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Seeing the Forest through the Eyes of a Hawk: An Evaluation of Recent Efforts to Protect Northern Goshawk Populations in Southwestern Forests

ABSTRACT

This article examines the recent controversy over managing southwestern forests to protect populations of the Northern Goshawk. After a brief discussion of the science behind Northern Goshawk management, the article explores the legal development of the controversy under the National Forest Management Act and the Endangered Species Act. In light of the shortcomings perceived by the author in the application of both statutes to the protection of Northern Goshawk populations, the article concludes with a discussion of the prospects of improving southwestern forest management through the use of an ecosystem management approach.

I. INTRODUCTION

The 1990s have been a contentious decade for forest management practices and policy in the national forests of the Southwest. A focal point of the controversy has been the habitat needs of a large forest-dwelling raptor, the Northern Goshawk. Similar to the disputes over the Northern Spotted Owl habitat requirements in the Pacific Northwest, the controversy over goshawk habitat needs has centered on the amount of old-growth forest habitat necessary to sustain viable populations. As both the Northern Spotted Owl and the Northern Goshawk utilize extensive amounts of forest habitat, both controversies have involved environmental and timber-resource interest groups. Accusations of political motivations and unsound science have commonly been made between opposing interests concerning the goshawk habitat issue.

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1. See, e.g., Steven L. Yaffee, Lessons about Leadership from the History of the Spotted Owl Controversy, 35 NAT. RESOURCESJ. 381 (1995) (Professor Yaffee outlines the scientific concerns regarding the Northern Spotted Owl, and the ensuing controversy that developed over forest management in the Pacific Northwest).

2. See Robin D. Silver, Destruction of the West's Surviving Canopied Woodlands Continues...(While Easy Money Still Does Grow on Trees), GOSHAWK UPDATE, Nov. 20, 1991, at 1, 5-8 (stating that the U.S. Fish and Wildlife Service determination that Northern Goshawk...
Also similar to the Northern Spotted Owl disputes, the controversy over goshawk protection has manifested itself in two separate but related legal arenas; the development of forest management guidelines under the National Forest Management Act (NFMA) and the listing of the Northern Goshawk under the Endangered Species Act (ESA). Following a brief discussion of the scientific background, this article examines the history of the goshawk habitat controversy as it developed within the NFMA and ESA processes. Also presented are the shortcomings in the application of both laws in achieving broader goals of forest resource management. This article concludes with an evaluation of the prospects for improving forest management in the Southwest while meeting the habitat needs of the Northern Goshawk through the application of an ecosystem management approach.

II. THE NORTHERN GOSHAWK AND FOREST HABITAT

"Goshawk" is a common name given to approximately ten species of large accipiter hawks occurring throughout the northern hemisphere. Known for their courage and extreme aggression, goshawks have an illustrious history as a favorite among falconers since medieval times. In North America, the Northern Goshawk (Accipiter gentilis) is the largest species of accipiter hawks, growing over two-feet long with a four-foot wingspan. Adult Northern Goshawks are a blue-gray color when seen from above, with a white and gray striped breast and a distinctive black cap with white stripes above the eyes. Goshawks generally mate for life, spending most of the year maintaining an active nest of one to three
fledglings. After a clutch of fledglings has been raised, a goshawk pair will separate and abandon the nest site for the winter, returning to the same nest site during the following spring months of March or April.

Three subspecies of Northern Goshawks are generally recognized in North America. The most common is *a.g. atricapillus*, discussed below. The subspecies *a.g. laingi* (Queen Charlotte Goshawk) is found in coastal British Columbia and southeastern Alaska; the subspecies *a.g. apache* (Apache Goshawk) is found in the sky islands of northern Mexico, southeastern Arizona, and New Mexico.

The range of *atricapillus* goshawks spans a large portion of the North American continent. This subspecies has a continuous breeding range across Canada, extending from Newfoundland to southern Alaska, and into the extensive forested mountain ranges in the lower 48 states, including the Appalachian and Blue Ridge Mountains in the east and the Cascade, Sierra Nevada, and Rocky Mountain ranges in the west. Additional breeding habitat is found in the Black Hills of South Dakota and throughout the Colorado Plateau region of the Four Corners. The wintering range of the *atricapillus* goshawks extends across most of the lower 48 states located above 40 degrees latitude and throughout the Rocky Mountain and western states.

The habitat requirements for the Northern Goshawk are at the heart of the forest management controversy. There is considerable disagreement concerning the amount of dense canopy old-growth forest necessary to maintain goshawk populations. The home range of a pair of goshawks is commonly divided into three components: a nesting area, a post-fledgling family area (PFA), and a foraging area. The nesting area consists of the stand of trees immediately surrounding a goshawk nest. The PFA is a more extensive area where goshawk pairs train their young to hunt. The foraging area consists of the remainder of the home range, and is used by a goshawk pair for hunting prey. Although most of the recent controversy has centered on the habitat characteristics of the foraging area, a brief review of the science behind the other components of a goshawk

9. See id. at 18.
10. See id. at 13.
11. See id. at 4 (describing *a.g. atricapillus*, *a.g. laingi*, and *a.g. apache*). The American Ornithologists' Union does not recognize the *a.g. Apache Goshawk* as a separate subspecies. See id.
12. See PAUL A. JOHNSGARD, HAWKS, EAGLES, AND FALCONS OF NORTH AMERICA 176-77, fig. 35 (1990). See also SQUIRES & REYNOLDS, supra note 4, at 2-4, 7.
14. See id. at 3-4.
range is useful in understanding the process through which goshawk management prescriptions have developed.

The first forest management prescriptions for protecting Northern Goshawk populations were developed by Richard Reynolds in the 1970s. Reynolds studied the habitat needs of several accipiter hawks, including the Northern Goshawk, in Oregon's mountain forests. In particular, Reynolds sought to identify characteristics of sites selected by these species for nesting, in order to determine the requisite resources and environmental characteristics to which accipiter species have adapted.

The results of Reynolds' research indicated that Northern Goshawks preferred building nests in large trees located in dense stands of mature or old-growth conifers, adjacent to small breaks in the forest canopy. Compared to Sharp-shinned Hawks and Cooper's Hawks, Northern Goshawks preferred a stand with less ground cover and larger nest trees, characteristics that are more prevalent in old-growth stands than in more even-aged, secondary-growth stands. Reynolds also observed that Northern Goshawks demonstrated a preference for nesting on moderately steep slopes with northerly aspects close to water sources.

In 1983 the Forest Service used the results of Reynolds' research as a basis for developing general management recommendations for western forests. Under these management recommendations, each identified pair of goshawks was provided two potentially active nest sites and two replacement nest sites. Each nest and replacement nest site encompassed an eight hectare (roughly 20 acre) stand of intact forest surrounding the nest. Replacement nest sites were to be located in old-growth stands with closed or nearly-closed canopies. Active sites and their respective replacement sites were to be spaced between 0.2 km and 0.5 km (654 to 1,635 feet) apart. To maintain a viable goshawk population, Reynolds recommended

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17. See id. at 134.
18. See id. at 128-35.
19. See id. at 135-36.
providing sufficient nesting habitat for a density of four goshawk pairs per township.  

In 1990, D. Coleman Crocker-Bedford evaluated the effectiveness of the Forest Service’s management recommendations on the North Kaibab Plateau in northern Arizona. The North Kaibab Plateau provided Crocker-Bedford a unique environment to test the management recommendations due to the limited extent of historical logging in the area. Prior to the 1970s, logging in this region consisted of intermittent and light selection harvesting. Beginning in 1973, the Forest Service began issuing timber contracts for more intensive harvesting on the plateau. However, at this time, the Forest Service identified Northern Goshawk nest sites and provided unharvested buffer zones around nest trees consistent with the prescriptions in the Forest Service’s goshawk management recommendations.

Using the goshawk nest information collected by the Forest Service during timber sales, Crocker-Bedford evaluated the reoccupancy rate of identified goshawk nest sites during the summer months of 1985, 1986, and 1987. Goshawk nest sites were divided into two categories depending on forest structure. Nest sites located in extensive areas of unharvested forest were considered “control locales,” and nest sites in harvested areas were considered “treatment locales.” By comparing goshawk reoccupancy of control locales with treatment locales, Crocker-Bedford hoped to estimate the impact of timber harvesting on goshawk populations.

Crocker-Bedford noticed a dramatic difference in the reoccupancy of nest territories in the control locales compared with the treatment locales. Seventy-nine percent of the control locales were observed to be reoccupied at least once, compared with only 25 percent of the treatment locales. The size of the buffer zones did not appear to affect the reoccupancy of nests in treatment areas. Red-tailed Hawks and Great

21. See id. at 6 (the recommendations therefore called for protecting 16 nest sites per township—8 active and 8 replacement).
23. See id. at 262.
24. See id. Under the Forest Service logging contracts, partial harvesting consisted of logging one-third of the timber volume from roughly 80 percent of a given sale area. See id.
25. See id.
26. See id.
27. See id. at 263.
28. See id.
29. See id.
30. See id. at 265.
Horned Owls often replaced goshawks in nests located in treatment locales but not in control locales.\textsuperscript{31}

Crocker-Bedford concluded that structural changes in foraging habitat was the cause of the decline of goshawks within the study area.\textsuperscript{32} Previous studies had indicated that goshawks are best adapted to foraging in dense forests with open understories.\textsuperscript{33} Crocker-Bedford provided two alternative suggestions for protecting goshawk populations. His primary suggestion was to silviculturally improve goshawk habitat over an extensive foraging area surrounding nest sites.\textsuperscript{34} Suggested management practices included opening the forest understory by thinning the densities of shrubs and saplings, and maintaining or enhancing the structure of the canopy by preserving larger trees.\textsuperscript{35}

As an alternative that would allow for greater timber production, Crocker-Bedford suggested dividing the foraging area of a Northern Goshawk home range into three structural classes, a dense canopy with an open understory structure to provide prime goshawk habitat, a maturing forest of marginal goshawk habitat, and areas subject to harvesting.\textsuperscript{36} Each class would be subject to even-aged management with rotation periods well beyond what is optimum for timber yields.\textsuperscript{37} Crocker-Bedford further suggested that each territory should be divided into continuous thirds of 1,000 to 2,000 hectares to minimize the number of openings created in the forest canopy and the amount of forest edge effects.\textsuperscript{38} Consistent management over extensive areas would provide an ecological advantage to goshawks competing with open forest or edge-benefited raptors.\textsuperscript{39}

Crocker-Bedford's research raised serious questions about the efficacy of protecting Northern Goshawk populations through the use of nest buffers alone.\textsuperscript{40} It appeared that other factors needed to be addressed, including the management of extensive foraging areas utilized by goshawks. Thus, the Crocker-Bedford study marks the beginning of the recent legal controversies surrounding goshawk protection that have manifested themselves in the NFMA and ESA listing processes.

\textsuperscript{31} See id. at 264.
\textsuperscript{32} See id. at 266.
\textsuperscript{33} See id.
\textsuperscript{34} See id. at 267.
\textsuperscript{35} See id.
\textsuperscript{36} See id.
\textsuperscript{37} See id.
\textsuperscript{38} See id.
\textsuperscript{39} See id.
\textsuperscript{40} See id. at 265, 268.
III. THE NORTHERN GOSHAWK AND THE NFMA

Based on the research of Crocker-Bedford and other studies in the North Kaibab Ranger District,\textsuperscript{41} environmental organizations sought more extensive protections of Northern Goshawk habitat. In February 1990, a coalition of environmental groups formally requested the Southwestern Regional Forester to suspend all harvesting in suitable goshawk habitat until the long-term survival of the species was assured. The environmentalists were convinced that current logging practices threatened the long-term viability of Northern Goshawk populations, in violation of NFMA's biodiversity provision.\textsuperscript{42}

The legal basis for the environmental groups' concern was well founded. The National Forest Management Act (NFMA)\textsuperscript{43} obligates the Forest Service to provide for diversity of plant and animal communities within national forests through land management planning.\textsuperscript{44} Regulations implementing this diversity provision require that habitat be managed to maintain viable populations of existing native and desired non-native vertebrate species. As it is impractical to monitor the status of each species independently, NFMA regulations require the Forest Service to designate management indicator species in each planning area, and monitor their population trends as forest plans are implemented.\textsuperscript{45} In theory, changes in the population of management indicator species reflect the effects of forest management activities on the plant and animal communities included in NFMA's biological diversity mandate.\textsuperscript{46} Five categories of management indicator species are recognized in the regulation: (1) federal and state threatened or endangered species; (2) species with special habitat needs that may be significantly influenced by management programs; (3) species commonly hunted, fished, or trapped; (4) non-game species of special interest; and (5) other species selected as changes in their population reflect the effects of management activities.\textsuperscript{47}

\textsuperscript{41} \textit{See}, e.g., \textit{Laurie J. Zinn \& Timothy J. Tibbits, Final Report, Goshawk Nesting Survey–1990: North Kaibab Ranger District, Kaibab National Forest} (Ariz. Game \& Fish Dep't 1990) (reporting results of a three-year survey of goshawk nests in the North Kaibab Ranger District, showing a declining goshawk population).

\textsuperscript{42} \textit{See} Letter from Charles Babbitt, President, \textit{Maricopa Audubon Society et al.}, to David Jolly, Regional Forester, U.S. Dep't of Agric., Forest Serv., Region 3 (Feb. 8, 1990) (on file with the Forest Service, Region 3).


\textsuperscript{44} 16 U.S.C. § 1604(g)(3)(B).


\textsuperscript{47} \textit{See} 36 C.F.R. § 219.19(a)(1).
As a matter of Forest Service policy, regional foresters are also required to identify and manage lands for sensitive species. Sensitive species are species whose viability is a concern due to significant downward trends in population or habitat capability. Sensitive species can be considered an overlay classification of management indicator species that includes state threatened and endangered species, federal candidate species, and other species where forest management activities could potentially trigger a federal or state listing. The policy of the Forest Service is to provide special care for sensitive species by analyzing management decisions for potentially adverse effects on their long-term viability.

The Southwestern Regional Forester listed the Northern Goshawk as a sensitive species in 1982 and incorporated management prescriptions based on Reynolds' research into several forest plans in the Southwestern Region. In response to the environmental groups, the Forest Service performed an internal review of the effectiveness of the existing goshawk protections, and concluded that additional measures were necessary to ensure the long-term viability of the region's Northern Goshawk populations.

In August 1990 the Forest Service organized a Goshawk Scientific Committee (GSC) and Goshawk Task Force (GTF) to review Northern Goshawk management needs in the southwestern region. The GSC was instructed to review available scientific information on Northern Goshawk habitat needs and goshawk populations in the southwest and develop a credible conservation management strategy. The GTF was assembled to provide the GSC with a variety of interest perspectives on the development of management guidelines and assure that these were consistent with other multiple-use objectives. Representatives on the GTF included the U.S. Fish and Wildlife Service, state wildlife management authorities, members of

49. See id. at § 2671.1.
50. See id. at § 2672.12.
54. See REYNOLDS ET AL., supra note 13, at 1.
The political nature of the process was apparent from the start. Against the wishes of the environmentalists, the Regional Forester decided to develop interim guidelines instead of preparing an environmental impact statement analyzing the cumulative impact of several alternatives. Following the first meeting of the GTF in January 1991, representatives of the two participating environmental organizations resigned in protest of this process. The resignation of the environmental representatives left the Task Force decidedly biased in favor of extractive interests. Representatives of the wildlife management agencies were alone in representing conservation interests, and conservation concerns were increasingly addressed with hostility by the dominant interests on the Task Force.

The GSC was composed exclusively of Forest Service scientists with the exception of one advisory member from the academic community. Early in the process, members of the GSC suggested that Crocker-Bedford’s research had not adequately demonstrated the need for extensive dense-canopy foraging habitat due to the statistical chance variation within the sample size of his study. From the GSC’s initial draft report and subsequent final recommendations, it would appear that the GSC rejected Crocker-Bedford’s suggestions of maintaining extensive areas of dense-canopy forest for foraging purposes.

Instead, the GSC took a different approach. Based on the known extent of foraging area for individual goshawks, the committee inferred that foraging goshawks are confronted with a wide variety of naturally occurring forest types and structures. The GSC concluded that almost nothing is known regarding the structure and composition of the foraging habitats used by Northern Goshawks. The GSC further reasoned that given

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56. See Letter from Karen Yarnell & Dave Henderson, State Representatives, National Audubon Society, to David Jolly, Regional Forester, U.S. Dep’t of Agric., Forest Serv. 1 (Feb. 27, 1991) (on file with the Forest Service).

57. See id. at 1-2.

58. See Inter-Office Memorandum from Timothy Tibbitts, Nongame Ornithologist, to Terry Johnson, Nongame Branch Supervisor, Arizona Game & Fish Dep’t 1 (Apr. 9, 1991) (on file with Arizona Game & Fish Dep’t).

59. See id.

60. See REYNOLDS ET AL., supra note 13, at app. 6.


such a wide variety of foraging environments, goshawks presumably forage opportunistically based on the abundance and availability of prey species. Based on these premises, the Committee concluded that the guidelines should focus on providing habitat for the principal goshawk prey species instead of providing foraging habitat known to be suitable for goshawks. According to the GSC, the ideal goshawk foraging habitat could be any habitat that provides an abundant and diverse selection of available prey.

The GSC divided the goshawk home range into three separate components including nest sites, the PFA, and a foraging area. Each goshawk pair would be provided three potentially active nest sites and three replacement nest sites, with 30 acres of mature, dense-canopy forest dominating each nest site. The three potentially active nest sites would be included in an approximately 600 acre PFA. The vegetative conditions of the PFA were to be structurally similar to the nesting areas with a few openings in the canopy structure to produce herbaceous and shrub vegetation. A 5,400-acre foraging area surrounding the PFA was prescribed for each goshawk pair.

The GSC identified 15 principal Northern Goshawk prey species for developing management criteria in the foraging area. Six vegetative structural stages were evaluated for their use by the identified prey species. Based on the percentage of prey species that are in need each of the six vegetative structural stages, the GSC initially recommended at least 60 percent of the foraging area be maintained in mature or old-growth successional stages, with 30 percent maintained in a young or mid-aged successional stage and a maximum of 10 percent in a seedling-sapling stage. No provision was made for a grass-forb/shrub stage, the most open vegetative structural stage evaluated.

When the GTF met with the GSC to discuss the recommendations, the members were informed that the original draft GSC recommendations were replaced by a revised draft report. Out of concern that the revised recommendations would become widely circulated, the GSC did not
submit the revised report to the GTF for review. Instead the GSC gave the GTF an overhead presentation outlining some of the changes from the previous draft report. The changes increased the acreage of openings and the percentage of early successional stages in both the PFA and the foraging areas. The GSC explained the increase in forest openings as necessary to provide for more forest regeneration.

At this meeting, seven variations of the GSC recommendations were discussed. The GSC recommended that the Forest Service adopt interim management prescriptions for only the nest sites and PFA. The GTF was unable to reach a unanimous consensus on a recommended course of action, but the majority of the GTF supported adopting the GSC recommendation with the additional provision of maintaining seven to ten large trees per acre in the foraging area. As the representatives of the wildlife agencies were unwilling to support the new GSC recommendations without seeing the revised draft report, they supported adopting the original draft GSC recommendations.

The Regional Forester accepted the recommendations of the GSC, and adopted interim management guidelines for protecting only nest sites and PFAs. The interim management guidelines were to be effective for one year while the Forest Service collected additional information to identify desirable conditions in the foraging area. The purpose of the interim management guidelines was "to provide protection for the northern goshawk, while allowing for continued, but modified, multiple-use activities within suitable Northern Goshawk habitat, including timber harvest." The interim management guidelines required each National Forest within the region to inventory suitable goshawk habitat in areas where planned projects might adversely affect goshawk populations. Three nest sites and three replacement nest site stands were to be delineated where structural characteristics of the stands consisted of at least 50 to 60 percent canopy cover with 16 to 22-inch diameter trees. PFAs were to be managed to maintain approximately 50 percent of the area in a mature forest condition with scattered small openings of one-third to one-fourth of an acre.

71. See Inter-Office Memorandum from Timothy Tibbits to Terry Johnson, supra note 58, at 2.
72. See id. at 3.
73. See id. at 2-3.
74. See id. at 3-6.
76. Id. at 28,853.
77. See id. at 28,855.
78. See id. at 28,857.
acre over approximately 10 percent of the area.\textsuperscript{79} The interim management guidelines did not prescribe any management criteria for the foraging area.\textsuperscript{80}

A coalition of environmental organizations immediately appealed the interim management guidelines to the Chief of the Forest Service.\textsuperscript{81} The environmental groups alleged that the amount of logging permitted in the PFA and the lack of protection over the foraging areas under the interim management guidelines did not protect the Northern Goshawk populations. The appellees alleged that the interim management guidelines had been adopted without adequate public input, without an environmental assessment under the National Environmental Policy Act (NEPA), and without formally amending the forest plans as required by NFMA.\textsuperscript{82} The Chief of the Forest Service dismissed the appeal, but directed the Southwestern Regional Forester to revise the interim management guidelines following a review of the public comments.\textsuperscript{83}

Thirty comment letters had been received regarding the interim management guidelines from an assortment of individuals, environmental organizations, wildlife management agencies, and timber industry representatives.\textsuperscript{84} After reviewing these letters, the Regional Forester made modest changes to the interim management guidelines such as clarifying the definitions, specifying that nest sites and PFA protections were applicable year-round, and incorporating provisions that enabled the Forest Service to take more extensive efforts in obtaining the cooperation of private landowners.\textsuperscript{85} No provisions were added to address the management of the foraging areas. In response to concerns over NEPA compliance, the Forest Service prepared an Environmental Assessment and

\textsuperscript{79} See id. at 28,856-57.
\textsuperscript{80} See id.
\textsuperscript{82} See Administrative Appeal of the Northern Goshawk Interim Management Directive No. 2670-91-1 Southwestern Region, before the Chief of the Forest Service, United States Department of Agriculture (July 8, 1991).
\textsuperscript{84} See id.
\textsuperscript{85} See id. at 51,676.
concurrently issued a Finding of No Significant Impact with the republication of the revised guidelines.86

Eight months later, in June of 1992, the GSC finished developing recommendations for foraging areas. Again, the GTF could not reach agreement on a recommendation to the Regional Forester regarding the appropriateness of the new management recommendations.87 Despite this, the Regional Forester went forward with the GSC’s recommendations without addressing the conservation concerns of the wildlife management agencies on the GTF. On June 19, 1992, the Regional Forester published final interim management guidelines for the Northern Goshawk in the Federal Register.88

The final interim guidelines were similar to the original version with respect to protections for nest sites and PFAs,89 but did provide the first management prescriptions for foraging areas. Also, compared with the original GSC recommendations, the amount of mature and old-growth forest preserved in foraging areas had been reduced from a minimum of 60 percent in the GSC’s original estimate90 to 40 percent in the final interim guidelines.91 The lost 20 percent of mature and old-growth forest was accounted for with an additional 10 percent of young forest and a new prescription for 10 percent in an open grass/shrub vegetative stage.92

The final interim management guidelines were highly controversial. The Arizona Game and Fish Department (AGFD) and the U.S. Fish and Wildlife Service strongly criticized the final interim management

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89. See Management Guidelines for the Northern Goshawk in the Southwestern Region, Significant Change to the Interim Policy Published October 15, 1981, 57 Fed. Reg. at 27,434. The amount of mature or old-growth forest in the PFA had been reduced from 50 percent to 40 percent. See id. at 27,432. The final interim management guidelines prescription of 40 percent mature or old-growth forest in the PFA contrasts sharply from the original GSC recommendation of 60 to 70 percent. See Goshawk Scientific Comm., supra note 62, at 21.
90. See Goshawk Scientific Comm., supra note 62, at 23.
guidelines. Both agencies challenged the premise that Northern Goshawks are habitat generalists, and argued that goshawks have a strong preference for foraging in old-growth, dense canopy-cover forests. The U.S. Fish and Wildlife Service was particularly concerned about the lack of data supporting several assumptions in the final interim guidelines, including the assumption that prey abundance governs goshawk populations (not prey availability), the list of prey species that the GSC evaluated, the described habitat needs of the specified prey species, and the recommended levels of canopy cover for different habitat regimes.

The AGFD also voiced several concerns with the final interim guidelines. Notable concerns included the failure of the GSC to consider differences between the habitat needs of winter and summer prey species and the potential impact to species dependent on dense forest habitat resulting from a landscape-scale application of the final interim management guidelines. The AGFD also pointed out that the recommendations for canopy cover given as minimum percentages might be interpreted as target percentages when applied to individual timber sales. Further, the AGFD stated that a density index or basal area prescriptions would be more practical and provide greater consistency in application compared to the canopy cover prescriptions. Finally, the AGFD felt that the final interim guidelines did not receive adequate peer review from other agencies, and should have been subject to a 90-day notice and comment period prior to implementation.

The Forest Service responded to these concerns by stating that they believed the expressed concerns were premature. According to the Forest Service, the final interim management guidelines were not to be considered final agency action, but merely a temporary measure to be used while it developed more permanent management criteria. The Forest Service also stated its intent to establish a scientific team to analyze the impacts of applying the management guidelines to other species sharing the same ecosystems as the Northern Goshawk and prepare an environmental

93. See Arizona Game & Fish Dep't, supra note 87; U.S. Fish & Wildlife Serv., Preliminary Comments on the U.S. Forest Service's Goshawk Scientific Committee Management Recommendations for the Northern Goshawk in the Southwestern United States (Recommendations), submitted by Letter from Michael J. Spear, Regional Director, U.S. Dep't of Interior, Fish & Wildlife Serv., to Larry Henson, Regional Forester, Southwestern Region, U.S. Dep't of Agric., Forest Serv. (Aug. 13, 1992) (on file with the Forest Service).
94. See Arizona Game & Fish Dep't, supra note 87, at 12; U.S. Fish & Wildlife Serv., supra note 93, at 1.
95. See U.S. Fish & Wildlife Serv., supra note 93, at 3.
96. See Arizona Game & Fish Dep't, supra note 87, at app.1 at 6.
impact statement. As a temporary exigency measure, the final interim guidelines were exempt from procedural requirements of public notice and comment. Adequate opportunity for public comment would be provided through the NEPA process (Environmental Impact Statement preparation) during amendment of the forest plans.

The concerns of the wildlife management agencies were proven to be well-founded. The Kaibab National Forest developed a practical procedure for applying the guidelines to timber sales. Titled the "Kaibab National Forest Implementation and Interpretation" (KNFII), the approach taken by the Kaibab National Forest was to prescribe stand density index and basal area values corresponding with the vegetative stand structures described in the final interim guidelines. Target stand densities were to be achieved by thinning, release, regeneration, and tending until patches of even-aged stands making up the recommended percentages were satisfied.

Many of the management concerns expressed by the AGFD came true with the KNFII. The KNFII applied the final interim management guidelines on a landscape scale to the entire forested ecosystem, including areas outside of established Northern Goshawk home ranges. The implementation strategy did not account for the impact that landscape-scale fragmentation of dense old-growth forest would have on other forest-dependent species of concern. Finally, by incorporating a stand density index correlated with minimum canopy cover recommendations, the KNFII effectively set the prescribed minimum forest criteria conditions as a target criteria without providing for denser, more desirable levels of canopy cover contemplated in the final interim management guidelines.

98. See Exemption of Proposed Manual Directives from Normal Procedures, 36 C.F.R. § 216.7 (1998) (exempting interim management directives from public comment when an exigency exists and it is determined to be of substantial public interest).
101. See id. at 3-4.
102. See id. at 7; app.A at 1.
103. See Letter from Duane L. Shroufe, Director, Arizona Game & Fish Dep't, to Charles W. Cartwright, Regional Forester, U.S. Forest Serv. app.1 at 2 (Apr. 27, 1992) (on file with Forest Service).
104. See Menasco & Higgins, supra note 100, at app.B.
Shortly after publishing the final interim management guidelines, the Forest Service published a notice of intent to prepare an Environmental Impact Statement (EIS) for amending the region's forest plans. The Forest Service assembled an interdisciplinary team of scientists for the purpose of developing alternative management prescriptions and performing an environmental analysis. Initially, the EIS for Forest Plan amendments was to apply to all southwestern region forests except for the Kaibab National Forest, for which the Forest Service had independently begun to prepare an EIS for an amendment to the Kaibab National Forest Resource Management Plan. Based on comments critical of amending the Kaibab Forest Resource Management Plan separately from other regional forest plans, the Kaibab National Forest Plan amendments were incorporated into the general EIS and plan amendment process for the southwestern region.

Initially, the Forest Service anticipated reissuing a second draft EIS for all southwestern forests in January 1996, with a final EIS completed by the fall of 1996. The Forest Service subsequently decided to accelerate the environmental assessment process and finalize the EIS by the fall of 1995, concurrent with the U.S. Fish and Wildlife Service's anticipated recovery plan for the Mexican Spotted Owl. The interdisciplinary team prepared a final EIS for the general amendment to the Southwestern Region Forest Plan based on comments received. Due to the accelerated schedule, no additional notice and comment was provided for the final EIS.


106. See id. at 28,172.


109. See id.


The interdisciplinary team considered six alternatives for the final EIS. In addition to a no-action alternative, three basic approaches were considered in five alternatives.\textsuperscript{112} Three of the alternatives incorporated existing Forest Service standards and guidelines for the Northern Goshawk with minor variations.\textsuperscript{113} State wildlife management agencies offered their own alternative,\textsuperscript{114} which would maintain approximately 40 percent of the forested landscape outside the PFA in an old-growth vegetative stage.\textsuperscript{115} The Forest Service also considered an alternative developed by Applied Ecosystems Inc., a representative of the timber industry, which primarily focused on fire concerns, not Northern Goshawk habitat protection.\textsuperscript{116} The Applied Ecosystems alternative called for reducing the size of the PFA to 415 acres, limiting the amount of mature and old-growth successional stages to 55 percent in the PFA and 50 percent in the foraging area, and reducing the range of canopy closure to as low as 30 percent in the PFA and 20 percent in the foraging area.\textsuperscript{117} Out of the alternatives considered, the Regional Forester incorporated the prescriptions of the final interim management guidelines for the Northern Goshawk into the amended forest plans.\textsuperscript{118}

The most striking feature of the guideline development process is the attrition of standards for preserving older successional stages throughout the home range of goshawks. The evaluation process began over Crocker-Bedford’s concern that timber harvesting was causing precipitous declines in goshawk populations on the North Kaibab plateau. However, each subsequent decision in the process, including the GSC use of a prey-based approach to determine habitat needs, the draft recommendations of the GSC, the final interim guidelines, the development of the KNFII standards, and, finally, the management criteria incorporated into the regional forest plans, provided for more openings in foraging areas. These policy decisions directly conflict with Crocker-Bedford’s observations.

The degradation of forest management criteria can be attributed to the GSC’s assumption that the Northern Goshawk is a habitat generalist that uses forest habitat opportunistically. Given such a premise, theoretically any habitat structure is suitable as long as it provides sufficient abundance and availability of prey. However, the link between the habitat needs of the list of primary prey species and desired forest conditions for

\textsuperscript{112} See id. at 7-8.
\textsuperscript{113} See id. at 8-9 (alternatives C, F, and G).
\textsuperscript{114} See id. at 8 (alternative D).
\textsuperscript{115} See id. at 142.
\textsuperscript{116} See id. at 8 (alternative E).
\textsuperscript{117} See id. at 151-52.
goshawk management is not based on science, but is the opinion of the GSC based on professional judgment. The wide variety of identified goshawk prey species are associated with such a broad range of forest conditions as to have little value in identifying preferred goshawk habitat. Such flexibility in habitat requirements may be ideal for developing management criteria satisfying the multiple use mandate, but is of questionable use in satisfying the Forest Service's biological diversity mandate.

If it is true that the Northern Goshawk is a habitat generalist, it is not well suited to serve as a management indicator species under NFMA. As a habitat generalist, the Northern Goshawk should be able to readily adapt to extreme changes in the ecosystem by altering its prey base. Population changes in such a species would provide a poor correlation with the forest management effects to vegetation type, timber age class, community composition, and other factors which management indicator species are intended to monitor. It would be more appropriate to evaluate other forest dwelling species that have special habitat needs more characteristic of the management indicator species anticipated by NFMA regulations. The species identified by the wildlife management agencies as having needs inconsistent with the goshawk management guidelines are better candidates for management indicator species.

The Regional Forester's decision to implement the interim guidelines in all regional forests without first receiving public comment is inconsistent with NEPA and the NFMA forest planning process. The

119. See Forest Service Planning, Fish and Wildlife Resources, 36 C.F.R. § 219.19(a)(1) (1998) ("on the basis of available scientific information, the interdisciplinary team shall estimate the effects of changes in vegetation type, timber age classes, community composition, rotation age, and year-long suitability of habitat related to mobility of management indicator species").

120. See Letter from Duane L. Shroufe, Director, Arizona Game & Fish Dep't, to Charles W. Cartwright, Regional Forester, U.S. Forest Serv. app.1 at 2 (Apr. 27, 1992) (on file with Forest Service) (stating that the Department believes that the goshawk guidelines would have adverse impacts on species such as turkey, tree squirrels, black bear, white-tailed deer, mule deer, and goshawk).

Forest Service justified its actions based on the immediacy of the need for protecting occupied Northern Goshawk habitat while more permanent policy was developed. The implementation of an emergency policy protective of goshawks is laudable; however, this decision is made suspect by the sudden change in recommendations by the GSC and the reservations of the wildlife management agencies regarding the adequacy of the management guidelines. Given the amount of controversy surrounding the implementation of these guidelines, particularly as implemented in the Kaibab National Forest, the Forest Service should have utilized the procedural protections provided by NEPA and NFMA in developing and implementing the guidelines.

IV. THE NORTHERN GOSHAWK AND THE ESA

Given the concern over the decline in goshawk population and the adequacy of the Forest Service's interim management guidelines, environmentalists attempted to redress their concerns using the Endangered Species Act (ESA). In July 1991, a coalition of environmental groups petitioned the U.S. Fish and Wildlife Service (FWS) for an emergency listing of the Northern Goshawk as an endangered species in Utah, Colorado, New Mexico, and Arizona under the ESA. The environmentalists perceived the decline in goshawk populations to be the result of the decimation of essential old-growth habitat, and alleged that the Forest Service's interim management guidelines failed to protect habitat critical to the goshawk's viability in the region. The petition requested the FWS to place an immediate moratorium on all logging within the potential home ranges of goshawks until a recovery plan was developed. The environmentalists requested additional protections for stands of mature forest outside of existing goshawk home ranges.

The ESA requires the FWS to determine whether a species is endangered based on the best available scientific and commercial data.
Endangered species are defined in the Act as species in danger of extinction throughout all or a significant portion of their range. The ESA requires, to the maximum extent practicable, the FWS to make a finding whether a petition presents substantial scientific or commercial information indicating that listing the species may be warranted within 90 days. Where an emergency situation poses significant risks to a species, as alleged in the Northern Goshawk petition, the FWS is authorized to publish regulations seeking to protect the Northern Goshawk for up to 240 days without providing notice and comment.

Pursuant to the ESA listing petition, the FWS first evaluated whether or not the goshawk populations in the Four Corners area satisfied the ESA definition of a species. For the purposes of the ESA, a species is defined as including "any subspecies of fish or wildlife or plants, and any distinct population segment of any species of vertebrate fish or wildlife that interbreeds when mature." The population in the listing petition must be a distinct population segment of Northern Goshawks to satisfy the ESA definition of a species. The FWS concluded that the goshawks in the southwestern states were not a distinct population of a species and therefore were not a listable entity based on the information presented in the petition. As a result, the FWS did not evaluate the merits of the petition. However, the FWS did determine that substantial scientific and commercial evidence indicates that goshawk populations may be in decline throughout its range in the United States. Accordingly, the FWS classified the Northern Goshawk as a Category 2 candidate species and initiated a status review of goshawk population trends. Such a listing, in effect,

134. See Notice of Initiation of Status Review on the Northern Goshawk, 57 Fed. Reg. at 545. Candidate species are those species being considered for listing as an endangered or threatened species, but not yet subject to a listing proposal. See Listing Endangered and Threatened Species and Designating Critical Habitat: Definitions, 50 C.F.R. § 424.02(b) (1998). Category 2 candidate species are species with which the FWS does not have sufficient information to warrant a proposal, but the information available suggests a proposed listing may be appropriate. See Endangered and Threatened Wildlife and Plants; Review of Plant and Animal Taxa that are Candidates for Listing as Endangered or Threatened Species, 61 Fed. Reg. 7596, 7597 (1996).
denied the petitioner’s request for an emergency listing and stipulated a need for more data before an endangered listing decision could be made.\textsuperscript{135}

Seeing that the isolated population issue had sidetracked the listing evaluation, the coalition of environmental groups then submitted a request to amend the listing petition to expand the geographical region to the forested west.\textsuperscript{136} In reviewing the amended petition, the FWS again focused on the ESA definition of a species. For a second time, the FWS concluded that the Northern Goshawk populations presented in the petition were not a species as defined in the ESA, and therefore were not subject to the protections afforded by the ESA.\textsuperscript{137}

In both evaluations, the FWS focused on the relationship between \textit{a.g. atricapillus} goshawk populations in the Appalachian Mountains and northern portions of the Great Lakes states to populations in the western United States. The evidence was not clear whether the two populations of \textit{atricapillus} goshawks were distinct. The FWS observed that although the populations were separated by an extensive area of the Great Plains lacking in goshawk habitat, there existed a continuous connection of dense forest habitat between the two regions through Canada.\textsuperscript{138}

The FWS’s conclusion hinged on the degree of genetic interchange between the two U.S. populations of goshawks. If there existed sufficient genetic interchange, the FWS reasoned the population in the petition was not distinct from the eastern \textit{atricapillus} goshawks, and was, therefore, not a listable entity. The FWS noted that goshawk migration is highly limited, but that even with very low rates of genetic interchange, there may be sufficient interchange to prevent genetic differentiation. As the listing petition had not presented evidence that genetic differentiation had occurred,\textsuperscript{139} the FWS concluded that the petition failed to provide substantial evidence that listing may be warranted. Therefore, the petition was again denied on the grounds that it did not present a listable entity.\textsuperscript{140}

\begin{itemize}
\item 137. \textit{See} Endangered and Threatened Wildlife and Plants; Notice of 90-Day Finding on Petition to List the Northern Goshawk as Threatened or Endangered in the Western United States, 57 Fed. Reg. at 28,476.
\item 138. \textit{See} id. at 28,475.
\item 139. \textit{See} id. at 28,476.
\item 140. \textit{See} id.
The coalition of environmental organizations responded by filing a lawsuit against the FWS and motion for summary judgment claiming that the determination by the FWS was arbitrary and capricious. The environmentalists asserted that the ESA and its legislative history do not support a "genetic criteria" test for making listing decisions, and that the FWS has historically interpreted the ESA to list populations without evidence of genetic variation or geographic isolation. Additionally, the environmentalists noted that two weeks prior to the listing determination, the FWS had issued a draft Interim Vertebrate Population Policy as part of the process of developing internal guidelines for defining populations eligible for ESA listing. The draft policy statement indicates that biological significance, ecological characteristics, and geographical distributions are the primary factors to be used in defining populations, and that genetic or morphological factors may be considered but are not essential in making the determination.

The FWS filed a cross-motion for summary judgment asserting that it had acted in accord with the ESA and had used an appropriate definition of what constitutes a listable entity. The FWS changed its listing criteria following amendments to the ESA in 1978 that added a distinct vertebrate population category to the definition of a species. The FWS alleged that, since 1978, it had repeatedly required evidence of geographical isolation and/or genetic differentiation to determine whether a population is distinct for purposes of an ESA listing. Additionally, it stated that several post-1978 draft guidance documents were not legally binding on the FWS. Thus, the FWS argued that its decision was not an arbitrary or capricious abuse of discretion because its use of a guidance document issued prior to the most recently issued policy was legitimate.

In its opinion, the district court found that the FWS had made several post-1978 listing decisions using several mutually inconsistent policies regarding the criteria for determining distinct population segments. The court stated that the drafters of the policy presumably would have relied on the most current and best scientific and commercial data available in developing the most recent policy for determining distinct population segments. As the most recent policy was based on the best scientific and commercial data available, failure to use the most recent policy in making a listing determination violated the ESA data quality standards.

142. See id. at 924 (citing the examples of the American Alligator and sea turtles listing).
143. See id. at 925-26.
144. See id. at 924-25.
145. See id. at 927.
146. See id. at 926.
requirement. The court agreed and concluded that the FWS had acted arbitrarily and capriciously. As a consequence, the court vacated and remanded the petition to the FWS for a new determination consistent with the most recent listing evaluation policy.\textsuperscript{147}

As required by the court, the FWS re-reviewed the petition to determine whether it presented substantial scientific or commercial information indicating that an ESA listing may be warranted.\textsuperscript{148} This time the FWS applied a new policy developed jointly by the National Marine Fisheries Service and the FWS for the recognition of distinct vertebrate population segments (the DPS policy).\textsuperscript{149} The DPS policy utilizes three factors in determining whether petitioned entities qualify as distinct populations: (1) the discreteness of the population segment in relation to the remainder of the species, (2) the significance of the population segment, and (3) the conservation status of the population segment.\textsuperscript{150}

In making its review, the FWS relied on the background section of the DPS policy that stated "[i]n all cases, the organisms in a population are members of a single species or lesser taxon."\textsuperscript{151} As the DPS policy used the term "taxon" in the singular form, the FWS reasoned that there cannot be two or more taxons in a distinct population segment. Interpreting taxons to be equivalent to subspecies, the FWS concluded that a distinct population segment cannot consist of more than one subspecies to satisfy the listing requirements under the DPS policy.\textsuperscript{152} As the petition to list the Northern Goshawk included up to three subspecies (\textit{a.g. gentilis}, \textit{a.g. laingi}, and \textit{a.g. apache}), it did not satisfy the test for a distinct population under the FWS interpretation of the DPS policy.\textsuperscript{153} Accordingly, the FWS determined that the petition still failed to prove that the Northern Goshawk was a listable entity under the ESA.\textsuperscript{154}

This novel approach to defining distinct population segments provoked a second lawsuit challenging the FWS goshawk listing decision.\textsuperscript{155} Faced with the goshawk ESA listing issue for the second time, the court again held the application of FWS policy regarding distinct population segments.
population segments to be arbitrary and capricious. The court found that the petition to list the Northern Goshawk was the first petition in which the FWS had applied the DPS policy. As the petition predated the DPS policy, the court held that the application of the new policy, without providing the petitioners notice or opportunity to amend the petition, was an arbitrary and capricious abuse of discretion. Again the court remanded the FWS determination for reconsideration.

On remand, the FWS re-evaluated the petition under the DPS policy criteria and determined that the petition presented substantial evidence that it may be warranted to list the Northern Goshawk as a threatened or endangered species. Again, the FWS did not consider the request for emergency listing. Instead the FWS noted that current scientific literature on the Northern Goshawk presented conflicting views regarding the conservation status of the species. The FWS concluded that a status review of the best available data was necessary before deciding if ESA listing was warranted.

Patricia Kennedy, an expert on the Northern Goshawk, evaluated the claim that goshawk populations have significantly declined in the western United States as part of the Northern Goshawk status review. Kennedy approached the claim by looking for evidence of goshawk range contraction, temporal decreases in abundance, and negative rates of population change. Her evaluation consisted of reviewing distribution maps and peer-reviewed published research on the status of goshawk populations. Her evaluation failed to discuss evidence presented by the petitioners in the listing petition or submitted during the listing process.
Kennedy’s findings indicate that there is a substantial lack of information suitable for evaluating the claim that goshawk populations are declining in the west. For evidence of range contraction, Kennedy cited the lack of change over time in published distribution maps and the lack of current reports of goshawk extirpation. Kennedy reported several problems in measuring reproductive patterns and survival rates from the published research, from which she concluded that patterns of abundance and rates of population change were unknown. Kennedy concluded that there is no strong evidence supporting the claim that goshawk populations are declining in the United States.

The FWS status review recognized this lack of information for evaluating population trends by noting Kennedy’s work as a “comprehensive review” of the current status of the Northern Goshawk. The FWS also considered the protections of the Forest Service’s goshawk management guidelines as well as other forest management strategies that focus on retention and restoration of mature forest habitat. Based on these observations, the FWS concluded that the Northern Goshawk was not in danger of extinction or likely to become endangered in the foreseeable future, and concluded that an ESA listing of the Northern Goshawk was not warranted.

The manner in which the FWS handled the Northern Goshawk petition for listing under the ESA raises several issues regarding endangered species protection. Of particular concern is the extensive amount of time taken by the FWS in evaluating the petition. The ESA specifies a 90-day time frame in which to determine whether a petition presents substantial evidence that a listing may be warranted, with a provision for immediate emergency protections. Over six years elapsed from the time the FWS received the petition to list the Northern Goshawk and the finding that ESA listing may be warranted. The extensive amount of time taken for the initial review was not the result of particular problems with the Northern Goshawk listing petition. The delay was the result of protracted

165. See id. at 98. (Kennedy appears to have relied on non-peer-reviewed distribution maps, as her sources for this information were popular birding publications and not peer-reviewed scientific publications).

166. See id. at 99-103.

167. See id. at 95.


169. See id. at 35,184.

170. See id.


litigation over the FWS's arbitrary and capricious abuse of discretion in defining terms under the ESA and implementing appropriate listing policy.

The extensive time frame involved was particularly unfortunate given the petitioner's concern that an emergency listing was necessary due to significant and impending destruction of critical habitat. The FWS failed to even acknowledge the petitioner's request for an emergency listing in any of its published findings. Based on the temporary nature of emergency listings, and the potential consequences of failing to provide them, emergency listings are not subject to the substantial evidence requirement of a normal ESA listing. In fact the FWS has been instructed to "shoot first and ask [all of the] questions later" when using emergency listing procedures. Considering that the petition was subsequently found to contain substantial evidence indicating that listing may be warranted, the FWS was arguably negligent in failing to provide emergency protections for the Northern Goshawk.

The FWS abused its ESA listing obligations through the use of novel, outdated, and inconsistent policies for defining a discrete population. The first evaluation of the listing petition concluded that the petition was too narrow. The second evaluation concluded that the petition was too broad. The scientific basis for the third evaluation was limited to a review of peer-reviewed research. Based on such a limited scope of review, the FWS concluded that the status of the goshawk was not sufficiently well known to support the listing petition. If this data was insufficient to determine the status of the Northern Goshawk, the FWS should have considered non peer-reviewed data to satisfy the ESA listing criteria. Additionally, the limited scope of review used by the FWS failed to consider the petition itself, which had previously been found to contain substantial evidence suggesting that listing may be warranted. The petition referenced several publications, both peer-reviewed and non-peer-reviewed, as evidence that goshawk populations were declining in the west. In concluding that the status of the goshawk is insufficiently known without considering the non peer-reviewed evidence presented in the petition, the FWS arguably acted arbitrarily and capriciously.

A final concern regarding the ESA listing evaluation for the Northern Goshawk was the lack of sufficient scientific information upon which to determine whether goshawk populations were increasing,

173. See Letter from Robin D. Silver et al. to Manuel Lujan, supra note 125, at 1-2.
175. As of the date of this writing, the petitioners have filed a complaint in the United States District Court for the District of Oregon claiming that the FWS evaluation was arbitrary and capricious. Center for Biological Diversity v. Badgley, Complaint for Declaratory and Injunctive Relief, Civ # CV'99-287 (D. Or. filed Feb. 25, 1999).
decreasing, or stable. The FWS was unable to reach a conclusion on this issue. Instead, the FWS concluded that because the petition had erroneously interpreted critical habitat characteristics and that the species remained well distributed throughout its historical range, an ESA listing was not warranted.

The FWS's finding that the evidence was insufficient to support an ESA listing reflects what may be a practical shortcoming of the ESA for species that have extensive ranges. For such species, extensive population research would be necessary to provide substantial evidence sufficient to show declines warranting an ESA listing. Population research on such a large scale commonly lies beyond the resources of most endangered species advocates, and the FWS's budget for evaluating petitions. Such a practical limitation does not speak well for the effectiveness of the ESA, the protections of which are unavailing to species that are quietly disappearing due to a lack of substantial scientific or commercial data to confirm their impending extinction.

V. AN ECOSYSTEM MANAGEMENT APPROACH

The underlying issue in the debates over the Northern Goshawk was the management of remaining old-growth forests in the southwestern region. In the process of developing management guidelines for protecting Northern Goshawk populations, the Forest Service and the FWS lost focus of this underlying issue. The result is a set of prescriptions for constructing a patchwork of forest habitats designed to serve a multitude of goshawk prey species. The underlying concerns for the broader needs of old-growth ecosystems remain unaddressed, and are arguably intensified under the goshawk management guidelines.

The Northern Goshawk management guidelines have brought to light a number of concerns regarding broader ecosystem needs. Members of the original GSC responsible for developing the management guidelines have subsequently recognized a need for a more regional approach to forest management than the current guidelines provide. These Forest Service scientists are now calling for forest management based on the historical variation of vegetation structures over large geographic areas. Additionally, the Southwestern Regional Forester has recognized that the

177. See generally Letter from Charles Babbitt to David Jolly, supra note 42; Letter from Robin D. Silver et al. to Manuel Lujan, supra, note 125.
179. See id. at 16 (recommending the development of management strategies over geographical areas of approximately 100,000 ha).
Northern Goshawk management guidelines amended to the region’s forest plans are a temporary measure until the plans are integrated into an ecosystem management context.180

What would such an ecosystem management approach look like, and how would it differ from the current prescriptions under the goshawk management guidelines? Both strategies have similar objectives in providing for multiple use of forest resources while preserving biological diversity.181 Both strategies also focus on maintaining forest structure and function instead of managing the output of forest products. Where the two strategies differ is in their approach to scale. The goshawk management guidelines are designed to the scale of an individual goshawk home range, irrespective of the cumulative impact such an approach has on larger landscapes. Ecosystem management would address a full range of spatial scales throughout a defined set of ecosystem processes or functions.182

Proposed revisions to the forest planning process illustrate how the Forest Service intends to implement ecosystem management principles.183 The proposed rule maintains existing elements of NFMA planning, but superimposes the concept of ecosystem management as governing the forest planning process.184 The addition of an ecosystem analysis element185 into the planning process provides a procedural mechanism for avoiding the problems with single-species management directives such as the goshawk management guidelines.

Under the proposed rule, ecosystem analysis would not be a decision making process, but an effort to enhance the Forest Service’s understanding of ecosystems. Thus an ecosystem analysis would be a factor used in subsequent decision making.186 The proposed rule does not directly call for the ecosystem analysis to prescribe management practices,

181. See generally Jack Ward Thomas & Susan Huke, The Forest Service Approach to Healthy Ecosystems, J. FORESTRY, Aug. 1996, at 14, 14 (providing the Forest Service’s definition of ecosystem management as a concept of natural resources management wherein national forest activities are considered within the context of economic, ecological, and social interactions within a defined area or region over both short and long term).
184. See id. at 18,919 (creating 36 C.F.R. § 219.1(b)(1)), wherein the first principle of forest management is to provide sustainable ecosystems which yield multiple benefits to present and future generations).
185. See id. at 18,925 (creating 36 C.F.R. § 219.7).
186. See id. at 18,904.
but would provide a format for recommending alternatives for achieving the goals of forest plans.\textsuperscript{187} While such a standardless mandate raises suspicions as to its substantive terms,\textsuperscript{188} the ecosystem assessment process offers some procedural advantages over the current single species management approach.

The ecosystem assessment would be carried out under the management goal of achieving sustainable ecosystems that provide multiple benefits. The planning process would recognize the multiple scales of ecosystems, including region-wide and trans-jurisdictional scales. Planning efforts would require greater involvement of state and local government agencies as well as the interested public in the process.\textsuperscript{189} Biological functions of ecosystems would be addressed in what the Forest Service calls a "coarse filter/fine filter" approach.\textsuperscript{190} The majority of biological needs would be satisfied by providing the desired composition and structure of ecosystems at different spatial scales (the coarse filter). More specific biological needs would be addressed by considering the habitat needs of threatened and endangered species, sensitive species, and for maintaining viable populations of management indicator species similar to the existing regulation (the fine filter).\textsuperscript{191} Thus, the process by which the goshawk management guidelines were developed would be an example of the fine-filter aspect of ecosystem management, which would be incorporated under an umbrella of larger scale coarse-filter provisions.

Such an ecosystem assessment has already been prepared for the southwestern region.\textsuperscript{192} The ecosystem assessment for the southwest establishes forest health as the goal of ecosystem management. Forest health is defined in terms of ecosystem structure more than function, with a healthy forest including a "diversity of several stages and stand structures sufficient to provide habitat for many native species and all essential ecosystem processes."\textsuperscript{193} Six southwestern forest ecosystems are

\begin{thebibliography}{99}
\bibitem{187} See id. at 18,925 (creating 36 C.F.R. § 219.7(b)).
\bibitem{188} See Julie A. Weis, Comment: Eliminating the National Forest Management Act's Diversity Requirement as a Substantive Standard, 27 ENVTL. L. 641, 661 (1997) (arguing that the proposed rule would leave only procedural challenges to Forest Service implementation of the biodiversity mandate).
\bibitem{189} See Proposed Rules, National Forest System Land and Resource Management Planning, 60 Fed. Reg at 18,919 (creating 36 C.F.R. §219.1(b)).
\bibitem{190} See id. at 18,893.
\bibitem{191} See id. at 18,922 (creating 36 C.F.R. §219.4(b)).
\bibitem{193} Id. at 2.
\end{thebibliography}
defined in the assessment in terms of their biotic community and geographical distribution.\textsuperscript{194}

The assessment does not define a desired ecosystem structure, but uses historical conditions before settlement as a standard of ecosystem health.\textsuperscript{195} The assessment provides relatively broad recommendations for reconstructing historical conditions in two southwestern forest ecosystems, ponderosa pine and mixed conifer forests.\textsuperscript{196} These recommendations focus mainly on density management through prudent thinning of lower crown classes. The recommended forested landscape would consist of relatively open areas interspersed with denser, less intensively managed areas.\textsuperscript{197} The assessment does not recommend the size or pattern of the different forest structures, allowing for fine-filter planning criteria to define such parameters. The ecosystem assessment recognized the goshawk management guidelines as a fine filter criteria compatible with its recommendations.\textsuperscript{198}

To account for differences in ecosystem management criteria, the ecosystem assessment recommends incorporation of adaptive management principles. Under an adaptive management approach, the effects of management practices on forest health are monitored and evaluated. If the impacts to forest health are not satisfactory, future projects are modified as necessary.\textsuperscript{199} Therefore, forest management would be a much more active and evolving process, working toward the goal of sustainable ecosystems.

The application of an ecosystem management approach to Pacific Northwest Forests serves as an example of how such an approach might be applied in the southwestern region. In the Pacific Northwest, a Forest Ecosystem Management Assessment Team (FEMAT) was formed to develop a set of management alternatives for all federal forests within the range of the Northern Spotted Owl.\textsuperscript{200} In evaluating alternatives, FEMAT assessed not only the viability of the Northern Spotted Owl, but the viability of over 1,000 species of plants and animals.\textsuperscript{201} The FEMAT alternatives prescribed ecosystem management principles over different types of reserve areas accommodating a range of management objectives.\textsuperscript{202}

\textsuperscript{194} See id. at 11 (defining evergreen oak and coniferous woodlands, ponderosa pine, mixed conifer, spruce-fir, aspen, and riparian areas as distinct ecosystems). See also id. at 12 fig.2.3 (illustrating the location of different forest ecosystems in the southwestern region).

\textsuperscript{195} See id. at 65.

\textsuperscript{196} See id. at 66.

\textsuperscript{197} See id. at 67.

\textsuperscript{198} See id. at 66.

\textsuperscript{199} See id. at 4-5.

\textsuperscript{200} See Franklin, supra note 182, at 47.

\textsuperscript{201} See id. at 48.

\textsuperscript{202} See id.
The ecosystem management approach taken by FEMAT was upheld under court challenges on both NFMA and ESA grounds.\textsuperscript{203}

"An Assessment of Forest Ecosystem Health in the Southwest"\textsuperscript{204} represents a good start, but alone is insufficient for developing an ecosystem management approach for the region. Far more research on the health of southwestern forests is necessary to develop an ecosystem management approach comparable to the FEMAT plan. Like FEMAT, the southwestern region should focus its efforts on assessing the viability needs of a broad cross section of the biotic community to provide for biological diversity in an ecosystem management plan. Various types of habitat reserves should be identified and their distribution across the landscape considered in several alternative plans. The process of identifying management objectives and developing alternatives should extend beyond the national forests to include other public and private land managers within the defined ecosystems. Adaptive management should be incorporated to ensure that this approach achieves the ecosystem management goals. Most importantly, the process should be open to public input to ensure that ecosystem management goals are clearly identified and adequately provided for in the final ecosystem management plan.

VI. SUMMARY AND CONCLUSIONS

The recent controversies regarding the protection of Northern Goshawk populations in southwestern forests raise a number of regional forest management issues. The goshawk management guidelines are at best a reasonable approach to addressing the specific needs of Northern Goshawks. However, the approach taken in developing the management guidelines brings into question the suitability of the Northern Goshawk for use as a management indicator species under NFMA. The application of the ESA has been of limited value in protecting the Northern Goshawk. The controversy that surrounds the Northern Goshawk is indicative of the problems characteristic of single species management of large-scale ecosystems, suggesting that a larger-scale ecosystem management approach may be a preferable alternative.

Proposed forest planning criteria implementing ecosystem management may address the problems associated with the goshawk management guidelines. The proposed criteria include addressing ecosystem management on a more regional perspective than is currently in forest plans. Such an effort would require more extensive research into southwestern forest ecosystem function and structure than is currently

\textsuperscript{204} AN ASSESSMENT OF FOREST ECOSYSTEM HEALTH IN THE SOUTHWEST, supra note 192.
available in the region's ecosystem assessment. Based on a more extensive database of ecosystem function and structure, the effects of the goshawk management guidelines as well as other criteria should be monitored under an adaptive management plan. Such an approach would provide a more measured degree of forest health and serve to remedy some of the problems in managing the southwestern forests under the management guidelines for the Northern Goshawk.