

# **Montana**

## **Abandoned Mine Land Workplan**

### **Period: FY2007 – FY2013**

#### **Summary**

With respect to locatable minerals, Montana was historically one of the most active and productive metallic mineral producing areas in the world and is presently rated as 4<sup>th</sup> among the states by the minerals industry for its mineral exploration potential. While production has presently dropped off the future potential to produce metals and industrial minerals in southwest and western Montana is great.

Some of the significant mining areas in Montana, as described on the DEQ web site, are the precious metal districts of western and southwestern Montana. Placer gold was first discovered in the Gold Creek area in 1852, production began in 1862 in Bannock, followed in 1863 by Virginia City. Helena, Silver Bow Creek, Confederate Gulch, Bear Gulch, Elk Creek, Gold Creek, Carpenter Creek/Blackfoot City, Indian Creek and numerous other locations in central southwestern Montana were soon were producing placer gold as well.

By 1887, Montana led the nation in production of silver. The Butte District was Montana's largest producer of silver. And the Granite Mountain and Bimetallic mines at Phillipsburg were thought to be the largest single sources of silver in the world. Development of the rich silver deposits at Wickes, Hecla, Rimini, Castle, Elkhorn, and Neihart further expanded Montana's production. The Butte District also produced copper for the expanding electric age.

The evolution of cyanide processing enabled gold extraction from previously unprofitable ore and large gold mines were developed such as at Golden Sunlight in the Whitehall District.

Montana has also been a large scale producer of base metals including zinc, manganese and lead. Copper, lead, and silver have been produced from lode mines in numerous districts throughout western and southwestern Montana. Most of the copper which made the electric age possible came from mines in the Butte district.

Sapphires were produced on a large scale from placer deposits around the Upper Missouri Lakes and the Rock Creek area. Placer gold and sapphires are still produced from numerous small productions in this district.

Industrial minerals have been also been and are being produced throughout western Montana. Talc deposits are prominent in the Dillon area, limestone is abundant in the Butte area and Garnet Range, and phosphate was historically produced from both the Missoula, Dillon and Butte Field Office areas.

#### **Site Status**

The Western BLM Montana zone (BFO, DFO, MFO) currently has an inventory of 1,183 known abandoned hardrock mines on public lands with both BLM and mixed ownership. This inventory

includes 5 unreclaimed mines that may impact water resources within 2 priority watersheds (Upper Missouri and Beaverhead); 59 unreclaimed sites likely pose physical safety hazards. To date, 16 water quality projects, including 18 sites have been remediated. Six of these water quality sites were reclaimed in partnership with the state of Montana or the EPA. Forty-one sites with physical safety hazards have been remediated.

### **AML Watershed Projects**

There are presently 5 known unreclaimed abandoned mines on public lands in Montana's Western Zone (BFO, DFO, MFO) that have possible impacts on water quality of 1 priority water shed, the Upper Missouri. These impacts include placer tailings inhibiting the flow of water and metals in mine dumps or tailings that may erode or mobilize into the watersheds. The 3 highest priority watersheds impacted by abandoned mines on public lands include, in priority order, the Boulder River, Ten Mile and Indian Creek. Work on BLM sites impacting water quality in the Boulder River has been completed (High Ore, Redwing Waldy). Work from 2007 to 2013 will include mines in the Upper Missouri.

The watersheds were prioritized on the basis of several inventories conducted by the Montana Bureau of Mines and Geology (MBMG) for the Forest Service and the BLM on the public lands in the early 1990s. The Montana Department of Environmental Quality (DEQ) conducted inventories during this period on private lands and mixed ownership sites. Periodic meeting between the agencies identified sites that ranked high for environmental degradation and presented opportunities for partnerships between the various agencies. These sites were remediated first. Agencies also had sites that were not mixed ownership which they remediated as funding allowed. They generally followed a prioritization scheme based on hazards presented to the environment and public health and safety. The watershed approach allowed several large mixed ownership sites to be reclaimed. The Boulder watershed with the High Ore, Comet, and City of Basin sites were cooperative efforts of DEQ, BLM, FS, and EPA. Public participation occurred both on the project specific level and the in the watershed selection.

Pegasus's bankruptcy at the Zortman/Landusky Mines resulted in AML funds augmenting the reclamation bonds to ensure that the preferred alternative identified in the reclamation EIS being implemented. The reclamation planning process was a cooperative effort of the BLM, DEQ, EPA, Fort Belknap Tribes and others. The dirt reclamation at the site is complete although water treatment will continue indefinitely. There is an annual shortfall of \$700,000 for water treatment. The treatment process is currently being studied by DEQ and BLM through the EE/CA process to identify the most efficient and cost effective treatment process that will meet water quality standards to extent possible. The MT Congressional delegation asked BLM to allocate funding to this project.

**Table 1.**

<b>Priority Watershed Projects FY 2007-FY2013</b>							
<b>WATERSHED</b>	<b>PROJECTS FUNDED/ PLANNED</b>	<b># AMM Sites</b>	<b>FY START</b>	<b>FY FINISH</b>	<b>EST TOTAL COST</b>	<b>EST BLM PORTION</b>	<b>KEY PARTNERS</b>
1. Lower Missouri	Zortman/Landusky Water Treatment	125 acres at 1 site	2002	2017	7.5 M	2.5 M	MT DEQ, Fort Belknap Tribes
2. BFO – Upper Missouri	Indian Creek Tailings	50 acres at 1 site	2005	2009	\$1.5M	BPS (est. \$1.5M)	Possible partners: National Guard, Greymont Mining, FWP
3. BFO - Upper Missouri	Iron Mask	~ 5 acres and 5 physical safety sites at 1 site	2006	2010	\$750,000	BPS (est. \$750,000)	None
4. BFO – Upper Missouri	Great Divide Sand Tailings	4.3 acres at 1 site	EE/CA in 2005	2008	\$550,000 (total – 750,000)	\$750,000	None
5. BFO - Upper Missouri	Hard Cash	~5 acres at 1 site	2009	2011	\$250,000 (est.)	\$250,000	None
6. BFO- Keating Gulch	Keating Tailings (Mixed ownership, BLM = ~8%)	~10 acres total, of which ~8% is BLM, funding revegetation study at 1 site	2005 began monitoring	2007	\$15,000/year Total \$30,000	BPS (est. \$30,000)	None
7. East Pacific Repository (FS)	Repository to hold wastes from FS sites in N. Elkhorn Mts.	Unknown at present	Unknown at present	Unknown at present	Unknown at present	Unknown at present	Forest Service

### **AML Physical Safety Sites**

To date 41 high-risk mine openings have been remediated and an additional 60 identified on BLM managed lands in southwest Montana. These sites are within the jurisdiction of the Butte, Dillon, and Missoula BLM Field Offices. The most significant type of mine hazard features are abandoned adits and shafts remaining at AML sites in close proximity to high use areas. Three mines with possible physical safety hazards near high use areas are presently known to exist in the field office areas:

- Scratchgravel Project consists of 2 mines (South Hopeful and Magpie) that lie in the Scratchgravel Hills which is a high use recreation area near the city of Helena where people ride motorcycles, horses and hike.
- The Sheep Creek mine contains an abandoned pit and adits near a Forest Service Campground.

These areas have high use for hiking and riding off road vehicles. It is estimated that \$47,000 will be required to remediate these mine hazard hazards. These mines will be backfilled or closed with bat friendly gates.

Remediation at key sites is guided by focused inventory assessments starting with those site clusters in closest proximity to sites with high public exposure.

**Table 2.**

<b>Priority Physical Safety Hazard Sites 2007-20013</b>					
<b>NOTE – THIS PRIORITY LIST WILL VARY OVER TIME DEPENDING ON THE PROGRESS OF WORK, NEW FOUND SITES AND THE PRESENCE OR ABSENCE OF ACTIVE CLAIMANTS</b>					
Cost estimates based on \$3000/feature for bat & cultural surveys, closure designs and closure. Actual costs for each site will vary greatly					
<b>RECREATION AND HIGH USE AREAS</b>	<b># OF AMM SITES</b>	<b>FY START</b>	<b>FY FINISH</b>	<b>EST BLM COST</b>	<b>KEY PARTNERS</b>
<b>Butte Field Office</b>					
1. BFO - Scratchgravel Hills (priority site hear near Helena)	1) Scratchgravel Project – 2 sites, 7 features A.) South Hopeful – Install Bat Gate B) Magpie Extension Group – 6 features – backfill and gate	2005	2007	BPS (est. \$39,000)	None
2. BFO - Keating Gulch Area (moderate use – hunting)	1) Keating Safety Project – 3 sites, 16 features (background surveys completed) A) Hard Cash – 7 features B) Hawk – 4 features C) Copper King – 5 features	2004	2007	BPS (est. \$42,000)	None
3. BFO – Iron Mask (low use – hunting)	1) Iron Mask Physical Safety Project, 1 site, 3 features	2006	2010	\$9,000	None
4. BFO - Big Indian	A) Big Indian – 1 site, 2 features	2006	2007	\$6000	None
5. BFO – Camp Creek (low to moderate use – hunters)	1) Camp Creek Project – 6 sites, 25 features A) Nitrogen – 4 features B) Mullens – 10 features C) Camp Creek – 6 features D) Chlorite (2 features) E) Hidden Mine – (2 features) F) Earl’s Prospect (1 feature) (Monitor claim status of Short shift & Little Butte)	2007	2008	\$75,000	None

6. BFO – Fish Creek (Isolated – low use area)	A) Fish2Heart – 1 site, 4 features, 3 adits (gate), 1 pit (backfill)	2007	2008	\$12,000	None
7. BFO - Marysville (moderate use – hunting, snowmobile)	1) Marysville Project, 3 sites, 6 features A) Empire Mine – 2 features B) Towsley Mine – 3 features C) Nile Mine West – 1 feature	2008	2009	\$18,000	None
8. BFO – Free Enterprise (Isolated – moderate use – hunting)	A) Free Enterprise Mine – 1 site, 1 feature	2009	2010	\$3,000	None
9. BFO – Spring Creek (low use – isolated)	1) Spring Creek Project, 2 sites, 4 features A) UM-PP sites 4 & 5 – 2 features B) Finn Gulch – 2 features	2010	2011	\$12,000	None
<b>Dillon Field Office</b>					
10. DFO – Sheep Creek (moderate use – near FS campground)	A) Sheep Creek – 1 site, 3 to 5 features	2006	2007	\$25,000	None
11. DFO – Rochester (Low to moderate use? – hunters, miners)	1) Rochester Project – 8 sites, 54 features (background surveys complete)	2004	2010	\$141,000	None
12. DFO – Montana Boy (low use area)	Montana Boy - 1 site, 1 features	2010	2011	\$3,000	
13. DFO – Pony Creek	1) Pony Creek – 1 site, 3 features A) Pony #4 B) Pony #4 C) Pony #6	2010	2011	\$9,000	
14. DFO - Jefferson River (low use area – hunters)	1) Jefferson River Project, 2 sites, 10 features A) Galena Mine (mix of pvt) – 4 features B) Paupers Dream – 6 features – inaccessible	2011	2012	\$30,000	
15. DFO – Ruby River (Low use)	1) Ruby River Project 3 sites, 3 features A) Sand Coulee Au Dep. – 1 features B) Latest Mine Out – 1 feature C) Buckeye – 1 feature (may do in conjunction with adjacent state water quality project) (Check claim status of South Broadguage Tamarack)	2012	2013	\$15,000	
16. DFO – Alder Gulch	1) Alder Gulch Project - 1 site, 1 feature A) Batton Brothers Mine – 1 feature (Monitor active claims in the area)	2012	2013	\$3,000	
17 DFO – Rattlesnake Cr. (low to moderate use)	1) Rattlesnake A) Groundhog – 1 site, 1 feature B) Goodview – 1 site “several” features				

<b>Missoula Field Office</b>					
18. MFO - Blackfoot (Coloma site is in high use recreation area)	1) Blackfoot Project – 2 sites, 2 features A) Coloma North – 1 feature C) Leonard – 1 feature	4 BH in 2006 or 2007	2007	\$5,200	None
19. MFO – Clark Fork (Medium to low use recreation areas)	1) Clark Fork Project – 5 sites, 8 features A) Silver King (4 features) B) Toy Town II – 1 feature C) Montana – 1 feature D) Cave Hill – 1 features E) Sunrise – 1 feature	5 sites BH in 2007	HP in 08	\$24,000	None

<b>South Dakota Field Office</b>					
20. Black Hills Exemption Area	2 Features	2006	2010	\$10,000	None

<b>Malta Field Office</b>					
21. Little Rockies	6 Features	2006	2010	\$15,000	None

<b>Lewistown Field Office</b>					
22. Judith and Moccasin Mountains	6 Features	2006	2010	\$15,000	None

**Table 3. FY2007 – FY2013 Workload Targets**

PE	FY07	FY08	FY09	FY10	FY11	FY12	FY13	Total
BH	BFO = 1 Iron Mask DFO = 8 Camp Cr 8 MFO = 5 Clark Fork 5 Total = 14	BFO = 3 Marysville 3 DFO = 0 MFO = 0 MaltaFO=6 Total = 9	BFO = 2 Free Enterprise (1) Hard Cash = 1 DFO = 0 MFO = 0 SDFO=2 Total = 4	BFO = 0 DFO = 2 MT Boy (1) Pony Cr (1) MFO = 0 LFO=6 Total = 8	BFO = 2 Spring Cr. Project (2) DFO = 2 Jefferson R (2) MFO = 0 Total = 4	BFO = 0 DFO = 5 Ruby R (2) Alder (1) Rattlesnake (2) MFO = 0 Total = 5	BFO = 0 DFO = 0 MFO = 0 Total = 0	44
HP	BFO = 6 Scratchgravel 2 Keating Safety Project 3 Big Indian 1 DFO = 1 Sheep Cr. 1 MFO = 4 Blackfoot Project 2 Total = 9	BFO = 9 Fish2Heart (1) Camp Creek Project (8) DFO = 0 MFO = 5 Clark Fork (5) Total = 14	BFO = 3 Marysville Project (3) DFO = 0 MFO = 0 MaFO=6 Total = 9	BFO = 2 Iron Mask (1) Free Enterprise (1) DFO = 8 Rochester (8) MFO = 0 SDFO=2 Total = 12	BFO= 0 DFO = 2 MT Boy (1) Pony Cr (1) MFO = 0 LFO=6 Total = 8	BFO = 2 Spring Cr Project (2) DFO = 22Jefferson n R. (2) MFO = 0 Total = 4	BFO = 0 DFO = 3 Ruby R. (2) Alder (1) Rattlesnake (2) MFO = 0 Total = 3	59

JK	BFO = 0 DFO = 0 MFO = 0 Total = 0	BFO = 4..3 Great Divide (4.3 acres) DFO = 0 MFO = 0 Total = 9..3	BFO = 55 Indian Cr Dredge Iron Mask (~5) DFO = 0 MFO = 0 Total = 55	BFO = 0 DFO = 0 MFO = 0 Total = 0	BFO = ~5 Hard Cash DFO = 0 MFO = 0 Total = ~5	BFO = 0 DFO = 0 MFO = 0 Total = 0	BFO = 0 DFO = 0 MFO = 0 Total = 0	
NP	BFO = 1 Iron Mask DFO = 0 MFO = 0 Total = 1	BFO = 0 DFO = 0 MFO = 0 Total = 0	BFO = 0 DFO = 0 MFO = 0 Total = 0	BFO = 0 DFO = 0 MFO = 0 Total = 0	BFO = 0 DFO = 0 MFO = 0 Total = 0	BFO = 0 DFO = 0 MFO = 0 Total = 0	BFO = 0 DFO = 0 MFO = 0 Total = 0	69.3 Acres
NQ	BFO = 0 DFO = 0 MFO = 0 Total = 0	BFO = 0 DFO = 0 MFO = 0 Total = 0	BFO = 0 DFO = 0 MFO = 0 Total = 0	BFO = 0 DFO = 0 MFO = 0 Total = 0	BFO = 0 DFO = 0 MFO = 0 Total = 0	BFO = 0 DFO = 0 MFO = 0 Total = 0	BFO = 0 DFO = 0 MFO = 0 Total = 0	1
								0

\* BH=Inventory/Assessment, HP=Physical Hazard, JK=Environmental Hazard, MG=Monitoring, NP=Evaluate Cost Avoidance/Cost Recovery, NQ=Process Hazmat Cost Avoidance/Cost Recovery Cases

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