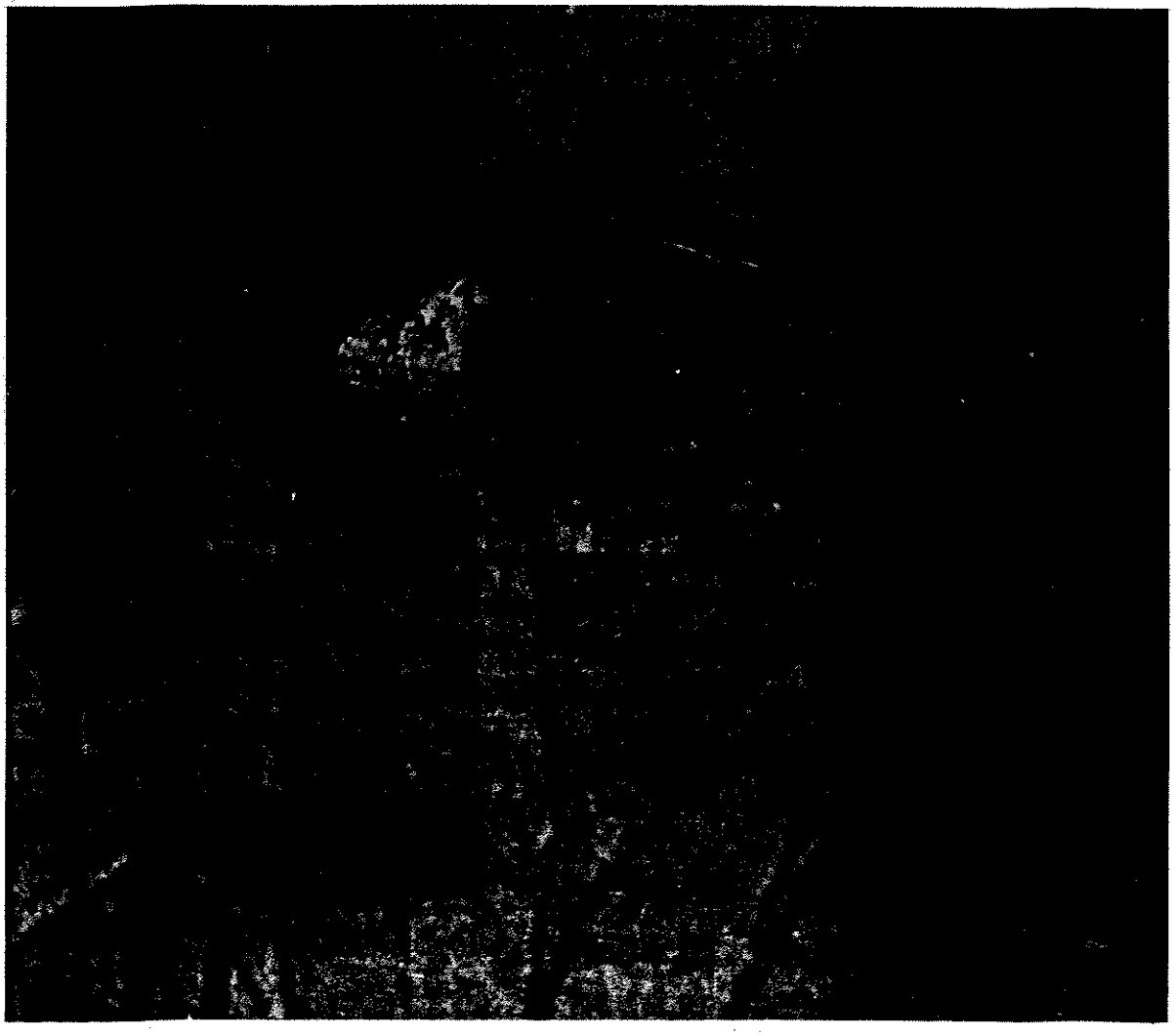
WILDLIFE MITIGATION REPORT

MOLYCORP GUADALUPE MOUNTAIN

TAILINGS DISPOSAL FACILITY



U.S. FISH and WILDLIFE SERVICE

JULY 1989

WILDLIFE MITIGATION REPORT

MOLYCORP GUADALUPE MOUNTAIN

TAILINGS DISPOSAL FACILITY

U.S. Fish and Wildlife Service

Prepared for

Bureau of Land Management

Albuquerque District Office

Albuquerque, New Mexico

July 1989

INTRODUCTION

This report has been prepared by the Fish and Wildlife Service (Service), Albuquerque Ecological Services Field Office at the request of the Bureau of Land Management (Bureau), Albuquerque District. It satisfies the requirements of Section 2(b) of the Fish and Wildlife Coordination Act (48 Stat 401, as amended; 16 U.S.C. 661-667e). The purpose is to mitigate potential wildlife losses for a proposed molybdenum tailings disposal facility located immediately west of Questa, New Mexico on land managed by the Bureau. The Service developed a variety of mitigation plans with the assistance of the New Mexico Department of Game and Fish (Department), Bureau's Taos Area Office, Molycorp Inc. and the Soil Conservation Service. A draft report was submitted to the Bureau on May 2, 1989 which resulted in selection of this final mitigation plan.

This report describes the proposed construction project, wildlife impacts, and contaminant issues and presents a plan to offset wildlife losses. The mitigation plan is intended to be included in Molycorp's "Plan of Operation" before the Bureau approves the proposed action. If project plans change or a considerable amount of time elapses before the project begins, wildlife impacts and associated mitigation should be re-examined.

PROJECT DESCRIPTION

Molycorp Inc. proposes to develop a 1,230-acre molybdenum tailings disposal facility immediately west of Questa in Taos County, New Mexico, on land owned and managed by the Bureau (Figure 1). Two rock-filled dams would be constructed in increments 50 feet high on either side of the saddle between the two peaks of Guadalupe Mountain. At their maximum height of 500 feet, the dams would cover 100 acres and the tailings would cover 568 acres. The pond is designed to reach capacity in 40 years. The tailings would be transported to the site via a pipeline from the Molycorp mine 12 miles east. Other facilities associated with the disposal site include rock quarries, a seepage pond, surface water diversion channels, a pump station, access roads, powerline extensions and tailings distribution lines. The project includes clearing, grading and excavating fill material from the disposal pond site.

All surface facilities would be removed from the current disposal site and disturbed areas at the existing site would be reclaimed as the new pond is put into use. Molycorp proposes to reclaim the existing tailings pond by covering it with top soil one foot deep and reseeding the area. A more detailed discussion of the project can be found in the "Draft Environmental Impact Statement, Molycorp Guadalupe Mountain Tailings Disposal Facility" by the Bureau, December 1988.

WILDLIFE IMPACTS

A total of 1,230 acres would be impacted by the project, including 668 acres for the tailings pond and dams, 34 acres for three quarry sites and 528 acres for ancillary construction of a road, seepage pond, diversion channel, maintenance site, powerline and pipeline (Figure 2). In addition to physical land disturbances within the project area, construction and

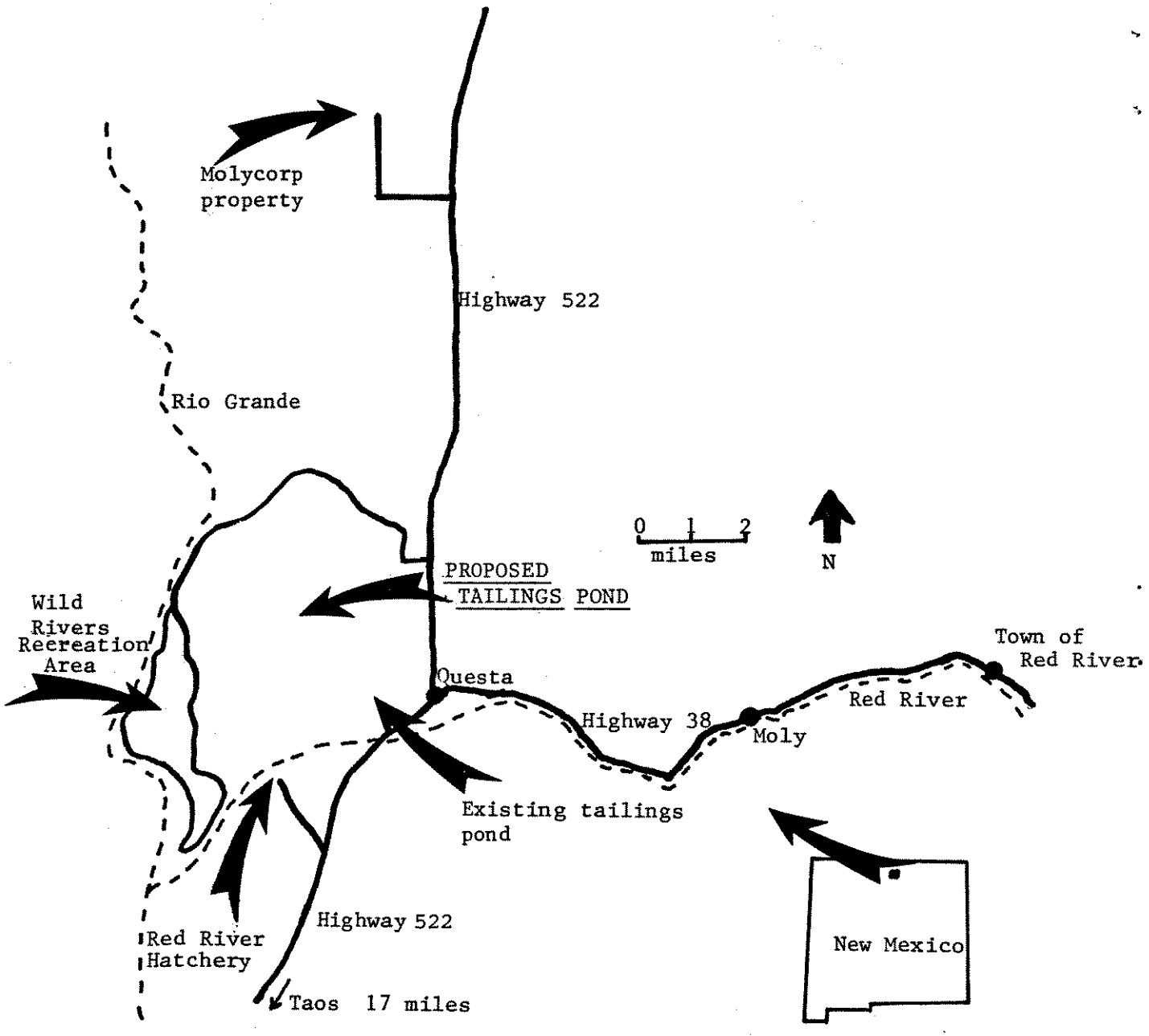
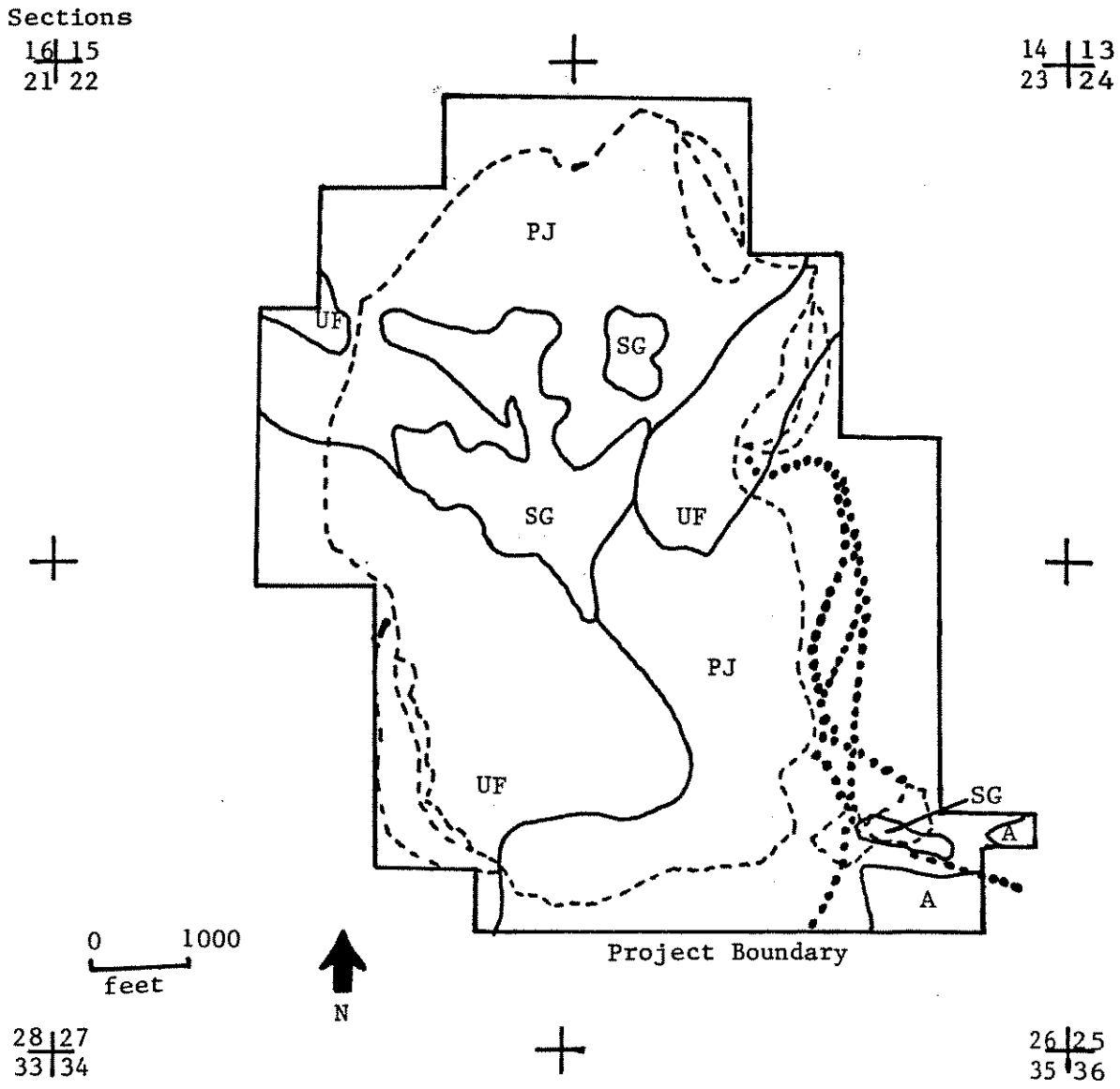


Figure 1. Vicinity map of the proposed Molycorp Guadalupe Mountain tailings disposal pond.



Legend

Vegetation type
UF = upland forest
SG = sagebrush-grassland
A = agriculture
PJ = pinyon-juniper

Tailings pond, dam, quarry
Roads, pipelines, powerlines

Figure 2. Vegetation types and construction proposals at the proposed Molycorp tailings disposal facility.

operation of the facility would disturb wildlife within and adjacent to the area. The project plan includes a proposal to fence the entire site, which would prevent movement of animals into and out of the area. Therefore, we estimate that the entire 1,230 acres of wildlife habitat will be lost.

The project area is dominated by pinyon-juniper woodlands. Upland forest, sagebrush-grassland and agricultural crops are also components of the vegetative community (Figure 2). Acres of habitat (Kennedy and Stahlecker, 1986) found within the project boundaries are as follows:

Vegetation Type	Acres
Pinyon-juniper	738
Upland forest	353
Sagebrush-grassland	115
Agriculture	24
Total	1,230

The following description of the habitats are taken from Kennedy and Stahlecker (1986). Scientific names of the plants discussed are listed in Appendix 1. The pinyon-juniper habitat is dominated by pinyon pine with one-seed juniper co-dominant. Other plant species found in this habitat are big sagebrush, blue grama grass, western wheatgrass, bromes, muttongrass and needlegrass. The upland forest habitat is a mixture of conifers dominated by pinyon pine, Rocky Mountain juniper, one-seed juniper, ponderosa pine and Douglas fir. The sagebrush-grassland habitat is dominated by big sagebrush, crested wheatgrass and blue grama grass. The agricultural habitat is dominated by a herbaceous cover of sleepy grass, summer cypress and curlycup gumweed.

Game animals in the area include mule deer, elk, cottontail, bobcat, coyote, gray fox, ringtail and mountain lion. Other mammals include white-tailed jackrabbit, Ord's kangaroo rat, deer mouse and least chipmunk (U.S. Department of Interior, 1988). Scientific names of mammals and birds are listed in Appendices 2 and 3, respectively. Kennedy and Stahlecker (1986) found 133 species of birds in the vicinity of Guadalupe Mountain.

Thirty-five species of birds were found in the pinyon-juniper habitat; common species in this habitat type include the black-throated warbler, plain titmouse, mountain chickadee and brown-headed cowbird. There are estimated to be 366 breeding pairs of birds per square kilometer of pinyon-juniper habitat.

Thirty-six species of birds were found in the upland forest habitat with the most common species being the rufous-sided towhee, dark-eyed junco, mourning dove and Virginia's warbler. Breeding bird density is estimated at 500 bird pairs per square kilometer.

Twenty-two bird species were found in the sagebrush-grassland habitat. The most common breeding species were Brewer's sparrow, vesper sparrow and sage sparrow at a density estimated at 200 bird pairs per square kilometer.

Very little of the area is in agriculture; however, Kennedy and Stahlecker (1986) verified 24 bird species in this habitat type, of which the western meadow-lark was the most common. The breeding bird density is estimated at 88 bird pairs per square kilometer.

ENVIRONMENTAL CONTAMINANTS

Environmental contaminants which may occur in the proposed tailing pond could have adverse impacts on fish and wildlife. There have been no biological studies at the current site to determine impacts to migratory birds, including waterfowl and shorebirds. A detailed study of contaminants at the existing tailings ponds (Figure 3) would provide data necessary to predict the environmental impacts of the proposed project.

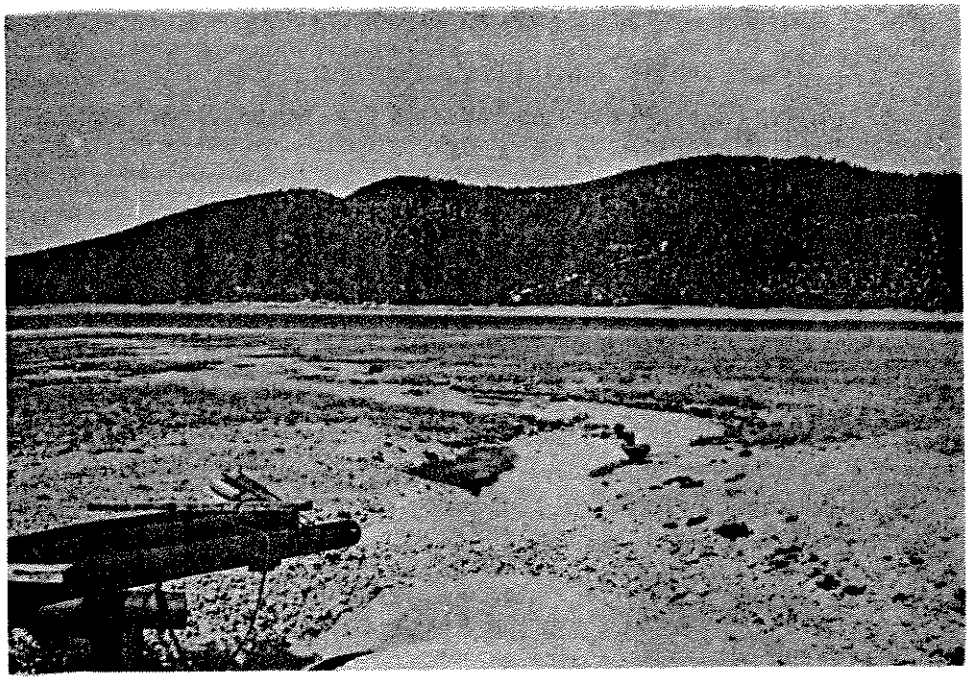


Figure 3. Molycorp Tailings Pond at Questa, New Mexico.

During August 1987, the Service collected fish and sediment samples from the Red River upstream and immediately downstream from the Molycorp Mine as well as at the New Mexico Highway 522 bridge, downstream from the mine. Residues of arsenic and selenium in sediment collected at the Molycorp mine and the Highway 522 bridge were elevated in comparison to the upstream site (Table 1). Selenium residues in fish were high throughout the watershed (Table 2).

Table 1. Arsenic and Selenium Concentrations in Sediment Collected from the Red River, New Mexico, August 1987.

Location	Element	Concentration parts per million (ppm)
Town of Red River	arsenic	2.12
	selenium	0.58
Molycorp Mine	arsenic	4.01
	selenium	1.10
Highway 522 Bridge	arsenic	4.11
	selenium	1.15

Table 2. Selenium Concentrations in Fish Collected from the Red River, New Mexico, August 1987.

Location	Fish Sample	Concentration parts per million (ppm)
Town of Red River	rainbow trout	0.81
	brook trout	3.55
	Rio Grande cutthroat	5.49
Molycorp Mine	rainbow trout	0.74
	brown trout	1.79
Highway 522 Bridge	brown trout	2.24
Upstream of Hatchery	brown trout	2.02
	brown trout	1.93
Downstream of Hatchery	brown trout	2.42
	brown trout	1.63
	brown trout	1.45
El Aguaje Campground	brown trout	2.20
	brown trout	2.71

Analytical data from mill tailings (pages 1-13 in U.S. Department of Interior, 1988) show selenium residues of 4.7 parts per million (ppm), which indicate a biological hazard may exist. The tailings also contain lead (180 ppm) and chromium residues (87 ppm) in high concentrations. Elevated selenium, chromium and lead residues in waterfowl are known to impair reproduction. Selenium residues in fish from the Red River are above levels (2 ppm) known to cause reproductive failure in fish. Animal tissues with residues above 5 ppm exceed current Food and Drug Administration criteria for public health and are not recommended for human consumption.

The Service visited the tailings pond area during the spring of 1989. On April 24, at least 60 waterfowl were observed on the ponds, and on May 30, 19 waterfowl were observed. Kennedy and Stahlecker (1986) documented 38 bird species in the area and Baltosser (1983) observed 22 bird species. These data indicate that wildlife may be at risk of exposure to toxic substances such as selenium, lead and chromium.

We recommend that a contaminant survey be done to assess the extent of contaminant bioaccumulation in resident and migratory wildlife. In addition, wildlife use of the ponds should be documented throughout the year. These data would indicate if the existing ponds are hazardous to wildlife and provide a basis for estimating future effects of the new tailings pond and developing reclamation recommendations for both the current and the proposed sites. Appendix 4 contains a detailed description of an adequate contaminant study.

WILDLIFE MITIGATION (THREE AREAS)

Federal construction projects or Federally permitted projects which result in adverse impacts to fish and wildlife resources require development of a mitigation plan to avoid, minimize or compensate for these impacts. Based on the Service Mitigation Policy (U.S. Department of Interior, 1981) which provides guidelines for developing mitigation we have grouped the habitats in the project area as follows:

> Most of the affected area (1,206 acres) is classified as Resource Category 3, for which the mitigation planning goal is no net loss of habitat value while minimizing loss of in-kind habitat value. These include pinyon-juniper, upland forest and sagebrush-grassland habitats. Minimizing wildlife impacts on-site and increasing the carrying capacity of other wildlife habitats would be consistent with this goal.
>
> The remainder of the affected area (24 acres) represents Resource Category 4, for which the mitigation planning goal is to minimize the loss of habitat value. Off-site mitigation is consistent with this goal.

Operation of the current tailings pond and the proposed pond, must be done in compliance with the Migratory Bird Treaty Act (16 U.S.C. 701-718). This Act prohibits persons from taking, killing or possessing migratory birds. The courts have also interpreted this Act to provide criminal penalties for unintentional take. Fines as high as $10,000 per incidence have been levied

against violators. This Act also provides penalties for impacts to a single bird. Bird mortality caused by toxic chemicals in tailings ponds could be prosecuted under this Act.

The Service, with input from the Department and Bureau, has considered and evaluated several mitigation proposals and has developed a plan that should adequately compensate for wildlife losses. We have identified three areas suitable for wildlife mitigation: 1) the Wild Rivers Recreation Area west of Guadalupe Mountain; 2) Molycorp's present tailings disposal area west of Questa; and 3) Molycorp property eight miles north of Questa and west of Highway 522 in Sunshine Valley (Figure 1).

Depending upon how much of the mitigation plan is implemented, we propose to increase carrying capacity for wildlife by eliminating livestock grazing and applying various land treatments. Each of the areas would be fenced to exclude livestock but allow for passage of deer, elk and other wildlife. Bureau fencing specifications require spacing barbed wire strands at 16, 22, 28 and 40 inches from the ground with the top strand smooth (Kuykendall, June 1989). Land treatment includes construction of water catchments, dikes, plowing and reseeding, and blasting potholes. Activities associated with each mitigation area will be described in more detail below.

1. Wild Rivers Recreation Area

To increase wildlife values in four areas within the Wild Rivers Recreation Area, Molycorp should develop wildlife water, reseed the site and erect livestock exclosures (Figure 4). In sections 9, 32 and 34, self-maintaining water catchments should be installed within the exclosures (Figure 5). Water should be delivered to the catchment in section 4 by a pipeline connected to the well at the visitor center (Figure 6). To maximize wildlife cover values, the exclosures should be located in areas of sagebrush-grassland habitat adjacent to pinyon-juniper habitat. Approximately three-fourths of the area within each exclosure should be reseeded with a mix of grasses, forbs and shrubs. Species desirable for wildlife include San Luis slender wheatgrass, orchard grass (Swensen 1988), penstemon and antelope bitterbrush (Kuykendall 1989). This proposal would benefit deer, elk, small game and birds.

Table 3 displays the acreage of each exclosure, the area prescribed for reseeding and the length of fence required.

Table 3. Exclosure Description for mitigation proposed in the Wild Rivers Recreation Area.

Location	Area in Acres	Area Proposed for Reseeding (Acres)	Fence Requirements (miles)
Section 9	12	9	.7
Section 4	43	32	1.5
Section 32	47	35	1.9
Section 34	23	17	1.0
Total	125	93	5.1

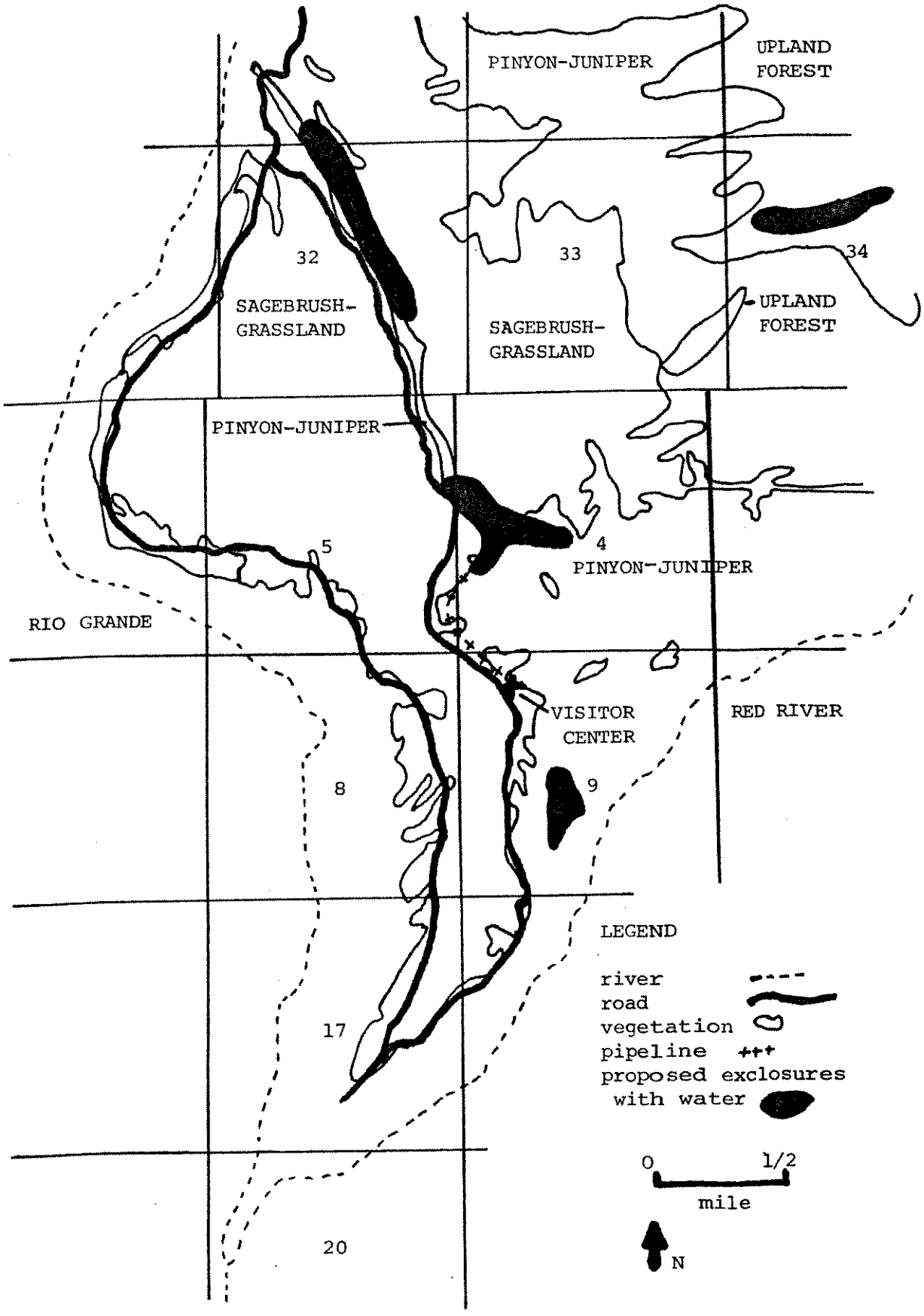


Figure 4. Proposed livestock exclosures within the Wild Rivers Recreation Area near Questa.

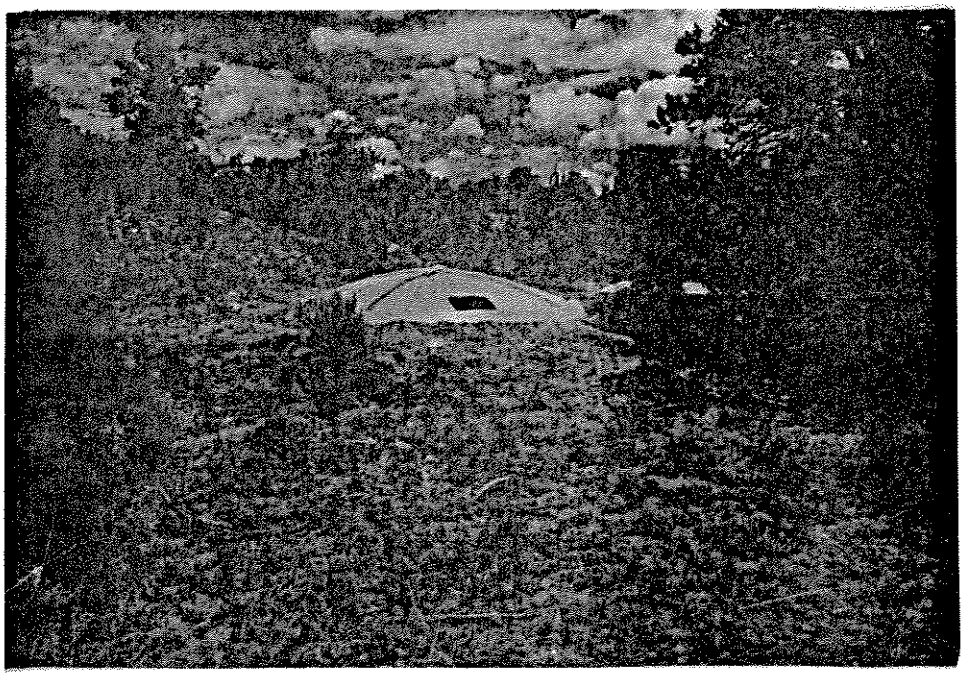


Figure 5. A water catchment for wildlife.

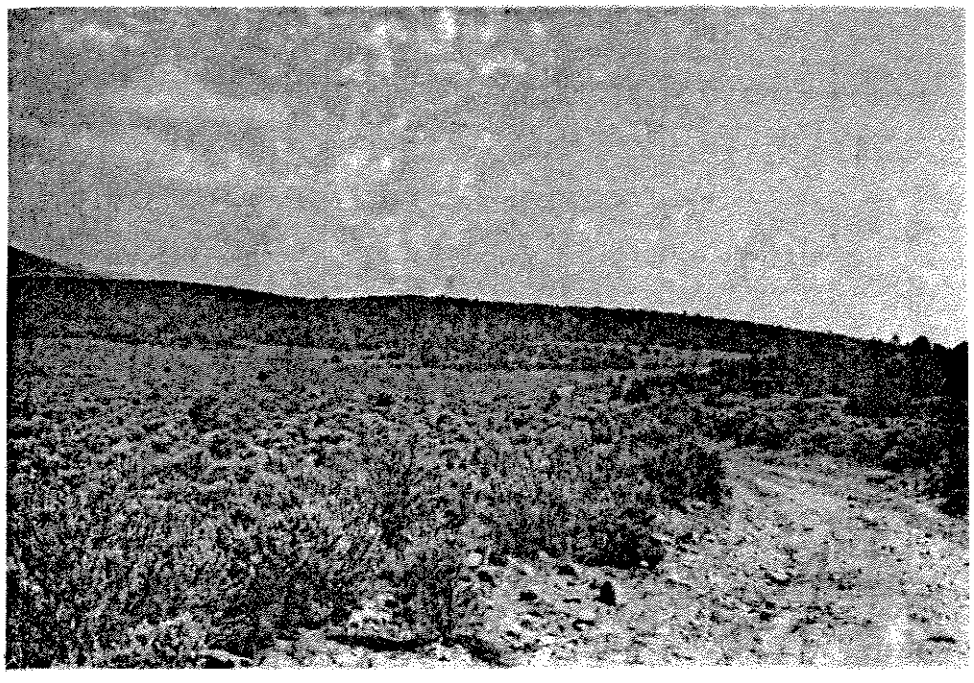


Figure 6. Area proposed for a livestock exclosure (Section 4).

The area of all the exclosures totals 125 acres (including 93 seeded acres). Cost estimates for this mitigation are $1,000 per water catchment, $2,000 per mile of fence, $2,000 for the water pipeline (Kuykendall, April 1989) and $80 per acre for reseeding (Lucero, June 1989). Based on these estimates, the total cost of this mitigation would be:

4 water catchments x $1,000	=	$4,000
5.1 miles of fence x $2,000	=	$10,200
water pipeline x $2,000	=	$2,000
93 acres of reseeding x $80	=	$7,440
Total	=	$23,640

2. Existing Molycorp Tailings Disposal Area

Wildlife would benefit if a portion of Molycorp's present tailings disposal area were designated for wildlife use. For purposes of mitigation we will assume 100 acres is available. This mitigation area would be more valuable if it were located adjacent to Guadalupe Mountain or the Red River. The area should be fenced, plowed and reseeded with a suitable mix of grasses, forbs and shrubs, including those recommended for the Recreation Area. The cost of this mitigation would be $8,000 for reseeding (100 acres x $80 per acre) and $3,400 for fencing (1.7 miles x $2,000 per mile) for a total of $11,400. This proposal would also benefit deer, elk, small game and birds.

3. Sunshine Valley Area

Two areas within Molycorp property north of Questa could be developed for wildlife (Figure 7). The first area, 100 acres, located within section 11, could be improved for wildlife by plowing, reseeding and constructing a livestock exclosure. Reseeding this area with grasses preferred by elk, such as San Luis slender wheatgrass and orchard grass (Swenson 1988), would significantly increase winter use by elk. Establishment of four-wing saltbush would benefit other species such as deer and birds (Kuykendall, June 1989). Existing fences encompass most of the area, and only a quarter mile of new fence would be required. The cost of this measure is $8,000 for reseeding (100 acres x $80) and $500 for fencing (0.25 miles x $2,000) for a total of $8,500.

The second area on Molycorp property (115 acres in sections 1 and 2) currently supports three acres of open water wetland (Figures 7 and 8). On April 12, 1989, twenty-seven additional acres were saturated with water (Figure 9). This area had received below-normal moisture for the year based on snowpack and precipitation records. During the period of January to May 1989, snowpack in this drainage was equivalent to zero inches of water, compared to an average of 3.8 inches. Precipitation during the same period was 0.65 inches compared to an average of 3.95 inches (Lucero, June 1989). These data indicate that groundwater will be at least at the same level if not at a higher level in the future.

Additional open water wetland habitat could be developed for wildlife in this area (sections 1 and 2). Eighteen bird species were identified using this site during four site visits (Table 4). Kennedy and Stahlecker (1986)

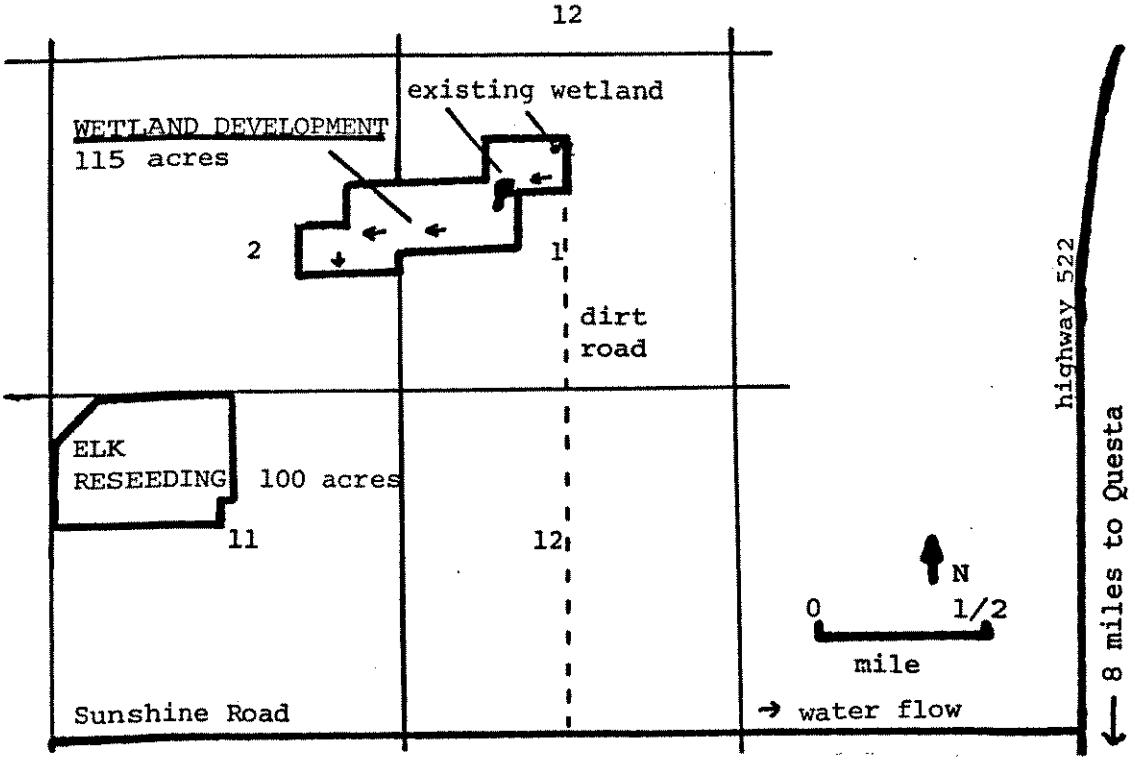


Figure 7. Proposed mitigation areas on Molycorp property north of Questa, New Mexico.

documented 37 bird species in the vicinity of the existing tailings pond. Wetlands are very scarce in this part of New Mexico. Where they occur, unique resident and migratory wildlife species are usually found. A distinct advantage of attracting waterfowl and other migratory species to this location is the possible reduction of their use of the existing or proposed tailing ponds at Questa. This would be particularly desirable if there were a contaminant threat to wildlife at the tailings ponds.

Table 4. Bird species identified at the Molycorp wetland north of Questa during the spring of 1989.*

Common Name	
Canada goose	American coot
Green-wing teal	Killdeer
Mallard	Phalarope sp.
Cinnamon teal	Mourning dove
Northern shoveler	Western meadowlark
Gadwall	Yellow-headed blackbird
Bufflehead	Red-winged blackbird
Marsh hawk	Vesper sparrow
American kestrel	Violet green swallow

* Four visits were made to the Site; March 27, April 12, April 18 and May 31, 1989.

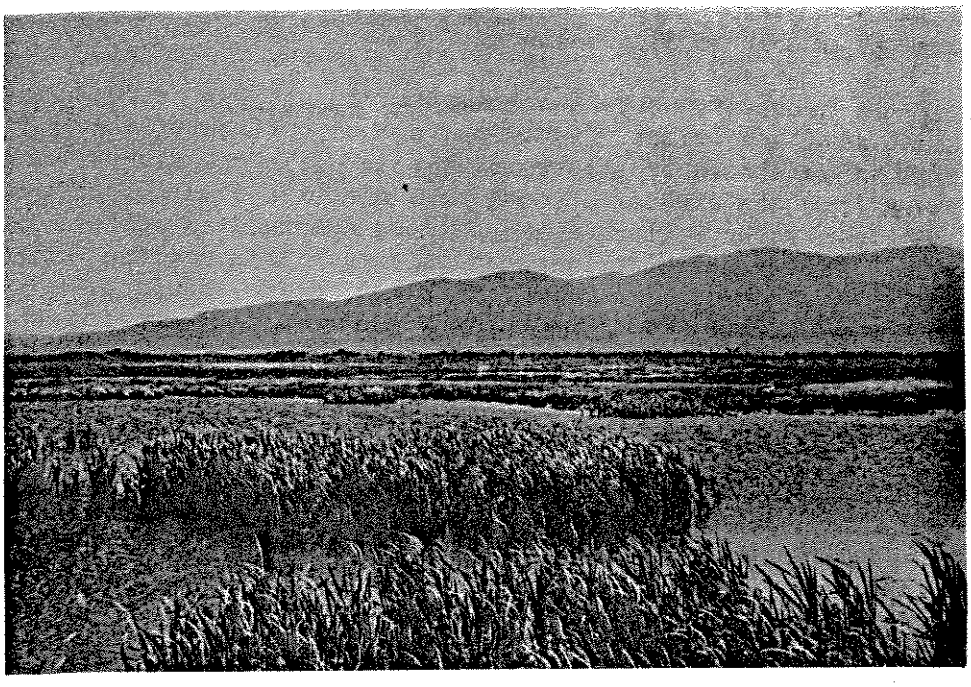


Figure 8. The existing wetland on Molycorp property north of Questa, New Mexico.

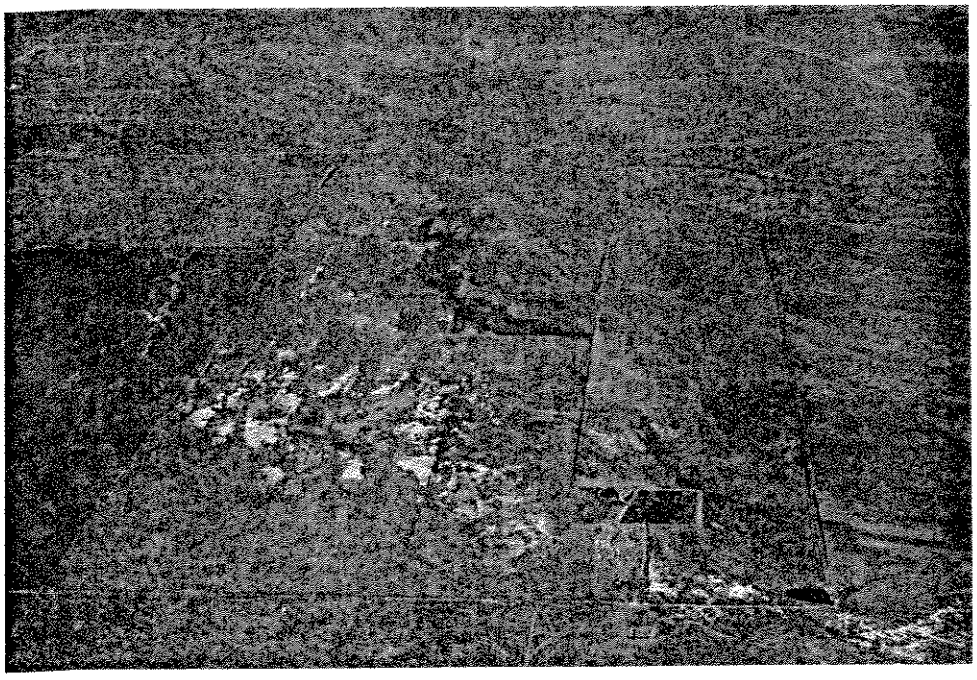


Figure 9. Aerial view of the Molycorp property proposed for wildlife mitigation.

To create additional open water wetland habitat, three different techniques could be used: backhoe excavation, pothole blasting and dike construction. The largest existing wetland has aggraded on the north side. This area could be excavated with a backhoe from the dike to increase the wetland area at least 0.1 acre at a cost of $1,000 (Lucero, June 1989).

Blasting would be necessary where mechanized equipment is ineffective due to water-saturated soil conditions. Dynamite, ammonium nitrate/fuel oil or an equivalent explosive should be strategically placed in the saturated soil to expel soil away from the explosive location. Blasting should create at least three acres of open water wetland and should be designed to achieve a variety of water depths, irregular shorelines and islands. This wetland configuration would maximize its productivity for wildlife. Blasting should be coordinated with the Department, the Service and the Soil Conservation Service to insure acceptable results. We have not estimated blasting costs at this time, since Molycorp has both the explosives and the expertise to carry out this phase of mitigation.

Two proposed dikes should be constructed in areas with adjacent dry soils (Figure 10). Therefore, mechanized equipment could be used for their construction. These dikes would serve to intercept and store spring runoff. If possible, material for the dikes should be obtained from the drainage immediately upstream to create a depression behind the dike. Construction should be coordinated with the Soil Conservation Service. Each dike would be approximately three feet high, not more than 50 feet long and cost about $2,500, or $5,000 total (Cullinan, June 1989). The dikes should create at least six acres of open water wetland.

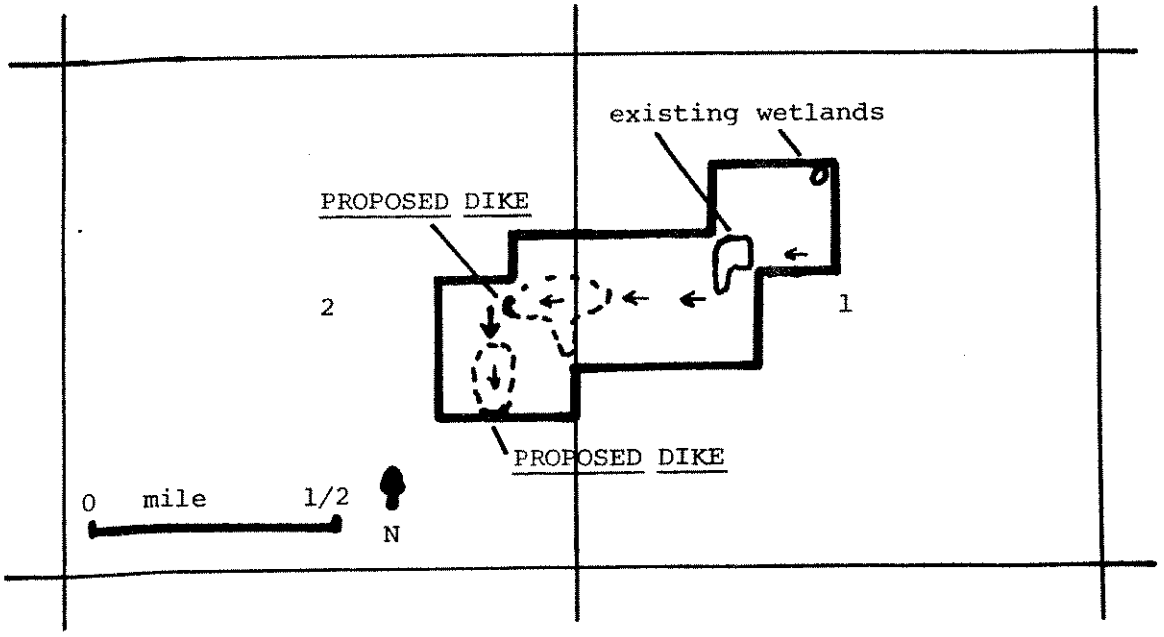


Figure 10. Proposed Dikes in the Wetland Management Area on Molycorp Property North of Questa, New Mexico

Groundwater flow in this area has not been measured. Since this wetland depends directly on the amount of groundwater available, we suggest that blasting and diking be conducted on an incremental basis. For example, several small holes could be created by blasting and observed for one year to determine if groundwater is sufficient to maintain open water. If it is, additional wet areas should be created. All preliminary activities should be conducted downslope from the existing two wetland areas to insure they are not adversely impacted. If no adverse impact is observed after the preliminary trial period, additional blasting could be done in the basin upstream from the wetlands. At full development this proposal should create at least nine acres of wetlands.

To further increase wildlife values, areas immediately adjacent to open water should be reseeded with a mix of plant species beneficial to waterfowl. Plants such as Garrison creeping foxtail and vantage reed canarygrass (Swenson, June 1988) would provide excellent nesting cover for waterfowl. Approximately 30 acres should be reseeded at a cost of $2,400.

To protect the newly created open water and reseeded areas, fences should be built around the entire area and livestock should be removed. Additional acreage surrounding the reseeded area also should be protected to insure that shorebirds and waterfowl have adequate escape cover from predators. The total area to be protected is 115 acres. Existing fences could be used, and about two miles of new fence would be necessary at a total cost of $4,000.

To protect the wetland area (115 acres) Molycorp should transfer ownership of this property to the Bureau. If this is accomplished, mitigation for loss of wildlife habitat would be complete. The cost of this mitigation measure for 115 acres is as follows:

dike construction	=	$5,000
reseeding	=	$2,400
fencing	=	$4,000
Total	=	$11,400

The cost of blasting has not been calculated.

In lieu of fee simple transfer to the Bureau, a management agreement with the Service, Department and Bureau would provide adequate protection. In addition, Molycorp should remove livestock, fence, plow and reseed for elk winter range on an additional 150 acres of land in section 1 (Figures 11 and 12). The cost of this measure would be $16,000 total: $12,000 for reseeding and $4,000 for 2 miles of fence.

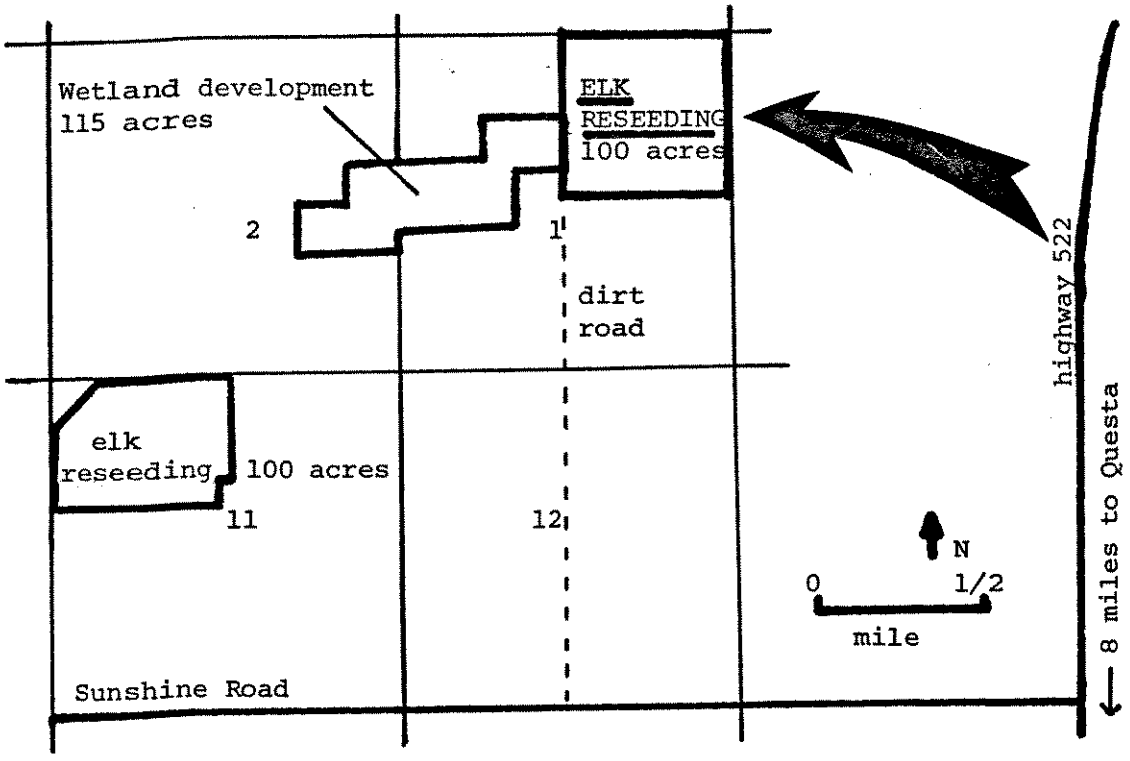


Figure 11. Additional mitigation area required if no land transfer is made to the Bureau.

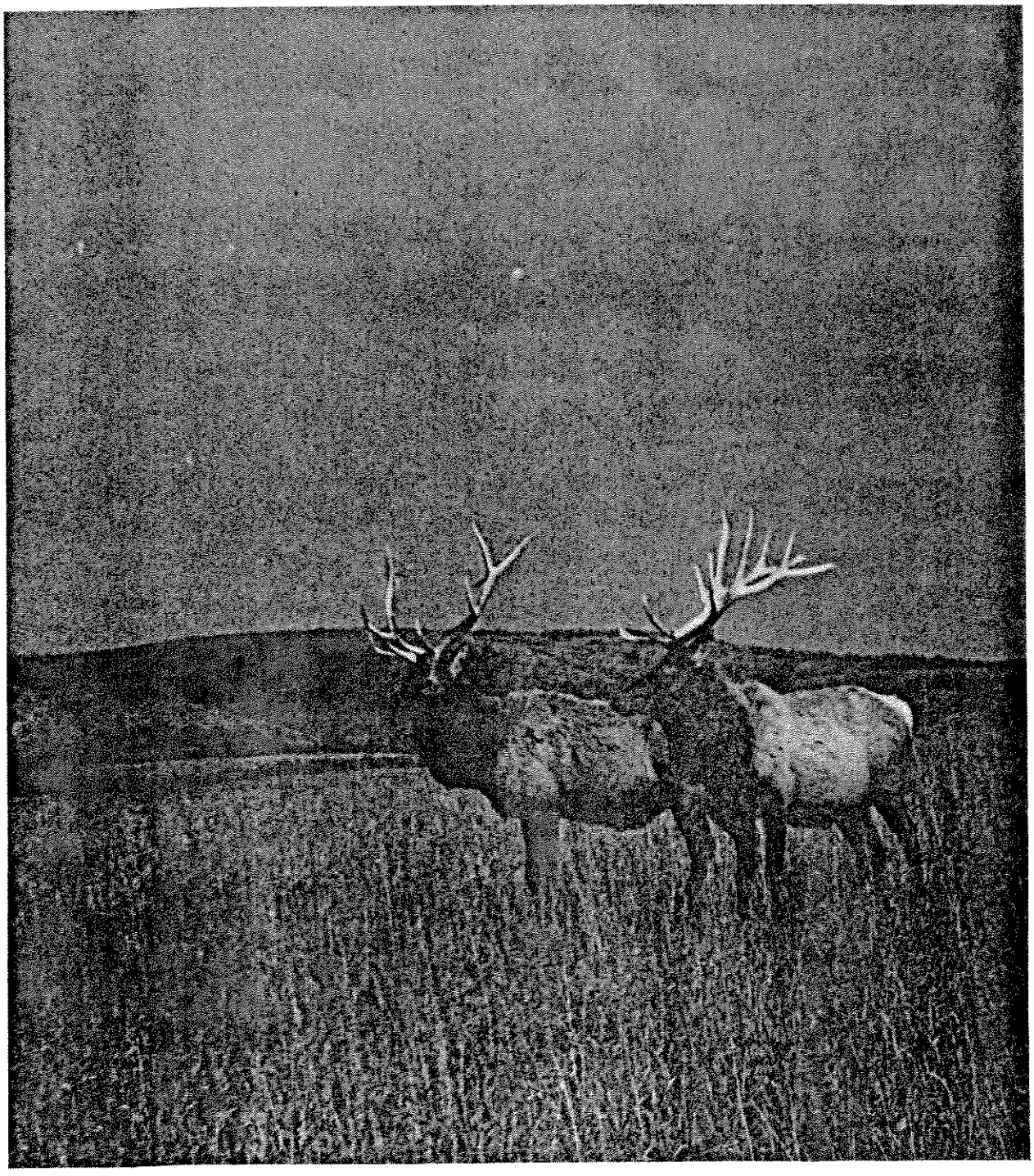


Figure 12. Many of the mitigation areas will benefit the elk.

SUMMARY DISCUSSION

During the development of these mitigation proposals we made certain assumptions concerning the wildlife value and use of the land. For example, we assumed that proposed mitigation lands are used equally by livestock and wildlife. When livestock are excluded from an area, the land will support twice as much wildlife use. With additional land management measures, a livestock exclosure can support substantially more wildlife use. Since unique and scarce wildlife species (waterfowl and wading birds) are more desirable than abundant wildlife species, mitigation favors those species and more mitigation credits are allowed for them. Additional mitigation credits are afforded for protection of wildlife habitats by land transfer from private to public ownership. We have also allowed mitigation credit for enhancement of potential wildlife habitat on reclaimed tailings.

The proposed Molycorp project would impact 1,206 acres of Resource Category 3 wildlife habitat. The Service's Mitigation Policy recommends that wildlife habitat equivalent in value to the 1,206 acres should be created to offset project impacts. Table 5 provides an analysis of wildlife benefits attributable to each of the mitigation measures previously discussed. In this analysis, one acre of land represents one unit of wildlife habitat value.

Mitigation at tailings site #1, is assigned a value of 100 units because we assumed no wildlife value at the present time. Removing livestock grazing from any area automatically gains one half of the total units, because wildlife take the place of livestock which they (livestock and wildlife) were using equally. Due to current low use by wildlife, vegetation treatments, water catchments, and/or reseeding double the wildlife value of these areas . Creating wetlands in sections 1 and 2 would be beneficial to wildlife for two reasons: this habitat type is locally scarce; and it attracts unique species. Species which utilize wetlands are adapted to this aquatic habitat and usually are not found in other habitats. Therefore, we have assigned wetland development four times the current wildlife value of the same area without livestock grazing. Since wetlands are important for wildlife and dwindling both locally and nationally, the Service places a high priority on conserving and protecting these valuable resources. Therefore, placing these wetlands in public ownership to provide for their protection and management has been assigned double the value of the existing area without livestock grazing. If the wetland development land transfer is not completed, Molycorp should increase wildlife values in another area and enter into a multi-agency management agreement.

In summary, to compensate for a loss of 1,230 acres of wildlife habitat due to the proposed project, the mitigation plan includes increasing wildlife values on 440 acres of land at a cost of $54,940. Increasing wildlife values on Bureau land in the Wild Rivers Recreation Area, sections 4, 9, 32, 34, 125 acres, would cost $23,640.

Table 5. Wildlife Habitat Values of Proposed Mitigation Measures.[a]

Area	Acres	Management	Wildlife Value Increase
1. Molycorp Present Tailings Site	100	no grazing, fence, and reseeding	100
2. Wild Rivers Recreation Area	125	remove grazing and fence	62
3. Wild Rivers Recreation Area	125	water catchments and reseed	125
4. Molycorp land, section 11	100	remove grazing and fence	100
5. Molycorp land, section 11	100	reseed	50
6. Molycorp land, section 1 and 2	115	remove grazing and fence	57
7. Molycorp land, sections 1 and 2	115	creating wetlands and reseeding which increases unique and desirable species	480
8. Molycorp land, sections 1 and 2	115	transfer ownership to the Bureau	225
9. Molycorp land, section 1[b]	150	remove grazing and fence	75
10. Molycorp land, section 1[b]	150	reseed	150

[a] The proposed tailings facility impacts requires 1,206 units of mitigation. Mitigation measures 1-8 accomplishes this.

[b] If Molycorp does not transfer it's land to the Bureau, number 8, then Molycorp will be required to complete 9 and 10 above.

Increasing wildlife values on Molycorp land:

a) present tailings site, sections 25 or 36, 100 acres, would cost $11,400;

b) north of Questa, section 11, 100 acres, would cost $8,500;

c) north of Questa, sections 1 and 2, 115 acres, would cost $11,400 plus unknown blasting costs;

d) transferring 115 acres of Molycorp land in sections 1 and 2, to the Bureau would have no capital cost.

If the land transfer is not completed, Molycorp should exclude livestock from an additional 150 acres of land, reseed and construct a fence (cost of $16,000) and sign a multi-agency agreement with the Service, Department and Bureau for management of the mitigation on Molycorp land (600 acres).

RECOMMENDATIONS

Based on our evaluation of wildlife impacts of the proposed project the Service recommends that the following measures be included in Molycorp's Plan of Operation for the proposed Guadalupe Mountain Tailings Disposal Facility prior to the Bureau's agreement to the plan:

1. Molycorp shall operate the tailings pond in accordance with the provisions of the Migratory Bird Treaty Act which prohibits taking of migratory birds.

2. Reclamation of the current tailings pond shall occur before or concurrent with the construction of the new site.

3. When additional storage disposal is necessary, Molycorp shall develop the Guadalupe tailings pond in 50-foot increments only.

4. Molycorp shall coordinate major blasting events to avoid impacting wildlife in adjacent areas.

5. Molycorp, in accordance with recommendations from the Service, the Department and the Bureau, shall study environmental contaminants to determine impacts to wildlife and develop appropriate reclamation plans for both the current and proposed disposal sites.

6. Molycorp shall coordinate reclamation of the proposed Guadalupe Mountain Tailings Disposal Site with the Service, Department and Bureau.

7. Through coordination with the Service, Department and Bureau, Molycorp shall increase the wildlife carrying capacity in several areas by excluding livestock and applying the following management prescription:

   a. develop wildlife waters, reseed, establish vegetation and construct livestock exclosures in four areas (total 115 acres) within the Bureau's Recreation Area.

   b. reseed, establish vegetation and construct a livestock exclosure for wildlife use on 100 acres located in the existing tailings pond area.

   c. develop additional open water wetlands (9 acres) on its land north of Questa, reseed and establish waterfowl cover (30 acres) and construct a fence to exclude livestock for a total area of 115 acres.

   d. transfer the wetland property (115 acres) to the Bureau for future management. If the land transfer is not conducted, Molycorp shall also complete (e) and (f) below.

   e. reseed and establish vegetation, fence and exclude livestock from 150 acres on Molycorp property.

   f. sign a multi-agency agreement concerning future management of the 465 acres located on Molycorp's property. Agencies shall include the Service, Department and the Bureau.

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Appendix 1. Common and Scientific Names of Plants Mentioned in this Report.

Common Name	Scientific Name
Pinyon pine	Pinus edulis
Ponderosa pine	Pinus ponderosa
Rocky mountain juniper	Juniperus scopulorum
One-seed juniper	Juniperus monosperma
Douglas fir	Pseudotsuga menziesii
Antelope bitterbrush	Purshia tridentata
Big sagebrush	Artemisia tridentata
Penstemon	Penstemon sp.
Blue grama grass	Bouteloua gracilis
Western wheatgrass	Agropyron smithii
Crested wheatgrass	Agropyron cristatum
Brome sp.	Bromus sp.
Muttongrass	Poa fendleriana
Needlegrass	Stipa sp.
Sleepy grass	Stipa robusta
Orchard grass	Dactylis sp.
Summer cypress	Kochia scoparia
Curlycup gumweed	Grindelia squarrosa
San Luis slender grass	Agropyron trachycaulum
Foxtail grass	Alopecurus sp.
Reed canary grass	Phalaris arundinacea

Appendix 2. Common and Scientific Names of Mammals Mentioned in this Report.

Common Name	Scientific Name
Mule Deer	Odocoileus hemionus
Elk	Cervus elaphus
Mountain lion	Felis concolor
Bobcat	Felis rufus
Ringtail	Bassaricus astutus
Gray fox	Canis lupus
Coyote	Canis latrans
Cottontail	Sylvilagus muttalli
White-tailed jackrabbit	Lepus townsendii
Least chipmunk	Eutamias minimus
Deer mouse	Peromyscus maniculatus
Ord's kangaroo rat	Dipodomys ordii

Appendix 3. Common and Scientific Names of Bird Species mentioned in this Report.

Common Name	Scientific Name
Canada goose	Branta canadensis
Green-wing teal	Anas crecca
Mallard	Anas platyrhynchos
Cinnamon teal	Anas cyanoptera
Northern shoveler	Anas clypeata
Gadwall	Anas stepera
Buffelhead	Bucephala albeola
Marsh Hawk	Circus cyaneus
American kestrel	Falco sparverius
American coot	Fulica americana
Killdeer	Charadrius vociferous
Phalarope sp.	Phalaropus sp.
Mourning dove	Zeniada macroura
Western meadowlark	Sturnella neglecta
Violet green swallow	Tachycineta thalassina
Mountain chickadee	Parus gambeli
Plain titmouse	Parus inornatus
Virginia's warbler	Vermivora virginiae
Black-throated gray warbler	Dendruica nigresens
Yellow-headed blackbird	Xanthocephalus xanthocephalus
Red-winged blackbird	Agelaius phoeniceus
Rufous-sided towhee	Pipilo erythrophthalmus
Brown-headed cowbird	Molothrus ater
Vesper sparrow	Pooecetes gramineus
Sage sparrow	Amphispiza belli
Dark-eyed junco	Junco hymealis
Brewer's sparrow	Spizella breweri

Appendix 4. Environmental Contaminant Study of the Molycorp Tailings Pond, Questa, New Mexico.

The objective of a contaminant study is to quantify environmental contaminant residues in wildlife that utilize the existing Molycorp mill tailings site. Environmental contaminants to be evaluated should include organochlorine and polyaromatic hydrocarbon compounds as well as inorganic heavy metals and related trace elements. To evaluate potential impacts, these data will be compared to contaminant residues from other locations in New Mexico and to toxicological data and criteria in the literature.

A wide range of indicator species will be selected for collection and analysis. The precise composition of the sample will depend upon species availability and the high likelihood that they are associated with the site. The basic sample matrix will consist of one species of terrestrial plant, one species of aquatic plant and available seed heads of species utilized by wildlife. Two invertebrate species will be collected: an aquatic insect and a flying insect with an aquatic larval stage. Sediment samples will be collected from six sites: one from each of the three existing tailings ponds, one from a small seep water wetland and one from each of the two decant channels. A passerine bird sample, most likely a species of swallow, will be collected. Two mammal samples will be collected by trapping rodents on the reclaimed areas of the mine tailings and on adjacent undisturbed forest and agricultural areas. Samples of cyprinid fish, if available, will be collected from each of the decant channels.

Sample sizes will be sufficient to produce reliable analytical results with correspondingly high quality control assurance. Separate samples will be collected for organochlorines, polyaromatic hydrocarbons, heavy metals and related trace elements. Duplicate samples for statistical comparisons will not be collected due to the foreseen scarcity of sample organisms and the considerable expense of analysis.

Sampling procedures include collection of plant species by hand, sediment with core samplers, invertebrate species with light traps and sweep nets, and passerine birds with mist nets or steel shot. Mammals will be live-trapped and fish will be trapped, seined or electroshocked. Birds will undergo necropsy; liver and kidney tissues will be removed and analyzed separately for heavy metals.

Proposed sample collection sites are shown in Table 1 and the attached map. The sample site identified on the table as MC-9 is located on property owned by Molycorp property 8 miles north of Questa and north of the proposed Guadalupe Mountain tailings site. It will be used as a control site for plants, aquatic and flying invertebrates, fish, mammals and birds, if similar species are available.

Table 1. Sediment, Plant, Invertebrate, Fish and Wildlife Samples to be Collected for the Molycorp Mill Tailings Study.

I.D. No.	Location	Sample Group	Sample Size (grams)	Analysis Code 1/
MC-1	East decant channel	Fish	150	1, 2, 3
		Aquatic plant	50	1, 2
		Aquatic invert.	50	1
		Sediment	1000	1, 2, 3
MC-2	Upper tailings pond	Aquatic plant	150	1, 2
		Sediment	1000	1, 2, 3
MC-3	Seep water wetland	Aquatic plant	150	1, 2
		Sediment	1000	1, 2, 3
MC-4	Tailings pond near west decant channel	Aquatic plant	150	1, 2
		Sediment	1000	1, 2, 3
MC-5	Tailings pond in south-west corner of site	Aquatic plant	150	1, 2
		Sediment	1000	1, 2, 3
MC-6	West decant channel	Fish	150	1, 2, 3
		Aquatic plant	150	1, 2
		Aquatic invert.	50	1
		Sediment	1000	1, 2, 3
MC-7	Reclaimed areas	Terrestrial plants	150	1, 2
		Flying insects	50	1
		Birds	15 indiv.	1, 2, 3
		Mammals	15 Indiv.	1, 2, 3
MC-8	Upland undisturbed	Terrestrial plant	150	1, 2
		Mammals	15 indiv.	1, 2, 3
MC-9	Molycorp wetland north of Guadalupe Mountains 8 miles north of Questa	Fish	150	1, 2, 3
		Aquatic plant	150	1, 2
		Terrestrial plant	150	1, 2
		Aquatic insect	50	1
		Flying insect	50	1
		Sediment	1000	1, 2, 3
		Birds	15 indiv.	1, 2, 3
		Mammals	15 indiv.	1, 2, 3

1/ Analysis Codes:
1. Heavy metals
2. Organochlorines
3. Polyaromatic hydrocarbons

All samples will be prepared in the field for analysis. Standard procedures will be followed to insure that samples are not cross-contaminated. Analysis will be in accordance with Patuxent Analytical Control Facility Procedures. Organic and inorganic compounds for which samples will be analyzed are shown in Table 2.

Table 2. List of organic and inorganic compounds for analysis of samples from the Molycorp Mill Tailings Site.

Organochlorine Scan:

o,p'-DDE	cis-chlordane
o,p'-DDD	trans-nonachlor
o,p'-DDT	cis-nonachlor
o,p'-DDE	trans-chlordane
p,p'-DDD	heptachlor epoxide
p'p'-DDT	hexachlorobenzene
lindane	mirex
dieldrin	BHC
endrin	toxaphene (estimate total)
oxychlordane	PCB's (estimated total)

Polynuclear aromatic hydrocarbons (PAH):

naphthalene	fluorene
phenanthrene	anthracene
fluoranthrene	pyrene
1,2-benzanthracene	chrysene
benzo (b) fluoranthrene	benzo (a) pyrene
benzo (k) fluoranthrene	benzo (e) pyrene
1,2,5,6-dibenzanthracene	benzo (g,h,i) perylene

Heavy Metals[1]:

Arsenic (As)	Manganese (Mn)	Copper (Cu)	Thallium (Tl)
Cadmium (Cd)	Mercury (Hg)	Tin (Sn)	Molybdenum (Mo)
Chromium (Cr)	Nickel (Ni)	Cobalt (Co)	Antimony (Sb)
Lead (Pb)	Selenium (Se)	Beryllium (Be)	Aluminum (Al)
Magnesium (Mg)	Zinc (Zn)	Vanadium (V)	Iron (Fe)

1 ICP scan for all metals, Se, As and Hg at highest sensitivity.

An estimate of analytical costs is displayed in Table 3. Separate samples will be collected for each analysis type. After all samples are collected, an exact catalog of samples will be prepared listing the sample type, tissue matrix and type of analysis requested. This estimate is based upon the current Patuxent Analytical Control Facility price code for contractor laboratories. The table does not identify individual sample costs. These data are available.

Table 3. Itemized estimate of analytical costs of samples from Molycorp Mill Tailings Site.

Compound Group	No. Samples	Cost/sample	Cost
Organochlorines			
Sample preparation	25	-	$ 680
Non-fish	15	$350	$5,250
Fish	3	$350	$1,050
Sediment	7	$300	$2,100
Polyaromatic hydrocarbons			
Sample preparation	25	-included above-	
Tissue	18	$260	$4,680
Sediment	7	$240	$1,680
Heavy Metals			
Sample preparation	30		$868
Precon for ICP	30		$330
ICP	30		$1,117
Arsenic	30		$774
Selenium	30		$774
Mercury	30		$764
Total			$20,067

The estimated costs for salary, equipment, overhead, report preparation, analysis and evaluation of contaminant data are shown in Table 4. A tabulation of all study costs is included.

Table 4. Estimated costs for sample collection and analysis from Molycorp Mill Tailings Site.

Salary: 10 work days x 4 biologists x $185/day		=	$7,400
Per diem: 40 days x $65/day		=	$650
Mileage: 1000 miles x $0.22/mile		=	$220
		Subtotal	$8,270
Equipment:	glassware	=	$100
	dry ice	=	$100
	shipping	=	$500
		Subtotal	$700
Report preparation		=	$1,850

Table 4 (continued)

Total Costs:	
Analytical	$20,067
Salary-Travel	$8,270
Equipment	$700
Report preparation	$1,850
Subtotal	$30,887
Overhead (38%)	$11,737
Total	$42,624

All collections will take place during summer months when only resident birds are on-site. Collections will be carried out in accordance with State and Federal collecting permits using all appropriate authorized methods and equipment. Appropriate fiscal accounting procedures must be established and analytical protocols must be approved through the Patuxent Analytical Control Facility for the Fish and Wildlife Service, Region 2, prior to commencement of sample collection. Report preparation will be completed within 90 days after receipt of all analytical data.