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Environmental Assessment

Lakes and BMG Wildfire Timber Salvage

Jemez and Cuba Ranger Districts, Santa Fe National Forest
Sandoval County, NM

Township 19 North, Range 2 East, Sections 11, 12, 14-16, and 20-23
Township 25 North, Range 1 East, Sections 17-19

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SECTION 1.0 - PURPOSE OF AND NEED FOR ACTION

The Forest Service has prepared this Environmental Assessment in compliance with the National Environmental Policy Act (NEPA) and other relevant federal and state laws and regulations. This Environmental Assessment discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action and alternatives. Supporting documentation, including more detailed analyses of project-area resources and interdisciplinary team meeting notes, may be found in the project planning record located at the Jemez Ranger District Office in Jemez Springs, New Mexico.

1.1 Proposed Action

The Cuba and Jemez Ranger Districts on the Santa Fe National Forest propose to harvest fire-killed trees on approximately 890 acres (in eleven units) of the 4,641 acres that burned in the Lakes and BMG wildfires (Map 1). Existing roads would be used to access harvest units. No live trees[1] would be harvested. Approximately 4 million board feet[2] of wood products would be removed through commercial timber sale contracts, with opportunities for wood products and fire wood collection following salvage operations. More than 90% of the trees proposed for salvage fall below 17 inches in diameter[3], averaging between 11 and 14 inches in diameter. Because of the small size of trees, there is a need to conduct the salvage in the first year, as insect damage after the first year would penetrate deep enough into the wood to make it less viable for use as saw timber or other wood products. As such, this proposed project would be implemented in late summer/fall 2003. Approximately 73% of the fire-killed trees are ponderosa pine, 16% are Douglas-fir, and the remaining 11% are white fir, limber pine, and spruce.

1.2 Purpose & Need for Action

The purpose and need for this project is to **recover the timber value of fire-killed trees** while protecting other resource values. Specific objectives include contributing to the regional economy of northern New Mexico by providing forest-based and wood-products manufacturing jobs, and providing citizens with the opportunity to gather wood-products such as posts and poles, firewood, biomass, vigas, and latillas both for resale and personal use.

[1] For this proposal, any tree exhibiting green needles, buds, or active cambium flow will be considered a live tree.
[2] 4 million board feet is an estimate based on reconnaissance plots, realistically, there will be some loss of wood due to insect infestation, which may result in less volume. There is also a possibility that trees identified as being alive shortly after the fire, may have died over the past year; potentially increasing volume.
[3] Diameter is measured at breast height – 4 ½ feet from the ground.

1.3 Existing Situation and Management Direction

The purpose and need is based on comparing the existing post-fire situation (4,641 burned) with desired conditions including both environmental and socio-economic goals. The agency's socio-economic goals related to salvaging fire-killed trees are described in the Santa Fe National Forest Plan, as well as in Forest Service mission and vision statements. This section summarizes the most relevant existing conditions and desired (Forest Plan) goals, standards and guidelines.

In June 2002, the BMG wildfire burned across 545 acres in a single day, northwest of Llaves and west of State Highway 112. Then in August 2002, the Lakes wildfire burned quickly across portions of Lake Fork Mesa, crossed State Highway 126, and burned across Sandoval Ridge, consuming approximately 4,096 acres. Of the 4,641 total acres that burned in these two wildfires, portions of the areas burned at high intensity over relatively flat terrain and along existing roads. A total of 890 acres in eleven patches (ranging from 12 to 164 acre in size) were identified in these areas where nearly all trees died. These eleven, easy-access patches, were identified as harvest units in this salvage proposal. Forested areas surrounding the eleven units consist of other high-severity burn patches on steep and/or inaccessible terrain within a mosaic of unburned, lightly burned, and moderately burned forest vegetation. Another aspect of the existing situation is the fact that over the past decade, the level of timber harvest on national forest lands has significantly declined, thereby reducing timber-related employment, wood products, and associated socio-economic benefits to northern New Mexico.

The desired situation is one where the public has opportunities to harvest and utilize valuable saw timber and other wood products from fire-killed trees on these national forest lands, while protecting natural resource values. This is consistent with Forest Plan goal to: *Utilize small sales to sanitize stands and salvage timber. These sales will be targeted for the smaller logging and manufacturing interests in local communities* (USDA-FS, 1987, pg 20). The proposal is also consistent with specific management area direction for Management Areas X, E, and R that allow for timber harvest activities including salvage of fire-killed trees.

Units 1-5, a small portion of Unit 6, and Unit 9 are within Management Area X - the Jemez National Recreation Area. The Jemez National Recreation Area Act permits:

> *"…**timber harvesting in the recreation area for commercial purposes**, including (but not limited to) vigas, latillas, the gathering of fuelwood, and for purposes of public safety, recreation, wildlife, and administration insofar as the harvesting is compatible with the purposes of the recreation areas. **Trees damaged or downed due to fire, disease, or insect infestation may be utilized, salvaged, or removed from the recreation area**"* (Public Law 103-104; section 2 (g)).

Units 6-8 lie within Management Area E where management direction identifies salvage as a timber management priority:

> *"Timber emphasis will be to treat stands to provide a uniform age class distribution, including old growth and unevenage. **Priority for treatment will be**:*
>
> ***1. Sanitation and salvage***

2. *Insect and disease management*
3. *Regeneration of mature and overmature stands with high site index values"* (USDA-FS, 1987, pg 119).

Units 10 and 11 are in Management Area R where:

> *"Cultural resource location, inventory, nomination, and protection are emphasized. The emphasis is also on wildlife habitat improvement and essential habitat protection and enhancement. Grazing and* ***timber harvest activities occur where compatible with the primary emphasis of this area. Firewood is provided as a by-product of timber harvest****"* (USDA-FS, 1987, pg 165).

In Management Area R, timber harvest is allowed as long as it meets standards and guidelines for protection of archaeological sites, snags and down logs, and wildlife forage and cover including those specific to oak communities (USDA-FS, 1987, pg. 168; see mitigation measures in Section 2.3).

The proposal is also designed to meet all Forest Plan standards and guidelines for protecting visual quality, soil, water, wildlife, and other resources (see mitigation measures, Section 2.3).

1.4 Decision Framework

Based on the environmental analysis, the Jemez and Cuba District Rangers will decide whether to approve the salvage harvest activities (including associated mitigation measures) as proposed, the salvage harvest alternative, or the no action alternative.

1.5 Public Involvement

This project was included on the Santa Fe National Forest Schedule of Proposed Actions for December 2002 – May 2003, which was mailed to over 100 parties and published on the Internet. In addition, a scoping letter was sent to over 180 potentially interested or affected organizations, agencies, congressional representatives, and citizens on October 2, 2002. A total of 11 comments were received. Six fully supported the proposed project, three were neutral and were accompanied by a request to be kept informed, one supported salvage logging with stipulations, and one opposed salvage logging (Project Record #12).

Additionally, as part of the public involvement process, the agency consulted with Researchers from Northern Arizona University related to research plots that burned on Lake Fork Mesa. The agency informally met with New Mexico Department of Game and Fish, range permittees, and Jemez Pueblo; who expressed support of the proposed salvage project. Field trips were conducted with representatives of the United States Fish and Wildlife Service and the New Mexico Endemic Salamander Team (Salamander Team)[4]. Interdisciplinary team members consulted with other agency representatives throughout the process including the State Historic Preservation Office, Los Alamos

[4] An interagency team responsible for implementing the *2000 Cooperative Management Plan for the Jemez Mountains Salamander.*

National Laboratories, and some landowners in the vicinity of Fenton Lake (Project Record # 4, 8, 10, 13, 19, 21, 23, 25, 26, 32).

1.6 Issues

Using all comments received, the Forest Service interdisciplinary team developed a list of issues to address. The interdisciplinary team grouped and sorted comments received into issues and non-issues. Issues are defined as a concern or debate about the effects of the proposal. Issues were further categorized as key issues (used to develop alternatives to the proposed action) and other issues (addressed through mitigation measures common to all alternatives). The effects related to all issues are discussed in Section 3, emphasizing key issues and de-emphasizing other issues. Comments not considered issues to analyze in this EA were those:

1. Outside the scope of the proposed action/purpose and need, thus irrelevant to the decision to be made;
2. Already decided (impacts avoided) by law, regulation, or other higher-level decision;
3. Conjectural and not supported by scientific or factual evidence.

A list of non-issues and reasons regarding their categorization is in the project record (# 14 and 18).

1.6.1 Key Issue

Wildlife: Proposed salvage activities in the Lakes wildfire, primarily on Sandoval Ridge, could cause disturbance to Jemez Mountains salamander habitat or inadvertently kill individual salamanders if they are present on the surface during salvage operations. The Jemez Mountains salamander is designated as a sensitive species[5]. Salvage units in the Lakes wildfire area are within potential salamander habitat per the *Cooperative Management Plan for Jemez Mountains Salamander* (New Mexico Endemic Salamander Team, 2000) and units 6-8 are within the "essential survey zone". Removing most of the fire-killed trees (snags) in these units would reduce the number of large down logs available for salamander habitat in the future.

Proposed logging in units 10 and 11 of the BMG wildfire area could cause auditory or visual disturbance to peregrine falcons that may use the surrounding area. Alternative 3 was developed to respond to wildlife issues. It eliminates Lakes wildfire units 6-8 in the essential salamander survey zone and BMG wildfire units 10 and 11 near suitable breeding habitat for the peregrine falcon.

1.6.2 Other Issues

The following issues are addressed by required or routinely used mitigation measures that are included in all action alternatives. These mitigations reduce potential impacts to an inconsequential level (see mitigation measures in Section 2.3). These measures have been shown to be effective on many salvage timber harvest projects implemented over the past several decades in the western U.S. The negligible effects associated with

[5] Region 3 sensitive species are those plant and animal species identified by a Regional Forester for which population viability is a concern; however, they are not considered federally threatened or endangered.

these issues are briefly described in Section 3, with an explanation of why they do not warrant further analysis.

Salvage harvest operations could affect:

Soil/Water: by increasing soil compaction, erosion, water runoff, soil productivity, and stream sedimentation.

Wildlife: by reducing the number of snags and future down logs that are important wildlife habitat components for many species - providing roosting/perch sites and habitat for prey species.

Safety/Recreation/Scenery: by impeding traffic flows and increasing traffic safety hazards for recreation users along log truck haul routes; and by leaving tree marking paint, tree stumps, slash piles, skid trails, log landings and other visible by-products that reduce visual quality.

Air: by increasing dust along haul roads that may exacerbate existing dust impacts to research equipment at the Milagro research site on Fenton Hill.

Heritage Resources: by increasing the risk of damage to heritage resources from the use of heavy log skidding equipment.

Oil pipelines: by increasing the risks of damage to shallow buried pipeline, located in the vicinity of units 10 and 11, from the use of heavy log skidding equipment.

SECTION 2.0 - ALTERNATIVES, INCLUDING THE PROPOSED ACTION

This section consists of four parts. Section 2.1 describes the three alternatives considered in detail for this project. Section 2.2 describes four additional alternatives considered but dropped from further study. Section 2.3 lists the mitigation measures associated with the salvage harvest alternatives. Section 2.4 presents the alternatives in comparative form, sharply defining the differences between each alternative and providing a clear basis for choice among options for the decision maker and the public.

2.1 Alternatives

2.1.1 Alternative 1 - No Action

Under the No Action alternative, no timber salvage would occur within the boundary of the Lakes and BMG wildfires. Other public land uses and management activities would continue in this area, as described in Section 3.1.

2.1.2 Alternative 2 – Proposed Action

This alternative was developed to meet the purpose and need by recovering approximately 4.0 million board feet of wood products from harvesting fire-killed trees on approximately 890 acres in eleven units within the boundary of the Lakes and BMG wildfire areas (Map 1). This volume would be offered in one or more small timber sales. Following salvage activities, there would be opportunities for wood products and fire wood collection within portions of both wildfires.

No live trees would be harvested. Standard ground-based logging systems would be employed. Only existing roads would be used; no new roads would be constructed or reconstructed. Standard road maintenance would occur as necessary for road use by logging trucks to ensure proper drainage, reduce erosion, and facilitate safe public access. No mature or old growth stands would be harvested, and more than 90% of the trees proposed for salvage are less than 17 inches in diameter, averaging between 11 and 14 inches in diameter (see section 2.3 for mitigation measures that are included with this alternative).

Because of the small size of trees, there is a need to conduct the salvage in the first year, as insect damage after the first year would penetrate deep enough into the wood to make the lumber less viable as saw timber or other wood products. As such, this proposed project would be implemented in late summer/fall 2003.

The following table indicates the size of units, approximately number of landings to be constructed (no more than one landing per 15 acres), roads to be used, and approximate board feet available in each unit.

Table 1. Alternative 2: Proposed Salvage Units

	Unit	Acres	MBF	Landings	Existing Road Access
Lakes Wildfire					
	1	77	292	5	FR 377T, 377S
	2	164	627	6	FR 377 IA, 377J, 377K, 377L, 377M, 377N, 377NA, 377R,
	3	106	400	7	FR 377I, 377IA
	4	36	135	2	FR 377G, 377E
	5	48	188	3	FR 377DA
	6	150	894	10	FR 126 DA, 126 DH, 126 DJ, 126HA
	7	22	128	1	FR 126 DF, 126 DFB
	8	12	73	1	FR 126 DE
	9	58	343	3	FR 376
BMG Wildfire					
	10	111	466	4	FR 313B, 313BB
	11	106	445	6	FR 522B, 522BB
Total		**890**	**3991**	**48**	

2.1.3 Alternative 3 - Lake Fork Salvage; Drop Sensitive Wildlife Units

This alternative was developed to address the key wildlife issues, by eliminating salvage units 6-8 on Sandoval Ridge to avoid potential impacts to Jemez Mountains salamander, and units 10 and 11 to avoid potential disturbance to peregrine falcon. It involves the same activities and design features as Alternative 2. It was also developed to partially meet the purpose and need by recovering approximately 2 million board feet of wood products from fire-killed trees in the Lake Fork Mesa area (Map 2).

Table 2. Alternative 3: Lakes Salvage; Drop Sensitive Wildlife Units.

Unit #	Acres	MBF	Landings	Existing Road Access
1	77	292	5	FR 377T, 377S
2	164	627	6	FR 377 IA, 377J, 377K, 377L, 377M, 377N, 377NA, 377R,
3	106	400	7	FR 377I, 377IA
4	36	135	2	FR 377G, 377E
5	48	188	3	FR 377DA
9	58	343	3	FR 376
Total	**489**	**1985**	**26**	

Table 3. Summary of Alternatives.

	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3 Lake Fork Mesa Salvage
Units	0	1-11	1-5, 9
Acres to be salvaged	0	890	489
Percent of Lakes wildfire (4096 acres)	0	16%	12%
Percent of BMG wildfire (545 acres)	0	40%	0
Harvest Volume (million board feet)	0	~4.0 MMBF	~2.0 MMBF

2.2 Alternatives Dropped from Detailed Analysis

2.2.1 Winter Logging

An alternative was considered that would limit harvest activities to times when the ground was frozen or snow covered, to protect soil.

This alternative (suggested in a public comment letter) was dropped from further analysis because it would not fulfill the purpose and need. The delay in harvest time to winter days when the ground freezes or is covered with snow would result in a substantial decrease in value of wood product removed due to insect infestation, rot, fungus, wood staining, weathering, and cracking. The greatest loss of saw log value would occur in the BMG wildfire area and along Lake Fork Mesa. The BMG wildfire occurred in June and has already been exposed to one summer of insect infestation. A delay until winter of 2003 would result in two summers of insect damage. While the Lakes wildfire occurred in late August and was not exposed to a full season of insect damage and weathering, the size of trees along Lake Fork Mesa averages 11 inches in diameter. As such, one full season of delay would significantly decrease the economic viability of the trees. This estimated loss of wood recovery value is partially based on what occurred after two years of insect damage following the Viveash fire on the Pecos/Las Vegas Ranger District. The two-year delay caused many fire-killed trees to rot and lose their timber value, significantly reducing the economic viability of the salvage wood (Malecek, personal communication, 2002).

2.2.2 Expand Area to be Salvaged

An alternative was considered that would salvage on a larger portion of the 4,641 acres that burned in the two wildfires. It would include additional burned areas along Sandoval Ridge and below Lake Fork Mesa near Fenton Lake, and could include the opportunity to salvage living trees damaged by fire, insects and disease. This alternative was based on a public concern that proposed salvage on less than 1/5th of the total area burned does not go far enough to meet the purpose and need of recovering the timber values available in this fire damaged area.

This alternative was dropped from further analysis primarily because it would not be economically feasible or practical to implement. Most of the moderately to severely burned areas from Lakes and BMG wildfires do not have an adequate road network for salvage operations. In addition, constructing new roads on national forest land such as in the Lake Fork area would likely result in adverse impacts inconsistent with Forest Plan standards, due to steep slopes and proximity to Fenton Lake State Park and nearby private land.

Probable resource impacts associated with constructing roads on those slopes include increases in invasive non-native plants, soil and water impacts, wildlife habitat disturbance, impacts to non-motorized recreation opportunities, and others. Road access through private land would also be needed. It is not economically reasonable to expend large sums of money to build new roads through the forest that have some negative impacts in order to extract a product of low economic value (small, burned trees with partial deterioration). Additionally, there are other salvage opportunities on the Santa Fe National Forest being planned or implemented that are expected to provide social and economic benefits to northern New Mexico such as the Borrego Salvage Project on Espanola Ranger District and Viveash Salvage Project on Pecos/Las Vegas Ranger District.

2.2.3 Leave 7-10 Snags on Each Acre of Salvage

An alternative was considered that would require leaving 7-10 snags on every acre of land salvaged. This alternative was suggested in a public response letter and was considered as it related to wildlife habitat concerns.

This alternative was dropped from further consideration. The Santa Fe National Forest Plan and associated Final Environmental Impact Statement (USDA-FS, 1987) provides guidance on the number of snags per acre related to wildlife needs. Forest wide standard and guidelines state, *"Manage for 220 natural snags per 100 acres on a minimum of 40% of the ecosystem area with emphasis on peripheral edges of openings."* The Plan also states, *"Areas unavailable for harvest are considered as part of the 40% as long as good spatial distribution is maintained"* (page 72). Specific to Management Area R (units 10 and 11 within the BMG wildfire) the plan provides a standard and guideline of "*Manage 75% of the forested acreage to have a minimum of 220 snags per 100 acres"* (page 168).

Mitigation measures for the proposed salvage sale have been developed that go beyond Forest Plan guidelines, ensuring ample retention of snags for wildlife species habitat. Furthermore, under the proposed action, salvage activities are identified to occur on only 16% of the Lakes wildfire and on less than 40% of the BMG wildfire. Leaving large portions of these wildfire areas untouched will provide for a significantly high number of snags in both wildfire areas.

2.2.4 Drop Units on Lake Fork Mesa and in the BMG Area to Protect Soils

An alternative was initially developed to address potential issues related to harvesting on fragile or impaired soils. The alternative was suggested in an initial internal interdisciplinary meeting. It involved the same activities and design features as the proposed action (Alternative 2), however it eliminated BMG wildfire area units (10, 11) and Lakes wildfire units 1-5 based on possible hydrophobicity and anticipated sensitive

soils. The alternative would have limited harvest activities to units 6-9 within the boundary of the Lakes wildfire.

This alternative was dropped from further analysis because soil analysis and field inspections by soil and water specialists found little to no hydrophobicity, and determined there was no significant issue related to sensitive soils. The proposed action will leave slash on the ground that will offer additional protection to soils. This combined with other components of the proposed action (including logging on generally flat ground, limiting skid trails, no new road construction, and implementing a variety of mitigation measures) will result in more beneficial effects to soil within units 1-5, 10, and 11 than no salvage as proposed in this alternative. The effects analysis section provides more detail related to the beneficial effect to soil resulting from proposed salvage in these areas.

2.3 Mitigation Measures Common to All Alternatives

In response to public comments on the proposal, mitigation measures were developed to eliminate or reduce potential impacts under the various alternatives. Unless otherwise noted, the mitigation measures will apply to all action alternatives.

2.3.1 Soil and Water

The following measures are required to minimize excessive soil erosion or sediment runoff from salvage operations. They are based on the Best Management Practices (BMPs) listed in Forest Service Handbook 2509.22 *Soil and Water Conservation Practices Handbook,* and BMPs listed in the Forest Plan.

GIS data indicate proposed harvest units occur on slopes well under 40% (project record #37); however, in the event that a small area (less than a few acres and not easily identifiable on GIS maps) exceeds 40% slope, operation of heavy logging equipment (such as skidders) will not be permitted on slopes in excess of 40% (USDA-FS, 1987, pg. 73).

Cut treetops and other slash will be retained on site, to help avoid soil erosion and water or sediment runoff, as well as to enhance soil moisture and vegetative recovery. Mechanized slash piling or manipulation with bulldozers will be prohibited, to further protect the topsoil from excessive movement or mixing.

Specific to Unit 9, the road surface will be properly drained using bar ditches and wing ditches to redirect water from running down the center of the road; rather, runoff will be directed toward a nearby large meadow. Operation of heavy equipment will not be permitted within the meadow.

After operations, all landings and skid trails will be properly drained using waterbars as needed to minimize erosion and runoff. They will be ripped and seeded as needed to ensure prompt revegetation with grasses and forbs, to reduce potential erosion and runoff (USDA-FS, 1987, pg. 78).

Skid trails and landings will be located along existing roads and old skid trails, and landing will not exceed one per 15 acres, to minimize the amount of new ground disturbance and soil impacts. Landings will be located on flat ground to avoid soil erosion and water runoff. Following harvest, skid trails and landings will be restored to vegetative productivity by seeding where necessary with weed-free seed mixtures.

2.3.2 Wildlife

Excluding the Sandoval Ridge area (units 6-8), at least 220 snags per 100 acres (proportionate to the existing species and size classes) will be retained within the burned area landscape, preferably in clumps of 2-5 trees interspersed with some individual trees. This will leave more snags than required by forest-wide and Management Area R standards, to meet the needs of snag-dependent species as well as providing future down logs (USDA-FS, 1987, pp. 72, 168).

At least 5 logs per acre in various stages of decomposition will be retained, preferably selecting those with the largest diameter and at least 15 feet in length, to meet the needs of species that use down logs, including Jemez Mountains salamander (USDA-FS, 1987, pg. 52).

Jemez Mountains salamander – mitigations for units 6-8 on Sandoval Ridge

Salvage activities will not be allowed between July 1 or the onset of the rainy season (whichever comes first) and October 15, to minimize the risk of mortality to salamanders from heavy equipment. Dates are from recommendations by the Salamander Team, based on when salamanders typically surface.

At least 10% of the existing snags greater than 9 inches in diameter will be retained. All Douglas-fir snags 20 inches in diameter or greater[6] will be retained. This will provide additional snags and future down logs to enhance salamander habitat. It is estimated that at least 6 large snags per acre will be retained, based on stand exam data.

Skidding or yarding whole trees will be prohibited and cut treetops and slash will be left on the ground to provide down wood (approximately 10-15 tons per acre) to enhance salamander habitat.

Public firewood gathering will not be permitted in occupied Jemez Mountains Salamander habitat, to provide additional down wood to enhance salamander habitat (USDA-FS, 1987, pg 63).

Jemez Mountains salamander – units 1-5 and 9 – Lake Fork Mesa area

Other units within potential suitable salamander habitat will be surveyed during the rainy season (typically July-August). If no salamanders are located, salvage activities may be initiated following the survey. If salamanders are found, skidding or yarding whole trees will be prohibited and cut treetops and slash will be left on

[6] A reconnaissance survey estimated that there are approximately 500 Douglas-fir trees at least 20 inches in diameter along Sandoval Ridge.

the ground to provide down wood (approximately 10-15 tons per acre) and public firewood gathering would not be permitted.

Mexican spotted owl –

Within Unit 6, salvage activities will not occur within the Protected Activity Center for the Mexican Spotted owl during the March 1 – August 31 breeding season (USDI – USFWS, 1995; USDA-FS, 1987, Appendix D, pg 2)[7].

Peregrine falcon –

To avoid disturbing falcons during their breeding season (USDA-FS, 1987, pg 63) Salvage in Unit 10 will not occur from March 1 - August 15 unless surveys confirm no falcons are present. An initial survey on April 17, 2003 revealed no nesting falcons; however, because some late migrating falcons can move into suitable breeding habitat later in the spring (Johnson, 2002 personal communication), a second survey will be conducted after May 15, 2003. If no falcons are present, the seasonal restriction on Unit 10 will be dropped.

Northern goshawk –

Prior to initiating salvage activities, a goshawk survey in and around proposed salvage units will be completed. If a goshawk nest site is found in or adjacent to salvage units, salvage activities will not be permitted between March 1 and September 30, within the designated post-fledgling area to avoid disturbance to goshawks during their breeding season (USDA-FS, 1987, Appendix D, pg 6 and 10).

2.3.3 Recreation and Scenery

No log hauling will be permitted during weekends and holidays during the period of peak recreation use (Memorial day through Labor day), in order to minimize potential traffic safety hazards or impacts to recreational traffic flows.

Units 6-8 will be irregularly shaped and contain snags and down logs, to help them blend with adjacent areas that burned more moderately, and maintain visual variety in accordance with Visual Quality Objectives for "partial retention" in Management Area E (USDA-FS, 1987, pg. 119).

In the immediate foreground[8] of Unit 9 along Forest Road 376, apply the following measures in order to meet the Scenic Integrity Objective of "high", in accordance with the Jemez National Recreation Area Management Plan and Forest Plan Amendment (USDA-FS, 2003):

- Tree marking paint will placed on the side of the tree facing away from the road (excluding unit boundary paint).
- Stumps will be no higher than six inches (when operationally safe) and cut with the surface angle facing away from the road.

[7] Salvage logging within this Protected Activity Center (PAC) is covered under Guideline 8 under management in the Mexican Spotted Owl recovery plan (pg 88): *If a stand-replacing fire occurs within a PAC, timber salvage plans must be evaluated on a case-specific basis*. This guidance along with consultation with US Fish and Wildlife Service, and the lack of live trees I the salvage sale unit would negate Guideline #2: *No harvest of trees greater than 9 inches in diameter is allowed in PACs*.

[8] Immediate foreground as defined in the Santa Fe National Forest Plan consists of five chains (330 feet).

- Landings will be restored to original or characteristic contours, and native vegetation reestablished within one year of project completion.
- Slash accumulations will be less than 18 inches high, and disposed of within one year of project completion (USDA-FS, 1987, pg 109).

2.3.4 Vegetation

The standard Forest Service contract clauses for avoiding invasive non-native plants (weeds) will be employed. The logging contractor will insure all equipment moved onto the National Forest is cleaned and free of soil, seeds, and vegetative matter or other debris that could contain or hold seeds, and will notify Forest Service prior to moving each piece of equipment onto National Forest so it may be inspected.

2.3.5 Air

To minimize dust near the Milagro research facility, dust abatement (typically water) will be applied along the first ½ mile of Forest Road 377 from its junction with State Highway 126 to where it passes by the facility. The sale administrator may require the contractor to water other roads if dust from log trucks is impacting other sites or people.

2.3.6 Heritage Resources

To ensure protection of historic and prehistoric sites, a 50-meter length of Forest Road 522 will be plated[9] to protect a sensitive heritage resource site. Heritage resource sites within salvage units 10 and 11 will be flagged or painted prior to implementing timber harvest and other wood product gathering activities to ensure all sites will be avoided by project activities. Heritage resource sites will be monitored during project implementation for disturbance and vandalism.

2.3.7 Oil Pipelines

Prior to using any heavy equipment within units 10 and 11, the Sale Administrator will coordinate with BMG Drilling Corporation to identify and mark locations of lightly buried pipelines. If pipelines occur within harvest units and cannot be avoided by heavy equipment, earth ramps will be constructed over pipeline crossing areas. Earth ramp specifications (width, depth, length) will be determined through consultation with BMG Drilling Corp. personnel.

[9]Several inches of dirt and/or gravel will be placed on the existing roadbed, essentially burying the existing, exposed road surface.

2.4 Comparison of Alternatives

This section compares the effects of implementing each alternative, to provide decision makers and the public a clear basis for choice. The table summarizes the more detailed effects analysis descriptions contained in Environmental Consequences, Section 3.0.

Table 4. Comparison of Effects by Alternative.

	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3 Lake Fork Mesa Salvage
Purpose and Need Recover the timber value of fire-killed trees while protecting other resource values	0 MMBF wood recovery. $0 product value provided No opportunity for firewood or small product collection	4 MMBF wood recovery. $880,000 product value Firewood and small product opportunities for communities in Jemez and Cuba area	2.0 MMBF wood recovery. $470,000 product value Firewood and small product opportunities for communities in Jemez. No opportunity in Cuba area
Key Issue: Wildlife Impacts to Jemez Mountains salamander and peregrine falcon and their habitats.	No risk of site disturbance to salamanders or breeding falcons. No reduction of snags and future down logs.	Risk of impacts to individual salamanders Risk of disturbance to potential peregrine falcon eyrie near Unit 10. Seasonal restrictions meet standards and conservation measures to protect both these species. Reduction of snags and future down logs on 890 acres	Lower risk of impacts to individual salamanders. No risk of disturbance to potential peregrine falcon eyrie as Unit 10 would not be logged. Seasonal restrictions meet standards and conservation measures to protect both these species. Reduction of snags and future down logs on 489 acres

SECTION 3.0 - ENVIRONMENTAL CONSEQUENCES

This section describes the physical, biological, social and economic environmental effects of implementing the proposed action and the potential changes to those environments due to implementation of the alternatives. This analysis is organized by resource. Within each section, the affected environment is briefly described first, followed by the effects (direct, indirect, and cumulative) of each alternative. The no action alternative provides a baseline for evaluation and comparison of the action alternatives that follow.

Cumulative effects are the incremental and additive effects from other activities that add to the effects of the management alternatives analyzed in this EA. In assessing cumulative effects, the interdisciplinary team considered past, present, and reasonably foreseeable future land use activities on federal and non-federal lands within and surrounding the project area. Foreseeable future activities only include those that have been proposed for NEPA analysis in the near future or a NEPA decision has already approved implementation of the action. Other possible future actions were considered too speculative to include in the cumulative effects analysis.

3.1 Past, Present and Foreseeable Future Actions

Vegetation Management including Timber Harvest, Thinning, Research, and Invasive Plants – The Barley Timber sale occurred in the late 1980s and early 1990s in the vicinity of Sandoval Ridge. This same area has been open to public Christmas tree cutting for the past decade. Areas that were cut under the timber sale burned at lower intensity during the Lakes wildfire. Roads associated with the timber sale are still present but are gated and closed to public use. Other areas have not been actively harvested for timber; however, public firewood collection has occurred in the past in the vicinity of the BMG wildfire and personal use permits have been provided to individuals for collecting aspen saplings along Lake Fork Mesa near Fenton Hill.

Four fire surrogate research plots (totaling 200 acres) were measured in 2001 by Northern Arizona University along Lake Fork Mesa. The University is interested in continuing research in these plots (John Bailey, 2002). With respect to Invasive plants, the Forest Service is in the process of finishing an EIS to address introduction and control of non-native species (weeds).

Wildfires and Rehabilitation – The Cebollita Wildfire occurred in 1971 along the eastern portion of Lake Fork Mesa. The resulting fire scar revegetated primarily with aspen. The Lakes wildfire occurred on August 2002. Seeding and contour felling occurred on portions of the Lake Fork Mesa as well as below the mesa top as part of Burned Area Emergency Rehabilitation activities. Limited mulching and seeding is proposed this spring in the northern portion of the BMG wildfire. As part of standard operating procedure, fire lines (hand and mechanical) were rehabilitated immediately following the recent wildfires.

Roads / Road Construction - Existing roads are present in all areas proposed for salvage. Roads in the vicinity of Sandoval Ridge were constructed for the Barley Timber sale and were subsequently been gated for administrative use only. Roads on Lake Fork Mesa are open to the public but receive low public use. Roads in the BMG area access BMG oil and gas facilities and are used by recreation users to access non-system trails in nearby cliffs. Forest Road 376 is a major travel corridor adjacent to Unit 9 and receives heavy use in the summer – particularly on weekends from recreation users. Portions of the road follow the alignment of an old railroad bed associated with logging in the early twentieth century that once ran up the canyon. In the past five years this travel corridor has been improved through resurfacing, replacing culverts, and improving drainage. Following the Lakes wildfire, new culverts were installed and surface drainage along the road was diverted into bar ditches and wing ditches in order to direct runoff into a large meadow area rather than directly into the stream channel. No new roads are proposed in any areas.

Livestock Grazing – Livestock grazing (sheep and cattle) is an historic use in the area – the largest allotment being located on the old San Diego Land grant managed privately until Forest Acquisition in the late 1960s. Currently all salvage units are located within designated cattle allotments.

Forest Service Administration and Other Special Use Sites – Los Alamos Labs previously managed a Hot Dry Rocks (geothermal) research site on Fenton Hill. Facilitates associated with the site included large tarp lined pits, buildings, and fences. When the site closed, some equipment was removed and some areas rehabilitated. Los Alamos labs currently manages the Milagro astronomy research site on Fenton Hill. The Forest Service manages an administrative site adjacent to the Lab facilities. A storage warehouse (primarily for fire equipment/supplies), housing trailers, a small cabin, helispot, and associated roads are present. To access salvage units on Lake Fork Mesa, vehicles pass by the above listed facilities. The BMG (Benson Montane Greer) oil and gas facility is located within the BMG wildfire and adjacent to salvage units. An airstrip is also present.

Wildlife and River/Fish Management – The Respect the Rio projects includes proposals to divert recreation use (vehicles and camping) away from the Rio Cebolla and Rio Guadalupe (near Unit 9), adding protection to wildlife using riparian areas. Fishing is a popular activity along these streams. No other areas contain streams. Following the Lakes wildfire, BAER treatments included replacing down logs in Jemez Mountain Salamander occupied habitat along Sandoval Ridge.

Private Lands – Private Land Owners in the vicinity of Fenton Lake salvaged timber off their lands in the Fall (2002) and Spring (2003) following the Lakes Wildfire.

Recreational Uses – Fenton Lake is located west of Lake Fork Mesa and Sandoval Ridge. The lake is a popular recreation destination in the summer months and is managed by the State. Past and current recreation use in the majority of the salvage areas is considered very low. Use is considered dispersed (there are no developed recreation sites or trails in any of the salvage areas). Recreation use along Forest Road 376 (Unit 9) is high and is anticipated to increase in the future due to accessibility and growth in nearby urban areas.

The Jemez National Recreation Area Management Plan proposed to close non-system roads along this travel corridor. The Respect the Rio Project includes proposals to construct parking areas along the corridor to control random off-road parking, which often occurs in sensitive meadow areas. In the BMG area, a limited number of recreation visitors park in the vicinity of the Oil and Gas facility and hike up to cliff houses. This informal parking is likely to continue in the area. The BMG drilling company has proposed realigning Forest Road 313 through their site to divert recreation users from driving through and parking at their facility.

3.2 Soil and Water

3.2.1 Affected Environment

Lakes wildfire - The Lakes wildfire burned within the Rio Guadalupe 5th code watershed. This watershed has water quality limited segments (New Mexico Water Quality Control Commission, 2002) within the fire perimeter. The Rio Cebolla from Fenton to the headwaters exceeds the state standard for temperature and stream bottom deposits and the segment from Rio de las Vacas to Fenton is listed for stream bottom deposits. With the exception of Unit 9[10], proposed salvage logging units are not located along stream courses – rather they are located along the generally flat topography associated with Lake Fork Mesa and Sandoval Ridge, well out of drainage bottoms. Area soils are derived from volcanic tuff bedrock and described as having a sandy loam or cobblely sandy loam texture.

Immediately following the Lakes wildfire, a BAER (Burned Area Emergency Rehabilitation) team was called in to determine values at risk and to prescribe treatments. The BAER team categorized the fire by severity, noting approximately 840 acres burned at high severity with an estimated 300 acres exhibiting hydrophobicity (water-repellant conditions). High severity impacts such as hydrophobicity occur when litter, duff, small woody debris, and logs are completely consumed (Robichaud et al, 2000). Areas burned at high severity were aerially seeded (primarily on mesa tops and gentle slopes where seeding would be effective) and log erosion barriers were placed in drainages on less than 35% slopes (overlapping portions of salvage units 1-4 and 6). The Terrestrial Ecosystem Survey for the Santa Fe National Forest was used to determine soil condition prior to the Lakes wildfire. It indicated that estimates of current soil loss were well within tolerable levels.

Following the Lakes wildfire, various resource specialists and a soil scientist inspected the area to determine if the estimated pre-fire soil loss rates were accurate and is conditions had changed following the fire. In late fall 2002, recent aspen sprouts and other shrubs were observed to be successfully regenerating in patches along Lake Fork Mesa and Sandoval Ridge. Duff, including burnt needles, had fallen in both these areas and in places cool season grasses were sprouting. On a recent (April 2003) field visit, no mass movement or rilling was observed along Lake Fork Mesa (encompassing portions of units 1-5). No hydrophobic soils were observed and soil moisture from recent

[10] Unit 9 is adjacent to but does not cross an ephemeral drainage. The unit lies outside of and to the north of the drainage bottom.

snowmelt was observed in areas along the west side of the mesa and to a greater extent as one moved eastward along the mesa top. A layer of duff was also observed on the mesa top. At the base of Lake Fork Mesa (Unit 9), a large amount of organic duff was observed in the southern portion of the unit as one moved closer to the drainage bottom. The northern portion of the unit contained less ground cover as it burned at higher intensity; however, no hydrophobic soils were observed. While portions of Sandoval Ridge (units 6-8) burned at high severity, no mass movement of soil was noted and no hydrophobicity was observed. Soils were moist from recent snowmelt. While patches of ground exhibited little duff other areas contained organic duff was observed with a more recent layer of needle cast. Thus, post-fire field examinations concluded soils in the Lakes wildfire area were in good condition.

BMG wildfire - The BMG wildfire is located in the Rio Puerco 5th Code Watershed. There are no perennial streams and thus there are no water quality limited segments in the area of the burn. Topography in the area is irregular with gentle slopes, intermittent drainages, interspersed with steep sided ridges referred to as "hogbacks". Soils consist of sandy clay loams derived from sedimentary sandstone. A BAER assessment was not completed for this fire due to its relatively small size and the limited acreage that burned at moderate to high severity; however, the northern portion of the fire was seeded and mulched by District employees following the wildfire. No treatment occurred on the remaining portions of the fire.

Prior to the wildfire, soil conditions were rated as impaired, because grassland areas were being encroached upon by piñon-juniper. The Terrestrial Ecosystem Survey indicated that estimated pre-fire soil loss was exceeding tolerance levels in the vicinity of Unit 10 (USDA-FS, 1993). Post-fire inspections conducted in Spring 2003 noted scatter pockets of grass and recovering ground vegetation; but in general, limited duff and live ground cover was noted in areas inspected (primarily in the southern, untreated areas). It was also observed that there are fewer trees in the BMG area, which could explain the lack of duff cover, particularly pine needles. Despite the high intensity fire and general lack of ground cover, areas of hydrophobicity were not observed. Rather, moisture was noted near the surface and infiltration was occurring. On steeper slopes, surface runoff was observed and sediment (but no debris jams) was noted in a partially plugged culvert near Unit 11.

3.2.2 Environmental Consequences

Review of Scientific Literature Related to Post-fire Effects of Salvage Logging

In considering effects to soil and water resulting from salvage logging, a review of current literature is appropriate.

Beschta et.al (1995)[11], argues *"There is no ecological need for immediate intervention on the post-fire landscape,"* citing agencies run the risk of creating new problems before old ones are solved, and due to the high degree of variability and uncertainty concerning impacts of post-fire responses, a conservative approach is warranted, particularly on sites

[11] The Beschta et.al document is a post-fire management position paper written in response to concerns about salvage logging in the Pacific Northwest. Numerous papers were written in response to the report that provide different viewpoints and scientific information.

susceptible to on-site erosion. Beschta recommends allowing natural recovery over human intervention, further noting that no management activity should be undertaken which does not protect soil integrity. In the case where salvage logging is deemed appropriate, Beschta provides numerous recommendations, some of which are presented here:

- Leaving at least 50% of standing dead trees,
- Leaving trees greater than 20 inches in diameter,
- Leaving live trees,
- Prohibiting the building of new roads

In a later paper, Beschta notes that salvage logging can sometimes be accomplished from an existing road network and in such situations, the simple rule of excluding salvage logging in all burned areas would not seem prudent (Ice and Beschta, 1999). McIver and Starr (2000) note the bulk of soil erosion and compaction problems associated with postfire logging are due to road construction and use of skid trails.

In a review of Beschta et.al., Everett (1995) states, *"There is no simple, clear answer in post-fire management, only one of weighing the multiple hazards present and biological and economic costs associated with alternative post-fire management actions, including no action."* As resource conditions differ from site to site, the land manager is responsible to integrate and apply scientific positions on local site conditions. In a general review of Beschta's recommendations, Everett notes, numerical limits on salvage logging such as leaving at least 50% of snags and all trees greater than 20 inches are not applicable. More appropriately, agencies should leave historical amounts of snags and logs to benefit wildlife and soils, and while additional amounts can be left to facilitate other management objectives, they should be balanced against other site-specific factors.

Ice (1995) agreed with Everett related to sensitive areas needing to be considered in a salvage operation on a case-by-case basis rather than by "one-size fits all recommendations" as proposed by Beschta. In response to the statement that *"There is no ecological need for immediate intervention on the post-fire landscape,"* Ice noted there are often compelling social reasons such as the potential to salvage valuable timber. Ice also noted there is an economic loss beginning immediately after the death of the trees that supports the argument for a rapid salvage of timber to avoid additional losses of value. Evers (2002), stated that meeting an economic objective is a valid use of forests, particularly where law or land management plan decisions specify timber production as a primarily goal or objective.

These differing viewpoints were considered in analyzing the site-specific effects of the proposed salvage sale.

Soil

Alternative 1 – The no action alternative likely best fits the passive management called for in the Beschta et. al. report as no salvage harvesting would occur. There would be no potential for harvest-related increases in compaction or erosion, however, accelerated erosion and soil loss rates would continue to occur throughout the wildfire areas, primarily in those areas where effective post-fire ground cover has not yet established. This effect would likely to continue for up to five years, based on experience with past fire recovery areas (Dome Wildfire in 1996 and Cerro Grande Wildfire in 2000).

Alternative 2 – Proposed activities would not likely result in any adverse impacts to soil properties or recovery of potential vegetative/site productivity, including any noticeable erosion or surface runoff problems from ground-based skidding of logs to the roads. The determination that this project would have a low probability of any unacceptable adverse impacts to soil and water resources is based on several factors:

- **No new roads are proposed** and as such, there would be no soil erosion associated with road construction.
- **Landings will be limited** to one per 15 acres, and of those, many will be located on pre-existing landing sites (from prior sales), along spur roads, and on flat terrain – limiting the amount of new soil disturbance and compaction.
- **Landings and skid trails will be seeded** to re-establish vegetative cover following the salvage activities as a required mitigation.
- **85% of the salvage occurs on slopes less than 15%,** an additional 13% of the area occurs on slopes between 15-30% - significantly limiting the amount of anticipated soil erosion and runoff related to slope factors.
- **Sediment delivery will be redirected** in the vicinity of Lake Fork Canyon (south of Unit 9) to reduce potential effects from runoff.
- **Mitigation measures** described in Section 2.3.1 have been effective on similar projects and support the low probability of any unacceptable adverse impacts to the soil resource.
- **Soil types (loose, sandy, cobbly)** are not prone to compaction and areas where compaction could occur (skid trails) would be limited.

Furthermore, the many large areas (between and surrounding harvest units) that burned at moderate to low intensity or remained unburned areas would serve as a buffer to slow overland flow coming from high burn severity areas. Soil that becomes detached and transported to these moderate, low, and unburned areas would be intercepted by ground cover allowing only minimal amounts to be transported into stream channels located outside of the salvage units such as the Rio Cebolla.

An indirect beneficial effect within harvest units would result from removing most of the dead standing tree boles and branches. This would increase the amount of sunlight penetration to the forest floor, which in some areas may stimulate rapid recovery of ground vegetation and trees including grasses, forbs, and aspen. Even dead trees, when closely spaced as they are in the majority of these harvest units, limit sunlight penetration and subsequent growth of ground vegetation.

In considering the differing viewpoints noted in the previous section, with respect to Beschta's recommendations of leaving 50% of the trees – more than 50% of trees will be left (as salvage under this alternative is only proposed on 16% of the Lakes wildfire and 40% of the BMG wildfire area). The decision to leave large amounts of these areas unsalvaged was based primarily on site-specific accessibility and slope with a high consideration of how these factors would affect soils and other resources in the immediate and surrounding area. Douglas-fir (important habitat for wildlife) trees in the 20-inch diameter range were identified within the salvage units on Sandoval Ridge (other units do not have high percent of Douglas-fir), and per mitigation measures for wildlife, they will be retained on the landscape. Cutting live trees and building new roads is not

proposed under this alternative, and as such, there would be no effects to soils related to these types of activities. Beschta concedes that in such cases (where salvage logging can be accomplished from existing road networks) excluding salvage would not seem prudent. McIver and Starr also note soil erosion and compaction are greatly reduced when new roads are not proposed for construction. While there may be minimal contribution to soil compaction from skid trails and landings under this alternative, it would be considered minimal.

Alternative 3 – The effects would be the same as described for Alternative 2 except there would be slightly less risk of salvage related activities impacting soils due to eliminating five units: units 6-8 (Sandoval Ridge) and 10-11 (BMG area) to address wildlife concerns. With application of mitigation measures described in Section 2.3 and estimated effects described in Alternative 2, there would be a very low probability of adversely impacting soil conditions or revegetation/site productivity in Units 1-5 and 9 proposed for salvage under this alternative.

Water Quality

Beschta (1995) notes that timber harvesting in post-fire landscapes can impact water quality through increased erosion and sediment delivery to streams and from associated activities may affect water quality. These increased sediment loads may affect stream channel stability. Increased stream temperatures are common in post-fire landscapes. These increases can impact aquatic biota. The Lakes wildfire removed some of the riparian vegetation that provided shade and cover near streams. No streams are present in the vicinity of the BMG wildfire

Alternative 1 – there would be no increase of sediment entering stream channels down slope from the Lakes wildfire attributable to salvage activities; however, increased quantities of sediment entering stream channels from erosion and runoff associated with severely burned areas would continue to occur, decreasing over the next five years as ground cover becomes stabilized, based on experiences with past fire recovery areas.

Alternatives 2 and 3 – No units proposed under these two alternatives are located in riparian zones. Therefore, there would be no measurable effect on stream temperature associated with harvest logging activities, because no canopy (shade) would be removed near any streams. A negligible amount (if any) of additional sediment would be expected to be deposited in stream channels as a result of harvest activities. The amount is determined to be negligible because there are no streams directly downslope and in proximity to harvest units, other than Unit 9. Unit 9 is in close proximity to the wet meadows of the Lake Fork area, but a mitigation measure that redirects runoff along Forest Road 376 would capture any sediment coming off the Unit. Additionally, mitigation measures call for at least 5 down logs per acre and 10-15 tons of slash (down woody material) to be retained on-site after harvest. This residual woody material added to the forest floor would provide effective ground cover that would reduce soil erosion rates, rain splash impacts to the ground, water runoff velocities, and transport of sediment into stream channels. Thus, there is no evidence to indicate that there would be any water quality impacts from this project.

Water Yield

All Alternatives - There would be no expected increase or decrease in water yield based on salvaging fire-killed trees or leaving them in place. This is primarily because the trees being salvaged are not influencing evaporation/transpiration or other water yield factors. Whether we salvage fire-killed trees or not, trees would gradually regenerate throughout the burned areas, and surface and groundwater regimes would return to their natural range of variability. Thus, water yield is not an issue for this project and will not be analyzed further.

Cumulative Effects for Soil and Water – Heavy grazing on the San Diego Land grant contributed to past soil erosion and deposition of sediment into streams. Grazing under current management is minimized in the river corridor in the vicinity of Unit 9 and this activity is no longer considered a major contributor to erosion and sediment in the stream. Heavy dispersed recreation use has been identified as a concern in Lake Fork Canyon and the Jemez National Recreation Area management plan proposes closing non-system roads along the river corridor to reduce effects to the stream. Closing non-system roads, improving drainage along Forest Road 376 by installing new culverts, and implementing mitigation measures under the proposed salvage sale would help improve water quality by deterring illegal off road use that contributes to soil erosion and redirecting sediment delivery away from the Rio Cebolla.

Postfire recovery actions already implemented, such as erosion control logs and seeding, would continue to reduce erosion and improve the rate of vegetative recovery on severely burned soils. Also, rehabilitation efforts on Fenton Lake State Park and adjacent private lands would cumulatively add to the reduction in soil erosion and increases in vegetative recovery for the watershed as a whole. Overall, the most noticeable increases in soil and vegetative productivity would occur as a result of restoration activities (seeding and log erosion barriers) implemented immediately after the fire.

In the uplands, logging operations would occur on gentle slopes and are not anticipated to substantially increase erosion. Proposed logging operations may disturb some of the areas BAER seeded; the salvage contract would require the seeding of landings and skid trails after the salvage operations are complete. Additionally, ground-based logging equipment can help break up hydrophobic soils and encourage aspen and shrubs to sprout; the resulting ground cover would help deter erosion. Additionally, leaving slash (tree tops and limbs) on the ground would help trap sediment and protect sprouts otherwise vulnerable to grazing ungulates. Previous road construction (in all areas), harvest activities (on Sandoval Ridge), and oil and gas exploration (In BMG area), have contributed to soil disturbance in the areas encompassed by these wildfires, yet pre-fire soil loss rates were for the most part considered to be well within tolerable levels. Post-fire effects related to increased quantities of sediment entering stream channels from excessive erosion and runoff in severely burned areas are likely to occur; however, inspection conducted as recently as April 2003 indicate little sheetwash and rilling present. Furthermore, no hydrophobicity was noted. Implementation of salvage logging operations under Alternatives 2 or 3 are not expected to significantly contribute to these current conditions as described in the previous section.

3.3 Air

3.3.1 Affected Environment

Researchers at the Milagro site on Fenton Hill have experienced problems with dust getting on their equipment. No other concerns related to dust were identified through internal or external scoping.

3.3.2 Environmental Consequences

Alternative 1– No logging would occur on Lake Fork Mesa and therefore no additional dust would be produced through road use that would exacerbate existing dust problems in that area.

Alternative 2 and 3 – The preexisting problem related to dust at the Milagro site on Fenton Hill is not the result of the proposed action. A dust abatement mitigation (Section 2.3.4) would minimize the potential for any localized air quality impacts from dust associated with the timber salvage.

Cumulative Effects – Over the long term, researchers at the Milagro site would likely continue to have problems with dust, as this was an existing problem caused by natural wind as well as travel along Forest Road 377 by researchers at the Milagro site, Forest Service personnel accessing forest facilities, and limited recreation travel. The concern that logging trucks would exacerbate the problem would be addressed by dust abatement mitigation. This mitigation measure would not only decrease dust from log hauling but dust produced from other uses of the road for the duration of salvage logging activities.

3.4 Vegetation

3.4.1 Affected Environment

Lake Fork Mesa – The eastern portion of Lake Fork Mesa burned in the 1971 Cebollita fire and the resulting 400-acre fire scar subsequently revegetated with aspen. This aspen stand defines the eastern boundary of the recent Lakes wildfire. The western portion of the mesa consists of a recently burned ponderosa pine forest with the majority of trees falling within the 11-12 inch diameter range. The vegetative structural stage along the mesa top (units 1-5) was classified as young forest (VSS 3) and along FR 376 (Unit 9), as mid-age forest (VSS 4) prior to the wildfire. No mature or old growth stands (VSS 5 and 6) were present. The subsequent high severity wildfire burned the majority of trees within the units proposed for logging and as a result, these areas have been converted to a VSS 1 – comprised of grass, shrub, forbs, and seedlings. There is no riparian or wetland vegetation within the areas designated for salvage.

Table 5. Tree Attributes and Species Composition for Units 1-5 and 9.

Species	Average Diameter (inches)	Average Height (feet)	Percent of Total Trees
Douglas-fir	12.0	53.2	6.9
Ponderosa pine	11.4	52.2	84.7
Limber pine	11.1	45.2	2.8
White fir	12.1	54.6	4.7
Spruce	14.5	64.7	0.9
Total	11.4	52.1	100.0

Source: timber reconnaissance cruise plots, USDA Forest Service, Santa Fe National Forest 2002

Sandoval Ridge – Prior to the Lakes wildfire, vegetation along Sandoval Ridge was comprised of a mixed conifer forest with Douglas-fir comprising over 50% of the total trees, other tree types consist of ponderosa pine, limber pine, and white fir. The average tree diameter falls between 13 and 14 inches. Portions of Sandoval Ridge were logged as part of the Barley Timber sale in 1989 and 1992 and in recent years, the area has been open for public Christmas tree cutting.

Vegetation structural stage (VSS) was previously classified as young forest (VSS 3) or mid-age forest (VSS 4). No mature or old growth stands (VSS 5 and 6) were present. The subsequent high severity wildfire burned the majority of trees within the units proposed for logging and as a result, these areas have been converted to a VSS 1 – comprised of grass, shrub, forbs, and seedlings.

Table 6. Tree Attributes and Species Composition for Units 6-8.

Species	Average Diameter (inches)	Average Height (feet)	Percent of Total Trees
Douglas-fir	13.9	58.9	54.1
Ponderosa pine	15.3	59.0	16.3
Limber pine	12.2	51.7	11.4
White fir	10.7	38.6	18.2
Total	13.4	54.4	100.0

Source: timber reconnaissance cruise plots, USDA Forest Service, Santa Fe National Forest 2002

BMG (BMG wildfire) - Vegetation in the BMG area transitions from piñon/juniper to open stands of now burnt ponderosa pine. The area had not been heavily logged in the past, but public firewood gathering has been permitted in the general area. Several years of drought stressed many of the trees in this area. The BMG wildfire occurred in spring/early summer and bark beetles, western pine beetles, ambrosia beetle, and wood bores responded aggressively to the stressed and weakened trees. Similar to Lake Fork Mesa and Sandoval Ridge, there were no mature or old growth stands (VSS 5 and 6) present prior to the wildfire and since the wildfire, the area has been converted to a VSS 1 – comprised of grass, shrub, forbs, and seedlings.

Table 7. Tree Attributes and Species Composition for Treatment Units 10 and 11.

Species	Average Diameter (inches)	Average Height (feet)	Percent of Total Trees
Ponderosa pine	13.7	53.4	100

Source: timber reconnaissance cruise plots, USDA Forest Service, Santa Fe National Forest 2002

Following these two fires, understory regeneration has included sprouting of grasses/ shrubs/forbs in both wildfire areas and aspen sprouts in the Lakes wildfire area. Surviving trees (those not proposed for salvage) within both wildfires were stressed from the fire. This fire stress, combined with past drought conditions, has increased the potential for bark beetle infestation - particularly in the larger diameter ponderosa pine and Douglas-fir. No outbreaks of invasive-non-native plants (noxious weeds) have been documented in either wildfire area.

3.4.2 Environmental Consequences

Alternative 1 – Understory vegetation has begun to regenerate within both wildfire areas and would be expected to continue at natural rates of recovery. With respect to various species of surviving trees, insects were observed in the BMG wildfire area last fall (2002) and are likely to move from fire stressed trees in the burned areas into adjacent green trees either within or adjacent to burned areas. Similarly, insects will likely appear in the Lakes wildfire area this spring (2003) and move to adjacent stands throughout the summer. The majority of standing dead trees would likely fall within the next 15 years.

There would be no change in possible introduction of invasive plants (noxious weeds); however, there is potential for them to be introduced into the area through other processes. Often, they first appear along roads and in areas where the ground has been disturbed, conditions that are present in both wildfire areas.

Alternative 2 and 3 – Understory vegetation will continue to regenerate. While there may be minimal disturbance to young sprouting plants while logging operations are occurring, disturbed areas would be seeded per required mitigation measures, effectively negating this effect. There may be beneficial effects to vegetation through salvage logging as discussed in the soil effects section where it was noted that removal of the dead tree canopy would allow more sunlight to reach the ground and stimulate regrowth, particularly among grasses and aspen. Salvage activities would also leave treetops and slash scattered on the ground that would help deter ungulates (cattle and elk) from browsing on young sprouts, particularly aspen.

With respect to various species of surviving trees, insects have been observed in the BMG wildfire area and are likely to become active in the Lakes wildfire area in the spring. Salvaging some of the trees in the coming year may slow the spread of insects as logging will result in creating spatial gaps that would deter easy insect movement to nearby trees.

There is a risk of invasive plants be introduced into the area on logging equipment, however, a standard mitigation measure that requires washing of equipment would minimize this possibility to an acceptable level. This mitigation would not apply to

firewood gatherers in pickup trucks and as such, some risk remains. It should be noted however, that the Santa Fe National Forest is currently completing a noxious weed management EIS. This EIS will include requirements to monitor disturbed sites for noxious weeds, particularly following timber sales or other activities that disturb soil. Areas where noxious weeds are found would be treated to eliminate or control the spread of weed populations. This should minimize potential future noxious weed problems should they occur in the project area.

Cumulative Effects – No cumulative effects to vegetation are anticipated by implementing any of the action alternatives. Past logging, Christmas tree cutting, fire wood gathering, and the recent wildfires are responsible for altering the vegetative make up of the area. Salvage logging dead trees in portions of the wildfires will not contribute to altering the live vegetative makeup of these areas. The BAER team seeded the high intensity burn areas in the Lakes wildfire with warm and cool season grasses in October 2002 and minimal seeding was conducted in the northern portion of the BMG fire. These activities, combined with seeding of landings and skid trails through the salvage logging operations would assist in recovery of vegetation until natural vegetation becomes well established.

3.5 Wildlife

- Wildlife discussion included in this section is organized in five general groups: Proposed, Endangered, Threatened and Sensitive Species,
- Management Indicator Species,
- Migratory Birds,
- Other Species of Concern, and
- General Wildlife.

3.5.1 Proposed, Endangered, Threatened and Sensitive (PETS) Species Affected Environment

The federally listed PET species that could be potentially affected by this project come from a letter from US Fish and Wildlife Service (Project Record #12, October 2002). U.S. Forest Service "sensitive" species for the Southwestern Region and Santa Fe National Forest come from the District Wildlife Biologist's review of the list (USDA-FS, 1999) in relation to habitat within the project area. The following PETS species occur or have potential habitat within or adjacent to the proposed salvage units:

Species	Status
Bald eagle	Threatened
Mexican spotted owl	Threatened
Peregrine falcon	Sensitive
Jemez Mountains salamander	Sensitive
Northern goshawk	Sensitive

The following PET species were not carried forward into analysis because there is no suitable habitat present or because project sites are outside of known range: southwestern willow flycatcher, black-footed ferret and silvery minnow, mountain plover. Forest

Service sensitive species that do not occur or have suitable habitat in the project area are: Pecos bluntnose shiner, Holy ghost ipomopsis, eastern cuckoo, black-tailed prairie dog, swift fox, New Mexican jumping mouse, Goat Peak pika, boreal owl, white-tailed ptarmigan, Rio Grande cutthroat trout, blue-black silverspot butterfly, hairless fleabane, Arizona willow and Chiricahua dock.

Bald eagle: There is no record of bald eagles breeding on the Jemez or Cuba Districts. In addition, there are no records of occurrence in or near any of the proposed salvage units, although Fenton Lake (located west of Lake Fork Mesa) has potential to be used as breeding habitat and is likely important for use during migration periods (S. Williams, personal communication, 2002). The proposed project units are greater than one mile from Fenton Lake (Sandoval Ridge is two miles away, and Lake Fork Mesa is about one mile away).

Mexican spotted owl: There is no breeding habitat for Mexican spotted owl within the BMG or Lake Fork Mesa areas that could be affected by activities associated with harvest units 1-5 and 9-11. Units 7 and 8 are in close proximity to potential breeding habitat but due to the current post-fire condition they do not contain suitable nesting habitat. Prior to the wildfires, these areas may have provided intermittent forage/roosting habitat. Unit 6 is within an area that was established as a spotted owl Protected Activity Center (nesting habitat) prior to the fire. This PAC was burned at high intensity during the Lakes wildfire, most likely destroying its suitability for future spotted owl breeding until a mixed conifer canopy is once again established (Johnson, 2002; USFWS, 2002). Several surveys for owls were conducted in the Sandoval Ridge area (units 6-8). Two spotted owls were seen within the Protected Activity Center, however, it is uncertain whether they are a nesting pair and whether they will find or establish a nest in the same area. Subsequent surveys are planned to make these determinations.

Northern goshawk: There are no known goshawk nest territories in any of the sale units in BMG or Lake Fork Mesa. Units 6, 7 and 8 are within the "foraging area" of a goshawk territory. Management activities may occur year-round within the foraging area (Forest Service Manual , R3 Supplement 2600-95-1, 6/5/95, page 14-16). In addition, the fire converted the high intensity burned areas (in all salvage units) to a Vegetative Structural Stage (VSS) 1, which is a grass/forb/shrub stage that lacks a live overstory canopy. Thus, Forest Plan canopy cover guidelines for foraging areas in VSS 4-6 stands (Appendix D, pp. 8-9) do not apply to the salvage units (W.Murphy, USFS Regional Biologist, personal communication, 2002).

Peregrine falcon: The only units that lie within or near a potential peregrine falcon nesting area (eyrie) are Units 10 and 11, and Unit 10 is the only one within the sensitive core area of the habitat (T. Johnson, raptor specialist/contractor, personal communication, 2002). Cliffs to the west of Unit 10 contain suitable breeding habitat, however, occupancy is unknown. An initial survey on April 17, 2003 did not reveal any falcons using the area. A subsequent survey is planned for mid May to determine if any late nesting peregrine have occupied the site.

Jemez Mountains salamander: There is no habitat for Jemez Mountains salamander in the BMG wildfire area (units 10-11). The units in the Lake Fork Mesa area (units 1-5, 9)

are in areas designated as *Survey Zone* in the *Cooperative Management Plan for the Jemez Mountains Salamander*. The Salamander Team reviewed these harvest units and determined they contain potential salamander habitat, and follow-up salamander surveys will be conducted during the rainy season when salamanders are most likely to surface, prior to salvage activities in these units. Salvage units 6-8 along Sandoval Ridge fall within the *Essential Survey Zone* except for a small portion of Unit 6 that falls within the *Survey Zone*. It is likely that units 6-8 on Sandoval Ridge would contain salamanders based on past surveys along Sandoval Ridge that found salamanders present.

3.5.2 Proposed, Endangered, Threatened and Sensitive Species Wildlife Environmental Consequences

Alternative 1 – As no salvage logging would occur, there would be no related effects to bald eagle, Mexican spotted owl, northern goshawk, peregrine falcon, and Jemez Mountains salamander. Benefits to wildlife from snags and down wood would occur without reduction.

Alternative 2 –

Bald eagle: Salvage logging activities in the BMG or the Lakes project areas would have no effect on the bald eagle. Because there is no record of bald eagles breeding on the Jemez and Cuba Districts, there is little likelihood that eagles would occur in the project areas other than for roosting/resting during migration or during the winter. Migrating eagles may pass through the proposed salvage units, but such use would be on a transient basis. Should any bald eagles enter the proposed salvage units during a period when salvage activities are occurring, they would fly from any disturbance. There would be some reduction of potential roost sites through removal of some dead trees; however, snags retained within units, combined with snags in unsalvaged areas within the burn as well as adjacent unburned areas, would provide roost sites.

Mexican spotted owl: Salvage logging activities may affect but would not be likely to adversely affect this species. This is because: (1) harvest units do not contain suitable nesting habitat characteristics; (2) a mitigation measure prohibits harvest within the Protected Activity Center during the breeding season as per the *Recovery Plan for the Mexican Spotted Owl;* and (3) harvest units would likely not be used for roosting, as little cover is present, and logging activity would not occur at night when owls would be foraging for food. There would be a slight increase in the risk of great horned owls and red-tailed hawks preying on spotted owls, since harvesting the dead trees creates more open habitat, which results in more ground vegetation and habitat for small mammals, which would attract more predatory bird species. Although snags would be harvested, adequate snags would be retained within the project area to provide spotted owl perch trees for hunting activities. Mitigations retaining down wood would maintain adequate cover for prey populations within the project area.

Northern goshawk: Salvage logging would not be expected to decrease population viability or cause a trend to federal listing of this species. Because of the lack of canopy cover within the high intensity burn areas, it is unlikely that goshawks would nest within the units proposed for salvage. Surrounding areas that sustained low or moderate burn could provide suitable nesting, foraging and roosting habitat. The potential for goshawks to use these areas could be precluded in BMG by the daily noise and activities of the

adjacent gas well site, and in both areas by wildfire activities last year. If a nest is found during the required pre-logging survey of all project units, logging operations would be prohibited during the breeding season, which would avoid potential adverse impacts to nesting goshawks. An adequate number of snags would be retained within and surrounding salvage units to provide for perching/hunting sites, should goshawks use the area, based on leaving more snags than is minimally required in the Forest Plan (pg. 72). Similarly, removal of snags in harvest units would not reduce the expected increase in shrubs and associated increase in prey species (small birds). While noise from project activities would cause goshawks foraging in that area to temporarily move to another foraging site, this would not be expected to adversely affect their ability to find prey.

Peregrine falcon: Salvage logging would not be expected to decrease population viability or cause a trend to federal listing of this species. Not allowing salvage activities to occur in Unit 10 from March 1 – August 15 (breeding season) unless the Spring 2003 survey confirms that no falcons are present, would avoid disturbing falcons during their breeding season (consistent with Forest Plan standards, page 63). Thus, salvage logging in this unit would have no impact on the peregrine falcon. Salvage logging units on Lake Fork Mesa and Sandoval Ridge are not within designated peregrine falcon habitat; however, it is possible that falcons could intermittently forage or roost in these areas. Should they choose to forage in these areas, salvage operations could result in temporary sound and visual disturbance. Falcons could fly from any disturbance and would most likely avoid the area during periods of activity. Because there are no suitable cliffs in either area, there would be no effects during the breeding season.

Jemez Mountains salamander: Salvage logging may impact individuals but would not be expected to decrease overall population viability or cause a trend to federal listing of this species. Possible impact to individual salamanders could occur from heavy equipment use, human activity, and ground disturbance particularly during the rainy season (the optimal surface habitat period). Mitigation measures developed through consultation with the New Mexico Endemic Salamander Team would minimize such impacts by prohibiting salvage operations on Sandoval Ridge (Units 6-8) in the *essential survey zone* during prime surface activities (monsoon season). In potential salamander habitat (Units 1-5 and 9), this same mitigation will apply, unless surveys determine that salamanders do not occur in those units. Additionally, the snag retention measures applied in all project units, as well as the additional snag retention requirements on Sandoval Ridge, would leave more snags (potential down wood) than required by the Forest Plan. By leaving all the large Douglas-fir trees on Sandoval Ridge and at least 10% of the other large snags, there would be no loss of future down logs needed to maintain suitable salamander habitat in the *essential survey zone*. A similar mitigation will apply to Lake Fork Mesa if salamanders are found. Maintaining snags for future down logs would provide for insect diversity, which is important as a salamander food source.

Alternative 3 - By eliminating salvage logging units on Sandoval Ridge and in the BMG area (units 6-8, 10-11), this alternative would slightly reduce potential disturbance effects to PETS species or their suitable habitats, as follows:

This alternative avoids any potential disturbance or other effects to the spotted owl Protected Activity Center that overlaps Unit 6. It avoids any potential disturbance to the peregrine falcon eyrie west of Unit 10. It avoids ground disturbance and potential impact to individual salamanders in the *essential survey zone* along Sandoval Ridge. It also retains all snags and future down logs on approximately 400 acres more than Alternative 2. Otherwise, effects would be the same as described for Alternative 2.

3.5.3 Management Indicator Species (MIS) Affected Environment

A review of Management Indicator Species (MIS) for the Santa Fe National Forest shows the following five MIS species have potential to be in the proposed salvage areas: **Merriams turkey, mourning dove, hairy woodpecker, Rocky Mountain elk, pinyon jay**. Unless otherwise indicated, population and suitable habitat data was obtained from the *MIS Assessment and Monitoring Report for the Santa Fe National Forest* (USDA-FS, 2002), and includes data collected by other agencies and partners.

Merriams turkey. Discussions with New Mexico Department of Game and Fish and District personnel indicate that turkeys have been observed in the vicinity of the project area. Turkey habitat is common throughout the Forest, encompassing approximately 1.3 million acres on the Forest. The population trend in New Mexico has been stable to increasing. Turkeys could forage in or near any of the harvest units, however, because of scarcity of water in these areas, it is unlikely that turkeys would nest in the area. Turkeys prefer to roost in tall mature or over-mature ponderosa pines with relatively open crowns and large horizontal branches starting at 20-30 feet from the ground. Trees with a diameter of at least 14 inches are used as roosts. Turkeys forage in grasslands, brush communities, deciduous tree/brush and in ponderosa pine. They eat grasses and grasshoppers in the summer, and oak mast and mature ponderosa pine seeds in the fall. Prior to the Lakes and BMG wildfires, the areas contained suitable turkey habitat, although there was a lack of water. Although the wildfires destroyed much of the overstory vegetation in these areas, regrowth has been noted.

Mourning dove. Mourning doves are included on the recorded species list for a Breeding Bird Survey route through a section of this project area (Sauer et al. 2001; Fair 2002), and in bird surveys done on Virgin Mesa (Dickson 2002). Based on habitat availability in this project area, it is estimated that mourning dove populations would be more common in the BMG area due to more open habitat. They could forage in or near harvest units, but use would be limited by lack of water. The mourning dove is found across North American and in many types of habitats including most forest types. On the Santa Fe National Forest, mourning dove habitat is abundant. The species is primarily found in lower elevations; however, they have been found in Douglas-fir, ponderosa pine communities generally early in the year, before deciduous trees develop leaves. While the Lakes and BMG wildfire areas provide suitable vegetation for mourning dove, the high elevations of Lake Fork Mesa and Sandoval Ridge place estimated mourning dove populations at uncommon to rare. In the lower elevations of the BMG wildfire area, mourning dove could be common where water is available. The post-fire conversion from dense forest to more open grass/shrub habitat enhanced habitat suitability for mourning dove use; however, the lack of water will remain a limiting factor.

Hairy woodpecker. Breeding bird surveys for New Mexico show an increasing population trend for this species. One survey on nearby Virgin Mesa (south of Lakes wildfire) noted hairy woodpeckers during the 2002 field season (Dickson 2002), and they have been documented in other parts of the Forest. It is an indicator species for the presence of snags and down logs. Nests are primarily in trees averaging 17 inches diameter. These trees and down logs are important to support insect populations for foraging. Prior to the wildfires, the proposed salvage units contained suitable habitat for woodpecker. The combined high, moderate and low intensity burning associated with the wildfires improved habitat for the woodpecker by creating a large number of snags, which over time will fall and contribute to down log habitat. As logs decay, they become hosts to a variety of insects, providing an increased array of food sources for the woodpecker.

Rocky Mountain elk. Overall, elk populations on the Forest are considered to be stable to increasing. In the Jemez Mountains, populations have declined from high levels recorded in 1997, through purposeful increased hunting pressure by New Mexico Department of Game and Fish. Recent pre-hunt population in Big Game Management units 6A, 6B and 6C is estimated at 5,200 (NMDG&F 2002), which is near the desired target population level. Many of these elk migrate through or spend summers in portions of Unit 6A, which covers harvest units in the Lakes/Sandoval Ridge area. The BMG wildfire falls within Unit 5b. This unit is one of six units in the larger Chama-Tres Piedras area. Population estimates for the six units has decreased from a high in 1997 of 12,500 to 9,200 in 2002. The target population for elk in this area is 9,100. Elk inhabit most forest types on the Forest that have good forage and cover, and utilize a variety of habitat types during the course of their lives. Elk appear to be extremely adaptable to both secondary successional and specific successional vegetation types. Lake Fork Mesa and Sandoval Ridge provided primarily summer range habitat for foraging (NMG&F, 2002). While elk may occasionally forage in the BMG area, its proximity to a highway, oil and gas facilities, and human activities, make it less attractive.

Piñon jays. These jays have potential habitat in the piñon/juniper woodlands located adjacent to the BMG wildfire area (units 10-11). Their diet consists of pine nuts, conifer and other seeds, fruits, insects, bird eggs, and nestlings. They are non-migratory but wander in winter flocks of 100s to 1,000s. The Santa Fe National Forest contains approximately 465,000 acres of piñon/juniper habitat.

Rocky Mountain bighorn sheep and **Rio Grande cutthroat trout** are not present and do not have suitable habitat within either of the burn areas, therefore, proposed salvage activities would not influence their population status or trend. **Mexican spotted owl** was previously discussed under the PETS section.

3.5.4 Management Indicator Species Environmental Consequences

Alternative 1 – There would be no salvage related effects to Management Indicator Species or their habitat. All snags would be maintained and would provide long-term dead and down woody debris.

Alternative 2 -
Merriam's turkey and mourning dove: Salvage activities would not influence the population status or trend of these species on the Santa Fe National Forest. Although by early summer 2003, there would be sufficient vegetation to provide sufficient foraging habitat, water would continue to be a limiting factor. Because of the lack of nearby water and lack of canopy cover, turkeys and mourning doves would not be expected to nest in any of the proposed units. As such, there would be no effect to nests or young. They would use the areas mainly for foraging. While foraging, these species would likely move away from the temporary noise disturbance created by salvage activities, and return when the disturbance has subsided. Removal of snags would not have a negative effect on their habitat. Project activities would not decrease the amount of potential habitat in any of the project areas. In fact, there may be a slight increase in quality of habitat, as the more open canopy would foster more grasses and forbs, increasing grasshoppers and other insects in the areas.

Hairy woodpecker: The proposed salvage is not expected to have any negative impacts on the overall population trends for the hairy woodpecker. Under the proposed action, removing some snags would slightly reduce the post-fire benefit of increased snags and down woody material that would provide cavities and food sources. However, mitigation measures require leaving ample numbers of snags, which would be more than the minimum required by Forest Plan standards (220 snags per 100 acres…), expecially in units 6-8 on Sandoval Ridge. The snags left within units combined with large numbers of snags created by the fire outside harvest units, would provide ample habitat and forage for the hairy woodpecker and associated cavity-nesting species.

Rocky Mountain elk: Salvage activities are not likely to have a negative effect on the overall population trends for elk in the area and the number of acres of elk habitat would not be decreased. Areas considered suitable to elk prior to the fire would likely retain suitability similar to that observed in post fire La Mesa fire habitat (Allen, 1994). Reduction in forest canopy would result in increased understory of shrubs, grasses, forbs, and aspen over the next 10-20 years – this increase in herbaceous vegetation would enhance elk forage opportunities. Elk would most likely avoid areas during salvage operations. Removal of some standing dead trees along Lake Fork Mesa and Sandoval Ridge would result in more open conditions and easier accessibility for elk to forage. Elk would find more young aspen sprouts to feed on in some of the harvested areas.

Piñon Jay: The proposed salvage is not expected to have negative impacts on the overall population trends for piñon jays in the project area. Depending on intensity and distance from project activities, there could be some disturbance to nesting habitat for any activities conducted during the breeding period. There would be no reduction in suitable habitat caused by implementation of this project.

Alternative 3 - Overall, effects for this alternative would be the same as described for Alternative 3, and there would be no difference in effects on population trends for any MIS species. The only difference with this alternative is that by eliminating harvest in BMG area, there would be no potential to affect piñon jay habitat, which only occurs in the BMG area. And by removing fewer snags (on 400 fewer acres), there would be less

loss of snag habitat for hairy woodpeckers and associated cavity nesting species, compared to Alternative 2.

3.5.5 Migratory Birds Affected Environment

Priority birds that could occur in the ponderosa pine and mixed conifer habitat, as designated by New Mexico Partners in Flight, include: **northern goshawk, Mexican spotted owl, Williamson's sapsucker, olive-sided flycatcher, dusky flycatcher, flammulated owl, Virginia's warbler,** and **Grace's warbler**.

There are no associations or important links between the bird communities in the Lakes and BMG wildfires and Important Bird Areas (IBAs). No IBAs would be affected by the proposed salvage. The following table displays the distance from proposed salvage areas to the nearest IBAs.

Table 8. Proposed Salvage and Important Bird Areas.

	Distance From Project Area in Miles		
IBAs	**Lake Fork Mesa**	**Sandoval Ridge**	**BMG**
Golondrino Mesa	>35	>35	>8
Chama River Gorge from El Vado to north end of Abiquiui Reservoir	~30	>25	>20
Caja del Rio and the Santa Fe River Canyon below the Caja del Rio on both BLM and FS lands	>25	>25	>50

Overwintering Areas generally consist of large wetlands. Important overwintering areas recognized on the Forest include the Rio Chama and Rio Grande corridors; well outside the proposed project areas. While portions of the proposed salvage areas could provide migration/winter roost sites for the bald eagle; these areas are not recognized as an important overwintering areas because significant concentrations of birds do not occur here nor do unique or a high diversity of birds winter here.

3.5.6 Migratory Birds Environmental Consequences

Alternative 1 – As no harvest activities would occur, there would be no project related impacts to migratory birds.

Alternative 2 and 3 - Overall, there may be impacts to individual birds from salvage logging; however, this localized effect would not be expected to result in declines in overall species population. Effects to migratory birds that could occur in all areas proposed for salvage include noise and movement disturbance from equipment use and human activities during tree cutting and removal. These effects would be greater if projects are done during the breeding season. Some trees with cavity nests may be cut. Adults would be able to escape, and if early enough in the breeding season, they could re-nest. While only dead trees would be cut, there could be noise disturbance to nests in live trees within project boundaries or in adjacent forest causing some changes in nest-attendance patterns. Depending on the intensity and duration of the disturbance, some nests could be abandoned. If done outside the breeding season, most birds could fly from project disturbance.

Impacts include reducing the number of snags available for cavity nests or for insect grubbing. Hutto (1995) recommended that an adequate amount of standing dead trees after a fire would provide habitat for those species that depend on that forest element. He suggested that selective removal of all trees of a certain size or species following a fire would probably not maintain the variety of microhabitat and birds species that would otherwise use the site. It was recommended that the best option may be to take trees from one part of the burn and leave another part of the burned area untouched. Because the proposed action identifies only about 16% of the Lakes wildfire and 40% of the BMG wildfire, and even less under Alternative 3, a majority of the burn areas would remain as intact post-burn habitat. Therefore, in combination with snag retention mitigations, snags would be available within the project units as well as in greater numbers in burned areas adjacent to the project sites.

3.5.7 Other Species of Concern Affected Environment

The U.S. Fish and Wildlife Service requested that we also consider several species of concern. No suitable habitat occurs within any of the proposed salvage units for:**William Lar's tiger beetle, San Ysidro tiger beetle, Bairds sparrow, Gypsum townsendia** and **Gypsum phacelia**, **Knight's milk-vetch**, and **Parish's alkali grass**. Additionally, there are no streams within five miles any of the proposed salvage units occupied by the **Rio Grande Sucker.**

Artic peregrine falcon could use the area for foraging during migration periods. The **Townsend's big-eared bat** roosts in limestone caves, lava tubes, and man-made structures, and hibernates in mines and caves. There are no mines or caves in the vicinity of any of the proposed salvage units. There are buildings near the BMG area and at Fenton Hill near Lake Fork Mesa units, as well as rock crevices in areas adjacent to some of the salvage units that could provide roost sites.

3.5.8 Other Species of Concern Environmental Consequences

Alternative 1 – There would be no salvage related effects to any species of concern.

Alternative 2 and 3 - There would be no anticipated impacts on the **Artic peregrine falcon**. This bird's occurrence would only be during migration, and if disturbed, adult birds could roost or forage in areas outside the project units. Snag removal could reduce the perch sites within the units, but because snags would be retained within the units and would be available outside the project area, there would be no impact on the falcon's ability to rest and forage in the area. Salvage logging activities would have no impact or disturbance to nocturnal foraging of **Townsend's big-eared bat**, because project activities would occur during the day.

3.5.9 General Wildlife Affected Environment

Wildlife habitat along Lake Fork Mesa, prior to the wildfire consisted primarily of ponderosa pine with smaller percentages of mixed conifer. No accessible standing water or springs existed along the mesa top. Within one month of the fire, regeneration of grasses and shrubs was observed. Immediately adjacent to the burned area is a 30-year-old aspen stand, indicating aspen regeneration is likely along recently burned portions of the mesa top.

Vegetation along Sandoval Ridge prior to the fire had a larger Douglas-fir component than along Lake Fork Mesa. Additionally, Sandoval Ridge was logged in the past 15 years and Gambel's oak (an important browse and mast species) was plentiful along ridges. No accessible standing water or springs exist along Sandoval Ridge. Regeneration following the fire consists of new grass growth and many aspen seedlings.

Wildlife habitat in the BMG area prior to the wildfire was moderately open with scattered ponderosa pine with an understory of mountain mahogany. No accessible standing water or springs exist within the burn area. With a burned overstory and sparse understory, little vegetation exists to provide for wildlife cover or forage. Down logs present prior to the wildfire were largely consumed during the burn. Regeneration since the fire shows 60-70% grass cover with new oak and mountain mahogany growth, both being good wildlife browse species.

General wildlife that could be expected in the Lakes and BMG areas include mountain lions, mule deer, black bear, bobcat, fox, rabbits, squirrels, bats and other small mammals, turkey, a variety of songbirds, and reptiles. Due to the lack of understory cover and down logs following the fire, existing number of prey species (small mammals and birds) is expected to be low. Observations shortly after the Lakes wildfire noted whiptails, ants, other insects, and hummingbirds along Sandoval Ridge. Hairy and downy woodpeckers were heard in the BMG wildfire area during the summer of 2002.

3.5.10 General Wildlife Environmental Consequences

Alternative 1- Small mammal prey species and raptor predator species are expected to increase within burned areas. Following the La Mesa fire, deer mice increased in all burned areas along with voles in grassy habitats and chipmunks in Ponderosa pine and mixed conifer forests (Guthrie 1984). Most snags would be expected to fall within 5-10 years after a fire, with many falling after seven years (T. Foxx 1996).

Alternative 2 - Equipment and human activity associated with logging and subsequent firewood collection would create noise and visual disturbance to various wildlife species using the area, causing temporary changes in foraging patterns. Because foraging habitat exists in adjacent forest, this temporary disturbance would not be expected to be a major impact to animals and birds that could avoid the project area for the period of disturbance. Active nest sites would be anticipated to be lower than normal the first few years following a fire because of the loss of overstory canopy. Should a nest occur in the area, nest attendance could be interrupted and/or absence from the nest may be prolonged, possibly causing nest failure or abandonment.

Use of heavy machinery and felling of trees could kill small wildlife species through direct contact. While adults would be able to escape disturbance, young in burrows or nests would not. Use of equipment on skid roads could restrict movement of burrowing species including salamanders and other small mammals. Because no new roads would be created and project design would emphasize the use of past skid trails and landings, these effects would be minimal. Additionally, since no new roads would be constructed and no clear cuts would be created (mitigations will retain numerous standing dead trees within units), there would be no fragmentation of habitat.

As discussed in previous sections the reduction in snags and future down logs would not be expected to adversely affect wildlife populations. Harvesting dead trees from these areas would not change the current successional stage of grass/shrub; however, removing trees in harvest units would reduce some of the full benefits related to down woody material as this material aids in converting and returning nutrients to the soil, which, in turn, promotes vegetation growth and long-term benefits to wildlife. Because many snags would be left on site, this impact would be minimal. Studies on the La Mesa fire (Moeur and Guthrie 1984) showed that clearing of all snags after a fire showed insignificant differences in vegetation and insect populations compared to a site where trees were not removed. Bird populations differed with greater species diversity and numbers on an uncleared site. Hutto (1995) noted high diversity in sites of stand-replacing fires. Broken-top snags or aspen were used significantly more often than expected on the basis of tree availability. Implementing mitigation measures would retain a variety of snags (including all aspen snags) within the sale units, combined with snag availability in surrounding burn areas where no salvage would take place, would contribute to maintaining bird habitat within and adjacent to the sale units.

Alternative 3 - Effects to general wildlife are similar to those discussed in Alternative 2; however, they would be expected to be of lesser degree as activities would occur only on Lake Fork Mesa, on less than 12% of the area burned in the Lakes wildfire.

3.5.11 All Wildlife Cumulative Effects

In reviewing the above past, present and future projects/events in relation to effects from the proposed salvage sales, those related to disturbance, snag removal, or soil compaction would be relevant.

Past logging, fires, and current logging by private landowners near Lake Fork Mesa (in the vicinity of Fenton Lake) have potential to add to effects of removing snags from the project units. However, because 1) the other private land logging sites are at least a mile from the current proposed sale site; 2) the proposed salvage sale is affecting less than 16% percent of the total acreage burned in the Lakes wildfire, and 3) snags are being retained within the sale unit and would be available outside of the sale units, cumulative effects would be expected to be minimal.

Because Fenton Lake is approximately one mile from the proposed sale site, disturbance from recreational use would not add to any effects of proposed sale. The combined effects of the Forest Service Administrative use and LANL use at Fenton Hill could create some short-term cumulative effects for the time of the proposed project activity. Because of the past use of these two sites, it would be expected that wildlife have become accustomed to avoiding these areas and using the more southern areas on Lake Fork Mesa as a travel corridor or foraging site. During the time of project activity, they could be channeled into a narrower band of suitable corridor between these two areas, or be forced to go around the mesa top.

Lake Fork Mesa and Sandoval Ridge are grazed by cattle and concentrated use in particularly suitable spots could add to soil compaction or damage in combination with related fire effects and logging disturbance. These soil impacts could lead to decreased vegetation growth, affecting localized availability of forage for wildlife, and also having

localized effects on prey populations. Grazing is not proposed to occur on Lake Fork Mesa for at least the first year following the Lakes wildfire. Because of the new and more widespread vegetation which would occur post-fire, it is possible that grazing could be better distributed following the fire, which could minimize localized concentrated grazing.

Past logging along Sandoval Ridge removed many of the larger diameter trees. In combination with the stand-replacing fire and the current proposal for salvage logging, numbers of large diameter snags and down woody debris would be lower than normally present in the absences of prior logging, wildfire, and salvage logging. This could have some long-term future effects because remaining smaller diameter logs would not provide habitat for as long as larger diameter logs. Furthermore, there may be some period of time in the future when there is a lack of down logs (until the forest stand is regenerated and is mature enough to replace down woody debris). Snag retention within the sale units, along with some replacement of dead and downed logs, and snags available in adjacent burned and unburned areas would minimize any cumulative effects. Snag and down log retention measures required for this project, in combination with replacement of dead and down logs in salamander occupied sites and spotted owl habitat conducted under the BAER project, would provide immediate and long-term woody material for cover habitat and mitigate any negative cumulative effects on species that use these habitat components.

The oil and gas operations site located within the BMG wildfire area, the landing strip, roads, and weekend recreation traffic currently creates disturbance to wildlife in the area. Over time, wildlife have likely acclimated and adjusted to these disturbances by moving further back into the adjacent forest, especially during periods of peak activity. Disturbance effects from the proposed salvage sale coupled with the drilling site activities and other uses of the area could temporarily cause further changes in foraging patterns, with wildlife needing to move further back into the undisturbed areas. These effects are anticipated to be short-term, only for the time of project activity, with some intermittent disturbance following the sale related to firewood collection, which has been an ongoing activity in the area.

Any cumulative effects would not be expected to cause any overall decrease in populations for any wildlife species.

3.6 Heritage Resources

3.6.1 Affected Environment

Lakes wildfire - Portions of the Jemez Mountains contain very high site densities with the majority of recorded sites being identified as field houses and artifact scatters associated with large pueblo sites. These sites primarily date to ancestral Jemez Pueblo occupation of the mountains between 1350 and 1700. The majority of these sites are located at elevations below 8000 feet. Lake Fork Mesa and Sandoval Ridge are located at higher elevations (between 8300 and 8700 feet above mean sea level) and as such were not considered desirable for farming by prehistoric inhabitants of the area but may have been used for hunting. The potential for sites to be present in these areas is considered

low. The base of Lake Fork Mesa along Lake Fork Canyon would be much more desirable to prehistoric inhabitants of the Jemez Mountains due to the close proximity of year-round water. Both prehistoric and historic sites have been recorded along this canyon. The historic sites date to the first half of the twentieth century and are related to early resource use on the San Diego Land Grant including logging, associated railroad construction and sheep/cattle grazing.

BMG wildfire – lands in the vicinity of the BMG wildfire contain high site densities related to prehistoric Gallina occupation of the area between 1050 and 1275 AD. Many of the sites located in this area are considered defensive in nature. They are often located along steep sided rocky ridges (locally termed "hog backs") and in cliffs along narrow canyons. Habitation sites are generally not located along gentle terrain in easily accessible areas. Several cliff houses, including the well-known Nogales Cliff house, are located 1-2 miles to the east and northeast of the BMG wildfire in steep cliff faces inaccessible by road. Prehistoric pit houses and surface structures have been identified on past surveys adjacent to and within the BMG wildfire area – primarily situated on rocky ridges.

All units in the proposed salvage sale have been 100% surveyed for heritage resources. No sites are present in Units 1-5 along Lake Fork Mesa and Units 6-8 along Sandoval Ridge. Sites are present near (but not within) Unit 9 along Forest Road 376, and within units 10 and 11 on the BMG wildfire.

3.6.2 Environmental Consequences

Alternative 1 – Under the no action alternative, there would be no effect to heritage resources from logging.

Alternative 2 and 3 – Provided mitigation measures are followed, there would be no direct or indirect effect to heritage resources under these alternatives. The proposed action includes mitigation measures (Section 2.3) that require all sites to be flagged and avoided by salvage activities. No heavy equipment would be permitted to operate within site boundaries and as such there would be no ground disturbance. An existing road currently crosses through a site boundary in the BMG wildfire area and a mitigation measure has been developed to protect this site by depositing fill on the road – effectively burying and protecting currently exposed artifacts.

Cumulative Effects – As there are no anticipated direct or indirect effects to heritage resources resulting from proposed salvage activities, there would be no cumulative effects.

3.7 Recreation and Public Safety

3.7.1 Affected Environment

Lakes wildfire – The Lakes wildfire burned within portions of Management Area E and X. The Recreation Opportunity Spectrum for units 1-5, the majority of Unit 6, and Unit 9

is designated as Roaded Natural[12]. The remaining portion of Unit 6 and units 7 and 8 are designated as Semi-primitive Motorized[13]. For the most part, the Recreation Opportunity Spectrum is being met; however, on Sandoval Ridge, within the Semi-primitive Motorized area, public vehicle access is not permitted as existing roads are gated. There are no developed recreation sites or trails in the vicinity of any salvage units.

Recreation use along Lake Fork Mesa (units 1-5) and on Sandoval Ridge (units 6-8) is considered low compared to other areas of the Jemez Ranger District, due in part to lack of developed recreation facilities, no water present to attract visitors, no developed trails, and low scenic values associated with post fire landscape. Use that does occur consists of limited hiking, biking, and seasonal hunting use. In contrast, the area along Forest Road 376 (adjacent to Unit 9) receives high, dispersed recreation use. While there are no developed recreation sites or trails in the area, the area is easily accessible along Forest Road 376. Forest Road 376 is a popular travel way for sightseers, conveniently connecting State Highway 4 and State Highway 126. The majority of recreation use along this travel corridor occurs between Memorial Day and Labor Day.

BMG Wildfire – The BMG wildfire burned within portions of Management Area R where the Recreation Opportunity Spectrum is designated as Roaded Natural. For the most part, the Recreation Opportunity Spectrum is being met; however, there are developments in the vicinity of the BMG oil and gas facility including storage tanks, pipelines, associated facilitates, and an airstrip that are not considered to be in harmony with the natural environment. There are no developed recreation sites or trails in the vicinity of the BMG wildfire. While the area immediately within the BMG wildfire has not been highly desirable to recreation users in the past, Forest Road 313 running through the area provides access to undeveloped trails leading to prehistoric cliff houses located 1-2 miles north and east of the wildfire. On weekends during the summer, a half dozen cars may be parked in the area with recreation users taking a day hike up to the cliff houses.

3.7.2 Environmental Consequences

Alternative 1 – Under the no action alternative there would be no harvest-related effects to recreation. Dead standing trees would eventually fall to the ground, which could occasionally block roads and temporarily limit recreational traffic. Because hazard trees were removed immediately following the fire and future hazard trees would be removed from along roads, no safety hazard to motorists would be anticipated. As off-road recreation use in these areas is generally considered low, and there are no developed recreation sites or trails, it is not likely that leaving standing dead trees within the perimeter of these burn areas would pose a significant safety hazard to forest visitors.

Alternative 2 – there would be no change to Recreation Opportunity Spectrum under this alternative. There may be a temporary inconvenience to a low number of visitors during

[12] Roaded Natural - characterized by a predominantly natural environment with evidence of moderate permanent resource use. Evidence of sights and sounds of people is moderate, but in harmony with the natural environment. Opportunity exists for both social interaction and moderate isolation from sights and sounds of people.
[13] Semi-primitive Motorized – charaterized by subtle alterations by people. Primitive roads and trails are usually present. There is a high probability of isolation from sights and sounds of people. Motorized access is provided or permitted.

periods of salvage operation along Lake Fork Mesa and Sandoval Ridge, as these areas would be closed for public safety; however, it is important to note that use in these areas is already very low and as such, very few visitors would be inconvenienced. Additionally, there are more desirable and unburned areas nearby that would easily absorb use that would be temporarily diverted from salvage areas.

Similarly, recreation use along Forest Road 376 would likely not be significantly disrupted. There may be a temporary inconvenience to travelers along the road during periods of salvage operation – such as if a tree can only be felled across the road; but such activities would only occur on week days when recreation use is low and would only result in temporary delay of travel as trees would be quickly removed so as not to block travel. Furthermore, salvage Unit 9 is small and operations would likely be completed within a short period of time, with activities estimated to last about one month.

Minimal recreation use in the vicinity of the BMG area generally occurs on weekends and consists of parking in the vicinity of the oil and gas facility to access areas outside the burn. The mitigation measure that restricts hauling on weekends would address safety and inconvenience concerns related to heavier traffic conditions on Forest Road 313.

Alternative 3 – there would be no change to Recreation Opportunity Spectrum under this alternative as a result of the salvage activities. There would be no harvest related effects to recreation users in the BMG wildfire area or in the Sandoval Ridge area as these units are not included. There may be a temporary inconvenience to a low number of visitors during periods of salvage operation along Lake Fork Mesa as described in Alternative 2. Similarly, recreation use along Forest Road 376 would likely not be significantly disrupted as noted in Alternative 2.

Cumulative Effects – Recreation use on Lake Fork Mesa and Sandoval Ridge is considered low and there are no cumulative effects anticipated for these areas. Dispersed recreation use along Forest Road 376 (Unit 9) is high during the summer and efforts have been made to improve recreational experiences along this travel corridor. Excluding cattle grazing in the corridor during high use periods (summer months) has reduced recreation/cattle conflicts. Improvements along on Forest Road 376 (replacing culverts and maintenance) have provided for better travel. Future projects that would close roads (as proposed in the Jemez National Recreation Area Management Plan) and control off-road parking (through Respect the Rio project), would limit off-road access and control parking along the corridor – improving experiences for hikers and anglers in the area. Salvage logging in Unit 9 would leave down logs (for wildlife) and provide some slash that could be used to help control off-road driving/scattered parking as proposed in the projects described above.

In the BMG area, recreation users currently travel on a road that provides primary access for BMG Drilling Company operations. There is a proposal to reroute this use away from the main BMG site. Under the proposed action, mitigation measures would deter off-road travel as well as limit logging truck use on weekends. These mitigations, combined with the future proposal to reroute the intersection around the BMG operations would provide safer travel for recreation users and less off-road resource damage.

3.8 Scenery

3.8.1 Affected Environment

Lakes Wildfire – The desired Visual Quality Objectives for areas within the Lakes Wildfire are designated as partial retention[14] in Management Area E, and retention[15] within Management Area X. Currently portions of these areas do not meet the desired Scenery Integrity Objectives due in large part to the recent wildfire, which increased foreground visibility beyond the road edge. The resulting post-fire landscape is a mosaic of black, gray and green. Black burned tree trunks and thick black/gray ash contrast with lighter colored exposed mineral soils, green grass and aspen. Scattered patches of unburned vegetation occur throughout the area, offering contrast from the burned areas. Post-fire vegetation that comes in first would be mostly non-conifer species like aspen, oak and grasses, followed by pine and other early seral species.

Salvage units along Lake Fork Mesa (1-5) and Sandoval Ridge (6-8) are not visible from any developed recreation sites, viewpoints, trails or major road corridors. Unit 9 is located along Forest Road 376, which runs through the heart of the Jemez National Recreation Area. This road takes the traveler through a variety of colorful, visibly appealing landscapes. The recent fire however, has resulted in reducing scenic integrity in the localized area surrounding Unit 9 and on nearby steep slopes that burned at high intensity. From Forest Road 376, Unit 9 lies in the immediate foreground view and other burned patches lie in middle ground views. The fire has increased foreground visibility and the visual absorption capability has been reduced, meaning that any activities would be more difficult to blend into the landscape.

BMG wildfire - The desired Scenic Integrity Objective for this Management Area varies from very low to high, and is designated as high in the foreground of State Highway 112. The boundary of the BMG wildfire is about ¼ mile from Highway 112 (at the edge of the foreground). The post fire landscape is similar to that described for the Lakes wildfire with blackened tree trunks contrasted against lighter ground surfaces. The sightline (or edge of the near horizon) is much deeper than prior to the fire. Traveling along Forest Road 313 within the salvage units, the sightline runs to the edge of ridges along either side of the road. Overall, the burned area currently has a very low visual absorption capability and with the current activities (oil and gas facilities) the current scenic integrity is marginally acceptable with a very high degree of visual impact caused by form, opening, and texture contrast.

3.8.2 Environmental Consequences

Alternative 1 - Visually these areas have been burnt and do not possess a high scenic integrity. Gobster (1993) surveyed recreation users and found that disruption in growing cycle (standing dead trees) usually results in a negative response from people when asked about their ideal of beauty. Burned trees in Unit 9 along Forest Road 376 in the Jemez National Recreation Area would likely generate the most comments from recreation users, as this is along a major travel route. The remaining burned areas receive low recreation use and would likely not generate many responses/concerns from the public.

[14] Partial Retention - where landscape character appears slightly altered.
[15] Retention - correlates with "high scenic integrity" where landscape character appears intact.

Over approximately the next 10 years, many dead trees would fall, and eventually become less visible as grasses, forbs and seedlings grow in.

Alternative 2 and 3 – There may be temporary disturbance to scenery during periods of operation with the presence of heavy equipment being visible to forest visitors. This effect would be of short duration. Removing standing dead trees from Unit 9 and implementing mitigation measures as described in Section 2.3.3 would improve scenic conditions along Forest Road 376. The other salvage units are not within view sheds of any major travel ways.

Cumulative Effects – Direct and indirect effects are considered minimal and short term. The proposed project is not anticipated to contribute to long-term cumulative effects to scenery.

3.9 Social and Economic

3.9.1 Affected Environment

Over the past several decades there has been a decrease in the level of logging on National Forest System lands. With respect to salvage sales involving burned timber, sale viability is dependent on the reduced value of wood from green trees to burned trees. Charred trees reduce the type of wood products that can be manufactured. Additionally, there are costs associated with removing smaller diameter trees in the 9 to 10 inch range and a value reduction associated with insect infestation. Saw log timber value decreases rapidly in burned trees due to insects, staining, weathering, cracking, and decomposition.

3.9.2 Environmental Consequences

Alternative 1 – this alternative would not contribute to the local economy as no logging or firewood gathering opportunities would be provided. This alternative would not meet the purpose and need to **recover the timber value of fire-killed trees;** and does not support the forest wide goal to **utilize small sales to sanitize stands and salvage timber targeted for the smaller logging and manufacturing interests in local communities.**

Alternative 2 – This alternative best meets the purpose and need. It also provides opportunities for small timber sales and public wood collection. Though limited to 16% of the Lakes wildfire and 40% of the BMG wildfire, this alternative provides the greatest amount of salvage wood products among the action alternatives. Material would be provided to communities in the Jemez Mountains as well as in the Cuba and Llaves area. The resource specialists considered the site-specific conditions (small diameter class of trees and accessibility) when determining the need to conduct the sale as soon as possible as the timber value will rapidly decrease in the small diameter burned trees proposed for salvage.

Present Net Value, defined as the difference between the total value of outputs and the total value of costs that are both discounted over the life of the project, measures economic efficiency. The Lakes/BMG Salvage Timber sale would be completed within two years. It is expected that expenditures associated with the sale would occur up front in the first year when the saw timber will be sold. The present new value (cost to the

agency) is -$35,000; however, the product value for the purchaser is estimated at $880,000. This represents a sizable contribution to northern New Mexico economy.

Table 9: Financial Analysis of Proposed Lakes/BMG Alternative 2

I. Resource Outputs	
Total Product Volume (incl sawlogs, firewood, vigas, etc)	4,000 MBF
II. Discounted Financial Revenues	
Total product revenue ($5.00/MBF)	$20,000
III. Discounted Financial Costs	
Harvest administration (40 days @ $200/day)	8,000
Sale preparation (20 days @ 200/day)	4,000
Analysis and documentation (NEPA)	35,000
Other resource support	4,000
Road maintenance ($1.00/MBF)	4,000
TOTAL	$55,000
IV. Comparison of Discounted Financial Revenue and Cost	
Financial present net value (Revenue minus Costs)	-$35,000
V. Total Product Value (assuming 80/20 sawlogs/cords)	
Sawlog finished product worth $250/MBF from the Mill	$800,000
A cord of pine is worth $100/cord	80,000
TOTAL	$880,000

Alternative 3 – This alternative also meets the purpose and need, though the overall amount of wood product offered would be less than the proposed action. Products would be available to local Jemez Mountain communities and adjacent areas. Should interested individuals from Llaves desire wood products there would be greater travel involved, as local material would not be made available. The present new value (cost to the agency) is -$40,000; however, the product value for the purchaser is estimated at $470,000. This is less of a contribution than that provided under Alternative 2.

Table 10: Financial Analysis of Proposed Lakes/BMG Alternative 3

I. Resource Outputs	
Total Product Volume (incl sawlogs, firewood, vigas, etc)	2,000 MBF
II. Discounted Financial Revenues	
Total product revenue ($5.00/MBF)	$10,000
III. Discounted Financial Costs	
Harvest administration (40 days @ $200/day)	6,000
Sale preparation (20 days @ 200/day)	3,000
Analysis and documentation (NEPA)	35,000
Other resource support	4,000
Road maintenance ($1.00/MBF)	2,000
TOTAL	$50,000
IV. Comparison of Discounted Financial Revenue and Cost	
Financial present net value (Revenue minus Costs)	-$40,000
V. Total Product Value (assuming 80/20 sawlogs/cords)	
Sawlog finished product worth $250/MBF from the Mill	$450,000
A cord of pine is worth $100/cord	20,000
TOTAL	$470,000

Cumulative Effects – A reduction in timber sales has occurred nationally over the past several decades. Many mills in northern New Mexico have closed or operate at much lower levels. Following the Lakes wildfire, some private landowners opted to salvage wood off their property, resulting in a small amount of wood product being offered to local small timber operators. Salvaging areas on Forest Land under alternatives 2 and 3 would increase the availability of burnt timber to small mill operators. Additionally, there may be other future salvage opportunities in the greater northern New Mexico area such as the Borrego Salvage Sale currently proposed on the Espanola Ranger District.

3.10 Environmental Justice

This section considered environmental justice as required under the 1994 Executive Order 12898. This order requires federal actions to address environmental justice in minority and low-income populations. This analysis considers the demographic, economic, and human health risk factors.

3.10.1 Affected Environment

The proposed salvage would take place near rural mountain communities in the vicinity of Jemez Springs and Cuba. These rural communities include minority populations of Hispanics and Native Americans. With Native Americans inhabiting the region for the past 800 years and Hispanic populations having first entered the area about 400 years ago, many of the families living in the area today, trace their ancestry for several generations. As such, there are strong ties to the land and a reliance on the natural resources of the forest.

3.10.2 Environmental Consequences

All Alternatives – None of the alternatives would result in adverse or disproportionate effects on low income or minority populations in and around the areas burned in the Lakes and BMG wildfires. Opportunities to bid on small salvage sales and harvest wood products under permits would be equitable for all segments of the population.

The proposed activities are consistent with activities implemented on National Forest lands throughout the United States over the past several decades. As such, the environmental effects are predictable as are the outcomes of implementing mitigation measures that have been refined over the years. There would be no displacement of minorities, changes of land use, or increase in taxes that would constitute an economic hardship. There would be no negative effects on public health.

Implementing Alternatives 2 or 3 would have beneficial effects on local rural communities by providing increased opportunities for firewood and other wood products for personal use or resale. Under federal laws, regulations and policies, timber sales and wood product permits would be offered without prejudice toward any particular group.

SECTION 4.0 - CONSULTATION AND COORDINATION

4.1 List of Parties to Whom the EA Was Sent ____

This section provides a list of agencies and individuals to whom the EA is sent for final review/comment, based on those who responded to scoping or other public participation activities for this project. Over 180 individuals and organizations were contacted in the scoping phase of this project. A complete list of individuals and organizations contacted is available in the project record.

Benson–Montin–Greer Drilling Corp.
Forest Guardians
Forest Trust
Forest Watch
New Mexico Endemic Salamander Team
Northern Arizona University
Rocky Mountain Research Station
Sangre de Cristo Audubon Society
State of New Mexico Environmental Department
Seven Springs Homeowners Association
Wild Watershed
U.S. Department of Interior - Fish and Wildlife Service
Jim Achen
Mary Caldwell
John Halper
Terry Johnson
Michael Sepich
Catherine Shemek

4.2 List of Key Preparers _____

Team Leader, NEPA Advisor, Writer/Editor	Rita Skinner, Natural Resource Coordinator, Jemez Ranger District
Vegetation, and Silvicultural Harvest Prescription	Andy Vigil, Forester, West Zone, Cuba Ranger District
Wildlife	Jo Wargo, Wildlife Biologist, Jemez Ranger District
Archaeology	Chris Jenkins, Archaeologist, Jemez Ranger District
Soil and Watershed, Burned Area Emergency Rehabilitation	Anna Jaramillo Scarborough
Recreation	Sherry Gaston, Recreation, Cuba Ranger District
Scenery	Jennifer Wellington, Landscape Architect, Supervisor's Office

SECTION 5.0 REFERENCES

Allen, Craig
1994 Elk Response to the La Mesa Fire and Current Status in the Jemez Mountains. In: Fire Effects in Southwestern. Proceedings of the Second La Mesa Fire Symposium. USDA Forest Service, Rocky Mountain Forest and Range Experiment Station. General Technical Report RM-GTR-286.

Bailey, John
2002 Northern Arizona University, email Communication Regarding Research Plots on Lake Fork Mesa, Lakes Project File Record #21.

Beschta et al.
1995 Wildfire and Salvage Logging: Recommendations for Ecologically Sound Post-Fire Salvage Logging and Other Post-fire Treatments on Federal Lands in the West. Unpublished Report on file at US Department of Agriculture, Forest Service, Pacific Northwest Research Station.

Dickson, L.
2002 Northern Arizona University. Bird Surveys, Virgin Mesa and Lake Fork Mesa, Jemez Ranger District Wildlife files.

Everett, Richard
1995 Letter dated August 16, 1995 to John Lowe. Review of Beschta document. On file with U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station, 1133 N. Western Ave., Wenatchee, WA 98801.

Evers, Louisa
Draft Addressing the Issues Raised in the 1995 Beschta Report on Post-Fire Salvage Logging. November 25, 2002 Draft. Lakes / BMG Project Record.

Fair, J.
2002 Breeding Bird Surveys Data for 1999, 2000, and 2002, Vallecitos. USDA-FS, Santa Fe National Forest, Jemez Ranger District Files. Jemez Springs, NM

Foxx, T
1996 Los Alamos National Laboratory. Personal Communication with Buck Sanchez. In: Biological Assessment and Evaluation for the Proposed Dome Fire Timber Salvage Project, Jemez Ranger District Wildlife Project Files.

Gobster,
1993 *The Aesthetic Experience of Sustainable Forest Ecosystems* in: Sustainable Ecological Systems: Implementing an Ecological Approach to Land Management. Covington, W. and Leonard Debano, technical coordinators. General Technical Report RM-247. USDA – FS, Rocky Mountain Forest and Range Experiment Station. Flagstaff Arizona.

Gustin, M.
2002 New Mexico Game and Fish Department. Personal Communication.

Guthrie, D. A.
1984 Effects of Fire on Small Mammals Within Bandelier National Monument. Pp 115-14. in: T.S. Foxx (compiler) La Mesa Fire Symposium. LA-9236-NERP. Los Alamos National Laboratory, New Mexico.

Harrison H.H.
1979 A Field Guide to Western Birds' Nests. The Peterson Field Guide Series. Houghton Mifflin Company, Boston, MA

Hutto, R.L.
1995 Composition of bird communities following stand-replacing forest in northern Rocky Mountain (U.S.A.) conifer forests. Conservation Biology, Vol. 9, No. 5, pp 1041-1058.

Ice, George G.
1995 A Review of the Report *"Wildfire and Salvage Logging: Recommendations for Ecologically Sound Post-Fire Salvage Logging and Other Post-Fire Treatments on Federal Lands in the West."* Dr. George G. Ice – Research Forest Hydrologist, National Council of the Paper Industry for Air and Stream Improvement, Inc, PO Box 458, Corvallis, OR 97339.

Ice, George and Robert Beschta
1995 *Should Salvage Logging be Prohibited Following Wildfire?* in Proceedings of the 1999 National Council for Air and Stream Improvement (NCASI) West Coast Regional Meeting Vol II, pp 452-460. Research Triangle Park, NC: National Council for Air and Stream Improvement, Inc.

Jemez National Recreation Area Act
1993 Public Law 103-104

Johnson, Terry
2002 Personal Communication and Email for Expert Opinion on Peregrine Falcon and Mexican Spotted Owl; email located in Lakes Project File, Record #19.

Kaufman, Kenn.
2000 Birds of North America. Houghton Mifflin Co., New York, NY.

McIver, J. D.; Starr, L.,
2000 Environmental Effects of Postfire Logging: Literature Review and Annotated Bibliography. PNW-GTR-486.

Moeur S. and D.A. Guthrie
1984 The Effects of Clearing Fire-Killed Trees on Wildlife. La Mesa Fire Symposium, Los Alamos, NM. LA-9236-NERP, Los Alamos National Laboratory, Los Alamos, NM.

New Mexico Department of Game and Fish.
Biota information system of New Mexico (BISON) Web site: http://nmnhp.unm.edu/bisonm/bisonquery.php

2002 Personal Communication with R.J. Kirkpatrick, Game Biologist, Albuquerque, NM.

2002 Elk Regional Management Information. Santa Fe, New Mexico.

New Mexico Endemic Salamander Team
2000 Cooperative Management Plan for the Jemez Mountains Salamander *(Plethodon neomexicanus)* on Lands Administered by the Forest Service. Prepared by the New Mexico Endemic Salamander Team with representatives from: New Mexico Department of Game and Fish, US Fish and Wildlife Service, US Geological Survey, and USDA Forest Service.

New Mexico Environmental Department
2000 State of New Mexico 303(d) List for Assessed Stream and River Reaches, NM.

New Mexico Partners in Flight (PIF) web site: http://www.hawksaloft.org/pif/mc.htm

Peterson, Roger Tory.
1990 Peterson Field Guides: Western Birds. Houghton Mifflin Company, Boston, MA.

Peterson, John
2002 Jemez District Ranger. Personnel communication.

Pippin, W.F., and B. Nichols
1981 Observations of Arthropod Populations Following the Bandelier National Monument Fire of 1977. In: Overview of La Mesa Fire Studies. Craig Allen, Research Ecologist, Jemez Mountain Field Station, Los Alamos, NM.

Robichaud, P.R.; Beyers, J.L.; Neary, D. G.
2000 Evaluating the Effectiveness of Postfire Rehabilitation Treatments. Rocky Mountain Research Station-GTR-63.

Rustay C.
2002 IBA coordinator for New Mexico. Personal communication with Mary Orr, USFS wildlife biologist April 16, 2002.

Sauer, J.R., J.E. hines, and J/ Fallon
2001 The North American Breeding Bird Survey Results and Analysis. Patuxent Wildlife Center, Laurel, MD. http://www.mpr-pwrc.usgs.gov/bbs.

Smalling, Wes
2002 Foresters Close Deal on Viveash Fire Timber in *The New Mexican*, November 21, 2002.

State of New Mexico Water Quality Control Commission.
2002 Water Quality and Water Pollution Control in New Mexico in 2002. Appendix B p. 138.

Toy, T.J., and W.R. Osterkamp
1995 The Applicability of RUSLE to geomorphic studies. Journal of Soil and Water Conservation, pp 498-503.

USDA Forest Service.
1987 Santa Fe National Forest Plan, as Amended. Santa Fe National Forest, 1474 Rodeo Rd., Santa Fe, NM 87504.

1993 Terrestrial Ecosystem Survey of the Santa Fe National Forest (TES). Southwestern Region, Albuquerque, NM.

1997 Birds of the Santa Fe National Forest. U.S. Government Printing Office: 1997-573-252/24077. Santa Fe National Forest, 1474 Rodeo Rd., Santa Fe, NM 87504

1999 USDA-FS Region Three Sensitive Species List. Southwestern Region, Albuquerque, NM.

2002 Santa Fe National Forest Management Indicator Species (MIS) Assessment, Santa Fe National Forest, Southwest Region.

2002 Viveash Fire Salvage Final Environmental Impact Statement. Pecos / Las Vegas Ranger District, Santa Fe National Forest, 1474 Rodeo Rd., Santa Fe, NM 87504

2002 Lakes wildfire Burned Area Emergency Rehabilitation Report. Jemez Ranger District, Santa Fe National Forest, 1474 Rodeo Rd., Santa Fe, NM 87504 (soil and water references)

2002 Timber Reconnaissance Cruise Plots Lakes and BMG wildfires. Santa Fe National Forest, 1474 Rodeo Rd., Santa Fe, NM 87504.

USDA Forest Service Handbook 2509.2 Soil and Water Conservation Practices Handbook.

Williams, S.
2002 Personal Communication in December 2002. New Mexico Department of Game and Fish.

USDI – Fish and Wildlife Service
1995 Recovery Plan for the Mexican Spotted Owl (*Strix Occidentalis Lucinda*). Vol. I. Albuquerque, New Mexico.

USDA – Fish and Wildlife Service
2002 Concurrence Letter to Jemez District Ranger re: Jemez National Recreation Area EA and Management Plan, Referencing Fenton Lake Mexican Spotted Owl PAC. Lakes Project File Record # 23.