

**USFS-ABANDONED MINED LAND INVENTORY PROJECT**

**SOUTH PLATTE RANGER DISTRICT**

**SUMMARY REPORT**

January 4, 1993

**USFS-ABANDONED MINED LAND INVENTORY PROJECT / SUMMARY REPORT  
SOUTH PLATTE RANGER DISTRICT**

**Introduction**

This document summarizes the sites *of concern* to the USFS - South Platte Ranger District. It does not include all the mine sites visited during the inventory of the district. The Summary Report includes only sites that were given Environmental Degradation Ratings of extreme (1), significant (2), or potentially significant (3) or sites given Mine (Physical) Hazard Ratings of extreme danger (1) or dangerous (2). The sites exhibiting environmental degradation will eventually undergo further investigation through the Regional Office. We recommend that all mine openings with a Mine Hazard Rating of 1 or 2 be capped, filled, or closed in some way. *Mines with a hazard rating of 3 (potentially dangerous) are not included in this summary. Even so, they are open and represent a threat to those who choose to enter them. If funds are available, these mines should also be closed.*

**NUMERICAL SUMMARY:**

**36** field forms

**57** mine openings inventoried (includes collapsed or filled openings)

**32** mine dumps, tailings piles, highwalls, etc.

**16** mine features have Environmental Degradation Ratings of 1, 2, 3 or 4.

Number of features with EDR of 1 = 1

Number of features with EDR of 2 = 0

Number of features with EDR of 3 = 3

Number of features with EDR of 4 = 12

Number of features with EDR of 5 = 73

**27** mine features have Mine (Physical) Hazard Ratings of 1, 2, or 3.

Number of features with PHR of 1 = 0

Number of features with PHR of 2 = 6

Number of features with PHR of 3 = 21

(There is no rating of 4)

Number of features with PHR of 5 = 62

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**PRIORITY SITES**

**Environmental Degradation**

Site Name	Quad Name	Site #	EDR
1) <b>Iron Clad Claims-Geneva Creek /Josephine Creek Bog Iron Deposits</b>	Montezuma	12-11-429-4380-2.300 and 12-11-430-4379-1.300	1
2) <b>Revenue Mountain Drainage-Baltic/Revenue Mine</b>	Montezuma	12-11-430-4380-1.300	2
3) <b>Upper N. Fork S. Platte River / Hall Valley-Whale &amp; Missouri Mines</b>	Montezuma	12-11-427-4374-1.300	3
4) <b>Sill Mine</b>	Montezuma	12-11-428-4380-1.300,302	3
5) <b>Northeast of Lininger Lake, Gem (Jim) Dandy Claim</b>	Jefferson	12-11-433/4367-1.102,202	3

The priority sites listed here exhibit environmental degradation related to mining. Certain areas within the North Fork of the South Platte River watershed exhibit degraded water quality where no mining or very limited mining has taken place. The hydrothermally altered geologic terrane appears to naturally be causing increased acidity and elevated metal concentrations in surface waters of these areas. **Areas exhibiting this "natural degradation" are not listed in the above priority sites.** In addition, some of the sites listed above may have a significant component of natural degradation in addition to mine-generated degradation.

A priority listing of sites exhibiting physical hazards is not given because only two mine features were rated as dangerous (Hazard Rating=2) in this district. They are described on page 15.

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**Sites Exhibiting Environmental Degradation**

Quad Name: Jefferson

**Site ID#:** 12-11-430-4370-1.300

**Site Name:** Handcart Gulch-water sample

**Environmental Degradation Rating:** 2

**Description and pertinent facts:** This full-suite water quality sample was taken from Handcart Gulch approximately 600 feet above it's confluence with the North Fork South Platte River. The sample was taken on 7/29/92 from an estimated flow of 15 cfs with a recorded pH of 3.5 and measured conductivity of 500 uS. At this locality, visible orange precipitates are abundant in the stream bed. Analysis of this preserved and filtered water sample reveals elevated levels of the following metals in this portion of Handcart Gulch:

<u>Metal</u>	<u>Concentration</u>	<u>Factor Above Colorado Basic Standard for Class 1 Aquatic Life</u>
Cadmium	0.52 ug/L	1.30 X
Copper	170 ug/L	34.0 X
Iron	13000 ug/L	13.0 X
Zinc	190 ug/L	3.80 X

The cause of large volume acid-metal drainage in Handcart Gulch is natural drainage from highly fractured, sulfide-rich rock mantles which blanket the slopes of Red Cone Peak. Surface and groundwater are degraded by the initial oxidation of iron sulfide controlled by Reaction 1 ( see next page ). This reaction is propagated by the extremely large available surface area of sulfide exposed to natural waters in the Red Cone rock mantles.

Large volume of acid-metal laden water which emerges from private claims on the east side of Handcart Gulch is related to two large faults which transect Red Cone Peak and cross the valley in this vicinity ( see geologic map). Prospect adits driven into these fault zones do not effectively increase flow rates from these structural features.

Additional acid generation is realized as free ferrous iron in surface waters is further oxidized to ferric iron by the action of bacteria in the extensive bog-iron deposits accumulating in the valley floor. The reaction responsible for this second phase of acid generation is shown on the following page ( Reaction 2 ).

Quad Name: Montezuma

**Site ID#:** 12-11-427-4374-1.300

**Site Name:** Upper N. Fork S. Platte River/Hall Valley-Whale & Missouri Mines

**Environmental Degradation Rating:** 3

**Description and pertinent facts:** This full-suite water quality sample taken from N. Fork S. Platte River in Upper Hall Valley, immediately below Missouri/Whale mine complex. This area was extensively mined for silver/base metals prior to 1900. All mine workings are currently inaccessible. Direct mine drainage was observed emerging from a recent exploration tunnel driven in below the historic Whale Mine workings, and from the lower portal of the Missouri Mine. The old workings of the Whale Mine appear to be above the water table at this time. This sample was collected to monitor off-site migration of metals from these mines. Sample was collected from wetlands below the Missouri Mine. At the time of site-visit on 7/23/92, recorded pH was 6.5 with a conductivity of 100 uS. Analysis of filtered-preserved water samples shows elevated levels of one metal:

<u>Metal</u>	<u>Concentration</u>	<u>Factor Above Colorado Basic Standard for Class 1 Aquatic Life</u>
Copper	21.0 ug/L	4.20 X

The portal below the historic Whale workings was sampled 8/90 and reveals elevated levels of: aluminum, cadmium, copper, iron, manganese, and zinc. The Missouri Mine complex was sampled also 8/90 and shows elevated levels of: copper and zinc. Currently, a strong wetland immediately adjacent to the Missouri Mine is responsible for an 80 % reduction in total copper.

Quad Name: Montezuma

**Site ID#:** 12-11-428-4374-1.300

**Site Name:** Upper Handcart Gulch/Webster Pass-Red Cone

**Environmental Degradation Rating:** 3

**Description and pertinent information:** This full-suite water quality sample collected at junction of two upper tributaries of the headwaters of Handcart Gulch, immediately above extensive, privately held mining claims laid out in the valley bottom. This stream drains Handcart Peak, Webster Pass, and Red Cone. Mining in this basin has been limited to placering of the large bog-iron deposits on the valley floor. Historically, native copper was panned out of these bog deposits and erroneously reported as "red gold". Visible degradation is limited in this area to minor iron oxide staining in the stream bed. At the time of the site-visit on 8/6/92, an estimated flow of 3 cfs had a recorded pH of 3.8 and a conductivity of 100 uS. Analysis of filtered & preserved water sample shows elevated levels of these metals:

<u>Metal</u>	<u>Concentration</u>	<u>Factor Above Colorado Basic Standard for Class 1 Aquatic Life</u>
Cadmium	0.44 ug/L	1.10 X
Copper	5.00 ug/L	Threshold
Iron	5600 ug/L	5.60 X
Zinc	120 ug/L	2.40 X

Quad Name: Montezuma

**Site ID#:** 12-11-428-4380-1.300,302

**Site Name:** Sill Mine

**Environmental Degradation Rating:** 3

**Description and pertinent facts:** The main adit of the Sill Mine is currently collapsed and is not draining any water. The surface flow of Upper Geneva Creek, which heads high on the northeast slopes of Santa Fe Peak, is somewhat degraded as it enters the Sill Mine site. This degradation is undoubtedly caused by sulfide mineralization in contact with groundwater in the upper mine workings of the Silver Wave mine on Santa Fe Peak. Surface flow estimated at less than 0.1 cfs in upper Geneva Creek had a recorded pH of 5.5 and a conductivity of 100 uS, in the vicinity of the Sill Mine, as of 8/7/92. Immediately adjacent to the collapsed portal of the Sill Mine, this reach of Upper Geneva Creek becomes groundwater near the main mine dumps. Some 900 feet to the east of the Sill Mine, a point of strong groundwater emergence is noted at the base of an extremely large slope of rock-mantle or talus. Flow rate estimates as of 8/7/92 for this groundwater were 0.75 cfs with a recorded pH of 4.3 and conductivity of 100 uS. It is not known at this time if there is communication between this groundwater and that in the vicinity of the Sill Mine. Increased flow rates and acidity in areas of no disturbance from mining suggest a substantial component of groundwater influx effecting water quality. No water quality sample collected this site.

Quad Name: Montezuma

**Site ID#:** 12-11-429-4380-2.300 and 12-11-430-4379-1.300

**Site Name:** Iron Clad Claims-Geneva Creek/Josephine Creek Bog Iron Deposits

**Environmental Degradation Rating:** 1

**Description and pertinent facts:** The Geneva Creek/Josephine Creek bog iron deposits are naturally forming iron sediments precipitated most likely by the action of bacteria in organic material on the valley bottom. Acidic metal laden waters have deposited iron and manganese oxides, and possibly native copper, in these bog deposits. Site visits on 8/20/92 and again on 9/15/92 revealed surface and groundwater of pH 3.4-3.9 with conductivities of 600-700 uS, draining over an extensive area of this 100 acre private inholding. A full-suite water quality sample collected from the northernmost bog deposit complex (2.300-Geneva Creek) was taken from groundwater flow emerging from a test hole drilled into the northern bog deposit. This reach drains the northeast slopes of Santa Fe Peak. The full-suite water quality sample collected from the south bog complex (1.300-Josephine Creek) was taken from surface flow. Josephine Creek heads on the east slopes of Sullivan Mountain. In both samples pH and conductivity were similar. Water quality degradation is assumed to be related to a combination of mining and natural components. Analysis of these samples is as follows:

Sample:429-4380-2.300:

<u>Metal</u>	<u>Concentration</u>	<u>Factor Above Colorado Basic Standard for Class 1 Aquatic Life</u>
Cadmium	8.60 ug/L	21.5 X
Chromium	32.0 ug/L	1.28 X
Copper	660 ug/L	132 X
Iron	100 mg/L	100 X
Manganese	4100 ug/L	4.10 X
Nickel	130 ug/L	2.60 X
Zinc	1500 ug/L	30.0 X

Sample:430-4379-1.300:

<u>Metal</u>	<u>Concentration</u>	<u>Factor Above Colorado Basic Standard for Class 1 Aquatic Life</u>
Aluminum	33.0 mg/L	330 X
Cadmium	13.0 ug/L	32.5 X
Copper	140 ug/L	28.0 X
Iron	31.0 mg/L	31.0 X
Lead	6.0 ug/L	1.50 X
Manganese	3100 ug/L	3.10 X
Nickel	75.0 ug/L	1.50 X
Zinc	1700 ug/L	34.0 X

Quad Name: Montezuma

**Site ID#:** 12-11-430-4375-1.300

**Site Name:** Upper Buno Gulch

**Environmental Degradation Rating:** 3

**Description and pertinent information:** This full-suite water quality sample was collected from the left-hand upper tributary of Buno Creek, which shows visible signs of degradation. This reach drains the northeast slope of Red Cone and a section of the Continental Divide, both of which have seen no impact from mining to date. This fact would elicit suggestions for the use of Upper Buno Creek as a likely area for baseline chemical studies of natural water quality degradation in an area of mineralization and subsequent impacts of historical mining. The right-hand tributary of Upper Buno Creek shows no sign of current metal transport or acidity. The impact on the left-hand tributary of Upper Buno Creek is assumed to be attributable to acidity and dissolved metals acquired by groundwater in contact with mineralized fractures and/or shear-alteration zones in the vicinity of Red Cone. A site-visit on 9/10/92 revealed a pH of 5.5 with a conductivity of 0 uS for this reach. Analysis of water samples show elevated levels of these metals:

<u>Metal</u>	<u>Concentration</u>	<u>Factor Over Colorado Basic Standard for Class 1 Aquatic Life</u>
Aluminum	1300 ug/L	13.0 X
Cadmium	0.4 ug/L	Threshold
Copper	13.0 ug/L	2.60 X
Zinc	87.0 ug/L	1.74 X

Quad Name: Montezuma

**Site ID#:** 12-11-430-4380-1.300

**Site Name:** Revenue Mountain Drainage-Baltic/Revenue Mine

**Environmental Degradation Rating:** 2

**Description and pertinent facts:** This full-suite water quality sample was taken from surface flow on drainage from Revenue Mountain, immediately above the point where this reach crosses Forest Road 119. This tributary of Geneva Creek drains the south slopes of Revenue Mountain. At the time of site-visits on 8/5/92 and again on 9/15/92, this drainage was observed to originate from ground water seeps which most likely have their origin in the vicinity of extensive workings of the Baltic/Revenue mines high on the slopes of Revenue Mountain. The Baltic/Revenue mine was initially developed by a vertical shaft located on the Continental Divide and subsequently by the Britannic Tunnel, which is now inaccessible. Mine maps show extensive stoping on the Baltic vein below the level of the Britannic Tunnel (12,125 ft.) in the vicinity of this headwaters of this reach. Recorded pH of this surface flow is 4.5 with a conductivity of 100 uS. Water degradation of this reach is assumed to be related to residence time of waters in the Baltic/Revenue mine workings controlled by fluctuations in the water table. Analysis reveals elevated levels of the following metals:

Factor Above Colorado Basic

<u>Metal</u>	<u>Concentration</u>	<u>Standard for Class 1 Aquatic Life</u>
Aluminum	3400 ug/L	34.0 X
Cadmium	3.00 ug/L	7.50 X
Copper	83.0 ug/L	16.6 X
Manganese	2500 ug/L	2.50 X
Zinc	680 ug/L	13.6 X

Quad Name: Montezuma

**Site ID#:** 12-11-433-4379-1.300

**Site Name:** Geneva Creek just above confluence of Smelter Gulch

**Environmental Degradation Rating:** 2

**Description and pertinent facts:** This full-suite water quality sample taken from Geneva Creek just above the confluence of Smelter Gulch. Flow was estimated at 4 cfs at the time of site visit on 8/20/92. Recorded pH at that time was 3.3 with a conductivity reading of 200 uS. This sample was taken from visibly degraded water, characterized by orange precipitates in suspension and in the stream-bed, to monitor downstream migration of metals from Upper Geneva Basin. Sample location is approximately 2 miles down watershed from currently forming bog iron deposits in Upper Geneva Basin. Analysis is as follows:

<u>Metal</u>	<u>Concentration</u>	<u>Factor Over Colorado Basic Standard for Class 1 Aquatic Life</u>
Cadmium	2.10 ug/L	5.25 X
Copper	53.0 ug/L	10.6 X
Iron	2900 ug/L	2.90 X
Manganese	1200 ug/L	1.20 X
Zinc	410 ug/L	8.20 X

Quad Name: Montezuma

**Site ID#:** 12-11-435-4375-1.300

**Site Name:** Lower Buno Gulch

**Environmental Degradation Rating:** 3

**Description and pertinent information:** This full-suite water quality sample collected from Buno Gulch at the point of termination of vehicular access into the upper valley. Water pH and conductivity recorded at the time of site visit on 8/26/92 were 8.2 and 0 uS respectively. Analysis of water sample reveals elevated levels of cadmium, as shown below.

<u>Metal</u>	<u>Concentration</u>	<u>Factor Over Colorado Basic Standard for Class 1 Aquatic Life</u>
Cadmium	0.9 ug/L	2.25 X

Quad Name: Mount Evans

**Site ID#:** 12-11-436-4375-1.300

**Site Name:** Geneva Park Campground-Geneva Creek

**Environmental Degradation Rating:** 3

**Description and pertinent facts:** This full-suite water quality sample taken from Geneva Creek, above confluence with Duck Creek, in the vicinity of Geneva Park Campground. Estimated flow recorded on 8/28/92 was 6 cfs with a pH of 5.1 and a conductivity of 100 uS. Water is visibly of good quality and no stream-bed precipitates were observed. However, analysis of this sample reveals elevated levels of the following metals:

<u>Metal</u>	<u>Concentration</u>	<u>Factor Above Colorado Basic Standard for Class 1 Aquatic Life</u>
Cadmium	1.50 ug/L	3.75 X
Copper	24.0 ug/L	4.80 X
Iron	1100 ug/L	1.10 X
Zinc	210 ug/L	4.20 X

Quad Name: Mount Logan

**Site ID#:** 12-11-437-4367-1.300

**Site Name:** N. Fork S. Platte River @ US Highway 285

**Environmental Degradation Rating:** 3

**Description and pertinent facts:** This full-suite water sample was collected from the North Fork South Platte River just above the confluence of Kenosha Gulch. The sample was taken on 7/23/92 with an estimated flow of 13-15 cfs. The recorded pH at this time was 5.7 and conductivity was low at 100 uS. Precipitates of iron are still observable in the stream-bed but are somewhat diminished compared with concentrations up-watershed. Only one metal in this sample exceeds Colorado Basic Standards for Class 1 Aquatic Life:

<u>Metal</u>	<u>Concentration</u>	<u>Factor Above Colorado Basic Standard for Class 1 Aquatic Life</u>
Copper	12.0 ug/L	2.40 X

## Sites Exhibiting Physical Hazards

Quad Name: Montezuma

**Site ID#:** 12-11-426-4374-2.102

**Site Name:** Upper Hall Valley/Prospects

**Hazard Rating:** 2

**Description and pertinent information:** This exploration tunnel is over 100 feet long and is currently open-standing without access deterrents. Portal of excavation is in unconsolidated overburden and/or fractured bedrock and recent collapses are evident. Initial timber sets have been exposed by sloughing of material at tunnel entrance. This mine is located just below the main Upper Hall Valley jeep road and is quite accessible to the curious. This tunnel should be properly safeguarded by backfill mine closure techniques.

Quad Name: Montezuma

**Site ID#:** 12-11-428-4380-1.101,102

**Site Name:** Sill Mine

**Hazard Rating:** 2

**Description and pertinent facts:** Two minor exploration tunnels which are associated with the Sill Mine complex are currently open-standing and pose a physical hazard to site visitors. The main mine workings of the Sill Mine are naturally collapsed and are inaccessible at this time. The two hazardous excavations in question are located less than 50 feet in elevation above the mine site and immediately adjacent to the Upper Geneva Basin jeep road. Both excavations are driven into unstable looking ground which show signs of possible collapse. The tunnels are both over 50 feet deep and could contain bad air as well as the obvious physical hazards. Both of these features should be properly backfilled as this area is popular with users of recreational vehicles.

**USFS-ABANDONED MINE LAND INVENTORY PROJECT**

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**ADDENDUM to the SUMMARY REPORT**

by Matthew A. Sares

COLORADO GEOLOGICAL SURVEY

January 11, 1995

**USFS-ABANDONED MINE LAND INVENTORY PROJECT**  
**SOUTH PLATTE RANGER DISTRICT**  
**ADDENDUM to the SUMMARY REPORT**

This document summarizes **additional sites** *of concern* to the USFS - South Platte Ranger District which were inventoried during the 1994 field season. (Previously, a Summary Report dated January 4, 1993 was transmitted to the USFS) During our investigation of mining in the South Park Ranger District we found and inventoried additional sites within the South Platte Ranger District. Most of these sites are on the Jefferson 7.5' quadrangle north of Kenosha Pass and south of Hall Valley. One site is near the Custer Cabins on the Hackett Mountain 7.5' quadrangle.

This addendum does not include all the newly inventoried mine sites. Just as the Summary Report, it includes only sites that were given Environmental Degradation Ratings of extreme (1), significant (2), or potentially significant (3) or sites given Mine (Physical) Hazard Ratings of extreme danger (1) or dangerous (2). The sites exhibiting environmental degradation will eventually undergo further investigation through the Regional Office. We recommend that all mine openings with a Mine Hazard Rating of 1 or 2 be capped, filled, or closed in some way. *Mines with a hazard rating of 3 (potentially dangerous) are not included in this summary. Even so, they are open and represent a threat to those who choose to enter them. If funds are available, these mines should also be closed.*

**USFS-ABANDONED MINE LAND INVENTORY PROJECT  
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ADDENDUM TO THE SUMMARY REPORT**

**Sites Exhibiting Environmental Degradation**

Quad Name: Jefferson

**Site ID#:** 12-11-433/4367-1.102 & 202

**Site Name:** Northeast of Lininger Lake, Gem (Jim) Dandy Claim

**Environmental Degradation Rating:** 3

**Description and pertinent facts:** This mine feature is an open pit trench excavation for uranium-bearing ore. The trench is approximately 250 feet long and 25 feet wide, with variable depth, 12 feet deep at its deepest. Radiometric scintillometer readings in the trench range up to 3100 counts per second (cps) which is at least 31 times background radiation (70-100 cps). Readings of dump material spread in several small piles around the trench range from 300-1000 cps. Nelson-Moore, et al (CGS Bull.40, 1978) states that 372 tons of uranium ore had been mined from this location at a grade of 0.21%  $U_3O_8$  and 0.01%  $V_2O_5$ . No concentrating of ore was done here, so this is a naturally occurring radioactive site. As such, little can be done to mitigate the radioactivity at this location. Signs could be posted about the radioactive nature of the site and the trench could be backfilled with the surrounding dump material. This would make the site less curious to visitors and minimize any collection of water in the trench during storm events and Spring snowmelt. The mine site is less than 0.2 miles east of FR-124, and less than 0.4 miles northeast of Lininger Lake, which has a number of (about 30) seasonal cabins around it.

## Sites Exhibiting Physical Hazards

Quad Name: Hackett Mountain

**Site ID#:** 12-11-471/4330-1.100

**Site Name:** Custer Cabin Area

**Hazard Rating:** 2

**Description and pertinent information:** This is an intact prospect adit about 0.2 miles southwest of the Custer Cabins (mouth of Metberry Gulch with the South Platte River). The adit extends about 25 feet back into the hill. Sloughing of unconsolidated material into the portal has restricted the opening to 3 x 4 feet. The area contains informal camping grounds and these are immediately adjacent to the adit, causing an increased level of public interaction with this mine, thus a Physical Hazard Rating = 2. An additional concern is that the floor of the adit is covered with garbage from campers. This adit should be backfilled or capped. Forest Road 205 leads to the site and provides decent access for construction vehicles.

Quad Name: Jefferson

**Site ID#:** 12-11-431/4367-1.100

**Site Name:** Northwest of Lininger Lake

**Hazard Rating:** 2

**Description and pertinent information:** This shaft is over 17 feet deep; timed rock drops indicate the full depth is approximately 30 feet. The shaft collar measures 4 x 4 feet. The shaft is easily accessed by foot on a barricaded 4WD road (old mine access road) and is less than 0.2 miles from FR-123. This shaft should be backfilled.

Quad Name: Jefferson

**Site ID#:** 12-11-433/4367-1.103

**Site Name:** Northeast of Lininger Lake

**Hazard Rating:** 2

**Description and pertinent information:** This is a deep shaft with a cratered ground surface opening of 16 x 14 feet which narrows to 5 x 6 feet at about 10 feet below grade. This was probably a fluorite prospect shaft. A loose 2-strand barbed-wire fence is around the shaft as an access deterrent, but is relatively ineffective and could eventually become a hazard itself. Colluvium around the shaft collar is subject to further erosion and could prove unstable. The shaft is only 0.4 miles from FR-124. This shaft should be capped and the site has relatively good access for construction equipment.