

Monitoring of the rockshelter sites in Box Canyon from escarpment failures is recommended, unless site mitigation supersedes any monitoring. Research design will be needed under Alternatives B and D for excavation of sites. Research designs will be subject to required 36 CFR Part 800 consultation and approval by the USHPO and Advisory Council.

3.8.1.4 *Cumulative Effects*

Past actions concerning cultural resources within the proposed Project Area include cultural resource surveys which have identified over 35 prehistoric and historic sites, some of which are considered eligible for the NRHP. Adverse activities have included unauthorized excavations and vandalism of archaeological sites. Present authorized activities have included an archaeological excavation at the Crazy Bird Shelter and the testing of other sites for evaluative purposes for an adjacent coal lease tract. The direct adverse impacts, under the proposed Pines Tract Project and alternatives, could include construction of new mine facilities, groundwater discharge, subsidence, tension cracks, fractures in bedrock, and escarpment failure at cultural resource sites that could potentially destroy or compromise the integrity of the sites.

3.8.1.5 *Residual Adverse Impacts*

Residual adverse impacts to cultural resource properties would include compromised site integrity due to physical damage to the sites (i.e. subsidence, tension cracks, rock fractures, and escarpment failure). These impacts can lead to increased erosion and exposure of some buried site deposits. Also, the presence of any new roads can lead to increased access to site locations resulting in site disturbance and vandalism.

3.8.1.6 *Irreversible/Irretrievable Commitment of Resources*

The proposed Pines Tract Project could result in the irreversible commitment of and the irretrievable commitment of cultural resources. The proposed project could result in the irreversible alteration or destruction of cultural resource sites that are considered ineligible for the NRHP. Further, cultural resource sites that have been deemed eligible or unevaluated for the NRHP could be directly impacted depending on the alternative chosen.

3.8.1.7 *Short Term Uses vs. Long Term Productivity*

The short-term use of natural resources during the Pines Tract Project activities could result in adverse affects to cultural resource sites located within the Project Area. If sites are damaged or destroyed during development, mining, or exploration, significant information could be irretrievably lost. Information and data retrieved through mitigation measures would represent short-term use of cultural resources at the expense of future research opportunities. Therefore, long-term productivity would be lost.

3.8.2 Paleontology

3.8.2.1 *Affected Environment*

The analysis area includes the Pines Coal Lease Tract, the Lease Modification Area, Permit Amendment Area, Muddy Canyon, and Link Canyon. According to the Department of Natural

Resources - Utah Geological Survey (1998), potential for paleontological resources within the Pines Tract Project Area is limited to the exposures of the Blackhawk Formation.

Lithostratigraphic Units

The major sequences of rock in the Project Area are comprised of members of the Cretaceous Mesa Verde Group. These include the Price River, Castlegate and Blackhawk Formations. The Price River Formation overlies the Castlegate sandstone (Hintze 1980). The underlying Blackhawk Formation possesses the greatest potential for paleontological resources within the Pines Tract Project Area.

Price River Formation

The Price River Formation consists of conglomerate, sandstone, siltstone and shale, and has low potential (Goodrich and Agapito 1997).

Castlegate Sandstone

The Castlegate Sandstone member of the Price River Formation is approximately 200 feet thick and consists of massive, tan, cliff forming fluvial sandstone, minor shale, siltstone and conglomerate, and has low potential (Goodrich and Agapito 1997).

Blackhawk Formation

The coal bearing Blackhawk Formation consists of 60 percent to 65 percent sandstone with the remainder being shales, siltstones, mudstones, and coal seams. This formation is approximately 830 feet thick and contains the Hiawatha coal seam (Goodrich and Agapito 1997). While no documented fossil resources are present within the Pines Tract Project boundary, vertebrate fossil resources have been recorded in the Blackhawk Formation in the Trail Mountain area, approximately 18 miles to the north. Included in these resources are tracks of ornithopod, theropod, and possibly ceratopsian dinosaurs; a complete Hadrosaur (ornithopod) skeleton; a ceratopsian femur; and bird tracks. Possible invertebrate resources within the Blackhawk Formation may include pelecypods and gastropods. Plant fossils known to exist within the formation include ferns, conifers and angiosperms.

3.8.2.2 *Environmental Consequences*

Two possible development scenarios need to be addressed in relationship to potential impacts. Canyon Fuel or another company may obtain the Pines Coal Lease Tract. If another company is the successful bidder, construction of new mine facilities near the head of Link Canyon, a waste dump/stock-pile accumulation, 1,500 feet of discharge pipe, and haul road improvement within Link Canyon to SR-10, near the town of Emery would be needed.

Both scenarios incorporate approximately 1,000 gpm of water that would be discharged into Link Canyon for at least 3 years, until main entries could be developed to the north to the proposed breakout in Muddy Creek. Prior to implementation, a paleontological resource survey would have to be conducted in the Link Canyon, and Muddy Creek localities to assess potential impacts due

to the water discharge project. Any paleontological resources encountered would then have to be evaluated and, if need be, mitigated.

3.8.2.2.1 No Action Alternative

No mining or development would affect any paleontological resources. Therefore, no impacts will occur to any known or unidentified paleontological resources other than what may occur on the existing Quitchupah Coal Lease Tract.

3.8.2.2.2 Alternative B

No known paleontological resources are present within the Pines Tract Project Area. Of the two strata present within the Pines Tract Project Area, only the Blackhawk formation has the potential to yield paleontological resources. This formation lies beneath the Castlegate Sandstone, approximately 200 feet below the surface. The portion of the Blackhawk Formation that would be directly impacted is the Upper Hiawatha coal seam, approximately 775 feet beneath the Castlegate/Blackhawk juncture. The Blackhawk Formation is exposed in cliff faces, where the canyon depth exceeds 200 feet, namely along the lower slopes of the East Fork of Box Canyon, the lower slopes of Link Canyon, and the southern slopes of Muddy Creek. The Upper Hiawatha coal seam will only be exposed in the deepest portions of Box Canyon, Link Canyon, and possibly Muddy creek. Subsidence related impacts to paleontological resources contained within the Blackhawk formation would only be visible if manifested in portions of the formation that are exposed in the canyon escarpments. Such impacts could be in the form of spalling, and/or escarpment failure due to subsidence related movement. Due to lack of specific information, impacts to paleontological resources from coal mining operations contained deeper within the formation, and not near canyon escarpment exposures, cannot be predicted, or evaluated.

3.8.2.2.3 Alternative C

Alternative C would have the same impacts as Alternative B, except that, SCLS #1 states that prior to undertaking surface disturbing activities, the Lessee may be required to conduct a paleontological appraisal of the proposed impact area. A plan would then be submitted making recommendations for the protection of, or measures to be taken, to mitigate impacts for identified paleontological remains. If paleontological remains of significant interest were discovered during operation under this lease, "the Lessee prior to disturbance shall immediately bring them to the attention of the appropriate authority."

3.8.2.2.4 Alternative D

The impacts would be the same as those described in Alternative C.

3.8.2.3 Mitigation and Monitoring

Due to the presence of the Blackhawk Formation, additional paleontological resources may exist along the plateau escarpments or below the ground. In order to protect such unidentified resources, the following stipulations should apply during the project development:

1. Personnel and equipment associated with the project should be restricted to those areas cleared for the project.
2. Personnel associated with the project should refrain from collecting or otherwise disturbing fossil materials that may be encountered during development.

3.8.2.4 *Cumulative Effects*

Direct adverse impacts under the Proposed Action and alternatives to paleontological resources would be unlikely in most situations in the Pines Tract Project Area. The presence of paleontological sites resulting from a rock fracture or strata failure, within the Blackhawk Formation, would be remote.

3.8.2.5 *Residual Adverse Impacts*

Residual adverse effects to paleontological properties may include exposure of fossils from escarpment failures or large rock fractures.

3.8.2.6 *Irreversible/Irretrievable Commitment of Resources*

No irreversible or irretrievable commitment of paleontological resources is anticipated.

3.8.2.7 *Short Term Uses vs. Long Term Productivity*

Paleontological resources are nonrenewable. Those destroyed or removed during exploration, mining, and development would be lost forever. Information retrieved through mitigation measures would represent short term use of said resources. However, this short term use would forego some future research opportunities that might benefit from improved research methods and techniques.

3.9 LAND USE AND RECREATION

3.9.1 Affected Environment

Existing Land Uses

The area of analysis for land use and recreation includes the Pines Tract Project Area (as defined in Appendix A) and the immediate vicinity, including portions of Emery and Sevier Counties and the town of Emery. Existing land uses in the vicinity of the Pines Tract Project Area include mining, timber production, transportation corridors, livestock grazing, wildlife habitat, and dispersed recreation. Discussions related to livestock grazing and stock ponds are found in Section 3.10 of this EIS and the Final Range Resources Technical Report (JBR 1998a). Figure 3-13 presents land uses within the Project Area vicinity. Specifically, Figure 3-13 presents the location of the FS Boundary in relation to the Pines Tract Project Area and the Project Area's proximity to the town of Emery. There are no existing special use permits or utility corridors (e.g., power lines, fences, or pipelines) transecting the Pines Tract Project Area. However, a power line is proposed to be constructed adjacent to the Link Canyon access road. The Pines Tract Project Area may contain land survey monuments and section corners.

Recreation

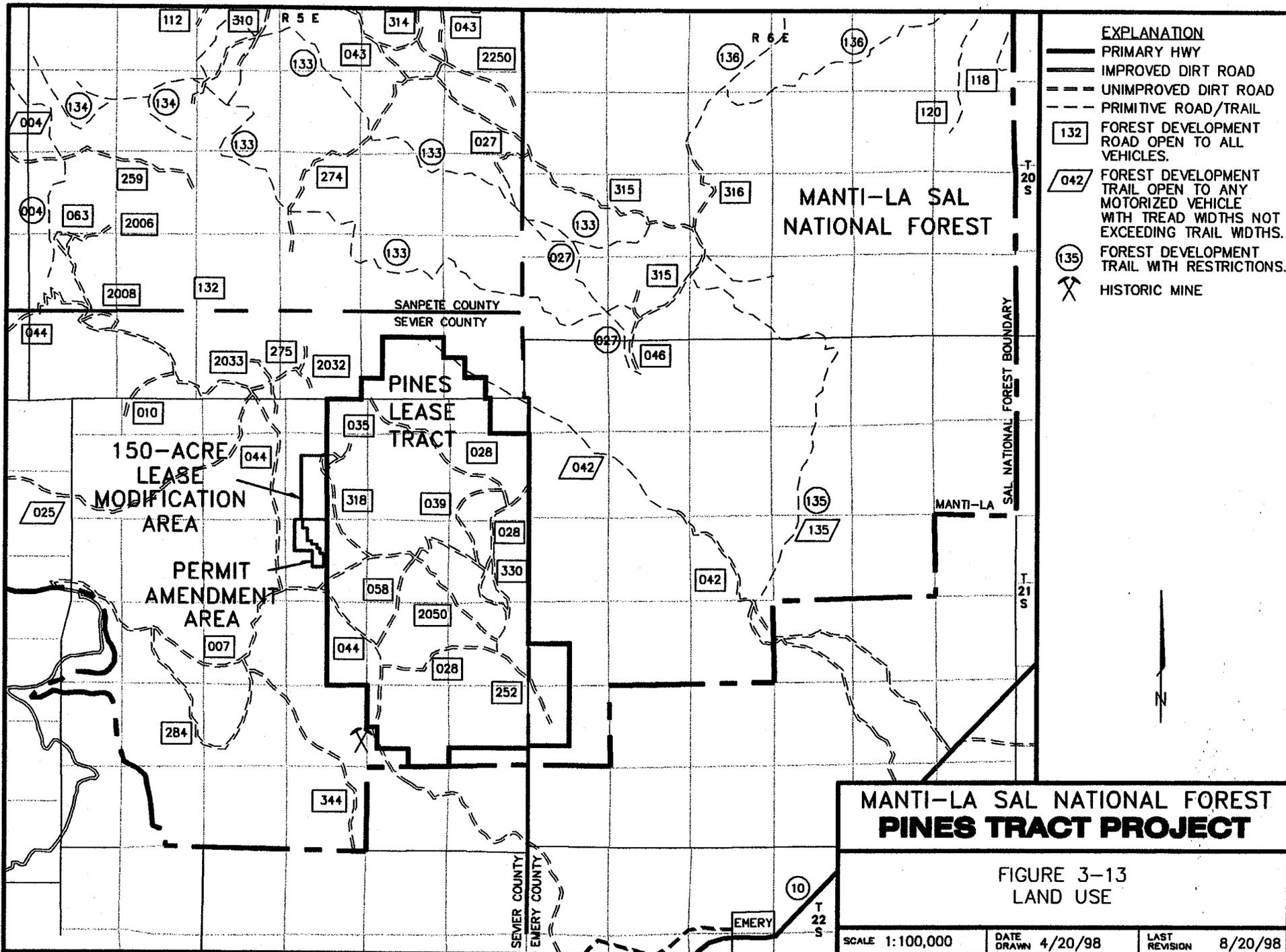
The dominant recreation within the Pines Tract Project Area include big and upland game hunting and off-road vehicle use (ORV). Less dominant recreational uses in the project vicinity include dispersed camping, hiking, and sightseeing. There are no designated camp grounds within the Project Area. Roads within the Pines Tract Project Area are four-wheel drive two-track roads. Figure 3-14 presents recreation opportunities spectrum, according to the FS, MLS Forest Plan, in the vicinity of the Project Area. According to the Forest Plan, the majority of the Project Area is designated as having a semi-primitive motorized recreational opportunity (USDA-FS 1986a).

Local and Regional Management Direction

The majority of the Pines Tract Project Area is located within Sevier County, with a small portion located in Emery County, as shown on Figure 3-13. The land surface is administered by the FS, MLS with the mineral estate managed by the BLM, Utah State Office.

The Forest Plan guides all natural resource management activities and establishes management standards and guidelines for the MLS (USDA-FS 1986). The Forest Plan describes resource management Standards and Guidelines and provides Goals and Objectives.

Management direction in the Forest Plan is a direct result of identified public issues, management concerns, and management opportunities. Proposed uses on forest lands, such as the Pines Coal Lease Tract, must be consistent with management requirements of the Forest Plan. Figure 3-15 presents the FS's multiple use management area direction for the Project Area.

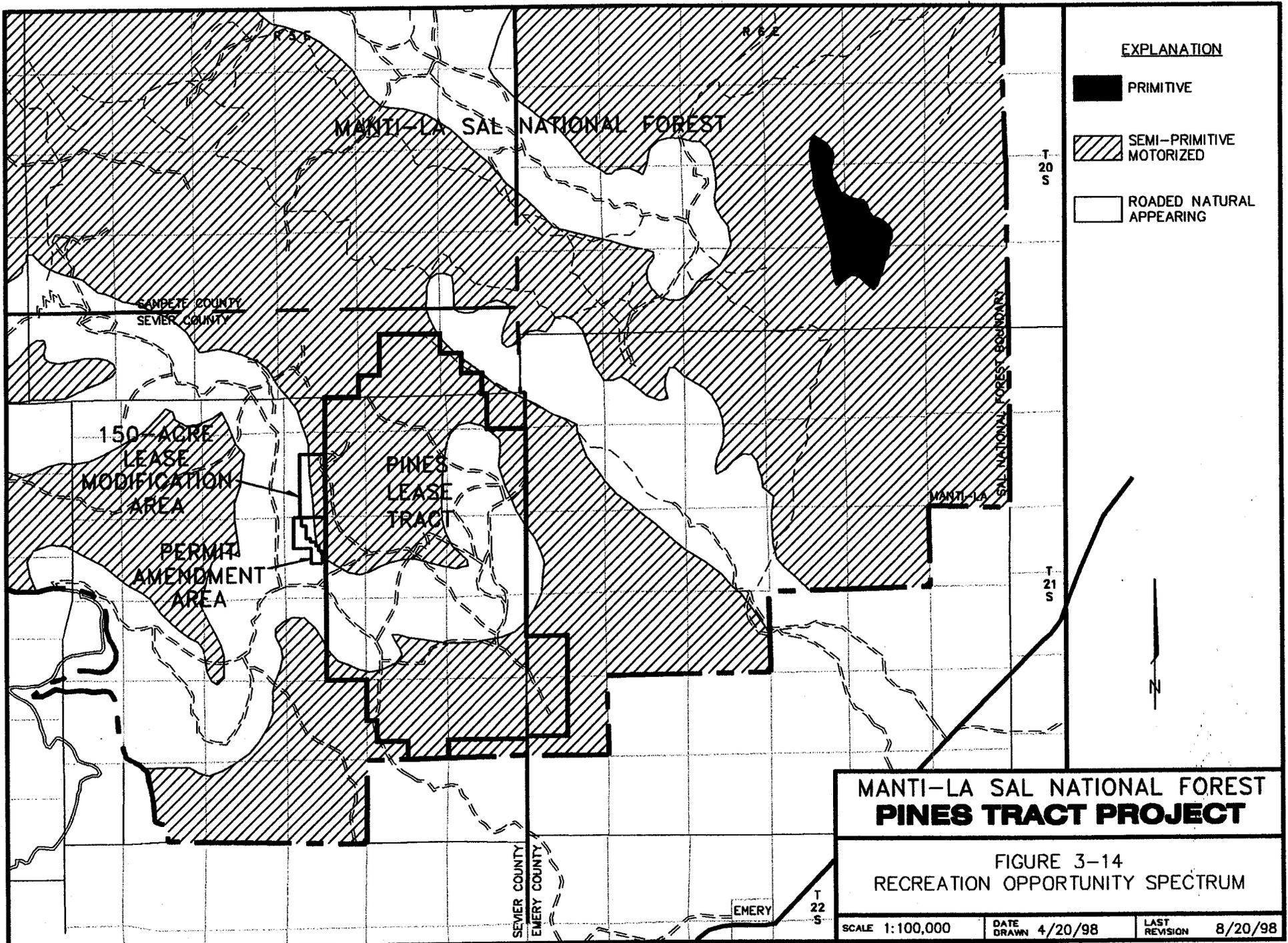


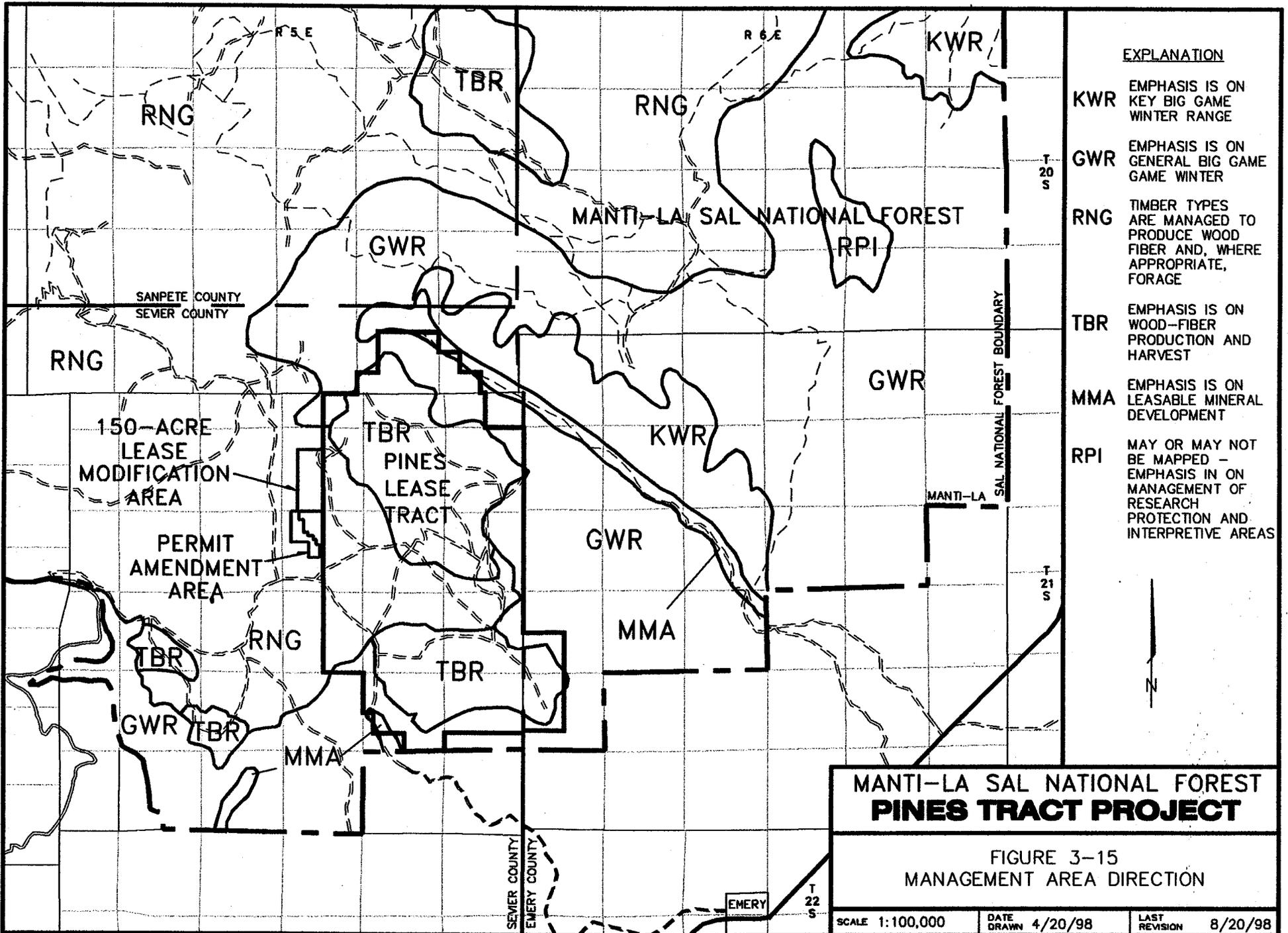
- EXPLANATION**
- PRIMARY HWY
 - IMPROVED DIRT ROAD
 - - - UNIMPROVED DIRT ROAD
 - - - PRIMITIVE ROAD/TRAIL
 - [132] FOREST DEVELOPMENT ROAD OPEN TO ALL VEHICLES.
 - [042] FOREST DEVELOPMENT TRAIL OPEN TO ANY MOTORIZED VEHICLE WITH TREAD WIDTHS NOT EXCEEDING TRAIL WIDTHS.
 - [135] FOREST DEVELOPMENT TRAIL WITH RESTRICTIONS.
 - X HISTORIC MINE

**MANTI-LA SAL NATIONAL FOREST
PINES TRACT PROJECT**

FIGURE 3-13
LAND USE

SCALE 1:100,000 DATE DRAWN 4/20/98 LAST REVISION 8/20/98





The Pines Tract Project Area and surrounding public land is open to oil and gas leasing; however, the area is currently not leased. To date, there have been no oil or gas discoveries in the Pines Tract Project Area (USDA-FS 1992).

To ensure the use and protection of leased coal lands, the BLM has implemented Standard Lease Terms and Conditions for all coal leases (Appendix C). Similarly, the FS has implemented SCLS in conjunction with the Forest Plan (Appendix D).

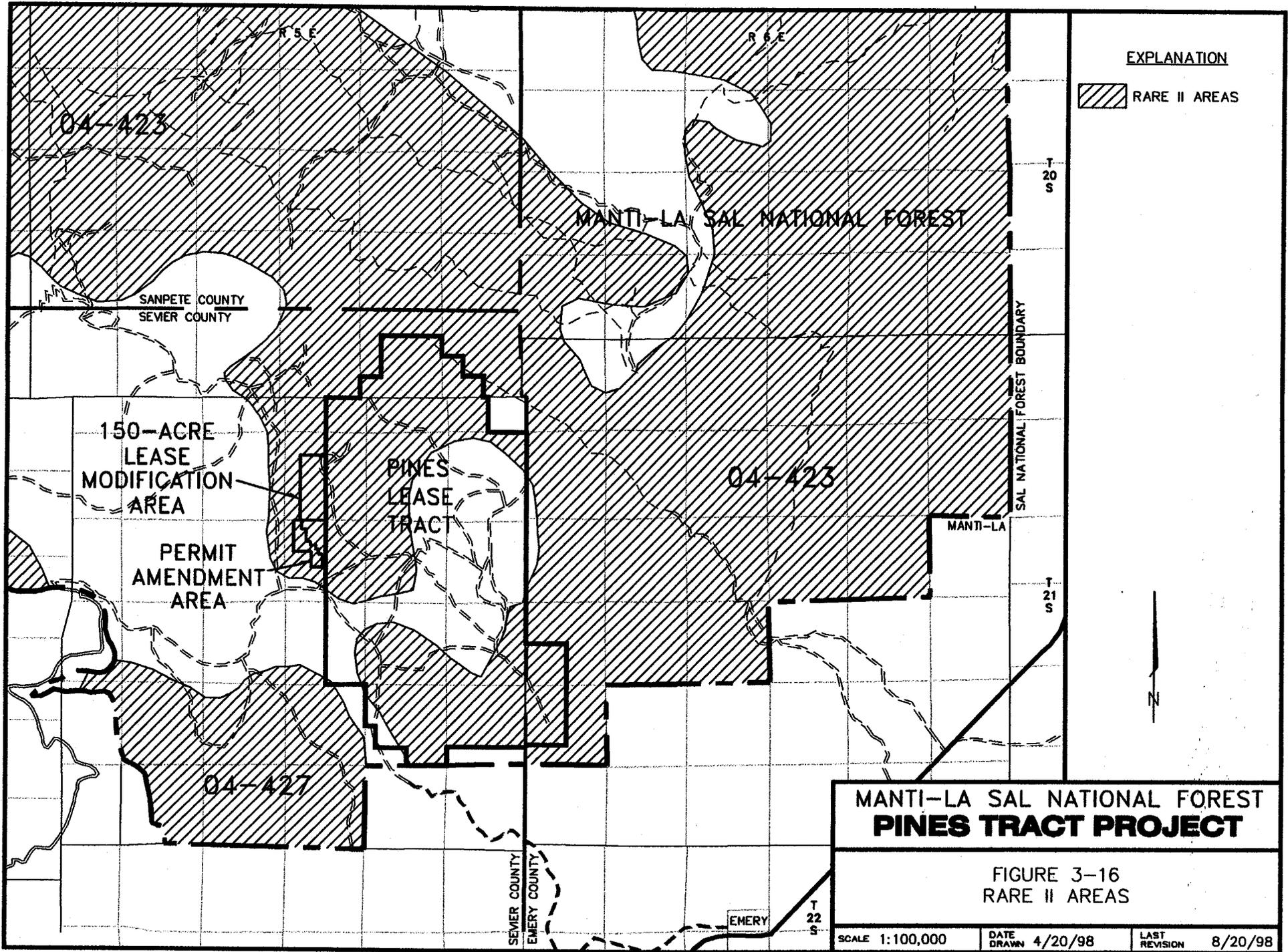
The BLM has identified lands within the jurisdiction of the Price River Field Office that contains minable coal. These lands have been made available for further consideration for coal leasing on a site-specific basis using the unsuitability criteria in 43 CFR 3461 and Multiple-Use Management threshold levels established by the Forest Plan (USDA-FS 1986a). Using this criteria, lands associated with the Pines Coal Lease Tract have been designated for leasing.

The Sevier County Zoning Resolution (Sevier County 1965) designates the Project Area (Pines Coal Lease Tract, 150-Lease Modification Area, and Permit Amendment Area) as GRF-1 Grazing, Recreation, and Forestry Zone. The GRF-1 zoning designates the primary use of the land for grazing, recreational, forestry and wildlife purposes. In general, this zone covers the open portion of Sevier Country which is occupied largely by grazing land, mountains, and canyons (Sevier County 1965). Permitted uses within the GRF-1 Zone include, but are not limited to, gravel pits, clay pits, rock quarries, oil and gas wells, mines, mineral reductions and processing structures and facilities, and all activities related thereto (Sevier County 1965). Continued mining within the Project Area would not conflict with Sevier County zoning. The County Zoning Resolution requires new mining operators within the County to obtain County approval and a Special Use Permit prior to constructing and operating a new mine. Emery County would require new mining operations to obtain a Special Use Permit prior to any new mining-related surface disturbance within the county. In the case of the Pines Tract Project, the only new surface disturbance that would be created within Emery County may result from exploration activities (i.e., creation of access roads and/or drill sites).

A portion of the Link Canyon road is located within Emery County and is maintained by the Emery County Road Department. Improvements to this road are under the jurisdiction of Emery County and would require a Construction Permit. All existing and proposed hauling of coal on County roads requires a Haul Permit from the Emery County Road Department.

Roadless Area Review and Evaluation II Areas - Roadless Policy

Two Roadless Area Review and Evaluation (RARE) II areas were inventoried in the Project Area in the late 1970s for the purposes of designating areas to be considered for wilderness designation under the Wilderness Act of 1964. They are RARE II Areas 04-427 and 04-423 (Figure 3-16). These areas were not designated as wilderness under the Utah Wilderness Act of 1984.



The Utah Wilderness Act of 1984 specifies that the nonselected areas be managed for multiple-uses and need not be managed for the purpose of preserving their qualities for potential future wilderness designation (Title II, Section 201). These areas were evaluated for special designation as Semiprimitive Non-Motorized Recreation (SPR) Management Units under the Forest Plan, 1986, but were considered more suitable for other management emphasis and were so designated.

USDA-FS Chief Mike Dombek has proposed a moratorium on the construction or reconstruction of roads in Roadless Areas, including RARE II Areas, on National Forest System lands. If implemented, and depending on the provisions of implementation, the moratorium could postpone the construction of new roads or reconstruction of existing roads for coal exploration purposes within RARE II Areas. The decision(s) on this project would comply with policy in effect at the time of decision.

3.9.2 Environmental Consequences

3.9.2.1 *No Action Alternative*

Under the No Action Alternative, the Pines Coal Lease Tract would not be available for lease, mining that would cause subsidence would not be allowed in the Permit Amendment Area, and the 150-acre Lease Modification to the Quitchupah Lease would not be allowed. Canyon Fuel would continue to mine within the Quitchupah Lease until minable reserves are removed. No impacts to existing land uses within the Pines Tract Project Area would occur. Existing land uses would be managed in accordance with Forest Plan Direction.

Under the No Action Alternative, the Pines Tract Project Area would be available for oil and gas leasing. No conflicts or delays in oil and gas leasing would occur nor would coal mining conflict with other land uses.

3.9.2.2 *Alternative B*

Implementation of the proposed project would result in minimal impacts to existing land uses. Subsidence and changes in ground surface are discussed in Section 3.1. Vertical changes in subsidence and surface gradient change will be too gradual to be observed by the public (Agapito Associates 1998). Such changes in the ground surface either will not be visually discernable or will be minor (e.g., elevational changes up to 5 feet and fractures less than 1 inch in width), no impacts to land uses within the Pines Tract Project Area are anticipated. Specifically, access to portions within the Pines Tract Project Area by recreationists, hunters, and/or allotment lessees are not anticipated to be hindered by such subsidence related ground movements.

Impacts resulting in alterations of spring or stream flows and stream gradient changes are not anticipated to be large enough in magnitude to impact groundwater or surface water resources (Mayo and Associates 1998; JBR 1998b) that may support big game. Therefore, impacts to big or upland game and associated impacts to recreationalists and hunters are not anticipated as a result of the proposed project.

Impacts to livestock grazing, specifically potential impacts to stock ponds resulting from subsidence, are discussed in Section 3.10 of this EIS and the Final Range Resources Technical Report (JBR 1998a).

Should Canyon Fuel obtain the Pines Coal Lease Tract, no changes in the existing access to the area would occur. Recreationists and other forest users (e.g., hunters and allotment permittees) would continue to have access to public lands using existing access roads and there would be no displacement of use. Areas potentially having escarpment failures are not immediately adjacent to existing FS access roads. Therefore, public users traveling along FS roads would not have the potential to be injured from falling rocks nor would their path of travel be obstructed; however, there is a potential safety hazard to hunters and recreationalists hiking or traveling near canyon rims, canyon bottoms, and immediately below escarpments. Due to the low number of recreationists using the Pines Tract Project Area per year, taking into consideration that escarpment failures could occur at isolated locations, and that escarpments only have the potential to fail when mining of the longwall panel approaches escarpments, the probability of a person becoming injured from falling debris is slim.

No changes in the number of visitor days by recreationists are expected as a result of implementation of the proposed project. As identified above, subsidence related ground movements resulting from proposed mining are not anticipated to impact existing land uses within the area. However, land survey monuments and their viability as solid data points may be altered due to changes in the ground surface. Under this alternative, no stipulations would be imposed requiring the replacement of damaged, disturbed, or displaced corner monuments, their accessories, and appendages.

The RFDS is consistent with the both the Emery County and Sevier County General Plan and zoning ordinances. If Canyon Fuel is the successful bidder, it would not be required to obtain a special use permit from Sevier County to continue operations at the SUFCO Mine (Don Brown, personal communication, April 17, 1998). If new surface disturbance is created within portions of the Pines Tract Project Area within Emery County, the mining operator would be required to obtain a Special Use Permit from Emery County.

Should another company obtain the Pines Coal Lease Tract, construction of a new mine facility within Link Canyon would be needed. New mine facilities would encompass approximately 100 acres of new surface disturbance. The placement of these new facilities would not interfere with existing facilities in the area, but has the potential to restrict or hinder access to public lands. The development of a new mine would result in a potential risk to public safety, specifically from the increase in traffic and coal haulage. A mine operator would be required to obtain approvals under existing laws and regulations. A site-specific environmental analysis and approvals and permits would be required. Emery County Road Department would also require the new mine to obtain a Construction Permit to upgrade the Link Canyon road and a Haul Permit to haul coal on County

roads. Under this scenario, current recreational use within the Pines Tract Project Area may be reduced due to difficulties accessing public lands using the Link Canyon road.

New roads could be constructed for the purpose of drilling coal exploration holes, if approved by the responsible officials, following an appropriate environmental analysis. Up to 10 holes could be drilled with a combined disturbance of 40 acres for project roads and drill pads. It is not likely that holes disturbance would be proposed within the RARE II areas, but for the purposes of this analysis it is assumed that it could be. It is not possible to predict the exact number of holes, their locations, or when they would be proposed. For the purposes of the analysis, it is assumed that all of them would be drilled in one field season. The temporary project roads would be constructed, the holes would be drilled, and the roads and pads would be reclaimed in one summer field season. This would result in a temporary (one year) intrusion into the RARE II Areas. The disturbed area, including the project roads, would be reclaimed in the fall and not used in successive years. In the Quitchupah/Pines area, reclamation and revegetation of coal exploration roads have routinely met specified revegetation standards within 5 years or less. The reclaimed road and pad locations can be visible for up to 10 years only because sagebrush invasion is slow and the reclaimed areas contain less brush species for this time period. Measures taken to prevent continued use of the reclaimed areas by recreationists have been very successful within the Project Area. Impacts to the undeveloped character of the roadless areas would be short-term as revegetation standards are expected to be met within 5 years.

If exploration activities are proposed during the moratorium, the lessee/operator would not be allowed to construct new project roads or reconstruct existing roads within those portions of the Project Area that lie within the RARE II Areas. This would postpone road construction/reconstruction in the RARE II Areas for the duration of the moratorium. The construction of drill pads and access by helicopters would probably be allowed under the moratorium. In addition, overland access to drilling locations by tracked vehicles, without the construction of roads, could also be an option, depending on provisions of the moratorium.

The reasonably foreseeable Box/Muddy Creek breakout and Link Canyon Mine do not lie within the RARE II areas, so they would not affect the undeveloped character of the RARE II Areas and would not be affected by the potential moratorium.

Although there are no current oil and gas leases within the Pines Tract Project Area, future leases could conflict with existing coal leases. Activities associated with oil and gas leases may be delayed until either mining within the immediate area proposed for the oil and gas activity ceases or the Pines Tract Project expires.

3.9.2.3 *Alternative C*

Implementation of Alternative C would result in less impacts than Alternative B. Specifically, impacts to recreational and hunter use of the area, as well as public safety, are not anticipated. Oil and gas leases could have a conflict with the existing coal lease and future oil and gas leasing

and exploration could be delayed. Survey monuments have the potential to be altered by ground movements resulting from subsidence over a larger area. Implementation of this alternative would not result in the potential for escarpment failure. Therefore, the concern for public safety resulting from escarpment failure would be reduced.

However, under this alternative, SCLSs would be implemented. In compliance with SCLS #16, survey monuments displaced or damaged from potential ground movements related to subsidence would be replaced by the operator.

Should another company obtain the Pines Coal Tract Lease, the resulting impacts to land use would be slightly less than those identified under Alternative B. The construction of a new mine in Link Canyon would result in an additional 100 acres of surface disturbance. Such activity would require site-specific environmental analysis, approvals, and permits under existing laws and regulations. Several SCLSs would apply which would reduce or eliminate potential impacts to the environment. Specifically, SCLS #5 would place limitations on the location and size of new facilities; SCLS #6 would consider new facilities in relationship with their surroundings in an effort to reduce visual impacts; and SCLS #15 ensures the removal of structures, equipment, and other mine related facilities.

Exploration activities would be conducted in RARE II areas as described under Alternative B; however, they would be consistent with the FS's recent moratorium on road construction. All future oil and gas leasing would be in conflict with the Pines Coal Lease Tract. Such oil and gas leases could be delayed until coal leases expire or mining within a particular area is completed.

Effects to future oil and gas leasing would be the same as for Alternative B.

3.9.2.4 *Alternative D*

Implementation of this alternative would have similar impacts as those identified under Alternative B and C.

3.9.3 Mitigation and Monitoring

The construction and operation of a new mine at Link Canyon should include design provisions to maintain public access to FS lands within the Pines Tract Project Area.

3.9.4 Cumulative Effects

Past and present actions in the immediate vicinity of the Project Area include underground coal mining in the Quitchupah Lease. Land uses in the Quitchupah Lease have been minimally affected by this continued underground coal mining. Specifically, the development of facilities at the SUFCO Mine has not hindered public access to Forest lands.

The implementation of the Pines Tract Project, in conjunction with past, present, and reasonably foreseeable future actions could conflict with land uses. Specifically, as increased mineral

development occurs within the region, access to Forest lands by recreationists may become increasingly hindered. In addition, future coal mining could conflict with oil and gas leases. All reasonably foreseeable future development on Forest lands would be required to be consistent with management requirements of the Forest Plan.

All reasonably foreseeable future exploration activity would be subject to site-specific analysis and approval. If the proposed moratorium on new roads in Roadless Areas is implemented, new project roads related to exploration could be delayed or prohibited.

3.9.5 Residual Adverse Impacts

Project-related surface disturbance related to past, present, and reasonably foreseeable future actions, if not reclaimed, could conflict with other land uses. Specifically, increasing amount of surface disturbance and the placement of mining-related surface facilities, would reduce the area available to other Forest users (e.g., recreationalists and hunters). Cumulative disturbance associated past, present, and reasonably foreseeable activities represents less than two percent of the total area available to recreationalists and hunters.

3.9.6 Irreversible/Irretrievable Commitment of Resources

No irreversible or irretrievable land use related impacts are anticipated.

3.9.7 Short Term Uses vs. Long Term Productivity

No short term uses relating to land use and the Pines Tract Project are anticipated to affect the long term productivity of the land.

3.10 RANGE RESOURCES

3.10.1 Affected Environment

The analysis area for range resources consists of the approximately 7,311-acre Pines Coal Lease Tract, the 150-acre Lease Modification Area, Link Canyon, and a portion of Box Canyon within the existing Quitcupah Lease (Permit Amendment Area); all located within the Emery C&H Allotment. This allotment consists of 49,512 acres, of which 33,572 acres are suitable for grazing by cattle. It is estimated that approximately 6,200 animal unit months (AUMs) are available on the allotment.

The allotment is currently permitted to 21 permittees, and is managed under a five unit deferred rest rotation grazing system. A total of 1,387 head of cattle are allowed to graze the allotment from June 16th to September 30th each year. The Pines unit of the Emery C&H Allotment is used as an early season pasture (June 16th to July 4th) and rested in alternate years. The system was developed to be compatible with elk winter use of portions of the allotment.

Data compiled for the 1992 allotment evaluation indicated that 80 percent of the allotment was in mid-seral stage, 15 percent was in low-seral stage, and 6 percent was in high-seral stage.

Water is the limiting factor within the analysis area. Currently, range improvements within the analysis area include eight stock ponds on the Pines Coal Lease Tract and one pond on the Lease Modification Area, two sets of water troughs, portions of two fences, and a cattle guard (Figure 3-17). Vegetation treatments to promote forage and wildlife habitat have also been conducted and treatment of sagebrush is possible in the future. Plans are also being developed to pump water out of Box Canyon and East Fork Box Canyon to provide water in mid-summer. Livestock also depend on live water sources (i.e., springs and streams).

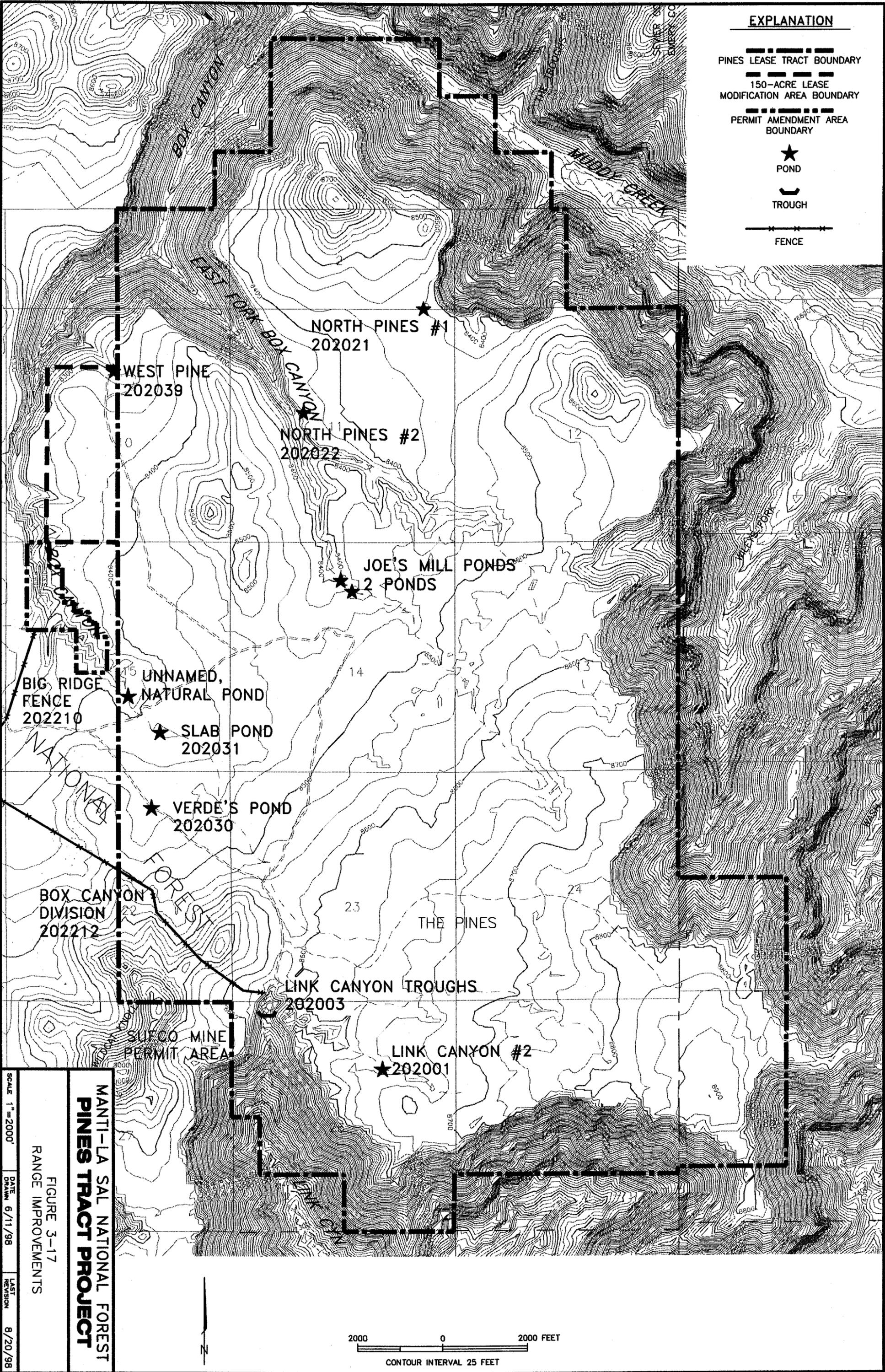
The Link Canyon Troughs, Joes Mill Pond (actually, two ponds close to each other), and springs are the most reliable water sources in the analysis area. The water availability of the other eight ponds is highly dependent on the amount of snow pack and the rate of thaw in the spring. These ponds may be dry when the livestock reach the allotment or may not last the entire grazing season for the Pines unit.

The AMP specifies that trailing onto the allotment will be via the Link Canyon trail, with no trailing permitted up the Muddy Creek drainage. Two other access routes are available, but not very practical. Livestock could be trucked from the west through Convulsion Canyon on the Fishlake National Forest and then north to the Wildcat Knolls area of the Emery C&H Allotment. This route would involve approximately 61 miles of trucking with less than 10 miles on paved roads.

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EXPLANATION

- PINES LEASE TRACT BOUNDARY
- 150-ACRE LEASE MODIFICATION AREA BOUNDARY
- PERMIT AMENDMENT AREA BOUNDARY
- ★ POND
- ┌ TROUGH
- FENCE



**MANTI-LA SAL NATIONAL FOREST
PINES TRACT PROJECT**

FIGURE 3-17
RANGE IMPROVEMENTS

SCALE 1"=2000'
DATE DRAWN 6/11/98
LAST REVISION 8/20/98

2000 0 2000 FEET
CONTOUR INTERVAL 25 FEET

An alternate route would be from the northeast via Ferron Canyon and then southwest to Muddy Canyon. However, the livestock could only be trucked half of the approximately 30-mile distance from Ferron, and would have to cross Muddy Creek during high flows to reach the Pines unit on June 16th each year. Soils would be too wet to trail livestock through some of the high country without creating excessive soil and vegetation damage. Trucking through the high country may be blocked by snowdrifts in June. The AMP also specifies that coordination with mining activities, such as reclamation of drill pads and monitoring spring flows, will be worked out as the need arises. Coal extraction has been ongoing in the allotment within the adjacent Quitcupah Lease since 1987.

3.10.2 Environmental Consequences

3.10.2.1 *No Action Alternative*

Under the No Action-No Lease Alternative no mining would take place within the analysis area. The allotment would be managed according to the AMP with emphasis on increasing forage, maintaining wildlife habitat, and implementing approved range improvements. No alteration of water supplies or the distribution of water by mining-induced subsidence would occur on the analysis area. Surface structures such as fences, troughs, pipelines, or other range improvements would not be subject to mining-induced damage. Trailing routes would not be blocked.

3.10.2.2 *Alternative B*

Mining under the East Fork of Box Canyon would be conducted in a manner that would allow for subsidence and potential impact to perennial waters. The potential exists for mining-induced subsidence to disrupt ground and surface water flows, which could reduce available water for livestock and impact riparian vegetation. Perennial waters of East Fork of Box Creek, and the Joes Mill Pond stock ponds (Table 3.12) in this area could be impacted by tension cracks. The loss of water in the nine stock pond could make approximately 192 AUMs unavailable to livestock for 1 year to 3 years.

Tension cracks could occur from the longwall mining under the rest of the analysis area, with potential impacts to the remaining six ponds. In the event that all six ponds were impacted at the same time, or that the tension cracks do not seal sufficiently to hold water, the maximum impact would be the loss of approximately 862 AUMs. However, mining would not take place in a manner that would cause impacts to all the ponds at one time. Therefore, the loss of AUMs would not occur at the same time, and it is likely that some natural closure of the cracks could occur before other ponds are impacted. Actual loss of AUMs at any one time is likely to be 400 or less.

Twelve springs have been identified (JBR 1998b) in the East Fork of Box Canyon. Subsidence-induced tension cracks could divert surface water to the groundwater on a short term basis (1 year to 3 years).

Table 3.12 Estimated AUMs associated with water troughs and ponds within the Pines Coal Lease Tract and Lease Modification Area¹

| Pond/Trough and Inventory Number | Estimated Acres Impacted | Estimated AUMs |
|--|--------------------------|------------------|
| Pond #202001, Link Canyon #2 | 1,000 | 192 ² |
| Troughs #202003, Link Canyon Troughs | 1,000 | 192 ² |
| Pond #202021, North Pines #1 | 780 | 150 |
| Pond #202022, North Pines #2 | 1,060 | 204 |
| Pond #202030, Verdus' Pond | 1,080 | 208 ³ |
| Pond #202031, Slab Pond | 1,080 | 208 ³ |
| Pond #202039, West Pine | 200 | 38 |
| Joes Mill Pond (2 ponds, one spring fed) | 1,000 | 192 |
| Unnamed, natural pond | 1,080 | 208 ³ |

¹AUMs are based on the area encompassed within a one-mile radius of the potentially impacted water source or one-half the distance to the nearest water source if less than one mile from the potentially impacted water source. The acreage within the encompassed area is converted to lost AUMs based on the average of 5.2 acres per AUM.

²The area associated with these two water sources overlap; therefore if both were affected, the total loss of AUMs would be approximately 230 AUMs.

³The area associated with these three water sources overlap; therefore if both were affected, the total loss of AUMs would be approximately 240 AUMs.

The impact from these cracks to riparian vegetation would be limited because much of the riparian zone vegetation is a result of the seepage of water into the colluvium at the base of the escarpment, rather than a result of the stream channel system. Therefore, some temporary (1 year to 3 years) loss of riparian vegetation could occur. Due to the narrowness of the canyon and the limited riparian zone, less than 40 AUMs are estimated to be available within this riparian zone.

Impacts within the 150-acre Lease Modification Area (Quitcupah Lease) could be the loss of water in one stock pond (#202039, West Pine Pond, Table 3.12) and in three springs due to potential subsidence-induced ground movements. Loss of water in this area could reduce the AUMs available to livestock by approximately 38 AUMs for 1 year to 3 years. No loss of

riparian vegetation is anticipated as the three springs are within Box Canyon, and the other eight springs would be sufficient to maintain the riparian vegetation.

Under this alternative, there are no provisions for replacing water needed to support livestock and the ecosystem.

Surface structures, such as fences, stock ponds, etc. would not be protected from mining-induced subsidence and the mining operator would not be responsible for the protection, restoration, or replacement of surface improvements. Approximately two miles of pasture fence, two water trough systems (including short pipelines), and nine stock ponds would be subject to subsidence impacts. Under this alternative, there would be no provision for replacing unappropriated water rights or repairing the impacted structures.

Potential for escarpment failure also exists under this alternative. Escarpment failure in Link Canyon would have potential to block the existing livestock trailing route. This is the only practical trailing route currently available; therefore the blockage of this access could make approximately 6,200 AUMs unavailable to livestock grazing. The impact would last until the access could be re-opened. Escarpment failure could also result in vegetation loss until the vegetation re-establishes on the newly exposed escarpment. This process could take years or decades. However, the steepness of the escarpments makes these areas unattractive to livestock, and actual loss of useable AUMs would be slight.

Approximately 40 acres of surface disturbance associated with exploration drilling would occur, resulting in the loss of approximately 8 AUMs, or approximately 0.1 of the available AUMs on the allotment. These sites would represent potential areas for noxious weed establishment during the period of disturbance and following reclamation of these sites. Reclamation would be conducted immediately following the exploration drilling (drill hole plugging, regrading, etc.) and the areas would be seeded in the fall. Impacts would be short-term (3 years to 6 years) until vegetation is reestablished. No impacts to livestock trailing would occur from drilling operations.

If Canyon Fuel is the successful bidder, a need to discharge mine water to Link Canyon is anticipated for 2 years to 3 years. Approximately 1,000 gpm would be discharged into the Link Canyon drainage. The discharge would create a permanent flow in what is currently an ephemeral channel. The change from an ephemeral drainage to a permanent flow drainage would increase water availability below the Forest boundary, potentially increasing the amount of available forage by on the BLM administered lands down-gradient of the discharge point. There could be some impact to the existing riparian vegetation by the increased flows below the discharge point and by the effects the increased flows could have on the channel morphology (JBR 1998c). The increase in available AUMs below the Forest boundary would only be for the period of time that the discharge occurs: 2 years to 3 years if the UPDES permit is obtained to discharge to Muddy Creek, or up to 20 years if the permit is not obtained.

Under the scenario of another mine company as lessee, new mine facilities would be required, and Link Canyon would be the likely location.

The Link Canyon dirt road is the main livestock trailing corridor for this allotment. The creation of a haul road could block access to the allotment during certain specific periods of the year. If livestock are unable to trail through this area, approximately 6,200 AUMs would be unavailable for grazing.

Surface disturbance to create construction sites for the new mine facilities, and the upgrade of the existing Link Canyon dirt road (approximately 8 miles) could result in additional loss of approximately 19 AUMs of livestock forage. The increased surface disturbance would be primarily within the pinyon-juniper community, but some riparian vegetation could also be impacted by the road improvement. The AUMs would be unavailable for the life of the mine and the 2 years to 3 years following reclamation.

Additional breakouts for ventilation/escapeway portals in the escarpment of Muddy Canyon (approximately 800 square feet of disturbance), a foot path associated with this escapeway portal, and additional portals needed in Link Canyon to provide entry and ventilation, and to convey the coal from the mine could create additional impacts to the livestock forage. These impacts would be primarily within the Douglas fir-aspen types on the escarpment and curlleaf mahogany and manzanita types along the edges of the canyon rim. If a discharge permit to Muddy Creek is not granted by the State, then the discharge to Link Canyon would occur for the life of mine.

3.10.2.3 *Alternative C*

Impacts would be similar to Alternative B, except several SCLSs that have direct bearing on the range and livestock would be implemented. These SCLSs would eliminate or reduce the potential for impacts to the vegetation resource and livestock forage. The SCLSs (#3 and #7) would require that adequate baseline data be obtained to locate, quantify, and demonstrate the interrelationship of the geology, topography, surface hydrology, vegetation, and wildlife. This data would be incorporated into future monitoring of potential impacts. The future monitoring would be established to locate, measure, and quantify the progressive and final effects of underground mining activities. SCLS #9 would also require that the mining operations be conducted in such a manner so as to prevent surface subsidence that could damage or alter the flow of perennial streams, or cause damage to existing surface structures. Existing FS owned or permitted surface improvements would be protected, restored, or replaced to provide for the continuance of current land uses (SCLS #13). Surface disturbance would be further limited by SCLS #12 that coal would only be extracted by underground mining methods. Stabilization and rehabilitation of sites supporting ancillary facilities, structures, equipment, and similar developments would be required following final termination of use of these facilities (SCLS #15). The Lessee would be responsible for replacing any surface water identified for protection, that may be lost or adversely affected by the mining operation. The water from an alternate source would be in sufficient quantity and quality to maintain existing ecosystem (SCLS #17).

Mining within the Permit Amendment Area under Box Canyon and the East Fork Box Canyon would not be permitted in a manner that would allow subsidence-induced impacts to perennial waters. No loss in AUM availability in the vicinity of Box Canyon and East Fork Box Canyon is anticipated.

Other impacts within the 150-acre Lease Modification Area and Pine Coal Lease Tract would be the same as those described for Alternative B. Except that the SCLS would require replacement water at the source. The effects from exploratory drilling would be the same as Alternative B.

Surface structures, such as fences, stock ponds, etc. could be impacted by mining-induced subsidence, but the impact would be temporary as the mining operator would be responsible for the protection, restoration, or replacement of surface improvements. Two water trough systems, nine stock ponds, and springs could be subject to subsidence impacts. If water from water sources is lost, the operator would be required to provide replacement water at the source.

These impacts to water supply and distribution would be offset by the requirement (by SCLS #17) that the lessee, at their expense, would be responsible to replace any surface water identified for protection, that may be lost or adversely affected by mining operations, with water from an alternate source in sufficient quantity and quality to maintain existing riparian habitat, fishery habitat, livestock and wildlife use, or other land uses. Therefore, between the anticipated low impact from the subsidence and the SCLS for replacement of waters, no loss of AUM availability is anticipated.

Underground mining operations would be conducted in a manner so as to prevent subsidence that could cause the creation of hazardous conditions such as potential escarpment failure and landslides. Therefore, no interference with livestock trailing routes is anticipated for this alternative.

If another company obtains the Pines Coal Lease Tract, the surface disturbance to create construction sites for the new mine facilities and the upgrade of the existing Link Canyon dirt road (approximately 8 miles) could result in additional loss of approximately 19 AUMs of livestock forage. The increased surface disturbance would be primarily within the pinyon-juniper community, but some riparian vegetation could also be impacted by the road improvement.

The Link Canyon dirt road is the main livestock trailing corridor for this portion of the allotment. The creation of a haul road could block access to the allotment during certain specific periods of the year. If livestock are unable to trail through this area, approximately 6,200 AUMs would be unavailable for grazing.

3.10.2.4 *Alternative D*

Impacts would be the same as Alternative C, except for the following:

Mining under Box Canyon (Permit Amendment Area) and East Fork of Box Canyon (Pines Coal Lease Tract) would be conducted in a manner that could allow for subsidence and potential impact to perennial waters. The potential exists for mining-induced subsidence to disrupt ground and surface water flows, which could reduce available water for livestock and impact riparian vegetation. Perennial waters of Box Creek, East Fork of Box Creek, Joes Mill Pond, Slab Pond, and the unnamed natural pond in this area could be impacted by tension cracks. The loss of water in all the stock ponds could make approximately 1,592 AUMs unavailable to livestock for 1 year to 3 years while natural sealing and bentonite plugging are completed (some of the ephemeral ponds do not always have water available for livestock). The modeling and analysis of the potential for subsidence under these perennial waters indicates that the geologic formations would limit the magnitude of the subsidence and resulting tensile cracks. Therefore, the impact to surface waters is likely to be short-term (1 year to 3 years).

Three springs have been identified (JBR 1998b) in Box Canyon and twelve springs have been identified in the East Fork Box Canyon which could be subject to subsidence impacts. Subsidence-induced tension cracks could divert surface water to the groundwater on a short term basis (1 year to 2 years). Therefore, some temporary (1 year to 5 years) loss of riparian vegetation could occur. Due to the narrowness of both canyons and the limited riparian zone, less than 80 AUMs are estimated to be available in the combined riparian zones. The loss of the water from the springs could make approximately 250 AUMs unavailable to livestock grazing for 1 year to 2 years.

If another company obtains the lease, the impacts associated with surface disturbance to create construction sites for the new mine facilities and the upgrade of the existing Link Canyon dirt road would be the same as Alternative B and C.

3.10.3 Mitigation and Monitoring

Alternatives C and D

The SCLSs #3, #7, #13, #15, and #17 are directly related to mitigation and monitoring of the vegetation resource, and therefore, related to range and livestock. SCLSs #3 and #7 require the collection of baseline information and the monitoring of progressive and final effects of underground mining activities on surface hydrology and vegetation. SCLS #13 requires that existing FS owned or permitted surface improvements will need to be protected, restored, or replaced to provide for the continuance of current land uses. SCLS #15 requires that facilities, structures, equipment, and other similar developments be removed from the Project Area within 2 years after final use of the facilities, and that the disturbed areas associated with those facilities be stabilized and rehabilitated, including re-establishment of drainages to a condition that supports the pre-mining land use. SCLS #17 requires that any surface water identified for protection, that

may be lost or adversely affected by mining operations, be replaced by the lessee with water from an alternate source in sufficient quantity and quality to maintain existing riparian habitat.

Monitoring of the surface flows over the life of mine would provide detection of surface water diversion of ephemeral or perennial drainages and of springs or seeps. Tension cracks that do occur in these areas which result in diversion of surface flow could be sealed with bentonite. Restoring the flow in this manner would maintain the vegetation communities associated with these water sources. Monitoring of ponds to assess mining induced damage and the repair necessary should also be implemented.

If the Link Canyon road is upgraded for coal haulage, the successful bidder and livestock permittees should be required to coordinate seasonal stoppage of coal traffic while livestock trail into or out of this portion of the allotment. Fencing to keep livestock from wandering onto the haul road during the grazing season should also be required to avoid a safety hazard and losses to livestock.

The reclaimed exploration access and drill sites should be monitored for a period of 3 years after revegetation for the presence of noxious weeds. If noxious weeds are discovered, a noxious weed control plan should be developed in cooperation with the FS, and implemented as necessary.

No additional mitigation or monitoring has been identified for the range/livestock resource.

3.10.4 Cumulative Effects

The cumulative effects to the range resources within the Emery C&H Allotment consist of the residual effects from past actions, current effects from present actions, and anticipated effects from reasonably foreseeable future actions.

The past actions include coal mining, timber sales (East Fork Box Creek, 1981; Link Canyon, 1982), livestock improvement projects (1940s-present), and wildlife habitat improvement projects (1980s-early 1990s). The current grazing permit accounts for the AUMs that were lost to mining disturbance.

The timber sales impacted approximately 1,300 acres. Regeneration and reforestation have been successful in reestablishing the timber resources. The herbaceous understory increased initially following the timber harvest, followed by a gradual decrease as the reforested areas mature and the canopy closes. This would have increased the forage for livestock initially with a return to pre-timber harvest forage levels over time. The livestock improvements have been primarily water developments. The residual impacts have been a change in vegetation from upland vegetation to ponds and riparian vegetation. The increased water distribution has increased the availability of forage which was formerly too far from water to be utilized. The wildlife habitat improvement projects resulted in the conversion of approximately 400 acres of sagebrush to grassland habitat, generally an improvement for livestock.

The present actions include coal mining of the Quitchupah Lease (1941-present), and continued range improvements. The impacts include approximately 70 acres of surface disturbance to vegetation for mine related facilities, some short-term subsidence effects, and small acreages of disturbance associated with the range improvements. The surface disturbance removes forage, but the range improvements either produce additional forage or make under-utilized forage available through increased water distribution.

The future actions include the development of the Pines Coal Lease Tract (1998-2026), and a powerline and substation in Link Canyon (1998-1999). These effects range from slight for Alternative C, to potential closure of the allotment under Alternatives B and D if by slight chance escarpment failures in Link Canyon block access to the allotment. The future actions also include the construction of one pond, solar pumps to distribute water on the plateau, and the pruning of mahogany trees on 75 acres; all positive actions to improve the allotment.

Although the residual, current, and anticipated effects to the range resources have or could change the nature of the landscape, the lands are in functioning condition and are meeting the land use plan goals for the area.

3.10.5 Residual Adverse Impacts

No residual adverse impacts to the range resource are anticipated from any of the selectable alternatives analyzed above. The impacts from exploration would be short-term until the disturbed sites are successfully reclaimed. Surface disturbance from the mine development would last until the mining is completed, the surface facilities are removed, and the site is reclaimed. The exception would be the road in Link Canyon, which if developed, would likely remain, creating minimal acreage of permanent forage loss. The improvement of the Link Canyon road would provide the option of trucking livestock to and from the allotment, rather than trailing livestock through the Canyon.

3.10.6 Irreversible/Irretrievable Commitment of Resources

The development of the Link Canyon road, if needed, would represent the only irreversible and irretrievable commitment of the range resource. It is likely that this road would remain after the cessation of mining; and therefore represent a permanent loss of the some forage. Less than 5 acres of vegetation, or less than 1 AUM, would be permanently removed under this scenario.

3.10.7 Short Term Uses vs. Long Term Productivity

Approximately 140 acres of vegetation could be impacted by surface disturbance under the alternatives analyzed above. In addition, a maximum of 75 acres of riparian vegetation could be impacted as a result of mining-induced ground movements. These impacts would be short-term (less than 10 years at a given disturbance site) and temporally distributed over the life of the mine. The sites would be reclaimed, or in the case of ground movement effects, revegetated by natural means. The long-term productivity of the allotment would not be reduced.

3.11 VISUAL RESOURCES AND NOISE

3.11.1 Visual Resources

3.11.1.1 *Affected Environment*

The area of analysis for visual resources and noise encompasses the Pines Tract Project Area; including the 7,311-acre Pines Coal Lease Tract, Permit Amendment Area, 150-acre Lease Modification Area, portions of Muddy Creek, and portions of Link Canyon. The area of analysis is shown on Figure 3-18.

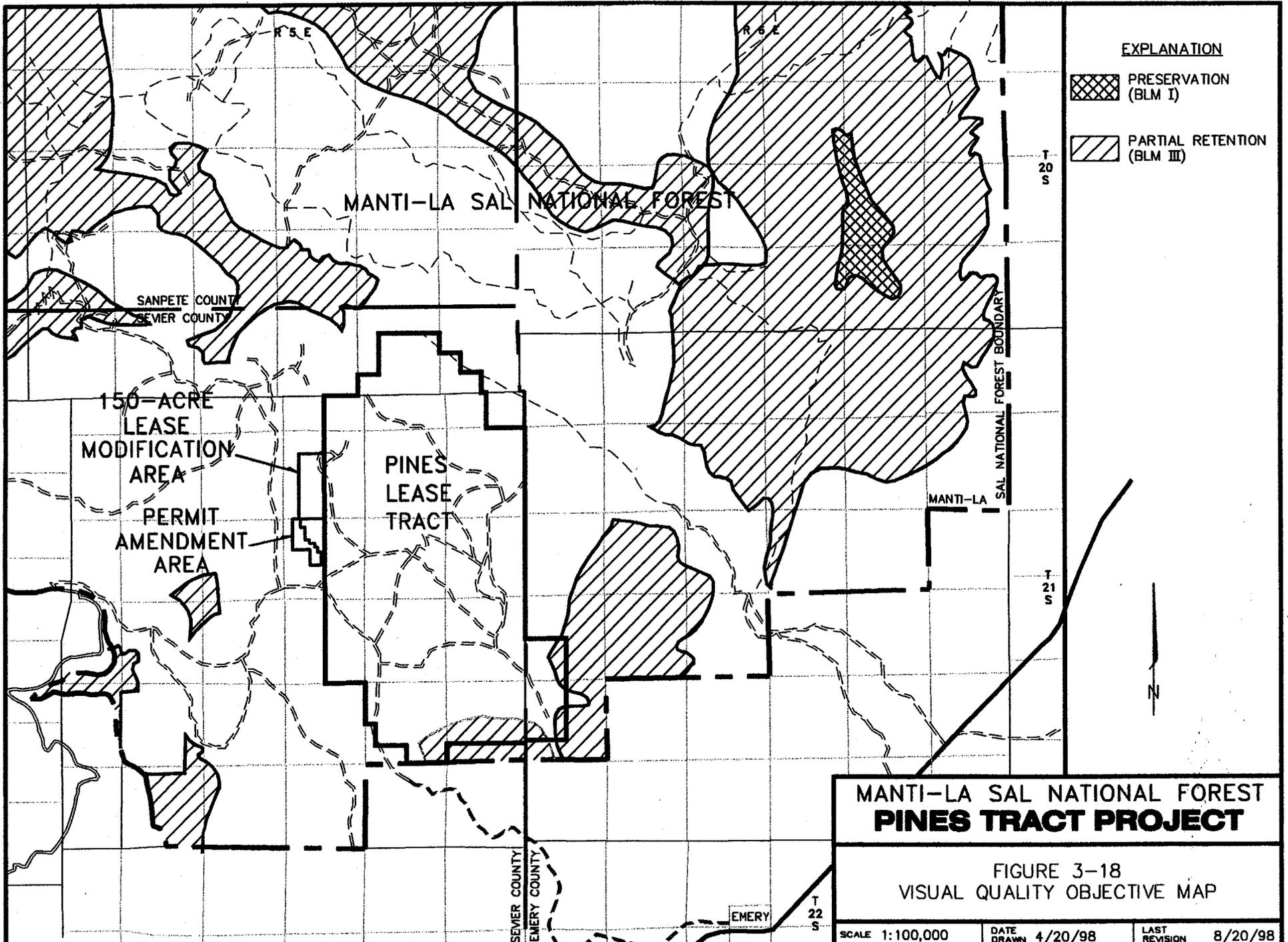
The Pines Tract Project Area is located in a sparsely populated portion of Sevier County. The topography is characterized by forested plateaus and steep canyons. The plateau along the northeastern border of the Pines Tract Project Area is characterized by vertical to near-vertical cliffs and talus slopes that descend as much as 1,300 feet to the floor of the adjacent canyons. There are four dominant canyons within and adjacent to the Project Area; Box Canyon, East Fork of Box Canyon, Muddy Creek Canyon, and Link Canyon.

Minimal development has occurred within the Pines Tract Project Area. The character of the landscape is for the most part natural and considered open space; however, the natural character has been minimally modified by the construction of several four-wheel drive two-track access roads and rangeland improvements (e.g., stock ponds).

Underground coal mining is currently being conducted within the Quitcupah Lease, located immediately to the west of the Pines Coal Lease Tract. Existing visual disturbances include surface disturbance associated with SUFCO Mine facilities located within East Spring Canyon and the 4 East Portal in Quitcupah Canyon. Minimal disturbance has occurred within the Pines Tract Project Area resulting from mineral exploration.

Landscapes within the Project Area are classified by the FS by their scenic quality, sensitivity level, and the distance from which they are seen. Scenic quality is measured by describing landscapes as distinctive, common, or minimal. Sensitivity is categorized as low, moderate, or high. The sensitivity level of a particular view is determined by the viewing point, the number of viewers, and the duration of viewing. The viewing distances are further defined as foreground, middleground, and background. This classification system has been used to determine visual quality objectives (VQO) for landscapes within the Pines Tract Project Area. VQO's provide a standard for scenery management. Each VQO describes a different amount of acceptable change or alteration of the scenery.

The FS conducted a visual resource inventory of the Pines Tract Project Area. This inventory is part of the Forest Plan and VQOs are presented in Figure 3-18. The visual character of the Pines Tract Project Area was further assessed using aerial photographs.



EXPLANATION

-  PRESERVATION (BLM I)
-  PARTIAL RETENTION (BLM III)

MANTI-LA SAL NATIONAL FOREST

SANPETE COUNTY
SEVIER COUNTY

150-ACRE
LEASE
MODIFICATION
AREA

PERMIT
AMENDMENT
AREA

PINES
LEASE
TRACT

MANTI-LA

SAL NATIONAL FOREST BOUNDARY

T
20
S

T
21
S

SEVIER COUNTY
EMERY COUNTY

EMERY

T
22
S

**MANTI-LA SAL NATIONAL FOREST
PINES TRACT PROJECT**

FIGURE 3-18
VISUAL QUALITY OBJECTIVE MAP

The majority of the Project Area is designated as mg2C; middleground viewed, medium sensitivity level, minimal variety class. This area is largely represented by broad plateaus and is sporadically forested. As noted above, this area is considered natural and undisturbed; however, manmade intrusions (e.g., access roads and stock ponds) occur within the area.

A portion of the East Fork of Box Canyon and the eastern border of the Pines Tract Project Area are designated as mg2a; middle ground viewed, medium sensitivity, distinctive variety class. East Fork of Box Canyon is characterized by vertical cliffs and escarpments. Escarpments in the East Fork of Box Canyon are generally oriented in an east-west direction and are up to 400 vertical feet tall.

The Link Canyon area to the south of the Pines Tract Project Area is designated as 3a; low sensitivity level, middleground viewed, medium sensitivity level, minimal variety class. Escarpments in Link Canyon area are generally oriented in an east-west direction.

Most of the Project Area has been designated as having a VQO of "Modification," with a small portion along the southern border of the tract designated as "Partial Retention."

"Partial Retention" provides for management activities that are "Visually Subordinate" to the characteristic landscape when managed according to the partial retention VQO. Activities may repeat form, line, color, or texture common to the characteristic landscape but changes in their qualities of size, amount, intensity, direction, pattern, etc., must remain visually subordinate to the characteristic landscape.

"Modification" provides for management of activities that are "Visually Dominant" within the characteristic landscape. However, activities of vegetative and land form alteration must borrow from naturally established form, line, color, or texture so completely and at such a scale that their visual characteristics are those of natural occurrences within the surrounding area or character type. Additional parts of these activities such as structures, roads, slash, root wads, etc. must remain visually subordinate to the proposed composition.

3.11.1.2 Environmental Consequences

3.11.1.2.1 No Action Alternative

Implementation of the No Action Alternative would not result in changes to the visual character of the Pines Tract Project Area. Canyon Fuel would continue to mine the Quitchupah Lease, accessing the area from the existing SUFCO Mine located in East Spring Canyon, until minable reserves within this tract are removed (approximately 14 years). No new disturbance to surface resources, resulting from escarpment failures, ground surface subsidence, changes in the vegetation community, or development-related surface disturbance would occur under this alternative.

3.11.1.2.2 *Alternative B*

The effects to visual resources resulting from implementation of the Pines Tract Project (including activities within the Lease Modification Area and Permit Amendment Area) were analyzed to determine if such impacts met FS VQOs for the Project Area. Visual impacts to the existing environment could result from changes in the existing topography (escarpment failures, tension cracks, and elevation changes in the ground surface), changes in the natural vegetation community due to fluctuations in the hydrological regime, and human-induced surface disturbance due to reasonably foreseeable mineral exploration activities

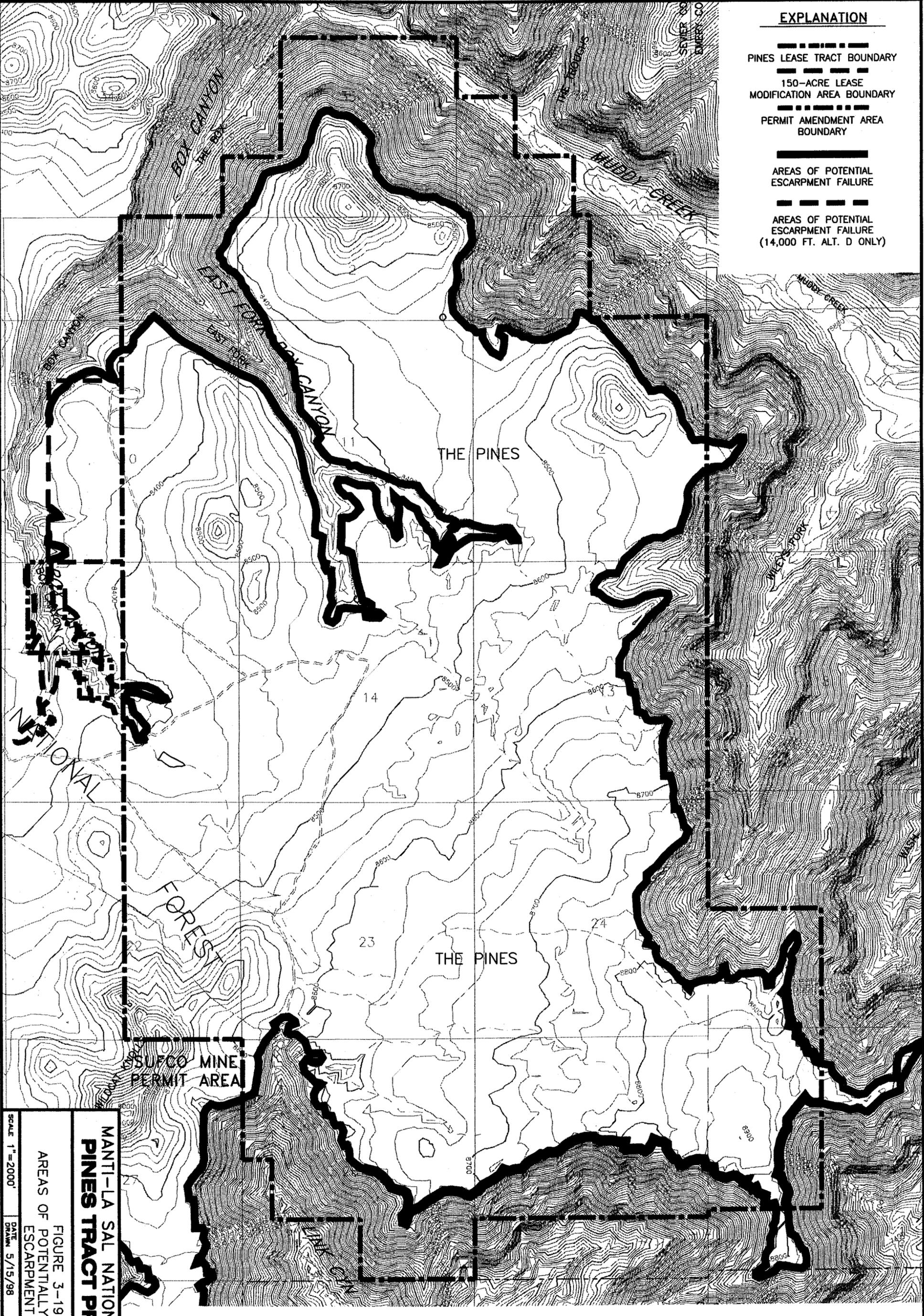
Impacts to visual resources were largely based on Section 3.1 of this EIS and the Final Geology, Topography, and Subsidence Technical Report (Agapito Associates 1998), which discusses potential subsidence-related impacts resulting from proposed longwall mining. Potential subsidence-induced impacts to the natural land surface would include vertical subsidence (changes in the ground surface elevation, estimated to be approximately 4-5 feet) and horizontal movement producing cracks. The effect of this subsidence over the general land surface would not be visually discernible with the exception of resulting escarpment failures. As much as 19.8 miles (105,000 linear feet) of escarpment have low to medium *potential to fail* under the implementation of this Alternative. A failure, however, may only account for a few percent of the total linear feet of escarpment. Failures are predicted to be "spot failures" less than 100 feet wide. Figure 3-19 presents areas of potential escarpment failure within the Pines Tract Project Area (Note that this figure also includes Box Canyon, as implemented under Alternative D; however, escarpments in Box Canyon would not have the potential for destabilization under this Alternative). Escarpment failures would be most visible along the southern boundary of the proposed Project Area. Specifically, they would be visible to recreationalists entering Link Canyon. Other areas having the potential for escarpment failure are located within the interior of the Project Area, away from major access roads, and not as visibly apparent.

Such visual impacts, although human-caused, would be natural in character (similar to the surrounding, undisturbed environment) and would repeat the naturally occurring elements of form, line, color, and texture. Specifically, cracks and escarpment destabilizations caused by human-induced subsidence would repeat the characteristics of cracks and escarpment failures that naturally occur as a result of weathering and other natural forces.

Because such subsidence-induced visual impacts repeat the basic natural elements of form, line, color, and texture as found in naturally occurring escarpment failures and the weathered landscape, these areas of impact would not be easily identifiable nor would they be the main focus to the casual observer traveling within the Project Area. Escarpment failures would not be continuous, but would occur at isolated locations, most likely at promontories. Because changes in the ground surface elevation would not be visually discernable to the public (e.g., elevational changes up to 5 feet and tension cracks less than one-inch in width), and escarpment failures would appear natural, impacts to visual character of the region are not considered significant.

EXPLANATION

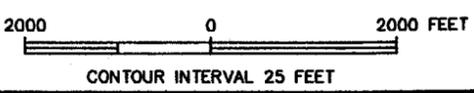
- PINES LEASE TRACT BOUNDARY
- 150-ACRE LEASE MODIFICATION AREA BOUNDARY
- PERMIT AMENDMENT AREA BOUNDARY
- AREAS OF POTENTIAL ESCARPMENT FAILURE
- AREAS OF POTENTIAL ESCARPMENT FAILURE (14,000 FT. ALT. D ONLY)



**MANTI-LA SAL NATIONAL FOREST
PINES TRACT PROJECT**

AREAS OF POTENTIALLY EFFECTED ESCARPMENT

SCALE 1"=2000'
DATE DRAWN 5/15/98
LAST REVISED 8/20/98



Surface disturbance associated with reasonably foreseeable mineral exploration activities, encompassing 40 acres of new disturbance, represent approximately 0.53 percent of the total Pines Tract Project Area. Such exploration-related disturbance would be temporary (reclaimed upon the completion of drilling at each site) and would occur sporadically throughout the Project Area. Therefore, impacts resulting from exploration activities would not change the visual character of the region and would be consistent with the FS VQO for the region.

According to the Final Vegetation Technical Report (JBR 1998c), the existing vegetation communities within the Project Area are not anticipated to change as a result of human-induced subsidence or fluctuations in the area's hydrology. Accordingly, no changes in the existing visual character of the region is expected to occur.

Disturbance associated with mineral exploration activities (e.g., exploration drilling) would be temporary (short-term; up to 1 year), would occur sporadically throughout the Pines Tract Project Area, and would be reclaimed upon the completion of drilling. Surface disturbance associated with the another company obtaining the Pines Coal Lease Tract represents 1.9 percent of the total area within the Project Area.

As noted above, the majority of the Project Area, including areas having the potential for changes in the ground surface and escarpment failure, are designated by the Forest Plan as "Modification." This designation allows for management activities that are visually dominate within the characteristic landscape. However, such activity must repeat the naturally occurring form, line, color, and texture to blend with the surrounding natural landscape. Changes in the ground surface, tension cracks, and escarpment failures, would blend with the surrounding landscape. Surface disturbance and underground mining are not proposed to occur underneath areas designated by the FS in the Forest Plan as "Partial Retention." Therefore, no visual impacts would occur in these areas, specifically near the southern boundary of the Project Area. Existing VQOs identified in the Forest Plan would continue to be met.

Should another company obtain the Pines Coal Lease Tract, similar potential for escarpment failure exists. In addition, approximately 100 acres of new surface disturbance would also occur. This disturbance would occur from the construction of a new mine at Link Canyon and from mineral exploration activities, such as the construction of access roads and drill pads. Approximately 62 acres of disturbance would occur long-term, for the life of the Link Canyon Mine, approximately 15 years to 20 years. The Link Canyon road is one of three access roads into the Pines Tract Project Area that is utilized by the public, and surface disturbance associated with new mine development in Link Canyon (including possibly paving the Link Canyon access road) would be highly visible.

The development of a new mine in Link Canyon would be the main focus to the common traveler passing through the canyon. Depending largely on the location and placement of new mine facilities, the natural visual character of the canyon would be altered. Changes in the visual

character of Link Canyon would occur from surface disturbance and vegetation removal. This area is classified as "Modification;" therefore, the changes would not conflict with FS VQOs for the area.

3.11.1.2.3 Alternative C

Implementation of Alternative C would have similar impacts to those identified for Alternative B. However, under Alternative C, SCLSs would be imposed to provide additional environmental protection measures. Specifically, mining would not be allowed under perennial drainages and escarpment areas. Potential impacts to escarpments (e.g., cliff toppling, rock shelter damage, escarpment failures), although determined minor, would not occur. Some areas throughout the Project Area would be expected to subside; however, these changes in the visual character of the region would not be visually discernible to the public. Changes in the visual character of the region would be minimal and would only result from surface disturbance related to reasonably foreseeable mineral exploration. Proposed impacts to the visual character of the region are consistent with FS VQOs.

If another company obtains the Pines Coal Lease Tract, SCLS #5 and #6 would apply to the construction of new mine facilities in Link Canyon. Limitations would be placed on the facilities size and location within Link Canyon. Also, the siting of mine facilities would be chosen to reduce adverse visual impacts. SCLS #15 would require in that facilities in Link Canyon be reclaimed upon the cessation of mining. The impacts to the visual character of the region are consistent with FS VQOs. Based on the close proximity to an area designated as "partial retention," mitigation has been recommended (See Section 3.11.1.3) to assure that FS VQOs for the area are met.

3.11.1.2.4 Alternative D

Implementation of Alternative D would result in similar impacts to the visual character of the Pines Tract Project Area as identified for Alternative B and C. Under this alternative, approximately 22.5 miles (119,000 linear feet) of escarpment has a low to medium potential to fail. These areas of potential escarpment failure are shown on Figure 3-19; they are predominantly along the northern, southern, and eastern boundaries of the Project Area. A failure, however, may only account for a few percent of the total linear feet of escarpment.

As noted under Alternative B, these escarpment destabilizations, although human-caused, would be natural in character and would repeat the characteristics of cracks and escarpment failures that naturally occur as a result of weathering and other natural forces.

Because such subsidence-induced visual impacts repeat the basic natural elements of form, line, color, and texture as found in naturally occurring escarpment failures and the weathered landscape, these areas of impact would not be easily identifiable nor would they be the main focus to the casual observer traveling within the Project Area.

If a company other than Canyon Fuel obtained the Pines Coal Lease Tract, impacts would be the same as Alternative B and C.

3.11.1.3 Mitigation and Monitoring

If another company obtains the Pines Coal Lease Tract, careful consideration should be given to the siting of a new mine facility in Link Canyon to reduce adverse visual impacts. This would be in addition to mitigation required by the SCLSs.

3.11.1.4 Cumulative Effects

The Pines Tract Project, in conjunction with past, present, and reasonably foreseeable future actions would result in minimal amounts of surface disturbance. Surface disturbance in the vicinity of the Pines Tract Project Area has resulted from the development of old mine facilities (e.g., Link Canyon Mine, Ricci Coal Mine), and would result from reasonably foreseeable construction of access roads and exploration activities. Such disturbance would occur sporadically throughout the forest and not at any one place.

Implementation of the Pines Tract Project (Alternatives B and D), in conjunction with past, present, and reasonably foreseeable actions could result in additional escarpment failures. Past and present activities have also resulted in escarpment failures in the Quitchupah Lease. Linear distances of escarpment failures within the Quitchupah Lease are unknown; however, the resulting disturbances have been natural in form and are not readily noticeable to the casual observer. The reasonably foreseeable development of a mine associated with the Muddy Coal Lease Tract could potentially result in isolated areas of escarpment failures. Such escarpment failures would be in addition to those potentially occurring within the Pines Tract Project Area and those already existing in the Quitchupah Lease. Because these isolated areas of escarpment failures would repeat the basic natural elements of form, line, color, and texture as found in naturally occurring escarpment failures and the weathered landscape, these areas of impact would not change the visual character of the region.

3.11.1.5 Residual Adverse Impacts

Should Canyon Fuel obtain the Pines Coal Lease Tract, residual adverse impacts to visual resources could occur. Visual disturbances could be related to escarpment failure. Isolated locations of escarpments, particularly at promontories, could be destabilized permanently. Pre-mining topography would be permanently altered; however, it would not change the visual character of the region.

Similar residual adverse impacts related to escarpment failures could occur if a new mine is developed in Link Canyon. In addition, mining-related surface disturbances resulting from the construction of new mine facilities would also occur. The construction of new mine facilities and associated changes in the natural topography to accommodate such construction would permanently alter the visual character of Link Canyon.

3.11.1.6 Irreversible/Irretrievable Commitment of Resources

Irreversible and irretrievable topographical changes in the existing landscape at isolated locations, specifically in the form of escarpment failures, could occur. However, this is not expected to change the visual character of the region.

3.11.1.7 Short Term Uses vs. Long Term Productivity

No short term uses relating to visual resources and the Pines Tract Project are anticipated to affect the long term productivity of the land.

3.11.2 Noise

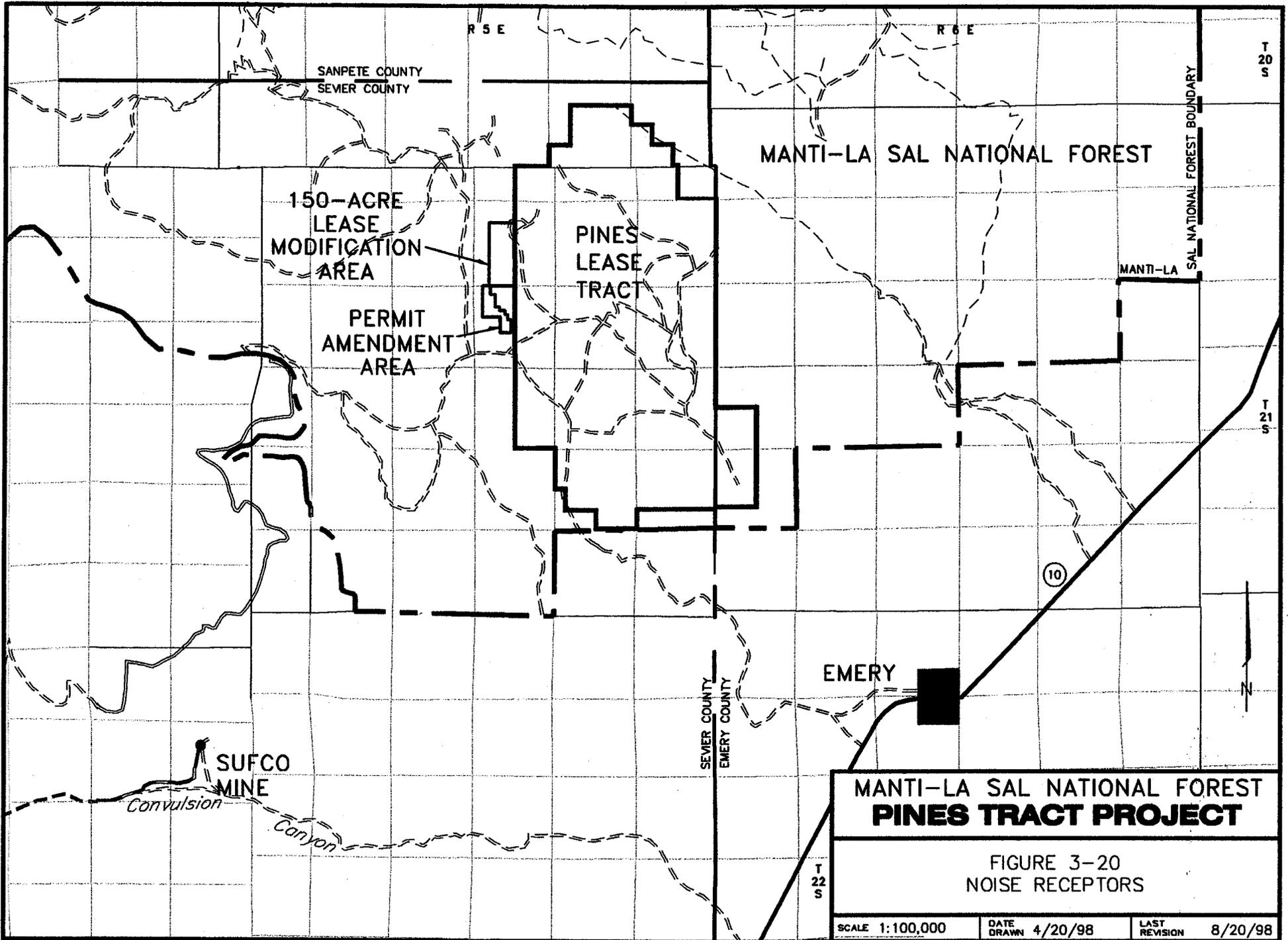
3.11.2.1 Affected Environment

The area of analysis encompasses the Pines Tract Project Area, the SUFCO Mine, and the town of Emery, as shown on Figure 3-20. The nearest human residence or sensitive noise receptor to the Project Area is located in the town of Emery, approximately seven miles to the southeast. Sensitive noise receptors, specifically the Pines Tract Project Area's proximity to the town of Emery, is shown on Figure 3-20.

Environmental noise is indicated by A-weighted sound pressure level (sound level). The unit of sound level measurement is decibel (dB), expressed as dBA (decibel-A weighted). A-weighted measurements of sound give greater emphasis to sound at the mid- and high- frequency level, which are more discernible to humans. Table 3.13 presents typical sound levels associated with ordinary noise sources.

Table 3.13 Sound Levels Associated with Ordinary Noise Sources

| Noise Source | Noise Level | Subjective Description |
|------------------------------------|-------------|------------------------|
| Amplified Music Band | 120 dBA | deafening |
| Commercial Jet Takeoff at 200 feet | 110 dBA | deafening |
| Busy Urban Street | 90 dBA | very loud |
| Freeway Traffic at 50 feet | 70 dBA | loud |
| Normal Conversation at 6 feet | 60 dBA | moderate |
| Typical Office (interior) | 50 dBA | moderate |
| Soft Radio Music | 40 dBA | faint |
| Typical Residential (interior) | 30 dBA | faint |
| Typical Whisper at 6 feet | 20 dBA | very faint |
| Human Breathing | 10 dBA | very faint |



The Pines Tract Project Area is located in a rural portion of Sevier County that is relatively natural and undisturbed. Ambient noise sources currently generated in the area include occasional ORVs, aircraft overflights, and natural sounds (e.g., wind, thunder, wildlife). Additional land uses in the area contributing to the generation of ambient noise include livestock grazing and occasional outdoor recreational activities (e.g., hunting). Noise typically generated by recreational use (ORV and hunting) ranges from 70 dBA to 85 dBA and is sporadic depending upon the time and season of use.

Noise is also generated by operations at the SUFCO Mine located in East Spring Canyon; however, it cannot be heard from the Pines Tract Project Area.

No noise measurements or studies have been conducted within the Project Area. However, Canyon Fuel has taken preliminary ambient noise measurements within the SUFCO Mine area. Noise generated by the SUFCO Mine is generally confined to two main areas; East Spring Canyon surface facilities and facilities located at the 4 East Portal in Quitcupah Canyon. In March 1998, Canyon Fuel collected preliminary data pertaining to noise. Data was collected using a dosimeter (Sorensen 1998).

Noise measurements taken by Canyon Fuel indicated a low average of 83.7 dBA and a high maximum of 90.4 dBA (Sorensen 1998). These measurements were recorded near the steps leading into the crusher building, the loudest location at the East Spring Canyon surface facility (approximately 100 feet north of the portal). Although no noise measurements were taken at the 4 East Portal, noise levels associated with the ventilation fan were estimated by Canyon Fuel to range from 85 dBA to 90 dBA (Wess Sorensen, personal communication, April 16 and 20, 1998). All ventilation fans associated with the SUFCO Mine are positioned upward in an effort to redirect noise.

In comparison, according to the underground mining equipment index, ventilation fans and blowers have a typical noise level ranging from 90 dBA to 100 dBA (Bartholomae 1983).

3.11.2.2 *Environmental Consequences*

3.11.2.2.1 *No Action Alternative*

Under Alternative A, no mining-related impacts to noise, other than those currently generated by the SUFCO Mine, would occur. Mining and associated noise would continue at the SUFCO Mine until approved coal reserves are mined (approximately 14 years). Noise would be generated at two locations; the main mine facility located at the East Spring Canyon area and the facility located at the 4 East Portal in Quitcupah Canyon. Existing noise sources; such as wildlife, weather, ORVs, and overhead aircraft; would continue at existing levels.

3.11.2.2.2 *Alternative B*

Under Alternative B, assuming Canyon Fuel obtains the Pines Coal Lease Tract, minimal increases in noise levels would result. Noise levels at the SUFCO Mine would remain the same.

Equipment operating at the main mine entrance at East Spring Canyon and equipment at the 4 East Portal in Quitcupah Canyon would operate at the same levels as prior to obtaining the Pines Coal Lease Tract (estimated to range from 85 dBA to 90 dBA), for an estimated 17 years.

Should another company, other than Canyon Fuel, obtain the Pines Coal Lease Tract, it would likely develop a new mine within Link Canyon. The construction of a new mine would generate temporary noise during the construction period (approximately 1 year). Noise would be generated from operating construction equipment. The Link Canyon Mine, once in full operation, would be expected to generate similar noise levels as the SUFCO Mine (estimated 85 dBA to 90 dBA), from the normal operating mine equipment (e.g., haul trucks, conveyors, ventilator fans). Such noise would be generated for the life of the mine, approximately 15 years to 20 years. This noise would be in addition to the noise generated from the operation of the SUFCO Mine.

There are no sensitive noise receptors in the immediate vicinity of the Project Area. Because there are no sensitive noise receptors in the immediate area and since current noise levels associated with the SUFCO Mine's operation are not going to increase, implementation of the proposed Pines Tract Project and associated noise levels are not anticipated to result in any noise-related impacts to humans or wildlife.

Recreationists within the Pines Tract Project Area would not hear any increase in noise levels as a result of proposed mining operations; however, they may occasionally hear the operation of a drill rig. Natural noise barriers (e.g., topography and vegetation) would reduce ambient noise levels with increasing distances. Due to the extensive distance (over seven miles), no noise from proposed mining operations would be heard in the town of Emery.

As a result of exploration activities, noise would be generated by vehicles traveling to and from the drill site and by the operation of drilling equipment. Noise generated from drilling equipment ranges from 80 dBA to 88 dBA. Such noise is anticipated to dissipate with increasing distance away from the operating drilling equipment. Drilling would be conducted sporadically and throughout the Project Area. Therefore, increased noise levels would be short-term, occurring for several weeks until drilling is completed at any one location. Drilling would be expected to occur within the first several years of operation and not for the entire project life (approximately 17 years).

Mitigation measures have been implemented to assure that noise levels are kept to a minimum and regularly maintained.

3.11.2.2.3 Alternative C

Implementation of Alternative C would have the same impacts as Alternative B. Mitigation measures have been imposed to minimize potential noise.

3.11.2.2.4 *Alternative D*

Implementation of Alternative D would have the same impacts as Alternative B. Mitigation measures have been imposed to minimize potential noise.

3.11.2.3 *Mitigation and Monitoring*

If possible, all proposed mining equipment, to the best extent possible, shall be equipped with sound dampening (reducing) devices. Ventilation fans associated with the potential Link Canyon Mine should be constructed so that they are positioned in a vertical direction in an effort to redirect noise levels upwards.

3.11.2.4 *Cumulative Effects*

Human-induced noise would be generated as a result of past, present, and reasonably foreseeable actions. However, each noise source would be isolated and would occur as each action is conducted within the region. The magnitude of such noise would disperse with increasing distance.

3.11.2.5 *Residual Adverse Impacts*

No residual adverse impacts are anticipated as a result of the implementation of the Pines Tract Project.

3.11.2.6 *Irreversible/Irretrievable Commitment of Resources*

No irreversible or irretrievable noise related impacts are anticipated.

3.11.2.7 *Short Term Uses vs. Long Term Productivity*

No short term uses relating to noise and the Pines Tract Project are anticipated to affect the long term productivity of the land.

3.12 AIR QUALITY

3.12.1 Affected Environment

The air quality analysis area includes the Pines Tract Project Area and a 100-mile radius, as shown on Figure 3-21. The air quality of a given airshed or region is determined by the topography, meteorology, location of air pollutant sources, and type, quantity, and combination of air pollutant. This section presents information on the weather, climate and air quality of the project region, and a brief overview of the regulatory requirements related to air quality permitting.

Climate

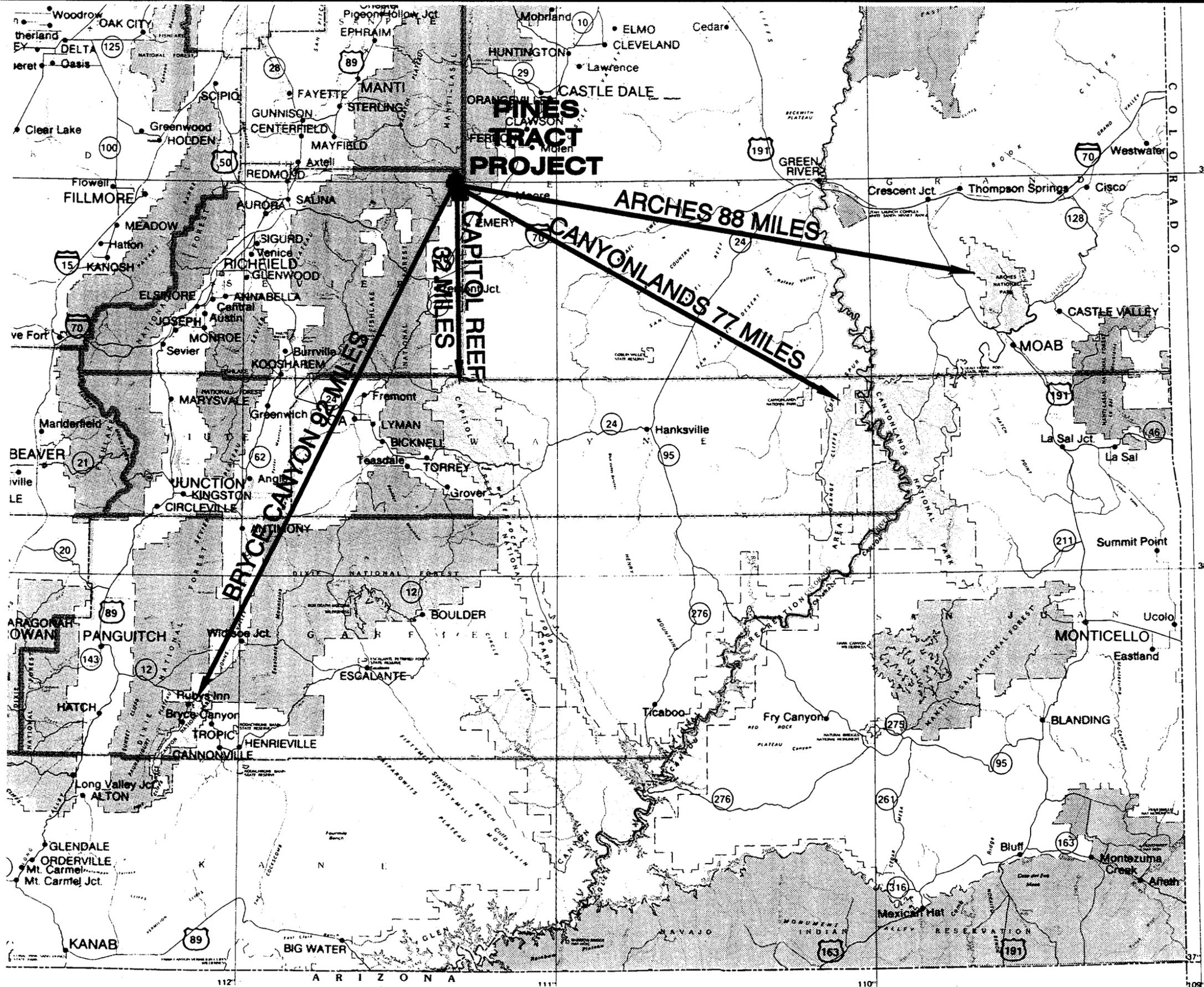
Utah's weather and climate are determined by altitude, latitude, and its location with respect to major mountain chains. The main chain of the Rocky Mountains presents a barrier from cold Arctic weather, experienced by the northern plains, while the Sierra Nevada and Cascade Mountains often prevent low level moisture from Pacific storms from reaching Utah. The proximity of the Wasatch Range and Plateau exerts a strong influence. Prevailing winds are westerly. When storms move into Utah from the west, they impact against the high Wasatch and south central mountains, causing orographic lifting which squeezes out moisture that otherwise would pass over the area. These mountain chains also act as barriers to air mass flow and are responsible for areas to the east being arid. Areas east of the Wasatch range are characterized by hot, dry summers, and cold dry winters.

Utah's climate is classified based on the Modified Koppen System. The Project Area is located between Steppelands and Undifferentiated Highlands. Steppelands (semiarid) occur between the desert margins and higher mountain regions. The average annual precipitation of the Steppelands is less than the potential evapotranspiration. Undifferentiated Highlands, which are located east of the Project Area are generally considered as humid regions with severely cold winters and cool to cold summers.

Air movements are predominantly from the west and north-west, year round. Meteorological data obtained for Clawson, Utah-1986, in the region of the Project Area suggests the wind blows out of the west and northwest the majority of the time (Figure 3-22). The strongest wind blows from the west, with wind speeds exceeding 21 knots. Winds from the west, southwest are present during the third quarter of the year (July to September) (Figure 3-23). The maximum wind speed west southwest is around 6 knots.

Prevailing wind and dispersion patterns are modified by the complexity of the terrain. Significant diurnal drainage flows can be expected within the Project Area. Drainage flows (slope and valley winds) are likely with local geological features such as the Cedar, White and Black Mountains, Old Women Plateau, Link, Box, East Fork Box Canyon, and Water Hollow Ridge. The Project Area may be subject to the possibility of inversions, with calms winds present slightly more than a quarter of the time.

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**MANTI-LA SAL NATIONAL FOREST
PINES TRACT PROJECT**

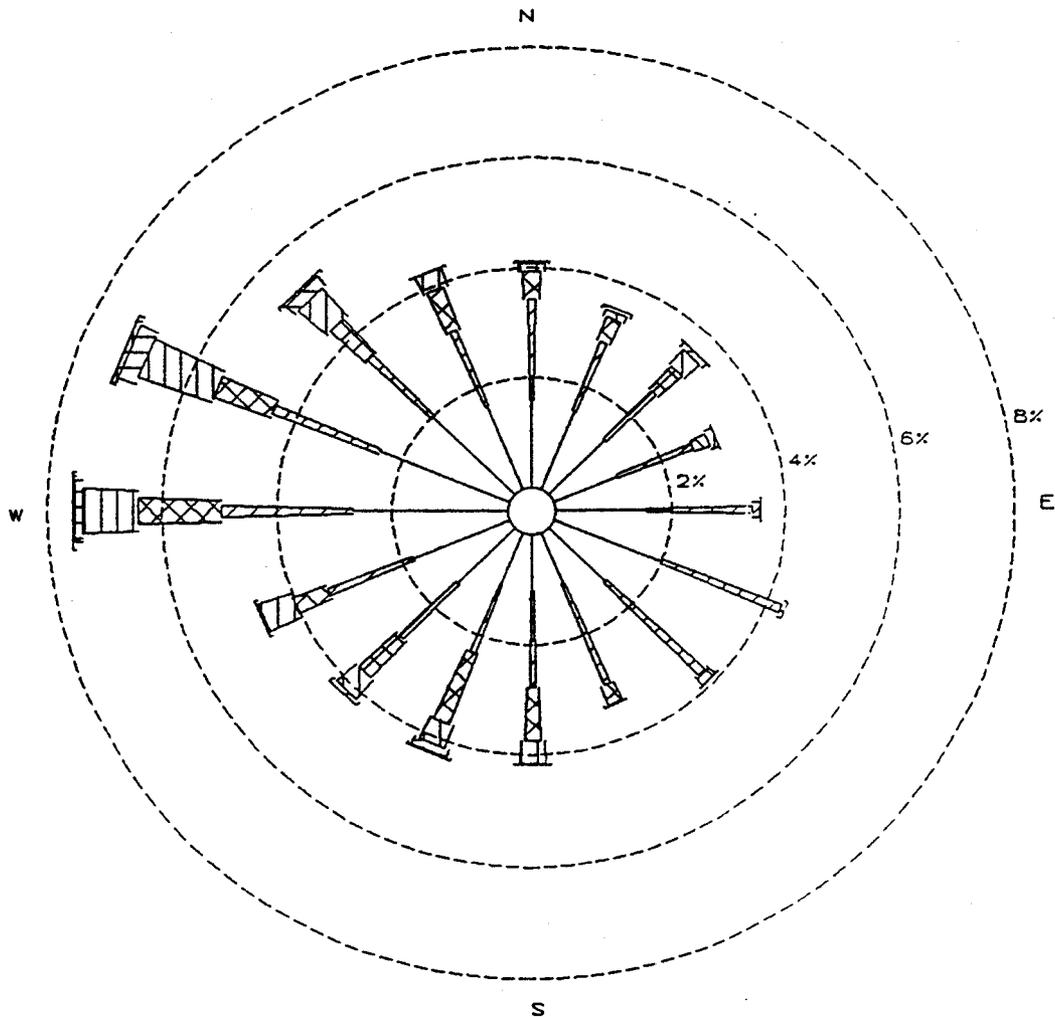
FIGURE 3-21
AIR QUALITY CLASS I DISTANCES

| | | |
|----------------|--------------------|-----------------------|
| SCALE 1"=2000' | DATE DRAWN 4/20/98 | LAST REVISION 8/20/98 |
|----------------|--------------------|-----------------------|

Source: Davidson Mapping, "State of Utah", copyright 1992 R.J. Davidson Design

UPL CLAWSON, UT 1986

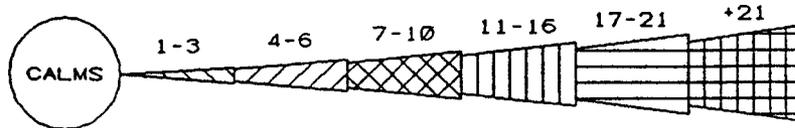
January 1-December 31; Midnight-11 PM



WIND SPEED (KNOTS)

CALM WINDS 28.61%

NOTE: Frequencies
Indicate direction
from which the
wind is blowing.

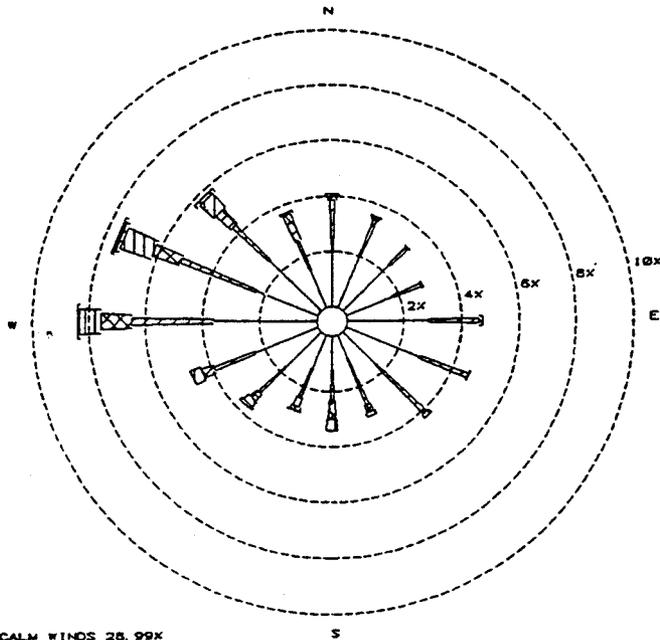


MANTI-LA SAL NATIONAL FOREST PINES TRACT PROJECT

FIGURE 3-22
WIND FREQUENCY DISTRIBUTION
UPL CLAWSON, UTAH
JANUARY 1 - DECEMBER 31, 1986

Clawson UT JAN-MAR 1986

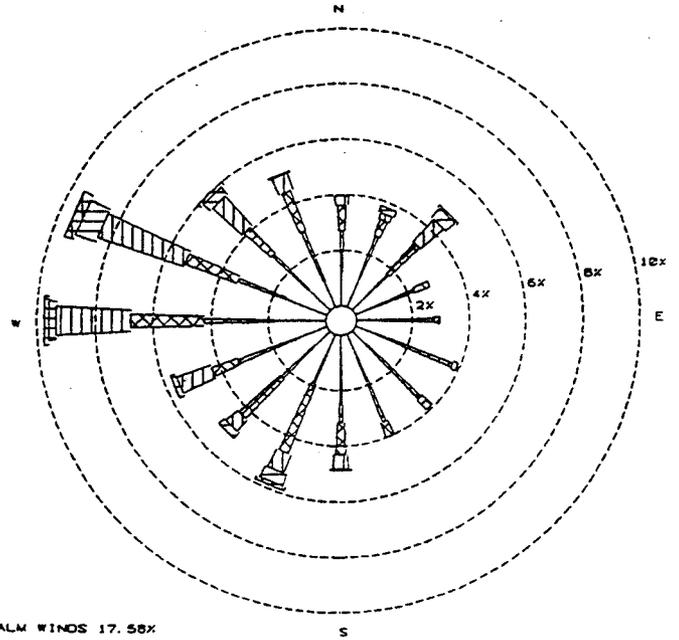
January 1-March 31: Midnight-11 PM



CALM WINDS 28.99%

Clawson UT APR-JUN 1986

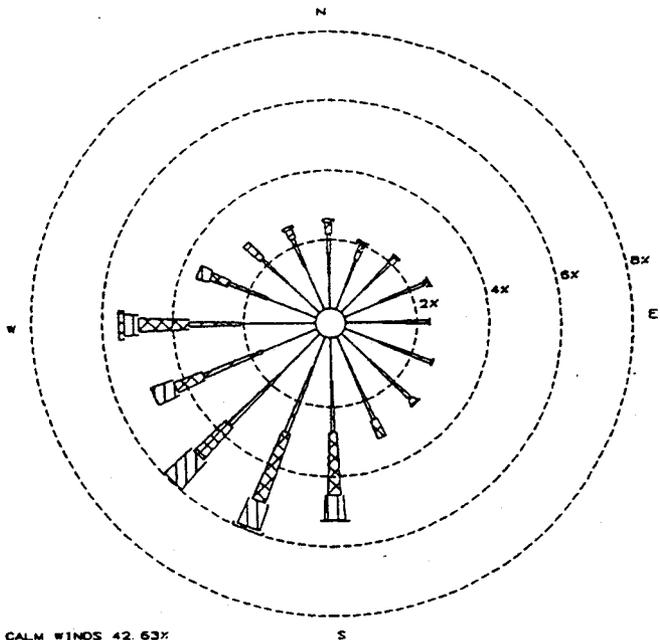
April 1-June 30: Midnight-11 PM



CALM WINDS 17.58%

Clawson UT JUL-SEP 1986

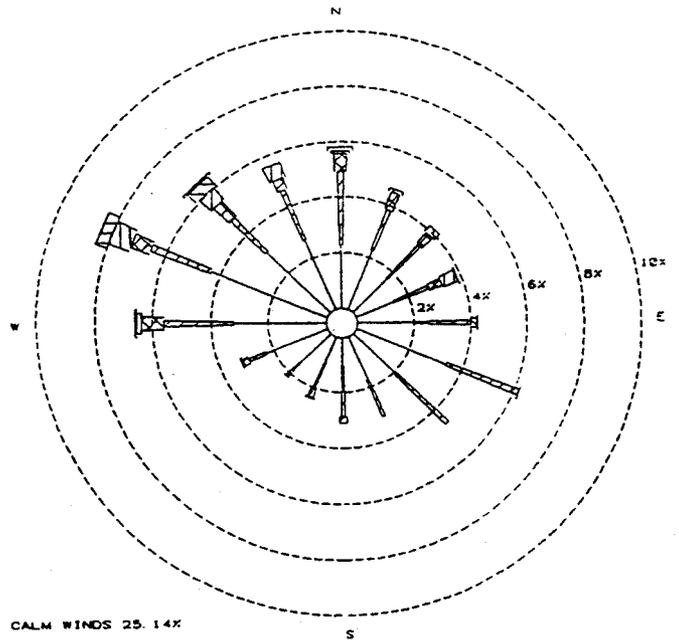
July 1-September 30: Midnight-11 PM



CALM WINDS 42.63%

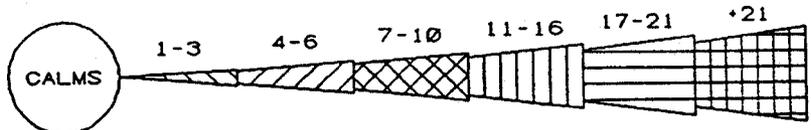
Clawson UT OCT-DEC 1986

October 1-December 31: Midnight-11 PM



CALM WINDS 25.14%

WIND SPEED (KNOTS)



CALM WINDS 28.99%

NOTE: Frequencies
Indicate direction
from which the
wind is blowing.

**MANTI-LA SAL NATIONAL FOREST
PINES TRACT PROJECT**

FIGURE 3-23
QUARTERLY WIND FREQUENCY DISTRIBUTION
CLAWSON, UTAH - 1986

However, diurnal drainage flows from the low valleys and high butte areas likely provide enough convection for significant air mass mixing throughout the year. Terra firma elevation within the Project Area ranges from 6,300 feet to 9,000 feet above MSL. Inversions are most common in the winter when snow cover and shorter daylight hours combine to intensify the difference between cold air at the surface and the warmer air mass aloft. A prolonged inversion, which is unlikely in the area, could create a buildup of air pollutants confined in one or more of the valleys located within the Project Area.

Temperature, as recorded at the Salina station, is considered representative of the project locations. Air temperatures vary considerably both diurnally and annually throughout the area. July is the hottest month with maximum normal highs exceeding 90°F. Minimum normal lows occur in January, with a temperature going down to 14°F on the average (Table 3.14). Salina, located approximately 26 miles directly west of the Project Area, has annual normal highs and lows ranging from 66.3 to 32.4, degrees F. respectively.

Regulatory Baseline

The majority of the Project Area is located in the northeast section of Sevier County, with a small portion located in Emery County, Utah. The Project Area is classified as a Class II-Attainment area under the Prevention of Significant Deterioration (PSD) regulations, Part D, of the 1977 Clean Air Amendments. All areas to which the PSD regulations apply are classified as Class I, II, or III. Class I allows the least increase in pollutant levels. Class I areas are protected against adverse impacts to air quality related values, such as: visibility, odors, flora and fauna impacts, soil, water, geological, and cultural structures. Arches, Bryce Canyon, Capitol Reef, Canyonlands, and Zion National Parks are Class I areas located within 100 miles of the Project Area (Figure 3-21). All other areas in central Utah are classified as Class II. Attainment status means that current and past ambient air quality sampling indicates that State or Federal criteria pollutant standards are being met.

Any major stationary sources or major modifications to a major source in an Attainment Area are subject to PSD review and permitting. PSD review includes a thorough ambient air quality analysis. Sources with potential emissions at, or greater than, the significant emission rates (Table 3.15) must prove that ambient area quality standards will be met and that Class I and II areas will not be impacted before construction or modification of the facility is permitted to commence.

Based on EPA's "Envirofacts Warehouse", which is part of the Aerometric Information Resource System (AIRS), there are no major sources located within a 20-mile radius of the Project Area. The closest major sources, Pacificorp's Huntington and Hunter power plants, are located 38 and 28 miles away from the Project Area, respectively.

Table 3.14 Temperature Statistics for Salina, Utah

| Temperature (°F) | | | | | | | |
|------------------|-------------|------|------------|------|--------|------|-------|
| | Extremes | | | | Normal | | |
| Month | Record High | Year | Record Low | Year | Max. | Min. | Month |
| Jan. | 69 | 1969 | -25 | 1963 | 40.7 | 14.1 | 27.4 |
| Feb. | 74 | 1972 | -18 | 1962 | 46.3 | 18.9 | 32.6 |
| Mar. | 80 | 1966 | -8 | 1976 | 54.6 | 24.6 | 39.6 |
| Apr. | 89 | 1977 | 11 | 1982 | 64 | 30.7 | 47.4 |
| May | 98 | 1977 | 19 | 1968 | 74.3 | 38.8 | 56.5 |
| June | 102 | 1977 | 25 | 1976 | 85 | 46.4 | 65.7 |
| July | 105 | 1978 | 36 | 1982 | 92.4 | 54.2 | 73.3 |
| Aug. | 105 | 1979 | 30 | 1962 | 90 | 52.1 | 71 |
| Sept. | 102 | 1977 | 19 | 1965 | 81.5 | 42.6 | 62 |
| Oct. | 90 | 1963 | -3 | 1971 | 69 | 31.6 | 50.3 |
| Nov. | 78 | 1967 | -8 | 1979 | 52.9 | 22.6 | 37.8 |
| Dec. | 68 | 1958 | -20 | 1972 | 42.4 | 15.3 | 28.8 |
| Annual | 105 | | -25 | | 66.3 | 32.8 | 49.6 |

Period of Record: 1928 - 1986
 Station: Elevation = 5,190 feet MSL; Latitude = 38° 57', Longitude = 111° 52'
 Pines Tract Project Area: Elevation = 7,000 feet - 9,000 feet MSL; Latitude = 38° 55', Longitude = 111° 25'

Table 3.15 Major Source and PSD Significant Emissions

| Criteria Pollutant | | PSD | | | |
|----------------------|--------------------------------------|--------------------------------------|---------------------------------------|--------------------------------|----------------------------------|
| | | Allowable Increment | | Significant Emission | |
| Pollutant (Criteria) | Averaging Period (National Standard) | Class I ($\mu\text{g}/\text{M}^3$) | Class II ($\mu\text{g}/\text{M}^3$) | Rates ¹ (tons/year) | SUFCA Mine Allowable (tons/year) |
| SO ₂ | 3 hours | 2 | 20 | 40 | |
| SO ₂ | 24 hours | 5 | 91 | | |
| SO ₂ | Annual | 25 | 512 | | |
| NO ₂ | Annual | 2.5 | 25 | 40 | 33 |
| PM ₁₀ | 24 hours | 4 | 17 | 15 | 13 |
| PM ₁₀ | Annual | 8 | 30 | | 43 ² |
| CO | 1 hour | | | 100 | 13 |
| CO | 8 hour | | | | |
| VOC | 1 hour | | | 40 | 3 |

¹ If rates are exceeded by a source, PSD review is required.
² Total particulate permitted rate.

Sources having emissions below the PSD major source thresholds are subject to New Source Review (NSR) permitting with the State of Utah. The Utah Division of Air Quality (UDAQ) has identified the SUFCA Mine as a minor source. Minor sources are required to demonstrate that they will neither cause nor contribute to a violation of the ambient air quality standards. Canyon Fuel would likely be required to modify their existing Approval Order (AO) with the UDAQ, prior to initiating construction of any modification affecting the source. Based on the projected production of the Pines Tract Project reserves, the permitted (allowable) emissions appear to be sufficient for the expansion. The modification to the existing permit would likely be applied for by the submittal of a NOI.

Based on the UDAQ permit, allowable emissions for the SUFCA Mine are 13 tons per year (tpy) for carbon monoxide (CO), 33 tpy of nitrogen oxides (NO_x), 13 tpy of particulate matter (PM) less than 10 μm (PM₁₀), 43 tpy of PM, and 3 tpy of volatile organic compounds (VOC). These annual allowable emission rates should be considered the regulatory baseline for the Project Area.

Air Quality Baseline

UDAQ has statewide responsibility for monitoring air quality. The majority of monitoring is collected in areas where levels of pollution are anticipated to be significant. A list of sources within a 30-mile radius of the Project Area, as reported by the AIRS database, are listed in Table 3.16. The majority of sources in the area are non-metallic earthen material extraction and processing facilities (e.g., sand and gravel, gypsum, and minerals). Particulate matter is typically the air pollutant emission associated with earthen material extractions and processing. However, the ambient air data for Sevier County show PM and PM₁₀ (PM less than 10 microns) at State background levels for the National Ambient Air Quality Standards (NAAQS). The 1997 data supplied by UDAQ for ambient air concentration averages are listed in Table 3.17. This data, in regard to Sevier and Emery County, suggest ambient air concentrations, especially for PM₁₀ are less than 20 percent of the threshold concentration limit of the NAAQS. No State ambient air monitors are located in Sanpete County.

The latest available emission inventory data for Emery County are the 1994 and 1995 summaries. For the 1994 reporting year, Emery County sources reported 4,010 tons of PM₁₀; 19,465 tons of SO₂; 40,837 tons of NO_x; 14,144 tons of VOC; and 15,559 tons of CO. The 1995 emission inventory point source summary reported 2,558 tons of PM₁₀; 19,908 tons of SO₂; 37,459 tons of NO_x; 227 tons, of VOC; and 1,841 tons of CO. For Sevier County, the 1994 emission inventory values are reported as 2,177 for PM₁₀; 1,199 for SO₂; 1,698 of NO_x; 15,158 for VOC, and 16,960 for CO. The 1995 emission inventory for Sevier County point source data reports 232 tons of PM₁₀; 48 tons of SO₂; 110 tons of NO_x; 13 tons of VOC, and 27 tons of CO. The significant difference between the 1994 and 1995 data is likely due to area sources not yet reported for 1995.

The general air quality in the Sevier and Emery County region is expected to be good to excellent because of the remoteness of the area, the distance from major urban populations, and the presence of only two major sources located in the immediate area. Visibility measurements taken at Capital Reef and Canyonlands National Parks indicate the average visual ranges in 1978 was 113 and in 1981 it was 118 miles. These distances probably represent the maximum for the region. Recent regional visibility (1994 through 1997) for the Canyonlands National Park, which is also representative for Capital Reef and Arches National Pack, averaged 129 miles. Seasonally, the lowest visibility occurs in the summer: 104 miles. Visibility is affected by regional haze, which is caused by both natural causes and the presence of fine PM of diameter less than 2.5 μm . Sulfates, nitrates, NO_x, organic, and relative humidity also can contribute to regional haze. Recent concerns in regard to visibility suggests average maximums may be on a decline for the area and the associated National Parks. Nonetheless, central Utah is one of the less impacted regions for haze and visibility impairment. Distances from the Project Area to the closest Class I areas are as follows:

Table 3.16 Air Pollution Sources in Sevier, Sanpete, and Emery County

| Number | Source Name (Company) | Location (Area) | Distance from Project Area (miles) ¹ |
|-----------------|-------------------------------------|---------------------|---|
| 1 | Coastal Chemicals | Salina | 22 |
| 2 | Cox Rock products | Aurora | 29 |
| 3 | Georgia-Pacific Gypsum | Sigurd | 32 |
| 4 | Hale Sand and Gravel | Redmond | 25 |
| 5 | Lay Rock Products | Aurora | 30 |
| 6 | Southern Utah Fuel | Salina Canyon | 18 |
| 7 | Terry Oil | Salina | 22 |
| 8 | Western Clay Milling Plant | Aurora | 30 |
| 9 | Consolidation Coal Company | Emery | 6 |
| 10 | Pacificorp Cottonwood Mine | Hwy 29, Orangeville | 19 |
| 11 | Western Clay Bentonite Pit Mine | I-70 Exit 89 | 12 |
| 12 | Western Clay Gypsum Mine | Fremont Junction | 14 |
| 13 | Pacific Corp Hunter Power Plant | Castledale | 28 |
| 14 ² | Pacific Corp Huntington Power Plant | Huntington | 30+ |
| 15 | Questar Ferron Compressor Station | Ferron | 10 |

¹Source located within 30 mile radius of Project Area.
²Huntington Plant included because of major source status.

Table 3.17 Applicable Ambient Air Concentrations

| Sevier County | | | | |
|--|--------------------------------------|--|--|--|
| Pollutant (Criteria) | Averaging Period (National Standard) | Concentration ($\mu\text{g}/\text{M}^3$) | NAAQS Primary ($\mu\text{g}/\text{M}^3$) | NAAQS Secondary ($\mu\text{g}/\text{M}^3$) |
| SO ₂ | 3 hours | 72 | n/a | 1300 |
| SO ₂ | 24 hours | 30 | 365 | n/a |
| SO ₂ | Annual | 4 | 80 | n/a |
| NO ₂ | Annual | 5 | 100 | 100 |
| PM ₁₀ | 24 hours | 12 | 150 | 150 |
| PM ₁₀ | Annual | 2 | 50 | 50 |
| CO | 1 hour | 8,000 | 40,000 | n/a |
| CO | 8 hour | 2,000 | 10,000 | n/a |
| VOC | 1 hour | 47 | (235) | (235) |
| Emery County | | | | |
| Pollutant (Criteria) | Averaging Period (National Standard) | Concentration ($\mu\text{g}/\text{M}^3$) | NAAQS Primary ($\mu\text{g}/\text{M}^3$) | NAAQS Secondary ($\mu\text{g}/\text{M}^3$) |
| SO ₂ | 3 hours | 100 | n/a | 1300 |
| SO ₂ | 24 hours | 48 | 365 | n/a |
| SO ₂ | Annual | 3 | 80 | n/a |
| NO ₂ | Annual | 17 | 100 | 100 |
| PM ₁₀ | 24 hours | 11 | 150 | 150 |
| PM ₁₀ | Annual | 5 | 50 | 50 |
| CO | 1 hour | 8,000 | 40,000 | n/a |
| CO | 8 hour | 2,000 | 10,000 | n/a |
| VOC | 1 hour | 47 | (235) | (235) |
| Source: State of Utah, Division of Air Quality. Air Quality Web Site. State Ambient Air Monitoring Data, March 17, 1998. | | | | |

| | | |
|----------------------------|---|----------|
| Capital Reef National Park | - | 32 miles |
| Canyonlands National Park | - | 77 miles |
| Arches National Park | - | 88 miles |
| Bryce National Park | - | 92 miles |

The SUFCO Mine operations appear to be in compliance with the requirements of the Clean Air Act, Clean Air Amendments of 1990, Permit-to-Construct Permit issued by UDAQ. Measures required and performed by the SUFCO Mine to comply with State and Federal air quality regulations include:

1. Dust emissions from surface operations are routinely mitigated by water spray application.
2. Equipment operators control fugitive dust by the application of water to any area when the potential for fugitive dust emissions are high.
3. The main conveyor belts, lifts, and drop points are covered and protected from prevailing winds.
4. Coal crushing and transfer operations are conducted in enclosed areas and protected by prevailing winds.
5. Loading commences, whenever possible, immediately after the product is removed from the mine, thus high moisture content aides in the mitigation of fugitive dust.
6. Access to haul roads are physically limited to public traffic by the surrounding terrain.
7. The service area that provides access to the existing mining operations are of limited space and specifically designed for mining and transport operations.
8. The high traffic areas in front of the portal and office building are paved.
9. Traffic is limited at the site the designed 25-car maximum parking lot. Personnel are transported to the mine by company bus and van pool.
10. The use of electric ventilation fans for air exchanges in the mine reduce potential combustion pollutant emissions.
11. Air pollution emissions from subsurface coal mining are significantly less than surface mining.

The relatively high moisture content of indigenous coal reserves (averaging greater than 4 percent) aids in preventing fugitive dust. Dust is controlled by watering. Emissions from the access roads

are considered minimal based on limited public access, design, and natural surrounding terrain (which prevents carried-on mud and dirt by vehicles). The number of employees, approximately 230, is expected to remain the same with the expansion and the current transportation to the mine by bus and van pool is expected to remain. Dust and combustion emissions caused by personnel and mining support operations are minimal, based on the car-pooling, minimal area of unpaved roads, and limited parking area.

3.12.2 Environmental Consequences

The air quality evaluation for the Project Area is assessed based on four alternatives as identified in the following sections and is limited to the greater Project Area and associated inclusive haul roads. Combustion of the coal as an energy source is not considered a pertinent environmental impact for this study (See Chapter 2.0). Purchasers of the coal mined in the Pines Tract Project Area are not located in the same or adjoining county (or air sheds) and are separate entities independent of this evaluation. Purchasers of the coal would likely obtain and combust coal from other suppliers if production from the Project Area ceased.

Specific terms are used to describe air quality emissions. The following terms are used and have specific meaning in this section of the report:

- **Potential Emissions:** air pollution emissions represented by continuous operation (usually 8,760 hours per year) and without the use of pollution control equipment.
- **Allowable Emissions:** air pollution emissions allowed under regulatory permitted values
- **Actual Emissions:** air pollution emissions as measured or estimated based on actual operating data.

3.12.2.1 No Action Alternative

Particulate matter (dust) is typically the largest source of air pollution from coal mining operations. Subsurface mining of coal has minimal impact on air quality when compared to open pit mining.

Based on the coal reserves currently accessible at the SUFCO Mine, the amount of mining activity would gradually decrease over the useful life of the mine. With approximately 81 MT of recoverable coal remaining in situ for the current leases, the life of the mine is approximately 14 years.

Current and future local air pollutant impacts are minimal, but are significant enough to require annual emission reporting to the State regulatory authority. The rate and impact of pollutants in the immediate area would decrease to essentially zero impact when the recoverable coal supply is depleted: year 2014.

The existing SUFCO Mine does not appear to affect regional air quality or visibility. Regional air pollution impact would essential remain unchanged whether or not the Pines Tract Project reserves are extracted. Baseline emissions for mining operations and haul road emissions for the Project Area would likely be maintained with this alternative until year 2014, when existing coal reserves within the active leases.

3.12.2.2 *Alternative B*

If Canyon Fuel is the successful bidder on the Pines Coal Lease Tract, on-site vehicles, supporting surface operations, loading, conveying, and ventilation from the mine will have a minimal, but measurable impact on local air quality. This scenario assumes Canyon Fuel would use the existing haul roads, surface facilities, and ventilation systems to extract the coal reserves located within the Pines Tract Project Area. With this alternative Canyon Fuel estimates that production would increase from approximately 6 to 9 mmtpy within 4 years and will remain at 9 mmtpy until year 2014. Coal extraction, and thus air emissions would gradually decrease from year 2014 to year 2017 based on remaining coal reserve estimates.

Fugitive dust emissions from the load-out area would be considered moderate. Coal-load out operations are a main source of fugitive dust emissions from mining operations. When haul trucks enter the site they are usually routed near the emergency coal storage area, creating pulverization of coal dust. However, this emission source is routinely controlled by water spray application, as required in the current air pollution permit. The potential PM₁₀ impact would increase from product load-out operations between 33 to 50 percent. Water sprays and continued mitigative measures could mitigate the PM₁₀ potential emissions up to 90 percent.

Forty three ton-duel-trailer haul trucks would be used to haul the coal from the mine site to customers or rail loading facilities. Truck loading is and would continue to be performed by dropping the product from a bin-hopper into the haul trucks. Drop points are protected from the prevailing wind direction. Loading of coal commences when possible, immediately after the product is removed from the mine, thus high moisture content aids in the mitigation of fugitive dust. The particulate impact from loading is estimated to increase from a current estimate of between 1.8 to 3.4 tpy to over 4.9 tpy. The current total facility allowable rate particulate rate is 43 tpy.

Coal crushing and conveying would be conducted in closed or shielded areas. The existing conveyor belts are covered, as are most lifts and drop points. Fugitive emissions are mitigated due to these abatement measures. The high moisture content of existing coal reserves also aid in preventing fugitive dust. Equipment operators would control fugitive dust by application of water to any area when the potential for fugitive dust emissions are high.

There are no anticipated changes for the existing coal stockpile volumes located at the East Spring Canyon Facility. Theses stock piles have an average capacity of 15,000 tons (12 inch - 0.0 inch coal), 10,000 tons (2 inch - 0.0 inch) and 5,000 tons (2 inch - 0.0 inch). The 5,000-ton stockpile

is considered a reserved area, and is not often used. The new proposed lease area could require use of the reserved 5000-ton stockpile. Utilizing this stockpile would have the potential to increase particulate emissions by less than 1 ton per year. Loading of stockpiled material by front end loader usually results in an increase of fugitive particulate emissions. Local topography, the moisture content of the coal, and water sprays would help in control fugitive dust emissions.

Existing mining ventilation equipment would remain the same with the anticipated expansion. Two blowers, powered by 1250 and 1000-horsepower electric motors serve to ventilate the underground excavation at the "4 East Fan". These existing blowers circulate air throughout the underground excavation. A current rate of 850,000 cfm is exhausted to the atmosphere. Air pollution control equipment is not currently located on the exhaust, and it is not required, based on air quality evaluation. The new proposed lease area would not significantly affect the current rate of exhaust or associated pollutants. Airflow corridors would be altered to provide sufficient air exchanges in the areas where the coal reserves are located.

With most of the mining activity being conducted subsurface, using existing facilities, affects to the visibility and regional haze are estimated to be insignificant. While continued mining would maintain the amount of particulate emitted into the atmosphere, the low relative humidity and insignificant emissions of sulfates, nitrates, NO_x and organic would not likely decrease regional or local visibility or increase haze. Haul trucks operating on public roads would increase regional impact of fugitive dust by approximately 50 percent. It is assumed in this scenario that the same mitigative measures currently employed (for haul roads) by Canyon Fuel would be maintained, as prescribed in the UDAQ air permit. Information from the National Park Service suggests the excellent regional visibility has been maintained throughout the existing life of the SUFCO Mine.

With the addition of the Pines Coal Lease Tract, the projected allowable emission limits (permitted limits) may require an increase of up to 45 percent. Modifications to the permit for operational parameters may be required. The duration of the annual impact would be lengthen by approximately 5 years when compared to Alternative A.

If another company obtains the Pines Coal Lease Tract, surface facilities, staging area, access roads, crushing and conveyance equipment, and ventilation would be required to mine the Pines Tract Project coal reserves. This alternative also assumes longwall method of extraction, approximately 100 acres of surface area disturbed for surface services, and upgrading of 6.1 miles of road (i.e., Link Canyon Road) for haul truck use. The following air quality impacts are estimated, predicted or assessed based on engineering judgment and knowledge of the project site.

Storage piles, while initially at zero volume, could eventually equal the existing storage piles located at the East Springs Canyon facility. Although loading and conveyor systems would have to comply with ACHIER, emissions from these operations would likely be 60 percent to 110 percent of Canyon Fuel's operations. With the required additional ventilation, assuming electric blowers, emissions from the two mining operations would double starting in year 2004 (full

production) and remain until a gradual decrease starting in year 2013. This estimate is based on start up operations and exhaustion of recoverable coal time frames. However, mine blasting and excavating required to create new access to the reserves would significantly increase particulate emissions to the atmosphere during the construction phase. Construction to improve the Link Canyon haul road would increase these PM₁₀ estimates during the first few years of the mine.

Visibility and regional haze is not likely to be affected by this alternative. With the low relative humidity, excellent air quality of the airshed, and the low predicted haze producing emissions, Alternative B would have insignificant, but measurable impact. Trucks using public roads to haul the coal have the potential to increase suspended PM in the Project Area. Haul road distance would be increased by approximately 6.1 miles, thus increasing the amount of haul road fugitive particulate and tail pipe emissions proportionally. If concurrent mining of Quitchupah Lease and Pines Coal Lease Tract occurred and mitigative dust measures were not performed on the public haul roads, particulate and haul truck would increase an average of 300 percent over Alternative B should Canyon Fuel obtain the lease and 500 percent over Alternative A. These impacts are based on an increase in the number of vehicle trips per day from 595 to over 1000 and an increase in the unpaved haul road distances (both directions) in the greater Project Area would increase from 9.95 to 16 miles. Tail pipe emissions would increase 8 percent over Alternative B should Canyon Fuel obtain the lease and 50 percent over Alternative A. Maximum regional impact would likely occur in year 2007 and gradually start to decrease, due to depleted coal reserves in year 2013.

Based on the addition of surface support equipment and facilities, emissions of pollutants would increase. Initial construction, haul road upgrade, start-up activities by another company would also impact the Project Area. A 60 to 110 percent increase of the current actual emissions of fugitive dust from surface disturbance would impact the immediate area. Allowable emissions equal to or slightly less than current permitted levels would be required by an alternate mining company operating in the Pines Coal Lease Tract. The existing SUFCO operation, under this scenario would maintain current levels of emissions until year 2012, based on estimated coal reserve supply. Fugitive dust emission from the abandoned existing portal would be dependant on reclamation efforts.

3.12.2.3 *Alternative C*

Assuming Canyon Fuel obtains the Pines Coal Lease Tract, air pollution emission impact based on this scenario is essentially the same as Alternate B, except for the fugitive dust mitigative measures of the SCLS #8 and the duration of the annual emissions. Without the Permit Amendment Area of the existing Quitchupah Lease, and with the addition of new proposed lease area, existing coal reserves will be depleted approximately in year 2016. Impact from mining operations would peak around year 2002 and generally start to decrease after year 2013, due the exhaustion of recoverable coal. Impact from all sources would decrease to zero by year 2017 based on exhaustion of existing coal reserves. With SCLS #8, a 75 to 90 percent reduction of fugitive dust emissions could be obtained. Because Canyon Fuel already provides measures for

dust suppression and the control of fugitive dust, the increased production would likely result in only a conservative value of 3.8 tpy of particulate from on-site operations. Regional impact from haul trucks (fugitive dust and tail pipe) emissions using public roads would increase approximately 50 percent from Alternative A, and be essentially the same as Alternative B.

If another company obtains the Pines Coal Lease Tract, air emissions impact will be essentially the same as Alternative B, the Link Canyon Scenario, except for the duration of air pollution impact and mitigative controls (SCLS #8). Air pollution controls can be assumed to reduce fugitive dust by up to 90 percent. Thus, the increased production by another company would likely result in an increase in fugitive emissions of only 28 percent. By year 2014, coal reserves would be depleted and emissions would decrease to zero. Regional fugitive dust impact from haul trucks using public roads would decrease significantly from Alternative B, the Link Canyon Scenario: 300 percent. This scenario would result in an increase in tail pipe emissions of approximately 50 percent over Alternative A, and essentially the same as Alternative B.

3.12.2.4 *Alternative D*

Air pollution impacts based on this scenario are essentially the same as Alternative C, except that the duration of emissions would likely last until year 2017 if Canyon Fuel obtains the lease, or year 2016 if another company obtains the lease.

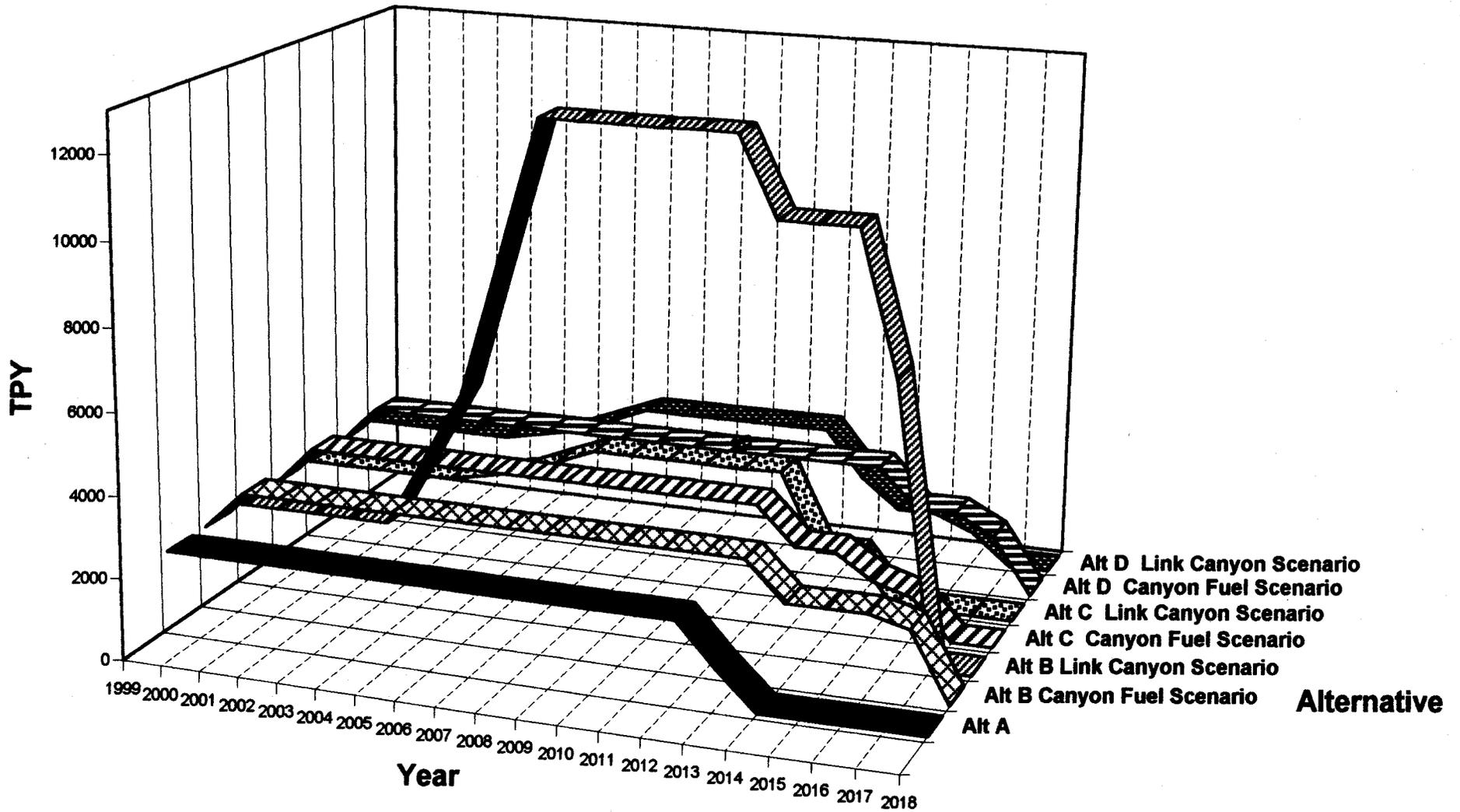
A comparison of haul road fugitive emissions for the seven scenarios is shown in Figure 3-24.

3.12.3 Mitigation and Monitoring

Fugitive dust from public roads (which is not addressed in the air permit) is essentially equal for all alternatives and scenarios except for Alternative B, assuming another company obtains the Pines Coal Lease Tract. The following mitigation and monitoring is recommended for Alternatives B, C, and D if another company obtains the lease:

1. Notice of Intent application to UDAQ to accurately assess and document the air pollution impact from mining portal construction and extraction operations.
2. Perform annual emission inventories to better assess the actual impact of this scenario.
3. Compliance with ACHIER-12 Fugitive Emissions and Fugitive Dust during construction and operation.
4. Air dispersion modeling to determine Class I area impact

The following mitigation and monitoring is recommended for Alternatives B, C, and D if Canyon Fuel obtains the lease:



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FIGURE 3-24
REGIONAL PM-10 IMPACT
FROM HAUL ROADS

SCALE NONE

DATE DRAWN 6/12/98

DATE DRAWN 7/28/98

1. Revision of AO by Canyon Fuel to UDAQ to accurately characterize operations and potential air pollution impact in regard to new proposed lease area.
2. Air dispersion modeling to determine Class I area impacts.

No other mitigation or monitoring measures are proposed beyond current ACHIER requirements.

3.12.4 Cumulative Effects

Based on the general excellent air quality and the area's high air mixing, cumulative impacts on the quality of the ambient air are minimal and are generally the same for each Alternative. The increase from tail pipe and fugitive emissions from haul trucks may add to the regional haze in Class I areas, but this can only be determined with air dispersion modeling.

Cumulative impacts resulting from past, present, and reasonably foreseeable future actions combined with the Pines Tract Project generally the same for each Alternatives B, C, and D.

3.12.5 Residual Adverse Impacts

No residual adverse impacts were determined under this study for the Project Area.

3.12.6 Irreversible/Irretrievable Commitment of Resources

The commitment of resources under these scenarios are not likely to have irreversible or irretrievable consequences on air quality.

3.12.7 Short Term Uses vs. Long Term Productivity

Regional air quality aspects of short term versus long term may have to be determined with air dispersion modeling. Emission of predetermined threshold pollutant limits are established by the FS that require a impact analysis of Class I areas. A short term schedule for mining the coal reserves may be more likely to trigger an impact analysis as opposed to a long term schedule of productivity.

3.13 TRANSPORTATION

3.13.1 Affected Environment

The area of analysis for the transportation resource includes all major highways, local roads and forest development roads that provide access to the existing SUFCO Mine, the MLS and the larger communities of Emery, Ferron, Castle Dale, Huntington and Salina. The transportation network would be used by workers commuting to the Project Area from those communities, as well as related truck hauling of equipment, supplies and coal.

Figure 3-25 presents regional transportation routes within the State of Utah (USGS 1968). Figure 3-26 shows general highways in the vicinity of the Project Area. These routes are paved roads. Local transportation roads within and surrounding the analysis area, which include forest development roads, are shown on Figure 3-27.

Transportation Routes

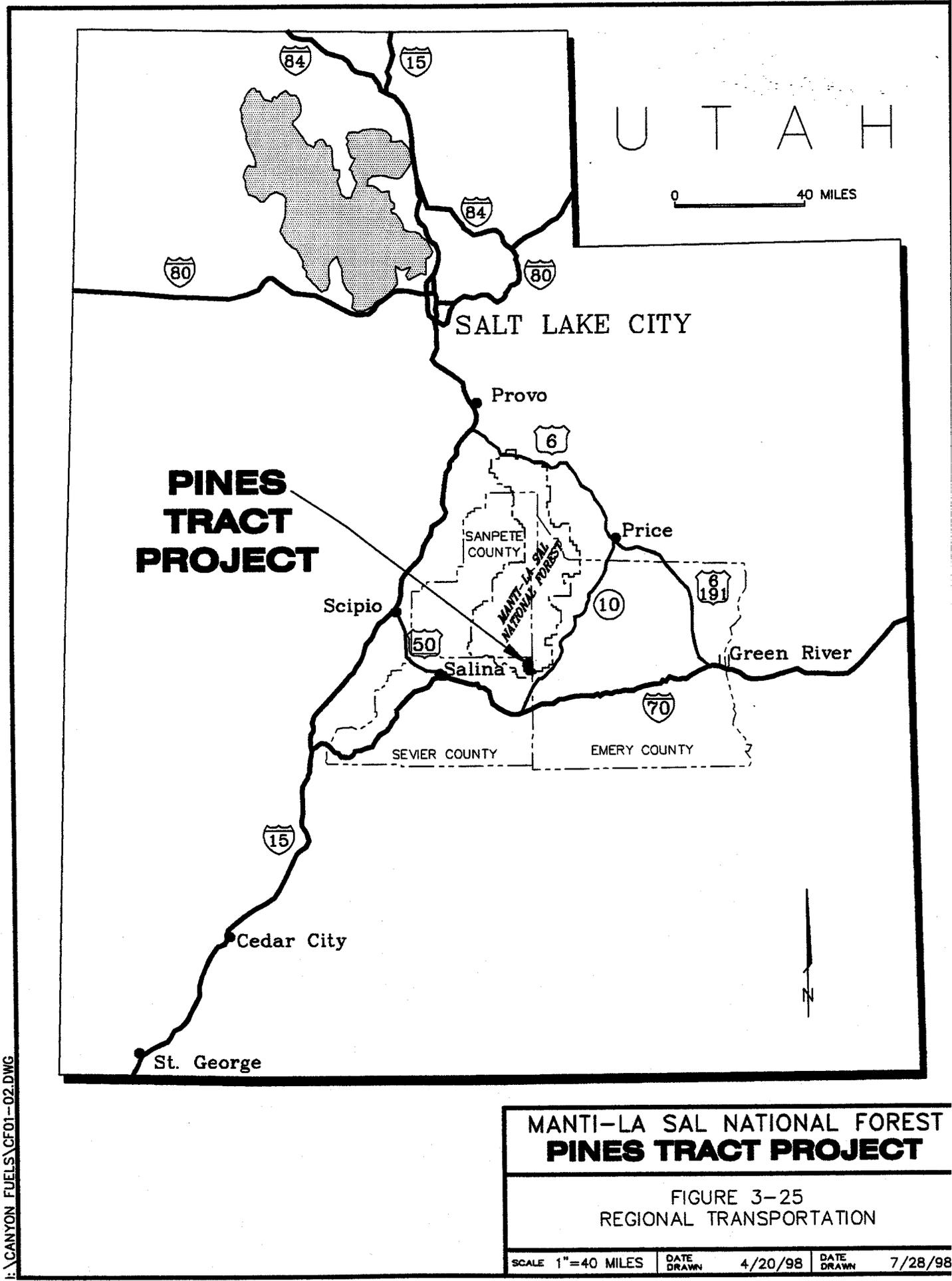
Coal currently mined from the existing SUFCO Mine is supplied to more than twenty customers. Some of the coal is hauled to rail loading facilities at Levan, Utah and Price, Utah, then transported by railcar to the customers. The major transportation routes are indicated in Table 3.18. Given present reserves and customers, the SUFCO Mine is likely to operate for 14 more years.

Table 3.18 Transportation Routes

| Enter Highway | To Highway | To Highway | Destination |
|---------------|------------|------------|----------------------------------|
| I-70 | SR-28 | | Levan, Utah |
| I-70 | SR-10 | Ridge Road | SCT Loadout near Price, Utah |
| I-70 | I-15 | I-80 | Customers Directly |
| I-70 | - | - | Salina, Utah (Temporary storage) |

State and Federal highways provide the main transportation access to the Project Area. The major transportation network consists of two highways: SR-10 and I-70. Descriptions of each highway are presented below. These highways are maintained by the Utah Department of Transportation (UDOT). All truck traffic from the SUFCO Mine is loaded to the legal limit or less.

Current volumes for all vehicular traffic for each highway are provided in Table 3.19. Which includes the annual average daily traffic (AADT) of 1,224 (both directions) of haul trucks, employees, maintenance and service vehicles from the existing operating SUFCO Mine.



U T A H

0 40 MILES

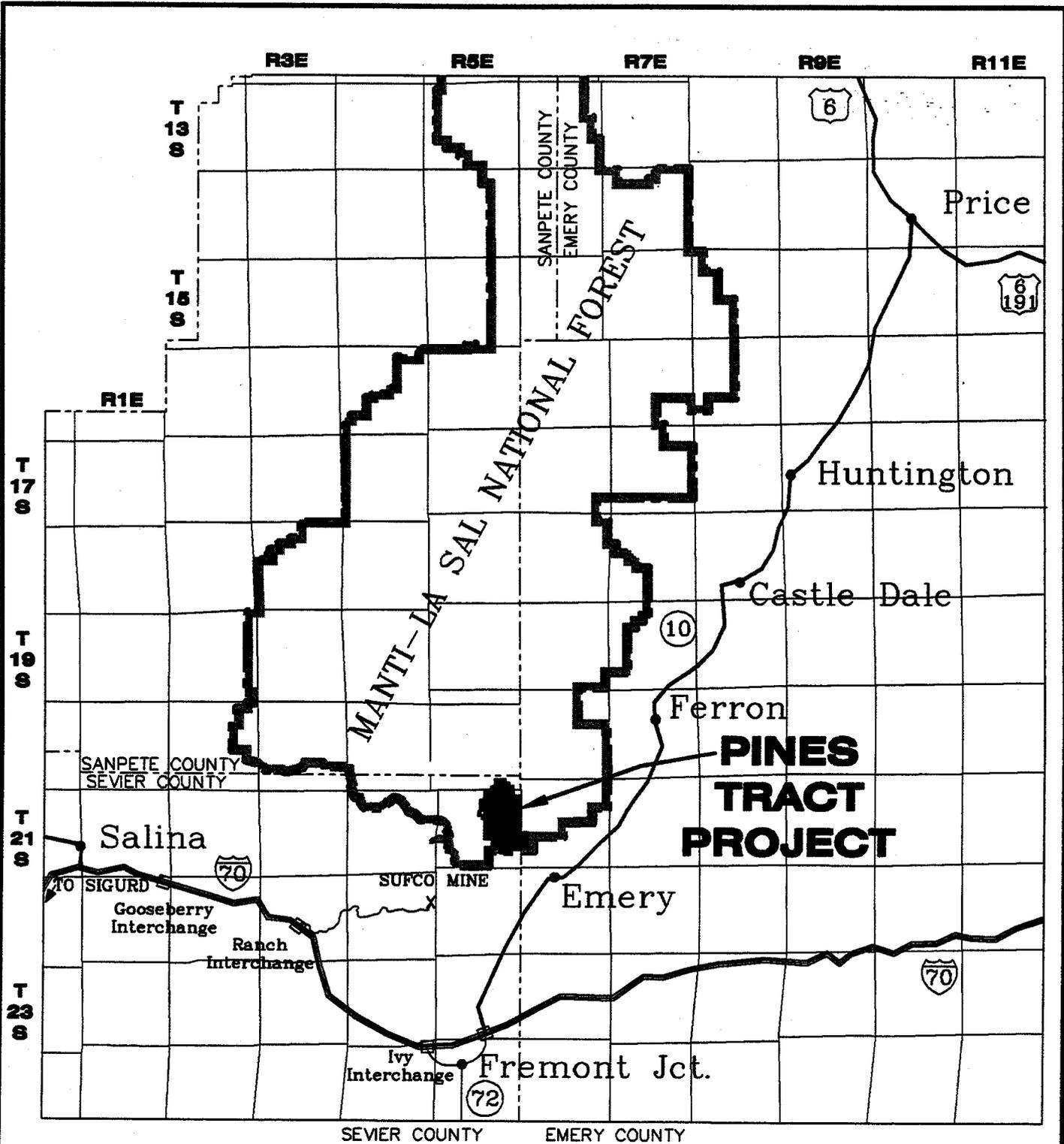
PINES TRACT PROJECT

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FIGURE 3-25
REGIONAL TRANSPORTATION

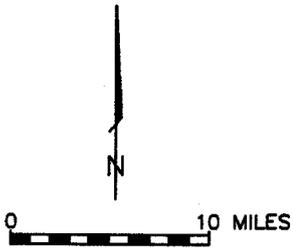
| | | |
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| SCALE 1"=40 MILES | DATE DRAWN 4/20/98 | DATE DRAWN 7/28/98 |
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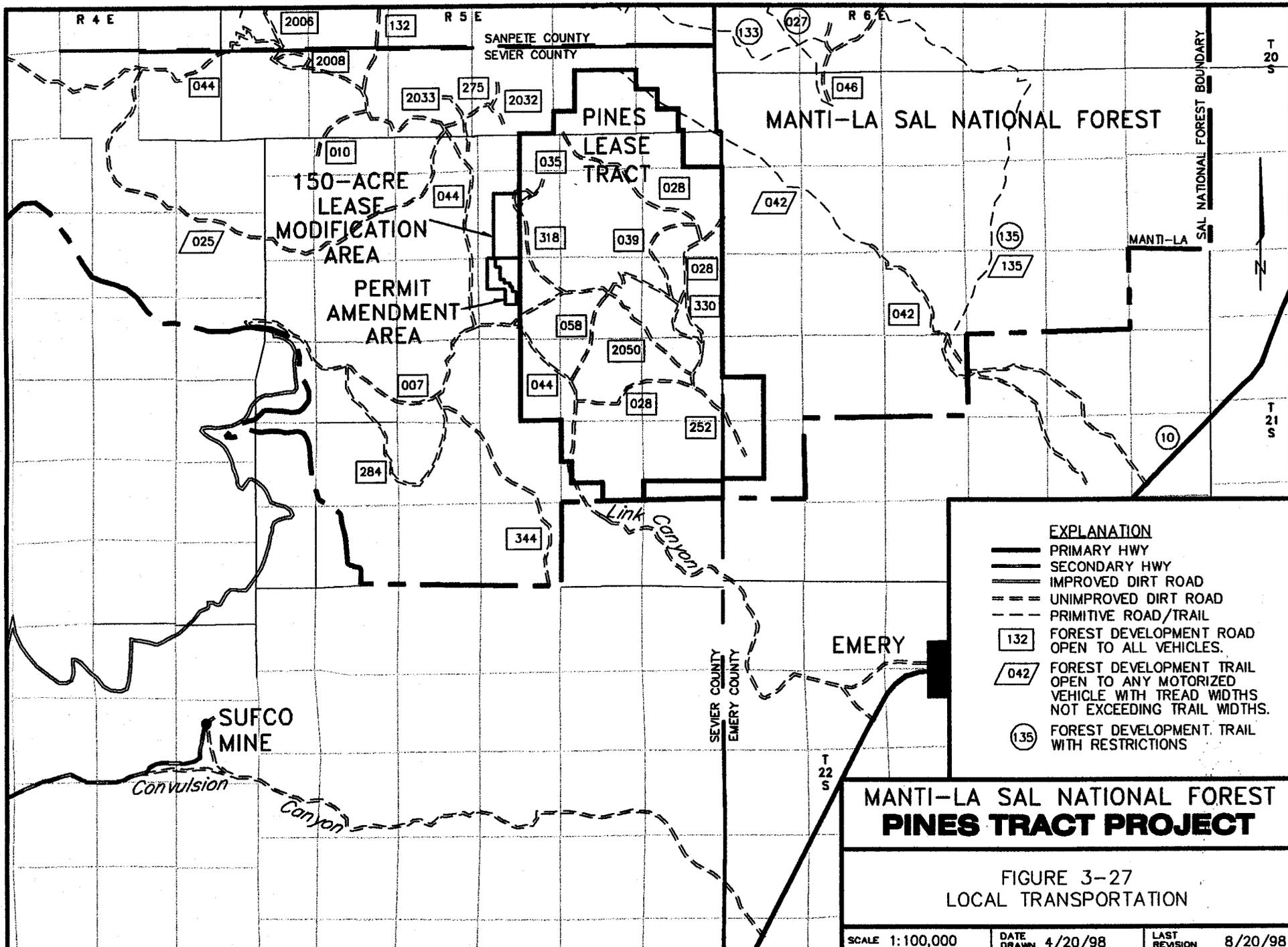
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FIGURE 3-26
GENERAL TRANSPORTATION



SCALE SCALE 1"~10' DATE DRAWN 4/20/98 LAST REVISION 7/28/98

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EXPLANATION

- PRIMARY HWY
- SECONDARY HWY
- IMPROVED DIRT ROAD
- UNIMPROVED DIRT ROAD
- PRIMITIVE ROAD/TRAIL
- FOREST DEVELOPMENT ROAD OPEN TO ALL VEHICLES.
- FOREST DEVELOPMENT TRAIL OPEN TO ANY MOTORIZED VEHICLE WITH TREAD WIDTHS NOT EXCEEDING TRAIL WIDTHS.
- FOREST DEVELOPMENT TRAIL WITH RESTRICTIONS

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FIGURE 3-27
LOCAL TRANSPORTATION

Table 3.19 1996 Highway Traffic Volumes

| From Interchange/Junction | To Interchange/Junction | Highway | Annual Average Daily Traffic ¹ |
|------------------------------|----------------------------|---------|---|
| North Huntington Corp. Limit | Junction SR-31 | SR-10 | 7,200 |
| Junction SR-31 | S Huntington Corp Limits | SR-10 | 9,565 |
| S Huntington Corp. Limits | N Castle Dale Corp Limits | SR-10 | 3,345 |
| N Castle Dale Corp Limits | S Castle Dale Corp Limits | SR-10 | 6,540 |
| S Castle Dale Corp Limits | North Ferron Corp Limits | SR-10 | 3,425 |
| North Ferron Corp Limits | South Ferron Corp Limits | SR-10 | 3,990 |
| South Ferron Corp Limits | East Emery Corp. Limits | SR-10 | 1,700 |
| East Emery Corp. Limits | West Emery Corp. Limits | SR-10 | 725 |
| West Emery Corp. Limits | I-70 | SR-10 | 430 |
| SR-10 Junction I-70 | Ivy Interchange | I-70 | 3,980 |
| Ivy Interchange | Ranch Interchange | I-70 | 4,475 |
| Ranch Interchange | Gooseberry Interchange | I-70 | 6,040 |
| Gooseberry Interchange | Salina Interchange | I-70 | 6,700 |
| Salina Interchange | West to Sigurd Interchange | I-70 | 7,395 |
| SR-10 Junction I-70 | East to Muddy Creek | I-70 | 3,345 |

¹ AADT both directions - UDOT 1996.

The SUFCO Mine is currently (Spring 1998) hauling approximately 16,450 tons per day from the mine. This is based on an annual production rate of 6 mmtpy. Traffic calculations used herein are based upon the annual average daily traffic (AADT) for consistency with those reported by UDOT.

According to UDOT, approximately 28 percent of the total daily traffic traveling west from the Ranch Interchange (Convulsion Canyon Mine Road on-ramp) are trucks. Approximately 10 percent of the total daily traffic traveling east from Ranch Interchange are trucks. These percentages include trucks from other mines and industries which may be using the highway (Phillips 1998).

State Route-10

State Route 10 is a north-south highway that connects central Utah area and Wasatch Front to the Project Area. This two-lane paved highway extends from the Project Area in Emery and Sevier Counties and I-70, north to Price, Utah. Telephone conversations with UDOT indicate that improvements to this road are planned to handle the ever growing traffic. Actual construction cannot be predicted since it depends upon necessary funds being obtained.

Traffic volumes on this highway range from generally low in the sparse population areas to exceeding the original design capacity in more populated areas. In 1996, average annual daily traffic on this highway between Emery and the junction with I-70 was 430 AADT for both directions of travel. From the east corporate limits of Emery to Ferron, traffic volumes increase to 1,700 AADT for both directions of travel. Within the Huntington Corporate Limits, the AADT in 1996 was as high as 9,565. These volumes include all present mining related traffic. The traffic design capacity to maintain a Traffic Service Level A is 1,900 vehicles per day (Merrill 1998 - UDOT Region 4, Richfield). Using an estimated 26 percent of the SUFCO Mine traffic traveling north to the Price area and railhead, 318 vehicles per day on SR-10 are related to that mining operation.

U.S. Interstate Highway I-70

Interstate I-70 is an important east-west highway providing access from I-15 in the west to Colorado. Despite its regional significance, the traffic volumes along this highway are modest, relative to its capacity. Interstate I-70 is a four-lane highway with an asphaltic concrete surface.

The road width each direction consists of a left shoulder 4 feet wide, two 12 feet wide lanes and a right shoulder 10-feet wide, for a total of 38 feet per direction of travel. The annual average daily traffic in the Project Area (SR-10 to Salina) is approximately 5,300 vehicles per day (average of AADT values on Table 3.19, above) in the Sevier County portion of the Project Area. The traffic design capacity to maintain a Traffic Service Level A is 18,700 vehicles per day (Merrill 1998). Using an estimated 74 percent of the SUFCO Mine traffic traveling west toward Salina, I-80 and the Levan loadout, 906 vehicles per day on I-70 West are related to that mining operation.

Local Roads

There are two local roads of primary interest in this analysis, the road associated with the existing SUFCO Mine, Convulsion Canyon Road, and the existing Link Canyon Road. In addition, there are several forest development roads including Duncan Mountain and Quitchupah roads. In recent years, there has been discussion of reconstructing the Quitchupah Road so that coal from the SUFCO Mine could be hauled more directly to SR-10 and points north. Since no formal plans exist and the net result would be the same, with haul trucks traveling north on SR-10, this document treats Quitchupah Road as the local road that it is.

In general, maintenance of local roads is the responsibility of the entity that owns them, although SUFCO Mine has done a considerable amount of maintenance work on the county access road to its facility (the Convulsion Canyon Road). The Link Canyon Road presently has an unimproved surface (dirt) road that receives minimum maintenance.

Convulsion Canyon Road to Existing SUFCO Mine. The mine access road is a county road that extends from the Ranch Interchange on I-70 to the mine, a distance of nearly 10 miles. This road is classified as a collector road in the State collector system. It was upgraded by the mine from a dirt FS road in 1977 to a Traffic Service Level B (USDA-FS 1998a). The road is designed for a traffic speed of 40 miles per hour (mph).

The road has a 28-foot finished surface width. The road section consists of 17.5 inches of untreated base course overlaid by 2.5 inches of gravel sub-base. The asphaltic concrete surface consists of a 3-inch base course overlaid by a 4.5-inch thick surface course. At least one surface seal coat with 0.75-inch chips provides a wear surface. No acid or toxic materials were used in the road surfacing (Duncan 1982).

Traffic Volume. The UDOT Price District Office and Sevier County were contacted regarding traffic volumes on the local roads. However, total traffic counts were unavailable. In general, traffic volumes on local roads that serve the Project Area are low, since the area is very sparsely inhabited. Traffic on the Convulsion Canyon Road, other than mine personnel, mine service trucks and haul trucks, is associated with road maintenance, ranching activities and recreation.

The daily haul truck traffic is about 764 AADT. The haul trucks are typically double trailer trucks with a capacity of 43 tons per truck. There are approximately 460 AADT additional employee, service and maintenance vehicles using Convulsion Canyon Road. Thus, the total AADT is 1,224 (both directions).

Convulsion Canyon Road Maintenance. The existing mine access road is maintained by SUFCO Mine in cooperation with the county and UDOT. SUFCO Mine repairs the road surface, blades the adjacent drainage ditches, fills potholes, and resurfaces the road. The road is maintained consistent with the FS Traffic Service Level B. Drainage along Convulsion Canyon Road is controlled by roadside drainage channels and culverts.

Link Canyon Road. Presently, access into Link Canyon is provided by a low standard county road to the old Link Canyon Mine. This road is dirt, not suitable for coal transportation, and would require reconstruction if another company mines the coal from the Project Area. Some alignment changes could occur near SR-10 to shorten the total distance but are not predictable at this time.

The existing 6-mile Link Canyon Road originates at SR-10 approximately 1 mile southwest of Emery. Under County jurisdiction, it travels 5.6 miles, first across Christiansen Wash, then into Link Canyon and up the drainage to the FS boundary. This access road crosses from Emery

County into Sevier County at a point approximately 3.2 miles from SR-10. The Forest road extends an additional 0.5 miles from the boundary to the portal of the old Link Canyon mine, and extends across the top of the plateau to connect with Skyline Drive.

The Link Canyon Road currently provides access to local ranching activities and recreation. Traffic volumes are minimal due to the sparse population in the area. Since no records are kept and minimal reasons exist to use this road, it is assumed that the AADT is approximately 20 or less.

Forest Development Roads. Forest development roads provide access to Forest land and are used by the public for recreation, by Forest permittees (ranching), and administrative personnel. They are shown on Figure 3-27. No additional roads would be constructed and none would be abandoned in any of the alternatives.

These roads are maintained for Traffic Service Level D at operational and objective maintenance level 2 for existing Forest uses. Roads in this maintenance level are typically low speed, single lane with some spot surfacing. These roads provide for access by high clearance vehicles during the normal season of use. User comfort and convenience are not considered priorities for these roads (USDA-FS 1992).

Roads such as Duncan Mountain and Quitcupah roads are sometimes used as access routes for cattle permittees and recreation seekers. In Link Canyon, cattle trailing to the allotments, strays gathering and round up are done yearly. These issues are further discussed in their respective sections.

The typical road has a 14-foot roadbed with a 12-foot wide travel way. There is a 2 percent cross slope for drainage and a 1.5:1 (horizontal to vertical) back slopes above the road and fill slopes. The minimum clear limit is approximately 20 feet (USDA-FS 1998a).

Mine Roads. Roads within the restricted mine area are limited. These consist of short haul roads and access roads used exclusively by mine personnel, haulage activities and service vehicles. The public is restricted from using these roads for the life of the mine.

These mine roads would be closed and reclaimed at the end of the mine life unless they are designated to become, or revert to, forest development roads, in which case they will be reclaimed to the configuration described as forest development roads above. Mine roads are not considered in this analysis since they are limited and strictly controlled.

3.13.2 Environmental Consequences

According to UDOT, no recent Traffic Impact Analysis has been completed in the Project Area. Technical information is limited to design information, traffic counts (AADT volumes) and general knowledge (Christensen 1998). Therefore, quantitative measures of certain evaluation criteria such as the duration of traffic or haulage delays and changes in the accident rate cannot be projected in all cases.

3.13.2.1 *No Action Alternative*

Upon the cessation of mining associated with the SUFCO Mine's remaining reserves in the Quitcupah Lease in approximately 14 years, haul truck traffic from the SUFCO Mine would cease. After mine reclamation, SUFCO Mine would discontinue maintenance of Convulsion Canyon Road. Elimination of all haul truck, employee and service traffic may reduce traffic on affected roads in the Project Area by the estimated percentages represented below.

| Road | Estimated Percent Reduction in Vehicular Traffic |
|-----------------------------|--|
| I-70 | 12 percent |
| SR-10 | 74 percent (Between I-70 and Emery) |
| Convulsion Canyon Road | 98 percent |
| Forest Development Roads | 2 percent (estimated misc. traffic) |
| Link Canyon Road (existing) | 0 percent (no change to existing traffic) |

3.13.2.2 *Alternative B*

Exploration Drilling. Where coal is leased that has not been explored to the extent necessary to design a mine, developmental drilling would be required. This would involve accessing areas away from the forest development roads by pioneering a road/trail (10 feet to 12 feet wide) to the location where reserve data (drilling) is needed. These road building activities would include avoidance of sensitive areas, topsoil preservation and replacement and revegetation after exploration is completed. The number and locations of the drill holes cannot be determined at this time. Drill pad sizes may range from a circle with a 50-foot radius to a 125-foot x 200-foot rectangle. Revegetation of the roads and pads could take from 3 years to 5 years to achieve a 90 percent success rate.

Drilling proposals are evaluated on a site-specific basis and require their own NEPA documents. An exploration license must be issued prior to any activity. With the current discussion of a road moratorium on FS land, either an exception will be required or exploration drilling using a helicopter supported program that requires no road building will be required (See Section 3.9).

Subsidence. Where coal is leased and mined by full extraction methods, primarily longwall, the potential exists for subsidence of the ground surface to occur. Effects could include a drop in the surface elevation of possibly 4 feet or tension cracks from less than an inch to 2 feet wide in the worst case. Escarpment failures may also occur from subsidence. However, there are no roads in the vicinity of steep escarpments where mining/subsidence is planned. The road into Link

Canyon would likely not experience this hazard since a large buffer of coal could be expected to be left in place in this vicinity and thus protect the road from rock falls.

None of the above situations should create hazards that cannot be mitigated. The effects are based on the RFDS available at this time. The drop in surface elevation of 4 feet would not be a shear drop at a specific point but would occur over a distance of several hundred feet. This means that the gradient created would be very slight, approximately 1 percent, so that in most cases it would not be noticed. Likewise, many of the tension cracks would heal themselves as wind and water filled them so they too would be difficult to observe.

Repair work to the forest development roads would be required in some circumstances. Most maintenance could be handled by a dozer and grader with additional road base material being hauled in by truck. Costs and delays to achieve repairs are difficult to predict but would not be excessive.

If Canyon Fuel obtains the Pines Coal Lease Tract, it would remove all coal through the existing SUFCO Mine surface facility. The coal would be hauled out Convulsion Canyon Road. The Link Canyon Road would not be reconstructed. In this scenario, production would increase by 50 percent, from 6.0 mmtpy to 9.0 mmtpy in the year 2000 for evaluation.

State Highway SR-10 Impacts. The general traffic design capacity for this highway to maintain a Traffic Service Level A is 1,900 vehicles per day (Merrill 1998). Higher volumes could be accommodated but at a lower service level, likely resulting in more congestion and slower speeds.

The increase in traffic resulting from additional mining from the analysis area would be expected to increase proportional to the increase in coal production. This suggests an additional AADT of 159 haul trucks, employee, service and maintenance vehicles would travel on SR-10 north to Ferron. This represents an increase of about 9 percent in total traffic. The increase would not be expected to exceed the design capacity of this section of road. However, traffic through Ferron, Castle Dale and Huntington increases to an AADT of 5,677 (UDOT 1996). This analysis includes additional employee traffic using their cars, which is more conservative than if employees commute to the mine on a company bus. For this section of SR-10, the traffic service level is exceeded.

Interstate I-70 Impacts. The general traffic design capacity for this highway to maintain a Service Level A is 18,700 vehicles per day (Merrill 1998). The present traffic volume is only about 28 percent of this capacity. Traffic from additional SUFCO Mine production (to 9.0 mmtpy) would increase it to 31 percent of the Traffic Service Level A design capacity.

Convulsion Canyon Road Impacts. The FS and BLM provided estimated coal reserves for calculation of traffic volumes from the SUFCO Mine. Table 3.20 presents traffic information for the SUFCO Mine for the combined Quitcupah, Pines Coal Lease Tract, and the Lease

Modification Area. Estimated traffic volumes are based on coal haul volumes of 9 mmtpy beginning in 2000 for 14 years of production and 6 mmtpy thereafter. Service vehicles, mine work personal vehicles and maintenance traffic are also represented.

Table 3.20 Convulsion Canyon Road Traffic Volumes

| Description | Volume |
|--|---|
| Truck Capacity | 43 Ton/Truck |
| Current Traffic (1998 - 1999) | 1,224 AADT (764 haul trucks + 460 others) |
| Traffic in 2000 - 2013 | 1,836 AADT (production of 9 mmtpy) |
| Traffic in 2014-2017 | 1,224 AADT (production of 6 mmtpy) |
| AADT - Annual Average Daily Traffic, both directions | |

Should another company obtain the Pines Coal Lease Tract, the construction and operation of a new mine located in Link Canyon would occur. Meanwhile, the SUFCO Mine would continue within the Quitchupah Lease. The Lease Modification Area (3.4 MT) would be included in the SUFCO Mine operations. Impacts to Convulsion Canyon Road would not change relative to the levels described in Table 3.20. However, the life of mine and duration of hauling coal could change depending upon the coal production rate at the SUFCO Mine.

Link Canyon Road Impacts. The new mine and portal would be located in the SW ¼ of Section 26, T. 21 S., R. 5 E. The existing 6-mile Link Canyon Road would be upgraded by reconstructing the entire roadway, which could consist of widening, straightening and paving the road. The county road portion of the Link Canyon Road would be reconstructed to AASHTO standards and would be paved for the entire length. Some alignment changes could occur near SR-10 to shorten the total distance. The Forest road portion would be reconstructed to FS standards that are also expected to satisfy AASHTO standards. This portion of the road would also be paved (Monroe 1998).

Annual average daily traffic on the Link Canyon Road is estimated to be 1,224 AADT for a mine that produces 6.0 mmtpy. This includes haulage, service vehicles, employees and other travelers. The road would be designed to accommodate these demands. A Traffic Impact Analysis could assess the impact of truck volumes to the existing and proposed roads by modeling road configurations, environmental and safety issues, traffic loads and design speeds.

Table 3.21 presents the range of design criteria applicable for the reconstruction of Link Canyon Road, as described in Road Preconstruction Handbook, Chapter 4 - Design Manual FSH 7709.56 (USDA-FS 1987).

Table 3.21 Design Criteria

| Description | Design Criteria |
|-----------------------------------|---|
| Traffic service level | A |
| Number of lanes | 2 |
| Lane width | 11 to 12 feet plus curve widening |
| Shoulder width | 1 to 2 feet |
| Driving surface | Asphaltic concrete |
| Sight distance | 235 to 313 feet |
| Design speed | 40 mph |
| Clearance | 4 feet minimum, horizontal |
| Horizontal and vertical alignment | Designed to meet design standard and safety criteria. |
| Curve widening | Required to provide for offtracking of haul trucks. Varies with curve radius. |
| Turnarounds | Sized for design vehicle and signed. |
| Design vehicle | Double trailer trucks (43 ton capacity) |

Drainage ditches would be constructed between the traveled way and the adjacent terrain. Inslopes of the ditches would not be steeper than 3:1 (horizontal to vertical) to enhance safety of drivers that may use the ditches to avoid collision with other vehicles. The ditches transport water that leaves the road surface or cut slope to the nearest ditch relief culvert or outlet ditch and drain the roadbed.

Culverts would be provided periodically to relieve the ditch-line-flow by piping water to the opposite side of the road where the flow can disperse way from the roadway or to where it can be directed away by open channel flow (Duncan 1982).

Subsidence effects on the Link Canyon Road would not be expected, since no mining would occur under it. Road damage from heavy truck traffic could result on this or any road if proper

maintenance is not performed. Thus, maintenance costs would be higher. Deer and elk collisions would also increase, especially during seasonal migrations, as more vehicles travel faster on a paved road. Access to grazing could be accomplished by hauling cattle in trucks. These issues are further discussed in the Wildlife and Range Resources Sections of this document.

State Highway SR-10 Impacts. With another company mining the Pines Coal Lease Tract from a new mine in Link Canyon, truck traffic on SR-10 would increase. This document assumes that all of the coal mine traffic would enter the highway on the south/west side of Emery and travel north. This is a conservative but realistic assumption since the economics of shipment by rail near Price could be more favorable. Employees and supplies could likely come from this direction too. Should a percentage of the traffic travel to/from the south, the current roads in that direction have available capacity to accommodate it.

The average AADT of 1,213 from west Emery to Ferron would increase about 100 percent to 2,437 average AADT with a mine in Link Canyon (Table 3.22). Traffic from the haul trucks, mine employees, service and maintenance vehicles is included. Through Ferron, Castle Dale and Huntington the average AADT of 5,677 would increase to 6,891 average AADT, or about 22 percent. This would exceed the 1,900-vehicles-per-day design specification for Traffic Service Level A. Thus, changes in "level of service" which includes increased delays, increased traffic accident rates and more vehicles through local communities would result. It is very difficult to quantify these issues because existing baseline data is sparse and multiple conditions could change.

Table 3.22 Link Canyon Road to SR-10 North Traffic Volumes with Another Company

| Description | Volume |
|--|---|
| Truck Capacity | 43 Ton/Truck |
| Traffic on Link Canyon Road 1998 - 2003 | 20 AADT |
| Traffic on Link Canyon Road 2003 - 2016 | 1,224 AADT (764 haul trucks + 460 others) |
| Traffic on SR-10 (W Emery to Ferron) 2003 - 2016 | 2,437 AADT (1,213 avg in 1996 + 1,224) |
| Traffic on SR-10 (Ferron through Huntington) 2003 - 2016 | 6,891 AADT (5,677 avg in 1996 + 1,224) |
| AADT - Annual Average Daily Traffic, both directions | |

Interstate I-70 Impacts. The general traffic design capacity for this highway to maintain a Service Level A is 18,700 vehicles per day (Merrill 1998). The present traffic volume is only about 28 percent of this capacity. Additional traffic from Link Canyon, to SR-10 and on south to I-70

would not affect I-70 if 100 percent of the coal is hauled north on SR-10 as described above. However, if even as much as 50 percent of the coal is hauled (and employees, service, etc.) south and onto I-70 the AADT would increase to 5,865. This would represent only 31 percent of the design capacity.

3.13.2.3 *Alternative C*

This alternative applies to the entire Project Area but does not allow subsidence of perennial drainages in either fork of Box Canyon or subsidence of escarpments.

Assuming Canyon Fuel obtains the Pines Coal Lease Tract, this alternative would allow Canyon Fuel to mine the Pines Coal Lease Tract, Permit Amendment Area, and Lease Modification Area, but subsidence and impacts to escarpments in Wiley's Fork, Box Canyon and East Fork Box Canyon would not be allowed. Approximately 10 MT less coal would be recovered under this scenario. It is assumed that the haul truck traffic and the resulting impacts to Convulsion Canyon Road, SR-10 and I-70 would be the same as for Alternative B except that SUFCO Mine will operate less time, approximately 1 year less.

If another company obtains the Pines Coal Lease Tract, transportation impacts would be similar to those described under Alternative B; however, approximately 10 million fewer tons of coal would be recovered. Transportation impacts and the Link Canyon Road would be constructed to the same design standards as described in Alternative B. The impacts would be the same except that the new mine in Link Canyon would operate approximately 2 years less.

In conjunction with SCLS #8 and if a significant degree of traffic is generated that is not related to their activity, the SUFCO Mine would be required to perform its share of road maintenance on Forest Development Roads by a commensurate share agreement with the FS.

3.13.2.4 *Alternative D*

If Canyon Fuel obtains the Pines Coal Lease Tract, it would be allowed to operate in the Pines Coal Lease Tract, Permit Amendment Area, and the Lease Modification Area. The coal reserves mined would be 2.2 MT greater than the volume described in Alternative B. However, the life of the mine would be about 2 years longer, operating until mid 2017. Implementation of SCLS, would not change the road design nor impacts.

If another company obtains the Pines Coal Lease Tract, the impacts would be the same as for Alternative C. Canyon Fuel would only mine the Permit Amendment Area and the Lease Modification Area, extending the life of the SUFCO Mine (and mining of the Quitchupah Lease) by 8 months.

3.13.3 Mitigation and Monitoring

The following mitigation and monitoring is recommended for Alternatives B, C, and D, assuming Canyon Fuel obtains the Pines Coal Lease Tract:

1. A road maintenance plan should be prepared to monitor road degeneration and maintenance requirements for Convulsion Canyon Road.

The following mitigation and monitoring is recommended for Alternatives B, C, and D, assuming another company is the successful bidder and obtains the Pines Coal Lease Tract:

1. The mine should prepare a haulage schedule which minimizes traffic volumes within the City of Emery, Utah during peak travel times.
2. The Link Canyon Road design should anticipate increased safety concerns for traffic and wildlife. Design considerations may include signage for traffic control and road widening.
3. A road maintenance plan should be prepared to monitor road degeneration and maintenance requirements for Convulsion Canyon Road, Link Canyon Road and SR-10.

3.13.4 Cumulative Effects

Coal mining and related activities have been ongoing in the region for several decades. Collapsed portals, portal access roads, exploration (coal, oil and gas) pads and truck turnarounds are still evident along the Link Canyon Road and surrounding area. Users, ranchers, recreationists, miners and others develop roads as needed. Some roads may become displaced because of subsidence associated with mining. More of these types of roads could result. The cumulative effect may be that some wildlife is disturbed and seasonal closures for protection of elk herds may be necessary. More maintenance of roads will be required and the possibility of increased traffic accidents and delays may result.

The duration of cumulative effects (e.g., increased traffic volume, increased potential for accidents, increased traffic delays, and road degradation) resulting from past, present, and reasonably foreseeable actions combined with the Pines Tract Project would differ slightly with each alternative (B, C, and D). The duration that these cumulative impacts would occur differ for each alternative by approximately 1 year to 2 years.

3.13.5 Residual Adverse Impacts

Residual adverse impacts to the roads in the Project Area include increased wear on the roads, destruction of areas for additional road construction, maintenance related to subsidence and more collisions with wildlife or vehicles. Truck traffic is significantly more damaging to roads than automobiles and requires more maintenance to keep roads in good operating condition. As new roads are needed, such as the Link Canyon Road, the width and alignment will impact the adjacent areas with cuts/fills, drainage structures and other construction materials. Subsidence and wildlife collisions are more difficult to predict but could be expected to increase.

3.13.6 Irreversible/Irretrievable Commitment of Resources

The irreversible/irretrievable commitment of resources related to transportation issues are for alternatives that are related to a new mine in Link Canyon by the construction of a new road in Link Canyon and its increased use. The land used for transportation corridors is impacted by the reduction in vegetation, aesthetic qualities, wildlife habitat and by increased potential for erosion. Illegal off-road activities could contribute to this erosion and do other damage if the new roads are used to gain access to areas that would otherwise be inaccessible. Foreign species of plants can flourish after the native flora is destroyed. Wildlife survival rates may decrease because more trucks travel faster on new paved roads.

3.13.7 Short Term Uses vs. Long Term Productivity

The short term vs. long term productivity of the land in the Project Area is enhanced in many ways by improved transportation. Both the short term, which benefits from new roads that makes access to jobs and recreation areas easier, and the long term, which relies on a good network of roads to attract and keep a strong economy in the communities, would benefit in increased productivity. If travel times are sometimes reduced in the short term, this could be outweighed by the improved roads that will remain long after the mining is complete.

3.14 SOCIOECONOMICS AND COAL RECOVERABILITY

3.14.1 Affected Environment

The area of analysis for socioeconomics and coal recoverability encompasses the immediate vicinity of the Project Area, portions of Emery and Sevier Counties, and the towns of Ferron and Emery. The majority of the Project Area is located within Sevier County, with the remainder in Emery County. Of the current 230 SUFCO Mine employees, 181 reside in Sevier County, 40 in Sanpete County, 7 in Juab County, and 2 in Piute County.

Sevier County - Background, Population and Economy

Sevier County was formed from the south section of Sanpete County in 1865, and named for the Sevier River. Agriculture has always been important to the county's economy, it is a leading producer of oats and cattle. The county has 406 farms covering over 158,000 acres. Sevier is currently the State's leading producer of gypsum.

Sevier County has a population of 18,238 (1997- preliminary) and has sustained an average population growth rate of just under 2 percent throughout the 1990s (Table 3.23). The median age in Sevier County is 29.2, which is higher than the State average age of 25.9. By the year 2010, the county's population is projected to grow to 21,878.

Table 3.23 Sevier County Economic and Demographic Summary

| Year | Population | School Age Population (Ages 5-17) | Total Employment | Non-Agricultural Wage & Salary Employment | Households | |
|------|------------|-----------------------------------|------------------|---|------------|-----------|
| | | | | | Total | Avg. Size |
| 1990 | 15,400 | 4,682 | 6,072 | 4,973 | 4,821 | 3.19 |
| 1995 | 17,019 | 4,811 | 6,860 | 5,721 | 5,427 | 3.14 |
| 2000 | 18,081 | 4,073 | 7,414 | 6,200 | 6,013 | 3.01 |
| 2005 | 19,717 | 4,168 | 8,061 | 6,770 | 6,688 | 2.95 |
| 2010 | 21,878 | 5,023 | 8,870 | 7,503 | 7,402 | 2.96 |

The 1996 unemployment rate for Sevier County is 4.7 percent; the State average is 3.5 percent. Per capita income is \$14,300, under the State average of \$18,226.

Trade, government, and services account for much of Sevier County's major industry employment. Agriculture, coal and non-metallic minerals extraction, trucking and warehousing, and tourism-related industries are also important. Major employers are the Sevier County School

District, Barney's Trucking, Robinson Transport, Moroni Feed Processing, SUFCO, Hales Sand and Gravel, Sevier Valley Hospital, K-Mart Stores, and Richfield Care Center.

Emery County - Background, Population and Economy

Emery County was established in 1880 and named to honor George W. Emery, the territorial governor of Utah from 1875-1880. Livestock raising and farming have been a mainstay of the county's economy throughout most of its history, beginning in 1877 when livestock growers from Sanpete County settled there. Emery County has 420 farms on 240,500 acres. Major crops include corn, oats, and hay. The completion of a railroad and the development of coal mining in the Carbon county area provided both the markets for Emery County's produce and jobs for its people from the 1880s through the early 20th century. The population of Emery County grew significantly during the 1970s when Utah Power and Light Company opened large power plants at Castle Dale and Huntington.

The estimated 1997 population of Emery County is 10,929. It has one of the lowest growth rates in the State, an average of 0.69 percent per year through the 1990s (Table 3.24). The average household size in the county is 3.2 people, the fourth largest in the State. Its median age of 25.2 is slightly higher than the State average. Emery County is expected to grow to 11,302 by the year 2010.

Table 3.24 Emery County Economic and Demographic Summary

| Year | Population | School Age Population (Ages 5-17) | Total Employment | Non-Agricultural Wage & Salary Employment | Households | |
|------|------------|-----------------------------------|------------------|---|------------|-----------|
| | | | | | Total | Avg. Size |
| 1990 | 10,300 | 3,458 | 4,403 | 3,632 | 3,064 | 3.36 |
| 1995 | 10,530 | 3,406 | 4,419 | 3,602 | 3,125 | 3.37 |
| 2000 | 10,360 | 2,538 | 4,527 | 3,680 | 3,283 | 3.16 |
| 2005 | 10,628 | 2,220 | 4,685 | 3,810 | 3,533 | 3.01 |
| 2010 | 11,302 | 2,572 | 4,955 | 4,046 | 3,840 | 2.94 |

At 7.7 percent (1996), Emery County's unemployment rate is the fourth highest in the State. Per capita income (1996) in the county was \$13,700.

Emery's economic structure has encountered major shifts since 1980, with fluctuations in construction and mining impacting employment in other industries. Mining, government, and transportation, communications and utilities had nearly equal shares of 1996 employment, and accounted for approximately 60 percent of the total employment. The county's economy is

specialized in coal mining-related industries and electric services. Agriculture is also important.

A coal mining company, Energy West, is the county's largest employer. Other major employers are the Emery County School District, the Castledale and Huntington units of Utah Power and Light, Emery County administrative services, and Genwal Resources - another coal mining company.

The closest towns to the Project Area are Emery and Ferron, both located in Emery County along State Route 10. Emery had a 1994 population of 295. The city of Ferron had a 1994 population of 1,599.

Land Use and Ownership Patterns

The proposed project occurs on public lands administered by the FS, MLS. These lands are administered to provide multiple uses such as recreation, wildlife habitat, water yields, and commodity production of timber, minerals, and grazing.

Recreation in the area includes camping, firewood gathering, hunting, and some snowmobiling. Yearly recreation use is light, but during deer and elk hunts, use is extremely heavy.

Distribution of Coal Revenues

Income is produced under a coal lease in three ways: 1) rental fees of \$3 per acre; 2) an up-front bonus bid for the right to lease, and 3) royalties generated per year.

Under current State and Federal laws, 50 percent of the mining royalties go to the Federal government, with a large portion of this applied to the mined-land reclamation fund. The other 50 percent goes into a State Mineral Lease Account and is allocated as follows:

| | |
|---------------|---|
| 32.50 percent | Community Impact Fund |
| 33.50 percent | Board of Regents to divide among higher education facilities |
| 2.25 percent | State Board of Education |
| 2.25 percent | Utah Geological Survey |
| 2.25 percent | Utah State University Water Research Lab |
| 25.00 percent | UDOT for distribution to special service districts in the county for construction/repair/maintenance of roads |

There are no low income/minority populations that could be disproportionately affected by the proposed actions.

3.14.2 Environmental Consequences

3.14.2.1 No Action Alternative

Under this alternative, the estimated coal reserves in the Pines Coal Lease Tract would not be mined. Assuming there are 71 MT of recoverable coal in the Pines Coal Lease Tract, at current

coal prices, \$1.42 billion in coal value would not be realized (based on the current market value for coal). The loss in revenue to the State would be \$56.8 million. The existing Quitchupah Lease would be mined out in 14 years, and the 230 jobs associated with that mining operation would then be lost. Additionally, there would be no mining allowed in the Lease Modification Area at this time, and mining would not be allowed in the Permit Amendment Area that could result in subsidence. The recoverable coal in the Lease Modification Area is 3.4 MT, worth approximately \$68 million at today's coal prices. The Permit Amendment Area is estimated to contain 2.2 MT of recoverable coal at a value of \$44 million. Combined with the value of the coal in the Pines Coal Lease Tract, the total would be \$1.53 billion worth of coal. Total Federal and State revenues foregone under this alternative would amount to \$122 million.

3.14.2.2 *Alternative B*

Alternatives B-D assume that full extraction longwall mining methods would be used. As a comparison, Table 3.25 presents a summary coal values realized by each alternative.

If Canyon Fuel obtains the lease under this alternative, all minable coal in the Pines Tract Project Area would be recovered to the fullest extent. This would include 71 MT of recoverable coal in the Pines Coal Lease Tract, valued at \$1.42 billion. Government (State and Federal) revenues would total \$113.6 million.

Canyon Fuel would continue to mine in the Quitchupah Lease, including the 150-acre Lease Modification Area. The total recoverable coal in these areas is 84.2 MT, which would provide (State and Federal) revenues of \$135 million, 3.4 MT of which would come from the Lease Modification Area.

All minable coal in the Pines Coal Lease Tract would be recovered to the fullest extent. This would include 71 MT of recoverable coal in the Pines Coal Lease Tract, under the East Fork of Box Canyon, and along the west cliffs of Wileys Fork, valued at \$1.42 billion. This coal would be mined from newly constructed facilities likely based in Link Canyon. Additional jobs would be created due to the construction and operation of this new mine, and mine jobs would exist for the 15- to 20-year anticipated life of the Pines Tract Project. Indirect employment effects would result from the SUFCO Mine purchasing equipment, supplies, and services from local and national vendors and from SUFCO Mine employees spending their incomes in the local economy.

Canyon Fuel would continue to mine the Quitchupah Lease, including the 150-acre Lease Modification Area. The total recoverable coal in these areas is 84.2 MT, which would provide State and Federal revenues of \$135 million. However, existing SUFCO Mine jobs would be lost after the mine-out of the Quitchupah Lease, in 14 years.

Table 3.25 Coal Recovery by Alternative (million tons)

| Alternative | Pines Tract | 150-ac Lease Modification | Box Canyon | Total | |
|-------------|-------------------|---------------------------|------------------|-------|---|
| A | 0 | 0 | 0.0 | 0.0 | 76.6 MT recoverable coal left in place representing \$122.6 million Federal and State revenues. The SUFCO Mine would continue mining in their existing leases with an expected mine life of 14 years. |
| B | 71.0 | 3.4 | N/A | 74.4 | Leasing the Pines Coal Lease Tract would potentially add 17 years to SUFCO's mine life, or 16 years to 20 years if another company got the lease. The lease modification would add 8 months to SUFCO's Mine life. |
| C | 60.9 ¹ | 3.4 | 0.0 ² | 64.5 | Same as above, except mine life would reduce by about 14 months in the Pines Coal Lease Tract. Not allowing subsidence of Box Canyon would reduce SUFCO's Mine life, about 8 months. |
| D | 71.0 | 3.4 | 2.2 | 76.6 | Same as Alternative B, except that allowing subsidence of Box Canyon would allow add to SUFCO's Mine life, about 8 months. |

¹ 10.1 MT left in place to protect perennial drainages and escarpments in East Fork of Box Canyon and along Wiley's Fork.

² 2.2 MT left in place to protect perennial streams and escarpments in Box Canyon.

3.14.2.3 Alternative C

Of the 71 MT of recoverable coal in the Pines Coal Lease Tract, 60.9 MT would be mined. At today's coal prices, this would be valued at \$1.22 billion, with \$97.4 million in State and Federal revenues. There would be no subsidence of East Fork of Box Canyon or along the west cliffs of Wileys Fork allowed. The estimated 10.1 MT of recoverable coal in those areas would be left in place, never to be recovered. This would amount to \$16.2 million in State and Federal coal revenues foregone.

The Lease Modification Area would add 150 acres to the Quitchupah Lease. This area has an estimated 3.4 MT of recoverable coal. This would add \$5.44 million to the State and Federal coal mining revenues. The Quitchupah Lease, with 14 years of reserves, would continue to be mined. Acquisition of the Pines Coal Lease Tract by Canyon Fuel would provide an additional

3 years to 5 years of mine life beyond the closure of the Quitchupah Lease for a total mine life of 15 years to 20 years, contributing significantly to continued employment and income primarily within Sevier County.

If another company were to obtain the Pines Coal Lease Tract, additional jobs would be created due to the construction and operation of this new mine, and these jobs would exist for the 15 years to 20-year anticipated life of the Pines Coal Lease Tract. However, existing SUFCO Mine jobs would be lost after the mine-out of the Quitchupah Lease, in 14 years.

Subsidence of the Permit Amendment Area (Box Canyon) would not occur, foregoing 2.2 MT of coal, representing \$44 million in coal reserves. The \$44 million worth of recoverable coal in the Permit Amendment Area, \$102 million worth under the East Fork of Box Canyon, and \$100 million in Wileys Fork would be left in place (\$19.7 million in revenues foregone).

3.14.2.4 *Alternative D*

Under this alternative, the 71 MT of recoverable coal would be mined if the Pines Coal Lease Tract is offered for lease. Economic impacts would be the same as Alternative B. Extracting coal from the Lease Modification Area would have the same effects as Alternative B and C.

Subsidence of the Permit Amendment Area (Box Canyon) would provide an additional 2.2 MT of coal, representing \$3.5 million in State and Federal revenue. If Canyon Fuel were to mine the Permit Amendment Area, it would add 8 months to the life of the SUFCO Mine.

The total value of recoverable coal under this scenario would be \$1.53 billion (based on current market values of coal), providing \$122.6 million in State and Federal revenues.

Canyon Fuel would continue to mine the Quitchupah Lease, including the Lease Modification Area and minable reserves under the Permit Amendment Area. Mining of the modified lease tract could provide 3.4 MT of recoverable coal, valued at \$68 million. Additionally, the mining of Permit Amendment Area could provide 2.2 MT of coal. The total recoverable coal in these areas is 5.6 MT, which would provide State and Federal revenues of \$9 million. However, existing SUFCO Mine jobs would be lost after the mine-out of the Quitchupah Lease, in 14 years.

3.14.3 Mitigation and Monitoring

No mitigation or monitoring is proposed.

3.14.4 Cumulative Effects

The mining of an estimated 71 MT of recoverable coal in the Pines Coal Lease Tract would add \$56.8 million in State revenues and \$56.8 million in Federal revenues to those currently provided by the mining industry operating in Sevier and Emery Counties. Additional State and Federal revenues would be incurred as a result of mining the Lease Modification Area and Permit

Amendment Area. Mining of the Pines Tract Project Area would extend the life of the existing permitted SUFCO Mine and provide for continued mining-related employment in Sevier County.

Acquisition of the Pines Coal Lease Tract by a company other than Canyon Fuel would involve the construction of new mine facilities in Link Canyon, adding 100 acres to the surface disturbance in the area. However, additional temporary and long-term jobs would be created due to the construction and operation of this new mine. Long term jobs would exist for the 15- to 20-year anticipated life of the Pines Tract Project.

The mining of the Pines Tract Project, whether by Canyon Fuel or another company, in conjunction with other past, present, and reasonably foreseeable actions, would have continued economic benefits to local communities (i.e., Emery). Indirect employment effects would result from reasonably foreseeable operations purchasing equipment, supplies, and services from local and national vendors and from employees spending their incomes in the local economy. This cumulative impact would be favorable for local and national economies.

3.14.5 Residual Adverse Impacts

There would be no residual adverse impacts to socioeconomic resources.

3.14.6 Irreversible/Irretrievable Commitment of Resources

There would be no irreversible or irretrievable commitment of socioeconomic resources.

3.14.7 Short Term Uses vs. Long Term Productivity

Mining of the Pines Tract Project would provide economic benefits to the county and continued employment that would last for the life of the mine (15 years to 20 years).

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4.0 CONSULTATION AND COORDINATION

4.1 SUMMARY OF COMMENTS

The FS received a total of five written comments, two telephone comments, and one personal visit during the EA public scoping period and nine written comments during the EIS public scoping period from parties responding to the NOI, news release, and public scoping letter. Additional written comments were prepared by the FS.

Written comments were received from the following individuals and agencies:

Castle Valley Special Service District
State of Utah, Department of Natural Resources, Division of Wildlife Resources
State of Utah, Department of Natural Resources, Division of Water Rights
Emery Water Conservancy District
Emery Stock Growers
Canyon Fuel Company, LLC
Utah Mining Association
Institute for Policy Research, Northwestern University
Southwest Center for Biological Diversity
Joseph L. Stephenson, Birmingham, Alabama
U.S.D.A. Forest Service, MLS
Wildlife Management Institute
Utah Farm Bureau

The full text of the written comments are part of the planning record and are located at the MLS Office in Price, Utah. A summation of the comments received during the EA and EIS public scoping period is provided Section 2.2 and 2.3 of this EIS.

4.2 PUBLIC INVOLVEMENT PLAN SUMMARY

Public involvement is an important part of the environmental analysis process. The purpose of the Public Involvement Plan is to describe in detail the method and technique that will be used to involve the public in development of the Pines Tract Project EIS. The goal of public involvement is to gain public understanding and participation in the analysis and decision-making process regarding the proposed Pines Tract Project. The goal is also to assure that the public's concerns

are evaluated and addressed in the EIS being prepared for this lease, and to detail how public input will be encouraged through the process.

A Public Involvement Plan was prepared for the Pines Tract Project documenting how the public will be kept informed during the EIS process. The phases of public participation included the following:

- Early and widespread notice of the proposed action
- Identification of public issues and concerns to be expressed in the analysis
- Identification of those issues not to be analyzed with an explanation why
- Sharing of resources and analytical data with the public
- Solicitation and incorporation of public input in development of alternatives
- Prediction of environmental impacts in areas of concern raised by the public
- Invite public review and formal public comment on the DEIS
- Response to DEIS public comments in the FEIS

Because coal mining is not a new issue in the area, and the level of public interest in the past has been low, it was decided that public scoping meetings would not be held unless requested by an interested party (e.g., public or an agency). Meetings would also be held if concerns are identified during the EIS process.

4.3 LIST OF AGENCIES, ORGANIZATION AND PERSONS TO WHOM COPIES OF THE STATEMENT ARE SENT

The original mailing list for the Pines Tract Project, dated February 2, 1998, encompassed 132 parties. This list represented all individuals, agencies, or groups who have expressed interest in similar projects. The mailing list has been continuously revised by either adding or deleting individuals who did or did not respond (either verbally or in writing) to the scoping letter, legal notice, NOI, or amended NOI. Any other parties that express interest in the project after the February 2, 1998, either by telephoning, visiting, or writing either the FS or BLM, have been and will continue to be added to the mailing list so that they receive all subsequent mailings.

A listing of the revised mailing list is presented below.

Val Payne, Director
Emery County Public Lands Council

Ken Christiansen
Emery Stock Growers

John Keeler
Utah Farm Bureau Federation

H. Paul Friesema
Institute for Policy Research,
Northwest University

Richard Pick
Canyon Fuel Company, LLC

Thomas Bingham

Utah Mining Association

Joseph L. Stephenson
Birmingham, Alabama

Peter Galvin
Southwest Center for Biological
Diversity

Brian Segee
Southwest Center for Biological
Diversity

Director, Office of Environmental
Affairs
U.S. Dept. of the Interior

Wess Sorenson
Canyon Fuel Company, LLC
SUFCA Mine

Kent Petersen
Emery County Commission

Darrel Leamaster
Castle Valley Special Service District

Peggy Mason
Sevier County Commission

Len Carpenter
Wildlife Management Institute

Tex Olsen
Sevier County Commission

Jay Mark Humphrey
Emery Water Conservancy District

Bob Willey
Energy West Mining

U.S. Fish and Wildlife Service

City of Emery

Miles Moretti
State of Utah
Dept. of Natural Resources
Division of Wildlife Resources

Rick Summers
State of Utah
Department of Environmental Quality

Mary Ann Wright
State of Utah
Dept. of Natural Resources
Division of Oil, Gas, & Mining

Governors Office of Planning &
Budget
Resource Development Coordinating
Committee

Mark Page
State of Utah
Dept. of Natural Resources
Division of Water Rights

Floyd McMullen
Office of Surface Mining

Director, Office of Environmental
Compliance
U.S. Department of Energy

USDA, National Agricultural Library
Head, Acquisitions and Serial Branch

U.S. Environmental Protection
Agency
Office of Federal Activities

EIS Review Coordinator
Environmental Protection Agency

Advisor on Environmental Quality -
Environmental Compliance Branch

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5.0 LIST OF PREPARERS AND REVIEWERS

5.1 LIST OF PREPARERS

Joseph A. Jarvis. Project Manager, JBR Environmental Consultants, Inc. B.S. and M.S. Wildlife Biology, Humboldt State College. Twenty-five years of environmental experience, including preparation of numerous NEPA documents, baseline data collection reports, and permitting for rights-of-way.

Catherine Clark. Assistant Project Manager, JBR Environmental Consultants, Inc. B.A. Geography, California State University Northridge, M.S. Environmental Resource Management, University of Nevada, Reno. Over eleven years of experience in the environmental field.

Dr. Gary Back. Wildlife Biologist, JBR Environmental Consultants, Inc. B.S. Wildlife Management, West Virginia University, Morgantown, West Virginia, M.S. Forestry, University of Vermont, Berlington, Vermont, Ph.D. Wildlife Ecology, University of Minnesota. Sixteen years experience in wildlife research, wildlife management, and vegetation rehabilitation and reclamation projects.

Dan Dyer P.E. CEM. Civil Engineer, JBR Environmental Consultants, Inc. B.S. Economics, Brigham Young University, Utah, M.S. Civil Engineering, Brigham Young University, Utah. Twenty-two years experience relating to civil and mine engineering.

Tim Thompson P.E. Civil Engineer, JBR Environmental Consultants, Inc. B.S. Mining Engineering, West Virginia University, Morgantown, West Virginia. Over Seventeen years of professional experience on a wide variety of civil, mining, and reclamation engineering projects. His past experience as a senior mine engineer involved coal exploration, environmental studies, permitting, and mine development programs.

Karla Knoop. Professional Hydrologist, JBR Environmental Consultants, Inc. B.S. Watershed Science, Utah State University. Seventeen years of experience in surface water hydrology and erosion studies. Experience includes channel restoration projects, drinking water investigations, storm water permitting, and baseline watershed studies.

Scott Billat. Archaeologist, JBR Environmental Consultants, Inc. B.S. and M.A. Anthropology, Brigham Young University, Utah. Over fourteen years of experience includes both prehistoric and historic archaeological investigations.

Doug Jones. Air Quality Specialist, JBR Environmental Consultants, Inc. B.S. Mining Engineering, University of Wisconsin, Pateville, Wisconsin. Over ten years of experience in the environmental and engineering field including air quality engineering, air dispersion modeling, emissions inventories, BACT analysis, air quality audits, ambient air monitoring, and the preparation of air permit applications.

Erin Hallenburg. Air Quality Specialist, JBR Environmental Consultants, Inc. B.S. Biology, Mt. Union College, B.S. Civil Engineering, University of New Mexico. Over sixteen years of experience in the environmental and engineering field, including air dispersion modeling, regulatory compliance and air quality studies.

Linda Matthews. Environmental Analyst, JBR Environmental Consultants, Inc. B.S. in Environmental Studies, Utah State University, graduate studies in forest ecology, Utah State University. Over twenty years of experience researching, preparing, and managing NEPA documents.

James Kent McAdoo. Biologist, JBR Environmental Consultants, Inc. B.S. Wildlife Management, University of Idaho, and M.S. Wildlife Management, University of Nevada, Reno. Over twenty years of experience conducting surveys and research involving a variety of wildlife species.

David Worley. Biologist, JBR Environmental Consultants, Inc. B.S. Biology, University of Nevada, Reno, M.S. Zoology, University of Nevada, Reno. Over sixteen years of experience conducting environmental baseline surveys for a wide variety of wildlife and plant species including raptors, big and small game, bats, aquatic habitat investigations and describing terrestrial and stream ecosystems.

Kelly Payne. Geologist, Mayo and Associates, LC. B.S. Geology, Brigham Young University, Utah. Over four years of experience in a variety of hydrogeologic investigations including groundwater systems and the hydrogeologic impacts of coal mining in the Wasatch Plateau and Book Cliffs coal fields of Utah.

Rex Goodrich P.E. Engineer/Geologist, Agapito Associates, Inc. B.S. Geology, Mesa College, Grand Junction, Colorado, B.S. Computer Science, Mesa College, Grand Junction, Colorado, M.S. Mechanical Engineering/Solid Mechanics, Colorado State University.

5.2 LIST OF REVIEWERS

Floyd A. McMullen, Jr. Senior Environmental Project Manager, USDI-Office of Surface Mining. M.S. Environmental Science, University of Colorado, Denver. B.S., Range-Forest Management, Colorado State University, Ten years experience with the BLM, 15 years with OSM.

Stan McDonald. Forest Archaeologist, USDA-FS, MLS. M.A. Anthropology, University of Idaho. B.S. Anthropology/Sociology (emphasis anthropology), Eastern Oregon State College. Twenty years experience in cultural resource management, has been Forest archaeologist since 1989.

Kevin Draper. Landscape Architect, USDA-FS, MLS. Master Landscape architect, Utah State University. B.S. Wildlife and Range Science, Brigham Young University. Sixteen years experience in consulting and government sectors.

Robert M. Thompson. Forest Botanist. USDA-FS, MLS. B.S. Botany and Soils, Brigham Young University. Forty three years experience in range management, botany, and threatened and endangered species specialties.

Liane L. Mattson. Geologist, USDA-FS, MLS. B.S. Geological Engineering, Colorado School of Mines. Nine years experience specializing in hydrogeology and groundwater investigations. Six years experience dealing with underground coal mining effects on water resources.

Stephen W. Falk. Mining Engineer, USDI-BLM. B.S. Mining Engineering, University of Utah. Sixteen years experience in mining engineering with specific expertise in coal and solid leasable minerals.

Max Nielson. Economist-Coal Lease Specialist, USDI-BLM. M.S. Resource Economics, Utah State University. Thirty three years experience in lands and minerals management, land use planning and economic analysis. Coordinator of BLM coal leasing program for past 15 years.

Carter E. Reed. Forest Geologist. USDA-FS, MLS. B.S. Geology, Cleveland State University. Twenty years experience in coal management and minerals administration with the USDA-FS.

Brent B. Barney, P.E. Civil Engineer, USDA-FS, MLS. M.S. Civil Engineering, University of Utah. B.S. Civil Engineering, University of Utah. Thirty two years experience in civil and transportation engineering.

Rodney L. Player. Forest Wildlife Biologist, USDA-FS, MLS. M.S. Range/Wildlife Relations, Utah State University. B.S. Range Management, Utah State University. Nineteen years experience in the USDA-FS, 14 years as a wildlife biologist.

Sandra Remund. Range Management Specialist, USDA-FS, MLS. B.S. Range Science, Utah State University. Six years experience in range management.

Reed Irwin. Forest Planner, USDA-FS, MLS. M.S. Geology, Bowling Green State University. B.S. Geology, Marietta College. Twelve years experience as exploration geologist, agency geologist and teaching. Thirteen years experience as Forest Planner.

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6.0 BIBLIOGRAPHY

- Agapito Associates, Inc. 1997. Evaluation and prediction of potential surface subsidence impacts from longwall mining under the Box Canyon area, SUFCO Mine. November 1997.
- Agapito Associates, Inc. 1998a. Evaluation and Prediction of Potential Surface Subsidence from Longwall Mining under the Pines Coal Lease Tract (UTU-76195).
- Agapito Associates, Inc. 1998b. Final Geology, Topography, and Subsidence Technical Report, Pines Coal Lease Tract EIS. Prepared for the USDA Forest Service, Manti-La Sal National Forest, June 1998.
- Alcorn, J.R. 1088. The birds of Nevada. Fairview West Publishing, Fallon, Nev. 418pp.
- Allgaier, F. K. 1988. Surface subsidence over longwall panels in the western United States, final results at the Deer Creek Mine, Utah. U.S. Bureau of Mines IC-9194.
- Andrews R. and R. Richter. 1992. Colorado Birds. Denver Museum of Natural History.
- Apfelbaum, S.I. and P. Seelbach. 1983. Nest tree, habitat selection and productivity in seven North American raptors. Raptor Research 17:99-104.
- Atwood, D., J. Holland, R. Bollander, B. Franklin, D.E. House, L. Armstrong, K. Thorne and L. England. 1991. Utah Endangered, Threatened and Sensitive Plant Field Guide. United States Department of Agriculture, USDA Forest Service, Intermountain Region.
- Balda, R.P., B.C. McKnight and C.D. Johnson. 1975. Flammulated owl migration in the southwestern United States. Wilson Bull. 87(4):520-533.
- Barlow, K.R. and D. Metcalfe. 1993. *1990 Excavations at Joes Valley Alcove*. University of Utah, Reports of Investigations 93-1, Salt Lake City.
- Bartholomae, Roy C. and Robert P. Parker. 1983. Mining Machinery Noise Control Guidelines, 1983. A Bureau of Mines Handbook, USDI.
- Behle, W.H. 1981. The birds of northeastern Utah. Utah Mus. Nat. Hist. Occas. Publ., 2:1-136.

- Behler, John L. and F. Wayne King. 1979. The Audubon Society Guide to North American Reptiles and amphibians. Alfred A. Knopf, New York.
- Bock, C.E. and J.H. Bock. 1974. On the Geographical Ecology and Evolution of the three-toed woodpeckers, *Picoides tridactylus* and *P. arcticus*. Am. Midland Nat. 92:397-405.
- Brauner, G. 1973. Subsidence due to underground mining part 2; ground movements and mining damage. U.S. Bureau of Mines IC-8572.
- Brauner, G. 1973. Subsidence due to underground mining part 1; theory and practice in predicting surface deformation. U.S. Bureau of Mines IC-8571.
- Brown, Don. County Attorney and Zoning Administrator, Sevier County, Utah. Personal Communication with Catherine Clark. April 17, 1998.
- Brown, P.E. and R.D. Berry. 1991. Bats: habitat, impacts, and mitigation. Pages 26-30. In R.D. Comer et al.(Eds.) Proc. V: Issues and Technology in the Management of Impacted Wildlife. Thorne Ecol. Inst. Boulder, Colo.
- Bull, E.L., A.L. Wright, and M.G. Henjum. 1990. Nesting habitat of flammulated owls in Oregon. J. Raptor Res. 24(3) : 52-55.
- Call, M.W. 1978. Nesting habitats and surveying techniques for common western raptors. USDI, Bureau of Land Manage. Tech. Note TN-316. 115pp.
- Call, M.W. 1979. Habitat management guides for birds of prey. USDI, Bureau of Land Manage. Tech. Note TN-338. 70pp.
- Canyon Fuel Company, LLC. 1991. Mining and Reclamation Plan SUFCO Mine. December 20, 1991..
- Canyon Fuel Company, LLC. 1996a. Mining and reclamation plan, Canyon Fuel Company, LLC, SUFCO Mine.
- Canyon Fuel Company, LLC. 1996b. 1996 Subsidence Report, Canyon Fuel Company, LLC, SUFCO Mine.
- Canyon Fuel Company, LLC. 1996c. SUFCO waste rock site hydrologic monitoring data. Electronic files given to Mayo and Associates by Canyon Fuel. Available in project files for Pines Coal Lease Tract EIS, Manti-La Sal Forest Supervisor's Office, Price, Utah.
- Canyon Fuel Company, LLC. 1998. Pines Tract Overburden Map. February 11, 1998.

- Christensen, Mac. 1998. Phone conversation regarding Traffic Impact Analysis, UDOT, Traffic and Safety Studies Engineer, April 14, 1998.
- Clary, Warren P. and Dean E. Medin. 1998. Riparian Zones: The Ultimate Ecotones? In Tenth Wildland Shrub Symposium, Shrubland Ecotones.
- Clark, T. 1986. Black-footed ferrets on the edge. Endangered Species Technical Bulletin Reprint. 3(7):1-4.
- Collier, G.D. and J.J. Spillet. 1975. Factors influencing distribution of the Utah prairie dog, *Cynomys parvidens* (Sciuridae). Southwestern Nat.
- Collins, P.W., C. Drost and G.M. Fellers. 1986. Migratory status of flammulated owls in California, with recent records from the California Channel Islands. Western Birds 17(1):21-32.
- Craig, Gerald. 1986. Peregrine falcon. In Audubon Wildlife Report, Amos S. Eno (Project Director). The National Audubon Society, New York.
- Crocket, A.B. and P.L. Hansley. 1978. Apparent response of Picoides woodpeckers to outbreaks of the pine bark beetle. Western Birds 9(2):67-70.
- Cronquist, A., A.H. Holmgren, N.H. Holmgren, J.L. Reveal and P.K. Holmgren. 1984. Intermountain Flora. Vol. Four. Subclass Asteridae (except Asteraceae). New York Botanical Garden.
- Cronquist, A., A.H. Holmgren, N.H. Holmgren, J.L. Reveal and P.K. Holmgren. 1989. Intermountain Flora. Vol. Three, Part B. Fabales. New York Botanical Garden.
- Crosland, Richard and Jenni Prince-Mahoney. 1998. *A Cultural Resource Inventory of 6.2 Miles of Power Line for the SUFCO Link Canyon Project, Sevier and Emery Counties, Utah*. JBR Cultural Resource Report 98-13. JBR Environmental Consultants, Inc. Springville, Utah.
- Crosland, Richard I. 1993. *Mobility Strategies of Archaic and Fremont Peoples: Faunal Evidence From Aspen Shelter (42SV1365), Utah*. Unpublished masters thesis. Brigham Young University Department of Anthropology. Provo, Utah.
- Day, K.S. 1994. Observations on Mountain Plovers (*Charadrius montanus*) breeding in Utah. Southwest. Nat. 39:298-300.

- DeBloois, Evan I. 1983. High Altitude Sites in Utah. In *High Altitude Adaptations in the Southwest*, edited by Joseph C. Winter, pp. 53-68. USDA Forest Service Cultural Resource Management Report No. 2.
- DeGraff, Jerome V. 1979. Geologic investigation of subsidence tension crack "self-healing" phenomena. USDA Forest Service Report.
- Demographic and Economic Analysis, Governor's Office of Planning and Budget, 1994. State of Utah Economic and Demographic Projections, 1994.
- Demographic and Economic Analysis, Governor's Office of Planning and Budget, 1998, County Profiles.
- Department of the Army, Technical Report Y-87-1, Corps of Engineers Wetland Delineation Manual, by Environmental Laboratory, Waterways Experiment Station, Vicksburg, Mississippi, January 1987.
- Dimick, D. 1991. Subsiding escarpments: a report on an experimental practice. SUFCO internal report. September.
- Dufour, Jill. Fisheries Biologist, Manti-La Sal National Forest. Personal Communication with Catherine Clark, JBR Environmental Consultants, Inc. April 16, 1998.
- Dumas, P.C. 1966. Studies of the *Rana* species complex of the Pacific northwest. *Copeia*, 1966:60-74.
- Duncan, James E. 1982. Transportation Analysis, Proposed Pines Coal Lease Tract, Ferron Ranger District, Manti-La Sal National Forest.
- Endangered Species Technical Bulletin. 1990. Proposed Listings; Razorback Sucker (*Xyrauchen texanus*). 15(6):4.
- Endangered Species Technical Bulletin. 1992a. Listing proposals, Razorback sucker (*Xyrauchen texanus*). 17(12):8-9.
- Endangered Species Technical Bulletin. 1992b. Listing proposals, Arizona willow (*Salix arizonica*). 17(12):8-9.
- Endangered Species Technical Bulletin. 1993a. Critical habitat designation proposed for four Colorado River fishes. 1993a. 18(2)7-11.

- Endangered Species Technical Bulletin. 1993b. Listing proposals, southwestern willow flycatcher (*Empidonax trailii extimus*). 18(3):14-15.
- Federal Register, January 28, 1998; Volume 63, Number 18; proposed rules, USDA Forest Service, 36 CFR Part 212, Administration of the Forest Development Transportation System: Temporary Suspension of Road Construction in Roadless Areas. Notice of Proposed Interim Rule; Request for Comment.
- Federal Register. July 23, 1993. Listing proposal for the Willow Flycatcher.
- Gaines, D. 1988. Birds of Yosemite and the East Slope. Artemisia Press. 352pp.
- Gober, P. and M. Lockhart. 1996. As goes the prairie dog so goes the ferret. Endangered Species Bulletin. 21(6):4-5.
- Goodrich, Rex R. and Agapito, J.F.T. 1997. Evaluation and prediction of potential surface subsidence impacts from longwall mining under the Box Canyon Area. Unpublished consulting report, Agapito Associates, Inc. Grand Junction, Colorado.
- Goodwin, H.A. and C.W. Holloway. 1972. Mammalia. In Red Data Book. Morges, Switzerland.
- Grant, C.V., B.B. Steel, and R.L. Bayn, Jr. 1991. Raptor population dynamics in Utah's Uinta Basin: the importance of food resource. Southwest Nat. 36:265-280.
- Grawl, W.D. and L.E. Webster. 1976. Breeding status of the mountain plover. Condor 78(2):265-267.
- Green, Nancy. 1985. The bald eagle. In Audubon Wildlife Report, Amos S. Eno, (Project Director). The National Audubon Society, New York.
- Hall, E.R. and K.R. Kelson. 1959. The mammals of North America. Ronald Press Co. New York.
- Hauck, F.R. and Keith Montgomery. 1982. *Archaeological Evaluations of Proposed Well Locations and Access Roads in the Manti-La Sal National Forest in Sevier and Sanpete Counties, Utah*. Archeological-Environmental Research Corporation, Bountiful.
- Hauck, R.F. and G. Hadden. 1996. Cultural resource evaluation of a potential mining subsidence zone in the Box Canyon locality of Sevier County, Utah. Report to SUFCO, Archeological-Environmental Research Corp. Project 1541 (SUFC-96-1).

- Hauck, R.F. and G. Hadden. 1997a. Cultural resource evaluation of a potential mining subsidence zone in the Pines locality of Sevier and Emery Counties, Utah. Report to SUFCO, Archeological-Environmental Research Corp. Project 1582 (SUFC-97-3).
- Hauck, Richard, and Glade Hadden. 1997b. *Archaeological Data Recovery Program for the Upper Box Canyon Site Complex Including Crazy Bird Shelter (42SV896) and Associated Sites (42SV2386, -2387, -2388) in Sevier County, Utah.*
- Hauck, Richard and Glade V. Hadden. 1997c. *Archaeological Data Recovery Program for the Upper Box Canyon Site Complex Including Crazy Bird Shelter (42SV896) and Associated Sites (42SV2386, 42SV2387, 42SV2388) in Sevier County, Utah.* Archeological-Environmental Research Corporation, Bountiful, Utah.
- Hauck, Richard. 1993. *Archaeological Excavations at the Twin Bridge Camp (42SV2311) in the Quitcupah Canyon Locality of Sevier County, Utah.* AERC Paper No. 54, Archeological-Environmental Research Corporation, Bountiful, Utah.
- Hem, J.D. 1985. Study and interpretation of the chemical characteristics of natural water. USGS Water-Supply Paper 2254, Third Edition, 263 p.
- Hennessey, S.P. 1978. Ecological relationships of accipiters in northern Utah with special emphasis on effects of human disturbance. M.S. Thesis, Utah State University, Logan, Utah. 65pp.
- Herron, G.B., C.A. Mortimore, and M.S. Rawlings. 1985. Nevada Raptors. Nevada Department of Wildlife. Biological Bulletin No. 8
- Herron, G.B. 1983. Population Surveys, Species Distribution, and Key Habitats of Selected Nongame Species. Nevada Department of Wildlife. Project W-35-R.
- Hester, Thomas R. 1973. *Chronological Ordering of Great Basin Prehistory.* Contributions of the Archaeological Research Facility No. 17. University of California, Berkeley.
- Hillman, C.N, and T.W. Clark. 1980. *Mustela nigripes.* In Mammalian Species, No. 126:1-3
- Hintze, Lehi. 1980. *Geological Map of Utah.* Utah Geological and Mineral Survey.
- Humphrey, S.R. and T.H. Kunz. 1976. Ecology of a Pleistocene relict, the western big-eared bat (*Plecotis townsendii*), in the southern Great Plains. J. Mamm. 57:470-494.

- Hunt, Alice P. and Dallas Tanner. 1960. Early Man Site Near Moab, Utah. *American Antiquity*. 26(1):110-117.
- Jameson, E.W. and H.J. Peeters. 1988. California mammals. Calif. Nat. History Guides: 52. Univ. of Calif. Press. Pages 110-137.
- Janetski, Joel C., Richard I. Crosland, and James D. Wilde. 1991. Preliminary Report on Aspen Shelter: An Upland Deer Hunting Camp on the Old Woman Plateau. *Utah Archaeology* 1991.
- JBR Environmental Consultants, Inc. 1998a. Final Range Resources Technical Report, Pines Coal Lease Tract EIS. Prepared for the USDA Forest Service, Manti-La Sal National Forest, June 1998.
- JBR Environmental Consultants, Inc. 1998b. Final Surface Water Technical Report, Pines Coal Lease Tract EIS. Prepared for the USDA Forest Service, Manti-La Sal National Forest, June 1998.
- JBR Environmental Consultants, Inc. 1998c. Final Vegetation Technical Report, Pines Coal Lease Tract EIS. Prepared for the USDA Forest Service, Manti-La Sal National Forest, June 1998.
- JBR Environmental Consultants, Inc. 1998d. Final Pines Tract Project EIS Technical Reports. Prepared for the USDA Forest Service, Manti-La Sal National Forest, June 1998.
- JBR Environmental Consultants, Inc. 1998e. Final Cultural Resources and Paleontology Technical Report, Pines Coal Lease Tract EIS. Prepared for the USDA Forest Service, Manti-La Sal National Forest, June 1998.
- Jennings, J. D. 1974. *Prehistory of North America*. Second Edition, McGraw Hill Inc. New York.
- Jennings, J. D. 1978. *Prehistory of Utah and the Eastern Great Basin*. University of Utah Anthropological Papers No. 98. Salt Lake City.
- Jennings, J. D. 1986. Prehistory: Introduction. In *Great Basin*, edited by Warren D'Azevedo, pp. 113-119. Handbook of North American Indians, Vol. 11, William G. Sturtevant, general editor. Smithsonian Institution, Washington D.C.
- Jennings, Jesse D., Alan R. Schroedl, and Richard N. Holmer. 1980. *Sudden Shelter*. University of Utah Anthropological Papers No. 103. Salt Lake City.

- Jensen, Earl H. and James W. Borchert; Soil Survey of Carbon Area, Utah; Natural Resources Conservation Service; Salt Lake City, Utah.
- Johansson C.A., D.S. Rogers, and R.E. Sherwin. 1997. Assessment of Spotted Bat (*Euderma maculatum*) and Townsend's Big-eared Bat (*Corynorhinus townsendii*) in the Proposed Southern Lease Area (LBA 11). Manti-La-Sal National Forest, Emery County, Utah. Conducted for Genwal Resources Inc.
- Johnsgard, P.A. 1988. North American owls, biology and natural history. Smithsonian Institution Press. 295pp.
- Johnsgard, P.A. 1990. Hawks, eagles and falcons of North America, biology and natural history. Smithsonian Institution Press. 403pp.
- Kadnuck, L.L.M. 1994. Response of springs to longwall coal mining at the Deer Creek and Cottonwood Mines, Wasatch Plateau, Utah. U.S. Bureau of Mines Information Circular 9405, 21p.
- Kennedy, P.L. and D.W. Stahlecker. 1989. Preliminary Northern goshawk Inventory. Unpublished Protocol.
- Knopf, F.L. 1996; Mountain Plover. In The Birds of North America, No. 211. Poole, A.F., P. Stettenheim and F.B Gill, eds. American Ornithologists Union and Academy of Natural Sciences of Philadelphia.
- Knowles, C.J., C.J. Stoner and S.P. Bieb. 1982. Selective use of black-tailed prairie dog towns by mountain plovers. Condor 84(1):71-74.
- Kunz, T.H. and R.A. Martin. 1982. Mammalian species. *Plecotus townsendii*. The American Soc. of Mammalogists 175:1-6.
- Larrison, E.J. and D.R. Johnson. 1981. Mammals of Idaho. Univ. of Ida. Press, Moscow. 166pp.
- Larsen, Daniel M. March 1997. Soil Survey of the Manti-La Sal National Forest, Manti division, Parts of Carbon, Emery, Sanpete, Sevier, and Utah counties (Soil Survey Area 645); USDA-FS, Intermountain Region, Manti-La Sal National Forest, Price, Utah.
- Larson, Vonn. 1990. A Fluted Point from Clear Creek Canyon, Central Utah. *Utah Archaeology* 1990 3(1):133-136.

- Leamaster, D. V. 1997. Letter from Castle Valley Special Service District Manager to Jeff DeFreest, Manti-La Sal National Forest. November 5.
- Leonard, M.L. and M.B. Fenton. 1983. Habitat use by spotted bats (*Euderma maculatum*), Chiroptera: Vespertilionidae): roosting and foraging behavior. *Can. J. Zool.* 61: 1487-1491.
- Madsen, David B. 1980. *Fremont Perspectives*. Utah Division of State History, Antiquities Section Selected Papers 7(16). Salt Lake City.
- Madsen, David B. 1982. Prehistoric Occupation Patterns, Subsistence Adaptations, and Chronology in the Fish Springs Area. Utah. In *Archaeological Investigations in Utah*. Cultural Resources Series No. 12. BLM, Salt Lake City.
- Madsen, David B. and Michael S. Berry. 1975. A Reassessment of Northeastern Great Basin Prehistory. *American Antiquity*. 40(4):391-405.
- Marley, W.E., Flores, R.M., and Cavaroc, V.V. 1979. Coal accumulation in the upper Cretaceous marginal deltaic environments of the Blackhawk Formation and Star Point Sandstone, Emery, Utah. *Utah Geology*, v. 6, n. 2, p. 25-40.
- Mattson, L. L. and J. A. Magers. 1995. Subsidence impacts on ground and surface water at a western coal mine. Proc. of Joseph B. Poland Symp. on Land Subsidence, Association of Engineering Geologists Annual Meeting.
- Mayo and Associates, LC. 1993. Evaluation of factors contributing to the TDS in SUFCO's mine discharge water. Unpublished consulting report prepared for SUFCO, 20 November 1993.
- Mayo and Associates, LC. 1997a. Investigation of surface and groundwater systems in the vicinity of the SUFCO Mine, Sevier County, Utah: Probable hydrologic consequences of coal mining at the SUFCO Mine and recommendations for surface and groundwater monitoring. Unpublished consulting report prepared for SUFCO, 7 January 1997.
- Mayo and Associates, LC. 1997b. Probable impacts from longwall coal mining at the SUFCO Mine to the hydrologic balance of Box Canyon Creek, Sevier County, Utah. Prepared for Canyon Fuel Company, LLC, Salina, Utah. December 1.
- Mayo and Associates, LC. 1997c. The Pines Tract Data Adequacy, Chapter 2 Geologic and Coal Data. Prepared for Canyon Fuel Company, LLC, SUFCO Mine.
- Mayo and Associates, LC. 1997d. The Pines Tract Data Adequacy, Chapter 3 Water Resources, Appendix A. Prepared for Canyon Fuel Company, LLC SUFCO Mine.

- Mayo and Associates, LC. 1997e. The Pines Tract Data Adequacy. Prepared for Canyon Fuel Company, LLC, SUFCO Mine.
- Mayo and Associates, LC. 1998. Final Groundwater Technical Report, Pines Coal Lease Tract EIS. Prepared for the USDA Forest Service, Manti-La Sal National Forest, June 1998.
- McCarthy, C., L. Aulman, and T. Russi 1986. Peregrine falcon reintroduction efforts in the eastern Sierra Nevada. Transactions Western Section The Wildlife Society 22:1-6.
- McDonald, Stan. 1995 A Preliminary View of Archaic Use of the Wasatch Plateau Uplands, Central Utah. Paper presented at 1st Rocky Mountain Anthropological Conference, Jackson.
- Merrill, Nathan. 1998. Phone conversation regarding traffic volumes to maintain Service Level A, UDOT, April 14, 1998.
- Morris, R.L. and W.W. Tanner. 1969. The ecology of the western spotted frog, *Rana pretiosa pretiosa* Baird and Girard, A life history study. Great Basin Nat. 29(2):45-81.
- OEA Research, Inc. 1994. Manti-La Sal National Forest Region 4 Integrated Riparian Evaluation Level II Methodology. Report 3: Green's Hollow - Box Canyon Inventory. Helena, Montana.
- Olson, S.J. and D. Edge. 1985. Nest site selection by mountain plovers in northcentral Montana. J. Range Manage. 38(3):280-282.
- Peng, S.S. 1986. Coal Mine Ground Control. 2nd Ed. John Wiley and Sons.
- Perkins, J.M. and J.R. Peterson. 1997. Bat survey for the SUFCO Mine, Emery County, Utah. 8pp.
- Phillips, Ron. 1998. Phone conversation regarding percent of truck traffic, UDOT Department of Program Development, April 9, 1998.
- Pierson, E.D., W.E. Rainey, and D.M. Koontz. 1991. Bats and mines: experimental mitigation for Townsend's big-eared bat at the McLaughlin Mine in California. Pages 31-42. In R.D. Comer et al.(Eds.) Proc. V: Issues and Technology in the Management of Impacted Wildlife. Thorne Ecol. Inst. Boulder, Colo.
- Pizzimenti J.J. and G.D. Collier. 1975. *Cynomys parvidens*. In Mammalian Species, No. 52:1-3.

- Plummer, L.N., Prestemon, E.C. and Parkhurst, D.L. 1991. An interactive code (NETPATH) for modeling net geochemical reactions along a flow path. USGS Water Resources Investigations Report 91-4078, 93 p.
- Poll, Richard D., Thomas G. Alexander, Eugene E. Campbell, and David E. Miller. 1993. Utah's History. Third Edition. Utah State University Press, Logan.
- Remund, Sandy. Range Management Specialist. USDA-FS. Personal Communication with Karla Knoop, June 9, 1998.
- Reynolds, R.T. and B.D. Linkhart. 1987. The nesting biology of flammulated owls in Colorado. Pages 239-248 in R.W. Nero, R.J. Clark, R.J. Knapton.
- Root, T. 1988. Atlas of Wintering North American Birds, an Analysis of Christmas Bird Counts. University of Chicago Press.
- Ryser, Fred A., Jr. 1985. Birds of the Great Basin, A Natural History. University of Nevada Press, Reno.
- Schroedl, Alan R. 1976. *The Archaic of the Northern Colorado Plateau*. Unpublished Ph.D. dissertation on file at Department of Anthropology, University of Utah.
- Sevier County. 1965. Zoning Resolution and Ordinance.
- Sevier County. 1998. General Plan.
- Shuster, W.C. 1980. Northern goshawk nest site requirements in the Colorado Rockies. *Western Birds* 11:89-96.
- Simms, Steven R. and La Mar Lindsay. 1984. Utah Intuitive Survey. In *Prehistoric and Historic Settlement in the Southeastern Great Basin (The MX Secondary Impact Survey)*, edited by Richard N. Holmer, pp. 130-184. Archeological Center Reports of Investigations No. 82-28. University of Utah, Salt Lake City.
- Smith, A. D. 1981. Muddy Creek coal drilling project, Wasatch Plateau, Utah. Utah Geological and Mineral Survey, Utah Department of Natural Resources and Energy, Special Studies 55.
- Sorensen, Wess. 1998. Letter to Liane Mattson, USDA Forest Service, Manti-La Sal National Forest, March 31, 1998.

- Sorensen, Wess. Technical Service Manager, Canyon Fuel Company LLC. Personal Communication with Catherine Clark, JBR Environmental Consultants, Inc. April 16 and 20, 1998.
- Sorenson, Wess. 1998. Technical Service Manager, Canyon Fuel Company LLC. Interview by Phone, Salina, Utah, March 26, 30, 31, 1998.
- Steward, Julian H. 1938. *Basin-Plateau Aboriginal Sociopolitical Groups*. Smithsonian Institution, Bureau of American Ethnology Bulletin 120. Washington, D.C.
- Swenson, J.E., K.L. Alt, and R.L. Eng. 1986. The ecology of the bald eagle in the Greater Yellowstone Ecosystem. *Wildl. Monogr.* 95. 46pp.
- Taylor, D.M. and C.D. Littlefield. 1986. Willow flycatcher and yellow warbler response to cattle grazing. *American Birds* 40:1169-1173.
- Terres, John K. 1980. *The Audubon Society Encyclopedia of North American Birds*. Alfred A. Knopf, New York.
- Thiros, S.A. and G.E. Cordy. 1991. Hydrology and potential effects of mining in the Quitcupah and Pines Coal-Lease Tracts, Central Utah. USGS Water-Resources Investigations Report 90-4084. Prepared in cooperation with the USDI BLM.
- Thompson, Bob. Botanist, Manti-La Sal National Forest. Personal communication with Liane Mattson, July 6, 1998.
- Tyus, H.M. 1992. Razorback sucker listed as endangered: A further decline in the Colorado River system. *Endangered Species UPDATE*. 9(5 and 6):1-3.
- U.S. Environmental Protection Agency. AP-42 Compilation of Air Pollutant Emission Factors; Vol 1 and II, Fifth Ed. January 1995.
- U.S. Environmental Protection Agency. Envirofacts Warehouse Web Site. Aerometric Information Resource System. March 13, 1998
- USDA-FS. 1986. Land and Resource Management Plan, Manti-La Sal National Forest; Manti-La Sal National Forest, Price, Utah.
- USDA-FS. 1986. Manti-La Sal National Forest Final Environmental Impact Statement; Manti-La Sal National Forest, Price, Utah.

- USDA-FS. 1986a. Manti-La Sal National Forest Final Environmental Impact Statement and Land and Resource Management Plan, Record of Decision and Summary, Manti-La Sal National Forest, Price Utah.
- USDA-FS. 1986b. Land and Resource Management Plan, Manti-La Sal National Forest; Manti-La Sal National Forest, Price, Utah.
- USDA-FS. 1987. Road Preconstruction Handbook, FSH 7709.56, Chapter 4, Design.
- USDA-FS. 1988. Environmental Assessment for Coastal States Energy Company Coal Lease Application U-63214 Quitchupah Lease. Price, Utah.
- USDA-FS. 1991. Threatened, endangered, and sensitive species of the Intermountain region.
- USDA-FS. 1992a. Analysis of Management Situation Report, Environmental Assessment: Emery C&H Allotment Management Plan. Manti-La Sal National Forest, Ferron, Utah.
- USDA-FS. 1992b. Decision Notice and Finding of No Significant Impact for the Emery C&H Allotment Plan EA/AMS on the Manti-La Sal National Forest in Emery, Sevier, and Sanpete Counties, Utah. Manti-La Sal National Forest, Ferron, Utah.
- USDA-FS. 1993. Level II Riparian Inventory. Report Area 3 - Green's Hollow/Box Canyon.
- USDA-FS. 1997. Mill Fork Federal Coal Lease Tract UTU-71307 Environmental Assessment Lease-by-Application No. 11. Manti-La Sal National Forest, Emery County, Utah; USDI BLM, Utah State Office.
- USDA-FS. 1998a. Typical Roadway Drawings, Region 4 Manti-La Sal National Forest, Duck and Six Salvage Sales, Provided by Martha Defreste April, 1998.
- USDA-FS. 1998b. Field observations of Carter Reed, June 1998.
- USDA-FS. Files. Region 4 Sensitive Species (Ferron/Price Ranger District) files and listed species, Species Occurrences and Habitat Needs files.
- USDI, BLM. 1983. Final Environmental Impact Statement, Uinta-Southwestern Utah Coal Region (Round Two).
- USDI, BLM. 1997. Tract delineation review report. Uinta-Southwestern Coal Region.
- USDI, BLM. 1998a. Draft staff report for Cyprus request to leave longwall machinery underground at the Star Point Mine, April 1998.

- USDI, BLM. 1998b. Reasonably Foreseeable Development for the Pines Coal Lease Tract. Available in project files for Pines Coal Lease Tract EIS, Manti-La Sal Forest Supervisor's Office, Price, Utah.
- Utah Division of Oil, Gas and Mining (UDOGM). 1989. Quitchupah and Muddy Creek Cumulative Hydrologic Impact Assessment: Convulsion Canyon Mine (Quitcupah Lease Tract Addition) ACT/041/002, Sevier and Sanpete Counties, Utah. October.
- Utah Division of Water Resources, January 1977. Hydrologic Inventory of the Dirty Devil Study Unit.
- Utah Division of Wildlife Resources, August 1990. Manti Elk Herd Management Plan, Herd Unit 12; Central and Southeast Regions.
- Utah Division of Wildlife Resources. 1990. Fauna of Southeastern Utah and Life Requisites Regarding their Ecosystems. Publication No. 90-11. Salt Lake City, Utah. (Ecosystem Descriptions).
- Waddell, K.M. 1978. Selected Hydrologic Data, 1931-77, Wasatch Plateau-Book Cliffs Coal-Fields Area, Utah. Utah Basic-Data Release No. 31. USGS Open File Report 78-121.
- Wai-Ping, V. and M.B. Fenton. 1989. Ecology of spotted bat roosting and foraging behavior. *J. Mammal.* 70(3):617-622.
- Watkins, L.C. 1977. Mammalian species. *Euderma maculatum*. *The American Soc. of Mammologists* 77:1-4.
- Welsh, S.L. 1983. A bouquet of daisies (*Erigeron*, Compositae). *Great Basin Naturalist.* 43(2):365-368.
- Welsh, S.L., N.D. Atwood, S. Goodrich and L.C. Higgins, eds. 1987. A Utah Flora. *Great Basin Naturalist Memoirs.* No.9. 894pp.
- Winter, J. 1974. The distribution of the flammulated owl on California. *Western Birds* 5(2):25-43.
- Woodsworth, G.C., G.P. Bell, and M.B. Fenton. 1981. Observations of the echolocation, feeding behavior, and habitat use of *Euderma maculatum* (Chiroptera: Vespertilionidae) in southcentral British Columbia. *Can. J. Zool.* 59:1099-1102.
- Wormington, H. Marie. 1955. A Reappraisal of the Fremont Culture. *Proceedings*, No. 1. Denver Museum of Natural History. Denver, Colorado.

7.0 GLOSSARY

Advance Mining: Exploitation in the same direction, or order of sequence, as development.

Affected Environment: Surface resources (including social and economic elements) within or adjacent to a geographic area that could potentially be affected by proposed activities. The environment of the area to be affected by the alternatives under consideration.

Air Quality Classes: Classifications established under the Prevention of Significant Deterioration portion of the Clean Air Act that limits the amount of air pollution considered significant within an area. Class I applies to areas where almost any change in air quality would be significant, Class II applies to areas where the deterioration normally accompanying moderate, well-controlled growth would be permitted, and Class III applies to areas where industrial deterioration would generally be allowed.

Allotment Management Plan: The document that contains the action program needed to manage the range resource for livestock grazing with consideration given to soil, watershed, recreation, timber and other resources on lands within a range allotment. Allotment management plans, and, where appropriate, coordinated resource management plans, identify prescriptions and practices for the management of grazing lands for livestock.

Alluvial Material: Material transported and deposited by running water in riverbeds, lakes, alluvial fans and valleys. Includes clay, silt, sand, gravel, and mud.

Alternative: A combination of management prescriptions applied in specific amounts and locations to achieve a desired management emphasis as expressed in goals and objectives. One of several policies, plans, or projects proposed for decision making. One alternative need not substitute for another in all respects.

Analysis Area: A delineated area of land subject to analysis.

Angle of draw: The angle of inclination from the vertical of the line connecting the edge of the workings and the edge of the subsidence area.

Animal Unit Month (AUM): The amount of forage necessary to sustain one cow and one calf or its equivalent for one month.

Aquatic Ecosystem: All organisms in a water-based community plus the associated environmental factors.

Aquifer: A layer of geologic material that contains water.

Authorized Officer: Any employee of the Bureau of Land Management delegated the authority to perform the duty described in the section in which the term is used.

Barrier: A large pillar of coal designed to isolate production areas, including longwall or room-and-pillar panels.

Best Available Control Technology: The best available air pollution control technology for a given purpose as stipulated by the U.S. EPA.

Big Game Winter Range: The area available to and used by big game (large mammals normally managed for sport hunting) through the winter season.

Big Game: Larger species of wildlife that are hunted such as elk, deer, moose, and mountain lion.

Biological Diversity: The diversity or numbers of species that collectively represent the living plants and animals within a local, regional, or continental landscape.

Biological Evaluation (BE): A documented Forest Service activities in sufficient detail to determine how an action or proposed action may affect any threatened, endangered, proposed, or sensitive species.

Bleeders: A series of parallel interconnected development entries partially surrounding longwall panels which provide ventilation and secondary access.

Bonus: That value in excess of the rentals and royalties that accrues to the United States because of coal resource ownership that is paid as part of the consideration for receiving a lease.

Browse: That part of the current leaf and twig growth of shrubs, wood vines, and trees available for animal consumption.

Buffer: A large block of coal left unmined to isolate the effects of underground workings.

Bureau of Land Management: The U.S. Department of the Interior agency responsible for managing most Federal government subsurface minerals. It has surface-management responsibility for Federal lands designated under the Federal Land Policy and Management Act of 1976.

Bypass Coal: An isolated coal deposit that cannot, for the foreseeable future, be mined economically and in an environmentally sound manner either separately or as part of any mining operation other than that of the applicant for either an emergency lease under the provisions of 43 CFR 3425.1-4, or a lease modification.

Candidate Species: Any species not yet officially listed but that are undergoing a status review or are proposed for listing according to the Federal Register notices published by the Secretary of the Interior or the Secretary of Commerce.

Casual Use: Activities which do not ordinarily lead to any appreciable disturbance or damage to lands, resources or improvements, for example, activities which do not involve use of heavy equipment or explosives and which do not involve vehicle movement except over already established roads and trails.

Caving: The collapse of roof strata into mined workings.

CEQ: See Council on Environmental Quality.

Certificate of bidding rights: A right granted by the Secretary to apply the fair market value of a relinquished coal or other mineral lease or right to preference right coal or other mineral lease as a credit against the bonus bid or bids on a competitive lease or leases acquired at a lease sale or sales, or as a credit against the payment required for a coal lease modification.

Compression crack: A closed crack in the ground formed in an area of compressional stress.

Compression: Stress resulting in the contraction or "squeezing" of ground strata; opposite of tension.

Continuous miner method: A mining method which uses a single "continuous miner" machine to mechanically break and load coal for transportation. Single entries are mined at a time and are separated by pillars; used for development and room-and-pillar mining.

Contrast: The effect of a striking difference in the form, line, color, or texture of an area being viewed.

Council on Environmental Quality: An advisory council to the President established by the National Environmental Policy Act of 1969. It reviews Federal programs for their affect on the environment, conducts environmental studies and advises the President on environmental matters.

Critical Habitat: Specific areas within the geographical area occupied by the species on which are found those physical and biological features (1) essential to the conservation of the species; and (2) which may require special management considerations or protection. Critical habitat shall not include the entire geographic area which can be occupied by the threatened and endangered species.

Crucial Habitat: A biological feature that, if lost, would adversely affect the species.

Cultural Resources Inventory Classes:

Class I - An existing data survey. This is an inventory of a study area to (1) provide a narrative overview of cultural resources by using existing information; and (2) compile existing cultural resource site record data on which to base the development of the Forest's site record system.

Class II - A sampling field inventory designed to locate, from surface and exposed profile indications, all cultural resource sites within a portion of an area so that an estimate can be made of the cultural resources for the entire area.

Class III - An intensive field inventory designed to locate, from surface and exposed profile indicators, all cultural resource sites within a portion of an area.

Cultural Resources Inventory: A survey of existing data.

Cultural Resources: Those fragile and nonrenewable remains of human activity, occupation, or endeavor reflected in districts, sites, structures, buildings, objects, artifacts, ruins, works or art, architecture, and natural features that were or importance in human events.

Cumulative Impact: The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time.

Depth of cover: The thickness of ground from a coal seam to surface.

Developed Recreation Sites: Relatively small, distinctly defined areas where facilities are provided for concentrated public use (i.e., campgrounds, picnic areas, and swimming areas).

Developed Recreation: Recreation that occurs a man-made developments such as campgrounds, picnic grounds, resorts, ski areas, trailheads, etc.

Development: The mining of initial entries for access, ventilation, etc. prior to full-scale production mining.

Differential subsidence: The difference in vertical subsidence between two locations.

Director: Director of the Bureau of Land Management.

Dispersed Recreation: That portion of outdoor recreation use that occurs outside of developed sites in the unroaded and roaded Forest environment (i.e., hunting, backpacking, and camping).

Displacement: As applied to wildlife, forced shifts in the patterns of wildlife use either in location or timing of use.

Distance Zone: The divisions of a landscape being viewed. Three zones are used to describe a landscape: foreground, middleground, background.

Diversity: (1) The relative abundance of wildlife species, plant species, communities, habitats, or habitat features per unit of area; or (2) The distribution and abundance of different plant and animal communities and species within the area covered by a Land Resource Management Plan (36 CFR Part 219.3).

Duration: The length of time the management activity and its impacts will be taking place.

Ecosystem: All organisms in a community plus the associated environmental factors.

Effects (also see Impacts):

Direct Effects - Caused by the action and occur at the same time and place.

Indirect Effects - Caused by the action later in time or farther removed in distance but still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related affects on air and water and other natural systems, including ecosystems.

Endangered Species: Any species in danger of extinction throughout all or a significant portion of its range.

Entry: An underground passage used for haulage or ventilation.

Environmental Analysis: An analysis of alternative actions and their predictable short and long-term environmental effects that include physical, biological, economic, social, and environmental design factors and their interactions.

Environmental Assessment (EA): A concise public document prepared to provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a FONSI. It includes a brief discussion of the need for the proposal, alternatives considered, environmental impact of the proposed action and alternatives, and a list of agencies and individuals consulted. Prepared by the responsible Federal agency consistent with 40 CFR 1508.9.

Environmental Impact Statement (EIS): A formal public document prepared to analyze the impacts on the environment of the proposed project or action and released for comment and review. An EIS must meet the requirements of NEPA, CEQ guidelines, and directives of the agency responsible for the proposed project or action.

Erosion Hazard Ratings:

Slight - Potential soil loss rates do not exceed tolerance soil loss. Loss in soil production potential from erosion is of low probability.

Moderate - Potential soil loss rates exceed tolerance soil loss. Loss in soil production potential from erosion is probable and significant if unmitigated. On-site investigation by watershed specialists may be needed for activities in such areas.

High - Potential soil loss rates exceed tolerance soil loss. Loss in soil production potential from erosion is inevitable and irreversible if unmitigated. These soils may require expensive measures to control erosion and sedimentation when activities are planned for such areas. On-site investigation by watershed specialists is highly recommended.

Erosion Hazard: The probability of soil loss resulting from complete removal of vegetation and litter. It is an interpretation based on potential soil loss in relation to tolerance values. Soil loss tolerance rate: an estimate of erosion that could occur over a short period of time (one year) without causing irreparable damage to long-term productivity of the soil.

Erosion: (1) The wearing away of the land surface by running water, wind, ice, or other geological agents including such processes as gravitational creep; or (2) Detachment and movement of soil or rock fragments by water, wind, ice, or gravity.

Exotic: Foreign, not native

Exploration License: A license issued by the Authorized Officer to permit the licensee to explore for coal on unleased Federal lands.

Exploration plan: A detailed plan to conduct exploration; it shows the location and type of exploration to be conducted, environmental protection procedures, present and proposed roads, and reclamation and abandonment procedures to be followed upon completion of operations.

Exploration: Drilling, excavating, and geological, geophysical or geochemical surveying operations designed to obtain detailed data on the physical and chemical characteristics of Federal coal and its environment including the strata below the Federal coal, overburden, and strata above the Federal coal, and the hydrologic conditions associated with the Federal coal.

Extraction ratio: The ratio of mined to unmined area within a defined area.

Face: The location of the longwall mining machine and active production mining within a longwall panel.

Fair Market Value: An amount in cash, or on terms reasonably equivalent to cash, for which in all probability the coal deposit would be sold or leased by a knowledgeable owner willing but not obligated to sell or lease to a knowledgeable purchaser who desires but is not obligated to buy or lease.

Federal Land Policy and Action of 1976 (FLPMA): Public Law 94-579 signed by the President on Management October 21, 1976. Established public land policy; to establish guidelines for its administration; to protect for the management, protection, development, and enhancement of the public lands; and for other purposes.

Federal Lands: Lands owned by the United States, without references to how the lands were acquired or what Federal agency administers the land, including surface estate, mineral estate and coal estate, but excluding lands held by the United States in trust for Indians, Aleuts or Eskimos.

First-pass mining: First stage room-and-pillar production mining at a lower extraction ratio than subsequent second-pass mining; larger pillars are left than after second-pass mining.

Floodplain: The lowland and relatively flat area adjoining inland waters including, at a minimum, that area subject to a one percent or greater chance of flooding in any given year.

Forage: All browse and herbaceous foods that are available to grazing/browsing animals.

Forest Service (FS): The agency of the United States Department of Agriculture responsible for managing National Forests and Grasslands under the Multiple Use and Sustained Yield Act of 1960.

Fossil: The remains or traces of an organism or assemblage of organisms that have been preserved by natural processes in the earth's crust exclusive of organisms that have been buried since the beginning of historical time.

Full-extraction mining: Complete extraction of the coal seam in the horizontal extent over a particular area; no pillars are left after mining.

Game Species: Any species of wildlife or fish for which seasons and bag limits have been prescribed and that are normally harvested by hunters, trappers, and fishermen under State or Federal laws, codes, and regulations.

Gateroad: A series of parallel development entries along both long sides of a longwall panel; entries are separated by either yield- and/or rigid-type pillars.

Gob: The term applied to that part of the mine from which the coal has been removed and the space has been filled up with waste rock.

Government Entity: A Federal or State agency or a political subdivision of a State, including a county or a municipality, or any corporation acting primarily as an agency or instrumentality of a State, which produces electrical energy for sale to the public.

Gradient: The slope (rise/run) of a surface or stream profile.

Habitat Type Group: A logical grouping of habitat types to facilitate resource planing and public presentations.

Habitat Type: An aggregation of all land areas potentially capable of producing similar plant communities at climax.

Habitat: A specific set of physical conditions that surround a single species, a group of species, or a large community. In wildlife management, the major components of habitat are considered to be food, water, cover, and living space.

Horizontal strain: The change in length per unit of length of ground in the horizontal plane.

Human Environment: The factors that include, but are not limited to, biological, physical, social, economic, cultural, and aesthetic factors that interrelate to form the environment.

Impact (See Effects): The effect, influence, alteration, or imprint caused by an action.

Indicator Species: A species of animal or plant whose presence is a fairly certain indications of a particular set of environmental conditions. Indicator species serve to show the effects of development actions on the environment.

Indirect Effects: Secondary effects that occur in locations other than the initial action or significantly later in time.

Intake: The passage through which fresh air is drawn or forced into a mine or to a section of a mine.

Interest in a lease, application or bid: Any record title interest, overriding royalty interest, working interest, operating rights or option, or any agreement covering such an interest; any claim or any prospective or future claim to an advantage or benefit from a lease; and any participation or any defined or undefined share in any increments, issues, or profits that may be derived from or that may accrue in any manner from the lease based on or pursuant to any agreement or understanding existing when the application was filed or entered into while the lease application or bid is pending. Stock ownership or stock control does not constitute an interest in a lease within the meaning of this definition. Attribution of acreage to stock within the meaning of this definition.

Invertebrate: An animal lacking a spinal column.

Irretrievable: Not retrievable, irrecoverable, incapable of being recovered or regained; not capable of being restored remedied or made good.

Irreversible: Not reversible; incapable of being reversed or altered. Not having the ability to change and then revert to the original state.

Key Wildlife Area: Any area that is critical to wildlife during at least a portion of the year. This importance may be due to vegetative characteristics such as residual nesting cover or behavioral aspects of the animals such as fawning/calving areas. Key areas included: winter ranges, lambing/fawning/calving areas, dancing/strutting grounds, nesting areas, breeding grounds, elk wallows, riparian and woody draws, and roosting areas.

Leasable Minerals: Minerals acquired only by lease and generally include oil, gas, coal, oil shale, sodium, potassium, phosphate, native asphalt, solid and semi-solid bitumen, and deposits of sulfur.

Lease Bond: The bond or equivalent security given the Department to assure payment of all obligations under a lease, exploration license, or license to mine, and to assure that all aspects of the mining operation other than reclamation operations under a permit on a lease are conducted in conformity with the approved mining or exploration plan.

Lease Modification Area: A proposed 150-acre lease modification to the Quitchupah Lease U-63214. Specifically located within Section 10, SE $\frac{1}{4}$ NW $\frac{1}{4}$, E $\frac{1}{2}$ SW $\frac{1}{4}$, E $\frac{1}{2}$ E $\frac{1}{2}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$, E $\frac{1}{2}$ E $\frac{1}{2}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$, E $\frac{1}{2}$ E $\frac{1}{2}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$, Township 21 South, Range 5 East (SLM).

Lease Stipulations: Additional specific terms and conditions that change the manner in which an operation may be conducted on a lease or modify the lease rights granted.

Lease: A Federal lease, issued under the coal leasing provisions of the mineral leasing laws, which grants the exclusive right to explore for and extract coal. In provisions of this group that also refer to Federal leases for minerals other than coal, the term Federal coal lease may apply.

License to mine: A license issued under the provisions of 43 CFR Part 3440 to mine coal for domestic use.

Licensee: The holder of an exploration license.

Logical Mining Unit Reserves: Recoverable coal reserves means the sum of estimated Federal and non-Federal recoverable coal reserves in the LMU.

Logical Mining Unit: An area of land in which the recoverable coal reserves can be developed in an efficient, economical, and orderly manner as a unit with due regard to conservation of recoverable coal reserves and other resources. An LMU may consist of one or more Federal leases and may include intervening or adjacent lands in which the United States does not own the coal. All lands in an LMU shall be under the effective control of a single operator/lessee, be able to be developed and operated as a single operation, and be contiguous.

Long-Term: Describes impacts that would occur over a 20-year period or more.

Longwall mining: A mining method in which large blocks of coal (panels), outlined by gateroad entries, are completely extracted in a single, continuous operation using a longwall mining machine.

Longwall move: The disassembly, transportation, and reassembly of a longwall mining machine at the end of a mined panel to the beginning of a new unmined panel.

Longwall panel: A rectangular block of coal bounded by development entries and fully mined (no pillars left) by a longwall mining machine.

Main Entry: A main haulage road.

Mains: A series of parallel interconnected development entries providing primary access to production areas, ventilation, and transportation of mined coal.

Maximum Economic Recovery (MER): Based on standard industry operating practices, all profitable portions of a leased Federal coal deposit must be mined. At the times of MER determinations, consideration will be given to: existing proven technology; commercially available and economically feasible equipment; coal quality, quantity, and marketability; safety, exploration, operating, processing, and transportation costs; and compliance with applicable laws and regulations. The requirement of MER does not restrict the authority of the authorized officer to ensure the conservation of the recoverable coal reserves and other resources and to prevent the wasting of coal.

Mineral Leasing Laws: The Mineral Leasing Act of 1920, as amended (30 U.S.C. 181 et seq.), and the Mineral Leasing Act for Acquired Lands of 1947, as amended (30 U.S.C. 351-359).

Mining height: The extracted height of a coal seam.

Mining Plan: A resource recovery and protection plan.

Mining Supervisor: The Authorized Officer.

Mining Unit: An area containing technically recoverable coal that will feasibly support a commercial mining operation. The coal may either be Federal coal or be both Federal and non-Federal coal.

Mitigation: Includes:

- (a) Avoiding the impact altogether by not taking a certain action or parts of an action.
- (b) Minimizing impacts by limiting the degree of magnitude of the action and its implementation.
- (c) Rectifying the impact of repairing, rehabilitating, or restoring the affected environment.
- (d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
- (e) Compensating for the impact by replacing or providing substitute resources or environments.

Multiple-use: Management of the surface and subsurface resources so that they are jointly used in the manner that will best meet the present and future needs of the public without permanent impairment of the productivity of the land or the quality of the environment.

National Environmental Policy Act of 1969 (NEPA): Public Law 91-190. Established environmental policy for the nation. Among other items, NEPA requires Federal agencies to consider environmental values in decision-making processes.

National Forest Management Act (NFMA): A law passed in 1976 as amendments to the Forest and Rangeland Renewable Resources Planning Act that requires the preparation of Regional and Forest plans and the preparation of regulations to guide that development.

National Forest System: All National Forest System lands reserved or withdrawn from the public domain of the United States; all National Forest System lands acquired through purchase, exchange, donation, or other means the National Grasslands and land use projects administered under Title III of the Bankhead-Jones Farm Tenant Act (7 U.S.C. 1010 et seq.); and other lands, waters, or interests therein which are administered by the U.S.D.A. Forest Service or are designated for administration through the U.S.D.A. Forest Service as a part of the system (16 U.S.C. 1609).

National Register of Historic Places (NRHP): A listing of architectural, historical, archaeological, and cultural sites of local, state, or national significance established by the Historic Preservation Act of 1966.

No Action Alternative: No action or activity would take place. Another definition is where ongoing programs described within the existing Land Management Plan continue. No decision would be made and no leases would be offered.

Nongame Species: Species of animals that are not managed as a sport hunting/fishing resource.

Nonpoint Source Pollution: Sources from which the pollutants discharged are:

- (1) induced by natural processes, including precipitation, seepage, percolation, and runoff;
- (2) not traceable to any discrete or identifiable facility; and
- (3) better controlled through the use of Best Management Practices, including process and planning techniques. This includes natural pollution sources not directly or indirectly caused by man.

Noxious Weeds: Rapidly spreading plants that cause a variety of major ecological impacts to both agriculture and wild lands.

Numerical (subsidence) model: A mathematical description of subsidence phenomena solved by computer, used for the prediction of ground surface deformation from mining.

Off-Road Vehicle (ORV): Any motorized vehicle designed for or capable of cross-country travel on or immediately over land, water, snow, ice, marsh, swampland or other natural terrain. It includes, but is not limited to, four-wheel drive or low-pressure-tire vehicles, motorcycles and related two-wheel vehicles, amphibious machines, ground-effect or air-cushion vehicles.

Operator: A lessee, exploration licensee or one conducting operations on a lease or exploration license under the authority of the lessee or exploration licensee.

Overburden: The geologic strata overlying a coal seam.

Overstory: The portion of a plant community consisting of the taller plants on the site; the forest or woodland canopy.

Panel centerline: The horizontal line running central and parallel to the long axis of a longwall panel.

Panel: A coal mining block that generally comprises one operating unit.

Partial-extraction mining: Incomplete extraction of the coal seam where pillars are left after mining.

Particulates: Small particles suspended in the air and generally considered pollutants.

Permanent strain: Ground strain that remains after the completion mining.

Permit Amendment Area: The area that is represented by Box Canyon that, if mined, has the potential for escarpment failure and may result in the damage or alteration of the perennial stream. Also referred to as the Proposed Subsidence Area. Specifically located in a portion of Section 15, W $\frac{1}{2}$, Township 21 South, Range 5 East (SLM).

Pines Tract Project Area: Encompasses three separate areas; the Pines Coal Lease Tract (7,311 acres), Lease Modification Area (150-acre), and Box Canyon Area (Permit Amendment Area).

Pines Tract Project: Encompasses three components: 1) Lease the Pines Coal Lease Tract (UTU-76195) as previously delineated by the BLM Interagency Tract Delineation Team through the competitive bid process. 2) modify the Quitchupah Lease (U-63214) by adding 150 acres (Lease Modification Area), and 3) evaluate a permit amendment submitted by Canyon Fuel that proposes to mine under and subside the perennial stream and escarpments in Box Canyon (currently not allowed under lease stipulations and the approved SUFCO Mine permit) (Permit Amendment Area).

Portal: The structure surrounding the immediate entrance to a mine.

Prehistoric Site: Archaeologic sites associated with American Indians and usually occurring before contact with Europeans.

Prevention of Significant Deterioration (PSD): A classification established to preserve, protect, and enhance the air quality in National Wilderness Preservation System areas in existence prior to August 1977 and other areas of National significance while ensuring economic growth can occur in a manner consistent with the preservation of existing clean air resources. Specific emission limitations and other measures, by class, are detailed in the Clean Air Act (42 U.S.C. 1875, et seq.).

Production mining: Full-scale mining following the initial mining of access (development) entries; in contrast to development mining.

Public Bodies: Federal and State agencies; political subdivision of a state, including counties and municipalities; rural electric cooperatives and similar organizations; and nonprofit corporations controlled by any such entities.

Range Allotment: A designated area of land available for livestock grazing upon which a specified number and kind of livestock may be grazed under an allotment management plan. It is the basic land unit used to facilitate management of the range resource on National Forest System lands administered by the U.S.D.A. Forest Service.

Rare Plants: A plant species, or subspecies, that is limited to a restricted geographic range or one that occurs sparsely over a wider area.

Reasonably Foreseeable Development Scenario (RFDS): The prediction of potentially future actions, occurring in within the cumulative assessment area, within a designated period of time.

Reclamation: Returning disturbed lands to a form and productivity that will be ecologically balanced and in conformity with a predetermined land management plan.

Record of Decision (ROD): A document separate from, but associated with, an environmental impact statement that publicly and officially discloses the responsible official's decision on the proposed action.

Recreation Opportunity Spectrum (ROS): Land delineations that identify a variety of recreation experience opportunities in six classes along a continuum from primitive to urban. Each class is defined in terms of natural resource settings, activities and experience opportunities. The six classes are: Urban, Rural, Roaded, Natural, Semiprimitive Motorized, Semiprimitive Nonmotorized, and Primitive.

Reserves: Recoverable Coal Reserves.

Restore: To bring back landscape to a former or original condition or appearance.

Retreat: Production mining following initial development of access entries in a coal seam.

Retreating Mining: Exploitation in the direction opposite from development.

Return: The air of ventilation that has passed through all the working faces of a split.

Revegetation: The reestablishment and development of self-sustaining plant cover. On disturbed sites, this normally requires human assistance such as seed bed preparation, reseeding, and mulching.

Rigid (abutment) pillar: A coal pillar designed to remain intact and provide complete load-bearing capacity throughout the course of mining.

Riparian Ecosystem: A transition between the aquatic ecosystem and the adjacent terrestrial ecosystem; identified by soil characteristics or distinctive vegetation communities that require free or unbound water.

Riparian: Riparian areas consist of terrestrial and aquatic ecosystems, those lands in a position to directly influence water quality and water resources, whether or not free water is available. This would include all lands in the active flood channel and lands immediately upslope of stream banks. These areas may be associated with lakes, reservoirs, estuaries, potholes, marshes, streams, bogs, wet meadows, and intermittent or permanent streams where free and unbound water is available.

Roaded, Natural (RN): A recreation opportunity classification term describing a land area that has been predominately a natural appearing environment with moderate evidence of sights and sounds of humans. Concentration of users is moderate to low. Roads of better than primitive class are usually with 0.5 mile. A broad range of motorized and nonmotorized activity opportunities are available. Management activities, including timber harvest, are present and harmonize with the natural environment.

Roadless: Refers to the absence of roads that have been constructed and maintained by mechanical means to ensure regular and continuous use.

Room-and-pillar mining: A mining method by which coal is extracted over large areas from a network of entries separated by pillars.

Scenic Quality Classes: The designation (A, B, or C) assigned a scenic quality rating unit to indicate the visual importance or quality of a unit relative to other units within the same physiographic province.

Scoping Process: An early and open public participation process for determining particular issues to be addressed in an environmental document and for identifying the significant issues related to a proposed action.

Second-pass mining: Final stage room-and-pillar production mining following first-pass mining; higher extraction ratios than first-pass mining are achieved by partial to full mining of remnant first-pass coal pillars.

Secretary: Secretary of the Interior.

Sensitive Species: Those plant or animal species that are susceptible or vulnerable to activity impacts or habitat alterations.

Significant: An effect that is analyzed in the context of the proposed action to determine the importance of the effect either beneficial or adverse. The degree of significance is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment and when the affects on the quality of the human environment are likely to be highly controversial.

Small Game: Birds and small mammals normally hunted or trapped.

Sole Part in Interest: A party who is and will be vested with all legal and equitable rights under a lease, bid, or an application for a lease. No one is a sole party in interest with respect to a lease or bid in which any other party has any interest.

Split Estate: Land in which the ownership of the surface is held by persons, including governmental bodies, other than the Federal government and the ownership of underlying coal is, in whole or in part, reserved to the Federal government.

Sterilization: Rendering coal resources unmineable.

Stipulation: A provision that modifies standard lease right and is attached to and made a part of the lease.

Strain: Change in length per unit of length; a measure of ground deformation.

Stress: The force per unit area (also pressure), or intensity of forces distributed over a given area, responsible for deforming and fracturing ground strata.

Subsidence: The deformation of the ground mass surrounding a mine due to the mining activity.

Substantial legal and financial commitments: Significant investments that have been made on the basis of a long-term coal contract in power plants, railroads, coal handling and preparation, extraction or storage facilities and other capital intensive activities. Cost of acquiring the coal in place or of the right to mine it without an existing mine are not sufficient to constitute substantial legal and financial commitments.

Surface coal mining operations: Activities conducted on the surface of lands in connection with a surface coal mine or surface operations and surface impacts incident to an underground mine.

Surface Management Agency: The Federal agency with jurisdiction over the surface of federally owned lands containing coal deposits, and, in the case of private surface over Federal coal, the Bureau of Land Management, except in areas designated as National Grasslands, where it means the Forest Service.

Tension crack: A crack (typically open) in the ground formed in an area of tensional stress.

Tension: Stress resulting in the elongation or "stretching" of ground strata; opposite of compression.

Threatened And Endangered Species: Definitions: Federal codes are defined as follows:

Endangered (E): Any species that is in danger of extinction throughout all or a significant portion of its range other than a species of the Class Insecta determined by the Secretary to constitute a pest whose protection under the ESA would present an overwhelming and overriding risk to man.

Threatened (T): Any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Candidate Species (C): Status review taxa for which the USFWS currently has on file substantial information on biological vulnerability and threat(s) to support the appropriateness of proposing to list the taxa as an endangered or threatened species.

Forest Service Sensitive: Those plant and animal species identified by a Regional Forester for which population viability is a concern as evidenced by: (a) significant current or predicted downward trends in population numbers or density or (b) significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution.

Total Dissolved Solids (TDS): Salt or an aggregate of carbonates, bicarbonates, chlorides, sulfates, phosphates, and nitrates of calcium, magnesium, manganese, sodium, potassium, and other cations that form salts that are dissolved or present in water.

Transient strain: Ground strain of a temporary or ephemeral duration, as opposed to permanent strain.

Valid existing rights: (a) Except for haul roads, that a person possesses valid existing rights for an area protected under section 522(e) of the Act on August 3, 1977, if the application of any of the prohibitions contained in that section to the property interest that existed on that date would effect a taking of the person's property which would entitle the person to just compensation under the Fifth and Fourteenth Amendments to the United States Constitution; (b) For haul roads, (1) A recorded right of way, recorded easement or a permit for a coal haul road recorded as of August 3, 1977, or (2) Any other road in existence as of August 3, 1977; (c) A person possesses valid existing rights if the person proposing to conduct surface coal mining operations can demonstrate that the coal is both needed for, and immediately adjacent to, an ongoing surface coal mining operation which existed on August 3, 1977. A determination that coal is "needed for" will be based upon a finding that the extension of mining is essential to make the surface coal mining operation as a whole economically viable; (d) Where an area comes under the protection of section 522(e) of the Act after August 3, 1977, valid existing rights shall be found if-- (1) On the date the protection comes into existence, a validly authorized surface coal mining operation exists on that area; or (2) The prohibition caused by section 522(e) of the Act, if applied to the property interest that exists on the date the protection comes into existence, would effect a taking of the person's property which would entitle the person to just compensation under the Fifth and Fourteenth Amendments to the United States Constitution. (e) Interpretation of the terms of the

document relied upon to establish the rights to which the standard of paragraphs (a) and (d) of this section applies shall be based either upon applicable State statutory or case law concerning interpretation of documents conveying mineral rights or, where no applicable State law exists, upon the usage and custom at the time and place it came into existence.

Vertebrate: An animal having a spinal column.

Visual Quality Objectives (VQO): Based upon variety class, sensitivity level, and distance zone determinations. Each objective describes a different level of acceptable alteration based on aesthetic importance. The degree of alteration is based on contrast with the surrounding landscape.

Preservation: In general, human activities are not detectable to the visitor.

Retention: Human activities are not evident to the casual Forest visitor.

Partial Retention: Human activities may be evident, but must remain subordinate to the characteristic landscape.

Modification: Human activity may dominate the characteristic landscape, but must, at the same time, use naturally established form, line, color, and texture. It should appear as a natural occurrence when viewed in middleground or background.

Maximum Modification: Human activity may dominate the characteristic landscape but should appear as a natural occurrence when viewed as background.

Enhancement: A short-term management alternative that is completed with the express purpose of increasing positive visual variety where little variety now exists.

Visual Resource: The composite of basic terrain, geologic features, water features, vegetative patterns, and land use effects that typify a land unit and influence the visual appeal of the unit.

Wetlands: Lands where saturation with water is the primary factor determining the nature of soil development and the kinds of animal and plant communities living under or on its surface.

Written Consent: The document or documents that a qualified surface owner has signed that: 1) permit a coal operator to enter and commence surface mining of coal, 2) describe any financial or other consideration given or promised in return for the permission, including in-kind considerations, 3) describe any consideration given in terms of type or method of operation or reclamation for the area, 4) contain any supplemental or related contracts between the surface owner and any other person who is a party to the permission, and 5) contain a full and accurate description of the area covered by the permission.

Yield pillar: A coal pillar design to crush controllably under loading.

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Appendix A

Legal Descriptions of the Pines Tract Project Area

Appendix A

Legal Descriptions of the Pines Tract Project Area

Pines Coal Lease Tract Area:

Township 20 South, Range 5 East, SLM

Section 35, S $\frac{1}{2}$ NE $\frac{1}{4}$, SE $\frac{1}{4}$ NW $\frac{1}{4}$, NE $\frac{1}{4}$ SW $\frac{1}{4}$, S $\frac{1}{2}$ SW $\frac{1}{4}$, SE $\frac{1}{4}$

Section 36, W $\frac{1}{2}$ SW $\frac{1}{4}$, SE $\frac{1}{4}$ SW $\frac{1}{4}$

Township 21 South, Range 5 East, SLM

Section 1, lots 3-4, S $\frac{1}{2}$ SW $\frac{1}{4}$, SW $\frac{1}{4}$ SE $\frac{1}{4}$

Section 2, lots 1-4, S $\frac{1}{2}$ S $\frac{1}{2}$

Section 3: lots 1-2, S $\frac{1}{2}$ SE $\frac{1}{4}$

Section 10: E $\frac{1}{2}$

Sections 11-14, all

Section 15: E $\frac{1}{2}$

Section 22, E $\frac{1}{2}$

Sections 23 - 24, all

Section 25, N $\frac{1}{2}$, N $\frac{1}{2}$ S $\frac{1}{2}$

Section 26, N $\frac{1}{2}$, NE $\frac{1}{4}$ SW $\frac{1}{4}$, E $\frac{1}{2}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$, SE $\frac{1}{4}$

Township 21 South, Range 6 East, SLM

Section 19, lots 3-4, E $\frac{1}{2}$ SW $\frac{1}{4}$

Section 30, lots 1-3, E $\frac{1}{2}$ NW $\frac{1}{4}$, NE $\frac{1}{4}$ SW $\frac{1}{4}$

150-acre Modification to Quitchupah Lease U-63214 (Lease Modification Area):

Township 21 South, Range 5 East, SLM

Section 10, SE $\frac{1}{4}$ NW $\frac{1}{4}$, E $\frac{1}{2}$ SW $\frac{1}{4}$, E $\frac{1}{2}$ E $\frac{1}{2}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$, E $\frac{1}{2}$ E $\frac{1}{2}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$, E $\frac{1}{2}$ E $\frac{1}{2}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$

Box Canyon Region (Permit Amendment Area):

Township 21 South, Range 5 East, SLM

Section 15, W $\frac{1}{2}$

Appendix B

Past, Present, and Reasonably Foreseeable Future Actions

Appendix B

Past, Present, and Reasonably Foreseeable Future Actions

Table B.1 Summary of Past Actions

| Past Actions | Implementation Dates (Begin and End) | Residual Effects |
|---|--------------------------------------|---|
| <p>MINERALS</p> <p>Ricci Coal Mine (Muddy Creek). On the north slope of Muddy Creek at the confluence with Last Water Canyon (NE¼NE¼, Section 35, T. 20 S., R. 5 E., SLM). Mine was accessed by an old road in the bottom of Muddy Creek canyon from SR-10 (about 8 miles). Underground room-and-pillar workings not very extensive.</p> | <p>1941-1953</p> | <p>Residual disturbances consists of the old portal, portal yard and old access road (partial natural revegetation). Portal was sealed in 1989 under the Utah Abandonment Mine Reclamation Program. Upper 4 miles of old road is now an all terrain vehicle trail and lower 4 miles is open to truck traffic (FDR 5042, single-lane, native surface). Some erosion/sediment production from old pad and road.</p> |
| <p>Link-Canyon Coal Mine (at head of Link Canyon NW¼SW¼, Section 26, T. 21 S., R. 5 E., SLM). Accessed by Link Canyon road which now provides motorized access to the Quitchupah/Pines area of the forest (FDR 50044, single-lane, native surface). Collapsed portals and partial access roads are still evident but no longer used. Old scale house (cave in rock outcrop adjacent to Link Canyon road), old coal loadout chute, rock structures, and some small coal piles still visible at portal area. Some coal dust and truck runaround areas still evident along Link Canyon road. Disturbed area has revegetated well. Underground room-and-pillar workings not very extensive.</p> | <p>1940-1952</p> | <p>Area has naturally revegetated. Minor erosion/sediment production from old roads/portal area. Perennial discharge of water from the mine portals has created small riparian zone in immediate vicinity of portals. No flow evident in Link Canyon downstream of riparian area other than during runoff and precipitation events.</p> |

Table B.1 Summary of Past Actions (cont.)

| Past Actions | Implementation Dates (Begin and End) | Residual Effects |
|--|--|--|
| Coal exploration drill holes. All old (pre-1997) drill holes and access roads have been adequately plugged, reclaimed and revegetated. See present and future actions for recent drillings. | 1900s-present | No residual effects other than some old/pads and roads slightly visible due to differences in vegetation (more grass/less brush). |
| Oil and Gas Wildcat drilling. Vortt Exploration Company, Link Canyon #1 (SE¼SW¼, Section 23, T. 21 S., R. 5 E., SLM). Drilled in 1981/1982 and reclaimed in 1982. Revegetation determined to meet standards in 1985. Two other wells drilled north of Muddy Creek more than 20 years ago. No evidence exists other than well location markers. | Link Canyon #1, 1981-1982 Others prior to 1976. | Area adequately reclaimed and revegetated. No residual effects. Old pad slight visible due to different vegetation. |
| Geophysical surveys. Many miles of geophysical surveys were conducted through the area in the 1980s. No roads were constructed. Off road access was by foot and helicopter. | 1980-1990 | None |
| <p>TIMBER</p> <p>East Fork Box Creek Timber Sale</p> | 1981 | 322 thousand board feet (tbf) of Ponderosa pine were cut over 400 acres. Spot planting of seedlings occurred after, regeneration/reforestation has met objectives. |
| Link Canyon Timber Sale | 1982 | 1.4 mbf of Ponderosa pine cut on 900 acres. Spot planting of seedlings occurred after, regeneration/reforestation has met objectives. |

Table B.1 Summary of Past Actions (cont.)

| Past Actions | Implementation Dates (Begin and End) | Residual Effects |
|---|--|---|
| <p>RANGELAND</p> <p>Water developments in the Pines allotment.</p> <p>Elk Knoll Trough</p> <p>Elk Knoll #1 Pond</p> <p>West Pine Pond</p> <p>North Pine #1 Pond</p> <p>North Pine #2 Pond</p> <p>Joes Mill Ponds (2)</p> <p>East Draw Big Ridge</p> <p>Slab Pond</p> <p>Verdus Pond</p> <p>Box Pond</p> <p>Link Canyon #1</p> <p>Link Canyon #2</p> <p>Link Canyon Trough</p> <p>Dry Point Pond</p> | <p>1960</p> <p>1966</p> <p>1967</p> <p>1966</p> <p>1966</p> <p>?</p> <p>1966</p> <p>1966</p> <p>1966</p> <p>1966</p> <p>1967</p> <p>1942</p> <p>1936</p> <p>1967</p> | <p>All for livestock distribution.</p> |
| <p>WILDLIFE</p> <p>Habitat improvements done in area of Pines Coal Lease Tract:</p> <p>400 acres of sagebrush burned for improvement of elk winter range.</p> | <p>Late 1980s-early 1990s</p> | <p>Satisfactory regrowth of grass species/shrub. Some negative effect on sage grouse nesting habitat.</p> |
| <p>Development of ponds for livestock.</p> | <p>1960s to present</p> | <p>Sage grouse also use ponds as water source.</p> |
| <p>Ninety to 100 blue bird boxes installed by USFWS</p> | <p>Early 1990s</p> | <p>Improved nesting habitat. Boxes are not maintained.</p> |

Table B.1 Summary of Past Actions (cont.)

| Past Actions | Implementation Dates (Begin and End) | Residual Effects |
|---|--------------------------------------|--|
| <p>TRANSPORTATION</p> <p>Roads were developed through mining activities, range (cattle driveways) and for pioneering quests. Some roads associated with timber sales represent minor portion.</p> | | <p>Road surface displacement, user developed roads.</p> |
| <p>RECREATION</p> <p>Dispersed camping and hunting.</p> | <p>Since 1930s</p> | <p>Some dispersed campsites visible.</p> |
| <p>CULTURAL RESOURCES</p> <p>Unauthorized excavations of archeological sites.</p> | <p>1980s-1990s?</p> | <p>Some vandalism of sites.</p> |
| <p>Cultural resource surveys</p> | <p>1978-present</p> | <p>Location of 20+ archeological and historical sites, some submitted for consideration in the NRHP.</p> |

Table B.2 Summary of Present Actions

| Present Actions | Date | Current Effects |
|---|---------------------|--|
| <p>MINERALS</p> <p>Canyon Fuel Company, LLC, SUFCO Coal Mine. Operation since 1941. Portal and coal handling facilities located on the Fishlake National Forest (Section 23, T. 22 S., R. 4 E., SLM). Access via paved Accord Lakes road (County Road 40008) from I-70. Road is under Sevier County jurisdiction and will remain after the mine is reclaimed for access to fee lands and recreational properties. Disturbance for surface facilities totals 70 acres, which includes the Quitchupah Canyon portal/breakout on fee land. Existing permit area totals 17,308 acres, including 16,618 acres of Federal coal leases, 640 acres fee coal leases, and the waste rock disposal site (40 acres), and 10 acres under FS special use permits. Most of the areas has been mined and subsided (see SUFCO MRP and Annual Subsidence Monitoring reports). Mine production life as presently permitted would extend 2013.</p> | <p>1941-present</p> | <p>See existing NEPA documents. Mining and Reclamation Plan (mine permit). Annual Subsidence and Hydrologic Monitoring Reports, Cumulative Hydrologic Impact Assessment.</p> |
| <p>TIMBER</p> <p>None</p> | | |
| <p>RANGELAND</p> <p>Link Canyon Trough expansion.</p> | <p>1997</p> | <p>Expand and rehabilitate trough for livestock distribution.</p> |
| <p>WILDLIFE</p> <p>Annual Raptor Survey</p> | <p>on-going</p> | <p>Improve data base for raptors.</p> |

Table B.2 Summary of Present Actions (cont.)

| Present Actions | Date | Current Effects |
|--|---------------------|--|
| <p>TRANSPORTATION</p> <p>Seasonal closures of Forest development Roads (FDR) 50028, 50307, 50318, 50330, 52035, 52039, 52058, 52252, 52278, October 1 to March 31.</p> | <p>1997-present</p> | <p>Seasonal closures for protection of elk herd.</p> |
| <p>RECREATION</p> <p>Dispersed camping/hunting. About 100 recreation visitor days/year (RVD/Yr)</p> | <p>1997</p> | <p>Some dispersed campsites visible.</p> |
| <p>CULTURAL RESOURCES</p> <p>Excavation at Crazy Bird Shelter.</p> | <p>1997</p> | <p>Recovered evidence of early Archaic, middle Archaic. Formative and possible Paleoindian occupation.</p> |

Table B.3 Summary of Reasonably Foreseeable Future Actions (within ten years, 1997-2007)

| Future Actions | Date | Anticipated Effects |
|--|----------------------------------|---|
| <p>MINERALS</p> <p>Pines Coal Lease Tract/Development. Pines Coal Lease Tract and associated surface facilities. Modification of Federal Coal Lease U-63214 (150 acres), including some coal exploration drilling, and proposed longwall mining/subsidence of West Fork of Box Canyon (Mine Plan amendment under evaluation). See Reasonable Foreseeable Development Scenario for the proposed Pines Tract EIS. Tract covers approximately 7,300 acres.</p> | <p>1998-2026</p> | <p>Mining in the Pines Coal Lease Tract would commence in 1999, longwall mining will produce surface subsidence. If a company other than SUFCO obtains the lease, the development of mine facilities in Link Canyon will be necessary. See reasonably foreseeable development scenario.</p> |
| <p>Breakout in Link Canyon. SUFCO proposed a breakout in Link Canyon for a powerline and substation to support the existing Convulsion Canyon mine. The powerline (69 kV) will connect to the existing line near State Route 10 and travel cross-country to intercept the Link Canyon Road. The line will follow the old Link Canyon road to the old mine then cross the canyon to the west to the proposed substation. A line (12 kV) will run from the substation to the proposed breakout and then into the mine. The substation and breakout are on the Manti-La Sal National Forest. The substation is proposed to be 20 feet by 40 feet and the road leading to it approximately 0.14 acres of surface disturbance. The breakout is proposed to be 9 feet by 20 feet and will be constructed from inside the mine. Approximately 0.24 miles of the 69 kV line is slated on the Forest, and will consist of 9 poles 40 feet high. The 69 kV line would cross about 4.7 miles of BLM land, and 1.23 miles of private land.</p> | <p>1998-1999</p> | <p>Surface disturbance from construction of substation pad and access road. Some changes in visual quality from powerline, substation and breakout. Powerlines will be equipped with raptor roosts.</p> |
| <p>Muddy Coal Lease Tract. It is anticipated that the Muddy Tract may be applied for at some time. Available information suggests questionable coal quality. The Muddy Tract lies directly north of the Pines Coal Lease Tract.</p> | <p>Not possible to determine</p> | <p>Mining in the tract would use underground methods, and would likely be accessed from underground. Surface disturbance would occur.</p> |

Table B.3 Summary of Reasonably Foreseeable Future Actions (within ten years, 1997-2007) (cont.)

| Future Actions | Date | Anticipated Effects |
|--|--|---|
| <p>Oil/Gas Drilling. The Pines Coal Lease Tract lies within the Manti-South Oil and Gas Potential Area and the Muddy Creek Oil and Gas Analysis Area evaluated in the FEIS for Oil and Gas Leasing on Lands Administered by the Manti-La National Forest. The Oil and Gas FEIS predicted up to 6 exploratory (wildcat) wells drilled in the southern portion of the Manti division for the years 1992-2006. This area was assessed as having moderate potential for oil/gas occurrence. No production was predicted. No wells have been drilled to date; prediction is still valid. For analysis purposes, it is assumed possible that all 6 of the predicted wells could lie within any one of the 3 Oil and Gas Analysis Areas in the Manti-South Oil and Gas Potential area. Thus, it can be assumed that up to 6 wells could be drilled in the Muddy Creek Analysis Area. The potential for any wells to be located within the SUFCO permit area is low due to problems finding unmined areas (support pillars) large enough to drill through that also lie in favorable topographic areas for drill pads/roads. Drilling through underground mine voids and maintaining circulation would involve substantial cost increases. Drilling within the Pines Coal Lease Tract, if it is leased, would likely be delayed until mining extends through the area to prevent conflicts with coal recovery. Total anticipated surface disturbance would be: (6 well pads x 2.25 ac/pad) + (6 wells x 6.14 mi. road/well x 6 ac/mi road) = 234 acres. However, it is not likely that more than 2 wells would be drilled within similar time frames. At any given time, only 78 acres or less would be disturbed.</p> | <p>Intermittent from present-mine life</p> | <p>Up to 78 acres of disturbance at any time. Human activity for construction / drilling / reclamation is anticipated at 2 field seasons with no activity from Nov. 1 to July 5. Approximately 5 years needed for successful vegetation. Human presence and noise would impact wildlife habitat, recreation and livestock grazing during summer months for 2 years. Visual impacts and loss of forage in disturbed area would last for 2 + 5 years = 7 years. Negligible watershed/hydrology impacts anticipated due to sediment/runoff control and materials containment requirements.</p> |

Table B.3 Summary of Reasonably Foreseeable Future Actions (within ten years, 1997-2007) (cont.)

| Future Actions | Date | Anticipated Effects |
|---|--|--|
| <p>Geophysical surveys for oil, gas and coal investigations. Up to 30 miles of geophysical survey lines could be conducted from 1992-2006 ranging from resistivity surveys to helicopter supported drill/shoot seismic surveys. No new roads needed. Surface disturbance would be minimal to none, but human presence/noise could be intense. Duration of human occupation would likely be less 1 day/mile. Existing roads would be used for access. No activity to date, so predictions valid through Pines Tract Project mine life.</p> | <p>Intermittent present mine-life</p> | <p>Human activity/noise could temporarily displace wildlife during field seasons (1 day/mile of survey line). Vehicle use of existing roads and helicopter transport of equipment/personnel could disturb wildlife, livestock, recreationists. Surface disturbance is negligible, so no measurable loss of forage predicted.</p> |
| <p>TIMBER</p> <p>None</p> | | |
| <p>RANGELAND</p> <p>Proposed allotment management plan (1992) predicted pond construction in Section 11 on West side of East Fork Box Canyon.</p> | <p>Possible sometime during tract life</p> | <p>For livestock distribution.</p> |
| <p>Solar pumps for Main Fork Box Canyon or East Fork Box Canyon proposed by allotment permittees.</p> | <p>Possible sometime during tract life</p> | <p>Pump water from creeks to troughs on canyon rim. Diversion of flow from Box Canyon or East Fork Box Creek, may incur impacts to stream flow and riparian areas. For livestock distribution.</p> |
| <p>WILDLIFE</p> <p>Mahogany pruning in Pines and Wildcat Knolls area, about 75 acres.</p> | <p>Possible sometime during tract life</p> | <p>Deer and elk winter range improvement.</p> |
| <p>TRANSPORTATION</p> <p>Seasonal closures of Forest Development Roads (FDR) 50028, 50307, 50318, 50330, 52035, 52039, 52058, 52252, 52278, October 1 to March 31.</p> | <p>Continue indefinitely</p> | <p>Seasonal closures for protection of elk herd.</p> |

Table B.3 Summary of Reasonably Foreseeable Future Actions (within ten years, 1997-2007) (cont.)

| Future Actions | Date | Anticipated Effects |
|---|-------------------------------------|---|
| New road construction associated with exploratory drilling. | Possible sometime during tract life | See minerals discussion for disturbance. All roads and pads would be reclaimed. |
| RECREATION None | | |
| CULTURAL RESOURCES Potential further research done at archeological sites in area. | Possible sometime during tract life | Will require own NEPA analysis, permits and compliance with appropriate laws. |

Appendix C

BLM Standard Coal Lease Terms And Conditions

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

Serial Number

COAL LEASE

PART I. LEASE RIGHTS GRANTED

This lease, entered into by and between the UNITED STATES OF AMERICA, hereinafter called lessor, through the Bureau of Land Management, and (Name and Address)

hereinafter called lessee, is effective (date), for a period of 20 years and for so long thereafter as coal is produced in commercial quantities from the leased lands, subject to readjustment of lease terms at the end of the 20th lease year and each 10-year period thereafter.

Sec. 1. This lease is issued pursuant and subject to the terms and provisions of the:

- Mineral Lands Leasing Act of 1920, Act of February 25, 1920, as amended, 41 Stat. 437, 30 U.S.C. 181-287, hereinafter referred to as the Act;
 Mineral Leasing Act for Acquired Lands, Act of August 7, 1947, 61 Stat. 913, 30 U.S.C. 351-359;

and to the regulations and formal orders of the Secretary of the Interior which are now or hereafter in force, when not inconsistent with the express and specific provisions herein.

Sec. 2. Lessor, in consideration of any bonuses, rents, and royalties to be paid, and the conditions and covenants to be observed as herein set forth, hereby grants and leases to lessee the exclusive right and privilege to drill for, mine, extract, remove, or otherwise process and dispose of the coal deposits in, upon, or under the following described lands:

SEE ATTACHED DESCRIPTION

containing _____ acres, more or less, together with the right to construct such works, buildings, plants, structures, equipment and appliances and the right to use such on-lease rights-of-way which may be necessary and convenient in the exercise of the rights and privileges granted, subject to the conditions herein provided.

PART II. TERMS AND CONDITIONS

Sec. 1. (a) RENTAL RATE - Lessee shall pay lessor rental annually and in advance for each acre or fraction thereof during the continuance of the lease at the rate of \$ _____ for each lease year.

(b) RENTAL CREDITS - Rental shall not be credited against either production or advance royalties for any year.

Sec. 2. (a) PRODUCTION ROYALTIES - The royalty shall be _____ percent of the value of the coal as set forth in the regulations. Royalties are due to lessor the final day of the month succeeding the calendar month in which the royalty obligation accrues.

(b) ADVANCE ROYALTIES - Upon request by the lessee, the authorized officer may accept, for a total of not more than 10 years, the payment of advance royalties in lieu of continued operation, consistent with the regulations. The advance royalty shall be based on a percent of the value of a minimum number of tons determined in the manner established by the advance royalty regulations in effect at the time the lessee requests approval to pay advance royalties in lieu of continued operation.

Sec. 3. BONDS - Lessee shall maintain in the proper office a lease bond in the amount of \$ _____. The authorized officer may require an increase in this amount when additional coverage is determined appropriate.

Sec. 4. DILIGENCE - This lease is subject to the conditions of diligent development and continued operation, except that these conditions are excused when operations under the lease are interrupted by strikes, elements, or casualties not attributable to the lessee. The lessor, in the public interest, may suspend the condition of continued operation upon payment of advance royalties in accordance with the regulations in existence at the time of the suspension. Lessee's failure to produce coal in commercial quantities at the end of 10 years shall terminate the lease. Lessee shall submit an operation and reclamation plan pursuant to Section 7 of the Act not later than 3 years after lease issuance.

The lessor reserves the power to assent to or order the suspension of the terms and conditions of this lease in accordance with, inter alia, Section 39 of the Mineral Leasing Act, 30 U.S.C. 209.

Sec. 5. LOGICAL MINING UNIT (LMU) - Either upon approval by the lessor of the lessee's application or at the direction of the lessor, this lease shall become an LMU or part of an LMU, subject to the provisions set forth in the regulations.

The stipulations established in an LMU approval in effect at the time of LMU approval will supersede the relevant inconsistent terms of this lease so long as the lease remains committed to the LMU. If the LMU of which this lease is a part is dissolved, the lease shall then be subject to the lease terms which would have been applied if the lease had not been included in an LMU.

Sec. 6. DOCUMENTS, EVIDENCE AND INSPECTION. - At such times and in such form as lessor may prescribe, lessee shall furnish detailed statements showing the amounts and quality of products removed and sold from the lease, the proceeds therefrom, and the amount used for production purposes or unavoidably lost.

Lessee shall keep open at all reasonable times for the inspection of any duly authorized officer of lessor, the leased premises and all surface and underground improvements, works, machinery, ore stockpiles, equipment, and all books, accounts, maps, and records relative to operations, surveys, or investigations on or under the leased lands.

Lessee shall allow lessor access to and copying of documents reasonably necessary to verify lessee compliance with terms and conditions of the lease.

While this lease remains in effect, information obtained under this section shall be closed to inspection by the public in accordance with the Freedom of Information Act (5 U.S.C. 352).

Sec. 7. DAMAGES TO PROPERTY AND CONDUCT OF OPERATIONS. - Lessee shall comply at its own expense with all reasonable orders of the Secretary, respecting diligent operations, prevention of waste, and protection of other resources.

Lessee shall not conduct exploration operations, other than casual use, without an approved exploration plan. All exploration plans prior to the commencement of mining operations within an approved mining permit area shall be submitted to the authorized officer.

Lessee shall carry on all operations in accordance with approved methods and practices as provided in the operating regulations, having due regard for the prevention of injury to life, health, or property, and prevention of waste, damage or degradation to any land, air, water, cultural, biological, visual, and other resources, including mineral deposits and formations of mineral deposits not leased hereunder, and to other land uses or users. Lessee shall take measures deemed necessary by lessor to accomplish the intent of this lease term. Such measures may include, but are not limited to, modification to proposed siting or design of facilities, timing of operations, and specification of interim and final reclamation procedures. Lessor reserves to itself the right to lease, sell, or otherwise dispose of the surface or other mineral deposits in the lands and the right to continue existing uses and to authorize future uses upon or in the leased lands, including issuing leases for mineral deposits not covered hereunder and approving easements or rights-of-way. Lessor shall condition such uses to prevent unnecessary or unreasonable interference with rights of lessee as may be consistent with concepts of multiple use and multiple mineral development.

Sec. 8. PROTECTION OF DIVERSE INTERESTS, AND EQUAL OPPORTUNITY. - Lessee shall: pay when due all taxes legally assessed and levied under the laws of the State or the United States; accord all employees complete freedom of purchase; pay all wages at least twice each month in lawful money of the United States; maintain a safe working environment in accordance with standard industry practices; restrict workday to not more than 8 hours in any one day for underground workers, except in emergencies; and take measures necessary to protect the health and safety of the public. No person under the age of 16 years shall be employed in any mine below the surface. To the extent that laws of the State in which the lands are situated are more restrictive than the provisions in this paragraph, then the State laws apply.

Lessee will comply with all provisions of Executive Order No. 11246 of September 24, 1965, as amended, and the rules, regulations, and relevant orders of the Secretary of Labor. Neither lessee nor lessee's subcontractors shall maintain segregated facilities.

Sec. 15. SPECIAL STIPULATIONS.

Sec. 9. TRANSFERS

- This lease may be transferred in whole or in part to any person, association or corporation qualified to hold such lease interest.
- This lease may be transferred in whole or in part to another public body or to a person who will mine the coal on behalf of, and for the use of, the public body or to a person who for the limited purpose of creating a security interest in favor of a lender agrees to be obligated to mine the coal on behalf of the public body.
- This lease may only be transferred in whole or in part to another small business qualified under 13 CFR 121.

Transfers of record title, working or royalty interest must be approved in accordance with the regulations.

(b) **RELINQUISHMENT.** - The lessee may relinquish in writing at any time all rights under this lease or any portion thereof as provided in the regulations. Upon lessor's acceptance of the relinquishment, lessee shall be relieved of all future obligations under the lease or the relinquished portion thereof, whichever is applicable.

Sec. 10. DELIVERY OF PREMISES, REMOVAL OF MACHINERY, EQUIPMENT, ETC. - At such time as all portions of this lease are returned to lessor, lessee shall deliver up to lessor the land leased, underground timbering, and such other supports and structures necessary for the preservation of the mine workings on the leased premises or deposits and place all workings in condition for suspension or abandonment. Within 180 days thereof, lessee shall remove from the premises all other structures, machinery, equipment, tools, and materials that it elects to or as required by the authorized officer. Any such structures, machinery, equipment, tools, and materials remaining on the leased lands beyond 180 days, or approved extension thereof, shall become the property of the lessor, but lessee shall either remove any or all such property or shall continue to be liable for the cost of removal and disposal in the amount actually incurred by the lessor. If the surface is owned by third parties, lessor shall waive the requirement for removal, provided the third parties do not object to such waiver. Lessee shall, prior to the termination of bond liability or at any other time when required and in accordance with all applicable laws and regulations, reclaim all lands the surface of which has been disturbed, dispose of all debris or solid waste, repair the offsite and onsite damage caused by lessee's activity or activities incidental thereto, and reclaim access roads or trails.

Sec. 11. PROCEEDINGS IN CASE OF DEFAULT. - If lessee fails to comply with applicable laws, existing regulations, or the terms, conditions and stipulations of this lease, and the noncompliance continues for 30 days after written notice thereof, this lease shall be subject to cancellation by the lessor only by judicial proceedings. This provision shall not be construed to prevent the exercise by lessor of any other legal and equitable remedy, including waiver of the default. Any such remedy or waiver shall not prevent later cancellation for the same default occurring at any other time.

Sec. 12. HEIRS AND SUCCESSORS-IN-INTEREST. - Each obligation of this lease shall extend to and be binding upon, and every benefit hereof shall inure to, the heirs, executors, administrators, successors, or assigns of the respective parties hereto.

Sec. 13. INDEMNIFICATION. - Lessee shall indemnify and hold harmless the United States from any and all claims arising out of the lessee's activities and operations under this lease.

Sec. 14. SPECIAL STATUTES. - This lease is subject to the Clean Water Act (33 U.S.C. 1252 et. seq.), the Clean Air Act (42 U.S.C. 4274 et. seq.), and to all other applicable laws pertaining to exploration activities, mining operations and reclamation, including the Surface Mining Control and Reclamation Act of 1977 (30 U.S.C. 1201 et. seq.).

Appendix D

Special Coal Lease Stipulations

Appendix D

Special Coal Lease Stipulations (SCLS)

Federal Regulations 43 CFR 3400 pertaining to Coal Management make provisions for the Surface Management Agency, the surface of which is under the jurisdiction of any Federal Agency other than the Department of the Interior, to consent to leasing and to prescribe conditions to insure the use and protection of the lands. All or part of this lease contain lands the surface of which are managed by the United States Department of Agriculture, Forest Service - Manti-La Sal National Forest.

The following stipulations pertain to the Lessee responsibility for mining operations on the lease area and on adjacent areas as may be specifically designated on National Forest System Lands.

Stipulation #1.

Before undertaking activities that may disturb the surface of previously undisturbed leased lands, the Lessee may be required to conduct a cultural resource inventory and a paleontological appraisal of the areas to be disturbed. These studies shall be conducted by qualified professional cultural resource specialists or qualified paleontologists, as appropriate, and a report prepared itemizing the findings. A plan will then be submitted making recommendations for the protection of, or measures to be taken to mitigate impacts for identified cultural or paleontological resources.

If cultural resources or paleontological remains (fossils) of significant scientific interest are discovered during operations under this lease, the Lessee prior to disturbance shall immediately bring them to the attention of the appropriate authority. Paleontological remains of significant scientific interest do not include leaves, ferns or dinosaur tracks commonly encountered during underground mining operations.

The cost of conducting the inventory, preparing reports, and carrying out mitigating measures shall be borne by the Lessee.

Stipulation #2.

If there is reason to believe that Threatened or Endangered (T&E) species of plants or animals, or migratory bird species of high Federal interest occur in the area, the Lessee shall be required to conduct an intensive field inventory of the area to be disturbed and/or impacted. The inventory shall be conducted by a qualified specialist and a report of findings will be prepared. A plan will be prepared making recommendations for the protection of these species or action necessary to mitigate the disturbance.

The cost of conducting the inventory, preparing reports and carrying out mitigating measures shall be borne by the Lessee.

Stipulation #3.

The Lessee shall be required to perform a study to secure adequate baseline data to quantify the existing surface resources on and adjacent to the lease area. Existing data may be used if such data are adequate for the intended purposes. The study shall be adequate to locate, quantify, and demonstrate the interrelationship of the geology, topography, surface and groundwater hydrology, vegetation and wildlife. Baseline data will be established so that future programs of observation can be incorporated at regular intervals for comparison.

Stipulation #4.

Powerlines used in conjunction with the mining of coal from this lease shall be constructed so as to provide adequate protection for raptors and other large birds. When feasible, powerlines will be located at least 100 yards from public roads.

Stipulation #5.

The limited area available for mine facilities at the coal outcrop, steep topography, adverse winter weather, and physical limitations on the size and design of access roads, are factors which will determine the ultimate size of the surface area utilized for the mine. A site-specific environmental analysis will be prepared for each new mine site development and for major improvements to existing developments to examine alternatives and mitigate conflicts.

Stipulation #6.

Consideration will be given to site selection to reduce adverse visual impacts. Where alternative sites are available, and each alternative is technically feasible, the alternative involving the least damage to the scenery and other resources shall be selected. Permanent structures and facilities will be designed, and screening techniques employed to reduce visual impacts, and where possible, achieve a final landscape compatible with the natural surroundings. The creation of unusual, objectionable, or unnatural landforms and vegetative landscape features will be avoided.

Stipulation #7.

The Lessee shall be required to establish a monitoring system to locate, measure and quantify the progressive and final effects of underground mining activities on the topographic surface, underground and surface hydrology and vegetation. The monitoring system shall utilize techniques which will provide a continuing record of change over time and an analytical method and measurement of a number of points over the lease area. The monitoring shall incorporate and be an extension of the baseline data.

Stipulation #8.

The Lessee shall provide for the suppression and control of fugitive dust on haul roads and at coal handling and storage facilities. On Forest Development Roads (FDR), Lessees may perform their share of road maintenance by a commensurate share agreement if a significant degree of traffic is generated that is not related to their activities.

Stipulation #9.

Except at specifically approved locations, underground mining operations shall be conducted in such a manner so as to prevent surface subsidence that would: (1) cause the creation of hazardous conditions such as potential escarpment failure and landslides, (2) cause damage to existing surface structures, and (3) damage or alter the flow of perennial streams. The Lessee shall provide specific measures for the protection of escarpments, and determine corrective measures to assure that hazardous conditions are not created.

Stipulation #10.

In order to avoid surface disturbance on steep canyon slopes and to preclude the need for surface access, all surface breakouts for ventilation tunnels shall be constructed from inside the mine, except at specific approved locations.

Stipulation #11.

If removal of timber required for clearing of construction sites, etc., such timber shall be removed in accordance with the regulations of the surface management agency.

Stipulation #12.

The coal contained within, and authorized for mining under this lease shall be extracted only by underground mining methods.

Stipulation #13.

Existing Forest Service owned or permitted surface improvements will need to be protected, restored, or replaced to provide for the continuance of current land uses.

Stipulation #14.

In order to protect big-game wintering areas, elk calving and deer fawning areas, sage grouse strutting areas, and other key wildlife habitat and/or activities, specific surface uses outside the mine development area may be curtailed during specified periods of the year.

Stipulation #15.

Support facilities, structures, equipment, and similar developments will be removed from the lease area within two years after the final termination of use of such facilities. This provision shall apply unless the requirement of Section 10 of the lease forms is applicable. Disturbed areas and those areas previously occupied by such facilities will be stabilized and rehabilitated, drainages re-established, and the areas returned to a pre-mining use.

Stipulation #16.

The Lessee, at the conclusion of the mining operation, or at other times as surface disturbance related to mining may occur, will replace all damaged, disturbed or displaced corner monuments (section corners, 1/4 corners, etc.), their accessories and appendages (witness trees, bearing trees, etc.), or restore them to their original condition and location, or at other locations that meet requirements of the rectangular surveying system. This work shall be conducted at the expense of the Lessee, by a professional land surveyor registered in the State of Utah, and to the standards and guidelines found in the Manual of Surveying Instructions, United States Department of the Interior.

Stipulation #17.

The Lessees, at their expense, will be responsible to replace any surface water and/or developed ground-water source identified for protection, that may be lost or adversely affected by mining operations, with water from an alternate source in sufficient quantity and quality to maintain existing riparian habitat, fishery habitat, livestock and wildlife use, or other land uses (authorized by 36 CFR 251).

Stipulation #18.

**STIPULATION FOR LANDS OF THE NATIONAL FOREST SYSTEM
UNDER JURISDICTION OF
THE DEPARTMENT OF AGRICULTURE**

The licensee/permittee/lessee must comply with all the rules and regulations of the Secretary of Agriculture set forth at Title 36, Chapter II, of the Code of Federal Regulations governing the use and management of the National Forest System (NFS) when not inconsistent with the rights granted by the Secretary of the Interior in the license/permit/lease. The Secretary of Agriculture's rules and regulations must be complied with for (1) all use and occupancy of the NFS prior to approval of a permit/operation plan by the Secretary of Interior, (2) uses of all existing improvements, such as Forest Development Roads, within and outside the area licensed, permitted or leased by the Secretary of Interior, and (3) use and occupancy of the NFS not authorized by a permit/operating plan approved by the Secretary of the Interior.

All matters related to this stipulation are to be addressed to:

Forest Supervisor
Manti-La Sal National Forest
599 West Price River Drive
Price, Utah 84501
Telephone: 435-637-2817

who is this authorized representative of the Secretary of Agriculture.

Signature of Licensee/Permittee/Lessee

Stipulation #19.

The lessee/operator is responsible for compliance and reporting regarding toxic and hazardous materials and substances under the Clean Water Act and all associated amendments and regulations for the handling of such materials on the land surface and in underground mine workings.

The lessee/operator will be required to remove all mine equipment and materials not needed for continued operations, roof support and mine safety from underground workings prior to abandonment of mine sections. No equipment and materials will be left in the underground workings for the purpose of disposal and cost reduction. Exceptions can be approved by the BLM, in consultation with the surface management agency, if the lessee/operator can demonstrate that removal would cause an unacceptable risk to the safety of mine personnel. Creation of a situation that would prevent removal of such material and equipment by retreat or abandonment of mine sections, without prior authorization would be considered noncompliance with lease terms and conditions and subject to appropriate penalties under the lease.

Prior to lease relinquishment, the lessee/operator must submit a certified statement to the BLM and the surface management agency identifying all mine equipment and materials, excluding waste rock generated by mining, that was left underground. Reporting would also include all hazardous/toxic materials and substances, mine equipment, and solid wastes. Copies of appropriate authorizing documents regarding all such materials left underground shall be provided with the required certified statement.

Stipulation #20.

Notwithstanding the approval of a mine plan by the BLM, lessor reserves the right to seek damages against the operator/lessor in the event (I) the operator/lessee fails to achieve maximum economic recovery [as defined at 43 CFR 3480.0-5(21)] of the recoverable coal reserves or (II) the operator/lessee is determined to have caused a wasting of recoverable coal reserves. Damage shall be measured on the basis of the royalty that would have been payable on the wasted or unrecovered coal.

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