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Briefing Report to the Chairman, Subcommittee on Mining and Natural Resources, Committee on Interior and Insular Affairs, House of Representatives

April 1988

FEDERAL LAND MANAGEMENT

An Assessment of Hardrock Mining Damage

GAO/RCED-88-123BR

GAO

United States
General Accounting Office
Washington, D.C. 20548

Resources, Community, and
Economic Development Division

B-222092

April 19, 1988

The Honorable Nick J. Rahall, II
Chairman, Subcommittee on Mining and
Natural Resources
Committee on Interior and Insular Affairs
House of Representatives

Dear Mr. Chairman:

This briefing report responds to your request that we determine the extent of unreclaimed federal land resulting from hardrock mining operations conducted under the Mining Law of 1872.[1] It also discusses the amount of federal and state funds spent to reclaim hardrock mine sites and state requirements regarding the reclamation of such sites on federal lands.

On the basis of statistical projections, we estimate that 424,049 acres of federal land are currently unreclaimed as a result of hardrock mining operations in the 11 western states included in our review. Of this amount, about 281,581 unreclaimed acres relate to abandoned, suspended, or unauthorized mining operations.[2] The estimated cost to reclaim this land is about $284 million. The remaining 142,468 acres of federal land are currently being mined and will need reclamation. (See section 1.) Appendix I contains photographs of federal lands GAO visited that were disturbed by hardrock mining operations and left unreclaimed. The photographs show the safety hazards and debris resulting from abandoned mining operations.

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[1]The Mining Law of 1872 (30 U.S.C. 22, 29, 37) allows U.S. citizens to establish claims to valuable mineral deposits commonly referred to as "hardrock" minerals, such as gold, copper, silver, lead, and iron, that are located on federal lands. After a mineral deposit has been discovered, the claim holder may patent the claim and purchase the land and mineral rights from the government for $2.50 to $5.00 an acre.

[2]For purposes of this report, unauthorized mining was considered to be mining activity initiated without federal agency approval.

We found that between 1974 and 1987, state and federal agencies spent over $3.2 million to reclaim federal land disturbed by hardrock mining in the states we reviewed. State agencies spent the majority of these funds--about $2.9 million--which mostly came from the abandoned mine land reclamation fund established by the Surface Mining Control and Reclamation Act of 1977, as amended. (See section 2.)

We also found that 8 of the 11 states included in our review have reclamation requirements that apply to hardrock mining operations on federal land. The extent to which state requirements affect hardrock mining on federal land varies. (See section 3.)

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To determine the magnitude of federal land left unreclaimed by hardrock mining, we sent questionnaires to federal officials responsible for managing federal land in the 11 western states where most hardrock mining occurs. About 98 percent of the questionnaires we sent out were completed and returned to us by the federal agencies that manage the land--primarily the Department of the Interior's Bureau of Land Management and the Department of Agriculture's Forest Service. The remaining questionnaires were completed by other federal land managing agencies such as Interior's Bureau of Reclamation. The results of the sample were statistically projected to obtain an estimate of the total amount of unreclaimed federal land resulting from hardrock mining. However, because our review did not include all states where hardrock mining occurs and because the only available data base included only mining claims active since October 1976, our estimates may understate the full extent of unreclaimed federal land.

To determine the amount of federal and state funds spent to reclaim federal land damaged by hardrock mining, we interviewed by telephone, and obtained documentation from, federal and state officials in the 11 western states and federal officials in Washington, D.C. We also reviewed state reclamation laws and agreements between the states and federal agencies regarding reclamation requirements and discussed these requirements with federal and state officials. (See section 4.)

We conducted our work between February 1987 and January 1988 in accordance with generally accepted government auditing standards. We discussed the results of our review with Bureau of Land Management and Forest Service officials. At your request, however, we did not obtain official agency comments on the report.

As agreed, unless you publicly announce the contents of this briefing report earlier, we plan no further distribution of it until 30 days from the date of this letter. At that time we will send copies to the Secretary of the Interior, the Secretary of Agriculture, the Senate Committee on Energy and Natural Resources, and other interested parties. Major contributors to the report are listed in appendix III.

Sincerely yours,

James Duffus III

James Duffus III
Associate Director

CONTENTS

		Page
LETTER		1
SECTION		
1	THE EXTENT OF FEDERAL LAND LEFT UNRECLAIMED FROM HARDROCK MINING	6
2	STATE AND FEDERAL FUNDS SPENT TO RECLAIM HARDROCK MINE SITES ON FEDERAL LANDS	12
	State Funds Expended	12
	Federal Funds Expended	14
3	STATE REQUIREMENTS RELATING TO THE RECLAMATION OF HARDROCK MINE SITES ON FEDERAL LAND	16
	State Requirements	16
	Coordination Between States and Federal Agencies	18
4	OBJECTIVES, SCOPE, AND METHODOLOGY	19
	Magnitude of Unreclaimed Federal Land	19
	State and Federal Fund Expenditures	20
	State Reclamation Requirements	20
APPENDIX		
I	SELECTED PHOTOGRAPHS OF UNRECLAIMED FEDERAL LAND IN GAO'S SAMPLE	21
II	SAMPLING ERROR FOR ESTIMATES OF UNRECLAIMED FEDERAL LAND AND COST OF RECLAMATION	25
III	MAJOR CONTRIBUTORS TO THIS REPORT	28
TABLES		
1.1	Types of Reclamation Action Needed For Federal Land Related to Abandoned, Suspended, and Unauthorized Mining Operations	8
2.1	State Expenditures to Reclaim Hardrock Mine Sites on Federal Land	13

2.2	BLM and Forest Service Expenditures to Reclaim Hardrock Mine Sites on Federal Land In the 11 Western States We Reviewed	15
3.1	State Requirements for Hardrock Mine Sites	17

FIGURES

1.1	Projected Acres of Unreclaimed Federal Land Resulting From Hardrock Mining	7
1.2	Breakdown of Projected Reclamation Cost of About $284 Million	10
1.3	Projected Acres of Unreclaimed Federal Land Resulting From Hardrock Mining, By Type of Mining Claim	11
I.1	Open Mine Shaft on Land Managed by the Bureau of Land Management in Nevada Poses a Safety Hazard	21
I.2	Two Views of Federal Land Managed by the Bureau of Land Management in Idaho That Remains Scarred from an Abandoned Mining Operation	22
I.3	Abandoned Building and Trash Litter Federal Land Managed by the Bureau of Land Management in California	23
I.4	Abandoned Placer Mine Poses Safety Hazards on National Forest Service Land in Arizona	24

ABBREVIATIONS

AML	Abandoned Mine Land Reclamation Fund
BLM	Bureau of Land Management
EPA	Environmental Protection Agency
GAO	General Accounting Office
RCED	Resources, Community, and Economic Development Division

SECTION 1

THE EXTENT OF FEDERAL LAND LEFT UNRECLAIMED FROM HARDROCK MINING

This section discusses the magnitude of federal land left unreclaimed from hardrock mining, the type of reclamation needed, the estimated cost of reclamation, and the types of mining claims involved. We based our estimates on a sample of quarter sections of federal land (one quarter section equals about 160 acres) that contained active mining claims between October 1976 and December 1986 in Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.[1]

We estimate that 424,049 acres of federal land disturbed by hardrock mining operations are unreclaimed. Of this amount, 142,468 acres (about 33 percent) are active authorized mining operations. The other 281,581 acres are abandoned, suspended, or unauthorized mining operations, as follows:

-- Abandoned or suspended mining operations account for 270,560 acres (about 64 percent) of unreclaimed federal land. This includes 196,612 acres on which operations have been abandoned and 12,298 acres on which operations have been suspended and which require reclamation; however, reclamation was not planned or occurring at the time of our review. Reclamation was either underway, planned, or not required at the time of our review for the remaining 61,650 acres.

-- Unauthorized mining operations account for 11,021 acres (about 3 percent) of unreclaimed land. (See fig. 1.1.)

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[1]To be considered active, a mining claim must have a current annual assessment affidavit on file with Interior's Bureau of Land Management stating that the claim holder has met the legal requirements for holding a claim.

Figure 1.1: Projected Acres of Unreclaimed Federal Land Resulting From Hardrock Mining

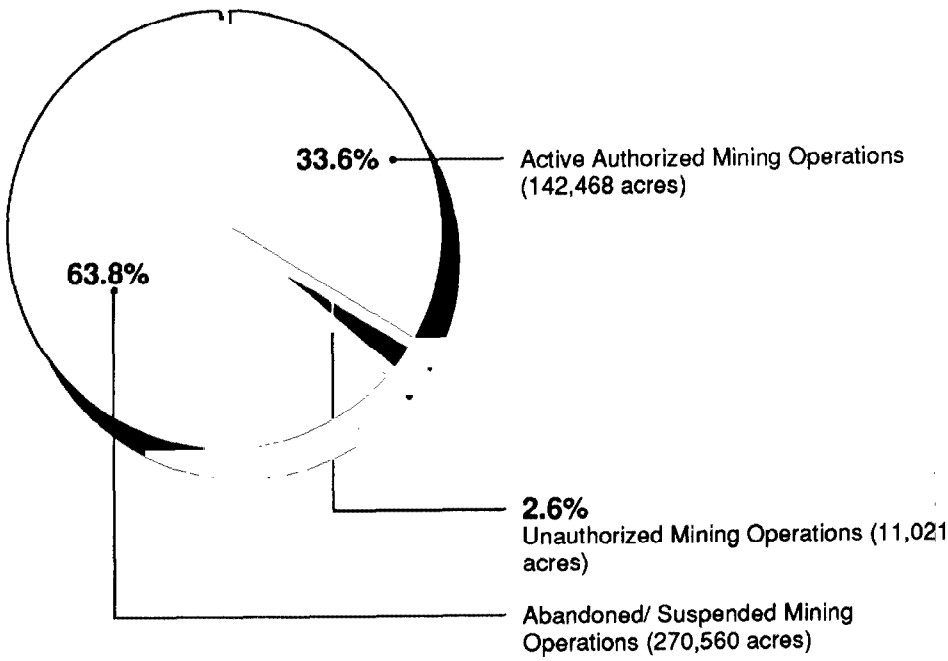


Table 1.1 shows the types of reclamation actions needed for the 281,581 acres of unreclaimed federal land, excluding 60,054 acres either undergoing reclamation or not requiring reclamation at the time of our review.

Table 1.1: Types of Reclamation Action Needed For Federal Land Related To Abandoned, Suspended, and Unauthorized Mining Operations

Reclamation action needed	Acres[a]
Reshaping or recontouring of surface	162,911
Reseeding	157,322
Top soil replacement	68,040
Vegetation replacement	57,179
Mine waste, harmful materials, or other litter requiring removal or disposal	24,916
Measures to control erosion, landslides, and water runoff	74,236
Closing of mine shafts and openings	26,034
Capping or plugging drillholes	5,271
Removal of structures, equipment, and materials	23,159
Other actions needed to restore land or ensure public safety	6,548

[a]The sum of the acres will exceed the total number of projected unreclaimed acres because some sites require more than one type of reclamation action to restore the land to an acceptable condition.

BLM and Forest Service land management officials provided us with reclamation cost estimates for the unreclaimed land they identified in our sample of quarter sections. Mine operators are not required to reclaim disturbances that occurred before agency reclamation regulations were implemented. The Forest Service's reclamation regulations apply only to mining disturbances created after August 1974. The Bureau of Land Management's reclamation requirements apply to mining disturbances created in 1981 or later. On the basis of our projections, the total cost to reclaim the 281,581 acres of disturbed federal land is about $284 million, broken down as follows:[2]

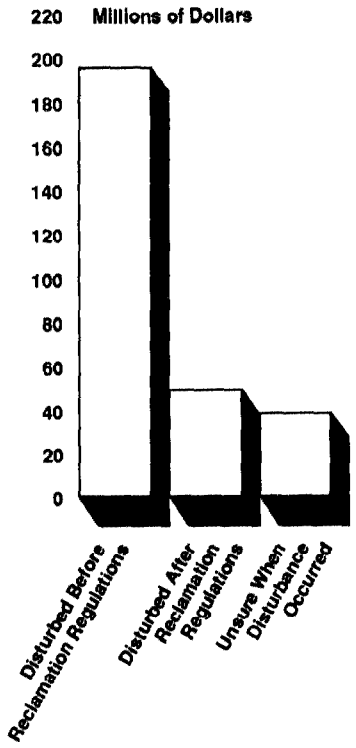
-- about $196 million to reclaim 161,314 acres of land disturbed prior to the date reclamation regulations took effect,

-- about $49 million to reclaim 48,874 acres of land disturbed after the date reclamation regulations took effect, and

-- about $39 million to reclaim 71,393 acres of land for which federal officials are unsure when the disturbance occurred. (See fig. 1.2.)

[2]The $284 million includes about $17 million for acreage either being reclaimed or not needing reclamation at the time of our review. The estimated reclamation cost for the 142,468 acres of active authorized mining operations is not included.

Figure 1.2: Breakdown of Projected Reclamation Cost of About $284 Million



The 424,049 acres of unreclaimed federal land can be categorized by type of mining claim as follows:[3]

-- 243,888 acres (about 58 percent) on lode mining claims,

-- 74,748 acres (about 18 percent) on placer mining claims,

-- 44,401 acres (about 10 percent) on millsites, and

-- 61,012 acres (about 14 percent) on unknown or unspecified types of claims. (See fig. 1.3.)

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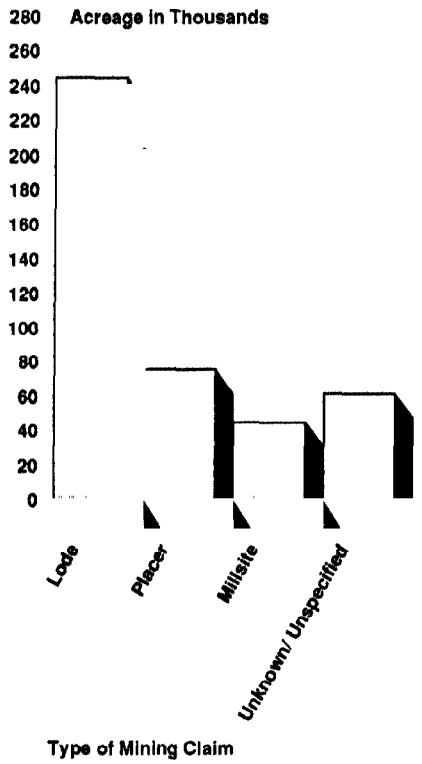
[3]A lode claim is established for minerals, such as gold or silver, in a well defined zone or belt of mineral-bearing rock confined between nonmineralized rock. A placer claim is established for minerals found in masses of gravel, sand, or similar material resulting from the crumbling and erosion of solid rock. A millsite claim is established in conjunction with other mining claims for the purpose of processing minerals extracted by mining.

Figure 1.3: Projected Acres of Unreclaimed Federal Land Resulting From Hardrock Mining, By Type of Mining Claim



SECTION 2

STATE AND FEDERAL FUNDS SPENT TO RECLAIM HARDROCK MINE SITES ON FEDERAL LANDS

State and federal agencies have spent over $3.2 million to reclaim federal land disturbed by hardrock mining in 10 of the 11 western states in our review. The states spent most of these funds--about $2.9 million--while federal agencies spent about $364,000.

STATE FUNDS EXPENDED

Since 1974, 5 of the 11 western states in our review (Colorado, Montana, New Mexico, Utah, and Wyoming) have spent about $2.9 million to reclaim federal land damaged by hardrock mining, according to state officials. Officials in the remaining six states (Arizona, California, Idaho, Nevada, Oregon, and Washington) said no state funds have been spent to reclaim hardrock mine sites on federal land. Most of the money spent (about $2 million) came from the abandoned mine land reclamation fund (AML) established under title IV of the Surface Mining Control and Reclamation Act of 1977, as amended. Although the primary purpose of the AML fund is to promote the reclamation of areas adversely affected by coal mining operations, in some instances funds may be used to reclaim non-coal sites that endanger human life and property, constitute a hazard to public health or safety, or degrade the environment. For example, in 1985 and 1986, Utah spent about $18,000 of abandoned mine land reclamation funds to close 22 mine shafts on BLM land. In addition to AML money, Montana, Utah, and Wyoming have spent a total of about $849,000 to reclaim hardrock mine sites on federal lands. These funds came from fines and fees the states impose on mine operators for reclamation purposes. Montana made the greatest expenditures from this source, spending about $620,000. (See table 2.1.)

Table 2.1: State Expenditures To Reclaim Hardrock Mine Sites On Federal Land

State	Land managing agency	Year of reclamation	Source of funds AML	Source of funds State	State total
Colorado	BLM	1986	$ 54,000		
	Forest Service	1985-87	55,000		
	National Park Service	1987	7,000		
	Bureau of Standards	1986	4,000		$ 120,000
Montana	BLM/Forest Service	1983-87	549,430[a]		
	Forest Service	1987		$ 620,265[b]	1,169,695
New Mexico	Forest Service	1987	233,640		233,640
Utah	BLM	1985-87	20,667		
	Forest Service	1982-83		13,389	34,056
Wyoming	BLM	1974-87		215,078[a]	
	BLM	1985-87	1,017,667		
	Forest Service	1985-87	102,944		1,335,689
Total			$2,044,348	$848,732	$2,893,080

[a]State officials' estimates.

[b]Includes projects on or adjacent to Forest Service land.

FEDERAL FUNDS EXPENDED

BLM and the Forest Service have spent about $363,523 since 1978 to reclaim abandoned hardrock mine sites on federal land. In general, this money has come from funds appropriated by the Congress for use in managing various programs, including the mining law program. Officials of both agencies use appropriated program funds to reclaim land only if unreclaimed land (1) presents a danger to public health or safety or (2) causes the degradation of environmentally sensitive areas such as wilderness study areas. For example, BLM officials in Idaho told us that the BLM state office spent $130,000 in 1983 and 1984 to reclaim an abandoned lead milling site after 50 cattle died from eating toxic chemicals that had seeped to the surface at the mine site. (See table 2.2.)

Table 2.2: BLM and Forest Service Expenditures to Reclaim Hardrock Mine Sites on Federal Land in the 11 Western States We Reviewed

Agency	State	Approximate acreage	Number of mine sites	Year expenditure occurred	Expenditures BLM/Forest Service
BLM	Arizona	3	3	1986	$ 5,410
Forest Service	Arizona	185[a]	6	1978-83	72,200
BLM	California	b	1	1986	13,037
Forest Service	California	160	1	c	25,000
BLM	Idaho	5	1	1983-84	130,000
BLM	Nevada	3	1	1986	3,976
BLM	Oregon	40	1	1984-85	1,400
BLM	Wyoming	d	6	1985-87	112,500
Total					$363,523

Note: BLM and Forest Service officials reported no expenditures to reclaim land for five states in our sample (Colorado, Montana, New Mexico, Utah, and Washington).

[a]The Forest Service reclaimed an additional 2.5 acres of hardrock mine sites in 1979 and 1980 for which the reclamation cost is not known.

[b]No acreage was reclaimed, but drums containing cyanide were removed.

[c]Estimated by a Forest Service official to have occurred within the past 10 years.

[d]BLM spent $85,000 to plug 35,000 drill holes on approximately 122 square miles of BLM land.

SECTION 3

STATE REQUIREMENTS RELATING TO THE RECLAMATION OF HARDROCK MINE SITES ON FEDERAL LAND

Eight of the 11 western states in our review have reclamation requirements that cover hardrock mining on federal land. To coordinate reclamation enforcement on federal land, BLM and the Forest Service have developed agreements with most of these states.

STATE REQUIREMENTS

The eight states with hardrock mining reclamation requirements--California, Colorado, Idaho, Montana, Oregon, Utah, Washington, and Wyoming--require operators to submit reclamation plans for approval before mining operations begin. Their regulations also require them to inspect mine sites for reclamation compliance at some point in the life of the mining operations. Finally, these states have authority to require mine operators to post a bond or financial guarantee to ensure reclamation.

Three of the states in our review--Arizona, Nevada, and New Mexico--do not have reclamation requirements. However, these states do have laws and regulations that assist state officials in controlling the impacts associated with hardrock mining that could affect water quality, air quality, or hazardous waste disposal. (See table 3.1.)

Table 3.1: State Requirements for Hardrock Mine Sites

States	Requires reclamation plan	Requires compliance inspections	Has authority to bond
Arizona	a	a	a
California[b]	c	b	Yes
Colorado	Yes	Yes	Yes
Idaho	c	Yes	Yes
Montana	c	Yes	Yes
Nevada	a	a	a
New Mexico	a	a	a
Oregon	c	Yes	Yes
Utah	c	Yes	Yes
Washington	c	Yes	Yes
Wyoming	Yes	Yes	Yes

[a]No state hardrock mining regulation exists.

[b]According to a California state official, the individual counties within the state have the responsibility for establishing reclamation, inspection, bonding, and enforcement standards for mining activities within their boundaries. Therefore, actual practice may differ between counties in the state.

[c]Reclamation plans are required for all large mining operations. Some types of small mining operations are exempted from these requirements.

COORDINATION BETWEEN STATES AND FEDERAL AGENCIES

To coordinate reclamation enforcement on federal land, BLM and the Forest Service have developed agreements, known as memoranda of understanding, with most of the eight states that have reclamation requirements. However, Montana and Utah do not have such agreements with the Forest Service, and BLM's agreement with Washington had expired at the time of our review. The agreements vary regarding how responsibility for the various aspects of reclamation--plan approval, bonding, inspection and enforcement--will be divided between the states and BLM and the Forest Service. For example, the agreement between the Forest Service and the state of Washington stated that regulation of hardrock mining activities on federal land will be coordinated but no details were specified. The agreement between BLM and Wyoming provides specific details regarding lead agency responsibility for approving, bonding, and inspecting certain types of operations. The agreement between BLM and Utah covers only bonding.

SECTION 4

OBJECTIVES, SCOPE AND METHODOLOGY

In response to a request dated October 16, 1986, from the Chairman, House Subcommittee on Mining and Natural Resources, and subsequent discussions with his office, we agreed to determine (1) the magnitude of unreclaimed federal land resulting from hardrock mining conducted under the Mining Law of 1872 and (2) the amount of state and federal funds expended to reclaim federal land damaged by hardrock mining. We also reviewed state requirements regarding the reclamation of federal land damaged by hardrock mining.

MAGNITUDE OF UNRECLAIMED FEDERAL LAND

To determine the extent of unreclaimed federal land resulting from hardrock mining, we obtained and analyzed a statistical sample of federal land in the 11 western states where most hardrock mining takes place--Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming. We obtained the sample from BLM's mining claim recordation system file, which, at the time of our review, contained all active mining claims on federal land from October 1976 through December 1986. From the file we identified the individual quarter sections on which mining claims had been filed. Because we did not sample from the entire universe of quarter sections on which mining has ever occurred, our projections may understate the total amount of unreclaimed federal land disturbed by hardrock mining.

We selected a simple random sample of 1,250 quarter sections from nearly 400,000 quarter sections that contained an active mining claim between October 1976 and December 1986. BLM state offices determined for us which federal agencies managed the individual quarter sections. We then sent a questionnaire designed to obtain information on the reclamation status of each quarter section to the federal agency field office that managed the land. We did not send out questionnaires for 151 of the quarter sections in our sample because BLM determined that they no longer contained any federal land. About 98 percent of the 1,099 questionnaires we sent out were completed and returned to us by the federal agencies that manage the land--primarily BLM and the Forest Service. BLM officials completed 719 of the questionnaires in our sample (about 65 percent of those sent out). Forest Service officials completed 358 of the questionnaires (about 33 percent of those sent out), and 5 of the questionnaires (less than 1 percent) were completed by other federal land managing agencies.

Because we reviewed a statistical sample of quarter sections, each estimate developed from the sample has a measurable precision, or sampling error. The sampling error is the maximum amount by which the estimate obtained from a statistical sample can be expected to differ from the true universe characteristic (value) we

are estimating. Sampling errors are stated at a certain confidence level--in this case, 95 percent. This means that the chances are 19 out of 20 that, if we reviewed all of the quarter sections in BLM's mining claim recordation system, the results of such a review would differ from the estimate obtained from our sample by less than the sampling errors of such estimates. (The sampling errors at the 95-percent confidence level for specific estimates discussed in this report are in app. II.)

From the sample, we projected (1) the amount of unreclaimed federal land resulting from hardrock mining on quarter sections containing active mining claims between October 1976 and December 1986, (2) the type of reclamation needed for land disturbed by abandoned, suspended, or unauthorized mining operations, (3) the cost of reclaiming the land, and (4) the amount of unreclaimed land by type of mining claim.

STATE AND FEDERAL FUND EXPENDITURES

To determine the amount of state and federal funds expended to reclaim federal land damaged by hardrock mining, we interviewed by telephone and obtained documentation from state government, BLM, and Forest Service officials in the 11 western states that we reviewed. We also interviewed and obtained documentation from officials at the Environmental Protection Agency (EPA) and the Department of Energy (DOE). We contacted EPA to determine whether any hardrock mining sites on federal land had been reclaimed under provisions of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, also known as the Superfund. We contacted DOE officials to determine whether any hardrock mining sites on federal land had been reclaimed using funds from the Uranium Mill Tailings Remedial Action Program. We also determined whether funds from the Abandoned Mine Land Program carried out under the Surface Mining Control and Reclamation Act of 1977, as amended, had been used to reclaim hardrock mining sites on federal land. In all of our interviews we attempted to obtain information as far back in time as agency records and/or officials' memories would permit.

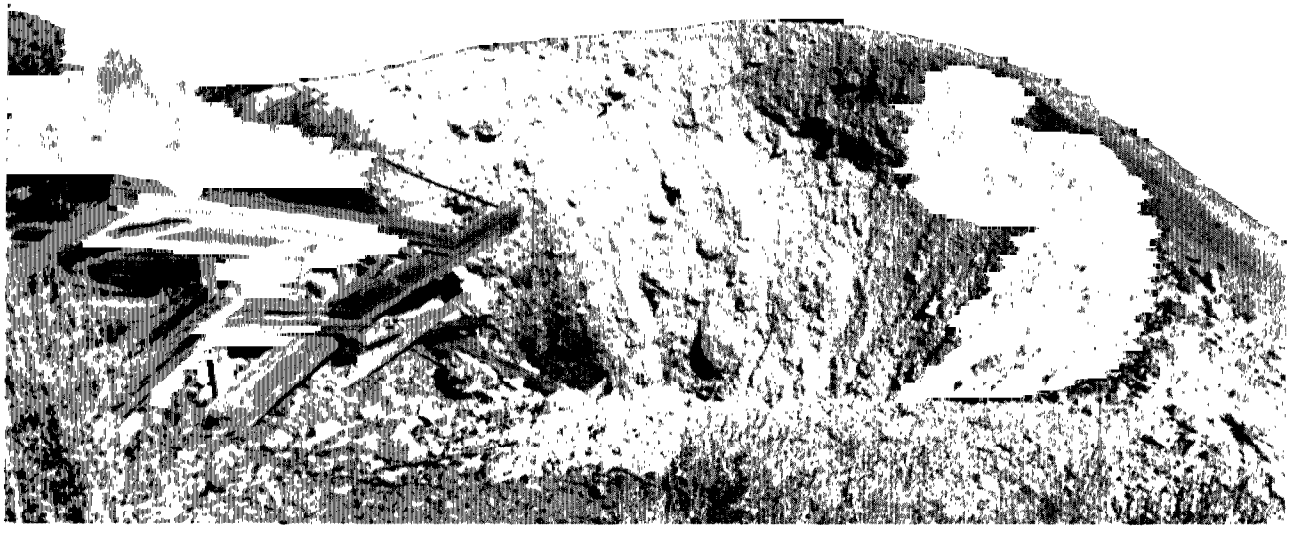
STATE RECLAMATION REQUIREMENTS

To determine state requirements regarding the reclamation of federal land, we contacted officials in each of the 11 states in our review and obtained from them copies of pertinent state reclamation laws and regulations. We also obtained from BLM and the Forest Service copies of agreements between the states and these agencies regarding the coordination of reclamation enforcement on federal land. We compared the agreements for similarities and differences in the assignment and coordination of reclamation responsibilities between the states and BLM and the Forest Service.

SELECTED PHOTOGRAPHS OF UNRECLAIMED FEDERAL LAND IN GAO'S SAMPLE

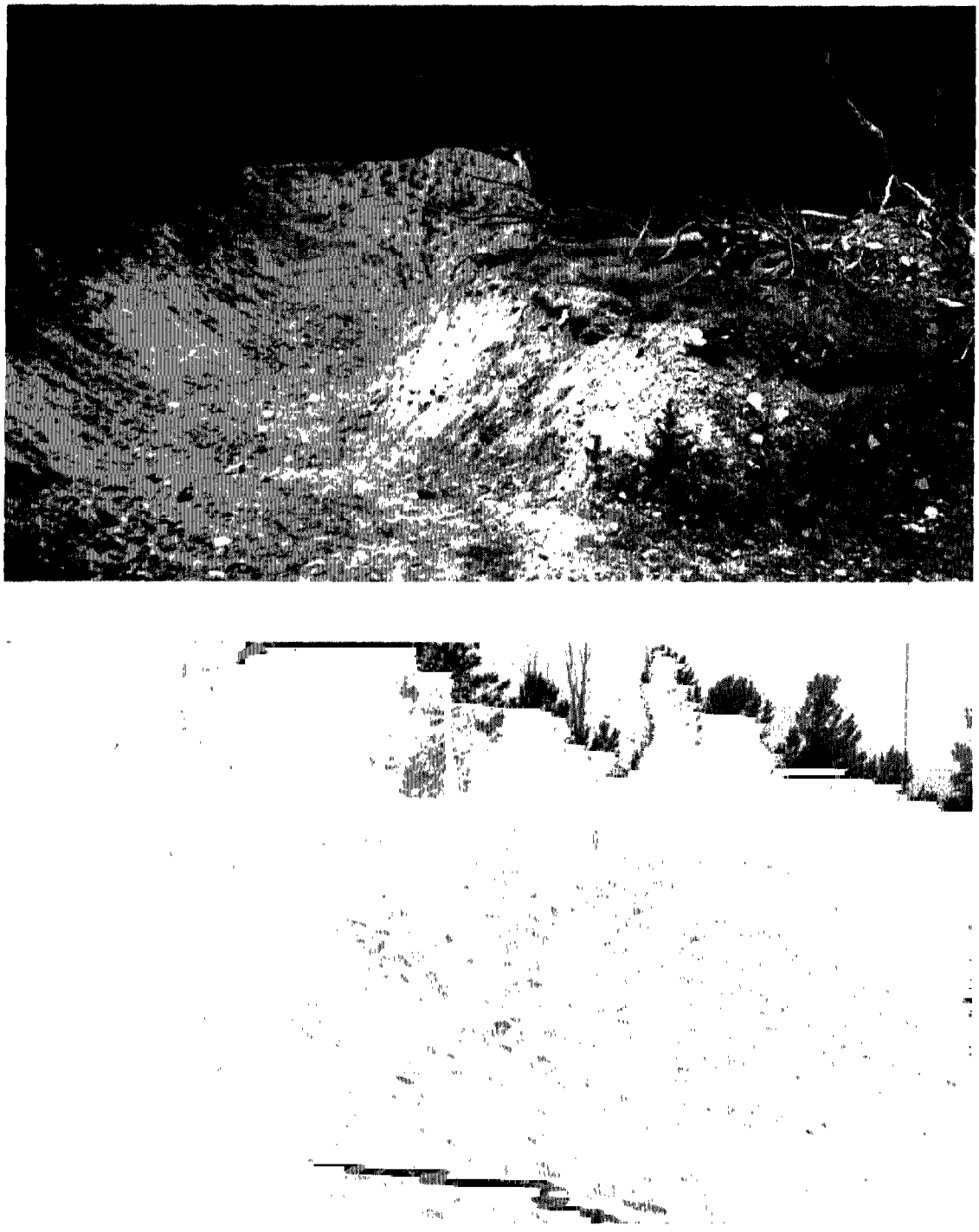
This appendix contains photographs of quarter sections of federal land included in our sample that were disturbed by hardrock mining operations and left unreclaimed.

Figure I.1: Open mine shaft on land managed by the Bureau of Land Management in Nevada poses a safety hazard



APPENDIX I

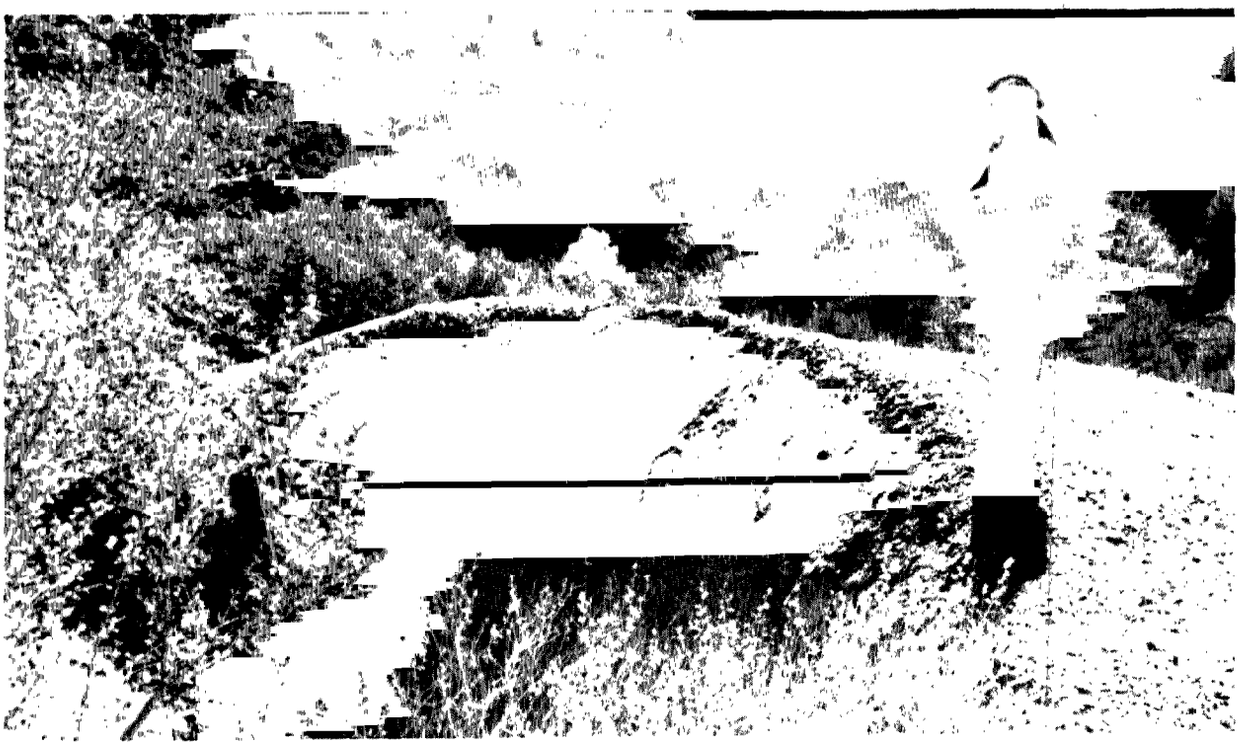
Figure I.2: Two views of federal land managed by the Bureau of Land Management in Idaho that remains scarred from an abandoned mining operation



APPENDIX I

Figure I.3: Abandoned building and trash litter federal land managed by the Bureau of Land Management in California

Figure I.4: Abandoned placer mine poses safety hazards on National Forest Service land in Arizona



SAMPLING ERROR FOR ESTIMATES OF UNRECLAIMED FEDERAL LAND AND COST OF RECLAMATION

Category	Estimate	Error (+/-)	Page
Total acres unreclaimed	424,049	126,599	6
Unreclaimed acres on abandoned, suspended, or unauthorized mining sites	281,581	78,416	6
Cost to reclaim acres on abandoned, suspended, or unauthorized mining sites	$283,563,195	$102,410,236	9
Unreclaimed acres on active authorized mining sites	142,468	93,293	6
Unreclaimed acres on abandoned or suspended mining sites, excluding unauthorized sites	270,560	78,060	6
Unreclaimed acres on abandoned sites, excluding unauthorized sites, for which reclamation is needed but was not occurring or planned at the time of our review	196,612	56,150	6
Unreclaimed acres on suspended operations, excluding unauthorized operations, for which reclamation is needed but was not occurring or planned at the time of our review	12,298	9,260	6
Unreclaimed abandoned or suspended operations, excluding unauthorized operations, for which reclamation was underway, planned, or not required at the time of our review	61,650	53,081	6
Unreclaimed acres on unauthorized mining sites	11,021	6,563	6

Category	Estimate	Error (+/-)	Page
Acres needing reshaping or recontouring of surface	162,911	44,650	8
Acres needing reseeding	157,322	50,430	8
Acres needing topsoil replacement	68,040	33,008	8
Acres needing vegetation replacement	57,179	28,984	8
Acres needing removal or disposal of mine waste, harmful materials, or other litter produced by the operations	24,916	14,042	8
Acres needing measures to control erosion, landslides, and water runoff	74,236	36,193	8
Acres needing the closing of mine shafts or adits	26,034	12,289	8
Acres needing drillholes plugged or capped	5,271	3,286	8
Acres needing the removal of structures, equipment, and materials	23,159	15,438	8
Acres needing other actions to restore the land and/or ensure public safety	6,548	4,599	8
Acres undergoing reclamation and/or not needing reclamation at the time of our review	60,054	52,994	8
Unreclaimed acres resulting from mining operations abandoned before regulations went into effect	161,314	52,628	9
Acres disturbed after regulations went into effect	48,874	19,625	9
Acres disturbed for which it is uncertain when disturbance occurred	71,394	53,638	9

Category	Estimate	Error (+/-)	Page
Cost to reclaim land disturbed before regulations went into effect	$195,661,875	$ 97,005,754	9
Cost to reclaim land disturbed after regulations went into effect	$ 49,260,618	$ 26,871,679	9
Cost to reclaim land for which it is uncertain when disturbance occurred	$ 38,640,702	$ 16,708,259	9
Cost for ongoing reclamation or reclamation not needed at the time of our review	$ 17,322,928	$ 11,390,614	9
Acres on lode mining claims	243,888	92,547	10
Acres on placer mining claims	74,748	55,451	10
Acres on millsite mining claims[a]	44,401		10
Acres on unknown or unidentified types of claims	61,012	29,172	10

[a]Because the sampling error exceeds the projected number of acres for millsite mining claims, the projection is considered unreliable.

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