080	46 22 17.040	verif.	0	1	1		high	--	removed	--	undeterm.
John T.	69	112 14 29.040	46 21 20.160	verif.	--	1	0			--	--	--	small
Josephine	70	112 18 45.000	46 24 59.040	verif.	2	1	1		5.8	--	21,680 yd ³	--	small
Jumbo	71	112 13 23.880	46 20 26.160	apprx.	--	1	0			--	--	--	undeterm.
King Cole	72	112 11 41.753	46 17 43.032	verif.	--	2	--			no	medium	--	small
Klondyke	73	112 14 52.937	46 20 19.782	verif.	1	multiple	0			--	--	--	small
Lady Hennessey	74	112 16 57.197	46 25 7.853	verif.	2	multiple	--			--	--	--	small
Lady Leith	75	112 16 35.182	46 23 29.229	verif.	2	6	2	--	neutral	no	3,505 yd ³	--	small
Lizzie Osborne	76	112 12 6.840	46 21 0.000	verif.	--	2	0			--	--	--	undeterm.
Lotta	77	112 16 51.330	46 16 46.110	verif.	--	1	--			--	--	--	--
Louise	78	112 15 59.693	46 18 41.946	verif.	--	1	0			--	--	--	undeterm.
Lower Bullion Mill and Smelter	79	112 18 53.460	46 21 26.044	verif.	--	--	--			yes	--	--	--
Lower Hattie Ferguson	80	112 14 15.198	46 19 52.803	verif.	0	1	1	<1 gpm	6.87	--	2,000 tons	--	undeterm.
Lower Hector	81	112 16 57.000	46 17 30.840	verif.	--	1	--			no	<10 yd ³	--	undeterm.
Lower Vera & Marie	82	112 14 1.827	46 18 57.349	apprx.	--	--	--			--	--	--	--
Manhattan	83	112 13 59.689	46 17 51.642	verif.	--	--	1	--	--	--	--	--	undeterm.
Mantle	84	112 14 34.427	46 17 27.187	verif.	2	2	--			yes	large	--	small
Marguerita	85	112 16 23.880	46 18 39.960	verif.	1	1	--			--	--	--	small
Mary Anne	86	112 15 56.160	46 21 20.160	verif.	--	--	0			--	--	--	--
May Lillie	87	112 16 10.316	46 24 49.437	verif.	--	--	--			--	--	--	--
Mike #14	88	112 14 16.713	46 20 24.161	verif.	--	1	0			--	--	--	undeterm.
Minneapolis	89	112 13 55.339	46 17 46.085	verif.	--	2	1	--	--	no	--	--	small
Minneapolis Placer & Prospect	90	112 14 0.217	46 17 22.178	verif.	--	1	0			no	--	--	--
Morning	91	112 16 15.206	46 21 52.699	verif.	3	3	2	--	6.31 6.31	no	1,300 tons	--	small
Morning Glory	92	112 14 36.960	46 19 4.080	verif.	1	3	0			no	29,000 yd ³	7,200 yd ³	medium
Morning Glory Tailings	93	112 14 45.960	46 19 0.120	verif.	--	--	0			yes	--	6000 tons	--
Morning Marie	94	112 14 27.820	46 19 13.807	verif.	1	1	1	<0.5 gpm	--	no	--	--	undeterm.
Morning Star	95	112 21 6.849	46 22 13.742	verif.	--	3	--			no	--	--	small
Mountain Chief	96	112 13 46.034	46 18 59.199	apprx.	1	1	1	--	--	yes	500 tons	--	small
Mt. Thompson	97	112 13 12.000	46 18 52.920	verif.	--	3	0			--	--	--	small
N462741	98	112 18 21.795	46 17 57.227	apprx.	--	--	--			--	--	--	--
North Waldy	99	112 12 56.880	46 18 51.840	verif.	--	1	1	1 gpm	7.43	no	small	--	undeterm.
Obelisk	100	112 13 17.468	46 16 17.113	verif.	1	2	0			yes	--	--	small
Old Basin Mill Site	101	112 16 0.962	46 16 13.243	verif.	--	--	--			yes	--	--	--

Table 1. Site-specific data for mines and prospects in the Boulder River watershed study area.—Continued

Site name	Site No. (fig. 1)	W. longitude	N. latitude	Location status	Shafts	Adits	No. of flowing adits	Flow rate	pH	Mill existence	Dump quantity	Tailings quantity	Past production
Overland Creek	102	112 14 11.040	46 22 41.880	verif.	2	--	--			no	--	--	undeterm.
Pearl	103	112 19 5.880	46 24 0.000	apprx.	1	--	--			no	--	--	--
Perry Parks Placer	104	112 18 5.194	46 24 2.017	verif.	--	--	--			--	placer dredgings	--	--
Phantom	105	112 14 52.515	46 18 47.624	verif.	--	1	1	0.5 gpm	7.43	no	200 tons	--	undeterm.
Piermont No.1 East/North Ada	106	112 15 25.453	46 22 10.349	verif.	2	--	--			no	--	--	undeterm.
Quartz Creek	107	112 15 23.410	46 24 44.553	verif.	--	1	0			--	--	--	undeterm.
Queen of the Hills	108	112 12 34.270	46 16 59.234	apprx.	--	--	--			--	--	--	small
Red Wing	109	112 12 58.139	46 18 24.187	verif.	--	2	1	0.2 gpm	7.74	no	--	--	small
Rocker	110	112 14 45.960	46 21 51.840	verif.	--	2	1	<1 gpm	3.35	no	1,500 tons	--	undeterm.
Rocker Extension	111	112 14 52.080	46 21 43.920	verif.	--	1	1	2 gpm	8.56	no	350 tons	--	undeterm.
Rose	112	112 14 45.161	46 17 8.054	verif.	--	--	--			--	--	--	small
Rumley	113	112 10 21.954	46 18 36.010	apprx.	1	--	--			--	--	--	medium
Ruth	114	112 14 42.157	46 17 6.384	verif.	--	--	--			--	--	--	undeterm.
Saturday Night	115	112 15 10.514	46 18 6.066	verif.	1	1	0			--	--	--	small
Seattle	116	112 14 23.534	46 18 4.564	verif.	--	multiple	0			--	--	--	undeterm.
Silmont Claims	117	112 12 39.795	46 16 15.526	verif.	--	--	0			--	--	--	--
Silver Hill	118	112 10 19.489	46 18 36.448	verif.	1	--	--			--	--	--	small
Sirius	119	112 14 40.518	46 20 15.110	verif.	1	1	1	1.5 gpm	4.44	no	5,000 tons	--	small
Smelter Creek Adit	120	112 18 33.120	46 21 24.840	verif.	--	--	--			--	--	--	--
Solar (Solar Pearl)	121	112 18 44.970	46 24 0.036	apprx.	2	1	--			no	--	--	small
South Mantle	122	112 14 38.810	46 17 6.117	verif.	--	3	--			no	--	--	small
Sparkling Water	123	112 15 32.870	46 21 3.327	verif.	--	--	0			--	--	--	undeterm.
St. Lawrence	124	112 16 22.963	46 21 3.636	verif.	2	--	--			--	--	--	undeterm.
St. Nick	125	112 15 0.131	46 20 29.061	verif.	1	--	--			--	--	--	undeterm.
Slyvan	126	112 15 32.825	46 18 22.638	verif.	--	3	--			--	--	--	undeterm.
Totten (Billie T.)	127	112 11 3.840	46 21 11.880	verif.	--	1	--			--	--	--	small
Uncle Sam	128	112 15 2.133	46 19 33.894	verif.	1	multiple	0			no	--	--	medium
Unnamed #1	129	112 13 12.000	46 21 18.000	verif.	--	1	1	--	--	no	500 tons	--	undeterm.
Unnamed #2	130	112 13 49.515	46 21 38.995	verif.	--	1	1	1 gpm	7.05	no	250 tons	--	undeterm.
Unnamed #3	131	112 13 53.480	46 21 34.194	verif.	3	2	1	<1 gpm	6.11	no	--	--	undeterm.
Unnamed #4	132	112 14 25.080	46 20 57.120	verif.	--	1	1	1 gpm	7.24	no	--	--	undeterm.
Unnamed Placer	133	112 16 40.080	46 23 52.08	verif.	--	--	--			--	--	--	--
Unnamed Placer	134	112 21 4.445	46 22 30.735	verif.	--	--	--			--	--	--	--
Unnamed Uranium	135	112 17 25.080	46 24 56.160	apprx.	--	--	--			--	--	--	--
Upper Buckeye Mill Tailings	136	112 17 40.770	46 23 44.869	verif.	--	--	--			yes	--	20,750 yd ³	--
Upper Bullion Mill Tailings	137	112 17 45.313	46 21 27.448	verif.	--	--	--			yes	--	4,200 yd ³	--
Venus	138	112 17 2.588	46 25 6.468	apprx.	--	--	--			--	--	--	small
Vera & Marie	139	112 14 25.080	46 19 17.040	verif.	2	2	--			no	1,500 tons	--	small
Vindicator	140	112 17 2.040	46 22 15.960	verif.	--	multiple	multiple	--	6.68	no	--	--	small
Virginia	141	112 12 32.677	46 17 29.805	apprx.	--	--	0			--	--	--	small
Waldy	142	112 12 58.339	46 18 28.426	verif.	--	1	1	5 gpm	7.93	no	small	--	undeterm.
Winters Camp	143	112 21 3.021	46 22 12.487	verif.	1	4	1	--	--	no	--	--	undeterm.

the workings at that site. The number of flowing adits, the flow rate, and the pH of the discharge represent important point-source information. In numerous cases, either the site did not have a flowing adit or data were not available for the flow rate and pH. The mill existence field indicates the historical presence or absence of a mill at the site. The dump quantity and tailings quantity fields provide a measure of the amount of waste rock or mill tailings at each site (again, the sources did not necessarily document this descriptor for every site). The past production field shows each site's output in relative terms. The following provides a measure of the value or magnitude of production based either upon the value of the ore shipped (expressed in units of \$1,000) or tonnage produced (expressed in units of 1,000 tons): very large, greater than \$5,000,000 or greater than 250,000 tons of ore; large, \$500,000–\$5,000,000 or 25,000–250,000 tons of ore; medium, \$50,000–\$499,000 or 2,500–24,000 tons of ore; small, less than \$50,000 or less than 2,500 tons of ore; no or undetermined production. Monetary figures represent value at time of production (Elliott and others, 1992).

Discussion

The Boulder River watershed study area contains numerous prospects and smaller mine-related localities not inventoried for this study. Whereas the potential exists for any one of these sites to adversely affect ecosystem health, the data sources and field investigations suggest that this inventory is comprehensive in terms of identifying the significant historical mines and mine-related sites.

Some historical mine sites contain large underground workings or have multiple shafts and adits over an area. Regardless of complexity, the inventory represents each site with a single location.

The decision to encode the location status field in table 1 with “verified” or “approximate” was determined by a comparison of the source description and field diagrams with the DOQs and locations symbolized on existing maps. A verified value means that USDA Forest Service and USGS personnel in Montana checked the mine-related location and agreed on its position with a high degree of confidence.

The values in table 1 represent a choice of values from multiple sources. Discounting the unique identifier, the geographic coordinates, and the location status, the values for any particular column do not necessarily originate from the same source. For example, the number of adits for the Ada mine originates from source A, and the number of adits for the Bullion mine originates from source B. Likewise for any particular mine, the values for each of the columns may derive from different sources. All data sources are referenced herein.

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136 Environmental Effects of Historical Mining, Boulder River Watershed, Montana

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