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Service

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

Arizona and New Mexico



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

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Abstract: The Forest Service, Southwestern Region, has prepared this “Final Supplement to the Final Environmental Impact Statement for Amendment of Forest Plans in Arizona and New Mexico” (FSFEIS) to disclose, review, and assess scientific arguments challenging the Agency’s conclusions over the northern goshawk’s habitat preferences. The supplement will update the final environmental impact statement (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.

This supplement to the FEIS has been 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. The original Notice of Intent for this plan amendment was published in the Federal Register on June 24, 1992 (57 FR 28171).

This supplement addresses the issue of scientific arguments over the northern goshawk’s habitat preference and updates the “FEIS for Amendment of National Forest Management Plans in the Southwestern Region.” The FEIS includes guidelines for management of habitat for the Mexican spotted owl and northern goshawk. 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. Copies of the Final EIS and Record of Decision are available on the World Wide Web at <http://www.fs.fed.us/r3/projects/index.shtml>.

Summary

The Forest Service, Southwestern Region, has prepared this “Supplement to the Final Environmental Impact Statement for Amendment of Forest Plans in Arizona and New Mexico” to disclose, review, and assess scientific arguments challenging the Agency’s conclusions over the northern goshawk’s habitat preferences. This supplement updates the final environmental impact statement (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.

This supplement to the FEIS was 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 addresses the issue of scientific arguments over the northern goshawk’s habitat preference and updates the “FEIS for Amendment of National Forest Management Plans” in the Southwestern Region.

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 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, New Mexico Department of Game and Fish, and 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.

Summary

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 identify concerns raised by, 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 found in Alternative C. Alternative D was patterned after DEIS comments submitted jointly by the Arizona and New Mexico state game agencies. State game agency input depicted in Alternative D is a slight variation of the recommendations developed by the Goshawk Interagency Implementation Team and of 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 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 a "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 those 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 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 Biological Diversity filed suit charging 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 findings 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.

On October 1, 2004, the Environmental Protection Agency issued a Notice of Availability in the Federal Register (FR 59, 58911) of the Forest Service’s “Draft Supplement to the Final Environmental Impact Statement for Amendment of Forest Plans in Arizona and New Mexico.” This Notice of Availability initiated a 45-day public comment period on the draft supplement. The comment period ended on November 15, 2004. The Forest Service received a total of 11 comment letters, including additional literature on the northern goshawk.

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

Contents

The following pages replace pages 6 - 9 in the “Final Environmental Impact Statement for Amendment of Forest Plans”1

The following pages replace pages 19 – 23 in the “Final Environmental Impact Statement for Amendment of Forest Plans” 11

Supplemental Consultation and Coordination.....49

Preparers and Contributors49

List of Agencies, Organizations and Persons to Whom

Copies of the Supplement to the FEIS Were Sent49

Literature Cited55

Comments to the Draft Supplement to the Final Environmental Impact Statement for Amendment to Forest Plans, and Forest Service ResponsesError! Bookmark not defined.

Forest Guardians**Error! Bookmark not defined.**

Center for Biological Diversity.....75

Carson Forest Watch.....107

Arizona Game and Fish Department.....112

U.S. Environmental Protection Agency.....119

B. Sachau123

Helen Snyder.....128

Kaibab Band of Paiute Indians131

Harold C. Reynolds.....133

New Mexico Department of Game and Fish138

USDI Office of Environmental Policy and Compliance.....142

Appendices.....Error! Bookmark not defined.

Appendices A through AAJ are provided on the CD in PDF,
however, they are summarized here for reference.

**The following pages
replace pages 6 - 9 in the
“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 the management direction proposed to be added to the forest plans.

A proposed action was developed based on the forest plan review, current 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 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 DEIS. 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 socio-economic impacts from adopting final Mexican spotted owl and northern goshawk guidelines.

Alternative C was separated from Alternative F because comments received stated 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 FEIS contains the standards and guidelines applicable to each alternative.

B. ALTERNATIVES DROPPED FROM DETAILED STUDY

The original proposed action (Alternative B) 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 than 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 FEIS. 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 FEIS.

A comparison of the basis for development of each alternative is summarized in Table 1 at the end of this section of the "Final 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 Forest 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 Forest plans would maintain the existing northern goshawk standard for a 20- to 30-acre core area around occupied nests. The Kaibab would provide eight 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 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 stands 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 practices 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).

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-Sitgreaves National Forests), 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-Sitgreaves National Forests mixed-conifer is presented in Table 3 at the end of this chapter.

Alternative G: This alternative was developed to respond to the Mexican Spotted Owl Recovery Plan (see Chapter 4 for Standard & Guideline 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 Arizona state game agency letter that responded to the draft forest plan amendment, and experience gained during implementation of 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 ecosystem management in goshawk habitat areas are not focused on any single species or element.

Alternative D & G: 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.

With respect to the northern goshawk, 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 displays differing scientific viewpoints on northern goshawk management beyond the commonly agreed 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 its respective forest plan 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

Alt.	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 in the Southwestern United States” (MRNG) (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 Forests Suggestions – Mexican spotted owl guidance would follow direction stated in Interim Directive 2 (June 1990, FSM 2676) plus have a demonstration area on the Apache-Sitgreaves National Forests. Northern goshawk guidance would be very similar to the MRNG (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 DEIS, and experience gained during implementation of the interim direction.

Table 2. Commonly Agreed Upon Northern Goshawk Habitat Components

Component	Description / Discussion
Percent of Landscape in VSS 6	The overall landscape contains approximately 20 percent in VSS 6 (24+ d.b.h.).
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 northern goshawk 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. However, the quantity and arrangement across the landscape of such age classes is not generally agreed upon, particularly 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 & 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	Available Treatment Acres	Management Emphasis
Zone 1	40 %+ Slopes North Aspects	23,915	None	Natural Evolution
Zone 2	20-39 % Slopes North Aspects	39,510	22,853	Uneven-aged – single tree selection only
Zone 3	0-19 % Slopes North Aspects	35,000	29,918	Uneven-aged – all methods
Zone 4	40 %+ Slopes South Aspects	11,470	None	Natural Evolution
Zone 5	20-39 % Slopes South Aspects	24,736	14,866	Balanced Uneven-aged and Even-aged
Zone 6	0-19 % Slopes South 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"+ d.b.h.). 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-fledgling areas, Alternative D calls for a target age of 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.* Alternative D calls for canopy closure restrictions for not only the small group/patch scale, like G, but also at the site and landscape scale. Alternative D calls for: (1) up to 20 percent of the landscape to be managed 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 landscape 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 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"d.b.h.)	Only Alternative D has canopy closure restrictions on VSS 3, thereby slowing growth and development into larger VSS classes.
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 the amount of time to restore large trees across the landscape will take significantly more time under Alternative D than that 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.

Attribute	Alternative Comparison
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 VSS 6.

* Long, J. N. and Smith, F. W. 2000

**The following pages
replace pages 19 – 23 in the
“Final Environmental Impact Statement
for Amendment of Forest Plans”**

TES Species (34)

Affected Environment

Within the Southwestern Region, there are 45 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 include sharp shinned hawk, pine grosbeak, and the flammulated owl. Other species, like Gould’s wild turkey, are sensitive to landscape patterns; however, the reason the turkey is sensitive is due to limited habitat in the United States. The United States represents the northernmost extension of its range, and as such, it is rare because of this, not because of any changes to landscape patterns.

Many 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 FEIS. A transition period will be needed to achieve full implementation of the amendment. In the short term (5 to 10 years), the effect of the new standards and guidelines with respect to desired on-the-ground conditions will vary little between alternatives. The true ramifications of the differences between alternatives

can be easily ascertained when reviewing 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, as areas with high tree densities continue to increase in density, the associated susceptibility to catastrophic events would also continue to increase. It is impossible to predict what the size or intensity will be for a given event. Even though fire and insects are a part of the ecosystem, 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, there exists the potential of fragmenting the landscape which may greatly reduce the number of large old trees that currently exist.

The areas most at risk to catastrophic events are those areas with the highest tree densities. These are the areas restricted or protected for the Mexican spotted owl and 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) must be sustainable.

Alternative A is the “no action” alternative where existing forest plan direction is continued. This alternative would emphasize even-aged management with a rotation length not to exceed 120 years in all areas outside of those 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 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. Existing grazing standards and guidelines generally call for the existing livestock stocking levels to be in line with capacity in the first or second decade. Not all existing forest plans have specific utilization rates for grazing animals.

The existing forest land management plans throughout the region were determined not to be adequate for Mexican spotted owl and northern goshawk. The existing forest 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 Mountains salamander, Sacramento Mountain salamander, Kaibab pincushion cactus, and Arizona leatherflower.

Many sensitive aquatic species are also trending toward listing under current forest plan implementation due to grazing management. The species identified are limited to those within forested habitats. Many other species may be impacted by current management under existing forest 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 have been or are being prepared for the Jemez Mountains salamander, Sacramento Mountain salamander, 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.

Alternatives C and F articulate the Mexican spotted owl and 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-Sitgreaves National Forests in Alternative F would depart from the recovery plan.

Because these alternatives do not fully implement the current Mexican spotted owl recovery plan, they

would have an adverse affect on the Mexican spotted owl and, thus, may not lead to its recovery. 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 four 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 hiding and thermal cover, thus there would be 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 allow for a flow of the 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 the Mexican spotted owl will be the same: may affect, 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 may affect, not likely to adversely affect the Mexican spotted owl, Alternative D would have a beneficial affect on the following sensitive

species: flammulated owl, sharp-shinned hawk, and Kaibab squirrel. Without changes 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 vegetation over sustainability of the northern goshawk. This alternative has many benefits over the existing standards and guidelines currently found in existing forests 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 recommended within 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 the 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 used to determine these 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 incorporate a long-term approach. Recovery recommendations for the Mexican spotted owl are for the short term and take precedence over all other recommendations for nonlisted species due to 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 these ecosystems will remain essentially unchanged.

Under the Mexican spotted owl recommendations all protected activity centers (PACs) and slopes greater than 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" diameter at breast height (d.b.h.). Harvest of trees between 12" and 24" d.b.h. 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" d.b.h. will be maintained throughout 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 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 Mountains 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 Mountains 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. Alternative G has the flexibility to mitigate any adverse impacts at a project or site level.

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 northern goshawk. To maintain this part of the ecosystem, grazing utilization 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 individuals, 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

identified 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).

Brief Summary of the Management Recommendations for the Northern Goshawk

Because the “Management Recommendations for the Northern Goshawk in the Southwestern United States,” (MRNG) (Reynolds et al. 1992) is the focus of the scientific debate, 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 northern goshawk’s home range: the nest area, the post-fledgling family area (PFA), 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” (Reynolds et al. 1992, p 21).

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

For the PFA, the MRNG calls for: an area of 420 acres not including the 180 acres for nest areas, centered around the nest area, 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.

Review of Pertinent Information Concerning Habitat Management for the Northern Goshawk

This section of the FSFEIS reviews and discusses scientific points of view, which differ from, or are contrary to those used to develop the MRNG, on which Alternative G is based. 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 the northern goshawk.

The scientific debate concerns the degree to which the 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 1986 paper by Crocker-Bedford and Chaney, titled "Characteristics of Goshawk Nesting Stands," later 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 Southwest Region."
5. An Arizona Game and Fish Department white paper of May 1993, outlining their concerns on the recommendations for goshawk management in the southwest region.
6. A letter from New Mexico Department of Game and Fish, November 28, 1995, commenting on the "Final Environmental Impact Statement for Amendment of Forest Plans."
7. Eleven papers written and/or published prior to 1996, which reported on studies of northern goshawk habitat use and preferences:
 - i) Fischer (1986)
 - ii) Hargis et al. (1994)
 - iii) Bright-Smith and Mannan (1994)
 - iv) Austin (1993)
 - v) Beier (1994)
 - vi) Titus et al. (1994)
 - vii) Crocker-Bedford (1994)
 - viii) Crocker-Bedford (1995)
 - ix) Snyder (1995)
 - x) Woodbridge and Detrich (1994)
 - xi) Titus et al. (1996)
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 and Forest Management in the Southwestern United States" by Braun et al.

Key points from these documents are summarized as follows.

A.1. Crocker-Bedford and Chaney (1988) 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 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 noted that goshawk nesting density appeared to be closely associated with dense overstories and open understories.

A.3. In their 1992, "Canopy Density at Goshawk Nesting Territories on the North Kaibab Ranger District, Kaibab National Forest," report, Ward, Ward and Tibbitts discussed the results of their investigation on the relationship between goshawk breeding activity and 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 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 and 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 Southwest 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 abundance.
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.
5. That suitable goshawk foraging habitat and sufficient prey will be provided by managing for those prey species" (USFWS 1992, p 1).

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' " (USFWS 1992, p 1). 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" (USFWS 1992, p 2).

Concerning premise number two, the Service noted, "The recommendations' observation that goshawks, like some other raptors, should be limited by prey availability is valid. However, the recommendations only consider simple prey abundance, not prey availability" (USFWS 1992, p 2). The Service goes on to say, "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” (USFWS 1992, p 3).

In their comments on premise three the Service stated, “The Service believes the recommendations were developed with too little information on goshawk diets in the FS Southwestern Region” (USFWS 1992, p 3). And, “Creating the structural forest environment to which goshawks are adapted will create availability of prey” (USFWS 1992, p 4).

Regarding premise four, the Service concluded, “The recommendations built a management prescription based on the vaguely understood habitat needs of 14 species, rather than the better understood habitat needs of the goshawk” (USFWS 1992, p 4).

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” (USFWS 1992, p 5).

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 AZGF raised a concern related to management of foraging areas for the 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” (AZGF 1993, p 5).

They further stated that they consider the goshawk a “forest habitat specialist” that is strongly associated with mature, dense forest structure in many forest types” (AZGF 1993, p 12). 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 the 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 in the Southwestern Region.” They stated “The Department finds the preferred alternative (G) to be a substantial improvement over the previous alternatives in the draft EIS, in that it appears that an opportunity to accomplish ecosystem management goals is provided” (NMDGF 1995, p 1). The NMDGF did have two concerns: (1) that a lack of specificity in standards and guides 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 11 papers are variously cited in the literature as supporting the argument that the 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. Fischer (1986) studied three coexisting *Accipiter* species in Utah from 1982-85. The study area ranged in elevation from a high of 3,350 m, to a low of 1,370 m. Vegetation varied greatly by elevation consisting of Gambel’s oak, big-toothed maple, white fir, Douglas-fir, quaking aspen, spruce, and sub-alpine fir. Fischer measured 16 habitat variables including canopy height, canopy depth, tree density and tree diameter.

Fischer found that northern goshawks used available habitat non-randomly, showing a strong preference for white fir/Douglas-fir woodland. On several occasions he observed northern goshawks capture prey in open areas such as ski trails and avalanche zones. Fischer stated, “It was obvious that these open areas were hunted, even though few radio locations were recorded there” (Fischer 1986, p 10). Fischer found that the prey of the northern goshawk included appreciable numbers of both birds and small mammals. Fischer found the dominant mammals in the diet of the northern goshawk to be ground squirrels, rock squirrels and chipmunks. None of these species are old-growth obligates. Fischer (1986) further stated, “Northern

goshawks, the largest species, foraged significantly more often in more open forest types” (p 15).

A.7.ii. 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 three summers. 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. (1994) reported, “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” (p 72).

“Our telemetry data indicated that perched goshawks tended to be found in well-canopied stands with large trees. These locations may have provided hunting perches, thermal cooling, or protective cover.” And, “The selection of areas with high diversity corresponds to the degree of interspersed by common goshawk prey species” (Hargis et al. 1994, p 72).

“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.” Furthermore, “...the selection for stands with the most canopy cover and largest diameter 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” (Hargis et al. 1994, p 73).

In conclusion Hargis et al. (1994) stated, within the home range of the goshawk, “...emphasis should be placed on creating or maintaining vegetative 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” (p 73).

A.7.iii. 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, Bright-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, Bright-Smith and Mannan (1994) 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 the mean rank of relative preference of all hawks increased with increasing canopy closure. Bright-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” (Bright-Smith and Mannan 1994, p 64).

A.7.iv. 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 (1993) found: (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 (1993) recommended at least 20 percent of the management area be in closed-mature/old-growth habitat (trees greater than 21 inches d.b.h. and average canopy closure over 40 percent).

A.7.v. 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 (1994) found 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.” And, “...the range of sites used by goshawks was impressively broad...” (Beier 1994, p 4). He also found used plots had more trees overall, more trees in the 8-16" d.b.h. class and >16" d.b.h. size class, and more trees > 18 m tall.

A.7.vi. 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 sub-specific 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.vii. In May of 1994, Crocker-Bedford 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, “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.” And, “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 most preferred” (Crocker-Bedford 1994, p 1).

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 and Chaney (1988) stated, “a demonstrated preference (use compared to availability) for nesting in stands of large trees with dense canopies ($P < 0.0001$), and suggested such preference was associated with similar stands in the vicinity used for foraging” (Crocker-Bedford 1994, p 8). It was also noted that closed canopies may be associated with overall prey abundance.

A.7.viii. Crocker-Bedford 1995, published an abstract of a paper presented at the annual meeting of 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 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 between 1973-1986 on 70-90 percent of each home range. For the four 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” (Crocker-Bedford 1995, p 43).

A.7.ix. In April 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 Coronado National Forest. Snyder had eight goals, two of which are pertinent to this discussion: (1) to produce a database containing nest-area locations and habitat measurements, including maps and photographs, for use by resource managers; and (2) 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 these 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.” And, “It is interesting that no nests were found in aspens although a special effort was made to search for nests in these trees” (Snyder 1995, p 16 and 22). Snyder also reported a minimum of 50 percent or greater canopy closure at nest sites.

A.7.x. 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. Woodbridge and Detrich found the following: (1) mean occupancy rates of habitat components increased as spatial scale increased from nest trees to nest stands and (2) nest stand clusters, despite intensive timber harvest and fragmentation of mature forest, supported high densities of nesting goshawks.

A.7.xi. Building on an ongoing study (discussed under A.7.vi.), Titus et al., 1996, reported results from multiyear goshawk nest surveys on the Tongass National Forest in Southeast Alaska. This study had the same five objectives as noted in A.7.vi: Titus et al. (1996) found that after three field seasons the total number of known nest sites in southeast Alaska was low compared to other parts of the country. Nest site productivity averaged 2.3 young/nest. For comparison purposes goshawk habitat in Southeast Alaska is far too different from ponderosa pine forest in the Southwest to make valuable comparisons (see Reynolds 2004).

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. began by critiquing two basic assumptions in the MRNG:

- “Goshawks do not require extensive stands of canopied forest, but do require high levels of interspersed forest.”
- Goshawks are dependent upon prey abundance not availability, and therefore do not directly select for forest structure” (Suckling et al. 1994, p 17).

In critiquing the first assumption, Suckling et al. (1994) noted, “None of the voluminous goshawk literature is cited to support these very unconventional notions of ecosystem management and goshawk ecology” (p 18). And, “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” (p 19). Suckling et al. cites at least 35 papers 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, re-occupancy 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/interspecific 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. (1994) noted, “It is true that goshawks use a variety of forest types as foraging areas. It does not follow, however, that they are forest generalists. Goshawks are forest specialists with a strong and demonstrated preference for mature forests” (p 25).

Suckling et al. (1994) also noted, “Studies not cited by the MRNG suggest goshawks require mature forest structures for foraging” (p 26).

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 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 panel 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 panel’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 panel’s findings and recommendations.

In making their report, the review panel 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 we 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 (September - March).
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... the “Management Recommendations” represent a major step toward research and management of ecosystems at a landscape scale...

12. The public needs to learn ponderosa pine forests in the Southwest were open and park-like in the pre-settlement period...” (Braun et al. 1996, p 10-11).

B. 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.

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 dated April 10, 2003, titled “Habitat Effects on Northern Goshawks.”
5. A review of January 9, 2004, by R. T. Reynolds 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.
7. Thirteen additional papers which studied habitat associations of northern goshawks published since 1996:
 - i) Patla (1997)
 - ii) Widen (1997)
 - iii) Good (1998)
 - iv) Reynolds and Joy (1998)

- v) Lapinski (2000)
- vi) Boal et al. (2001)
- vii) Ingraldi (2001)
- viii) Stephens (2001)
- ix) Bloxton (2002)
- x) Finn et al. (2002)
- xi) Joy (2002)
- xii) Drennan and Beier (2003)
- xiii) La Sorte et al. (2004)

Key points from these documents are summarized as follows.

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

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 inch d.b.h. 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 Drennan.

B.2. In October 2001, the Northern Goshawk Scientific Committee (NGSC) produced a “Review of Supplemental Information Relevant to Habitat Management for the Northern Goshawk in Southwestern United States” (Reynolds et al.) for the Southwestern Region of the USDA Forest Service. In this document the NGSC reviewed 9 of the 11 papers previously 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.

The NGSC made the following findings concerning Austin (1993):

1. The study was more applicable to mixed conifer rather than ponderosa pine forests.

2. Home ranges were 22 percent larger than the largest home ranges reported in other North American studies.
3. Findings on habitat use are potentially flawed because of failure to determine or report the degree of location error during radio-telemetry studies.
4. 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 100-140 years old, 20 percent of the home range with trees 140-185 years old, and 20 percent of the home range with trees 180-235 years old. Austin recommends this proportion of age classes is expected to provide the large trees with lifted crowns and open understories.

The NGSC made the following findings concerning Beier (1994):

1. The study was conducted in Southwest ponderosa pine forest.
2. Findings are potentially confounded by several factors including whether 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.
3. “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” (Reynolds et al. 2001, p 7).
4. 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).
5. Beier’s prey census study did not include two important northern goshawk prey items in the southwest—Abert’s squirrel and red

squirrel—potentially confounding the counts of prey in used vs. unused foraging sites.

6. Despite the small sample size, Beier’s data support the MRNG in that foraging goshawks prefer large trees and a diversity of vegetation provided by 20 percent of the home range in trees 100-140 years old, 20 percent of the home range with trees 140-185 years old and 20 percent of the home range with trees 180-235 years old. The NGSC recommended a high level of interspersed structural stages and advocated clumping large old trees with interlocking crowns.

The NGSC made the following conclusion concerning Crocker-Bedford’s 1994 paper: “All topics in the 15 documents reviewed by Crocker-Bedford were effectively addressed by the Scientific Committee in the development of the MRNG” (Reynolds et al. 2001, p 12). 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 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, in a study area containing only 16.4 percent forests, 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 was not discussed in the MRNG; however, NGSC concluded studies of goshawk nest densities often lacked pre-timber

harvest controls, and nest densities are likely to differ among localities, forest types, and years, making comparisons equivocal.

The NGSC made three conclusive statements regarding the Crocker-Bedford (1995) paper and the goshawk guidelines:

1. The MRNG recognized that logging probably affects goshawks.
2. 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.
3. The NGSC noted that Crocker-Bedford (1994 and 1995) was considered during the development of the MRNG.

The NGSC made the following findings regarding the consistency of findings in Hargis et al. (1994) with the 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 the following findings concerning Mannan and Smith (1993):

1. The Mannan and Smith study included only ponderosa pine and mixed conifer forests.
2. Home ranges were intermediate in size to those reported in other studies.
3. 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.
4. The determination of use or avoidance of “edge” in the study appeared confounded.
5. Canopy cover diversity was consistent with the MRNG.

6. 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 that Mannan and Smith reported is equivocal.

The NGSC made the following findings concerning Snyder (1995) as it relates to the MRNG:

1. The MRNG did not address Madrean evergreen forest.
2. Canopy cover recommendations in the MRNG are consistent with Snyder’s findings.
3. The MRNG did not address Mearns quail (a common prey species in Madrean forests) as a prey item.
4. Extensive searches for goshawk nests are required before population trends can be established.
5. Snyder’s report is supportive of the desired forest conditions found in the MRNG because of diversity of vegetation that goshawks utilized in the study area.

The NGSC made several findings concerning Titus et al. (1994), however, these findings are not reported here because the 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 the following findings concerning Woodbridge and Detrich (1994):

1. The forest types in the Woodbridge and Detrich study are similar to southwestern forests.
2. The NGSC prevented extensive fragmentation of forests by tree harvests as was the case in the Woodbridge and Detrich study area.
3. The NGSC also recognized the importance of nest areas, nest sites, and nest trees for breeding goshawks.

4. Some of the findings are not pertinent because implementation of the MRNG do not result in large-scale fragmentation and, therefore, do not suggest amending the MRNG.

In summary, the NGSC found the new information in the nine cited papers supported the MRNG and 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, 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 their population limiting 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 increased primary forest productivity during wet years results in abundant foods (mast seeding, insects), increased populations of birds and mammal prey, and increased breeding by goshawks.

Reynolds et al. (2003) reported “Goshawks on the Kaibab Plateau have a high annual fidelity to their territories” (p 6). And, “Overall, 95% of males and 94% of females remained on their original territories from one year to the next” (p 6). Furthermore, “Failure of a nest attempt in a previous year had little influence on either territory or mate fidelity” (p 7). They concluded, “These data, when coupled with estimates of adult survival, fidelity, and dispersal, suggest that competition for breeding

territories on the Kaibab may be high as a direct result of a saturated breeding population” (p 8).

Reynolds et al. (2003) also reported, “On higher quality territories, the amount of deciduous vegetation and forest openings increased with distance for circle plots; whereas, proportions of these habitats decreased with distance from random locations” (p 9). And, “The number and size of openings within a goshawk’s territory and foraging range are, therefore, important to the goshawk’s reproductive success” (p 10).

In summary, Reynolds et al. (2003) 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)” (p 10).

B.4. In an April 10, 2003, paper, Crocker-Bedford updated his previous 2001 literature review on “Habitat Effects on Northern Goshawks,” citing a number of authors who support the position that goshawk nest sites include larger trees and denser overstory canopies than the surrounding landscape. Also cited were 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 (2003) stated, “Up to some point, larger stands of mature forest are better for both nesting and foraging than smaller stands (a few studies).” And, “Although individual goshawks are not everywhere obligates of mature forests, such habitat may be important for the survival of the species” (p 3).

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 related to the northern goshawk, that may have had information on how goshawks used habitats during the breeding and winter seasons.

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 much of habitat use by goshawks appeared to be related to 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.

12. Clearly, goshawks are opportunistic; they use a wide variety of habitats and take whatever prey presents itself provided they can detect and pursue it.
13. A high interspersed of prey habitats probably benefits the energetics of foraging goshawks by providing an overall greater diversity of prey species and reduces the travel time between patches of foraging goshawks.

In conclusion, Reynolds (2004) noted, "Goshawks breed in most forest and woodland types that occur in their geographic range... and in some localities in open shrub, tundra, or riparian areas... where they nest in small patches of trees but hunt in the open." And, "Much of the diversity of vegetation types used by goshawks may be related to the availabilities of different prey species in each of those vegetation types" (p 6).

The above conclusions support Reynolds, et al. (1992) and Reynolds et al. (1996) findings that northern goshawk habitat conservation plans should include goshawk (nesting, foraging) and the habitats of all major prey species in a local goshawk food web. While some authors have argued goshawks require closed canopy, mature forest for nesting and foraging, research is increasingly showing that goshawks use a variety of forest and woodland types and age classes and, in some areas, hunt extensively in openings and in edges along openings (Reynolds 2004).

B.6. In 2004, The Wildlife Society released Technical Review 04-1 "The Status of Northern Goshawks in the Western United States," Anderson et al. (2004). The Raptor Research Foundation Inc. and The Wildlife Society jointly formed a technical review committee to: (1) determine if there is evidence of a population trend in northern goshawks in the western U.S., excluding Alaska; (2) determine if there is evidence that goshawks nesting in the eastern and western United States represent distinct, genetically unique populations;

and (3) evaluate evidence for northern goshawk habitat relationships, including any association with large, mostly unbroken tracts of old-growth and mature forests.

Charge number three is at the heart of the Southwestern United States goshawk habitat debate. The Wildlife Society committee concluded, “Given the current knowledge of goshawk-habitat relationships, it is not scientifically defensible to solely use the distribution and abundance of late-successional forest as a surrogate measure to infer goshawk status, population trend, and habitat quality” (Anderson et al. 2004, p 18).

B.7. As with the 11 papers noted in A.7., the following 13 papers are variously cited as supporting the argument that the 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. Further, goshawks avoid open areas and young stands, and that harvesting reduces occupancy and ultimately population density.

B.7.i. Patla (1997) studied a population of northern goshawks for 6 years from 1989 to 1995 on the Targhee National Forest in eastern Idaho and western Wyoming. The study included 31 territories located in Douglas-fir and lodgepole pine and focused on nesting habitat over large areas, and the effects of timber harvesting on both habitat and reproductive success. The most common harvest method was clearcutting. Patla evaluated five spatial scales: the nest tree, nest plot, nest area, post-fledgling family area and the forage area. Her study area consisted of steep mountainous terrain in the upper Snake River basin. Vegetation included sub-alpine fir, Engleman spruce, whitebark pine, Douglas-fir, quaking aspen and lodgepole pine.

Patla found 27 of the 31 territories were occupied at least once during the study. Sixty-four percent of nest territories had some timber harvest while 35 percent were undisturbed. Patla found significant differences in productivity between years with weather being the dominant factor. The study found five prey items dominated the diet of the northern goshawk: snowshoe hare, Uinta ground squirrel, ruffed grouse, blue grouse, and red squirrel. One male goshawk fed almost exclusively on ground squirrels. Patla’s observations were very similar to Fischer’s (1986), “I observed goshawks hunting ground squirrels in open areas of grass or sage

meadows at three different locations” (Patla 1997, p 43). Patla found that sage/shrub cover in the foraging area was positively correlated with occupancy of the goshawk territory. The study results suggest the importance of sage/shrub cover in providing consistent foraging opportunities for northern goshawks. She also found that occupancy rates of pre-harvest nesting territories were higher than post-harvest territories but the differences were not significant.

Patla concluded, within the PFA and FA, the MRNG recommendation for retention of 60 percent cover in mid-aged, mature and old forest stands (20 percent in each category) were very close to the average proportion of total mature forest cover found within estimated goshawk PFAs and FAs on the Targhee National Forest.

B.7.ii. In a 1997 paper, Widen reported on broad scale goshawk population trends and status in Fennoscandia, as well as habitat needs and preferences. Widen (1997) concluded, goshawk populations in Fennoscandia have declined 50-60 percent from the 1950s to the 1980s. During the same time, roughly 40 percent of the forested land had been cleared. Widen cited his 1989 study which found goshawks strongly preferred large patches and mature forest. However, “large patch” was not defined. Widen also concluded, hunting habitats are more crucial than nesting habitats.

B.7.iii. Good (1998) monitored eight male goshawks during the summers of 1996 and 1997 on the Medicine Bow National Forest in south central Wyoming. Vegetation was dominated by lodgepole pine with Douglas-fir, subalpine fir, limber pine, ponderosa pine and quaking aspen comprising the rest of the tree component. Good looked at four factors that affect relative use of goshawk kill areas: (1) prey abundance, (2) habitat characteristics, (3) landscape patterns, and (4) habitat needs of prey species.

Good (1998) found that on average goshawks did not return more often to sites with greater prey abundance. Goshawks returned most often to sites with gentler slopes, fewer ground shrubs, greater density of trees 23 cm d.b.h., and sites dominated by lodgepole pine adjacent to clearcuts with inclusions of small openings. Good also found that goshawks did not return frequently to sites with greater canopy coverage but made kills in a wide range of habitat structure.

B.7.iv. Based on data collected from 1991 through 1996, Reynolds and Joy (1998) reported on the distribution of nesting pairs, annual proportion of pairs laying eggs, nesting success, fecundity, fledgling sex ratio, mate and territory fidelity, and natal and breeding dispersal of goshawks on the Kaibab Plateau in Northern Arizona. They also provided an estimate of the minimum number of monitoring pairs necessary to accurately determine occupancy rates, production of fledglings and nesting success to be 40 pairs.

From 1991 through 1996, Reynolds and Joy banded 429 goshawks in the study area including 86 males, 87 females and 256 nestlings. Brood size ranged from 1 to 3 nestlings and annual nesting success ranged between 72-86 percent. The sex ratio of broods was 54.3 percent female and 45.7 percent male. Reynolds and Joy (1998) found 107 nest territories which they estimated to be 73 percent of the potential territories on the Kaibab Plateau.

In conclusion, they noted in spite of low male survival, there is evidence that the goshawk population on the Kaibab is both saturated and relatively stable and the high annual rate of occupancy of territories by goshawks is suggestive of a saturated population. Reynolds and Joy (1998) also suggest that to determine goshawk fecundity would require a sample size of between 80 and 100 pairs.

B.7.v. Lapinski (2000) reported on a master's study she conducted on goshawk nest production and habitat use for 4 years beginning in 1996 and ending in 1999. Lapinski found 36 active historic nests and captured and placed transmitters on 6 adult goshawks including 1 male. The study was conducted in the Upper Peninsula of Michigan.

Lapinski found nest success to be 1.14 young fledged per year with a predation rate of 25 percent. Based on a personal communication, she speculated that fisher predation may be facilitated by reductions in continuous cover of mixed hardwood-conifer forests. She found that goshawks neither selected nor avoided a variety of habitat types in the Upper Peninsula of Michigan other than a selection for hardwood cover types. She also found that prey availability (ruffed grouse and snowshoe hare) was an important part of habitat selection by goshawks. Home ranges of goshawks

in the Upper Peninsula of Michigan were smaller than those in the West.

B.7.vi. Boal et al. (2001) studied goshawks in Minnesota for 3 years from 1998-2000. Habitats included hardwood and conifer forests consisting of aspen, paper birch, red oak, white pine, and red pine. Boal et al. classified stands as young 0-25 years, mature 25-50 years and old <50 years. Boal et al. located 53 nest areas and radio tagged 33 adults (18 males and 15 females). Eighty-one percent of the nests were in aspen, 11 percent in paper birch and 4 percent in white pine. Fledgling success was 1.75 young per nest. Boal et al. found early successional upland hardwoods were the most common habitat type for foraging goshawks. Mature early and mature late successional upland conifers were preferred for breeding. Goshawk home ranges also had high levels of downed wood, high stem densities, dense canopies and unobstructed lower canopies.

B.7.vii. Ingraldi (2001) studied northern goshawks for 7 years on the Apache-Sitgreaves National Forests in east-central Arizona. The study had three purposes: (1) estimate adult and post-fledgling survival rates; (2) estimate percent of nests active, active nests that produce young, primary sex ratio, and fledgling per nest; and (3) model the status and population trend of northern goshawks on the Apache-Sitgreaves National Forests in east-central Arizona.

Vegetation in the study area is typical of the Mogollon Rim, dominated by mixed conifer, ponderosa pine, white fir, aspen and gamble oak. Ingraldi found over the 7-year period, mean territory activity rate was 48 percent with a mean failure rate of 31 percent. Ten territories produced 52 percent of the young. Mean fecundity rate was 46 percent. Ingraldi noted occupancy rate was a poor indicator of population status while the number of fledglings per active nest was a much better indicator of population performance. Finally, Ingraldi (2001) noted although some territories were attractive for nests they were not suitable for producing young.

B.7.viii. Stephens (2001) studied the wintering ecology of northern goshawks for two seasons (1998/99 and 1999/2000) in the Uinta Mountains in northern Utah. The predominant vegetation in the study area included spruce-fir, lodgepole pine, ponderosa pine, Douglas-fir and pinyon/juniper woodlands. Stephens radio tagged 18 goshawks (7

male and 11 female). Stephens found 40 percent of marked males and 90 percent of marked females migrated during winter. Most goshawks migrated to lower elevation pinyon/juniper woodlands which he called an important wintering ground. Goshawks also used agricultural areas, sagebrush and cottonwood riparian forests during winter. Stephens also measured several habitat parameters: canopy closure, tree density, tree height, tree diameter, sapling density, shrub density and slope. Stephens found lodgepole pine and mountain fir were selected in higher proportions than their availability in the study area. Oak, ponderosa pine and lowland riparian were also present in higher percentages than in the study area. Stephens noted wintering goshawks selected forested landscapes with high canopy closure both during the day and at night.

B.7.ix. Bloxton (2002) studied northern goshawks from 1996-2000 in managed forest settings in western Washington during the breeding season. Bloxton looked at prey abundance, space use and demography. Eight of the nine territories used to assess special use occurred on intensively managed private forest lands. Bloxton radio tagged 29 goshawks and monitored 23 territories to determine occupancy and reproductive success. Bloxton found weather during La Nina years had a significant effect on prey availability, habitat use and mortality of goshawks. Bloxton determined blue and ruffed grouse, band-tailed pigeons, northern flying squirrels, snowshoe hares and Douglas' tree squirrels dominated goshawk diets.

Bloxton documents goshawks successfully hunting in all forest types and successional stages except recent clearcuts and shrub/sapling stages. However goshawks tended to hunt in stands with larger diameter trees even though kills were recorded in everything from open 13-year-old regeneration units to 200-year-old growth stands. As such there was substantial variation among kill sites.

B.7.x. Finn et al. (2002) studied breeding ecology and habitat use by northern goshawks in western Washington from 1996 through 1998. Finn et al. found 12 of 30 historic sites to be occupied. They classified habitat by LANDSAT imagery including six forested habitats and three non-forest habitats. Finn et al. (2002) noted, goshawks appeared to respond to habitat features at a variety of spatial scales and habitat configurations. They found that landscapes surrounding occupied nest sites were

dominated by late-seral forest and to a lesser degree by mid-seral forest. Nest sites had large uniform tree patches. The percent of stand initiation cover (trees less than 7 years old) increased as spatial scale increased. At nest stands, stand initiation cover increased to a maximum of 17 percent. Finn et al. (2002) found goshawks nested in mature forest stands (trees older than 40 years) surrounded by late seral forest. Finn et al. (2002) also concluded that goshawk needs at large scales can be met in a variety of ways that may be compatible with the needs of other species or that allow managers to balance biological and economic objectives.

B.7.xi. Joy (2002) developed a dynamic model aimed at predicting goshawk nesting habitat. The study area was the North Kaibab Ranger District in Arizona. Joy also assessed the relationship between abundance, distribution and demographic performance of goshawks and the range of habitat conditions supporting the population. Joy (2002) stated, "because of the nesting requirements of the goshawk, the vegetation types associated with nest-tree plots are not likely to be in proportion to those observed on the study area outside of the nest areas" (p 24). Joy also found the most common habitat variables distinguishing goshawk territories were the amount and arrangement of ponderosa pine, mixed conifer, deciduous trees, openings, and overall diversity of vegetation types. Joy showed that higher quality goshawk territories contained smaller and fewer openings than random plots.

B.7.xii. Drennan and Beier (2003) studied 13 adult wintering goshawks for 2 winters (1994-1995 and 1995-1996) and found most female goshawks stayed near their nesting territory while male goshawks moved to lower elevation pinyon-juniper areas. Wintering male goshawks preyed on cottontailed rabbits and Abert's squirrels. They also found when selecting a foraging site within a home range and habitat type, goshawks selected sites in moderately dense, mature forests where they could use their maneuverability to capture prey. They also noted this pattern was consistent during the breeding season.

B.7.xiii. La Sorte et al. (2004) studied habitat associations of sympatric red-tailed hawks and northern goshawks at two spatial scales around nest sites during the breeding season. The study occurred on the Kaibab Plateau in northern Arizona.

La Sorte et al. found red-tailed hawk nests were located on steep north slopes, containing abundant shrubs. Red-tailed hawk nests were also higher in the tree than goshawk nests and had less overhead cover. Conversely, goshawk nests had higher overhead cover, little understory shrubs, and were lower in the canopy with no aspect affiliation. The investigators concluded that their results were consistent with other studies that documented goshawks nesting in areas of high canopy closure, mature trees and open understories which corresponds to the management of a post-fledgling family area outlined in Reynolds et al. 1992.

C. Finally, this review is based on the following recent documents, developed since the draft supplement to the final environmental impact statement was published.

1. Two papers published in 2005, titled “Sampling Considerations for Demographic and Habitat Studies of Northern Goshawks” and “Patterns of Temporal Variation in Goshawk Reproduction and Prey Resources.”
 - i) Reynolds et al. (2005)
 - ii) Salafsky and Reynolds (2005)
2. Four “in press” papers received by the Forest Service in 2005.
 - i) Reynolds et al. (in press, a)
 - ii) Reynolds and Joy (in press)
 - iii) Reynolds et al. (in press, b)
 - iv) Wiens et al. (2006)
3. A recent paper by Greenwald et al. (2005), titled “A Review of Northern Goshawk Habitat Selection in the Home Range and Implications for Forest Management in the Western United States” and a response to this paper by three of the MRNG primary authors.
 - i) Greenwald et al. (2005)
 - ii) Reynolds et al. (in review)

Key points from these documents are summarized as follows.

C.1.i. In their paper titled “Sampling Considerations for Demographic and Habitat Studies of Northern Goshawks,” Reynolds et al. (2005) reported on the

results of 12 years of goshawk nest monitoring on the North Kaibab. Reynolds et al. used mark-recapture methodology from 1991-2002 to determine distribution, vital rates, abundance, fidelity to mate and nest territory, natal and breeding dispersal, and habitat occupancy of breeding goshawks. The number of known breeding territories increased from 37 in 1991 to 121 in 2002. By 2002, about 95 percent of the Kaibab National Forest had been searched. They defined a breeding territory as an area exclusively occupied by a pair of goshawks during a breeding season. Using this method, Reynolds (unpublished data) found that paired goshawks had strong site fidelity to their breeding territory. They located territories using two protocols: systematic foot searches for goshawks and their nests and broadcast vocalizations from stations along transect lines.

Reynolds et al. (2004) reported that over years, goshawks often have alternative nest sites. To ensure the best possible results they employed a within-territory nest search protocol. Nests were “used” if eggs were laid, or eggs were not laid but evidence of occupancy was obvious. They found that there was large temporal variation in the frequency of egg laying, some pairs going 7 years between laying events. On average 63 percent of the nests were successful. There were 273 alternate nest sites in 91 territories. Annually 64 percent of the breeding population used alternate nest sites. Sample sizes of 60-80 territories in good years and 80-100 territories in bad breeding years were necessary to gain adequate estimates. In summary, their study showed that, because breeding varied temporally and spatially and detectability of nonbreeders was low, accurate estimates of the numbers of nests and nest location greatly depends on the sampling effort. Reynolds et al. (2005) recommend a minimum of 8 years of searches to adequately sample an area for occupancy of breeding territories.

C.1.ii. Salafsky and Reynolds (2005) studied goshawk productivity in relation to prey base productivity and abundance in an effort to determine if prey availability limited goshawk productivity. The study was conducted on the Kaibab Plateau in northern Arizona. Their objectives were to determine if prey resources limit the reproductive rates of goshawks with relatively diverse diets, and describe how changes in prey populations may influence goshawk productivity. If

prey was limiting then variations in productivity should be associated with variations in prey abundance. Salafsky and Reynolds (2005) found variation in both goshawk productivity and prey density across sampling year, with goshawk productivity taking a significant decline between 2000 and 2001 which correlated with significant declines in prey density during the same time period. Goshawks were found to consume a wide variety of prey items 710 from 30 individual prey species. Seven species made significant contributions to goshawk diets. They found a strong positive correlation between total prey density and goshawk productivity from 1999-2002. Red squirrel was the only prey species found to have a significant positive relationship with goshawk productivity. Since this species does not hibernate it remains available year-around.

Salafsky and Reynolds (2005) found high temporal correlations between goshawk productivity and annual prey densities. They state “Therefore it appears that goshawk reproduction on the Kaibab Plateau responded to inter-annual increases in prey density” (p 243).

C.2.i. In their as yet unpublished paper titled “An Ecosystem-Based Conservation Strategy for the Northern Goshawk,” Reynolds et al. (in press, a) describe the process they used to develop Southwestern goshawk conservation strategy¹ (SWGS), described the potential for its broad application in western forest landscapes, describe its compatibility with the restoration of ecological forest processes, and summarize implementation. The SWGS is based on describing desired habitat conditions based on the life history and habitats of the northern goshawk, the life histories and habitats of its primary prey, and the ecology and dynamics of the forests it inhabits. The premise is that a conservation strategy that addresses all the stages of a species’ life history, the physical and biological factors that limit its populations, the members of its ecological community, and the special and temporal dynamics of the ecosystem it occupies, should be robust to failure. They review goshawk life history, goshawk limiting factors, goshawk habitat, goshawk prey, geographical and annual variation in goshawk diets, determine goshawk diets, develop suites of important prey species, prey habitats, forest

ecology and synthesis of these components. From here they review the development and implementation of vegetation structural stages or VSS classes. Concerning the implementation of the SWGS they note, “Specific management actions and the intensity that they are applied should be contingent on the differences between the existing conditions of a focal area and the desired conditions” (Reynolds et al. in press, a, p 18).

Reynolds et al. (in press, a) also note, “The desired forest conditions described in the SWGS resembled the historical conditions of southwestern ponderosa pine forests described by Pearson (1950) and White (1985). These similarities suggest that implementing the SWGS would move forests toward restoration of presettlement conditions” (p 21). They also describe the SWGS as a multi-species strategy because it was based on the habitats and ecological relationships of many plant and animals in the goshawk food web.

C.2.ii. In a publication titled “Demography of Northern Goshawks in Northern Arizona, 1991-1996,” Reynolds and Joy (in press) document a study of 282 goshawk nesting attempts on 107 territories on the Kaibab Plateau in northern Arizona from 1991-1996. As a result of the study they report on the distribution and density of breeding pairs, inter-annual variations in proportions of pairs breeding and reproduction, fledgling sex ratios, territory fidelity, and survival of adult goshawks. This study presents the first 6 years of a 15-year study.

Reynolds and Joy found that all but 2 of the 107 territories contained active nests in 1 or more breeding seasons, and the annual percentage of nests failing did not differ significantly between years (14-28 percent). The mean number of fledglings produced and successful nests declined from the better breeding years of 1991-1993. Of 282 nesting attempts in which eggs were laid, 46 (16 percent) were known to have failed. Combining years there were 126 females (54.3 percent) and 106 (45.7 percent) males from 125 broods. Because they had surveyed a high percent of the national forest and the Grand Canyon National Park, Reynolds and Joy were able to determine that the 107 known nesting territories comprised about 73 percent of the potential nesting population in the study area. Of the 105 territories that layed eggs 56 percent contained more than 1 nest, 41 percent

¹ The Southwestern goshawk conservation strategy (SWGS) is synonymous with the MRNG.

more than 2 nests, 12 percent had 3 alternate nests, and 4 percent more than 4 alternate nests.

Annual turnover of adults on territories varied from 10-40 percent for males and 0-50 percent for females. Both male and female breeders showed high fidelity to nesting territories. Survival rates for males were constant at (0.69) and for females at (0.87). They also determined that goshawk territories on the Kaibab Plateau are spatially and temporally fixed.

C.2.iii. In their as yet unpublished paper titled “A Review and Evaluation of Factors Limiting Northern Goshawk Populations,” Reynolds et al. (in press, b) conducted a literature review for factors potentially limiting goshawk populations. They also evaluated the relative importance of the potential limiting factors and discussed how and what scale these factors operate to limit goshawk populations. Reynolds et al. (in press, b) evaluated goshawk behavior, food, vegetation composition and structure, predators, competitors, disease, and weather. They limited their review to factors affecting goshawk reproduction and survival.

Their evaluation of territoriality showed that it can constrain breeding populations by limiting the number of breeding individuals, however, variations within and among landscapes may vary greatly thus effecting the spacing of breeders across any given landscape. Limiting factors concerning vegetative composition were investigated for both the nest and foraging areas. Based on their review, they determined that structure in nest stands is more important than tree species composition. Reynolds et al. (in press, b) report that while many studies implicitly or explicitly point to mature and old forest as important to goshawk occupancy and reproduction, none determine whether or how goshawk actually use any of the vegetation types or seral stages found in circular plots.

Reynolds et al. (in press, b) challenge the conclusions on foraging areas reported by Beier and Drennan (1997), Drennan and Beier (2003) and Good (1998) by stating, “We believe, however, that inference about choice of hunting habitat based on foraging/kill site data are equivocal for several reasons. First the presumed foraging/kill sites may not have been the sites where a goshawk first detected the prey... Second, goshawks frequently move their prey after killing it... Third, studies using indices of prey abundance fail to account for

variation in bird and mammal detection probabilities due to among-plot difference in vegetation structure” (Reynolds et al. in press, b, p 13 and 14). They conclude that the idealized home range contains a diversity of vegetation types and seral stages, including small openings, to provide the habitats of the goshawk’s diverse suit of prey (Reynolds et al. 1992).

Based on their review of prey availability Reynolds et al. (in press, b) conclude that the density, physiological condition, and survival of goshawk fledglings, juveniles and adults appears to be directly related to food availability. Therefore, it is an important and ubiquitous factor limiting goshawk reproduction and survival.

In their summary, Reynolds et al. (in press, b) point out that no study to their knowledge quantified a direct relationship between goshawk survival and vegetation composition and structure, either in breeding habitats or in winter habitats, although some evidence suggests that predation on goshawks may be higher in non-forested habitats. They also note that considerable evidence suggests that vegetative structure at nest sites and foraging sites and the abundance and availability of food were the primary factors limiting goshawk reproduction and survival. The strength of these conclusions are likely to depend on factors such as the number of species within the prey base, whether or not prey populations fluctuate in synchrony, spatial variation in composition and structure of vegetation and abundances of predators and competitors.

C.2.iv. In their as yet unpublished paper titled “Post-fledgling Survival of Northern Goshawks: The Effects of Prey Abundance, Weather, and Dispersal,” Wiens et al. (2006) investigated post-fledgling and post-independence survival of 89 radio marked juvenile goshawks produced from 48 nests in northern Arizona from 1998-2001. The overall goal was to identify critical periods of post-fledgling survival and to determine what ecological factors are most strongly limiting to goshawk productivity at the level of juvenile survival. Specifically they addressed age, gender and cohort specific survival rates, the relative importance of environmental factors to survival and to estimate the importance of fledging and post-independence on juvenile survival rates.

Wiens et al. (2006) tracked 41 of 89 juveniles until they recovered the radio or found the bird dead. They recorded eight mortalities (five females and three males) during the fledgling dependency period. Based on evidence found at the recovery sites, three died from predation or injuries attributable to predation, three from starvation and two unknown causes. By week 13 they were only able to detect 15 of 64 remaining radio-marked juveniles. An additional 6 mortalities (4 females and 2 males) occurred during the 5-week period following independence whereas 10 mortalities (7 males, 3 females) occurred between weeks 13 and 40 post-fledgling. A total of 24 hawks were recovered dead during the study, with predation accounting for 46 percent of the mortality.

Wiens et al. (2006) concluded that post-fledgling survival of juvenile goshawks was consistently high among years and most strongly related to fledgling age, annual changes in prey abundance, gender related difference in body condition. Contrary to predictions they found no evidence that heavy precipitation affected juvenile survival.

C.3.i. Greenwald et al. (2005), conducted a literature review of all published and unpublished North American telemetry-based studies within-home-range habitat selection by northern goshawks. They only considered radio telemetry studies of habitat selection because in their words “such methodology represents the sole means to collect a relatively unbiased sample of locations for a wide-ranging predator like the goshawk, allowing statistical comparison of habitat use verses availability” (p 121). Greenwald et al. (2005), reported that 9 of 12 studies demonstrated selection for stands with higher canopy closure, larger tree size and greater numbers of large trees than found in random sites. Selection for stand diversity was inconclusive. However they reported that, “There was great variation in stand vegetation diversity among the studies” (p 123). They further noted that most studies found that goshawks avoided openings and logged early seral stands. They also reported that four studies determined that goshawks did not select stands for prey abundance. Goshawks in winter continued to select stands with higher canopy closure. They cite five studies that suggest that timber harvest reduces occupancy. They rejected the assumption that foraging goshawks use habitat opportunistically. They also conclude that food availability was not found to limit goshawk productivity in occupied territories.

Greenwald et al. (2005), concluded by stating, “In sum, based on apparent inconsistencies between subsequent research and Reynolds et al. (1992), we recommend adaptation of the management guidelines to incorporate results of numerous studies conducted since 1992” (p 128).

C.3.ii. In this unpublished paper titled, “Habitat Conservation of the Northern Goshawk in the Southwest United States: Response to Greenwald et al. 2005,” three of the primary authors of the southwest goshawk management guidelines respond to Greenwald et al. (2005). They begin with “Here we show that Greenwald’s et al. (2005) conclusion derives from misunderstandings of the desired habitat conditions described in the MRNG, a poor understanding of the ecological factors limiting goshawk populations, a failure to understand goshawk forest habitat as dynamic ecosystems, incomplete reviews of the literature, and inclusion of studies with limited samples of goshawks” (Reynolds et al. in review, p 1 and 2). While Greenwald et al. (2005) insist that mature to old-growth forest are necessary for goshawks, Reynolds et al. (in review) answer with “The literature on prey life histories and habitats indicated that mid-aged to old forests were the most important habitat for most goshawk prey species followed in importance by small open areas (Reynolds et al. 1992)... Thus, MRNG desired landscapes had as much old forest with small interspersed openings as could be sustained” (p 2 and 3). The mosaic of vegetation structural stages (VSS) outlined in the MRNG resemble the pattern of presettlement ponderosa pine in which trees were strongly aggregated into groups of 3-44 trees occupying 0.2-0.3 ha (Cooper 1961, White 1985). Tree groups, and occasional individual trees, were typically separated by variable-sized, but small openings into which roots of the grouped trees spread (Pearson 1950). Reynolds et al. (in review) further explain their silvicultural and biological rationale by addressing the sustainability of old forest with small openings, which are similar to the patchiness found in presettlement ponderosa pine, with lifted canopies, interlocking branches, extensive shading, with snags, downed logs and woody debris, along with brushy understories.

Reynolds et al., (in review) point out several studies that Greenwald et al. (2005) did not include in their literature review (Drennan and Beier 2003 and Stephens 2001). They note that there are wide habitat differences in goshawk habitat use between

dry pinyon-juniper woodlands and mesic coniferous rain forests in Alaska. Reynolds et al. (in review) conclude, “Such extensive variation in vegetation structure (big trees, little trees, no trees; closed canopy, open canopy, no canopy) leads us to conclude that tree size, canopy cover, canopy layers, and woody debris are not always factors limiting goshawk populations as posited by Greenwald et al. (2005)” (p 6).

In their 2005 response to Greenwald et al. (2005), Reynolds et al. (in review) address the “prey base” habitat issue brought up by the former. They state, “Greenwald’s et al. (2005) suggestion of inadequacy of the MRNG is based on their misrepresentations of the desired habitat conditions for goshawks and their prey described in the MRNG.” Further, “Equating the desired openings described in the MRNG to historical clearcuts is misleading” (p 7). Greenwald et al. (2005) admit openings may benefit ground squirrels, a major item in western goshawk diets, and they also ignore rabbits as a food source.

Next, Reynolds et al. (in review) address the inadequacies of several studies cited by Greenwald et al. (2005). Greenwald et al. did not include all radio telemetry studies as they claim (see Younk, 1996). Also at least 12 studies reviewed by Greenwald et al. (2005) included fewer than 10 radio-tagged goshawks and 1 study included only 2 birds. Because of the lack of a robust sample size in these studies they are unlikely to adequately describe all of the habitats used by goshawks.

Reynolds et al. (in review) then address forest structure and prey abundance. Greenwald et al. (2005) cite four studies that in their view demonstrate that goshawk select for forest structure and not for prey abundance. Reynolds et al. (in review) point out the potential problems with the approach taken in these studies. First is the assumption that radio-located goshawks were actually hunting when located and not involved in some other activity, and that kill sites were indeed the spot where the kill was made i.e. goshawks had not moved their kill. Reynolds et al. (in review) believe that the MRNG provide the best vegetative structure giving access to abundant prey.

Next Reynolds et al. (in review) address the issue of close canopy forests introduced by Greenwald et al. (2005). Reynolds et al. (in review) point out that the five studies cited by Greenwald et al. (2005)

were not specifically designed to test or determine habitat surrounding goshawk nests. Thus, they could only hypothesize concerning goshawk habitat relationships.

Reynolds et al. (in review) then point out numerous studies relating goshawk reproduction to surrounding landscape habitats; La Sorte et al. (2004), Joy (2002), Desimone (1997), Maurer (2000), Clough (2000), Daw and DeStefano (2001) and McGrath et al. (2003). Finally, Greenwald et al. (2005) cited Crocker-Bedford’s (1990) 3-year study in which he reported significantly lower nest occupancy and productivity of goshawks in areas that had been only lightly harvested verses those areas that had been more heavily harvested. However, 15 years of study on the Kaibab Plateau has shown that there is great temporal and spatial variation in goshawk productivity (Reynolds et al. and Reynolds and Joy in press). “While Crocker-Bedford (1990) concluded that heavier cutting reduced occupancy and reproduction compared to light cutting, we show... that demonstrating the effects of tree cutting on reproduction is not always straight forward even with long-term data” (Reynolds et al. in review, p 16).

Therefore, Reynolds et al. (in review) disagree with Greenwald’s et al. (2005) statements that, “recommendations focusing on increasing prey abundance at the expense of forest structure...are not likely to increase goshawk occupancy rates.” And, “The multiple species, ecosystem approach of the MRNG addresses the most ubiquitous factors appearing to limit goshawk populations: Food abundance, food availability, and suitable nest habitat” (Reynolds et al. in review, p 17 and 18).

Discussion on Literature Review

As stated in Anderson et al. (2004), most biologists can agree on managing northern goshawk habitat at three spatial scales: the nest, nest stand and foraging area. The scientific debate has been stated in terms of the degree to which the northern goshawk should be considered a habitat specialist, requiring large tracts of old-growth forest, closed canopies, large trees and, further, that they avoid open areas, young stands, edges and areas with high vegetation diversity.

The contrary point of view is that the northern goshawk is a habitat generalist capable of utilizing a variety of habitats, especially for foraging

(Reynolds, 2004). However, only 1 (southeast Alaska) of the 180 documents reviewed by Reynolds (2004) showed the northern goshawk strictly using old growth.

Proponents of the goshawk specialist theory cite various scientific literature to support their arguments as to habitat requirements or habitats that are avoided or not used by the northern goshawk.

In support of the contention that goshawks require closed canopy (> 40 percent) old-growth forest throughout their home range, proponents variously cite: Austin 1993, Beier and Drennan 1997, Boal et al. 2001, Bright-Smith and Mannan 1994, Drennan and Beier 2003, Hargis et al. 1994, Stephens 2001, Ward et al. 1992, Patla 1997, Finn 2002, La Sorte et al. 2004, Joy 2002, and Ingraldi 2001.

There appears to be no debate that goshawks will use areas of high-canopy closure within their home range, especially in the nest stand. One interesting anomaly here is silvics of ponderosa pine forests. Older ponderosa pine forests, particularly on drier sites found in the Southwest, generally do not provide high levels of canopy closure due to the open nature of their crowns and generous spacing of the trees at older ages (150+ years).

Debate over the amount and extent of old growth or whether the northern goshawk is an old-growth obligate is substantive. Reynolds (2004), points out the wide variety of habitats used by the goshawk for nesting and foraging and questions whether all of these habitats are replete with old-growth forest. Clough (2002), found goshawks nesting in very young stands 17 of 19 times. In their review of the status of the northern goshawk in the western United States, Anderson et al. (2004) concluded, "Given the current knowledge of goshawk-habitat relationships, it is not scientifically defensible to solely use the distribution and abundance of late-successional forest as a surrogate measure to infer goshawk status, population trend and habitat quality" (p 18).

In support of the contention that goshawks require large trees in their home range, proponents cite: Austin 1993, Beier and Drennan 1997, Bloxton 2002, Boal et al. 2001, Good 1998 and Hargis et al. 1994.

There appears to be no substantive debate concerning the use of large trees in the home range of the northern goshawk especially for nesting and perching. However, Clough (2002) found 17 of 19 goshawk nests in open forests with 65 percent of the PFA dominated by small sized trees.

Proponents of the goshawk specialists theory often cite literature in support of their arguments that northern goshawks select habitats that lack edge, vegetation diversity, forest edges, openings in the canopy and they specifically do not select habitats based on prey abundance as follows: Austin 1993, Beier and Drennan 1997, Bloxton 2002, Boal et al. 2001, Bright-Smith and Mannan 1994, Titus et al. 1996, Fischer 1986, Lapinski 2000, Joy 2002, La Sorte et al. 2004, Good 1998, and Drennan and Beier 2003.

Reynolds (2004) points out northern goshawks occupy a wide variety of habitats as documented in the scientific literature including: ponderosa pine with pinyon-juniper woodland stringers, pine-oak woodland, ponderosa pine, Douglas-fir western hemlock, Douglas-fir, mixed conifer, aspen, lodgepole pine, paper birch, beech, hardwood-hemlock, etc.

Widen (1989), Kenward and Widen (1989), Younk and Bechard (1994), as well as Joy (2002), report finding that northern goshawks utilize habitats with relatively high prey abundance and availability. It should also be noted Beier and Drennan (1997), Drennan and Beier (2003), and Good (1998), did not explain how kill sites were located, therefore, it is impossible to tell where the actual taking of prey occurred, especially since various methods yield various results as to habitat associations, Reynolds (2004).

Kenward (1982), Kennedy (1989), Hargis et al. (1994), Titus et al. (1994), Younk and Bechard (1992) and (1994), and Clough (2002), all reported northern goshawks using young stands, forest edges and openings.

Proponents of the goshawk specialist's theory supporting the argument that timber harvesting reduces goshawk nest occupancy, reduces goshawk nesting density and threatens population viability cite: Crocker-Bedford (1990), Crocker-Bedford (1995), Ward et al. (1992), Patla (1997), Finn (2002), La Sorte et al. (2004), Joy (2002), and Ingraldi (2001).

The North Kaibab Ranger District of the Kaibab National Forest has been treating forest stands following the management recommendations outlined in GTR-RM 217, Reynolds et al. (1992), and the Preferred Alternative in the Regional Forest Plan Amendment 1996 for the past 7 years (See Table 5). During that time, they treated an average of 2,719 acres per year averaging 4,994 MBF harvested annually.

Table 5. Timber Harvest on the North Kaibab Ranger District of the Kaibab National Forest

Year	Acres Treated	Volume-MBF
1998	1,143	4,855
1999	7,697	9,137
2000	4,509	7,968
2001	3,116	6,631
2002	1,255	3,838
2003	620	1,163
2004	696	1,386
Totals	19,036	34,960
Means	2,719	4,994

During the same period, Joy (2002) reported that northern goshawk territory occupancy on the Kaibab Plateau remained stable while nesting success varied by year.

Woven into the debate on whether goshawks are old-growth, closed-canopy forest obligates or are opportunists that use a variety of habitats, are great differences in habitats of primary goshawk prey species and the necessary entry of goshawks into these habitats to capture prey.

In their review of the pre-1996 literature (Appendix H) the NGSC concluded the MRNG provided for the foraging needs of the goshawk by providing suitable (and sustaining) foraging habitat (40 percent of the landscape is mature and old forests, and small openings) for both the goshawk and its major prey species.

National Forest Surveys and Monitoring

National forests in the Southwestern Region have been monitoring northern goshawks for over 10 years. Beginning in 1991, a standardized protocol became available for conducting goshawk surveys. This protocol included standard procedures for timing, intensity and duration of goshawk surveys.

The tables displayed in Appendix AM summarize the data from those surveys.

The total number of post family-fledgling areas (PFAs) within the Southwestern Region has steadily increased from 272 in 1991, to 683 in 2004. Over that same period, the individual national forests in the region monitored an average of 333 PFAs per year.

As reported in Reynolds et al. (2003), northern goshawk productivity on many national forests in the region was down during the recent drought. The summarized information is reported by post family-fledgling area. The post family-fledgling area is described on page 13 of the MRNG (Reynolds et al. RM GTR 217, August 1992).

During the 1991 to 2004 time period, volume of timber sold and harvested within the Southwestern Region has steadily decreased (see Table 6). Corresponding monitoring data over the same time period in the region shows that the percent of total PFAs that produced fledglings, percent of total PFAs occupied but didn't produce, and percent of total PFAs with at least one goshawk present has also steadily declined. This data trend is consistent with Reynolds et al. (2003) as described above.

Table 6 Regional Timber Harvest Data (CCF = Hundred Cubic Feet)

Year	CCF Sold	CCF Cut
1988	392.6	485.2
1989	357.4	496.9
1990	305.2	433.2
1991	282.3	344.1
1992	163	291.8
1993	153	190.6
1994	119.1	115.5
1995	85.7	99.6
1996	33.3	46.3
1997	88.9	83.2
1998	43.1	34.9
1999	72	83.7
2000	68.6	65.4
2001	81.3	70.5
2002	65.6	70.9
Total	2,311.1	2,911.8

It is statistically unsound to draw many conclusions on a regional scale from the individual national forest's northern goshawk monitoring data due to a number of factors, including:

1. Forest monitoring protocol was developed before recent literature concluded that more nest site searches are necessary to validate absence or presence (See Boyce, et al. 2005).
2. Variation of data and results among and between forests is wide.
3. There is a wide variety of environmental variables unique to many forests which have influence over the results.
4. As stated in Reynolds et al. (2005), recent research has indicated that necessary sampling efforts to accurately estimate the reproductive status of northern goshawks indicate that current sampling protocols may be insufficient.

Reynolds et al. (2005) report the difficulty of finding and monitoring breeding goshawks determined during 14 years of intensive mark-recapture study of nesting goshawks on 121 territories. This difficulty stems from their elusive behavior, their complex forest habitats, and their annual frequent use of many widely-dispersed alternate nests within their breeding territories. Because not all goshawks breed every year (only breeding goshawks can be detectability with reliability), as many as 8 years of repeated searching is needed to unequivocally classify areas as "unoccupied" by territorial breeding goshawks (Reynolds et al. 2005).

Further, alternate goshawks nests can be further than 1.5 miles apart and between 55-76 percent of goshawks laying eggs in a given year moved to an alternate nest (Reynolds et al. 2005), making the monitoring of goshawk reproduction and other vital rates difficult.

A review of the goshawk literature makes it apparent that few studies of breeding goshawks have been conducted with the necessary sampling effort to make

reasonable comparisons with the densities and vital rates reported on the Kaibab Plateau (Reynolds and Joy in press, Reynolds et al. 2005).

5. Determining the stability of northern goshawk populations, the principal objective of a 14-year study of the goshawk population on the Kaibab Plateau, has proven to be a very complex problem because goshawk populations are affected not only by the availability of forest habitats but also by the availability of food. Each species of goshawk prey is, in turn, affected by the abundance of their habitats, the quality of which varies according to drought versus wet periods (Salafsky 2004).

Summaries and corresponding graphs of monitoring data are displayed for each national forest in the Southwestern Region beginning in 1991 and ending in the 2004 field season in Appendix AM.

Summary Discussion

The Preferred Alternative (Alternative G) implements "Management Recommendations for the Northern Goshawk in the Southwestern United States" (RM-217) as supplemented by management guidelines for Mexican spotted owls developed in response to the "Mexican Spotted Owl Recovery Plan." The recommendations in RM-217 are based on a synthesis of published literature and other data establishing:

- In the southwestern United States, goshawks utilize a variety of vegetation communities including ponderosa pine, mixed species, spruce-fir and woodland.
- 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 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. 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 DEIS. 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 FEIS 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 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 in 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 and G reflect different interpretations of the literature. As such, some have characterized this difference as a debate about whether the goshawk is a habitat generalist or an old forest specialist. Actually, the interpretations 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 old forest is required 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 11 papers reviewed in this supplement in support of the opposing scientific view (documents A.7.) only 2 (Hargis et al. 1994; Woodbridge and Detrich 1994) of the 11 documents were published in peer-reviewed journals. The other nine 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 1993), and a published, but not peer-reviewed, abstract (Crocker-Bedford 1995).

Recommendations in Alternative G are based on RM-217 which synthesized 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 recommendations embodied in Alternative D were based on studies that indicated significant goshawk use of old forest for foraging. Furthermore, it should be noted that 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 in section B.2.

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 USFWS 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 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 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 provided comment on the literature cited within RM-217. In addition, it listed an additional 12 references used in formulation of the petition. Only the USFWS 1998 finding on the listing of the northern goshawk dealt directly with the species. Other papers referenced in the petition addressed topics such as silviculture, probability and statistics, and songbirds.

On July 25, 2003, following a review of the information challenged in the request (petition), the Agency found no significant errors requiring substantive changes to RM-217. The review did discover eight minor errors. None of the errors affected the desired forest conditions or the specific

management recommendations. In one of these errors, RM-217 misquoted a single reference. The misquote did not change or influence the outcome of the management recommendations.

The January 17, 2003, request to retract (withdraw) RM-217 was denied because no significant errors were found and no substantive changes were needed. An erratum was distributed with the publication that corrected the errors.

Following this determination, a September 4, 2003, Request for Reconsideration of the January 17, 2003, petition was filed under United States Department of Agriculture (USDA) Information Quality Act Guidelines and Data Quality Act (DQA) (Public Law 106-554 §515) on behalf of the same four requesters. The request primarily addressed perceived procedural errors in the review process, with additional comment on the topics displayed in the original petition.

The USDA convened a panel to review the Request for Reconsideration even though RM-217 is considered non-influential information by the Forest Service. The panel consisted of three participants—one each from the Natural Resources Conservation Service, Food Safety Inspection Service, and Forest Service.

Following careful examination and thoughtful review of the Request for Reconsideration, the panel affirmed the Forest Service response and found no compelling evidence to support retraction or amendment of the original July 25, 2003, Agency response. The panel determined that the initial Agency response was conducted with a great deal 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 the presentation of new information (science) related to the northern goshawk.

The review found 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.

Threatened and Endangered Species, Critical Habitat and Section 7(a)(2) Consultation of the ESA

Listed Species and Critical Habitat

The number of species listed as threatened or endangered and the number of species with

designated critical habitat that occur in the USDA Forest Service’s Southwestern Region has changed over time. Changes have occurred for several reasons: new listings and delistings, litigation supporting listings, and litigation challenging the validity of listings. For example, the peregrine falcon was delisted, the Chiricahua leopard frog was listed, and designated critical habitat for the loach minnow, spikedace and cactus ferruginous pygmy owl was designated, withdrawn and re-designated, and as a result of litigation the designated population segments of gray wolves was rendered invalid.

Currently there are 30 endangered and 15 threatened species, 2 proposed species, 13 designated critical habitats and 3 proposed critical habitats, 3 experimental populations, 1 proposed experimental population, and 10 candidate species in the Southwestern Region (Table 7).

Table 7. Federally Listed, Proposed, and Candidate Species, and Designated or Proposed Critical Habitats in the Southwestern Region

Common Name	Scientific Name	Federal Status	Critical Habitat
MAMMALS			
Black-footed ferret	<i>Mustela nigripes</i>	Endangered	No
Black-tailed prairie dog	<i>Cynomys ludovicianus</i>	Candidate	NA
Jaguar	<i>Panthera onca</i>	Endangered	No
Lesser long-nosed bat	<i>Leptonycteris curasoae verbabuenae</i>	Endangered	No
Mexican gray wolf	<i>Canis lupus</i>	Experimental non-essential	NA
Mexican long-nosed bat	<i>Leptonycteris nivalis</i>	Endangered	No
Mount Graham red squirrel Critical Habitat	<i>Tamiasciurus hudsonicus grahamensis</i>	Endangered Designated	Yes
Ocelot	<i>Leopardus (=Felix) pardalis</i>	Endangered	No
BIRDS			
Bald eagle	<i>Haliaeetus leucocephalus</i>	Threatened	No
Cactus ferruginous pygmy owl	<i>Glaucidium brasilianum cactorum</i>	Endangered	Yes, but none in Action Area
California condor	<i>Gymnogyps californianus</i>	Experimental non-essential	NA
Least tern (interior pop.)	<i>Sterna antillarum</i>	Endangered	No
Mexican spotted owl Critical Habitat	<i>Strix occidentalis lucida</i>	Threatened Proposed	Proposed

Common Name	Scientific Name	Federal Status	Critical Habitat
Northern aplomado falcon	<i>Falco femoralis septentrionalis</i>	Endangered Proposed Experimental non-essential	No
Southwestern willow flycatcher	<i>Empidonax traillii extimus</i>	Endangered	No
Yellow-billed cuckoo	<i>Coccyzus americanus</i>	Candidate	NA
Yuma Clapper rail	<i>Rallus longirostris yumanensis</i>	Endangered	No
FISH			
Apache trout	<i>Oncorhynchus apache</i>	Threatened	No
Arkansas River shiner (Canadian R. pop. only)	<i>Notropis girardi</i>	Threatened	Yes
Critical Habitat		Designated	
Chihuahua Chub	<i>Gila nigrescens</i>	Threatened	No
Colorado Pikeminnow	<i>Ptychocheilus lucius</i>	Endangered	Yes
Critical Habitat		Designated	
Colorado Pikeminnow	<i>Ptychocheilus lucius</i>	Experimental non-essential	NA
Desert pupfish	<i>Cyprinodon macularius macularius</i>	Endangered	Yes
Critical Habitat		Designated	
Gila chub	<i>Gila intermedia</i>	Proposed Endangered	Proposed
Proposed Critical Habitat		Proposed	
Gila topminnow	<i>Poeciliopsis occidentalis</i>	Endangered	No
Gila trout	<i>Oncorhynchus gilae</i>	Endangered	No
Little Colorado Spinedace	<i>Lepidomeda vittata</i>	Threatened	Yes
Critical Habitat		Designated	
Loach minnow	<i>Tiaroga cobitis</i>	Threatened	Yes
Critical Habitat		Designated	
Razorback sucker	<i>Xyrauchen texanus</i>	Endangered	Yes
Critical Habitat		Designated	
Rio Grande silvery minnow	<i>Hybognathus amarus</i>	Endangered	Yes
Critical Habitat		Designated	
Sonora chub	<i>Gila ditaenia</i>	Threatened	Yes
Critical Habitat		Designated	
Spikedace	<i>Medu fulgida</i>	Threatened	Yes
Critical Habitat		Designated	
Yaqui catfish	<i>Ictalurus pricei</i>	Threatened	Yes
Critical Habitat		Designated	

Common Name	Scientific Name	Federal Status	Critical Habitat
Yaqui chub	<i>Gila purpurea</i>	Endangered	Yes
Critical Habitat		Designated	
Zuni bluehead sucker	<i>Castostomus discobolus yarrowi</i>	Candidate	NA
AMPHIBIANS/REPTILES			
Boreal Toad	<i>Bufo boreas</i>	Candidate	NA
Chiricahua leopard frog	<i>Rana chiricahuensis</i>	Threatened	No
New Mexican ridge-nosed rattlesnake	<i>Crotalus willardi obscurus</i>	Threatened	No
Sonora tiger salamander	<i>Ambystoma tigrinum stebbinsi</i>	Endangered	No
INVERTEBRATES			
Alamosa springsnail	<i>Pseudotryonia alamosae</i>	Endangered	No
Gila springsnail	<i>Pyrgulopsis gilae</i>	Candidate	NA
Huachuca springsnail	<i>Pyrgulopsis thomsoni</i>	Candidate	NA
New Mexico springsnail	<i>Pyrgulopsis thermalis</i>	Candidate	NA
Sacramento Mountains checkerspot butterfly	<i>Euphydryas anicia cloudcrofti</i>	Proposed Endangered	Proposed
Proposed Critical Habitat		Proposed	
Stephan's riffle beetle	<i>Heterelmis stephani</i>	Candidate	NA
Three forks springsnail	<i>Pyrgulopsis trivialis</i>	Candidate	NA
PLANTS			
Arizona agave	<i>Agave arizonica</i>	Endangered	No
Arizona cliff-rose	<i>Purshia (=Cowania) subintegra</i>	Endangered	No
Arizona hedgehog cactus	<i>Echinocereus triglochidiatus</i> var. <i>arizonicus</i>	Endangered	No
Canelo hills ladies'-tresses	<i>Spiranthes delitescens</i>	Endangered	No
Fickeisen plains cactus	<i>Pediocactus peeblesianus</i> var. <i>fickeiseniae</i>	Candidate	NA
Holy ghost ipomopsis	<i>Ipomopsis sancti-spiritus</i>	Endangered	No
Huachuca water umbel	<i>Lilaeopsis schaffneriana</i> ssp. <i>recurva</i>	Endangered	Yes
Critical Habitat		Designated	
Kuenzler hedgehog cactus	<i>Echinocereus fendleri</i> var. <i>kuenzleri</i>	Endangered	No
Pima pineapple cactus	<i>Coryphantha scheeri</i> var. <i>robustispina</i>	Endangered	No
Sacramento Mountains thistle	<i>Cirsium vinaceum</i>	Threatened	No
Sacramento prickly poppy	<i>Argemone pleiacantha</i> spp. <i>Pinnatiseca</i>	Endangered	No
San Francisco Peaks groundsel	<i>Senecio franciscanus</i>	Threatened	Yes
Critical Habitat		Designated	
Todsen's pennyroyal	<i>Hedeoma todsenii</i>	Endangered	Yes, but none in the Region
Zuni fleabane	<i>Erigeron Rhizomatus</i>	Threatened	No

Endangered Species Act Consultations

The current 11 national forests land and resource management plans (LRMPs), as amended, are covered by numerous Endangered Species Act (ESA) Section 7 consultations. Refer to the following:

LRMP Consultations

There have been 6 formal ESA § 7 consultations in the region, covering each of the 11 LRMPs and their amendments. These include:

1. The initial consultation on each LRMP in the region (Table 8).
2. The November 25, 1996, jeopardy and adverse critical habitat modification biological opinion (BO) on the existing LRMPs for the Mexican spotted owl (U.S. Fish and Wildlife Service (FWS) 1996; #000032 RO).
3. The November 25, 1996, non-jeopardy and no adverse critical habitat modification BO on the 1996 Regional LRMP Amendment to the region's LRMPs for the Mexican spotted owl (U.S. Fish and Wildlife Service 1996b; 000031RO).
4. The December 19, 1997, non-jeopardy and no adverse critical habitat modification BO/Conference Opinion (CO) for all federally listed or proposed species and

designated or proposed critical habitats other than the Mexican spotted owl, which included what has become known as the "Seven Species Direction" (U.S. Fish and Wildlife Service 1997; 000087RO).

5. The January 17, 2003, non-jeopardy BO on the proposed implementation rate for the grazing Standards and Guidelines (S&Gs) (U.S. Fish and Wildlife Service 2003; 000031RO).
6. The June 10, 2005, Programmatic Biological and Conference Opinion on the continued implementation of the 11 national forest LRMPs as amended (U.S. Fish and Wildlife Service 2005; 2-22-03-F-366). Each of these consultations is discussed below.

Initial Consultation on Each National Forest LRMP in the Region

The LRMPs for the 11 national forests in the region were developed from 1985 to 1988 and each national forest prepared a biological evaluation (BE) for its LRMP. Consultation was done for all "may affect" determinations for the species and critical habitats that were federally listed or proposed when the LRMPs were developed. The FWS issued a Biological Opinion and Conference Opinion on each LRMP between 1985 and 1987, all with non-jeopardy/no adverse critical habitat modification opinions (Table 8).

Table 8. LRMP Consultations for the 11 National Forest in the Southwestern Region

National Forest	LRMP Approval Date	Consultation Date (FWS Consultation No.)
Apache-Sitgreaves	October 1987	May 6, 1986 (No. 2-21-83-F-016)
Carson	October 1986	September 2, 1985
Cibola	July 1985	February 13, 1985
Coconino	August 1987	December 1986
Coronado	August 1986	December 6, 1985
Gila	November 1986	October 4, 1985 (No. 2/ES-SE 000087RO)
Kaibab	April 1988	February 27, 1987
Lincoln	October 1986	July 19, 1985 (No. 2-22-83-F-032)
Prescott	August 1987	March 4, 1986 (No. 2-21-83020)
Santa Fe	September 1987	August 11, 1986 (No. 2-22-86-F-043)
Tonto	October 1985	July 26, 1985 (No. 2-21-83-F-13)

**Jeopardy Biological Opinion
on the Existing LRMPs for the
Mexican Spotted Owl and Critical Habitat**

After the Mexican spotted owl was proposed on November 4, 1991, and listed as threatened on March 16, 1993, the Forest Service began conferencing and consultations on site-specific projects. The Forest Service initiated informal consultation on the Mexican spotted owl and critical habitat for its existing LRMPs on September 6, 1995. After submitting the biological assessment on September 22, 1995, the Forest Service and FWS met five times in October 1995, to discuss additional information needs. The Forest Service submitted additional information and formal consultation was initiated on November 9, 1995. A jeopardy and adverse critical habitat modification BO for the existing LRMPs was issued on November 25, 1997, but a non-jeopardy/no adverse modification BO issued the same day for the amended LRMPs rendered this consultation moot (see below).

**Non-Jeopardy Biological Opinion
on the Amended LRMPs for the
Mexican Spotted Owl and Critical Habitat**

The Forest Service, in cooperation with the FWS and with input from the Mexican Spotted Owl Recovery Team, amended the Standards & Guidelines (S&Gs) of the existing LRMPs to conform to the management recommendations in the “Mexican Spotted Owl Recovery Plan.” The amended S&Gs were incorporated into the region’s 11 LRMPs on June 5, 1996.

On July 14, 1995, the Forest Service submitted a BA and requested formal consultation on Alternative G in the “Draft Environmental Impact Statement – Amendment of LRMPs.” On October 10, 1995, the Forest Service submitted the “Supplemental Biological Assessment - Environmental Impact Statement Amending the LRMPs to Incorporate Standards and Guidelines for the Mexican Spotted Owl and Northern Goshawk” and additional data and information. The FWS issued a non-jeopardy/no adverse modification BO on the region-wide amendment on November 25, 1997.

**Non-jeopardy Biological Opinion on the
Amended LRMPs for Federally Listed Species
Other Than the Mexican Spotted Owl**

In January 1996, the Forest Service and FWS signed an agreement on procedures for

consultation on the region’s 11 LRMPs for all listed and proposed species and critical habitats (except the Mexican spotted owl and critical habitat, which were covered in two separate BOs described above). The Forest Service requested initiation of formal consultation/conferencing on May 15, 1996. The FWS sent a draft BO/CO to the Forest Service on September 18, 1997, and issued a final non-jeopardy/no adverse modification BO/CO on December 19, 1997.

**Consultation on the Proposed
Implementation Rate for the Grazing Activities**

The June 1996, region-wide LRMP amendment contained livestock grazing S&Gs that are applicable in Mexican spotted owl nesting and foraging habitat. The Forest Service prepared a BA and requested re-initiation of consultation on November 7, 2002. A request for formal consultation was sent to FWS on November 7, 2002. The FWS issued its non-jeopardy BO on January 15, 2003.

Most Recent LRMP Consultation

In February 2003, the Forest Service and FWS began discussions about the continued relevance of the existing LRMP consultations. In early April 2003, the Forest Service re-initiated consultation on the 11 LRMPs and the 1996 region-wide LRMP amendment.

On June 2, 2003, the Forest Service and FWS completed a consultation agreement for the 2003 regional LRMP consultation. On June 4, 2003, the FWS concurred with the list of species to be considered in the consultation. The Forest Service completed a biological assessment on the continued implementation of the 11 national forest LRMPs as amended on April 8, 2004. On June 10, 2005, the FWS completed the programmatic biological and conference opinion on the continued implementation of the 11 national forest LRMPs, as amended.

Consultation Conclusion

The preferred alternative is to implement Alternative G, as described in the “Final Environmental Impact Statement for Amendment of Forest Plans” (November 1995) and the “Final Supplement to the Final Environmental Impact Statement for Amendment of Forest Plans in Arizona and New Mexico.” This alternative is, in effect, a continuation of current forest plan direction related to the northern goshawk, Mexican spotted owl, and old growth. The scope of this action includes all 11 Southwestern Region national forests in Arizona and New Mexico

and is considered to have a short term (5 to 10 years) lifespan. Each of the region's forest plans are scheduled for revision beginning in 2005.

Alternative G was developed to respond to the Mexican Spotted Owl Recovery Plan. It was developed in collaboration with the U.S. Fish and Wildlife Service (including a recovery team member). 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 Game and Fish Department and New Mexico Department of Game and Fish letter that responded to the draft, and experience gained during implementation of the interim direction.

The Agency has assessed the need for section 7 consultation on the current SFEIS for the northern goshawk and concluded that the current section 7 consultation that applies to the 11 national forest

land and resource management plans and the regional amendment June 5, 1996, are unaffected by and provide section 7 coverage for the current northern goshawk SFEIS.

On July 15, 2005, the Agency sent a letter to the U.S. Fish and Wildlife Service requesting validation of the section 7 assessment. On September 1, 2005, the Agency received a reply to its request validating out assessment of the need for section 7 review of the NGH SFEIS. The USFWS stated, "We agree that selecting Alternative G results in no change in management direction for all land and resource management plans for all 11 national forests and grasslands in the Southwestern Region. Further, we also agree with your assessment that section 7 consultation is not needed on the supplemental Final EIS because the affects to listed species from Alternative G (i.e. 1996 Regional Plan amendments) have already been addressed in the Service's recent June 10, 2005, Biological Opinion."

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 development of this supplement to the final environmental impact statement:

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

This 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 the 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
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Natural Resources Conservation Service, Alamogordo, NM
U.S. Fish & Wildlife Service, Southwestern Region, Albuquerque, NM
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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
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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
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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
Hualapai 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, Kykotsmovi, 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 & 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
Lincoln County, Board of Commissioners, Carrizozo, NM
Northern AZ University, School of Forestry, Flagstaff, AZ
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
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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