United States Department of Agriculture

Forest Service

Southwestern Region

Draft Supplement to the Final Environmental Impact Statement for Amendment of Forest Plans

Arizona and New Mexico

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Draft Supplement to the Final Environmental Impact Statement for Amendment of Forest Plans

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Arizona and New Mexico

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Abstract: The Forest Service, Southwestern Region, is preparing a supplement to the "Final Environmental Impact Statement (FEIS) for Amendment of Forest Plans" to disclose, review, and assess scientific arguments challenging the agency's conclusions over the northern goshawk's habitat preferences. The supplement will update the FEIS which amended the 11 forest plans in the region for northern goshawk, Mexican spotted owl, and old-growth standards and guidelines in June 1996.

The supplement to the FEIS is being prepared in accordance with an opinion filed November 18, 2003, by the Ninth Circuit Court of Appeals (CV-00-01711-RCB) which held that the Final EIS failed to disclose responsible scientific opposition that was addressed in the project record. The original Notice of Intent for this plan amendment was published in the Federal Register on June 24, 1992 (57 FR 28171). The supplement will address the issue of scientific arguments over the northern goshawk's habitat preference and update the "Final EIS for Amendment of National Forest Management Plans in the Southwestern Region." The Final EIS includes guidelines for management of habitat for the Mexican spotted owl and northern goshawk. The Final EIS was noticed for availability in the Federal Register on November 3, 1995 (60 FR 55841). The Record of Decision was signed June 5, 1996. Copies of the Final EIS and Record of Decision are available on the Internet at *www.fs.fed.us/r3/projects/index.shtml*.

Reviewers should provide the Forest Service with their comments during the review period of the draft supplement to the final environmental impact statement. This will enable the Forest Service to analyze and respond to the comments at one time and to use information acquired in the preparation of the final supplement to the final environmental impact statement, thus avoiding

undue delay in the decisionmaking process. Reviewers have an obligation to structure their participation in the National Environmental Policy Act process so that it is meaningful and alerts the agency to the reviewers' position and contentions. Vermont Yankee Nuclear Power Corp. v. NRDC, 435 U.S. 519, 553 (1978). Environmental objections that could have been raised at the draft stage may be waived if not raised until after completion of the final environmental impact statement. City of Angoon v. Hodel (9th Circuit, l986) and Wisconsin Heritages, Inc. v. Harris, 490 F. Supp. 1334, 1338 (E.D. Wis. 1980). Comments on the draft environmental impact statement should be specific and should address the adequacy of the statement and the merits of the alternatives discussed (40 CFR 1503.3).

Send Comments to:	Harv Forsgren Southwestern Regional Forester Attn: Goshawk SEIS Team 333 Broadway Blvd., SE Albuquerque, New Mexico 87102
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Send Electronic Comments to:	comments-southwestern-regional-office@fs.fed.us

Date Comments Must Be Received:

Contents

I – Reynolds, R. T. 2004. Is the northern goshawk an old-growth forest specialist or a habitat generalist?

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V – Titus, K., C. J. Flatten, and R. E. Lowell. 1994. Northern goshawk ecology and habitat relationships on the Tongass National Forest. Final Annual Project Report, Alaska Department of Fish and Game.

W – Crocker-Bedford, C. D. 1994. Conservation of the Queen Charlotte Goshawk in southeast Alaska. 1994. 39pp.

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Y – Snyder, H. 1995. Apache goshawk conservation biology in southwest Arizona. Arizona Game and Fish Department Heritage Grant-in-Aid project I92065. Final Report April 1995. 35pp.

Z – Woodbridge, B. and P. J. Detrich. 1994. Territory occupancy and habitat patch size of northern goshawks in the southern Cascades of California. Studies in Avian Biology 16:83-87.

AA – Suckling, K., et al. 1994. Comments on the Draft Environmental Impact Statement and Proposal to Amend Ten National Forest Land Management Plans. December 1, 1994.

Summary

The Forest Service, Southwestern Region, is preparing a supplement to the "Final Environmental Impact Statement (FEIS) for Amendment of Forest Plans" to disclose, review, and assess scientific arguments challenging the agency's conclusions over the northern goshawk's habitat preferences. The supplement will update the FEIS which amended the 11 forest plans in the region for northern goshawk, Mexican spotted owl, and old-growth standards and guidelines in June 1996. The FEIS includes guidelines for management of habitat for the Mexican spotted owl and northern goshawk. The original Notice of Intent to prepare an environmental impact statement (NOI) for the plan amendment was published in the "Federal Register" on June 24, 1992 (57 FR 28171). The FEIS was noticed for availability in the "Federal Register" on November 3, 1995 (60 FR 55841). The Record of Decision was signed June 5, 1996.

The supplement to the FEIS is being prepared in accordance with an opinion filed November 18, 2003, by the Ninth Circuit Court of Appeals (CV-00-01711-RCB) which held that the FEIS failed to disclose responsible scientific opposition that was addressed in the project record. This supplement to the FEIS will address the issue of scientific arguments over the northern goshawk's habitat preference and update the Southwestern Region's "FEIS for Amendment of Forest Plans."

Background

Based on concerns over the viability of the northern goshawk in the Southwestern United States the USDA Forest Service (Forest Service) Regional Forester for the Southwestern Region (Arizona and New Mexico) created the Northern Goshawk Scientific Committee to review the habitat management needs for the species.

In August 1992, the Northern Goshawk Scientific Committee published General Technical Report RM-217, "Management Recommendations for the Northern Goshawk in the Southwestern United States." This report concluded that the northern goshawk occupied a mosaic of forest types, forest ages, structural conditions, and successional stages in their daily foraging movements throughout the southwest's deciduous and mixed conifer forests. The report then set forth recommendations describing the desired balance of forest age classes or vegetation structural stages (VSS) for the nest area, post-fledging area, and foraging area of the goshawk's range in the Southwestern United States.

Previous to release of the technical report on June 24, 1992, the Forest Service published a Notice of Intent to prepare an environmental impact statement amending forest land and resource management plans (Forest Plans) in the Southwestern Region to incorporate guidelines for habitat management of the northern goshawk.

Following a request for public comment the Forest Service received comments and letters from the Arizona Game and Fish Department, the New Mexico Department of Game and Fish, and the U.S. Fish and Wildlife Service, among others. The Arizona Game and Fish Department submitted a letter and accompanying report titled, "Arizona Game and Fish Department Review of U.S. Forest Service Strategy for Managing Northern Goshawk Habitat in the Southwestern United States." This report presented a differing conclusion over the habitat preferences of the northern goshawk than that presented in General Technical Report RM-217.

Much correspondence over the Forest Service's General Technical Report RM-217 and the Arizona Game and Fish Department's letter and accompanying report ensued between the Forest Service and Federal and state game management agencies. In addition, on June 15, 1994, the Forest Service completed the "Goshawk Opinion Paper: A Response to Arizona Game and Fish

Department Review of U.S. Forest Service Strategy for Managing Northern Goshawk Habitat in the Southwestern United States."

Partially in response to public and agency comment, the Forest Service created an interagency team—the Goshawk Interagency Implementation Team—to discuss implementation of General Technical Report RM-217 recommendations, as well as to identify concerns raised and propose revisions to those recommendations.

In August 1994, the Forest Service issued the "Draft Environmental Impact Statement for Amendment of Forest Plans" (DEIS) which displayed and analyzed environmental impacts of alternative approaches to amending the region's forest plans. Within its range of alternatives the DEIS proposed an alternative consistent with the recommendations found in General Technical Report RM-217 (Alternative C). It also proposed an alternative (Alternative D) with a range of vegetative structural stages with higher percentages of old-growth percentages than that found in Alternative C. Alternative D was patterned after DEIS comments submitted jointly by the Arizona and New Mexico state game agencies. The state game agency input depicted in Alternative D is a slight variation from the recommendations developed by the Goshawk Interagency Implementation Team and from information depicted in the report RM-217.

Following its issuance, the Forest Service offered, received and considered public comments on the DEIS. Wildlife biologist D. C. Crocker-Bedford, the Arizona Game and Fish Department, the New Mexico Department of Game and Fish, and the Center for Biological Diversity, among others, submitted comments to the DEIS. These comments, once again, challenged General Technical Report RM-217's conclusions on the habitat preferences of the northern goshawk. Several of the comment letters received cited additional research and scientific studies that were released after publication of General Technical Report RM-217 and supported the position that the northern goshawk preferred vegetative structural conditions with higher proportions of dense canopy mature forests, particularly in the foraging areas.

In October 1995, the Forest Service issued the "Final Environmental Impact Statement for Amendment of Forest Plans" (FEIS). The FEIS included minor changes to Alternatives C and D. Alternative D was revised to include standards and guidelines that reflect verbatim comments submitted by the Arizona Game and Fish Department and the New Mexico Department of Game and Fish resulting in a slight variation from the recommendations developed by the Goshawk Interagency Implementation Team and that detailed in General Technical Report RM-217.

The FEIS also included an alternative that was developed to respond to the Mexican Spotted Owl Recovery Plan (Alternative G). Alternative G included standards and guidelines for the northern goshawk that were developed in early May 1995, and considered all known information from the Goshawk Interagency Implementation Team recommendations, Arizona Game and Fish Department and New Mexico Department of Game and Fish comments, and experience gained during implementation of interim direction.

Following release of the FEIS, the Forest Service provided an opportunity to interested parties to submit comments. On June 5, 1996, the Regional Forester issued the "Record of Decision for Amendment of Forest Plans: Arizona and New Mexico" (ROD) which selected Alternative G, as detailed in the FEIS, for implementation.

An administrative appeal opportunity was afforded to those individuals and organizations who had been involved in the process. The Southwest Center for Biological Diversity, partnering with

the Southwest Forest Alliance and the Forest Conservation Council, filed an administrative appeal on July 23, 1996. Their appeal was one of 13 appeals on the ROD. An appeal point in the Southwest Center for Biological Diversity appeal contended that the Forest Service did not consider the best available scientific information. The June 5, 1996, Record of Decision was affirmed on all 13 appeals by the Appeal Deciding Officer for the Chief of the Forest Service.

In 2000, the Center for Biodiversity filed suit charging that the decision did not adequately evaluate opposing viewpoints in the FEIS. In adopting the ROD, the suit alleged the Forest Service failed to maintain the scientific integrity of its NEPA process because the FEIS failed to discuss or analyze reliable and relevant scientific studies describing the northern goshawk's habitat and foraging needs. Specifically, plaintiffs claimed the FEIS omitted from its review any discussion of at least nine scientific studies and/or reports whose conclusions contradicted the finding and recommendations mentioned in the FEIS.

The District Court granted summary judgment in favor of the Forest Service in a 2001 opinion. On November 18, 2003, the Ninth Circuit Court reversed and remanded the District Court's opinion stating:

> *While the agency is not required to publish each individual comment in the final statement, the regulations clearly state that the agency must disclose responsible opposing scientific opinion and indicate its response in the text of the final statement itself. The mere presence of the information in the record alone does not cure the deficiency here.*
>
> *Accordingly, we find that the Final EIS fails to disclose and discuss responsible opposing scientific viewpoints in the final statement itself in violation of NEPA and the implementing regulations.*

This "Draft Supplement to the Final Environmental Impact Statement for Amendment of Forest Plans" (DSEIS) is intended to remedy the deficiency found by the Ninth Circuit Court of Appeals. That is, disclose, review, and assess alternative points of view and scientific perspectives to those used by the Agency in formulating Alternative G, the preferred alternative.

Supplemental Pages

This "Draft Supplement to the Final Environmental Impact Statement for Amendment of Forest Plans" in Arizona and New Mexico contains replacement pages for pages 6-9 of Chapter 2 and pages 19-23 of Chapter 3.

Public Comment Process

The Forest Service, Southwestern Region has prepared this "Draft Supplement to the Final Environmental Impact Statement for Amendment of Forest Plans" in Arizona and New Mexico.

The draft supplement to the FEIS is available for review at USDA Forest Service, Southwestern Regional Office, 333 Broadway Blvd., SE, Albuquerque, NM 87102. The draft supplement to the FEIS is also available on the Internet at *www.fs.fed.us/r3/projects/index.shtml*. Additional information regarding this action can be obtained from: Lou Woltering, Deputy Director of Wildlife, Southwestern Region, 333 Broadway Blvd., SE, Albuquerque, NM 87102. The purpose of this comment period is to provide an opportunity for the public to provide early and

meaningful participation on a proposed action prior to a decision being made by the responsible official.

The Environmental Protection Agency will publish a Notice of Availability (NOA) for the draft supplement to the FEIS in the "Federal Register." Written, facsimile, hand-delivered, oral, and electronic comments concerning this action will be accepted for 45 days following that date. The publication date of the NOA in the "Federal Register" is the exclusive means for calculating the comment period for a proposed action documented in a draft EIS. Those wishing to comment should not rely upon dates or timeframe information provided by any other source.

Written comments must be submitted to: Harv Forsgren, Southwestern Regional Forester, Attn: Goshawk SEIS Team, 333 Broadway Blvd., SE, Albuquerque, New Mexico 87102. The office business hours for those submitting hand-delivered comments are 8 a.m.to 5 p.m., Monday through Friday, excluding holidays.

Oral comments must be provided at the responsible official's office during normal business hours via telephone at (505) 842-3800 or in person.

Electronic comments must be submitted in a format such as an e-mail message, plain text (.txt), rich text format (.rtf), and Word (.doc) to *comments-southwestern-regional-office@fs.fed.us.* Comments must have an identifiable name attached or verification of identity will be required. A scanned signature may serve as verification on electronic comments.

Comments received in response to this solicitation including names and addresses of those who comment, will be considered part of the public record on this DSEIS and will be available for public inspection. Comments submitted anonymously will be accepted and considered, however, those who submit anonymous comments will not have standing to appeal the subsequent decision under 36 CFR 217.

Additionally, pursuant to 7 CFR 1.27(d), any person may request the Agency to withhold a submission from the public record by showing how the Freedom of Information Act (FOIA) permits such confidentiality. Persons requesting such confidentiality should be aware that, under the FOIA, confidentiality may be granted in only very limited circumstances, such as to protect trade secrets. The Forest Service will inform the requester of the Agency's decision regarding the request for confidentiality, and where the request is denied, the Agency will return the submission and notify the requester that the comments may be resubmitted with or without name and address within 7 days.

The following pages
replace pages 6-9
in the Southwestern Region's
"Final Environmental Impact Statement
for Amendment of Forest Plans"

CHAPTER 2 • ALTERNATIVES

A. ALTERNATIVE DEVELOPMENT

A preliminary review of Southwestern Region forest plans was conducted in 1993. The review identified the plan changes that would result from incorporating current Mexican spotted owl and northern goshawk management direction into existing forest plans. The Regional Forester also identified needed changes in the silvicultural emphasis, old-growth allocation and steep slope (40 percent +) logging practices. The review also identified other standards and guidelines in the forest plans that may conflict with management direction proposed to be added to the forest plans.

A proposed action was developed based on the forest plan review, known management knowledge for the Mexican spotted owl and northern goshawk, and the changes identified by the Regional Forester. A summary of the proposed forest plan changes was developed as a Scoping Report that was sent to the public for review in late 1993 (see Chapter 5 of this environmental impact statement for more information).

The National Environmental Policy Act requires that a “no action” alternative be developed for this environmental impact statement (see Alternative A). Alternative B was described in the Scoping Report as the initial proposed action. Three additional alternatives were developed in early 1994 based on comments received on the Scoping Report. Alternative C was developed by modifying Alternative B with the wording and content changes suggested by Scoping Report commenters. Alternative C was identified in the draft environmental impact statement (DEIS) as the proposed action of the Forest Service. Alternative D was developed from suggestions submitted by the Goshawk Interagency Implementation Team. Alternative E was developed from suggestions submitted by Applied Ecosystems, Inc. Alternative F was based on suggestions by the Apache-Sitgreaves National Forests for an ecosystem approach to vegetation management.

A DEIS was released for comment as documented in a Notice of Availability in the Federal Register on August 19, 1994. The notice identified a formal comment period ending on December 01, 1994 (a total of 104 days). Comments on the DEIS that were submitted late were considered if they were received prior to May 1, 1995 (a total of 151 extra comment period days).

DEIS commenters suggested changes in several of the alternatives. All of the action alternatives depicted in the final EIS are within the range of environmental effects disclosed in the draft EIS. The changes made in the FEIS are consistent with the intent of existing regulations (40 CFR 1503.4). A summary of the changes for each alternative follows.

Alternative A was modified to reflect resource management direction in forest plans that existed prior to Forest Service adoption of special interim management guidelines for the Mexican spotted owl and northern goshawk. The public asked for this change to make the “no action” alternative a better baseline for comparison of the true resource and socioeconomic impacts from adopting final Mexican spotted owl and northern goshawk guidelines.

Alternative C was separated from Alternative F because comments received stated that the presentation in the DEIS of the paired alternatives was confusing. This combined alternative was identified as the Agency’s preferred alternative in the DEIS.

Alternative D was adjusted to reflect comments received from the Arizona and New Mexico state game agencies. The northern goshawk standards and guidelines depicted in Appendix E for Alternative D are a verbatim rendition lifted directly from their jointly submitted DEIS comment letter and replace input previously supplied from the Goshawk Interagency Implementation Team. The Mexican spotted owl standards and guidelines were adjusted to reflect information in the Mexican Spotted Owl Recovery Plan.

Alternative E was not changed from draft to final EIS.

Alternative G was added after the draft based on many comments received that the Agency needed to respond to the Mexican Spotted Owl Recovery Plan (MSORP). The MSORP was released for public review in March 1995. A team of Federal scientists, including a recovery plan team member, developed Alternative G standards and guidelines for both birds in early May 1995 (see Chapter 4 for Team information). This team translated the MSORP into forest plan standards and guidelines and also developed northern goshawk standards and guidelines considering existing Forest Service direction, Goshawk Interagency Implementation Team recommendations, and the DEIS comment letter submitted by the state game agencies.

Among avian biologists and within the research community there are commonly agreed upon components of goshawk biology, habitat needs, and management direction for management of the northern goshawk. These are the foundation from which goshawk guidelines in the action alternatives are developed. For this reason, action alternatives will have similar approaches to northern goshawk management direction.

The primary difference between the action alternatives is variation in the standards and guidelines related to the foraging areas that will ultimately be included in the amendment of Southwestern Region forest plans. This variation represents differing scientific opinion on the characteristics of foraging areas used by goshawks. Appendix E of this final environmental impact statement contains the standards and guidelines applicable to each alternative.

B. ALTERNATIVES DROPPED FROM DETAILED STUDY

The original proposed action (Alternative B) that was depicted in the Scoping Report has been dropped from detailed study. The many commenters to the Scoping Report, both internal and external to the Agency, suggested wording changes that helped clarify the intent of the amendment. The changes are minor and have been incorporated in Alternative C. The expected environmental effects of Alternative B would not be any different that those expected for Alternative C. Alternative C has been carried forward as an alternative discussed in detail.

C. ALTERNATIVES CONSIDERED IN DETAIL

1. Objectives Common to Alternatives: The objectives stated in Chapter 1 of this environmental impact statement for the proposed action are exactly the same for all action alternatives.

2. Alternative Mitigation: This environmental impact statement is a programmatic document. Site-specific mitigation measures have not been described for any of the alternatives. The wording of key standards and guidelines peculiar to each alternative are displayed in Appendix E. The broad, programmatic environmental effects of the alternatives are predicted based on the standards and guidelines in each alternative. Site specific environmental effects will be analyzed and disclosed during the Southwestern Region's integrated resource management process for individual projects implemented under the umbrella of the amended forest plans.

3. Alternative Descriptions: Six alternatives are displayed in detail in this environmental impact statement. Each of the alternatives represent different ways to incorporate programmatic management guidance into project implementation, a different emphasis on management tools used and/or a different set of specific management direction (e.g., different wording for standards and guidelines). For specific details on how the standards and guidelines would vary by alternative, review Appendix E of this final environmental impact statement.

A comparison of the basis for development of each alternative is summarized in Table 1 at the end of this section of the supplement to the final environmental impact statement.

Alternative A: Alternative A is the "no action alternative" required by National Environmental Policy Act regulations (40 CFR Part 1502.14(d)). In the context of this programmatic environmental impact statement, Alternative A would continue existing forest plan direction for Mexican spotted owl and northern goshawk management. Formal consultation related to the Mexican spotted owl would be sought on any and all forest management activities deemed to "may affect" the owl. New direction for the two birds would not be added to forest plans until they are revised beginning in 2005 and ending in approximately 2010. Old-growth

allocation percents would still vary from forest to forest. Even-aged management would be the emphasized silvicultural tool. The Apache-Sitgreaves, Carson, Coconino, and Kaibab National Forests plans would maintain the existing Mexican spotted owl standard for a 300-acre core area around each occupied nest, even though on-the-ground management would be guided by biological opinions issued by the Fish and Wildlife Service. The Apache-Sitgreaves, Carson, Cibola, Coconino, and Prescott National Forests Plans would maintain the existing northern goshawk standard for a 20- to 30-acre core area around occupied nests. The Kaibab would provide 8-chain buffers around occupied nests. No other northern goshawk protection would be provided. Steep slope (slopes 40 percent +) harvest solely for timber production purposes would still be a possible activity on the Apache-Sitgreaves, Gila, Lincoln, and Santa Fe National Forests, but not on any of the other forests.

Alternative C: Alternative C would incorporate Mexican spotted owl and northern goshawk management direction into forest plans through the forest plan amendment process described in the National Forest Management Act regulations (36 CFR 219). Old-growth standards and guidelines would be the same for every national forest in the Southwestern Region. The specific areas for old-growth allocation (20 percent) within each management area and old-growth block size would be determined during the site-specific integrated resource management analysis conducted for specific projects. In areas where existing old-growth was surplus to identified ecosystem needs, the best would be allocated to old-growth. All existing old-growth would be retained in areas where the old-growth age classes were deficit. Additional lands will be allocated and managed for future old-growth where needed to meet the 20 percent guideline. Uneven-aged silvicultural will be emphasized over other methods. The option of using even-aged silvicultural methods would be determined in the integrated resource management process during the site specific analysis for projects implementing forest plans. Mexican spotted owl guidance would follow the direction stated in Interim Directive #2 plus dispersal habitat considerations. Northern goshawk guidance would be very similar to that which is presented in the report “Management Recommendations for the Northern Goshawk in the Southwestern United States” (RM-217).

Alternative D: This alternative is patterned after DEIS comments submitted jointly by the Arizona and New Mexico state game agencies. The standards and guidelines for northern goshawk management are a verbatim rendition from their comment letter. The state game agency input depicted in this alternative is a slight variation from the recommendations developed by the Goshawk Interagency Implementation Team and from information depicted in the report “Management Recommendations for the Northern Goshawk in the Southwestern United States” (RM-217).

Alternative D is exactly like Alternative G with respect to Mexican spotted owl management guidance and silvicultural emphasis. Steep slope logging would be allowed for reasons other than timber production. Appendix E depicts the specific standards and guidelines for managing the forested areas.

The management approach detailed in Alternative D is the Arizona and New Mexico state game agencies’ alternative which integrates selected scientific papers and their conclusions on northern goshawk habitat preferences together with the commonly agreed upon components of goshawk biology and habitat needs (See Table 2). This management approach is based heavily on the view that northern goshawk require foraging areas containing large, unbroken blocks of old forest.

Alternative E: This alternative is patterned after Scoping Report comments received from Applied Ecosystems, Inc. Mexican spotted owl standards and guidelines generally follow Interim Directive #2 like Alternative C, but define smaller core and territory acreages (core areas 300 to 400 acres; territories 750 to 950 acres). The northern goshawk standards and guidelines are similar to those in Alternative C, except there is less VSS class 4-6 acreage and reduced canopy cover percents in the nonnest portion of the territory. Old-growth would be allocated as 10 percent of the area with no specific block size minimum defined. Steep slope logging would be allowed for reasons other than timber production. Alternative E also includes the addition of standards and guidelines to guide ecosystem planning, to address forest health concerns, and to guide implementation of other standards and guidelines.

Alternative F: This alternative was developed by the staff on the Apache-Sitgreaves National Forests as an example of an ecosystem approach to management for the Mexican spotted owl. This alternative is like Alternative C except that a demonstration area would be established on the Apache National Forest to test an adaptive ecosystem approach to management of the mixed-conifer type (i.e., primary Mexican spotted owl habitat). The total acres of mixed-conifer type on the Apache National Forest is 168,244. This demonstration area stratifies the mixed-conifer type into six ecological zones. Management emphasis for each zone would be in accordance with prescribed standards and guidelines to manage for specific vegetation desired condition in the mixed-conifer rather than the Mexican spotted owl guidelines depicted in Alternative C. The ecological zones are based on primary aspect and degree of slope. Zone 1 is north aspect greater than 40 percent slope, Zone 2 is north aspect 20-39 percent slope, Zone 3 is north aspect 0-19 percent slope, Zone 4 is south aspect greater than 40 percent slope, Zone 5 is south aspect 20-39 percent slope, and Zone 6 is south aspect 0-19 percent slope. Overlapping these zones are areas that currently have administrative decisions that prohibit, or otherwise are set aside to not receive commercial timber harvest. These overlapping areas include: wilderness, primitive areas, research natural areas, all slopes greater than 40 percent, areas allocated for old-growth through previous NEPA decisions, and old-growth allocated through this proposal to protect Mexican Spotted owl habitat. This combined area constitutes 71,223 acres of the total mixed conifer area (168,244 acres), or 42 percent of the mixed conifer that would receive no commercial harvest under this proposal. Where commercial harvest is allowed, the following management emphasis will be applied: Zone 2 (north-facing slopes) would be managed for timber harvest only on slopes less than 40 percent and would emphasize uneven-aged condition utilizing single tree selection, Zone 3 (north-facing slopes) would be managed for timber harvest but again would emphasize uneven-aged conditions using single tree selection, group selection, or small group shelterwood methods. In Zones 5 and 6 (south-facing slopes), the area would be managed for a balance of an uneven-aged and even-aged condition.

For all other areas of the region (including nonmixed conifer zones on the Apache National Forest), all standards and guidelines as depicted in Alternative C would be implemented in this alternative. This alternative would still rely on the integrated resource management process to make the site specific project design decisions. A brief comparison of the different zones in the Apache National Forest mixed-conifer is presented in Table 3 at the end of this EIS chapter.

Alternative G: This alternative was developed to respond to the Mexican Spotted Owl Recovery Plan (see Chapter 4 for standards and guidelines team information). Standards and guidelines for the northern goshawk were developed in early May 1995, and considered all known information from the Goshawk Interagency Implementation Team recommendations, the state game agency letter that responded to the draft, and experience gained during implementation of the interim direction. Appendix E contains the specific language for standards and guidelines that are associated with this alternative.

Under Alternative G, the standards and guidelines for managing across the landscape represent an ecosystem management approach. The approach used for managing goshawk habitat areas provides for many wildlife species, timber and forage. As a result, the standards and guidelines for ecosytem management in goshawk habitat areas are not focused on any single species or element.

Alternatives D and G: Alternative D differs from Alternative G in that Alternative D calls for higher stand densities outside of post-fledging family areas than called for in Alternative G. These areas include woodland, ponderosa pine, mixed conifer, and spruce-fir forest cover types in the southwestern United States. In addition, all other forest types may be considered to be important habitat. Higher densities called for in Alternative D are designed to result in and promote a more closed canopy or denser forest with older trees in these areas. Alternative D also calls for the blocks with higher canopy closure to vary in size while Alternative G manages for the same canopy closures only within small groups.

The intent of Alternative D is to sustain approximately 40 percent of the landscape in old

forest (large old trees) through time. This will be achieved by maintaining the existing mature (VSS 5) to old forest (VSS 6) structure across the landscape until an average of 20 percent of the landscape contains VSS 5 and 20 percent contains VSS 6 (AGFD, 1993). Similarly, Alternative G strives to maintain the same 20/20 percentage of VSS 5 and VSS 6 across the landscape. The difference between Alternatives D and G relative to mature and old forest is that Alternative D has an objective to sustain as much mature and old forest across the landscape as possible in larger blocks.

Table 4 at the end of this section of the supplement to the FEIS summarizes the habitat attribute differences for the northern goshawk between Alternative D and Alternative G. Both alternatives originate out of commonly agreed upon habitat components for the northern goshawk. Table 4, then, displays differing scientific viewpoints on northern goshawk management beyond the commonly ageed upon components in Table 1. Alternative D represents scientific viewpoints that call for larger blocks of old and mature forest than called for in Alternative G.

D. FOREST SERVICE PREFERRED ALTERNATIVE

The Forest Service preferred alternative is Alternative G. Alternative G was developed to respond directly to and implement the guidelines in the Mexican Spotted Owl Recovery Plan. It was developed in collaboration with the Fish and Wildlife Service (including a recovery team member).

As new information becomes available during implementation of the Mexican Spotted Owl Recovery Plan, the standards and guidelines (Alternative G) incorporated by amendment in forest plans will be adjusted accordingly.

As each national forest undertakes it's respective National Forest Management Act revision, this amendment language will be reanalyzed in the context of any anticipated changes in current forest plan management direction.

Chapter 3 contains a complete discussion of the expected programmatic cumulative effects from amending forest plans to include new standards and guidelines for the Mexican spotted owl and northern goshawk. Other forest plan standards and guidelines were also adjusted when they appeared to conflict with planned management direction for the two birds.

Table 1 – Comparison of Basis for Development of Alternatives

Alternative	Alternative Development Criteria
A	No Action Alternative – Required under the National Environmental Policy Act: Reflects resource management direction in forest plans that existed prior to Forest Service adoption of special interim management guidelines for the Mexican spotted owl and northern goshawk.
B	Initial Scoping Proposed Action – Dropped from Detailed Study
C	DEIS Proposed Action (Modification of Alternative B – Initial Scoping Proposed Action): Mexican spotted owl guidance would follow direction stated in Interim Directive #2 (June 1990, FSM 2676) plus dispersal habitat considerations. Northern goshawk guidance would be very similar to the "Management Recommendations for the Northern Goshawk" (MRNG) report (RM-217).
D	Adjusted Goshawk Interagency Implementation Team Recommendations - Reflects comments received from Arizona and New Mexico state game agencies. Northern goshawk standards and guidelines are verbatim from jointly submitted DEIS comment letter and replace input previously supplied from the Goshawk Interagency Implementation Team. The Mexican spotted owl standards and guidelines were adjusted to reflect information in the Mexican Spotted Owl Recovery Plan.

E	Applied Ecosystems, Inc. Suggestions - Mexican spotted owl standards and guidelines generally follow Interim Directive #2 (June 1990, FSM 2676). Northern goshawk standards and guidelines are similar to those in Alternative C.
F	Apache-Sitgreaves National Forest Suggestions - Mexican spotted owl guidance would follow direction stated in Interim Directive #2 (June 1990, FSM 2676) plus have a demonstration area on Apache-Sitgreaves National Forests. Northern goshawk guidance would be very similar to the MRNG report (RM-217).
G	Mexican Spotted Owl Recovery Plan Integration Alternative - Developed to respond to the Mexican Spotted Owl Recovery Plan. Standards and guidelines for the northern goshawk were developed in early May 1995, and considered all known information from the Goshawk Interagency Implementation Team recommendations, the joint Arizona and New Mexico Game Agencies letter that responded to the draft, and experience gained during implementation of the interim direction.

Table 2 – Commonly Agreed Upon Northern Goshawk Habitat Componets

Component	Description/Discussion
Percent of Landscape in VSS 6	The overall landscape contains approximately 20 percent in VSS 6 (24+ dbh).
VSS 1 Component	Many of the food components (primary prey species) necessary for the reproductive biology of the northern goshawk require meadows and open areas (VSS 1).
Nest Areas	Habitat components (age class, canopy closure, density) of nest areas are commonly agreed upon and are essential for the northern goshawks reproduction. Goshawks use the densest stands available for nest areas. Specific values of tree sizes, density and canopy closure vary depending on the characteristics of the ecosystem.
Older Age Classes	The importance and need of forests in older age classes (VSS 5 & 6) is widely recognized. The quantity and arrangement across the landscape of such age classes is not generally agreed upon, particulary in unpublished work.
Growth Rates	The knowledge that tree growth in the Southwest is a limiting factor in forest structural stage development is widely recognized. The rate of establishment and growth of forest structure and composition limits habitat both spatially and temporally.
Snags and Down Woody Material	The importance of snags and down woody material across the landscape is an important habitat element for maintenance of a prey base.

Table 3 - Comparison of Zones as Described in Alternative F

Zone Delineation	Slope (Percent) and Aspect	Total Acres	Treatment Available Acres	Management Emphasis
1	40%+ Slopes; North Aspects	23,915	None	Natural Evolution
2	20-39%+ Slopes; North Aspects	39,510	22,853	Uneven-aged – single tree selection only

3	0-19%+ Slopes; North Aspects	35,000	29,918	Uneven-aged – all methods
4	40%+ Slopes; North Aspects	11,470	None	Natural Evolution
5	29-39%+ Slopes; North Aspects	24,736	14,866	Balanced Uneven-aged and Even-aged
6	0-19%+ Slopes; North Aspects	33,613	29,384	Balanced Uneven-aged and Even-aged
Totals		**168,244**	**97,021**	

Table 4 – Habitat Attribute Differences between Alternative D and Alternative G for the Northern Goshawk

Attribute	Alternative Comparison
Vegetation Types	Alternative D only addresses ponderosa pine habitat. Alternative G addresses woodland, ponderosa pine, mixed conifer, and spruce-fir habitats.
Target Tree Age in VSS 6	Both alternatives call for 20 percent in VSS 6 (24"+ dbh). Both alternatives call for the same target age of 250+ years for areas designated as post-fledgling family area (PFA). For the remainder of the landscape outside the post-fledging areas, Alternative D calls for 250+ years while Alternative G calls for 200+. The difference is that for a regulated forest on a 20-year entry, Alternative D will have fewer regeneration treatments or fewer openings than Alternative G per entry.
Group Size	Both alternatives call for management at the group, patch, site, and landscape levels[1]. Alternative D calls for canopy closure restrictions for not only the small group/patch scale, like G, but also at the site and larger scale. Alternative D calls for: (1) up to 20 percent of the landscape for even-aged management for sites up to 100 acres in size; (2) large blocks of mature stands with densities managed at the site or larger scale; and (3) retaining denser patches for hiding and thermal cover in addition to the percentages outlined for each VSS class. Alternative G mimics the natural forest conditions prior to settlement which consisted of small groups of trees and the canopy restrictions and stocking levels are based only at this small scale and tracked at the larger scales.
Old-growth and Canopy Density of VSS 5 and 6	Both alternatives require that 20 percent of the area outside the nest areas and across the landscape be maintained in VSS 6 and 20 percent in VSS 5. VSS 5 areas meet most but not all of the criteria for old-growth. However, the primary difference of Alternative D, from that of Alternative G, is management scale, densities and the limitations on regulation of the flow of VSS 5 and 6 across space and time.
Canopy Density VSS 3 (9-12" dbh)	Only Alternative D has canopy closure restrictions on VSS 3, thereby slowing growth and development into larger VSS classes.

[1] Long, J. N. and Smith, F. W. 2000

Hiding and Thermal Cover Allocations	Only Alternative D retains guidelines for hiding and thermal cover allocations for goshawk prey and other wildlife. Alternative G calls for no allocations as it was not needed with the change from even-aged to uneven-aged management.
Resulting Herb/Shrub Understory	The herbaceous and shrub understory amounts are in direct proportion to canopy closure. The higher the closure, the less sunlight available to develop herb/shrub understories. Alternative D will have significantly less herb/shrub understory in the larger blocks of old and mature forest based on the projected crown closure and longer target ages resulting in less regeneration.
Large Trees	Both alternatives have similar target amounts for VSS 5 and 6. However, with the higher tree and crown densities in Alternative D, growth of individual trees will be significantly slower and restoration of large trees across the landscape will take significantly more time under Alternative D than in Alternative G. Such increases may not be possible with higher stocking levels due to potential loss of forest structure from fire, insects, and disease.
Spatial Distribution of Structural Components and VSS Classes	Alternative D will have structural components and VSS classes significantly less spatially distributed across the landscape than Alternative G because of the broad scales at which densities are being managed.
Even-aged vs. uneven-aged forest structures	Alternative G calls for uneven-aged management and resulting forest structure. Alternative D allows up to 20 percent of the landscape to have even-aged management with the remaining areas using uneven-aged management. Mixing management of uneven-aged at the group scale with even-aged at the site level restricts ability to provide all structural components, such as large trees, at the group level and achieve target percentages of age classes adequately distributed over space and time such as 20 percent of VSS6.

The following pages replace pages 19-23 in the Southwestern Region's "Final Environmental Impact Statement for Amendment of Forest Plans"

This copy remains the same as the original document. Changes begin at the "TES Species (34)" section.

TES Species (34)

Affected Environment

Within the Southwestern Region, there are 44 species currently listed and 10 species proposed for listing under the Endangered Species Act (ESA). In addition, 414 species found within the region on national forests are considered to be "sensitive." The region's sensitive species program is designed to meet species needs, to maintain the species and their habitats, and to eliminate the need for listing under the ESA (Forest Service Manual 2670.21).

The two species of concern for these plan amendments—the Mexican spotted owl and the northern goshawk—are widespread throughout the Southwest and the threat to the species is based on habitat degradation on a landscape scale. Other sensitive species within this category would be sharp shinned hawk, pine grosbeak, and the flammulated owl. Other species like the Gould's wild turkey are sensitive to landscape patterns; however, the reason the turkey is sensitive is the limited habitat in the United States is the northernmost extension of its range, and it is rare because of this and not because of any changes to landscape patterns.

Many of the rare species are vulnerable to disturbances due to their limited distribution. Most species require site specific mitigation that will be proposed and analyzed within the analyses of individual projects. An accepted ecological approach is to do analyses at multiple scales, one above and one below that needed to analyze the site specific action. This type of analysis can only be done at the project level and is beyond the scope of this regional programmatic analysis.

Environmental Effects

The implementation of new forest plan standards and guidelines on the ground will not instantaneously coincide with the issuance of the Record of Decision based on this EIS. A transition

period will be needed to get to full implementation of the amendment. In the short term of 5 to 10 years, the effect of the new standards and guidelines with respect to desired on-the-ground conditions will vary little between the alternatives. The true ramifications of the differences between alternatives can be easily ascertained when reviewing the expected long-term environmental effects.

In all alternatives, the risk is high that catastrophic events will occur within the next decade (see analysis concerning forest health). With greater restrictions, areas with high tree densities continue to increase in density and the associated risk also continues to increase. It is impossible to know what the size or intensity will be for a given event. Even though fire and insects are a part of the ecosystem, the current conditions are not “normal” and represent stressed ecosystems. The impact of any event will much more likely be catastrophic. Depending on the size of the event, such a catastrophic event has the potential of fragmenting the landscape or it may have the potential to greatly reduce the number of large old trees that currently exist.

The areas most at risk are the areas with the highest tree densities. These are the areas restricted or protected for the Mexican spotted owl and the northern goshawk and these are the areas of greatest importance to the conservation of these two species. What is sustainable for these two species as well as other species tied to old forests appears to not be sustainable in the long term (200+ years) due to losses to insects and fire. However, the ecosystem as a whole (ecosystem defined as the vegetative community with all of its associated animal component) has to be sustainable.

Alternative A is the “no action” alternative where existing plan direction is continued. Basically this alternative would emphasize even-aged management with a rotation length not to exceed 120 years in all areas outside of areas allocated for old-growth and wilderness. Cable logging is allowed on steep slopes. Protection for biological diversity is limited to mitigations for specific habitat needs. Mitigations are generally limited in scope (e.g., protection for the northern goshawk limited to a buffer around nest trees). Old-growth associated species like the Mexican spotted owl and the northern goshawk will have limited habitat primarily associated only with the areas set aside for old-growth and wilderness. Special habitat components, like snags and large down logs, are limited in scope with guidelines that include only a limited percentage of the suitable timber base. Surveys for the Mexican spotted owl and the northern goshawk are limited. For the northern goshawk, there is a heavy dependence on timber markers to find nesting sites. The existing grazing standards and guidelines generally call for the existing stocking to be in line with capacity in the first or second decade. Not all existing plans have specific utilization rates for grazing animals.

The existing forest land management plans throughout the region were documented not to be adequate for Mexican spotted owl and northern goshawk. The existing plans would also have an adverse affect on the listed Mt. Graham red squirrel and Sacramento Mountain thistle and may cause the following sensitive species to trend toward listing: northern goshawk, flammulated owl, sharp-shinned hawk, Kaibab squirrel, Jemez salamander, Sacramento Mountain salamander, Kaibab pincushion cactus, Arizona leatherflower. Many of the aquatic species are trending toward listing under current plan implementation due to grazing management. The species identified are limited to those within the forested habitats. Many other species may be impacted by current management under existing plans; however, with the exception of grazing utilization rates, these species are in other habitats (e.g., desert, aquatic, etc.) and are outside the scope of this analysis.

The flammulated owl and the sharp-shinned hawk depend on old-growth and would be adversely impacted if old-growth was limited only to that designated to be set aside. Conservation strategies are being prepared for the Jemez salamander, Sacramento Mountain salamander, and Kaibab pincushion cactus and may ultimately lead to amendment of forest plans. The Mount Graham red squirrel and Sacramento Mountain thistle have existing recovery plans. The Arizona leatherflower is a Category 1 species and is being considered for listing based on its limited range. Current mitigation is probably adequate as protection against disturbance; however, current plans do not have specific direction for this plant species.

Alternatives C and F articulate the Mexican spotted owl and the northern goshawk habitat requirements

into standards and guidelines. This alternative does not represent the most current knowledge for the Mexican spotted owl that has been published in the recovery plan. The proposed demonstration area on the Apache National Forest in Alternative F would depart from the recovery plan.

Since these alternatives do not fully implement the current Mexican spotted owl recovery plan, it would have an adverse affect on the Mexican spotted owl and may not lead to its recovery. The grazing utilization rates would be restricted to occupied owl and goshawk territories and would not be applied across the landscape. Numerous sensitive species tied to aquatic ecosystems may be impacted with a possible trend toward listing. The listed southwestern willow flycatcher would continue to be adversely affected due to current grazing management.

Alternative D is very similar to Alternative G. The primary difference is that it is written in a more "regulatory" format. This alternative calls for territory establishment if a landscape approach is not used. It is recommended that a landscape approach be used (similar to Alternative G). Alternative G calls for additional surveys if needed while this alternative specifically calls for 2 years of surveys. Alternative D calls for all trees to be grown to at least 250 years, while Alternative G uses 200+. Alternative G recommends a range for reserve trees where Alternative D recommends 4 trees per acre in ponderosa pine. Alternative D recommends maintaining all existing standards and guidelines for hiding and thermal cover. Alternative G does not address it; therefore, there is no change in these standards and guidelines. Alternative D addresses old-growth as it relates to "blocks."

Alternative G proposes to restore or maintain a minimum of 20 percent of the landscape as old-growth. It does not specify the use of "blocks." Instead, patterns are to be provided that provide for a flow of old-growth functions and interactions at multiple scales across the landscape through time. The 20 percent is the amount of the landscape and not specific acres. Alternative G is similar to Alternative D in that all existing old-growth is to be maintained.

The same standards for Mexican spotted owl described in Alternative G also apply for Alternative D. Therefore, the affects on Mexican spotted owl will be the same, "not likely to adversely affect." Grazing utilization rates would apply only to occupied territories; therefore, the effects of grazing on MSO will be the same as Alternatives C and F.

In addition to not likely to adversely affect Mexican spotted owl, Alternative D would have a beneficial affect on the following sensitive species: flammulated owl, sharp-shinned hawk, and Kaibab squirrel. Without change in grazing in all cover types, Alternative D would not change the current adverse impacts on aquatic species outside MSO and northern goshawk habitat identified in Alternative A.

Alternative E stresses conditions that favor sustainability of the vegetation over sustainability of the northern goshawk. This alternative has many benefits over the existing standards and guidelines currently found in the forest plans. It is highly likely that, as we learn more about the ecosystem and the needs of specific wildlife species, desired vegetative conditions may approach what is described in this alternative. However, as stated in the section immediately before discussion of the individual alternatives, both the vegetative communities as well as the associated animal species must be sustainable but conditions described for either side are usually different due to the lack of knowledge concerning the ecosystems.

Since this alternative does not fully implement the current Mexican spotted owl recovery plan, it would have an adverse affect on the Mexican spotted owl and may not lead to its recovery. Numerous sensitive species tied to aquatic ecosystems may be impacted with a possible trend toward listing. The listed southwestern willow flycatcher would continue to be adversely affected due to current grazing management.

Standards and guidelines for the northern goshawk are limited only to occupied areas and do not allow for population expansion or shifts. Guidelines pertaining to nest size, percent of area in VSS 4, 5, and 6, and the number of reserve trees have lower values than those found in the goshawk recommendations. It is not clear how long trees would be allowed to grow. It is stated that old-growth be limited to 10 percent of the land area under management. Trees outside of these old-growth areas will be allowed only enough time to grow to

the size defined within the different VSS classes and the VSS 6 would not have the age that would exhibit old-growth characteristics.

This alternative would have an adverse affect on northern goshawk. It may also have an adverse affect on other sensitive species, i.e., sharp-shinned hawk and flammulated owl. Listed and sensitive species tied to aquatic ecosystems that are currently being impacted by the current application of grazing will continue their adverse impact or continue their trend toward listing.

Alternative G incorporates the needs of the Mexican spotted owl and northern goshawk. The science behind the needs are contained in two publications, “Mexican Spotted Owl Recovery Plan” and “Management Recommendations for the Northern Goshawk in the Southwestern United States” (GTR RM-217, 1992). Both publications endorse the concept of managing ecosystems; however, only the recommendations for the Northern Goshawk incorporates a long-term approach. Recovery recommendations for the spotted owl are for the short term and take precedence over all other recommendations for nonlisted species because of its listed status under the Endangered Species Act.

This alternative deals primarily with the habitat of these two species which consists of the forested ecosystems of pinyon-juniper, pine-oak, ponderosa pine, and mixed conifer. With the exception of grazing management modifications, existing standards and guidelines outside of these ecosystems will essentially remain unchanged.

Under the Mexican spotted owl recommendations all protected activity centers (PACs) and slopes > 40 percent will be protected with no timber harvest being allowed. All areas with ponderosa pine/gamble oak and mixed conifer vegetative types will be “restricted.” In restricted areas, all sites meeting "threshold" conditions will be maintained with no timber harvest of trees > 12" dbh. The harvest of trees between 12" and 24" dbh will only be allowed within restricted areas outside of those sites meeting target conditions and only on up to 20 percent of the restricted areas. Trees over 24" dbh will be maintained everywhere within the restricted and protected areas. Excess trees to be harvested will be based on a “Q” of 1.4 or less. A more detailed description is contained in “Draft Mexican Spotted Owl Recovery Plan,” March 1995.

Under the northern goshawk recommendations, all nest sites and post-fledgling areas (PFAs) will be restricted with higher stocking levels (canopy cover). All areas outside of PFAs will have the desired stocking levels correlating to an average of 40 percent canopy cover with a high contrast both above and below. As stated above for both the Mexican spotted owl and the northern goshawk the landscape will contain trees that are uneven-aged allowing for more large, old trees. A more detailed discussion of the recommendations are contained in, “Management Recommendations for the Northern Goshawk in the Southwestern United States.” (RM-217)

Two listed species, Sacramento Mountain thistle and Mount Graham red squirrel, could be impacted due to the restrictions that would not allow the Forest Service to do any vegetative manipulation in “protected” areas (i.e., PACs, steep slopes, and stands that meet threshold conditions). Without being able to reduce fuels, the Mount Graham red squirrel will continue to be at greater risk to wildfires. Without being able to reduce tree densities and lessen the potential risks from catastrophic fires, springs and seeps containing Sacramento Mountain thistle will be impacted with the possible loss of springs and seeps. Within the limited habitat for these two listed species, management activities necessary to implement their recovery plans will take precedence and will be exempt from the conflicting Mexican spotted owl standards and guidelines.

Possible disturbance could adversely affect the Kaibab pincushion cactus and Arizona leatherflower. A conservation strategy is being formulated for the Kaibab pincushion cactus. Alternative G has the flexibility to mitigate any adverse impacts at a project or site level. Until such time as conservation strategies, recovery plans or agreements are developed and approved, the entire range of these two species will be exempt from the proposed action except on a case-by-case basis subject to consultation with the Fish and Wildlife Service.

In addition to the forest structure, the health of the herbaceous and shrub components of the ecosystem is also important for the prey species associated with the Mexican spotted owl and the

northern goshawk. To maintain this part of the ecosystem, grazing utilizations rates are proposed. These rates differ based on range condition with the intent of maintaining good to excellent range conditions where they exist and to restore range that is in poorer condition. Ecologically it makes little sense to limit the utilization rate guidelines to only Mexican spotted owl and northern goshawk habitat; therefore, the utilization guidelines are being proposed across the landscape in all vegetation cover types.

For all listed species, Alternative G may affect, but will not adversely effect any species. For all sensitive species, Alternative G may impact, but no species will trend toward Federal listing and there will be no loss of viability.

Due to the proposed grazing utilization rates, there will be a beneficial effect on all listed and sensitive species tied to riparian and aquatic habitats where degradation of habitat due to grazing has been contributed as the primary reason for listing (e.g., southwestern willow flycatcher) or for including a species within the regional sensitive species list (e.g., numerous native fish species).

Review of Pertinent Information Concerning Habitat Management for the Northern Goshawk

This section of the DSEIS reviews and discusses scientific points of view, which differ from, or are contrary to those used to develop the "Management Recommendations for the Northern Goshawk in the Southwestern United States" **(**MRNG**)** which resulted in Alternative G. It provides an assessment of those differing points of view in terms of whether or not the findings in those papers would result in a change in the Agency's preferred alternative and, ultimately, its decision.

This section also presents information which was developed after the 1996 amendment, but relates to the disclosure of pertinent information concerning northern goshawk habitat management.

The discussion was facilitated by a review of the contrary scientific points-of-view written by Reynolds et al. 2001. This section then draws conclusions based in part on the review, thereby providing a reasoned discussion of the relevant but differing scientific points-of-view concerning habitat management for northern goshawk.

The scientific debate concerns the degree to which northern goshawk requires old or mature forest with dense closed canopies. While all goshawk scientists agree that some old or mature forest is needed within goshawk home ranges, they differ over the necessary amount and arrangement of such forest.

A. This review is based in part on the following documents printed before the 1996 amendment:

1. A paper by Crocker-Bedford and Chaney, 1988, titled "Characteristics of Goshawk nesting Stands," published in 1988 in the Proceedings of the Southwest Raptor Management Symposium and Workshop, Tucson, Arizona.
2. A second paper by Crocker-Bedford titled "Goshawk Reproduction and Forest Management," The Wildlife Society Bulletin Vol. 18, No. 3, Fall 1990.
3. A paper by Ward, Ward and Tibbitts, April 1992, titled "Canopy Density at Goshawk Nesting Territories on the North Kaibab Ranger District, Kaibab National Forest," Final Report, Arizona Game and Fish Department.
4. A letter from the U.S. Fish and Wildlife Service on August 13, 1992 commenting on the "Recommendation for Goshawk Management in the Southwestern Region."
5. An Arizona Game and Fish Department white paper of May 1993 outlining their concerns for the "Recommendation for Goshawk Management in the Southwestern Region."
6. A letter from New Mexico Department of Game and Fish, November 28, 1995 commenting on the final environmental impact statement.
7. Nine papers written and/or published between 1993 and 1994, which reported on studies of northern goshawk habitat use and preferences;
    - Hargis et al. (1994)
    - Smith and Mannan (1994)
    - Austin (1993)
    - Beier (1994)

- Titus *et al.* (1994)
- Crocker-Bedford (1994)
- Crocker-Bedford (1995)
- Snyder (1995)
- Woodbridge and Detrich (1994)

8. A document of December 1, 1994, titled "Comments on the Draft Environmental Impact Statement and Proposal to Amend Ten National Forest Land Management Plans" by Suckling et al.
9. A document of March 1996, by The Wildlife Society, on Technical Review 96-2 of "Northern Goshawk Management in the Southwestern United States" by Braun et al.

B. This review is also based on the following documents printed after the 1996 regional amendment:

1. A paper by Beier and Drennan titled "Forest Structure and Prey Abundance in Foraging Areas of Northern Goshawks," published in "Ecological Applications," 7(2), 1997.
2. A document of October 30, 2001, titled "Review of Supplemental Information Relevant to Habitat Management for the Northern Goshawk in the Southwestern United States" by Reynolds et al.
3. Reynolds et al. 2003, Rocky Mountain Research Station Progress Report titled "Population Ecology, Demographics, Habitat, and Genetics of the Northern Goshawk on the Kaibab Plateau, Arizona."
4. An unpublished paper by Crocker-Bedford April 10, 2003, titled "Habitat Effects on Northern Goshawks."
5. R.T. Reynolds (January 9, 2004) conducted a review of over 180 documents including peer-reviewed publications, theses, reports, and draft manuscripts for information on how goshawks use habitats in both the breeding season and winter, titled "Is the Northern Goshawk an Old-growth Forest Specialist or a Habitat Generalist?"
6. A 2004 Wildlife Society Technical Review 04-1, titled "The Status of Northern Goshawks in the Western United States," by Anderson et al.

Key points from all these documents are summarized in the following sections.

A.1. In their paper of 1988, Crocker-Bedford and Chaney reported on a 3-year study which evaluated nesting habitat of the northern goshawk on the North Kaibab Ranger District, Kaibab National Forest, in northern Arizona. Their results demonstrated that goshawks nest in the densest stands available under the conditions of the North Kaibab. They found that goshawks totally avoided nesting in stands with less than 60 percent canopy cover and most preferred having more than 80 percent canopy cover. Their study also showed that goshawk nesting stands had much higher densities of large trees than were otherwise present in the typical stand on the North Kaibab.

A.2. In his 1990 paper, Crocker-Bedford reported on a study designed to experimentally test the adequacy of nest habitat buffers for maintaining goshawk reproduction. This study also occurred on the North Kaibab Ranger District. Although the data showed an average territory included 2.3 known nest trees, Crocker-Bedford believed there were 3. He also found that nest buffers, either large or small, did not maintain goshawk reproduction. Where timber harvest had occurred around buffers, reproduction rates were 75-80 percent lower and nestling production was 94 percent lower. Crocker-Bedford also stated that "Goshawk nesting density appears to be closely associated with dense overstories and open understories."

A.3. In their 1992 "Final Report" Ward, Ward and Tibbitts discussed the results of their investigation on the relationship between goshawk breeding activity and changes in canopy density on the North Kaibab Ranger District of the Kaibab National Forest. They found that active territories had a higher proportion of stands with 40-60 percent canopy closure classes than did inactive territories. They also found active territories had a greater percentage of stands with 60-80 percent canopy closure. They surmised that relatively closed canopy, mature forest conditions, recognized as critical goshawk nest stands, are also important across wider areas of goshawk home range.

A.4. On August 13, 1992, the USDA Forest Service, Southwestern Region received a letter from the Regional Director of the Southwest Region of the U.S. Fish and Wildlife Service (Service) providing preliminary comments to the "Recommendations for Goshawk Management in the Southwestern

Region." The Service stated, "The recommendations are founded on a series of premises which are poorly supported by the published data. They are:

1. That little information is available on goshawk foraging habitat, but what exists suggests they are habitat generalists;
2. That in the Southwest, goshawks are limited by prey base;
3. That the most important goshawk prey species in the Southwest are known;
4. That enough is known of the 14 prey species' biology to define and manage for their habitats; and,
5. That suitable goshawk foraging habitat and sufficient prey will be provided by managing for those prey species."

In their letter, the Service discussed their concerns with each premise individually. Concerning premise number one, the Service stated "A considerable body of literature contradicts the recommendations' position that goshawk foraging habitat is poorly understood. This literature also contradicts the recommendations' characterization of the goshawk as a "forest habitat generalist." The Service suggested that the recommendations used flawed reasoning in suggesting that, because goshawks may encounter a mosaic of forest types in their home ranges, they use all of those forest types. The Service then cites several authors (Fischer 1986, Kenward 1982, Bloom et al. 1985, Crocker-Bedford 1990) among others to support the argument that goshawks prefer to nest and forage in large tracts of closed canopy, older or mature forest. In a concluding statement, the Service noted, "The majority of published evidence suggests that the recommendations' forest mosaic will be inferior or unsuitable goshawk habitat."

Concerning premise number two, the Service noted, "The recommendations' observation that goshawks, like some raptors, should be limited by prey availability is valid. However, the recommendations only consider simple prey abundance, not prey availability." The Service goes on to say that "Prey availability is a function of prey abundance, and the susceptibility of prey to the foraging ecology of the goshawk. Plentiful literature demonstrates that the goshawk is specialized to capture prey in the complex structural environment of a forest."

In their comments on premise three, the Service stated that "The Service believes the recommendations were developed with too little information on goshawk diets in the Forest Service Southwestern Region. Creating the structural forest environment to which goshawks are adapted will create availability of prey."

Regarding premise four, the Service concluded, "The recommendations built a management prescription based on vaguely understood habitat needs of 14 species, rather than the better understood habitat needs of the goshawk."

In their summary statement regarding premise five the Service said, "The available information suggests that the converse is more scientifically sound. By providing the mature forest to which goshawks are behaviorally and morphologically adapted, prey availability will be provided."

A.5. The Service, like the Arizona Game and Fish Department (AZGF), also commented on the use of minimum values instead of targets. The argument here is that by managing for minimum values, goshawk habitat quality will be degraded over time.

In May of 1993 the AZGF released a document titled "Review of U.S. Forest Service Strategy for Managing Northern Goshawk Habitat in the Southwestern United States." In that document the department raised a concern for the management of foraging areas for northern goshawk, specifically that application of the interim guidelines and implementation guidelines for the foraging area will result in forest conditions which do not adequately meet the needs of the goshawk and other wildlife species.

They further stated, "they consider the goshawk a 'forest habitat specialist' that is strongly associated with mature, dense forest structure in many forest types." To support this argument the AZGF cited Mannan and Smith 1993, Austin 1991, Kennedy 1989, Hargis et al. 1994, Crocker-Bedford 1990a, Fischer 1986 and Ward et al. 1992. The AZGF cited these studies as supporting the perspective that northern goshawk and its prey prefer mature forest with dense canopies. The AZGF also stated a concern that more open foraging areas would give a competitive advantage to other raptors.

A.6. In their letter of November 28, 1995, the New Mexico Department of Game and Fish (NMDGF) provided comments on the "Final Environmental Impact Statement for Amendment of Forest Plans," Southwestern Region. They stated, "The department finds the preferred Alternative (G) to be a substantial improvement over previous alternatives in the draft EIS, in that it appears that an opportunity to accomplish ecosystem management goals is provided." The NMDGF did have two concerns: (1) that a lack of specificity in standards and guidelines may provide too much flexibility for interpreting the intent of management, and (2) that no discussion of the benefits of fire or insects to forest structure is provided.

A.7. The following nine papers are variously cited in the literature as supporting the argument that northern goshawk is a habitat specialist that requires mature or old forest with large trees and dense canopies in both the nesting stand and the foraging area.

A.7.i Hargis et al*.* 1994 conducted a study of habitat use by northern goshawks on the Inyo National Forest located on the eastern slopes of the southern Sierra Nevada Mountains in California. They radio tracked eight females and two males over the three summers of the project. They found that the 10 adults they tracked were associated with 6 territories. The results of this study are widely cited by other authors. However, their results are often only partially cited (personal communication on April 2, 2004 between Dr. Hargis and Wally Murphy).

In the "Discussion and Management Implications" section of their document Hargis et al. reported that:

"By using areas that were geographically removed from their nest stands, goshawks were able to include vegetation types and patterns that were generally uncommon, such as riparian vegetation, wet meadows and old-growth stands adjacent to meadows or pumice flats."

"Our telemetry data indicated that perched goshawks tended to be found in well-canopied stands with large trees. This location may have provided hunting perches, thermal cooling, or protective cover. The selection of areas with high diversity corresponds to the degree of interspersion used by common goshawk prey species."

"Regardless of the absolute values, goshawks in our study selected stands that were denser than the average available, both for nesting and foraging, as measured by basal area, canopy closure, and the number of trees in all five diameter classes. The selection for stands with the most canopy cover and largest trees can be translated to the site potential for different regions. Yet our study indicates that goshawks select areas that are vegetatively diverse for foraging, including numerous aggregations of mature trees for nest stands and perch sites."

In conclusion Hargis et al*.* stated "within the home range of the goshawk, emphasis should be placed on creating or maintaining vegetation diversity, retaining mature timber around permanent water sources and along forest-open edges, and ensuring that a portion of the range provides forest stands that have structural attributes similar to those found at the nest site for each particular geographic area."

A.7.ii. In 1993, Mannan and Smith produced a document titled "Habitat Use by Breeding Male Northern Goshawks in Northern Arizona, Final Report," USDA Forest Service Cooperative Agreement No. 28-C1-556. In 1994 after changing senior authors, Smith and Mannan published the results of the same study in "Studies of Avian Biology," No. 16:58-65, 1994. This review cites the second document.

As a basis for their study Smith and Mannan equipped five and nine male goshawks with radios in 1991 and 1992 respectively. The study was conducted on the North Kaibab Ranger District, Kaibab National Forest, in northern Arizona. The main pattern they found was that the mean rank of relative preference of all hawks increased with increasing canopy closure. Smith and Mannan acknowledged the limitations of their measurements of canopy closure from aerial photos, but stated "our findings support the general idea of maintaining relatively high canopy closure over a significant portion of areas managed for foraging goshawks."

A.7.iii. As part of a Masters Degree program at Oregon State University, Austin 1993 studied 10 radio-equipped northern goshawks on the Shasta-Trinity and Klamath National Forests in the Southern Cascade Mountains of northern California. In this study, Austin investigated home range size in relation to two objectives: (1) estimate the average

home range, and (2) describe the use of habitats within home ranges by breeding goshawks.

Austin found that: (1) Goshawks selected the closed-mature/old-growth habitat with more than 40 percent average canopy closure, and (2) early successional forest or unforested areas seemed to be less important, i.e., seedling/sapling/grass-forb.

Because of her study, Austin recommended that at least 20 percent of the management area be in closed-mature/old-growth habitat (trees greater than 21 inches dbh and average canopy closure over 40 percent.

A.7.iv. Beier (1994) authored "Selection of Foraging Habitat by Northern Goshawks on the Coconino National Forest," Arizona Game and Fish Department Heritage Grant Project Number 1-94025, Progress Report. Beier investigated habitat selection within the home range, rather than how home ranges are located in a larger landscape. Beier tracked 16 radio-tagged adult goshawks.

Beier found that prey abundance did not seem important in selection of foraging areas by goshawks. He stated, "The most striking finding was that used plots showed enormous variation in vegetation structure, the range of sites used by goshawks was impressively broad." He also found that used plots had more trees overall, more trees in the 8-16" dbh class and >16" dbh size class, and more trees > 18m tall.

A.7.v. Titus et al. (1994) prepared a Final Annual Project Report, for the USDA Forest Service, Alaska Region, Tongass National Forest, "Northern Goshawk Ecology and Habitat Relationships on the Tongass National Forest." This study had five objectives:

1. Locate additional goshawk nest sites and characterize nest site objectives;
2. Determine goshawk home ranges and habitat associations using radio telemetry;
3. Evaluate the diet of goshawks during the nesting period;
4. Determine the short-term dispersal distances and survival rates of juvenile goshawks when possible; and
5. Assess subspecific variation in A.g. laingi for southeast Alaska.

Relevant to this discussion Titus et al. found that 83 percent of the goshawk nests they discovered were located in old-growth stands and 17 percent were located in 90+ year-old second-growth stands.

A.7.vi. In May of 1994, Crocker-Bedford C.D. prepared "Conservation of the Queen Charlotte Goshawk in Southeast Alaska" as an appendix to "A Proposed Strategy for Maintaining Well-Distributed, Viable Populations of Wildlife Associated with Old-Growth Forests in Southeast Alaska" by Suring et al. Crocker-Bedford reported that "Closed canopies appear to provide preferred microclimate in the nesting stand, increased productivity of some important prey species, and reduced competition and predation by open-forest raptors. In southeast Alaska, 92 percent of the relocations on radio-tagged goshawks were in old-growth forests having over 8 mbf/ac. Old-growth having over 20 mbf/ac. was preferred."

Crocker-Bedford cited numerous authors including; Allen 1978, Speiser and Bosakowski 1987, Reynolds et al. 1992, Hall 1984, and Hennessy 1978 to support the argument that goshawks typically nest in taller mature or old-growth forest stands, either coniferous or deciduous, which have relatively dense canopies. Crocker-Bedford also cited a paper he coauthored with Chaney (1988) where they stated, "a demonstrated preference for nesting in stands of large trees with dense canopies, and suggested such preference was associated with similar stands in the vicinity used for foraging. Also, closed canopies may be associated with overall prey abundance."

A.7.vii. Crocker-Bedford (1995) presented a paper at the annual meeting of the Raptor Research Foundation, Goshawk Symposium, November 3, 1994, Flagstaff, Arizona, titled "Northern Goshawk Reproduction Relative to Selection Harvest in Arizona." In an abstract of his presentation, Crocker-Bedford (1995) separated 53 nest clusters into four categories: 12 in assumed home ranges which had received little or no harvesting (1973-1986); 14 which had selection harvesting on 10-39 percent of each home range area; 16 which had harvesting on 40-60 percent of each home range area; and 11 which had selection harvesting 1973-1986 on 70-90 percent of each home range. For the 4 categories,

respectively occupancy rates were 83 percent, 43 percent, 31 percent and 0.00 (P, 0.001). Crocker-Bedford summarized his conclusion with, “These and other data could indicate some real decline in the local breeding population and productivity, and/or represent movement of successful breeders from more logged to less logged areas.”

A.7.viii. In April of 1995, H. Snyder published a Final Grant-In-Aid report for the Arizona Game and Fish Department titled, “Apache Goshawk Conservation Biology in Southeast Arizona.” This study was based on a 1-year contract between the AZGF and the Coronado National Forest. Snyder had eight goals, two of which are pertinent to this discussion: to produce a database containing nest-area locations and habitat measurements, including maps and photographs, for use by resource managers and to describe the foraging range and habitat utilization of selected pairs in three different habitats, with emphasis on the use by the Apache goshawk of oak woodlands. Snyder noted, “Most goshawk habitat on the study area is extremely disjunct, and in the case of four pairs a complete search was relatively easy because the area was relatively small and much of the intervening terrain was sparsely vegetated with rocky outcrops and cliffs. It is interesting that no nests were found in aspen although a special effort was made to search for nests in these areas.” Snyder also reported a minimum of 50 percent or greater canopy closure at nest sites.

A.7.ix. In 1994, Woodbridge and Detrich published “Territory Occupancy and Habitat Patch Size of Northern Goshawks in the Southern Cascades of California,” in “Studies in Avian Biology,” No. 16:83-87. In this study Woodbridge and Detrich describe spatial patterns of habitat use by nesting goshawks at four levels of resolution: nest trees, nest stands, territories (clusters of nest stands) and spacing between territories. In this study Woodbridge and Detrich found the following: (1) that mean occupancy rates of habitat components increased as spacial scale increased from nest trees to nest stands and nest stand clusters, and (2) despite intensive timber harvest and fragmentation of mature forest, their study area supported high densities of nesting goshawks.

A.8. On December 1, 1994 a coalition of environmental groups led by the Southwest Center for Biological Diversity provided comments on the “Draft Environmental Impact Statement and Proposal to Amend Ten National Forest Land Management Plans,” prepared by Suckling et al. In this document, Suckling et al. provided an extensive review and critique of the “Management Recommendations for the Northern Goshawk in the Southwestern United States” (MRNG), pages 17-28.

In their assessment, Suckling et al. begin by critiquing two basic assumptions in the MRNG:

1. Goshawks do not require extensive stands of canopied forest, but do require high levels of interspersion.
2. Goshawks are dependent upon prey abundance not availability and, therefore, do not directly select for forest structure.

In critiquing assumption one, Suckling (1994) et al. provided the comment that “None of the voluminous goshawk literature is cited to support these very unconventional notions of ecosystem management and goshawk ecology. Goshawk literature is relatively consistent in strongly associating goshawks in the United States with extensive forests or large stands of mature and old-growth trees.” Suckling et al. cite at least 35 authors to support this objection.

From these citations, Suckling et al. conclude the following: goshawk nesting habitat is generally mature and extensive; nest productivity increases with amount of mature forest; reoccupancy rates are higher in extensive mature forest; home ranges are smaller and overlap is greater in more extensive forests; logging in mature and old-growth forests diminishes the habitat elements necessary for successful nesting and foraging; logging fragments contiguous forest tracts making less suitable goshawk habitat; intra/inter-specific competition for nest sites and prey items is increased by forest fragmentation; and predation on goshawks may be increased by forest fragmentation.

In critiquing assumption two, Suckling et al. provided the comments that: “It is true that goshawks use a variety of forest types as foraging area but it does not follow, however, that they are forest generalists. Goshawks are forest specialists with a strong and demonstrated preference for mature forests and studies not cited by the MRNG suggest goshawks require mature forest structures for foraging.”

To support this argument Suckling et al. cite Fischer 1986, Fischer and Murphy 1986, Widen 1989, Austin 1991 and 1993, Hargis et al. 1993 and Crocker-Bedford and Chaney 1988 among others. A number of these papers have been reviewed, in this document.

A.9. In March of 1996, The Wildlife Society released "Northern Goshawk and Forest Management in the Southwestern United States," Technical Review 96-2 by Braun et al. This document emerged from a request by the Arizona Chapter of The Wildlife Society for the formation of a panel of scientists to review the interim guidelines and related forest management activities in the Southwest. The review team was formed jointly by The Wildlife Society and the American Ornithologists Union. The document is incorporated by reference and appears as Appendix J.

The team was requested to review the scientific basis for the goshawk interim management guidelines resulting from the "Management Recommendations for the Northern Goshawk in the Southwestern United States." The team's specific charges were to: (1) review the scientific literature concerning northern goshawk biology and management in the Southwest; (2) evaluate the scientific basis and policy guidance for the interim guidelines; (3) perform an on-the-ground inspection of forest management conditions in the Southwest relative to implementation of the interim guidelines; and (4) prepare a report outlining the review team's findings and recommendations.

In making their report, the review team came to 12 conclusions:

1. The scope and review of the biology of northern goshawks in the "Management Recommendations" are excellent.
2. The "Management Recommendations" represent an innovative approach to forest management because they encourage forest managers to consider forest ecosystems as assemblages of interacting species of plants and animals.
3. The "Management Recommendations" and related USFS policy lack substantive considerations for evaluating the effectiveness and testing the consequences of implementing these practices.
4. No evidence was presented to indicate that northern goshawk populations are declining, threatened or endangered in the Southwest or anywhere in its range, and the team found no evidence of a long-term decline in goshawk breeding populations.
5. The complexity of detail for silvicultural treatments in the "Management Recommendations" indicates a preciseness of management that cannot and probably need not uniformly be achieved over large areas.
6. Surveys of goshawks should be standardized and conducted in all southwestern forests to establish baseline data on population status and trends in all seasons, and to monitor the status of goshawks.
7. Northern goshawks use a variety of forested habitats during the nesting period.
8. Significant research should be conducted on habitat and prey requirements during the nonnesting period (Sep-Mar).
9. Implementation of prescriptions in the "Management Recommendations" must be carefully considered and recognize the diverse growing conditions and inherent heterogeneity of southwestern forests.
10. In the absence of frequent ground fire, healthy southwestern ponderosa pine forests need management. The "Management Recommendations" should contribute to a healthy, heterogeneous forest.
11. Proper management of southwestern forests must involve an ecosystem/landscape approach and should not be narrowly focused on one species. We believe the "Management Recommendations" represent a major step toward research and management of ecosystems at a landscape scale.
12. The public needs to learn that ponderosa pine forests in the Southwest were open, park-like forests in the presettlement period.

New information concerning management of northern goshawk habitat has also become available since the 1996 regional amendment and significant points of these papers are summarized in the following review.

Because the "Management Recommendations for the Northern Goshawk in the Southwestern United States" (Reynolds et al. 1992), which resulted in the formulation of Alternative G, is the focus of the scientific debate, therefore, a summary of the MRNG is presented here for reference.

At the core of the MRNG are the recommendations for management of three components of the goshawks home range: the nest area, the post-fledgling family area, and the foraging area. The authors of the MRNG state, "The largest areas (acres) reported in the literature, rather than the average or smallest, were used when developing the management recommendations for the nest area, PFA and foraging area."

For the nest area, the MRNG suggests: (1) maintaining three suitable and three replacement nest sites totaling 180 acres; (2) all nest areas are best located one-half mile from each other; and (3) in ponderosa pine 30-40 trees per acre, 16-22 inches DBH, 200+ years-old and a canopy closure of at least 50 percent.

For the post-fledgling family area (PFA) the MRNG calls for: an area of 420 acres not including the 180 acres for nest areas, centered around the nest areas, with 60 percent in the oldest stands to include 2 snags per acre, 3 large downed logs per acre and mature and old forest composed of live trees in clumps or stringers with interlocking crowns. In ponderosa pine forests the MRNG calls for a minimum of 50 percent canopy cover with clumps of the mature (VSS 5) and old (VSS 6) forest age classes, and a minimum 60 percent canopy cover within one-third of the mid-aged (VSS 4) clumps, and 50 percent canopy cover within the remaining two-thirds of the mid-aged clumps of trees.

For the foraging area in ponderosa pine the MRNG suggest management on approximately 5,400 acres not including the nest areas and the PFA, 60 percent of which should be in the 3 oldest age classes (mid-aged, mature and old forest), at least 2 snags per acre, 3 downed logs per acre, a minimum of 3-5 old large trees per acre in clumps with a minimum canopy closure of 40 percent within the clumps of mature and old live trees.

B.1. We begin our review of this latest information with a review of a paper by Beier and Drennan (1997) published in "Ecological Applications" Vol. 7, No. 2. This paper reported findings which are similar to Beier (1994), that goshawks apparently did not select foraging sites based on prey abundance and goshawks selected foraging sites that had higher canopy closure, greater tree density and greater density of trees than other areas studied.

The data from Beier and Drennan (1997) show a mean canopy closure of 48.3 percent on plots used by goshawks with 21 trees per acre (extrapolated from smaller plots) greater than 16" DBH. In the MRNG, the recommended mean canopy cover within the PFA (minimum of 50 percent within the mature and old age classes) and within the foraging areas (minimum of 40 percent within the mature and old age classes) should approximate or exceed the 48.3 percent cover at foraging sites reported by Beier and Drennen.

B.2. In October of 2001, the Northern Goshawk Scientific Committee (NGSC) (Reynolds et al.), produced a "Review of Supplemental Information Relevant to Habitat Management for the Northern Goshawk in Southwestern United States" (Appendix H) for the Southwestern Region of the USDA Forest Service. In this document the NGSC reviewed the "9" papers discussed and disclosed in A.7. The NGSC noted that only two of the papers were published in peer reviewed journals, the other seven consist of an unpublished progress report, agency reports, a thesis, and a published but not peer reviewed abstract. They also stated that science is an endeavor of accumulating knowledge through an established process of inquiry, logic, validation and peer reviewed publication.

The NGSC made four findings concerning Austin (1993). First, her study was more applicable to mixed conifer rather than to ponderosa pine forests. Second, her home ranges were 22 percent larger than the largest home ranges reported in other North American studies. Third, her findings on habitat use are potentially flawed because she failed to determine or report the degree of location error during her radiotelemetry studies. And finally, her

data support the desired future condition identified in the MRNG in that the MRNG in ponderosa pine, call for 20 percent of the home range in trees 100- to 140-years-old, 20 percent of the home range with trees 140- to 185-years-old and 20 percent of the home range with trees 180- to 235-years-old. This proportion of age classes is expected to provide the large trees with lifted crowns and open understories, Austin (1993) recommends.

The NGSC made six findings concerning Beier (1994). First, the study was conducted in Southwest ponderosa pine forest. Second, the findings are potentially confounded by several factors including whether or not observed goshawks were actually foraging versus participating in other activities while perching or flying, incorrectly identifying the actual "kill site" by a predator that may stop a number of times on the way to a nest with a prey item, and confusing a "kill site" with the site where a prey was first detected (a critical factor in foraging site selection) by the predator with prey that often move some distances during escape attempts. Third, Beier's finding that prey numbers were the same in used and unused sites does not necessarily support his conclusion that "goshawks did not pay much attention to prey density." Fourth, in spite of all this, Beier's finding that goshawks prefer large trees and a diversity of vegetation is consistent with the MRNG (see previous discussion).

Fifth, Beier's prey census study did not include two important Southwestern goshawk prey items—Abert's squirrel and red squirrel—potentially confounding his counts of prey in used vs. unused foraging sites. Finally, despite his small sample size Beier's data supports the MRNG in that foraging goshawks prefer large trees and a diversity of vegetation provided by 20 percent of the home range in trees 100- to 140-years-old, 20 percent of the home range with trees 140- to 185-years-old and 20 percent of the home range with trees 180- to 235-years-old. The NGSC recommended a high level of interspersion of structural stages and advocated clumping large old trees with interlocking crowns.

The NGSC made one conclusion concerning Crocker-Bedford's 1994 review: "all topics in the 15 documents reviewed by Crocker-Bedford were effectively addressed by the NGSC in developing the MRNG." However, the NGSC reviewed 3 of 15 pre-1992 documents cited by Crocker-Bedford that were published in peer-reviewed journals.

Hogland (1964) (Crocker-Bedford p.20), which was published in a German journal, reported that juvenile goshawks dispersed >30 miles from nest sites in Sweden. Because the NGSC recommended implementing the MRNG in landscapes, adequate habitat should be available for dispersing juveniles.

Kostrzewa (1987) (Crocker-Bedford p. 10), also in a German journal, reported that in a study area containing only 16.4 percent forests that goshawks nested further from openings than other hawks in Germany. In an effort to prevent southwestern forests from becoming fragmented, the NGSC recommended overstory canopy cover up to 70 percent (MRNG p. 7, Table 1; p. 16) with openings no larger than 2 acres in size, no greater than 200 feet across.

Shuster (1976) (Crocker-Bedford, p. 40 Table 1) reported on nesting density of goshawks in Colorado. According to Crocker-Bedford, Shuster found 3 pairs of goshawks per 10,000 acres in areas of Colorado where there was little timber harvest, and as timber harvest increased, the number of goshawk nests per 10,000 acres decreased. Nesting density is not discussed in the MRNG. However, NGSC concluded that studies of goshawk nest densities often lacked pre-timber harvest controls, and that nest densities are likely to differ among localities, forest types, and years, making comparisons equivocal.

The NGSC made three findings concerning Crocker-Bedford (1995). First, the MRNG recognized that logging probably affects goshawks and second, a 12-year study of nesting goshawks on the North Kaibab Ranger District identified 102 territories (Reynolds et al. 2003) indicating that the goshawk population there may not have declined. Third, the NGSC noted that Crocker-Bedford (1994-1995) was considered during the development of the MRNG.

The NGSC made seven findings regarding the consistency of findings in Hargis et al. (1994) with MRNG. Hargis et al. (1994) concluded that, "within the home range of the goshawk emphasis should be placed on creating or maintaining vegetation diversity, retaining mature timber around permanent water sources and along forest-open edges, and

ensuring that a portion of the range provides forest stands that have structural attributes similar to those found at the nest site for each particular geographic area."

The NGSC made six findings concerning Mannan and Smith (1993). First, the NGSC noted that the Mannan and Smith study included only ponderosa pine and mixed conifer forests. Second, they found that the Mannan and Smith home ranges were intermediate in size to those reported in other studies. Third, the NGSC found that the authors were only able to study goshawk use/avoidance of canopy cover categories and they were unable to partition their canopy cover categories and not forest age classes. Fourth the determination of use or avoidance of "edge" in the Mannan and Smith (1993) study appeared confounded and fifth, the Mannan and Smith finding concerning canopy cover diversity was consistent with the MRNG. The NGSC concluded that overall Mannan and Smith findings support the MRNG for 40-60 percent canopy cover in ponderosa pine and 60-70 percent in mixed conifer. They also stated the distance to edge in Mannan and Smith reported is equivocal.

The NGSC made five findings concerning Snyder (1995). First, the MRNG did not address Madrean evergreen forest. Second, canopy cover recommendations in the MRNG are consistent with Snyder's findings. Third, the MRNG did not address Mearns quail (a common prey species in Madrean forests) as a prey item. Fourth, the NGSC noted that extensive searches for goshawk nests are required before population trends can be established. And fifth, the NGSC concluded that Snyder's report is supportive of the desired forest conditions found in the MRNG because of diversity of vegetation that goshawks utilized in her study area.

The NGSC made five findings concerning Titus et al. (1994), however, extreme differences in habitat between Southwest ponderosa pine forests and forests in southeastern Alaska make comparisons to the MRNG difficult, if not impossible.

The NGSC made four findings concerning Woodbridge and Detrich (1994). First, the forest types in the Woodbridge and Detrich study are similar to southwestern forests. Second, the NGSC prevented extensive fragmentation of forests. Third, the NGSC recognized the importance of nest areas, nest sites and nest trees for breeding goshawks. Overall, the NGSC found that some of the findings in Woodbridge and Detrich are not pertinent because implementation of the MRNG does not result in large scale fragmentation and, therefore, does not suggest amending the MRNG.

In summary, the NGSC found that the new information found in the "9" cited papers supported the MRNG and that none of the new information warranted amending the MRNG.

B.3. Reynolds et al. (2003) is a progress report concerning the long-term northern goshawk study on the Kaibab Plateau in Northern Arizona. The study has four objectives related to goshawk habitat management: (1) Identify the distribution, density, vital rates and genetic structure of the northern goshawk population on the Kaibab Plateau; (2) Identify factors such as habitat, food, predators, competitors and short- and long-term weather patterns, and interactions among these factors that are limiting the population of goshawks on the Kaibab Plateau; (3) Identify the effects of forest management on both the vital rates of the Kaibab Plateau goshawk population and on each of the factors limiting the goshawk population; and (4), Identify habitat elements that differentiate high quality from low quality habitat by investigating the relationship between the long-term demographic performance of individual goshawks on territories and the landscape-level composition and structure of the habitat within their territories.

One hypothesis being tested is that goshawk reproduction may be affected as much by food abundance as by habitat structure. The food abundance hypothesis is based on the idea that

territories on the Kaibab may be high as a direct result of a saturated breeding population."

They also reported that "on higher quality territories, the amount of deciduous vegetation and forest openings increased with distance from circle plots: whereas, proportions of these habitats decreased with distance from random locations. The number and size of openings within a goshawk's territory and foraging range are, therefore, important to the goshawk's reproductive success."

In summary, Reynolds et al. pointed out "The evidence is mounting that prey abundance varies in response to variations in forest productivity (e.g., cone crops, understory plant production) and short- and long-term weather patterns (wet vs. dry periods)."

B.4. In his April 10, 2003, paper, Crocker-Bedford updated his September 21, 2001, literature review on "Habitat Effects on Northern Goshawks." In this paper, Crocker-Bedford cites a number of authors who support the position that goshawk nest sites include larger trees and denser overstory canopies than the surrounding landscape. Crocker-Bedford also cited Beier and Drennan (1997) and Good (1998) to make the point that goshawk foraging areas are composed of stands of larger trees, dense overstories, and fewer shrubs and saplings, and they found no association between foraging locations and the actual density of potential prey.

In summary, Crocker-Bedford stated, "up to some point, larger stands of mature trees are better for both nesting and foraging than smaller stands (a few studies). Although individual goshawks are not everywhere obligates of mature forests, such habitat may be important for the survival of the species."

B.5. On January 9, 2004, Reynolds produced a report, "Is the Northern Goshawk an Old-growth Forest Specialist or a Habitat Generalist?" based on a review of over 180 documents, including peer-reviewed publications, theses, reports and draft manuscripts, that may have had information on how goshawks used habitats during the breeding and winter seasons. The entire document appears as Appendix I.

The following statements are from the "Findings and Synthesis" section of Reynolds (2004):

1. Clearly, both nesting and foraging goshawks use nearly every forest and woodland habitat type that occurs within the hawk's geographic range.
2. The diversity of vegetation types within the home ranges of goshawks increased with increasing distance from the nest.
3. Even within nest areas themselves, the habitat structure was variable depending on forest type.
4. In territories lacking old forests, goshawks nest in mid-aged forests.
5. Only one report found that goshawks extensively used old-growth forests versus other forest age classes.
6. The high density of goshawks on the Kaibab Plateau (a disturbed habitat) strongly suggests that goshawks are not old-growth obligates. This does not mean that goshawks avoid old-growth or do not use old-growth: it simply shows that goshawks can live and reproduce in forests other than old-growth.
7. Much of the variation in habitats used appears to be related to the local availability of habitats in combination with an apparent opportunistic nature of goshawks.
8. During the breeding season, nesting goshawks are energetically limited to a finite space surrounding the nest.
9. During winter, when goshawks are not so space limited, their wider range allows them to use a greater variety of habitats.
10. Goshawks may prefer certain habitat compositions and structures to others and may, therefore, not use habitats within their home ranges in direct proportion to each habitat's occurrence.
11. The sum of evidence reviewed argues that much of habitat use by goshawks appeared to be related to relative differences among habitats, in prey abundance and prey availability. Thus, goshawks may nest or forage, more often in habitats or mixes of habitats, where prey is more abundant. Much of the diversity of vegetation types and conditions used by goshawks appears to be related to the diverse habitats that many prey species of goshawks use although there is some contrary evidence of this perspective.

- Goshawk nest areas, which may include more than one nest, contain one or more stands of large old trees with a relatively dense canopy cover. The size of these nest areas has been noted to be approximately 30 acres. Most goshawks have two to four alternate nest areas within their home range. Alternate nest areas may be used in different years.

- The post fledging-family area surrounds the nest site and typically includes a variety of forest types and conditions. It represents an area of concentrated use by the goshawk family from the time the young leave the nest until they are no longer dependent on the adult for food (up to 2 months post-fledging). These areas have a variety of forest conditions; however the vegetation structure generally resembles that found in the nest stands with patches of dense trees, developed herbaceous and/or shrubby understories. All vegetation structures have habitat attributes critical for goshawk prey.

- Goshawks forage in larger areas surrounding the nesting areas. These areas are approximately 5,400 acres in size. There is evidence that goshawks use mature and old forest within these areas more heavily than they use other seral stages. However, goshawks use available habitats (openings) opportunistically which suggests that the choice of foraging habitat by goshawks may be as closely tied to prey availability as to habitat structure and composition.

While there is general agreement among scientists on the above points, a handful of papers have been cited as evidence that goshawks require foraging areas containing large, unbroken blocks of old forest (references). Primary findings in these papers are detailed above in the section titled “Review of Pertinent Information Concerning Habitat Management for the Northern Goshawk.”

Some of these papers were cited in the Arizona and New Mexico Game Agencies’ response to the draft EIS. That response used the papers, in part, as the basis for an alternative set of recommendations for northern goshawk management that placed more emphasis on large blocks of old forest. Those alternative recommendations are represented in this supplement to the Final EIS as Alternative D. Recommendations for nesting and post-fledging areas in Alternative D are virtually identical to the recommendations in Alternative G. Major differences between the alternatives focus on the composition and management of foraging areas. Highlights include:

- Alternative G would manage forested portions of foraging areas on the equivalent of a 200-year rotation. Alternative D would use the equivalent of a 250-year rotation.

- Both alternatives would require that 20 percent of the foraging area be composed of VSS 6. Alternative G would count all patches of old growth, no matter how small, in determining whether the 20 percent was being maintained. Alternative D would require that the VSS 6 be maintained in larger blocks (> 100 acres).

- Alternative G calls for uneven-aged management and the resulting forest structure. Alternative D allows up to 20 percent of the landscape to have even-aged management with the remaining areas using uneven-aged management.

The recommendations embodied in Alternative D reflect a different interpretation of the literature than that found in RM-217. Some have characterized this difference as a debate about whether the goshawk is a habitat generalist or an old forest specialist. Actually the viewpoints are not that different.

The two sets of recommendations for nesting areas and post-fledging areas are virtually identical. For foraging areas, both recognize the need for large areas containing a variety of vegetation types but including an old forest component. The difference between these viewpoints focuses primarily on the question: How much and how should old forest be distributed across the foraging areas?

The available scientific information does not provide direct answers to this question. It should be noted that of the initial nine papers reviewed in this supplement in support of the opposing scientific view (documents A7), only two (Hargis et al. 1994; Woodbridge and Detrich 1994) of the nine

documents were published in peer-reviewed journals. The other seven consisted of unpublished progress reports to granting agencies (Beier 1994; Mannan and Smith 1993; Snyder 1995), unpublished agency reports (Crocker-Bedford 1994; Titus et al. 1994), an unpublished thesis (Austin 1994), and a published, but not peer-reviewed, abstract (Crocker-Bedford 1995).

Recommendations in RM-217 were based on a synthesis of the following studies of: (1) knowledge of the life history, ecology, behavior, and diets of goshawks; (2) vegetative composition of sites at which goshawks were actually detected during foraging activities; and (3) the natural history and habitat of 14 important goshawk prey species.

The alternative recommendations embodied in Alternative D were based on studies that indicated significant goshawk use of old forest for foraging. However, these studies do not provide information that could be directly used to determine necessary amounts and distribution of old forest in foraging areas. The recommendations in Alternative D represent a different set of working hypotheses concerning the need for old-growth within foraging areas. The studies cited in the joint Arizona and New Mexico Game Agencies' letter, along with other studies cited in the legal challenge to the FEIS, could also be considered consistent with the recommendations in RM-217 as detailed above in section B2.

In summary, there is some difference of opinion concerning appropriate amounts and distribution of closed canopy old forest in goshawk foraging areas. The Preferred Alternative (Alternative G) continues to rely on the scientific information synthesized in RM-217 for the following reasons:

- None of the available scientific information directly answers the question of how much old forest is needed in goshawk foraging areas and how should it be distributed. RM-217 represents a reasonable interpretation of that literature based on an extensive review of scientific literature. While recognizing the importance of mature and old forest to goshawks and many of their prey, the actual recommended amount of mature and old forests in RM-217 was determined by the growth dynamics of forests. Based on forest dynamics, the maximum amount of mature and old forest (to 240 years) in a sustaining forest landscape is 40 percent (20 percent in mature, 20 percent in old forest) (Reynolds et al. 1992).

- RM-217 brings together information on habitat used by goshawks and habitat used by their principle prey species and forest dynamics. Thus, it is a systems-based recommendation that attempts to provide for both goshawks and the faunal community that supports them, all within constraints imposed by the dominant vegetation comprising a forest type.

- The recommendations in RM-217 would result in large-scale forest composition and structure that is consistent with our knowledge of the historical range of variability of the forests in the Southwest. Such forest structure could be reliably sustained over time. Forest composition and structure resulting from the recommendations contained in Alternative D would be much more difficult to sustain.

Proposed Listing of Northern Goshawk Under the Endangered Species Act

On June 29, 1998, the U.S. Fish and Wildlife Service (USFWS) announced a 12-month finding on a petition to list the northern goshawk in the contiguous United States west of the 100th meridian under the Endangered Species Act, as amended. After review of all available scientific and commercial information, the USWFS found that listing the population was not warranted (63 FR 35183) (Appendix K).

The conclusions on which the USFWS based its finding are relevant to the discussion here. In announcing its finding, the USFWS stated that it based its finding on the following conclusions:

1. While forest management (i.e., 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.

2. The USFWS found no evidence to conclude 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.
3. The petition contended that the goshawk is dependent on large, unbroken tracts of old-growth and mature forest and asserted that declines in such forests were placing the species in danger of extinction. However, neither the petition nor other information available to the USFWS supported this claim.
4. The USFWS "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." (63 FR 35184)

Data Quality Act Petition on Northern Goshawk Science

On January 17, 2003, a petition to correct information disseminated by the USDA Forest Service, namely the "Management Recommendations for the Northern Goshawk in the Southwestern United States" (RM-217), was filed on behalf of four requesters (Coalition of Arizona and New Mexico Counties, Northern Arizona Loggers Association, Washington Contract Loggers Association, and William K. Olsen (primary contact)). The petition addressed alleged multiple information quality violations and errors in RM-217 and attempted to display that the errors and violations were of such significance and magnitude that corrections alone were not adequate, and withdrawal of RM-217 was the only appropriate remedy. This petition was one of five requests for correction regarding the northern goshawk filed under the United States Department of Agriculture (USDA) Information Quality Act Guidelines and Data Quality Act (DQA) (Public Law 106-554 §515).

The petition alleged violations of the science supporting such topics as nest area size, quantity and stand structure, post-fledging family areas, canopy cover, goshawk prey species and desired foraging area conditions, vegetative structural stage, as well as others.

The petition providedw[(at7mgi)6.m(u)5.6(eed of thilli)4.3(ta(cte c

of care and due diligence, resulting in identification of eight technical errors unrelated to the request for reconsideration, which the agency corrected. In addition, an extensive scientific review was conducted by the Agency in examination of the claims of the requester.

The panel found that RM-217 was the product of extensive peer review in the scientific community qualified to produce the specified data and recommendations.

Following a request by the Coalition of Arizona and New Mexico Counties, the Data Quality Act Petition and Request for Reconsideration were reviewed for presentation of new information (science) related to the northern goshawk.

The review found that no new information was presented within the DQA petition that had not been already integrated into the discussion. The review panel found, and documented in its January 8, 2004, correspondence that the “request was developed as a surrogate ‘peer comment’ on the overall document.” [RM-217] The panel continued by stating “The request was also based upon a directed policy outcome rather than identifying a clear informational deficiency.” Subsequent review of literature used in this supplement verified that no new information was displayed in the petition that has not already been integrated herein.

Section 7(a)(2) of the ESA, CONSULTATION

This section will be written following identification of the preferred alternative.

Supplemental Consultation and Coordination

Preparers and Contributors

The Forest Service consulted the following individuals, Federal, State, and local agencies, tribes and non-Forest Service persons during the development of this draft supplement to the final environmental impact statement:

ID Team Members

Douglas A. Boyce, Jr., Alaska Issues Coordinator, USDA Forest Service, Pacific Northwest Research Station, Forest Sciences Laboratory, Juneau, AK

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Lou Woltering, Deputy Director of Wildlife, Fisheries and Rare Plants, USDA Forest Service, Southwestern Region, Albuquerque, NM

List of Agencies, Organizations and Persons to Whom Copies of the Supplement to the FEIS Were Sent

This draft supplement to the final environmental impact statement has been distributed to individuals who specifically requested a copy of the document. In addition, copies have been sent to the following Federal agencies, Federally recognized tribes, State and local governments, and organizations representing a wide range of views regarding management of national forests in the Southwestern Region of the USDA Forest Service.

Federal Agencies

U.S. EPA, Region IX, San Francisco, CA

Fort Apache Agency, Bureau of Indian Affairs, Whiteriver, AZ

U.S. Bureau of Land Management, Roswell, NM
U.S. Fish & Wildlife Service, Flagstaff, AZ
U.S. Fish & Wildlife Service, Phoenix, AZ
U.S. Fish & Wildlife Service, Regional Office, Albuquerque, NM
National Park Service, Washington, DC
Rocky Mountain Forest and Range Experimental Station, Flagstaff, AZ
Federal Highway Administration – CFLHD, Lakewood, CO
Natural Resources Conservation Service, Alamogordo, NM
Advisory Council on Historic Preservation, Washington, DC
USDA APHIS PPD/EAD, Riverdale, MD
Rural Utilities Service, Washington, DC
USDA, Natural Resources Conservation Service, Washington, DC
USDA, National Agricultural Library, Beltsville, MD
Bureau of Land Management, New Mexico State Office, Santa Fe, NM
National Marine Fisheries Service, Long Beach, CA
Deputy Assistant Secretary of Defense (E), Arlington, VA
U.S. Air Force, Environment, Safety, and Occupational Health, Washington, DC
Army Corps of Engineers, Dallas, TX
U.S. Navy, Environmental Protection Division, Washington, DC
U.S. Environmental Protection Agency, Washington, DC
U.S. Environmental Protection Agency, Dallas, TX
U.S. Department of the Interior, Washington, DC
National Park Service, Lakewood, CO
U.S. Coast Guard, Marine Environment and Protection Division, Washington, DC
Federal Aviation Administration, Fort Worth, TX
Federal Highway Administration, Olympia Fields, IL

Tribal

Gila River Indian Community, Sacaton, AZ
Ramah Navajo Chapter, Ramah, NM
San Carlos Apache Tribe, San Carlos, AZ
Tohono O'Odham Nation, Sells, AZ
Tonto Apache Tribal Council, Payson, AZ
Mescalero Apache Tribe, Div. of RM&P, Mescalero, NM
Five Sandoval Pueblos, Inc., Bernalillo, NM
White Mountain Apache Tribe, Outdoor Rec, Whiteriver, AZ
Ysleta del Sur Pueblo, El Paso, TX
Southern Ute Tribe, Ignacio, CO
Pueblo of San Juan, San Juan Pueblo, NM

Pueblo of Taos, Taos, NM
Pueblo of Zuni, Zuni, NM
Kaibab Paiute Tribal Council, Fredonia, AZ
Pueblo of San Felipe, San Felipe Pueblo, NM
Cocopah Indian Tribe, Somerton, AZ
Havasupai Tribal Council, Supai, AZ
Pueblo of Laguna, Laguna Pueblo, NM
Colorado River Indian Tribe, Parker, AZ
Pueblo of Jemez, Jemez Pueblo, NM
Pueblo of Santa Clara, Espanola, NM
Hulapai Tribe, Peach Springs, AZ
Chairman Ute Mountain Ute Tribe, Towaoc, CO
Quechan Indian Tribe, Yuma, AZ
San Juan So. Paiute Tribe, Tuba City, AZ
Ak-Chin Indian Community, Maricopa, AZ
Pueblo of Isleta, Isleta Pueblo, NM
Navajo Nation, Window Rock, AZ
White Mountain Apache Tribe, Whiteriver, AZ
Mohave-Apache, Fountain Hills, AZ
Pueblo of Zia, Zia Pueblo, NM
Pueblo of Picuris, Penasco, NM
Yavapai-Prescott Tribe, Prescott, AZ
Governor, Pueblo of Cochiti, Cochiti Pueblo, NM
Eight Northern Indian Pueblo Council, San Juan Pueblo, NM
Pueblo of San Idelfonso, Santa Fe, NM
Mescalero Apache Tribe, Mescalero, NM
Pueblo of Santa Ana, Bernalillo, NM
Pueblo of Sandia, Bernalillo, NM
Pueblo of Nambe, Santa Fe, NM
Pueblo of Acoma, Acoma, NM
Pueblo of Santo Domingo, Santo Domingo Pueblo, NM
Pascua Yaqui Tribe, Tucson, AZ
Hopi Tribe, Kykostmovi, AZ
Pueblo of Pojoaque, Santa Fe, NM
Jicarilla Apache Tribe, Dulce, NM
Pueblo of Tesuque, Santa Fe, NM
Alamo Chapter, Navajo Nation, Magdalena, NM
Tohajiilee, Navajo Chapter, Tohajiilee, NM
Apache Indian Tribe of Oklahoma, Anadarko, OK

Comanche Tribe of Oklahoma, Lawton, OK
Cheyenne-Arapaho Tribes of OK, Concho, OK
Wichita and Affiliated Tribes, Anadarko, OK
Fort Still Apache Tribe, Apache, OK
San Carlos Agency, Bureau of Indian Affairs, San Carlos, AZ

State and Local Governments

Arizona Game & Fish Department, Flagstaff, AZ
Arizona Game & Fish Department, Mesa, AZ
Arizona Game & Fish Department, Kingman, AZ
Eastern Arizona Counties Organization, St. Johns, AZ
Greer Fire District, Greer, AZ

City/Town

Lincoln County, Board of Commissioners, Carrizozo, NM
Northern AZ University, School of Forestry, Flagstaff, AZ
New Mexico Dept. of Game & Fish, Santa Fe, NM
Mohave County Public Land Use Commission, Kingman, AZ
New Mexico State University, Las Cruces, NM
San Miguel County, Las Vegas, NM
Lincoln County, Carrizozo, NM
Eddy County, Carlsbad, NM
Otero County, Alamogordo, NM
Village of Angel Fire, Angel Fire, NM
New Mexico Dept. of Game & Fish, Santa Fe, NM
Greenlee County, Clifton, AZ
Coalition of Arizona/New Mexico Counties, Glenwood, NM
NM Department of Agriculture, MSC APR, Las Cruces, NM
New Mexico Dept. of Game & Fish, Santa Fe, NM
Hidalgo County Public Land Advisory Committee, Animas, NM

Business and Special Interest Groups

Blue Ribbon Coalition, Pocatello, ID
Chiricahua Regional Council, Portal, AZ
Mesa Four Wheelers, Mesa, AZ
New Mexico Cattle Growers Assn., Albuquerque, NM
Sacramento Grazing Assn., c/o Jimmy Goss, Weed, NM
Carson Forest Watch, Llano, NM
The Nature Conservancy, Tucson, AZ
Sierra Club, Tularosa Basin Group, Alamogordo, NM

Sierra Club, Pajarito Group, Los Alamos, NM
Tierra y Montes SWCD, Las Vegas, NM
Center for Biological Diversity, Tucson, AZ
New Mexico Audubon Council, Los Alamos, NM
Southwest Forest Alliance, Flagstaff, AZ
Wildlife Management Institute, Ft. Collins, CO
Defenders of Wildlife, Washington, DC
Evans Ranches, Alpine, AZ
Salt River Project, Environmental Services, Phoenix, AZ
Sandia Peak Ski Co., Albuquerque, NM
Ski Apache, Manager, Ruidoso, NM
Chilton Ranch & Cattle Co., Arivaca, AZ

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Reynolds, R. T., R. T. Graham, M. H. Reiser, R. L. Bassett, P. L. Kennedy, D. A. Boyce, Jr., G. Goodwin, R. Smith, and E. L. Fisher. 1992. Management recommendations for the northern goshawk in the southwestern United States. USDA Forest Service General Technical Report RM-217:90 pp.

Reynolds, R. T., Boyce, D. A., Graham R. T., Hildegard Reiser, M., 2001. Review of supplemental information relevant to habitat management for the northern goshawk in the southwestern United States.

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Ward, L. Z., D. K. Ward, and T. J. Tibbitts. 1992. Canopy density analysis at goshawk nesting territories on the North Kaibab Ranger District, Kaibab National Forest. Final Report:61pp.

Woodbridge, B. and P. J. Detrich. 1994. Territory occupancy and habitat patch size of northern goshawks in the southern Cascades of California. Studies in Avian Biology 16:83-87.

Appendices

The following appendices remain intact and unedited from the original "Final Environmental Impact Statement for Amendment of Forest Plans." The contents of these appendices are not duplicated within this supplement to the final environmental impact statement. Contents of these appendices are available on the Internet at *www.fs.fed.us/r3/projects/index.shtml.*

Appendix A – Process Record

Appendix B – Forest Plan Amendments

Appendix C – Forest Plan Correction Notices

Appendix D – Standard Vegetation Treatment Table

Appendix E – Alternative Comparison – Standards/Guidelines

Appendix F – Copies of DEIS Comment Letters

Appendix G – Regional Habitat Differences

The appendices that follow are those associated with the preparation of this draft supplement to the final environmental impact statement.

Appendix H

Reynolds, R. T., Boyce, D. A., Graham R. T., Hildegard Reiser, M., 2001. Review of supplemental information relevant to habitat management for the northern goshawk in the southwestern United States.

Appendix I

Reynolds, R. T. 2004. Is the northern goshawk an old-growth forest specialist or a habitat generalist?

Appendix J

Braun, et al. 1996. Northern goshawk management in the Southwestern United States. The Wildlife Society, Technical Review 96-2.

Appendix K

U.S. Fish and Wildlife Service, 1998, 50 CFR 17, Endangered and Threatened Wildlife and Plants; Notice of 12-Month Finding on a Petition to list the Northern Goshawk in the Contiguous United States West of the 100th Meridian. Federal Register, Vol. 63, 35183

Appendix L

Crocker-Bedford, D. C. and B. Chaney. 1986. Characteristics of goshawk nesting stands. Southwest Raptor Management Symposium and Workshop 11:210-217.

Appendix M

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Appendix Q

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Appendix R

Hargis, C. D., C. McCarthy, and R. D. Perloff. 1994. Home ranges and habitats of northern goshawks in eastern California. Studies in Avian Biology 16:66-74.

Appendix S

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Appendix V

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Appendix Y

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Appendix Z

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