United States
Department of
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Service

**Southwestern
Region**

Final Supplement to the Final Environmental Impact Statement for the Agua/Caballos Proposed Projects

Carson National Forest
Rio Arriba County, New Mexico

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Final Supplement to the Final Environmental Impact Statement for the Agua/Caballos Proposed Projects

Carson National Forest

Southwestern Region
USDA Forest Service

Final Supplement
to the
Final Environmental Impact Statement
for the
Agua/Caballos Proposed Projects

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Abstract: The Forest Service proposed various silvicultural treatments, associated road construction, reconstruction, prescribed burning, old growth allocation and road closures in the 23,767-acre Agua/Caballos analysis area. Extensive areas of dense tree regeneration, rapidly declining acres of aspen, elevated levels of mistletoe infestation, decadent herbaceous and shrubby understory, few stands of older forests, high fuel loading and miles of open road—reflect the extent of human influence on the Agua/Caballos analysis area. These changes affect watershed conditions, potential for catastrophic wildfire, wildlife habitat capability and the overall health of the forested ecosystems. Creating openings in the forest, regenerating aspen, thinning trees in the understory, prescribing fire, allocating old growth and closing roads will help produce and maintain desired forest conditions—benefiting forest health, soil productivity, and the habitats of old growth dependent plants and animals. In addition several of these activities will be the sources of sawtimber and forest products needed to support local businesses and meet the intent of a court mandated Stipulated Settlement Agreement and Order, as well as the Sustained Yield Forest Management Act.

In addition to the no action alternative (Alternative A), five action alternatives (Alternatives C-G) were developed to address the issues raised by the public concerning the proposal. Public comments on the draft environmental impact statement and the supplement to the final environmental impact statement have been considered in the final environmental impact statement (published in 2002) and this final supplement to the final environmental impact statement. Alternative G was chosen as the preferred alternative.

Alternative C allocates 20 percent for old growth, harvests on 5,987 acres for sawtimber, constructs 23 miles of road, prescribes 2,185 acres of burning, and closes 37 miles of existing road.

Alternative D: allocates 26 percent for old growth, harvests on 1,983 acres for sawtimber, prescribes 2,185 acres of burning, and closes 37 miles of existing road.

Alternative E: allocates 26 percent for old growth, harvests on 3,195 acres for sawtimber, prescribes 2,185 acres of burning, and closes 37 miles of existing road.

Alternative F: allocates 20 percent for old growth, harvests on 3,705 acres for sawtimber, constructs 11 miles of road, prescribes 561 acres of burning, and closes 37 miles of existing road.

Alternative G (preferred alternative): allocates 20 percent for old growth, harvests on 3,884 acres for sawtimber, constructs 3 miles of new road, prescribes 2,065 acres of burning, and closes 37 miles of existing road.

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Introduction

The environmental analysis for the Agua/Caballos Proposed Projects has taken place over a 12-year period. The process went through several lapses when interdisciplinary team members were unable to participate due to other forest priorities or changes in personnel. Although the public periodically expressed frustration over the length of time it was taking to complete the analysis, public involvement was continuous.

In June 2002, the Carson National Forest issued a "Final Environmental Impact Statement for the Agua/Caballos Proposed Projects," along with a Record of Decision. [323] Subsequently, one appeal was filed with the Appeal Deciding Officer. [333] The Appeal Deciding Officer reversed the decision and instructed the Forest Supervisor to: (1) complete the analysis of effects on management indicator species (MIS), considering population and habitat information collected at the forest plan level or at an appropriate geographical scale for a particular species, and (2) circulate a supplemental environmental impact statement for public comment and issue a new decision. [335]

The updated Forest-wide MIS Assessment resulted in some changes to the MIS section of Chapter 3 – Affected Environment/Environmental Consequences, *Wildlife of the Agua/Caballos* of the FEIS. Consequently, a supplemental final environmental impact statement (SFEIS) was circulated for public review and comment in July 2003. [344] The SFEIS provided the public a chance to review new information on the Carson National Forest's management indicator species and how the species and their habitats relate to the Agua/Caballos Proposed Projects analysis. The SFEIS was sent to all those who received a copy of the "Record of Decision" and "Final Environment Impact Statement for the Agua/Caballos Proposed Projects" in 2002. [344]

To comply with the implementing regulations of the National Environmental Policy Act (40 CFR 1503.4 (a)), this document includes responses to public comments to the supplemental FEIS. In addition, this document provides clarification and updated information to portions of the Agua/Caballos Proposed Projects FEIS and SFEIS, specifically:

Chapter 3 - Affected Environment and Environmental Consequences, Wildlife

Appendix A - Project Record Index

Appendix B - Public Comments and Responses to the SFEIS

Appendix F - Literature Cited

At the beginning of each section, it will state whether the section serves as a replacement or additional information to either the FEIS or SFEIS.

The following pages
replace pages 130-178
(MIS)
in the
Final Environmental Impact Statement
for the
Agua/Caballos Proposed Projects

Maps and figures remain the same; text and some tables change.

Chapter 3 – Affected Environment and Environmental Consequences

Wildlife[1]

Overall Habitat Conditions

Vegetation structural stage (VSS) is a method of describing the growth stages of a stand of living trees. Stages are derived from tree size (DBH) and total canopy cover. Overall, the VSS is dependent on the time it takes seedlings to become established and subsequent growth rates. Life expectancy of trees determines how long the oldest VSS can be maintained (Reynolds et al. 1992). The desired VSS distribution for ponderosa pine, mixed conifer and spruce-fir on the Carson is based on the 1996 "Region-wide Amendment of Forest Plans" [193C] and the "Goshawk Management Recommendations" (Reynolds et al. 1992). Reynolds and others recommend striving for VSS classes equally distributed across the landscape to maintain biodiversity and healthy forests relatively safe from catastrophic fires and pests. Not only is an even VSS distribution beneficial to the northern goshawk, but it also provides for the needs of a wide variety of wildlife species.

It is important to note that this recommended VSS distribution is only a reference point to help define the relationship between existing and desired forest conditions. To reach desired forest conditions, some form of stand regeneration and tree density control (e.g., fire, insect and disease, understory thinning, group selections) is needed. Depending upon management intensity (minimal, moderate or intensive), the desired forest conditions can be attained at varying rates. No alternative developed for the Agua/Caballos analysis would achieve the desired distribution of VSS classes, however various alternative treatments would slightly shift structural stage distribution. For example, thinning small diameter trees and retaining the larger trees in a VSS 3 stand would shift the stand to a VSS 4 and enables them to develop into VSS 5 and 6.

Historic activities, such as those discussed in the *Vegetation* section (FEIS June 2002), have created low structural diversity across the Agua/Caballos analysis area. As displayed in Figure 2, structural diversity is heavily weighed in VSS 3 and VSS 4 and lacks both early (VSS 1 and 2) and late (VSS 5 and 6) conditions.

Figure 2. VSS Distribution for All Vegetation Types in the Aqua/Caballos Analysis Area

[1] This section is based on the wildlife report and addendum documented in the project record at [314], and supersedes the October 1998 report [245].

Most treatments proposed in the Agua/Caballos analysis cannot shift an entire stand to a different vegetation structural stage. Group selections create small openings within stands and provide habitat attributes found in VSS 1. Thinning and prescribed burning can also contribute to increasing understory productivity even though the structural stage may not change as a result of the treatment.

The objective of achieving more stands in the VSS 5 and 6 is limited by time. Intensity of forest treatments influences the growth rates of trees. For example, because of competition, trees in unthinned ponderosa pine stands will not grow more than 11 inches in diameter over a 220-year period. As a result, trees in an unthinned stand will remain small even though they are 200 years old and the stand will continue as a "young VSS" (Reynolds et al. 1992). The primary objective for most treatments developed for the Agua/Caballos analysis is to reduce the competition within stands and provide conditions that are conducive to allowing trees in these stands to grow to larger sizes faster. Also refer to *Vegetation*, Large Trees Table 11 (FEIS June 2002) for a more indepth discussion.

Management Indicator Species

The Carson National Forest Plan (as amended) identified 11 wildlife species as management indicator species (MIS) to monitor the conditions of the forest's ecosystems [3]. The Forest Plan provides direction on managing quality habitat for management indicator species by management area (MA). In January 2003, Forest Plan clarification pages were produced to bring together in one place the Carson management indicator species (identified for each management area). [336) These MIS are considered to be representative for a variety of other species with similar life requirements and were determined to reflect the habitat needs for the majority of the forest's species. MIS were selected because population changes are believed to indicate the effects of management activities that occur on the forest.

All 11 management indicator species or species groups were considered for the Agua/Caballos analysis. Six species and two groups were found to have the potential of being affected by the alternatives and were evaluated in detail. **Based upon the analysis area not being within the current or potential range for Brewer's sparrow (MA 12 - Sagebrush), bighorn (MA 9 - high elevation grassland) or ptarmigan (MA 9 - high elevation grassland), these species were not evaluated in this analysis.**

This final supplement is based on the Forest Plan, including the clarification pages. The MIS that may be affected by the proposed activities, their key habitat components for measuring quality habitat, and representative habitats by management area are displayed in Table 29b.

Table 29b. Management Indicator Species Habitat Within the Agua/Caballos Analysis Area

Management Indicator Species	Key MIS Habitat Component for Quality Habitat	Forest Plan Management Areas Within the Analysis Area Managed for Quality Habitat
Plain Titmous *(Baeolophus ridgwayi)*	piñon-juniper canopies	MA 8 - Piñon-Juniper
Abert's Squirre *(Sciurus aberti)*	interlocking canopies	MA 4 - Ponderosa Pine <40% MA 5 - Mixed Conifer and Ponderosa Pine >40% MA 7 - Unsuitable Timber

Management Indicator Species	Key MIS Habitat Component for Quality Habitat	Forest Plan Management Areas Within the Analysis Area Managed for Quality Habitat
Hairy Woodpecker *(Picoides villosus)*	snags	MA 1 - Spruce-fir <40% MA 3 - Mixed Conifer <40% MA 4 - Ponderosa Pine <40% MA 5 - Mixed Conifer and Ponderosa Pine >40% MA 6 - Aspen MA 7 - Unsuitable Timber MA 14 - Riparian
Red Squirrel *(Tamiasciurus hudsonicus)*	mixed conifer	MA 3 - Mixed Conifer <40% MA 5 - Mixed Conifer and Ponderosa Pine >40% MA 6 - Aspen MA 7 - Unsuitable Timber
Rocky Mountain Elk *(Cervis elaphus canadensis)*	general forest	MA 1 - Spruce-fir <40% MA 3 - Mixed Conifer <40% MA 4 - Ponderosa Pine <40% MA 5 - Mixed Conifer and Ponderosa Pine >40% MA 6 - Aspen MA 7 - Unsuitable Timber MA 8 - Piñon-Juniper MA 9 - High Elevation Grassland MA 12 - Sagebrush MA 14 - Riparian
Merriam's Turkey *(Meleagris gallopavo)*	old growth pine	MA 3 - Mixed Conifer <40% MA 4 - Ponderosa Pine <40% MA 5 - Mixed Conifer and Ponderosa Pine >40% MA 7 - Unsuitable Timber
Resident Trout	perennial stream, riparian	MA 14 - Riparian
Aquatic Macro Invertebrates	perennial stream, riparian	MA 14 - Riparian

Site-specific environmental effects on these species' habitats are described by alternative in the tables to follow. After the site-specific effects analysis, there is a discussion of how the Agua/Caballos Proposed Projects might affect these MIS and their habitats across Carson National Forest. Since the publication of the supplement to the FEIS in June 2003 [344], updated information for several management indicator species has been obtained. It is included in the appropriate sections on MIS in this document.

Cumulative Effects

Some animals are much more mobile than others. Therefore, it is important to recognize the entire range of an animal's habitat as its affected environment, instead of just the analysis area. This analysis describes the affected environment for each management indicator species and analyzes the impacts of all activities within this area for each alternative. For example, the red squirrel does not move around much—staying in the spruce-fir and mixed conifer and

overwintering instead of migrating for the winter. Therefore, its affected environment is the spruce-fir and mixed conifer within the analysis area. On the other hand, elk use much larger areas to mate, calve, graze and winter. Therefore, its affected environment also includes habitat outside of the Agua/Caballos analysis area. In essence, cumulative effects are an integral part of the effects analysis for wildlife and will be discussed for each species.

The types of activities that affect the species' habitat, directly, indirectly or cumulatively are listed under "Proposed Activities That Affect (species name)" for each species' section. The past, present and reasonably foreseeable activities are more specifically listed in the beginning of Chapter 3, Table 4 (FEIS June 2002). These activities were considered when determining the cumulative effects for each species' habitat.

Habitat and Population Trends and Viability

In addition to defining management indicator species, the forest planning regulations (36 CFR 219.9 (a)(6)) state that, "Population trends of management indicator species will be monitored and relationships to habitat changes determined." From known relationships between species and habitat, trends in amount and condition of habitat over time may also reflect population trends. This is not necessarily the situation in all circumstances. Population trends can often relate to other outside forces, such as predation, nest parasitism or detrimental impacts to other migratory habitats.

Population trend is most appropriately addressed at scales above the project level. Many of these selected MIS species occur and range far beyond a local scale such as the Agua/Caballos analysis area. Individuals, family groups or herds, such as elk, annually use areas much larger than the analysis area and population trend must be examined on a much greater scale to be meaningful. Evidence from long-term censuses suggests that few natural populations or communities persist at or near equilibrium on a local scale (Martin and Finch 1995). At a site-specific project level, there is a great deal of fluctuation in wide ranging populations. For this reason, it is not appropriate to determine population trend at the local level. For National Forest Management Act implementation, population trend is addressed at the scale of the Carson National Forest.

As a result of this effects analysis, it is determined that a management activity at the project level may result in temporary displacement or disturbance of individuals. However over the long term, implementation of any of the alternatives within the Agua/Caballos analysis area would either maintain or improve habitat conditions and populations for management indicator species.

It is the mandate of the Forest Service to manage fish and wildlife habitat "to maintain viable populations of existing native and desired non-native vertebrate species…." (36 CFR 219.19) Wildlife effects for this environmental analysis are based on an updated forest-wide assessment of management indicator species. [314] Taking into consideration forest-wide habitat conditions for a particular MIS, this analysis assumes that if habitat for a species is either maintained forest-wide, or on an upward trend, or planned actions improve habitat conditions, the activities proposed in the Agua/Caballos analysis area would not negatively affect species' viability—site-specifically or forest-wide.

The "Final Environmental Impact Statement (FEIS) for the Carson Forest Plan" analyzed seven alternatives. [1] The Carson Forest Plan decision alternative is described relative to projected impacts on management indicator species over the life of the plan, taking into account the estimated annual volume to be harvested from the forest. The FEIS describes that,

> *"The Proposed Action will over time provide moderate to high amounts and quality of most habitat components within the suitable timberlands and other management areas. Requirements for management of old growth, cover, vegetative diversity, raptor nesting habitat and many other habitat components receive*

> *greater emphasis and specific direction than other alternatives. Populations of all indicator species, with the possible exception of certain rare animals, will be managed at levels greatly exceeding minimum viable populations. [1, p.152]"*

Figure 2 shows the projected harvest level over the period of the Forest Plan compared to the actual harvest. Since the FEIS determined that MIS would be managed at levels greatly exceeding viable populations at the projected harvest levels, and the actual harvest level has averaged only about one-third of the projected, it is assumed that any of the alternatives in the Aqua/Caballos analysis are not only insignificant, but are well within the forest's ability to maintain viable populations for MIS.

Figure 2a. Comparison of Forest Plan Allowable Sale Quantity to Actual Harvest

Abert's Squirrel (Ponderosa Pine)

Affected Environment

Abert's squirrel (also referred to as the tassel-eared squirrel) principally utilizes the ponderosa pine (*Pinus ponderosa*) forest type. The species is an indicator for the presence of interlocking canopies in ponderosa pine (USDA 1986a, p.97). Abert's squirrel depends on ponderosa pine for basically all its life necessities and requires diversity of age classes and tree densities. Pine twigs, pine cones, pine seeds, pine bark, as well as truffles (underground mushrooms known to form mycorrhizal associations with ponderosa pine) are used by the Abert's squirrel (States 1985 and 1988). The map below displays potential habitat distribution for Abert's squirrel within the Agua/Caballos analysis area.

Map D. Abert's Squirrel Potential Habitat Distribution Within Agua/Caballos Analysis Area

Environmental Factors

- **Various tree size classes for arboreal travel and cover**. A variety of tree sizes exist in each of the VSS classes throughout ponderosa pine within the analysis area. However, 87 percent of this habitat type is in a mid-seral condition with 50 percent in VSS 3 and 37 percent in VSS 4.
- **Mistletoe brooms in ponderosa pine for nesting**. An estimated 22 percent of the ponderosa pine in the Agua/Caballos analysis area is infected with mistletoe.

Approximately 27 percent of the ponderosa pine on the El Rito Ranger District is infected, and 33 percent for the entire Carson National Forest. Mistletoe infections can create brooms that are occasionally used by the Abert's squirrel for nest construction. However, nests are often constructed in the absence of mistletoe. An adequate number of trees are infected with mistletoe to support Abert's squirrel nesting within the analysis area. None of the alternatives would reduce mistletoe infection to the degree to result in a limiting factor for nest construction.

- **Ponderosa pine stands for truffle production.** VSS classes 3 through 6 in ponderosa pine stands support truffle production. Over 70 percent of this type of habitat would not be affected in the preferred alternative. The vast majority of the treated acres is in the VSS 3 and 4 classes and incorporates thinning and prescribed burning, which should improve truffle production.
- **Interlocking tree crowns for feeding (pine cone food source), nesting, and arboreal travel**. Within the analysis area, 4,745 acres of ponderosa pine support this key habitat component with canopy closure greater than 60 percent. Also within the analysis area, there are 10,550 acres of multi-storied ponderosa pine stands that provide the same habitat component. Over half of the analysis area has the forest structure to support feeding, nesting and arboreal travel for the Abert's squirrel.
- **Oak understory for acorn food source**. Within the analysis area, oak understory along with early seral conditions in ponderosa pine produces few scattered mast crops (acorns) on a multiyear rotation that is unpredictable. The decadent condition (poor vigor) of oak stands limits consistent, annual acorn production preferred by the Abert's squirrel.
- **Also lacking is an adequate percentage of larger structural diversity for preferred nesting habitat**. The desired condition would be to have around 40 percent of the pine type in VSS 5 and 6 classes. Approximately 9 percent of the area is currently in these two classes. The treatments generally have only limited ability to make these shifts. The primary objective for most treatments developed for the preferred alternative is to reduce the competition within stands and provide conditions that are conducive to allowing trees in these stands to grow to larger sizes faster.

Figure 3. Abert's Squirrel Habitat in Aqua/Caballos Analysis—Existing VSS Distribution Compared With Alternative G After Treatment

Proposed Activities That Affect Abert's Squirrel

A. Disturbance (short term) During Activity
- Logging
- Prescribed burning

B. Habitat Effectiveness
- Change (alteration and arrangement) in VSS of ponderosa pine habitat

C. Other Influencing Activities
- Past: Railroad logging created dense even-aged or two storied pole sapling stands
  Thinning
  Prescribed burning
  Stand replacement by wildfire
- Present: Small game hunting
- Future: Potential for stand replacement by wildfire
  Firewood harvesting
  Viga and latilla sales

The activities listed above are described more specifically in Table 4 at the beginning of Chapter 3 of the FEIS (June 2002) and were considered when determining cumulative effects of the alternatives.

Table 30. Alternative Comparison of the Habitat for Abert's Squirrel

Cause	Alternative A	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G
Disturbance to Wildlife						
Would the location, season, extent, intensity of harvesting/cutting activities disturb the ABERT'S SQUIRREL (short term)? If so, to what extent?	No timber harvesting or associated activities would occur causing disturbance to the Abert's squirrel.	Disturbance would be up to 7 years in specific stands disrupting nesting in the spring, causing some temporary displacement.	Disturbance would be up to 4 years in specific stands disrupting nesting in the spring, causing some temporary displacement.	Disturbance would be up to 5 years in specific stands disrupting nesting in the spring, causing some temporary displacement.		Disturbance would be up to 6 years in specific stands disrupting nesting in the spring, causing some temporary displacement.
Would prescribed fire (intensity, duration, season, location) disturb the ABERT'S SQUIRREL? If so, to what extent? (Refer to MM #WL13)	No prescribed burning would occur causing disturbance to the Abert's squirrel.	Disturbance may be up to 2 years after treatment. Some site-specific disturbance to the Abert's squirrel causing temporary displacement would be possible during prescribed burning activities in ponderosa pine stands.				
Are there other activities (past, present and future), in conjunction with proposed activities that would disturb the ABERT'S SQUIRREL in its affected environment? If so, how and to what extent?	Continued firewood gathering and small sales would not cause significant disturbance over affected environment. A major fire would significantly disturb the squirrels and their affected environment.	The proposed activities would create some short-term disturbance, however, Abert's squirrel would move around and find areas where there is no disturbance for that time period. No long-term cumulative impact of disturbance to the squirrel would be expected for any of the action alternatives.				
Impacts to Habitat Effectiveness						
Change in Habitat Structure:						
How would changes in VSS distribution (structure) from harvesting/cutting activities, meadow	Since harvesting and burning are not proposed in this alternative, only slight	Harvest and thinning treatments in 43 percent of existing ponderosa pine with >60%	Harvest and thinning treatments in 11 percent of existing ponderosa pine with >60%	Harvest and thinning treatments in 20 percent of existing ponderosa pine with >60%	Harvest and thinning treatments in 24 percent of existing ponderosa pine with >60%	Harvest and thinning treatments in 24 percent of existing ponderosa pine with >60%

Cause	Alternative A	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G
maintenance and prescribed burning affect ABERT'S SQUIRREL habitat? (Refer to Vegetation section for environmental consequences from various silvicultural treatments)	changes would occur to the VSS distribution over time. Gradually as they mature, stands would become denser and the number of open areas would decrease. 4,745 acres (29 percent) of ponderosa pine with >60 percent canopy closure would continue to provide adequate interlocking tree crowns for feeding, traveling and nesting. The high number (14,612 acres) of VSS 3 and 4 ponderosa pine stands would support the production of truffles as a food source. Multistory canopies used by the squirrel for travel and cover would be present on 10,550 acres of the pine.	canopy closure would take stands below 60 percent canopy closure. 2,705 acres of the treated area would still have >60 percent canopy. After treatments, 14,509 acres of pine in VSS 3 and 4 would continue to sustain truffle production, and 10,272 acres of multistory canopies in ponderosa pine would support the stand structure needed for travel and cover. Prescribed burning in 2,106 acres of ponderosa pine/oak would stimulate acorn, mushroom and fungi production, improving the quality of the squirrel's food source.	canopy closure would take stands below 60 percent canopy closure. 4,223 acres of the treated area would still have >60 percent canopy. After treatments, 14,612 acres of pine in VSS 3 and 4 would continue to sustain truffle production, and 10,453 acres of multistory canopies in ponderosa pine would support the stand structure needed for travel and cover. Prescribed burning in 2,106 acres of ponderosa pine/oak would stimulate acorn, mushroom and fungi production, improving the quality of the squirrel's food source.	canopy closure would take stands below 60 percent canopy closure. 3,796 acres of the treated area would still have >60 percent canopy. After treatments, 14,432 acres of pine in VSS 3 and 4 would continue to sustain truffle production, and 10,333 acres of multistory canopies in ponderosa pine would support the stand structure needed for travel and cover. Prescribed burning in 2,106 acres of ponderosa pine/oak would stimulate acorn, mushroom and fungi production, improving the quality of the squirrel's food source.	canopy closure would take stands below 60 percent canopy closure. 3,606 acres of the treated area would still have >60 percent canopy. After treatments, 14,432 acres of pine in VSS 3 and 4 would continue to sustain truffle production, and 10,464 acres of multistory canopies in ponderosa pine would support the stand structure needed for travel and cover. Prescribed burning in 2,106 acres of ponderosa pine/oak would stimulate acorn, mushroom and fungi production, improving the quality of the squirrel's food source.	canopy closure would take stands below 60 percent canopy closure. 3,606 acres of the treated area would still have >60 percent canopy. After treatments, 14,432 acres of pine in VSS 3 and 4 would continue to sustain truffle production, and 10,333 acres of multistory canopies in ponderosa pine would support the stand structure needed for travel and cover. Prescribed burning in 1,986 acres of ponderosa pine/oak would stimulate acorn, mushroom and fungi production, improving the quality of the squirrel's food source.
Are there other activities (past, present and future), in conjunction with proposed activities, that would change the	In the event of severe drought, fuel buildup and debris accumulation could still fuel a catastrophic, stand replacement wildfire, whether stands have been harvested or not. A wildfire of this magnitude would drastically remove the key habitat components of the Abert's squirrel.					

Cause	Alternative A	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G
habitat structure and distribution of the ABERT'S SQUIRREL'S affected environment? If so, how and to what extent?						

Abert's Squirrel on the Carson National Forest

Abert's squirrels are well distributed throughout the Southwest, but restricted to areas where ponderosa pine is the dominant tree (Patton 1975). The majority of the use occurs in mid- to late seral stages vegetation structural stage (VSS) classes 3 through 6.

The Carson Forest Plan estimates approximately 222,000 acres of ponderosa pine forest type that provides potential habitat for Abert's squirrel. The current vegetation cover data identifies 301,297 total acres of ponderosa pine. Some degree of Abert's squirrel occupancy is noted within most of these acres. The species may be casual in the piñon/juniper woodlands, mixed conifer and even spruce-fir, but forest types other than ponderosa pine are not preferred habitat (Rassmussen 1941, Keith 1965, Patton and Green 1970, Patton 1975, Pederson et al. 1976, J. Hall 1981, Brown 1984, Pederson and Welch 1985, Hoffmeister 1986, Davis and Brown 1989). As displayed on Map E of the Carson National Forest the potential habitat for the Abert's squirrel is well distributed across the forest.

Map E. Abert's Squirrel Potential Habitat Distribution on the Carson National Forest (USDA 1987)

Habitat Condition and Trend

Forest-wide conditions are represented by various diversity unit analyses that have been conducted during the inception of the Forest Plan (1986). These include analyses such as MaPa, Alamo/Dinner, Angostura and Ojo Ryan on the east side of the Carson. On the west side these include: Hopewell, Felipito, La Manga, Borracho, Valle Grande, Upper Petaca Ecosystem Management Area and other data from the entire Vallecitos Federal Sustained Yield Unit, as well as other stand exams across the forest. These are generally consistent with conditions found within the Agua/Caballos analysis area (Figure 3), except that the domination of mid-seral conditions (VSS 3 and 4) appears to be even more prevalent on the east side than the west. With the exception of wilderness areas, early (VSS 1) and late (VSS 6) seral conditions are largely absent.

Large ponderosa pines with interlocking canopies are a structural component not as prevalent as desired across the forest. The present dominance of mid-seral conditions in ponderosa pine relate primarily to cumulative effects of historic heavy harvesting, such as the railroad logging early in the 20th century and fire suppression. Historic overstory removal prescriptions also contributed to the trend toward smaller diameter stands. The long-term trend (pre-Forest Plan) across the Carson was away from the larger structure stands and toward denser and smaller diameter stands. Some areas of ponderosa pine have also been lost or shifted toward mixed species by the invasion of white fir.

Reduction of stand heterogeneity and removal of big trees in large disjunctive blocks would likely have a negative effect on this squirrel's habitat. Recent changes in management practices on the forest places more emphasis on thinning and prescribed burning, which will increase desired habitat. Thinning and group selections to create clumpy conditions and reduce competition can replace larger trees faster (Reynolds et al. 1992). Maintenance of clustered stands is essential in providing the canopy cover needed for truffle production, as well as cover and nesting sites. In some areas there has been little or no activity in this habitat type during the life of the Forest Plan. Prescribed fire controls dense reproduction.

Figure 4 shows that between 1986 (when the Carson Forest Plan was implemented) and 2000, approximately 7 percent of the potential Abert's squirrel habitat has been actively managed for timber production.

Figure 4. Proportion of Ponderosa Pine Treated in Timber Sales on the Carson National Forest From 1986 to 2000 (RMRIS DB, Activity Records)

Unless 20 percent of the ecosystem management area has been allocated to old growth, Carson Forest Plan direction restricts harvesting large trees in the ponderosa pine in a manner that would take a stand out of meeting old growth criteria (USDA 1996). More recent management has tended to focus on thinning from below, rather than timber activity primarily used during the early years of the Forest Plan. Management practices of thinning from below and group selections across the forest enhances Abert's squirrel habitat that in turn should assure its survival (Patton 1984).

Figure 5 shows that of the 7 percent potential Abert's squirrel habitat that has been treated through timber sales since 1986, 65 percent of the habitat has shifted from late[1] to early seral conditions.

[1] Late seral stage includes stands that are not old growth.

Figure 5. Changes in Forested Seral Conditions in Timber Sale Areas on the Carson National Forest from 1986 to 2000.

Although timber harvest areas have shifted seral stages from late to early, it is on a limited percentage of the total habitat area with the majority (79 percent) being potential habitat for Abert's squirrel which is mostly in mid-seral conditions and about 21 percent estimated to be quality habitat.

However, there are over 254,000 acres of wilderness (Wilderness Act, 1964), wild and scenic river areas (Wild and Scenic Rivers Act, 1968), roadless areas (USDA 1986c, 20. Semi-primitive-2), slopes > 40 percent (USDA 1986c, 5. MC/PP >40 percent - 2 and Timber - 12) and special management areas (USDA 1986c, 19. Special Areas - 2) on the Carson National Forest that have management direction through the Forest Plan or Federal laws that exclude harvesting.

Agua/Caballos analysis area supports 16,274 acres of ponderosa pine. Based on the Carson Forest-wide Management Indicator Species Assessment and habitat trend analysis, there is estimated to be 3,262 acres of ponderosa pine that is quality habitat for the Abert's squirrel. Alternative G would reduce quality Abert's squirrel habitat by approximately 505 acres (3 percent). Alternatives C and F would reduce more acres, while Alternatives D and E would reduce less. Alternative G would improve habitat conditions on approximately 1,861 acres of Abert's squirrel quality habitat. Treatments in other ponderosa pine stands not currently meeting quality habitat criteria would more rapidly move an additional 2,043 acres toward quality habitat. The forest-wide trend of occupied or quality habitat from the time of the Forest Plan is up from an estimated 53,220 to 63,190 acres (20 percent). [314] Implementing Alternative G would still maintain an upward trend for Abert's squirrel quality habitat across the Carson National Forest.

Population Trend and Viability

Information from the Bison-M database indicates that this species is fairly common throughout New Mexico and Arizona (NMDGF 2001). Findley (1975) also describes Abert's squirrel to be widely distributed throughout its range.

Map F. Distribution of Abert's Squirrel in North America (NatureServe Explorer 2002)

The NatureServe database (www.natureserve.org/explorer) documents that throughout its range, the Abert's squirrel is listed as "G5" (i.e., globally secure and common, widespread and abundant). Reasons given for the G5 ranking are its large range and that it is common in many areas and there is no evidence of large-scale declines. It is not vulnerable in most of its range. Species with this rank typically occur in more than 100 localities, and there are more than 10,000 individuals. Within the United States, the Abert's squirrel is listed as "N5" (i.e., secure and common, widespread and abundant). In New Mexico, the Abert's squirrel is listed as "S4" (i.e., apparently secure—uncommon but not rare, and usually widespread in the nation or state/province). Species with this rank typically occur more than 100 occurrences and more than 10,000 individuals. An "S4" ranking can imply possible cause of long-term concern.

Based on the frequency and level of Abert's squirrel activity observed by biologists and other field personnel, the species is fairly common across its range. Several years ago on the Jicarilla Ranger District, the Abert's squirrel was determined to be plentiful enough for the NM Department of Game and Fish to expand hunting of the species in the area. With 93 percent of the squirrel's habitat on the forest not being impacted by management activities, changes to habitat conditions are not likely to have an effect on population viability.

Figure 6. Mean Harvest Abert's Squirrel for New Mexico (NMDGF 2001)

State wide harvest data indicates a slight decrease in mean harvest from 1983 to 1999 (NMGF 2001). Population trends, however, are not necessarily directly correlated with harvest data. It is possible that the popularity of squirrel hunting is declining slightly. However, it is just as likely that some degree of correlation can be made. When populations are increasing, the popularity of squirrel hunting is likely to be more appealing.

Available evidence suggests that populations of Abert's squirrels fluctuate both in the short- and long-term (Pearson 1950, Keith 1965, Farentinos 1972, Hall 1981), but there is no danger of extinction (UM 1997). Factors causing these fluctuations are not clear. A good and widespread mast crop brings an abundance of squirrels, whereas a year or so of scanty pine cone production results in a scarcity of these animals (Hoffmeister 1986). Population numbers of *S. aberti* appear to fluctuate widely over time and space. Population cycles may be related to cyclic variation in the biomass of the pine seed crops. Eight subspecies of *S. aberti* are listed in CITES-Appendix III (Hall and Kelson 1959).

Estimates of squirrel home range size vary as well. In Utah, Pederson et al. (1976) radio tracked squirrels during the summer on home ranges before and after timber harvests. Seven home ranges in this study averaged 6.2 acres before harvest, and 3 of these home ranges averaged 32.0 acres after harvest, indicating that timber harvesting can have an effect on squirrel density. Optimum densities are 50 to 100 per 100 acres (Patton 1977).[1] On the Carson, the species ranges from fairly uncommon to common throughout the pine type, but by no means approaches these numbers. This is likely to be linked to large areas of mid-seral habitat conditions as opposed to mature stands of ponderosa coupled with less favorable (more extreme) weather conditions.

The Abert's squirrel population on the Carson National Forest is considered to be stable, but is likely lower than potential, and is also directly related to both climate and habitat. Figure 3 is fairly representative of forest-wide conditions. Occupied or quality habitat for Abert's squirrel on the forest has increased during the life of the Forest Plan, but conditions still have room for improvement. Habitat conditions are considered to have a slight upward trend. The nature of projects over the last decade has generally shifted timber harvest away from overstory and shelterwood final removals to thinning from below and group selections. The cumulative effect of these treatments is the basis for stating there is a "slight upward trend in conditions."

As displayed in Figure 7, there is not a significant percentage of habitat being treated in preferred Alternative G relative to existing squirrel habitat on the forest. However, these types of treatments are likely to be implemented in other areas across the forest. Taking this into account, the proposed Aqua/Caballos Project (particularly Alternative G) would contribute to improving forest-wide Abert's squirrel habitat. This gradual improvement of the squirrel's habitat should help sustain viable populations on the Carson National Forest.

[1] Note: This is for excellent habitat in Arizona.

Figure 7. Percentage of Abert's Squirrel Habitat Treated in Aqua Caballos Alternative G in Relation to Forest-wide Abert's Squirrel Habitat

Forest Monitoring

Forest-wide monitoring for the Abert's squirrel was initiated during the 2003 field season (Frey 2003a). [354] In summarizing that effort, current population densities on the forest were extremely low. Density estimates ranged from 1 squirrel per 50 acres to 1 per 500 acres. However, the late timing of the monitoring study could have resulted in density estimates lower than actual. Of the 31 plots monitored, 58 percent had evidence of recent or current Abert's squirrel occupancy. Most plots (90.3 percent) exhibited evidence of occurrence at some time in the past, based on the presence of old feeding signs. It was clear during previous years, Abert's squirrel had a greater distribution and abundance than observed in 2003. However, the squirrel density in previous years could not be assessed (Frey 2003a). Based on data collected in adjacent states, population densities also crashed in 2002 with continued declines in 2003. With the most extensive and severe drought conditions in decades and the reliance of the species on cone/seeds, hypogenous fungi and acorn production, low densities should be expected. In her report, Frey cites Swetnam, who suggests that 2002 was possibly the driest year in the Southwest over the past 1,400 years (Frey 2003a).

The Frey's report states optimal habitat conditions are considered to be best met in uncut climax ponderosa pine forests and in managed stands with similar structure. In summary, optimal conditions are comprised of large diameter trees with interlocking canopies, along with groups of trees of various age classes, size and density that provide diverse habitat components. Intensive and widespread thinning is thought to adversely impact Abert's squirrels (Dodd et al. 1998). Although thinning is proposed in Alternative G, it is not considered "intensive" nor is it in the optimal stand conditions described above and would aid in moving most stands toward desired conditions. Furthermore, no treatments are proposed in the stands that best meet these conditions.

Red Squirrel (Mixed Conifer)

Affected Environment

Red squirrels require mature coniferous trees as a source of cones and seed (Degraaf and Rudis 1986). The best cone production occurs in 200- to 300-year-old Douglas-fir 40- to 300-year-old white fir (*Abies concolor*), and 150- to 200-year-old Engelmann spruce. The best seed producing stands of blue spruce (*Picea pungens*) are 50 to 150 years old (Reynolds et al. 1992).

- The more diverse the tree species are, the more likely that cone crop production will exist to sustain red squirrel populations. They are predominantly found in areas with greater than 60 percent canopy closure. Red squirrels utilize large diameter trees for nests that are located on big branches near the trunk of the tree. They may also use mistletoe formations and cavities. Food caches (middens) are a paramount importance to red squirrels (Reynolds et al. 1992). The map below displays potential habitat distribution for red squirrel within the Agua/Caballos analysis area.

Map G. Red Squirrel Potential Habitat Distribution Within Agua/Caballos Analysis Area

Environmental Factors

- Large standing dead trees (snags) for excavating nests and shelter areas in all forest/woodland areas, including aspen. Large snags are primarily found in stands that are in VSS 5 and 6. The average number of snags in the analysis area is 4 per acre. In mixed conifer, the average is 5.25 snags per acre and in ponderosa pine, it is 2.5 snags per acre. There are 1,853 acres of mixed conifer and spruce-fir habitat in the VSS 4, 5 and 6 which provide nesting habitat in the form of mistletoe brooms, snags, cull trees and large logs. However, the VSS 5 and 6 classes are only 431 acres of the most important habitat type.
- Smaller snags and dead and down trees (logs) around nests provide key feeding sites. Most of this feeding habitat is present within the upper elevation mixed conifer and spruce-fir types and sporadic within mixed conifer inclusions of ponderosa pine areas.
- Moist and shaded forest floor cache sites in groups of mature trees maintain the humidity necessary to prevent the cones from opening. In the spring, summer and fall, fungi are also available as a food source in mixed conifer and spruce-fir. Food caches (middens) are of paramount importance to red squirrels (Reynolds et al. 1992). Without these middens, winter starvation is inevitable (Smith 1968, Kemp and Keith 1970). At cache sites, groups of mature trees and shading from additional understory and overstory vegetation maintains the humidity necessary to prevent the cones from opening.
- Canopy cover >60 percent for arboreal travel and pup rearing. Within the analysis area, approximately 3,700 acres (88 percent) of mixed conifer and spruce-fir have 60 percent or greater canopy cover.
- Snags and downed logs for food cache sites and protection. Currently there are sufficient amounts of down logs and woody debris in the mixed conifer to provide for these needs and meet Forest Plan standards and guidelines.

The Agua/Caballos analysis area displayed below indicates the need to shift portions of the VSS 3 and 4 habitats to larger structural size classes.

Figure 8. Red Squirrel Habitat in Aqua/Caballos Analysis—Existing VSS Distribution Compared With Alternative G After Treatment

Proposed Activities That Affect Red Squirrel

A. Disturbance (short term) During Activity
- Logging
- Prescribed burning

B. Habitat Effectiveness
- Change (alteration and arrangement) in VSS of mixed conifer habitat
- Maintenance of snags and dead/down material
- Old growth enhancement

C. Other Influencing Activities
- Past: Fire suppression - dense timber stands
  Light logging activity
  Precommercial thinning
- Present: Implementation of 1996 Forest Plan Amendment.
- Future: Continued exclusion of most harvest activities in mixed conifer.
  Potential for stand replacement by wildfire

The activities listed above are described more specifically in Table 4 at the beginning of Chapter 3 and were considered when determining cumulative effects of the alternatives.

Table 31. Alternative Comparison of the Habitat for the Red Squirrel

Cause	Alternative A	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G
Disturbance to Wildlife						
Would the location, season, extent, intensity of harvesting/cutting activities disturb the RED SQUIRREL (short term)? If so, to what extent?	No timber harvesting or associated activities would occur to cause disturbance to the red squirrel.	Disturbance would be up to 7 years.	Disturbance would be up to 4 years.	Disturbance would be up to 5 years.		Disturbance would be up to 6 years.
		More specifically there would be some displacement in stands being treated and only on days when operations are actually occurring in that stand.				
Would prescribed fire (intensity, duration, season, location) disturb the RED SQUIRREL? If so, to what extent? (Refer to MM #WL13)	Since no prescribed burning in mixed conifer is proposed under any of the alternatives, there would be no disturbance to the red squirrel.					
Are there other activities (past, present and future), in conjunction with proposed activities that would disturb the RED SQUIRREL in its affected environment? If so, how and to what extent?	Continued firewood gathering and small sales would not cause very much disturbance over the affected environment. A major fire would disturb the squirrel.	The proposed activities would create some short-term disturbance, but the red squirrel would likely move around and find areas where disturbance was not occurring during that time period. No long-term cumulative impact of disturbance to the squirrel would be expected for any of the action alternatives.				
Impacts to Habitat Effectiveness						
Change in Habitat Structure						
How would changes in VSS distribution (structure) from	Since harvesting and burning are not proposed in	Harvesting/cutting activities and prescribed burning would only produce slight changes in the VSS distribution of mixed conifer. (Refer to Table 6 in the *Vegetation* section). Alternative C would create the greatest shift in VSS in mixed conifer—a 5 percent decrease in VSS 3 and a 5 percent increase in VSS 4. The				

Cause	Alternative A	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G
harvesting/cutting activities, meadow maintenance and prescribed burning affect RED SQUIRREL habitat? (Refer to Vegetation section for environmental consequences from various silvicultural treatments)	this alternative, only gradual changes would occur to the VSS distribution over time. Gradually as they mature, stands would become denser and the number of open areas would decrease.	other action alternatives would shift only between VSS 3 and VSS 4, changing VSS in less than 5 percent of the existing stand condition. For example, approximately 29 percent of the analysis area is in VSS 4. In Alternative C, VSS 4 would go up to 34 percent, Alternatives D and E to 31 percent, Alternative F to 30 percent and Alternative G up to 32 percent. Due to thinning from below and other treatments, this would increase the vigor and growth of trees growing in these VSS age classes. Regardless of the VSS alterations in any of the action alternatives, the changes do not substantially affect the overall red squirrel habitat. At the stand level, stand structure would not be altered to where it could not be useable by the red squirrel for some portion of it's life cycle needs. Meadow maintenance would support an additional food source that may, on occasion, be utilized along the edge. There would be no prescribed burning in the mixed conifer type to affect red squirrel habitat. The quality of the habitat components would remain abundant and useable.				
Are there other activities (past, present and future), in conjunction with proposed activities that would change the habitat structure of the RED SQUIRREL'S affected environment? If so, how and to what extent?	In the event of severe drought, fuel buildup and debris accumulation could still fuel a catastrophic, stand replacement wildfire, whether stands have been harvested or not. A wildfire of this magnitude would drastically remove the key habitat components of the red squirrel.					
Old Growth						
How does the allocation of old growth affect the RED SQUIRREL?	Old growth allocation provides additional protection to large trees that the red squirrel is dependent on for nesting. In stands allocated to old growth, quality habitat for the red squirrel would be sustained in all key aspects of its life cycles (foraging, nesting, food caches, cover, arboreal travel, in all seasons). Alternative A would add no more stands to the 15 percent (3,334 acres) of the analysis area already allocated to old growth. Alternatives D and E would allocate 26 percent (5,889 acres) of the analysis area, while Alternatives C, F and G would allocate 20 percent (4,457 acres). Also refer to the *Vegetation* (Old Growth) section in this document.					
How does harvesting firewood in old growth stands affect the RED SQUIRREL?	Since no firewood harvesting or associated activities would take place in allocated old growth, this component of the red squirrel's habitat would not be affected.	Alternative C would treat 147 acres of existing old growth with firewood harvests. Only small trees would be cut, which would eliminate competition and stimulate growth of the remaining	Since no firewood harvesting or associated activities would take place in allocated old growth, this component of the red squirrel's habitat would not be affected. Quality habitat for the red squirrel would be sustained and continue to provide for its life cycle needs, such as foraging, nesting, food caches and cover in all seasons.			

Cause	Alternative A	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G
		trees, benefiting habitat for the red squirrel in the long term.				
Are there other activities (past, present and future), in conjunction with proposed activities that would affect the RED SQUIRREL'S affected environment relative to old growth? If so, how and to what extent?	In the event of severe drought, fuel buildup and debris accumulation could still fuel a catastrophic, stand replacement wildfire, whether stands have been harvested or not. A wildfire of this magnitude would drastically remove the red squirrel's key habitat components.					
Snags and Down Logs						
Would activities affect the quality and quantity of existing snags and down logs? If so, would this affect the RED SQUIRREL? (Refer to MM #WL1, WL2 and WL13)	Most existing snags (standing dead trees) and logs (dead and down trees) would remain available, providing for red squirrel needs such as ground cover, production of fungi as a food source, food caches and hibernation. Although there would be no proposed harvest activities, some of this habitat component near open roadways would be gathered as firewood.	Most existing snags and logs would be retained to provide for red squirrel habitat needs. Commercial timber harvest operations may create some snags and increase logs and woody residues. Some snags may be removed during harvest operations if deemed a safety threat to forest workers or forest users. Since prescribed burning would not occur in the mixed conifer type, losing snags or dead and down trees (logs) would not be a threat. Where accessible to open roadways, some snags and logs may be removed as firewood. The proposed road closures would help reduce the removal of these snags and logs.				

Red Squirrel on the Carson National Forest

On the Carson National Forest, this species is commonly observed throughout the mixed conifer (240,445) acres) and spruce-fir (201,339 acres) habitat types. Characteristic mounds or middens confirm red squirrels presence and are found throughout red squirrel habitat on the forest. Red squirrel clippings, cone felling and stripping are also a usual sign of occurrence. As displayed on a map of the Carson National Forest, potential habitat for the red squirrel is well distributed across the forest.

Map H. Red Squirrel Potential Habitat Distribution on the Carson National Forest (USDA 1987)

Habitat Condition and Trend

The dominant mid-seral conditions on the Carson primarily relate to cumulative effects of historical heavy logging, primarily railroad logging in the early 20th century, and long-term fire suppression. Overstory removal prescriptions also contributed to the trend toward smaller diameter stands. Over the past 15-20 years, most vegetation treatments in red squirrel habitat have shifted away from sawtimber and moved toward wildlife habitat improvement.

Vegetation treatments since 1986 have been consistent with the Forest Plan, creating small openings and retaining large cone producing trees for red squirrel foraging opportunities. Although timber harvest has dropped dramatically (97 percent) across the Carson National Forest since 1984, a common practice throughout the period of the Forest Plan (1986), with regard to harvest activities, was to locate and avoid patches around squirrel middens (see Forest Plan direction in previous section). The untreated stands continue to provide and maintain a closed canopy for fungi production and mesic conditions. As a result, the current habitat condition for this species is relatively good.

Current management practices on the forest place more emphasis on thinning and prescribed burning, increasing the desired habitat in mixed conifer. Prescribed fire controls dense reproduction and improves prey base populations. Thinning in mixed conifer stands that are not maturing into large diameter trees reduces inter-tree competition for moisture, nutrients and light and stimulates growth of residual trees. In addition, dense stands of trees are prone to catastrophic wildfire, which could completely remove red squirrel habitat, affecting local populations. By thinning dense stands, the risk of a catastrophic wildfire is reduced.

Figure 9 shows that between 1986 (when the Carson Forest Plan was implemented) and 2000, approximately 4 percent of potential red squirrel habitat has been actively managed for timber production.

Figure 9. Proportion of Mixed Conifer and Spruce-fir Treated in Timber Sales on the Carson National Forest From 1986 to 2000 (RMRIS DB, Activity Records)

Standards and guidelines incorporated in the Carson Forest Plan through the 1996 "Region-wide Amendment of Forest Plans" (USDA 1996) restrict management activities within the mixed conifer. Standards and guidelines include:

- No timber harvesting (except for fire risk abatement) in mixed conifer on slopes greater than 40 percent.
- Within Mexican spotted owl restricted habitat (mixed conifer), 25 percent of the oldest and/or best nest/roost habitat (threshold) must not go below threshold values.
- Unless 20 percent of an ecosystem management area has been allocated to old growth, any mixed conifer stands must not be treated in a manner that would take the stand out of meeting old growth criteria (USDA 1996).

Since 1995, the Carson National Forest has focused on thinning from below, with little or no timber activity in the mixed conifer. Figure 10 shows that of the 4 percent potential red squirrel habitat that has been treated through timber sales since 1986, 62 percent of the habitat has shifted from late[1] to early seral conditions.

[1] Late seral stage includes stands that are not old growth.

Figure 10. Changes in Forested Seral Conditions in Timber Sale Areas on the Carson National Forest from 1986 to 2000.

In addition, over 254,000 acres of wilderness (Wilderness Act 1964), wild and scenic river areas (Wild and Scenic Rivers Act 1968), roadless areas (USDA 1986c, 20. Semi-primitive-2), slopes > 40 percent (USDA 1986c, 5. MC/PP >40% - 2 and Timber – 12) and special management areas (USDA 1986c, 19. Special Areas – 2) on the Carson National Forest have management direction through the Forest Plan or Federal laws that exclude harvesting.

Population Trend and Viability

Red squirrels are year-round residents of forest types from Alaska to Newfoundland, south to the southern Appalachians and through the Rocky Mountains to Arizona and New Mexico. This species is widespread in North America and abundant in many areas (NatureServe 2002). Overall, the U.S. population is stable.

The NatureServe database (www.natureserve.org/explorer) documents that throughout its range, the red squirrel is listed as “G5” (i.e., globally secure and common, widespread and abundant). Reasons given for the G5 ranking are its large range and that it is common in many areas and there is no evidence of large-scale declines. It is not vulnerable in most of its range. Species with this rank typically occur in more than 100 localities, and there are more than 10,000 individuals. Within the United States, the red squirrel is listed as “N5” (i.e., secure and common, widespread, and abundant). In New Mexico, the red squirrel is listed as “S5” (i.e., secure, common, widespread and abundant).

Map I. Distribution of Red Squirrel in North America (NatureServe Explorer 2002)

Information from the Bison-M database indicates that this species is fairly common throughout mixed conifer and spruce-fir forests of New Mexico and Arizona (NMDGF 2001). In 1988, the N.M. Department of Game and Fish listed the red squirrel as a game mammal (NMDGF 1988). There is no indication or documentation that red squirrels are declining in the Southwest.

State wide harvest data indicates a slight decrease in mean harvest from 1983 to 1999 (NMGF). Population trends are not necessarily directly correlated with harvest data. It is possible that the popularity of squirrel hunting is slightly declining. However, it is just as likely that some degree of correlation can be made. When populations are abundant, the popularity of squirrel hunting is likely to be more appealing.

State wide harvest data indicates a slight decrease in mean harvest from 1983 to 1999 (NMGF 2001). Population trends, however, are not necessarily directly correlated with harvest data. It is possible that the popularity of squirrel hunting is declining slightly. However, it is just as likely that some degree of correlation can be made. When populations are increasing, the popularity of squirrel hunting is likely to be more appealing.

Figure 11. Mean Harvest Red Squirrel for New Mexico (NMDGF 2001)

Many studies, reviewed by Klenner and Krebs (1991), indicated that red squirrel population density varies with cone crops. Rusch and Reeder (1978) reported that summer populations fluctuated between 67 and 151 red squirrels per 2,500 acres in mixed habitats. The number of cones required to sustain a single red squirrel for a year ranges from 42,000 to 131,000, thus 9 to 25 large, mature cone-producing trees per territory are necessary (Smith 1968, Rusch and Reeder 1978, Gurnell 1984, Patton and Vahle 1986). On the Carson National Forest, very few acres of red squirrel habitat (mixed conifer and spruce-fir) have been harvested since 1995 or are planned for future harvest. Thinning and prescribed burning will only improve conditions for growing large, mature cone-producing trees.

Frequent observations and the extensive distribution and abundance of mixed conifer and spruce-fir forest are indicative that the species continues to survive and reproduce successfully across the forest. Ninety-six percent of the squirrel's habitat on the forest is not being impacted by management activities.

Red squirrel habitat on the Carson National Forest is in good condition and is stable. Taking into account the condition and trend of the squirrel's habitat on the forest, existing data and field observations, the Carson is supporting stable populations of red squirrel and viable populations are being sustained. The Forest Service is maintaining and/or increasing older seral stages of trees found throughout the forest, thus increasing habitat diversity as well as old growth that red squirrels depend on.

The nature of projects over the last decade has generally shifted timber harvest away from overstory and shelterwood final removals to thinning from below and group selections. Future implementation of prescribed burning and thinning will only continue to improve the squirrel's habitat. Subsequently, implementation of these forest activities would have an insignificant effect on the viability of squirrel populations. Catastrophic wildfire in the mixed conifer would threaten local red squirrel populations; however, current emphasis on reducing fuels in mixed conifer will reduce the risk.

As displayed in Figure 12, there is not a significant percentage of habitat being treated in preferred Alternative G relative to existing red squirrel habitat on the forest. However, these types of treatments are likely to be implemented in other areas across the forest. Taking this into account, the proposed Aqua/Caballos Project (particularly Alternative G) would contribute to improving red squirrel habitat forest-wide. Considering the trend of the squirrel's habitat, with existing data and field observations, the Carson National Forest is sustaining viable populations of red squirrel.

Figure 12. Percentage of Red Squirrel Habitat Treated in Aqua Caballos Alternative G in Relation to Forest-wide Squirrel Habitat

Forest Monitoring

Forest-wide monitoring of red squirrel was initiated in 2003 (Frey 2003b). [355] A total of 116 transects and 58 stands were surveyed for squirrel middens. Forest-wide density of active primary middens varied from 0 to 3.37 per acre with an overall mean of .47 per acre. Red squirrel densities were found to be within the range of variation found in other studies. Relatively low densities were found in the lower elevation mixed conifer containing more Douglas-fir and white fir. However, mean densities of red squirrels in the spruce-fir containing Engelmann spruce and sub-alpine fir and stands of blue spruce were as high or higher than the maximum density reported in most previous studies. The single best predictor of red squirrel midden density was large diameter, Engelmann spruce. Alternative G does not include harvesting large diameter Engelmann spruce.

Hairy Woodpecker (Snag Habitat)

Affected Environment

The hairy woodpecker is an indicator species for the presence of snags and down logs (USDA 1986a, p.97). Hairy woodpeckers are one of the most common woodpeckers in the Southwest, particularly in riparian habitats and in ponderosa pine, mixed-species and spruce-fir forests (Hubbard 1978). The species is a forest generalist, keying in on available snags and live aspen. Nests are primarily in trees averaging 17 inches in diameter at breast height (DBH) and approximately 60 feet high. The woodpecker forages for insects primarily on tree trunks averaging 17 inches DBH and greater than 30 feet tall. Down logs are also important in supporting insect populations for the hairy woodpecker. Map J displays potential habitat distribution for hairy woodpecker within the Agua/Caballos analysis area.

Map J. Hairy Woodpecker Potential Habitat Distribution Within Agua/Caballos Analysis Area

Environmental Factors

- Large, standing dead trees (snags) for excavating nests and shelter areas in all forest/woodland areas, including aspen. The average number of snags in the analysis area is 4 per acre. In the mixed conifer the average is 5.25 snags per acre and in the ponderosa pine it is 2.5 snags per acre. The VSS 5 and 6 classes, which provide for larger

snags and snag recruitment trees are only about 30 percent of the desired amount within the habitat type.

- Bennetts (1991) positively correlates the number of birds detected with increasing levels of dwarf mistletoe. Therefore, Bennetts suggests "management planning should also include situations in which ecological processes that create snags be allowed to occur uninterrupted." He continues by adding, "Consideration should be given to the historic role of these processes in shaping forest communities." Bennetts goes on to say, "I do not advocate that these processes be allowed to run uninterrupted when conflicts arise with a priori management goals." [also found in PR 196 paper #8]
- Smaller snags and dead and down trees (logs) around nests provide key feeding sites. Most of this feeding habitat is present within the mixed conifer and spruce-fir types and sporadic within portions of ponderosa pine areas. The piñon/juniper woodlands also provide for this need. This condition is adequately met as a result of the heavily represented VSS 3 class in all habitat types.
- Approximately 75 percent of the hairy woodpecker habitat would remain untreated in the preferred Alternative G. This would allow for most of the affected areas to be treated to reduce competition and produce larger trees faster while retaining the majority of the existing habitat conditions.

Figure 13. Hairy Woodpecker Habitat in Aqua/Caballos Analysis—Existing VSS Distribution Compared With Alternative G After Treatment

Proposed Activities That Affect Hairy Woodpecker

A. Disturbance (short term) During Activity
- Logging
- Prescribed burning

B. Habitat Effectiveness
- VSS arrangement and alteration (recruitment of future snag trees).
- Maintenance of existing snags and dead and down material.

C. Other Influencing Activities
- Past: Fire suppression - dense timber stands
  Light logging activity
  Precommercial thinning

- Present: Implementation of 1996 Forest Plan Amendment.
  Prescribed burning
  Insects and disease (create culls and snags)
- Future: Continued exclusion of most harvest activities in mixed conifer.
  Potential for stand replacement by wildfire
  Firewood gathering

The activities listed above are described more specifically in Table 4 at beginning of Chapter 3 and were considered when determining the cumulative effects of the alternatives.

Table 32. Alternative Comparison of the Habitat for Hairy Woodpecker

Cause	Alternative A	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G
Disturbance to Wildlife						
Would the location, season, extent, intensity of harvesting/cutting activities disturb the HAIRY WOODPECKER (short term)? If so, to what extent?	With no harvest activities proposed, no disturbance would occur to the hairy woodpecker.	Disturbance would be up to 7 years.	Disturbance would be up to 4 years.	Disturbance would be up to 5 years.		Disturbance would be up to 6 years.
		More specifically there would be some displacement in stands being treated and only on days when operations are actually occurring in that stand.				
Would prescribed fire (intensity, duration, season, location) disturb the HAIRY WOODPECKER? If so, to what extent? (Refer to MM #WL13)	Since no prescribed burning in mixed conifer is proposed under any of the alternatives, there would be no disturbance to the hairy woodpecker. Prescribed fires within the treated ponderosa pine stands may cause a temporary displacement of the woodpeckers for the duration of the burn.					
Are there other activities (past, present and future), in conjunction with proposed activities that would disturb the HAIRY WOODPECKER in its affected environment? If so, how and to what extent?	The hairy woodpecker is somewhat tolerant of most activities occurring in the forest, depending on their intensity. Continued firewood gathering and small sales would not cause significant disturbance to the bird and its snag habitat. A major event such as a stand replacement wildfire would create a high level of disturbance to the woodpecker.					
Impacts to Habitat Effectiveness						
Change in Habitat Structure						
How would changes in VSS distribution and internal stand structure from harvesting/cutting activities, meadow maintenance and prescribed burning affect the HAIRY WOODPECKER? (Refer to Vegetation section for environmental consequences from various silvicultural treatments)	With no harvesting or burning, there would be no affect to the overall VSS distribution of the affected environment. Over an extended period of time, gradual changes would result in denser, mature stands and fewer open areas.	Stands used for nesting, foraging and cover (VSS 3–6) would remain plentiful after the completion of timber harvesting. Down woody material created by this activity would create foraging areas for insects. Existing snags and large down logs would be protected from harvesting and prescribed burning. In each VSS mentioned, there would be plenty of trees available for natural snag recruitment or could be created if the need arises.				

Snags and Down Logs		
Would activities affect the quality and quantity of existing snags and down logs? If so, would this affect the HAIRY WOODPECKER? (Refer to MM #WL1, WL2, WL5 and WL13)	No immediate alterations would be made to the quality of the existing snags and down logs within the VSS 3 - 6 stands.	Mitigation measures ensure that most of the existing snags and logs would be retained for the hairy woodpecker's courtship, nesting and feeding needs. Commercial timber harvest operations in these alternatives may create some snags and increase logs and woody residues. Some snags may be removed during harvest operations if deemed a safety threat to forest workers or forest users. Prescribed burning in the ponderosa pine type (approximately 2,106 acres in Alternatives C, D and E, 440 acres in Alternative F and 1,986 acres in Alternative G) may destroy some snags. The risk of losing this habitat component by fire would be minimal, since burning prescriptions would favor retaining snags and logs. Where accessible to open roadways, some snags and logs may be removed as firewood. The proposed road closures would help reduce the removal of some of these snags and logs.
Are there other activities (past, present and future), in conjunction with proposed activities that would change the HAIRY WOODPECKER'S affected environment relative to snags and down logs? If so, how and to what extent?	In the event of severe drought, fuel buildup and debris accumulation could still fuel a catastrophic, stand replacement wildfire, whether stands have been harvested or not. Such a fire would remove existing snag habitat, but would also create a greater number of snags by killing many live green trees of various sizes. The abundance of these snags could provide optimum conditions for the hairy woodpecker over a long period of time.	

Hairy Woodpecker on the Carson National Forest

On the Carson National Forest, this species is commonly observed throughout the ponderosa pine and mixed conifer habitat types. The species will also use the spruce-fir and aspen (not shown on map). As displayed on Map K of the Carson National Forest, the potential habitat for the hairy woodpecker is abundant and well distributed across the forest. The total potential habitat including all cover types is 839,248 acres.

Map K. Hairy Woodpecker Potential Habitat Distribution on the Carson National Forest (USDA *1987)*

Habitat Condition and Trend

Forest-wide conditions are represented by various diversity unit analyses that have been conducted during the inception of the Forest Plan (1986). These include analyses such as MaPa, Alamo/Dinner, Angostura and Ojo Ryan on the east side of the Carson. On the west side these include: Hopewell, Felipito, La Manga, Borracho, Valle Grande, Upper Petaca Ecosystem Management Area and other data from the entire Vallecitos Federal Sustained Yield Unit, as well as other stand exams across the forest. These are generally consistent with conditions found within the Agua/Caballos analysis area (Figure 13), except that the domination of mid-seral conditions (VSS 3 and 4) appear to be even more prevalent on the east side than the west. With the exception of wilderness areas, early (VSS 1) and late (VSS 6) seral conditions are largely absent.

Snags and down woody debris comprise an important habitat component for many woodpeckers and other cavity-nesting species. Low snag availability resulting from timber harvest, firewood removal, or intense surface fires may adversely affect populations of snag-dependent species, such as the hairy woodpecker (Balda 1975, Thomas et al 1979). Timber harvest, firewood harvest and other personal use products such as vigas and latillas can also reduce down materials. The figure below shows that between 1986 (when the Carson Forest Plan was implemented) and 2000, approximately 6 percent of potential hairy woodpecker habitat has been actively managed for timber production.

Figure 14 shows that of the 6 percent potential hairy woodpecker habitat that has been treated through timber sales since 1986, 62 percent of the habitat has shifted from late to early seral conditions.

Figure 14. Proportion of Hairy Woodpecker Forested Habitats Treated in Timber Sales on the Carson National Forest from 1986 to 2000 (RMRIS DB, Activity Records)

Although timber harvest areas have shifted seral stages from late to early, it is on a limited percentage of the total habitat area and the rest of the treated areas are still in mid to late seral conditions. Szaro and Balda (1982) studied the effects of timber harvest on breeding bird densities in ponderosa pine forest on the Coconino National Forest in Arizona. During all years of the study, hairy woodpeckers were found in all types of harvested stands, except clear cuts. Hairy woodpecker densities averaged about 3 pairs/100 acres, and did not differ among treatments (Szaro and Balda 1982, 1986).

Gathering of dead and down firewood is common practice on the Carson National Forest. Accessibility and increasing demand for firewood has made snags and down woody debris susceptible to removal along forest roads. Areas with high road density have the highest rate of snag removal—primarily on slopes immediately above roads. Zones generally confined to 50 feet on either side of an open road are where firewood gathering is most concentrated. Dead and down firewood gathering requires a permit. The "Carson National Forest Firewood Guide," which accompanies every firewood permit issued, specifically states, "You may not cut:

- ✓ Standing dead ponderosa pine trees or those to be preserved for wildlife habitat.
- ✓ On timber sale or contract areas posted with signs, green firewood areas.
- ✓ Within 100 feet of paved roads.
- ✓ Within 100 feet of lakes and flowing streams.
- ✓ Within established recreation areas."

However, there are over 254,000 acres of wilderness (Wilderness Act 1964), wild and scenic river areas (Wild and Scenic Rivers Act 1968), roadless areas (USDA 1986c, 20. Semi-primitive-2), slopes > 40 percent (USDA 1986c, 5. MC/PP >40% - 2 and Timber – 12) and special management areas (USDA 1986c, 19. Special Areas – 2) on the Carson National Forest that have management direction through the Forest Plan or Federal laws that exclude harvesting or removal of snags or are considered inaccessible to snag removal.

Figure 15. Changes in Forested Seral Conditions in Timber Sale Areas on the Carson National Forest from 1986 to 2000.

Agua/Caballos analysis area has an estimated 2,227 acres of old growth habitat. These stands are comprised of the largest structural components and stands qualifying as old growth. None of these acres are being treated in any of the alternatives.

The Carson Forest-wide Management Indicator Species Assessment and habitat trend analysis has determined that quality hairy woodpecker habitat on the Carson National Forest has increased since the Forest Plan was implemented (1986) from 106,880 to 112,702 acres. This is an upward trend of about 5 percent. All of the quality hairy woodpecker habitat and approximately 75 percent of the potential habitat in the conifer types would remain untreated in Alternatives A and C-G. Implementing any of the alternatives would still maintain an upward trend in quality hairy woodpecker habitat across the Carson National Forest. In addition, management efforts since 1986 have been consistent with Forest Plan guidelines, which are intended to "provide quality habitat for the hairy woodpecker." Large trees, which are future down logs and snags, are being maintained across the forest.

Natural Snag Recruitment

Wildland fire and insect and disease infestations result in the creation of snags. Approximately 6,000 acres of snags of various species in ponderosa pine and mixed conifer vegetation type were created in the 1996 Hondo Fire event on the Questa Ranger District. Other than the Hondo Fire, very few fires—wild or prescribed—have actually changed seral stage conditions on the Carson.

Since 1979, insect infestations have been tracked on the Carson National Forest through aerial surveys. The cumulative insect and disease infestations that have occurred from 1979 to 2001 have been mapped. Depending on the type of insect attack, snags are created at different rates as a natural part of ecosystem processes. Pine bark beetle occurrences almost result in small pockets of ponderosa pine tree mortality after one year. The trend in bark beetle infestations on the forest since 1986 directly correlates to snag recruitment and improvement of habitat for the hairy woodpecker.

Spruce budworm infestations generally slow growth unless repeated defoliation occurs over several years. The spruce budworm infestations usually move around to different areas, but overlap areas do occur and those areas generally produce snags after several years.

During the life of the Carson Forest Plan, there has been little change in the long-term trend of available habitat and quality of habitat. This conclusion can be made given: (1) the small amount (approximately 6 percent) of potential hairy woodpecker habitat that has been affected by forest management activities since 1986; (2) the relatively minor changes in seral conditions due to

wildfire; (3) the limited areas on the forest where dead and down firewood is collected; and (4) the continuation of natural snag recruitment, which compensates for items 1-3.

Figure 16. Spruce Budworm Defoliation on Carson National Forest 1985 to 2001 (acres).

Population Trend and Viability

Hairy woodpeckers are year-round residents of nearly all forest types from central Canada to the southern United States (Scott et al. 1977). This species is one of the most common woodpeckers in the Southwest, particularly in riparian habitats and in ponderosa pine, mixed species and spruce-fir forests (Hubbard 1978). Overall, the U.S. population is stable.

The NatureServe database (www.natureserve.org/explorer) documents that throughout its range, the hairy woodpecker is listed as “G5” (i.e., globally secure and common, widespread and abundant) although it may be rare in parts of its range, particularly on the periphery. Reasons given for the G5 ranking are its large range and that it is common in many areas and there is no evidence of large-scale declines. It is not vulnerable in most of its range. Species with this rank typically occur in more than 100 localities, and there are more than 10,000 individuals. Within the United States, the hairy woodpecker is listed as “N5” (i.e., secure and common, widespread, and abundant). In New Mexico, the hairy woodpecker is listed as “S5” (i.e., secure, common, widespread and abundant).

Monitoring information from the North American Breeding Bird Surveys in New Mexico indicates population and trends are stable, abundant and not declining. Figure 17 displays a slightly upward trend from 1968 to 2000 for the hairy woodpecker in New Mexico.

Map L. Distribution of Hairy Woodpecker in North America (NatureServe Explorer 2002)

Figure 17. Estimated Trend for Hairy Woodpecker in New Mexico (Sauer et. al 2001)

Figure 18. Time Series of Species Data for Angel Fire, Cebolla and Ojo Sarco Survey Routes

On the Carson National Forest, a USGS Breeding Bird Survey has three survey routes adjacent to or within the Carson National Forest—Angel Fire, Cebolla (near La Placitas), and Ojo Sarco.[1] An average of 0.52 woodpeckers were found along these transect lines annually. Six to 8 years of data do not provide sufficient information to determine trend; however, it does document that the species commonly occurs on the Carson.

Eagle Environmental conducted a prey base analysis study in the spring and summer of 1985 in an area west of the Questa Ranger District on public lands administered by the Bureau of Land Management (BLM) (Stahlecker et al. 1989). Data for this species comes from the wooded canyon benches habitat, which is similar to the transition zone between the piñon-juniper and ponderosa pine type that is a condition prevalent across much of the Carson National Forest. This habitat type contains a mix of juniper, piñon and ponderosa pine. The survey also includes the upland forest habitat, which is similar to the lower elevation mixed conifer habitats on the Carson, but is generally a more open canopy than most of the Carson's forested stands. The woodland canyon benches had not been harvested, while the upland forest was historically harvested. Population densities for the wooded canyon benches averaged 4.4 breeding pair per hectares (~100 acres). The upland forest habitat type averaged 4.8 breeding pair per 40 hectares (~100 acres). Based on this study, an average of 4.5 breeding pairs per 100 acres can be estimated across the Carson National Forest in quality habitats of ponderosa pine and mixed conifer.

Avian inventories were also conducted on the Camino Real Ranger District in mixed conifer and ponderosa pine from 1999 to 2001. These inventories were not specifically designed to determine breeding pair per acre but were strip transects to determine relative abundance and occurrence. However, it is estimated that 22 individuals per square kilometer were encountered. Although individuals do not directly relate to breeding pair, if 50 percent of these individuals are breeding pair, this data indicates very similar populations to the spot mapping data collected by Stahlecher in 1989. Population trends appear to be stable.

Taking into account the condition and trend of the bird's habitat on the forest and existing data from nearby habitat, the hairy woodpecker population on the Carson National Forest is stable.

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[1] Numbers reflect the abundance of the species near the survey route. They are averages of the total counts along the route for the period 1989-1998. Because each survey route is 24.5 miles long, and consists of 50, 3-minute counts along the length of the route, the abundance estimate represents the number of birds that a very good birder would encounter in about 2.5 hours of roadside birding in the area near the BBS route.

Continuing to manage the forest according to the Forest Plan's guidelines—maintain road densities at their lowest within analysis areas across the forest, 300 or more snags per 100 acres, large woody debris on the forest floor, increase the aspen component, decrease conifers in aspen—will insure that hairy woodpecker habitat will be maintained over time. Natural occurrences, such as wildfire and lightning strikes, can also create favorable habitat conditions for the hairy woodpecker.

As displayed in Figure 19, there is not a significant percentage of habitat being treated in the preferred Alternative G, but over time these types of improved habitat conditions should become more widespread and should contribute to an improving trend for hairy woodpecker.

Figure 19. Percentage of Hairy Woodpecker Habitat Treated in Aqua Caballos Alternative G in Relation to Forest-wide Woodpecker Habitat

Forest Monitoring

Forest-wide avian monitoring was initiated in 2003 (Beason and Giroir 2004). [358] Hairy woodpeckers were detected in every habitat type except for alpine tundra. Although this species was selected as an indicator to represent the presence of snag habitat, most observations this season were in the piñon-juniper habitat type, where large diameter snags are not likely to occur. This may be the result of an extremely high insect (bark beetle) infestation in the piñon pine in 2003, creating an abnormal foraging opportunity. Future monitoring should provide more information regarding this management indicator species and habitat preference.

Rocky Mountain Elk (General Forest)

Affected Environment

Rocky Mountain elk are large North American ungulates that use a variety of habitats. The Carson Forest Plan identifies elk as an indicator of general forest habitat type (USDA 1986a, p.97). The site-specific effects analysis for Rocky Mountain elk is located in Table 33a.

Because elk have had a historically wide distribution, their preferred habitat also varies widely (Skovlin 1982). Populations in the mountainous West tend to inhabit coniferous forests associated with rugged, broken terrain or foothill ranges. Certain types may temporarily be of limited value to this species due to environmental conditions such as snow depth, water availability and/or vegetation components. Elk are generally more adaptable to a wide variety of successional stages and vegetation types. During the summer, elk spend most of their time in high mountain meadows in the alpine or subalpine zones or in stream bottoms (Adams 1982).

The summer months are particularly important for elk to build body condition and accumulate fat as an energy store for the winter. Nutritional demands during the summer months include lactation in cows, antler growth in bulls and growth in calves. Habitats favored by elk during the summer months are moist meadows and riparian areas offering succulent forage and bedding sites. During hot weather, elk seek shaded, cool habitats (Leege 1984). Elk remain on summer range until forced down to lower elevations by snow or severe weather (Edge et al. 1987, Leege 1984). The entire Agua/Caballos analysis area serves as winter and summer habitats for elk. The Rio Vallecitos drainage, the Fifteen Springs area, portions of the Tierra Amarilla Land Grant, and adjacent habitats on the Tres Piedras Ranger District to the north and northeast are also considered elk habitat.

Environmental Factors

- All conifer forest and woodland types for thermal and hiding cover. Winter range is east of FR 123. Summer range is west of FR 123.
- Places adjacent to water sources are key birthing areas. Water is readily available most of the year within reasonable distance of cover and key foraging areas. This holds true for key calving and fawning areas.
- Slash piles and large woody debris are used for body thermoregulation. Large woody debris, rotting logs and duff help regulate body temperature during cold and hot weather conditions, as well as acting as windbreaks. These key components are only deficit along roads where firewood gathering has taken place.
- Meadows and riparian areas provide succulent grasses, forbs and browse for food sources. Sheep grazing has significantly been reduced since the early 1960s, so meadows have largely recovered. Cattle grazing is impacting the wet meadow bottoms. The upland areas where sheep graze are only moderately impacted. Grazing by wildlife and livestock has affected the condition of these key use areas.
- Oak understory provides acorns and browse, as well as, hiding and thermal cover. Impacts from the Great Osier Fire created more oak in the northern portion of the range. Occasional acorn crops serve as a buffer food source. Oak is not used much for winter thermal cover unless adjacent to or within ponderosa pine stands. Stands of larger oak provide some hiding cover. Piñon/juniper provides both hiding and limited thermal cover in the winter. Oak is generally in good condition for summer hiding/thermal cover.

Figure 20. Rocky Mountain Elk Habitat in Aqua/Caballos Analysis—Existing VSS Distribution Compared with Alternative G after Treatment

Proposed Activities That Affect Elk

A. Disturbance (short term) During Activity
- Vegetation management activities
- Prescribed burning
- Fuel treatment activities
- Road building and use

B. Habitat Effectiveness
- Change (alteration and arrangement) in VSS of all forest cover types
- Large trees harvested or created through silvicultural practices
- Change in cover/forage quality
- Hiding cover
- Edge effect
- Installation of additional water sources
- Meadow maintenance
- Down logs and woody debris

C. Other Influencing Activities
- Past: Railroad logging removed many large ponderosa pine trees
  Great Osier Fire at the turn of the century was a stand replacement fire
  Heavy sheep grazing of mountain meadows
  Hunting pressure
- Present: Grazing impacts on meadows
  Conifer encroachment onto meadows
  Hunting
- Future: Potential stand replacement from wildfire
  Firewood harvesting
  Viga and latilla sales
  Change in range management
  Timber sales and prescribed fire practices occurring outside of the Agua/Caballos analysis area or the Vallecitos Federal Sustained Yield Unit

The activities listed above are described more specifically in Table 4 at the beginning of Chapter 3 and were considered when determining the cumulative effects of the alternatives.

Table 33a. Alternative Comparison of the Habitat for Elk

Cause	Alternative A	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G
Disturbance to Wildlife						
Would the location, season, extent, intensity of harvesting/cutting activities disturb ELK (short term)? If so, to what extent?	No timber harvesting or associated activities would occur causing disturbance to elk.	Disturbance would be up to 7 years.	Disturbance would be up to 4 years.	Disturbance would be up to 5 years.		Disturbance would be up to 6 years.
		There would be disturbance to resting and feeding, with some displacement.				
Would prescribed fire (intensity, duration, season, location) disturb ELK? If so, to what extent? (Refer to MM #S5, WL5, WL6, WL7, WL9, S5, WL1, WL2, WL5, WL6, WL10, WL11 and WL12)	No prescribed burning would occur causing disturbance to elk.	Disturbance up to 2 years after treatment is anticipated. There may be some displacement of animals using the area for foraging or shelter. This disturbance would be site specific to the area receiving the treatment.				
Would road use (density, use level, seasonal use, location, extent, intensity) disturb ELK? (short term and long term) If so, to what extent?	Although no roads would be closed as a result of this analysis, roads will be closed through a previous decision, and the analysis area would have a final road density of 2.7 mi/mi^2. Disturbance from summer (recreational driving and wood gathering) and fall (hunting) activities would continue.	Disturbance and some displacement would be up to 7 years.	Disturbance and some displacement would be up to 4 years.	Disturbance and some displacement would be up to 5 years.		Disturbance and some displacement would be up to 6 years.
		When activities are completed, the final open road density on Alternatives C-G would be 1.7mi/mi^2 from an existing 3.3 mi/mi^2. Closing approximately 64 miles of road would improve elk habitat effectiveness.				
Are there other activities (past, present and future), in conjunction with proposed activities that would disturb ELK in their affected environment? If so, how and to what extent?	Continued grazing, firewood gathering and small sales would not cause significant disturbance over the affected environment. A catastrophic wildfire	Elk would move around and find areas where there would be no disturbance. There is a substantial amount of thermal and hiding cover in adjacent forested stands and canyons surrounding the analysis area where elk would find shelter. No cumulative impacts that would disturb elk are anticipated.				

Cause	Alternative A	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G
what extent?	would create significant disturbance.					
Impacts to Habitat Effectiveness						
Change in Habitat Structure						
How would changes in VSS distribution (structure) from harvesting/cutting activities, meadow maintenance and prescribed burning affect ELK habitat? (Refer to *Vegetation* section for environmental consequences from various silvicultural treatments)	With no harvesting or burning, there would be no affect to the overall VSS distribution of the affected environment. Over an extended period of time, gradual changes would result in denser, mature stands and fewer open areas.	The slight changes in the VSS distribution would not be significant in the overall affected environment. Refer to Table 6 in the *Vegetation* section.				
Would harvesting/cutting activities, meadow maintenance and prescribed burning change the quality of cover/forage? How would this affect ELK habitat? (Refer to MM #WL5 - WL11)	Without timber harvesting or any other associated activities, the current cover and forage components would remain unchanged. The quality of forage would diminish over time, as meadows are encroached by conifers and aspen. Timbered stands would develop into better quality thermal and hiding cover.	Within individual stands, foraging opportunities in both winter and summer range would be enhanced. Decadent oak stands and senescent (dead) grasses would be replaced by new growth, on more stems per acre, which would be more palatable for foraging. Hiding and thermal cover would meet the needs of the existing and anticipated future elk populations in the area. Refer to Tables 6-8 in the *Vegetation* section. Mitigation measures #S5, WL1, WL2, WL5, WL6, WL10, WL11 and WL12 would ensure that sensitive hiding cover would be retained.				
Are there other activities (past, present and future), in conjunction with proposed activities that would change the habitat structure of the affected environment for ELK? If so, how and to what extent?	In the event of severe drought, fuel buildup and debris accumulation may increase the probability of a catastrophic, stand replacement wildfire. Such an event would increase the amount of foraging areas and eventual hiding cover.					
Change in VSS Arrangement (across the landscape)						
Would harvesting/cutting activities, meadow maintenance and prescribed burning change the cover/forage ratio (mosaic). If	No noticeable change to the current cover/forage ratio (48 percent thermal cover, 46 percent hiding cover, and 38 percent	The cover/forage ratio (composite) within the	The cover/forage ratio (composite) within the	The cover/forage ratio (composite) within the	The cover/forage ratio (composite) within the	The cover/forage ratio (composite) within the

Cause	Alternative A	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G
so, how would this affect ELK habitat? (Refer to *Vegetation* section for environmental consequences from various silvicultural treatments and MM #WL5 - WL11)	forage - composite) would occur in the short term. In the long term (50+ years), there would be a reduction in forage areas due to conifer and aspen encroachment. Elk would continue to use the existing edge effect.	analysis area would be altered slightly to 44 percent thermal cover, 42 percent short-term hiding cover and 52 percent long-term hiding cover, and 42 percent forage.	analysis area would be altered slightly to 47 percent thermal cover, 45 percent short-term hiding cover and 47 percent long-term hiding cover, and 39 percent forage.	analysis area would be altered slightly to 46 percent thermal cover, 44 percent short-term hiding cover and 48 percent long-term hiding cover, 40 percent forage.	analysis area would be altered slightly to 47 percent thermal cover, 44 percent short-term hiding cover and 49 percent long-term hiding cover, and 39 percent forage.	analysis area would be altered slightly to 45 percent thermal cover, 43 percent short-term hiding cover and 49 percent long-term hiding cover, and 40 percent forage.
		The change in the cover and forage arrangement in any of the action alternatives would create a more favorable foraging by providing more edge habitat.				
How would changing the amount and distribution of hiding cover affect ELK habitat? (Refer to MM #WL5, WL6, WL10 and WL11)	Hiding cover would remain undisturbed. Elk populations would continue to use the area as they currently do.	In the short-term (1 to 7 years), hiding cover would decrease slightly. In the long-term (7 to 15 years), hiding cover would increase. Elk would use these areas more extensively and more often.				
Are there other activities (past, present and future), in conjunction with proposed activities that would change the VSS arrangement of the affected environment for ELK? If so, how and to what extent?	In the event of severe drought, fuel buildup and debris accumulation may increase the probability of a catastrophic, stand replacement wildfire. Such an event would increase the amount of foraging areas and hiding cover would be created.					
Fragmentation and Connectivity						
When activities are completed and the designated roads are closed, to what extent would ELK habitat be fragmented and migration corridors altered? (Refer to MM #WL6, WL9, WL10 and WL11)	Maintaining the existing roadways would not fragment habitat used by elk. The level of road use, especially, along the main access roads, may reduce effectiveness of some habitats used by animals during certain periods, such as hunting season.	The open road density would drop from 2.7 to 1.7 mi/mi^2 in all alternatives. This 37 percent reduction would benefit elk habitat and not cause fragmentation. Often when roads are effectively closed, they can provide linear wildlife openings, often used in travel and foraging.				
Are there other activities (past, present and future), in conjunction with proposed	In the event of severe drought, fuel buildup and debris accumulation may increase the probability of a catastrophic, stand replacement wildfire. This type of event would enhance connectivity by creating edge habitat for elk. Due to VSS type conversion, elk would likely migrate into areas that are currently not used very often.					

Cause	Alternative A	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G
activities that would affect fragmentation and connectivity of the affected environment for ELK? If so, how and to what extent?						
Riparian						
Would activities affect the quality and quantity of existing riparian vegetation? If so, would this affect the ELK? (Refer to MM #WL1, WL5 - WL11)	No timber harvesting or associated activities would occur in riparian areas under this alternative. There would be no effect on the quality or quantity of existing riparian vegetation.	Riparian habitats would be avoided and protective buffer areas would keep timber harvest activities out of these delicate habitats (see Chapter 2, *Mitigation Measures*). The integrity of the existing riparian areas would be maintained and continue to provide for elk foraging and parturition needs (calving and fawning) and rearing of young.				
Are there other activities (past, present and future), in conjunction with proposed activities, that would change the affected environment for ELK relative to riparian? If so, how and to what extent?	In the event of severe drought, fuel buildup and debris accumulation may increase the probability of a catastrophic, stand replacement wildfire. In the short term, this type of event would substantially alter vegetation in the riparian areas by removing large areas of shade. With water close by, however, riparian areas would quickly revegetate.					
Water Sources						
Would activities affect the distribution or number of water sources in the analysis area? If so, would this affect ELK? (Refer to MM #WL5 - WL10)	Water sources are currently present in elk summer range. No additional water sources would be developed.	Four additional water sources would improve the distribution of elk. New water sources would encourage animals to use underutilized areas, where water was previously not available.				

Rocky Mountain Elk on the Carson National Forest

Elk virtually use all habitat types on the Carson National Forest. The summer months are particularly important to build body condition and accumulate fat as an energy store for the winter. Nutritional demands during the summer months include lactation in females, antler growth and growth in calves. Habitats favored by elk during the summer months are moist meadows and riparian areas offering succulent forage and bedding sites. During hot weather, elk seek shaded, cool habitats (Leege 1984). Elk remain on summer range until forced down to lower elevations by snow or severe weather (Edge et al. 1987, Leege 1984).

During the winter months, less forage is available and its nutritional value and digestibility are at a minimum level, thus forage availability is a key factor. Winter range usually consists of lower elevation, south-facing slopes with browse and areas with good thermal cover nearby.

Elk need cover for protection against heat and extreme cold, as well as hiding and calving cover. Ideal habitat is grasslands or meadows interspersed with forests that have large amounts of edge (Skovlin 1982). Use of larger open areas tends to decrease at 110 yards from cover. Calving cover requirements vary from place to place and within populations. Security or hiding cover is necessary in places of human disturbance (Peek et al. 1982). Elk may use more open areas during spring and summer because of earlier spring green-up (Edge 1987).

Suppression of natural disturbances and the removal of some late seral communities through logging have resulted in an artificial overabundance of mid-seral communities (Dahms and Geils 1997). Dense thickets of sapling and pole stands have replaced the open structure of historic forests in the Southwest (Harrington and Sackett 1990). Expanding coniferous thickets have suppressed understory plants.

In addition to fire suppression and heavy logging, intense livestock grazing not only removed the fine fuels needed to carry a fire, but shifted the competitive advantage from the herbaceous understory to tree seedlings. This also increased tree density within the forest and allowed tree expansion into meadows. Over large areas, important components of structural diversity, namely meadows, open canopy and old growth forests, have been converted to pine and fir thickets (Moir and Fletcher 1996).

Habitat Condition and Trend

Changes in disturbance regimes and other forest processes have resulted in a transformation of forest conditions such as structure and composition. On the Carson National Forest, forage has decreased as a result of fire suppression and fewer vegetation management activities, such as thinning and group selections, which create small openings and transient range. In contrast, cover has increased as trees encroach on forage areas.

The relationship between overstory density and understory productivity has been documented in numerous studies (Dahms and Geils 1997). Moore and Deiter (1992) report on the relation between stand density and understory productivity in a ponderosa pine forest on the Kaibab Plateau. Productivity of grasses, sedges, forbs and shrubs decreased with stand density.

On the Carson, the majority of elk habitat is in a mid-seral condition with a lack of widely distributed understory forage in the forested types. This results in increased competition between numerous species of wildlife and livestock in key pastures. Most livestock allocations were made during the period of heavy timber harvest, which created transient range and provided for much higher levels of forage production for all ungulates. Increasing elk populations have contributed to higher utilization levels on important foraging areas such as meadows and riparian areas. The same sites are also key livestock grazing areas. With the decline in timber practices on the forest and continued fire suppression, canopy closure and duff layers are increasing, thus reducing understory forage production in the forested types.

Figure 21. Understory Productivity by Stand Density Index of Ponderosa Pine on the Kaibab Plateau, AZ (redrawn from Moore and Deiter 1992).

The entire Agua/Caballos analysis area supports quality elk habitat. Total acres of treatments range from approximately 2,000 acres (Alternative D) to 6,000 acres (Alternative C). The Carson Forest Plan EIS identifies 1,362,760 acres as occupied elk habitat. The Carson Forest-wide Management Indicator Species Assessment and habitat trend analysis now estimates there are 1,424,074 acres of elk habitat. This is an upward trend of about 4 percent. This is due to increased use in most of the sagebrush habitat type on the forest. Alternative G would not change the forest-wide trend in quality elk habitat, but would change uses in the areas of treatment. Generally it would take sites that are now cover types and improve foraging conditions.

Population Trend and Viability

Background

Due to heavy unregulated hunting in the mid to late 1800s and early 1900s, elk were extirpated from New Mexico by 1909. The following year efforts to reintroduce elk into the state began. In 1911, 12 animals from Routt County, Colorado, were released near Raton and Las Vegas, and 50 animals from Yellowstone Park were released in San Miguel County and in the Pecos area (V. Bailey 1932). In 1912 there were 60 elk in New Mexico; by 1923 the northeastern herd had grown to 750; by 1934 there were 3,500 to 4,000 elk state wide.

The present Central Carson elk herd was started with two small transplants on the Tres Piedras District in 1938 and 1939. The New Mexico Department of Game and Fish transplanted 14 mature elk in the Tusas Valley. Similar transplants have also occurred in southern Colorado. By 1967, the state herd was estimated at 11,000, and most of the former elk range, including that of Merriam's elk, was occupied (NMDGF 1967, Findley et al., 1975).

Recent Trends

With regard to elk, the N.M. Department of Game and Fish (NMDGF) has steadily increased hunting permits including a limited number of late season cow permits to help hold the population at desired levels and prevent depredation of hay fields on private lands. In the long term, however, good habitat for elk is dependent on projects specifically designed to provide understory forage recovery, away from streams and riparian vegetation, and to improve small parks and openings through meadow maintenance and thinning near these sites. Each wintering area should have a schedule established to conduct prescribed burning and maintenance.

Figure 22. Elk Permits Issued All Carson National Forest Hunt Units

The drop in numbers after the 1998 season partially reflects a boundary change in Unit 49. The trend in elk numbers may best be reflected by the increase in hunting permits issued during the period of the Forest Plan.

Over the last century, elk numbers on the Carson increased (Dunn et al. 1995, Catanach et al. 1995), however, current observations of year-round elk use in piñon-juniper may be an indication that elk populations are reaching a "peak" or that populations are stabilizing. Winter range encroachment from private land development and hunting success also influence population trends.

The N.M. Department of Game and Fish have conducted aerial surveys for many years, but population estimates could not be determined due to the inability to see animals in the denser cover types. It was also unknown what percentage of animals was in the open areas and actually counted, and how many were under canopy cover. As a result in selected locations, sightability index surveys (SIS) analyses were initiated in 1999 to estimate big game population size by Game Management Units (GMU).

Table 33b. New Mexico Game and Fish Population estimates for Elk on the Carson National Forest by Game Management Unit.

Ranger District	Game Management Unit	Modeled Population January 2001	1999 SIS Population Estimate	2000 SIS Population Estimate	2001 SIS Population Estimate
Jicarilla	2	1,000	-		
Camino Real	44/45	1,350*	-		1,421
Camino Real	49	500	-		405
T-P, mostly on BLM	50	550	2,270**	401	
Canjilon, El Rito	51	750	554	887	
Tres Piedras	52	3,000	2,799	2,924	
Questa	53	600	568	583	
Questa	55 Valle Vidal portion only	–		2,575	

* Only about 10 percent on Carson NF, remainder on Santa Fe NF
** Unusually high numbers due to influx of winter migration

As displayed in Figure 23, there is 28 percent of the Agua/Caballos analysis area that would be treated by some method in preferred Alternative G. The most beneficial treatments would be the group selections with prescribed fire. The least beneficial would be the precommercial thinning without prescribed fire followup. However, all treatments would be to some degree beneficial to elk.

Figure 23. Percent Elk Habitat Treated in Aqua/Caballos Analysis Area (23,767 acres)

Taking into account the condition and trend of the elk's habitat on the forest, existing data and continued increase in the number of hunting permits issued by the N.M. Department of Game and Fish, the Carson National Forest is sustaining viable populations of Rocky Mountain elk. Future implementation of prescribed burning, urban interface fire projects, thinning, aspen regeneration and meadow maintenance should improve elk foraging habitat. Subsequently, these forest activities proposed for the Agua/Caballos analysis area would have no effect on the viability of elk populations.

Merriam's Turkey (Ponderosa Pine)

Affected Environment

Merriam's turkey is an indicator species for the presence of old growth pine (USDA 1986a, p.97). Merriam's turkey is common in most mountainous areas of New Mexico and across the West. The bird primarily utilizes ponderosa pine and pine-oak as well as the transition habitats between ponderosa and piñon-juniper woodland habitats and ponderosa and mixed conifer. There are three essential habitat components. These include surface water, roosting trees, and openings for summer brood areas. Turkeys often key in on old growth habitats as they generally provide a combination of cover, roosting and summer brood habitats.

Turkeys prefer to roost in tall, mature or over-mature ponderosa pines with relatively open crowns and large horizontal branches starting at 6 to 9 meters (20-30 ft) from the ground. Trees with a diameter at breast height (DBH) of over 14 inches are used as roosts. Preferred roost sites are often located just below a ridge line. Hens normally nest within one-half mile radius of water. Winter and summer habitats occur within the Agua/Caballos analysis area, including Fifteen Springs, portions of the Tierra Amarilla Land Grant and adjacent habitats on the Tres Piedras Ranger District. Map M below displays potential habitat distribution for Merriam's turkey within the Agua/Caballos analysis area.

Map M. Merriam's Turkey Potential Habitat Distribution Within Agua/Caballos Analysis Area

Environmental Factors

- Large ponderosa pine trees for roosting (summer range - 2 tree groups per section and winter range - 4 tree groups per section). Winter range is east of FR 123. Summer range is west of FR 123. Roosting trees occur in both areas. Past logging of large trees does not have much influence today as several roost trees can occur in stands that classify as VSS 3 or 4. However, the VSS 5 and 6 habitats are lacking and would be preferable as other habitat components are also available.
- Surface waters in some form (spring, seep, dirt tank, etc.) one mile apart in prime nesting areas and accessible during nesting season. Currently, this condition is largely being met within the analysis area.
- Slash piles and large woody debris for courtship and nesting purposes. Only deficit along roads where firewood cutting has taken place, but turkey don't usually use these areas for nesting.
- Meadows and riparian areas provide succulent grasses, seed heads and insects for food sources. Small openings are essential for foraging areas. Poults are almost completely insectivorous for the first few weeks. Sheep grazing has significantly been reduced since the early 1960s so meadows have largely recovered. Presently cattle grazing is impacting the wet meadow bottoms. The upland areas where sheep graze are only moderately impacted. Wildlife grazing in these key areas also affects their condition. Lacking are small openings in the VSS 3 and 4 forested types.
- Oak understory provides acorns and browse, as well as, hiding/thermal cover. Impacts from the Great Osier Fire actually created more oak in the northern portion of the range. Acorns are not a reliable source of food for turkeys, since a crop cannot be depended on every year. Winter range—not used as much for thermal or hiding cover. Oak adjacent to ponderosa pine stands serve as good thermal areas. Summer range—oak is in good condition for hiding and thermal cover.
- Piñon/juniper woodlands within the analysis area provide berries and nut food sources as well as hiding/thermal cover during the winter.

Two important elements addressed by the preferred alternative is the longer term shift to larger structural size classes. And of immediate importance is the development of summer brood habitats. Areas of group selection harvest serves to develop these sites and are important in both the ponderosa pine and mixed conifer. These brood sites would likely be effective for 10 to 20 years at which point additional habitat development should be considered. Especially since a relatively small amount of openings are proposed in this project.

Figure 24. Merriam's Turkey Existing VSS Distribution in Aqua/Caballos Analysis Compared with Alternative G after Treatment

Proposed Activities That Affect Merriam's Turkey

A. Disturbance (short term) During Activity
- Vegetation management activities
- Prescribed burning
- Fuel treatment activities
- Road building and use

B. Habitat Effectiveness
- Change (alteration and arrangement) in VSS of forest cover types
- Large trees harvested or created through silvicultural practices
- Change in cover/forage quality
- Hiding cover
- Edge effect
- Installation of additional water sources
- Meadow maintenance
- Down logs and woody debris

C. Other Influencing Activities
- Past: Railroad logging removed many large ponderosa pine trees
  Great Osier Fire at the turn of the century was a stand replacement fire
  Heavy sheep grazing of mountain meadows
  Hunting pressure
  Re-introduction of turkey on the adjacent Tres Piedras Ranger District
- Present: Grazing impacts on meadows
  Conifer encroachment onto meadows
  Hunting
  Expansion of introduced Merriam's turkey flock
- Future: Potential stand replacement from wildfire
  Firewood harvesting in the piñon/juniper woodlands
  Viga and latilla sales
  Change in range management
  Timber sales and prescribed fire practices occurring outside of the Agua/Caballos analysis area or the Vallecitos Federal Sustained Yield Unit

The activities listed above are described more specifically in Table 4 at beginning of Chapter 3 and were considered when determining the cumulative effects of the alternatives.

Table 34a. Alternative Comparison of the Habitat for Merriam's Turkey

Cause	Alternative A	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G
Disturbance to Wildlife						
Would the location, season, extent, intensity of harvesting/cutting activities disturb the TURKEY (short term)? If so, to what extent?	No timber harvesting or associated activities would occur causing disturbance to turkeys.	Disturbance would be up to 7 years.	Disturbance would be up to 4 years.	Disturbance would be up to 5 years.		Disturbance would be up to 6 years.
		Activities would disturb nesting and cause some displacement.				
Would prescribed fire (intensity, duration, season, location) disturb the TURKEY? If so, to what extent? (Refer to MM #WL13)	No prescribed burning would occur causing disturbance to the turkey.	Disturbance from burning could be up to 2 years after treatment. If burning activities were prescribed in the spring season, some disturbance to nesting and displacement would occur. Burning, however, would be in prescription and the majority of it would be implemented in the fall.				
Would road use (density, use level, seasonal use, location, extent, intensity) disturb the TURKEY? (short term and long term) If so, to what extent?	Although no roads would be closed as a result of this analysis, roads will be closed through a previous decision, and the analysis area would have a final road density of 2.7 mi/mi^2. Disturbance from summer (recreational driving and wood gathering) and fall (hunting) would continue.	In areas where timber harvesting and other activities are taking place, road use is expected to increase. In the short term, displacement from these high use areas would occur. Eventually, the logging debris would attract turkeys back into these areas. Turkeys are fairly tolerant of disturbance, but they will find quiet areas during the day to rest and feed. In the long term, a decrease in road density to 1.7 mi/mi^2 would benefit the turkey.				
Are there other activities (past, present and future), in conjunction with proposed activities that would disturb the TURKEY in its affected environment? If so, how and to what extent?	Continued grazing, firewood gathering, small sales would not cause significant disturbance over the affected environment. A major fire would disturb the turkey and its affected habitat.	Proposed harvesting and burning, along with continued grazing and firewood gathering, would not cumulatively cause significant disturbance to the turkey. Turkeys adjust to disturbance by moving to quieter areas until activities are completed.				
Impacts to Habitat Effectiveness						
Change in Habitat Structure						
How would changes in VSS	Over a long period of time	Slight changes in the VSS distribution would not be significant in the overall affected				

Cause	Alternative A	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G
distribution (structure) from harvesting/cutting activities, meadow maintenance and prescribed burning affect TURKEY habitat? (Refer to Vegetation section for environmental consequences from various silvicultural treatments)	there would be gradual change in VSS distribution that would result in more mature forest stands and fewer open areas.	environment. (Refer to Table 6 in the Vegetation section) However, small patch cuts in aspen, prescribed burning in ponderosa pine, as well as vegetation treatments (timber harvest) would open some of these areas, creating favorable turkey habitat. Stands in early seral stages of growth, new aspen shoots, along with woody debris, create habitats used by turkey during their life cycle.				
Would harvesting/cutting activities, meadow maintenance and prescribed burning change the quality of cover/forage? How would this affect the TURKEY habitat? (Refer to MM #WL10 - WL12)	Without timber harvesting or any other associated activities, the current cover and forage components would remain unchanged. The quality of forage would diminish over an extended period of time, as meadows are encroached by conifers and aspen. Timbered stands would develop into better quality thermal and hiding cover stands.	Within individual stands, foraging opportunities in both winter and summer range would be enhanced. Decadent oak stands and senescent (dead) grasses would be replaced by new growth on more stems per acre, which would be more palatable for foraging. Hiding and thermal cover would meet the needs of the existing and anticipated future turkey populations in the area. Mitigation measures #S5, WL1, WL2, WL5, WL6, WL10, WL11 and WL12 would ensure that sensitive hiding cover would be retained. Openings created by activities would benefit turkey habitat. Harvest activities, prescribed burning and meadow maintenance would create bugging and dusting areas used by turkey. Refer to Tables 6 - 8 in the *Vegetation* section.				
Are there other activities (past, present and future), in conjunction with proposed activities that would change the habitat structure of the TURKEY'S affected environment? If so, how and to what extent?	In the event of severe drought, fuel buildup and debris accumulation could still fuel a catastrophic, stand replacement wildfire, whether stands have been harvested or not. Such an event would create a high amount of foraging areas and eventual hiding cover. Roost trees would be substantially diminished, possibly some trees in deeper canyons and wet areas would not be burned and would still be available as roost trees.					
Change in VSS Arrangement (across the landscape)						
Would harvesting/cutting activities, meadow maintenance and prescribed burning change the cover/forage ratio (mosaic). If so, how would this affect TURKEY habitat (edge effect, etc.)? (Refer to *Vegetation* section for environmental	No noticeable change to the current cover/forage ratio (48 percent thermal cover, 46 percent hiding cover, and 38 percent forage - composite) would occur in the short term. In the long term (50+ years), there would be a	The cover/forage ratio (composite) within the analysis area would be altered slightly to 44 percent	The cover/forage ratio (composite) within the analysis area would be altered slightly to 47 percent	The cover/forage ratio (composite) within the analysis area would be altered slightly to 46 percent	The cover/forage ratio (composite) within the analysis area would be altered slightly to 47 percent	The cover/forage ratio (composite) within the analysis area would be altered slightly to 45 percent

Cause	Alternative A	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G
consequences from various silvicultural treatments and MM #WL5 and WL6)	reduction in forage areas due to conifer and aspen encroachment. Turkey deer would use the existing edge effect.	thermal cover, 42 percent short-term hiding cover and 52 percent long-term hiding cover, and 42 percent forage.	thermal cover, 45 percent short-term hiding cover and 47 percent long-term hiding cover, and 39 percent forage.	thermal cover, 44 percent short-term hiding cover and 48 percent long-term hiding cover, 40 percent forage.	thermal cover, 44 percent short-term hiding cover and 49 percent long-term hiding cover, and 39 percent forage.	thermal cover, 43 percent short-term hiding cover and 49 percent long-term hiding cover, and 40 percent forage.
		The change in the cover and forage arrangement in any of the action alternatives would create more favorable foraging by providing more edge habitat.				
How would changing the amount and distribution of hiding cover affect the TURKEY habitat? (Refer to MM #WL5, WL6, WL10 and WL11)	Hiding cover would remain unchanged. Turkey populations would continue to use the area as they currently do.	In the short term (1 to 7 years), hiding cover would decrease slightly. In the long term (7 to 15 years), hiding cover would recover. Turkeys would use these areas more extensively and more often.				
Are there other activities (past, present and future), in conjunction with proposed activities that would change the VSS arrangement of the TURKEY'S affected environment? If so, how and to what extent?	In the event of severe drought, fuel buildup and debris accumulation could still fuel a catastrophic, stand replacement wildfire, whether stands have been harvested or not.					
Fragmentation and Connectivity						
When activities are completed and the designated roads are closed, to what extent would TURKEY habitat be fragmented and migration corridors altered? (Refer to MM #WL6 and WL9)	Maintaining the existing roadways would not fragment habitat used by turkey. The level of road use, especially along main access roads, may reduce effectiveness of some habitats used by animals during certain periods, such as hunting season.	The open road density would drop from 2.7 to 1.7 mi/mi^2 in all alternatives. This 37 percent reduction would benefit turkey habitat and not cause fragmentation. Often when roads are effectively closed, they can provide linear wildlife openings, often used in travel and foraging.				
Are there other activities (past, present and future), in conjunction with proposed activities that would affect fragmentation and connectivity	In the event of severe drought, fuel buildup and debris accumulation could still fuel a catastrophic, stand replacement wildfire, whether stands have been harvested or not. This type of event would enhance connectivity by creating a large edge effect for the turkey habitat, where it is now not present. Due to VSS type conversion, turkey would likely migrate into areas that are currently not used very often.					

Cause	Alternative A	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G
of the TURKEY'S affected environment? If so, how and to what extent?						
Riparian						
Would activities affect the quality and quantity of existing riparian vegetation? If so, would this affect the TURKEY? (Refer to MM #S5, WL1, WL5 - WL10)	No timber harvesting or associated activities would occur in riparian areas under this alternative. There would be no effect on the quality or quantity of existing riparian vegetation.	Riparian habitats would be being avoided and protective buffer areas would keep timber harvest activities out of these delicate habitats (see Chapter 2, *Mitigation Measures*). The integrity of the existing riparian areas would be maintained and continue to provide for turkey foraging and for those components needed for rearing young.				
Are there other activities (past, present and future), in conjunction with proposed activities, that would change the TURKEY'S affected environment relative to riparian? If so, how and to what extent?	In the event of severe drought, fuel buildup and debris accumulation could still fuel a catastrophic, stand replacement wildfire, whether stands have been harvested or not. In the short term, this type of event would substantially alter vegetation in the riparian influence areas by removing large areas of shade. With water close by, however, riparian areas would quickly revegetate. Recent reintroductions of wild turkeys into the Tres Piedras Ranger District to the northeast may eventually expand into this affected environment. There is also a strong possibility of future reintroduction of wild turkeys directly into this area.					
Snags and Down Logs						
Would activities affect the quality and quantity of existing snags and down logs? If so, would this affect the TURKEY? (Refer to MM #WL1, WL2 and WL13)	Most existing snags (standing dead trees) and logs (dead and down trees) would remain available for turkey courtship and nesting purposes, and also to serve as ground cover for escape. Although there would be no proposed harvest activities, some of this habitat component near roadways would be gathered as firewood.	Mitigation measures ensure that most of the existing snags and logs would be retained for turkey courtship and nesting needs, and also serve, to some extent, as ground cover. Commercial timber harvest operations in these action alternatives may create some snags and increase logs and woody residues. Some snags may be removed during harvest operations if deemed a safety threat to forest workers or forest users. Prescribed burning in the ponderosa pine type (approximately 2,106 acres in Alternatives C, D and E, 440 acres in Alternative F and 1,986 acres in Alternative G) may destroy some snags. The risk of losing this habitat component by fire would be minimal, since burning prescriptions would favor retaining snags and logs. Where accessible to open roadways, some snags and logs may be removed as firewood. The proposed road closures would help reduce the removal of some of these snags and logs.					
Are there other activities (past, present and future), in conjunction with proposed activities that would change the TURKEY'S affected environment relative to snags	In the event of severe drought, fuel buildup and debris accumulation could still fuel a catastrophic, stand replacement wildfire, whether stands have been harvested or not. A stand replacement fire may initially burn all trees (including any snags or logs) for roosting or feeding purposes, however more snags and downed logs would be created over a 3- to 7-year timeframe. Turkeys are versatile and would move to areas that have favorable habitat for survival, if a catastrophic stand replacement fire occurs. For dusting and bugging, turkeys prefer recently burned areas, either by wildfire or prescribed fire.					

Cause	Alternative A	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G
and down logs? If so, how and to what extent?						
Water Sources						
Would activities affect the distribution or number of water sources in the analysis area? If so, would this affect the TURKEY? (Refer to MM #WL5 - WL10)	Current water sources provide for the turkeys needs, more so, in summer range. No additional water sources would be developed.	Four additional water sources would improve the distribution of turkeys. New water sources would encourage the animals to use underutilized areas, where water was previously not available.				
How would activities affect population viability of MERRIAM'S TURKEY?	The Carson National Forest contains approx 192,000 acres of ponderosa pine habitat in Management Area 4, and 195,000 acres of mixed conifer in Management Areas 3 and 5. Reintroductions have expanded occupied habitats. Merriam's turkey is also an upland game bird in New Mexico, which indicates that there are enough birds to permit harvesting. Even when harvested through downward trend periods, Merriam's turkey is still considered common on the landscape. Merriam's turkey habitat on the Carson NF is in fair condition and stable. Taking into account the condition and trend of the turkey's habitat on the forest, successes in reintroduction programs, existing data and field observations, the Carson NF is sustaining viable populations of Merriam's turkey. The abundance of nesting and cover opportunities on the Carson contribute to maintaining viable populations. [309] Thinning to create clumpy conditions interspersed with openings can reduce competition and create larger tree diversity for roosting. Openings are used as strut grounds and foraging. Prescribed fire would control dense tree reproduction and provide understory forage. Continued development of small, protected water sources and implementation of effective road closures in turkey habitat also improve conditions. Implementation of these forest activities in any of the action alternatives proposed for the Agua/Caballos analysis area would have no effect on the viability of turkey populations.					

Merriam's Turkey on the Carson National Forest

The ponderosa pine belt occurs in the mid-elevation portions of the Carson National Forest. Merriam's turkey habitat is abundant and well distributed, but is fairly heavily dominated by mid-seral conditions. This is not as beneficial as a good balance of habitat conditions including early- and late-seral stages. Suitable habitat must include three main components: water, roost sites and summer/brood areas. Roost trees are naturally more abundant in late-seral stands. These trees also provide for food, escape and resting cover. Open areas of grass and forbs (early seral conditions) provide the summer brood areas with a source of food in the form of seeds and insects for developing poults (NMGF 2000). Piñon, juniper and Gambel oak are found on the south-facing slopes for winter forage requirements.

Map N. Merriam's Turkey Potential Habitat Distribution on the Carson National Forest (USDA 1987)

Habitat Condition and Trend

The Carson Forest Plan estimates approximately 222,000 acres of ponderosa pine forest type that provide quality habitat for wild turkey. The vegetation cover data indicates the Carson National Forest has over 301,297 acres of ponderosa pine. There is some degree of species occupancy in most of these habitats. Although the habitat type is the same as Abert's squirrel, the actual areas utilized by wild turkey are larger as the species will more commonly use the adjacent forest types. With this in mind, some treatments such as group selections in adjacent mixed conifer stands can be just as beneficial for this species as those in the ponderosa pine.

With regard to cumulative effects, the dominant mid-seral conditions primarily relate to the effects of forest succession from historical logging such as the railroad logging early in the 20th century and fire suppression. Duff layers in the understory not subjected to periodic burning suppressed turkey forage base. Overstory removal prescriptions also contributed to the trend toward dense, smaller diameter stands.

Reduction of stand heterogeneity and landscapes dominated by the VSS 3 and 4 conditions has likely had a negative effect on turkey habitat. Recent changes in management practices on the forest places more emphasis on thinning, prescribed burning and timber harvest objectives to meet a desired ecological condition. Thinning, group selection and prescribed burning will all help move the VSS 3 and 4 stands toward larger and more diverse structural stages faster (Reynolds et al. 1992).

Figure 25 shows that between 1986 (when the Carson Forest Plan was implemented) and 2000, approximately 7 percent of potential Merriam's turkey habitat has been actively managed for timber production.

Figure 25. Proportion of Merriam's Turkey Forested Habitats Treated in Timber Sales on the Carson National Forest From 1986 to 2000 (RMRIS DB, Activity Records)

Within the Agua/Caballos analysis area, 16,274 acres of ponderosa pine and an additional 4,779 acres of mixed conifer and aspen provide potential turkey habitat. Based on the Carson Forest-wide Management Indicator Species Assessment and the habitat trend analysis, there is estimated to be 8,421 acres of quality habitat for Merriam's turkey. Alternative G would treat 1,983 of those acres (23 percent). It is estimated that 87 acres of quality habitat would be reduced, while 1,864 of those acres would be improved. In addition, it is estimated that 2,213 acres of potential habitat would be more rapidly moved toward quality habitat conditions. Forest-wide trend of occupied or quality habitat from the time of the Forest Plan is slightly up from an estimated 117,300 to 118,572 acres (1 percent). [314] Implementing Alternative G would still maintain an upward trend across the Carson National Forest.

Population Trend and Viability

Merriam's turkey has the widest distribution and is the most common subspecies of turkey. It is found in many mountainous areas of northern New Mexico. However when miners and stockmen came into New Mexico in the 1800s, they started to effectively kill turkeys. Wagonloads were hauled to market. Subsequently, turkeys were eliminated from many mountain ranges and their populations depleted in other areas. The ebb was around 1924 when sportsmen began actively promoting hunting regulations and bag limits. By 1930, efforts by the N.M. Department of Game and Fish (NMDGF) began to turn the numbers around. Birds were also live-trapped and moved to other areas (NMDGF 1997).

Most mountain ranges in New Mexico now support healthy, self-sustaining Merriam's turkey populations (NMGF 2000). Drought conditions can affect mast crops from piñon-juniper and oak, which can significantly influence yearly reproduction (Liedlich 1991). Turkey reintroductions during the past decade have contributed to localized increases in populations and distribution.

The wild turkey is one of those species for which there is currently no reliable technique to estimate density or total populations, nor has a single method emerged as a standard for surveying populations. Spring gobbling surveys can be used to confirm presence and success in new transplant areas, but is unsuitable for estimating population numbers (Colorado Division of Wildlife 1993).

Population trend data can be gathered over large areas. Merriam's turkey is one of the bird species which data is collected and compiled on a large-scale breeding bird survey of North American birds. This breeding bird survey (BBS) is maintained by the Patuxent Research Center (US Geological Survey) and is found on a Web site (http://www.mbr-pwrc.usgs.gov/bbs). It is a roadside survey, primarily covering the continental United States and southern Canada, although survey routes have recently been initiated in Alaska and northern Mexico. The BBS was started in 1966, and the over 3,500 routes are surveyed in June by experienced birders.

The primary objective of the BBS has been the estimation of population change for songbirds. However, the data have many potential uses, and investigators have used the data to address a variety of research and management objectives (Sauer 1997). Since 1966 the population trend of Merriam's turkey in the western part of the United States has increased over 33 percent.

Map O(a). Distribution of All Subspecies of Wild Turkey in North America (BBS Survey Map Displays) (Note: there are several other subspecies of wild turkey, but Merriam's turkey is the dominant subspecies in the 11 western states.)

Populations have expanded on the Carson National Forest since the inception of the Forest Plan. For example, on the Jicarilla Ranger District, the Forest Service and N.M. Department of Game and Fish have cooperated in transplanting over 60 birds since 1988. The two agencies, as well as the Bureau of Land Management, conduct yearly gobbler surveys to track population trends. These surveys do not provide population numbers, but can show upward or downward trends. Results of these surveys have shown a steady or slightly increasing population since 1996. The population is doing well enough that the New Mexico Department of Game and Fish and the Forest Service agreed to a limited hunt beginning in 1998. In the winter of 1995, 64 mixed sex Merriam's turkeys were transplanted on the Tres Piedras Ranger District in unoccupied range. After a few years of observations, the transplants have successfully occupied that portion of the district.

Based on data from the N.M. Department of Game and Fish, the Patuxent Research Center and individual observations made by Forest Service biologists, populations of Merriam's turkey on the Carson National Forest are considered stable to increasing. As displayed in Figure 26a, there is not a significant percentage of habitat being treated in preferred Alternative G, but over time these types of improved habitat conditions should become more widespread and should contribute to an improving trend for Merriam's turkey.

Figure 26a. Percentage of Merriam's Turkey Habitat Treated in Aqua Caballos Alternative G in Relation to Forest-wide Turkey Habitat

Plain (Juniper) Titmouse (Piñon Canopies)

Affected Environment

The plain titmouse is an indicator species for the presence of piñon-juniper (PJ) canopies (USDA 1986a, p.97). Also known as "juniper" titmouse, it is a resident of deciduous or mixed woodlands, favoring oak and piñon-juniper (Ehrlich et al. 1988)[1]. The titmouse usually nests in natural cavities or old woodpecker holes primarily in oak trees, but it is capable of excavating its own cavity in rotted wood. The species feeds mainly on insects, seeds and occasional fruits, and is also a bark gleaner. As a cavity nester, large, older trees are an important habitat feature. Map O(b) displays habitat distribution for juniper titmouse within the Agua/Caballos analysis area.

Map O(b). Juniper Titmouse Potential Habitat Distribution Within Agua/Caballos Analysis Area

[1] Ehrlich, Paul; Dobkin, David; Wheye, Darryl. 1988. The birder's handbook: a field guide to the natural history of North American birds. New York, NY: Simon and Schuster, Inc.

Environmental Factors

- Cavities in snags and hollow trees in deciduous or mixed woodlands, favoring oak and piñon-juniper.

Proposed Activities That Affect Juniper Titmouse

- No type of treatment planned under any of the alternatives would affect juniper titmouse habitat in the Agua/Caballos analysis area.

Table 34b. Alternative Comparison of the Habitat for Juniper Titmouse

Cause	Alternative A	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G
Disturbance to Wildlife						
Would the location, season, extent, intensity of harvesting/cutting activities disturb the JUNIPER TITMOUSE (short term)? If so, to what extent?	With no harvest activities proposed in piñon-juniper habitat, no disturbance would occur to the juniper titmouse.					
Would prescribed fire (intensity, duration, season, location) disturb the JUNIPER TITMOUSE? If so, to what extent? (Refer to MM #WL13)	Since no prescribed burning in the piñon-juniper is proposed under any of the alternatives, there would be no disturbance to the juniper titmouse. Prescribed fires within the treated ponderosa pine stands may cause a temporary displacement of the woodpeckers for the duration of the burn.					
Are there other activities (past, present and future), in conjunction with proposed activities that would disturb the JUNIPER TITMOUSE in its affected environment? If so, how and to what extent?	The juniper titmouse is somewhat tolerant of most activities occurring in the forest, depending on their intensity. Continued firewood gathering and small sales would not cause significant disturbance to the bird and its snag habitat. A major event such as a stand replacement wildfire would create a high level of disturbance to the titmouse.					
Impacts to Habitat Effectiveness						
Change in Habitat Structure						
How would changes in VSS distribution and internal stand structure from harvesting/cutting activities, meadow maintenance and prescribed burning affect the JUNIPER TITMOUSE? (Refer to *Vegetation* section to also see that no silvicultural treatments are prescribed under any alternative)	With no harvesting or burning, there would be no affect to the overall VSS distribution of the affected environment. Over an extended period of time, effects of the bark beetle on piñon pines would result in fewer trees and less habitat for the juniper titmouse.					
Snags and Down Logs						
Would activities affect the quality and quantity of existing snags and down logs? If so,	No immediate alterations would be made to the quality of existing snags and down logs within the piñon-juniper stands within the Agua/Caballos analysis area.					

Cause	Alternative A	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G
would this affect the JUNIPER TITMOUSE? (Refer to MM #WL1, WL2, WL5 and WL13)						
Are there other activities (past, present and future), in conjunction with proposed activities that would change the JUNIPER TITMOUSE'S affected environment relative to snags and down logs? If so, how and to what extent?	In the event of severe drought, fuel buildup and debris accumulation could still fuel a catastrophic, stand replacement wildfire, whether stands have been harvested or not. Such a fire would remove existing snag habitat, but would also create a greater number of snags by killing many live green trees of various sizes. The abundance of these snags could provide optimum conditions for the juniper titmouse over a long period of time.					
How would activities affect population viability of JUNIPER TITMOUSE?	A downward trend of an estimated 6,680 acres or about 2 percent of available juniper titmouse habitat has occurred on the Carson National Forest since 1986. An additional reduction in habitat over time is expected as bark beetle impacts of the 2002 summer and fall are realized, especially if drought conditions continue on the forest through 2003. Survey estimates for areas on the forest indicate a declining trend in juniper titmouse populations on the Carson National Forest. Analyzing population change on survey routes is probably the most effective use of BBS data, however, these data do not provide an explanation for the causes of population trends (Sauer et al. 2001). [314] Taking into account the condition and trend of the bird's habitat on the forest and existing data from nearby habitat, the hair woodpecker population on the Carson National Forest is stable. Continuing to manage the forest according to the Forest Plan's guidelines—maintain road densities at their lowest within analysis areas across the forest, 300 or more snags per 100 acres, large woody debris on the forest floor, increase the aspen component, decrease conifers in aspen—will insure that juniper titmouse habitat will be maintained over time. Natural occurrences, such as wildfire and lightning strikes, can also create favorable habitat conditions for the juniper titmouse. Twenty to 26 percent old growth allocation and closure of 37 percent of existing roads in the Agua/Caballos analysis area under the action alternatives would protect and improve habitat for juniper titmouse.					

Juniper Titmouse on the Carson National Forest

At the time the Forest Plan was implemented, 364,900 acres of juniper titmouse habitat were determined for the forest. Since that time stands have grown, some have been harvested, wildfires and disease have changed the landscape to a limited degree and data to estimate conditions and cover types has also improved or changed in methods.

Map O(c). Juniper Titmouse Potential Habitat Distribution on the Carson National Forest (USDA 1987)

Habitat Condition and Trend

Forest-wide habitat trend for the juniper titmouse is based on acres of available quality or "occupied" habitat (roost tree availability) identified in the Carson Forest Plan EIS compared to an estimate of existing acres of similar habitat. Juniper titmouse habitat from 1986 to 2002 is estimated to have decreased from 364,900 to 348,729 acres or a downward trend of about 2 percent. The Agua/Caballos analysis area contains 971 acres of piñon-juniper habitat. It is not known how many of these acres are quality (piñon-juniper canopies) habitat. None of the alternatives propose treatments in the piñon-juniper habitat type. Therefore, there are no anticipated effects to the forest-wide habitat trend.

Figure 26b. Changes in Juniper Titmouse Suitable Habitat on the Carson National Forest from 1986 to 2002.

Figure 26c. Time Series of Plain Titmouse Data for Ojo Sarco and Cebolla Survey Routes

The following pages
replace pages 191-198
(Mexican Spotted Owl)
in the
Final Environmental Impact Statement
for the
Agua/Caballos Proposed Projects

Map 26. Stands Identified to Manage as Mexican Spotted Owl Habitat

Threatened and Endangered Species

During the 2 years since the FEIS (June 2002) was published, new information concerning recent court decisions has warranted clarification and minor modifications to the FEIS (as supplemented), particularly with respect to the management of northern goshawk habitat and the recently proposed Mexican spotted owl habitat. The following discussions are considered an integral part of the "Final Environmental Impact Statement for the Agua/Caballos Proposed Projects and Supplement" (June 2003).

Mexican Spotted Owl
(Strix occidentalis lucida)

Affected Environment

Mixed conifer and pine-oak forest, including riparian forest, in the major drainages of the Agua/Caballos analysis area and surrounding canyons. Currently, no Mexican spotted owls (MSO) have been located within the affected environment, therefore, it is considered potential habitat.

Environmental Factors

- Mid-aged to old forest with a component of large trees. The Agua/Caballos analysis area provides approximately 1,163 acres (29 percent) of mixed conifer, mid-aged forest, and 431 acres (11 percent) of mixed conifer, mature and old forest that could support key nesting habitat.
- Multiple canopied forest, moderately closed, with scattered forest openings, are important to Mexican spotted owls (MSO) for roosting, hunting, escape cover, nesting and rearing young. The present mixed conifer forest has three age groups of trees which make up this habitat type
- Forest openings and meadows provide for quality hunting of prey due to edge effect. These areas are scattered throughout the affected environment.
- Riparian areas serve as key habitats which contribute to quality hunting of prey, preferred roosting sites, nesting and fledging areas, and migration corridors. Most drainages in the Agua/Caballos analysis area are intermittent and support some riparian habitat. Borracho Canyon maintains a perennial flow, which is not substantial, but does support riparian habitat. Adjacent drainages such as El Rito Canyon or the Felipito Canyon just north of Agua/Caballos, support more substantial riparian habitat.
- Standing dead trees (snags) and dead and down trees (logs) are also important to MSO for nesting, roosting, and feeding. Throughout the MSOs potential habitat, there is a sufficient number of snags, logs, and dead and down woody residues in each forest and woodland type. The affected environment currently supports an abundance of ground fuels that have accumulated through the years. These heavy ground fuel conditions pose a threat for a potentially serious, catastrophic, stand replacement wildfire.
- A variety of small wildlife makes up the Mexican spotted owl's prey base. A number of different prey species are currently found in all habitats of the owl's potential habitat. Two are management indicator species (MIS)—the red squirrel and Abert's squirrel. Supporting healthy, functional, habitat for these prey species, in turn, supports an abundant food source for the owl. Prey becomes abundant after the spring snowmelt, especially in the deeper, cooler canyons and north-facing slopes. The mid- to late-summer rains enhance habitat conditions that support an increase in prey numbers. These prey do not appear to be as abundant during the critical breeding and nesting periods. Local, late winter climatic conditions likely hamper prey activity and restrict the food source.

Proposed Activities That Affect Mexican Spotted Owl

A. Disturbance (short term) During Activity
- Logging (especially during nesting/fledging periods)
- Prescribed burning (especially during nesting/fledging periods)

B. Habitat Effectiveness
- Change (alteration and arrangement) in VSS of mixed conifer habitat
- Change in edge effect
- Allocation of old growth

C. Other Influencing Activities
- Past: Railroad logging created dense even-aged or two-storied pole sapling stands and removed many of the large, old trees.
  Heavy livestock grazing reduced forage for prey species.
  Fire suppression has caused accumulations of fuels and dense forest conditions.
- Present: Implementation of 1996 Forest Plan Amendment.
  Livestock grazing
- Future: Continued exclusion of most harvest activities in mixed conifer
  Potential stand replacement by wildfire
  Firewood harvesting
  Viga and latilla sales
  Logging in the VFSYU
  Livestock grazing

Final MSO Recovery Plan and the 1996 Region-wide Amendment to Forest Plans

The majority of mixed conifer stands in the analysis area are uneven-aged with at least three distinct age classes. The average basal area within the mixed conifer type in the analysis area is 119 square feet per acre. The mixed conifer type is considered restricted habitat for the MSO, so treatments within the mixed conifer type must follow the MSO Recovery Plan.

All mixed conifer stands with slopes over 40 percent are considered protected habitat, where no timber harvesting would be done. The analysis area has 623 acres of protected MSO habitat with slopes over 40 percent.

According to the MSO Recovery Plan, a minimum of 25 percent of the mixed conifer restricted MSO habitat must be designated as threshold habitat for the owl. Within the Agua/Caballos analysis area, 26 percent (1,743 acres) of mixed conifer restricted MSO habitat is designated as threshold for the owl. All of the stands currently meeting threshold conditions (308 acres), plus an additional 1,435 acres of the stands that are closest to meeting threshold conditions, are designated. No alternative would allow tree cutting or road building in any designated threshold stands.

Treatments in the remaining mixed conifer stands would be aimed at creating or maintaining replacement nest/roost tree habitat, while providing a diversity of stand conditions across the landscape, ensuring habitat for a diversity of prey species. The MSO Recovery Plan recognizes the need to reduce the densities of some mixed conifer stands to accomplish this diversity (USDI Fish and Wildlife Service 1995).

Surveys for the presence of the MSO have been occurring on the entire Carson National Forest since 1988. Over the course of 10 years of survey in identified suitable habitat, no owls have been positively identified using the area. The surveys have been conducted by a trained biologist from outside the Forest Service and from within the Forest Service.

With the exception of Jicarilla Ranger District where some owls have been verified, the rest of the Carson does not seem to be able to support the MSO, although suitable habitat does exist. This portion of the forest may not be conducive to successful breeding by the MSO because of a key ecological factor—high elevation. Local climatic conditions on this part of the forest in northern New Mexico may be too cold during mating and nesting periods. During the owl's breeding season, the availability of prey in suitable habitat is usually not very abundant, possibly due to cold microclimatic conditions and late snowpack, discouraging prey activity. Without a food source, the MSO cannot successfully breed and raise young. Historic records do not indicate an abundance of Mexican spotted owls occurring in north-central New Mexico.

This theory has been discussed between Forest Service biologists and biologists with the U.S. Fish and Wildlife Service (USFWS). Logic dictates that cold microclimatic conditions during the owl's breeding season could have an influence on the availability of prey during this critical time period and hamper any attempt at reproduction.

During the formal comment period for the 1999 draft environmental impact statement (DEIS) and the 2000 supplement to the DEIS, letters from Carson Forest Watch refer to the 2000 proposal for MSO critical habitat. [253, letter 26 and 300, letter 43] At the time Carson Forest Watch's comments were addressed, the Final Rule designating critical habitat had been published. [294A] Neither the Agua/Caballos analysis area, nor the Carson National Forest was included in the designation.

On November 18, 2003, the U.S. Fish and Wildlife Service published a proposal to designate critical habitat for the Mexican spotted owl (MSO) on National Forest System lands (68 FR 65020). [350] The western portion of the Agua/Caballos analysis area is within the proposed critical habitat. Since Alternative G includes activities within proposed MSO critical habitat, the Carson National Forest initiated conferencing in December 2003. [352] Each of the constituent elements was evaluated in an addendum to the biological assessment and evaluation. [263 and 352] In a conference report (2/9/2004) responding to the addendum, the U.S. Fish and Wildlife Service states, "…we concur with the El Rito Ranger District determination that the action as proposed may affect, not likely to adversely affect proposed critical habitat for the owl." The agency adds that we may request the conference report as a letter of concurrence issued through informal consultation if critical habitat for the owl is designated in the project area. [359]

Effects

Although the MSO has not been found occupying the available habitat on the district, it cannot be discounted that the owl may, on occasion, use this habitat for migration purposes or feeding. By identifying and setting aside fully protected, mixed conifer habitat (such as threshold and restricted areas), the direction set forth in the 1996 Forest Plan Amendment [193c], the Carson Forest Plan, and the Final Mexican Spotted Owl Recovery Plan [192] is being met. In all action alternatives, there would be no negative effects. Activities within the managed mixed conifer stands identified for treatment would be managed so that stand health is maintained and forest conditions are enhanced, favoring the Mexican spotted owl. See the biological evaluation for further effects analysis on the MSO.

The USFWS has since concurred with the Forest Service's determination of "may affect, but is not likely to adversely affect" the Mexican spotted owl for preferred Alternative G. [304] The USFWS explains that "this concurrence is based on the following reasons: (1) surveys were completed and no owls are currently known to occupy the area; (2) impacts to restricted habitat are expected to be insignificant or discountable as described above; (3) potential foraging and future nest/roost habitat is likely to be improved due to the increased habitat diversity and reduced risk of catastrophic wildfire; and (4) the projects are consistent with the owl recovery plan." The USFWS letter of concurrence does not include requirements for additional surveys, but states that if future surveys find listed species in habitat where they have not been previously observed, the Forest Service should contact the USFWS to verify the determination and concurrence is still valid.

Table 37. Alternative Comparison of the Habitat for Mexican Spotted Owl

Cause	Alternative A	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G
Disturbance to Wildlife						
Would the location, season, extent, intensity of harvesting/cutting activities, road use (density, use level, seasonal use, location, extent, intensity), or prescribed fire (intensity, duration, season, location) disturb the MSO in the short or long term? If so, to what extent?	Because there are no known Mexican spotted owls occupying the Agua/Caballos analysis area, there would be no disturbance to spotted owls in any of the alternatives. In the event that the area should become occupied, measures would be taken to assure that the owl is not disturbed.					
Impacts to Habitat Effectiveness						
Change in Habitat Structure						
How would changes in VSS distribution (structure and quality) from harvesting/cutting activities, meadow maintenance and prescribed burning affect MSO habitat? (Refer to *Vegetation* section for environmental consequences from various silvicultural treatments)	With no timber harvest occurring, there would be no changes to the VSS distribution of the affected environment. Over time, there would be gradual change to these stands that would result in more mature forest stands and fewer open areas. This would reduce edge effect and, in turn, the abundance of prey in these areas.	The slight changes in the VSS distribution would not be significant in the overall affected environment. (Refer to Table 6 in the *Vegetation* section) Treatments in mixed conifer would enhance habitat conditions that would favor the MSO. Small forest openings would be created and large woody debris would become available for use by small rodents and other small wildlife that make up the MSO prey base. All action alternatives would maintain mixed conifer stands in VSS 5 and 6 that are preferred by MSO for nesting.				
Are there other activities (past, present and future), in conjunction with proposed activities, that would change the habitat structure of the MSO affected environment? If so, how and to what extent?	In the event of severe drought, fuel buildup and debris accumulation could still fuel a catastrophic, stand replacement wildfire, whether stands have been harvested or not. Such an event would affect the existing natural environment on which the MSO depends.					

Cause	Alternative A	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G
Fragmentation and Connectivity						
When activities are completed and the designated roads are closed, to what extent would MSO habitat be fragmented? (Refer to MM #WL6, WL10 and WL11)	Fragmentation is defined as a process by which large, contiguous blocks of habitat are broken into smaller patches isolated from each other by a landscape matrix dissimilar to the original habitat (USDA Forest Service 1997). Currently, the Mexican spotted owl does not occupy available habitat in the Agua/Caballos analysis area. Fragmentation or connectivity problems do not exist on the Carson National Forest. Implementation under any of the alternatives would not isolate forest patches, and forest or woodland cover types would connect MSO potential habitat. The Agua/Caballos analysis area would also remain surrounded by forest/woodland cover types and not be isolated from other MSO habitats on or adjacent to neighboring forests. Past timber harvesting within the Agua/Caballos analysis area altered the vegetation structural stages for many timbered stands, however, these VSS cumulative alterations have not created any truly isolated habitats. Proposed activities associated with any of the action alternatives would be even less intensive than past practices, and would also not create any fragmentation or connectivity problems.					
Riparian						
Would activities affect the quality and quantity of existing riparian vegetation? If so, would this affect the MSO? (Refer to MM #WL5 - WL10)	No timber harvesting or associated activities would occur in riparian areas under this alternative. There would be no effect on the quality or quantity of existing riparian vegetation.	Riparian habitats would be avoided and protective buffer areas would keep timber harvest activities out of these delicate habitats (see Chapter 2, *Mitigation Measures*). The integrity of the existing riparian areas would be maintained.				
Snags and Down Logs						
Would activities affect the quality and quantity of existing snags and down logs? If so, would this affect the MSO? (Refer to MM #WL1, WL2 and WL13)	In Alternative A (no action) there would be no immediate alterations to the quality of the existing snags and down logs within the VSS 3, 4, 5 and 6 stands. Over time, little change would occur to the quantity and quality of snags as stands continue to mature and trees die off.	Mitigation measures ensure that most of the existing snags and logs would be retained for the needs of snag dependent species, including the Mexican spotted owl. Commercial timber harvest operations in these action alternatives may create some snags and increase logs and woody residues that would be attractive to MSO prey. Some snags may be removed during harvest operations if deemed a safety threat to forest workers or forest users. Timber harvest in the mixed conifer would be minimal under any of the action alternatives, thus the risk of snag and downed log removal by post treatment firewood gatherers would be lower than in other cover types. Prescribed burning in the ponderosa pine type (approximately 2,106 acres in Alternatives C, D and E, 440 acres in Alternative F and 1,986 acres in Alternative G) may destroy some snags. The risk of losing this habitat component by fire would be minimal, since burning prescriptions would favor retaining snags and logs. There would be no prescribed burning within the mixed conifer type, so this threat does not exist, however, under wildland fire conditions this threat could be severe. Where accessible to open roadways, some snags and logs may be removed as firewood. The proposed road closures would help reduce the removal of some of these snags and logs.				
Are there other activities (past, present and future), in	In the event of severe drought, fuel buildup and debris accumulation could still fuel a catastrophic, stand replacement wildfire, whether stands have been harvested or not. A stand replacement fire may burn all trees (including any snags					

Cause	Alternative A	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G
conjunction with proposed activities that would change the MSO's affected environment relative to snags and down logs? If so, how and to what extent?	or logs) that are key components of Mexican spotted owl habitat, however a high level of snags and downed logs would be created over a 3- to 7-year timeframe.					
How would activities affect population viability of MEXICAN SPOTTED OWL?	Currently the Carson National Forest has no know contribution to sustaining viable populations of MSO across its range. The forest will continue to comply with the 1995 Mexican Owl Recovery Plan and the 1996 Amendment to the Forest Plan when treating or affecting mixed conifer stands. Surveys will also persist in mixed conifer and other suitable habitat where projects are proposed. Standards and guidelines would be met under any of the action alternatives to protect potential Mexican spotted owl habitat. Activities proposed under any of the action alternatives would improve conditions for the MSO. The U.S. Fish and Wildlife Service concurred with a finding of "May Affect, Not Likely to Adversely Affect" the MSO. [263 and 304]					

The following pages
replace pages 200-207
(Northern Goshawk)
in the
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Forest Service Sensitive Species

Northern Goshawk

Affected Environment

The conifer forest types within the major drainages of the El Rito Ranger District (e.g., El Rito, Vallecitos, Tusas).

Environmental Factors

- Nests tend to be near water. Nest areas are a key habitat component of goshawk home ranges. In each of the three southwestern forest types, goshawks nest in stands that are in older-aged forests (VSS 5 and 6) and have a high density of large trees, high tree canopy cover, and high basal areas. Nest areas are usually on cool, shady slopes or canyon sides, and are often near streams. (Reynolds, et al. 1992) Surveys for the goshawk within the Agua/Caballos analysis area began back in 1991. [244] Formal surveys for the goshawk have been done over the years with positive results. Two goshawk nest sites were located. Post-fledgling areas (PFAs), along with replacement nest areas, were established in these two areas meeting the Amendment of Forest Plans in Arizona and New Mexico. [193C] Within these two PFA's there would be no harvest within nest areas or replacement nest areas. Timing restrictions would be in place for breeding and rearing of young.
- Large, old trees in ponderosa pine, mixed conifer or aspen with dense canopy cover for nesting. The Agua/Caballos analysis area contains approximately 3,000 acres of VSS 5 and 6 habitat type preferred by goshawks. Canopy cover outside of post fledging areas (PFAs) is estimated between 50-70 percent, and within PFAs is between 55-80 percent (see Tables 7-9 of the *Vegetation* section). Preferred habitat for goshawk nesting in the analysis area is present. Post fledging family areas are found in the analysis area. These PFAs would be protected from any activities proposed in the action alternatives.
- A variety of forest types and conditions (young to old forests) with patches of dense trees, developed herbaceous and/or shrubby understories and habitat attributes (snags, down logs, small openings) for fledging young and prey. The Agua/Caballos area contains normal to high numbers of VSS 3 and 4 stands, which are suitable for herbaceous and shrubby understories. A variety of habitat conditions for the goshawk are present both for breeding and feeding. Snags, downed logs and small openings are also present in moderate numbers. Any action alternative would create additional openings for feeding (finding prey) and additional snags and large debris for rodent populations (prey species). Open understories enhance detection and capture of prey.
- Note: Prey includes hairy woodpecker, Abert's squirrel and red squirrel (MIS for this wildlife analysis).

Proposed Activities That Affect Northern Goshawk

A. Disturbance (short term) During Activity
   - Logging (especially during nesting/fledging periods)
   - Prescribed burning (especially during nesting/fledging periods)

B. Habitat Effectiveness
   - Change (alteration and arrangement) in VSS of ponderosa pine habitat
   - Change in edge effect
   - Allocation of old growth

C. Other Influencing Activities

- Past: Railroad logging created dense even-aged or two storied pole sapling stands and removed many of the large, old trees.
  Heavy livestock grazing reduced forage for prey species.
  Fire suppression caused accumulations of fuels and dense forest conditions.
- Present: Implementation of 1996 Forest Plan Amendment.
  Livestock grazing
- Future: Continued exclusion of most harvest activities in mixed conifer.
  Potential stand replacement from wildfire
  Firewood harvesting
  Viga and latilla sales
  Logging in the VFSYU
  Livestock grazing

Management Recommendations for the Northern Goshawk

In June 1996, the Southwestern Region issued a "Record of Decision (ROD) for Amendment of Forest Plans in Arizona and New Mexico." [193C] The ROD amended and incorporated into each of 11 forest plans in the Southwestern Region, the "Management Recommendations for the Northern Goshawk in the Southwestern U.S." (MRNG) prepared by a committee of scientists of Richard T. Reynolds and others (1992).

Reynolds and others (1992) concluded that northern goshawk is a "habitat generalist" occupying a mosaic of forest types, forest ages, structural conditions and successional stages in their daily foraging movements throughout the Southwestern Region's coniferous, deciduous, and mixed forests. They also found that the goshawk seldom used young, dense forests because those forests contain too few large trees in which the goshawk can nest, and insufficient space "in and below the canopy to facilitate flight and capture of prey (Reynolds et al. 1992, p. 10)." On the basis of these conclusions, the report set forth recommendations describing the desired balance of forest age classes, or vegetation structural stages (VSS) for the nest area, post-fledging family area, and foraging area of the goshawks' home range. The recommendations were derived from the information available on how foraging goshawks use their habitat. In particular, the report recommended that a mosaic of vegetation stages be interspersed throughout the foraging area in small patches, with a majority, or 60 percent, of the area comprised of VSS 4, 5, and 6 (Reynolds et al. 1992, p.6).

In response to the Forest Service's intent to incorporate MRNG in all forest plans of the Southwestern Region through a region-wide amendment, the agency received comments challenging the MRNG's conclusion that northern goshawks are "habitat generalists." One agency in particular, the Arizona Game and Fish Department, submitted a paper presenting scientific evidence refuting the Forest Service's conclusion. [47A] The Arizona Game and Fish Department argued that the proposed old growth standard does not incorporate important habitat attributes or distribution requirements to sustain the habitat needs of the northern goshawk.

In light of a court challenge resulting in a 9th Circuit Court opinion (CV-00-01711-RCB), the FEIS for the amendment of forest plans "failed to disclose responsible scientific opposition to the conclusion upon which it is based." [351] The plaintiffs argued that scientific information existed that supports the contention that the goshawk is an old growth forest habitat specialist and does not use a range of habitats, including multiple forest age classes (or structural stages), forest edges, and openings as Reynolds and others found in developing MRNG for Southwestern forests. The Court has directed the Forest Service to address the responsible opposing viewpoint over habitat preferences of the goshawk in a supplement to the FEIS and issue a new decision. In the interim, the 1996 amendment has not been enjoined or found to be wholly inadequate by the

Court and continues to be used as region-wide forest plan direction for the goshawk, as well as the Mexican spotted owl.

Outside of suitable habitat for the Mexican spotted owl, the Agua/Caballos EIS is principally based on managing for northern goshawk and its habitat—particularly through the application of goshawk standards and guidelines outlined in the 1996 "Region-wide Amendment of Forest Plans" and the "Management Recommendations for the Northern Goshawk in the Southwestern U.S." [193C and 17A] During the formal comment period for the 1999 "Agua/Caballos Proposed Projects DEIS," Carson Forest Watch and Forest Guardians submitted comments. Both letters mention an opposing viewpoint associated with goshawk habitat management. [253-letters 21 and 26] Carson Forest Watch points out that the DEIS "failed to mention the controversy surrounding the goshawk guidelines and the Mexican spotted owl recovery plans—which are currently being challenged by the SW Center for Biological Diversity. NEPA requires such disclosure of scientific uncertainty and controversy, etc." [253, letter 21] Forest Guardians cites Shuster (1980) in describing the stands in which goshawks preferred to nest. [253, letter 26]

Responses to these comments were provided in the FEIS (pp. 349 and 351). These responses have been updated in Appendix B of this "Final Supplement to the FEIS." Forest Guardians' reference to Shuster (1980) was also addressed in Appendix I – Publications or Papers Brought Forth by the Public (FEIS, pp. 419-425). Appendix I of the FEIS has also been updated to speak directly to Shuster and how Reynolds cites Shuster's findings when describing goshawk nest stands.

In response to the opposing viewpoint that the northern goshawk is an old growth specialist—not a habitat generalist—Reynolds conducted an exhaustive literature review (Reynolds 2004). [357] The intent of the review was to assemble and synthesize information on habitat use by the northern goshawk and determine if the available information supports the contention that the goshawk is an old growth forest habitat specialist or whether they use a range of habitats, including multiple forest age classes (or structural stages), forest edges and openings. Over 180 documents were reviewed, including peer-reviewed publications, theses, reports and draft manuscripts for information on how goshawks use habitats in both the breeding season and in winter. The review focused on habitat used by goshawks in North America.

In order to address public comments on goshawk habitat preferences, the following discussion relates what Reynolds found in his review and how his conclusions apply to the Agua/Caballos analysis area and, in particular, to Alternative G—the preferred alternative.

Vegetation Structural Stages

Reynolds' literature review identifies "an abundance of evidence that habitats used by northern goshawks were not limited to old growth forests. Both nesting and foraging goshawks clearly use nearly every forest and woodland habitat type that occurs within the hawk's geographic range." Descriptions of these forests and woodlands "show extensive variation in the horizontal and vertical structure of the vegetation comprising these types. Many of the forest and woodland types occupied by goshawks do not produce closed forests with tall trees and continuous canopies purported by the plaintiffs to be required by goshawks. [351]

Chapter 3 – Affected Environment and Environmental Consequences, *Vegetation* of the 2002 FEIS (p. 69) refers to the goshawk guidelines in describing the desired condition for the analysis area—"forests within goshawk nesting home ranges should be an interspersed mosaic of structural stages–young and old forests—to increase the diversity of habitat for goshawks and their many prey species." The objective of treatments in all the action alternatives for the Agua/Caballos analysis area is to move it toward achieving a balance of vegetation structural stages (VSS) to maximize diversity (FEIS, p. 69).

The effects of harvesting, precommercial thinning, aspen patch cutting and mistletoe treatments on vegetation structure and composition as described in Alternative G would result in stand acres of VSS 1 and 2 remaining the same as the current condition. However, many small patches of VSS 1s and 2s would be created within stands from group selection cuts and aspen patch cuts.

These patches would be between one quarter and 4 acres in size, totaling 386 acres (FEIS, p. 38). Commercial thinning and thinning from below in the VSS 3 and 4 classes would reduce competition and increase the growth of the residual trees in the stand. Acceleration in tree growth would move a stand more rapidly into VSS classes 5 and 6. In the short term, the number of stands in VSS 6 would not change. During the next 50 years, VSS 4 and 5 stands would develop into VSS 6. Implementation of this alternative would have the same overall VSS distribution for the analysis area as Alternative D. However structural diversity would be much higher than Alternative D, with twice as many acres of patch cuts—mostly through group selections.

The slight changes in VSS distribution would not be significant in the overall affected environment. However, all action alternatives would create additional areas of key habitat components preferred by the goshawk. Additional openings and large woody debris would be available for small rodents, nongame and small-game species that goshawks prey upon. All action alternatives would increase the VSS 5 and 6 components that goshawks prefer for nesting purposes.

Canopy Cover

Reynolds finds that many reports have shown, "irrespective of forest type, goshawk nest area habitat in North America is typically mature-to-old forest. Nest areas are typically composed of relatively (depending on forest type, elevation, growth site potential) large, dense trees with relatively closed canopies and open understories; canopy trees in nest sites/areas can be old growth or younger age classes. Habitat structure is more important than the composition in the nest area."

Reynolds (2004) discusses studies on canopy cover as having some variation among populations—being as low as 31-33 percent in Oregon and Nevada and as high as 70 percent or more in Arizona. He also points out: "There is also variation (locally and geographically) in number of canopy layers (structure) in nest areas—from single to multiple layers. In saturated goshawk populations, the structure of nest area habitat can be variable depending on the availability of high quality nest area habitat within territories." Also reported are goshawk nest site conditions that vary largely due to changes in local availability of habitat. Composition and structure of nest areas often depend on the availability of potential nest sites within a breeding territory whose location is limited by surrounding territories.

Chapter 3 – Affected Environment and Environmental Consequences, *Vegetation* of the 2002 FEIS (p. 75) uses the goshawk guidelines in describing the desired canopy cover in goshawk foraging areas—a balance of closed, moderately closed and open canopy covers in the younger structural stages. The closed to moderately closed canopy covers should predominate the mature and old growth structural stages to provide moist forest soils for sustaining fungi (food for goshawk prey species). Using the canopy cover guidelines from Reynolds (1992) and the 1996 Region-wide Amendment for Forest Plans, Tables 7, 8 and 9 (pp. 76-77) of the 2002 FEIS display the effects on canopy for each of the alternatives.

The overall canopy cover for landscapes outside goshawk post-fledging areas would not be changed significantly in any of the alternatives. The average canopy cover for ponderosa pine, mixed conifer and spruce-fir cover types would still be higher than the desired condition for each cover type. Table 7 shows the present canopy cover distribution for landscapes outside goshawk post-fledging areas, and how alternatives compare in reaching the desired condition from the 1996 region-wide amendment for forest plans. Alternative G would still result in an average canopy cover above what is recommended.

Alternative G does not include any clearcutting or overstory removal. The overall canopy cover for landscapes within goshawk post-fledging areas would be reduced nearer to the desired condition in Alternative G. The average canopy cover for ponderosa pine, mixed conifer and spruce-fir cover types would still be equal to or higher than the desired condition for each cover type. Table 8 shows the present canopy cover distribution within goshawk post-fledging areas, and how each

alternative would compare in reaching the desired condition from the 1996 "Region-wide Amendment for Forest Plans."

The average canopy cover for goshawk nest areas would not be changed since no treatments would be done in goshawk nest areas in any of the alternatives. Table 9 shows the present canopy cover distribution for goshawk nest areas, and how each alternative would compare in reaching the desired condition from the 1996 "Region-wide Amendment for Forest Plans."

Old Growth

In his literature review, Reynolds describes, "despite the wide diversity of habitats occupied by goshawks, the reports reviewed showed that mature and older forests (including, but not limited to, old growth) consistently comprised the habitat in goshawk nest areas (typically 30-acre areas immediately surrounding the nest) in both North America and Europe."

The 1996 "Region-wide Amendment for Forest Plans" states that, "until the Forest Plan is revised, allocate no less than 20 percent of each forested ecosystem management area to old growth…" Within the Agua/Caballos analysis area, existing old growth is less than 20 percent. This shortage is mostly due to extensive railroad logging in the early 1900s in the southern two-thirds of the analysis area. The analysis area contains many acres of good potential old growth, which can be allocated to develop into old growth stands over time.

To be sure that an adequate allocation of old growth would be made relative to the ecosystem management area, the analysis reviewed the old growth allocations already made in all ecosystem management areas on the El Rito Ranger District. Old growth allocations were made within the Agua/Caballos analysis area for each of the action alternatives. Stands were identified for allocation before harvest units were selected. This insured the best blocks of existing and the best potential old growth stands would be allocated for each of the alternatives.

Alternative G would allocate 4,457 acres (20 percent of the forested acres in the analysis area) to old growth—including all of the existing old growth (2,649 acres) within the analysis area. This alternative allocates all existing old growth, all Mexican Spotted Owl threshold and designated threshold habitat, and an additional 502 acres that is expected to meet old growth in the future. The additional acres are generally adjacent to existing old growth blocks to make those blocks bigger and more effective wildlife habitat. The alternative allocates several large blocks scattered throughout the analysis area. Approximately one-half (1,758) of the acres that were allocated in the Valle Grande and Borracho decisions would be dropped from the original allocation. This would be done to allocate all of the existing old growth, as well as, some good potential old growth stands adjacent to a previously allocated block in the Felipito analysis; and still not allocate over 20 percent of the analysis area.

Nest Sites

Irrespective of forest type, Reynolds' literature review found goshawk nest area habitat in North America is typically mature-to-old forest. Nest areas are characteristically composed of (depending on forest type, elevation, growth site potential) large, dense trees with relatively closed canopies and open understories; canopy trees in nest sites/areas can be old growth or younger age classes.

Surveys for the goshawk within the Agua/Caballos analysis area began back in 1991. [244] Formal surveys for the goshawk have been done over the years with positive results. Two goshawk nest sites were located. Post-fledgling areas (PFAs), along with replacement nest areas, were established in these two areas meeting the "Management Recommendations for the Northern Goshawk in the SW United States" (Reynolds 1992). Within these two PFAs there would be no harvest within nest areas or replacement nest areas. Timing restrictions would be in place for breeding and rearing of young. Small patch cuts along with thinning from below may occur in some parts of the PFAs.

Since the species is known to inhabit the analysis area, priority habitats where these birds might possibly use as nest sites will be reinventoried prior to treatment.

Northern Goshawk Populations

In the same comment letter mentioning the controversy over MRNG, Carson Forest Watch also states: "The DEIS fails to acknowledge recent documented declines of both spotted owls and northern goshawks in Region 3. Forest Service reports from the past two years show clear declines in numbers and abundance and nesting success for these two species of concern." [253, letter 21] Carson Forest Watch does not cite to which studies the group is referring.

In June 1998, the U.S. Fish and Wildlife Service (USFWS) published a Notice of 12-Month Finding in the "Federal Register" on a petition to list the northern goshawk (63 FR 35183). [234] The USFWS concludes:

> *…the Service finds that while forest management (e.g., timber harvest and fire exclusion) has changed the vegetation characteristics throughout much of the western United States, the goshawk continues to be well distributed throughout its historic range. The Service finds no evidence that the goshawk population is declining in the western United States, that habitat is limiting the overall population, that there are any significant areas of extirpation, or that a significant curtailment of the species' habitat or range is occurring. The petition relies largely on the contention that the goshawk is dependent on large, unbroken tracts of old growth and mature forest in its assertion that the species is in danger of extinction. However, neither the petition nor other information available to the Service supports this claim. The Service found that while goshawks frequently use stands of old growth and mature forest for nesting, overall the species appears to be a forest habitat generalist in terms of the variety and age-classes of forest types it uses to meet its life history requirements. Therefore, the Service finds that listing the northern goshawk in the contiguous United States west of the 100th meridian as threatened or endangered is not warranted because the best available information does not indicate that it is in danger of extinction or likely to become so in the foreseeable future.*

Other areas in the Southwest, such as the Kaibab National Forest, have high occupancy and birds are commonly seen during migration periods. Northern goshawks are found throughout the United States. [309]

Summary

The effects of Alternative G on the northern goshawk and its habitat are thoroughly analyzed for the Agua/Caballos analysis area in the FEIS and this final supplement to the FEIS (Chapter 3 – Affected Environment and Environmental Consequences, *Wildlife*) and the biological assessment and evaluation as amended. [263]

In reviewing Shuster (1980)[1], habitat needs and management objectives are identified and consistent with the "Management Recommendations for the Northern Goshawk in the

[1] Cited by Forest Guardians. [253, letter 6]

Southwestern U.S." (Reynolds et al. 1992) and the Aqua/Caballos FEIS. Shuster's findings for nest site preference include: (1) nests located in live large trees; (2) all nests are immediately adjacent to small openings; (3) all nests had both natural openings and clearcuts within 350 meters of a nest tree; and (4) nest sites had sparse open understory (Shuster 1980). This is not contrary to Reynolds and other researchers (Reynolds 2004).

Northern goshawk habitat on the Carson National Forest is in fair condition with a stable trend. There is generally high nest fidelity on the forest with some repeat occupancy on the nest sites being monitored. However, there are likely alternate nesting locations for the known post-fledging areas yet to be located. It is also likely that reproductive success will also fluctuate with weather patterns, such as extreme drought, which can affect prey base populations.

The identification and conservation of goshawk habitat is prudent to prevent population declines or isolation of individuals and subpopulations (Reynolds et al. 1992). Thinning and prescribed burning in ponderosa pine and mixed conifer in the Agua/Caballos analysis area to create a more balanced distribution of vegetation structural stages, riparian area enhancement for prey species and aspen regeneration for nesting would improve the quality of habitat and would be within the findings described by Reynolds' literature review.

Table 38. Alternative Comparison of the Habitat for Northern Goshawk

Cause	Alternative A	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G
Disturbance to Wildlife						
Would the location, season, extent, intensity of harvesting/cutting activities disturb the NORTHERN GOSHAWK (short term)? If so, to what extent?	No prescribed burning would occur causing disturbance to the northern goshawk.	Disturbance and some displacement would occur up to 7 years after implementation. However, there would be no disturbance to any existing PFA areas.	Disturbance and some displacement would occur up to 4 years after implementation. However, there would be no disturbance to any existing PFA areas.	Disturbance and some displacement would occur up to 5 years after implementation. However, there would be no disturbance to any existing PFA areas.		Disturbance and some displacement would occur up to 6 years after implementation. However, there would be no disturbance to any existing PFA areas.
Would prescribed fire (intensity, duration, season, location) disturb the NORTHERN GOSHAWK? If so, to what extent?	With no prescribed burning proposed, no disturbance would occur to the northern goshawk.	Disturbance of up to 2 years after treatment is anticipated. If prescribed burning activities take place in the spring near a PFA, some disturbance to nesting and displacement may occur. However, there would be no burning or any other activities within established PFAs in the Agua/Caballos analysis area.				
Are there other activities (past, present and future), in conjunction with proposed activities that would disturb the NORTHERN GOSHAWK in its affected environment? If so, how and to what extent?	Goshawks would move around and find areas where there would be no disturbance. In addition to the proposed activities, continued grazing, firewood gathering and small sales would not cause significant disturbance to goshawk habitat. A major fire would extensively disturb the goshawk's affected environment.					
Impacts to Habitat Effectiveness						
Change in Habitat Structure						
How would changes in VSS distribution (structure) from harvesting/cutting	Since harvesting and burning are not proposed in this alternative, only gradual changes would	The slight changes in VSS distribution would not be significant in the overall affected environment. (Refer to Table 6 in the *Vegetation* section). However, all action alternatives would create additional areas of key habitat components preferred by the goshawk. Additional openings and large woody debris would be available for small rodents, nongame and small-game species that the goshawk				

Cause	Alternative A	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G
activities, meadow maintenance and prescribed burning affect NORTHERN GOSHAWK habitat? (Refer to Vegetation section for environmental consequences from various silvicultural treatments)	occur to the VSS distribution over time. Gradually as they mature, stands would become denser and the number of open areas would decrease, resulting in a loss of quality habitat for the goshawk.	prey upon. All action alternatives would increase the VSS 5 and 6 components that goshawks prefer for nesting purposes.				
Are there other activities (past, present and future), in conjunction with proposed activities that would change the habitat structure of the NORTHERN GOSHAWK'S affected environment? If so, how and to what extent?	In the event of severe drought, fuel buildup and debris accumulation could still fuel a catastrophic, stand replacement wildfire, whether stands have been harvested or not. A wildfire of this magnitude would drastically remove the key habitat components of the northern goshawk.					
Change in VSS Arrangement (across the landscape)						
Would harvesting/cutting activities, meadow maintenance and prescribed burning change the cover/forage ratio (mosaic). If so, how would this affect NORTHERN GOSHAWK habitat? (Refer to Vegetation section for environmental consequences from various silvicultural treatments and MM	There would be no noticeable change to the current cover/forage ratio (48 percent thermal cover, 46 percent hiding cover and 38 percent forage - composite) arrangement in the short term. In the long term (50+ years), there would be a reduction of forage areas due to conifer and aspen encroachment. Goshawks would use existing edge habitats associated with the cover/ forage arrangement present or created within the Agua/	The cover and forage ratio (composite) within the analysis area would be altered slightly to 44 percent thermal cover, 42 percent hiding cover (short term) and 52 percent (long term), and 42 percent forage. The change of the cover and forage arrangement	The cover and forage ratio (composite) within the analysis area would be altered slightly to 47 percent thermal cover, 45 percent hiding cover (short term) and 47 percent (long term), and 39 percent forage. The change of the cover and forage arrangement	The cover and forage ratio (composite) within the analysis area would be altered slightly to 46 percent thermal cover, 44 percent hiding cover (short term) and 48 percent (long term), 40 percent forage. The change of the cover and forage arrangement	The cover and forage ratio (composite) within the analysis area would be altered slightly to 47 percent thermal cover, 44 percent hiding cover (short term) and 49 percent (long term), and 39 percent forage. The change of the cover and forage arrangement	The cover and forage ratio (composite) within the analysis area would be altered slightly to 45 percent thermal cover, 43 percent hiding cover (short term) and 49 percent (long term), and 40 percent forage. The change of the cover and forage arrangement

Cause	Alternative A	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G
#WL3 - WL8)	Caballos analysis area and in adjacent canyons. Due to no timber harvesting, or any other associated activities, current cover/forage areas and associated edge habitats would remain unchanged in the short term. However, edge habitats used as quality hunting zones would diminish over an extended period of time as meadows and forest openings are encroached by conifers and aspen eventually losing quality edge habitat. Timbered stands would continue to offer potential nesting habitat. Changes in cover and forage would be especially important to the northern goshawk as it pertains to the abundance of their prey that, in turn, would be responsive to the abundance of their habitat. The more diverse the VSS, the more mosaic the habitats for prey species, then the greater the edge effect and more abundant the prey base.	creates a more favorable foraging environment by creating more edge effect.	creates a more favorable foraging environment by creating more edge effect.	creates a more favorable foraging environment by creating more edge effect.	creates a more favorable foraging environment by creating more edge effect.	creates a more favorable foraging environment by creating more edge effect.
How would changing the edge effect affect the NORTHERN GOSHAWK habitat?	No additional edge habitat would be created. Over a long period of time there would be gradual change, resulting in more mature forest stands and fewer open areas. This change would reduce edge effect	Group selection cuts and prescribed burning proposed in all action alternatives would create additional edge, slightly enhancing the prey base and foraging opportunities for the goshawk. Increasing the edge in both vertical (grasses, forbs and shrubs) and horizontal diversity (down logs and woody debris) would benefit the goshawk and enhance its prey base for the short term (about 10 years).				

Cause	Alternative A	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G
	and habitat diversity, and also diminish diversity of wildlife species (prey base).					
Are there other activities (past, present and future), in conjunction with proposed activities that would change the VSS arrangement of the NORTHERN GOSHAWK'S affected environment? If so, how and to what extent?	In the event of severe drought, fuel buildup and debris accumulation could still fuel a catastrophic, stand replacement wildfire, whether stands have been harvested or not. A wildfire of this magnitude would drastically remove the key habitat components of the northern goshawk.					
Old Growth						
How does the allocation of old growth affect the NORTHERN GOSHAWK? (Refer to MM #WL12)	Old growth allocation provides additional protection to areas with large trees that would benefit the goshawk for nesting and roosting, in both short and long term. Alternative A would add no more stands to the 15 percent (3,334 acres) of the analysis area already allocated to old growth. Alternatives D and E would allocate 26 percent (5,889 acres) of the analysis area, while and Alternative C, F and G would allocate 20 percent (4,457 acres). Also refer to the Vegetation (Old Growth) section in this document. Allocations include several large blocks throughout the analysis area.					
Would activities affect the quality and quantity of existing old growth, cause fragmentation, and reduce connectivity? If so, would this affect the NORTHERN GOSHAWK? (Refer to Vegetation section for environmental consequences from various silvicultural treatments)	Since no firewood harvesting or associated activities would take place in allocated old growth, this component of the goshawk's habitat would not be affected. Old growth stands left alone over time would gradually become more decadent and deteriorate, creating more openings as trees die.	A total of 147 acres of existing old growth would be treated through firewood harvesting. Activities would occur outside of nesting areas and PFAs. In the short term, activities may disturb a goshawk foraging in the area. Only small trees would be cut, which would eliminate	Since no firewood harvesting or associated activities would take place in allocated old growth, this component of the goshawk's habitat would not be affected. Old growth stands left alone over time would gradually become more decadent and deteriorate, creating more openings as trees die.			

Cause	Alternative A	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G
		competition and stimulate growth of the remaining trees, benefiting habitat for goshawk in the long term.				
	If a catastrophic wildfire occurred in the analysis area, old growth stands could be severely altered. A stand replacement fire of several thousand acres may fragment habitat, but more likely, connected forested stands would be unaffected. Stands of any forest cover type would provide connectivity for goshawk habitat.					
Snags and Down Logs						
Would activities affect the quality and quantity of existing snags and down logs? If so, would this affect the NORTHERN GOSHAWK? (Refer to MM #WL1 - WL4 and WL13)	Most existing snags (standing dead trees) and logs (dead and down trees) would be available, providing prey species for the goshawk. Although there would be no proposed harvest activities, some of this habitat component near roadways would be gathered as firewood.	Mitigation measures ensure that most of the existing snags and logs would be retained for the goshawk's prey needs and also serve, to some extent, as ground cover. Commercial timber harvest operations may create some snags and increase logs and woody residues. Some snags may be removed during harvest operations if deemed a safety threat to forest workers or forest users. No harvesting would occur in identified PFAs. Prescribed burning in the ponderosa pine type (approximately 2,106 acres in Alternatives C, D and E, 440 acres in Alternative F and 1,986 acres in Alternative G) may destroy some snags. The risk of losing this habitat component by fire would be minimal, since burning prescriptions would favor retaining snags and logs. No burning would occur in identified PFAs. Where accessible to open roadways, some snags and logs may be removed as firewood. The proposed road closures would help reduce the removal of some of these snags and logs.				
Are there other activities (past, present and future), in conjunction with proposed activities that would change the NORTHERN GOSHAWK'S affected environment relative to snags and down logs? If so, how and to what extent?	In the event of severe drought, fuel buildup and debris accumulation could still fuel a catastrophic, stand replacement wildfire, whether stands have been harvested or not. A wildfire of this magnitude would drastically remove key habitat components of the goshawk. After a stand replacement fire, a high level of downed logs and snags would be created over a 3- to 7-year timeframe.					

The following pages
replace pages 212-214
(Rio Grande Cutthroat Trout)
in the
Final Environmental Impact Statement
for the
Agua/Caballos Proposed Projects

Resident Trout and Aquatic Macroinvertebrates

Affected Environment

Resident trout species are used as indicator species for quality perennial streams and riparian vegetation. [1, p.97] Resident populations reproduce and sustain themselves in the wild. Defined also as "resident trout" in the Carson Forest Plan, rainbow, brown and brook trout are nonnative species that have been stocked extensively in northern New Mexico during the last 100 years. Rio Grande cutthroat trout is the only native of the resident trout management indicator species.

Aquatic macroinvertebrates or aquatic insects are found in lakes, streams, ponds, marshes and puddles and help maintain the health of the water ecosystem by eating bacteria and dead, decaying plants and animals. Local populations of certain aquatic macroinvertebrates are indicator species of high quality water. They are an indicator of overall aquatic conditions, quality of fisheries and associated riparian habitat. [1, p.97] For the purpose of analyzing the effects of forest management activities, the primary habitat requirement for aquatic macroinvertebrates, as well as resident trout, is perennial water.

This analysis on resident trout and aquatic macroinvertebrates is based on the effects identified in Chapter 3, *Soils and Watershed* of the "Final Environmental Impact Statement for the Agua/Caballos Proposed Projects," as well as surveys in 2001 by forest fish biologists.

From local information and forest watershed maps, Cañada del Borracho is identified as a perennial stream and will be treated as such for this analysis. Attempted surveys in 2001, however, found only small pockets of water throughout the otherwise dry streambed above the confluence with Rio Vallecitos. No fish were present in any of the small pools. Effects will be determined on the assumption that Cañada del Borracho reaches and maintains a perennial flow, even though the stream has been intermittent throughout for the last 2 years of ongoing drought.

Environmental Factors

- Resident trout prefer clear, cold streams with deep pools and consistent water flow and lakes.
- Population densities are regulated mostly by stream size and morphology (Koster 1957).
- Deeper pools provide overwintering habitat, and consistent flows are important.
- Productivity is a reflection of general water quality. Substrates with clean gravels of various sizes and with little embeddedness provide for macroinvertebrate production as a consistent food source. Clean gravel substrates are also important for successful resident trout reproduction.
- Undercut banks and large woody debris anchored throughout the stream course provide summer cover for predator avoidance (Sublette et al. 1990).
- Resident trout and aquatic macroinvertebrates prefer water temperatures in a particular range.
- Optimum habitat for Rio Grande cutthroat includes the absence of and protection from nonnative trout species, such as brown, rainbow and brook trout.
- Improvement of riparian habitats and upland watershed improvements through grazing management, road closures, stream habitat improvements and best management practices relate directly to water quality and the abundance and diversity of resident trout and aquatic macroinvertebrates.

Map O(d). Potential Resident Trout and Aquatic Macroinvertebrate Habitat Distribution Within Agua/Caballos Analysis Area and Alternative G

Proposed Activities That Affect Resident Trout and Aquatic Macroinvertebrates

A. Disturbance (short term) During Activity (dependent upon proximity to perennial water)
- Vegetation management activities
- Prescribed burning
- Road building and use

B. Habitat Effectiveness
- Number of road crossings
- Quality riparian vegetation

C. Other Influencing Activities
- Past: Heavy railroad logging and associated road building
  Great Osier Fire at the turn of the century was a stand replacement fire.
  Heavy livestock grazing of riparian vegetation
  Road crossings
  Fishing pressure
  Introduction of exotic species
  Private development within Vallecitos watershed

- Present: Grazing impacts, especially on riparian vegetation
  Road crossings
  Fishing pressure
  Introduction of exotic species
  Private development within Vallecitos watershed
- Future: Potential stand replacement from wildfire, especially involving riparian vegetation
  Grazing impacts, especially on riparian vegetation
  Introduction of exotic species
  Private development within Vallecitos watershed

The activities listed above were considered when determining the cumulative effects of the alternatives.

Map O(e). Resident Trout and Aquatic Macroinvertebrate Potential Habitat Distribution on the Carson National Forest

Table 39b. Alternative Comparison of the Habitat for Resident Trout and Aquatic Macroinvertebrates

Cause	Alternative A	C	D	E	F	G
Impacts to Habitat Effectiveness						
Water Quality						
Would use of roads and road crossings affect the quality and quantity of RESIDENT TROUT or AQUATIC MACROINVERTEBRATE habitat?	Present rate of sedimentation originating from a network of compacted, rutted and eroded roadways would continue into stream systems. Continuous public use along 101.7 miles of open roads—most of which exhibit poor drainage, compaction, and rutting damage—would contribute sedimentation. Excessive amounts of sedimentation would directly effect resident trout by altering water quality, decreasing spawning success, altering pool depth ratios and could result in increased water temperatures. Effects to aquatic macroinvertebrates under continued sedimentation in Cañada del Borracho may decrease reproduction by filling interstitial spaces within substrates, affecting life stages of a large variety of aquatic macroinvertebrates, which in turn would reduce the food source available to resident trout. Sedimentation may lower the levels of dissolved oxygen, which can have a drastic affect on aquatic macroinvertebrates such as mayflies, stoneflies and water pennies.	Initially additional road crossings and road use may decrease population numbers and habitat condition for aquatic macroinvertebrates, in turn negatively impacting resident trout. Sedimentation may prolong turbidity and cause increased silt levels, smothering aquatic macroinvertebrates, covering resident fish spawning areas and reducing photosynthetic rates. With the most road crossings, Alternative C would create more impacts than Alternatives F and G. Alternatives D and E would not create any new road crossings and would have the least impact on sedimentation. With mitigation measures such as establishing streamside management zones and restricting harvest operations to dry, frozen or snow covered conditions, effects to resident trout and aquatic macroinvertebrates under any action alternative would be minimal during harvest activities. Effects to water quality could be expected to increase during the spring runoff and summer thunderstorms in Cañada del Borracho, which ultimately flows into the Rio Vallecitos. During such events, the result would be similar effects to resident trout and aquatic macroinvertebrates as described In Alternative A. Short-term water quality impacts (sedimentation) from increased ground disturbing activities could affect resident trout and aquatic macroinvertebrates for 3 to 5 years. After 5 years, post harvest conditions would improve with road closures and less drainage crossings. Road obliteration, reclamation and fewer drainage crossings would contribute to bringing sedimentation and deposition balances back into the watershed. In the long term, water quality is expected to improve in Cañada del Borracho.				
Would harvesting/cutting or prescribed burning affect the quality and quantity of RESIDENT TROUT or AQUATIC MACROINVERTEBRATE habitat?	Without thinning and prescribed burning within the analysis area, there is an increased risk of catastrophic wildfire. A fire burning at high temperatures and spreading through the crowns of trees in a major portion of the analysis area would drastically increase sedimentation into each subwatershed, eventually affecting Rio Vallecitos. Catastrophic wildfires have recently had significant effects on resident trout and macroinvertebrates throughout northern New Mexico. After the last few	Thinning followed by prescribed burning would alter vegetation conditions, decreasing the chance of a catastrophic wildfire. Prescribed burning under each of these alternatives, except Alternative F, would take more than one year to accomplish. Alternatives C–G would all contribute to reducing the potential for a catastrophic wildfire within the analysis area, thus decreasing the detrimental effects on resident trout and macroinvertebrates that such a fire would create.				

Cause	Alternative A	C	D	E	F	G
	years of continuous drought, the Viveash and Cerro Grande Fires caused massive fish and aquatic macroinvertebrate die offs in a number of drainages, extending for several miles outside burn perimeters. A catastrophic fire would affect riparian vegetation, water quality, stream width and depth, stream gradient, water chemistry, dissolved oxygen, pH levels and every other aspect that aquatic macroinvertebrates and resident trout depend upon throughout each life stage.					
Are there other activities (past, present and future), in conjunction with proposed activities that would change RESIDENT TROUT OR AQUATIC MACROINVERTEBRATES affected environment relative to water quality? If so, how and to what extent?	Cumulative effects include those from past, present and reasonably foreseeable activities producing sediment into Cañada del Borracho and Rio Vallecitos and affecting resident trout and aquatic macroinvertebrates. Under Alternative A, continual deposition in all the drainages, including Cañada del Borracho, would impact water quality in Rio Vallecitos. These effects would alter the production of both resident trout and aquatic macroinvertebrates. Under current continuous use of the existing road system within the analysis area with no road improvements or management actions to improve the balance of erosion and deposition, Cañada del Borracho and Rio Vallecitos would be affected as their ability to provide immediate habitat to both resident trout and macro invertebrates decreases.	In the event of severe drought, fuel buildup and debris accumulation could still fuel a catastrophic, stand replacement wildfire, whether stands have been harvested or not. In the short term, this type of event could remove a substantial amount of vegetation in the riparian influence areas. Without a vegetation buffer, excessive loads of sediment may reach Borracho and other drainages within or adjacent to the analysis area. It is likely that riparian areas within the boundaries of National Forest System lands would quickly reestablish. Impacts from areas of development on private land within the Cañada del Borracho subwatershed and along both sides of the Rio Vallecitos also contribute negative impacts to water quality. Developed areas are likely to take longer to reestablish after a catastrophic, stand replacement wildfire than areas on the national forest.				
Riparian						
Would activities affect the quality and quantity of existing riparian vegetation? If so, would this affect RESIDENT TROUT OR AQUATIC MACROINVERTEBRATES? (Refer to MM #W2 - W6, WL9 - WL10)	No timber harvesting or associated activities would occur in riparian areas under this alternative. There would be no effect on the quality or quantity of existing riparian vegetation.	Riparian habitats would be avoided and protective buffer areas would keep timber harvest activities out of these delicate habitats (see Chapter 2, Mitigation Measures). The integrity of the existing riparian areas would be maintained and continue to provide a buffer to minimize sediment delivery to the stream channel, as well as shade to reduce and stabilize water temperature.				
Are there other activities (past, present and future), in conjunction with proposed activities, that would change RESIDENT	In the event of severe drought, fuel buildup and debris accumulation could still fuel a catastrophic, stand replacement wildfire, whether stands have been harvested or not. In the short term, this type of event would substantially alter vegetation in the riparian influence areas by removing large areas of shade. With water close by, however, riparian areas would quickly revegetate.					

Cause	Alternative A	C	D	E	F	G
TROUT OR AQUATIC MACROINVERTEBRATE affected environment relative to riparian? If so, how and to what extent?						

Resident Trout and Aquatic Macroinvertebrates on the Carson National Forest

Resident trout include all species of salmonids on the Carson, both native and nonnative species. The Forest Plan EIS identifies 400 miles of occupied habitat for both resident trout and aquatic macroinvertebrates. [1, p. 97] The total number of stream miles has not changed since the EIS was prepared. However, the data processing and Geographic Information System abilities have resulted in a refinement of the actual habitat to 444.26 miles.

Rainbow, Brown and Brook Trout

The resident nonnative trout tend to have a wider range of tolerance for habitat conditions than native trout species. Sedimentation of the substrate reducing spawning habitat can result from various activities such as roading, grazing, fire, etc. Habitat quality is also influenced by grazing and dewatering. Overall, most areas of the forest that are occupied by resident trout and may be supplemented by stocking appear to be in good or stable condition.

Rio Grande Cutthroat Trout

The Rio Grande cutthroat trout (RGCT) evolved in areas where it was the only trout species present. It was once widespread in the upper Rio Grande and Canadian River basins of northern New Mexico and south-central Colorado (Sublette et al. 1990). As more people migrated into New Mexico, the RGCT was overharvested. In response to the cutthroat's decline, various nonnative trout species were stocked in the state's rivers, lakes and streams. Since the late 1800s, nonnative trout have been introduced throughout most of the Rio Grande cutthroat's native range in the western United States. Generally, the introduced trout species will out compete the native cutthroat for food and space (Sublette et al. 1990). Rio Grande cutthroat also readily hybridize with other spring spawning trout, such as rainbow trout (*Oncorhynchus mykiss*), and subspecies of cutthroat trout (*O. clarki*), contaminating the genetics of pure RGCT populations (Sublette et al. 1990; NMDGF 1999).

On the Carson National Forest, pure populations of RGCT are mostly limited to the upper reaches of streams that have either manmade or natural barriers (waterfalls or beaver dams) that prevent nonnative trout from upward migration and accessing the system. The distribution of the Rio Grande cutthroat trout has declined to 9 percent of its former range in New Mexico (Duff 1996) and down to 5 to 7 percent of its former range in Carson National Forest waterways (Storch 1996).

Habitat destruction and degradation have impacted most streams occupied by Rio Grande cutthroat trout. Rio Grande cutthroat habitat has been degraded by many activities. Road systems are the primary source of sedimentation in streams on the forest. Although affected streams may still be suitable, they are less than optimal cutthroat habitat. Other factors that reduce habitat quality include domestic livestock grazing, which can destroy overhanging banks and increase sedimentation, and diversions of water for irrigation, which can significantly reduce the amount of water in a stream system. Mining has impacted specific sites. Dewatering and sedimentation are the two most prevalent factors affecting habitat conditions (Duff 1996).

Timber harvest and associated road building have led to the deterioration of RGCT habitat; however timber harvest on national forests has declined appreciably in the last 16 years. From 1986 to 1990 the Carson National Forest averaged 25.5 million board feet per year of timber cutting. From 1991 to 2001 the average was 7.1 million board feet—a decline of 72 percent in volume. Few new roads are built in conjunction with timber harvest, since the existing infrastructure can be used. Any new road construction is usually for moving an existing portion of road out of a sensitive area, such as riparian vegetation along streambanks. Roads are being decommissioned and obliterated each year, reducing their contribution to sedimentation of streams. In the 1990s the Carson National Forest decommissioned 70 to 100 miles of road per year. Since 2000, the forest has decommissioned an average of 50 miles per year. Many of the current pure, stable, and secure populations occur at elevations where timber harvest has not occurred and, therefore, have not been affected.

Livestock grazing practices on public land in New Mexico have significantly improved over the last century. Changing livestock stocking levels and improved management practices have occurred and will continue to follow current management direction. Restoration of riparian areas and maintaining healthy habitat is a priority for the Carson National Forest, as well as the Southwestern Region (USDI 2002, NMDGF 2002).

Aquatic Macroinvertebrates

Railroad logging in the early 1900s was one of the most significant events that affected stream systems on the Carson National Forest. Riparian conditions were seriously impacted by the use of tie staging along the streams. And stream conditions were devastated as they were channelized to float crossties down to the Rio Grande. Over the next several decades, watershed conditions rapidly eroded due to the lack of any herbaceous ground cover on the canyon slopes. By the mid-1900s, the Federal government had gradually acquired lands, once privately owned by logging companies, into the National Forest System. Riparian areas and stream conditions improved as managed grazing systems were established, watershed restoration projects were implemented (which began as early as 1933), roads were closed and obliterated, and logging practices changed.

Today, road systems are the primary source of sedimentation in streams on the forest. Although affected streams may still be suitable, they are less than optimal for aquatic macroinvertebrates that require high water quality. Other factors that reduce habitat quality include domestic livestock grazing, which can destroy overhanging banks and increase sedimentation, and diversions of water for irrigation, which can significantly reduce the amount of water in a stream system. Dewatering and sedimentation are the two most prevalent factors affecting habitat conditions (Duff 1996).

Habitat Condition and Trend

Habitat conditions on the Carson National Forest vary by stream and by location within the stream. Some population distributions and numbers or resident trout are likely limited by sedimentation, stream temperature, low pH and lack of quality pools. Overall, most habitats appear able to support resident trout and diverse communities of aquatic macroinvertebrates. Stream habitat surveys, which are ongoing, will better qualify conditions in specific streams over time.

Population distributions, genetic purity and numbers of Rio Grande cutthroat appear limited by competition and predation from and hybridization with nonnative species. Recent removal and restoration efforts have protected and improved populations although there is still an overall decline in occupancy in historic ranges. Recovery of these habitats can be slow, but the continued commitment to manage and restore watersheds will improve Rio Grande cutthroat trout habitat over time. Physical habitat conditions and habitat trend for Rio Grande cutthroat trout is stable. Since implementation of the Carson Forest Plan, the physical condition of aquatic habitat in most areas of the forest appears to be stable or improved.

The Carson Forest-wide Management Indicator Species Assessment and habitat trend analysis has determined that quality resident trout and aquatic macroinvertebrate habitat on the Carson National Forest is stable and improved since the Forest Plan was implemented (1986). With proposed mitigation measures in place, implementing any of the action alternatives would still maintain this habitat trend across the Carson National Forest.

Population Trend and Viability

Rainbow, Brown and Brook Trout

The rainbow trout is the most widely cultured and stocked trout in North America. The rainbow and, to a lesser degree, the brown trout have been stocked historically and currently in northern New Mexico. The occurrence of whirling disease in hatcheries has significantly reduced the current stocking levels. A number of stocked fish do survive in the stream habitats to become

resident trout. Hybridization and competition from natives are not significant factors with these species since over time they will outcompete and dominate the native species. Restoration activities for natives have been relatively small in scale, but could become a factor on nonnative populations as the extent of restorations increase.

Population surveys have not been done over enough time to indicate trend. As survey data is accumulated, trend will be estimated. The rainbow trout occurs across the majority of the United States and Canada. The NatureServe database (www.natureserve.org/explorer) documents that throughout its range, rainbow trout is listed as "G5" (i.e., globally secure and common, widespread and abundant). Reasons given for the G5 ranking are its large range and that it is common in many areas and there is no evidence of large-scale declines. It is not vulnerable in most of its range. Species with this rank typically occur in more than 100 localities, and there are more than 10,000 individuals. Within the United States, the rainbow trout is listed as "N5" (i.e., secure and common, widespread and abundant). In New Mexico, the rainbow trout is listed as "SE" (i.e., apparently secure—exotic in the state/province).

The brown trout is an exotic species that now occurs in 46 of the lower 48 states being absent in several states in the extreme south and also has a global rank of "G5" and a state rank of "SE."

The brook trout is an uncommon in New Mexico and is an exotic in the western United States. It is native to the eastern United States and Canada and is ranked "G5." It also has a state rank of "SE."

Rio Grande Cutthroat Trout

The NatureServe database (www.natureserve.org/explorer) documents that throughout its range, the Rio Grande cutthroat trout is listed as "G4," which means it is uncommon but not rare (although it may be rare in parts of its range, particularly on the periphery), and usually widespread. Apparently the species is not vulnerable in most of its range, but possibly cause for long-term concern. Typically more than 100 occurrences and more than 10,000 individuals exist in its range. The RGCT is ranked "T3." Reasons given for this ranking are: (1) its small range in the Rio Grande drainage of Colorado and New Mexico; (2) there are approximately 200 extant populations; (3) it has favorable protection and management in place; and (4) it is secure and likely to improve in status with active management.

The Carson National Forest is cooperating with the New Mexico Department of Game and Fish to restore and protect cutthroat populations (NMDGF 1999). There are approximately 57 tributaries on the Carson National Forest that contain RGCT populations. These streams are systematically being checked for purity of genetics. Approximately 30 streams or tributaries have Class A or B populations—the highest ratings for genetic purity. Although several pure populations of RGCT do have brown or brook trout coexisting in the same reach, the brown or brook trout will generally out compete the cutthroat and eventually eliminate a cutthroat population in a stream system. Bag limits of RGCT have also been reduced over the last decade and many fishermen are now practicing catch and release. They are also encouraged via trout clubs and other fisherman to release cuts and keep browns in RGCT waters.

A number of the streams or tributaries with suitable barriers have had the nonnatives removed. During the past several years approximately 15 miles of RGCT streams have been restored or improved by removal of nonnative species and either construction or improvement migration barriers. In addition, barriers were constructed in the past on streams with mixed populations of native and nonnative species. These native populations are currently being maintained by mechanically removing the nonnatives from above the barrier locations. This is necessary to maintain populations until a complete restoration is done.

Table 39c. Pure and Stable RGCT Populations on Carson NF

Stream	Ranger District
El Rito Creek	El Rito
Bitter Creek	Questa
Columbine Creek	Questa
San Cristobal Creek	Questa
Powderhouse Creek	Questa
Policarpio Creek	Camino Real

Most occupied habitat is in upper stream reaches, which generally have less impact from management activities. However, these streams are smaller in size and flow, resulting in a smaller area of habitat. Historic habitat in lower stream reaches is more impacted. Since implementation of the Forest Plan, forest-wide road closure activities and increased focus on riparian management, many areas appear to be stabilizing.

There are 13 confirmed pure populations (6 on the Carson NF) of RGCT with populations over 2,500 fish, that are secured by barriers and do not have nonnative competitors (Table 39c). Specific threats discussed in detail above do not indicate that the 13 core populations are threatened by any of the identified threats alone or in combination (USDI 2002). The USFWS finds that these populations are likely to persist into the future because of the large numbers of individuals within these populations and the threats are adequately addressed by the ongoing management actions of State and Federal agencies to remove nonnatives (brook and brown trout), test for genetic purity, conduct stream surveys, maintain barriers, conduct public education and outreach, and test for whirling disease. Rio Grande cutthroat trout populations on the Carson National Forest are considered static.

There are 120 miles of drainage within the Agua/Caballos analysis area of which the majority are intermittent or ephemeral streams. Borracho, Madera and Agua are subwatersheds and are within the Agua/Caballos analysis area. There are no known populations of Rio Grande cutthroat trout in any of these subwatersheds of the Rio Vallecitos. The Rio Grande cutthroat does not exist in any of the waters (streams) of the Agua/Caballos analysis area. The headwaters of El Rito Creek are the only known locations on the El Rito Ranger District where pure strain populations of Rio Grande cutthroat are known.

The headwaters of the Rio Vallecitos flow through the “T” Bone Ranch on the Tres Piedras Ranger District and may contain populations of Rio Grande cutthroat trout, although it is unknown as to whether they are pure strains. In 1982, a meristic grade of “A” was give to Rio Grande cutthroat trout found downstream of the analysis area in Jaroso Creek. A meristic grade denotes an assessment of purity based on phenotypic assessment characters. Jaroso Creek is not located within the analysis area, nor is it on the Carson National Forest.

Most occupied habitat is in upper stream reaches that generally have less impact from management activities. However, these streams are smaller in size and flow, resulting in a smaller area of habitat. Historic habitat in lower stream reaches is more impacted. Since implementation of the Forest Plan, forest-wide road closure activities and increased focus on riparian management, many areas appear to be stabilizing. Population and genetic surveys have not been conducted over enough time and stream miles to conclude a trend in population and viability.

By implementing the proposed mitigation measures (MM #W1-W7) and best possible management practices (BMPs) and through other protective measures made in this analysis, fish habitats in and adjacent to the Agua/Caballos analysis area would not be negatively impacted. Some watershed problems do exist in the area and need correction, but they are not associated with the

Agua/Caballos proposed actions. These improvement efforts would be pursued under a separate analysis and strategy.

Aquatic Macroinvertebrates

Macroinvertebrate communities are used to display changes from management activities or natural effects and can decline or recover quickly or in the long term, depending on the type and duration of the impact. Overall, diverse communities of aquatic macroinvertebrates are represented forest-wide, and are considered stable unless an influence or significant event affects a local or given reach of stream. However, most populations can quickly recover.

Aquatic macroinvertebrate surveys and analysis have been conducted on several streams within the forest. Representative streams and sample points within those systems have been selected for aquatic macroinvertebrate sampling. Initial baseline data was collected in 1982. Additional points were included and monitoring samples collected annually between 1997 and 2001.

Because of the volatile fluctuations that can occur in most aquatic macroinvertebrate populations, trends by numbers are of little value unless long-term studies show persistent changes. Persistent absences or declines or in some cases appearances of certain benthic organisms may also indicate a change in aquatic health. Population trends for aquatic macroinvertebrates on the Carson National Forest appear to be stable, although additional time is necessary to determine a more reliable indication of trend.

Summary

Taking into account the condition and trend of resident trout and aquatic macroinvertebrate habitat on the forest, existing data and continued inventory and monitoring of these indicator species, the Carson National Forest is sustaining viable populations of resident trout and aquatic macroinvertebrates. With mitigation measures to protect riparian vegetation, implementation of timber harvesting, prescribed burning, thinning, aspen regeneration, meadow maintenance and road closures in the Agua/Caballos analysis area should improve aquatic habitat in the long-term. Subsequently, forest activities proposed under any of the action alternatives would have no effect on the viability of resident trout or aquatic macroinvertebrate populations on the Carson National Forest.

The following pages
replace pages 214-217
(Migratory Birds)
in the
Final Environmental Impact Statement
for the
Agua/Caballos Proposed Projects

Migratory Birds

Partners in Flight (PIF) identifies physiographic areas and high priority migratory bird species by broad habitat types. They also developed a list of priority breeding bird species by habitat type. The Agua/Caballos Proposed Projects FEIS used information from the PIF Web site (partnersinflight.org) for the migratory bird analysis. Table 40 in the FEIS summarized the effects of the proposed projects on 9 PIF high priority species with associated habitat type within the Aqua/Caballos analysis area.

In February 2003, the U.S. Fish and Wildlife Service released its Birds of Conservation Concern 2002 report (USDI 2002). Table 40a includes all species listed in the Birds of Conservation Concern Report for the Southern Rockies/Colorado Plateau Bird Conservation Region and the priority species identified by Partners In Flight (*partnersinflight.org*) with associated habitat types within the Agua/Caballos analysis area. Table 40b lists the species evaluated in the Agua/Caballos analysis, as well as those species on the Fish and Wildlife Service list that are not analyzed because they do not have habitat within the analysis area.

Table 40a. Birds of Conservation Concern and Priority Species with Potential Habitat in the Analysis Area

Species	FWs List[1]	Habitat	SF	MC	PP	PJ
Migratory Birds With Potential Habitat Within Analysis Area						
*Goshawk, Northern				HP	HP	
*Grouse, Blue		open coniferous, mixes woodland	HP			
*Owl, Boreal		dense spruce-fir forests	HP			
*Owl, Mexican Spotted				HP	HP	
*Sapsucker, Williamson's	x			HP	P	
*Flycatcher, Olive-sided				HP		
*Flycatcher, Dusky				HP		
*Owl, Flammulated	x			P	HP	
*Warbler, Virginia's	x				HP	P
*Warbler, Grace's	x				HP	
**Woodpecker, Lewis's	x	middle elevation riparian			P	
*Flycatcher, Gray						HP
*Vireo, Gray	x					HP
*Warbler, Black-throated Gray	x					HP
**Hawk, Ferruginous	x	piñon-juniper woodlands				HP
**Jay, Piñon	x					HR

[1] Source: Birds of Conservation Concern Report (2003) – Table 16. Southern Rockies/Colorado Plateau (BCR 16) List.

FWS Listed or Partners In Flight Priority Species With No Potential Habitat Within Analysis Area

Cuckoo, Yellow-billed	x	woods, orchards, streamside willow and alder				
Eagle, Golden	x	open mountains, foothills, canyons, plains				
Falcon, Peregrine	x	open wetlands near cliffs				
Falcon, Prairie	x	canyons, open mountains, plains, prairies, deserts				
Godwit, Marbled	x	Northern Great Plains				
Grouse, Gunnison Sage	x	sagebrush, foothills, plains				
Harrier, Northern	x	open grasslands, marshes				
Hawk, Swainson's	x	dry open plains, prairies				
Longspur, Chestnut-collared	x	moist upland prairie				
Owl, Burrowing	x	Great Basin desert shrub, open country				
Owl, Short-eared	x	open country, marches, tundra				
Pewee, Greater		mountain pine-oak woodlands (AZ, SW edge of NM)			---	
Phalarope, Wilson's	x	wet meadows				
Pipit, Sprague's	x	grassy fields (southern NM)				
Plover, Mountain	x	dry upland prairies, plains, semidesert				
Plover, Snowy	x	barren sandy beaches, and flats				
Sandpiper, Solitary	x	migrates through NM				
Sparrow, Sage	x	sagebrush, open arid desert				
Swift, Black	x	high elevation riparian, cliffs, waterfalls				
Thrasher, Bendire's	x	open grasslands, brushy desert (west NM)				---
Thrasher, Crissal	x	montane shrub (southern NM)				
Warbler, Olive		high mountains (SW NM, Gila NF and SE AZ)			---	
Warbler, Red-faced		high mountains (southwestern NM only, Gila NF)		---		

* In 2002 FEIS, Chapter 3, *Wildlife*. No further analysis is included in this document.

**Not in 2002 FEIS. Are included in this document.

HP – Highest Priority P – Priority HR – High Responsibility	SF – Spruce-fir MC – Mixed conifer	PP – Ponderosa pine PJ – Piñon-juniper

Table 40b. Effects of Activities on Migratory Birds and Their Habitat Types

PIF High Priority and/or FWS Identified Species	Important Habitat Features and Life History Considerations	Effects
	Mixed Conifer Habitat Type	
Williamson's Sapsucker	• Specializes in sap and phloem; breeders switch to a diet of ants during the nestling season, especially carpenter and wood ants. • Wounded or scarred live conifers most frequently used for feeding. • Availability of suitable nesting sites critical component, preferring snags or cavities in live aspen, aspen snags are preferred over conifer snags. • Prefers conifers infected with the fungus *Fomes igniarius*, or aspens with heart rot. • Prefers drainage bottoms to ridgetops.	• Small group selections ([4 acres) in the mixed conifer would promote aspen regeneration. • Some positive effects are expected through aspen harvest, but aspen regeneration is expected to become more and more important to the population viability of such species. • Mitigation measures generally protect drainage bottoms, which provide protection for preferred habitats but can have long-term effects by not regenerating aspen in these sites.
Olive-sided Flycatcher	• Nests in coniferous trees generally far out from the trunk. • Needs forest edges for foraging and increases in density with a decrease in canopy cover. • Needs snags or tree tops near open areas or above canopy as diet consists mainly of larger flying insects, primarily bees.	• Management objectives such as small patch cuts are consistent with improving habitat conditions for this species. • Mitigation measures protect special features such as snags.
Dusky Flycatcher	• Uses mixed conifer or ponderosa pine forest with a shrubby understory, brushy areas and open areas with scattered trees such as early succession habitat following a disturbance such as fire. • Shrub component appears to be critical in New Mexico. • Tends to choose shrubs with denser foliage for nesting. Nests built from 3-16 feet. • Openings near shrubs needed for foraging.	• Management objectives such as small patch cuts and prescribed burning are consistent with improving habitat conditions for this species.

PIF High Priority and/or FWS Identified Species	Important Habitat Features and Life History Considerations	Effects
	Ponderosa Pine Habitat Type	
Flammulated Owl	• Secondary cavity nester. • Most closely associated with open ponderosa pine forest, but may use Douglas-fir, white fir, blue spruce, aspen or larger shrub oaks, piñon-juniper canyons and clearings. • Nest holes are mostly made by flickers or sapsuckers • Almost exclusively insectivorous. • U.S. populations are highly migratory. • Locally found in virtually every habitat type and range of conditions and is the most often encountered owl detected during surveys.	• Short-term effects are minor as the greatest percentage of ponderosa pine habitat treated (Alt. C) would only be less than 15 percent of total acres within the analysis area. • Mitigation measures protect snags and snag recruitment trees. • Overall objectives provide for improved diversity and foraging potential.
Virginia's Warbler	• Mostly ponderosa pine forest: always open with well-developed herbaceous or dense woody understory is a special requirement • Nesting area nests are built on the ground, in a depression or at base of a shrub, concealed by dead leaves or overhanging foliage or grasses, but especially Gambel oak • Percentage of dead trees is negatively correlated with nesting area.	• Short-term effects are minor as the greatest percentage of ponderosa pine habitat treated (Alt. C) would only be less than 15 percent of total acres within the analysis area. • Prescribed burning would temporarily reduce understory, but would rapidly rejuvenate nesting conditions. • Overall objectives provide for improved open stand diversity and nesting potential. • Thinning would reduce potential for small dead trees due to competition mortality.
Grace's Warbler	• Ponderosa pine forest: sometimes with a scrub oak component, considered a mature pine obligate; preference given to robust, mature or old growth forest. • Feeds in the upper portions of robust pines on branches, nests found in trees from 20-60 ft. (6-18m) above the ground	• Short-term effects may result from removal of some taller trees but mitigation measures and old growth allocation would protect old growth habitats where general habitat requirements are found. • Proposed activity objectives

PIF High Priority and/or FWS Identified Species	Important Habitat Features and Life History Considerations	Effects
	• Over time and a large landscape, an optimal goal is: o 45-60 percent mature ponderosa pine savanna o 15-25 percent open meadow o 25-35 percent uneven-aged ponderosa pine o and other trees, with an oak understory 5-10 percent aspen forest	would promote desired habitat conditions of mature pine forest. • Harvest and thinning objectives are consistent with PIF management recommendations. • Treatment acres are not enough to reach desired landscape goals.
Lewis' Woodpecker	• Favors open forests and is closely associated with old-growth ponderosa pine and mature riparian cottonwood forests. • Populations are thought to have widely declined with logging of ponderosa pine, loss of the open park-like quality of mature ponderosa pine to fire suppression and subsequent forest succession, and loss and degradation of cottonwood riparian habitats. • Populations can be locally erratic and transitory, moving with the abundance and availability of insects and mast fruits, although individuals may return to same nest site in consecutive years. • Breeds in cottonwood riparian forest, a severely threatened habitat. • Unlike other woodpeckers, feeds by flycatching or gleaning, so an abundance of flying insects and the availability of perches with an open canopy or next to open areas are important habitat characteristics. • Large, soft snags are critical for nest cavities.	• Management Requirements: Maintaining open, park-like stands of ponderosa pine forest and cottonwood forests, with snags, mature trees, shrubby understory, and a productive insect fauna would benefit the species. • Habitat degradation and fragmentation that results in the loss of mature ponderosa pine, oaks or riparian cottonwood is detrimental. However, land management activities that create openings and edges for foraging could be beneficial. The group selections proposed in the action alternatives would benefit the Lewis' woodpecker. Allocation of old growth would ensure the maintenance of snags and large ponderosas. • Lewis's woodpecker Is closely associated with post-fire habitats and fire-maintained open-canopy stands of ponderosa pine. Prescribed burning following vegetation treatments, especially thinning would improve habitat for the woodpecker.

PIF High Priority and/or FWS Identified Species	Important Habitat Features and Life History Considerations	Effects
	Piñon-Juniper Habitat Type	
Gray Flycatcher	• Prefers open piñon-juniper forest, often with interspersed ponderosa pine. • Shrub cover cannot be too dense; prefers approximately 60 percent. • Logging and fire may create new habitat after several years.	• No short-term effects. However, few specific management objectives in any alternatives are designed to improve much of this habitat type. • Some treatments for ponderosa pine along with prescribed burning and firewood harvest would be adjacent to piñon-juniper habitats that could improve conditions for this species. • Most shrub densities are not meeting desired conditions.
Gray Vireo	• Analysis area may or may not be within the distribution area of this species. Often found in clusters, with other areas of apparently good habitat unoccupied. • Prefers open piñon-juniper woodland or juniper savanna with a shrub component (35-45 percent cover). • In northwest New Mexico, found in broad-bottomed, flat or gently sloped canyons, in areas with rock outcroppings on near ridgetops. • Antelope brittlebrush, mountain mahogany, Utah serviceberry and big sagebrush are shrubs found in northwest areas, with large amounts of bare ground between herbaceous plants forming ground cover. • Feeds on the ground and up to16 feet. • No water required.	• No short-term effects. However, few specific management objectives are designed to improve much of this habitat type. • Some treatments for ponderosa pine along with prescribed burning would be adjacent to piñon-juniper habitats that could improve conditions for this species.
Black-throated Gray Warbler	• Prefers large stands of piñon-dominated woodland. • Often found in dense forests with a canopy. • Understory can be variable. • Uses edges: tree/shrub or tree/grass.	• No short-term effects. However, few specific management objectives are designed to improve much of this habitat type. • Some treatments for ponderosa pine along with prescribed burning would

PIF High Priority and/or FWS Identified Species	Important Habitat Features and Life History Considerations	Effects
	• Current breeding bird survey trends for the western U.S. region show this species increasing slightly.	be adjacent to piñon-juniper habitats, which could improve conditions for this species.
Piñon Jay	• Needs large stands of large trees over extensive areas: need to move from crop to crop, as pine nut production is sporadic. • Pine seed availability is the primary factor in breeding site selection. • Nests in dense, mature stands of piñon-juniper. • Up to 8 miles (13km) daily range. • Loose, colonial and early breeder.	• Although widely distributed and relatively abundant on the Carson NF, piñon jay populations in the U.S. are in sharp, consistent, long-term decline (~50 percent since 1966), with little indication that populations are stabilizing (USDI 2002). • Piñon jays are highly dependent on nut crops from piñon pines. The considerable mortality of piñons across the forest is likely to significantly effect local piñon jay populations over the next decade. However, the activities proposed for the Agua/Caballos analysis area would neither impact piñons nor piñon jays.
Ferruginous Hawk	• Needs close proximity to high quality grasslands or irrigated agricultural lands in NM. • Prefers forest edge or mature, isolated, flat-topped junipers, with thick support branches for nests in NM. • In NW New Mexico, often nests on rock spires. • In eastern New Mexico, often uses old homestead trees, may nest on the ground. • Highly sensitive to human disturbance. • Prey mainly small to medium-sized mammals in NM.	• No short-term effects. However, few specific management objectives are designed to improve much of this habitat type. • Some treatments for ponderosa pine along with prescribed burning would be adjacent to piñon-juniper habitats, which could improve conditions for this species. • Since no proposed activities would occur in the PJ, open grassland between trees without a shrub layer would be maintained. Small isolated junipers would not be removed.

The boreal owl and the blue grouse are listed as priority species for the **spruce-fir** habitat type. These two species have been addressed in previous sections. In addition, no activities are proposed in the spruce-fir habitat type of the Agua/Caballos analysis area.

Forest Monitoring

In 2003, Rocky Mountain Bird Observatory, in cooperation with Carson National Forest, implemented the first year of a habitat-based, bird monitoring program designed to provide population trend data on most diurnal, regularly occurring breeding bird species in this part of the southern Rocky Mountain region. [358] This program is modeled after "Monitoring Colorado's Birds" (Leukering et al. 2002) and is consistent with goals emphasized in the "Partners in Flight National Landbird Monitoring Strategy" (Bart et al. 2001). In addition to monitoring bird populations, the program will generate a wealth of information useful in managing bird populations (e.g., habitat associations and spatial distribution). This report details the findings from the first year of what is intended to be a long-term, cooperative effort to monitor bird populations on the Carson National Forest. The second year of monitoring has been initiated.

All of the nonraptor species identified in the Fish and Wildlife Service 2002 report with habitat potential within the analysis area (Table 40b) were detected during the 2003 avian monitoring on the Carson National Forest. A total of 55 transects of 15 point counts each were conducted in 9 habitats, which detected 112 species. Four additional riparian transects were added to the random selection. Excellent data was gathered on 40 species for which density estimates can be made, 16 of which had priority scores by the New Mexico Working Group of Partners in Flight. The dusky flycatcher was the only species that was detected numerous times in other habitats (PP, PJ, AS, SF) but not in the high priority habitat (MC) identified by FWS. Additional years of data will be needed to determine trends as well as densities for other species on the forest.

A – Project Record Index

This index replaces Appendix A (pp. 271-280) of the FEIS.

Vol	No	Date	Document	Author	Received By
1	1	86.10.31	Carson LRMP FEIS	USDA, Forest Service	Found at any Carson NF office
1	2	86.10.31	Carson LRMP ROD	USDA, Forest Service	Found at any Carson NF office
1	3	86.10.31	Carson Forest Plan	USDA, Forest Service	Found at any Carson NF office
1	4	87.08.00	Terrestrial Ecosystems Survey of the Carson NF	USDA, Forest Service	Found at any Carson NF office
1	5	89.00.00	Landscape character types of the national forests	USDA, Forest Service	Found at Carson SO, Taos
1	6	89.10.18	Decision notice and EA/Valle Grande Timber Sale	USDA, Forest Service, Carson NF	Interested Public
1	7	90.03.29	Decision notice and EA/Borracho and Bolo Timber Sales	USDA, Forest Service, Carson NF	Interested Public
1	8	90.04.26	FP direction as related to proposed A/C timber sale	NA	Project File
1	9	91.10.00	Map: Compartment, stand and diversity unit boundaries SUPERCEDED by GIS generated map, doc #220.	Zone Silviculturalist	Project File
1	10	92.00.00	Stand exam data (1980-92)	Zone Silviculturalist	Found at El Rito District Office
1	11	92.02.09	Overlays: OG allocation by alt. (AutoCad 94.08.01) SUPERCEDED by new OG allocations according to 1996 Southwestern Region ROD for Amendment of Forest, doc #214.	Zone Silviculturalist	Project File
1	12	92.07.00	Record of Decision and EIS/Felipito Timber Sale	USDA, Forest Service, Carson NF	Found at Carson SO, Taos
1	13	92.07.28	ID Team field trip notes	NA	Project File
1	14	92.08.00	Map: Vegetative cover type (AutoCad 94.05) SUPERCEDED by doc #214.	Forest Technician	Project File
1	15	92.08.00	Overlay: Timber suitability SUPERCEDED by GIS generated map, doc #209 (97.03.27).	NA	Project File
1	16	92.08.00	Map: Existing condition of OG (AutoCad 94.07.15) SUPERCEDED by GIS generated map, doc #214.	Zone Silviculturalist	Project File
1	17	92.08.24	List of TE&S species	USFWS, State Supervisor	USFS, District Ranger
1	17A	92.09.00	Management recommendations for the northern goshawk in the southwestern US	USDA Forest Service, Rocky Mountain Research Station	Found at any Forest Service office in Arizona New Mexico
1	18	92.09.28	Phone call w/concerned citizen, range concerns	USFS, District Ranger	Project File

Vol	No	Date	Document	Author	Received By
1	19	92.09.30	Phone call w/concerned citizen, water developments	USFS, District Ranger	Project File
1	20	92.10.15	Phone call w/NMG&F	Asst. District Wildlife Biologist	Project File
1	21	92.11.00	Intensive stand reconnaissance field notes	Zone Silviculturalist	Project File
1	22	92.11.04	Initial request for affected environment/scoping	USFS, District Ranger	SO and El Rito District Staff
1	23	92.11.04	Phone call w/NMG&F, questions on big game	Asst. District Wildlife Biologist	Project File
1	24	92.11.05	Letter concerning info on A/C process	USFS, District Ranger	NM Game & Fish
1	25	92.11.12	Map: Historical and present wildlife use areas	District Wildlife Biologist	Project File
1	26	92.11.13	Phone call w/NMG&F, questions on big game	Asst. District Wildlife Biologist	Project File
1	27	92.11.13	Phone call w/NMG&F, ferruginous owl	Asst. District Wildlife Biologist	Project File
1	28	92.11.13	Wildlife - affected environment SUPERCEDED BY doc. #314	Asst. District Wildlife Biologist	Project File
1	28A	92.11.13	Map: Existing snag density evaluation	Assist. District Wildlife Biologist	Project File
1	29	92.12.01	Map: Estimated needs for cultural surveys UPDATED by GIS generated map, doc #196A.	Zone Silviculturalist	Project File
1	30	92.12.17	A/C scoping mtg agenda, role definition	El Rito Ranger District	Project File
1	31	92.12.18	News release, Notice of Intent	El Rito Ranger District	RG Sun, New Mex, Taos News
1	32	92.12.18	Announcement of Notice of Intent	Forest Supervisor	Federal Register
1	33	92.12.18	News release on project initiation	Forest Public Affairs Officer	Rio Grande Sun and Taos News
1	34	92.12.24	Article on project initiation	Taos News	Public
1	35	92.12.24	Article on project initiation	Rio Grande Sun	Public
1	36	93.01.08	Letter requesting to be on mailing list	Concerned citizen	USFS, District Ranger
1	37	93.01.14	Letter on guidelines for community forestry	Public Forestry Foundation	USFS, District Ranger
1	38	93.01.15	Letter concerning elk calving closures	Duke City Lumber	USFS, District Ranger
1	39	93.01.19	Phone call w/concerned citizen, local unemployment	USFS, District Ranger	Project File
1	40	93.01.20	Phone call w/concerned citizen, silvicultural Rx's	USFS, District Ranger	Project File
1	41	93.01.20	Letter concerning freeze on logging on Carson	Forest Trust	Rio Grande Sun, editor
1	42	93.01.25	Petition	Employees of Duke City Lumber Co	US Forest Service
1	43	93.01.27	Letter response to NOI in Federal Register	USFWS, State Supervisor	USFS, District Ranger

Vol	No	Date	Document	Author	Received By
1	44	93.01.28	Public Participation Plan for A/C	IDT Leader	Project File
1	45	93.02.10	Letter response to NOI in Federal Register	National Park Service	USFS, District Ranger
1	46	93.02.23	Cultural resources analysis for A/C	District Archeologist	Project File
1	47	93.05.00	Wildlife, DFC notes	District Wildlife Biologist	Project File
1	47A	93.05.00	Review of US Forest Service Strategy for Managing Northern Goshawk Habitat in the Southwestern US	Arizona Game & fish Department	
1	48	93.05.17	IDT Meeting Notes: needs for effects analysis	IDT Leader	Project File
1	49	93.05.19	Letter	Carson Watch	USFS, District Ranger
1	50	93.05.21	IDT meeting notes, DFC	IDT Leader	Project File/ID Team
1	51	93.05.21	Timber sales, past and planned (map) SUPERSEDED by doc #249 p. III-3.	District Forester	Project File
1	52	93.05.26	Final request for affected environment/scoping	District Ranger	SO/El Rito Staff and Specialists
1	53	93.06.00	Past fire locations/El Rito Ranger District and DC UPDATED by doc #243.	District Fire Management Officer	Project File
1	54	93.06.00	Vegetation, DFC	Zone Silviculturalist	Project File
1	55	93.06.01	Transportation system analysis SUPERCEDED by doc #219, 228 and 318.	Forest Engineering Technician	Project File
1	56	93.06.01	Overlay: Existing roads SUPERCEDED by doc #247.	Forest Engineering Technician	Project File
1	57	93.06.03	Mitigation measures for roads	Forest Engineering Technician	IDT Leader
1	58	93.06.03	Letter to Bill Richardson, concerns over VFSYU	La Compania Ocha Inc.	Rio Grande Sun
1	59	93.06.03	DFC statements, draft	ID Team	Project File
1	60	93.06.03	Fire, affected environment and DFC	District Fire Management Officer	Project File
1	61	93.06.04	Letter announcing field trips with public	USFS, District Ranger	Mailing List
1	62	93.06.07	Letter in response to 93.06.04 DFC letter	Concerned Citizen	USFS, District Ranger
1	63	93.06.07	VFSYU Timber Resource Inventory	Carson National Forest specialists	
1	64	93.06.09	Letter in response to 93.06.04 DFC letter	Carson Forest Watch	USFS, District Ranger
1	65	93.06.10	Letter in response to 93.05.19 letter	Regional Forester	Carson Forest Watch
1	66	93.06.10	Article concerning VFSYU	Rio Grande Sun	Public
1	67	93.06.10	Article announcing field trips in A/C analysis area	Rio Grande Sun	Public

Vol	No	Date	Document	Author	Received By
1	68	93.06.14	Request for information	Concerned Citizen	USFS, District Ranger
1	69	93.06.14	Article on VFSYU, timber sales and MSO	New Mexican	Public
1	70	93.06.18	Lands and minerals, affected environment	District Archeologist	Project File
1	71	93.06.18	Social & cultural, affected environment SUPERCEDED by doc #310.	District Archeologist	Project File
1	72	93.06.18	Heritage resources, affected environment SUPERCEDED by doc #238.	District Archeologist	Project File
1	73	93.06.18	Visual resources, affected environment SUPERCEDED by doc #239.	District Archeologist	Project File
1	74	93.06.18	Recreation, affected environment SUPERCEDED by doc #240.	District Archeologist	Project File
1	74A	93.06.22	Ecosystem Reserve Requirements/La Manga	Forest Conservation Council	District Ranger
1	75	93.06.23	Range, affected environment SUPERCEDED by doc #242.	District Range Conservationist	Project File
2	76	93.06.23	Economics, affected environment	District Archeologist	Project File
2	77	93.06.24	Announcement of field trips	Taos News	Public
2	78	93.06.25	Letter	Concerned Citizen	El Rito Ranger District
2	79	93.06.25	Water, affected environment and amendment	Forest Hydrologist, Hydro. Tech.	Project File
2	80	93.06.26	Article on protest by VFSYU loggers	New Mexican	Public
2	81	93.06.30	Field trip notes	IDT Leaders	Project File
2	82	93.07.07	Letter in response to 93.06.04 DFC letter	Concerned Citizen	USFS, District Ranger
2	83	93.07.08	Letter in response to field trip and DFC	Duke City Lumber	USFS, District Ranger
2	84	93.07.14	IDT Meeting Notes: alternative development	IDT Leader	Project File
2	85	93.07.19	VFSYU, status report/briefing paper	Forest Public Affairs Officer	Project File/Public Information
2	86	93.07.22	IDT Meeting Notes: alternative themes SUPERCEDED by doc #216.	District Ranger and IDT Leader	Project File
2	87	93.07.22	Letter in response to alternative themes	USFS, District Ranger	Mailing List
2	88	93.07.22	Letters	Concerned Citizens	Taos News, editor
2	89	93.07.23	Memo concerning “preferred” alternative	IDT Leader	ID Team
2	90	93.07.25	Articles on logging in NM	Albuquerque Journal	Public

Vol	No	Date	Document	Author	Received By
2	91	93.07.25	Article concerning MSO and old growth	Albuquerque Journal	Public
2	92	93.07.27	Field trip notes	IDT Leader	Project File
2	93	93.07.30	Letter concerning alternatives	Carson Forest Watch	District Ranger and IDT Leader
2	94	93.08.00	Regional demand and supply projections for recreation	USDA, Forest Service	
2	95	93.08.04	Letter, concerning water and affected environment	NM Environment Department	USFS, District Ranger
2	96	93.08.09	Letter in response to field trip	Concerned citizen	USFS, District Ranger
2	97	93.08.13	IDT Meeting Notes concerning volumes on A/C	IDT Leader	Project File
2	98	93.08.18	Letter in response to field trip and elk calving	USFS, District Ranger	Anonymous
2	99	93.08.23	Copy of letter responding to 93.07.08 letter	NM Game & Fish	La Compania Ocha Inc.
2	100	93.08.26	Article on VFSYU contract disputes	New Mexican	Public
2	101	93.08.27	Proposed mtg on timber harvest alts	IDT Leader	District Forester
2	102	93.09.00	Integrated Resource Management, SW Region	USDA, Forest Service	
2	103	93.09.20	Phone call w/NMG&F, DFC, alts, field trip	IDT Leader	Project File
2	104	93.10.00	Map: Goshawk inventory areas SUPERCEDED by doc #244.	District Wildlife Biologist	Project File
2	105	93.10.21	Heritage, rec and visual resources, supplement	District Archeologist	Project File
2	106	93.11.01	Map: Mexican spotted owl habitat (AutoCad 94.10.06) SUPERCEDED by doc #222C.	Asst. District Wildlife Biologist	Project File
2	107	93.11.04	DFC statements, final	IDT Leader	Project File
2	108	93.11.08	Issues for A/C	Public field trip comments	Project File
2	109	93.11.19	Opportunities for fire management	District Fire Management Ofiicer	Project File
2	110	93.11.19	Transportation system-issues and opportunities	Forest Engineering Technician	Project File
2	111	93.12.09	Phone call w/Forest Hydro., watershed effects	Zone Silviculturalist	Project File
2	112	94.01.05	Letter concerning 93.12.13 mtg on elk closures	NM Game & Fish	Forest Supervisor
2	113	94.01.12	Note on A/C analysis area	Forest Conservation Council	USFS, District Ranger
2	114	94.02.02	Initial alternative themes SUPERCEDED by doc #202, 207, 208 & 212.	IDT Leader	Project File
2	115	94.02.02	Map: Past old growth allocations (AutoCad 94.07.15)	Zone Silviculturalist	Project File

Vol	No	Date	Document	Author	Received By
2	116	94.02.07	Soils, affected environment w/correction	Forest Hydrologist, Hydro. Tech.	Project File
2	117	94.02.07	Briefing on A/C by El Rito RD to Core Team	Core Team Member	Project File
2	118	94.02.07	Map: TES units w/severe erosion potential SUPERCEDED by doc #209 (97.03.27)	Forest Hydrologist	Project File
2	119	94.02.25	Map: Silvicultural priority treatments SUPERCEDED by doc #233.	Zone Silviculturalist	Project File
2	120	94.03.00	Record of Decision and EIS/La Manga Timber Sale	USDA, Forest Service, Carson NF	Found at Carson SO, Taos
2	121	94.03.01	Presettlement condition papers	Various sources	
2	122	94.03.08	EC and DFC table, draft	Core Team Member	Project File
2	123	94.03.08	Map: Revised stand boundaries SUPERCEDED by doc #220.	Forest Silviculturalist	Project File
2	124	94.03.10	Letter, updated species list	USFWS, State Supervisor	USFS, District Ranger
2	125	94.03.11	Veg. data base summaries/queries(from stand exams) SUPERCEDED by doc #247.	Zone Silviculturalist	Project File
2	126	94.03.17	Opportunities, purpose and need	Core Team Member	Project File
2	127	94.03.23	Purpose and need from DFC statements	Core Team Member	Project File
2	128	94.03.29	Development of key issues	Core Team Member	Project File
2	129	94.04.00	Map: Existing and proposed wildlife waters	District Wildlife Biologist	Project File
2	130	94.04.00	Overlay: Existing VSS distribution SUPERCEDED by doc #247.	Forest Timber Staff	Project File
2	131	94.04.00	Maps: Treated stands by alts. (AutoCad 94.08.01) SUPERCEDED by doc #247.	ID Team	Project File
2	132	94.04.00	Overlays: Roads by alt. (AutoCad 94.08.01) SUPERCEDED by doc #247	Forest Engineering Technician	Project File
2	133	94.04.06	Map: Elk calving areas (AutoCad 95.01.19) SUPERCEDED by doc #213.	District Wildlife Biologist	Project File
2	134	94.04.07	Vegetation, affected environment SUPERCEDED by doc #233.	Zone Silviculturalist	Project File
2	135	94.04.12	Map: Necessary emergency fire access	District Fire Management Officer	Project File
2	136	94.04.14	Approval of key issues and measures approval	Forest Supervisor	Core Team Member
2	136 A	94.04.14	News release on Open House	Core Team	Rio Grande Sun

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2	137	94.04.18	Map: Existing and proposed fuelbreaks	District Fire Management Officer	Project File
2	138	94.04.28	Open house, notification, displays, comments	Core Team Member	Project File
2	139	94.04.28	Article concerning elk closures in VFSYU	Rio Grande Sun	Public
2	140	94.05.03	Approval of final alternatives for DEIS SUPERCEDED by doc #216.	Forest Supervisor	Core Team Member
2	141	94.05.05	Article on A/C	Taos News	Public
2	142	94.05.09	Watershed/roads opportunities	District Wildlife Biologist	Project File
2	143	94.05.16	Letter concerning development of alternatives	Carson Forest Watch	Core Team Member
2	144	94.05.18	Mitigation for the A/C analysis	Core Team Member	Project File
2	145	94.05.26	ID Team field trip notes, preparing for USFWS	Core Team Member	Project File
2	146	94.05.31	Map: Harvest units (by alt) in MSO habitat SUPERCEDED by doc #231A.	Core Team Member	Project File
2	147	94.06.01	Field trip notes w/USFWS, MSO habitat	Core Team Member	Project File
2	148	94.06.08	Mtg notes on effects requests	Core Team Member	Project File
2	149	94.06.14	Road closure analysis	Core Team Member	Project File
2	150	94.06.17	Heritage resources effects report for A/C SUPERCEDED by doc #238.	District Archeologist	Project File
3	151	94.06.17	Map: Historical RR grades	District Archeologist	Project File
3	152	94.06.20	Phone call w/Forest Trust	Core Team Member	Project File
3	153	94.06.22	Recreation effects report for A/C SUPERCEDED by doc #240.	District Archeologist	Project File
3	154	94.07.06	Overlays (4): Wildlife cover (hiding, thermal, forage) SUPERCEDED by doc's #233 & 245.	GIS Coordinator	Project File
3	155	94.07.07	Wild and scenic river eligibility analysis for A/C	Core Team Member	Project File
3	156	94.07.12	Watershed effects report for A/C SUPERCEDED by doc #236.	Forest Hydro. Technician	Project File
3	157	94.07.12	Map: Watershed boundaries (AutoCad 94.11.00)	Forest Hydrologist	Project File
3	158	94.07.12	Soils effects report for A/C SUPERCEDED by doc #236.	Forest Hydro. Technician	Project File
3	159	94.07.20	R03 WILD run for A/C NO LONGER APPLICABLE to new analysis	District Wildlife Biologist	Project File

Vol	No	Date	Document	Author	Received By
3	160	94.07.21	Cost calculations for slash hazard reduction	District Fire Management Officer	Project File
3	161	94.07.25	Range effects report for A/C SUPERCEDED by doc #242.	USFS, District Ranger	Project File
3	162	94.07.25	Map: Existing range improvements	District Ranger	Project File
3	163	94.08.00	Various queries from veg. Data base (May-Aug. 1994) SUPERCEDED by doc #214.	Core Team Member	Project File
3	164	94.08.02	IDT Meeting Notes: Selection of alternative SUPERCEDED by doc #237.	Core Team Member	Project File
3	165	94.08.08	SW Willow Flycatcher habitat assessment	District Wildlife Biologist	Project File
3	166	94.08.15	Letter concerning existing and potential OG in A/C NO LONGER APPLICABLE to new analysis	Forest Supervisor	USFWS, State Supervisor
3	166 A	94.08.15	Vegetation Report SUPERCEDED by doc #233.	Zone Silviculturalist	Project File
3	167	94.08.23	Letter requesting info. on A/C and response	Forest Trust	Forest Supervisor
3	167 A	94.08.30	Briefing paper on VFSYU - La Manga and A/C	Carson Public Affairs Officer	Public
3	168	94.08.31	Notes re: railroad grades and alt. transportation systems	District Archeologist	Core Team Member
3	169	94.08.31	Note re: correspondence with USFWS	District Wildlife Biologist	Project File
3	170	94.09.02	Letter responding to preferred Alternative B	USFWS, State Supervisor	Forest Supervisor
3	171	94.09.19	Changes to alternative transportation systems SUPERCEDED by doc #214.	Forest Engineer	Project File
3	172	94.09.27	Final wildlife affected env. and env. conseq. report SUPERCEDED by doc #245.	District Wildlife Biologist	Project File
3	173	94.10.06	Biological Assessment and Evaluation (new BAE will be developed to address preferred alt. in Final EIS.	District Wildlife Biologist	USFWS, State Supervisor
3	174	94.12.01	Letter which accompanied maps	Core Team Member	Forest Trust
3	175	94.12.05	Doc. that MSO habitat map sent to Forest Trust	Core Team Member	Project File
3	176	94.12.06	"TABLE 3" re: MSO suitable/capable habitat	USFS, District Ranger	USFWS, State Supervisor
3	177	94.12.13	Phone call w/USFWS biologist	Core Team Member	Project File
3	178	95.01.18	Mtg. notes (chapters 1 & 2) of DEIS w/District Ranger	Core Team Member	Project File
3	179	95.01.25	Memo: Cultural Survey Contract	Forest Archeologist	Project File

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3	180	95.02.22	Mtg notes on briefing w/Forest Supervisor and SO Staff	Carson Core Team Member	Project File
3	181	95.03.01	Phone request from Forest Trust for A/C info.	Core Team Member	Project File
3	182	95.03.09	Past, present and reasonably foreseeable future actions	District Forester	Core Team
3	183	95.04.10	News release for A/C DEIS	Carson Public Affairs Officer	Taos News, RG Sun, Journal North
3	184	95.04.12	A/C DEIS: SUPERCEDED by 2/99 DEIS	USDA - Forest Service	Mailing List
3	185	95.04.13	Articles announcing availability of A/C DEIS	Rio Grande Sun and Taos News	
3	186	95.04.19	16 DEIS comment letters (from 4/19-10/16, 1995) and responses	Concerned citizens, special interest groups and Federal, State and local agencies.	Carson Forest Supervisor/ Carson Core Team
3	187	95.04.21	Notice of Availability - A/C DEIS	Federal Register	Public
3	188	95.04.30	Request for information from project record	Carson Forest Watch	Carson Core Team
3	189	95.05.11	Article requesting comments on A/C DEIS	The Taos News	
3	190	95.05.31	Request for copy of A/C DEIS	Colorado State Univ Library	Carson Core Team
4	191	95.06.21	IDT Mtg notes: concerning MSO Recovery Plan and A/C	Carson Core Team	Project File
4	192	95.10.15	Final MSO Recovery Plan	USDI Fish Wildlife Service	Public
4	192 A	96.00.00	Forests Forever!: A plan to restore ecological and economic integrity to the Southwest's national forests and forest dependent communities	Southwest Forest Alliance	
4	192 B	96.01.12	Letter:Duke City withdrawing as ARO on the VFSYU and response (01/30/96)	Duke City Lumber Co.	Chief, USDA Forest Service
4	193	96.01.18	Meeting Notes: A/C planning/procedure	Carson Core Team	Project File
4	193 A	96.03.13	Court Settlement: La Compania vs. USDA Forest Service	US District Court Judge John E. Conway	Plaintiffs and Defendants
4	193 B	96.03.16	Court Settlement: Madera Forest Products Assoc. vs. USDA Forest Service	US District Court Judge John E. Conway	Plaintiffs and Defendants
4	193 C	96.06.05	Record of Decision for Amendment of Forest Plans	USDA Forest Service	Found at any Carson NF office
4	194	96.06.14	Queries/Calculations using Final MSO Recovery Plan	Zone Silviculturalist	Project File
4	195	96.06.20	IDT Meeting Notes: MSO Recovery Plan and A/C	Carson Core Team	Project File

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4	195 A	96.07.03	Overlay: MSO designated threshold stands	Zone Silviculturalist and Wildlife Biologist	Project File
4	195 B	96.07.03	Note: Response to comment letter #4 [186]	Forest Soil Scientist	Zone Silviculturalist
4	195 C	96.07.12	Map: Areas surveyed for heritage resources	District Archeologist	Project File
4	195 D	96.07.13	Letter: Concerns about TES units and harvesting	Forest Trust	Forest Hydrologist
4	196	96.07.30	Letter/scientific research information	Southwest Forest Alliance	Forest Supervisor
4	196 A	96.08.16	Map: Heritage survey needs by alternative	CT member and District Forester	Project File
4	196 B	96.12.09	Overlay: Stands meeting new FP amendment OG definition in A/C analysis area	Zone Silviculturalist	Project File
4	197	96.12.16	Meeting Notes: How to proceed w/new DEIS w/Regional NEPA Coordinator	Carson Core Team	Project File
4	198	96.12.17	Time table for issuing a new A/C Draft EIS	Carson Core Team	Project File
4	198 A	97.01.22	Stipulated Order: Amending settlement agreement w/La Compania (193A)	US District Court Judge John E Conway	Plaintiffs and Defendants
4	199	97.01.29	IDT meeting agenda & notes	ID Team	Project File
4	200	97.01.29	IRM Step 5 Initiation of A/C Proposed actions	District Ranger	Carson Core Team
5	201	97.02.11	IDT Meeting Notes: Issues	Carson Core Team	Project File
5	202	97.02.19	IDT Meeting Notes: Issues, draft alternatives	Carson Core Team	Project File
5	203	97.02.20	Letter: Scoping for A/C new (2nd) draft EIS and mailing list	District Ranger	Public
5	204	97.02.20	Letters (3): Responses to A/C 2/20/98 scoping letter	Public	Project File
5	205	97.02.20	Overlay: OG and threshold stands (new def) and past OG allocations in A/C analysis area	Zone Silviculturalist	Project File
5	206	97.03.00	Overlays (9): Addressing issues	ID Team	Project File
5	207	97.03.17	IDT Meeting Notes: Issues, alternative development	Carson Core Team	Project File
5	207 A	97.03.17	Memo: Including Borracho and Valle Grande areas into A/C analysis	District Ranger	Project File
5	208	97.03.25	IDT Meeting Notes: Issues, alternative development	Carson Core Team	Project File
5	209	97.03.27	Maps (3): Timber suitability, TES, slope (GIS)	Zone Silviculturalist	Project File
5	210	97.04.01	IDT Meeting Notes: Alternatives and mitigation measures	Carson Core Team	Project File
5	211	97.04.07	Meeting notes: Steve Bates, NMDGF	Carson Core Team	Project File

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5	212	97.04.09	IDT Meeting Notes: Issues, alternatives and mitigation measures	Carson Core Team	Project File
5	213	97.04.10	Map: Key elk calving areas (GIS)	District Wildlife Biologist	
5	214	97.04.11	ARC Info/ARC View - developing alts	Carson Core Team	Project File
5	215	97.04.15	Index: Response to request for info on 8mm tape	Carson Core Team	S. Bates, NMDGF
5	216	97.04.11	Approval of final alternatives for 2nd DEIS (w/mtg notes)	Forest Supervisor	Project File
5	217	97.04.21	IDT Meeting Notes and review	Carson Core Team	Project File
5	218	97.04.22	Notice of Intent Agua/Caballos	Federal Register Vol. 62, No. 77	Public
5	218 A	97.05.05	Court Judgment: In favor of defendants (USDA Forest Service) on all plaintiff's claims (Forest Conservation Council) FCC vs. USDA Forest Service	Senior US District Judge	
5	219	97.05.07	IDT Meeting Notes: Comparison of alternatives table	Carson Core Team	Project File
5	219 A	97.05.08	Letter: Notification that MSO critical habitat is dropped from conferencing and consultation.	US Fish & Wildlife Service	Regional Forester
5	220	97.05.29	Map: Compartment and stand (GIS)	Zone Silviculturalist	Project File
5	221	97.06.16	4 DEIS comment letters (from 3/10-6/11, 1997) and responses	Concerned citizens, special interest groups and Federal, State & local agencies.	Carson Forest Supervisor/ Carson Core Team
5	222	97.06.25	IDT Meeting Notes: Alternative comparison	Carson Core Team	Project File
5	222 A	97.06.26	Maps (9): Used in watershed analysis (GIS)	GIS Coordinator	Forest Soil Scientist
5	222 B	97.07.00	General Technical Report RM-FTR-295: An assessment of forest ecosystem health in the southwest	USDA Forest Service Rocky Mountain Forest Range Experiment Station	
5	222 C	97.00.00	MSO surveys: 1992-97 and 1999 followup	District Wildlife Biologist	Project File
5	223	97.07.16	Phone conversation: Ryan Temple, Forest Trust	IDT member	Project File
5	224	97.08.15	Phone conversation: P. Becker, Vallecitos Stables	District Archeologist	Project File
5	225	97.08.28	Inventory standards and accounting forms and addendums 1993-02-081-A thru G: SHPO concurrence w/archy survey strategy and A/C roads cultural clearance	SHPO	Forest Supervisor
6	226	97.09.05	IDT Meeting Notes: Streamside mgmt zones	Carson Core Team	Project File

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6	227	97.09.17	Working paper: A/C cumulative effects	Carson Forest LMP Staff	Project File
6	228	97.12.12	IDT Meeting Notes: Roads issue	Carson Core Team	Project File
6	229	97.12.15	Correction to Carson TES manuscript; Map Unit 175	Forest Soil Scientist	Forest Planner
6	230	98.02.18	Letter: Request to be on mail list, forward comments, FOIA for economic analysis documents	Forest Guardians	Carson FOIA Officer
6	231	98.03.05	Meeting notes: Discussion of alternatives w/USFWS	District Wildlife Biologist	Project File
6	231 A	98.04.00	Notes on alternative development from June 1996 through March 1998.	Zone Silviculturist	Project File
6	232	98.05.08	Memo: Dropping riparian fencing from A/C analysis	District Ranger	ID Team
6	233	98.06.16	Vegetation report SUPERCEDED by doc #312.	Zone Silviculturist	Project File
6	234	98.06.29	Notice of 12-month finding on a petition to list the northern goshawk in the contiguous US, west of the 100th meridian.	USFWS	Federal Fegister (63 FR 35183)
6	234 A	98.07.00	1998-2000 State of NM §303(d) list for assessed river/stream reaches requiring total maximum daily loads (TMDLs): Final ROD for river/stream listings	NM Environmental Department	
6	235	98.07.02	IDT Meeting Notes: Briefing for district ranger on preferred alternative	Core Team Member	
6	236	98.07.10	Soil and water resources effects analysis for A/C SUPERCEDED by doc #311.	Forest Soil Scientist	Project File
6	237	98.07.10	Meeting Notes: Selection of preferred alternative by forest supervisor	Core Team Member	Project File
6	238	98.07.17	Heritage resources effects report SUPERCEDED by doc #284	District Archaeologist	Project File
6	239	98.07.17	Visual effects report	District Archaeologist	Project File
6	240	98.07.23	Recreation effects report SUPERCEDED by doc #315	District Archaeologist	Project File
6	241	98.07.23	Social & cultural effects report SUPERCEDED by doc #310	District Archaeologist	Project File
6	242	98.07.23	Livestock grazing effects report	District Range Conservationist	Project File
6	243	98.07.24	Fire effects report SUPERCEDED by doc #316	District Fire Management Officer	Project File
6	244	98.08.00	Northern goshawk surveys: 1991-1998 and followup surveys in 2000	District Wildlife Biologist	Project File
7	245	98.10.07	Wildlife effects report SUPERCEDED by doc #314	District Wildlife Biologist	Project File

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7	245 A	98.10.21	Letter: Comments on A/C and FS response	Vallecitos Stables, P. Becker	Forest Supervisor
7	246	98.11.00	Schedule of Proposed Actions for the Carson NF	NEPA Coordinator	Mailing List
7	247	98.12.00	ARC Info/ARC View - developing alternatives	Carson Core Team	Project File
7	248	99.01.08	Economics Effects Analysis SUPERCEDED by doc #310.	Forest Planner	Project File
7	249	99.02.08	A/C DEIS – Number Two	USDA - Forest Service	Mailing List
7	250	99.02.19	Notice of Availability - A/C DEIS II	Federal Register	Public
7	251	99.02.23	Schedule of Proposed Actions for the Carson NF	NEPA Coordinator	Mailing List
7	252	99.02.25	Articles announcing availability of A/C DEIS	Rio Grande Sun and Taos News	
7	253	99.02.25	21 DEIS II comment letters nos. 21-42 (from 2/24 to 08/13/1999)	Concerned citizens, special interest groups & Federal, State & local agencies.	Carson Forest Supervisor/ Carson Core Team
7	253 A	80.00.00	Shuster, W.C. 1980. Northern goshawk nest site requirements in the CO Rockies	Brought up in letter #26 [253]	Project File
7	254	99.03.19	Letter: Response to information request	District Ranger	G. Grossman
7	255	99.03.24	Field trip notes: To address concerns Mr. Becker of Vallecitos Stables has with A/C (Becker attended)	District Forester	Project File
7	256	99.04.07	Response: To Forest Trust re: info that was requested	Assistant Forestry Staff	Project File
7	257	99.04.08	Memo: Documentation of phone conversation w/C. Henson, NMGF.	ID Team Member	Project File
7	258	99.04.08	Notes: Documentation of community meeting held by Forest Trust.	District Forester	Project File
7	259	99.04.12	Update: Project mailing list (updated in data base by A. Kuykendall)	District Personnel	Project File
7	260	99.04.14	IDT Meeting Notes: Review of DEIS2 comment letters 4/14-15/99	ID Team Member	Project File
7	261	99.04.23	IDT Meeting Notes: How comments will be addressed in FEIS	ID Team Member	Project File
7	262	99.04.28	IDT Meeting Notes: How comments will be addressed in FEIS	ID Team Member	Project File
7	263	99.05.03	Biological assessment and evaluation (BAE) for the A/C projects, 2/16/2000 and 12/31/03 amendments	District Zone Biologist	USFWS and Project File
7	264	99.05.03	11 letters: Request for comments on A/C DEIS II (2nd mailing)	Forest Supervisor	11 Native American Tribes and Pueblos
7	265	99.05.10	IDT Meeting Notes: How comments will be addressed in FEIS and changes to FEIS	Core Team Member	Project File

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7	266	99.05.11	Letter: Individual's comment on A/C area and FS response	J. Hoekwater	Forest Supervisor
7	267	99.05.26	IDT Meeting Notes: Stands dropped from preferred alternative	ID Team Member/Forest Silviculturalist	Project File
7	268	99.05.27	FOIA (control #1999.024) request for Sierra Club comment letter [252, letter #27] and FS response	Forest Guardians, Bryan Bird	FOIA Coordinator
7	269	99.05.27	DEIS II comment letter (responding to PR #264)	Navajo Nation	District Ranger
7	270	99.05.28	FOIA (control #1999.025) request for all DEIS comment letters [252] and copy of A/C and FS response	SF New Mexican, Ben Neary	District Ranger
7	271	99.06.00	Schedule of Proposed Actions for the Carson NF	NEPA Coordinator	Mailing List
7	272	99.06.00	Article: Community tours proposed Agua/Caballos timber sale in the Vallecitos Federal Sustained Yield Unit.	La Jicarita	
7	273	99.06.01	FOIA (control #1999.026) request for soil and water effects report [236] and FS response	Forest Guardians, Bryan Bird	FOIA Coordinator
7	274	99.06.15	Note: Documentation of copies made from PR upon request by C. Wilmsen.	ID Team Member	Project File
7	275	99.06.15	Letter: Response to BAE (#263).	USFWS, Ecological Services	District Ranger
7	276	99.06.15	6 articles/editorials/letter to ed: Related to A/C, environmentalists, USFWS response to BAE (6/15-29).	SF New Mexican, Albuquerque Journal North	
7	277	99.06.24	Addresses: Update to mailing list.	El Rito Ranger District	Project File
7	278	99.07.01	Meeting: Notes on Espanola mtg. w/La Jicarita, La Madera, FS, Forest Trust, Audubon Society, Quivira Coalition, Madera Forest Community Assoc., Madera Forest Products, Common Ground, UC – Berkeley.	ID Team Member	Project File
7	279	99.07.01	Transportation Report	ID Team	Project File
7	280	99.07.13	Meeting: Notes on deliberation of how to proceed w/new road numbers and public comments. Decision to issue a Supplement to DEIS II w/new road numbers, new significant issue and new alternative.	ID Team Member	Project File
7	281	99.07.14	Memo: Documentation of phone conversation w/D. Sire, R3 NEPA Coordinator.	ID Team Member	Project File
7	282	99.07.15	Memo: Decision to issue supplement and develop new alternative (G).	Forest Supervisor	Project File
7	283	99.07.21	Letter: Response to request for information.	District Ranger	M. Kellog

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7	284	99.07.26	IDT Meeting Notes: Briefing on issuance of Supplement and new alternative (G).	ID Team Member	ID Team
7	285	99.09.23	Heritage resources effects report	District Archaeologist	Project File
7	286	99.10.00	Schedule of Proposed Actions for the Carson NF	NEPA Coordinator	Mailing List
7	287	99.11.12	Field trip notes: Documentation of trip w/Sierra Club, Audubon Society and FS	ID Team Member	Project File
7	288	99.12.08	NFMA Findings: Agua/Caballos silvicultural treatments	Forest Silviculturalist	Project File
7	289	99.12.20	Notice of Intent Agua/Caballos supplement	Federal Register Vol. 64, No 243	Public
8	290	00.01.00	Schedule of Proposed Actions for the Carson NF	NEPA Coordinator	Mailing List
8	291	00.03.06	Data base query of roads to be closed and left open	IDT Member	Project File
8	292	00.03.08	New figures for alternatives and why	Forest Silviculturalist	Project File
8	293	00.04.00	Schedule of Proposed Actions for the Carson NF	NEPA Coordinator	Mailing List
8	294	00.07.00	Schedule of Proposed Actions for the Carson NF	NEPA Coordinator	Mailing List
8	294 A	00.07.21	Proposed Rule: Designation of MSO critical habitat	USFWS	Federal Register (65 FR 45336)
8	295	00.08.04	Supplement to the 1999 DEIS	USDA - Forest Service	Mailing List
8	296	00.08.18	Notice of Availability: Supplement to the 1999 DEIS	Federal Register Vol. 65, No. 161	Public
8	297	00.08.21	Letter: Requesting maps to use in response to Supplement (includes FS response)	Forest Trust	Forest Planner
8	298	00.08.31	Article: "Forest wants public comment of Vallecitos unit projects" (also incl news release faxed media)	The Taos News	
8	299	00.09.12	Announcement: Changing end of comment period from 9/25 to 10/02/00.	USDA – Forest Service	Mailing List (same as PR #295)
8	300	00.09.15	12 Comment letters on the Supplement to the DEIS II nos. 43-55 (from 08/25 to 11/14/2000)	Concerned citizens, special interest groups and Federal, State and local agencies.	Carson Forest Supervisor/ Carson Core Team
8	301	00.09.20	Letter documenting review of A/C Supplement	USDI-Office of Environmental Policy and Compliance	Forest Supervisor
8	302	00.09.27	Letter classifying A/C proposed action as "low impact"	U.S. Environmental Protection Agency	Forest Supervisor
8	303	00.10.00	Schedule of Proposed Actions for the Carson NF	NEPA Coordinator	Mailing List

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8	304	00.10.30	Concurrence on BAE (#263): Cons. #2-22-93-I-125	USFWS	Forest Supervisor
8	305	00.11.20	Response to request for Supplement to DEIS II	District Ranger	Forest Guardians
8	306	01.01.00	Schedule of Proposed Actions for the Carson NF	NEPA Coordinator	Mailing List
8	306 A	01.01.01	Final Rule: Designation of MSO critical habitat	USFWS	Federal Register (66 FR 8530)
8	307	01.04.00	Schedule of Proposed Actions for the Carson NF	NEPA Coordinator	Mailing List
8	308	01.07.00	Schedule of Proposed Actions for the Carson NF	NEPA Coordinator	Mailing List
8	309	01.08.01	Summary of publications brought forth by the public	Various FS Specialists	Project File
8	310	01.08.02	Social and Economics Analysis with appendices	Rocky Mountain Regional Economist (Ed. by Forest Forester)	Project File
9	311	01.08.03	Soil and water resources effects analysis for A/C and cumulative effects addendum (8/10/01)	Forest Soil Scientist	Project File
9	312	01.08.03	Vegetation report	Zone Silviculturist	Project File
9	313	01.08.10	Air quality effects analysis for A/C	Forest Soil Scientist	Project File
9	314	01.08.13	Wildlife effects report and MIS assessment (both updated 5/03)	District Wildlife Biologist	Project File
9	315	01.08.17	Recreation effects report	District Rec/Lands/Special Uses	Project File
9	316	01.08.17	Fire effects report	District Fire Management Officer	Project File
9	317	01.08.20	Monitoring Plan	Forest Planner and District Ranger	Project File
9	318	01.10.00	Roads analysis for the A/C analysis area	Planning Specialist	Project File
9	319	01.10.00	Schedule of Proposed Actions for the Carson NF	NEPA Coordinator	Mailing List
9	320	02.01.00	Schedule of Proposed Actions for the Carson NF	NEPA Coordinator	Mailing List
10	321	02.04.00	Schedule of Proposed Actions for the Carson NF	NEPA Coordinator	Mailing List
10	321 A	02.05.06	Final database for Agua/Caballos	GIS Coordinator	Project File
10	322	02.05.09	Record of decision for the Agua/Caballos proposed projects	Forest Supervisor	Project File
10	323	02.06.00	A/C FEIS and ROD and mailing list	USDA - Forest Service	Mailing List
10	324	02.07.04	Notice of Availability: A/C FEIS and ROD	Taos News	Public

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10	325	02.07.00	Schedule of Proposed Actions for the Carson NF	NEPA Coordinator	Mailing List
10	326	02.07.19	Notice of Availability: A/C FEIS and ROD	Federal Register Vol. 67, No. 139	Public
10	327	02.08.01	List of PR documents requested by Sam Hitt (Wild Watershed) through an office visit to SO		
10	328	02.08.13	Letter: no comment on the FEIS	USDA – Natural Resources Conservation Service	Forest Supervisor
10	329	02.08.13	Notes: visit with Joanie Berde concerning A/C decision and prescriptions	Forest Silviculturalist	Project File
10	330	02.08.23	Articles: pertaining to A/C appeal	Albuquerque Journal, New Mexican & The Taos News	Public
10	331	02.08.29	Supplemental information: field report verifying Borracho Creek does not support fisheries (documentation occurred 8/09/01, but was inadvertently left out of the project record)	Forest Assistant Fisheries Biologist	Project File
10	332	02.08.29	Supplemental information: forest-wide assessment of plain titmouse and aqua invertebrates SUPERCEDED by May 2003 Forest-wide MIS Assessment doc #314	Forest Wildlife Biologist	Project File
10	333	02.08.20	Notice of Appeal	Joanie Berde - Carson Forest Watch Paul Becker – Vallecitos Stables John Horning – Forest Guardians Sam Hitt – Wild Watershed	Regional Forester
10	334	02.09.04	Meeting notes: Informal disposition on appeal	Forest Supervisor	Appeal Reviewing Officer (RO)
10	335	02.10.01	Appeal decision	Appeal Deciding Officer	Appellants
10	336	02.10.00	Schedule of Proposed Actions for the Carson NF	NEPA Coordinator	Mailing List
10	337	03.01.00	Schedule of Proposed Actions for the Carson NF	NEPA Coordinator	Mailing List
10	338	03.01.02	Clarification pages: Forest Plan MIS	Forest Supervisor	FP Mailing List
10	339	03.04.00	Schedule of Proposed Actions for the Carson NF	NEPA Coordinator	Mailing List
10	340	03.04.14	Notice of Intent Supplemental Agua/Caballos FEIS	Federal Register Vol. 68, No. 75	Public
11	341	03.04.25	Road Analysis Report for the Carson NF	Forest Supervisor	Project File

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11	342	03.07.00	Schedule of Proposed Actions for the Carson NF	Planning	Mailing List
11	343	03.07.18	Notice of Availability: A/C Supplement to the FEIS	Federal Register Vol. 68, No. 138	Public
11	344	03.07.20	Supplement to the FEIS for the Agua/Caballos Proposed Projects and mailing list	USDA - Forest Service	Mailing List
11	345	03.07.31	Notice for Comment on the SFEIS	The Taos News	Public
11	346	03.08.27	Forest Resources of the Carson National Forest	Forest Inventory and Analysis Team	Project File
11	347	03.09.01	7 SFEIS comment letters nos. 56-62 (from 7/23-9/4/2003	Concerned citizens, special interest groups and Federal and State agencies.	Carson Forest Supervisor
11	348	03.09.30	Content analysis and responses to comment letters nos. 56-62.	ID Team	Project File
11	349	03.10.00	Schedule of Proposed Actions for the Carson NF	Planning	Mailing List
11	350	03.11.18	Proposed Rule: Designation of MSO critical habitat on National Forest System and tribal lands	USFWS	Federal Register (68 FR 65020)
11	351	03.11.18	Opinion: CBD v. Forest Service. Failure to disclose responsible scientific opposition to the conclusion upon which a FEIS/decision is based.	Judge Pogue, 9th Circuit Court of Appeals	
11	352	03.12.31	Conferencing request: Cons. #2-22-93-I-125 MSO proposed critical habitat (Addendum to BAE #263)	Forest Supervisor	USFWS, Ecological Services
11	353	03.12.31	Baseline Inventory of Small Mammal Prey-base Communities on Carson National Forest, NM	Jennifer Frey, PhD	Project File
11	354	03.12.31	Initiation of Abert's Squirrel Monitoring on Carson National Forest, NM	Jennifer Frey, PhD	Project File
11	355	03.12.31	Initiation of Red Squirrel Monitoring on Carson National Forest, NM	Jennifer Frey, PhD	Project File
11	356	04.01.00	Schedule of Proposed Actions for the Carson NF	Planning	Mailing List
11	357	04.01.09	Literature review: Is the northern goshawk an old growth forest specialist or a habitat generalist?	R.T. Reynolds	Project File
11	358	04.02.00	Monitoring the Birds of Carson National Forest	Beason and Giroir, RM Bird Observatory	Project File
11	359	04.02.09	Conferencing Report: Cons. #2-22-93-I-125 MSO proposed critical habitat	USFWS, Ecological Services	Forest Supervisor
11	360	04.04.00	References used for Abert's squirrel: Dodd et al. 1998. Pederson et al. 1987 Rasmussen et al. 1975	Publications	

B – Public Comments and Responses to the Supplement of the FEIS

In response to the Supplement to the Final Environmental Impact Statement issued in June 2003, 7 comment letters (letters 56-62) were received from the public. [348] The Forest Service documented and analyzed these letters, which resulted in 54 substantive comments. These comments and responses to them are presented here as **an addendum to Appendix B of the 2002 FEIS**. This section of the Final Environmental Impact Statement complies with section 40 CFR 1503.4, Response to Comments, of the National Environmental Policy Act (NEPA) regulations and 36 CFR 215.6, Comments on proposed actions. In addition, four responses to previous comments made in the 2002 FEIS (letters 21, 26 and 43) have been updated and are also included at the end of this appendix.

Below is a list of commenters and the unique identifier given to each of their letters. Comments are labeled using a combination of the comment letter number and an individual comment number. For example, if the letter number is "10" and this letter has 5 comments, the comments are labeled "10.01" through "10.05." How comments are identified and labeled for each letter can be found in the project record: comment letters on the Supplement to the FEIS are numbered **56 - 62** and can be found in the project record as document #347 (see Appendix A).

Letter ID	Date	Commenter	Organization
56	03.07.23	Bolander, Lloyd	
57	03.07.24	Berde, Joanie	Carson Forest Watch
58	03.07.30	Curry, Ron	New Mexico Environment Department
59	03.08.25	Trevino, Rosendo	USDA National Resources Conservation Service
60	03.08.28	Spencer, Stephen R.	USDI Office of Environmental Policy and Compliance
61	03.09.02	Hitt, Sam	Wild Watershed, Forest Guardians and Carson Forest Watch
62	03.09.04	Jansky, Michael P.	U.S. Environmental Protection Agency

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59.01	We have reviewed the Final Environmental Impact Statement for Agua/Caballos Proposed Projects and we have no comments, changes or additions.	Thank you. We appreciate the time you have taken to review the document.
60.01	The U.S. department of the Interior has review the Supplement to the Final Environmental Impact Statement for the Carson National Forest, Rio Arriba County, New Mexico. In this regard, we have no comments. Thank you for the opportunity to review this document.	Thank you. We appreciate the time you have taken to review the document.
	Vegetation	
56.01	Will the effect of drought and insect damage to the pine and piñon areas change the treatments proposed?	There are no proposed treatments in the piñon vegetation type, which is the only species that has shown significant mortality to insect and disease infestation. Treatments proposed in ponderosa pine would typically help reduce susceptibility to drought related disease and is outlined in the purpose and need (FEIS, pp.4-5).
	Soil and Water	
58.01	The reviewed document describes potential impacts to water quality, fish habitat, and benthic macroinvertebrate populations in the streams of the analysis area (pp. 60-69). It is not clear whether the Rio Vallecitos is considered among these streams, but since it flows along one boundary of the analysis area, and is perennial, it should be. The Canada del Boracho (which may be ephemeral) is mentioned many more times in the document than the Rio Vallecitos, suggesting that potential impacts to the Rio Vallecitos were not considered in depth. Nor was the status of the fishery (species present, reliability of water, habitat quality) of the Rio Vallecitos specifically described. The Rio Vallecitos is of special interest to NMED and the Surface Water Quality Bureau (SWQB), in particular, because it is recognized (on the State of New Mexico Clean Water Act Section 303(d) List) as not meeting its designated use as a high quality cold water fishery. Turbidity, temperature, and aluminum are thought to be the causes of this impairment. None of the sources	The full analysis of soil and watershed effects is contained in the “Final Environmental Impact Statement for the Agua/Caballos Proposed Projects,” pages 106-125 (found at http://www.fs.fed.us/r3/carson under "Planning"). This analysis describes in detail the scale and scope of the soil, water quality and watershed effects analysis for this project. Identification of current water quality, sources of impacts to the water resource and the status of the Rio Vallecitos as an Impaired Waterbody (State of New Mexico Clean Water Act Section 303(d) List) is a primary component of that analysis. Please refer to this analysis for the full description of effects and recommended Best Management Practices and other mitigation measures outlined to address those effects.

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	identified in the 303(d) List are related to silviculture, but a large forest restoration or logging project in its watershed could negatively affect the Rio Vallecitos.	
58.02	Assuming that the information provided applies to the Rio Vallecitos, SWQB agrees with the Forest Service that under Alternative A (the no action alternative), a catastrophic fire is more likely to occur which would have relatively severe harmful effects on the fish and aquatic habitat of the streams of the analysis area. As such, Alternative G (the preferred alternative) would evidently bring about short term impacts of less severity, but would reduce the likelihood of much more damaging impacts occurring. Because the proposed action would institute a management shift towards a more natural fire regime, with less risk of serious degradation to water quality, and some potential for improvement of watershed conditions in the long term, NMED supports the Forest Service in implementing Alternative G. We encourage the Forest Service to work with any contractors or sale recipients involved to ensure that best management practices are indeed utilized, and that the access routes developed for the project are selected with caution, to minimize erosion and runoff from the watershed.	We agree. Thank you for your comments and support of management activities on the Carson National Forest.
	Wildlife -- Management Indicator Species	
57.01	Most of the determinations of effects to the Management Indicator Species is based on 6 years of disturbance - But with fuelwood areas open, and the usual project delays - its really more like 10 years. So the effects on species were probably under-estimated.	The estimated duration of impacts is 6 years. This estimate is thought to be the maximum, with many treatment areas being less. Historically, most firewood harvest associated with timber sales has been conducted after harvest activities are completed. As a result there are examples where delays in timber harvest also resulted in prolonged firewood activities. In this project, 50 project of all stands slated for firewood are only being thinned by firewood harvest. Also see response to comment 61.33.
57.04	Finally, we are concerned that much of the data used for MIS effects is old - most 20+ years old (1980's). Recent climate change, drought, fires, etc. should also have been	Most of the stand exam data for the Forest-wide MIS Assessment has been collected over the past 20 years. However, we have considered that in the assessment. We

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	factored into effects analysis. Habitat and population projections need to consider fire, drought etc. and be adjusted. Tree re-growth and regeneration is likely to be less than stated in this document, unfortunately.	were very conservative in making allowances for growth since data was collected. Actually, the ingrowth is likely to be more than what was stated. Deductions were also made for habitat loss due to fire. In addition, the MIS assessment identifies some projected impacts for which the extent has not yet been determined, such as habitat loss due to piñon bark beetle infestations. MIS monitoring surveys were conducted on the forest in 2003 during extreme drought and reflect dry conditions. These effects will be used to update the Forest-wide MIS Assessment as data becomes available. Older data is also valuable and necessary to determine trend.
57.05	Since the Supplement to the FEIS uses 20 year old data and bases effects upon "average" forest conditions - we are concerned that with a long-term drought and global warming, and increased fires that we are experiencing in the Southwest - that the effects to MIS are overly optimistic and do not account for habitat loss and damage from drought and fires.	Drought conditions along with overly dense forest conditions have resulted in increased fires in the Southwest. Wildfire generally does not have a light touch on the landscape and often completely eliminates habitats for decades or even centuries. Forest thinning can be very effective in locally reducing those threats. If drought conditions persist, forest thinning becomes even more important to reduce the competition for limited resources and alleviate some of the stress created by drought. MIS monitoring surveys were conducted on the forest in 2003 during extreme drought and reflect dry conditions. It is intended that the Forest-wide MIS Assessment for the Carson National Forest will be periodically updated. Changes in conditions will be reflected in those updates. Also see response to comment 57.04.
61.38	Forest Plan Consistency What measures, if any, have been taken to "monitor and document the effects of management activities on management indicator species habitat" in the Project area (Forest Plan, p.136)?	The monitoring and documentation of trends of management indicator species habitat is done at a forest level—not at the project level—and is provided in the Forest-wide Management Indicator Species Assessment. This is a living document and will be updated to include new data on a regular basis. The Carson NF does have updated population monitoring data on small mammals, and migratory birds—species not typically monitored by other agencies. The documentation of effects to management indicator species habitat within the project area is found in the Final Supplement to the FEIS.
61.39	Please disclose any efforts to monitor populations of management indicator species in cooperation with New Mexico Department of Game and Fish and U.S. Fish and	We work with the New Mexico Department of Game and Fish and U.S. Fish and Wildlife Service to find out what data they have collected on a species. The New Mexico Department of

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	Wildlife Service (Forest Plan, p.120).	Game and Fish conducts annual fish, big horn sheep, elk and turkey population surveys. The U.S. Fish and Wildlife Service can provide information on migratory bird species, but largely operates as a regulatory agency.
61.41	The estimated volume of timber harvest is not accurate because the volume associated with "dead and down permits" was factored in beginning in 1998 although the program has been in place for decades (MIS, p.121). This significant volume of timber must be acknowledged when estimating the effects on population trends of management indicator species.	The "timber volume" displayed in the table (MIS, p. 121 and FEIS, p. 132) is accurate prior to 1998. Dead and down firewood is included in the estimates after 1998 when the forest began charging for dead and down permits and the volume sold was reported similar to "timber volume." The table displays the difference between actual timber harvest and the annual Allowable Sale Quantity (ASQ) volume of timber harvest for the Carson National Forest. Dead and down firewood volume was not included in the annual ASQ, therefore, it is in addition to it. Put in context, the effects of including dead and down firewood in the actual volume harvested beginning in 1998 is insignificant when compared to the differential between the actual harvest volume and the ASQ the Forest Plan effects were based upon.
61.42	This effort to estimate population trends for management indicator species based on habitat changes is severely constrained by the fact that only approximately one third of the forest stands have inventory data (MIS p.130). No data is available from any stands on the Jicarilla ranger district. Therefore, the conclusions drawn in the SFEIS concerning populations of management indicator species (both actual and trend) are of dubious value.	Population trends and habitat trends are related but a separate consideration. We are in the process of collecting more population data. [354, 355, 358] With regard to habitat, we disagree. Many scientific articles in professional publications have achieved reliable conclusions with data sets that may only be a fraction of the sample size of data used in the Carson's Forest-wide MIS Assessment.
61.43	What does "actual tree data" mean as used on page 121 of the MIS.	This means that the quantity of trees in each size class (where available) was evaluated to help determine the nature and condition of the habitat in a stand. The VSS code provides indicators of minimum size class standards and canopy density. The actual composition of a stand can be seen by looking at the actual tree data and will reveal much more about the nature of the stand. In this case, stand composition was used to develop queries to reflect the desired objectives.
61.44	Please supply the conversion table of basal area to canopy closure used in the SFEIS and any supporting scientific	Actually this table was not used to make any determinations in the SFEIS. As stated in the Forest-wide MIS Assessment,

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	evidence to document its accuracy.	this data has not been published; therefore, this information was used as a comparison value to cross-check our estimates. If we had used the data to make a determination, it would have increased the canopy closure acres by approximately 25 percent. Since we chose to keep all estimates on the conservative side, we decided to use the data as a verification tool only. However in answering your question, we have looked at other data such as the studies at Taylor Woods, Arizona[1] that have very similar results.
61.45	Citations to Baker et al (1988), Houk (1993), Hejl (1994) and Surlock and Finch (1997) on page 214 of FEIS are missing from the reference section.	These references are included in an updated version of FEIS, Appendix F – *Literature Cited* found in this document. We appreciate you pointing this out to us.
61.46	Typographical efforts [sic] occur on pages 60, 68 of the SFEIS and on pages 51, 139 of the MIS.	We appreciate you pointing this out to us. We have corrected some of the typographical **errors**. However, since the information provided was not detailed enough, we failed to find all of them.
	Abert's Squirrel	
61.01	Abert's Squirrel *(Sciurus aberti*) Please explain how this project will comply with the Forest Plan requirement to "identify those stands where squirrel activity is especially high and recommend deferment from cutting during the entry" (Forest Plan, p.131). Have any site-specific surveys for Abert's squirrel been completed in the project area or the Carson National Forest? If so, what did the data show in terms of population trend?	Identification of "especially high squirrel activity" is made during the intensive reconnaissance phase of a project. It is also common practice to provide instruction to markers to avoid any remarkable squirrel activity areas during the marking phase of a project. Monitoring of this species is ongoing on each ranger district on the Carson National Forest. [354] Monitoring sites are random selection locations and are not specifically located by project area. No trend data is yet available. However, the effects of drought on Abert's squirrel indicate very low population numbers. "Especially high squirrel activity" is not likely to occur anywhere on the Carson NF during such conditions. As a result, each stand identified for treatment will be reevaluated for even moderate Abert's squirrel activity, prior to entry. Moderate, as well as high, activity areas will be deferred from treatments. Red squirrel populations do not

[1] Notes on this study are included with the A/C Wildlife Effects Report and 2003 MIS Assessment, project record #314.

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		seem to be similarly affected by the drought, however treatments in high red squirrel activity areas will also be deferred.
61.02	How is the Project following Pederson et al (1976) recommendations to avoid Abert's squirrel nest and feeding sites, restrict logging to late summer to early fall, avoid disturbance by breaking up logging units into small blocks and not piling and burning slash (MIS, p.27)?	While the Pederson et al. (1976) paper was used in the Forest-wide MIS Assessment to show what has been recommended for management activities by different researchers, the management of Abert's squirrel is prescribed through Carson Forest Plan standards and guidelines (Forest Plan, Wildlife and Fish - 10).
61.03	Why were the recommendations of Dodd et al. (1998) not discussed? They are to conduct Abert's squirrel surveys during spring and early summer and retain identified high quality source areas during logging operations. This paper was provided to the Forest Service over a year ago but is not cited in either the SFEIS or MIS Assessment (see project record 333, appendix A).	Not referencing Dodd et al. was an oversight on our part. Dodd's work is in fact the foundation of our forest's current monitoring efforts. Forest-wide monitoring for the Abert's squirrel was initiated during the 2003 field season (Frey 2003a). [354] Frey based her monitoring protocol on Dodd (p. 6). Surveys for Abert's squirrel activity areas in stands identified for treatment in the Agua/Caballos analysis area will be based on Dodd and Frey.
61.04	The SFEIS says that thinning and prescribed burning in ponderosa pine VSS 3 and 4 classes "should improve truffle production" (SFEIS, p.8). However, Pederson et al (1987) says that "fewer fungi were produced in logged stands" (MIS, p.27). What steps, if any, have been taken to preserve important hypogenous fungi production areas? Were any surveys conducted to identify high quality fungi production sites?	It should be noted that there is a significant difference between thinning overstocked stands to achieve larger structural conditions, and the type of logging (clearcutting) studied by Pederson (1987). His recommendations to minimize long-term effects on squirrels would be to limit clearcuts to less than 20-acre blocks and avoid clearcuts of larger than 50 acres. The long-term effects of thinning treatments should provide improved microclimates for fungi production. Fungi surveys are not conducted. The thinning in the VSS 3 and VSS 4 class stands will be from below and removal of small diameter trees. By removing the competition of the younger, smaller trees in the stand, this should promote healthier older stands, which in turn stimulate hypogenous fungi growth. The Pederson et al. (1987) paper discusses effects of removing all trees larger than 10 to 12 inches in diameter. As discussed in the Forest-wide MIS Assessment, ponderosa pine is a fire dependant species and the Abert's squirrel has evolved within a low severity fire environment. No surveys have been conducted for hypogenous fungi production areas. If there was an important hypogenous fungi

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		area found within the harvest areas, then there should also be signs of high squirrel activity and the area would be recommended for deferment of cutting.
61.05	Identify where the 505 acres of high quality Abert's squirrel habitat are that will be cut in the project area (SFEIS, p.13).	A table used to calculate the number of treated acres by stand of high quality Abert's squirrel habitat has been added to the Wildlife Report found in the project record [314].
61.06	What information supports the estimate of 5 percent of ponderosa pine stands becoming suitable Abert's squirrel habitat through forest succession (MIS, p.26)?	Ingrowth is a factor that plays a role in changing conditions in forest succession. In the Forest-wide MIS Assessment, we felt it would be negligent to not include a minimal estimate for forest growth. Five percent is a professional estimate made by an experienced silviculturalist and wildlife biologist. Since 1986, this estimation translates to less than one-quarter of 1 percent per year.
61.07	Explain why "quality" Abert's squirrel habitat was reduced from 4745 acres in the previous analysis (project record #314, p.7) to 3262 in the SFEIS (SFEIS, p.13)? Where are the dropped acres found?	The 4,745 acres are estimated to have canopy closure greater than 60 percent and was used to compare alternatives with regard to adequate interlocking canopy. The 3,262 acres were based on more stringent standards used to identify "quality habitat" in the Forest-wide MIS Assessment. Also see response to comment 61.13
61.08	What is the basis of the estimate that 53,220 acres of occupied Abert's squirrel habitat existed in 1986 when the Forest Plan was developed (MIS, p. 124)?	This figure is taken directly from Table 33, page 97 of the Forest Plan FEIS. [1]
61.09	How was the percentage of acres with interlocking canopies estimated? How was the percentage of acres with high intensity fires estimated (MIS. p. 125)?	This is explained in the Rationale for Determining Habitat Trend Lines (Forest-wide MIS Assessment, Appendix). [314] The following is a summary of that process. To evaluate stand data, the forest was divided into four separate areas with contiguous boundaries: (1) Jicarilla (D3); (2) Camino Real (D4); (3) Questa (D7); and (4) El Rito (D2), Canjilon (D1) and Tres Piedras (D6) Ranger Districts. Habitats are more similar within these groups and the percentage of stands with exams will vary between these areas. Each was evaluated separately prior to extrapolation and then totaled to increase reliability of the acreage estimates. Then the total ponderosa pine (PP) acres were compared to PP acres with stand exams for each district or combination of districts to develop a multiplier. The Jicarilla Ranger District

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		has no stand exam data. However, it does have suitable habitat and huntable populations of Abert's squirrel. Therefore, a forest-wide ratio of average suitable habitat to total ponderosa pine acres from the remainder of the forest is used to estimate suitable acres of habitat for the Jicarilla Ranger District. Then tree size distribution data was reviewed to help select the query criteria for suitable habitat containing interlocking canopies. We evaluated fields with tree size information that included trees per acre >10", >14", >16", >18" and >20" diameter at breast height (DBH) to help develop the query used for determining stands with suitable conditions. A query was developed that basically selects for desired conditions in the Vegetation Structural Stage (VSS) 4 through 6. It was also designed to include number of high end VSS 3 stands with a strong component of larger trees that could provide suitable habitat with interlocking canopies. The distribution of tree size data was used instead of just a VSS query, as VSS data was not available on all the stands with stand exams and the actual size class distribution was likely to improve stand selection for suitable habitat. A percentage factor based on the stand exam acres meeting the criteria was then calculated for each unit. This was applied to the total PP acres for each unit to determine the estimated gross stand acres of squirrel habitat. The average basal area on those acres was then calculated by unit. This averaged 110 BA. It is estimated that interlocking canopies that allow for arboreal movement by squirrels will average at least 50 percent of each of the stands identified as suitable habitat. Since the Forest Plan was first implemented, ponderosa pine stands have progressed toward more suitable habitat as a result of forest succession. A factor of 5 percent was considered a conservative estimate of acres moving into suitability from forest succession and was applied to those acres. However, management activities (timber sales) and wildfire have reduced certain habitats to unsuitable. High intensity wildfire and certain harvest prescriptions such as overstory

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		removal, seed cuts and shelter wood harvests are example of areas that are deducted from the total acres of interlocking canopies. Only the actual acres treated that are estimated to result in acres becoming unsuitable were subtracted. After the adjustments for losses and gains were done for each unit the acres were totaled forest-wide. The acres reduced by wildfire were estimated by identifying the significant fires that occurred on each district. Acres were then estimated by incident that were crown fire or of such an intensity that would have eliminated habitat capabilities.
61.10	How many acres of 60 percent or more canopy closure will be reduced to less than 60 percent? The SFEIS says 24 percent but doesn't provide acreage (SFEIS. p.10).	As described in Table 30 on pages 10 and 11 of the SFEIS, there are 4,745 acres of ponderosa pine with >60 percent canopy. Alternative G would reduce this number to 3,606 acres with >60 percent canopy, thus reducing the acres of ponderosa pine with >60 percent canopy by 1,139 or 24 percent.
	Resident Trout and Aquatic Macroinvertebrates	
61.36	Resident Trout and Aquatic Macroinvertebrates How many years of data gathering will be needed to determine macroinvertebrate population treads (MIS, p.117)?	Due to the highly fluctuating nature of macroinvertebrate organisms (hatch timing, stream drift and other factors such as yearly variations in flow and water temperatures), it will likely take many years to determine actual trends.
	Hairy Woodpecker	
57.03	How will snags be protected? Page 27 states that snags will be protected for Hairy Woodpeckers as mitigation but it does not detail how. Forest Service patrols? This is always a problem with timber sales on the Carson - as areas accessible are used by the public after hours, when Forest Service personnel or logging personnel are not present. So - this should have been disclosed. Mitigation measures aren't very effective in protecting snags, and remaining large trees during timber sales.	The Carson National Forest encourages the public to help protect snags. Please refer to the Carson National Forest Firewood Guide "Save Our Snags" also see the response to comment 61.21 and 61.17. We acknowledge that not all snags will be protected. Areas adjacent to open roads often lose snags desired for retention. However on the average, the forest meets the standard and guidelines of 300 snags per 100 acres. Within the analysis area the average of 4 snags per acre is within Forest Plan standards and guidelines (SFEIS, p. 25).
61.11	Hairy Woodpecker (*Picoides villosus*) What is the substantive difference between terrestrial	The Terrestrial Ecosystem Survey (TES) data polygons are generally larger and include a complex variety of ecosystem

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	ecosystem survey data and a vegetative cover map (MIS, p. 34)? Was terrestrial ecosystem survey data used in the analysis of all management indicator species? When will the vegetative cover maps be completed?	characteristics such as soils, slope, temperature and vegetation. It will, in some cases, reflect more of a potential natural vegetation type as opposed to existing vegetation. [4] The Forest- wide GIS vegetation layer reflects only the existing cover type and was not completed at the time of the Agua/Caballos FEIS. [323] The degree of similarity is quite high. TES data was used to develop a spatial display of potential habitat for each management indicator species. The intent was to illustrate the likely distribution of the species across the forest in the MIS Assessment. All other elements of analysis used the vegetation cover data. It is our intention to periodically update the Forest-wide MIS Assessment and include a potential distribution map based on vegetation cover in the next year or two.
61.12	What areas were identified as highly vulnerable to firewood collection (MIS, p.35)? Were these areas considered in meeting the Forest Plan snag and down log requirements?	An explanation of areas vulnerable to firewood collection on the forest is found on page 38 of the Forest-wide MIS Assessment. [314]
61.13	How does the Forest Plan and this Project describe "quality" hairy woodpecker habitat (MIS, p.35)? Is there a difference in the definition of quality in the two documents?	Quality habitat as identified in the Carson Forest Plan is assumed occupied by the species as identified by the Forest Plan FEIS, page 97. [1] This same relationship is applied in the Forest-wide MIS Assessment. No, there is no difference in the definition of “quality” in the two documents.
61.14	Have snags and down logs been surveyed in the old growth and mature stands in the project area (MIS, p.32)? If so, what were the results? Is the project area currently meeting Forest Plan snag and down log requirements?	Information on old growth in the Agua/Caballos analysis area is described in detail in the FEIS (pages 82 to 91). [323]
61.15	Please disclose the number of acres with sufficient snags needed to maintain viable hairy woodpecker populations in the project area and the forest as a whole.	Table 83 (p. 150) of the Forest Plan FEIS displays a comparison of MIS habitat components. The EIS concludes that all alternatives (including one that manages for 150 snags per 100 acres) will maintain indicator species and their habitats and will not be adversely affected to the point where viable populations could not be maintained. The selected alternative from the FEIS was consistent with the Carson Forest Plan. The Forest Plan establishes an objective of 300 snags per 100 acres (Forest Plan, Fish and Wildlife - 8. The

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		Agua/Caballos analysis area averages 4 snags per acre (SFEIS, p. 25), which is within Forest Plan standards and guidelines.
61.16	What information was used to determine the one percent ingrowth rate (MIS, p.36)? How does this differ from the 5 percent used in the Abert's squirrel [should this be hairy woodpecker?] analysis (MIS, p.26)?	It is a professional estimate by our silviculturalist and wildlife biologist. The 1 percent ingrowth represents a change in structural size from 1986 to present. The interlocking canopy reflects tree branch growth over the same time period, which occurs at a more rapid rate than trunk diameter. Also see response to comment 61.09.
61.17	How many acres in the Project area have been affected by firewood and small products removal (MIS, p.37)? Have roads effectively been closed in the Project area to protect snags and down logs from illegal firewood and small product collection?	The entire Agua/Caballos analysis area has been and continues to be open for dead and down firewood gathering. Most of the effects from firewood gathering are within 200 feet of open roads. A number of roads through past activities have been effectively closed within the analysis area. Specific acres for product removal are addressed in Table 4, pp. 60-62 of the Agua/Caballos FEIS. [324]
61.18	How many years of data collection are needed to determine population trends for hairy woodpecker on the Forest and in the project area? It is stated that "six to eight years of data do not provide sufficient information to determine trend" (MIS, p.41).	This is highly variable depending on the type of inventory and inventory design. The Forest-wide MIS Assessment uses the best data available, which are Breeding Bird Surveys (BBS). The use of BBS surveys is one method to determine population trends. The Carson National Forest is currently conducting surveys to collect additional bird population data, which should provide population trends for the hairy woodpecker after 3 years of gathering field data. It is expected we will have the data analyzed for use by the beginning of 2006. The data collection was started in spring of 2003. [358]
61.19	How was it determined that 106,880 acres of occupied hairy woodpecker habitat existed in 1986 when the Forest Plan was developed (MIS, p.127).	This figure is taken directly from Table 33, page 97 of the Forest Plan FEIS. [1]
61.20	Why are there zero acres of hairy woodpecker ponderosa pine habitat in the Questa and Jicarilla ranger district? Why are there zero acres of hairy woodpecker mixed conifer habitat in the Jicarilla ranger district (MIS, p.129). How does this affect the determination of population trend for hairy woodpecker?	We established stringent standards for meeting what we believe to be quality habitat criteria. We estimate that the “net acres” are 282 acres on the Jicarilla RD and 169 acres on Questa RD. Mixed conifer on the Jicarilla RD is very limited, however, we do estimate 59 acres of hairy woodpecker habitat on the district. The estimated habitat trend for hairy woodpecker on the Carson National Forest is from 106,880

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		acres in 1986 to 112,444 acres in 2002.
61.21	What limits, if any, are there for removal of hazardous snags during logging operations?	The timber sale contract allows for only included timber to be cut and removed. Only timber specifically designated under the terms of the contract qualifies for included timber. Snags of any kind are generally not included timber, except for salvage sales. In any case, even hazardous snags must be designated as included timber prior to removal.
	Juniper (Plain) Titmouse	
61.32	Juniper (Plain) Titmouse (*Baeolophus ridgwayi*) What measures, if any, has the Project taken to reduce the decline of the Juniper titmouse population on the Carson national forest (MIS, p.19)?	The proposed project would not impact any habitat for this species.
	Merriam's Turkey	
61.27	Merriam's Turkey (*Meleagris gallopavo*) How many turkeys have been sited since 1966 on the Cebolla and Ojo Sarco Breeding Bird Survey routes that are located on the Carson National Forest? Is this enough data to determine population trends (MIS, p.73)?	The Breeding Bird Survey does not give the individual results for wild turkeys on these survey routes. The BBS does give an average bird/route number for the wild turkey. The Cebolla route, started in 1973, has an average of 0.09 and Ojo Sarco, started in 1968, has an average of 0.03. These BBS routes by themselves will not provide population trend for the Merriam's turkey.
61.28	Are turkey roost sites or foraging areas the limiting factor in the project area? How does this limiting factor affect "the trend in available habitat" (MIS, p.140)?	The "trend in available habitat" is done only for turkey roost tree availability, since that is the component identified in the Forest Plan EIS for this management indicator species. There are other habitat requirements and needs for turkeys such as foraging habitat. Within the analysis area the factor that would limit the turkeys the most would be foraging habitat, however, while foraging habitat may be improved, there is currently adequate habitat to support turkeys.
61.29	Have surveys for turkey roost trees with adequate cover nearby been done in the Project area or anywhere on the Carson national forest (MIS, p.136 and 137)?	No surveys have been done that would record roost trees and associated cover in either the analysis area or elsewhere on the forest. The Forest-wide MIS Assessment is based on stand exam information that would likely provide this habitat component.

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61.30	How many acres of old growth ponderosa pine turkey habitat is available on the Carson national forest (MIS, p.136)?	We estimate that there are approximately 105,622 gross acres of turkey habitat in ponderosa pine that contains the old growth component adequate for roost trees on the Carson National Forest. This number should not be confused with the old growth definition found in the 1996 “Region-wide Amendment to Forest Plans.” Old growth is explained on pages 70 and 71 of the Forest-wide MIS Assessment. [314] The calculations for ponderosa pine are on page 139 of the MIS Assessment.
61.31	What information was used to estimate that one percent of overall ponderosa pine, mixed conifer and aspen stands have become suitable turkey habitat since 1986 (MIS, p.137)?	Ingrowth is a factor that plays a role in changing conditions in forest succession. In the Forest-wide MIS Assessment we felt it would be negligent to not include a minimum estimate for growth. Also see response to comment 61.23.
	Red Squirrel	
57.02	Page 24 states that effects on Red Squirrels are not significant because only small amount of habitat is being treated in preferred Alt. G. However, this does not match page 22 - where approx. 1/3 of quality habitat is being treated (624 out of 1,947 acres quality habitat) and of this 1/3 - 75% will be temporarily reduced as quality habitat. So - 75% of 1/3 TOTAL quality habitat acres are being reduced or lost for Red Squirrels - which is significant and should have been disclosed as such.	The discussion on page 24 of the SFEIS refers to Figure 12 on the same page, which places the proposed acres for treatment in context with the acres of quality red squirrel habitat on the Carson National Forest. The effects within the analysis area are disclosed on page 22 of the SFEIS.
61.22	Red Squirrel (*Tamiasciurs hudsonicus*) Please explain how this Project will comply with the Forest plan requirement to "identify those stands where squirrel activity is especially high and recommend deferment from cutting during the entry" (Forest Plan, p.131). Have any site-specific surveys for red squirrel been completed in the Project area or the Carson National Forest? If so, what did the data show in terms of population trend?	There are several occasions when this is addressed. During intensive reconnaissance of the stands any “especially high” squirrel use is noted on the forms. If none are encountered, none are reported. Also, instructions to markers are to avoid or skip over any areas of “especially high” squirrel use. For Agua/Caballos, each stand identified for treatment will be reevaluated for high red squirrel activity prior to entry. High activity areas will be deferred from treatments (ROD 2004).
61.23	What information was used to estimate the figure of one percent of overall mixed conifer and spruce-fir stands becoming suitable red squirrel habitat since 1986 (MIS, p.47).	Ingrowth is a factor that plays a role in changing conditions in forest succession. In the Forest-wide MIS Assessment, we felt it would be negligent to not include a minimum estimate for growth. The 1 percent from 1986 to the present is a

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		professional, but very conservative, estimate made by the forest silviculturalist and wildlife biologist. The Forest Resources of the Carson National Forest Report [346] indicates that this estimate may in fact be too conservative, but still shows that we considered growth as a part of habitat trend.
61.24	What new information has come to light to warrant changing the word "stable" to "upward trend" in describing red squirrel habitat on the Carson national forest (MIS, p.52 and project record #314, p.108).	This was based on the rationale for determining habitat trend lines, which was prepared for the Supplement to the FEIS. [342]
61.25	How was it determined that 46 percent of quality red squirrel habitat was logged since 1986 (SFEIS, p.22)?	The question is not correct as stated. Of the 4 percent of potential red squirrel habitat that was treated since 1986, it is estimated that 46 percent was likely to be quality habitat.
61.26	How was it determined that 473 acres of red squirrel habitat in the Project area would be logged (SFEIS, p.22)?	Actually, page 22 identifies approximately 624 acres of 1,947 acres of quality red squirrel habitat that would be treated. Of those, 473 acres would be temporarily removed or reduced from quality red squirrel habitat. The decision to treat any specific acres is first based on the purpose and need of the project. For Aqua/Caballos, the primary objectives are priorities for forest growth and health. Silvicultural prescriptions, which include other interdisciplinary objectives, are then prepared to meet overall objectives.
	Rio Grande Cutthroat Trout	
61.37	How many lower stream reaches have stabilized enough to provide secure habitat for Rio Grande Cutthroat Trout since 1986 when the Forest Plan was developed (MIS, p.108)?	This project does not contain or affect habitat for the Rio Grande cutthroat trout (SFEIS pages 61-69).
61.40	What conservation strategies, if any, have been developed for Rio Grande Cutthroat Trout and other sensitive species listed in the FEIS that may be adversely affected by the Project (see Forest Service Manual section 26212).	Conservation strategies have been developed for a number of species including the Rio Grande cutthroat trout, but none of these species are considered to be adversely affected by the project.
	Rocky Mountain Elk	

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61.33	F. Rocky Mountain Elk (Cervis elaphus nelsoni) Why is the Project allowing elk habitat to be disturbed for up to six years when the Forest Plan limits logging disturbance to no more than three years (SFEIS, p.36 and MIS, p.65)?	What is stated in the Forest Plan is that a primary objective for timber sales is to limit logging disturbance in an activity area to no more than 3 years whenever possible on each timber sale. The activity area is defined as a cutting unit and logging disturbance as the harvesting of trees and not the stand improvement done after harvesting. The Agua/Caballos FEIS covers numerous activity areas—not all being harvested at the same time. Within each activity area, logging disturbance is planned for completion within 3 years.
61.34	Please document compliance with Forest Plan direction for elk (MIS, p.64 to 68).	See response to Comment 61.33. Also the project would provide for enhancement of forage in winter and summer range. Hiding and thermal cover would provide for needs of both current and future elk populations. Open road density would drop from 2.7 to 1.7 miles per square mile. Also see *Mitigation Measures* of the 2002 FEIS (particularly riparian areas, pp. 55-56) for compliance with the Forest Plan. The Record of Decision will also include seasonal limitations of operation to protect primary elk calving areas. [FP, Wildlife and Fish-9 and 213]
61.35	Explain why mule deer were dropped from the SFEIS analysis when they were included with elk in the earlier FEIS?	In the FEIS, the biologist grouped elk and mule deer together since the project would have similar impacts on both species. However, the SFEIS only deals with effects to management indicator species identified in the Carson Forest Plan. The mule deer is not a management indicator species for the forest; therefore, it was not included. The effects analysis for mule deer is in the FEIS (pp. 159-168).
The following responses to comments made in the 2002 FEIS (letters 21, 26 and 43) are updated and replace the responses in Appendix B of the 2002 FEIS.		
	Northern Goshawk	
21.04 [253]	The DEIS fails to acknowledge recent documented declines of both spotted owls and northern goshawks in Region 3. Forest Service reports from the past two years show clear declines in numbers and abundance and nesting success for these two species of concern. The DEIS failed to mention these declines, and relies upon	When this comment was received, the "Management Recommendations for the Northern Goshawk in the Southwest" (also known as the goshawk guidelines) were the subject of litigation and the Forest Service could not comment on the case. In light of a recent 9th Circuit Court opinion (CV-00-01711-

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	Region 3 management guidelines that have not been successful to protect these species. It also failed to mention the controversy surrounding the Goshawk Guidelines and the Mexican spotted owl Recovery Plans - which are currently being challenged by the SW Center For Biological Diversity. NEPA requires such disclosure of scientific uncertainty and controversy, etc. Please address these concerns in the Final EIS.	RCB), the FEIS for the Amendment of Forest Plans "failed to disclose responsible scientific opposition to the conclusion upon which it is based." [351] The plaintiffs argued that scientific information existed that supports the contention that the goshawk is an old growth forest habitat specialist and does not use a range of habitats, including multiple forest age classes (or structural stages), forest edges, and openings as Reynolds and others found in developing MRNG for Southwestern forests. The Court has directed the Forest Service to address the responsible opposing viewpoint over habitat preferences of the goshawk in a Supplement to the FEIS and issue a new decision. In the interim, the 1996 Amendment has not been enjoined or found to be wholly inadequate by the Court and continues to be used as region-wide Forest Plan direction for the goshawk, as well as the Mexican spotted owl. In response to the opposing viewpoint that the northern goshawk is an old growth specialist—not a habitat generalist—Reynolds conducted an exhaustive literature review (Reynolds 2004). [357] The intent of the review was to assemble and synthesize information on habitat use by the northern goshawk and determine if the available information supports the contention that the goshawk is an old growth forest habitat specialist or whether they use a range of habitats, including multiple forest age classes (or structural stages), forest edges and openings. Over 180 documents were reviewed, including peer-reviewed publications, theses, reports and draft manuscripts for information on how goshawks use habitats in both the breeding season and in winter. The review focused on habitat used by goshawks in North America. In order to address this and other public comments on goshawk habitat preferences, a discussion has been included in this final supplement (Chapter 3, *Wildlife*) relating what Reynolds found in his review and how his conclusions apply to the Agua/Caballos analysis area and, in particular, to Alternative G - the preferred alternative.
26.06 [253]	Northern goshawk One native species that will be especially impacted by the	Surveys for the goshawk within the Agua/Caballos analysis area began back in 1991. Formal surveys for the goshawk have been done over the years with positive results. Two

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	forest service's flawed wildlife management strategy in the El Rito Ranger District is the northern goshawk. This accipiter is dependent upon closed canopy conifer and aspen forests, and finds ideal habitat within mature and old growth stands. In the Rockies, Schuster (1980) found the goshawk preferred the oldest stands of aspen and throughout pine and mixed conifer forests, goshawks almost always select nest sites located in the oldest most structurally diverse stands. The northern goshawk has evolved physical characteristics that enable it to hunt most efficiently in relatively mature, dense forest structures. Because of this, clearcutting or overstory removal will negatively affect the prey base of the goshawk by drastically altering the mature forests that are essential to the blue grouse, cottontail rabbit, hairy woodpecker, northern flicker, red squirrel, Stellar's jay, and Williamson's sapsucker.	have been done over the years with positive results. Two goshawk nest sites were located as well as replacement nest areas. PFAs were established in these two areas meeting the "Management Recommendations for the Northern Goshawk in the SW United States." Within these two PFAs there would be no harvest within nest areas or replacement nest areas. Timing restrictions would be in place for breeding and rearing of young. Small patch cuts along with thinning from below may occur in some parts of the PFAs. Threshold habitat along with allocated old growth for the Agua/Caballos analysis area has been incorporated in all alternatives. Alternative G **does not include any clearcutting or overstory removal**. The effects of Alternative G on the northern goshawk, its habitat and various prey species (Abert's squirrel, red squirrel, hairy woodpecker and blue grouse) are thoroughly analyzed for the Agua/Caballos analysis area in the FEIS [323] and this Final Supplement to the FEIS (Chapter 3, Affected Environment and Environmental Consequences, *Wildlife*) and the biological assessment and evaluation as amended. [263] The analysis identifies the goshawk's preference for nesting habitat consisting of large, old trees in ponderosa pine, mixed conifer and aspen, as well as, a variety of forest types and conditions (young to old forests) with patches of dense trees, developed herbaceous and/or shrubby understories and habitat attributes (snags, down logs, small openings) for fledging young and prey. In reviewing Shuster (1980), habitat needs and management objectives are identified and consistent with the "Management Recommendations for the Northern Goshawk in the Southwestern U.S." (Reynolds et al. 1992) and the Aqua/Caballos FEIS. Shuster's findings for nest site preference include: (1) nests located in live large trees; (2) all nests immediately adjacent to small openings; (3) all nests had both natural openings and clearcuts within 350 meters of a nest tree; and (4) nest sites had sparse open understory (Shuster 1980). This is not contrary to Reynolds and other researchers (Reynolds 2004). Northern goshawk habitat on the Carson National Forest is in fair condition with a stable trend. There is generally high nest

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		fidelity on the forest with some repeat occupancy on the nest sites being monitored. However, there are likely alternate nesting locations for the known post-fledging areas yet to be located.
	Mexican Spotted Owl	
26.07 [253]	Mexican spotted owl The Agua/Caballos timber sale area contains restricted owl habitat, and has been included in USFWS' critical habitat designation. As such, the, timber sale area is vital for long term recovery of owl populations. Despite this fact, the Agua/Caballos DEIS assures the reviewer that no owls have been "positively identified" in the area and that conditions are not right for the species. However, the US Fish and Wildlife Service has noted in regard to the Agua/Caballos timber sale (letter to Forest Supervisor from USFWS, 8/31/94) that owl surveys within northern New Mexico in the past have been "far from exhaustive" and "undetected owls could be inhabiting areas within or adjacent to the [Agua/Caballos] analysis area. The USFWS suggest that, according to Region 3 protocol, owl surveys should be conducted in the area at least 1 year prior to implementation of the timber sale. The USFWS states further concerns with the timber sale in regards to "isolated patches of suitable habitat [that] may be crucial for an owl population."	At the time this comment was addressed in the 2002 FEIS, the Final Rule designating Mexican spotted owl (MSO) critical habitat had been published. [294A] Neither the Agua/Caballos analysis area, nor the Carson National Forest was included in the designation. On November 18, 2003, the U.S. Fish and Wildlife Service published a proposal to designate critical habitat for the Mexican spotted owl on National Forest System lands (68 FR 65020). [350] The western portion of the Agua/Caballos analysis area is within the proposed critical habitat. Since Alternative G includes activities within proposed MSO critical habitat, the Carson National Forest initiated conferencing in December 2003. [352] Each of the constituent elements was evaluated in an Addendum to the Biological Assessment and Evaluation. [263 and 352] In a conference report (2/9/2004) responding to the addendum, the U.S. Fish and Wildlife Service (USFWS) states, "…we concur with the El Rito Ranger District determination that the action as proposed may affect, not likely to adversely affect proposed critical habitat for the owl." The agency adds that we may request the conference report as a letter of concurrence issued through informal consultation if critical habitat for the owl is designated in the project area. [359] In addition, the USFWS has concurred with the Forest Service's determination of "may affect, but is not likely to adversely affect" the Mexican spotted owl for Alternative G. [304] In its letter, the USFWS explains that "this concurrence is based on the following reasons: (1) surveys were completed and no owls are currently known to occupy the area; (2) impacts to restricted habitat are expected to be insignificant or discountable as described above; (3) potential foraging and future nest/roost habitat is likely to be improved due to the increased habitat diversity and reduced risk of catastrophic wildfire; and (4) the projects are consistent with the owl

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		recovery plan." The USFWS letter of concurrence does not include required surveys, but states that if future surveys find listed species in habitat where they have not been previously observed, the Forest Service should contact the USFWS to verify the determination and concurrence is still valid. The effects on proposed critical habitat and the species are also addressed in Chapter 3, *Wildlife* of this final supplement to the FEIS.
43.02 [300]	No mention is made in the new DEIS regarding the recent USFWS proposed Critical Habitat for the Mexican spotted owl. How will this affect this project and how will the Forest Service address Critical Habitat protections for the owl in the Agua-Caballos analysis area? – Was a new Section 7 consultation conducted with USFWS regarding this issue and also regarding the new alternatives? No mention was made in the new DEIS of USFWS concurrence on the alternatives C and G; also – was a Biological Evaluation (B.E.) done for this new Supplement? No mention of it in project record list on page A-8. The B.E. (Biological Evaluation) for the new Alt. C and G should have been included in the Supplement DEIS.	Please refer to response to comment 26.07 regarding MSO critical habitat. The May 3, 1999 BAE was amended to incorporate the effects of Alternative G on February 16, 2000. [263] This amendment was sent to the USFWS for its concurrence. Concurrence was received on October 30, 2000. [304] As indicated these documents are in the Project Record.

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