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Final Environmental Impact Statement for the El Cajete Pumice Mine

Santa Fe National Forest

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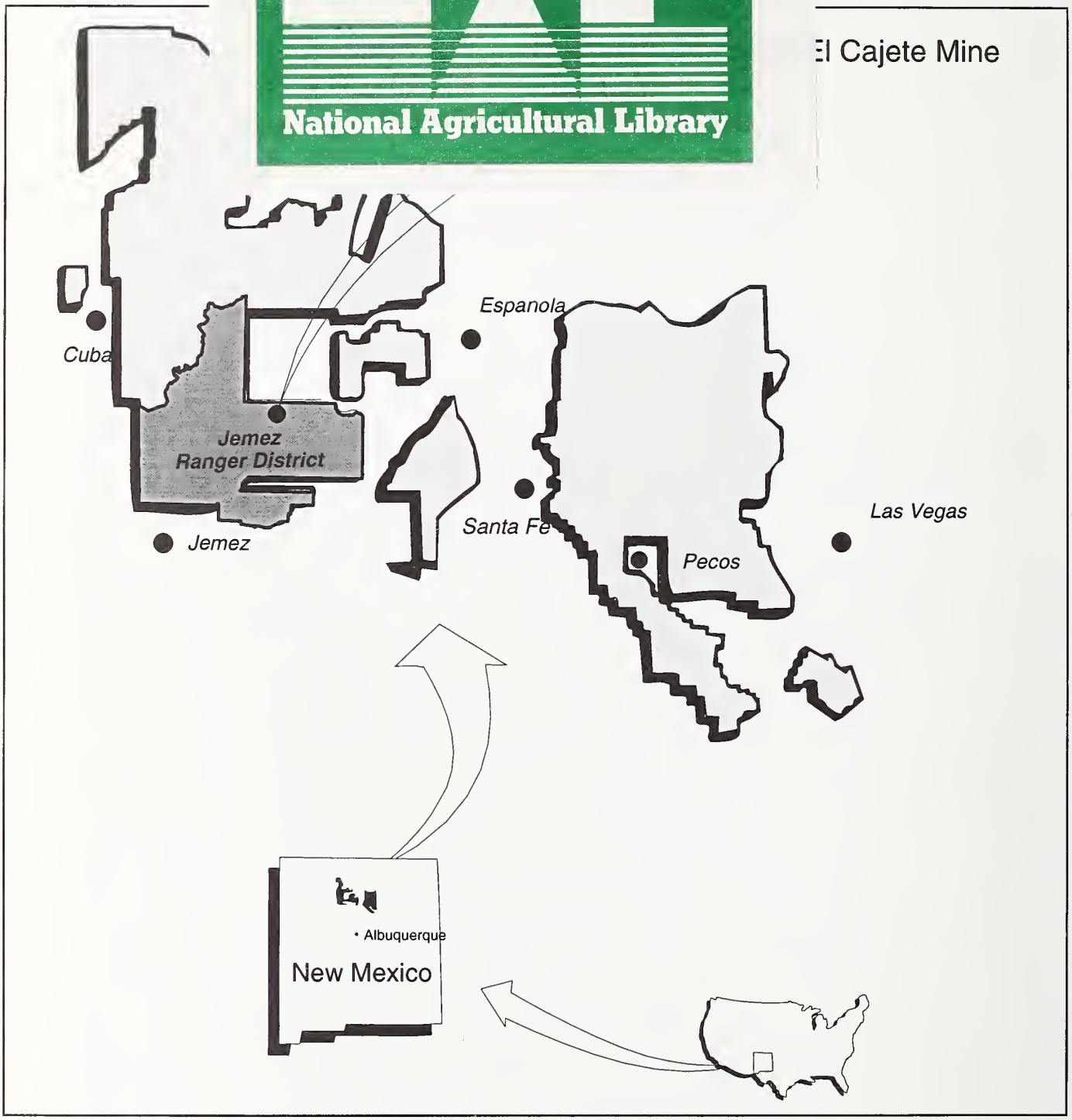

Cover Photo: Proposed El Cajete Mine Area. View is looking east from the Holt Tract. Demonstration Area is upper center.

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Final Environmental Impact Statement
El Cajete Pumice Mine

Proposed Action and Location:
El Cajete Pumice Mine
Jemez Ranger District, Santa Fe National Forest
Sandoval County, New Mexico

Lead Federal Agency:
U.S. Department of Agriculture, Forest Service
Santa Fe National Forest
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Abstract: Copar Pumice Company has proposed to surface mine 100,000 tons of pumice annually for 10 years at the 83.5 acre El Cajete Mine. Mining would require the removal of forest vegetation and stripping and stockpiling of top soil. Bulldozers, loaders and a screening plant would be used for mining. Pumice would be hauled to mill sites in San Ysidro and Espanola, New Mexico. Waste pumice would be back filled and reshaped to mimic the characteristic landscape. Stockpiled top soil would be spread over the reshaped slopes and revegetated with native plants to reestablish the forest.

This Final Environmental Impact Statement (EIS) analyzes the environmental effects of Copar Pumice Company's proposed action Alternative 1, Alternatives 1(a) and 2 which provide for variations in mitigation and reclamation measures, and the "No Action" Alternative 3. This document also contains the Forest Service responses to public comment on the Draft EIS, which was released for a 45-day comment period on January 16, 1996.

The accompanying Record of Decision documents the decision made by the Forest Service and the reasons for that decision based on the Final Environmental Impact Statement. This document also includes an amendment to the Santa Fe National Forest Plan.

Contents

Note: Sections preceded by an "*" indicates that there are substantial changes or additions from the Draft Environmental Impact Statement other than clarifications or editorial corrections.

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List of Tables

List of Figures

List of Photos

Summary

Introduction

This Final Environmental Impact Statement (EIS) has been prepared in response to a proposed Plan of Operations submitted by Copar Pumice Company to surface mine pumice on 83.5 acres of the Brown Placer Mining Claims 9, 10, 11 and 12. The mining claims are owned by claimants under the General Mining Law and have been leased to Copar Pumice Company.

The proposed El Cajete Mine would be located in portions of Section 6, T. 18 N., R. 4 E. and Section 1 of T. 18 N., R. 3 E. The proposed mine would be located within the Jemez National Recreation Area (NRA) of the Santa Fe National Forest in Sandoval County, New Mexico.

The proposed mine would be at an average elevation of 8,300 feet. The forest is predominately ponderosa pine. Soils are productive and suitable for revegetation and reforestation. The area is potential habitat for various sensitive, threatened and endangered species. It is also habitat for a variety of species common to the Santa Fe National Forest. Dispersed recreation use is relatively light with most use occurring on logging roads within the area. Viewing scenery from nearby Highway 4 is a major Jemez NRA activity.

The Final EIS discloses the direct, indirect and cumulative impacts on environmental resources for the proposed action and alternatives to it to the extent necessary to determine if the impacts would be significant. The analyses described in this document will be the basis for a decision to approve the proposed action or an alternative to it. Appropriate monitoring and mitigation measures are also determined for the approved action.

The Draft EIS was released for a 45-day comment period on January 16, 1996. Summarized comments and Forest Service responses are contained in the appendix of this document. The accompanying Record of Decision documents the decision made by the Forest Service and the reasons for that decision, based on this Final Environmental Impact Statement

Proposed Action

Copar Pumice Company plans to mine 100,000 tons of locatable pumice annually for a 10-year period at its proposed 83.5-acre El Cajete Mine. The proposed mine would replace Copar Pumice Company's existing 29-acre Las Conchas Mine which will be depleted in 1996.

Surface mining of pumice would require the removal of ponderosa pine and other forest vegetation. Top soil would be stripped and stockpiled separately from waste pumice for later reclamation.

Bulldozers, loaders and other large earth moving equipment would be used to mine and reclaim the El Cajete Mine. A 400 ton per hour screening plant would be used to sort out various product sizes of locatable pumice from the common variety pumice. Common variety pumice would be stockpiled and used later for reshaping and reclaiming the mined area.

Locatable pumice would be hauled by 18-wheeled tractor-trailer trucks both east and west on N.M. State Highway 4 to Copar Pumice Company's processing plants in San Ysidro and Espanola, New Mexico. Five standard sized contract trucks capable of hauling 25 tons per load would be used. A total of 40 truck trips, 20 loaded and 20 empty, would be made daily during the work week. Short segments of Forest Roads 4G and 131 would be used to access the highway.

The mine would operate up to 10 hours per day, Monday through Friday for an estimated 250 days per year. Holiday and weekend operations are excluded to reduce traffic during peak recreation use periods. The mine would not operate during severe winter conditions.

As mining progresses, the wasted pumice would be replaced and shaped to mimic the existing ridgeline landscape. The maximum slope would be 40 percent. Top soil would be respread over the reclaimed area, seeded with grasses and forbs, planted with tree seedlings, and fertilized.

The mine area would be fenced to exclude livestock and posted to prohibit public entry during mining operations. Performance bonding would be required to insure that reclamation, revegetation, and reforestation is completed to a satisfactory standard.

Alternatives

The alternatives analyzed in this EIS are described in detail in Chapter 2, Alternatives Including the Proposed Action.

Alternative 1 is Copar Pumice Company's proposed Plan of Operations described in the preceeding section.

Alternative 1(a) differs from Alternative 1 because additional reclamation and mitigation measures are required to conserve soil productivity, reduce impacts to surface water, and speed recovery of vegetation and wildlife habitat. The reshaped topography with slopes limited to 30 percent would be required to retain drainage on site. In addition, contour furrows and

other methods would be used to reduce the potential for erosion. Native species would be used for revegetation and reforestation in patterns that mimic the natural grasslands in the area. Prescribed ground cover and seedling survival levels would be required for revegetation and reforestation efforts.

Alternative 2 repeats the increased reclamation and mitigation measures of Alternative 1(a) and reduces the size of the mine to 58 acres to reduce the impact on scenery.

Alternative 3 is the "No Action" Alternative required by NEPA regulations. The proposed Plan of Operations for the mine would not be approved with the implementation of this alternative. Selection of this alternative would violate the General Mining Law of 1872, as amended, and is consequently not within the deciding officer's discretion. The "No Action" alternative is required by NEPA and offers a baseline for comparison with the other alternatives.

Summary of Impacts

Detailed analyses of potential impacts and mitigation measures for each alternative and affected resource are presented in Chapter 4, Environmental Consequences. For definitions of irretrievable and irreversible, please see the Glossary in the back of this document.

Soil Productivity

The productivity of the soils to produce wood fiber and herbaceous forage within the proposed mine would decline with the implementation of Alternatives 1, 1(a) and 2. Alternative 3 would not result in a decline in productivity because mining would not be approved.

An estimated 40 percent reduction in productivity would result from the changes in soil structure and nutrient balance caused by stripping, stockpiling, and respreading of the top soil prior to and following the surface mining of pumice and reclamation of the mined area.

The impacts to productivity would be greatest in Alternatives 1 and 1(a) because these alternatives would approve an 83.5-acre mine. Alternative 2, which would approve a 58-acre mine, would reduce the loss of productivity by 25.5 acres. Mitigation measures in Alternatives 1(a) and 2 that would require lower slope angles, erosion control structures, and increased revegetation and reforestation standards would further reduce the potential for soil erosion and the possible permanent loss of productivity in comparison to Alternative 1.

The decline in productivity would be an unavoidable adverse impact that is considered irreversible because many decades would pass before the current level of soil productivity would be restored. The decline in productivity, although significant for the 58 to 83.5 acres within the proposed mine, would not be cumulatively significant for the 41,700-acre East Fork of the Jemez River Watershed.

Ground Water

Pumice mining would have little, if any, measurable effect on the recharge of the ground water aquifers underlying or near the proposed mine. Quantity and quality of water in shallow and deep ground water aquifers would not decline as a result of mining. If any change occurs, it would likely be from an increase in the amount of water available for infiltration and recharge of the shallow aquifer with the reduction in evapotranspiration resulting from the removal of vegetation.

The reclamation of the proposed mine would result in the backfilling and reshaping of the mined area with waste pumice, replacement of the stockpiled top soil, and revegetation and reforestation of the site. Precipitation would be captured and infiltrated on-site. As a consequence, the Jemez NRA legislative requirement that the hydrological condition be restored as close as practical to the premining condition would be met.

Pumice mining would increase the potential to contaminate the shallow ground water aquifer with a fuel or hydraulic fluid spill. As a preventative mitigation measure, an impervious spill containment structure would be used for fueling and lubricating activities. A spill kit would also be kept on-site to capture spills from a hydraulic line rupture. All waste oils and contaminated pumice from an accidental spill would be collected and disposed of in an authorized facility.

Ground water monitoring wells would be maintained to monitor the quality of ground water during and after mining.

Wetland and Surface Water

Pumice mining would increase the potential for runoff to transport sediment to surface water in the nearby intermittent stream originating at Montoya Spring. There would be no potential for sediment to reach the

East Fork of the Jemez Wild and Scenic River located 2 miles to the west, however, because the intermittent stream ceases to flow above ground one-half mile below the spring. Any sediment reaching this dry drainage would be trapped and stabilized by dense grass and other vegetation in the canyon bottom.

The potential for erosion to affect areas off-site would be greatest in Alternative 1 where the ridge line topography, steeper slopes, and lack of erosion control structures on a 83.5-acre reclaimed mine would increase the potential for sheet erosion and formation of rills and gullies. Alternative 1(a) would have a lower erosion potential because of mitigation requirements that create a closed basin topography, reduce slopes to a maximum of 30 percent, and construct contour furrows and a storm water drainage and detention structure. Alternative 2 repeats the reclamation and erosion control requirements of Alternative 1(a) and further reduces the potential for erosion by approving a smaller 58-acre mine.

The proposed 58- to 83.5-acre mine is small in comparison to the 41,700-acre East Fork of the Jemez River Watershed within which the mine would be located. Due to the small size and mitigation and reclamation measures to conserve and reestablish forest resources, the proposed mine would not significantly add to the cumulative impacts to water quality, soils, and vegetation resources in the watershed.

Recreation Opportunities and Uses

The proposed El Cajete Mine would be within the Jemez National Recreation Area and near the East Fork of the Jemez Wild and Scenic River corridor boundary and Forest Trail 137 which accesses the river. A portion of the mine would be visible from N.M. State Highway 4, which is designated by the State as the Jemez Mountain Trail Scenic and Historic Byway. The **Forest Plan** management direction for this area emphasizes providing and protecting recreation opportunities and scenic resources.

Nearby residents make up the majority of dispersed recreation users on-site. Mining would result in the exclusion of users within the boundary fenced to exclude livestock and the public from hazardous areas during mining and reclamation. Most recreation use consists of cross-country skiing, gathering firewood, hunting, and motorized travel on roads within the area and is relatively low in comparison to the East Fork of the Jemez Wild and Scenic River and Jemez NRA.

The greatest effects to dispersed recreation users would occur off-site from sound and scenic impacts. Sound and scenic impacts are covered in detail in following sections. Sound would be heard most often by hikers on Forest Trail 137 and other users and residents within one-quarter mile of the mine. Scenic impacts would be greatest for recreation users that could view the mine from its edge, along Highway 4, and the peaks and escarpments within the Jemez NRA.

These unavoidable adverse irretrievable impacts to recreation uses and opportunities would be significant because the impacts occur within the Jemez NRA and near the East Fork of the Jemez Wild and Scenic River which are both nationally recognized recreation resources.

Heritage Resources

There are no archeological or historic sites within or near the proposed mine that would be affected by mining. American Indian tribes that use or may use the Jemez Mountains for religious and cultural purposes were contacted to determine if the proposed mine would affect their uses.

Jemez Pueblo initially expressed opposition to mining because the mine would be too close to routes used to access sites of ritual significance. The pueblo, however, has since indicated in additional consultation that leaving an undisturbed buffer between the proposed mine and their area of concern would protect their use.

Santo Domingo Pueblo expressed opposition to all activities on the Jemez Mountains because of the mountains' cultural significance to the tribe. In a subsequent contact, the tribe indicated their concern was general in nature and not related to religious or cultural uses within or near the proposed mine. The tribe's concern was not considered further because specific uses that could be affected by the mine were not identified.

Scenery

The area proposed for mining can currently be seen through gaps in forest vegetation from Highway 4, Los Griegos Peak, Las Conchas Peak, Cat Mesa Escarpment, and the private McKeever home. The existing Las Conchas Mine can also be seen from Los Griegos Peak and Las Conchas Peak. Analysis of scenic impacts of the proposed and existing mines was based on potential views because existing forest vegetation, which limits views from most key observation points, can be lost to wildfire or insect and disease epidemics.

The **Forest Plan** calls for a scenic condition of Retention for the proposed El Cajete Mine and the existing Las Conchas Mine. The Retention scenic condition requires activities not be evident to a casual observer one year after completion of the project. Most of the areas around the proposed and existing mine meet Retention or Partial Retention conditions. Partial Retention means activities are evident but subordinate to the natural landscape character.

The scenic condition of the proposed mine is currently inventoried from aerial photographs and on-site conditions as Marginally Acceptable due to recent timber harvest and disease treatment in the Integrated Forest Protection Demonstration Area. Depending on the observation point, however, the mine site may range from Retention to Modification. Modification means activities are dominating the landscape but appear natural in the foreground, middleground and background views. Marginally Acceptable means activities are dominating the landscape in foreground and middleground views, but appear natural from the background. The existing Las Conchas Mine is classed as Unacceptable Alternation because mining and reclamation are dominating the landscape from all viewing distances with the exception of highway views.

Key observation points were selected to analyze the scenic impacts of mining. Los Griegos and Las Conchas peaks and Cat Mesa Escarpment are middleground observation points. Highway 4 is a foreground observation point. The Wanderer observation point is representative of an individual viewing the mine from the immediate foreground. The McKeever and Vallecitos observation points are representative of nearby residential views.

During the projected 10 years of active mining and up to 2 years after final reclamation, all action alternatives result in a scenic condition of Unacceptable Alteration for any observation point. In comparison, the No Action Alternative 3 meets at least Partial Retention with the exception of Los Griegos and the Wanderer meeting Marginally Acceptable.

In the first decade after reclamation, only the Las Conchas and Highway 4 observation points in Alternative 2 would meet the **Forest Plan** scenic condition of Retention because less area between the highway and proposed mine would be mined. During this period, Alternative 3 would meet Retention with the exception of the Los Griegos, Wanderer and Highway 4 observation points: Los Griegos and the Wanderer would meet a scenic condition of Modification, while Highway 4 views would meet Partial Retention.

By the 15th year after reclamation, Alternative 2 would meet Retention from all observation points with the exception of the Wanderer which would meet Partial Retention. Twenty years after reclamation, Alternative 1 and 1(a) would meet at least the Modification condition with the exception of the Wanderer observation point which would be Marginally Acceptable. Half of the observation points in Alternative 1(a) would continue to improve and meet the Retention scenic condition by year 30. None of the observation points in Alternative 1 would meet Retention in 30 years, except Rabbit Mountain.

The unavoidable adverse irretrievable decline in scenic conditions from key observation points within the Jemez NRA would be significant because scenery is an integral part of the resources of this national recreation area and the impact is long-term and cumulative with scenic impacts of the Las Conchas Mine.

Minerals

Alternatives 1 and 1(a) would approve a Plan of Operations to mine locatable pumice at the proposed 83.5-acre El Cajete Mine site. Alternative 2 would approve mining within a 58-acre area at this site. In all action alternatives, common variety pumice would be sorted out at the mine's screening plant and used to backfill the reclaimed pit.

Alternatives 1 and 1(a) would mine 1,695,000 cubic yards of locatable pumice. Common variety mineral must be wasted under the Jemez NRA legislation which prohibits sale of common material, and is referred in the remainder of this document as waste pumice.

The approval of a 25.5-acre smaller mine in Alternative 2 reduces the amount of locatable pumice available for mining by 546,800 cubic yards.

Forest Vegetation

Implementation of action alternatives would require the removal of all forest vegetation in preparation for surface mining. Understory vegetation consists of grasses, forbs, Gamble oak, wood rose and honey locust. The overstory vegetation is primarily ponderosa pine saplings and poles. Quaking aspen, white fir and Douglas-fir also occur in the area.

Some mature conifers occur in areas not harvested during the Bonito Timber Sale within the proposed El Cajete Mine site. The removal of vegetation on 83.5 acres in Alternatives 1 and 1(a) would remove an

estimated 241,000 board feet of merchantable timber. The 58-acre mine approved in Alternative 2 would remove an estimated 84,500 board feet of merchantable timber. Merchantable timber not used for wildlife habitat logs would be sold to Copar Pumice Company at appraised prices.

The unavoidable adverse impacts to forest vegetation would result in an irretrievable loss of wood fiber and herbaceous productivity. The impacts, however, would not be cumulatively significant for the vegetation resources within the East Fork of the Jemez River Watershed.

Integrated Forest Protection Demonstration Area

A 16-acre area within the proposed mine site was clearcut and the stumps removed to determine and compare the level of root rot infection to observable mortality. Reforestation of the site was also planned to determine if removal of infected stumps would be an effective treatment method for severely infected sites.

This portion of the Integrated Forest Protection Demonstration Area would be eliminated from future study with implementation of the action alternatives. Data currently collected would still be of use in developing a rating system for root rot infection. The effectiveness of removing infected stumps prior to reforestation, however, would not be possible at this site. This unavoidable adverse impact would be irreversible.

Wildlife Habitat

Habitat of common wildlife species and potential habitat of some threatened, endangered and sensitive species would be structurally altered by the proposed mine. Predominately ponderosa pine and some mixed-conifer and aspen habitat would be converted to grasslands and ponderosa pine plantations established on the reclaimed site. These effects would persist within the reclaimed area for several decades until a young forest is reestablished.

Mining and reclamation activities would also cause sound and visual disturbance for wildlife species. Disturbance would likely result in a localized decline in habitat suitability primarily within one-quarter mile of the mine.

These unavoidable adverse impacts to wildlife habitat would cause an irretrievable loss over the several decades necessary for a young forest to become established.

Surveys for many of the threatened, endangered and sensitive wildlife and plant species that could occur in this habitat failed to locate any of these species. A biological assessment and evaluation conducted for threatened, endangered and sensitive species determined that the proposed mine would not have a significant impact on these species.

Sound

Mining equipment at the proposed mine would be heard most often by recreation users within one-quarter mile of the mine and by nearby residents. The level of sound heard would vary widely with the amount of wind that masks sound and the height and density of vegetation or presence of topographic features that serve as sound barriers.

The background sound level of a forest is about 40 dBAs with a slight breeze. A 65 dBA sound level is considered an acceptable level for residential areas.

Assuming no masking or sound barrier effects, a sound level of 90 dBAs from heavy machinery at the center of the mine would attenuate to 60 dBAs at 1,600 feet on Forest Trail 137, and 54 dBAs at 3,200 feet where the nearest Los Pinos Subdivision residence is located. Actual levels would be lower with vegetation, ridges or the mine wall absorbing sound.

Air Quality

Pumice mining would produce dust primarily from screening, conveying, stockpiling, and hauling pumice. The N.M. Environment Department regulates dust production from screening plants by requiring an air quality permit.

The screening plant at the Las Conchas Mine would be moved to and used at the El Cajete Mine. The air quality permit for this plant permits a 400 ton per hour production rate and control of dust emissions with water spraying when the opacity of the dust plume reaches 10 percent. The plant has been operating at an average 250 tons per hour production rate at the Las Conchas Mine and opacity has not exceeded 5 percent.

Pumice has an excellent water holding capacity in comparison to most mineral materials. The moisture content of piled pumice during opacity readings ranges between 52-69 percent. The high moisture content of pumice explains why dust abatement has not been necessary during screening, conveying, and stockpiling at the Las Conchas Mine.

Dust would also be produced from the access road between the highway and the proposed mine since the roadbed is pumice and truck traffic would crush pumice to a fine powder. The air quality permit requires watering or other methods to abate road dust. Surfacing the road with crushed aggregate or paving the road are mitigation methods employed in Alternatives 1(a) and 2 to control road dust.

Residential Property Values

Long-term monitoring of property values would be required to determine if pumice mining would lower the values of nearby private land and homes. To date, experience of a realtor and a builder on private properties nearest the proposed mine indicates that private land and homes have continued to sell and prices have increased.

Highway and Mine Safety

At the projected level of mining during the 10-year life of the mine, about 7.5 million miles would be traveled by tractor-trailer trucks hauling pumice from the proposed mine over Highway 4 to mill sites in San Ysidro and Espanola, New Mexico. Seventy-five percent of the loads would go to the Espanola Mill Site.

The average rate of truck accidents in the United States is 0.28 accidents per million miles traveled. At the projected mileage, an accident rate of 2.1 accidents could be expected during the life of the mine.

Several curves on Highway 4 between the proposed mine and Espanola are difficult for standard length tractor-trailers to travel.

Economic Impacts

The proposed El Cajete Mine in Alternatives 1 and 1(a) would produce an estimated annual gross sales of $800,000 to $1,500,000 assuming prices for pumice remain the same and the proposed mine produces at the same level as the Las Conchas Mine. Employment of 28 full-time and 2 part-time workers, currently employed by the Las Conchas Mine, would likely continue at this production level.

Alternative 2 would be 25.5 acres smaller than the other action alternatives and production of locatable pumice would decline by 693,000 cubic yards. The time the mine would be in operation, value of mineral produced, and the number of employees could decline with this alternative.

Economic impacts from the proposed El Cajete Mine would increase significantly if Copar Pumice Company's annual projected demand of nearly 170,000 cubic yards is reached. Currently, the Las Conchas Mine is producing 40-50,000 cubic yards per year.

I. Purpose of and Need for Action

This chapter discusses the purpose of the proposed action and need for Forest Service action. Source documents from the project record are incorporated by reference throughout the Final EIS.

Introduction

Copar Pumice Company of Espanola, New Mexico submitted a proposed Plan of Operations in July 1992 to the Santa Fe National Forest for approval to surface mine locatable pumice on an estimated 133 acres of portions of Brown Placer Mining Claims 9, 10, 11 and 12 [Plan of Operations; July 24, 1992].

The El Cajete Mine would be located within the Jemez National Recreation Area (NRA) of the Santa Fe National Forest in Sandoval County, New Mexico. The mine would be in portions of Lots 7 and 19 of Sec. 6, T. 18 N., R. 4 E.; SE 1/4 SE 1/4 & Lot 11 of Sec. 1, T. 18 N., R. 3 E.; Lots 12 and 16 of Sec. 1, T. 18 N., R. 3 E.; Lots 13 and 15 of Sec. 1, T. 18 N., R. 3 E; N.M.P.M. See Figure 1 on the following page.

Copar Pumice Company leases the mining claims from mining claimants Richard P. Cook, Shirley A. Cook, Kelly Armstrong, and Debbie Cantrup. In February 1995, Copar Pumice Company reduced the proposed mine from 133 acres to 83.5 acres after discussing with the Forest Service the potential impacts of the original proposal on scenery, heritage resources and wildlife habitat [1950 Memo; February 14, 1995].

Pumice mining at the proposed El Cajete Mine would begin as soon as the proposed Plan of Operations is approved by the Santa Fe National Forest.

Copar Pumice Company submitted the proposed operating plan in compliance with Forest Service 36 Code of Federal Regulations (CFR) Part 228-Minerals, Subpart A-Locatable Minerals. The regulations provide the process for approval of operating plans in recognition of a mining claimant's statutory right to mine minerals claimed under the General Mining Law of 1872, as amended.

The National Environmental Policy Act (NEPA) and 36 CFR 228 regulations require an environmental analysis of the proposal to determine and disclose the impacts of mining. The mining regulations require, to the extent practicable, prevention or control of adverse environmental impacts to scenery, fish and wildlife habitat, and other surface resources. Miners must also comply with state and federal air, water and solid waste disposal laws and reshape and revegetate the disturbed area to reclaim the mined area and prevent or control erosion, landslides, and runoff.

The Jemez National Recreation Area Act and the **Santa Fe National Forest Plan** also require control of environmental impacts from mining activities.

On October 12, 1993 Public Law (PL) 103-104 established the Jemez National Recreation Area (NRA) to conserve, protect and restore recreational, ecological, heritage and wildlife resources within the Jemez NRA. Administration of the area must be in accordance with this Act (see Appendix B) and the laws, rules, and regulations applicable to National Forest System lands in a manner that will further the purposes of the recreation area. Management of the natural resources shall be permitted only to the extent that management is compatible with and does not impair the purposes for which the recreation area is established. The legislation permits mining on valid mining claims and requires, to the extent practicable, reclamation of the premining visual and hydrological conditions. Mineral patenting of mining claims, new mining claims, mineral leases, and common variety mineral sales were prohibited by the legislation.

The **Santa Fe National Forest Plan** of September 4, 1987 established management direction for the El Cajete Mine area. The El Cajete Mine would be within Management Area C of the Forest Plan. Management Area C recognizes Highway 4 as a major transportation corridor with outstanding developed recreation opportunities and scenery which are to be emphasized and enhanced. Mining and other resource uses are also permitted within the management area. Scenery is to be retained so that observers are unaware of activities along highways, trails and recreation areas within one year after completion of ground disturbing activities [Forest Plan, pp. 106-111].

This Final EIS documents and discloses the environmental analysis and impacts of the El Cajete Mine in compliance with Forest Service Regulation 36 CFR 228, Public Law 103-104, Santa Fe National Forest Plan, and NEPA regulations 40 CFR 1500-1508. The Final EIS also recommends the mitigation measures to protect and reclaim the surface resources in and around the proposed El Cajete Mine to avoid or minimize adverse environmental effects.

This Final EIS is not a decision document. Its purpose is to disclose the environmental consequences resulting from implementation of the alternatives discussed. The Record of Decision issued with the Final EIS sets site specific mining, reclamation, and mitigation measures.

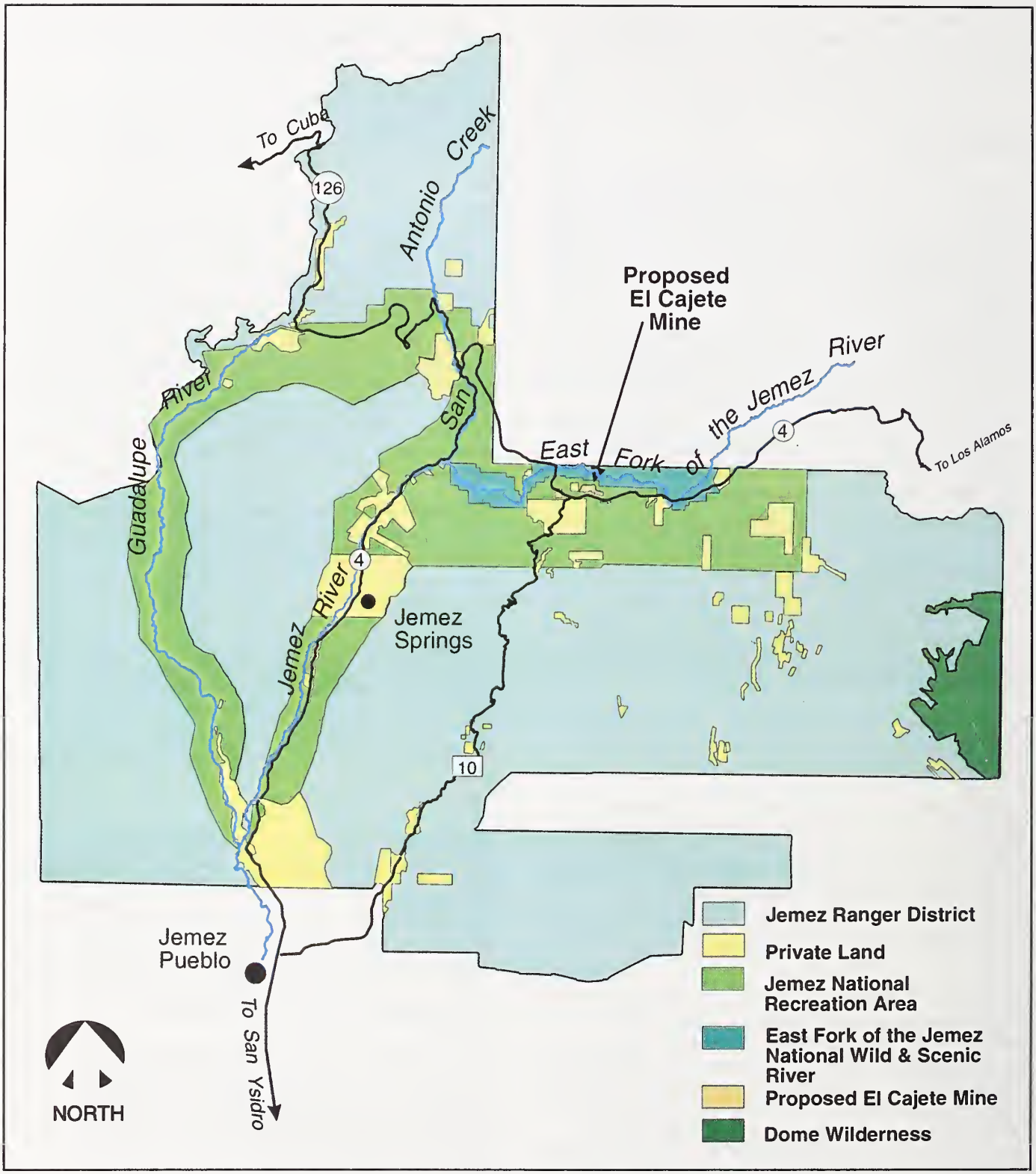

Figure 1. El Cajete Mine Vicinity Map, Santa Fe National Forest, Jemez Ranger District.

Proposed Action

Copar's proposed action is Alternative 1. Copar Pumice Company proposed the 83.5-acre El Cajete Mine because the company's existing 29-acre Las Conchas Mine will be depleted by 1996.

Copar Pumice Company projects the proposed El Cajete Mine would produce 100,000 tons (169,500 cubic yards) of locatable pumice annually for a 10-year period at its expected demand level. The proposed El Cajete Mine would range in width from 500 to 1,300 feet and would be about 3,700 feet long. Mining depth would vary between 30 and 80 feet.

Bulldozers, graders, loaders, lube-fuel trucks, and a screening plant would be used in the mining and reclamation operations. A watch person's trailer and portable toilet would be located within the mine boundary.

Short segments of Forest Roads 4G and 131 would be used to access N.M. State Highway 4. Five contract 18-wheeled tractor-trailers capable of hauling 25 tons each would be used to haul pumice both east and west over Highway 4 to company processing plants in Espanola and San Ysidro, New Mexico.

Each of the 5 trucks would make 4 trips daily. An average of 20 loaded and 20 empty truck trips for a round trip total of 40 truck trips would be made daily during the work week. Seventy-five percent of the trucks would haul between the proposed mine and the Espanola plant. The remainder would be hauled to San Ysidro. The proposed mine would operate 10 hours per day on a Monday through Friday work week, holidays, weekends, and inclement weather excluded, for about 250 days annually.

The proposed surface mining would require the removal of an estimated 240,000 board feet of timber

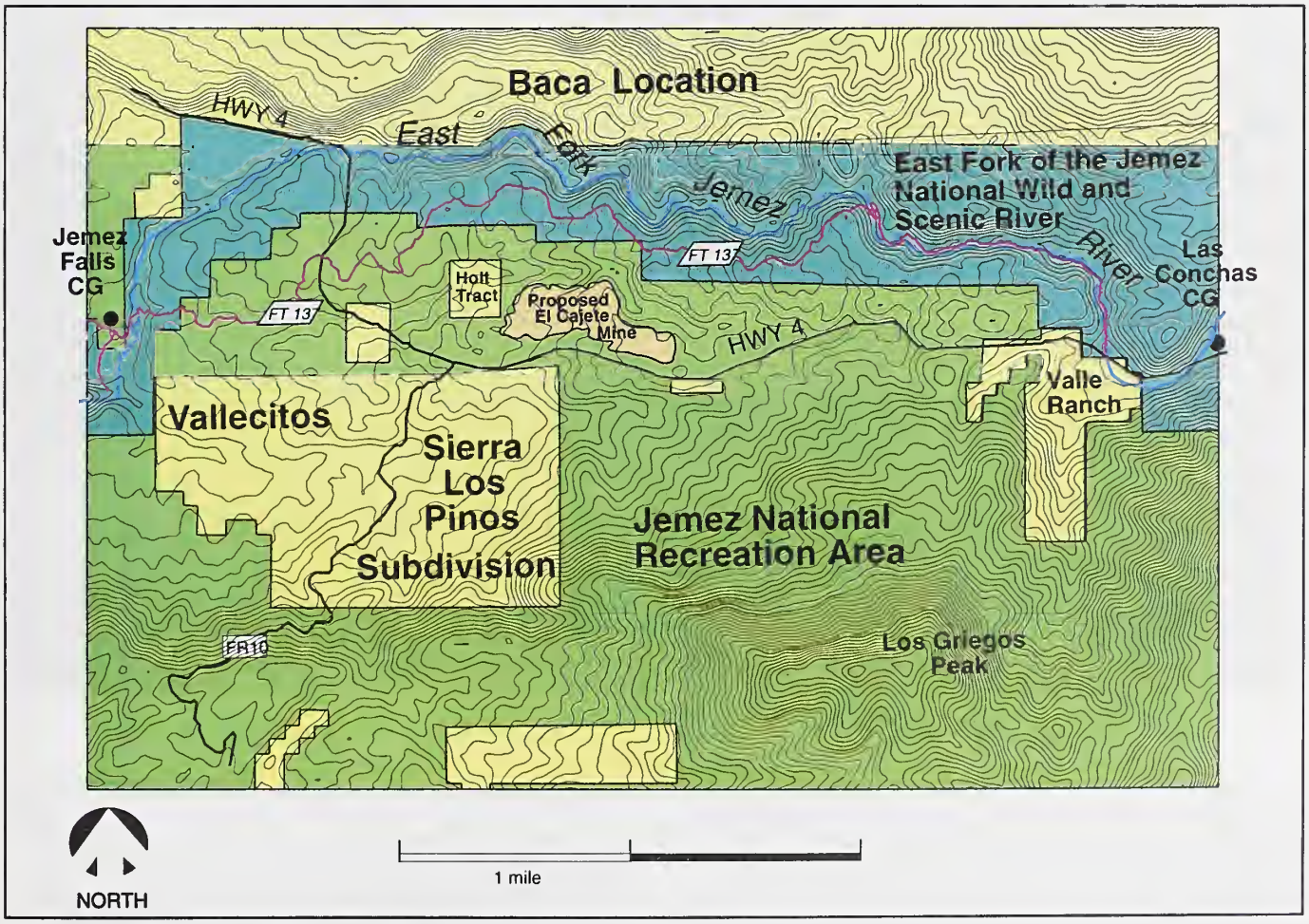

Figure 2. El Cajete Mine Location Map.

Photo 1. Aerial View of El Cajete Mine Area.

and other forest vegetation before the top soil and overburden, which is stained pumice, is stripped and stockpiled separately for later reclamation. Drainage would be confined to settlement ponds within the mine boundary.

A screen of forest vegetation ranging in width from 200 to 600 feet would remain between Highway 4 and the proposed mine's southern edge to limit views of the mine from the highway. Private lands known as the Holt Tract would have a 300-foot wide undisturbed area between residential property and the proposed mine's western end. A 50- to 200-foot wide screen of

vegetation would also be undisturbed between the proposed mine's northern edge and Mistletoe Canyon Cross-country Ski Trail.

Timber not needed for reclamation would be sold to Copar Pumice Company at appraised prices. Slash would be lopped and crushed or burned and stumps would be burned or buried.

Mining would begin at the 8,400 foot elevation near the east end and progress westward to the 8,200 foot elevation. Mining activities would be conducted in 27-acre blocks. About one-third of a block would be actively mined while another one-third provides storage space for stockpiles. The remaining one-third of the block would be reclaimed and revegetated as the mining progresses.

The Las Conchas Mine screening plant would be moved to the El Cajete Mine and used to sort and pile locatable pumice into various product sizes for loading and hauling. The common variety pumice, which is pumice smaller than three-quarters of an inch, would be sorted out and used along with the overburden to backfill the mined area. Backfilled slopes would not exceed 40 percent and, because the backfilled pumice would not compact to its original volume, the reclaimed elevation would average about 20 feet below the existing elevation.

Dust from screening, conveying, piling and hauling would be controlled as required under a N.M. Environment Department Air Quality Permit. Watering to reduce dust is required when the opacity or density of airborne dust exceeds 10 percent.

Once the wasted pumice is replaced, the stockpiled top soil would be spread over the site, seeded with grasses and forbs, and planted with tree seedlings.

Livestock fencing would be constructed to mark the boundary and exclude cattle until vegetation is established. Public use would be prohibited during active mining and reclamation by signing the boundary fence.

Performance bonding would be required to insure that reclamation is completed and revegetation is successful.

Decisions To Be Made

Leonard Atencio, Forest Supervisor of the Santa Fe National Forest, is the Deciding Officer. The Deciding Officer will determine from alternative mining strategies the practical environmental mitigation and reclamation measures necessary to manage the impacts to surface resources. The Forest Supervisor will also approve the Plan of Operations that incorporates the recommended mitigation and reclamation measures.

Summary of Scoping and Public Issues

Comments on the proposed El Cajete Mine were sought in a meeting with the Vallecitos de los Indios and Sierra Los Pinos Home and Landowners Association and by letter to nearly 300 residents, individuals, groups and agencies. Those contacted were also invited to a field trip. Thirty-four individuals attended the field trip and 36 written responses were received [2800 Memo; February 26, 1993].

Analysis of the public issues voiced during scoping of the proposed El Cajete Mine, prior scoping for the Las Conchas Mine and Congressional hearings on the Jemez NRA legislation, which was passed in part to limit mineral activities, resulted in a decision to prepare an environmental impact statement. Additional scoping was conducted by letter and with the Notice of Intent to prepare an environmental impact statement. Fifteen responses were received [2800 Memo; December 21, 1993].

The public comments regarding the proposed El Cajete Mine, past comments on the approval of the Las Conchas Mine, **Santa Fe National Forest Plan** direction, and the Jemez NRA mandates resulted in the major issues summarized below. The major issues were developed to direct the analysis of environmental impacts of the proposed El Cajete Pumice Mine and are utilized in the selection of alternative mitigation and reclamation measures to be incorporated in the approved Plan of Operations.

Major Issues

Soil Productivity

Soil productivity and the ability of the soil to produce the potential natural vegetation could be irretrievably lost due to mining.

Ground Water

Residents and landowners of nearby private lands are concerned that the proposed El Cajete Mine could reduce or contaminate the ground water serving their private and community water wells. These concerns, in part, resulted in the Jemez NRA requirement that

reclamation restore disturbed lands to a hydrological condition as close as practical to the premining condition.

Wetland and Surface Water

The proposed El Cajete Mine slightly increases the potential for soil erosion in the Montoya Spring and intermittent stream drainage which is within the East Fork of the Jemez Wild and Scenic River Watershed. The East Fork of the Jemez River does not meet N.M. Environment Department standards for a high quality cold water fishery because of sediment and other non-point pollution contaminants. Santa Fe National Forest Plan direction requires reduction of sediment and other contaminants from reaching the river.

Recreation Opportunities and Uses

The proposed El Cajete Mine would be within the Jemez National Recreation Area (NRA) between New Mexico State Highway 4 and Forest Trail 137 and would affect public enjoyment of the area. The highway is used extensively by recreation users driving for pleasure and viewing scenery as well as for access to developed recreation sites and the East Fork of the Jemez Wild and Scenic River. Forest Trail 137 also accesses the wild and scenic river and is used by hikers and other users. The **Santa Fe National Forest Plan** emphasizes enhancement of scenery and developed and dispersed recreation opportunities in the area.

Concerns over the effects of pumice mining on recreation opportunities and uses, in part, resulted in the Jemez NRA requirement to conserve, protect, and restore recreational values.

Heritage Resources

Jemez Pueblo members and other tribes use the Jemez Mountains for cultural and religious purposes. Concerns over the effects of pumice mining on American Indian cultural and religious uses resulted in the Jemez NRA requirement that the tribes be consulted to conserve, protect and restore American Indian uses.

The Jemez Pueblo Tribal Council stated during consultation that it is opposed to the proposed mine because it infringes upon routes used by the Jemez people to access archeological and cultural properties of ritual significance and may adversely impact ecosystem integrity and air and sound quality. In subsequent consultation, Jemez Pueblo officials indicated conflict could be avoided by moving the proposed mine boundary away from the area of concern.

The Governor of Santo Domingo Pueblo also objected to mining and other Forest Service management activities on the Jemez Mountains because of the area's cultural significance to the tribe. No specific reasons or locations of concern, however, were identified regarding the mine.

Scenery

Driving and viewing scenery along State Highway 4 is a major recreation use in the Jemez NRA. Portions of the proposed El Cajete Mine would be visible in the foreground view from the highway and nearby private lands. The proposed mine would also be partially visible in middleground views from surrounding observation points in the Jemez NRA.

Table 1. Required Permits and Issuing Authority

Permit	Issuing Authority
Plan of Operation	USDA, Forest Service, Santa Fe National Forest
Mine Permit	N.M. Energy, Minerals and Natural Resources Department Mining Act Reclamation Bureau
Air Quality Permit	N.M. Environment Department, Air Pollution Control Bureau
Storm Water Discharge Plan	U.S. Environmental Protection Agency
Discharge of Dredged or Fill Material	U.S. Corps of Engineers and N.M. Environment Department Water Quality Bureau

Concerns over the impact of pumice mining to scenery resulted in a Jemez NRA requirement that mined land be reclaimed to a visual condition as close as practical to the premining condition.

Permits Required

There are federal, state and county laws, regulations and ordinances that affect or may affect mining now or in the future at the proposed El Cajete Mine. Permits that are or may be required are displayed in Table 1. This is not an exhaustive list since other permits may be required depending upon the approved Plan of Operation and regulatory changes.

Copar Pumice Company will be required to secure all permits applicable to its mining operation which do not conflict with federal laws, regulations or policy. The Forest Service assumes no responsibility for enforcing laws, regulations or ordinances that are under the jurisdiction of other governmental bodies.

II. Alternatives Including the Proposed Action

This chapter describes the alternatives to Copar Pumice Company's proposed El Cajete Mine described in Chapter 1 as the proposed action. This chapter also summarizes the impacts of the alternatives.

Mitigation measures intended to avoid, eliminate or reduce potential adverse impacts are identified in this section. Mitigation measures incorporate **Forest Plan** standards and guidelines, best management practices, and legal authorities of the Forest Service and become part of the terms and conditions of the Record of Decision and the approved Plan of Operations.

Mitigation measures proposed for implementation for the action alternatives are based upon standard practices and operation procedures which have been employed and proven effective in similar circumstances.

Monitoring time frames and enforcement of required mitigation measures by the Forest Service are also outlined in the following sections.

Alternative 1

This alternative is Copar Pumice Company's proposed Plan of Operations. Refer to the description of this alternative in Chapter 1, Proposed Action section. The Proposed Action Alternative and Alternatives 1(a) and 2 which were developed to respond to issues resulting from the proposal are displayed below in Figure 3.

Alternative 1(a)

Alternative 1(a) modifies Alternative 1 by specifying additional reclamation and mitigation requirements to conserve soil productivity, reduce impacts to surface water, and speed recovery of the vegetation and wildlife habitat.

No storage of fuel, oil or hazardous materials would be permitted on-site. Mining equipment would be fueled and lubricated in an impervious spill containment structure. A spill kit would be kept on site. Spills,

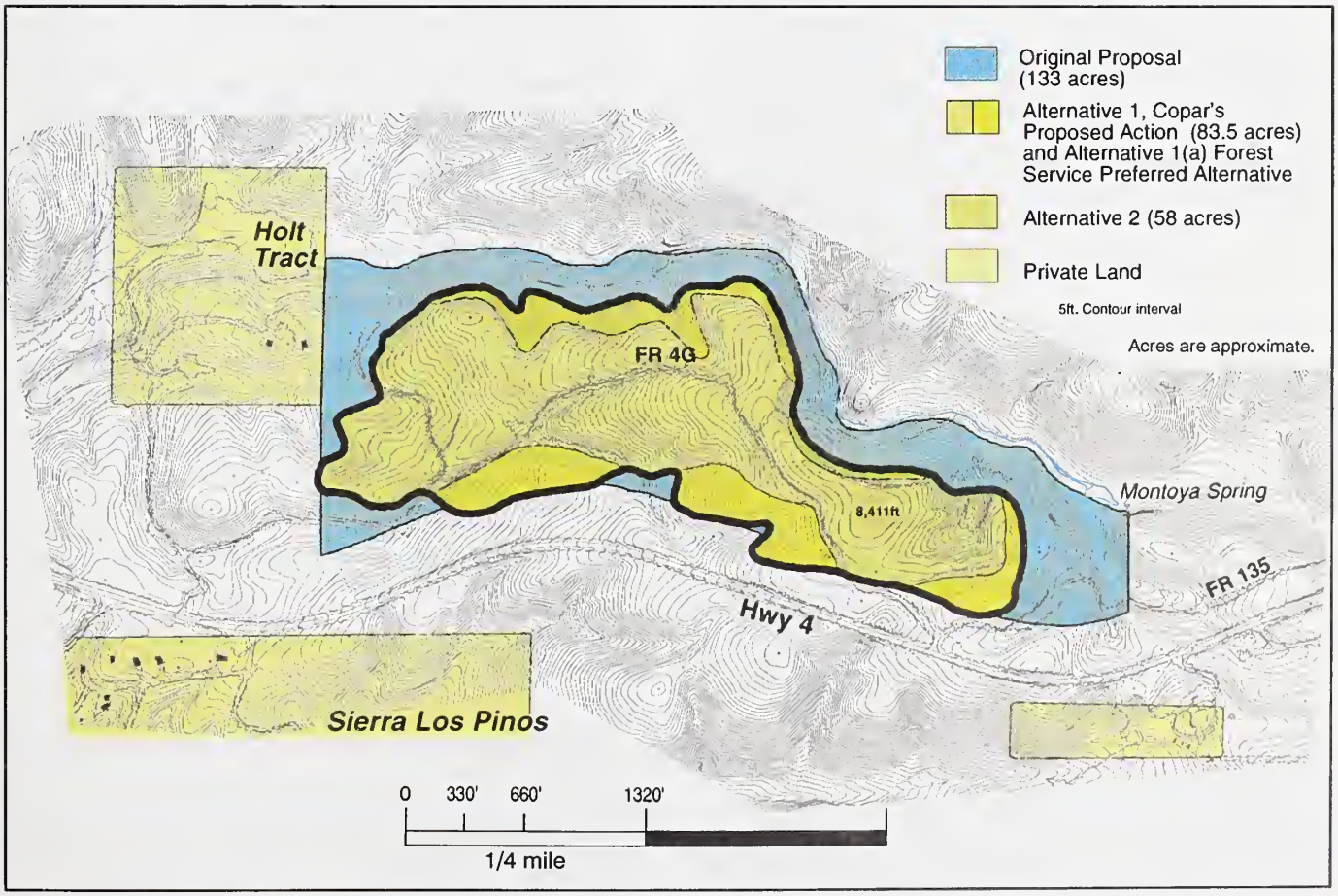

Figure 3. El Cajete Mine Alternative Boundaries.

such as a ruptured hydraulic line, would be contained and removed to an authorized facility.

Trees removed prior to mining on slopes draining toward the intermittent stream would be hauled up hill to prevent soil disturbance and damage to vegetation on the slope below that serves as a sediment barrier. On slopes steeper than 30 percent, the trees would be winched up. Bulldozers and other heavy equipment would not be permitted on these slopes.

Harvest of top soil on slopes greater than 30 percent would be with an excavator or dragline to prevent downhill movement of disturbed soil. Mining would also be conducted in the same manner on steep slopes in this area.

On all slopes draining toward the intermittent stream, slash from tree tops and branches would be lopped and scattered below the disturbed area and filter fences, such as straw bales and filter fabric, would be used to prevent sediment from disturbed areas moving downhill.

Greater care would be exercised when stripping, stockpiling, storing and replacing top soil to reduce mixing of organic rich surface layers with the underlying sterile overburden. Stockpiles of top soil would be stored separately from waste pumice. All stockpiles would be bermed to prevent erosion loss. Top soil would be respread to a minimum depth of 6 inches. Top soil would be respread the same season it is harvested to maintain the greatest viability of seed, fungi and microorganisms native to the area.

Slash smaller than 9 inches in diameter would be mixed in with the top soil or retained and scattered over the surface and crushed to provide a long term carbon source and to aid in reducing soil movement.

Prior to spreading of top soil, wasted pumice would be backfilled and reshaped to mimic the landscape characteristics of nearby meadows and to prevent off-site drainage. Small hills similar to naturally occurring hills in nearby grasslands would be constructed to block long linear views in the reclaimed area. All slopes will be rounded.

Progressive mining and reclamation techniques would be used to reduce visual impacts and speed recovery of the vegetation. No more than a 27-acre section of forest vegetation would be cleared at one time in preparation of mining. Reclamation and revegetation would be completed on at least 30 percent of the previously mined section before beginning the clearing of the next section.

To maintain water quality, the reshaped mine would be designed to retain all runoff within the pit limits. A storm water drainage detention and infiltration structure would be provided to control drainage on the east end of the proposed mine serving as a top soil and waste pumice storage area.

A planned reclamation contour map and planting plans, submitted by the mining company, will be approved by the Forest Service.

All reshaped slopes would be limited to a maximum of 30 percent. Contour furrows and/or silt fences would be installed across critical slopes. Soil erosion would be controlled at or below soil loss tolerance levels following the second growing season after revegetation. The reclaimed area would be inspected by May 31 and September 30 each year for rills and gullies following reclamation work. Rills and gullies would be repaired within 30 days after discovery. A Forest Service interdisciplinary team will develop strategies to remedy any of these conditions and direct repairs.

The following native grasses, forbs and shrubs would be used in percentages approximating natural conditions to plant the area after spreading of the top soil: Mountain muhly, June grass, Arizona fescue, pine dropseed, squirrel tail, oatgrass, American vetch, goldenpea, buckbrush, gooseberry, current and wood rose. Seeding rates would be determined by a Forest Service soil scientist. Planted shrubs and seeding would follow the approved planting plan.

To increase revegetation success, top soil would be spread in the fall and broadcast seeded while the top soil is friable. Mulching with certified weed free wheat straw and machine crimping would be required. Hydromulching and seeding may be substituted for broadcasting and machine crimping. Broadcast fertilizing with 50 pounds per acre of ammonium phosphate would be required. Revegetation will be considered successful when 50 percent ground cover is achieved 3 years after seeding.

One year old container or 2-year old bare root ponderosa pine seedlings would be planted at the rate of 500 trees per acre in the spring under prescribed soil moisture and temperature requirements. Seedlings would be grown from seed from the appropriate Santa Fe National Forest seed zone.

Seedlings would be planted in groups ranging in size from 3 to 10 acres to simulate a natural mosaic of forest and grassland vegetation that would break-up long linear views. Seedlings would be planted at least 100 feet from the edge of the undisturbed forest to retard the spread of root rot and mistletoe into the

planted areas. Reforestation would be considered successful when 50 percent of the trees survive 3 years after planting.

Existing oak, locust, and other vegetation, selected by the Forest Service, will be temporarily replanted for eventual transplanting of the reclaimed mine sections as per the planting plan.

In the vegetation screen between the proposed mine and Highway 4, retain conifers infected with root rot and dwarf mistletoe and standing dead trees to reduce views into the mine area for 10 to 15 years after reclamation of the mine. Encourage invasion of aspen in root rot infected areas. If conifer mortality results in significant views into the mine area, consider planting a mix of native vegetation. The Plan of Operations may require this additional planting pending an assessment of its effectiveness by the Forest Service. Treatment of root rot and mistletoe disease areas may be considered under an integrated pest management plan 10 to 15 years after reclamation to prevent the spread of these diseases into the reclaimed area.

Ground water monitoring wells Nos. 1 and 2 would be maintained for water monitoring purposes. Water quality samples would be taken at the estimated half-way point in the mining process and within 1 year after reclamation and revegetation is completed. Any violations of water quality would be reported to the State of New Mexico Environment Department for corrective action.

Logs greater than 9 inches in diameter would be retained and scattered over the reclaimed mine for an average density of 5 logs per acre to provide future rotten log habitat and soil carbon. Salvaged logs would be placed within 100 feet of the edge of the opening to simulate natural windfall from the forest edge or within the plantings of pines. Log landings will be located outside of view from Highway 4 to the extent practical.

Stumps would be stored on the surface for at least 1 year to kill the root rot fungi and then buried at least 30 feet deep or burned and the residue buried.

Livestock fencing would be designed to permit passage of elk and deer. Areas frequently crossed by migrating elk would have poles or pipe in place of the top wire to facilitate passage of elk. Fencing would tie to the highway right-of-way fence to reduce the total amount of fencing that obstructs wildlife passage. Livestock gates would be provided by the operator to permit rounding up of livestock and passage of skiers. Natural openings, minimum clearing limits and varying the alignment would be used during fencing to reduce impacts to scenery.

To protect the safety of the public, areas undergoing active mining and reclamation would be posted with warning signs at inter-visible distances prohibiting public admittance. As mining progresses, signing would be moved to permit public use of reclaimed and revegetated areas.

Weekend and holiday mining and hauling would be prohibited to eliminate sound and traffic impacts during the high recreation use periods.

Signing for about 900 feet of Mistletoe Canyon Cross-country Ski Trail would be rerouted around the end of the mine's western boundary once mining progresses to this point.

Forest Road 131 and 4G to the mine boundary would be reconstructed by Copar Pumice Company to a 14-foot wide all-weather standard which would include out-sloping or crowning and ditching to control drainage. Asphalt paving or 6 inches of crushed aggregate would be used for surfacing. Watering or other dust abatement methods would be required during dry conditions if crushed aggregate is used.

A gate on Forest Road 4G would be provided by the operator 100 feet west of the intersection of Forest Road 131 to permit truckers to open the gate without blocking Forest Road 131. Public entry would be prohibited on Forest Road 4G by signing. Forest Road 4G near the intersection with Forest Road 2547-A, which accesses the private Holt tract, would be closed by a gate and signed to prohibit public entry.

Once mining is completed, access roads would be obliterated to meet the scenery objective of "Retention". A short segment of Forest Road 4G may be retained to provide access to a future observation site and trailhead within the forested edge of the reclaimed mine.

Mining activities would cease if unrecorded heritage sites are located during ground-disturbing activities. A Forest Service heritage specialist would be contacted immediately and the site avoided until a determination of the potential for eligibility for nomination to the National Register is made. The heritage specialist, in consultation with the N.M. State Historic Preservation Officer, would determine the eligibility of the site and the appropriate method of protecting or salvaging the site.

Consultation with American Indian tribes and access to traditional use areas would be continued.

Fugitive dust emissions from the screening plant and access road would be controlled as required by the

N.M. State Air Quality Permit 899-M-1 dated May 4, 1992.

Photo points would be established on Los Griegos Peak, Las Conchas Peak, Cat Mesa, Highway 4, and the Holt Tract to monitor scenic effects of mining and reclamation.

The above mitigation measures have been used effectively to reduce the impact of pumice mining at the Las Conchas Pumice Mine or in other forest management activities. The degree to which the impact is reduced is discussed in Chapter IV, Environmental Consequences.

Alternative 2

This alternative further modifies Alternative 1(a) by reducing the mine area to 58 acres to retain scenery on the proposed mine's northern and southern edges and eastern end. These retained areas also further reduce the possibility of sediment reaching the intermittent stream by increasing the width of undisturbed soil and vegetation.

Alternative 3

This is the "no action" alternative required by NEPA Regulation 40 CFR Part 1500. The no action alternative provides the baseline for estimating the environmental consequences of the proposed action and the other alternatives. Selection of this alternative would violate the General Mining Law of 1892, as amended, and is consequently not within the deciding officer's discretion.

Table 2. Summary of Environmental Impacts by Major Issues

Major Issues	Alternative 1 Copar's Proposed Action	Alternative 1(a) Forest Service Preferred Action	Alternative 2	Alternative 3 No Action
Soil Productivity	Reduced 40%	Reduced 40%	Reduced 40%	No Impact
	Highest erosion potential	Moderate erosion potential	Lowest erosion potential	
Ground Water	Slight potential to impact shallow ground water	Slight potential to impact shallow ground water	Slight potential to impact shallow ground water	No Impact
Wetland & Stream	Highest sedimentation potential	Moderate sedimentation potential	Lowest sedimentation potential	No Impact
Recreation Opportunities	Use prohibited on site	Use prohibited on site	Use prohibited on site	No Impact
	Roaded natural opportunity declines for 0.5 mile radius during operation	Roaded natural opportunity declines for 0.5 mile radius during operation	Roaded natural opportunity declines for 0.5 mile radius during operation	No Impact
Heritage Resources	Resource avoided	Resource avoided	Resource avoided	No Impact
Scenery	Highest significant impact over 30 years	Moderately significant impact over 30 years	Lowest significant impact over 30 years	No Impact

Table 3. Summary of Achievable Scenic Conditions *

	10 - 30 Years After Reclamation			
	Alternatives			
Key Observation Points	**1**	**1(a)**	**2**	**3**
Los Griegos	MA-M**	M	PR-R!	M-PR^
Cat Mesa	M-PR**	M-PR#	R	R
Las Conchas	M-PR**	PR-R#	R	R
Wanderer	UA-MA#	MA-M#	PR	PR
NMSH 4	M	M	R	PR-R#
McKeever	M	PR-R#	PR-R!	R

* *Achievable scenic conditions if screening vegetation is lost to insects, disease or wildfire. UA=Unacceptable Alteration; MA=Marginally Acceptable; M=Modification; PR=Partial Retention; R=Retention. See glossary in the appendix for definitions.*

** *Achieves next highest scenic condition when pine plantation canopy covers 35% of mined area. Length of time dependent on viewing angle.*

^ *Achieves next highest scenic condition when crowns of planted trees close in 20-30 years.*

\# *Achieves next highest scenic condition when planted trees reach 20% of the adjacent tree height in about 25 years. Alternative 3 assumes a monotype pine plantation with trees planted at regular intervals.*

! *Achieves next highest scenic condition when the mined area appears like the natural mountain grasslands in about 15 years.*

Comparison of the Consequences of Alternatives

Table 2 summarizes and compares the environmental impacts between Copar Pumice Company's proposed action and alternatives to it. Detailed descriptions of the environmental impacts for the major issues and other resources are presented in Chapter 4, Environmental Consequences.

Pumice mining would result in significant, long-term adverse impacts to scenery in the Jemez NRA. Table 3 summarizes the scenic conditions that would be achieved 10-30 years after the mined area would be reclaimed. Chapter 4, Environmental Consequences provides a detailed description of scenic impacts.

III. Affected Environment

This chapter describes the environment that would be affected by the proposed El Cajete Mine. The resources discussed are the relevant physical, biological, social, and economic conditions of the proposed mine area that will likely be affected if mining is approved.

Soil Productivity

The area within the proposed El Cajete Mine is composed of several soils and vegetation types described in the 1993 **Terrestrial Ecosystem Survey of the Santa Fe National Forest** as Map Units 641, 642 and 660.

Map Unit 641 is composed of two soils components on slopes ranging from 0 to 15 percent that support a potential natural vegetation of ponderosa pine and Gamble oak. The first component is a Mollic Vitrandept which is a moderately well developed deep, cindery, sandy loam soil. The second component is a Mollic Eutroboralf which is a well developed deep, sandy loam soil. Both soils have a moderate potential to produce wood fiber and are capable of producing up to 2,500 pounds of forage per acre.

Map Unit 642 is a Mollic Vitrandepts soil occurring on slopes from 15 to 40 percent. Most of the proposed mine is within this soil type. This deep, very cindery, sandy loam supports a potential natural vegetation of ponderosa pine and Gamble oak and has a moderate potential for the production of wood fiber. It is capable of producing up to 2,500 pounds of forage per acre.

Map Unit 660 was mapped as an Andic Dystrocrepts soil. Further investigation of this soil classification indicates that this soil is an Andic Haploborolls. This soil occurs on the northern edge of the proposed mine on slopes greater than 40 percent. This deep, cindery, sandy loam supports a potential natural vegetation of mixed conifers—ponderosa pine, Douglas-fir and white fir. The soil is similar in wood fiber production compared to the other soils in the proposed mine and has the potential to produce more forage than the other soils.

The soils within the proposed mine have a moderate potential for erosion and a high potential for revegetation and reforestation.

Ground Water

A 1995 investigation of ground water hydrology was conducted and documented in the **Conceptual Hydrogeology of the Proposed El Cajete Pumice Mine and Surrounding Area** [Colpitts; June 15 and 21, 1995]. South Mountain Rhyolite was found to underlie the El Cajete Pumice Deposit at the proposed mine site. A thin clay to sandy clay layer lies between the South Mountain Rhyolite and pumice deposit. The clay layer is a paleosol, or buried soil, that developed on the bedrock prior to the El Cajete eruption. The clay layer is extensive over the area but may not be continuous.

Two separate ground water aquifers occur in the area of the proposed mine. A shallow aquifer occurs in highly localized paleo-valley areas above the paleosol where the clay content serves to prevent water from deeper infiltration. A deeper aquifer occurs within fractures in the South Mountain Rhyolite.

Three water monitoring wells and 10 stratigraphy holes drilled at the proposed mine failed to locate free water above the paleosol, indicating the shallow aquifer does not exist directly below the area of the proposed mine.

A shallow aquifer was located at a stratigraphy drill hole on Forest Road 131 about 600 feet east of the proposed mine's eastern boundary and about 600 feet

Photo 2. Water Sampling at Monitoring Well No. 2.

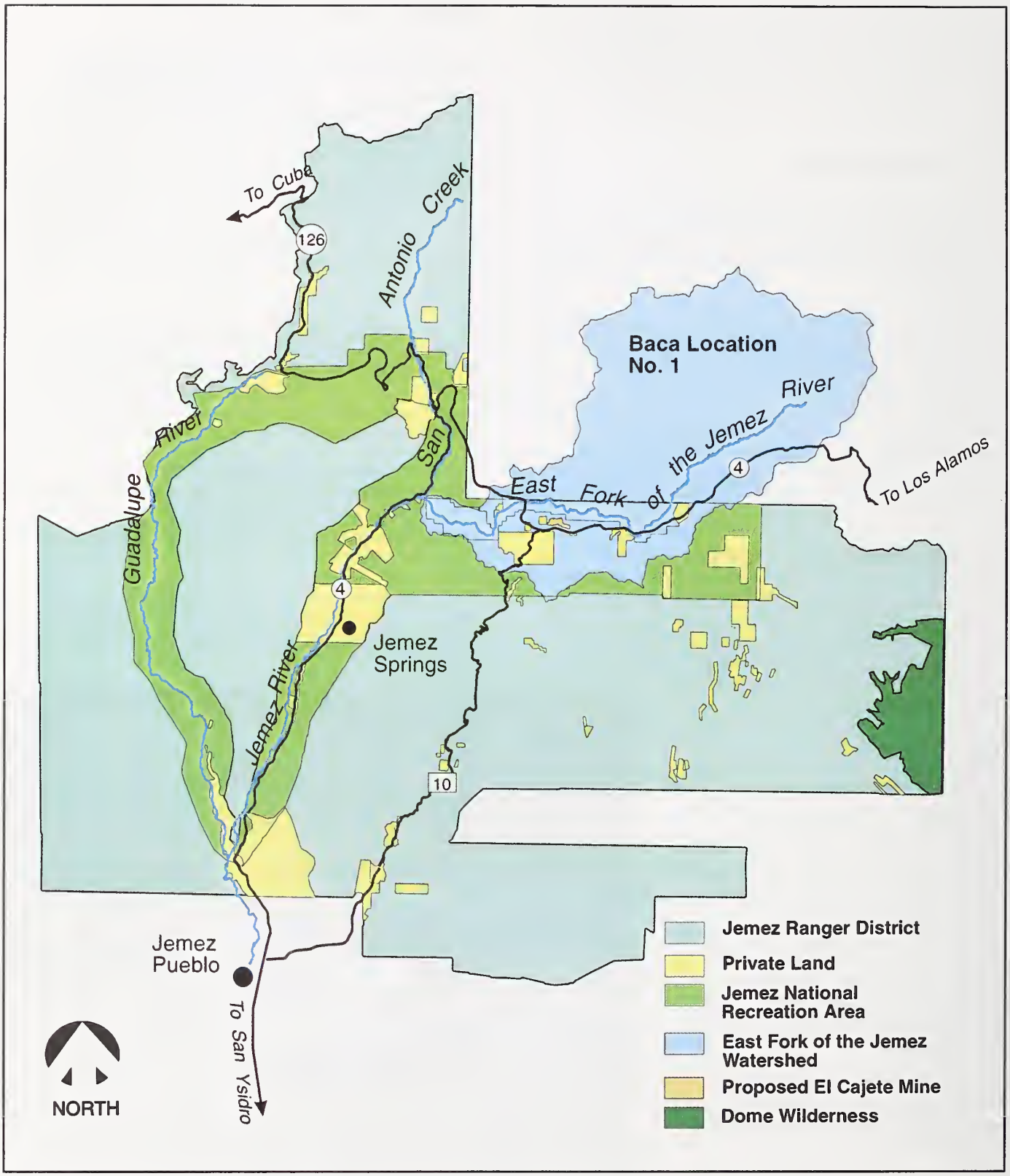

Figure 4. East Fork of the Jemez Wild and Scenic River Watershed.

south of Montoya Spring. The shallow water table was perched on the paleosol layer and its elevation of about 7.5 feet above Montoya Spring indicates this aquifer is flowing north and supplying water to the spring. The water is believed to originate on Los Griegos Peak above the 8,700 foot elevation.

The deep aquifer at the proposed mine occurs in the South Mountain Rhyolite 200 to 300 feet below the land surface. The geology and depth is consistent with domestic water wells in the nearby residential areas. The deep aquifer was encountered at all three water monitoring wells drilled at the proposed mine.

Water quality in the monitoring wells met U.S. Environmental Protection Agency drinking water standards and quality and water chemistry is similar to the nearby residential wells.

Tritium dating of the water in the deep aquifer in the nearby residential wells indicates the water has been underground for at least 30 years and is thought to come from the higher peaks surrounding the Valle Grande.

Wetland and Surface Water

The proposed El Cajete Mine is within the East Fork of the Jemez Wild and Scenic River watershed. The watershed within the Santa Fe National Forest boundary is about 12,554 acres in size. The headwaters of the watershed are within the private Baca Location Ranch and is about 29,146 acres in size. Eleven miles of the East Fork of the Jemez Wild and Scenic River is within the Santa Fe National Forest. Five miles of the headwaters of the river is within the Baca Location Ranch and is not part of the wild and scenic river system [2520 Memo; August 11, 1995]. See Figure 4 on the preceeding page.

The proposed El Cajete Mine would be near Montoya Spring and intermittent stream. The U.S. Army Corps of Engineers (COE) has tentatively classified the spring and 0.5 mile long stream as a U.S. jurisdictional headwaters wetland and intermittent stream [COE, Albuquerque District; October 29, 1992]. The COE regulates dredging or filling of wetlands with a Nationwide Permit under Section 404 of the U.S. Clean Water Act. A Water Quality Certificate from the N.M. Environment Department is required with the issuance of a 404 Permit. The project area is outside the delineated boundary of the wetland and does not require wetland permits.

The spring and intermittent stream are an important source of water for wildlife and the wetland is used extensively by elk for wallowing. Excluding the East Fork of the Jemez Wild and Scenic River, the spring and intermittent stream are also the only source of water for livestock within the North Pasture of the V Double Slash Allotment.

The intermittent stream ceases to flow above ground one-half mile downstream from Montoya Spring. The dry drainage continues westward for 2 miles until it intersects with the East Fork of the Jemez Wild and Scenic River. The drainage is vegetated with grasses, forbs and shrubs. Sediment that currently reaches the intermittent stream and dry drainage is stabilized by the canyon bottom vegetation and is not transported to the river.

Photo 3. Montoya Spring and Intermittent Stream.

The N.M. Environment Department's Surface Water Quality Bureau classifies the East Fork of the Jemez Wild and Scenic River as a "non-attainment" stream because it fails to meet New Mexico's standards for a high quality cold water fishery because of sediment and other contaminants from non-point pollution sources. Despite this designation, the river is suitable for domestic water, fish culture, livestock, wildlife habitat and swimming and water play.

Most of the sediment and other contaminants entering the river are thought to result from livestock grazing in the Valle Grande area on the private Baca Location

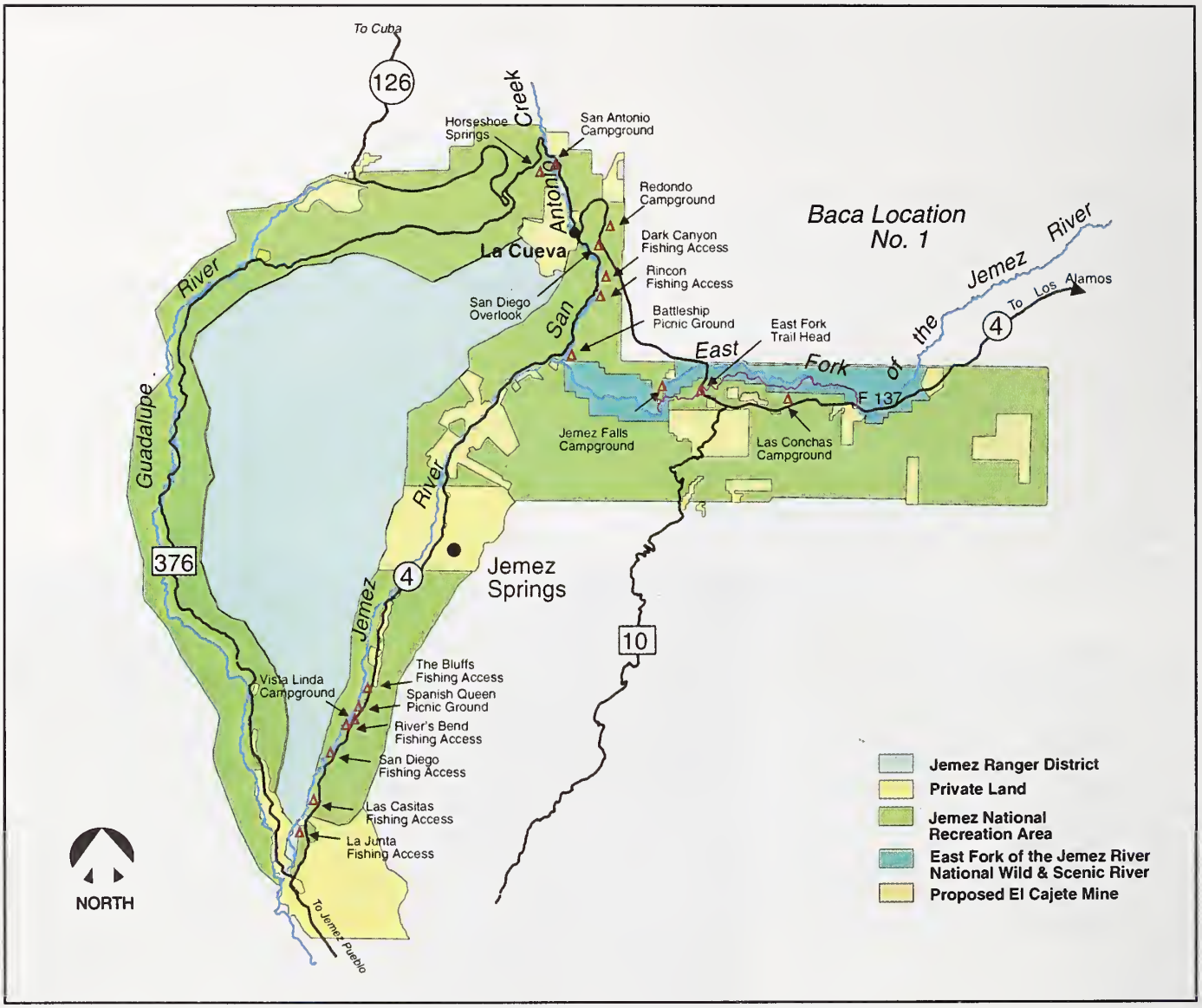

Figure 5. Jemez National Recreation Area.

Ranch. Other sources for sediment and contamination result from recreation use within the Jemez NRA and from residential development on private lands.

Recreation Opportunities and Uses

The proposed El Cajete Mine would be within the 57,000-acre Jemez National Recreation Area (NRA) which was created by the U.S. Congress in 1993, in part, to conserve, protect and restore the recreational and other resource values of the Jemez Mountains. The Jemez NRA includes the East Fork of the Jemez Wild and Scenic River which was designated by Congress in 1991. The "wild" area of the river is accessed by Forest Trail 137 and Highway 4 which are near the proposed mine. [Environmental Assessment for the East Fork of the Jemez Wild and Scenic River Management Plan, November 1994.]

The proposed mine would be about 0.2 of a mile from the East Fork of the Jemez River Corridor Boundary. The proposed mine is slightly more than one-quarter of a mile from the river. The river is located 400 feet below Forest Trail 137 which is located on the ridge south of the river.

About a three-quarter of a mile length of the proposed mine would be within 200 to 600 feet of Highway 4.

Photo 4. East Fork Trailhead.

The East Fork Trailhead, located about 1 mile west of the proposed mine, is the closest developed recreation site.

The undeveloped Las Conchas trailhead is located about 2 miles to the east. Jemez Falls Campground, Picnicground and Trailhead are located 2 miles west of the proposed mine while Las Conchas Campground is located 2.5 miles to the east.

Most recreationists visiting the Jemez NRA are from the cities of Albuquerque, Rio Rancho, Santa Fe, and Los Alamos or the rural communities surrounding these cities or the Jemez Mountains. Users also come from other parts of New Mexico and the surrounding southwestern United States. In the last 5 years, tourists outside of the southwestern region and from Europe and Asia are increasingly common due to international marketing of the Santa Fe Indian Market and Fiesta, and Albuquerque's Kodak International Balloon Fiesta [2310 Memo; July 12, 1995].

Most recreation use occurs on the weekends and holidays between May and September when many families are seeking short excursions and climatic relief from hot weather. Fall hunting between September and November, and the winter cross-country skiing between December and March are also important use seasons.

Recreation use for the Santa Fe National Forest has been estimated to be increasing at the population growth rate of 3 percent annually. Use is expected to accelerate significantly with the promotion of the Jemez NRA by tourism and rural development interests. Nearby Bandelier National Monument has experienced more than a 7 percent annual growth during the last decade and N.M. State Parks has reported a 5 percent increase. The N.M. State Highway and Transportation Department reports traffic volume on Highway 4 has increased 15 percent annually during the last 4 years.

Recreation use is measured in recreation visitor days (RVDs) and visits. One RVD equals one 12-hour day. A visit constitutes one entry into an area. Recreation use is further categorized either as dispersed or developed. Dispersed use occurs in areas with few or no constructed facilities. Developed use occurs in recreation sites constructed specifically to facilitate recreation uses.

A major source of dispersed use results from driving for pleasure along N.M. State Highways 4 and 126


Photo 5. Las Conchas Campground.

Photo 6. Fishing on the East Fork of the Jemez Wild and Scenic River.

which results in an estimated 40,000 RVDs and 1 million visits annually in the Jemez NRA. Other dispersed recreation use in the Jemez NRA is estimated to be about 200,000 RVDs. About 30,000 RVDs of this dispersed use results from camping, hiking and fishing along the East Fork of the Jemez Wild and Scenic River and Forest Trail 137. Camping, cross-country skiing, picnicking, fishing, hunting, hot spring bathing, and motorized travel are the major dispersed recreation activities within the rest of the Jemez NRA.

Dispersed recreation use at the proposed El Cajete Mine is estimated to be 100 RVDs generated by less than 500 visitors who principally originate at the nearby residential area. The mine would be within a Roaded Natural Recreation Opportunity Spectrum area. Dispersed recreation use within or near the proposed mine consists of, in order of importance, cross-country skiing, gathering firewood, hunting, and motorized travel. This use is associated with Forest Roads (FR) 4G and 131 and old logging roads in the area. Skiers use about 1.25 miles of Mistletoe Canyon Trail near the proposed mine's northern and western boundaries. Mistletoe Canyon Trail is signed and maintained by the N.M. Cross-Country Ski Club and is located on old logging roads.

Developed recreation use within the Jemez National Recreation Area occurs at 6 campgrounds, 5 picnic grounds, 1 overlook, 2 rest areas, 2 trailheads, and 5 angler parking areas. Capacity of developed sites is measured in persons-at-one-time (PAOT). Each developed unit equals 5 PAOTs. Table 4 displays the capacity and use of developed recreation sites near the proposed mine.

Other developed recreation sites within the Jemez National Recreation Area have a total capacity and use of 2,045 PAOTs and 212,000 RVDs, respectively.

Heritage Resources

An inventory of the proposed mine failed to locate any historic or prehistoric heritage sites within the proposed mine boundaries. A historic cabin site was recorded in a previous survey north of the proposed mine boundary.

The Jemez Mountains are important to a number of American Indian tribes for religious and cultural purposes. Consultation with the tribes that may use

Table 4. Capacity and Use of Developed Recreation Sites Near the El Cajete Mine

Developed Recreation Sites	Capacity in PAOTs	Use in RVDs
Las Conchas Campground	60	10,000
Jemez Falls Campground	250	35,000
Jemez Falls Group Picnic Ground	100	5,000
Jemez Falls Family Picnic Ground	20	10,000
Jemez Falls Trailhead	100	5,000
East Fork Trailhead	100	5,000
Total	**630**	**70,000**

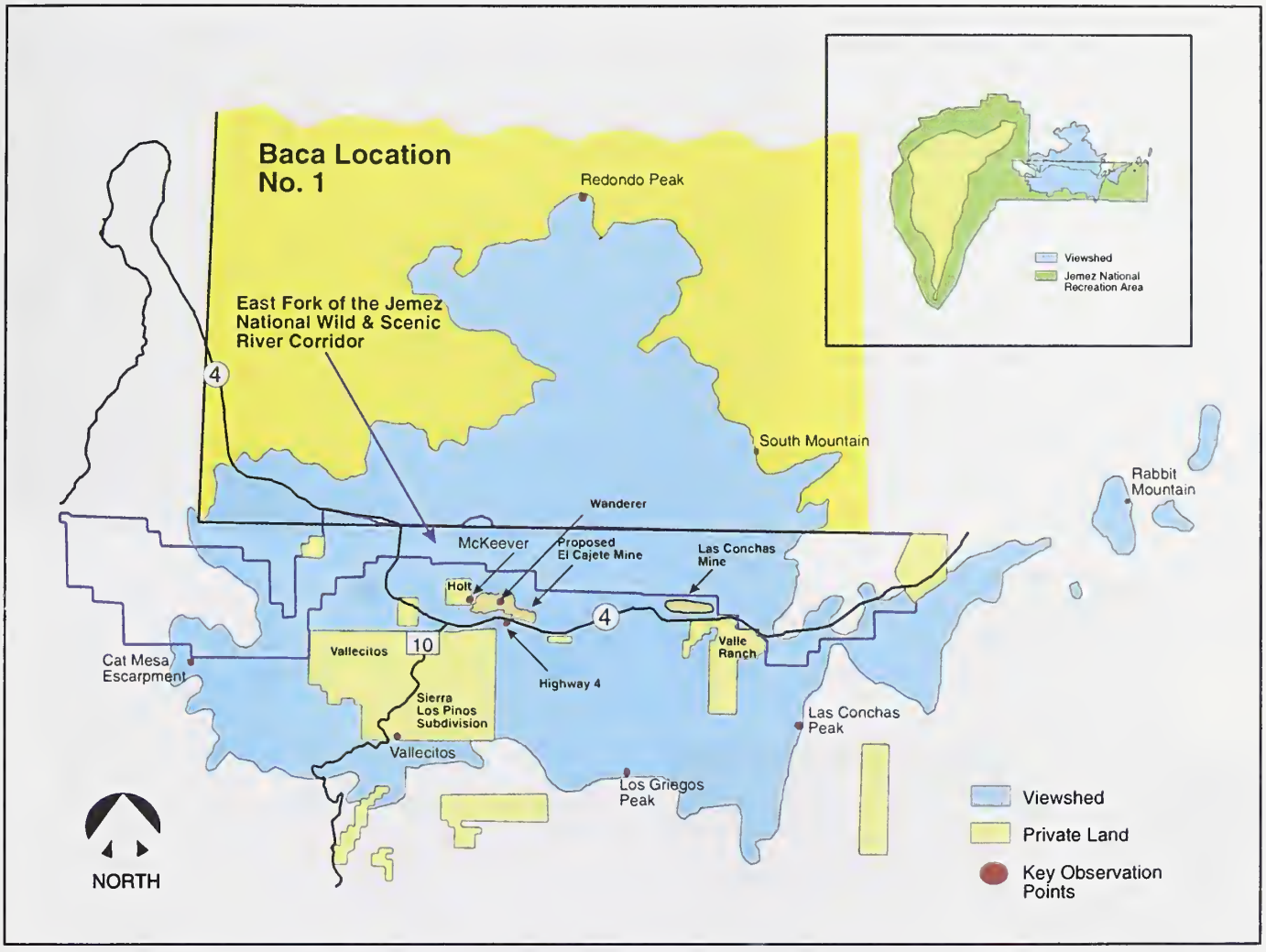

Figure 6. El Cajete Mine Viewshed.

the area within and near the proposed mine was conducted to determine if mining would affect their uses. Responses expressing concern about the proposed mine were received from Jemez and Santo Domingo Pueblos.

Jemez Pueblo initially expressed concern that the proposed mine could infringe upon routes used by the Jemez people to access archeological and cultural properties of ritual significance and would oppose mining. Jemez Pueblo indicated in subsequent consultation, however, that their concern could be resolved by leaving an undisturbed area between the proposed mine and their ritual route.

Santo Domingo Pueblo stated that they were concerned about all projects throughout the Jemez Mountains because of the mountains' cultural significance to the tribe. The pueblo stated their concern was general in nature and not specific to the proposed mine area.

Heritage site locations are confidential to prevent damage by looters or interference with cultural and religious practices of American Indians. As a consequence, the historic site and ritual route are not displayed in this document. A description of the ethnological and archeological resources of the Jemez Mountains is contained in Appendix A.

Scenery

The El Cajete Mine viewshed is nearly 14,000 acres in size and includes portions of the Jemez NRA, East Fork of the Jemez Wild and Scenic River, and the N.M.

Jemez Mountains Scenic and Historic Byway along Highway 4. Without forest vegetation screening the view, the proposed mine could be seen from about 7,500 acres surrounding the proposed mining area. The mining area cannot be seen from the remaining viewshed area because topographic features block the view [2380 Memo; August 11, 1995].

In large part, the Jemez NR., Wild and Scenic River, and Scenic and Historic Byway were established to protect the outstanding scenery for the recreating public. Much of the viewshed is also within Forest Plan Management Area C which was established to emphasize enhancement and protection of scenery and recreation. About 47 percent of the viewshed is predominately within the private Baca Location No. 1 which was identified in the Jemez NRA legislation as desirable for acquisition because of its recreation opportunities and outstanding scenic beauty [Report on the Study of the Baca Location No. 1; 1993]. Other private lands within the viewshed include the Vallecitos de los Indios, Sierra Los Pinos and Holt residential tracts, and the Valle Ranch and Lee Ranch tracts.

Photo 7. View of McKeever Residence from West End of El Cajete Mine Boundary.

Photo 8. View of the Proposed El Cajete Mine Area from Highway 4 and the Forest Road 131 Intersection.

The **Santa Fe National Forest Plan** directs that management activities should meet a scenic condition of Retention for 80 percent of the viewshed. Currently 40 percent of the National Forest lands within the viewshed meet a scenic condition of Partial Retention while another 40 percent meet the Retention condition. The remaining areas are primarily in a Modification condition due to past timber sales, roads, powerlines, or other scenery altering activities. The existing Las Conchas mine is classed as having an Unacceptable scenic condition.

The McKeever residence, located on the eastern edge of the Holt Tract, portions of Forest Road 4G, the Mistletoe Canyon Cross-Country Ski Trail and Highway 4 are areas with immediate foreground views of the proposed mine.

Small openings in the existing forest vegetation results in several limited immediate foreground views of the proposed mining area from Highway 4. The screening vegetation, however, is severely infected with dwarf mistletoe and shoestring root rot disease. Over the next 10 years, most of the ponderosa pine seedlings and saplings will die while mature trees may live for several more decades. Loss of the vegetative screen

would significantly increase the view into the proposed mine from the highway.

Screening vegetation also limits middleground views of the proposed mine from East Los Griegos Peak and Las Conchas Peak.

Forest vegetation prevents drivers from viewing the proposed mine from FR 135 on Cat Mesa. Recreation users who park and walk a short distance north of the switchback 1.5 miles west of the Forest Road 10 intersection would have a relatively unobstructed view of the proposed mine.

Observers on Redondo Peak road, which is located on the private Baca Location and closed to public entry, would be able to see unobstructed middleground views of the proposed and existing mines.

Limited middleground views of the proposed and existing mines could also be seen from South and Rabbit mountains on the Baca Location.

Forest vegetation or topographic barriers, with the exception of the eastern side of the Holt Tract, obscure any views of the mine from other private lands, residences, Forest Trail 137, and developed recreation sites.

Las Conchas Peak, Los Griegos Peak and the Cat Mesa Escarpment are accessible by abandoned trails which have potential for reconstruction and use by hikers and cross-country skiers visiting the Jemez NRA. Depending on the location of future trails and presence of screening vegetation, the existing and proposed mines may be visible from the peaks. The existing mine would not be visible from the Cat Mesa Escarpment. Most of the proposed mine, however,

Photo 9. View of the El Cajete Mine Area from Los Griegos Peak.

would be visible from several locations along a trail accessing Cat Mesa.

The proposed mine would not be visible from forest roads in the 4A series on the north side of Los Griegos Peak. These roads also serve as cross-country ski trails. A few limited views of the Las Conchas Mine can be seen from some of these roads.

Geology

The Jemez Mountains are the product of volcanic activity beginning nearly 13 million years ago. Jemez volcanics unconformably overlie Precambrian rocks to the west, Paleozoic through Mesozoic sedimentary rocks to the north and Tertiary sediments filling the Rio Grande Rift to the south and east. The thick accumulation of volcanic rock layers in the Jemez Mountains range in age composition from Tertiary basalts to Quaternary rhyolites. With depths of up to 5,900 feet, volcanic rocks cover an area of over 1,000 square miles [2800 Memo; November 17, 1994].

Much of the Jemez Mountains visible today were formed by a series of volcanic eruptions beginning in the late Tertiary which culminated in two massive eruptions about 1.1 and 1.4 million years ago. Pyroclastic ash flows produced during the two major eruptions formed the voluminous Bandelier Tuff rock formation, the most common rock type making up the Jemez Mountains.

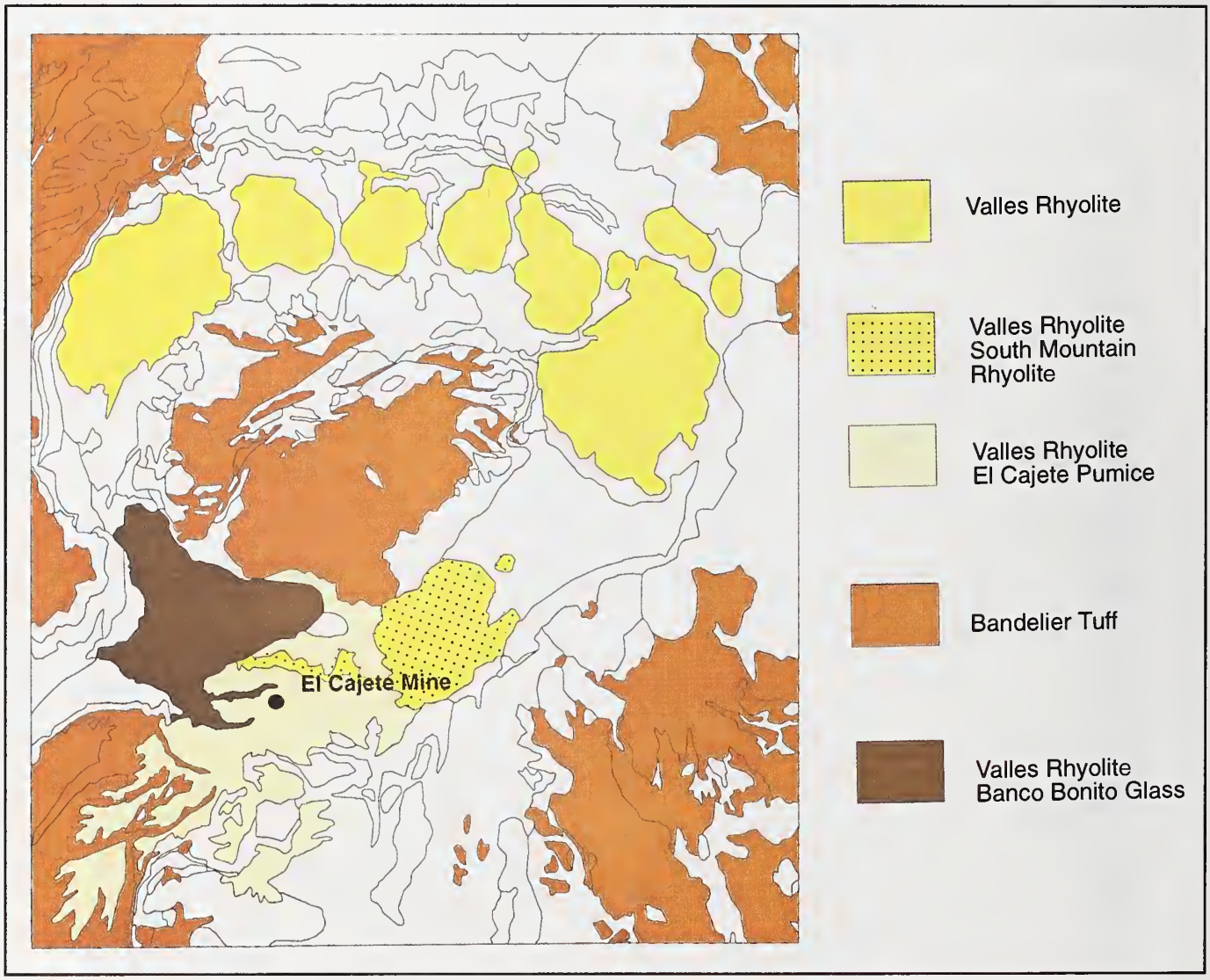

Figure 7. Major Geologic Deposits Near the El Cajete Mine.

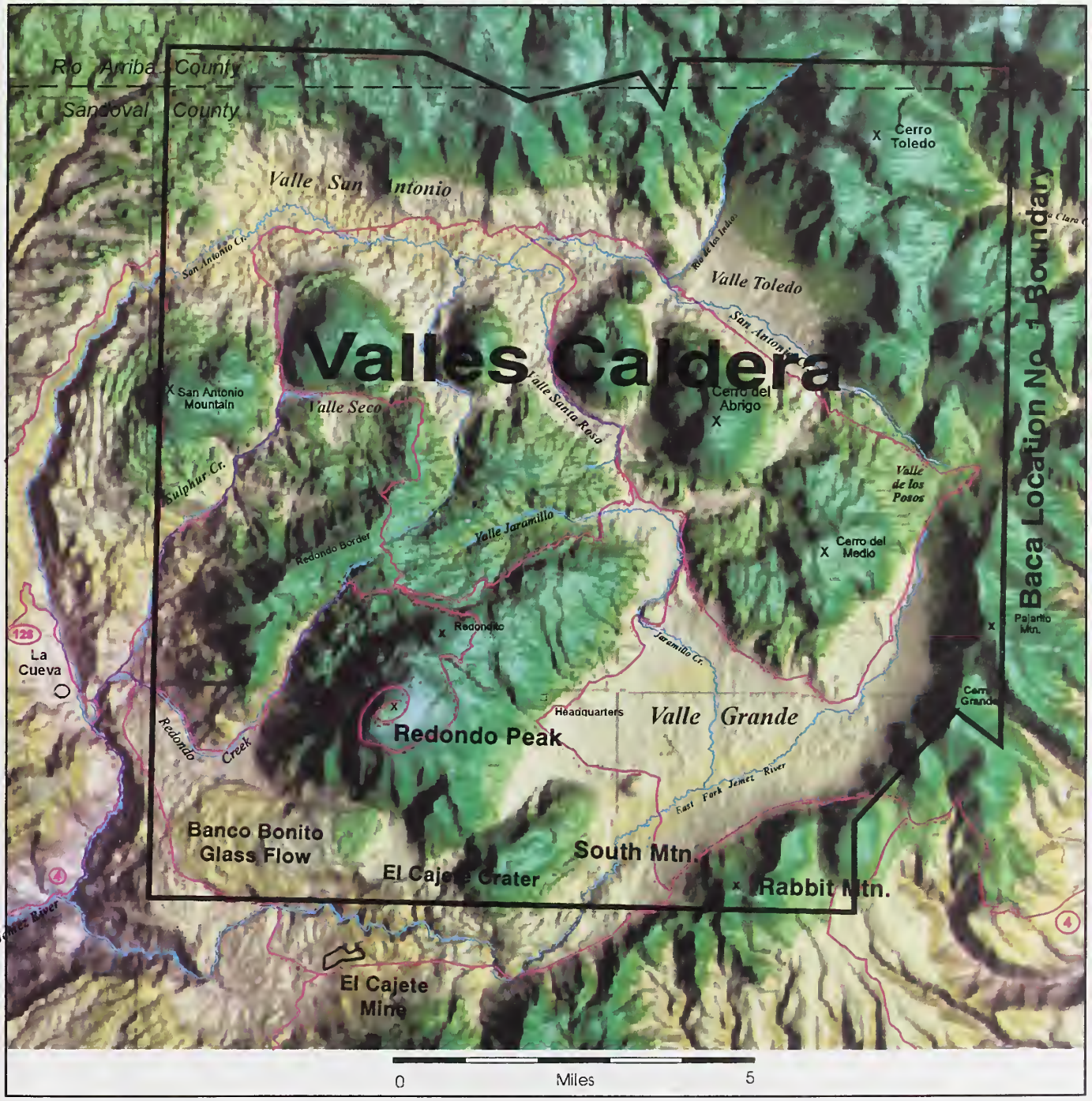

Figure 8. Geographic Features of the El Cajete Mine Area.

The circular Valles Caldera, with an average diameter of 13.5 miles, was formed after the second major eruption when the roof of the depleted magma chamber collapsed inward along a ring-shaped fault system.

Resurgence of magma subsequently uplifted the caldera floor forming the 11,254-foot Redondo Peak north of the proposed mine. Magma resurgence also resulted in resurgent lava domes such as the 9,795-foot South Mountain to the northeast of the proposed

mine and the later El Cajete Crater eruptions at the base of Redondo Peak which produced the El Cajete pumice deposit and Banco Bonito glass and Battleship ash flows.

The two rock units exposed in the proposed mine area were erupted during late-stage magma resurgence from the El Cajete Crater. These rocks have a similar chemical composition but resulted from very different types of eruptions due to decreasing gas content within the magma.

The South Mountain Rhyolite, also known as the Valles Rhyolite, is the oldest member of the El Cajete Crater eruptions. It is the relatively durable pinkish rock forming outcrops in the drainage running east to west near the proposed mine and the cliffs along the East Fork of the Jemez Wild and Scenic River.

The El Cajete pumice rock was ejected high into the air and fell to form an air-fall deposit up to 80 feet deep over the South Mountain Rhyolite. The El Cajete pumice deposit consists of bedded white plinian pumice layers with minor tan colored, non-welded pyroclastic flow and surge deposits.

Minerals

The lands within the proposed mine were reserved from public domain in 1905 and placed within what is now the Santa Fe National Forest. As reserved Forest Service System lands, the area was open to mineral entry under the General Mining Law, as amended.

Mining claimants Richard P. Cook, Shirley A. Cook, Kelly Armstrong, and Deborah Cantrup filed mining claims on the area proposed for mining on March 4, 1988. The placer mining claims involved are Brown Placer #9, Serial No. (SN) 145310, 74.67 acres; Brown Placer #10, SN 145311, 77.96 acres; Brown Placer #11, SN 145312, 75.22 acres; and Brown Placer #12,

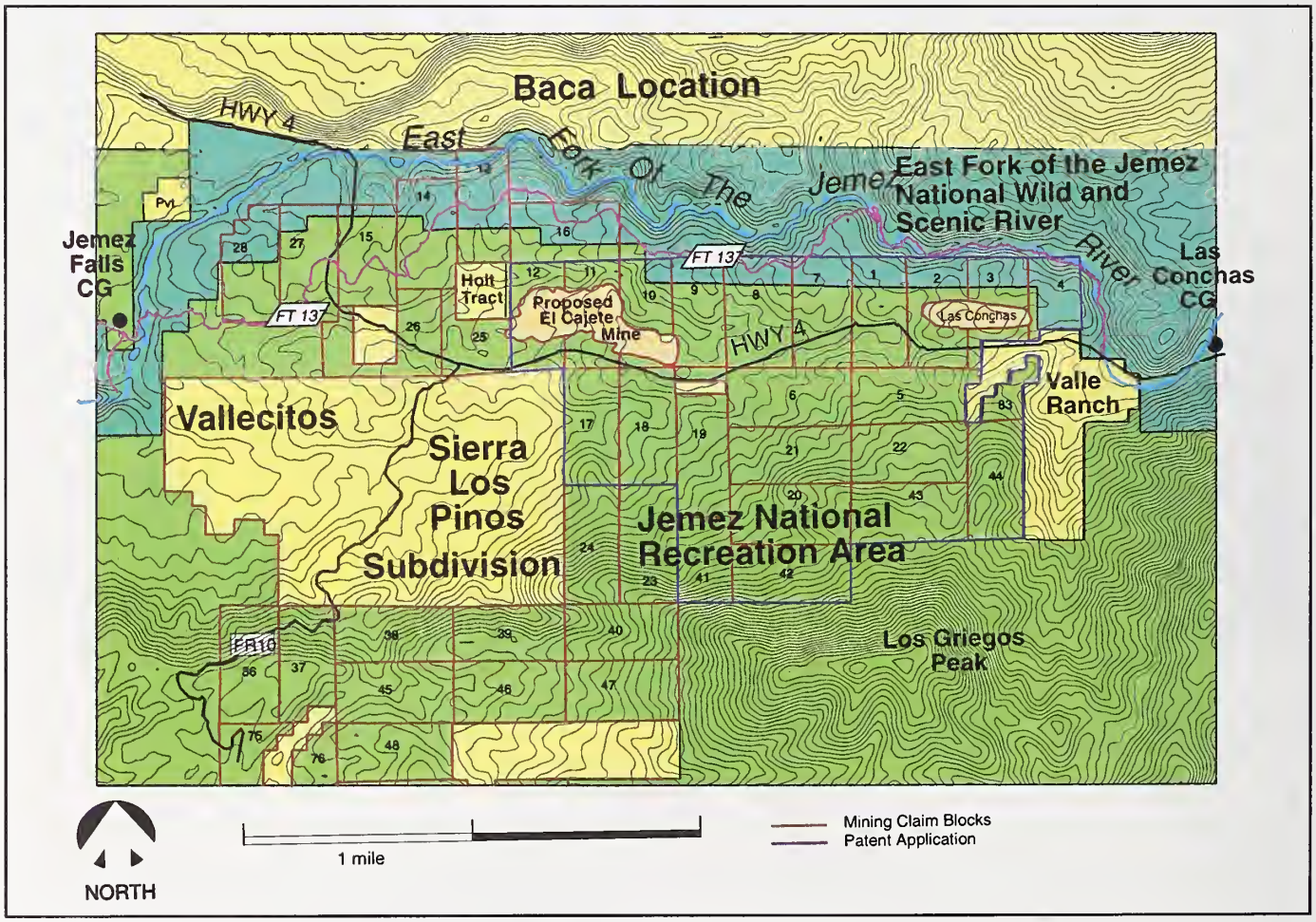

Figure 9. Mining Claim Block and Patent Application Area.

SN 145313, 69.9 acres. The claimants leased the claims to Copar Pumice Company, Inc., of Espanola, New Mexico [2810/2850 Classification Report; May 19, 1995].

In addition to the four mining claims involved at the proposed El Cajete Mine, the mining claimants own 46 other claims within the Jemez NRA. Another 25 claims adjacent to but outside of the Jemez NRA are also owned by the claimants. Most claims are 80-acre placer mining claims. Some claims adjoining private lands are smaller.

The mining claimants filed for patent to the four claims at the proposed mine and 19 other contiguous claims on September 29, 1989 with the U.S. Department of Interior's Bureau of Land Management (BLM). About 1,520 acres are within the patent application area. The BLM is the agency responsible for any issue of patent.

The BLM issued the First Half of the Final Certificate for patenting on these 23 claims on January 16, 1991. The second half of the certificate process includes the determination that a valuable mineral has been discovered on the claims that an operator could mine at a profit. Normally patent must be issued by the U.S. Government on a valid claim.

Public concerns over the impacts of pumice mining and patenting of mining claims resulted in passage of the Jemez National Recreation Area (NRA) on October 12, 1993. The legislation permits mining on valid mining claims filed before passage of the act, but prohibits the issuance of patent on valid claims after May 30, 1991. The act requires a determination of validity on the claims and withdraws all minerals from new claims, leases or sale within the Jemez NRA.

The validity examination has been completed on the four claims involved at the El Cajete Mine and data was collected in 1995 on most of the remaining claims in the patent application area as part of the validity determination process. The other claims in the Jemez NRA are scheduled for examination in 1996.

The Jemez NRA legislation required mining claimants who felt they had been deprived of property rights to file a claim in the U.S. Claims Court to seek compensation for such rights. The mining claimants filed a complaint on May 25, 1994 alleging the denial of patenting on valid mining claims is a taking of property rights. The case is currently being litigated [Litigation Report; August 1, 1994].

As part of the validity examination, the Forest Service under its Mineral Regulation 36 CFR 228, Subpart C, conducted a classification determination to first determine if the pumice claimed is locatable under the mining law. The **Classification Report for Brown Placer Claim Nos. 9-12** dated May 23, 1995 concluded that pumice larger than three-quarters of an inch at the proposed mine that is suitable for use in the garment finishing industry is subject to location and appropriation under U.S. mining laws and regulations.

Block pumice, greater than 2" in diameter, is locatable per Forest regulations 36 CFR, 228.42.

Smaller pumice is common variety material and must be sorted out and wasted at the mine because the sale of common variety pumice is prohibited by the Jemez NRA legislation. Common variety pumice ranges from 55 to 83 percent of the total deposit. Copar Pumice Company had originally proposed to mine 66,666 tons (112,993 cubic yards) of common variety pumice at the proposed mine.

Photo 10. Ponderosa Pine and Arizona Fescue Habitat.

Photo 11. White Fir and Arizona Fescue Habitat.

surrounding area. Heavy dwarf mistletoe infection has reduced tree vigor across 66 percent of the area. Shoestring root rot disease is also at extreme levels and, in conjunction with mistletoe and bark beetles, is causing high mortality in all conifers. Some aspen is also being killed by root rot but this species has greater resistance to the disease and is not affected by mistletoe or bark beetles.

Root rot is caused by several species of Armillaria fungi which can persist in the stumps of dead trees for decades. Root rot in this area spreads principally from rhizomorphs or shoestrings from stumps. The disease is also known to spread from tree to tree through root grafting or from spores produced by fruiting bodies which come in contact with stumps or other wounds.

Forest Vegetation

About 88 percent of the proposed mine is forested with ponderosa pine or is in an early stage of regeneration due to the 1991 Bonito Timber Sale. This acreage is classed as a ponderosa pine and Arizona fescue forest habitat type.

The Bonito Timber Sale harvested all trees on about 16 acres and all 9 inch diameter and larger trees on another 23 acres to treat severe mistletoe and root rot infections [El Cajete Mine EIS, Existing Conditions: Vegetation; May 22, 1995].

Twelve percent of the proposed mine, which is on a steep north-facing slope, is mixed conifer forest composed of ponderosa pine, white fir, Douglas-fir, spruce and quaking aspen. This area is classed as a white fir and Arizona fescue forest habitat type.

Photo 12. Mortality in the Vegetation Screen Between Along Highway 4.

The timber stands are highly productive and capable of producing 5 to 15 thousand board feet per acre. Habitat typing indicates revegetation ranges from usually rapid to moderately rapid and reforestation success is high.

Despite the high site productivity, severe forest health problems exist within the proposed mine and

The ponderosa pine vegetation between the proposed mine and Highway 4 which would serve as a screen between the mine and highway is heavily infested with root rot and mistletoe. The level of infestation will likely kill most of the pine seedlings and saplings within 1-2 decades. Pole and mature sized trees may live 2-3 decades. Aspen, oak and locust can be expected to slowly invade this area as the pine dies.

Integrated Forest Protection Demonstration Area

Prior to selection of the area for mining by Copar Pumice Company, the Forest Service Rocky Mountain Experiment Station, Southwestern Region Forest Pest Management Group, and Santa Fe National Forest decided to establish an Integrated Forest Protection Demonstration Area to study the long-term effectiveness of treating timber stands infected with root rot and mistletoe. The decision was implemented as part of the Bonito Timber Sale.

Photo 13. Clear Cut and Stump Removal Area.

Most of the proposed mine area was harvested of all timber larger than 9 inches in diameter to remove trees severely infected with dwarf mistletoe. At a future date it was planned to cut all remaining poles, saplings and seedlings infected with mistletoe to complete the sanitation of the area.

The focus of the root rot research within the proposed mine was on a 16-acre area severely infected with the disease on the east end of what was to become the proposed mine. Data was collected on the outward appearance of trees and compared to actual infection rates to determine a severity of infection rating. After collecting appearance data, the 16-acre area was clear cut and the root systems were analyzed to determine the infection level. All stumps were removed in 1992 to eliminate the fungi's woody food source in preparation for planting. [Simulation of Management . . . March 1993.]

The clear cut and stumped area was planned to be reforested with 800 to 1,000 ponderosa pine seedlings per acre. The reinfestation rate of the root rot disease would have been observed for 5 to 10 years to test the effectiveness of stump removal and reforestation at various stocking levels.

The study was suspended and reforestation canceled when the area was proposed by Copar Pumice Company in 1993 for pumice mining.

Livestock Grazing

The proposed El Cajete Mine would be within the North Jemez Pasture of the "V" Double Slash Grazing Allotment. The grazing allotment is managed under a rest rotation system. The North Jemez pasture is grazed by 148 head of cattle for a 2- to 3-week period each year when scheduled for grazing. The pasture is typically rested 1 year out of every 3 years.

Wildlife Habitat

The ponderosa pine and mixed conifer forests and riparian areas within and around the proposed mine are habitat or have the potential to be habitat for a number of common wildlife species. This habitat, however, is not as effective as similar areas because of the presence of nearby residents and their dogs, high traffic volume on Highway 4, and motorized recreation use on forest roads [2670 Memo; April 12, 1995].

Management indicator species which are common in the area include Rocky Mountain elk, wild turkey, mourning dove and hairy woodpecker. These species were selected by the Forest Plan as indicators of the effects of management on the habitats of all species.

Elk utilize the proposed mine and nearby areas for forage and cover, particularly during spring and fall migrations. The nearby wetland serves as foraging, rutting and wallowing habitat.

Other less common species include mule deer, black bear and mountain lion. Migratory birds also utilize the area.

Sensitive Wildlife and Plant Species

The project and surrounding area are potential habitat for a number of species listed as sensitive by the Forest Service's Southwestern Region. Surveys for northern goshawk, Jemez Mountains salamander, flammulated owl, wood lily, and Say's pond snail did not find these sensitive species within or near the proposed mine.

Threatened or Endangered Wildlife Species

The area has limited potential habitats for the following listed threatened and endangered species under the Endangered Species Act: threatened Mexican spotted owl, endangered American peregrine falcon, and threatened bald eagle.

The project and surrounding area contain potential roosting habitats for the bald eagle and Mexican spotted owl.

This area is not within designated critical habitat for the Mexican spotted owl. Surveys in the project area in from 1989-1991 and 1995 did not locate Mexican spotted owls within or adjacent to the project area. The biological assessment and consultation processes considered the Mexican Spotted Owl Recovery Plan.

Peregrine falcons occur in the Jemez Mountains and could infrequently forage near the project area. Bald eagles are infrequent spring and fall migrants in the Jemez Mountains and use the Rio Grande during the winter.

Consultation with the U.S. Fish and Wildlife Service under the Endangered Species Act has been conducted and potential effects evaluated to threatened and endangered species documented in the **Biological Assessment and Evaluation of the El Cajete Pumice Mine** [2670 Memo; November 1995, 2670 Memo, July 1996].

Sound

Some residents and recreationists expressed concern that sounds from mining would be annoying and may disrupt their rural atmosphere or sense of solitude.

Sound is measured in decibels (dBs). Because humans do not hear very low or high frequency sound, sound measurements are made with an A-weighted meter to approximate the frequency response of the human ear. Such measurements are expressed as dBAs.

Sound from equipment used in mining would range from 85 to 95 dBAs at a distance of 50 feet. The amount of sound heard by residents and recreation users and their reaction to the sound is dependent upon many physical and psychological variables.

Physical factors include the distance from the source and receptor, terrain and vegetation barriers, and the amount of wind and other background sounds in the area. Attitude is the major psychological factor effecting people's reaction to sound. Some people are annoyed at any sound while others are unaffected by relatively loud sounds [Draft EIS Carolate Copper Project; January 1995].

Sounds from the existing mine, highway or residential area have not been measured. Low-level sounds of engines and backup warning beepers from the Las Conchas Mine, Highway 4, and residential areas have been heard on windless days at elevations above these sources from distances of 1.5 miles [1950 Memo; September 30, 1994].

Sound decreases about 6 dBs with a doubling of the distance from the source. Without taking into consideration the effects of background sounds or terrain and vegetation barriers, 90 dBAs emanating from the center of the proposed mine would attenuate to about 63 dBAs when heard from Forest Trail 137 at 1,200 feet and 57 dBAs at 2,400 feet from the nearest residence.

To put this level of sound in perspective, background sound characteristic of a forest is in the range of 40 dBAs [Geothermal Demonstration Program EIS; January 1980]. Wind is the most important determinate in coniferous forest sounds. A slight breeze can produce background sound levels of 50 dBAs [Report to Congress, Potential Impacts of Aircraft Overflights of National Forest System Wildernesses, July 1992]. The U.S. Department of Housing and Urban Development defines 65 dBAs as an average day-night acceptable sound standard for residential areas [Draft EIS Carolate Copper Project, January 1995].

The sound barrier effects of forest vegetation, the depth of the mine and background sound levels would significantly decrease the amount of sound heard from the mine.

Air Quality

The proposed mining would produce dust from all mining and reclamation activities. Most dust would be produced by mining, screening, piling, loading, and hauling pumice from the mine to the highway.

The New Mexico Environment Department regulates dust production from screening plants, storage piles and haul roads under a permitting system that requires mitigation of dust by watering or other means when dust emissions exceed State standards as determined by computer modeling and observation by a State certified observer.

The screening plant from the Las Conchas Mine would be used at the El Cajete Mine. The screening plant currently produces about 250 tons of screened pumice per hour at the Las Conchas Mine when in operation. Based on computer modeling, the Environment Department permits a production level of 400 tons per hour for this plant. Water spraying to control dust is required if opacity or density of the dust plume from the screening plant or conveyor belts reaches 10 percent. Opacity readings to date have been well within limits and watering has not been necessary [1950 Memo; July 31, 1995].

Residential Property Values

Some residents and landowners are concerned that traffic, noise, dust, and damage to scenery from the proposed mine would decrease property values in the nearby Vallecitos de los Indios and Holt private residential tracts and the Sierra Los Pinos Subdivision.

These concerns, however, are not reflected in the experience of a realtor and a developer selling property on private lands closest to the proposed mine. The realtor, who provides written notification to prospective buyers that mining may occur nearby, reports properties continue to sell and prices have increased on private land adjacent to the proposed mine [Ron Brown Realty; January 25, 1995]. A resident living closest to the mine, who is building and selling homes, has stated he is not concerned with the mining if it is not closer than several hundred feet from his property and the mined area is reclaimed after mining [1950 Memo; January 8, 1993].

Highway and Mine Safety

Some residents have expressed concern the 40 truck trips per day during the week resulting from pumice hauling would endanger commuters and school buses because they are too large for sharp curves on Highway 4, often exceed the speed limit, or operate when the road is snow packed. Average daily vehicle traffic on Highway 4 near Jemez Pueblo is about 2,250 cars [Estimated Recreation Visits and Visitor Days, January 1995].

Other residents were concerned that mining is a dangerous activity and accidents, fuel spills and fires could strain the emergency services available.

Copar Pumice Company's contract haul trucks have had 3 accidents since hauling began in 1987 from the Las Conchas Mine. No injuries resulted from these accidents. All of these accidents occurred on Highway 4 more than 10 miles from the mine. Two of the accidents resulted from mechanical failure and involved only the trucks. One of the accidents involved another vehicle which slid into a haul truck on ice at a narrow curve [2310 Recreation Planning, July 12, 1995].

Highway safety is under the jurisdiction of the New Mexico State Highway and Transportation Department. The Highway and Transportation Department states that the state highway system is built to facilitate commerce and limitations on trucking must be made by vehicle weight and not by length or type of product hauled. Weight limitations must be applied to all trucking if weight limits on the highway were to be changed. Copar Pumice Company trucks meet state weight requirements. The department is aware of the sharp curves on Highway 4 and has made several improvements including paving shoulders, shifting the centerline and additional clearing of trees [1950 Memo; March 1, 1996].

Traffic regulations and operating on snow-packed roads are under the jurisdiction of the New Mexico State Department of Public Safety. Trucking contractors are subject to the same speed and traffic regulations that govern all other motorists. Rather than requiring the use of tire chains when roads are snow packed, the public safety department relies on closing highways to all traffic when it determines a road has become too hazardous for travel.

After a snow or ice storm, Copar Pumice Company's mine foreman, who is the first to arrive at the mine, discourages hauling by relaying road conditions to the mill site at the beginning of the operating day [1950 Memo; August 3, 1995].

Mine safety is under the jurisdiction of the U.S. Department of Labor's Mine Safety and Health Administration. The agency inspects Copar Pumice Company's mines twice each year. Mining at the Las Conchas Mine, which has been open since 1987, has not resulted in mining accidents, hazardous spills or fires that required a response from emergency services.

The Mine Safety and Health Administration indicates the Las Conchas Mine has been operated safely and the safety citations that have been issued are typical of most mining operations. Five citations were issued in 1995 with only one resulting in an order to withdraw operators. The citations involved a loose railing, a loose wire, an uncovered drive belt, a gap between a platform and the shaker screen, and operating end-loaders under an undercut high wall.

An order to withdraw the loader operators was issued when pieces of a frozen high wall collapsed and posed a falling hazard to operators [1950 Memo; August 2, 1995].

Economic Impacts

Copar Pumice Company's annual sales for garment finishing pumice has ranged between 40,000 to nearly 50,000 cubic yards between their 1993 and 1995 fiscal years from the existing Las Conchas Mine. The company reports garment finishing pumice sells for $20 to $30 per cubic yard, freight on board, at their processing plants [2810/2850 Classification Report; May 23, 1995].

The company has requested specific production costs, taxes or other financial information that it considers to be proprietary in nature not be disclosed as authorized under the mining and Freedom of Information Act regulations. Based on the range of production levels and sale prices, sales for garment finishing pumice can be estimated to range between $800,000 and $1,500,000 per year.

The Las Conchas Mine directly employed 28 full-time workers and 2 part-time workers during the 1994-5 fiscal year. Seven people work at the mine and 9 others are employed at the processing plants. Ten truckers haul pumice to the processing plants and consumers. A business and a plant manager are the remaining full-time workers. Two individuals work part-time maintaining equipment [1950 Memo; August 8, 1995].

It is expected the proposed El Cajete Mine would produce sales and employment to at least the level of the Las Conchas Mine.

IV. Environmental Consequences

This chapter discloses the potential consequences of the impacts of each of the alternatives and provides the scientific and analytical basis for the comparison of alternatives discussed in Chapter 2.

Soil Productivity

All action alternatives would result in a decline in the soil productivity of the proposed mine area [2520 Memo; August 11, 1995]. Alternative 3 would not impact soil productivity since mining would not be approved.

The soils in Alternatives 1, 1(a) and 2 would be converted from moderately well developed productive soils to a young soil with about 40 percent of the original capability for wood fiber and herbaceous forage production due the changes in soil structure and nutrient balance resulting from stripping, stockpiling and respreading activities.

Additional loss of soil productivity could also occur indirectly from soil erosion. Rapid revegetation of bare soil and control of runoff, therefore, is critical to preventing loss of soil.

Although Alternative 1 provides for revegetation of the reclaimed mine, the potential for soil loss would be greater than in Alternatives 1(a) and 2 which employ additional measures to insure rapid establishment of herbaceous vegetation. To insure a high level of seedling survival, Alternatives 1(a) and 2 would require the respreading of top soil in the fall, seeding while the soil is soft, crimping in a straw mulch and fertilizing the area. Use of a closed basin topography, lower slope angles, and contour furrowing to reduce erosive forces and retain runoff would also significantly reduce the erosion potential of Alternatives 1(a) and 2.

Herbaceous vegetation in all alternatives would be established within 1 to 3 years after placement of the top soil and would effectively cover the ground within 5 to 8 years. Alternative 1 does not require the use of native plants. Use of native grasses, forbs and shrubs would permit faster recovery of the potential natural vegetation in Alternatives 1(a) and 2.

The decline in soil productivity in all action alternatives, although significant for this 58- to 83.5-acre mine, would not be cumulatively significant for the soil productivity within the much larger 41,700-acre East Fork of the Jemez River watershed.

Although revegetation and control of erosion would stabilize and prevent the permanent loss of soil productivity, many decades would pass before full productivity would be restored. Consequently, the loss of soil productivity is considered to be an irreversible adverse impact that cannot be avoided.

Ground Water

Removal of pumice at the proposed mine in all action alternatives would have little, if any, direct impact on recharge of the aquifers in the local area. If change occurs, it would likely be in an increase in the water available to the shallow aquifer below Montoya Spring because a portion of the precipitation currently being transpired into the atmosphere by the conifer forest that would be removed by mining may infiltrate deep enough into the waste pumice that is backfilled into the mined area to reach the paleosol that underlies the pumice deposit. The paleosol is thought to serve as a seal that traps and directs the flow of the ground water forming the shallow aquifer [Hydrology Report, Proposed El Cajete Pumice Mine; June 26, 1995].

Any increase in ground water in the shallow aquifer from the 58- to 83.5-acre mine, however, would be very small in comparison to the 1,000 or more acres in the Los Griegos Peak Watershed which is believed to be serving the shallow aquifer at Montoya Spring and intermittent stream [Conceptual Hydrogeology of the Proposed El Cajete Pumice Mine and Surrounding Area; June 15 and 21, 1995].

Some increased potential exists for contamination of the shallow aquifer as a result of an accidental fuel or hydraulic fluid spill. The paleosol and 100 to 300 foot depth of rock between the shallow and deep aquifers, however, makes the potential for spill contamination of the deep aquifer to be very low [Hydrology Report, Proposed El Cajete Pumice Mine; June 26, 1995].

As mitigation measures, used oils would be collected and disposed of only in an authorized facility off the National Forest. No storage of fuel or oil would be permitted at the mine. Mining equipment would be fueled and lubricated in a spill containment facility constructed by the operator. A spill kit would be kept on site and spills, such as a ruptured hydraulic line, would be contained and contaminated pumice disposed of in an authorized facility off the National Forest.

The potential of the mine to affect the recharge of the deep aquifer would be very low. The absorption capacity of the backfilled pumice, the underlying paleosol, and the 100 to 300 foot depth of volcanic rock between the paleosol and the deep aquifer would make infiltration to this level unlikely.

In addition, tritium dating of the nearby community well water, calculation of evapotranspiration rates at various elevations, and observation of the depth of infiltration of precipitation at the Las Conchas Mine indicates the deep ground water does not result from precipitation infiltrating the pumice deposit in the local area. Instead, the deep ground water most likely originates on the higher peaks surrounding the Valle Grande area and flows underground for decades before reaching the area underlying the proposed mine.

Consequently, no measurable change in water volumes would occur in the deeper aquifer underlying the proposed mine or the nearby residential areas as the result of mining [Conceptual Hydrogeology of the Proposed El Cajete Pumice Mine and Surrounding Area; June 15 and 21, 1995].

Water monitoring wells 1 and 2, which were installed on the edge of the proposed mine to determine the depth to water and water quality, would be used to monitor ground water. Water quality samples would be taken at the half-way point in the mining process and following final reclamation activities. Any violations of water quality would be reported to the N.M. Environment Department for corrective action.

The reclamation of an area approved for mining would result in the backfilling and reshaping of the mined area with waste pumice, control of surface runoff, top soil replacement, and revegetation and reforestation of the site. Precipitation would be captured and stored on-site in the upper soil horizons for use by the planted vegetation. As a result, reclamation and revegetation efforts would meet the Jemez NRA legislative requirement of restoring the disturbed land to a hydrological condition as close as practical to its premining condition.

Wetland and Surface Water

Alternative 1, in comparison to other action alternatives, would have a greater potential for runoff to transport sediment to surface water in the nearby intermittent stream because of steeper slopes and the lack of contour furrowing and closed basin topography [2520 Memo; August 11, 1995]. The potential would be small, however, because 100-200 feet of undisturbed soil and vegetation would be retained between the mined area and the intermittent stream, drainage would be controlled, and mitigation measures would be employed to control erosion in all action alternatives.

Alternatives 1(a) and 2, which employ closed basin topography, lower slope angle, contour furrowing and higher revegetation standards, would have lower potentials to produce sediment. In addition, Alternative 2 would produce the least sediment because 25.5 acres on the north-facing slope would not be mined, decreasing the total acres disturbed, and significantly increasing the undisturbed soil and vegetation buffer in this area.

There would be no potential for sediment to reach the East Fork of the Jemez Wild and Scenic River in any of the action alternatives because the intermittent stream goes underground more than 2 miles from the river, providing ample opportunity for sediment to be stabilized by canyon bottom vegetation in this dry tributary canyon. In addition, mitigation measures such as interior shaping and water control structures will keep runoff water within the mine site.

Surface and subsurface flows affecting Montoya Spring and intermittent stream would not be impacted by the proposed mine because the watershed area producing water is avoided in all action alternatives.

The proposed mine at 58 or 83.5 acres is very small in comparison to the 41,700-acre East Fork of the Jemez River watershed. Due to the small size of the area, reclamation efforts employed and mitigation requirements, the proposed mine would not significantly add to the cumulative impacts to water quality, soils and vegetation resources. The impacts to these resources would principally continue to result from livestock grazing on the private Baca Location Ranch, residential development of private lands in the Vallecitos de los Indios and other areas, and recreation use in the Jemez NRA and Wild and Scenic River.

Recreation Opportunities and Uses

The proposed El Cajete Mine would be within the Jemez National Recreation Area and near the East Fork of the Jemez Wild and Scenic River, which were designated by the U.S. Congress as nationally important recreation areas. Highway 4, which is designated by New Mexico as the Jemez Mountain Trail Scenic and Historic Byway, is also nearby. These designations and the Forest Plan management direction for the area all emphasize the importance of providing and protecting recreation opportunities and related scenic resources [2310 Memo; July 12, 1995].

Impacts of the proposed mining on recreation in Alternatives 1, 1(a) and 2 would result primarily from the on- and off-site sound and scenic impacts from

mining and reclamation activities. Sound and scenic impacts are discussed in greater detail in separate sections of Chapter 4 but are discussed here where they impact the Roaded Natural Recreation Opportunity Spectrum setting of the area. In the Roaded Natural setting, recreation users would expect to have opportunities for motorized and non-motorized recreation in a mostly natural appearing environment. Alternative 3 would not impact recreation opportunities or the related scenic resource because mining would not be approved.

Most dispersed recreation use in or near the proposed mine consists of hiking and cross-country skiing, gathering firewood, hunting, or motorized travel on the roads in the area. An estimated 100 Recreation Visitor Days (RVDs) generated by less than 500 visitors annually occurs within and adjacent to the proposed mine boundary.

The sights and sounds of mining, however, would extend impacts to recreation use beyond the mine boundary. Sound impacts would occur when the mine is in operation or under active reclamation and only during weekdays since the mine would not operate on weekends and holidays. Visual impacts, however, would extend for decades until the reclaimed area appears natural with the maturing of vegetation seeded and planted on site.

Sounds from mining would be heard most commonly by hikers on Forest Trail 137, which is located about one-quarter mile north of the mine. On windless days, sounds may be heard up to 1.5 miles from the mine at higher elevations. In addition to sound impacts, travelers on Highway 4 and hikers on the peaks up to 1.5 miles from the mine in the Jemez NRA would be able to see the mine from some locations.

Annual dispersed recreation use within sight and sound distance of the mine is estimated to be 30,000 RVDs. Eighty-percent of this use, however, results from highway use where travelers are passing by and would have only very brief views into the mine area, depending upon how quickly the existing vegetation screen deteriorates from disease and the effectiveness of any plantings. The remaining use would result from hiking and skiing on Trail 137 and the Mistletoe Canyon Ski Trail or, to a far lesser extent, from the peaks surrounding the site where exposure to the sights and sounds of mining would detract from the experience of some recreation visitors.

In Alternatives 1, 1(a) and 2 the public would be excluded from the area being actively mined and reclaimed for safety purposes by fencing and signs. Exclusion of the public from this area would be an insignificant impact because of the relatively low level of use in comparison to recreation use and opportunities available nearby.

The sights and sounds of mining and reclamation activities, however, would reduce the Roaded Natural recreation experience over a broader area of the Jemez NRA and also impact the East Fork of the Jemez Wild and Scenic River. These adverse impacts cannot be avoided. The reduction in use and recreation opportunities would be irretrievable but not irreversible.

The sounds from mining would persist for 10 years during operating hours. Scenic impacts would extend from 10 to 30 years depending on the observer position. As a consequence, the cumulative impacts of public exclusion, reduction in opportunity and exposure of a larger number of recreationists in the surrounding area to mining activities would be a significant environmental impact until mining and reclamation is completed and public access permitted.

Heritage Resources

A heritage resource survey of the proposed mine did not locate any archeological or historic sites within the proposed mine boundary. A nearby historic site located several hundred feet from the boundary would not be impacted by the proposed mine [IS&A Report 93-10-68; October 7, 1993].

The Jemez Pueblo and other tribes that use the Jemez Mountains for cultural and religious purposes were consulted in February 1994 to determine if pumice mining at the proposed El Cajete site would impact the sites or areas used for such purposes.

Jemez Pueblo initially stated in a letter response it was opposed to the proposed mine because of its proximity to routes used to access sites of ritual significance [Jemez Pueblo; February 17, 1994]. In subsequent meetings with the tribal government, however, Jemez Pueblo tentatively indicated that leaving an undisturbed buffer between the proposed mine and the area of concern would adequately protect their use [1950 Memos; July 25, 1994; June 5, 1995; June 27, 1995].

Most of the tribes contacted by letter did not respond to the consultation letter. The tribes most likely to be affected were later contacted by telephone. No concerns were determined by this method with the exception of Santo Domingo Pueblo. The Governor of Santo Domingo Pueblo objected to any mining activities in the Jemez Mountains because of the

mountains' cultural significance to the tribe. In a subsequent telephone contact, the Santo Domingo Governor stated the tribe's concern was for the Jemez Mountains in general and not the proposed mine site. Since a specific area and cultural and traditional uses were not identified, the concerns of the Santo Domingo Pueblo were not considered further.

Scenery

Analysis of the impacts to scenery by the proposed El Cajete Mine and the existing Las Conchas Mine were based on potential views without the existing forest vegetation which limits views of the mines from most observation points. Potential views were used for analysis because forest vegetation can change or be lost over time due to wild fire, insects and diseases, residential development, or forest management practices [2380 Memo; August 11, 1995].

The proposed mine would have the potential to be seen from 7,540 acres surrounding the area. About half of these acres would also provide a view of the existing Las Conchas Mine. Both mines were used in the visual analysis because the proposed mine area and the Las Conchas Mine would be visible from some observation points and could cumulatively impact the scenery.

Scenic impacts were analyzed in relationship to the Santa Fe National Forest Plan which directs management activities meet a scenery objective of Retention for the El Cajete and Las Conchas mine areas. The Retention objective requires maintenance of scenery in a manner to prevent activities from being evident to the casual observer. The areas surrounding the mines generally meet the Retention and Partial Retention objectives. Partial Retention means human activities are evident but subordinate to the natural landscape character.

Currently, the scenic condition of the proposed El Cajete Mine area on-site is Marginally Acceptable where mature timber has been harvested. Depending on the observation point, however, the mine site may range from Retention to the Modification condition. Modification means human activities dominate the landscape but appear natural when viewed from the foreground, middleground and background. Marginally Acceptable means human activities dominate but appear natural when viewed from the background.

The Las Conchas Mine is classed as Unacceptable Alteration due to active mining and reclamation. Unacceptable Alteration means human activities dominate the natural landscape. An aerial view of Las Conchas Mine in Photo 14 displays the visual contrast between the surrounding forest, the western reclaimed and revegetated area, and the active backfilling and mining areas in 1994. The Las Conchas Mine meets the Forest Plan objective of Retention as viewed from the highway; the only observation position required for consideration when this mine was approved. With the designation of the Jemez National Recreation Area, this entire recreation area is now considered visually sensitive and thus warranted additional analysis of observation points besides just the highway views.

The proposed 83.5-acre El Cajete Mine in Alternatives 1 and 1(a) would have the same boundary. The primary difference in scenic impacts between these alternatives would result from the different reclamation standards for the alternatives. Recontoured slopes would be limited to a maximum of 40 percent in Alternative 1 and revegetation would be with non-native grasses and forbs commonly used for reclamation. A plantation, regularly spaced trees, of ponderosa pine would also be established. In comparison, Alternative 1(a) would limit maximum slope limits of 30 percent and native grasses, forbs and shrubs would be used to revegetate the site. Ponderosa pine would be planted in groups to mimic the natural invasion of grasslands by conifers characteristic of the area. In addition, existing oak, locust and other vegetation would be transplanted in the reclaimed mine.

In Alternative 2, the boundary of the proposed mine would change as the mine is reduced to 58 acres to protect scenic and other resources. The smaller mine would be less visible and the same slope limits and revegetation standards employed in Alternative 1(a) would be utilized.

Ten key observation points were selected to analyze the scenic impacts of mining in Alternatives 1, 1(a) and 2. Alternative 3, the No Action Alternative, is used for comparison purposes. The extent of alternation by alternative and the scenic condition that can be achieved over time was analyzed for each observation point.

Los Griegos and Las Conchas peaks are the most critical mountaintop observation points because their nearly 10,000 foot elevations and 2.5 mile distance would provide a bird's eye view of the proposed mine. Cat Mesa Escarpment, at nearly the same distance, would have a reduced viewing potential since it lies at the 8,301 foot elevation. These observation points lie within the Jemez NRA and abandoned trails that access these areas have potential for reconstruction and use as major recreation routes.

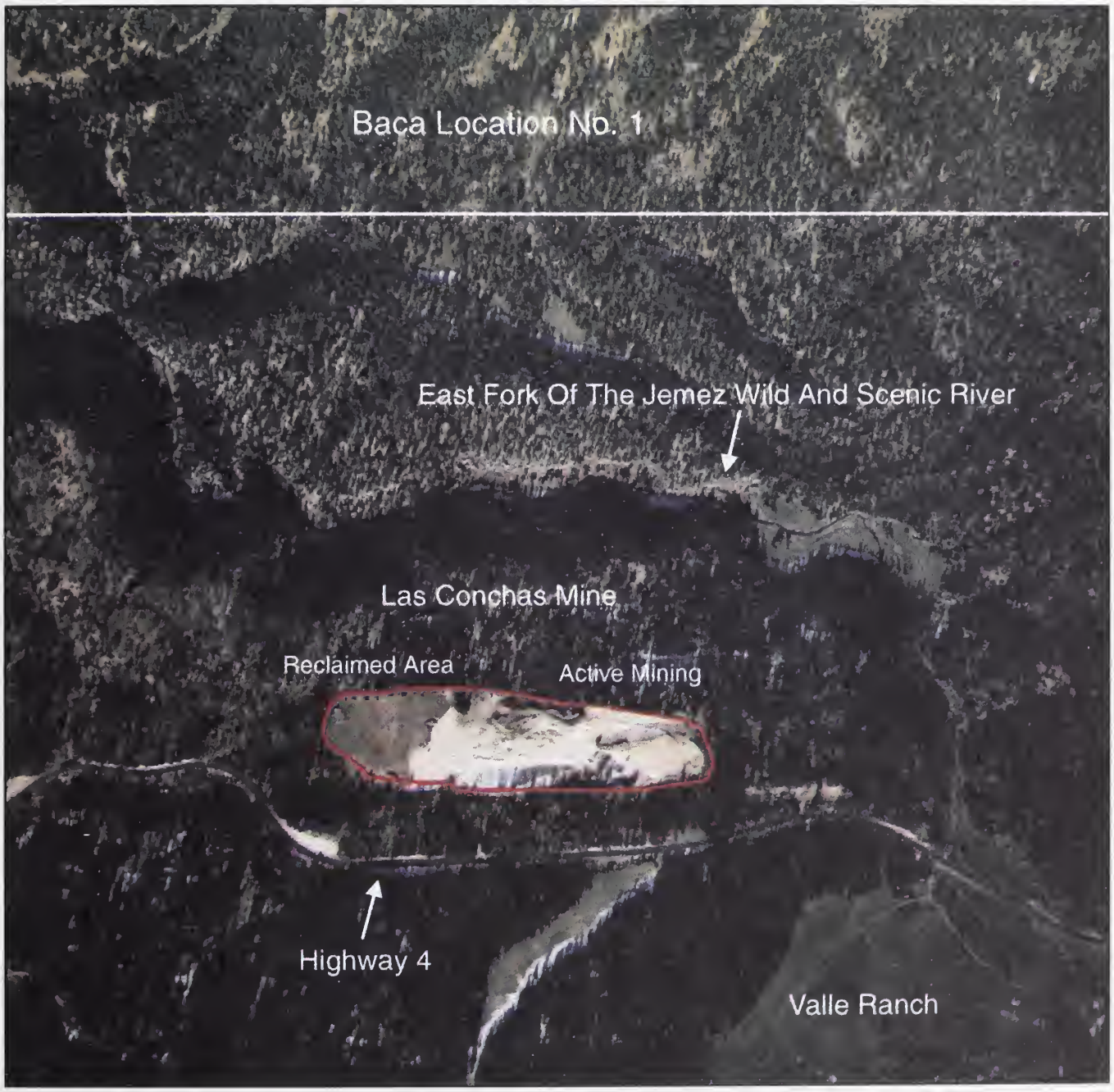

Photo 14. Aerial View of Las Conchas Mine.

Observers on Los Griegos Peak can currently see both the proposed mine area and Las Conchas Mine through a few gaps in the forest vegetation. Observers on Las Conchas Peak can see the Las Conchas Mine if they hike off the trail to the northwest side of the peak. Views of the mine are limited, however, and mostly occur when the leaves are off the deciduous trees between November and April. The proposed mine area could be seen from Las Conchas Peak under these same conditions.

In order to view the proposed mine from Cat Mesa Escarpment observers must walk through the screening forest vegetation between Forest Road 135 and the escarpment. The Cat Mesa Escarpment observation point is accessed by an abandoned trail which has potential to expand the opportunities for hiking, viewing scenery and other recreation activities in the Jemez NRA. If reconstructed and featured as a Jemez NRA attraction, the trail would significantly increase the number of people viewing the area of the proposed mine.

Redondo, South Mountain and Rabbit Mountain are higher peaks located on the private Baca Location Ranch. The achievable scenic conditions for these peaks were analyzed because the Baca Location has been identified as desirable for purchase and inclusion in the Jemez NRA. Since public access is currently limited to the owners and workers, scenic conditions are not discussed in detail.

Other critical observation points in the Jemez NRA include Highway 4 and a mobile observation point called the Wanderer. The Highway 4 view would provide a 5 second long view of the proposed mine through gaps in the screening forest vegetation.

The Wanderer observation point would result when someone wanders into the mine area from the surrounding forest. This is not a fixed point and could occur from any location within the mine or near the mine's edge. The Wanderer position would be the most impacted observation point because the mine area would be in the immediate foreground. The current scenic condition for the Wanderer observation point is marginally acceptable due to past timber harvest and treatment of forest diseases.

The vegetation screen for Alternatives 1 and 1(a) would appear from Highway 4 as a narrow fringe in comparison to Alternative 2 which is wider in this alternative to reduce visual impacts in key areas. Because the screening pine forest is severely infected with dwarf mistletoe and shoestring root rot disease, the wider vegetation screen in Alternative 2 would be a more effective visual buffer. Currently the scenic condition for Highway 4 observation points is Retention.

Due to the predicted loss of vegetation screen, the Plan of Operations may require planting a mix of native vegetation to limit any significant views into the mine from the highway. To effectively limit views, planted vegetation would need to be large enough, and placed in strategic groupings to ideally limit views of the mine area from any point along the highway. However, native species of firs and pines, and even to some extent aspen, are susceptible to the same diseases as the existing vegetative screen. Aspen would only be effective part of the year since during leaf off, the mine would still be visible. Non-native species are not recommended since they would appear out-of-context.

Consequently, prior to requiring a screen to be planted, the Plan of Operations will assess the longevity of individual trees, the extent of the mine area seen or potentially seen, and the longevity of a planted screen. Due to these varying conditions, the effectiveness of a planted screen cannot be relied upon to limit views of the mine and therefore achievable scenic conditions do not reflect any benefit from screen plantings in the "Summary of Achievable Conditions".

Two observation points from residential properties were selected to represent these critical views. The McKeever home would be the most immediately impacted residence because it is 350 feet from the proposed mine, and mining and the reclaimed area would be visible from the property. The Vallecitos observation point, located 1.4 miles away at the 8,320 foot elevation, is representative of residences in the Sierra Los Pinos Subdivision above 8,200 feet that could have views of the proposed mine if the dense stand of Ponderosa pine were removed.

The proposed mine lies within a Roaded Natural Recreation Opportunity Spectrum (ROS) area. Landscapes within the ROS of Roaded Natural are defined as mostly natural appearing as viewed from sensitive roads and trails, thus meeting the norm of Retention and Partial Retention scenic conditions. The scenic conditions of Modification and Marginally Acceptable are considered inconsistent settings in the Roaded Natural ROS class.

Alternative 1 Scenic Effects

During mining and up to 2 years after reclamation, the scenic condition would be at an Unacceptable Alteration level from any observation point because

the relatively bare ground and lack of trees would contrast with the surrounding forested landscape.

The reclaimed mine would be considered Unacceptable Alteration from the Wanderer's vantage point for up to 10 years after reclamation. A Marginally Acceptable level would be achieved between 10 and 30 years, but the uniform appearance of a pine plantation may never blend with the surrounding forest from this observation point.

The observation points of Los Griegos Peak, Cat Mesa Mesa Escarpment and Las Conchas Peak would have Unacceptable Alteration, Marginally Acceptable and Modification levels, respectively, by the 10th year. By year 30, the scenic conditions would improve to Modification for Los Griegos Peak and Partial Retention for the other observation points.

Highway travelers would be aware of the mine as it is cleared of forest because of back-lighting visible through the relatively narrow screen of vegetation between the proposed mine and highway. Views into the mine would increase as diseases kill most of the younger sapling and pole-sized pines in the screen, leaving rows of towering mature trees to further detract from the view.

The uniform texture and row affect of the pine plantation would be visible in the reclaimed mine and would further detract from the scenic condition until invading aspen, oak and locust grow large enough to provide screening from the spring through the fall. Because of the loss of effective screening and uniform appearance of the plantation and towering mature pine, highway scenery would be at the Marginally Acceptable level at the 10th year and at the Modification level within 30 years.

The McKeever observation point would experience impacts similar to the highway views because of similar screening distances and incidence of disease. Higher angled slopes in this alternative would result in an extensive view of the reclaimed mine leading to a Marginally Acceptable level at the 10th year and Modification at 30 years. Mining of pumice between this observation point and the highway, depending on the density of the screening vegetation at this point and along the highway, may make it possible to view the highway from the residence.

A view from the Vallecitos observation point is currently blocked by a dense pole stand of ponderosa pine. A scenic condition of Modification would be met at this observation point in the next 10-30 years if the proposed mine were visible.

Alternative 1(a) Scenic Effects

During mining and up to 2 years after reclamation, the scenic condition would be at an Unacceptable Alteration level from any observation point because the open area would contrast with the surrounding forested landscape. By year 10, the mine site would still be considered Unacceptable Alternation from the Wanderer observation point. Even at 30 years with a Modification scenic condition, a wanderer would likely recognize that the area had been disturbed because the planted pine would be young in comparison to the mature forest surrounding the site and the opening would not follow the natural topographic features. Consequently, there would be little existing vegetation visible except that exposed along the ridgeline of the mine's boundary and beyond.

Alternative 1(a) views from Los Griegos and Las Conchas peaks and the Cat Mesa Escarpment would improve in scenic condition in comparison to Alternative 1 because pine planted in scattered groups would mimic natural vegetation patterns and would not appear like a typical plantation from these observation points. By year 30, views from Las Conchas Peak would meet the Retention, Los Griegos Peak would meet Modification, and Cat Mesa Escarpment would meet Partial Retention objectives.

Highway travelers would experience a slight improvement in the view in comparison to Alternative 1 because native grasses, shrubs and scattered planting of pine would mimic the natural vegetation patterns. This improvement, however, would not mitigate the impact of back-lighting and towering row-like appearance of mature pine. A scenic condition of Unacceptable Alteration at 2 years after reclamation would improve to Marginally Acceptable by year 10. A scenic condition of Modification would be achieved at year 30.

Views from the McKeever and Vallecitos observation points improve over Alternative 1. The McKeever observation point eventually meets a scenic condition of Retention by year 30 as pine plantings mature and minimize viewing distance.

The view from the Vallecitos observation point, if the forest vegetation were removed, would meet Partial Retention by year 30.

Alternative 2 Scenic Effects

As with Alternative 1 and 1(a), 2 years after final reclamation the area would be at an Unacceptable Alteration scenic condition for all observation points.

By year 10, however, the use of native species, planting of pine in groups and following natural topographic breaks improves the scenic condition over Alternative 1 and 1(a) to a Marginally Acceptable condition for the Wanderer observation point. Existing vegetation on inward-facing slopes greatly adds to reclamation efforts creating a more natural appearing landscape. At year 30, the scenic condition level of Partial Retention would be reached for this observation point.

The Los Griegos observation point meets the Modification scenic condition in year 10 and the Retention condition at 30 years. The Las Conchas observation point meets the Retention scenic condition by year 10. The Cat Mesa Escarpment observation points meet the Partial Retention scenic condition by the 10th year and the Retention condition by year 30. The more rapid improvement in scenic conditions in comparison to the other action alternatives results from the decrease in mine size and corresponding seen area, as well as from the use of native species and natural appearing vegetation patterns.

Alternative 2 would increase the width of the vegetation screen between the mine and highway. Some back-lighting would still be evident by highway travelers but a Retention scenic condition would be met within the first 10 years after reclamation from these observation points. Alternatives 1 and 1(a), in comparison, only achieve a Modification scenic condition in 30 years.

Scenic conditions of Partial Retention at 10 years and Retention at 15 years would be met at the McKeever observation point. Views from the Vallecitos observation point, if made possible with the removal or loss of the screening vegetation, would meet Retention scenic conditions by year 15.

Alternative 3 Scenic Effects

In Alternative 3, mining and reclamation does not occur. Planting of pine in the Integrated Forest Protection and Demonstration Area and natural forest succession, however, would occur and result in improved scenic conditions over time.

All observation points, with the exceptions of Los Griegos Peak, Highway 4 and the Wanderer, meet Retention scenic conditions within 30 years.

The view from Los Griegos Peak would improve as the pine plantation fills in the Demonstration Area but the contrast with the surrounding mature forest would still be detectable from this viewing angle and result in a scenic condition of Partial Retention in 30 years.

Due to disease mortality in the screening vegetation, highway travelers would increasingly be aware of the pine plantation in the Demonstration Area. Consequently, the scenic condition would decline from Retention to Partial Retention due to the uniform effect of the plantation. Once this effect would no longer be noticeable, the scenic condition would return to Retention.

From the Wanderer observation point, the Demonstration Area would be Marginally Acceptable in the first decade and would over time improve to a Partial Retention scenic condition.

Summary of Scenic Effects

During the 10 years of mining and up to 2 years after the final area is reclaimed, all action alternatives have a scenic condition of Unacceptable Alteration from any observation point. Alternative 3 meets at least Partial Retention with the exception of Los Griegos and the Wanderer meeting Marginally Acceptable because of past timber harvest and forest disease treatment activities.

In the first 10 years after reclamation for the action alternatives, only the Las Conchas and Highway 4 observation points in Alternative 2 meet the **Forest Plan** scenic condition of Retention. During this 10-year period, Alternative 3 would meet the Retention condition with the exception of the Los Griegos, the Wanderer and highway observation points; Los Griegos and the Wanderer would meet a scenic condition of Modification, while highway views would meet Partial Retention. A scenic condition of Marginally Acceptable would be met in Alternative 3 for the Los Griegos and Wanderer observation points, while the Highway view would meet Partial Retention during this time.

By the 15th year after reclamation, Alternative 2 would meet Retention from all observation points with the exception of the Wanderer which would meet Partial Retention. Twenty years after reclamation, Alternative 1 and 1(a) would meet at least the Modification scenic condition for all observation points with the exception of the Wanderer which would meet a Marginally Acceptable condition. Half of the observation points in Alternative 1(a) would eventually meet Retention by year 30. None of the observation points in Alternative 1 would meet Retention in 30 years, except for Rabbit Mountain which meets Retention within 10 years.

The greatest cumulative effect of viewing both the Las Conchas and El Cajete Mines would be from Los

Griegos and Las Conchas peaks. The cumulative effect would occur over a 15-year period when the El Cajete Mine is being actively mined and reclaimed, and the vegetation on the reclaimed Las Conchas Mine is maturing and assimilating this mine into the forested landscape. From these observation points, there should be no noticeable cumulative impact 10 years after the El Cajete Mine has been reclaimed and 20 years has elapsed since the Las Conchas Mine reclamation.

In conclusion, the unavoidable adverse impacts to scenery are irretrievable but not irreversible. The short- and long-term decline in scenic conditions within the Jemez NRA is a significant environmental impact because the Jemez NRA was designated, in part, to recognize and protect the area's outstanding scenery.

Reclamation activities and revegetation and reforestation mitigation measures over the long-term reduce impacts to scenery and meet the Jemez NRA legislative requirement to restore the scenery to the pre-mining condition to the extent practical. Of the action alternatives, Alternative 2 best meets the Jemez NRA legislative requirement to only permit

Table 5. Summary of Achievable Scenic Conditions *

Key Observation Points	Current	During Operation and up to 2 years After Reclamation				2-10 Years After Reclamation				10-30 Years After Reclamation			
		1	1a	2	3	1	1a	2	3	1	1a	2	3
Los Griegos	M	UA	UA	UA	MA	UA	MA	M	M	MA-M**	M	PR-R!	M-PR^
Cat Mesa	R	UA	UA	UA	R	MA	M	PR	R	M-PR**	M-PR#	R	R
Las Conchas	PR	UA	UA	UA	PR	M	PR	R	R	M-PR**	PR-R#	R	R
Wanderer	MA	UA	UA	UA	MA	UA	UA	MA	M	UA-MA#	MA-M#	PR	PR
NMSH	R	UA	UA	UA	R	MA	MA	R	PR	M	M	R	PR-R#
McKeever	M	UA	UA	UA	PR	MA	M	PR	R	M	PR-R#	PR-R!	R
Vallecitos	R	UA	UA	UA	R	MA	MA	M	R	M	M-PR#	PR-R!	R
Redondo	PR	UA	UA	UA	PR	MA	M	PR	R	M	PR-R#	R	R
South Mtn	PR	UA	UA	UA	PR	MA	M	PR	R	M-PR	PR-R#	R	R
Rabbit Mtn	R	UA@	UA@	UA@	R	R	R	R	R	R	R	R	R

Notes:

Current condition includes vegetation at the observation point.

* *Scenic conditions achievable without the benefit of vegetative screening at the observation point. UA=Unacceptable Alteration; MA=Marginally Acceptable; M=Modification; PR=Partial Retention; R=Retention. For definitions please see Glossary.*

** *Achieves next highest scenic condition when monotype pine plantation canopy covers 35% of opening. Length of time dependent on viewing angle.*

^ *Achieves next highest scenic condition when tree crowns begin to close, 20-30 years depending on viewing angle.*

\# *Achieves next highest scenic condition when planted trees reach 20% of adjacent stand height, approximately 20-25 years. Alternative 3 assumes a monotype pine plantation with trees planted at regular intervals.*

! *Achieves next highest scenic condition when opening assimilates characteristics of natural mountain meadows, in approximately 15 years.*

@ *Unacceptable Alteration until color contrast of pumice is covered with dark topsoil and grasses begin to become established, then Retention. The potential seen area from Rabbit Mountain is at the east end which is the starting block for the mine operation. With concurrent reclamation, this seen area will be undetectable years ahead of the final reclamation effort on the west end of the mine.*

management which is compatible with and does not impair the purposes for which the recreation area was established. Alternative 2 will reach a Retention scenic condition within 2-15 years depending on the observation point. The other action alternatives will take approximately 20 years or longer to reach the scenic condition of Retention. Achievable scenic conditions over time are summarized in Table 5 on the preceeding page.

Geology

All of the action alternatives would result in the mining of a substantial proportion of the El Cajete Pumice Deposit within the proposed mine boundary. The three-quarter of an inch and larger sized locatable pumice would be sorted out from the smaller sized common variety size and hauled to processing plants. The common variety pumice would be stockpiled and used later for reclamation.

Not all of the pumice deposit, however, within the proposed mine would be mined. An undisturbed layer of pumice above the underlying paleosol would be left intact to prevent the contamination of clean pumice with the clay and other minerals in the paleosol. Undisturbed pumice would typically be at least 5- to 10-feet deep and would be substantially deeper where variations in the topography to the underlying bedrock restrict the depth of the mine.

Common variety pumice would be placed in the mined area above the undisturbed pumice and reshaped to mimic the characteristic landscape. The final grade of the reclaimed mine area would be only an estimated 20 feet below the pre-mining elevation because the sorted material fails to compact to its original volume.

The presence of the remaining undisturbed pumice deposit and paleosol layers and replacement of the common variety pumice would retain much of the hydrogeologic function of the deposit. Hydrologic changes that would result from the proposed mining are discussed in the Ground Water section of this chapter.

Minerals

The Jemez NRA legislation recognizes pre-existing Congressionally conferred rights to access and mine on a properly claimed, valid, unpatented mining claim. Alternatives 1 and 1(a) approve the extraction of locatable minerals within the 83.5-acre El Cajete Mine as proposed by Copar Pumice Company.

Alternative 2 would be 25.5 acres smaller than the other action alternatives and would limit access to about 546,800 cubic yards of locatable pumice [1950 Memo; June 5, 1995]. The price for this pumice ranges from $20 to $30 per cubic yard [Classification Report; May 19, 1995].

Copar Pumice Company has proposed a 9.3-acre mine on mining claims outside of the East Fork of the Jemez River watershed and the Jemez NRA. The proposed South Copar Pit would be located about 3 miles south of the proposed El Cajete Mine within the Vallecitos Watershed. The proposed mine would provide common variety material for the company's customers and serve as an alternate source of locatable pumice in the event the Las Conchas Mine is depleted and approval of the proposed El Cajete Mine is delayed.

Effects of the South Pit Mine are disclosed in the **Environmental Assessment for the South Copar Pit Proposed Plan of Operation #1003-952.**

Forest Vegetation

Alternatives 1 and 1(a) would remove all forest vegetation on 83.5 acres of the proposed mine. Alternative 2 would remove 58 acres of forest vegetation. Most of the vegetation removed would be ponderosa pine saplings and poles remaining after the 1991 Bonito Timber Sale.

An estimated 241,000 board feet of merchantable timber from ponderosa pine, Douglas-fir and white fir trees larger than 9 inches in diameter would also be removed in Alternatives 1 and 1(a). In Alternative 2, merchantable timber volume from these species would drop to 84,500 board feet [El Cajete Mine EIS, Volume Estimates of Merchantable Timber; October 12, 1995].

Most of the merchantable timber removed would be stockpiled and scattered over the reclaimed mine site to provide an average of 5 logs per acre for wildlife habitat.

The action alternatives would also remove quaking aspen and various grasses, forbs and shrubs common as understory plants in this habitat type. Most of the slash generated by the clearing of forest vegetation would be retained in the top soil stockpiles and respread over the reclaimed mine to provide a future source of soil carbon.

The removal of forest vegetation would be an unavoidable adverse impact. Although forest habitat would be reestablished on the reclaimed mine site, the

loss of soil productivity would result in lower wood fiber and herbaceous vegetation production. These impacts would effectively be irreversible because of the long time period necessary for restoration of the site's productivity. The impacts, however, are not cumulatively significant to the surrounding forest because of the proposed mine's small size in relationship to total forest habitat in the watershed.

Alternative 3 would not remove any forest vegetation. Some of the 16 acres currently cleared of trees in the Integrated Forest Protection Demonstration Area would be replanted with ponderosa pine at various densities to determine the reinfection rate of shoestring root rot disease.

Integrated Forest Protection Demonstration Area

The 16-acre area within the proposed mine that was part of the Demonstration Area would be eliminated from future study. Data collected to determine the severity of root rot infection in comparison to the outward appearance of trees at this site would not be affected.

The second part of the research, however, which included planting the site and observing the root rot reinfection rate would not be possible because mining would alter soil profiles. This is an irreversible adverse impact that cannot be avoided. The investment of financial and manpower resources in the Demonstration Area at this site would be lost with the implementation of the action alternatives. Other parts of the Demonstration Area outside of the mine area would not be affected.

The 16-acre portion of the Demonstration Area would not be affected by Alternative 3 because the mine would not be approved. Planting of this site with various densities of ponderosa pine seedlings to study the reinfection rate of root rot could proceed as planned.

Livestock Grazing

Livestock on the North Jemez Pasture of the "V" Double Slash Grazing Allotment would be fenced out of the proposed El Cajete Mine during mining to prevent injury to livestock and permit the reestablishment of vegetation after reclamation. Livestock would be excluded for 3 to 5 years after revegetation to assure adequate establishment of grasses, forbs, shrubs, and ponderosa pine seedlings.

The total area to be fenced to exclude livestock would be about 170 acres in size in order to incorporate the highway right-of-way fencing and logical fencing boundaries in natural and man-made openings. The excluded area would be larger than the proposed 83.5-acre mine in order to reduce the number of fence crossings for migratory wildlife and the impacts to scenery created by fence clearing.

As mining and reclamation progresses and revegetation is determined to be sufficiently established, cross-fencing could be used to return the reclaimed area to livestock grazing. The excluded acreage would not significantly reduce the forage available for livestock in the North Jemez Pasture. Once the reclaimed area has been successfully revegetated the fencing would be removed and livestock grazing would be resumed.

Wildlife Habitat

The proposed 83.5-acre mine in Alternative 1 and 1(a) would affect habitat of wildlife species by structurally altering about 10 acres of mixed conifer, 61 acres of ponderosa pine, and 12.5 acres of grass and forb habitats. The 58-acre mine in Alternative 2 would impact 2 acres of mixed conifer, 43 acres of pine, and 12.5 acres of grass and forb habitats [2670 Memo: May 26, 1995].

Additional reclamation and mitigation requirements in Alternative 1(a) decreases the impacts to wildlife habitat in comparison to Alternative 1 by reducing the loss of soil productivity and accelerating the re-establishment of the wildlife habitat. Alternative 2 employs these additional requirements and further reduces the impacts because 25.5 fewer acres are disturbed.

In Alternatives 1, 1(a) and 2, wildlife within sight distance of the activity area would be disturbed by the presence of miners and mining equipment. Sound disturbance would be greatest within one-quarter of a mile of the mine. Sound disturbances could occur between a quarter and a half mile or more, however, the screening affect of the topography, vegetation, and wind would greatly diminish effects of sound.

The localized decline in habitat suitability is an unavoidable impact for species preferring young to mature forest habitat. These irretrievable impacts would persist for several decades until a young forest is reestablished. Over time as the habitat matures there would be a succession of wildlife species that would benefit from the various stages of forest succession that would result.

The localized habitat impacts from mining would not be cumulatively significant when added to the foreseeable public and private land management and development activities within the 41,700-acre East Fork of the Jemez River Watershed.

An assessment and evaluation of the effects of mining on listed threatened, endangered and sensitive species was conducted and submitted to the U.S. Fish and Wildlife Service for consultation. The **Biological Assessment and Evaluation of the El Cajete Pumice Mine** concluded that the project may effect, but would not likely cause adverse effects to the peregrine falcon, Mexican spotted owl, bald eagle, or their habitats [2670 Memos; November 1995].

Although impacts would be important to species currently occupying the site, the total area affected is small in comparison to the surrounding habitat within the watershed and would not be cumulatively significant.

Specific impacts to the habitat and species at and near the proposed mine would be as follows:

Common Wildlife Species

Common wildlife species that could be impacted by the proposed mine include Rocky Mountain elk, turkey, hairy woodpecker, mourning dove, and other migratory birds. Less common species include mule deer, black bear and mountain lion.

Mining and reclamation would cause sound and visual disturbance, removal of forage and cover vegetation, and increased human occupancy. Disturbance by mining activities would likely result in avoidance of the project area during the daytime and reduced forage availability and habitat security primarily within one-quarter mile of the mine. Habitat security, which is currently reduced by recreation use and traffic in this area, would increase with the closure of the access road after mining and reclamation.

The magnitude of these effects is limited to a localized decline in habitat suitability within one-quarter mile of the mining activity. The potential for this area's effectiveness as habitat is already reduced because the area is near Highway 4 and a residential area where disturbance to wildlife is frequent due to the sights and sounds of humans and pets.

The effects caused by the mine would persist within the mined area for several decades until a young forest is reestablished on the reclaimed mine.

Sensitive Wildlife and Plant Habitat

Alternatives 1, 1(a) and 2 would cause sound and visual disturbance to a number of wildlife species listed by the Southwestern Region of the Forest Service as sensitive. Sound impacts would be greatest within one-quarter mile of the mine during operating hours. These alternatives also structurally alter the habitat of these wildlife species. Mining is not approved in Alternative 3 and only existing impacts to wildlife due to human disturbance from highway, residential and recreation use would occur.

Northern Goshawk and Flammulated Owl

Sound, visual and structural alterations would result in localized decline in suitability of potential nesting, foraging and roosting habitats. The effects caused by this project would persist for the duration of mining and reclamation.

Mining may impact individual northern goshawks or flammulated owls but would not result in a trend toward federal listing or loss of viability of the population because the area is not located within established home ranges. Surveys for northern goshawks in 1995 and flammulated owls in 1989-1991 and 1995 did not locate either of these species within or near the project area.

Spotted bat, Occult Little Brown Bat and Other Sensitive Bat Species

Sound, visual and structural changes to bat habitats are similar to those of goshawks and owls.

Individual spotted, occult little brown, and other sensitive bats may be impacted, but impacts would not likely result in a trend toward federal listing or loss of population viability because bats are not particularly sensitive to human activities. The area would remain available for night-time foraging and potential roosting habitat in rock outcrops and wetland habitat located within the canyon north of the mine would not be impacted.

Jemez Mountain Salamander

The proposed mining would not impact the Jemez Mountain salamander because pumice deposits

are not considered suitable habitat for this species. No salamanders were located during surveys of the area.

Wood Lily

Mining would not impact wood lilies because no wood lilies have been located during inventories of the area. The area does not contain upper white fir or lower spruce-fir habitats preferred by this species.

New Mexico Jumping Mouse and Say's Pond Snail

Mining would not likely lower the potential of the wetland and intermittent spring to provide habitat for jumping mice and pond snails because disturbance from mining would be several hundred feet from these habitats. In addition, jumping mouse activity normally occurs at night when mining has ceased. Surveys conducted in the wetland did not locate Say's pond snail.

Threatened and Endangered Species Habitat

The proposed 83.5-acre mine in Alternative 1 and 1(a) and 58-acre mine in Alternative 2 would structurally alter potential foraging and roosting habitats of the threatened Mexican spotted owl. The proposed mine, however, is not within designated critical habitat of the threatened Mexican spotted owl or the sensitive habitats of other endangered species.

In Alternatives 1, 1(a) and 2, wildlife within sight distance of the activity area may be disturbed by the presence of miners and mining equipment. Sound disturbance would be greatest within one-quarter of a mile of the mine. Beyond one-quarter of a mile disturbance would be reduced by attenuation of sound, masking by wind, and the barrier effects of topography and vegetation.

Mexican Spotted Owl

Alternative 1 and 1(a) would cause sound and visual disturbances and structural alterations to about 50 acres of potential roosting habitat that is located within one-quarter mile of the mine. Of this 50 acres, about 26 acres would be structurally altered by the mining operation. In Alternative 2, about 16 acres would be structurally altered.

Sound and visual disturbance and structural alteration would likely result in avoidance of the potential roosting habitat within one-quarter mile of the mine and would result in a localized decline in habitat suitability.

Mining and reclamation activities may effect, but would not likely adversely effect, the Mexican spotted owl and potential roosting habitats.

American Peregrine Falcon and Bald Eagle

Mining and reclamation would have similar sound, visual and structural impacts on potential falcon and eagle habitats as the Mexican spotted owl and

Table 6. Sound Levels Audible from the Center of the Proposed Mine

Distance from Sound	Level of Sound	Remarks
50 feet	90 dBAs	Hearing damage may occur with 8 hours of exposure at this level. Most people are annoyed at this level.
100 feet	84 dBAs	
200 feet	78 dBAs	
400 feet	72 dBAs	
800 feet	66 dBAs	
1,600 feet	60 dBAs	Forest Trail 137
3,200 feet	54 dBAs	Nearest Los Pinos Subdivision residence

would result in a localized decline in the suitability of potential foraging and roosting habitats primarily within one-quarter mile of the mine until reclamation is completed.

Because the mining operation is not within or near suitable nesting habitat, it would not likely have direct, indirect, or cumulative effects to nesting peregrine falcons. Directly, peregrine falcon that might forage in East Fork Canyon or other areas near the project area and haul route hear sounds produced by heavy equipment. Due to the screening affect of forest vegetation, topography, and wind, sound disturbances would be absorbed or attenuated mostly within a quarter mile from the project area. Some sounds could reach a half mile or more from the project area. These limited direct affects would not likely modify the behavior of peregrine falcon along the East Fork Jemez River. Even though effects would be minor and insignificant, they would result in a may effect, not likely to adversely effect for the peregrine falcon.

Because bald eagles are not known to nest in the Jemez Mountains, the project would not likely have direct, indirect, or cumulative effects to nesting bald eagles. Regarding the occasional use of the project area as foraging and/or migration habitats, the project could cause limited direct effects as a result of sound disturbances primarily within a quarter mile of the project. Bald eagles may avoid roosting or foraging in the area within a quarter mile of the project area during mining activities. Within a quarter mile of the project, the screening affect of forest vegetation, topography, and wind would mostly absorb or attenuate the mining sounds. Indirectly, the area greater than a quarter mile from the project area would be available and relatively undisturbed as roosting or foraging habitat.

The project would cause slight direct and cumulative affects resulting from the clearing of about 16 acres of potential roosting habitat and sound disturbance to about 150 acres of potential roosting habitat within a quarter mile of the project area.

As a result of the direct and cumulative affects, this project may effect but is not likely to adversely effect the bald eagle. There are alternative roosting sites that are greater than a quarter mile from the project.

Sound

Sounds from mining would occur Mondays through Friday, holidays excluded, for up to 10 hours per day for about 250 days each year.

Sound impacts are commonly evaluated according to the extent federal, state or local sound regulations are exceeded or the degree of disturbance to people can be estimated. Since there are no specific disturbance regulations for the mine area, the degree of annoyance becomes a key factor in evaluating sound effects.

Mining equipment produces about 90 dBAs of sound. Background forest sounds are at the 40 dBA level. About 65 dBAs are considered an acceptable level for residential areas. A general guideline used to compare sound levels to level of community annoyance indicates more than 70 percent of a community would be annoyed at 90 dBAs of sound while only 20 percent would be annoyed at a level of 65 dBAs. Less than 3 percent would be annoyed at 40 dBAs [Alaska Helicopter Tours Sound Measurements; June 1994].

Sound decreases 6 dBs with the doubling of the distance from the source. Table 6 displays the sound level audible at various distances from the center of the mine area.

The sound levels displayed do not take into consideration absorption of sound by the mine wall, terrain or vegetation, nor the masking effects of forest and residential sounds. The 30-80 foot high wall of pumice that develops as the mine deepens would have the most effect in absorption of sound. Absorption of sound by forest vegetation and the sound of wind in the trees would also significantly reduce a listeners ability to hear mining equipment in operation.

The greatest effect to residents would occur when the mine has progressed to its western end, and mining equipment is operating at or near the existing ground level. The closest resident in the Holt Tract, at about 400 feet from the west end of the mine, would hear 72 dBAs of sound assuming no absorption or masking of sound. The closest Sierra Los Pinos Subdivision residents are more than twice this distance and would hear about 66 dBAs of sound. Once the mine reached a depth of 20 feet in this area, the amount of sound audible would be significantly reduced.

Other residents living within 800 feet of Highway 4 would be more aware of the sounds generated by haul trucks on the highway than by the mining equipment because the highway is on the ridge between the mine and most of the residences.

The unavoidable adverse impact of sounds from mining and hauling pumice would irretrievably detract from the solitude that some recreation users and residents seek when visiting or living in the area near the proposed mine. Sound impacts, however, are not considered significant by themselves or cumulatively with other traffic and residential sounds because sound levels would be below levels considered acceptable for residential areas and audible only during operating hours on days with little wind.

Air Quality

Some residents expressed concern that pumice mining would produce dust at levels that could be harmful to their health. Production of dust and health effects are under the jurisdiction of the New Mexico Environment Department.

The Environment Department regulates dust emissions through a permit system that requires control of dust emissions with water spraying when on-site opacity reaches 10 percent. Dust from haul roads must also be controlled with water spraying, a stabilizing agent, or paving material [Air Quality Permit No. 899-M-1; May 4, 1992].

The Las Conchas Mine Screening Plant, which will be moved and used at the proposed El Cajete Mine, has been permitted by the Environment Department to operate at a 400 ton per hour production rate. At the current 250 ton per hour rate of operation, dust emissions from the plant have not required control.

Testing as part of the permit issuance and monitoring processes reveals opacity to range between 0 to 5 percent and is well within the 10 percent limit prescribed by the air quality permit. Moisture content of the pumice during testing ranged from nearly 52 to 59 percent which is high for a mineral material [1950 Memo; July 31, 1995].

Dust emissions are low because pumice has an excellent water holding capacity. [Water Holding Capacity and Water Movement-Tufflite vs. Sand; April 27, 1990]. As a consequence, dust production from pumice mining is very low in comparison to sand and gravel or other minerals.

Dust emissions would be an unavoidable adverse impact that would irretrievably reduce the air quality within the vicinity of the screening plant. This impact is not considered significant by itself or cumulatively with other dust sources such as dirt roads since the emissions are well within State regulated limits and would be permitted under a State air quality permit.

Residential Property Values

Some residents and landowners of the neighboring residential tracts expressed concern that mining on the nearby Santa Fe National Forest may reduce their property values.

The Forest Service's Southwestern Region realty specialist indicated this concern could not be evaluated in detail because it is dependent upon an activity that has yet to occur and on future market factors that are difficult to predict. Only long-term monitoring of prices in relationship to mining and market factors would be able to document a change in property values.

Furthermore, the realty specialist was not aware of any documented decline of property values because of mining on neighboring National Forest lands and pointed out that case law regarding changes in zoning on private lands from residential to commercial use is inconclusive. Uncertainty over the impacts of mining, however, might increase the length of time required to sell a property [1950 Memo; November 5, 1992].

A realtor who is selling homes and land on the private tract closest to the proposed mine reports properties are selling and prices have increased during the past several years despite his written notification that mining may occur nearby [Ron Brown Reality; January 25, 1995]. The developer who lives closest to the mine and is constructing other houses for sale has stated he is not concerned with the mine as long as it is several hundred feet from the property and will be reclaimed [1950 Memo; January 8, 1993].

Highway and Mine Safety

Jurisdiction for highway safety is held by the N.M. Department of Public Safety and the N.M. State Highway and Transportation Department. The U.S. Department of Labor's Mine Safety and Health Administration has jurisdiction over the safety of mines.

The Mine Safety and Health Administration reports that typical surface mining hazards result from high wall failure and accidents involving moving vehicles or machinery. The agency reports Copar Pumice Company's Las Conchas Mine has been operating safely and no accidents have occurred [1950 Memo; August 2, 1995].

The Highway and Transportation Department does not have regulatory authority to limit the length of tractor-trailer trucks on highways. Tractor-trailer trucks are

limited by weight under the agency's regulatory authority to meet the design criteria for State highways. Lower weight limits for Highway 4 could be established by the State. The State Highway and Transportation Department's position, however, is that the highway was designed and constructed to facilitate commerce at the current weight limits. Lower weight limits, which would have to be applied to all vehicles, could unnecessarily limit commerce [1950 Memo; July 30, 1995].

Lower weight limits would not necessarily result in the use of smaller trucks and would increase the number of trips needed to haul the same amount of material.

The round trip mileage from the proposed mine to processing plants in either Espanola or San Ysidro is 75 miles. Each trip, including travel time and loading and unloading, takes 2 hours to complete. At the projected 40 truck trips per day during 250 days per year for the 10-year period of operation, an estimated 7,500,000 miles would be traveled. At this rate, trucks would be spaced an average of 13.5 minutes apart [1950 Memo; October 18, 1995].

According to U.S. Department of Transportation statistics, the average rate of truck accidents is 0.28 accidents per million miles traveled [Draft EIS Carlota Copper Project; January 1995]. At the projected 7.5 million miles, the expected accident rate would be 2.1 accidents during the proposed mine's operation.

The unavoidable adverse impacts of pumice hauling from the El Cajete Mine would maintain the existing level of mining traffic, the potential for accidents, and wear and tear on Highway 4. These effects, however, are within the design limits of the highway and are small in comparison to the average 2,000 or more vehicles per day on the highway.

Economic Impacts

The proposed El Cajete Mine in all action alternatives would have an estimated annual gross sales of $800,000 to $1,500,000 assuming costs of production and sale prices remain the same and the proposed mine's production matches the 1993 to 1995 Las Conchas Mine production of 40,000 to 50,000 cubic yards garment finishing pumice. Employment of 28 full-time and 2 part-time workers, currently employed by the Las Conchas Mine, would likely continue at this production level.

Alternative 2 reduces the total volume of pumice available for mining by an estimated 546,800 cubic yards as a result of reducing the size of the proposed mine from 83.5 acres to 58 acres. The length of time the proposed mine would operate would be shortened and economic and employment benefits from the mine would decline proportionately.

Implementation of Alternative 3 would not approve the proposed El Cajete Mine. Once the Las Conchas Mine is depleted and reclaimed in 1996, there would be no production, sales or employment from pumice mining.

Economic impacts from sales, taxes and employment from mining in all action alternatives would increase significantly and benefit the local economy if Copar Pumice Company's projected production of nearly 170,000 cubic yards of pumice at the proposed El Cajete Mine is produced. This volume is more than 4 times the current production at the Las Conchas Mine.

Specifically Required Disclosures

Effects on Threatened and Endangered Species and Critical Habitat

There are no known adverse impacts to any federally listed threatened and/or endangered species or critical habitat, as defined by the Endangered Species Act, as a result of the El Cajete Mine.

Effects on Prime Farm, Range and Forest Land

The mine area would not impact prime farm and range lands as defined by the Secretary of Agriculture Memorandum 1827. "Prime" forest land definitions do not apply to National Forest System lands.

Energy or Depletable Resource Requirements and Conservation Potential

There are no unusual energy or depletable resource requirements or conservation potential for implementing any of the alternatives.

Effects on Wetlands and Floodplains

Wetlands and floodplains would not affected by the mine.

V. List of Preparers

Interdisciplinary (ID) Team

Name and Position	Education and Experience	Involvement
Crostic, Bob Jemez District Recreation/ Lands/Minerals Staff	B.S. and M.S. Forest Recreation, Utah State University, Jemez District Rec/Lands/Minerals Staff 11 years; Other District R, L & M Staff 12 years; Forest Planning 4 years.	ID Team Leader EIS Writer/Editor Recreation Situation and Analysis.
Mielke, Claudia Santa Fe National Forest Landscape Architect & Assistant Recreation Staff	B.S. Natural Resource Planning & Analysis, University of Wisconsin-Madison. Santa Fe National Forest Landscape Architect & Assistant Recreation Staff 5 years; Landscape Architect & Asst. Rec. Staff for 11 years on 2 districts and 4 forests.	ID Team Member Scenery Situation and Analysis FEIS Coordinator
Phillips, John Jemez District Range, Soils & Watershed Assistant	B.S. Range Science, N.M. State University. Three years District Range Conservationists. Three years Southwestern Regional Soils Survey and former District Soils Scientist.	ID Team Member Range, Soils & Water Situation & Analysis
Raish, Carol Jemez District Archeologist	B.A. Spanish & French, Washburn Univ.; M.A. Archeology, University of Nebraska; Ph.D. Archeology, Univ. of New Mexico. former Jemez District Archeologist; FS field and lab project director, 4 years; National Park Service, archeologist/editor, 2 years.	ID Team Member Heritage Resource
Sanchez, Juan Jemez District Range, Wildlife, Soils & Watershed Staff	B.S. Wildlife Management, Eastern N.M. Univ.; M.S. Wildlife Science, N.M. State University; Two years Biologist, U.S. Fish & Wildlife Service; 7 years Forest Service District Wildlife Biologist & Range Staff	ID Team Member Threatened & Endangered Sps. Situation and Analysis
Sims, Bruce Santa Fe National Forest Hydrologist	B.S. Education, Univ. of Texas; M.Ed., Univ. of Arizona; M.S. Watershed Management, University of Arizona. Twenty years in watershed management—16 years Forest Service. Former Santa Fe National Forest hydrologist.	ID Team Member Ground Water Situation & Analysis
Tafoya, Diane Santa Fe Natioal Forest Geologist	B.A. Geology, University of New Mexico. Two years F.S. District Geologist & 4 years Santa Fe National Forest Geologist.	ID Team Member Geology and Minerals

Other Contributors

Bergeron, Ray—Santa Fe National Forest Mining Claims Examination Geologist.

Krausmann, Bill—Southwestern Regional Office computer graphics support

Linden, Michael—Southwestern Regional N.M. Zone Mineral Examiner.

McWilliams, Steve—Santa Fe National Forest hydrologist as of May 1996.

Scheier, Charles—Southwestern Regional Appraiser.

Skinner, Rita—Santa Fe National Forest, Jemez Ranger District Archeologist as of July 1995.

Stewart, Buddy—Southwestern Regional Office Economics Group Leader

Suazo, Ray and Sandoval, Al—Santa Fe National Forest computer graphics support.

VI. List of Agencies, Organizations and Persons to Whom Copies of the Final EIS Are Sent

Copies of the Final EIS are available for review at the following Forest Service offices:

Supervisor's Office
Santa Fe National Forest
1220 St. Francis Drive
Santa Fe, New Mexico

Santa Fe National Forest
Coyote Ranger District
Coyote, New Mexico

Santa Fe National Forest
Los Alamos Area Office
475 20th Street, Suite B
Los Alamos, New Mexico

Santa Fe National Forest
Cuba Ranger District
Cuba, New Mexico

Santa Fe National Forest
Espanola Ranger District
222 Los Alamos Highway
Espanola, New Mexico

Santa Fe National Forest
Pecos-Las Vegas Ranger District
Pecos, New Mexico

Supervisor's Office
Cibola National Forest
Land Mgmt. Planning
2113 Osuna Rd. NE,
Suite A
Albuquerque, New Mexico

Supervisor's Office
Carson National Forest
Land Mgmt. Planning
208 Cruz Alta Road
Taos, New Mexico

USDA Forest Service
Southwestern Regional Office
Ecosystem Analysis and Planning
517 Gold Avenue, SW
Albuquerque, New Mexico

USDA Forest Service
Washington Office
Director, Environmental Coordination
Head, Acquisitions and Serials Branch
Auditors Building, 201 14th Street, SW
at Independence Avenue, SW
Washington, DC

Copies of the Final EIS were sent to the following government agencies, organizations and individuals:

Federal Agencies

U.S. Council on Environmental Quality.

U.S. Department of Army; Corps of Engineers, Albuquerque District.

U.S. Department of Interior; Bureau of Land Management, N.M. State Office.

U.S. Department of Interior, Bureau of Mines.

U.S. Department of Interior; National Park Service, S.W. Region and Bandelier National Monument.

U.S. Department of Interior; Bureau of Indian Affairs, Albuquerque Area Office, Southern Pueblos Agency and Northern Pueblos Agency.

U.S. Department of Labor; Mine Safety and Health Administration.

U.S. Environmental Protection Agency; Region IV.

U.S. Fish and Wildlife Service; Regional Office & Ecological Services Office.

State Agencies

N.M. Department of Game and Fish; Director & Conservation Services Division

N.M. Economic Development Department, Gary Bratcher

N.M. Environment Department; Office of the Secretary, Mining Coordinator, Air Pollution Control Bureau & Surface Water Quality Branch

N.M. Energy, Minerals and Natural Resources Department, Mining and Minerals Division, Mining Act Reclamation Bureau & Institute of Mining and Technology

N.M. Governor's Office

N.M. Office of Cultural Affairs, Historic Preservation Division

N.M. Transportation and Highway Department; Office of the Secretary and District 5 and 6 Engineers

N.M. Attorney General, Tom Udall

Elected Officials

U.S. Congressman Bill Richardson

U.S. Congressman Joe Skeen

U.S. Congressman Steven Schiff

U.S. Senator Pete Domenici

U.S. Senator Jeff Bingaman

N.M. State Legislator Jeanette Wallace

Local Government

City of Espanola

Los Alamos County Council

Rio Arriba County Commission

Sandoval County Commission

Village of Jemez Springs

Village of San Ysidro

American Indian Pueblos, Tribes and Organizations

All Indian Pueblo Council

Eight Northern Indian Pueblos

Five Sandoval Indian Pueblos

Pueblo of Cochiti

Pueblo of Jemez

Pueblo of Nambe

Pueblo of Pojoaque

Pueblo of San Ildefonso

Pueblo of San Juan

Pueblo of Santa Clara

Pueblo of Santo Domingo

Pueblo of Tesuque

Pueblo of Zia

Jicarillo Apache Tribe

Navajo Tribe

Libraries

Albuquerque Public Library

Bernalillo Public Library

College of Santa Fe Library

Corrales Public Library

East Mountain Library

Espanola Public Library

Highlands University Library

Jemez Springs Community Library

Mesa Public Library in Los Alamos and White Rock

New Mexico Institue of Mining and Technology Library

New Mexico State Library

New Mexico State University Library

Rio Rancho Public Library

Santa Fe Public Library

Santa Fe Community College Library

St. John's College Library

University of New Mexico Library

Organizations and Businesses

Albuquerque Journal North

Amigos Bravos

Copar Pumice Company

East Fork Preservation Coalition

Forest Conservation Council

Forest Guardians

Jemez Thunder

LightHawk

Los Alamos Monitor

Mission Mining, Inc.

Montgomery and Andrews, Gallen Buller

New Mexico Citizens for Clean Air & Water, Los Alamos Chapter

New Mexico Cross Country Ski Club

New Mexico Environmental Law Center

New Mexico Forestry Counsel

New Mexico Mountain Club

New Mexico Natural History Institute

New Mexico Trout

New Mexico Wildlife Federation

Public Land Users Association, Wayne Parker

Riverway

Robert Colpitts

Sangre de Christo Audobon Society, Tom Jervis

Santa Fe Forest Watch

Santa Fe Forestry Council

Santa Fe New Mexican

Save the Jemez, Tom Ribe and Dr. Ted Davis

Sierra Club, Rio Grande Chapter—Albuquerque and and Santa Fe Groups

Sierra Los Pinos and Vallecitos Land and Home Owners Association

Southwest Center for Biological Diversity

State Trust and Public Lands

Thompson Ridger Property Owners Association, K. J. Leibee

Individuals

Frederick App
Michele Altherr
Rudolfo Anaya
William W. Anderson
David & Joysree Aubrey
Don Bartol and Monique Casiano
Jan Bandler
David Barfield
Larry and Dorothy Beatty
Joel Bennett
Martha Bogert
Mike Blair
Francis Boone
Ron Brown
Stephen Bull
Margaia Forcier-Call
Sue Campbell
Mary and Lew Caldwell
David Carlson
Becky and Jesse Christman
Bradley Cooke
Harold Corn
Therese Councilor
Richard L. and Joyce E. Crabb
Norton and Ruth Mary Crowell
Lisa Cummings
Ana, Bill and Sharyn Davidson
Charles and Mary Davies
Barbara DeMarsh
G. Wayne & DeeAnn DeMill
David Dixon
Lawrence & Margaret Dominguez
John Mark and Neva Jo Doub
Fred and Brenda Edeskuty
Marge Fraser
Martha Ann Freeman
Robert French
Dr. Edward Flynn
Elizabeth Fuller
Gary Glatzmaier
Paul Johnson and Donna Goad
Eda Gordon
John Halper
Dr. Jerry Hoffer
John Hogan
Andrew Davis and Dee Homans
Bruce Hoselton
Mary Humphrey
Jasper and Betty Jackson
Brian and Elaine Jacobs
Abe Jacobson
Max Jenson
Terry and Jennifer Johnson
Jean and Llewellyn Jones
Judy Kilburg
Karla Kuyuca
Steven J. Lambert
Glenn Larson
Mr. and Mrs. Eric Larson
Mr. and Mrs. Bobby Laskie
Richard Lass
Joseph LeFevers
Manuel L'Esperance
Melvin Leon
Nathan Lyon
John Marr
Diane Martin
Mr. and Mrs. Paul Martinez
Jacalyn McAdam
Jim McClary
Thomas McKeever
Stephen & Colleen Meyer
Laura Mijeras
Liz Mikols
Carol Mooney

Jeff & Mary Moore
Kurt Moore
Ron Morgan
Marilyn Norcini
Neal Olcott
Chuck Ouray
Benedict Pope
David A. Ponton
Jean and Tom Payne
Betty Perkins
John Phillips
David Richerson
Erma Ruth
Allen and Mardell Schmiedicke
Don Schrader
Louis Scofield
Bob & Sue Sebring
Mario Schillaci
Phillip Shultz
Brad and Sabine Shurter
John & Virginia Shurter
Bruce Sims
Elwood H. & Winifred A. Smith
Thomas Lyttle & Donna M. Smith
Conrad Soltero
Beverley Spears
Suzanne Star
Cathy Renee Stanhope
Ara Stevens
Tanya Struble
Jeanette DePriest-Tag
Craig and Linda Taylor
James and Elizabeth Terrell
David Torney
Harold and Lynn Trease
John Troxell and Glenda McGrath
Ray Trujillo
Royce & Pat Tyler
Mimi Voegelin
Noel Bennett & Jim Wakeman
Sydney Walter
Mr. and Mrs. Joseph Whelan
Kent Wolford
Carol Wolvington
John Zinn

VII. References

The references listed below are cited within this document and are available in the project record. The project record also contains additional information, maps, records and memos related to this project. The project record is available for public review in the Santa Fe National Forest Supervisor's Office.

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Glossary

A

Affected environment: The physical, biological, social and economic environment within which a human activity is proposed.

Aquifer: A body of rock that is sufficiently permeable to conduct ground water and to yield economically significant quantities of water to wells and springs.

B

Background view: The view beginning 3-5 miles from the observer and extending as far as the eye can detect objects. Patterns of vegetation are evident but texture and detail perceived is weak to nonexistent.

Best Management Practices: Forest Service management actions and mitigation measures which are designed to minimize adverse effects and maintain water quality by preventative rather than corrective measures.

Biological assessment (BA): A "biological assessment" is conducted for major Federal construction projects requiring an environmental impact statement, in accordance with legal requirements under Section 7 of the Endangered Species Act (16 USC 1536c). The purpose of the assessment and resulting document is to determine whether the proposed action is likely to affect an endangered, threatened, or proposed species (2670.512 FSM). The biological assessment is in the process record.

Biological evaluation (BE): A documented Forest Service review of Forest Service programs or activities in sufficient detail to determine how an action or proposed action may affect any threatened, endangered, proposed, or sensitive species (2670.512 FSM). The biological evaluation is in the process record.

Board foot: A unit of lumber measurement equal to one foot square by one inch thick.

C

Caldera: A large circular depression formed by the collapse of a volcano into the space created by the explosion of the underlying magma chamber. The 13-mile wide diameter of the Valles Caldera of the Jemez Mountains was created by a volcanic eruption 1.1 million years ago.

Characteristic landscape: The land and water forms and vegetation that compose the features of a landscape.

Cenozoic Era: Span of geologic time between 60 million years and the present. Follows the Mesozoic Era.

Clearcut harvest: The harvest of all standing trees in one cut for the purpose of growing a new even-aged stand.

Cold water fishery: Stream and lake waters which support cold-water fish, such as trout, which have a maximum sustained water temperature tolerance of about 70 degrees Fahrenheit.

Common variety minerals: Minerals which are generally common and have a lower economic value such as sand, gravel, rock, cinder, pumice and clay. Synonymous with mineral material.

Contour furrow: A mound of soil and associated trench constructed along a slope at points of equal elevation. The trench is several inches to one foot deep and allows for water retention and greater infiltration time.

Critical habitat: Habitat that is present in minimum amounts and is the determining factor in the potential for population maintenance and growth.

Cumulative impact: The incremental effect of all actions, including federal and non-federal agencies and private parties, when added to other past, present, or reasonably foreseeable future actions of such agencies and parties. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time. Synonymous with cumulative effect.

D

dBA: The sound pressure level in decibels measured with a frequency-weighing network corresponding to the A-scale on a standard sound level meter. The A-scale suppresses low frequency sounds humans do not hear.

Decibel (dB): A unit used in expressing the relative loudness of sound.

Developed recreation: Recreation that requires campgrounds and picnic grounds or other developed facilities provided for concentrated public use.

Direct effect: An effect caused by an action that occurs at the same time and place. Synonymous with direct impact.

Dispersed recreation: Recreation which occurs outside of developed facilities. Examples include driving for pleasure, viewing scenery, cross-country skiing, gathering firewood and hiking.

Dwarf mistletoe: A parasitic plant which occurs on ponderosa pine that can seriously retard growth and kill young trees.

E

Ecosystem: The functional units formed by plant and animal communities as they interact with their physical environment.

Elk Wallow: Shallow pool of water and mud used by bull elk in the rutting season to roll.

Endangered species: A plant or animal listed as such in the Federal Register by the U.S. Fish and Wildlife Service under provisions of the Endangered Species Act which is in danger of extinction throughout all or significant portion of its range.

Environmental analysis: An analysis of the predictable short- and long-term environmental effects resulting from the implementation of an action and its alternatives.

Environmental effects: Direct, indirect and cumulative effects relative to physical, biological, economic and social factors that result from the implementation of an action.

Environmental Impact Statement (EIS): A detailed written statement disclosing environmental effects which would be expected to result from a proposed action and its alternatives.

Erosion: The detachment and movement of soil and rock by water, wind and gravity. Sheet erosion occurs when runoff removes a fairly uniform layer of soil without developing rills or gullys. Rills and gullys are small and large channels, respectively, that often develop during high runoff events.

Erosion potential: The ranking of a soil's potential to erode.

Evapotranspiration: The process by which water in rain and snow is returned to the atmosphere through evaporation from the soil and vegetation surfaces or plant transpiration.

F

Filter fence: Usually straw bales or filter cloth used to reduce the force of runoff and filter out sediment. Straw bale dams are used in drainages or gullys or as baffles in contour furrows. Filter cloth is used for areas subject to sheet erosion.

Forage: All non-woody plants used for food by wildlife and domestic livestock.

Forb: Any herbaceous broad-leafed, flowering plant other than grass that does not produce a woody, persistent above ground stem.

Foreground: The portions of a view between the observer and up to one-half mile distant where objects are perceived in detail.

Forest Plan: A land and resource management plan that defines land use allocations and standards and guidelines for managing the Santa Fe National Forest.

Forest road: Road that is part of the Forest Transportation System.

Forest trail: Trail that is part of the Forest Transportation System.

Fugitive dust: Dust particles suspended in the air from screening plants, excavation, roads and other sources.

G

Ground water: Subsurface water in the part of the geologic stratum that is completely saturated.

H

Habitat: The environment occupied by a plant or animal or community of plants or population of animals.

Headwaters: The upper tributaries of a stream.

Heritage resource: The tangible and intangible aspects of culture, living and dead, that are valued by a given culture or contain information about the culture. Heritage resources include, but are not limited to, sites, structures, buildings, districts, objects and artifacts associated with or representative of people, cultures and activities or events.

Hydrogeology: The study of the properties and interrelationship of the hydrology and geology of the area. Hydrology is the study of terrestrial water, in particular inland water before its discharge into the oceans or evaporation into the atmosphere. It includes the study of the occurrence and movement of water and ice on or under the earth's surface. Geology is the study of the origin, structure, and composition of the earth. It is commonly subdivided into historical and physical.

Hydrologic function: The ability of a watershed to sustain favorable quality, quantity and timing of water flow.

I

Igneous rock: Rock that solidified from molten or partly molten magma.

Immediate foreground: The view ranging from 0 to 330 feet where objects can be perceived in detail.

Indirect effect: An effect that is caused by an action that occurs later in time or is removed in distance from the action but is still reasonably foreseeable. Synonymous with indirect impact.

Infiltration: The movement of water into the soil or porous rock.

Interdisciplinary Team: A team with skills from different resources assembled to adequately identify and resolve issues and conduct an environmental analysis.

Intermittent stream: A stream where the duration of flow is extended beyond the immediate response to precipitation by shallow ground water storage. Flow is frequently absent in dry seasons or within dry segments between continuously flowing segments.

Inter-visible distance: For boundary and warning signs around the exclusion fence for the proposed El Cajete Mine, the distance from which an observer standing at one sign can see the next sign along a boundary. The intent of inter-visible signing is to adequately notify recreation users that encounter the exclusion fence the prohibition and danger involved in entering the area.

Irretrievable resource commitment: An allocation decision or action causing a loss of production or the use of a natural resource. Usually applies to renewable resources. In economics, an opportunity foregone. For example: In timber harvesting, the current production of board foot volume would be irretrievably lost when mature trees are harvested. The loss however, is not irreversible because young trees would be established and production would be gradually restored over time.

Irreversible resource commitment: An allocation decision or action causing permanent loss of a resource or opportunity. Usually applies to the effects of use of nonrenewable resources, such as minerals or heritage resources, or to those factors such as soil productivity that are renewable only over long periods of time.

Issue: A point of discussion, debate or dispute about environmental effects.

J

Jurisdictional wetland: A wetland area identified and delineated by specific technical criteria, field indicators and other information for purposes of jurisdiction by the U.S. Army Corps of Engineers (COE), U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service or the U.S. Natural Resources Conservation Service.

K

Key Observation Point: An observer position used to determine the visible area.

L

Livestock grazing: The grazing of cattle or other domestic livestock under a grazing permit issued by the Forest Service for a particular range allotment.

Locatable mineral: Minerals which may be claimed by posting and filing mining claims under the General Mining Law of 1872, as amended. Locatable minerals may be metallic or nonmetallic minerals or uncommon varieties of mineral materials. Public Law 167, which amended the Mining Law in 1955, defined block pumice and uncommon varieties of mineral materials as locatable. Block pumice is pumice larger than 2 inches in any one dimension. Uncommon varieties of mineral materials are mineral materials which are valuable because the deposit has some property giving it distinct and special value.

Long-term effects: Environmental effects that persist for more than 10 years after implementation of an action.

Lop and scatter: The process of cutting off and scattering branches and tops of felled trees to get the wood in contact with the soil for the purposes of speeding up the rotting process.

M

Magma: Molten rock within the earth's crust which when cool forms lava, tuff, ash, pumice, obsidian glass, basalt, rhyolite and other igneous rocks.

Management Area: A contiguous area of land delineated by the Forest Plan that has a common management emphasis, direction and standards and guidelines for attaining multiple-use goals and objectives.

Management indicator species: A plant or animal identified in the Forest Plan whose presence is a sign that particular environmental conditions are also present. Indicator species are used to monitor the effects of management actions on habitat.

Mesozoic Era: Span of geologic time between 230 to 62 million years. Follows the Paleozoic Era and precedes the Cenozoic Era.

Middleground: The view of a landscape between the foreground and the background views. The middleground view generally ranges from one-half mile to 3 to 5 miles from the observer.

Mineral entry: The right under the General Mining Law of 1872, as amended, to enter non-withdrawn public domain land and explore for, extract, and sell locatable minerals.

Mineral lease: A lease for oil and gas, geothermal or other leaseable minerals under various laws of the United States.

Mineral material: See common variety mineral.

Mineral withdrawal: Public lands with unique features which are valued by the public or are needed for administrative purposes that are withdrawn from mineral entry under the mining and/or leasing laws.

Mining claim: That portion of the public estate held for mining purposes in which the right of exclusive possession of the locatable mineral deposit is vested in the locator of the deposit.

Mitigation measures: Actions designed to avoid, reduce, eliminate or compensate for adverse effects.

Mixed-conifer: A mixture of ponderosa pine, Douglas-fir, white fir, limber pine, and occasionally Engelmann or Blue Spruce. Ponderosa pine constitutes less than 50 percent of the mixture.

Monitor: To systematically observe or measure environmental conditions in order to track changes.

Motorized recreation: Recreation use that includes motor vehicles such as motorcycles, all-terrain vehicles, snowmobiles, trucks or cars as an integral part of the experience.

Mulching and hydro-mulching: The spreading of straw over the prepared seed bed for the purpose of increasing soil moisture and reducing ground temperatures to protect germinating grass, forb and shrub seedlings. Machine crimping is used to prevent the straw from blowing away. Hydro-mulching utilizes a slurry of water, straw and binding agent that is sprayed over the seed bed.

N

Native species: Plants that originate or are naturally occurring in that area.

NEPA: The National Environmental Policy Act of 1969 that established the policy, goals and process for protecting the environment.

No Action Alternative: A required alternative in the NEPA process that involves no change from current conditions since the proposed action is not implemented.

Non-motorized recreation: Recreation use which does not employ motor vehicles as an integral part of the experience. Examples are hiking, horseback riding, cross-country skiing, and mountain biking.

Nutrients: Essential chemicals needed by plants for growth and health.

O

Opacity: An ocular estimate of the relative density or opaqueness of a dust plume.

P

Paleosol: Prehistoric soil.

Paleozoic Era: Span of geologic time ranging from about 470 to 230 million years. Follows the Precambrian Era and precedes the Mesozoic Era.

Patent application: Process through which a person applies to the Federal Government to have granted all surface and locatable mineral rights to a mining claim. Patented mining claims become private land.

Plan of Operations: Under 36 CFR 228.4, prospective mineral operators are required to submit a Plan of Operation that outlines: name and address of the operator; location of the proposed mine; and information sufficient to describe the type of mining proposed, standard of roads, means of transportation, period of operation, and measures to be taken to meet the requirements for environmental protection.

Plinian: An explosive, high velocity volcanic eruption producing a steady stream of fragmented magma and gas.

Potential habitat: Plant and animal habitat that could be occupied at a future date.

Precambrian Era: Span of geologic time ranging from 2.5 to 0.6 billion years. Precedes the Paleozoic Era.

Preferred Alternative: The alternative recommended by the Forest Service for implementation.

Progressive mining and reclamation: The act of reclaiming the mined area as soon as possible after mining proceeds to the next block. At the proposed El Cajete Mine, mining and reclamation would occur within blocks about 27 acres in size. As mining progresses through a block, about 9 acres would be actively mined while another 9 acres serves to stockpile waste pumice and top soil. The first 9 acres mined would be undergoing reclamation.

Pyroclastic flows: Fragmented rock produced during aerial expulsion of magma from a volcanic explosion.

Q

Quaternary rhyolite: An igneous rock of the Quaternary Period of the Cenozoic Era. The Quaternary Period is the most recent geologic time span and follows the Tertiary Period of the same era. Valles Rhyolite includes 500,000 year old South Mountain Rhyolite; 58,000 to 150,000 year old El Cajete Pumice; and 130,000 year old Banco Bonito Glass Flow.

R

Ranger District: An administrative subdivision of a National Forest supervised by a District Ranger who reports to a Forest Supervisor.

Reclamation: An act of restoring the usefulness and productivity of a mined area.

Record of Decision: A document separate from but associated with a Final Environmental Impact Statement that publicly and officially discloses the Responsible Official's decision on the proposed action.

Recreation Opportunity Spectrum: A land classification system that categorizes National Forest land into six classes. Each class is defined by its setting and the probable recreation experiences and activities it affords. The six classes are as follows:

Primitive — Characterized by an essentially unmodified environment, where trails may be present but structures are rare and the probability of isolation from the sights and sounds of people is high.

Semi-primitive non-motorized — Characterized by few and/or subtle modifications by people and with a high probability of isolation from the sights and sounds of people.

Semi-primitive motorized — Characterized by moderately dominant alterations by people, with strong evidence of primitive roads and trails.

Roaded natural — Characterized by a predominantly natural environment with evidence of moderate permanent resource use. Evidence of sights and sounds of people is moderate but in harmony with the natural environment. Opportunity exists for both social interaction and moderate isolation from sights and sounds of people.

Rural — Characterized by an area in which the sights and sounds of people are prevalent and the landscape has been considerably altered by the works of people.

Urban — Characterized by a natural setting dominated by people-made structures and the sights and sounds of people predominate.

Recreation Visitor Day (RVD): A unit for measuring recreation activities based on aggregates of 12 visitor hours. An RVD may consist of one person for 12

hours, 12 persons for one hour or any equivalent combination of continuous or intermittent recreation use.

Reforestation: The natural or artificial restocking of an area with trees to reestablish a forest. Natural reforestation occurs when seeds produced by nearby seed trees germinate and grow on the disturbed area. Artificial reforestation involves planting 1-year old container or 2-year old bare root seedlings under specific soil temperature and moisture requirements. Seedlings are greenhouse or nursery grown from native seed collected from specified seed zones to insure the best adapted seedlings are planted on the disturbed area.

Reshaping: Backfilling the mined area with waste pumice and shaping the backfill to restore a characteristic land form.

Revegetation: The re-establishment and development of a plant cover on a disturbed area usually by reseeding with grasses, forbs and shrubs suitable for the site. Shrubs and tree seedlings are often planted to achieve faster results.

Rhizomorph: A root-like structure of the shoestring root rot fungus (armillaria spp.).

Riparian area: The area along streams, wetlands or other water bodies identified by the presence of vegetation that requires free water or moist soil conditions.

Riprap: Loose rock piled in a drainage to reduce the force of water.

Runoff: That portion of precipitation that is not absorbed by the soil and retained on site.

S

Scenic Condition Levels:

Preservation (P) - A scenic condition objective that provides for ecological change only. Management activities, except for very low scenic-impact recreation facilities, are provided.

Retention (R) - A scenic condition objective meaning human activities are not visually evident. In retention area, activities may only repeat attributes of form, line, color and texture found in the natural or natural-appearing landscape character.

Partial Retention (PR) - A scenic condition objective meaning human activities must remain visually subordinate to the attributes of the natural or natural-appearing landscape character. Activities may repeat form, line, color or texture common to these landscape characters, but changes in quality of size, number, intensity, direction, pattern, and so on, must remain visually subordinate to these landscape characters.

Modification (M) - A scenic condition objective meaning human activities may visually dominate the original natural landscape character, but at the same time, vegetative and landform alterations must utilize naturally established form, line, color, and texture from the natural landscape. Activities should appear as natural occurrences when viewed in foreground, middleground, and background distances.

Marginally Acceptable (MA) - A scenic condition objective meaning human activities of vegetative and landform alterations may dominate the original, natural landscape character but should appear as natural occurrences when viewed as background.

Unacceptable Alteration (UA) - A scenic condition level, though never an objective, where human activities of vegetative and landform alterations are excessive and totally dominate the natural or natural-appearing landscape character. Unacceptable alterations are "what not to do to any landscape", regardless of the distance from which the management activity may be observed.

Scoping process: The process used to identify issues which are within the Forest Service authority to resolve.

Sediment: Solid organic or mineral material that has been suspended in water, ice or air, is being transported, or has been transported from its site of origin by water, ice, wind or gravity and has come to rest on the surface. Sediment can be produced from natural rock weathering and soil erosion or from man-made air and water erosion resulting from timber harvest, livestock grazing, excavation, and other ground-disturbing activities.

Sensitive species: Plant and animal species that are candidate species for listing in the Federal Register by the U.S. Fish and Wildlife Service as threatened or endangered or are listed by the State or the Forest Service as needing special management to prevent them from becoming threatened or endangered.

Short-term effect: Environmental effects that occur within 10 years after the implementation of an action.

Significant effect: In NEPA, a significant effect is a subjective judgment of the Responsible Official that an environmental effect is significant based on its context and intensity. Context means the significance of an action is analyzed in the context of society as a whole, the affected region and interests, and the locality. Intensity refers to severity of the effect. Items listed in 40 CFR 1508.27(b)(1-10) are used to evaluate intensity.

Slash: Stumps, logs, bark, branches, needles, leaves and other plant debris generated by excavation, construction or timber harvest activities.

Soil: A mixture of minerals, organic matter and living organisms on the earth's surface in which plants grow. The humus-rich and underlying clay layers make up the top soil which overlie the parent or bedrock.

Soil loss tolerance level: The maximum rate of soil loss that can occur while sustaining site productivity.

Soil productivity: The capacity of a soil to produce a specific crop under defined levels of management. Productivity is dependent on available soil moisture, nutrients and growing season.

Standard and guideline: The policy, conduct and level of attainment prescribed to manage the resources within management areas of the Forest Plan.

Statutory right: In mineral rights, an exclusive right to possess, access, mine and sell locatable minerals that is vested in the mining claimant under the statues of the General Mining Law of 1872 and its amendments.

Storm Water Drainage Plan: A plan submitted to the U.S. Environmental Protection Agency for disturbed areas larger than 5 acres to specify the methods for collection, detention and infiltration of storm water on-site.

Stratigraphy: The study of the distribution, order of deposition, and age of rock layers.

T

Tertiary basalt: An igneous rock of the Tertiary Period of the Cenozoic Era. Tertiary Period ranges from 62 to 3 million years ago. In the Jemez Mountains, the earliest Tertiary basalts date to 13 million years ago.

Terrestrial Ecosystem Survey: A systematic inventory and mapping of the soils, vegetation and climatic attributes that define naturally occurring ecosystems within the landscape.

Threatened species: A plant or animal listed as such in the Federal Register by the U.S. Fish and Wildlife Service under provisions of the Endangered Species Act which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Tritium dating: The use of tritium to date ground water. Tritium is a naturally occurring radio-isotope of hydrogen that was produced in large quantities during atmospheric nuclear tests between 1953 and 1961. Using the rate of radio-active decay of tritium and the levels of natural and man-made tritium before and after testing, it is possible to calculate the age of ground water. Tritium dating of well water in the Vallecitos de los Indios area indicates the ground water is at least 50 years old.

U

Understory: The woody trees and shrubs growing under a more or less continuous cover of branches and foliage of overstory trees.

V

Viewshed: The landscape seen or potentially seen from all or a logical part of travel route, use area, or observation point.

W

Waste pumice: In the context of the proposed El Cajete Mine, pumice which is discolored by stains and common variety pumice which has been sorted out from locatable pumice. Stained pumice generally occurs under the top soil and ranges from 1 to 3 feet thick. Staining makes it unusable for garment finishing. Common variety pumice under the Jemez NRA legislation cannot be sold and, as a consequence, is used to backfill and reshape the mined area during reclamation.

Watershed: A geographic region from which water drains into a particular drainage system, spring, stream or other body of water. Watershed boundaries are defined by the ridges or divides that create distinct drainages.

Wetlands: Areas that are inundated by surface or ground water with a frequency sufficient to support, and under normal circumstances do or would support, a prevalence of vegetation or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands include bogs, marshes and wet meadows.

Wild and Scenic River: A river with scenic, recreational, geological, fish and wildlife, historic, cultural or other similar values designated by Congress under the Wild and Scenic Rivers Act for preservation of its free-flowing condition. Sections of Wild and Scenic Rivers are classed as follows:

Wild River: That portion which is free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted.

Scenic River: That portion which is free of impoundments, with shorelines or watersheds still largely primitive and undeveloped, but accessible in places by roads.

Recreational River: That portion which is readily accessible by road, that may have some development along the shorelines, and may have undergone some impoundment or diversion in the past.

Wildlife: All non-domesticated mammals, birds, fishes, reptiles and amphibians living in a natural environment.

Wood fiber: All fiber produced by tree growth. May be measured in cubic feet for chips, board feet for lumber, cords for firewood, or linear feet for other products.

Appendix

A. Overview of the Archaeology and Cultural History on the Jemez Ranger District, Santa Fe National Forest

The cultural history of the Jemez Mountains appears to be long and fairly continuous. Though data are scarce for the early periods, there are clear indications of at least seasonal occupation of the Jemez Mountains through the early Basketmaker. More sedentary lifestyles began appearing during the Coalition Period and continued until modern times.

Paleoindian Period

The first recognized period of human occupation in North America is the Paleoindian period (10000 to 5500 B.C.). This period is defined by lanceolate projectile points that are commonly found associated with the remains of extinct Pleistocene megafauna. Paleoindian activity in the Jemez Mountains was probably in the form of seasonal gathering, hunting, and collecting of plants, animals, and obsidian. Several sites from this time period have been documented in the Cochiti Reservoir region to the southeast of the Jemez Mountains (Biella 1977).

Archaic Period

In general, the Archaic Period is characterized by the presence of a wide variety of smaller stemmed, side- and corner-notched projectile points and an increase in the occurrence of ground stone implements (Jennings 1974:74). This tool technology is considered to indicate a shift in subsistence patterns to a greater reliance on the exploitation of smaller game and plant resources.

During the Early Archaic Period (5,500-3,000 B.C.), seasonal hunting and gathering and obsidian procurement undoubtedly continued in the Jemez Mountains. The earliest sites known from the area date from the Middle Archaic Period (3,000-1,000 B.C.) and consist of obsidian workshops and campsites. The introduction of corn and horticultural technology are considered to occur during the Late Archaic Period (1,000 B.C.-A.D. 600). Despite the introduction of corn, seasonal habitation, and hunting and gathering of food continued throughout the Late Archaic. One of the earliest dates for corn comes from Jemez Cave, a site one mile north of Jemez Springs, New Mexico (Elliott 1988; Report 1988-10-046).

Early Developmental Period (Basketmaker III - Pueblo I)

Late Developmental Period (Pueblo II)

The Developmental Period (A.D. 600-1175) is credited with the appearance of ceramics in the study area (Elliott 1988).

These ceramics were found at a site (FS 1538) near the historic pueblo site of Patokwa and include Lino Gray sherds (dated A.D. 600-800 by Breternitz 1966:83) and an early, mineral-painted black-on-white ware. The site also contains two probable pithouse depressions with low storage room mounds on one side. A later component dating to the Coalition Period is also present on the site. The Developmental Period is only very sparsely represented in the Jemez District.

Other sites related to the Developmental Period have been identified near Santa Ana and Zia pueblos (Moore et al. 1978), on the Pajarito Plateau (Steen 1977), in the Cochiti Reservoir area, along the flood plains of the Rio Grande and Santa Fe rivers (Biella 1977), at Jemez Cave (Alexander and Reiter 1935; Ford 1975), along Vallecitos Creek (Holmes 1905), in the vicinity of Ponderosa, New Mexico (Dodge 1982), and in rock shelters along San Luis Creek and Sulphur Springs (Whitford and Ludwig 1975).

Coalition Period (Pueblo III)

A number of Coalition Period (A.D. 1175-1300 or 1325) sites are known in the Jemez Mountains. In the Canones area, 11 sites with Coalition Period components have been recorded (Elliott 1986). During this period, site density and population increase considerably in the area owing to internal population growth within the Rio Grande Valley and probably also to immigration from western Anasazi centers such as Chaco Canyon (Logan and Mueller 1990; Report 1990-10-158).

Sites of this period in the Jemez include masonry pueblos of up to 50 rooms with large circular, subterranean kivas; 1- or 2-room field houses; and agricultural features. The beginning of this period in the area is considered to be when locally made ceramics changed from mineral-painted wares (Kwahe'e Black-on-white) to carbon-painted wares (Santa Fe Black-on-white) (Logan and Mueller 1990; Report 1990-10-158).

Classic Period (Pueblo IV)

The Classic Period (A.D. 1300 or 1325-1600) is defined by the manufacture of glaze wares, increases in site density and site size, aggregation of the population into larger pueblosl, and an overall cultural florescence (Moore et al. 1978). Sites consist of multiple room blocks containing upwards of 1,000 rooms of coursed adobe and/or masonry with multiple kivas. Many of the larger sites are surrounded by a large number of small, 1- to 3-room field house sites. Additional features associated with the Classic Period include terraces, small-scale irrigation systems, and check dams (Biella 1977; Steen 1977; Cordell 1978; Elliott 1980). This time period is also identified by a

shift from lower elevation habitation sites to high elevation, mesa-top habitation locations.

Historic Period (1541 to present)

The Historic Period technically begins with the first written account of the culture in the Jemez Mountains in 1541 by one of the men in Coronado's expedition. The first contacts had no great effect on the Jemez cultures and it wasn't until 1598 when New Mexico became a Spanish colony that life for the Jemez began to drastically change (Elliott 1988; Report 1988-10-046).

The **Mission Period** (1598-1680 A.D.) is the era in which at least two missions were established by Spanish priests to convert the Indians to Catholicism. In the long term, neither of these missions were successful and the Jemez Indians returned to their homes on the mesa tops.

In 1680 during the **Pueblo Revolt Period** (1680-1696 A.D.), the Jemez helped to drive the Spaniards from New Mexico. De Vargas reconquered New Mexico 12 years later and the Spanish established yet another mission to convert the Jemez.

Refugee Period (1696-1706 A.D.)

In 1696, the Jemez revolted and retreated to a large pueblo site, Astialakwa. Two subsequent battles between the two cultures greatly reduced the Jemez population. Between 1696 and 1706, most of the Jemez people abandoned the Jemez Mountains and joined other pueblos.

The beginning of the **Reservation Period** (1706 to present) is marked by the establishment of the modern day Jemez Pueblo in 1706. Life for the Jemez people became extremely tumultuous under the influence of the Spaniards. As a result of the contact between the two cultures, the Jemez people changed their residences more frequently and often reinhabited old pueblos located on the mesa tops. Thus, several of the old pueblo sites in the Jemez Mountains have more recent components to them. Many of the Jemez peoples' lifeways were permanently changed. Some of these permanent changes are apparent in artifacts such as pottery and the introduction of Spanish metals.

The previous discussion presented a cultural overview from the perspective of the Indian inhabitants of the Jemez Mountains. However, two other groups have also played important roles in the history of the region—the Hispanics and the Anglos. The brief summary of Hispanic and Anglo use of the area presented below is drawn from an overview developed by Elliott (1989; Report 1989-10-031).

The Hispanic presence in the area effectively dates from 1598 when don Juan de Onate established the first permanent colony near San Juan Pueblo. After the Pueblo Revolt, full Spanish reoccupation of the Jemez did not occur until 1696. The Canon de San Diego land grant was made in 1798, with major settlement near the confluence of the Jemez and Guadalupe Rivers. A number of sites from the early 1800's occur in this area which were evidently abandoned occasionally owing to the presence of Navajo raiders. In 1821, Mexico gained independence from Spain and assumed control over New Mexico until the war of 1846 with the United States. After the treaty of Guadalupe Hidalgo in 1848, the United States assumed control over most of New Mexico and the Anglo presence in the Jemez area became much greater.

The United States honored the claim of the heirs to the original Canon de San Diego de los Jemez land grant and confirmed a patent for 6,000 acres of farmland and 110,000 acres of common grazing land in 1860. A wealthy local rancher began purchasing individual and common lands from the grantees and eventually claimed all the common lands. The heirs sued and received 80% of the common lands, with their lawyers receiving half of this total. The remaining acres were sold at auction in 1908; other portions of the grant were purchased by an Albuquerque lawyer in 1912 for back taxes. Commercial logging of the area began in 1922 with formation of the White Pine Lumber Company and construction of a lumber mill and logging railroad from Bernalillo up the Jemez and Guadalupe Rivers.

Evidence of the logging activity can be found in numerous logging camps, log cabins, railroad grades and trestles within the San Diego Grant Boundary. The grant was purchased by the U.S. Forest Service and added to the Santa Fe National Forest in 1967.

Hispanic and Anglo use of the Jemez Mountains has focused on stock grazing, logging, mining, and hunting, as discussed by Winter (1980; Report 1980-10-045). The original Jemez Forest Reserve was created in 1905, while the Santa Fe National Forest was created in 1915 with the combination of the Jemez and Pecos Forest Reserves (Elliott 1980; Report 1980-10-095). Homestead and mining claim patents resulted in many of the private lands within the Forest. Remnants of log homes, mill sites, and mines evidence this period of settlement that dated from the mid eighteen hundreds to the early 1940s. During the 1930s, the Civilian Conservation Corps constructed roads, recreation sites, and other facilities still used by today's visitors.

B. Public Law 103-104, October 12, 1993

Public Law 103-104
103d Congress

An Act

To establish the Jemez National Recreation Area in the State of New Mexico, and for other purposes.

Oct. 12, 1993
[H.R. 38]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

Conservation.
Environmental protection.
16 USC 460jjj.

SECTION 1. ESTABLISHMENT.

(a) PURPOSE AND ESTABLISHMENT.—In order to conserve, protect, and restore the recreational, ecological, cultural, religious, and wildlife resource values of the Jemez Mountains, there is hereby established the Jemez National Recreational Area (hereinafter in this Act referred to as the "recreation area"), to be administered by the Secretary of Agriculture (hereinafter in this Act referred to as the "Secretary").

(b) AREA INCLUDED.—The recreation area shall be comprised of approximately 57,000 acres of lands and interests in lands within the Santa Fe National Forest as generally depicted on the map entitled "Jemez National Recreation Area—Proposed" and dated September 1992. The map shall be on file and available for public inspection in the offices of the Chief of the Forest Service, Department of Agriculture, Washington, District of Columbia. The Secretary may from time to time, in consultation with local tribal leaders, make minor revisions in the boundary of the recreation area to promote management effectiveness and efficiency in furtherance of the purposes of this Act.

(c) MAP AND DESCRIPTION.—As soon as practicable after enactment of this Act, the Secretary shall file a map and legal description of the recreation area with the Committee on Natural Resources of the House of Representatives and with the Committee on Energy and Natural Resources and the Select Committee on Indian Affairs of the Senate. Such map and legal description shall have the same force and effect as if included in this Act, except that correction of clerical and typographical errors in such legal description and map may be made. Such map and legal description shall be on file and available for public inspection in the Office of the Chief of the Forest Service, Department of Agriculture.

(d) NO ADDITIONAL LANDS.—No lands or interests therein outside of the boundaries of the recreation area may be added to the recreation area without specific authorization by Congress.

SEC. 2. ADMINISTRATION.

16 USC 460jjj-1.

(a) IN GENERAL.—The Secretary shall administer the recreation area in accordance with this Act and the laws, rules, and regulations applicable to National Forest System lands in a manner that will further the purposes of the recreation area. Management of the

natural resources within the recreation area shall be permitted only to the extent that such management is compatible with and does not impair the purposes for which the recreation area is established. Recreational activities within the recreation area shall include (but not be limited to) hiking, camping, hunting, fishing, skiing, backpacking, rock climbing, and swimming.

(b) MANAGEMENT PLAN.—The Secretary shall, no later than 5 years after the enactment of this Act, develop a management plan for the recreation area, as an amendment to the Santa Fe National Forest Land and Resource Management Plan, to reflect the establishment of the recreation area and to conform to the provisions of this Act. Nothing in this Act shall require the Secretary to revise the Santa Fe Forest Land and Resource Management Plan pursuant to section 6 of the Forest and Rangeland Renewable Resources Planning Act of 1974. During development of the management plan for the recreation area, the Secretary shall study newly designated land within the recreation area, and adjacent national forest land.

(c) CULTURAL RESOURCES.—In administering the recreation area, the Secretary shall give particular emphasis to the preservation, stabilization, and protection of cultural resources located within the recreation area in furtherance of the Archaeological Resources Protection Act of 1979, the National Historic Preservation Act, and the Act of August 11, 1978 (42 U.S.C. 1991) (commonly referred to as the "American Indian Religious Freedom Act").

(d) NATIVE AMERICANS.—(1) In recognition of the historic use of portions of the recreation area by Indian peoples for traditional cultural and customary uses, the Secretary shall, subject to the provisions of section 2(n) in consultation with local tribal leaders, ensure the protection of religious and cultural sites and provide access from time to time to those sites by Indian peoples for traditional cultural and customary uses. Such access shall be consistent with the purpose and intent of the Act of August 11, 1978 (42 U.S.C. 1991) (commonly referred to as the "American Indian Religious Freedom Act"). The Secretary, in accordance with such Act, upon request of an Indian tribe or pueblo, may from time to time temporarily close to general public use one or more specific portions of the recreational area in order to protect traditional and customary uses in such portions by Indian peoples.

(2) In preparing and implementing management plans for the recreation area, the Secretary shall request that the Governor of the Pueblo of Jemez and the chief executive officers of other appropriate Indian tribes and pueblos make recommendations on methods of—

(A) assuring access to religious and cultural sites;

(B) enhancing the privacy and continuity of traditional cultural and religious activities in the recreation area; and

(C) protecting traditional cultural and religious sites in the recreation area.

(e) WILDLIFE RESOURCES.—In administering the recreation area, the Secretary shall give particular emphasis to the conservation and protection of wildlife resources, including species listed as sensitive by the Forest Service, within the recreation area and shall comply with applicable Federal and State laws relating to wildlife, including the Endangered Species Act of 1973.

(f) HUNTING.—The Secretary shall permit hunting and fishing on lands and waters under the jurisdiction of the Secretary within

the recreation area in accordance with applicable Federal and State law.

(g) TIMBER HARVESTING.—The Secretary may permit timber harvesting in the recreation area for commercial purposes, including (but not limited to) vigas, latillas, the gathering of fuelwood, and for purposes of public safety, recreation, wildlife, and administration, insofar as the harvesting is compatible with the purposes of the recreation area. Trees damaged or downed due to fire, disease, or insect infestation may be utilized, salvaged, or removed from the recreation area as authorized by the Secretary in furtherance of the purposes of this Act. Nothing in this Act shall be construed to affect the timber sales under contract on the date of enactment of this Act. Nothing in this Act shall be construed to effect the Los Griegos timber sale in the Los Griegos Diversity Unit number 0322 as shown on the West Half Diversity Unit map of the Santa Fe National Forest dated November 1991; except that the Secretary shall manage such sale using uneven aged management including the individual tree selection method.

(h) GRAZING.—The Secretary may permit grazing within the recreation area in accordance with regulations prescribed by the Secretary. Riparian areas shall be managed in such a manner as to protect their important resource values.

(i) TRANSPORTATION PLAN.—(1) Within 1 year after the date of enactment of this Act, the Secretary shall prepare a transportation plan that provides for the most efficient use of roads and trails to accomplish the purposes of this Act. The plan shall provide for a comprehensive trails system that provides for dispersed recreation while minimizing impact on significant archaeological and religious sites.

(2) The Secretary shall construct, maintain, and close roads within the recreation area after consultation with local tribal leaders and only in accordance with such plan.

(j) RECREATIONAL FACILITIES.—The Secretary shall provide for recreational facilities within the recreation area. Such facilities shall be constructed so as to minimize impacts on the scenic beauty, the natural character, and the archaeological and religious sites of the recreation area.

(k) VISITOR FACILITIES.—The Secretary shall establish a visitor center and interpretive facilities in or near the recreation area for the purpose of providing for education relating to the interpretation of cultural and natural resources of the recreation area.

(l) POWER TRANSMISSION LINES.—In accordance with Federal and State laws and regulations, the Secretary may permit a utility corridor for high power electric transmission lines within the recreation area only when the Secretary determines that—

(1) there is not a feasible alternative for the location of such corridor;

(2) damage to the recreational and scenic quality and to the archaeological and religious sites of the recreation area will not be significant;

(3) it is in the public interest that such corridor be located in the recreation area; and

(4) a plan to minimize harm to the resources of the recreation area has been developed.

(m) SCIENTIFIC INVESTIGATIONS.—The Secretary may permit scientific investigations within the recreation area upon the Sec-

retary's determination that such investigations are in the public interest and are compatible with the purposes of this Act.

(n) RESOURCE PROTECTION.—The Secretary may designate zones where, and establish periods when, any activity otherwise permitted in the recreation area will not be permitted for reasons of public safety, administration, fish and wildlife management, protection of archaeological or cultural resources, or public use and enjoyment. Except in emergencies such designations by the Secretary shall be put into effect only after consultation with the appropriate State agencies, appropriate tribal leaders, and other affected parties.

16 USC 460jjj-2.

SEC. 3. MINERALS AND MINING.

(a) LIMITATION ON PATENT ISSUANCE.—(1) Notwithstanding any other provision of law, no patents shall be issued after May 30, 1991, for any location or claim made in the recreation area under the mining laws of the United States.

(2) Notwithstanding any statute of limitations or similar restriction otherwise applicable, any party claiming to have been deprived of any property right by enactment of paragraph (1) may file in the United States Claims Court a claim against the United States within 1 year after the date of enactment of this Act seeking compensation for such property right. The United States Claims Court shall have jurisdiction to render judgment upon any such claim in accordance with section 1491 of title 28, United States Code.

(b) WITHDRAWAL.—Subject to valid existing rights, after the date of enactment of this Act, lands within the recreation area withdrawn from location under the general mining laws and from the operation of the mineral leasing, geothermal leasing, and mineral material disposal laws.

(c) RECLAMATION.—No mining activity involving any surface disturbance of lands or waters within such area, including disturbance through subsidence, shall be permitted except in accordance with requirements imposed by the Secretary, including requirements for reasonable reclamation of disturbed lands to a visual and hydrological condition as close as practical to their premining condition.

(d) MINING CLAIM VALIDITY REVIEW.—The Secretary of Agriculture shall undertake and complete within 3 years after the date of enactment of this Act an expedited program to examine all unpatented mining claims, including those for which a patent application has been filed, within the recreation area. Upon determination by the Secretary of Agriculture that the elements of a contest are present, the Secretary of the Interior shall immediately determine the validity of such claims. If a claim is determined to be invalid, the Secretary shall promptly declare the claim to be null and void.

(e) PUBLIC PURPOSES.—The Secretary may utilize mineral materials from within the recreation area for public purposes such as maintenance and construction of roads, trails, and facilities as long as such use is compatible with the purposes of the recreation area.

16 USC 460jjj-3.

SEC. 4. ADJOINING LANDS.

The Secretary may evaluate lands adjoining the recreation area for possible inclusion in the recreation area and make recommendations to Congress, including (but not limited to) that area

authorized for study by section 5 of Public Law 101–556 (104 Stat. 2764), known as the Baca Location Number 1. The Secretary, in consultation with local tribal leaders and the National Park Service, shall, no later than 2 years after enactment of this Act, submit recommendations with respect to future boundaries for the recreation area.

SEC. 5. ACQUISITION OF LAND. 16 USC 460jjj-4.

(a) STATE LAND.—Land and interests in land within the boundaries of the recreation area that are owned by the State of New Mexico, or a political subdivision of New Mexico, may be acquired only by donation or exchange.

(b) OFFERS TO SELL.—

(1) IN GENERAL.—Subject to paragraph (2), the Secretary may acquire land and interests in land within the boundaries of the recreation area by donation, purchase with donated or appropriated funds, or exchange.

(2) LIMITATION.—The Secretary may not acquire lands within the recreation area without the consent of the owner thereof unless the Secretary has determined that such lands will be put to a use different from their use as of the date of enactment of this Act and that such new use would be incompatible with the protection of the natural and cultural resources of the recreation area.

SEC. 6. AUTHORIZATION OF APPROPRIATIONS. 16 USC 460jjj-5.

There is authorized to be appropriated such sums as may be necessary to carry out the purposes of this Act.

Approved October 12, 1993.

LEGISLATIVE HISTORY—H.R. 38:

HOUSE REPORTS: No. 103-58 (Comm. on Natural Resources).
SENATE REPORTS: No. 103-139 (Comm. on Energy and Natural Resources).
CONGRESSIONAL RECORD, Vol. 139 (1993):
Apr. 20, 21, considered and passed House.
Sept. 22, considered and passed Senate, amended.
Sept. 29, House concurred in Senate amendments.

C. Public Comments and Forest Service Responses from the Draft EIS for the El Cajete Pumice Mine

This appendix presents comments from the public regarding the Draft Environmental Impact Statement (DEIS) for the El Cajete Pumice Mine, released for public review on January 16, 1996. A "Notice of Availability" was published in the Federal Register, Volume 61, Number 18, Page 2510, on January 26, 1996, inviting comment on this document until March 11, 1996. In addition to the Notice of Availability, the Forest prepared a news release for the media, and sent a copy of the DEIS to all individuals and organizations on the mailing list.

Changes between the DEIS and the Final Environmental Impact Statement (FEIS) were based, in part, on these comments and further analysis by the Forest Service. Changes in the FEIS include edits, clarifications and corrections. The FEIS Table of Contents provides a notation next to the subheadings to note which portions of the document have substantially changed between the draft and the final.

Sixty-five comments were received, either in the form of letters, comment forms, oral comments, or a petition (see Table 1). The Forest Service responded only to specific comments that were substantive or technical in nature, or that concerned questions about policy or procedure. Each respondent's letter was numbered (Table 2), and the substantive comments identified and coded by topic (Table 3). The substantive comments were then combined by topic area and summarized into comment issues, which include both direct quotes and paraphrased statements. Many issues are a synthesis of more than one person's or group's comments. Comments are numbered consecutively by topic. The Forest Service's response follows each set of comments.

All comments received are available for public review in the Project Record.

Table 1. Form of Public Response

Type	Number
Letter or postcard	55
Written comment form	5
Oral comment	4
Petition	1 (with 19 signatures)

Table 2. Respondents by Comment Number

Entity	Comment Number
Government	
Local	
Village of Jemez Springs	4
Los Alamos City Council	25
La Cueva Volunteer Fire Department	30
Sandavol County Administrative Offices	52
State	
NM State Highway and Transportation Department	54
NM Office of Cultural Affairs, Historic Preservation Division	60
NM Environment Dept.	65
Federal	
USDI Office of Environmental Policy and Compliance	24
US Environmental Protection Agency	53

Table 2. Respondents by Comment Number (Continued)

Entity	Comment Number
Conservation/Environmental	
The Rio Grande Chapter of the Sierra Club	32
Save the Jemez, Inc	45
Forest Conservation Council	61
Forest Guardians	64
Tribe	
Jemez Pueblo, Dept. of Archeology & Preservation	10
Business	
Spears Architects	14
Individuals	1, 2, 3, 5, 6, 7, 9, 11, 12, 13, 15, 16, 18, 19, 20, 21, 22, 23, 26, 27, 28, 29, 31, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 46, 47, 48, 49, 50, 51, 55, 56, 57, 58, 59, 62, 63

Table 3. Comment Numbers by Topic Area

Topic	Sub-Topic	Public Comment Numbers
Mining	Mining law, regulations and related agency policy	22, 31, 32, 37, 45, 46, 52, 58, 59, 63, 64
	Reclamation	7, 9, 32, 37, 47, 55, 57
	Multiple use vs. single use/tradeoffs of land use	1, 5, 6, 7, 9, 14, 15, 22, 25, 32, 34, 41, 46, 49
	Monitoring, oversight, and enforcement	11, 26, 45, 46, 50, 55, 57, 58, 59, 63, 64, 65
	Pumice supply, demand and use	1, 22, 36, 45, 58, 64
Recreation	Recreation opportunities and uses	2, 6, 7, 8, 13, 21, 31, 32, 33, 34, 37, 42, 45, 46, 56, 57, 59, 62
Jemez National Recreation Area	Jemez National Recreation Area legislation and compliance	5, 21, 22, 23, 25, 27, 28, 32, 40, 44, 45, 46, 50, 57, 59, 63, 64
Wild and Scenic River	Wild and Scenic River Act	5, 27, 59

Table 3. Comment Numbers by Topic Area (Continued)

Topic	Sub-Topic	Public Comment Numbers
Scenery	Impacts to/protection of scenery	2, 5, 15, 21, 23, 28, 32, 34, 42, 43, 44, 45, 46, 58, 60, 62, 63
Socio-Economic	Tourism	28, 29, 32, 43, 51, 56, 58
	Local Economy	1, 25, 31, 32, 40, 45
	Residential Property Values	5, 26, 31, 32, 45, 48, 50, 57, 58, 59
	Road Repair and Maintenance	5, 19, 28, 29, 42, 43, 50, 58
	Benefits/Costs	1, 5, 11, 18, 22, 25, 26, 32, 45, 51, 55, 58, 64
	Proximity of Mine Boundary	3, 8, 47
Transportation of Pumice & Highway Safety	Highway Safety	1, 2, 4, 5, 10, 11, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 35, 36, 37, 38, 39, 41, 42, 43, 44, 45, 46, 47, 48, 49, 51, 57, 58, 59, 62
Noise (Sound)	Noise from operations and truck traffic	4, 5, 7, 11, 25, 26, 27, 28, 31, 39, 42, 45, 46, 50, 58, 59, 63
Air Quality	Pumice and road dust, vehicle emissions	5, 7, 11, 24, 25, 26, 31, 45, 47, 49, 50, 51, 63, 64, 65
Soil Productivity	Soil productivity, erosion and soil loss	1, 5, 7, 42, 46, 50, 51, 61, 65
Water Quality	Ground water filtration, contamination, quality	1, 7, 32, 36, 42, 46, 48, 50, 61, 65
	Surface water (streams, wetlands, fish habitat)	32, 36, 42, 45, 46, 50, 51, 61, 65
Wildlife Habitat	Threatened, endangered and sensitive species; habitat	24, 45, 46, 50, 61, 64
	Other wildlife and habitat	1, 5, 7, 16, 24, 32, 43, 45, 46, 50, 51, 56, 61, 64, 65
Vegetation & Ecology	Removal of forest vegetation and ecological disturbance	1, 7, 13, 24, 46
Demonstration Area	Root rot disease research demonstration area	34, 46

Table 3. Comment Numbers by Topic Area (Continued)

Topic	Sub-Topic	Public Comment Numbers
Heritage Resources	Heritage Resources	5, 10, 45, 60
Planning Process, Laws and Regulations	Public involvement	11, 45, 46, 55, 57, 59, 63
	National Environmental Policy Act	24, 26, 32, 37, 45, 51, 55, 64, 65
	National Forest Management Act and Forest Plan	5, 58, 64

Mining

Mining Law, Regulations and Related Agency Policy

Comment 1: *Why not follow the 1993 revised version of the General Mining Law, instead of the old 1872 version?*

Response: Although there has been much controversy, discussion and activity surrounding the General Mining Laws, the law has remained substantially unchanged since it was passed in 1872. There has been no revision of the law.

Comment 2: *"Why is merchantable timber on the proposed site to be sold to Copar? They are not in the timber business."*

Response: The 1872 Mining Law provided that a claimant is entitled to timber that is needed in their mining operation. This actually stems from the early use of lumber in mining to support tunnels, as ties for mining car rails or for use in the headframes and structures needed to operate a mine. Copar is entitled to any timber needed for actual use in their mining operation, such as logs placed during reclamation for wildlife and vegetation enhancement (FEIS, Chapter II, Alternative 1(a)). Copar is required to pay the Government for any other timber removed in mining the area.

Comment 3: *The proponent [Copar] should first establish an appropriate zone for their mine operation (within the County Zoning) before being permitted to mine.*

Response: County zoning ordinances do not apply on National Forest System lands. The Santa Fe National Forest Plan allows mining (pp. 81-82) except where lands have been withdrawn from the operation of the mining laws.

Comment 4: *The DEIS (p. 4) was in error stating that Copar owned the locatable minerals. The minerals are the "property of the public" until removed from the mine.*

Response: We agree. The FEIS had been amended.

Comment 5: *The Forest Service decision to authorize the mine operation appears to have already been made, because of mandates of the General Mining Law of 1872, so why go through this decision-making process?*

Response: The decision-making process is important because there are substantial differences in the alternatives and the impacts to the environment, depending on which alternative is selected. Through the NEPA process, mining alternatives are developed and analyzed to determine relative impacts to the environment. As stated in the FEIS (Chapter I), Decisions To Be Made, the deciding officer determines which alternative best meets the requirements of the Forest Service surface protection regulations 36 CFR 228.1, "so as to minimize adverse impacts on National Forest System surface resources."

Comment 6: *The Forest Service is inadequately recognizing their authority to regulate mining activity, within the scope of the General Mining Law of 1872, to "minimize adverse environmental impacts to National Forest surface resources", and are not following related direction in the Organic Administration Act of 1897, which is not subordinated by the General Mining Law.*

Response: The Organic Act of 1897, which gave the President of the United States the authority to create the National Forests, also stated that lands "subject to entry under the existing mining laws...shall continue to be subject to such location and entry, notwithstanding any provisions herein contained." (16 USC 482). At the same time the authority was given to the Secretary of Agriculture to prescribe rules and regulations (16 USC 479) to "regulate occupancy and use and to preserve the forests thereon from destruction" (16 USC 551). The 36 CFR 228 Surface Protection regulations for locatable mining proceeded from the Organic Act and specify how the Forest Service must manage the surface within the scope of the General Mining Laws. This EIS, which addresses soil productivity, ground water, wetland and surface water, recreation opportunities, heritage resources, scenery, vegetation, wildlife habitat, and other surface resources (Chapters III and IV) appropriately responds to the 36 CFR 228 Forest Service regulations by requiring the identified mitigation measures (Alternatives 1a and 2, Chapter II) to be included in Copar's Plan of Operation before it can be approved.

Reclamation

Comment 7: *Who pays for the reclamation, revegetation and reforestation of the Las Conchas mine? Copar Pumice Company should be required to reclaim the Las Conchas mine satisfactorily before authorizing any new mines.*

Response: Copar is required to reclaim the Las Conchas Mine. The Forest Service is holding a reclamation bond posted by Copar for the amount needed to complete all of the reclamation. The total bond will not be released until all of the reclamation is satisfactorily completed. Currently, all of the mine has been reshaped. Where seeding and planting have been completed, vegetation and tree seedling growth meet objectives for this point in time (almost three seasons after reclaiming the first areas). The existing vegetation on the reclaimed portions has already substantially reduced the color contrast of the mine (FEIS, Chapter IV, Scenery, aerial view, shows a photo taken only one year after reclamation was established on the first 1/3 of the mine). Federal Regulations do not give the authority to delay approval of a new mine contingent upon the completion of reclamation elsewhere.

Comment 8: *The DEIS does not provide the post-reclamation contour maps and set of altimetric sections, which are necessary to judge whether the intent of the Jemez National Recreation Area legislation is met and to insure reclamation is completed. The final EIS must deliver to the public a precise and quantifiable description of the final contours of the reclaimed surface.*

Response: In order to meet the intent of the Jemez National Recreation Area, the Forest Service is requiring a planned contour map in Copar's Plan of Operation. The FEIS adequately describes the requirements of the final contours on page 14. The submitted map must meet these requirements (see also Response to SCENERY Comment 3 for further discussion).

Comment 9: *Reclamation should include restoring the site to pre-existing topographical attributes by hauling in similar volume of common-variety materials to fill in the mined area.*

Response: The final surface is expected to be about 20 feet lower than the existing topography. Sixty to 70% of the material will be replaced because only an estimated 30 to 40% of the material is "locatable" and can be removed from the Jemez National Recreation Area. In addition, the pumice expands in volume once removed from the deposit. Rather than resulting in a huge open pit, reclamation is expected to produce an acceptable final contour with internal topographic features which mimic the characteristic landscape. The cost of refilling the area's original contour would be prohibitive, as hauling material is the highest cost to this type of mining. Aside from an economic impact, it should be recognized that if other common variety materials were used to refill the site, those materials must also be mined from somewhere, also at some environmental cost.

Comment 10: *Will there be enough "wasted pumice" (small diameter material) left to accomplish the reclamation objectives, to surmount the overall excavation and prevent the "long linear views"?*

Response: Yes, as per the discussion in the Response to Comment 9. This is reasonably predictable from observing the pumice available for reclamation after mining at the Las Conchas Mine.

Multiple Use vs. Single Uses/ Tradeoffs of Land Use

Comment 11: *Long-term mining of this heavily used recreational area is a misuse of public land (and not the intent of "multiple use"). You should not allow the minor capital gains for one company to completely override the interests and wishes of the many people who live, work and recreate in this forest. It is inappropriate to allow Copar's profits (or stone-washed jeans) to outweigh the negative impacts to this area's outstanding scenic, ecologic and recreational values. Harvesting pumice just doesn't balance with protecting the valuable resources in this heavily used recreational area.*

Response: Economic profits from the mining company and other "trade-offs" are not used to decide whether or not mining is appropriate in this area. This is because neither the General Mining Law nor other federal laws give the Forest Service the authority to "not allow" the mining of locatable minerals on National Forest System Lands. Because of this, the decision to be made (FEIS, Chapter I) is not whether to mine, but to determine from alternative mining strategies the practical environmental mitigation and reclamation measures necessary to manage the impacts to surface resources. The "No Action" alternative is included in the analysis because it is a requirement under the National Environmental Policy Act and provides a baseline from which to compare the environmental consequences of mining alternatives.

Monitoring, Oversight and Enforcement

Comment 12: *The ground water quality monitoring requirement is inadequate (DEIS page 38). It is not sufficient to sample the two wells only twice in the life of the mine, doing the first sampling 5 years after mining begins and the second after reclamation. If there's a water contamination problem it may be found too late. The Forest Service should require monitoring of the shallow aquifer (as well as the deep aquifer), and of water elevations to evaluate potential effects on ground water quality.*

Response: We understand the concern about monitoring ground water quality. However, in this case, where there are no contaminants related to the mining activities, it is appropriate. The monitoring wells were drilled in order to characterize the subsurface and to investigate the depth, source, and flow direction of subsurface water in the vicinity of the mine. The identified concern was that the removal of pumice would affect the recharge capacity of the aquifer. The monitoring wells were also sampled to provide a baseline water quality. Other threats to water quality would be associated with accidental spills of fuel, oil, or hydraulic fluids in the mine site. Mitigation measures have been developed to safeguard the everyday use of these materials (FEIS, Chapter II, Alternative 1(a)), such as refueling and lubrication operations and changing oil over an impervious surface. In the event of a significant spill of these materials, the existing monitoring wells could be sampled immediately.

Comment 13: *The Forest Service isn't checking routinely for compliance with the Plan of Operation at Las Conchas to ensure public and environmental safety, as exemplified by the 55 gallon drum left in a ditch at the mine gate for 2-3 weeks before someone called the State Environmental Department to get it removed. It is stated that 5 citations were issued at Las Conchas last year and that it's typical of mining operations. That would make about 50 violations expected at El Cajete, which is unacceptable. If Copar violates the law in operating the mine, what can we reasonably expect during reclamation, and what would be the consequences for negligence? Further, Copar's history of non-compliance isn't adequately documented in the DEIS, which heightens concerns about the proposal. And there's not sufficient Forest Service oversight of the mine. Checking for rills and gullies biannually isn't adequate protection from erosion.*

Response: Copar has no history of non-compliance on National Forest System Lands. The Jemez Ranger District has characterized Copar as an "exemplary" operator and, the operator has responded promptly to all requests by the District.

The presence of a drum does not necessarily indicate a danger to the public or to the environment (chemicals and materials common to vehicle traffic; fuels, oils and hydraulic fluids, were the only ones used within the mine site). The safety citations related in the FEIS (Chapter III, Highway and Mine Safety) are described in order to demonstrate the type of safety violations occurring. None of the situations described (loose railing, loose wire, uncovered drive belt, a gap between shaker screen and platform, and operating loaders under an undercut highwall) posed a threat of danger to the public or the environment, but rather to the mine employees. The list also shows that the Mine Safety and Health Administration is appropriately overseeing those types of safety issues. The Forest Service conducts inspections for compliance with an operator's plan of operations, the surface protection regulations (36 CFR 228) and to see that operations

are not unnecessarily or unreasonably causing injury, loss or damage to surface resources (36 CFR 228.7).

Erosion during operations will be avoided through implementation of a mine drainage plan. Long term erosion is best avoided by creating stable land forms during reclamation recontouring. Appropriate measures to break up slope length, to avoid building "funnels", to tie reclaimed slopes into undisturbed ground, and to minimize slope angles to 30% or less, will result in successful revegetation. The proposed mine will be interior draining, and loss of soil on reclaimed slopes will not contribute to erosion elsewhere in the watershed. Monitoring for rills and gullies formally twice during the year and informally after significant storms is adequate to insure that corrective measures can be taken if there is a problem.

The Forest Service can reasonably expect Plan compliance and reclamation success at the El Cajete mine given Copar's work at Las Conchas and Copar's past pattern of compliance with their Plan of Operation. Further, the New Mexico State Mining Act Bureau accepted the reclamation at Copar's Las Conchas mine in 1995 (Project Record 146). In the event of noncompliance, Federal Regulations provide the means to fully administer compliance with Plan of Operation on National Forest System Lands. Federal Regulations in 36 CFR 228.8 address the requirements for environmental protection which must be met in a Plan of Operation before it can be approved (228.5 (b)). Operations must be conducted according to an approved Plan (228.5(a)). If inspections show that noncompliance with the plan "is unnecessarily or unreasonably causing injury, loss or damage to surface resources", then "the authorized officer shall serve a notice of non-compliance upon the operator" which specifies the action necessary to comply and a timeframe of generally no more than 30 days to bring the operation into compliance (228.7(b)).

The regulations also address the possibility of environmental damage occurring which is not foreseen in the initial Plan of Operations. In 36 CFR 228.4(e), "[a]t any time the authorized officer may ask the operator to furnish a proposed modification of the plan detailing the means of minimizing unforeseen significant disturbance of surface resources." If this disturbance is occurring, and operations are causing irreparable injury, loss, or damage to surface resources, work can be stopped (228.4(e)(3)). The regulations provide for a flexible approach which allows the Forest Service to act, at any point in the life of a mine, to ensure the safety of surface resources.

Comment 14: *The Jemez National Recreation Area and Common Varieties Act prohibits marketing pumice for other than high value fabric washing. There needs to be an enforceable system of checking for possible illegal marketing of the pumice. The public has no assurance that the pumice mined at El Cajete will not be used for common variety purposes. Haul trucks should be regularly checked by federal officers to see that they don't contain common variety pumice.*

Response: The Jemez National Recreation Act allows the commercial mining of "locatable" or "uncommon variety" minerals, but prohibits similar mining of "mineral materials", or "common variety" minerals on the Jemez National Recreation Area. It is a misconception that the eventual use of pumice mined on the Jemez National Recreation Area is a direct factor in determining whether the pumice is classified as "locatable" or "common variety". The classification of pumice as "locatable" depends on its suitability for a higher value usage, not whether it is actually used for a particular purpose. The pumice in the El Cajete deposit has been determined to be "locatable" or "common variety" based on its size (1995 Classification Report, Linden, et al.., Project Record 99). It is not necessary to insure that pumice mined in the Jemez National Recreation Area is marketed for the proper "use", but simply that "common variety" pumice does not leave the mine site.

We agree that it is important to monitor mining to insure that no common variety pumice is removed from within the Jemez National Recreation Area. The Forest Service is presently developing monitoring guidelines to include random spot checks at the El Cajete mine and of trucks carrying pumice from the mine, as well as documented inspections. These monitoring measures would be incorporated into the Plan of Operation.

Comment 15: *The DEIS does not adequately describe provisions of the performance bond required of Copar, such as the amount, type, and mechanism for financial assurance relating to environmental protection. For instance, what are the conditional requirements if revegetation efforts are not successful? The public and decision makers must be assured that there will be adequate funding to implement all monitoring and reclamation requirements in the event of a company default or abandonment of the site.*

Response: The amount of the performance bond will be determined based on the final Plan of Operations, and the bond must be furnished to the Forest Service before the Plan can be signed. The regulations giving

the requirements for bonding are found in 36 CFR 228.13. The amount of the bond is calculated as the cost to the Forest Service if the operator were to default and the Forest had to hire all of the specified reclamation work to be done (36 CFR 228.13 (b)). The amount will be calculated after all of the mitigation measures have been added to the Plan. For "insurance", reclamation is bonded for results, not for activities. For example, bond held for revegetation is not released when the specified seeding and planting is completed, but when vegetation growth actually meets the ground cover criteria and acceptable tree seedling mortality rate.

Comment 16: *The DEIS is not clear as to what is an enforced regulation and what is just a matter of intent or "wishful thinking", such as tonnage hauled, number of haul trucks, operating hours per day, etc.*

Response: The operator's Plan of Operation is required to describe the number and type of haul trucks, the operating hours and schedule. Once the Plan is signed, the operator is approved to do that amount of activity or less. The Plan of Operations is an enforceable document resembling a signed contract.

Comment 17: *The DEIS page 1 states that the mine would not operate during severe winter conditions. Who decides what is "severe" and what oversight and assurance will there be that hauling will not occur during icy, snowy or other hazardous conditions? [Some commenters added examples of "near miss" situations with pumice trucks during inclement weather or snowy road conditions].*

Response: The mine supervisor has stated that the mine will not operate during severe winter conditions. The Forest Service can not determine for the operator what constitutes "severe" conditions, or assume the task of oversight in order to assure the public that hauling will not occur during those times. This would be logistically problematic and would result in selective regulation of traffic along a State Highway, which the Forest Service does not have the authority to manage. The Forest Service is developing voluntary compliance measures which could be adopted by the operator to address the situation.

Comment 18: *Contrary to the DEIS page 35, there is not sufficient evidence that the mine supervisor takes consistent, reasonable precautions to get to the site prior to haulers, assess road conditions, and stop hauling under hazardous road conditions.*

Response: The mine supervisor indicated, in a recent discussion (Project Record 212), that whoever arrives at the mine first, whether truck drivers, mine workers or mine supervisor, has the responsibility to contact the mill office and relay a message to the haulers and other personnel regarding the morning road conditions. It is to the company's and the contract drivers advantage to suspend hauling during hazardous conditions, and any of the persons listed above may relay the information. It is difficult to get road information to all the drivers before they start work, as drivers begin travel to the site as early as 4:00 am.

Pumice Supply, Demand and Use

Comment 19: *We question the basis for determining the validity of the mining claims for mining pumice in the Jemez National Recreation Area, which hinges on the economic viability (market value) for this "locatable" pumice in the garment industry. There are alternatives to pumice for stone-washed fabric being developed and utilized. Thus the garment industry's demand for pumice is expected to decline over the next 10 years, reducing the long-term economic viability of the El Cajete mine.*

Response: We agree that the validity of an unpatented mining claim depends on multiple factors including whether economic conditions exist which give the mineral a commercial value. The existence of an economically viable pumice market was demonstrated by the Las Conchas mine. Any number of products may be in the process of development, but discussion of these is limited to speculation until their use has been demonstrated. Other products currently serve a similar function as pumice in the fabric finishing industry, but have not completely replaced the use of pumice. The continued future use of these other products is far from determined. Enzymes alone can be effective but are much less costly when used with a "carrier" such as pumice, which is still the cheapest material, over all, for this purpose. Although there has been an decrease in the total market use of pumice during the last few years, Copar has continued to sell its product at a steady rate. From inquiries into the industry, the El Cajete pumice deposit is of a consistent high quality desirable for fabric finishing. The recent trend in the market has in part reflected other pumice providers leaving the market because they could not compete well with the Copar product. A 1914 court case (Diamond Coal & Coke Co. v. U.S., 233 US 236 (1914), pp. 239-240) used the following statement: "the known conditions (are) plainly such as

to engender the belief that the land contain(s) mineral deposits of such quality and quantity as would render their extraction profitable and justify expenditures to that end." Copar has a proposed a 10-year mine. Over that time period, it appears that the above statement would apply. Although there is no simple test for determining whether an unpatented mining claim is valid, the above test has been used to describe a qualification for a valid unpatented claim in numerous court cases since it was first announced by the United States Supreme Court in 1914.

Comment 20: *The Forest Service misclassified the 3/4" pumice mined from El Cajete as "locatable" based on the high market value for fabric finishing. We believe this market will not remain viable for the life of the mine and at the least the mining should be approved in small increments with annual reevaluation of market conditions. Thus, the 3/4" pumice should be classified as "common variety" rather than "locatable" under the Common Varieties Act of 1955, and the Jemez National Recreation Area Act of 1993 excludes mining common variety material in the Jemez National Recreation Area.*

Response: Please refer the Response to Comment 19 regarding the economic market for pumice. Mining would occur in block increments (five blocks of up to 27 acres each) so that surface disturbance (reclamation, active mining and topsoil storage space) will be confined within one block at a time (FEIS, Chapter I, Proposed Action). Because blocks are to be mined consecutively, mine development is confined to what can be produced (locatable pumice as per the Jemez National Recreation Act) and sold (economic conditions). If market conditions were to significantly change during the life of the mine, a re-classification of the pumice could well be indicated.

Comment 21: *Pumice isn't vital to the Nation. It's used for non-essential products, and there are non-mining alternatives for making stone-washed jeans.*

Response: The operation of the existing General Mining Law apply, whether a material is "vital to the nation" or used for "stone-washing" jeans. As discussed in Response to Comment 19, pumice is still cheaper to use than other materials or enzymes alone in the fabric finishing industry. As long as this is the case, a market exists for this product.

Comment 22: *Why aren't alternative pumice claim locations being evaluated instead, to meet demands for road and building materials, and health and beauty aids?*

Response: A claimant has the right to access locatable minerals on their claims (1872 General Mining Las, as amended). Copar has proposed to mine the pumice at this location. Advantages of the location (to the operator) include a short distance to highway transportation, a site which avoided Threatened and Endangered Species (the operator made inquiries before settling on this location) and a known uniform and abundant source of pumice. The mine was proposed in this location before the Jemez National Recreation Act became law. Road and building materials ("common" variety pumice) cannot be commercially mined at this location under provisions of the Jemez National Recreation Area Act.

Recreation

Comment 1: *Mining isn't consistent with the recreational attraction of this area, and the DEIS does not adequately consider the negative impacts to recreation uses and opportunities. It will significantly impact people who recreate in and around the mine and haul roads, including numerous people who cross-country ski, bicycle along State Highway 4, hike and horseback ride (especially along the East Fork Trail, #137), fish, camp, and gather wild mushrooms. The sense of serenity, beauty and isolation will be lost and the quality of the recreational experience in the Jemez National Recreation Area and along the Historic and Scenic highways will be greatly diminished.*

Response: Mining is permitted within the Jemez National Recreation Area on valid unpatented mining claims established prior to the passage of Public Law 103-104 (Project Record 31). For greater detail see the Responses to MINING Comments 4, 14, and 20.

The FEIS (Chapters III and IV, Recreation Opportunities and Uses) adequately describes the recreation uses and opportunities and discloses that the mining impacts on this resource are considered significant and will last many years. However, they do not extend throughout the NRA and are minor in comparison to the recreation resources available within the 57,000 acre Jemez National Recreation Area. Impacts to recreation by the El Cajete Pumice Mine would be similar to the impacts that have resulted at the Las Conchas Pumice Mine, located 1.25 miles to the east. The Las Conchas Pumice Mine has been in operation since 1989, during which time recreation use for the entire Jemez National Recreation Area has been increasing at an annual rate of 8% (Project Record 111).

Scenic resources and associated impacts are discussed separately in the FEIS (Chapters III and IV, Scenery), and in the Responses to SCENERY Comments. Visitors driving for pleasure and viewing scenery would result in the greatest number of users impacted by the mine. Under Alternative 1(a), two areas of sparse vegetation would permit views of the mine site 200 feet north of the highway. Views would last several seconds at highway speeds. Eventual loss of the vegetative screen, due to severe disease infestations, will increase the impact over time. Other dispersed users may see the mine through clearings in the vegetation from several viewing areas located 2-3 miles from the mine area (Project Record 119).

On windless days, sound from mine operations may be heard within a quarter mile by recreationists on segments of Forest Trail 137 and the Mistletoe Canyon Ski Trail (FEIS, Chapter IV, Sound). Mining noise, including impacts on recreation, are discussed in the FEIS (Chapters III and IV), and in responses to the comments on Noise.

Mitigation measures will be employed to reduce the impacts to recreation uses and opportunities. Mining will not occur on weekends and holidays when most recreation use occurs to reduce traffic congestion. Progressive mining and reclamation techniques will mimic the characteristic landscape to reduce visual impacts and speed recovery of the seeded and planted vegetation. Native grasses, forbs and shrubs will be seeded on the reclaimed area; ponderosa pine seedlings and shrubs will be planted; and selected existing shrubs will be transplanted to mimic natural patterns. A short segment of the Mistletoe Canyon Ski Trail will be relocated outside of the mine boundary. As soon as the reclaimed areas are determined to be successfully revegetated, the public will be permitted to access and use these areas. Fencing, to exclude livestock during the mining operation, will make use of natural openings to reduce visual impacts. A portion of Forest Road 4G may be retained after mining and reclamation to provide access to a future trailhead and scenic view of Redondo Peak. These and other mitigation measures that affect recreation are detailed in the FEIS on Chapter II, Alternative 1(a).

Jemez National Recreation Area

Comment 1: *The potential impacts of the mine and the heavy truck traffic are inconsistent with the intent of the Jemez National Recreation Area. The proposed Plan of Operation for the mine would violate the Jemez National Recreation Area mandate, permanently impairing some of the values for which the Jemez National Recreation Area was established to conserve, protect and restore. In addition, the DEIS requirement for surface reclamation grossly disobeys the scenic and topographic reclamation guidelines of the Jemez National Recreation Area.*

Response: The purpose of the Jemez National Recreation Area is to "...conserve, protect, and restore the recreational, ecological, eultural, religious, and wildlife resource values of the Jemez Mountains". Management requirements for these and other resources, including minerals, within the Jemez National Recreation Area are set by Public Law 103-104 (Project Record 31). Requirements that directly affect mineral management are contained in Section 2(a) and Section 3(b-d).

Section 2(a) states that the Jemez National Recreation Area shall be administered in accordance with "...the laws, rules, and regulations applicable to National Forest System lands in a manner that will further the purposes of the recreation area". In addition, management of natural resources "shall be permitted only to the extent that such management is compatible with and does not impair the purposes for which the recreation area is established". Section 3(b-d) permits mining to go forward on valid unpatented mining claims that were in existence prior to passage of Public Law 103-104. The proposed El Cajete Pumice Mine will be on unpatented mining claims filed in 1988 prior to establishment of the Jemez National Recreation Area. This section also requires reclamation of lands disturbed by mining "...to a visual and hydrological condition as close as practical to their premining condition."

The mitigation measures identified in the FEIS will be an integral part of the approved Plan of Operations for the proposed mine and will control impacts to the environment to the extent practical (FEIS, Chapter II, Alternative 1(a)). These measures are the direct result of the establishing legislation for the Jemez National Recreation Area and other federal laws and regulations governing resource management and environmental protection of the Santa Fe National Forest.

Approval of a Plan of Operations for the El Cajete Pumice Mine that incorporates mitigation measures for the protection, conservation and restoration of resources is consistent with the Jemez National Recreation Area. The establishing legislation, and the other federal laws and regulations governing mineral rights, require approval of mining on valid unpatented mining claims. The impacts to soil productivity and wood fiber and herbaceous production will be irreversible. Other resource impacts range from 10 to 30 years but are not permanent. Reclamation

measures restore scenery and hydrological function to the extent practical as required by the legislation.

For information on the specific mitigation measures which provide for the conservation, protection and restoration of the many resource values of the Jemez National Recreation Area see the responses to the comments received for these resources.

Wild And Scenic River

Comment 1: *Mining will compromise values within the adjacent wild and scenic river corridor. No estimates of the impact of noise from the mine activities that could be heard by visitors to the "wild" river section of East Fork of the Jemez River were mentioned in the DEIS. Noise from the mining operation would be in conflict with the spirit and intent of the Wild and Scenic Rivers Act.*

Response: There are no sound regulations for the East Fork of the Jemez National Wild and Scenic River. The DEIS states that sounds from mining equipment, screening plant and haul trucks in the range of 63 dBAs will be most often heard by users of Forest Trail 137 within 0.25 mile of the El Cajete Pumice Mine (FEIS, Chapter IV, Recreation Opportunities and Uses, and Sound). This assumes there is no wind, topographic or vegetation barriers that would make this level of sound inaudible. The length of trail in this hearing range and within the wild section is about 0.75 mile long. Sounds from mining would not be heard on the river because of the background sounds of running water. Sounds would also not be heard on weekends or holidays when the mine is closed (also, see Response to NOISE Comment 3).

Comment 2: *Public access to the East Fork of the Jemez Wild and Scenic River area will be blocked by this mine.*

Response: Portions of the area being actively mined and reclaimed, and Forest Road 4G, will be closed to public entry for safety purposes. Once reclamation is determined to be successfully reclaimed, the area will again be opened to public use. Although a few people travel across the proposed mine area to reach the river corridor and Forest Trail 137, most visitors utilize Forest Road 131 or the Mistletoe Canyon Ski Trail to access the corridor and trail. These routes will remain open to permit travel around the closed area (FEIS, Chapter II, Alternative 1(a)). Traveling around the closed area could increase the miles traveled by 0.5 to 1.5 miles depending on the route taken and the location of the active mining and reclamation.

Scenery

Comment 1: *The beauty and pristine quality of much of the Jemez is a precious quality that needs and deserves protection. The mine's proposed size and scope would significantly impact scenery of the Jemez National Recreation Area. The mine is inconsistent with the scenic beauty and recreation attractions of the area. We don't need to destroy more beautiful terrain and threaten the integrity of the Jemez National Recreation Area with scarring for the sake of stone washed jeans.*

Response: We recognize the high quality of the scenic beauty in the Jemez National Recreation Area (FEIS, Chapter III, Scenery). The effects on scenery from the El Cajete Mine are displayed in Table 5, FEIS, Chapter IV. The Summary of Scenic Effects has been rewritten to correlate with Table 5 and clarify conclusive statements.

Please also see additional responses related to SCENERY.

Comment 2: *Not only will the beauty of the area be ruined but it will also detract from the ability to draw tourists to the area which we need for our local economy. The DEIS fails to adequately analyze adverse impacts on the recreation opportunities and uses regarding scenic resources.*

Response: Please refer to Response to Tourism Comment 1 under SOCIO-ECONOMIC.

Comment 3: *The existing topography breaks up the viewscape, provides privacy and a sense of isolation for recreation visitors. Mine restoration should reasonably approximate the lay of the surroundings and must result in a scenically nonperturbing landscape. The DEIS does not do this. The final topography of the restored mine is a pit 1/2 miles long and 500' wide and depth of 100 feet. This in no way resembles or blends into the surrounding landscape and it will be a gross violation of the existing legislation governing surface restoration of the Jemez National Recreation Area.*

Response: The restored mine will not resemble the pit described. Although the mining depth will vary between 30 and 80 feet, common variety pumice will be stockpiled and used later for reshaping and reclaiming the mined area. The resulting terrain after

reclamation is estimated to average about 20 feet below the existing elevation since the stockpiled pumice will not compact to its original volume (FEIS, Chapter I, Proposed Action).

The FEIS (Chapter II) also includes an additional mitigation measure for reclamation: A planned reclamation contour map and planting plans, submitted by the mining company, will be approved by the Forest Service. The planting plan will identify the planting location of native grasses, forbes, shrubs, tree seedlings and transplants as described in the FEIS, Chapter II.

The approved planned reclamation contour map will reflect the requirements in the FEIS, Chapter II. Prior to spreading of topsoil, wasted pumice will be back filled and reshaped, characteristic of nearby meadows, and to prevent off-site drainage. Small hills, similar to naturally occurring hills in nearby grasslands, will be constructed to block long linear views in the reclaimed area. In addition, all reshaped slopes will be rounded and limited to a maximum of 30 percent. Contour furrows and silt fences will be installed across critical slopes to reduce soil erosion.

Please reference FEIS, Chapter IV, Environmental Consequences, Scenery, for added clarification to descriptions by alternative of the impacts to scenery related to final contours and topographic features. Also reference Responses to MINING Comments 9 and 10.

Comment 4: *The proposed mine would be visible from State Route 4, a State designated Scenic and Historic Byway, and from several points from State Route 4, particularly since the screen of vegetation left between road and the mine is expected to be lost because of blow-down and tree mortality. The mine will have a significant impact on the quality of visitor experience at the Jemez National Recreation Area and to the residents of the area.*

Response: The DEIS is in agreement with these statements. Due to the predicted loss of vegetation screen, the Plan of Operations may require planting a mix of native vegetation to limit any significant views into the mine from the highway. To effectively limit views, planted vegetation would need to be large enough, and placed in strategic groupings to ideally limit views of the mine area from any point along the highway. However, native species of firs and pines, and even to some extent aspen, are susceptible to the same diseases as the existing vegetative screen. Aspen would only be effective part of the year since during leaf off the mine would still be visible. Non-native species are not recommended since they would appear out-of-context.

Consequently, prior to requiring a screen to be planted, the Plan of Operation will assess the longevity of individual trees, the extent of the mine area seen or potentially seen, and the longevity of a planted screen. Due to these varying conditions, the effectiveness of a planted screen cannot be relied upon to limit views of the mine and therefore achievable scenic conditions do not reflect any benefit from screen plantings in the "Summary of Achievable Conditions".

Comment 5: *Is not any modification of this pristine area unacceptable? The DEIS describes unavoidable adverse impacts, often modified by irreversible and irretrievable consequences to scenery. This should be reason enough not to allow the mine. The benefits do not outweigh the negative consequences.*

The existing Las Conchas mine is classified as Unacceptable Alteration; "what not to do to any landscape", per the DEIS glossary definition. The record is clear. Why another? The mine's impact is cumulative with the scenic impact from the Las Conchas Mine.

The mining impact is long term. The DEIS addresses the destruction of beauty for the remainder of our lives which is absolutely unacceptable. The DEIS states Unacceptable Alternation for decades. In Alternatives 1 or 1a, the scenic level of Retention is not achieved, even after 30 years reclamation. Consequently, it will only be our future grandchildren that will be able to begin to enjoy the beauty of the area.

Response: We acknowledge the serious adverse effects of the mine on scenic values. The scenic condition of the El Cajete pumice mine site up to 2 years after reclamation is classified as "Unacceptable Alternation" regardless of the action alternative. We also agree with the statements relating to the duration of the impacts to scenery. The mining impact to scenery is long term (displayed in FEIS, Table 5, Chapter IV). The "Summary of Achievable Scenic Conditions" has been rewritten to correlate with Table 5 and clarify conclusive statements.

Over time, views of the mine may become less of an impact on visual quality, depending on the observer position, the duration of view or travel speed, and the amount of screening, as the grasses, trees and shrubs grow. As staged reclamation efforts take affect, the mine will slowly assimilate mountain opening characteristics and eventually the edges of the opening will blend into the landscape. In Alternative 1(a), this

will occur over a 20 to 30 year time frame and beyond depending upon observation point and when the planted trees reach 20% of the adjacent stand height. Alternative 2 takes on similar characteristics within 2 to 15 years since the mine is smaller and the boundary follows natural topographic breaks which limit or buffer views and enable a more natural blending of the opening. Alternative 1(a) relies on planted vegetation and internal contours to blend the opening while Alternative 2 relies on these in addition to it's smaller size and the immediate surrounding terrain features to blend the opening's edges.

The FEIS also recognizes that the El Cajete mine's impact is cumulative with the scenic impact from the Las Conchas Mine (FEIS, Chapter IV, Summary of Scenic Effects). The cumulative impact would occur approximately over a 15-year period when the El Cajete Mine is being actively mined and reclaimed, and the vegetation on the reclaimed Las Conchas mine is maturing and assimilating this mine into the forested landscape.

While acknowledging these impacts, the FEIS also recognizes that from within many portions of the viewshed the mine may not be visible due to the dense forest canopy cover and terrain features. Of the observation points analyzed on National Forest System Land, the majority of observation points currently have limited views of the proposed mine site due to existing vegetative screening at the observation point. (Scenery Effects Analysis Findings by Key Observation Points (Project Record 119).

Please refer to Responses to MINING Comments 11, 21 and 22 for an explanation of why another mine is proposed.

Socio-Economic

Tourism

Comment 1: *The DEIS is totally deficient in its discussion of economic impacts. Economic activity is not discussed in the following terms and is not referenced even once regarding the tourism industry, regional economic development, hunting & outdoor recreation industry, or the concept of regional or national economic value of the Jemez National Recreation Area. In addition, there is no mention of the economic impacts to the State, Los Alamos or Jemez Springs.*

Response: We agree that tourism is an important part of the local economy. We do not agree, however, that the impacts to recreation use from the 83.5 acre El Cajete Pumice Mine will cause a measurable reduction in recreation use or the economic activity in the area.

The tourism economy results from: 1) The numerous recreation opportunities within the 57,000 acre Jemez National Recreation Area and the surrounding 187,000 acre Jemez Ranger District of the Santa Fe National Forest; and 2) The rapidly increasing population growth that is occurring in and around the cities of Albuquerque, Santa Fe, Rio Rancho and Los Alamos.

The effects of the mine on the tourism economy are limited because the mine and its impact area will affect a relatively small number of recreation users in comparison to the recreation use occurring in the surrounding Jemez National Recreation Area and Ranger District. In addition, recreation use is likely to grow rapidly in proportion to the expanding urban populations.

About 100 Recreation Visitor Days (RVDs) of dispersed recreation use annually will be directly displaced by the mine. Visitors at developed recreation sites will not be impacted. Another 30,000 RVDs may be affected where users can see or hear the mine. In comparison, the Jemez National Recreation Area and Ranger District receive more than 600,000 RVDs in dispersed and developed recreation use (FEIS, Chapter IV, Recreation Opportunities and Uses, and Project Record 111).

It is expected that most of the small number of recreation users displaced by the El Cajete Pumice Mine will simply utilize other nearby areas and continue to contribute to the economy. This has been the case with the existing Las Conchas Pumice Mine. The Las Conchas Pumice Mine, which has been in operation since 1989, also displaced a small number of recreation users and can be heard and seen over much of the same area. During this time period, recreation use has increased 8% and highway traffic has increased 15% annually (Project Record 111). The El Cajete Pumice Mine will replace the Las Conchas Pumice Mine; they will not both be operating simultaneously.

Local Economy

Comment 2: *The number of jobs provided by the Copar Pumice Company to people living in communities near the mine is negligible. For instance, most of the truck drivers live in Rio Arriba County and their participation in the Jemez economy is trivial at best.*

Don't let the non-use people stop this. Too many of our young people have already left because there was no work. Employment of mine workers is important to Los Alamos County.

Response: We agree that the 28 or more jobs that will be directly created by the El Cajete Pumice Mine are very small in comparison to the total jobs generated within the counties which the mine, mill sites, business offices and workers live or conduct the business of Copar Pumice Company.

The proposed mine will be located in Sandoval County where the San Ysidro Mill currently manufactures, packages and ships products from the Las Conchas Pumice Mine. Many San Ysidro Mill workers are residents of the communities of San Ysidro and Jemez Pueblo which are also in Sandoval County. The Transit Mix Mill, which also serves the Las Conchas Pumice Mine, is located in Rio Arriba County. Communities in Rio Arriba County and the adjacent Santa Fe and Los Alamos counties are home to most of Copar Pumice Company's workers.

The contribution to the economic health of the affected employees and their counties and communities should not be discounted, however, because the number of jobs created is small or the beneficial economic impacts occur at a distant location. These jobs are important to the employees and their communities because the jobs are full-time, year-around, relatively well-paying jobs in areas where chronic unemployment is relatively high and many job seekers must migrate to other areas to secure employment.

Residential Property Values

Comment 3: *Private land in the Jemez Mountains is valuable because it offers vistas, tranquility and an escape from noise. These values will be negatively affected by mining activities, including the impact of heavy truck traffic on commuters to Los Alamos.*

Commenters "strongly dispute the insinuation that property values will remain high, regardless of size and scope of the proposed mine."

The assessment of impacts on property values is inadequate and should be re-evaluated using professional economists and by polling all residents, realtors, and developers. "The Forest Service should provide the public with open case studies of mines in other areas of the West and their impacts on property values."

The DEIS does not acknowledge the near-unanimous opposition of the Sierra Los Pinos homeowners to the proposed mine based on the probable adverse consequences to their property values. "I suppose that in 30 years, when most of the homes in the area have been abandoned, the conclusion will be reached that there was a detrimental effect."

Response: The public scoping process for the DEIS included the Home and Landowners Association for the Sierra Los Pinos Subdivision and Vallecitos area and all known residents and landowners in the subdivision, Vallecitos and Holt Tract private lands. The scoping revealed that some residents and landowners and the Home and Landowners Association were concerned that a mine near the private lands could reduce their property values. As a consequence, these concerns and the potential effect on residential property values were discussed (FEIS, Chapter III and IV, Residential Property Values).

Property values of a home or residential lot in this area can be affected by many factors. A home or lot's view, its location in a quiet neighborhood or the amount of traffic encountered while commuting may be important to some buyers. Factors affecting the purchase price for other buyers may include the price of homes and lots, cost of financing, community services available and the property's location within commuting distance to work, schools, churches and medical and shopping facilities.

Because there are many factors resulting in the price of a residential property and each buyer differs on the importance of each factor, it is not possible to predict the actual change in a specific area's property values from a poll of residents and landowners, or by comparing impacts of mining on property values in other western states as some commenters suggest.

Comments received from home and landowners during public scoping varied in their perception of mine impacts on property values. Of the 130 residents and landowners contacted during the public involvement process, 10 indicated they were concerned about property values (Project Record 23 and 24). Of the 65 letters received in response to the DEIS, 8 are from residents and landowners concerned that property values might decline (Project Record 190). The closest resident, who lives 300 feet from the mine and is building and selling homes on his property, said he is not concerned about the impacts of mining (Project Record 22). The realtor who has sold property in this tract, after notifying buyers mining is likely to occur, reports homes and lots are continuing to sell at increasing prices (Project Record 81).

The Las Conchas Pumice Mine has operated since 1989 and is about 1.75 miles from this private land. Hauling of pumice over State Highway 4 from this mine has been at the same level proposed for the El Cajete Pumice Mine. Property values have not declined due to this haul traffic or other mining impacts.

The suggestion that mining impacts on property values in other western states be used to gauge changes in property values in the subject area would not result in reliable information for many of the reasons discussed above. Property values are unique to each community and its economic base and can be expected to vary widely across a large geographic area (Project Record 200).

Comparison of data on actual sales to past sales before, during and after mining in this area, therefore, would be the only reliable measure for determining whether property values had been adversely affected by the mine. Other factors affecting property values, such as changes in employment opportunities and supply and demand for properties, would also be accounted for in this process. It was for these reasons that the DEIS states that long-term monitoring of sales data would be necessary to determine if mining adversely effects property values (Project Record 19).

Road Repair and Maintenance

Comment 4: *The true costs of shipping pumice have not been adequately addressed. There would be extra road wear and damage caused by the heavy truck traffic. The costs of increased maintenance and potential widening and improvements to State Highway 4 would be borne by the state and county and taxpayers all for the benefit of Copar.*

Response: Copar Pumice Company's planned use of the highway is the same amount that has occurred for the haul from the existing Las Conchas pumice mine, which would be replaced by the El Cajete Pumice Mine (refer to Response to TRANSPORTATION OF PUMICE AND HIGHWAY SAFETY Comment 12; and Project Record 166).

New Mexico State Highway 4 is a public road designed and maintained to bear the weight of the 18 wheeled tractor-trailer trucks employed by Copar Pumice Company's contract truckers and all of the other companies hauling on this route (Project Records 114, 165, 172, and 183). See also Response to TRANSPORTATION OF PUMICE AND HIGHWAY SAFETY Comment 4.

The increased construction and maintenance costs of all highways caused by truck use is compensated for in the higher registration fees and fuel taxes charged truck owners. Construction and maintenance costs resulting from trucking on Highway 4 is not tracked separately by the State Highway Department. Fees and taxes that are collected from these truckers are deposited in general state and federal revenue funds.

The Federal Highway Administration and State Highway Department in the late 1980s and early 1990s improved several sections of Highway 4. There are no future plans to widen or reconstruct the highway north from Jemez Springs to Los Alamos (Project Record 165). Remaining construction work on the highway is between San Ysidro and Jemez Springs. It will include straightening of some curves, shoulder widening and paving, guard railing, culvert construction, bridge reconstruction and improved signing (Project Record 162). This work is a routine modernization of the highway which benefits all motorists and commercial operators and is not connected to pumice haul traffic.

Benefits/Costs

Comment 5: *The financial impact of this project to the State of New Mexico's economy would not be significant.*

Response: We agree that the $800,000 to $1,500,000 in annual sales and 28 full-time and 2 part-time jobs generated by the proposed mine is insignificant when compared to the either the State's total or mining economy. The economic impact of the proposed mine, however, is important to the workers and communities in which they reside. Please see the Response to Local Economy Comment 2.

Comment 6: *All mining activities have some long-term negative economic impacts (costs) which the DEIS failed to address. The only consideration in the DEIS is the economic well-being of Copar. Costs such as accidents, property value degradation, increased traffic enforcement, increased road maintenance, grazing losses, and replacing the study area, should be considered. Also, the economic effects of road traffic on local communities, tourism, hunting and outdoor-recreation industries, regional economic development and regional and national economic value of the Jemez National Recreation Area should be considered.*

Response: The proposed El Cajete Mine would be similar to the existing Las Conchas Mine in terms of the number of employees and amount of traffic.

Experience from the Las Conchas Pumice Mine indicates that significant costs to State and local governments, property owners and tourist industries have not occurred. In addition, issues regarding benefits/costs of the mine were not expressed by the public during scoping. Consequently, an in-depth analysis and assignment of dollar values to costs was not conducted in the DEIS. Please refer to the Responses to Comments on the JEMEZ NATIONAL RECREATION AREA, WILD AND SCENIC RIVER, RECREATION, TRANSPORTATION OF PUMICE AND HIGHWAY SAFETY, and Residential Property Values, and Road Repair and Maintenance for additional explanation of costs.

The benefits and costs are not a factor in deciding to approve the proposed Plan of Operations because approval is not a discretionary decision. Please refer to the Responses to MINING Comments 1 through 6 for additional information on the mining laws and regulations.

Comment 7: *The DEIS misinforms the public by a claim that there would be no negative economic effects associated with mine development. Under what reasoning do you come to the conclusion this mine would enhance the National Forest and enrich the good citizens of the United States? The public is tiring of these public land giveaways. What is the deal for the American public? How do we profit? Does the Forest Service earn any money during these 10 years.*

Response: The DEIS does not claim there are no negative economic effects. However, the analysis did not indicate environmental impacts would result in costs extensive enough to warrant an in-depth economic analysis, and therefore, costs were not considered in detail. Congress, under the General Mining Law, grants a mining claimant the right to mine without charge. Consequently, the federal government does not earn revenue from the production of locatable mineral deposits under the US mining laws.

Comment 8: *Since we cannot see Copar's payroll data, how do we know that this is an economic good for the locality and not just an activity to increase the mine owner's personal wealth.*

Response: The purpose of a mining business is to make a profit for the owners. The existing Las Conchas Pumice Mine is evidence that mining locatable pumice in the El Cajete Pumice Deposit is profitable enough to employ 28 full-time and 2 part-time workers and has resulted in beneficial monetary impacts to local communities and counties. The proposed El Cajete Pumice Mine is expected to have at least the same level of economic effects as the existing mine which it will replace.

Comment 9: *The DEIS fails to address the negative economic impact to the livestock industry from loss of pasture for cattle, and fails to consider alternatives, such as never resuming cattle grazing. No mention is made of when grazing may begin after reclamation or how cattle grazing would affect the reclaimed area.*

Response: The cattle grazing in the area would not be significantly impacted by the temporary exclusion from the mine area due to the availability of sufficient forage in the remaining allotment area. About 170 acres or 11% of the pasture will be fenced to exclude livestock during mining and reclamation (FEIS, Chapter IV, Livestock Grazing). Grazing could be permitted once ground cover reaches 50% and planted pine seedlings can withstand grazing approximately three years after seeding the site.

Comment 10: *Page 45 of the DEIS indicates the selection of Alternative 2 "could cost the mining claimants and Copar Pumice Company millions of dollars". This is not true. The selection of Alternative 2 or 3 will not cost the mining claimants or Copar millions of dollars because they do not own the pumice beneath our public lands yet. They will have to write off the money they have spent to research and file their claims, but until they mine and sell the pumice, they do not yet possess the millions of dollars they will get from mining on our public lands.*

Response: The FEIS has been reworded. Please also refer to Responses in the MINING section under Mining Laws, Regulations and Related Agency Policy.

Comment 11: *How much money was spent to study and publish the document?*

Response: The time and salary costs for interdisciplinary team members and the team leader who worked on the environmental analysis and DEIS for the El Cajete Pumice Mine were not tracked. Consequently, an accurate cost cannot be calculated for this work. The DEIS cost $7,000 to print.

Proximity to Mine Boundary

Comment 12: *Allowing mining near the Holt and Sierra Los Pinos residential areas may attract children into dangerous situations. Private property needs to be*

separated from mining activity. There should be at least a 300 foot buffer between the mine and residential property.

Response: Initiation of a development proposal for a mine on valid unpatented mining claims on National Forest System lands is at the discretion of the claimant, who has a right to mine properly located minerals under the US mining laws and regulations. Copar Pumice Company, as lessee of the unpatented mining claims, chose the El Cajete site in 1992 when they submitted a Plan of Operation for the 133 acre mine (Project Record 13). The mine was reduced in size voluntarily by Copar Pumice Company to 83.5 acres in 1995 after discussing with the Santa Fe National Forest the various concerns that had been developed during the planning process (Project Record 84).

Copar Pumice Company also volunteered to move the west end of the mine about 350 feet to the east of the Holt Tract boundary to reduce visual impacts of the mine on the one resident who would be able to see the mine from his home. This property owner stated he was not concerned with mining activity if it was more than 300 feet from his boundary, and the area would be reclaimed (Project Record 57).

Surface mining of pumice involves the use of large end-loaders, bull dozers, semi-trucks and a screening plant, as well as the excavation of a deep pit, and may present hazards to adults and children who get too close to operating equipment or the pit.

To reduce the likelihood of an accident, the area around the mine will be administratively closed to public entry under the Forest Supervisor's authority. Fencing, to exclude livestock, will also provide a visual barrier to public entry, and the fence will be posted with warning signs that advise people of the danger and administrative closure. A watch person will stay at the mine to prohibit unauthorized entry when miners are not present at night and on the weekends and holidays.

Transportation Of Pumice And Highway Safety

Comment 1: *The Forest Service should have a responsibility to refrain from enabling and abetting known illegal activities. The numerous violations and hazards from the pumice trucks include illegal hauling by oversized trucks through Bandelier National Monument, overloaded trucks, unsafe driving (high speeds, crossing yellow center line, disregard for bicyclists and other drivers), and failing to stop at the stop sign as they exit from the Las Conchas Mine. Such violations are difficult for the police to control. It is unacceptable for the Federal land manager to impose on local and state authorities this burden of law-enforcement. The court has thrown out citations by police because it is physically impossible for these trucks to legally navigate the road. This contradicts the DEIS that states the "highway system is built to facilitate commerce and is within the design limits of the highways."*

The Forest Service should regulate truck traffic associated with El Cajete Mine. Commercial hauling on portion of the State Highway is within Bandelier National Monument may not be allowed.

Response: The Forest Service does not sanction illegal activities of any kind. The trucks that will be used to transport pumice will be of legal size and weight. State Highway 4 design, use, and traffic regulations are all under the jurisdiction of the New Mexico Department of Public Safety, New Mexico State Highway and Transportation Department, and local agencies (i.e. Los Alamos County), and is not regulated by the Forest Service nor the National Park Service. The State has informed us that the centerline has been shifted on the tight curve above Los Alamos, enabling trucks to negotiate the curve without crossing the centerline (Project Record 114, 165).

The Jemez Ranger District encouraged the State Highway Traffic Engineer for District 6 and Jemez Pueblo and Jemez Springs to work together to reduce speeding by pumice trucks and other vehicles in these congested areas. As a consequence, the Highway Department lowered the speed limit in Jemez Pueblo and installed a flashing yellow pedestrian light in Jemez Springs to slow traffic and increase pedestrian safety. Jemez Springs will also prohibit use of "jake" or engine brakes to reduce noise from trucks (Project Records 159 and 152).

Comment 2: *The DEIS ignores the State's rules and Los Alamos County ordinances that state "when double yellow lines are painted on a pavement, no driver shall drive any vehicle across the lines except the driver of a vehicle turning left into or from an alley, private road, or driveway."*

Response: See Response to Comment 1 above. It is generally the responsibility of the New Mexico Department of Public Safety to enforce traffic laws. Attempts to enforce this regulation by Los Alamos County failed because the court ruled the highway was open to all trucks in this weight class and it was

impossible for drivers to negotiate the turns without crossing the center line (Project Record 119).

Comment 3: *Copar should be required to follow state highway laws and use pilot vehicles to guide the oversized vehicles proposed in the DEIS, through the twisty stretch of SH 4 through Bandelier National Monument, and the stretch of SH 4 east of Los Alamos County line to the junction of SH 4 and SR 501.*

To prevent potential adverse affect, we recommend flag persons be considered to control traffic and ensure motorist safety at the two or three hair pin turns which cannot be navigated by these vehicles without crossing into oncoming lane of traffic.

Response: The trucks used to haul pumice would not require the use of pilot vehicles or flag persons to meet legal requirements for hauling on State Highway 4, including through Bandelier National Monument, because they are of standard size and weight (Project Record 172). State Highway 4 is used by numerous commercial trucks of similar size class (80,000 lb. GVW) and has been used by Copar mine trucks hauling from Las Conchas Mine for the past 7 years. Therefore, it would not be reasonable to require pilot vehicles or flag persons for trucks from El Cajete Mine when it is not required for other commercial trucks on the highway (Project Record 114, 144, and 183; FEIS, Chapter III and IV, Highway and Mine Safety).

Comment 4: *A more reasonable and legally sound approach (rather than curve widening) would be to bar Copar and other semi-trucks from Highway 4 east of the Valle Grande since they cannot legally negotiate these roads.*

The FEIS should specify that in the absence of highway improvements of sharp curves, the hauling must be accomplished by shorter, non-articulated dump trucks of the 8-ton class. The size of haul trucks should be reduced.

Response: The State is aware of the problem of alignment on State Highway 4 and has made several improvements including paving shoulders, shifting the centerline and additional clearing (Project Record 165).

The state highway system is designed and constructed to facilitate commerce at the current weight limits (Project Record 165, 183). Lower weight limits could be established on State Highway 4, but that would be contrary to the purpose of the state highway system, would affect all truck operators, and would require more trips for all goods and services hauled via State Highway 4.

Additionally, if the size of haul trucks were smaller, there would be an increase in the number of haul trucks and risk of accidents. Since other large trucks already freely use the Highway, it is not reasonable to limit the vehicle size of just one operator.

Comment 5: *Require that all the trucks go towards Los Alamos and not through Jemez Springs to cut down on the possibility of lost lives near Soda Dam, the Mission and the Village of Jemez Springs.*

Response: As discussed in Response to Comment 4 above, State Highway 4 is a public highway, open to all highway legal vehicles. The Forest Service does not have the authority to direct traffic through one community in favor of another.

Comment 6: *The use of the proposed tractor trailer should be included in the Plan of Operations contingent on the completion of the major straightening and widening of turns on SR 4, which such trucks cannot otherwise negotiate legally.*

Response: The Forest Service does coordinate with the State and Federal Highway Administration on planning work on highways through National Forests. However, the Forest Service has no authority to direct State funded construction projects on State Highways (see also other Responses to Comments under this topic).

Comment 7: *Serious injury accidents have occurred from mining truck traffic, but were not mentioned in the DEIS. There have also been a number of near accidents when the pumice trucks cross the centerline and oncoming traffic must stop and backup the road to get past the trucks. Many commenters reported personal experiences with "near miss" accidents with mining traffic and it is predicted that many close calls have been unreported.*

Based on accidents from the existing Las Conchas Mine activities the accident statistic in the DEIS is incorrect. The impact and accident rate for the pumice trucks is underestimated. The record from the existing Las Conchas mine operation predicts that there will be at least 5.7 accidents (based only on known accidents) over the ten year trucking operation. The DEIS should list all accidents and incidents with Copar trucks in the final EIS.

It's possible that the 2.1 accidents predicted over the life of the mine operation could involve school busses or vehicles with many occupants. Fatalities are possible. The risk of fatalities for pumice mining is an

unacceptable public risk. In addition, this accident statistic is based on a national average of vehicle-miles, most of which are accrued on multi-lane, separated-direction, and relatively straight interstate highways, and most of which are on relatively flat terrain. The insurance industry could provide more relevant statistics on accidents per vehicle mile on the kind of road and rate-of descent appropriate to SR 4, as opposed to Interstate 80 across the midwest.

Response: There have been four accidents involving trucks hauling pumice in the last 7 years of operation at Las Conchas Mine (Project Records 117, 173). Two involved pumice trucks which had stopped to avoid another accidents, and were then hit by other drivers. The other two accidents were a result of mechanical failures. We are unaware of any fatal accidents that were caused by pumice haulers.

The proposed mine is located in the same general area and along the same highway as the Las Conchas Mine. The proposed mine also anticipates a similar hauling schedule, number of trucks and number of trips as occurs now from the Las Conchas mine, which the El Cajete Pumice Mine will replace.

We agree the accident rate for State Highway 4 could be higher than rates originally reported for other highways due to mountainous conditions and winding alignments. The average accident rate for State Highway 4 is lower than the state average for this class of highway. State Transportation Department records for 1993-1995 show, for the entire 67.9 mile length of State Highway 4, an average accident rate (all types of accidents) to be 0.75 accidents per 1,000,000 miles of travel. State Highway 4 is classified as a major collector from Los Alamos county to mile post 46.3. The state average for this class of road is 1.155 accidents per 1,000,000 miles. The section from Mile post 46.3 to 0.00 at San Ysidro is classified as a Minor Collector. The state average for this class of road is 0.928 accidents per 1,000,000 miles. The rates listed above includes accidents involving all classes of vehicles in all types of weather (Project Record 206).

Comment 8: *The DEIS needs to address the reason for the unusually high accident rate, the mitigation activities that will be instituted and the expected impact on the cost of the total operation for the community to absorb this unusually high level of accidents.*

Response: Please refer to the Response to Comment 7 above, and to Road Repair and Maintenance under SOCIO-ECONOMIC Comments.

Comment 9: *The DEIS fails to adequately analyze highway safety issues and the Federal officials are negligent in their treatment of this issue. A thorough analysis of highway safety, including the impact of traffic accidents, the increased commuter stress levels caused by encountering heavy truck traffic, the risk to bicyclists, the potential loss of tourism (from the reluctancy of visitors to drive to favorite recreation areas), and impacts to wildlife along the haul routes must be included in the document.*

Response: See Responses to Comments under WILDLIFE HABITAT, and SOCIO-ECONOMIC, Tourism.

Truck traffic on State Highway 4 from the El Cajete Mine will be no greater than the 40 round trips made daily when the maximum amount of pumice was being hauled from the Las Conchas Mine. As such, there will not be an increase in the impacts from truck traffic.

State Highway 4 is currently open to bicycle use. We agree that some stretches are not well suited for bicycles due to narrow shoulders and heavy mixed traffic.

Comment 10: *The DEIS states that the State Highway and Transportation Department is considering widening several curves on the Highway where the curve radii make passage of standard length of tractor-trailers difficult. This would have significant environmental impacts, and use of federal funds for such improvements would require full NEPA analysis. There are no plans whatsoever to widen the curves. This statement has no relevance, unless it is the implied intent of the Federal manager to make the mine's permit contingent on these road improvements' having taken place.*

Response: The DEIS is incorrect. Discussions with the State Highway Department regarding work on these curves in 1995 was misunderstood. The State has made some improvements to the area in question including paving of shoulders, additional clearing and restriping of sharp curves (Project record 114, 165). There are no known plans to do additional work from Jemez Springs northeast toward Los Alamos, and only minor improvements planned from Jemez Springs to San Ysidro. The Forest Service has no authority to make the mine permit contingent upon state highway improvements.

Comment 11: *Trucks exceed the 25 mph speed limit through Jemez Springs. Increased traffic will present increased hazards in Jemez Springs where folks walk, run, and children get off school buses, and near the play park.*

Response: We agree with these concerns. However, the New Mexico Department of Public Safety and local authorities have the responsibility to enforce the traffic laws on State Highways; the Forest Service does not have this authority. The Forest Service will monitor truck traffic and complaints from motorists on State Highway 4 and forwarded them to the mine operator and to authorities.

Comment 12: *Combining the South Pit, Utility Block and El Cajete mines, when in full operation, there will be 126 additional trucks per day at times added to the current traffic on portions of SR 4. The 20 trips per day from the El Cajete operation pose risks.*

Response: Copar states that between the El Cajete mine and the South Pit mine combined, they will make 40 trips per day maximum. Utility Block, which is a separate company, makes about 4 trips per day from their mining operation. This results in a maximum total of 44 trips per day, which is equal to the current operation. South Pit was proposed to provide pumice in the interim, pending the opening of El Cajete. This results in maximum of 44 round trips per day from all mining operations. Copar will employ the same 5 contract trucks to haul from the El Cajete and South Pit mines.

The average daily traffic on State Highway 4 is about 3,500 vehicles per day between 1993 to 1995. The 44 trips a day made by pumice haulers represents 1.2% of the overall traffic on the highway (Project Record 206). See also Responses to Road Repair and Maintenance Comments under SOCIO-ECONOMIC.

Comment 13: *Copar's pumice trucks wait for foremen to open the mine gates even under the worse conditions. Many mornings there are a number of trucks parked along the highway waiting for the mine to open. Often when roads are hazardously snow packed and slippery. The road clearing in the morning is sporadic at best and pumice haulers take no heed of road conditions.*

Response: Bad weather can be a problem in mountainous terrain. The mining company manages the hauling operation to avoid hauling during times of snow packed conditions (FEIS, Chapter III, Highway and Mine Safety). Driving during hazardous weather conditions poses a serious risk to both the truckers and other motorists and should be avoided.

Noise From Mining Operations And Truck Traffic

Comment 1: *Noise from mining equipment and trucks will have adverse effects in the area of the mine and along the haul route. This noise will impact rural communities, religious institutions, state and national monuments, a National Wild and Scenic River and National Recreation Area, a National Natural Landmark, and Forest Trail #137. The peacefulness will be disrupted, impacting residents, visitors and wildlife. Of particular concern is the noise from early morning, weekend and holiday operations, the use of "jake brakes", and haul trucks traveling together.*

Response: We agree that mining and hauling activities will be heard within and around the El Cajete Pumice Mine, along the State Highway 4 haul routes, and in the other areas mentioned in the Comment (FEIS, Chapters III and IV, Sound). The sound heard from mining and hauling activities will occur only during the work week and will be at the same level as produced at the existing Las Conchas Pumice Mine.

Impacts of sound on wildlife were considered in the Biological Assessment and Evaluation (Project Records 129, 130). Research shows wildlife tends to habituate to sounds or avoid areas with unnatural sounds. In general, wildlife populations and health of species are not adversely affected by sounds (Project Record 29).

There are no specific regulations governing the level of sound produced by mining and hauling equipment with the exception of nationwide muffler requirements to protect workers' hearing. The U.S. Department of Labor's Occupational Safety and Health Administration regulations require that engines must be muffled to reduce sound below the 90 dBA level because exposure for 8 hours at this level can cause permanent hearing damage.

Comment 2: *The noise standard of 65 dBAs may be appropriate for an urban neighborhood but not a quiet rural community. One important reason people live in this area is because of the quiet.*

Response: The U.S. Department of Housing and Urban Development (HUD) considers 65 dBAs to be an acceptable level of sound for residential areas during day light hours (Project Record 90). The U.S.

Environmental Protection Agency (EPA) considers 45 dBAs to be an acceptable night time sound level. The natural background sound level of forests on windless days is 40 dBAs (Project Record 1).

Sound becomes noise when it is unwanted, disagreeable or interferes with the performance or enjoyment of their activities (Project Record 90). Individuals, however, vary widely in what level of sound they consider to be an annoying noise. Because of the many physical and psychological variables involved, government agencies have attempted to define what sound levels are acceptable to people in a community. In the case of the 65 dBAs, about 80% of a community would find this level of sound acceptable (Project Record 59).

Comment 3: *The analysis needs to consider the amplification of noise by closed canyons and natural amphitheaters. Both of these natural features will enhance noise in the area of Jemez Springs and Vallecitos de los Indios.*

Response: The level of sound heard by visitors and residents will vary depending on a number of factors. On a windless day with mining equipment operating at 90 dBAs, a hiker on Forest Trail 137 about 1,600 feet away from the mine would hear sound at the 60 dBA level. The closest Sierra Los Pinos Subdivision resident, at a distance of 3,200 feet, would hear sound at the 54 dBAs level (FEIS, Chapter IV, Sound).

The sound levels discussed above assume there are no vegetation, topographic or mine wall sound barriers between the mine and the listener. Sound levels will actually be lower for most listeners because one or more of these barriers are present from most listening positions.

Wind speed would also have an effect on the ability to hear mining and hauling activities. A slight wind of less than 5 miles per hour can produce sound levels greater than 50 dBAs in a coniferous forest (Project Record 12). Winds above this level would likely mask most sounds from mining and hauling activities for most of the recreation users and residents.

Air Quality

Comment 1: *As long as the dust from roads, storage piles and screening plant are controlled according to the current Air Quality Permit the State air quality laws and regulations will be met. Copar should coordinate with New Mexico Air Pollution Control Bureau to determine whether the current permit will be completely applicable at the new site.*

Response: We agree. The US Environmental Protection Agency (EPA) has delegated to the State of New Mexico, under the US Clean Air Act, the jurisdiction to regulate air quality. The NM Environment Department's Air Quality Bureau (AQB) regulates emissions with an air quality permitting system.

The proposed El Cajete Pumice Mine lies within Sandoval County. Sandoval County is a designated Class II airshed that currently attains NMED's standards for dust and exhaust emissions. Proponents of activities that produce dust or other emissions must apply for an air quality permit, determine the amount of dust that will be produced, and control the dust to the levels specified by an air quality permit issued by the AQB. The Forest Service's role is to review and grant a Conformity Determination for new air quality permits that certifies whether or not the emissions to be permitted meet the NM State Implementation Plan.

Copar Pumice Company currently has an air quality permit for its existing screening plant and related activities at the Las Conchas Pumice Mine. Dust emissions are controlled as required under Air Quality Permit # 899-M-1 dated May 4, 1992 (FEIS, Chap. II and Project Record 11).

Copar Pumice Company plans to move and use this screening plant at the proposed El Cajete Pumice Mine. The existing plant is 7 miles from Bandelier Wilderness, a Class I Airshed, in Bandelier National Monument. The proposed mine is located 1.25 miles further to the west from Bandelier.

Copar Pumice Company must coordinate with the AQB prior to moving the plant because the air quality permit requires that at least a 15 day notice be given prior to moving. The AQB must grant permission to move because the El Cajete Pumice Mine and screening plant will be within 31 miles of a Class I airshed.

The existing air quality permit also requires: 1) The screening plant and conveyors are operated with water sprays or other control measures such that emissions do not exceed an opacity of 10%; 2) Road emissions are controlled with watering or other means; 3) No more than 400 tons of pumice per hour are projected 10 hours per day, Monday through Friday, April through December; and 4) The plant must not be located closer than one-quarter mile from an inhabited dwelling.

During the process of applying for the Air Quality Permit, Copar Pumice Company was required to hire an independent contractor approved by the Air Quality Bureau to computer model the production of dust from screening, conveying, piling and loading pumice. The modeling determined that with the required controls dust production would be limited to 3.7 tons of dust per year. The threshold for concern for Class I airsheds is 250 tons of dust per year from a single source. There is no limit to the number of single sources (Project Record 211).

To assure emissions from the screening plant and conveyors do not exceed permit requirements, opacity testing is conducted by a certified observer who makes an ocular estimate of the density of airborne dust at the screening plant. At the Las Conchas Pumice Mine, with a production of 250 tons per hour, opacity has never exceeded 5% because of the high water holding capacity of pumice (Project Record 113).

At the 400 ton per hour production level of the screening plant anticipated at the El Cajate Pumice Mine, water spraying may be necessary if opacity exceeds 10%. Watering would also be required under the air quality permit when necessary during dry conditions to control dust from mining and reclamation activities due to stripping, stockpiling and respreading of top soil and on interior haul roads. The approved Plan of Operations also requires the paving or surfacing of the haul from the mine to the highway to control dust (FEIS, Chap. II, Alternatives 1(a) and 2).

Comment 2: *There is no discussion of a source of water nor water rights needed for dust abatement. If water is hauled to the mine to reduce dust, truck traffic estimates will need to be increased.*

Response: The DEIS did not consider how Copar would acquire the water to be used in dust abatement because water can be purchased from area businesses or individuals who possess water rights. The number of water truck trips would not significantly increase the number of total truck trips.

Comment 3: *The dust will impact the resources of and visitors to Trail 137, the East Fork of the Jemez Wild and Scenic River and Bandelier National Monument. Dust from uncovered trucks coats vegetation in the monument and accumulates along the highway.*

Response: The proposed mine will be 1,000 feet from the boundary of the East Fork of the Jemez National Wild and Scenic River Corridor Boundary and is more than one-quarter mile from the actual river. Forest Trail 137 lies between the corridor boundary and the river. Bandelier National Monument is 7 miles from the mine. These distances and the dust control measures in the air quality permit and Plan of Operation, which requires surfacing or paving of haul roads, assure that there will be no adverse effects to resources or visitors in these areas.

A visual inspection of the highway failed to locate any accumulation of pumice dust. Cinders used by the Highway Department to increase traction on snow and ice were present and may be mistaken by some as pumice (Project Record 202).

Comment 4: *Mining and hauling pumice will produce dust in the area of the mine and along the haul routes, reducing visibility and air quality, coating vegetation, and affecting the health of residents. Pumice dust contains a radioactive component further posing a health threat for residents.*

Response: Pumice dust poses a health hazard when it contains cristobalite, a known carcinogen, or relatively high levels of crystalline quartz that can cause silicosis. Studies by the University of Texas show that El Cajete Pumice dust does not contain cristobalite and the crystalline quartz content is less than 0.5%. The Department of Labor's Occupational and Health Administration does not require use of respirators or other protective equipment for pumice miners and other workers handling pumice (Project Record 208).

The US Department of Labor's Mine Safety and Health Administration has inspected the Las Conchas Pumice Mine twice each year during its operation for adherence to federal safety regulations. Exposure of miners to silica dust was monitored by collecting air samples during the safety inspections. The samples determined that exposure of miners to silica dust was less than 20% of the permitted level. At this low level of exposure, the wearing of protective equipment by miners is not required (Project Record 210).

The computer modeling of dust emissions, which was conducted for the Air Quality Bureau in securing Air Quality Permit #899-M-1, shows there will be no health hazards for the public outside of the 330 foot restricted access area around the screening plant. Dust smaller than 10 microns (PM 10) and total suspended particulates are controlled within this area and ambient air standards for particulates are met outside of the restricted area (Project Record 211).

The radioactive nature of pumice dust was not considered in the DEIS since this concern was unknown at the time of publication. Subsequent discussion with geologists at Los Alamos National Laboratories reveals that El Cajete Pumice contains 5.7 parts per million (PPM) Uranium and 23 PPM Thorium. These trace amounts occur naturally in all volcanic rock and are about half of the level found in Bandelier Tuff which is the most common volcanic rock in the Jemez Mountains (Project Record 191).

A computer model developed by a volunteer for a continuing education class was used to calculate a rough estimate of the radiation dose possible from dust produced by the El Cajete Pumice Mine. The model assumed there were no dust abatement measures used to control dust. The model determined that the dose was below the EPA limits and would not pose a radiation health hazard to residents living one-quarter mile or more from the mine (Project Record 209).

According to the NMED comments on the DEIS, Copar Pumice Company will be in compliance with the air quality laws and regulations if the dust from haul roads, storage piles and the screening plant are controlled as required by the current air quality permit (Project Record 176).

Comment 5: *The DEIS fails to adequately evaluate air pollution impacts from mine truck traffic, including sulfur dioxide, carbon monoxide, hydrocarbon particulates and other pollutants within the Jemez Mountains and Bandelier National Monument. Bandelier is a Class I Airshed. Cumulative effects of exhaust emissions must be considered under the Clean Air Act.*

Response: Emissions from internal combustion engines used in mining were not considered in the DEIS and FEIS because the EPA sets the emission levels for engines prior to manufacture and the exhaust emissions are insignificant when compared to the total exhaust emissions occurring on this highway or within the Sandoval County Airshed. In the air quality permitting process, the AQB only considers exhaust emissions from fixed sources and not from mobile highway sources (Project Record 211).

Comment 6: *Further analysis of the dust is required, and should consider weather conditions, use of tarps to cover pumice during transport, mining methods, and the requirements under the Clean Air Act.*

Response: The NMED's AQB has the jurisdictional authority to control emissions under the Clean Air Act and would have to determine the need for further analysis. Truckers are required to cover their loads under NM State highway regulations. Dust blowing off of pumice haul trucks on the State highways is considered to be insignificant by the AQB (Project Record 211).

Soil Productivity

Comment 1: *A 40 percent reduction in soil productivity is unacceptable, especially in the Jemez National Recreation Area. The disturbance of top soil will result in degradation of soil structure, loss of soil biota, and increase soil erosion potential. Removal of top soil with tree stumps, root balls and other organic matter is likely to result in a greater loss in soil resources and soil productivity than is reported.*

Response: The FEIS (Chapter IV, Soil Productivity) addresses the loss of site productivity due to the stripping, stockpiling and respreading of top soil during mining and reclamation and the adverse effect on soil biota that results.

The FEIS also addresses reclamation actions which will conserve productivity to the extent possible (Chapter II, Alternatives 1(a) and 2). Stumps will be buried 30 feet deep or burned buried to prevent spread of root rot disease to the ponderosa pine seedlings to be planted after reclamation. Limbs and tops of trees removed during mining will be retained in the top soil and logs larger than 9 inches in diameter will be stockpiled and spread over the reclaimed area to provide carbon for soil development and wildlife habitat.

Slope limits, interior drainage, contour furrows, silt fences, seeding with native plants, mulching and fertilizing will be used to control erosion that could result in further loss of productivity. Similar reclamation efforts at the existing Las Conchas Pumice Mine were determined to be successful by the NM Mining and Minerals Division under the NM Mining Act (Project Record 146).

The 83.5 acres of the El Cajete Pumice Mine comprises only 0.2 percent of the 41,700 acre East Fork of the Jemez River Watershed. Impacts to soil productivity by the El Cajete Pumice Mine and other ground disturbing activities within the watershed will have no measurable effect on watershed's cumulative productivity because the impacts are relatively small and controlled and are dispersed in location and over time throughout this large watershed (Project Record 120).

Comment 2: *Topsoil will be lost and it takes a very long time to form on this type of rock material. The top soil took 100,000 years to form and only a day to remove. The remaining topsoil surrounding the mine is only a few inches thick. I am very concerned about the soil erosion effects and the irreversible soil loss. The statement that the decline in soil productivity would not be cumulatively significant for the East Fork of the Jemez River Watershed is not supported in the DEIS.*

Response: Because soil takes a long time to develop, top soil will be harvested and stockpiled for reclamation. Although the productivity of the harvested soil will be reduced, an estimated 60 percent of the productivity will be conserved. This will make it possible to revegetate and reforest the site and speed the recovery of the soil's productivity. Soil erosion from the reclaimed mine will also be controlled as described in the preceding response to prevent any further loss of productivity. On-site soil erosion efforts will assure that soil outside the project area will not be affected by El Cajete Pumice Mine.

The analysis of the direct, indirect and cumulative effects of the El Cajete Pumice Mine on the soils and waters within the 41,700 acre East Fork of the Jemez River Watershed concluded livestock grazing and residential roads and septic systems on private lands and recreation use on the National Forest are the main causes of sedimentation and pollution of water in the watershed (Project Record 120).

Comment 3: *Stockpiling wasted common pumice and top soil on or near the northern ridge on the proposed mine site would greatly increase the potential for sediment transport into the perennial stream from Montoya Spring.*

Response: The small stream is within an intermittent drainage and is perennial only for one-third to one-half of a mile below Montoya Spring. The drainage below the point where the stream disappears is dry and continues for 2 miles before intersecting with the East Fork of the Jemez River. Effective ground cover in the drainage bottom is 100 percent and there is no evidence of overland water flow (Project Record 202).

Stockpiled top soil and common variety pumice will be stored in bermed areas to prevent loss to erosion. A storm water drainage and infiltration structure will be constructed in the dry drainage that drains towards the stream to trap sediment and infiltrate runoff. Throughout the length of the mine along the stream drainage, a 100 to 200 foot wide buffer of undisturbed forest with 100 percent effective ground cover will be retained to prevent sediment from reaching the drainage bottom (FEIS, Chapter II, Alternative 1(a) and 2; Chapter IV, Environmental Consequences, Soil Productivity and Wetland and Surface Water).

These mitigation measures and the erosion control measures described in the preceding section insure that no significant amount of sediment will reach the stream, the dry drainage or the East Fork of the Jemez River.

Water Quality

Ground Water

Comment 1: *Mining and reclamation activities will alter the quantity and quality of the ground water in the area.*

Response: An independent hydrogeologic investigation was conducted to determine the presence and depth to ground water aquifers and to establish the quality of the water (Project Records 105 & 107). Ten core holes and three water monitoring wells were drilled. Drilling data from nearby private wells and scientific investigations by Los Alamos National Laboratories were also reviewed. The drilling identified shallow and deep ground water aquifers consistent with similar aquifers located on nearby private lands.

The shallow ground water aquifer in the vicinity of the mine is confined to highly localized paleo-valleys that were buried by the El Cajete Pumice Deposit. Shallow ground water is trapped in the pumice by a clay paleosol which overlies the South Mountain Rhyolite formation. The presence of 100 to 300 feet of rhyolite rock between the paleosol and the deep aquifer further insures that the deep ground water will not be impacted by the mine. The shallow ground water at the elevation of the mine and nearby private lands is fed by springs on nearby Los Griegos Peak.

The deep ground water aquifer is located in the South Mountain Rhyolite formation which underlies the pumice. Water in this aquifer is fed by the more distant Valle Grande.

One drill hole about 600 feet east of the proposed mine boundary located a shallow ground water aquifer at a depth of 42 feet from the surface. This shallow aquifer is supplying water to Montoya Spring and is fed by springs located on the north face of 10,117 foot high Los Griegos Peak. The other nine drill holes within the proposed mine boundary failed to locate any shallow ground water under the mine.

Evapotranspiration rates below 8,700 feet in elevation indicates precipitation is not enough to recharge the shallow ground water aquifer. The proposed mine ranges in elevation from 8,417 to 8,175 feet in elevation and, consequently, is not recharging Montoya Spring and the small stream or other shallow aquifers.

Mining will increase the proportion of precipitation available for infiltration because the mature forest is removed and evapotranspiration will be greatly reduced. Drill data from the holes surrounding the dry drainage that drains towards the small stream indicates the paleosol and underlying rhyolite follows the drainage gradient. The additional water resulting from reduced evapotranspiration may infiltrate through the 40 to 60 feet of common variety pumice to be back filled in this area during reclamation and be directed by the paleosol or rhyolite towards the stream.

If infiltrating water reached the stream, the amount would likely to be too small to measure because this portion of the mine is very small in comparison to the 1,000 acres in the Los Griegos Peak watershed that is feeding Montoya Spring and stream. Any water whieh infiltrated to the stream would be of excellent quality because the back filled pumice is an excellent, inert filter.

The deep ground water aquifer underlying the mine area was found in the 3 monitoring wells at depths ranging from 126 to 330 feet in the South Mountain Rhyolite formation. The volume of water was relatively small in two of the wells which is typical of the many of the nearby private wells in this formation. No shallow ground water was encountered in drilling these wells. Water samples were taken to provide baseline data for future sampling during and after mining.

Comment 2: *The Forest Service needs to determine if and how much water is recharging Montoya Spring from the mine site, and what the potential is for the spring to be adversely affected by the mine. Mining could impact wells in the Sierra Los Pinos subdivision, disrupt the infiltration of rain and snow melt, and increase evaporation from pooled runoff in the concave basins formed after reclamation. Since the basin is below surrounding terrain, ground water moving laterally could flow into the basin and be lost to evaporation.*

Response: The hydrogeologic investigation found no connection between the mine area and Montoya Spring or the shallow and deep aquifers serving the wells in the Sierra Los Pinos Subdivision and the Vallecitos and Holt residential tracts (Project Record 105 and 107).

Montoya and Vallecitos springs and the shallow wells in Sierra Los Pinos Subdivision and Vallecitos residential areas are fed by springs on the nearby Los Griegos Peak. These springs result from snow pack and rain that falls above the 8,700 elevation where precipitation rates are higher than the evapotranspiration rate.

The deep domestic wells serving the Sierra Los Pinos Subdivision and other residential areas are in the South Mountain Rhyolite formation. Tritium dating of this water at the Sierra Los Pinos Subdivision by Los Alamos National Laboratory geologists indicates that the water is likely to have originated on the high peaks surrounding the Valle Grande and headwaters of the East Fork of the Jemez River. This water has taken at least 50 years to infiltrate through the rhyolite fractures to reach the deep aquifer serving the residential area.

There will be little surface water and whatever amount stays on the surface will be short lived. The minimal evaporation from standing water is more than offset by additional water infiltrating into the ground. The lowest point within the mined area is above the paleosol and could not capture lateral movement of water underground.

Comment 3: *Additional analysis of the overlying material, water holding capacity of the removed pumice and confining formations, and sampling that reflects seasonal variations, is needed to substantiate the conclusion that there is not a shallow aquifer underlying the proposed mine site.*

The New Mexico Mining Act requires that hydrologic conclusions be based on at least 12 months of baseline data. Without this additional analysis the DEIS can not conclude that there is not a shallow aquifer under the proposed mine site.

Response: The hydrogeologic investigation determined that there is no shallow ground water aquifer under the proposed mine (Project Records 105 and 107). The Forest Service does not require 12 months of baseline data when analyzing the environmental effects and approving a Plan of Operations.

Comment 4: *The hydrology reports indicate the clay layer is localized and not continuous beneath the mine*

site and, therefore, does not seal and prevent deeper infiltration. The DEIS contradicts this conclusion. The DEIS should also accurately reflect the risk of a spill contaminating the deeper aquifer and, if applicable, additional measures should be taken to protect the aquifer.

Response: The FEIS will be corrected to state that the paleosol was located at most, but not all, drill sites since 3 of the 10 drill samples did not have evidence of a paleosol (Project Record 105 and 107). The drill holes lacking evidence of a paleosol may be due to the underlying topography or the auger drilling employed to determine the stratigraphy of the pumice deposit.

The paleosol is the soil that developed on the original topography prior to its burial by the El Cajete Pumice Deposit. The soil would have been thinner on the ridges and thicker in the valleys that existed on this topography. Drill holes that lacked evidence of a paleosol could be located over paleo-ridge tops.

Auger drilling, however, may also be the reason for the failure to recover evidence of a paleosol in some areas. This type of drilling sometimes results in the loss of the end sample when the auger was raised to the surface.

Only one drill hole outside of the proposed mine discovered a highly localized shallow ground water aquifer. The paleosol is 2.5 feet deep and lines a paleo-valley in a geologic joint system that serves to trap and direct shallow ground water from Los Griegos Peak to Montoya Spring. Other drill holes within the mine boundary with paleosol depths ranging from 1 to 3.5 feet deep failed to locate any shallow ground water underlying the mine.

The lack of shallow ground water under the mine and calculations of evapotranspiration rates for the mine elevation, shallow rooting depth of mature ponderosa pine and lack of organic staining below rooting depth all support the conclusion that precipitation at the proposed mine does not infiltrate to or recharge any aquifers under the mine.

A slight potential exists for the spilling of diesel oil, lubricating oil and hydraulic fluid and gasoline (FEIS, Chapter IV, Ground Water). Spills could result from ruptured lines or tanks on equipment or during fueling and lubricating operations. The approved Plan of Operations will not permit on-site storage of fuels and oils.

Mitigation measures described in the FEIS (Chapter II, Alternatives 1(a) and 2) make it unlikely that a spill would contaminate the shallow or deep aquifers or surface water. The approved operating plan will require a spill containment plan and the operator will be responsible for containing and cleaning up any spill. Fueling and lubricating of machinery will be restricted to an impervious structure bermed to contain any spill. A spill containment kit will be kept on-site to capture any spill for cleanup. Pumice contaminated by a spill will be removed to an approved disposal site.

Surface Water

Comment 5: *The DEIS fails to adequately analyze the adverse impacts on wetlands and surface water.*

Response: The project area does not involve jurisdictional wetlands (FEIS, Chapter III, Wetland and Surface Water). The closest wetland to the mine site is the area around and below Montoya Spring and its small stream that flows for one-third to one-half mile before disappearing in a rhyolite outcrop. A narrow strip a few feet wide along the stream bank also has wetland characteristics.

The spring is 600 feet from the proposed mine. The stream is 100 to 200 feet from the north edge of the proposed mine. These undisturbed, heavily forested areas were intentionally left to capture any sediment which might erode from the mine. The small spring and stream are outside of any area that will be disturbed and mitigation measures employed to control erosion and sediment insure surface waters will not be affected by mining.

The mine site is within the East Fork of the Jemez River Watershed. The river, however, is located 2 miles downstream from where the small stream disappears and would not be affected by any runoff from the mine. This dry drainage does not have evidence of overland flow and drainage bottom is densely vegetated with grasses and forbs that would trap any sediment reaching the drainage (FEIS, SUMMARY, Summary of Impacts, and Chapter III, Wetland and Surface Water).

Comment 6: *The 30 percent slope proposed for the reclaimed mine pit may be too steep to be effectively revegetated. This may not constitute restoring the surface water hydrologic regimen back to the pre-existing conditions per Section 3, Part C of Public Law 103-104 that established the Jemez National Recreation Area.*

Response: The 30 percent slope limit is the maximum slope permitted. Most of the reclaimed area will have

lower slope gradients. Practical experience from the reclamation at the Las Conchas Pumice Mine, where 40 percent slopes were permitted, indicates revegetation will be successful and erosion can be controlled on slopes greater than 30 percent. The NM Mining and Minerals Division has also found the reclamation and revegetation at the Las Conchas Pumice Mine as acceptable under the NM Mining Act (Project Record 146).

The Jemez National Recreation Area legislation states "No mining activity ...shall be permitted except in accordance with requirements ...for reasonable reclamation of disturbed lands to a ...hydrological condition as close as practical to their premining condition".

The mitigation measures and reclamation requirements that will be incorporated into the approved Plan of Operations are designed to restore the hydrologic condition to the extent practical. An undisturbed layer of pumice is left in the floor of the mine to prevent contamination of the product with the underlying clay paleosol. The backfilled common variety pumice, which will average 40 feet in depth, will be placed on the undisturbed pumice during reclamation. The undisturbed and back filled pumice will serve like the existing pumice deposit to store precipitation for forest vegetation that will be reestablished on the reclaimed area.

Stockpiled top soil will be spread over the back filled pumice to provide a fertile rooting medium for native grasses, forbs, shrubs and conifers to be planted on the reclaimed area. The plants will control erosion and facilitate infiltration of precipitation. Because evapotranspiration rates will be lower for many years following revegetation of the reclaimed mine, there may be a slight increase in the percolation of precipitation to the shallow ground water aquifer. Any increased water to the shallow aquifer will be of high quality because pumice is an inert, excellent filter.

The hydrologic conditions of infiltration, percolation and control of runoff now present on the site would continue after the mine is reclaimed.

Comment 7: *The DEIS and associated documents do not support the conclusion that the watershed encompassing Montoya Spring and stream is avoided by all action alternatives. It is not evident that the local surface water infiltration and ground water movement does not feed Montoya Spring. The hydrology report did not provide adequate information to fully evaluate the hydrology of the proposed mine site.*

Response: Please see to the responses to the Ground Water comments. The hydrogeologic investigation found no connection between the mine and Montoya Spring which is recharged by springs on Los Griegos Peak (Project Records 105 and 107).

Comment 8: *The DEIS should include an assessment of the potential for storm water runoff into the perennial reach of the stream down gradient of Montoya Spring and impacts to the East Fork of the Jemez River. We recommend against using the canyon on the east end of the mine site as a storage area for topsoil and waste pumice, as it increases the potential for sediment runoff into Montoya Stream.*

Response: See the response to Comment 3. Top soil will be stored in bermed areas at the top of drainages to prevent any loss to erosion. Storm water will be controlled under a plan approved by the US Environmental Protection Agency. Shaping of the reclaimed mine, maximum slope limits, rapid revegetation of the area and installation of contour furrows and silt fences will all be used to insure erosion is limited to short slope distances within the mine and sediment does not reach the small stream or the East Fork of the Jemez River.

Comment 9: *The DEIS characterizes the Montoya Spring and stream as intermittent. The evidence (aquatic vegetation, hydric soils, water flow in the winter) indicates that they are perennial.*

Response: The FEIS correctly characterizes the entire drainage as intermittent. Most of the 3 mile long drainage is dry and does not show any overland flow.

It is recognized that Montoya Spring itself and the small stream that originates from it are perennial. This small stream flows for one-third of a mile during drought conditions to one-half of a mile during spring runoff before disappearing in fractures in a rhyolite outcrop.

Comment 10: *It should be clarified that even though the East Fork of the Jemez Wild and Scenic River does not meet New Mexico standards for a high quality cold water fishery, other designated uses such as domestic water supply, fish culture, livestock watering, wildlife habitat and secondary contact are supported.*

Response: The FEIS, Chapter III, Wetland and Surface Water, will note that the river is suitable for domestic use, livestock water, fish culture, wildlife habitat and secondary contact.

Wildlife

Threatened and Endangered Species

Comment 1: *The DEIS needs a correction; the bald eagle was reclassified from endangered to threatened under the endangered species act on July 12, 1995.*

Response: The Forest Service agrees and the FEIS reflects this change.

Comment 2: *The DEIS states wildlife habitat would be unavoidably and irretrievably altered for several decades. Why are the loggers put out of business because of the potential threat to spotted owl, and Copar could be allowed to clearcut and alter 83.5 acres?*

Response: Mining, unlike timber sales, is not a discretionary action. However, all Forest Service decisions on proposed actions, including mining activities, must be consistent with applicable laws, regulations, and court mandated injunctions (also, refer to the Responses to MINING Comment 2 for additional information). Tree cutting for the mine, like all other cutting has been stayed per the Mexican Spotted Owl injunction from August 1995 until such time when it is lifted. This current court injunction prohibits cutting of trees on National Forest System lands in the Southwest Region for all activities, including mining.

Mining proposals are subjected to the same type of biological assessment/evaluation process as timber sales. The biological assessment process evaluates potentially effected threatened and endangered species, determines the likelihood of effects to threatened and endangered species and their habitats, makes a finding of effect (i.e., no effect or may effect), and provides recommendations for mitigations. Findings of may effect must be referred to the U.S. Fish and Wildlife Service for their review and concurrence.

Comment 3: *A discussion of project impacts in relation to recommendations made in the Mexican Spotted Owl Recovery Plan, should be included.*

Response: During the biological assessment (Project Record 130) process the Forest Service considered the Mexican Spotted Owl Recovery Plan. Habitats were classified as per the Recovery Plan and the U.S. Fish and Wildlife Service was consulted regarding potential effects to the Mexican spotted owl and its habitat.

The project is not located in critical habitat for the Mexican spotted owl. The nearest designated critical habitat is greater than one mile from the project area. The Mexican Spotted Owl Recovery Plan classified the following restricted habitats: 10 acres as potential roosting habitat within the project area; 40 acres also as potential roosting habitat within 0.25 miles from the project area; and 40 acres of potential nesting habitat that lacks welded tuff with cavities between 0.25 and 0.5 miles from the project area. The other habitats within 0.25 miles of the project area are considered potential foraging habitat.

The mining activities associated with this project "may effect but are not likely to adversely effect" the Mexican spotted owl and its habitat because:

- It is unlikely that Mexican spotted owls would nest in and occupy the project and surrounding area (i.e., 0.25 miles to 0.5 miles around the project) because the same area lacks suitable nesting habitat. The mixed conifer habitats within and surrounding the project area do not contain welded volcanic tuff and cavities. Protocol surveys did not record the presence of Mexican spotted owls in 1989, 1990, and 1995.
- There are 50 acres of potential roosting habitat within 0.25 miles of the project area, in Montoya Spring Canyon, and 16 acres of potential foraging habitat. Forty acres of the potential roosting habitat would not be structurally altered but would be impacted by sounds and visual disturbances. Ten acres of potential roosting habitat would be removed. Also, the mine operation would clear the 16 acres of ponderosa pine (VSS 4-5) that could be used as foraging habitat.
- East Fork Canyon within 0.5 miles of the project, the screening affect of the topography, vegetation, and wind would greatly diminish the sound created by the mining operation.
- Mexican spotted owls may occasionally use the project and surrounding area during the non-breeding season by wandering, single individuals. There are alternate potential roosting and foraging habitats that are greater than 0.25 miles from the project area.
- The project is not located within or near designated critical habitat.
- Though sound disturbance would occur during the day, the surrounding area would remain available as foraging habitat.

Comment 4: *If proposed mining and reclamation activities are expected to result in visual and structural impacts to potential falcon and eagle habitat, a "no effect" determination is not appropriate.*

Response: After further consultation with the U.S. Fish and Wildlife Service, the Forest Service revised the findings for both the peregrine falcon and bald eagle to "may effect but not likely to adversely effect." The U.S. Fish and Wildlife Service concurs with these revisions. These findings were revised because, even though affects would be slight, there would still be limited potential for affects to occur.

Comment 5: *In order for the public to evaluate the completeness of surveys for threatened, endangered and sensitive species more detail should be included, including time of year the surveys were conducted, methods used, and the results.*

Response: Surveys were conducted for Mexican spotted owls, northern goshawks, Jemez Mountains salamanders, and wood lily plants. Surveys were not conducted for the southwestern willow flycatcher because the project and surrounding area do not contain its suitable habitat. Informal surveys were conducted for the flammulated owl and Say's pond snail. For the remaining species, the Biological Assessment, Biological Evaluation and effects analysis relied on life history information and past surveys conducted in the local area. Details can be found in the Biological Assessment (Project Record 130) and Biological Evaluation (Project Record 129), available on request.

Comment 6: *The DEIS fails to adequately evaluate negative impacts on threatened, endangered and sensitive species, including wood lily, northern goshawk, and their habitats.*

Response: The Forest Service considered the following species in the Biological Assessment (Project Record 130) and Biological Evaluation (Project Record 129) for this project:

Scientific Name & Common Name	Status
Strix occidentalis lucida Mexican spotted owl	Threatened
Falco peregrinus anatum American peregrine falcon	Endangered
Haleaeetus leucocephalus bald eagle	Threatened
Empidonax trailii extimus southwestern willow flycatcher	Endangered
Plethodon neomexicanus Jemez Mountain salamander	Candidate
Accipiter gentilis northern goshawk	Sensitive
Buteo albonotatis zone-tailed hawk	Sensitive
Otus flammeolus flammulated owl	Sensitive
Zapus hudsonius luteus New Mexico jumping mouse	Candidate
Euderma maculatum spotted bat	Candidate
Myotis lucifugus occultis Occult little brown bat	Candidate
Myotis yumanensis Yuma myotis	Candidate
Myotis evotis long-eared myotis	Candidate
Myotis thysanodes fringed myotis	Candidate
Lymnaea caperata Say's pond snail	Sensitive
Lilium philadelphicum wood lily	Sensitive

The Biological Assessment and Biological Evaluation, and FEIS (Chapter IV, Wildlife Habitat) provide detailed information on the species and effects considered by the Forest Service. The Biological Assessment and Biological Evaluation discussed data sources, affected habitats, analyses of effects, and findings of effects. The Biological Assessment and Biological Evaluation determined that there would be "no effect or impact" to the designated critical habitat of the Mexican spotted owl, the southwestern willow flycatcher, zone-tailed hawk, New Mexico jumping mouse, Jemez Mountains salamander, Say's pond snail, and wood lily; and that there would be a "may effect, but not likely to adversely effect" for the Mexican spotted owl, bald eagle, and peregrine falcon and a "may impact to individuals, but is not likely to result in a trend toward Federal listing or loss of viability" for the northern goshawk, flammulated owl,

spotted bat, Occult little brown bat, long-eared myotis, fringed myotis, and Yuma myotis. The U.S. Fish and Wildlife Service concurred with findings of effects/ impacts for the species noted above (Project Record 130). The New Mexico Department of Game and Fish was involved in scoping and provided copies of biological reports.

Other Wildlife and Habitat

Comment 7: *Why would you agree to "unavoidably and irretrievably" alter wildlife habitat for several decades?*

Response: See the Responses to MINING Comments 2, 5, 6, and 11 regarding why the Forest Service has limited decision-making discretion when evaluating and authorizing valid locatable mining proposals.

Comment 8: *Under Affected Environment Wetland and Surface Water (p. 21, DEIS), there is no discussion of how disturbance near the important habitats of the spring, intermittent stream and the associated wetland will impact wildlife populations throughout the time (several decades) these impacts will persist. Primary, secondary and cumulative effects need to be described and mitigation measures incorporated into alternatives.*

Response: Detailed information regarding this is available in the Forest Service's report of existing and desired conditions (Project Record 91), the effects analysis for wildlife (Project Record 100), and Biological Assessment (Project Record 130) and Biological Evaluation (Project Record 129).

Directly, the mining alternatives would cause sound and visual disturbances to about 29 acres of wetland and associated meadow habitats within 0.25 miles of the project area. The actions alternatives avoid wetland and meadow habitats, but there will still be a slight, insignificant decline in habitat suitability for affected wildlife species within 0.25 miles of the mine site, due to the noise disturbance.

Comment 9: *The DEIS fails to adequately evaluate the negative impacts to wildlife (including wildlife killed or injured by truck traffic) and their associated habitat, including the changes in structural stage (Vegetative Structure Stage, VSS) distribution in the area. In addition the cumulative effects of incremental habitat destruction, fragmentation, and degradation are not adequately addressed.*

Response: Potential negative effects to wildlife are addressed in the DEIS, FEIS, and the Biological Assessment and Evaluation (Project Record 129, 130). Findings of effects to habitats and species were concurred with by the U.S. Fish and Wildlife Service. The FEIS and supporting reports note that wildlife species, including threatened and endangered species, could or would be affected or impacted, but not adversely.

Effects evaluations considered habitat requirements of wildlife species, the occurrence or potential occurrence of wildlife species, habitats that would be degraded or removed, habitat fragmentation, and needs for space and security. The Forest Service concluded that action alternatives would not lead to significant cumulative effects to wildlife species and habitat.

The concern about traffic hazards to wildlife was not considered a major issue because the project would result in a negligible increase in traffic when compared to the existing traffic along State Highway 4 (also see the Responses to TRANSPORTATION OF PUMICE AND HIGHWAY SAFETY Comments 9 and 12.

Comment 10: *The DEIS fails to assess impacts of possible dewatering of the wet meadow fed by Montoya spring on game habitat, and impacts to the meadow jumping mouse. There is no consideration of the effects on the habitat for elk, which obviously use the meadow as a seasonal wallow and grazing resource. The analysis does not indicate what type of surveys were done at this spring to determine the extent and diversity of wildlife associated with the spring. Establishing a baseline of wildlife populations associated with this spring should be done prior to permitting any level of mining in the area.*

Response: Monitoring habitat or wildlife near the spring is not needed because it is not expected to be dewatered or otherwise impacted by the mining operation. Please also refer to Responses to Surface Water and Ground Water Comments, under WATER QUALITY.

Comment 11: *The DEIS claim that impacts to wildlife would be primarily limited to the mine site and 1/4 to 1/2 mile area around the mine is absurd and unsubstantiated.*

Response: For projects of this type, it is generally accepted that the effects of visual and sound stimuli have their greatest potential to impact species and habitat within 0.25 miles of a project area. Sounds and visual stimuli can cause effects within 0.5 miles or more from a project area, however, the screening affects of topography, vegetation, and wind greatly diminish disturbances at distances within 0.25 miles

or more. The U.S. Fish and Wildlife Service concurred with these findings based on the conclusion that most impacts would occur within 0.25 miles with some disturbance reaching 0.5 miles or more from the project area (Project Record 130).

Comment 12: *The DEIS needs to have a more detailed discussion on the impacts of the alternatives on species such as the hairy woodpecker, a forest interior species, and "management indicator species" for the Santa Fe National Forest.*

Response: The level of detail in the DEIS was limited based on the insignificance of this issue. Preliminary analysis indicated there would be no effect to these species. This information is discussed in the report of existing and desired conditions (Project Record 91) and the effects analysis of alternatives considered (Project Record 100). Potential impacts were considered for management indicator species, including the hairy woodpecker, and to mule deer, black bear, mountain lion, and migratory birds. The analysis concluded that the action alternatives would cause sound and visual disturbances and structural alterations to the potential habitats of these species, causing some reduction in the amount of habitat use within 0.25 miles of the project (Project Record 100). The magnitude of the impacts would be slight and insignificant, not likely affecting population viability.

Vegetation And Ecology

Comment 1: *When the trees (and topsoil) are removed and replaced with a strip mine, the landscape looks bleak and much of the wildlife is gone. What right do you have to uproot the majestic ponderosa pines which are home to many woodland creatures, and which provide visitors with the sound of wind in the trees and the sight of crisp snow on the tree limbs? Removal of forest habitat will persist for several decades. The forest vegetation and associated ecological values of this specifically designated area need to be protected.*

Response: The Forest Service recognizes the negative impacts, and the duration of these impacts, on scenery and wildlife habitat due to removal of vegetation (FEIS, Chapter IV, Scenery, and Wildlife Habitat). Please refer to the Responses to SCENERY and WILDLIFE HABITAT Comments for summary of scenic effects and the decline in habitat suitability. Also see FEIS, Chapter IV, Forest Vegetation.

The FEIS addresses Copar's right to mine the area (FEIS, Chapter I, Introduction; Chapters III and IV, Minerals). Mining of the area requires removal of the existing vegetation (refer to the Responses to MINING Comments 1 through 6 for interpretation of the Mining Law, Regulations and Related Agency Policy). To aid in the recovery of the ecosystem after mining, most of the large trees remaining in the area will be used to provide log habitat for wildlife (FEIS, Chapter II, Alternative 1(a) and 2).

To speed ecosystem recovery, portions of the mine will be reclaimed as mining is in progress. Native grasses, forbs, shrubs and ponderosa pine seedlings will be planted to aid rapid recovery of the ecosystem. As the reclaimed area progresses from grass through forest successional stages, a variety of habitat types will be provided over time.

Demonstration Project Area

Comment 1: *Allowing destruction of the 16 acre demonstration area, which is an unavoidable adverse impact, illustrates poor long-term planning for the area.*

Response: The demonstration area was being considered as the location of a root rot research study prior to the filing of a pumice mine claim in March of 1988. Plans to conduct the study at this location were finalized later in 1988. The demonstration area was logged in the winter of 1991/92. The decision to continue the research effort was made because of the unique study opportunities, the widespread need for knowledge of this disease, and the forest management issues present at that time. It was calculated that the study could be completed before the mine claim was actually developed. Further investment was suspended in 1993. Useful information for research purposes was gathered prior to withdrawing this demonstration area (FEIS, Chapters III and IV, Integrated Forest Protection Demonstration Area).

Heritage Resources

Comment 1: *The DEIS states that there are no archaeological or historical sites within or near the proposed mine. How was this determined?*

Response: The FEIS (Chapter IV, Heritage Resource) states that a heritage resource survey of the proposed mine did not locate any archaeological or historical sites within the proposed boundary. One historic site is located several hundred feet outside of the mine boundary and will not be impacted by mining activities. Professional archaeologists surveyed 100

percent of the area within the proposed mine boundary by walking parallel transects spaced 10-20 meters apart. Transect spacing was based on vegetation cover and topography. The proposed El Cajete mine will have no effect on heritage resources. The State Historic Preservation Office concurred with the survey findings November 5, 1993 (Project Record 30).

Comment 2: *Historic masonry and adobe buildings immediately adjacent to the proposed haul routes could be damaged by truck vibrations. The Forest Service should assess the eligibility of these buildings to the National Register of Historic Places, and the potential effects to the buildings along the selected route.*

Response: While some research has been done on the effects of traffic vibrations on multi-storied, unsupported, masonry structures, such as the great houses in Chaco Canyon, we do not believe this research is directly applicable to this situation.

Typically, legally loaded highway truck traffic will not affect structures located over 20 feet from a highway (Project Record 155). If damage were occurring, it should be evident from the past traffic. Numerous logging, sand and gravel, cement, asphalt, livestock, oil and gas drilling, fuel and other trucks, which are typically heavier than pumice trucks, have utilized the State Highway before and after it was reconstructed and paved in the 1950s and 1960s.

Despite the truck traffic which has occurred in the past, there is no evidence to indicate that trucks on paved State Highways, engineered to support and absorb vibrations from these 80,000 pound gross vehicle weight trucks, directly or indirectly cause vibrations that would damage the existing historic adobe or masonry buildings or houses at Jemez State Monument or in the pueblos of Jemez and Santa Clara.

Even if vibrations from truck traffic were causing damage, it would be difficult to isolate pumice truck traffic from other truck traffic or truck traffic in general from natural phenomenon as the cause of damage to historic properties. Natural settling, precipitation, ground movement, and wind also have the potential to affect historic structures.

The truck traffic from the proposed El Cajete Pumice Mine is at the same level that occurred at the height of production at the existing Las Conchas Pumice Mine. A total of five trucks would make four round trips per day from the El Cajete Pumice Mine for a total of 40 truck trips. This is less than 2 percent of the average daily traffic on Highway 4 (Project Record 166). When Copar Pumice Company's proposed South Pit Pumice Mine is permitted, the total amount of traffic would remain the same since the same trucks would be used to haul from both mines.

The Forest Service cannot control truck or other traffic on the State highways. The NM State Highways and Transportation Department has the legal jurisdiction to control vehicle traffic. Truck traffic is controlled through the establishment of weight limits by the Highway Department. The Highway Department permits the use of pumice and other trucks because the highway was designed to facilitate commerce and bear the weight of these trucks (Project Records 114, 165, 172, and 183).

We do not believe the scope of the heritage resource consultation under Section 106 of the National Historic Preservation Act extends to the historic or prehistoric properties located along Highway 4 within the private lands inside the Santa Fe National Forest Boundary, as in the case of Jemez State Monument, or to the properties located on Jemez and Santa Clara Pueblos which are outside of the Forest boundary. The Area of Potential Effect is the mine and the Forest Service system roads accessing State Highway 4 (Project Record 213).

Comment 3: *The DEIS failed to adequately address concerns of Native Americans at Cochiti, Jemez, and Santo Domingo.*

Response: The Forest Service solicited public comments on the proposal and subsequent impacts from 1992-1996 (see also Responses to Public Involvement Comments 6 and 7 under PLANNING PROCESS, LAWS, AND REGULATIONS). Comments and concerns were requested from tribes in New Mexico, Arizona, and Colorado, as stated in the FEIS (Chapter I, Major Issues; Chapters III and IV, Heritage Resources) consultation with surrounding Pueblo communities and other tribes, including Cochiti, Jemez, and Santo Domingo was initiated by the Forest Service.

Consultation letters were followed with phone calls to tribes and pueblos that did not respond by phone or letter. Cochiti Pueblo did not respond.

When contacted, the Pueblo of Santo Domingo expressed concern over all activities within the Jemez Mountains, but they did not have specific concerns in reference to the proposed El Cajete mine (Project Records 58, 62, 63, 102, 109 and 159).

In depth consultation meetings were conducted with the Jemez Governor and his staff. Concerns regarding the potential for adverse impacts to a traditional use area located within the initial project area were addressed and the project boundary was modified to mitigate these concerns (Project Record 179).

Planning Process, Laws And Regulations

National Environmental Policy Act (NEPA)

Comment 1: *There will be significant long-term cumulative effects from the combination of past, current and future mining claim exploration and mining activities in the Jemez Mountains (e.g., South Pit and Los Griegos areas), along with silvicultural forest management actions, recreation and road uses, and other activities in the area. A comprehensive inventory must be made of all reasonably foreseeable forestry, mining, and other resource-extraction activities within several miles of the proposed El Cajete mine site. Cumulative effects descriptions in the DEIS are inadequate regarding water quality and hydrologic integrity in the watershed, soil exposure and loss, air quality, wildlife habitat loss, fragmentation and degradation, the local (Jemez) economy, and public safety.*

Response: The DEIS and FEIS, Chapter III, describe direct, indirect and cumulative effects estimated for the major issues identified during the planning process. Cumulative effects analysis areas, as described in the FEIS and specialist reports in the Project Record, include: the East Fork of the Jemez River Watershed, for water, soil, vegetation, and wildlife; the key observation points in the surrounding area, for scenery; and the Jemez National Recreation Area, Wild and Scenic River corridor and State Highway 4 corridor, for recreation and noise related issues.

The cumulative effects analysis for water, soil, vegetation, air quality and wildlife habitat indicated that there should be no significant cumulative effects to those resources (FEIS, Chapter IV). The risk of incurring significant cumulative or off-site effects to soil, vegetation, wildlife or air was considered to be low because the direct and indirect effects would be very localized (at or near the mine site). Thus, a highly detailed analysis of off-site activities was not needed for these resource issues. The watershed analysis report (Project Record 120) discusses in more detail the influence of past, present and future activities within the watershed. See also Response to SOIL PRODUCTIVITY and WATER QUALITY Comments regarding the analysis for water and soil resources.

The potential for significant cumulative effects of the El Cajete mine on the economy or public safety is also negligible, and therefore not analyzed in detail (FEIS, Chapter IV, Residential Property Values, and Highway and Mine Safety).

The cumulative effects analysis for recreation and scenery discloses that there would be significant cumulative effects for up to 30 years due to the sights and sounds of mining activities impacting the recreational experience and scenic qualities of this area depending upon the alternative and observation position (FEIS, Chapter IV, Recreation Opportunities and Uses, and Summary of Scenic Effects).

An in-depth cumulative effects analysis is not required for every issue. NEPA "documents must concentrate on the issues that are truly significant to the action in question, rather than on amassing needless detail" (40 CFR 1500.1). The FEIS complies with NEPA (40 CFR 1502.14) by disclosing cumulative effects of a reasonable range of alternatives to permit the Forest Service to make a "reasoned choice".

Comment 2: *Because the proposed Operating Plan is not included in the DEIS, impacts cannot be fully assessed during public review.*

Response: The proposed Plan of Operation (or Operating Plan) as submitted by Copar Pumice Company is the same as Alternative 1, described in the DEIS as the "Proposed Action" (pg. 1, para. 14; pg. 13, para. 5; pp. 7-11). Thus, it was fully available for public review. The original Plan submitted by Copar Company is also in the Project Record (13), available on request.

The selected mining alternative (identified in the Record of Decision) will be incorporated into a final Plan of Operation, including some additional details regarding project specifications. The final Plan of Operation can be reviewed by the public for monitoring purposes.

Comment 3: *The DEIS does not address any alternatives to the Operating Plan designed to reduce impacts on the local community other than altering the size of the mine. Variations in hours of operation, the number and type of trucks, traffic volume and other factors are not considered as alternatives.*

Response: The Forest Service planning team considered numerous alternative mitigation measures based on public comment, other agency suggestions, and past experience with similar mine operations. The Forest Service determined that some alternative measures suggested, such as those listed in the comment, would either not be effective in reducing impacts or would excessively restrict development of valid unpatented mining claims that is authorized by the US mining laws. See Response to TRANSPORTATION OF PUMICE AND HIGHWAY SAFETY Comment 7 regarding highway safety.

In addition to altering the size of the mine (Alternative 2), Alternatives 1A and 2 include over 40 additional specific mitigation measures to reduce impacts over those in the proposed Plan of Operation (Alternative 1). Nine measures were added to specifically reduce effects on the local community with respect to recreation, public access, safety, scenery, noise and dust (FEIS, Chapter II, Alternative 1(a)). For example, mining and hauling operations are prohibited on weekends and holidays to eliminate noise and traffic impacts during high recreation use periods. Alternatives 1A and 2 provide reasonable and effective methods for minimizing potential adverse effects.

Comment 4: *The highway improvements that may be needed to accommodate the pumice haul trucks (e.g.. widening) are connected actions that require full NEPA analysis and should be included in this EIS.*

Response: The State Highway Department has not identified any highway improvements that would be necessary before the pumice from El Cajete could be hauled, therefore there are no highway improvement actions that would be defined as "connected actions" under the NEPA (40 CFR 1508.25). Also see Responses to TRANSPORTATION OF PUMICE AND HIGHWAY SAFETY Comment 10.

Comment 5: *The description and (quantitative) analysis of mitigation measures is insufficient, for both the existing Las Conchas mine and the proposed El Cajete mine.*

The DEIS should analyze impacts that have occurred at Las Conchas, describe the effectiveness of mitigation measures, and reveal Forest Service inspection data including data that shows whether the pumice hauled from Las Conchas was actually "locatable".

Response: NEPA regulations in 40 CFR 1502.14(f) state that alternatives shall "include appropriate mitigation measures not already included in the proposed action ... ." Over 40 specific mitigation measures designed to minimize environmental impacts are described in the FEIS in Chapter II, Alternative 1(a). Many of those measures were found to be highly effective on other similar projects including the Las Conchas mine. When the State Mine Reclamation Bureau inspected the reclaimed portion of the Las Conchas mine site, they found it to be satisfactory (Project Record 146). The Las Conchas mine is in full compliance with state air quality regulations and federal safety regulations (Project Record 116 and 176 and Response to AIR QUALITY Comment 4 and MINING: Monitoring, Oversight and Enforcement Comment 13). Alternatives 1A and 2 for the El Cajete mine proposal include additional, and in some cases more stringent reclamation measures than were required for the Las Conchas mine.

The effects analysis reports and references throughout the FEIS clearly show that the effects of the Las Conchas mine were evaluated during the analysis of the El Cajete Mine proposal.

The Jemez National Recreation Area Act directed the Forest Service to examine all unpatented mining claims within the Jemez National Recreation Area to determine whether questions exist regarding the validity of any of those claims that would require that a contest be brought before the Department of the Interior to resolve such questions. Because of the claim examination work, geologists have visited the Las Conchas site numerous times during the last two years. During frequent unannounced mine visits, geologists were able to observe pumice being sorted into locatable and non-locatable piles, and non-locatable pumice being returned to the pit. Forest Serviee inspectors observed that the pumice loaded onto haul trucks was locatable, based on visual inspection of the size of the pumice fragments. Bureau of Land Management and Forest Service geologists ran tests to determine what portion of the deposit was "locatable" and what portion was "common variety" pumice. Since legislation for the Jemez National Recreation Area was passed, no infractions of the Act were observed. For more discussion see Responses to Monitoring, Oversight and Enforcement under MINING Comments.

Public Involvement

Comment 6: *The Forest Service should have made a better effort to inform the public about the proposed mine, such as putting articles in the Albuquerque Journal and Jemez Thunder, and including horse riding groups on the mailing list.*

Response: The Forest Service used a variety of public involvement methods to inform and involve the public in the planning process for the mine proposal. The Forest Service distributed letters soliciting public input early in the planning process, along with meeting with local homeowners and conducting a public meeting and field trip to the proposed mine site (Oct. and Nov. 1992). Update letters, public notices and news releases were used to keep the public informed about the progress of project planning, and fourteen newspaper articles about the proposed mine appeared in 1995-96 in the Los Alamos Monitor, New Mexican, Albuquerque Journal and Jemez Thunder. The Forest Service continued to informally consult with interested agencies, organizations and individuals. A public meeting was held in Los Alamos in February of 1996.

The Forest Service attempted to include all known interested parties on the El Cajete mailing lists. While local equestrian groups were not specifically included on the lists, some individuals on the mailing lists are members of local equestrian groups.

Comment 7: *Due to the high level of concern by the public in the Jemez Mountains, Los Alamos and Santa Fe, hearings should be held in these areas to allow for further public input.*

Response: We agree that there is a high level of public concern about the proposed mine. However, the Forest Service believes that all of the major issues associated with the proposal have been identified over the past four years of planning and public involvement. No new information or concerns were raised during the public review of the DEIS or since that time. In addition, the latitude for Forest Service decision-making on this proposal is very narrow due to the non-discretionary nature imposed by the General Mining Law. Therefore, a public hearing does not seem necessary or appropriate.

We encourage the public to continue to participate throughout the next stages of implementation and monitoring. We remain open to considering new information or suggestions. We will continue to meet with interested parties or conduct field trips to the mine site upon request.

National Forest Management Act and Forest Plan

Comment 8: *"The proposed mine would result in further degradation of the scenic and recreational values of the area and would violate the Santa Fe National Forest Plan's direction for Management Area C."*

Response: It is true that the proposed mine is expected to significantly degrade scenic and recreational values of the area, and would not enhance this area's outstanding scenery as directed in the Santa Fe National Forest Plan. These effects, even when mitigated to the degree possible, cannot be avoided.

It is also true that the mine would not meet the Visual Quality Objective of Retention within the required timeframes or some of the associated standards and guidelines for visual quality identified in the Forest Plan. However, the Forest Service cannot prevent development of a valid unpatented mining claim due to the 1872 mining law. We have identified mitigation and reclamation measures to protect scenic and recreational resources to the extent practical.

The Forest Plan is amended in the Record of Decision for the El Cajete Mine to address the conflict between meeting the mining law and meeting Forest Plan standards and guidelines (see Record of Decision).

Index

RECORD OF DECISION
EL CAJETE PUMICE MINE
ENVIRONMENTAL IMPACT STATEMENT
Santa Fe National Forest
USDA Forest Service
Sandoval County, NM

INTRODUCTION

This Record of Decision (ROD) documents my selection of a modification of **Alternative 1a.** This **modified Alternative 1a** will be used to develop a Plan of Operations for the El Cajete Pumice Mine on the Jemez District of the Santa Fe National Forest (NF). This ROD describes the alternatives considered and my rationale for selecting this alternative. It also identifies the Environmentally Preferable Alternative.

The El Cajete Mine site is located on the Jemez Ranger District of the Santa Fe National Forest in Sandoval County, New Mexico (T18N, R4E, Section 6 and T18N, R3E, Section 1). It is approximately 16 miles west of Los Alamos and 4 miles east of La Cueva, along State Highway 4. It also lies within the Jemez National Recreation Area (NRA), established in October, 1993. See map.

In July, 1992, Copar Pumice Company (Copar) submitted a proposed Plan of Operations to the Santa Fe NF. Copar's proposal was to surface mine 100,000 tons of pumice annually for 10 years, recovering the locatable pumice (3/4-inch or larger in size) and returning the non-locatable pumice back into the pit area. Mining would require the removal of forest vegetation and soil. Scrapers, loaders and a screening plant would be used for mining. The mine would be divided into three tracts, and then each tract would be divided further into three smaller sections. The mine would then be developed progressively, one tract at a time. As each section is mined, there would be a section re-shaped and re-seeded behind it. Top soil would be removed ahead of the mining on each section, and replaced directly on the section last mined. In this development plan, no more than 1/3 of the mine would be in an un-reclaimed state at any time. Locatable pumice would be hauled to mill sites in San Ysidro and Espanola, New Mexico. Reclamation would require that the ground be reshaped to mimic the characteristic landscape and then revegetated with native plants and trees. The proposal is described in detail in the Final EIS, pp. 9-11.

Copar's initial Plan of Operation proposed to mine 133 acres. In February, 1995, Copar agreed to reduce the size of the proposed mine to 83.5 acres, in order to address some of the concerns raised during early analysis. Copar's 133-acre proposal was dropped from further study, and the Plan of Operation, as revised to 83.5 acres, was analyzed as **Alternative 1. Alternative 1a** (identified as the preferred alternative in the Draft EIS), was developed to include additional mitigation/reclamation measures identified during the environmental analysis. **Alternative 2** included the same added measures as Alternative 1a, but reduced the size of the mine to 58 acres, primarily to limit impacts to scenery. **Alternative 3** is the "no action" alternative required as a baseline from which to compare environmental consequences under the National Environmental Policy Act (NEPA) regulations at 40 CFR 1502.14 (d).
The **modified Alternative 1a** does not introduce any new elements, but is an alternative that incorporates portions of **Alternative 1a and Alternative 2**, as analyzed in the EIS. The **modified Alternative 1a** contains the same mitigation measures as **Alternative 1a**, but reduces the size of the mine from 83.5 acres to 76.2 acres (see map, enclosed). **Modified Alternative 1a** will leave both buffer areas

(identified in **Alternative 2**) along the northern edge of the mine. It has also been clarified that this alternative specifies the timing of mining so that the eastern portion of the mine (a key visual buffer in **Alternative 2**) will be the last area to be removed by mining.

Copar's proposed Plan of Operations was evaluated in accordance with the 36 Code of Federal Regulations (CFR) Part 228-Minerals, Subpart A-Locatable Minerals. Those regulations direct Forest Service decisions on a Plan of Operations in recognition of a mining claimant's statutory right to access minerals claimed under the 1872 Mining Law, as amended. Under the Mining Law and mining regulations, the Forest Service is responsible for determining the practical environmental mitigation and reclamation measures necessary to manage the impacts to surface resources, and to approve a Plan of Operations that incorporates these measures.

The Jemez NRA Act was enacted on October 12, 1993. The purpose of the Jemez NRA Act was to "conserve, protect and restore the recreational, ecological, cultural, religious and wildlife resource values of the Jemez Mountains". The Jemez NRA Act withdraws the area from the location of new mining claims, but allows mining on claims with valid existing rights. Brown Placer Claims Number 9, 10, 11 and 12 (the mining claims involved in the El Cajete project) have been examined by the Forest Service and found to be properly locatable and valid in the Classification Report of May, 1995, and Mineral Report of August 30, 1995 (Linden, et. al.). The Act specifies that the NRA must be administered "in a manner that will further the purposes of the Recreation Area." Mining activity must only be permitted in accordance with requirements imposed by the Forest Service. Specifically, the Act mentions requirements for "reasonable reclamation of disturbed lands to a visual and hydrological condition as close as practical to their pre-mining condition." The Act prohibits patenting (the right of a claimant to purchase and obtain full title to the land on which their mining claims are located.)

Copar proposed the mine in order to continue a supply of locatable pumice material to the Company, since their 29-acre Las Conchas Mine has recently been depleted. The Las Conchas Mine was a similar operation conducted from 1988 to 1996, located approximately 1.3 miles east of the El Cajete Mine site.

PUBLIC INVOLVEMENT

Public involvement occurred throughout the planning process to ensure that concerns of interested and affected groups and individuals were addressed in the environmental analysis. An initial public meeting was held with local residents, and a scoping letter was mailed to nearly 300 residents, groups, individuals and agencies. The scoping letter also invited interested people to participate in a field trip to the proposed mine site. Thirty-four people attended the field trip and 36 written responses were received.

The Forest Service analyzed public comments received during scoping on the El Cajete Mine project, along with earlier public comments on the Las Conchas Mine project, and public hearings regarding the Jemez NRA legislation (which was passed in part to limit mineral activities). Additional scoping was conducted by letter and with the Notice of Intent to prepare an Environmental Impact Statement, published in the Federal Register, Vol. 59, on March 31, 1994. Fifteen additional responses were received.

The issues (concerns) associated with the El Cajete Mine proposal were used to focus the analysis of environmental effects, and to develop mitigation and reclamation measures for the mining operation. The Draft EIS was completed in January, 1996, and distributed for a 45-day public review to 160 addresses, including libraries, colleges, and the media.

The public comment period ended March 11, 1996. Sixty-five responses to the Draft EIS were received. All comments were analyzed and considered, and as a result minor corrections were made in the Final EIS. Appendix C of the Final EIS contains a discussion of the substantive comments received on the Draft EIS, and the Forest Service responses to the comments.

DECISION AND RATIONALE

Based on the analysis documented in the Final EIS, it is my decision to select an alternative which is a modification of **Alternative 1a.** The modifications are within the scope of **Alternatives 1a** and **2,** and the environmental effects of those alternatives as described in the EIS.

I decided to select a **modified Alternative 1a** because it incorporates all practical mitigation measures to protect the scenic values which are of particular importance within the Jemez National Recreation Area. Leaving a buffer along the north edge of the mine will reduce the negative visual impacts from Redondo and South Mountain viewpoints over **Alternative 1a,** unmodified. The east end buffer, identified as a critical buffer as viewed from surrounding mountain peaks, will not be removed until the portion of the mine visible behind it will be in reclamation. The effect of retaining these buffers is to break up the appearance of the mine from a distance and to allow the openings created to appear natural for as long as possible during and after mining. The **Modified Alternative 1a** includes all identified practicable means to avoid or minimize social and environmental harm that may occur from the El Cajete Mine, while still approving the mining operation as required by law. It includes effective mitigation, reclamation, monitoring and enforcement requirements to restore soil productivity, ground water, surface water, forest vegetation and wildlife habitat, recreation and scenic values, heritage resources, and public safety. The Alternative meets applicable laws and regulations.

While the modifications in **Alternative 1a, modified,** will reduce the visual impacts of the mine over an un-modified **Alternative 1a,** it is recognized that they do not do so as completely as would **Alternative 2. Alternative 2** included additional mitigation of scenic and recreation impacts by further reducing the size and altering the shape of the mine site. I did not select **Alternative 2** because it would have required the claimant to give up areas along the south side of the mine that were of a major economic importance to the mine. This would deprive Copar of their statutory right to mine locatable pumice on some of the best mineral deposits on their valid claims.

Alternative 3, the no action (no mining) alternative, is not within the authority of the Forest Service to select due to the 1872 Mining Law.

The following summarizes the most important mitigation/reclamation measures in **Alternative 1a Modified.** The Final EIS contains a more comprehensive list of mitigation measures (pp. 15-18).

Soil Productivity and Soil Loss

Although there will be an unavoidable temporary loss of soil productivity, erosion control and revegetation will prevent permanent productivity losses. The selected alternative requires: separating out the top soil and respreading it (on the previously mined section) the same season it's removed in order to maintain the greatest viability of existing seed, fungi and microorganisms; seeding and planting using native grasses, forbs and shrubs; mulching with weed-free straw; fertilizing with ammonium phosphate; using filter methods to trap any soil eroding from disturbed areas; using a concave, closed basin topography, shallow slope angles, and contour furrowing; mixing the smaller woody material into the soil to provide a long term carbon source and further reduce soil movement; retaining at least 5 down logs per acre;

and revegetating at least 30% of the previously mined section before beginning to clear vegetation from the next section to be mined. Herbaceous vegetation will be established within 1 to 3 years after placement of top soil.

Ground Water

Removal of pumice at the mine site will have little, if any, direct impact on recharge of the aquifers in the local area. Erosion control and revegetation will ensure that the disturbed land is restored to a hydrological condition as close as practical to its premining condition.

To minimize the potential for contamination of the aquifer as a result of accidental spills the selected alternative requires that: used oil be collected and disposed of in an authorized facility off the National Forest; no storage of fuel or oil be permitted at the mine; mining equipment be fueled and lubricated over an impervious spill containment surface; and a spill kit be kept on site. Ground water quality will be monitored through two monitoring wells installed on the edges of the mine site.

Wetland and Surface Water

The measures previously listed for soil protection will keep water runoff within the mine site. Sediment from the mine site will not reach the East Fork of the Jemez Wild and Scenic River because the intermittent stream goes underground more the 2 miles from the River, providing ample opportunity for sediment to be stabilized instead of moving into the River. There are no wetlands in the mine area. Surface and subsurface water flows affecting Montoya Spring and the intermittent stream located outside the mine area will not be impacted by the mine because the watershed area producing water is avoided.

Recreation Opportunities and Uses

Although Forest Trail 137 in the Jemez NRA and areas along the East Fork of the Jemez Wild and Scenic River are popular recreation areas, there is little dispersed recreation in close proximity to the mine site. The selected alternative reduces potential impacts to the quality of the recreational experience from exposure to the sights and sounds of the mine operation by: prohibiting operations during weekends and holidays (when the most recreational use occurs); rerouting a portion of the Mistletoe Canyon Cross-country ski trail to avoid the mine area; locating log landings outside the view from Highway 4 to the extent practical; eliminating stumps (after 1 year to kill root rot); obliterating access roads after mining; retaining some existing vegetation to reduce large open views of the mine; reshaping the ground to mimic premining conditions; planting and seeding native vegetation in a natural-appearing mosaic of forest and grassland vegetation; and staging the operations such that only one third of the area is mined and then revegetated before starting on another third of the mine.

Scenery

There will be unavoidable negative effects to the scenery with any of the mining alternatives, for at least a few years after reclamation has begun. Any impact to scenic conditions due to the mine site is important because the site is within the Jemez NRA, designated in part to recognize and protect the area's outstanding scenery.

The selected alternative excludes mining a 7.3 acre portion of the northern boundary which provides a scenic vegetative "buffer" from mountain top views and reduces the total mine

acreage from 83.5 to 76.2 acres. Retaining the buffer along the north edge allows views from Redondo and South Mountain to meet Retention in a shorter time frame. Views from the highway and other mountain observation points remain as in **Alternative 1a.**
For the selected alternative, there will be no "unacceptable alteration" to scenic conditions 2-10 years after reclamation has begun for all viewpoints except a person wandering to the mine edge from the surrounding forest.

Heritage Resources

There are no archeological or historic sites in the area of the mine site. The State Historic Preservation Officer concurs with Forest Service archaeologists that there will be no measurable impacts to heritage resources.

Forest Vegetation and Wildlife

Forest vegetation will be removed and later restored to this site by reclamation. The selected alternative includes many measures to retain top soil and soil productivity, and to restore, as rapidly as possible, the pre-existing forest vegetation (mostly young ponderosa pine/gambel oak habitat). The localized effects in the relatively small-size mine site will not result in any adverse effects to the viability of wildlife populations, or adverse effects to any threatened or endangered species or their habitats.

Other Issues

The analysis documented in the Final EIS concludes that the selected alternative will not adversely affect public health and safety, residential property values, or local economies. Dust abatement measures included in the selected alternative will control dust to well within State standards. Truck traffic to and from the mine site is an unavoidable adverse effect. However, truck traffic from the El Cajete Mine will be about the same as has been occurring from the Las Conchas Mine for the past 9 years. The proposed truck traffic is within the design limits of the highway, and is comparable to other commercial truck traffic using this highway.

The selected alternative will result in employment of approximately 28 full-time and 2 part-time workers, formerly employed at the Las Conchas Mine.

Forest Plan Amendment

A secondary part of this decision approves a non-significant amendment to the Forest Plan. The amendment allows the El Cajete Mine to relax Forest Plan standards and guidelines for visual quality (the Forest Plan currently does not distinguish between standards and guidelines). The Forest Plan requires meeting the visual quality objective of Retention within Management Area C, where the El Cajete Mine is located, because it is in a visually sensitive area. **Alternative 1a Modified** will reduce impacts to the scenery to the extent practicable, but can not eliminate scenic impacts or meet the Retention objective during or shortly after mining. Thus, the following statement is added to the Forest Plan, page 108, and applies to the visual quality standard and guideline references on pages 56, 81, 109 and 110 of the Forest Plan:

"The statutory right to develop valid mineral claims under the 1872 Mining Law, supercedes management direction provided by the Forest Plan. Therefore, the visual quality standards and guidelines may be relaxed only as necessary to meet the requirements of the 1872 Mining Law, as ammended."

ENVIRONMENTALLY PREFERABLE ALTERNATIVE

Council on Environmental Quality (CEQ) regulations at 40 CFR Part 1505.2 (b) require an agency to specify the environmentally preferable alternative, which is the alternative which causes the least damage to the physical and biological environment, and which best protects, preserves and enhances historic, cultural and natural resources. **Alternative 3**, the no action alternative, is the environmentally preferable alternative for this project.

Alternative 3 was not selected because it would violate the 1872 Mining Law and is therefore not within Forest Service authority to select.

FINDINGS REQUIRED BY OTHER LAWS

With the non-significant Forest Plan amendment included in this decision, the selected alternative is consistent with the Santa Fe NF Forest Plan. It meets the goals, standards and guidelines for the Forest and for activities within Management Area C. It meets requirements in 36 CFR 219.27 regarding vegetative manipulation. The selected alternative complies with all National Forest Management Act (NFMA) and NEPA regulations.

The Forest Service consulted with and received concurrence from the US Fish and Wildlife Service regarding biological determinations for threatened and endangered species, and complied with all requirements of the Endangered Species Act. Our archaeologists consulted with local Pueblos and other interested parties regarding heritage resources, and received concurrence from the State Historic Preservation Officer that no adverse effects will occur to any historic or cultural properties. The selected alternative meets provisions of the Jemez NRA Act, as well as all other applicable statutes and regulations.

APPEAL RIGHTS

The decision to approve **Alternative 1a Modified** for the Plan of Operations for the El Cajete Pumice Mine, is subject to appeal in accordance with 36 CFR 215. A Notice of Appeal must be fully consistent with 36 CFR 215.14, and must be filed with the Regional Forester (Appeals Deciding Officer), USFS SW Regional Office, 517 Gold Ave. SW, Albuquerque, NM 87102, within 45 days from the date of publication of the legal notice of decision in the *Albuquerque Journal*.

The Copar Pumice Company has the right to appeal this decision to approve **Alternative 1a Modified**, in accordance with 36 CFR 215 ***or*** 36 CFR 251 Subpart C. Under 36 CFR 251, a Notice of Appeal must be fully consistent with 36 CFR 251.90, and must be filed in duplicate with the Regional Forester at the address previously listed, **and** the Forest Supervisor, Santa Fe National Forest, PO Box 1689, Santa Fe, NM 87504, within 45 days from the date of publication of the legal notice of decision in the *Albuquerque Journal*. In accordance with 36 CFR 251.84, I am willing to meet with Copar to discuss any concerns about this decision.

The decision to amend the Forest Plan is subject to appeal in accordance with 36 CFR 217. A Notice of Appeal must be fully consistent with 36 CFR 217.9, and must be filed in duplicate with the Regional Forester and the Forest Supervisor at the addresses previously listed, within 45 days from the date of publication of the legal notice of decision in the *Albuquerque Journal*.

IMPLEMENTATION

If no appeal is filed under 36 CFR 215, implementation may occur 5 business days from the close of the 45 day appeal period. If an appeal is filed under 36 CFR 215, implementation may occur 15 days following the date of appeal disposition. (An appeal decision is due 45 days from the end of the appeal period).

The decision adopting the non-significant amendment to the Forest Plan will become effective 7 calendar days after publication of the legal notice of decision in the *Albuquerque Journal*.

If an appeal is filed by Copar under 36 CFR 251, implementation may occur during review of the appeal unless a stay is requested and granted.

However, Copar can not actually begin implementation until the Forest Service reviews and approves their final Plan of Operations, which must comply with the provisions of the selected alternative. Copar must also submit a reclamation bond to cover the estimated cost of reclaiming land that would be adversely affected if mine operations are abandoned or ceased (36 CFR 228.109). An approved Plan of Operations does not relieve Copar from the obligation to secure any other required state and federal permits or authorizations.

Any proposed changes in the approved Plan of Operations will require additional analysis in accordance with the NEPA regulations if impacts from those proposed changes would be significantly different than those analyzed in the Final EIS and considered in this ROD.

CONTACT PERSON

For additional information concerning this decision contact: Diane Tafoya, Forest Geologist, (505) 438-7845, Santa Fe NF Supervisor's Office, P.O. Box 1689, Santa Fe, NM 87504; or Dennis Trujillo, District Recreation, Lands and Minerals Staff Officer, (505) 829-3535, Jemez Ranger District, P.O. Box 150, Jemez Springs, New Mexico 87025.

Leonard Atencio — 12/5/96

LEONARD ATENCIO — **DATE**
Forest Supervisor
Santa Fe National Forest

EL CAJETE MINE BOUNDARIES