Chapter 2

Effects of Exempting Thirteen Bureau of Land Management Timber Sales From Requirements of the Endangered Species Act on the Viability Assessments in the Final Environmental Impact Statement

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INTRODUCTION

In January 1992, the U.S. Department of Agriculture Forest Service issued a Final Environmental Impact Statement on Management for the Northern Spotted Owl in the National Forests (USDA 1992) (hereafter referred to as the Final Environmental Impact Statement). Final Environmental Impact Statement analyzed five alternatives for management of spotted owl habitat. The Conservation Strategy put forward by the Interagency Scientific Committee (Thomas et al. 1990) was the selected alternative in the Final Environmental Impact Statement.

The interagency Scientific Committee's Conservation Strategy included lands under management by the Bureau of Land Management in western Oregon and northern California. A major assumption for analysis of all five alternatives of the Final Environmental Impact Statement was that lands administered by the Bureau of Land Management would be managed under a strategy equal or superior to the Interagency Scientific Committee's Strategy with regards to owl viability. In the Forest Service's Final Environmental Impact Statement, it was also assumed that formal consultation between the Bureau of Land Management and the U.S. Fish and Wildlife Service, required by Section 7 of the Endangered Species Act, would preclude implementation of the Bureau of Land Management timber sales in conflict with the Interagency Scientific Committee's Strategy.

While the viability assessment for the Final Environmental Impact Statement was being prepared, the Bureau of Land Management in Oregon applied to the Endangered Species Committee for an exemption from the requirements of Section 7 of the Endangered Species Act for 44 timber sales, previously judged through consultation with the Fish and Wildlife Service to cause jeopardy to the spotted owl. On May 15, 1992, the committee exempted 13 of these sales. Additionally, the Endangered Species Committee required the Bureau of Land Management to follow the mandates of the Recovery Plan for Northern Spotted Owls (USDI 1992) if they proceeded with the 13 exempted timber sales (Endangered Species Committee 1992).

The granting of exemptions for these sales invalidates the assumption made in the Final Environmental Impact Statement that Section 7 consultation would result in management equal of superior to that provided by the Interagency Scientific Committee's Strategy. It was noted in the Final Environmental Impact Statement that, if an exemption was granted, the viability would need to be reexamined (USDA 1992). On May 28, 1992, an order of the U.S. District Court, Western District of Washington at Seattle, instructed the Forest Service to

reexamine the Final Environmental impact Statement viability analysis reported in the Final Environmental Impact Statement.

Currently, the Bureau of Land Management in Oregon is under a court-imposed injunction which prohibits timber sales in spotted owl habitat until new management plans are implemented in full accordance with the provisions of the National Environmental Policy Act. In the analysis presented, we assumed that the present injunction is temporary and will eventually be rescinded, allowing the Bureau of Land Management to follow a course of management that provides some level of timber harvest.

It seems likely at this point that management of northern spotted owl (Strix occidentalis caurina t habitat by the Bureau of Land Management in California will continue to be consistent with the provisions of the Interagency Scientific Committee's Strategy (J. Decker pets. comm.). If so, the assumptions made in preparation of the Final Environmental Impact Statement remain valid for California.

PURPOSE OF THE ANALYSIS

The purpose of the analysis that follows was to evaluate the effect of 13 exempted Bureau of Land Management timber sales on the viability assessments of the Forest Service Final Environmental Impact Statement alternatives. Although this review was triggered by the exemption of these 13 sales, the exemptions are only a part of the larger question regarding the Bureau of Land Management's overall participation in habitat management for the northern spotted owl.

Contributions by the Bureau of Land Management to present and projected amounts of spotted owl habitat are unclear at this time. As a result, Forest Service analysts must make assumptions about current and future trends in spotted owl habitat managed by the Bureau of Land Management. The task of the Scientific Analysis Team was to consider all currently available evidence in the examination of the Final Environmental Impact Statement assumption that the Bureau of Land Management would manage similar to the Interagency Scientific Committee's Strategy. The exemption of the 13 sales is but part of the evidence. These assumptions of the Final Environmental Impact Statement cannot be examined in isolation of the role of Section 7 consultation and the Bureau of Land Management's current approved management plans.

METHODS

Scenarios Analyzed

Scenario 1 - Exemption/Interagency Scientific Committee - The Scientific Analysis Team based this analysis on the comparison of two habitat management scenarios by the Bureau of Land Management. First, we analyzed the 13 exempted sales as a one-time action followed by the Bureau of Land Management's adherence to a management strategy equal to or superior to the Interagency Scientific Committee's Strategy in terms of providing for northern spotted owls. This analysis was referred to as "Exemption/Interagency Scientific Committee". While current evidence does not support this assumption, the analysis was completed for purpose of comparison and in response to direct instruction given to the Scientific Analysis Team by Forest Service administrators.

Scenario 2- Current Approved Plans - The second scenario of the analysis is referred to as "Current Approved Plans". It is based on the assumption that following the 13 sale exemption, the Bureau of Land Management in Oregon will follow its current approved plans. These plans are comprised of two components: Management Framework Plans and Agreement Areas. Management Framework Plans were developed in the 1980's (D. Bibles pers. comm.) arid specify 60-year rotations for timber harvest on lands available for logging. The Bureau of Land Management 's agreement with the Oregon Department of Fish and Wildlife established I10 "Bureau of Land Management/Oregon Department of Fish and Wildlife Agreement Areas" within which suitable spotted owl habitat would be protected (USDI 1988). One such area was transferred to the Bureau of Indian Affairs, leaving 109 Agreement Areas. The Interagency Scientific Committee's Strategy (Thomas et al. 1990:77-80) describes Agreement Areas in detail.

It was apparent from communication with the Bureau of Land Management Oregon State Director (D. Bibles pers. comm.) that the most likely future forest management strategy for Bureau of Land Management administered lands would be based on the Preferred Alternatives of the Bureau of Land Management's Draft Resource Management Plans that were prepared in 1992. The Scientific Analysis Team's charge (Appendix 2-A) was initially limited to assessment of the exemption of 13 timber sales as related to current approved plans. During that analysis (which is presented in this chapter), we were instructed by Forest Service administrators to conduct a similar analysis of the effects resulting from the Bureau of Land Management following the Preferred Alternatives of their Draft Resource Management Plans. That analysis was also completed by the Scientific Analysis Team and is documented in Chapter 3 of this report.

Results of viability analyses were not directly comparable between the Interagency Scientific Committee's Strategy, the Forest Service Final Environmental Impact Statement, and the Bureau of Land Management Draft Resource Management Plans. For example, the basis for estimates of habitat capability varied: the Interagency Scientific Committee used professional judgment and calculated habitat capability based on number of known owl pairs; the Forest Service developed a model for use in the Final Environmental Impact Statement, and the Bureau of Land Management used the "McKelvey habitat model" which differed significantly from the modeling approach used in the Final Environmental Impact Statement. Similarly, estimates of the potential change in amounts of habitat varied. The Interagency Scientific Committee assumed continued rates of decline in habitat comparable to those observed, based on previous rates of timber harvest, while the Forest Service and the Bureau of Land Management used programming models, (FORPLAN and TRIM-PLUS, respectively). To compare the Interagency Scientific Committee's Strategy with the Bureau of Land Management Preferred Alternative, we found it necessary to use data from the Bureau of Land Management's Draft Resource Management Plans. Only in this manner was a direct comparison possible. We therefore kept the analysis of the Bureau of Land Management's Current Approved Plans (Chapter 2) separate from the analysis of their Preferred Alternative (Chapter 3).

For the analysis of the current approved plans, we assumed that the Bureau of Land Management would continue to plan and offer timber sales which, although in compliance with their current approved management plans, would not be consistent with a management strategy equal, or superior, to the Interagency Scientific Committee's Strategy in providing habitat for the spotted owl. Specifically, sales could be planned in spotted owl Habitat Conservation Areas that were prescribed by the Interagency Scientific Committee. Habitat Conservation Areas are large blocks of Federal land where habitat conditions and prescriptions are expected to provide for multiple pairs of spotted owls now, and in the future. We also assumed that timber sales

would be proposed by the Bureau of Land Management that do not comply with provisions of the Interagency Scientific Committee's Strategy for dispersal habitat (the 50-11-40 rule). The 50-11-40 rule provides for at least 50 percent of a quarter-township having trees averaging at least 11 inches in diameter at breast height with a canopy closure of 40 percent or greater.

Consultation with Fish and Wildlife Service

Any action by a Federal agency that "may affect" a species listed under the Endangered Species Act is subject to consultation with the Fish and Wildlife Service under Section 7 of that Act. Therefore, our analysis considered both the additional role that Section 7 consultation might play in modifying the Bureau of Land Management's current approved management plans, and whether this would result in overall management that provides a likelihood of viability for spotted owls similar to that provided by the Interagency Scientific Committee's Strategy.

The Bureau of Land Management routinely consults with the Fish and Wildlife Service on timber sales that may affect spotted owls or their habitat. Our analysis of a Biological Opinion (USDI 1991) issued by the Fish and Wildlife Service for the Bureau of Land Management's 1991 timber sale program revealed that such consultation did not cause the Bureau of Land Management to manage spotted owl habitat in a manner similar to the Interagency Scientific Committee's Strategy. The Bureau of Land Management formally consulted with the Fish and Wildlife Service on 174 planned timber sales which conflicted with 50-11-40 standards in 110 quarter-townships. Jeopardy opinions issued by the Fish and Wildlife Service for 52 of the 174 timber sales involved 67 of the 110 quarter-townships in conflict with 50-11-40 standards. Therefore, sales not meeting the 50-11-40 standards in 43 quarter-townships were given non-jeopardy opinions by the Fish and Wildlife Service and allowed to proceed. The exemption granted by the Endangered Species Committee involved another 13 sales in an additional 17 quarter-townships that did not meet 50-11-40 standards. The result was the combined "approval" by the Fish and Wildlife Service and the Endangered Species Committee of sales which would not meet 50-11-40 standards in 60 quarter-townships. The Fish and Wildlife Service's Biological Opinion (USDI 1991) also indicated that three sales were approved Habitat Conservation Areas, which further conflicts with the Interagency Scientific Committee's Strategy.

The Endangered Species Committee's exemption of 13 sales after the Fish and Wildlife Service's jeopardy determination further demonstrates the uncertainty of assumptions made in the preparation of the Final Environmental Impact Statement about the ability of Section 7 consultations to result in a level of habitat protection that has a high probability of providing for viable populations of threatened or endangered species. As a mitigation measure for granting the exemption for the 13 sales, the Endangered Species Committee required the Bureau of Land Management to submit new 10-year management plans to the Fish and Wildlife Service for consultation which indicated their effects on spotted owls and their habitat (Endangered Species Committee 1992). Superficially, this decision lends credibility to the assumption in the Final Environmental Impact Statement had the committee not added the proviso that, if the Fish and Wildlife Service determines that these 10-year plans will "likely jeopardize the continued existence" of northern spotted owls, the Bureau of Land Management could apply to the Endangered Species Committee for exemption from the requirements of Section 7 of the Endangered Species Act for the *entire management plan*.

Discussions with Fish and Wildlife Service personnel (B. Mulder pers. comm.) and regulations pursuant to the Endangered Species Act in 50 CFR Part 402 (Federal Register 1986) indicate

us that, even without exemptions granted by the Endangered Species Committee, consultation between Federal land management agencies and the Fish and Wildlife Service will not necessarily cause Federal agencies to meet the requirements of a management strategy (such as the Interagency Scientific Committee's Strategy) or the Draft Recovery Plan. Consultation under Section 7(a)(2) of the Endangered Species Act is designed to ensure that Federal agency actions are not likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat. This avoidance of a jeopardy determination is viewed by the Fish and Wildlife Service (B. Mulder pers. comm.) and the Scientific Analysis Team as significantly lower standard than a recovery or management plan that provides a high likelihood of viable populations. This is accomplished by providing management guidelines for application across the range of the species. Therefore, avoiding jeopardy opinions by the Fish and Wildlife Service on a project-by*project basis, or even cumulatively, seems likely to result, over time, in habitat conditions which would increase the risk to the viability of the northern spotted owl. While "take" of individual owls or pairs of owls may be avoided, consultation may allow, or at least perpetuate, fragmentation of habitat and provide amounts of nesting, roosting, and foraging spotted owl habitat that are minimal or inadequate in both size and arrangement for maintaining reproductive spotted owl pairs in appropriate proximity to other such pairs. The consequences of such situations were clearly analyzed by Thomas et al. (1990). The final effects of consultation between the Bureau of Land Management and the Fish and Wildlife Service regarding designated critical habitat are unclear at this time.

Section 7(a)(1) of the Endangered Species Act requires Federal agencies to "utilize" their authorities to further the purposes of the Act by carrying out programs for the conservation of threatened or endangered species. Implementation of conservation strategies or adoption of a recovery plan for a threatened or endangered species are actions that further those purposes. Discussion reported in the Federal Register (1986:19934) regarding regulations developed implement the Endangered Species Act clearly state that, "The Fish and Wildlife Service or National Marine Fishery Service will not, nor do they have the authority to, mandate how or when other Federal agencies are to implement their responsibilities under Section 7(a)(1) the Act. Section 7(a)(1) has limited purpose under the Act: to authorize Federal agencies factor endangered species conservation into their planning processes, regardless of other statutory directives."

For purposes of analysis, we recognized that Section 7 consultation will modify at least some limber sales proposed by the Bureau of Land Management. Based on Biological Opinions issued by the Fish and Wildlife Service, the actions of the Endangered Species Committee, and the limitations of Section 7 regulations, this assessment was conducted under the assumption that the Section 7 consultation process will not provide a de .facto "management plan" equal to or superior to the Interagency Scientific Committee's Strategy in terms of providing for viability of northern spotted owls across their range.

Viability Evaluation Criteria

The Final Environmental Impact Statement used seven criteria to assess how well the alternatives provided for northern spotted owls (USDA 1992). None of the criteria can be used independently to assess population viability. The inter-relationships among all criteria must be considered when assessing population viability. It is possible that an alternative could be weak in one criterion but be strong in a compensating criterion which must be considered in developing the overall rating for an alternative.

Criterion I - Potential Change. Potential change in amount, and rate of change, of spotted owl nesting, roosting, and foraging habitat over time on National Forests.

Parameter: Population trend, in the short and long term, at the subspecies' range and physiographic province scales.

The intent of this criterion is to assess affects of each alternative on the amount of spotted owl habitat over time. An increase in the amount of habitat provides a higher probability of persistence for the spotted owl than a decrease in habitat. A stable or slow rate of decline in amount of habitat offers lower likelihood of persistence, but allows managers more time to detect, and possibly correct, unacceptable declines in spotted owl populations caused by loss of habitat. A more rapid rate of decline may preclude effective intervention by managers.

Criterion 2 - Distribution. Provision on National Forests for designated spotted owl nesting, roosting, and foraging habitat distributed throughout the range of the northern spotted owl, with emphasis on areas of concern.

Parameter: Population distribution at the subspecies' range and physiographic province scales.

The basic premise for this criterion is that species or subspecies well distributed throughout their ranges are less prone to extinction than those species confined to small portions of their range.

Other elements being equal, a broadly distributed population with few barriers to movement has a higher probability of viability than a subdivided population with more barriers within its range (Thomas et al. 1990:23). A broad, interconnected distribution lessens risk of catastrophic loss due to disease, habitat destruction, and other catastrophic events. Areas of concern are identified in the Interagency Scientific Committee's Report (Thomas et al. 1990:66). Several areas concern have been identified because, as a result of natural and human-caused activities, they have low amounts of spotted owl habitat or they may be isolated, or both. Thus, problems with distribution may occur in these areas and protection of habitat is therefore especially important.

Criterion 3 - Habitat Capability. Habitat capability, estimated as potential number of pairs of northern spotted owls, within each population over time on National Forests.

Parameter: Population size at the physiographic province scale.

The basic premise of this criterion is that a higher habitat capability is better because of the greater likelihood for sufficient population size to offset potential demographic or genetic problems.

The intent of this criterion is to evaluate habitat capability of large areas supporting interbreeding owls. The values used to assess this criterion are based on estimates from Schonewald-Cox (1983) as adapted by Marcot et al. (1986). Schonewald-Cox described levels of protection ranging from low likelihood of long term survival to very high likelihood. The number of reproductive pairs are assumed to approximately equal effective population size (that is, the effective population size is approximately one-half the adult census population size) (Marcot and Holthausen 1987).

Criterion 4 - Dispersal Habitat. Provision for movement or dispersal habitat in National Forests outside of designated areas managed primarily for spotted owl habitat.

Parameter: Distribution among clusters at the local scale.

The basic premise of this criterion is that providing habitat between designated areas facilitates the movement and dispersal of owls among clusters.

A thorough discussion of dispersal habitat was presented in the Interagency Scientific Committee's Report (Thomas et al. 1990:309-310). In summary, the report states,

> "We use 'connectivity' to mean the kinds and amounts of habitat occurring in the zones between [designated areas]. Conditions there must be compatible with the movement of spotted owls, such that they are both capable of moving through these habitats and inclined to do so. Although connecting zones need not assure habitat capable of supporting a pair of breeding owls, they do not need to provide stopover places where owls can find suitable cover and, especially, foraging opportunities. To that extent, then, we believe that the connecting zones between [designated areas] must include some forested landscapes."

Several areas of concern have been identified because they pose barriers to movement and dispersal of spotted owls. Provisions for dispersal habitat in these areas is especially important.

Criterion 5 - Spacing. Spacing between designated areas managed primarily for owl habitat, measured between boundaries of designated areas on National Forests.

Parameter: Population distribution among pairs at the local scale.

The basic premise of this criterion is that designated areas closer together provide greater assurance of successful movement of spotted owls among areas than when such areas are farther apart.

The basis for assessing this criterion is the data set reported in the Interagency Scientific Committee's Report (Thomas et al. 1990:307) which states 67 percent of all juveniles observed dispersed maximum distances of 12 miles or more, and 50 percent dispersed at least 17.5 miles. When designated areas are further than 17 miles apart, there is a greater risk of mortality or lower probability of locating a mate.

To provide for viable populations, habitats need to be both well-distributed and spaced lose enough to ensure interchange of spotted owls among designated habitats. Spacing and distribution are related. A habitat conservation strategy has a greater likelihood of success if it provides adequate access among several designated areas. This redundancy in distribution is insurance against severing populations if designated habitat areas are changed to unsuitable conditions due to catastrophic events. Measurements of first, second, and third nearest distances from each designated habitat area provides an estimate of such spacing patterns.

Criterion 6 - Patch Size. Provision for size and distribution of spotted owl nesting, roosting, and foraging habitat patches within designated areas managed primarily for owl habitat on National Forests.

Parameter: Population size and population distribution within clusters at the local scale.

The intent of this criterion is to assess patch size and patch contiguity as two measures of habitat quality. The premise is that larger, more contiguous habitat patches are of higher quality than small non-contiguous habitat. Northern spotted owls are more likely to persist in higher quality habitat than in lower quality habitat. Smaller patches, especially those with abrupt edges, may also result in habitat loss when exposed trees fall in high winds and when stands suffer other impacts associated with forest edges (Thomas et al. 1990). As patches of habitat become smaller and more isolated, habitat quality decreases. Likelihood of future occupancy by spotted owls is higher if currently poor quality habitat is managed to assure recovery of previously harvested areas to regain spotted owl nesting, roosting, and foraging habitat characteristics in large contiguous blocks.

Criterion 7 - Clustering. Provision for designated areas large enough to support multiple pairs of spotted owls on National Forests.

Parameters: Trend in population size at the local scale.

The basic premise of this criterion is that large designated areas containing multiple pairs of owls, referred to as clusters of pairs, provide for greater likelihood of persistence of owls than do small designated areas.

Demographic modeling conducted by the Interagency Scientific Committee (Thomas et al. 1990) suggested that clusters of more than 20 owl pairs were more likely to persist because of, among other factors, increased probability of within-cluster replacement of lost mates by nonterritorial birds. The Interagency Scientific Committee's Report (Thomas et al. 1990:24) noted, "both empirical and modeling results suggest that clusters of 15 to 20 pairs should be stable over the long term, even given low to moderate rates of dispersal among them by juvenile owls." The Interagency Scientific Committee recommended 20-pair clusters because not all pair sites were expected to be occupied at any one point in time.

Because not all areas are capable of supporting large, protected clusters of owls due to existing habitat conditions and ownerships, it is not possible to specify absolute numbers of individual pairs or clusters as a basis for assessing alternatives. Rather, assessments are based on frequency distribution of cluster sizes.

The Scientific Analysis Team examined each criterion in relationship to the two scenarios for habitat management by the Bureau of Land Management described earlier in this Chapter. When possible, and where it provided insight, the seven criteria were used to evaluate effects of each scenario on specific sites, physiographic provinces, and the entire range of the northern spotted owl. Primary sources of information used in this assessment included the Interagency Scientific Committee's Strategy and associated files (Thomas et al. 1990), the Final Environment Impact Statement (USDA 1992), a Bureau of Land Management District Draft Resource Management Plan (USDI 1992a) and maps, and Environmental Analysis files for each of the Bureau of Land Management sales exempted by the Endangered Species Committee.

RESULTS

Scenario 1 - Exemption/Interagency Scientific Committee

Criterion 1 - Potential Change in Habitat - The Interagency Scientific Committee's Strategy called for protection of nesting, roosting, and foraging habitat in Habitat Conservation Areas and areas reserved from timber harvest under agency resource management plans or congressionally designated Wilderness areas. The Interagency Scientific Committee's Strategy further provided that the lands between the Habitat Conservation Areas and reserved areas could be logged so long as the 50-11-40 rule was applied. The exemption of the 13 Bureau of Land Management timber sales allowed logging of 1,763 acres of nesting, roosting, and foraging habitat outside Habitat Conservation Areas or reserved areas. Three of the exempted timber sales, Moore Coon, Windy, and Four Gates, appear to occur within boundaries of three Habitat Conservation Areas (O-31, O-31 and 0-28 respectively) as mapped in the Final Environmental Impact Statement (USDA 1992). Based on statements in the Biological Opinion prepared the Fish and Wildlife Service during formal consultation procedures (USDI 1991) which note that these sales would affect 50-11-40 standards, we assumed that these sales were not actually in Habitat Conservation Areas. We attribute the apparent discrepancy to either mapping error or revision of boundaries of Habitat Conservation Areas by the Bureau of Land Management in a manner consistent with the Interagency Scientific Committee's Strategy. On the other hand, if any of the sales do in fact occur within the boundary of a Habitat Conservation Area as prescribed by the Interagency Scientific Committee, the effect is a small (151 acres) removal nesting, roosting, and foraging habitat. This very localized minor effect, even if it did occur, did not significantly affect viability ratings of alternatives in the Final Environmental Impact statement when considered as a one-time action.

We, therefore, assumed that either the Bureau of Land Management made boundary changes consistent with the provisions in the Interagency Scientific Committee's Strategy or, if not, the amount of habitat affected is insignificant. We therefore concluded that there would be no effect on the assumption in the Final Environmental Impact Statement regarding the potential change in the amount of habitat (Table 2-1).

Table 2-1 Range-Wide Acres of Northern Spotted Owl Nesting, Roosting, and Foraging Habitat on Bureau of Land Management Administered Lands by Scenario Analyzed (Percent Change From Future Amounts Anticipated by the Interagency Scientific Committee). [1]

	(Thousands of Acres)		
Scenario	Year 0 (Present)	Year 50	Year 100
Exempt/ ISC[2]	1,253	1,008 (0)	1,229 (0)
Current Approved Plans	1,153	494 (-51%)	483 (-61%)

[1] Acreage estimates for the Bureau of Land Management in Oregon were taken from USDI 1992 while those in California were taken from Thomas et al.

[2]Assumes that the Forest Service follows the Interagency Scientific Committee's Strategy and the Bureau of Land Management follows an equally effective strategy for spotted owl viability after the exemption of 13 timber sales.

The Interagency Scientific Committee anticipated that logging outside Habitat Conservation Areas and reserved areas would occur at rates governed by sustained yield principles of forestry. The expected rates of logging are not necessarily synonymous with expected rates of loss for spotted owl nesting, roosting, and foraging habitat since not all stands that are harvested meet the definitions of such habitat. Expectations for spotted owl habitat in areas outside Habitat Conservation Areas were based primarily on amounts and distribution of dispersal habitat as provided by compliance with the 50-11-40 rule.

Responses by the Interagency Scientific Committee to management questions from agencies following the publication of the Interagency Scientific Committee's Strategy provide further guidance concerning timber harvest in the areas outside Habitat Conservation Areas (Thomas 1991). These responses included provisions allowing logging that would change forest stand conditions from those favorable for nesting, roosting, and foraging by spotted owls to conditions that would limit owl use to only dispersal and foraging. This could result in rapid loss of most of the nesting habitat outside Habitat Conservation Areas and other reserved areas. Therefore, since the Interagency Scientific Committee did not quantify the rate of loss of nesting, roosting, and foraging habitat outside Habitat Conservation Areas and reserved areas, the exemptions of the 13 Bureau of Land Management sales by the Endangered Species Committee have no effect on the assumptions made in the Final Environmental Impact Statement regarding potential change in habitat.

Criterion 2 - Distribution of Nesting, Roosting, and Foraging Habitat - If all 13 exempted sales are outside Habitat Conservation Area boundaries (see Criterion 1), the

distribution of areas (Habitat Conservation Areas) designated for the protection of nesting, roosting, and foraging habitat would remain unchanged from that proposed in the Interagency Scientific Committee's Strategy.

Criterion 3 - Capability of the Habitat to Support Pairs of Owls - As in Criterion 1, it was assumed in the Interagency Scientific Committee's Strategy that forested areas outside Habitat Conservation Areas in the forest matrix would be subject to logging, in accordance with 50-11-40 standards, and might therefore be rendered, at least temporarily, unsuitable to support nesting pairs of owls. Because all 13 sales in question are assumed to occur outside Habitat Conservation Areas or be very minor in extent, this criterion would not apply.

Criterion 4 - Provisions for Dispersal Habitat - The Interagency Scientific Committee's Strategy provided for well-distributed dispersal habitat (i.e., stands with trees at least 11 inches in dbh and at least 40 percent crown closure) through the application of the 50-11-40 rule. The exemption of the 13 Bureau of Land Management timber sales by the Endangered Species Committee will cause or worsen conflicts with the 50-11-40 standards in 17 quarter-townships. Of these 17, 14 quarter-townships were already below the 50-11-40 standard and three other quarter-townships will be reduced below that standard as a result of cutting the exempted sales. It should be noted that these conflicts with 50-11-40 standards are occurring in areas where lands administered by the Bureau of Land Management occur interspersed with private lands in a checkerboard pattern. Strict compliance with the 50-11-40 rule, which applies only to Federal lands, may result in an overall condition where only 25 percent of a quarter-township meets the 11-40 standards.

In the short term, the quality of dispersal habitat will be most affected in the areas where the exempted sales are concentrated between Habitat Conservation Areas. These sales will further reduce dispersal habitat in areas where lack of dispersal habitat may already adversely affect successful dispersal.

Dispersal of spotted owls between Habitat Conservation Areas 0-27 and 0-26 is likely to be severely and adversely affected by large areas of private land that are not subject to, and do not currently meet, 50-11-40 standards. Further worsening the situation, the distance between these adjacent Habitat Conservation Areas is 12 miles-the maximum distance recommended by the Interagency Scientific Committee. The 13 exempted Bureau of Land Management sales impact 404 acres of dispersal habitat adjacent to a large block of private land situated between these Habitat Conservation Areas that likely does not meet the 50-11-40 criteria. Five quarter-townships that lie between these two Habitat Conservation Areas will be adversely affected by the exempted sales. Two of these quarter-townships currently meet the 50 percent standard; one will be reduced from 58 to 37 percent, the other from 55 to 34 percent. One quarter-township will remain above minimum standards at 51 percent, and two others, which are already below 11-40 standards, will be reduced even further.

The exempted sales will result in the logging of 307 acres between Habitat Conservation A teas 0-25 and 0-27. Three quarter-townships will be affected between these two Habitat Conservation Areas, all three of which are already below the 50+11-40 standard for dispersal habitat. The area in each quarter-township meeting the 50-11-40 standard will be reduced to 29, 31, and 35 percent. Here, the expanse of private land and a distance of 24 miles (twice the 12-mile distance considered appropriate by the Interagency Scientific Committee) between these Habitat Conservation Areas makes the maintenance of adequate dispersal habitat to provide for movement of spotted owls even more critical.

The, exempted sales will result in logging 277 acres of dispersal habitat between Habitat Conservation Areas 0-29 and O-31. A total of five quarter-townships will be affected between these two Habitat Conservation Areas, all of which are already below the 50-11-40 standard

for dispersal habitat. Three will be reduced to 19 percent, one to 16 percent, and one to 31 percent of the quarter-township meeting the 11-40 standard. The Bureau of Land Management administered lands here are more contiguous than in the more typical checkerboard areas. The distance between these Habitat Conservation Areas is four miles, well within spacing guidelines of the Interagency Scientific Committee's Strategy. Hence, while the effects of cutting such stands conflict with the Interagency Scientific Committee's Strategy, they are probably less significant here than in other areas.

All of the 13 exempted Bureau of Land Management sales are located in the Oregon Coast Range Physiographic Province. This province has been identified as an area of concern by both the Interagency Scientific Committee (Thomas et al. 1990) and the Fish and Wildlife Service (USDI 1991) due to scarcity of nesting, roosting, and foraging habitat, low numbers of owls, fragmented habitat, and the distances between patches of habitat. Prior to the exemption of the 13 sales by the Endangered Species Committee, 40 percent (127 of 317) of quarter-townships lands administered by the Bureau of Land Management in the province did not meet 50-11-40 standards (USDI 1991). After the exemption and assuming the sales will be harvested, percent (130/317) will not meet the standards. Seven other sales in the province that conflict with the 50-11-40 standards in seven quarter-townships were given nonjeopardy Biological Opinions by the Fish and Wildlife Service.

Three of the exempted sales (Devore Mt., Camas Valley West, and Prego) have particular potential to adversely affect movement of spotted owls between physiographic provinces. None of these three sales disrupts direct connections with adjacent provinces, but each represent a short-term loss of dispersal habitat in areas of potential use by owls for east/west and north/south movement between provinces.

Whereas it was possible, by assuming that meeting 50-11-40 standards equated to meeting dispersal requirements, to quantify changes to habitat that will occur as a consequence of cutting the exempted sales. It was not possible to quantify the effects on actual dispersal by spotted owls. Qualitatively, we expected that an increase in the number of quarter-townships not meeting dispersal standards and further degradation of habitat conditions in quarter-townships already below standards would result in increased exposure of owls to predation and increased competition for prey in areas between Habitat Conservation Areas. Subsequently, these owls might well be less likely to successfully disperse between Habitat Conservation Areas. The number of owls that will not successfully disperse, and the increase in mortality rate of dispersing owls resulting from the exemption of the 13 sales, cannot be predicted. We conclude that the cumulative effect of this harvest and prior timber cutting based on management plans that do not provide for well-distributed dispersal habitat would continue the trend of declining quantity and quality of dispersal habitat in an area already deficient in dispersal habitat.

Recent analysis by the Bureau of Land Management (USDI 1992a) indicated that if the Bureau of Land Management implemented the 50-11-40 standards which would protect dispersal habitat to the level expected by the Interagency Scientific Committee, most if not all of their quarter-townships would meet the standards within 40 years, that is, by around year 2030 (USDI 1992a). In other words, there is a pronounced problem with dispersal habitat on lands administered by the Bureau of Land Management for at least the next 40 years. This problem is acute in the short term (10-40 years). However, if the Bureau of Land Management were

adopt standards for dispersal habitat equal or superior to those prescribed by the Interagency Scientific Committee, the problem would diminish with time until alleviated in 40 years. The exemption of the 13 Bureau of Land Management sales further worsens the situation.

Criterion 5 - Spacing Between Areas Designated for Spotted Owl Management - The spacing analysis described in the Final Environmental Impact Statement was conducted for Habitat Conservation Areas under Alternatives B, C, and D, and for Spotted Owl Habitat Areas under Alternative A. Since the exempted timber sales are outside of Habitat Conservation Areas and SOHAs, this criterion is not affected.

Criterion 6 - Patch Size of Habitat - Assuming exempted timber sales occur outside Habitat Conservation Areas, neither the size of Habitat Conservation Areas or number of owl pairs within Habitat Conservation Areas would be affected.

Criterion 7 - Clustering of Owl Pairs - Since the sales are not in designated reserve areas, there would be no effect on clustering.

Scenario 2 - Current Approved Plans

Our analysis of the effects of the 13 exempted sales as a one-time action concluded that only Criterion 4 was affected. However, the following analysis of the exempted 13 sales, when viewed as part of the Bureau of Land Management ’s current approved management plans, illustrated that all of the evaluation criteria would be affected as follows.

Criterion 1 - Potential Change in Habitat - Current approved management plans for the Bureau of Land Management in Oregon do not provide Habitat Conservation Areas or other large blocks where suitable habitat and forest stands capable of growing into habitat for spotted owls will be protected. The Bureau of Land Management/Oregon Department of Fish and Wildlife Agreement Areas will protect 109 areas totaling approximately 228,000 acres compared to an estimated 734,000 acres in Habitat Conservation Areas administered by the Bureau of Land Management in Oregon ~s described under the Interagency Scientific Committee’s Strategy (Thomas et al. 1990). Only the habitat currently suitable in the Bureau of Land Management/Oregon Department of Fish and Wildlife Agreement Areas is protected. All current suitable habitat and stands with potential to develop into suitable habitat are protected in Habitat Conservation Areas as prescribed by the Interagency Scientific Committee. Significant reductions in nesting, roosting, and foraging habitat below that described in the Interagency Scientific Committee’s Strategy will occur as a result. Expected changes in the amounts of suitable spotted owl habitat that the Bureau of Land Management expects to provide through time are displayed in Table 2-1 for the two analyzed scenarios.

There would be a 51 percent reduction (under the current approved plans scenario) in the amount of nesting, roosting, and foraging habitat that the Bureau of Land Management would contribute in 50 years, as compared to the amount expected by Interagency Scientific Committee. In 100 years, the reduction would be 61 percent (Table 2-2).

Table 2-2 Potential Change in Acres[1] of Northern Spotted Owl Nesting, Roosting, and Foraging Habitat (Percent Change From Expectations of the Interagency Scientific Committee) on Lands Administered by the Forest Service and the Bureau of Land Management.

	Thousands of Acres					
	Year 0 (Present)		Year 50		Year 100	
Scenario	FS/BLM	Total	FS/BLM	Total	FS/BLM	Total
Exempt/ ISC [2]	6,073/1,153	7,226	5,605/1008 (0%)	6,613 (0%)	6,025/1,229 (0%)	7,324 (0%)
FEIS-Alt B BLM-Current Approved Plans	6,073/1,153	7,226	5,605/494 (-51%)	6,009 (-9%)	6,025/483 (-61%)	6,508 (-11%)
FEIS-Alt C BLM-Current Approved Plans	6,073/1,153	7,226	6,171/494 (-51%)	6,665 (+1%)	6,673/483 (-61%)	7,156 (-2%)
FEIS-Alt D BLM-Current Approved Plans	6,073/1,153	7,226	61951/494 (-51%)	7,445 (+13%)	7,640/483 (-61%)	8,123 (+11%)

[1]Forest Service acreages are from USDA (1992). Acreages for the Bureau of Land Management in Oregon are taken from USDI (1992) while those in California taken from Thomas et al (1990).
[2]Assttmes that the Forest Service follows the Interagency Scientific Committee's Strategy and the Bureau of Land Management follows an equivalent strategy following
the exemption of 13 timber sales by the Endangered Species Committee.

Criterion 2 - Distribution of Nesting, Roosting, and Foraging Habitat - Current approved management plans of the Bureau of Land Management protect nesting, roosting, and foraging habitat in Bureau of Land Management/Oregon Department of Fish and Wildlife Agreement Areas. The Bureau of Land Management/Oregon Department of Fish and Wildlife Agreement Areas are distributed over the Oregon Coast Range (n=51), Klamath Mountains (n=30), and Oregon Cascades West (n=28) Physiographic Provinces. The Agreement Areas currently contain an average of 2,100 acres (range from 734 to 4,188 acres) of spotted owl nesting, roosting, and foraging habitat (Thomas et al. 1990). The Bureau of Land Management/Oregon Department of Fish and Wildlife Agreement Areas are well-distributed within and among the physiographic provinces and are essentially equal to the distribution of habitat provided by Habitat Conservation Areas under the Interagency Scientific Committee's Strategy. However, in the long term (100 years) it can be expected that, because of the limited size of Agreement Areas and increasing fragmentation of habitat within the areas, they will likely support far fewer or no pairs of spotted owls (USDI 1992a:4-71).

The distribution of designated areas (i.e., Habitat Conservation Areas) in the Interagency Scientific Committee's Strategy is affected in the long term if the Bureau of Land Management does not designate Habitat Conservation Areas. Failure of the Bureau of Land Management to designate Habitat Conservation Areas would eliminate 11 complete Habitat Conservation Areas and portions of 13 others on lands administered by the Bureau of Land Management (Table 2-3). As discussed earlier, the Oregon Coast Range Physiographic Province has been identified as in area of concern, where the density of northern spotted owls is one-eighth of that recorded in other coastal areas (Thomas et al. 1990:67). Habitat conditions on lands administered the Bureau of Land Management within the Oregon Coast Range Province are critical for maintaining a well-distributed, connected network of nesting, roosting, and foraging habitat (USDA 1992). Forecasted future conditions of the Bureau of Land Management/Oregon Department of Fish and Wildlife Agreement Areas indicate that under the Bureau of Land Management's current approved management plans, the Agreement Areas will not effectively contribute to maintaining such a network (USDI 1992a).

It educed long-term distribution of spotted owl habitat linking the Oregon Coast Range, Klamath Mountains, and Oregon Cascades West Physiographic Provinces is highly likely to reduce chances c)f spotted owls moving among these provinces. The distribution of Habitat Conservation Areas proposed by the Interagency Scientific Committee (Thomas et al. 1990) on National Forests alone will not meet the Interagency Scientific Committee's Strategy's requirements for well-distributed blocks of habitat connected by dispersal habitat.

Table 2-3 Habitat Conservation Areas in the Interagency Scientific Committee's Strategy Affected by the Bureau of Land Management in Oregon Following Current Approved Plans and Number of Adjusted Future Expected Pairs In the Interagency Scientific Committee's Strategy Compared to the Bureau of Land Management's Current Plans.

	Pairs of Owls			Pairs of Owls	
Shared FS/BLM HCAs BLM portion Lost	ISC Expectations	Current BLM Plans	Entire BLM HCAs Lost	ISC Expectations	Current BLM Plans
0-6	23	14	0-12	24	0
0-7	25	23	0-16	22	0
0-11	22	18	0-24	20	0
0-17	25	3	0-26	23	0
0-19	29	25	0-27	28	0
0-20	17	17	0-28	24	0
0-21	23	3	0-30	25	0
0-29	20	7	0-37	17	0
0-31	23	16	0-38	5	0
0-32	21	16	0-39	2	0
0-33	20	4	0-40	14	0
0-35	20	19			
0-36	26	4	___		
Total: 13			11		

Criterion 3 - Capability of the Habitat to Support Pairs of Owls - Both the Bureau of Land Management (USDI 1992a) and Forest Service (USDA 1992) estimated the capability habitat to support owl pairs. Unfortunately, each agency used different processes and time scales. In the Final Environmental Impact Statement, the Forest Service used a process differing from procedures previously used, such as those used for Interagency Scientific Committee estimates. As a result, direct comparisons between these efforts are not possible. However, it was possible to crudely assess the effects of the Bureau of Land Management's current approved plans on the capability of areas designated for spotted owl habitat to support pairs of spotted owls. These data were then compared with estimates made for the Interagency Scientific Committee's Strategy (Table 2-4).

Table 2-4 Future Capability of Category 1 and 2 Habitat Conservation Areas or Oregon Department of Fish and Wildlife Agreement Areas on Lands Administered by the Bureau of Land Management in Oregon to Support Pairs of Spotted Owls, Based upon Estimates in the Interagency Scientific Committee's Strategy by Analysis Scenario and by Physiographic Province.

Scenario	Physiographic Province	Adjusted Future Pairs[1]	Percent Reduction From ISC Expectations
Exempt/ ISC [2]	Oregon Coast R.	164	0
	Klamath Mtns.	89	0
	Oregon Cascades	83	0
	Total:	336	0
Current Approved Plans	Oregon Coast R.	0-23	100-86
	Klamath Mtns.	0-43	100-52
	Oregon Cascades	0-24	100-71
	Total:	0-903[3]	100-733[3]

[1] Adjusted future pairs based on estimates for Habitat Conservation Areas on lands administered by the Bureau of Land Management in Oregon and proportions of ownerships jointly shared by the Bureau of Land Management and the Forest Service Habitat Conservation Areas, and based on Interagency Scientific Committee estimates and proportions of Bureau 0f Land Management acreages lost.

[2] Assumes that the Forest Service will follow the Interagency Scientific Committee's Strategy and that Bureau of Land Management will follow an equal strategy alter the exemption of the 13 timber sales.

[3] Bureau of Land Management/Oregon Department of Fish and Wildlife Agreement Areas are theoretically capable of supporting 90 pairs of spotted owls (Thomas et al. 1990). Estimates in draft resource management plans (USDI 1992a) indicate that for Alternative B, an alternative very similar to the current approved management plans (J. Lint pers. comm.), the outlook for sustaining owl pairs on lands administered by the Bureau of Land Management in Oregon is Hear zero (USDI 1992a:4-71). The actual capability probably is somewhere between the two estimates and likely toward 1he low value.

Although the Bureau of Land Management/Oregon Department of Fish and Wildlife Agreement Areas were established to maintain 90 pairs of spotted owls over the long term (50-100 years), the likelihood of that occurring is near zero because they are small, fragmented, single pair areas in which habitat conditions are expected to deteriorate (Thomas et al. 1990, USDI 1992). Even if the Agreement Areas are assumed to be capable of supporting 90 pairs, when compared to the 336 future pairs expected on lands administered by the Bureau of Land Management in Oregon under the Interagency Scientific Committee's Strategy, it represents a 73 percent reduction. The actual reduction, based on the analysis Bureau of Land Management has completed, for an alternative of draft resource management plans which approximate the current plans, show the reduction is likely to be significantly greater than 73 percent (USDI 1992a:4-71).

The effect of continuing the Bureau of Land Management's current approved plans in Oregon on the capability of all Federal lands to support pairs of spotted owls varies by physiographic province. The Oregon Coast Range Province is the most adversely affected. Here, the number of pairs is reduced by 141 (56 percent of 250 future expected pairs on Federal lands), relative to that expected by the Interagency Scientific Committee. This assumes the Bureau of Land Management/Oregon Department of Fish and Wildlife Agreement Areas support pairs at

anticipated levels-which is highly unlikely for reasons documented earlier. Assuming the Agreement Areas will not support any pairs of owls in the future, the number of pairs lost is 164, a 66 percent reduction. Reductions in pairs in the Klamath Mountains Province based on similar assumptions range from 12 percent to 16 percent of 600 pairs expected in the future on Federal lands, and from 14 percent to 19 percent of 435 pairs expected in the future on Federal lands in the Oregon Cascades West Province.

On a range-wide basis, reductions in the number of northern spotted owl pairs on Oregon Bureau of Land Management administered lands results in a total future expected population level less than that envisioned by the Interagency Scientific Committee. The Interagency Scientific Committee estimated the conservation strategy would provide at least 1,469 future expected owl pairs. The Bureau of Land Management's current approved plans may reduce this total by an estimated 17 percent (assuming Agreement Areas maintain 90 pairs) to 23 percent (assuming Agreement Areas maintain no owl pairs).

Criterion 4 - Provisions for Dispersal Habitat - The 13 exempted Bureau of Land Management sales wilt reduce existing dispersal habitat by 1,763 acres. If Bureau of Land Management follows current approved plans, approximately 50 percent of all Bureau of Land Management quarter-townships in western Oregon will likely fail to meet 50-11-40 standards within about 10 years. This assumes that the increase in number of quarter-townships not meeting the 50-11-40 standard would increase at a rate of 1 percent per year if the Bureau of Land Management's 1991 timber sale program, after consultation, is any indication of future actions (USDI 1991). It also assumes that because of 60-year harvest cycles, insignificant amounts of habitat will grow into a condition that meets 11-40 standards in the next 10 years.

Some dispersal habitat would be retained by means of other land allocations such as riparian zones, but in unknown amounts and distribution. Patches designated for protection as nesting, roosting, and foraging habitat would also aid dispersal. However, the Interagency Scientific Committee's Strategy determined that additional measures were required to increase the probability of movement of owls between Habitat Conservation Areas (Thomas et al. 1990:26). Recent analyses by the Bureau of Land Management for their Draft Resource Management Plans indicated that implementation of any management alternatives lacking such provisions would likely eventually result in most or all of the quarter-townships within the planning areas not meeting 50-11-40 standards as prescribed in the Interagency Scientific Committee's Strategy (USDI 1992a).

Adherence by the Bureau of Land Management to standards that would provide for levels of well distributed dispersal habitat equal to or superior to those of the Interagency Scientific Committee's Strategy becomes particularly critical and difficult to achieve where private and Federal lands are intermingled in a checkerboard pattern as previously discussed. Here, if there is no contribution to the 50-11-40 standards from private lands, strict compliance with the Interagency Scientific Committee's Strategy by the Bureau of Land Management would result in about 25 percent of the landscape providing dispersal habitat if it were all capable.
Private lands will likely contribute some dispersal habitat when stands on those lands exceed about 40 years of age. The amount of time such stands contribute significantly to dispersal habitat will depend on the stand age and condition and when harvested. This in turn will depend largely on conditions of the forest products markets. Because of concerns about risks to dispersing spotted owls in this type of landscape, the Interagency Scientific Committee called for a review of the effectiveness of the 50-11-40 rule in such areas after three years (i.e., by 1993).

Present forest conditions (i.e., pronounced and increasing fragmentation, lack of habitat, and intermingled, clearcut private lands) make it likely that there will be a rapid reduction of dispersal habitat under current approved plans for the Bureau of Land Management in Oregon. This seems likely to continue in the short term (1-50 years) even if consultation between Bureau of Land Management and Fish and Wildlife Service determines that logging of such habitat is likely to result in jeopardizing the continued existence of northern spotted owls. Significant additional losses of dispersal habitat due to catastrophic events will almost certainly occur, further contributing to poor conditions of dispersal habitat in the province. Short rotation ages (60 years) will restrict the future amounts of forests reaching conditions needed for successful dispersal.

Dispersal habitat for owls on lands administered by the Bureau of Land Management is crucial to enhancing movement of owls within and among habitats on National Forests in the Oregon Cascades West, Klamath Mountains, and Oregon Coast Range Provinces. Difficulty with dispersal of owls is likely to be pronounced between Habitat Conservation Areas O-19 and 0-20 if there are no requirements to provide adequate quantity, quality, and arrangement of dispersal habitat. Under the Bureau of Land Management's current approved plans, dispersal habitat will not be adequately and appropriately distributed. Further, habitat within the Agreement Areas will continue to deteriorate (USDI 1992a). As this occurs, spotted owls on National Forests in the Oregon Coast Range may well become increasingly demographically isolated. This will likely significantly increase the probability, but to an unknown extent, that spotted owls will be eventually extirpated within that province. Successful dispersal of juvenile owls between the Oregon Cascades West Province and the Klamath Mountains Province will also become increasingly unlikely.

Range-wide, all of these collective factors seem likely to significantly increase the risk of lowering the long-term viability of the metapopulation of northern spotted owls. How much of an increase is not precisely quantifiable.

Criterion 5 - Spacing Between Areas Designated for Spotted Owl Management - We do not expect most of the 109 Bureau of Land Management/Oregon Department of Fish and Wildlife Agreement Areas to support pairs of owls over the long term (50-100 years). Therefore, the responsibility of the Forest Service is increased under regulations pursuant to the National Forest Management Act to provide for viable populations of spotted owls well distributed in the planning areas (interpreted by the Scientific Analysis Team as National Forests within the range of the northern spotted owl). The Forest Service portions of the 13 Habitat Conservation Areas (Table 2-3) identified in the Interagency Scientific Committee's Strategy as being shared with Bureau of Land Management will support fewer pairs of spotted owls than listed in Table Q5 of the Interagency Scientific Committee's Strategy (Thomas et al. 1990:335). The loss of the Bureau of Land Management's contributions affects both the size and spacing of some Habitat Conservation Areas. In some cases Habitat Conservation Areas change from Category 1 Habitat Conservation Areas (capable of supporting 20 or more pairs of spotted owls) to Category Habitat Conservation Areas (capable of supporting 2-19 pairs). Loss of all or portions of Habitat Conservation Area affects criteria established by the Interagency Scientific Committee's Strategy for spacing between Habitat Conservation Areas. Category 1 Habitat Conservation Areas are to be no more than 12 miles apart. Distance between Category 2 Habitat Conservation Areas is to be a maximum of 7 miles.

A total of 10 shared (Forest Service and Bureau of Land Management) Habitat Conservation Areas will drop in habitat capability from Category I to Category 2. The average first, second, and third nearest neighbor distances between boundaries of Habitat Conservation Areas will also increase (Table 2-5). The most significant increase is in the Oregon Coast Range Province where only the first nearest neighbor Habitat Conservation Area is within the prescriptions of the Interagency Scientific Committee's Strategy for spacing. Here, six Habitat Conservation Areas changed in habitat capability from Category I to Category 2. These are in a north to south line. Because they are now Category 2 Habitat Conservation Areas, a separate nearest neighbor analysis was conducted. The average distance from these Category 2 Habitat Conservation Areas (previously Category 1 Habitat Conservation Areas) to the first, second, and third nearest neighbor Habitat Conservation Areas is 7.9, 19.7, and 26.8 miles respectively. These distances are above the maximum prescribed for Category 2 Habitat Conservation Areas in the Interagency Scientific Committee's Strategy. One of the goals of the Interagency Scientific Committee's Strategy was to have any one Habitat Conservation Area in close proximity (within spacing standards) to at least three other Habitat Conservation Areas. Because of ownership patterns and habitat conditions, it was not possible to fully meet that goal in the Interagency Scientific Committee's Strategy. Under the Bureau of Land Management 's current approved plans the connections will be further weakened.

Table 2-5 Average First, Second, and Third Nearest Neighbor Distances (In Miles) Between Boundaries of Category 1 and 2 Habitat Conservation Areas on National Forests and Lands Administered by the Bureau of Land Management by Physiographic Province (NN = Nearest Neighboring Habitat Conservation Area Within the Province).

		Physiographic Province		
		Oregon Cascade W.	OR Coast Range	Klamath Mtns.
Scenario	NN	Distance	Distance	Distance
Exemption/ ISC	1st	5.2	5.1	4.5
	2nd	8.5	9.3	7.2
	3rd	12.6	15.7	12.1
Current Approved Plans	1st	5.1	8.2	4.2
	2nd	9.1	19.6	7.8
	3rd	16.1	25.4	12.8

In addition to increased distances between Habitat Conservation Areas, Bureau of Land Management's current approved plans will affect areas identified as "critical links" (Thomas et al. 1990). These are areas where movements of spotted owls between physiographic provinces are most likely. The Interagency Scientific Committee's Strategy prescribed Habitat Conservation Areas to bridge these "gaps". The average distance between Habitat Conservation Areas across physiographic provinces in critical link areas increase 3 to 4 times under the Bureau of Land Management's current approved plans (see Table 2-6). The increased distances represent levels where successful movement of owls between physiographic provinces is increasingly unlikely.

Table 2-6 Average Distances (Miles) Between Boundaries of Habitat Conservation Areas Across Physiographic Province Boundaries in Areas Identified as "Critical Links". Percent Column Indicates Percent of Radio-Tagged Juveniles Known to Disperse at Least as Far as the Average Distance Between Habitat Conservation Areas.

Scenario	Critical Link	Distance	%
Exemption/	Oregon Coast to Western Oregon Cascade	17.4	50
ISC	Oregon Coast to Klamath	16.5	54
	Klamath to Western Oregon Cascade	6.9	74
Current	Oregon Coast to Western Oregon Cascade	56.4	2
Approved	Oregon Coast to Klamath	68.4	0
Plans	Klamath to Western Oregon Cascade	29.6	21

Criterion 6 - Patch Size of Habitat - Areas of contiguous habitat probably support a larger number of northern spotted owls than an equal amount of habitat distributed as small patches (USDA 1988, Anderson et al. 1990). Fragmentation of habitat blocks increases the ratio of edge habitat to interior habitat, resulting in a smaller amount of interior habitat overall (Thomas et al. 1990:293). A primary objective of identifying Habitat Conservation Areas was to provide large blocks of nesting, roosting, and foraging habitat, and to provide for areas which are expected to develop into superior owl habitat through time (Thomas et al. 1990:167). In this context, patch size is equated to Habitat Conservation Area size for a quantitative analysis. A management strategy which reduces Habitat Conservation Area size, however, must also be viewed in the light of acres of habitat removed from Habitat Conservation Areas.

Throughout the range of the northern spotted owl, Habitat Conservation Areas as described in the Interagency Scientific Committee's Strategy are comprised of mixed ownerships, including Federal, state, private, and tribal lands. The Scientific Analysis Team analysis focused on management of Federal lands as prescribed by the Interagency Scientific Committee's Strategy. Assuming that the Bureau of Land Management follows their current approved plans, the average size of Habitat Conservation Areas generally decreases within affected provinces due to the loss of the Bureau of Land Management 's portion of shared Habitat Conservation Areas (Table 2-7). An exception is the Oregon West Cascade Province where average Habitat Conservation Area size increases by 8,042 acres per Habitat Conservation Area because the eliminated Habitat Conservation Areas are smaller. However, it should be remembered that total Bureau of Land Management acreage designated as Habitat Conservation Areas decreased by 734,000 acres. The size of Habitat Conservation Areas in the Oregon Coast Range Province decreases by an average of 15,203 acres per Habitat Conservation Area (32 percent). Habitat Conservation Areas in the Klamath Mountains Province average a reduction of 4,554 acres per Habitat Conservation Area (5 percent). Smaller Habitat Conservation Areas reduce the probability of reaching the desired numbers of pairs (cluster size) within each Habitat Conservation Area, and hence, the population goal within each province.

Table 2-7 Number and Average Size of Habitat Conservation Areas Under the Two Scenarios Analyzed By Physiographic Province.

	Exemption/ISC		Current Approved Plans	
Province	No. of HCAs	Mean HCA Size (Ac.)	No. of HCAs	Mean HCA Size (Ac.)
Oregon Coast Range	12	47,917	7	32,714
Oregon Cascades West	18	74,333	16	82,375
Oregon Cascades East	6	22,167	6	22,167
Klamath Mtns.	43	44,279	40	42,100
CA Cascades/Modoc	12	21,283	12	21,283
No. CA Coast Range	31	7,435	31	7,435
WA Olympic Peninsula	1	676,000	1	676,000
WA Cascades West	22	67,727	22	67,727
WA Cascades East	13	39,000	12	39,000
Range wide:	127	55,975	117	39,905

Based on the loss or reduction of Habitat Conservation Areas within the affected provinces, average Habitat Conservation Area size would decrease from 55,975 to 39,905 acres range wide (Table 2-7). This reduction (29 percent) in average size of Habitat Conservation Areas would negatively affect the total number of owls on a range wide basis (clustering analysis criterion 7).

Criterion T - Clustering of Owl Pairs - Currently the Bureau of Land Management/Oregon Department of Fish and Wildlife Agreement Areas provide sufficient habitat to maintain pairs of owls individually or in small clusters. The majority (range = 91-100 percent) Agreement Areas currently provide clusters of one to four pairs of owls (Table 2-8). The sum column totals in Table 2-8 do not total 109 Agreement Areas because groups of two or more contiguous Agreement Areas were treated as one. In the long term, we assume the Bureau of Land Management/Oregon Department of Fish and Wildlife Agreement Areas will support considerably fewer or no pairs of owls (USDI 1992). Loss of territorial owl pairs from these areas is expected due to anticipated loss of quality, quantity, and distribution of suitable owl habitat within these designated areas. Lack of provisions for well distributed dispersal habitat on Bureau of Land Management administered lands would preclude or reduce effective dispersal and recolonization of Bureau of Land Management/Oregon Department of Fish and Wildlife Agreement Areas.

Table 2-8 Number of Bureau of Land Management/Oregon Department of Fish and Wildlife Agreement Areas by Cluster Size (Multiple Pairs of Owls).

	Physiographic Province					
	Klamath Mtns		OR Coast Range		OR Cascades W.	
Cluster size	Presently	AFEP[1]	Presently	AFEP	Presently	AFEP
0	0	20	0	22	0	17
I-4	20	0	20	0	16	0
5-9	0	0	2	0	1	0
Total:	20	20	22	22	17	17

[1]AFEP = Adjusted future expected pairs of owls, based on Thomas et al. 1990.

Table 2-8 illustrates that currently only 5 percent of the Agreement Areas are capable of supporting more than four pairs of spotted owls and that none are capable of supporting more than nine pairs. Table 2-8 further displays that, in the future, the Agreement Areas will likely provide few or no clusters of owls.

In addition to the assessment of Agreement Areas, our analysis for this criterion focused on the number of Habitat Conservation Areas and number of owl pairs within Habitat Conservation Areas. Of the three physiographic provinces affected by the Bureau of Land Management's current approved plans, the Oregon Coast Range shows the greatest expected reduction (42 percent) in the number of Habitat Conservation Areas (Table 2-9). Expected reductions in number of Habitat Conservation Areas of 22 percent and 5 percent occur within the Oregon Cascades West and Klamath Mountains Physiographic Provinces, respectively. As a result, there will likely be a resulting downward trend in the number of owl pairs within Habitat Conservation Areas and in each affected province.

Table 2-9 Comparison of the Number of Category 1 and 2 Habitat Conservation Areas Based on the Two Scenarios Analyzed by Physiographic Province.

Physiographic Province	Number of HCAs Exemption/ISC	Cur. Approv. Plns.	% Reduction
Oregon Coast Range	12	7	42
Oregon Cascades West	18	14	22
Oregon Cascades East	6	6	0
Klamath Mtns.	43	41	5
CA Cascades/Modoc	11	11	0
No. Calif. Coast Range	31	31	0
WA Olympic Peninsula	1	1	0
WA Cascades West	22	22	0
WA Cascades East	13	13	0
Range wide:	157	146	5

The number of adjusted future expected pairs of owls in Habitat Conservation Areas will be below the desired level of at least 20 pairs for the majority of Habitat Conservation Areas within two of the three affected provinces (Table 2-10). Of the affected provinces, the Oregon Coast Range would lose 9 of 10 Category 1 Habitat Conservation Areas prescribed by the Interagency Scientific Committee's Strategy and would have the lowest (8 percent) ratio Habitat Conservation Areas containing at least 20 pairs of owls. This represents a 90 percent reduction in Category 1 Habitat Conservation Areas for the Oregon Coast Range Province, which is an area of special concern (Thomas et al. 1990). Four Habitat Conservation Areas (27 percent) with clusters of pairs greater than 20 will be lost in the Klamath Mountains Province and six (35 percent) will be lost in the Oregon Cascades West Province.

Table 2-10 Comparison of Frequency Distribution of Habitat Conservation Areas and Bureau of Land Management/Oregon Department of Fish and Wildlife Agreement Areas Based on the Two Scenarios Analyzed by Cluster Size and Physiographic Province. (Cluster Size Represents the Number of Adjusted Future Expected Owl Pairs.)

	Physiographic Province[1]					
	OR Coast Range		OR Casc West		OR Casc East	
Cluster size	Exempt/ ISC	Current Approv Pins	Exempt/ ISC	Current Approv Pins	Exempt/ ISC	Current Approv Pins
0	0	5	0	3	0	0
1-4	0	2	0	1	5	5
5-9	1	1	0	0	0	0
10-14	0	0	1	1	0	0
15-19	1	3	0	2	0	0
20-24	7	1	12	9	1	1
25-29	3	0	4	1	0	0
30+	0	0	1	1	0	0
Total:	12	12	18	18	6	6
	Klamath Mtns		CA Casc/Modoc		CA Coast Range	
Cluster size	Exempt/ ISC	Current Approv Pins	Exempt/ ISC	Current Approv Pins	Exempt/ ISC	Current Approv Pins
0	8	11	4	4	7	7
1-4	11	12	6	6	7	7
5-9	1	1	0	0	2	2
10-14	2	2	1	1	0	0
15-19	6	6	0	0	0	0
20-24	12	8	0	0	1	1
25-29	1	1	0	0	0	0
30+	2	2	0	0	0	0
Unknown					14	14
Total:	43	43	11	11	31	31
	WA Oly Pen		WA Casc West		WA Casc East	
Cluster size	Exempt/ ISC	Current Approv Pins	Exempt/ ISC	Current Approv Pins	Exempt/ ISC	Current Approv Pins
0	0	0	0	0	0	0
1-4	0	0	10	10	9	9
5-9	0	0	3	3	1	1
10-14	0	0	2	2	1	1
15-19	0	0	1	1	0	0
20-24	0	0	3	3	2	2
25-29	0	0	2	2	0	0
30+	1	1	1	1	0	0
Total:	1	1	22	22	13	13

Table 2-10 (continued) Comparison of Frequency Distribution of Habitat Conservation Areas and Bureau of Land Management/Oregon Department of Fish and Wildlife Agreement Areas Based on the Two Scenarios Analyzed by Cluster Size and Physiographic Province. (Cluster Size Represents the Number of Adjusted Future Expected Owl Pairs.)

	Range-wide	
Cluster size	Exempt/ ISC	Current Approv Pins
0	23	34
I-4	73	77
5-9	12	12
10-14	11	11
15-19	9	13
20-24	43	30
25-29	12	6
30+	6	6
Unknown	14	14
Total:	203	203

[1]Provinces: WA 013, Penn. = Washington Olympic Peninsula; WA Case West = Washington Cascades West; WA Case East = Washington Cascades East; OR Coast Range = Oregon Coast Range; OR Case West = Oregon Cascades West; OR Case East - Oregon Cascades East; CA Casc/Modoc = California Cascades/Modoc; and CA Coast Range = Northern California Coast Range.

Range wide, Bureau of Land Management 's current approved plans will decrease the number of Habitat Conservation Areas on Federal lands by 7 percent (11 of 157 Habitat Conservation Areas)(Table 2-9). Approximately 21 percent (42 of 203) of Habitat Conservation would retain 20 or more adjusted future expected pairs of owls under the Bureau of Land Management 's currently approved plans, compared to 30 percent (61 of 203) under the Interagency Scientific Committee's Strategy (Table 2-10). In addition, I1 Habitat Conservation Areas will decrease to a size where zero future adjusted pairs of owls are expected. This is a 41 percent increase in the number of such Habitat Conservation Areas. An expectation of zero future adjusted pairs occurs when the amounts and arrangement of habitat are not expected to maintain a pair of owls consistently each year.

The effects of Bureau of Land Management's current approved plans on the numbers and size of dusters prescribed by the Interagency Scientific Committee's Strategy significantly reduce the strategy's overall expected future populations. Range wide reductions in future pairs ranging from 14 percent to 19 percent (246-336) from the numbers of pairs described by the Interagency Scientific Committee's Strategy will result from Bureau of Land Management following their current approved plans.

Smaller clusters also create conditions that make occupancy by spotted owls of the remaining clusters (i.e., Habitat Conservation Areas) less certain. Empirical data and modeling indicate that local extinction rates increase as the size of population clusters decreases (Thomas et M. 1990). Therefore, the prorated shares of spotted owl pairs expected in Habitat Conservation Areas formerly shared between the Bureau of Land Management and Forest Service may not. be attainable. This situation would then be further exacerbated by reduced probabilities for successful dispersal.

SUMMARY AND CONCLUSIONS

The Scientific Analysis Team analyzed implications of exempting 13 Bureau of Land Management timber sales from requirements of the Endangered Species Act. Specifically, we analyzed changes to viability assessments for alternatives in the Forest Service's Final Environmental Impact Statement from two perspectives. First, an exemption of the 13 sales represented as a one-time action followed by the Bureau of Land Management implementing the Interagency Scientific Committee's Strategy (i.e., the Exemption/Interagency Scientific Committee scenario). Second, following exemption of the 13 sales, the Bureau of Land Management continuing to follow their currently approved plan (i.e., the Current Approved Plan scenario).

The effects on viability ratings of the Forest Service Final Environmental Impact Statement differed by management scenario considered for the Bureau of Land Management. Of the seven vibility criteria assessed, the 13 timber sales when viewed as a one-time action only affected one criterion (criterion 4 - provisions for dispersal habitat). While exemption of the timber sales worsens the problem of providing for dispersal habitat in landscape of checkerboard ownership, the sales removed a small total area (1,763 acres) of dispersal habitat and affected few (17 of 317 quarter-townships). Although impacts to dispersal habitat were relatively localized and occurred within an area of concern, the Scientific Analysis Team concluded that exemption of 13 Bureau of Land Management timber sales by the Endangered Species Act would not change the ratings of viability presented for alternatives in the Final Environmental Impact Statement. No mitigation measures were proposed.

In contrast, the Scientific Analysis Team concluded that such an exemption followed by implementation of the Bureau of Land Management 's currently approved plans significantly affected all seven viability criteria. An increase in the risk to the viability of northern spotted owls was attributed to the following, compared to Interagency Scientific Committee: 1) potential change in the amount (51 percent reduction) and distribution (loss of effective habitat areas over the long term) of habitat; 2) loss of owl pairs (17-23 percent reduction); 3) loss dispersal habitat (failure to meet 50-11-40 standards within 10 years); 4) increased distances between Habitat Conservation Areas (exceeding 7 and 12 mile maximum distances between category 2 and category 1 Habitat Conservation Areas, respectively); 5) changes in size Habitat Conservation Areas (29 percent reduction in average size); and 6) number of Habitat Conservation Areas (7 percent reduction). Independently and collectively, these factors fail achieve desired population levels set by the Interagency Scientific Committee. Consequently the Scientific Analysis Team believes a reassessment of viability ratings for alternatives in the Final Environmental Impact Statement and mitigation options are warranted.

REASSESSMENT OF VIABILITY RATINGS FOR EACH OF THE FINAL ENVIRONMENTAL IMPACT STATEMENT ALTERNATIVES

Contributions of lands administered by the Bureau of Land Management to northern spotted owl habitat, based on the two scenarios analyzed, affect each of the five alternatives in the Final Environmental Impact Statement. The effects on each scenario vary. Discussions of each alternative and the effects to the viability assessments associated with each scenario are affected are described below. For this reassessment the Scientific Analysis Team used a five-scale rating system, instead of the three used in the Final Environmental Impact Statement, because of differences between alternatives that warranted distinction. The ratings for this analysis follow.

HIGH - There is a high likelihood that the population(s) of the species would stabilize on National Forests within the range of the northern spotted owl. This provides broad latitude for natural catastrophes and uncertainties in knowledge. The likelihood of widespread or complete extirpation is low.

MEDIUM HIGH - There is a moderately high likelihood, somewhat better than 50/50, that the populations of the species would stabilize on National Forests within the range of the northern spotted owl. This provides limited latitude for natural catastrophes and uncertainties in knowledge. There is less than a 50/50 likelihood of widespread or complete extirpation.

MEDIUM - There is a roughly 50/50 likelihood that the population would stabilize, and a similar likelihood of widespread or complete extirpation. This provides extremely limited latitude for natural catastrophes and uncertainties in knowledge.

MEDIUM LOW - There is less than a 50/50 likelihood that the population would stabilize, and a greater than 50/50 likelihood of widespread or complete extirpation. There is no latitude for natural catastrophes and uncertainties in knowledge.

LOW - It is highly unlikely that the species' populations would stabilize, and there is high likelihood of widespread or complete extirpation. There is no latitude for natural catastrophes and uncertainties in knowledge.

Assessments of viability ratings are presented for each alternative rather than each evaluation criterion in a manner identical to analyses completed for the Final Environmental Impact Statement. Inter-relationships among all criteria were considered collectively when assessing population viability.

Alternative A of the Final Environmental Impact Statement

Alternative A of the Final Environmental Impact Statement provides spotted owl habitat by using a network of habitat areas where nesting, roosting, and foraging habitat capable of supporting single pairs of spotted owls would be protected. No provisions are made for dispersal habitat. This strategy was evaluated by the Interagency Scientific Committee and described as having a high risk of spotted owls being extirpated from significant portions of their range. The viability assessment reported in the Final Environmental Impact Statement likewise rated Alternative A of the Final Environmental Impact Statement as having a low likelihood of population viability. Neither analysis scenario (Exemption/Interagency Scientific Committee or Current Approved Plans), has an effect upon this rating. The rating remains low.

Alternative B of the Final Environmental Impact Statement

Alternative B of the Final Environmental Impact Statement is the Interagency Scientific Committee's Conservation Strategy which uses multiple pair Habitat Conservation Areas to provide nesting, roosting, and foraging habitat, and the 50-11-40 rule to provide well distributed dispersal habitat of adequate quality. Since this strategy was developed to include National Parks, National Forests, and lands administered by the Bureau of Land Management, deviations from its standards and guidelines affect the probability of success. Such a deviation would be the exemption of the 13 Bureau of Land Management sales, which conflicts with dispersal habitat guidelines. The magnitude of the effects on overall viability depends on the analysis scenario.

Scenario 1 - Exemption/Interagency Scientific Committee. Under Alternative B of the Final Environmental Impact Statement, this scenario affects only expectations of the Interagency Scientific Committee concerning well distributed dispersal habitat. It results in the removal of 1,763 acres of habitat used for dispersal by spotted owls. This represents about 0.17 percent of the nesting, roosting, and foraging habitat, on lands administered by the Bureau of Land Management in Oregon, which are also important to owls for dispersal. Additional, but unknown, acreages of forest stands used by owls only for dispersal and limited foraging exist. Considering only suitable spotted owl habitat on all involved Federal ownerships within the range of the northern spotted owl, the 13 exempted sales total less than 0.02 percent of such habitat. If, as we assumed for this scenario, the Bureau of Land Management provides for well distributed dispersal habitat similar to the standards of the Interagency Scientific Committee's Strategy, the loss of suitable habitat, which also provides dispersal habitat, can be considered minor and relatively insignificant. Therefore, the overall effect of the exemption of these 13 sales, standing alone, would have negligible effects on the "high" viability rating assigned to Alternative B in the Final Environmental Impact Statement.

Scenario 2 - Current Approved Plans. Under Alternative B of the Final Environmental Impact Statement effects are significant and likely consequences result in serious weakening of the Interagency Scientific Committee's Strategy. Increased isolation of the owl population in the Oregon Coast Range Province would occur. Instead of a future subpopulation level of about 250 pairs in 50 years as anticipated under the Interagency Scientific Committee's Strategy, about 86 pairs could be anticipated in 50 years. These pairs will occur in two separate geographical areas. This small number of pairs in isolated subpopulations would be susceptible to diminution by catastrophic and demographic events that could greatly increase the likelihood of low viability or even eventual extirpation in this province.

There likely will be a decrease in the rate of successful dispersal of spotted owls between the Klamath Mountains and Oregon Cascades West Provinces, with a high and increasing probability of producing relatively isolated subpopulations of spotted owls in these provinces. The Bureau of Land Management 's current approved plans are anticipated to result in a subpopulation of about 460 owl pairs in the Klamath Mountains and other physiographic provinces of California that provide habitat for northern spotted owls, instead of approximately 550 pairs anticipated under the Interagency Scientific Committee's Strategy. Slightly more than 350 pairs are expected in the Oregon Cascades East and West Provinces compared to 436 pairs expected under the interagency Scientific Committee's Strategy.

There will be an increased likelihood that Category 1 Habitat Conservation Areas, which are reduced from 20 plus pair areas, to smaller Category 2 Habitat Conservation Areas will fail to actually support the number of pairs anticipated.

The combined effects would lower the overall viability rating for Alternative B in the Final Environmental Impact Statement from "high" to "medium low" (Table 2-11) with a "high" probability of extirpation of the Oregon Coast Range population over the long term.

Alternative C of the Final Environmental Impact Statement

Alternative C in the Final Environmental impact Statement is comprised of the components of the Interagency Scientific Committee's Strategy and further applies Habitat Conservation Area standards and guidelines to Critical Habitat Units which are areas of habitat on Federal land, designated by the Fish and Wildlife Service under provisions of the Endangered Species Act. In Alternative C of the Final Environmental Impact Statement, the Critical Habitat Units are to b managed according to the standards and guidelines for Habitat Conservation Areas. Alternative C of the Final Environmental Impact Statement was rated as having a "high" likelihood of providing for viable populations.

Scenario 1 - Exemption/Interagency Scientific Committee- As in Alternative B of the Final Environmental Impact Statement, this scenario will not change the viability rating of "high" described for Alternative C of the Final Environmental Impact Statement but local reductions in successful dispersal by spotted owls would likely occur.

Scenario 2 - Current Approved Plans - The addition of large blocks of habitat in designated Critical Habitat Units to the Habitat Conservation Area network has several beneficial effects that tend to alleviate the negative effects of this scenario. They include:

1. Reduction of the loss of habitat by designating more acreage to the Habitat Conservation Areas. Approximately 800,000 acres on National Forests in Oregon in the three affected physiographic provinces would be added, thereby increasing the Habitat Conservation Area network.

2. Increased numbers of pairs of spotted owls expected, in the long term, on National Forests by 18 percent over Alternative B of the Final Environmental Impact Statement.

3. Increased patch sizes designated for protection and, thereby, increasing the number of clusters of 20 or more owl pairs from 34 such clusters in Alternative B of the Final Environmental Impact Statement to 40 such clusters under Alternative C of the Final Environmental Impact Statement.

4. Reduction of distances between Habitat Conservation Areas to facilitate movement of owls between Habitat Conservation Areas. This is particularly called for in the Oregon Coast Range Province where first nearest neighbor distances decrease by 82 percent and second neighbor distances decrease by 65 percent. Values in the Oregon Cascades West Province are -49 percent and -37 percent respectively. Spacing in the Klamath Mountains Province remains essentially unchanged.

5. Increased distribution of spotted owl habitat to be protected in designated areas. The Critical Habitat Units will create greater redundancy in the network, that is more habitat over more of the landscape, which is an important hedge against catastrophic loss of habitat.

In spite of the benefits discussed above, the spotted owl population in the Oregon Coast Range would still become increasingly isolated. This isolated population would be expected to be larger than under Alternative B of the Final Environmental Impact Statement, up to 122 pairs (a 42 percent increase), but it would still be in two separate geographic areas. Additionally, some of the Habitat Conservation Areas that would be reduced from Category 1 to Category 2 size status would not be adjacent to Critical Habitat Units and would remain small. This scenario makes it increasingly likely that the Forest Service could not, over the long term, meet National Forest Management Act regulations for maintaining a viable population of owls well distributed within the planning area.

Based on the above assessment, the Scientific Analysis Team believes the viability rating of Alternative C of the Final Environmental Impact Statement will be "medium" for overall viability of the northern spotted owl (Table 2-11).

Alternative D of the Final Environmental Impact Statement

Alternative D of the Final Environmental Impact Statement entails applying standards and guidelines of the Interagency Scientific Committee's Strategy plus all remaining nesting, roosting, and foraging habitat. It provides the benefits ascribed to Alternative C of the Final Environmental Impact Statement above, but to a greater area. A larger population of owls (136 pairs compared to 122 in Alternative C of the Final Environmental Impact Statement) would be expected for the Oregon Coast Range Province Habitat Conservation Areas on National Forests. Here again, isolation of the province would be of concern, although the larger population would be somewhat less susceptible to extirpation from stochastic events over a given timeframe than compared to Alternative C of the Final Environmental Impact Statement.

Scenario 1 - Exemption/Interagency Scientific Committee - As explained in the assessment of Alternative B of the Final Environmental Impact Statement, this scenario would not change the viability rating of "high" described in Alternative D of the Final Environmental Impact Statement (Table 2-11).

Scenario 2 - Current Approved Plans - The "high" viability rating assigned to Alternative D of the Final Environmental Impact Statement will drop to a "medium-high" rating (Table 2-11) because of the likely isolation of the population of spotted owls in the Oregon Coast Range. Simply protecting all existing nesting, roosting, and foraging habitat between the Habitat Conservation Areas and perhaps gaining I2 pairs, as in this alternative compared to Alternative C, would not result in future habitat conditions conducive to reducing risks to such a subpopulation. This alternative, by not providing for reductions of fragmentation in the areas between Habitat Conservation Areas, will cause the nesting, roosting, and foraging habitat patches to be less effective in supporting reproduction pairs of spotted owls through time. A strategy that provides for the maximum number of pairs possible by allowing forested lands, with the potential to do so, to grow back into nesting, roosting, and foraging habitat would increase the rating.

Alternative E of the Final Environmental Impact Statement

Alternative E of the Final Environmental Impact Statement, titled the "Multi-resource Strategy", incorporates certain elements of Alternative B of the Final Environmental Impact Statement (the Interagency Scientific Committee's Strategy). However, it decreases the size and number of Habitat Conservation Areas, thereby increasing distances between them. It further reduces provisions for dispersal by reducing the area where dispersal habitat is provided, and also reduces the standards compared to the 50-11-40 rule. The Final Environmental Impact Statement reported that this alternative had a "low" likelihood of providing for population viability. The likelihood of maintaining viability is further reduced under Alternative E of the Final Environmental Impact Statement by the increasing isolation of the Coast Range population and reduction of the number of future expected owl pairs. However, "low" is the lowest rating assigned under the rating scheme used. The rating assigned by the Scientific Analysis Team to Alternative E of the Final Environmental Impact Statement, therefore, remains at "low" for both scenarios analyzed in this chapter (Exemption/Interagency Scientific Committee and Current Approved Plans).

Table 2-11 summarizes the effects of the analysis scenarios on viability ratings of northern spotted owls on National Forests for the five alternatives of the Final Environmental Impact Statement.

Table 2-11 Viability Ratings of the Alternatives of the Final Environmental Impact Statement Based on Assumptions of the Final Environmental Impact Statement Compared to Ratings for the Analysis Scenarios.

FEIS Alternative	FEIS Viability Rating	Revised Viability Rating for Exemption/ ISC	Revised Viability Rating for Current Approved BLM Plans
A	LOW	LOW	LOW
B	HIGH	HIGH	MEDIUM LOW
C	HIGH	HIGH	MEDIUM
D	HIGH	HIGH	MEDIUM HIGH
E	LOW	LOW	LOW

RECOMMENDED MITIGATION OPTIONS

Recommended mitigation options are offered as a means of at least partially offsetting the effects of each analysis scenario.

Scenario 1 - Exemption/Interagency Scientific Committee

The Scientific Analysis Team offers no mitigation options for this management scenario because we determined that there would he very minor effects on dispersal habitat. Subsequently there is no change to the viability ratings of alternatives in the Final Environmental Impact Statement resulting from an exemption of 13 Bureau of Land Management timber sales when considered as a one-time action followed by the Bureau of Land Management managing habitat at least equal to the levels provided under the interagency Scientific Committee's Strategy.

Scenario 2 - Current Approved Plans

The exemption of the 13 Bureau of Land Management timber sales, when considered part of the Bureau of Land Management 's current approved plans, require considerable mitigation. The three alternatives of the Forest Service Final Environmental Impact Statement that received "high" ratings in the analysis drop below a rating of "high" (Table 2-11). The other two alternatives which were rated low remain "low" (Table 2-11). Alternative B, the selected alternative in the Final Environmental Impact Statement, is rated under this scenario as having "medium-low" probability (Table 2-11) of providing for viable populations of northern spotted owls.

A letter from the Deputy Chief of the Forest Service, James Overbay (See Appendix 2-A), provided instructions for this analysis. These instructions said that, if the exempted Bureau of Land Management sales were determined by the Scientific Analysis Team to reduce the viability rating of the Final Environmental Impact Statement selected alternative, appropriate mitigation options were to be developed and recommended to the Final Environmental Impact Statement team. The Final Environmental Impact Statement team would revise the Final Environmental Impact Statement as necessary. Recommendations designed to mitigate the effects of the Bureau of Land Management's current approved plans over the long term on Alternative B of the Final Environmental Impact Statement and thus return it to conditions warranting a "high" viability rating, are discussed below. Since both Alternatives C and D of the Final Environmental Impact Statement incorporated all the management elements of Alternative B of the Final Environmental impact Statement, the recommended mitigation measures below, if adopted, will also result in "high" ratings for these alternatives.

Table 2-12 lists brief summaries of the effects of Bureau of Land Management 's current approved plans and mitigation options on National Forests. The options are discussed in greater detail following the table. Site specific mitigation recommendations are delineated on the map in Appendix 2-B.

Table 2-12 Effects of the Bureau of Land Management's Current Approved Plans in Oregon on Alternative B of the Final Environmental Impact Statement (the Selected Alternative) and Recommended Mitigation Options.

Effects	Recommended Mitigation
Reduced nesting, roosting, and foraging habitat in designated areas (i.e., HCAs).	Increase numbers or sizes of HCAs on National Forests in Oregon.
Reduced distribution of nesting, roosting, and foraging habitat.	Partially mitigated by increasing numbers or sizes of HCAs on National Forests in Oregon.
Reduced capability to support term.	Increases numbers or sizes of HCAs on National Forests in Oregon.
Reductions in well distributed dispersal habitat.	Reduce distances between HCAs by increasing numbers or sizes of HCAs on National Forests in Oregon or strengthen standards for providing well distributed dispersal habitat.
Increased spacing between HCAs.	Increase numbers or sizes of HCAs On National Forests in Oregon.
Decreased size of habitat patches protected in the long term.	Increase sizes of HCAs On National Forests in Oregon.
Decreased numbers and size of areas for multiple pairs of spotted owls (clusters).	Increase numbers and sizes of HCAs on National Forests in Oregon.
Increased isolation of the Oregon Coast Range Physiographic Province subpopulation of spotted owls.	Partially mitigated by increasing protection of habitat on National Forests in Oregon to allow for maximum numbers of spotted owls in the future to reduce risks of local extirpation.

Options to mitigate for the lower viability ratings resulting from the effects of Bureau of Land Management following their current management plans are limited. Increasing the levels of reserves (i.e., Habitat Conservation Areas) for spotted owl management on National Forest System lands seems to be the only means of compensation or mitigations within Forest Service control. Compensation for the loss of Habitat Conservation Areas on lands administered by the Bureau of Land Management or loss of portions of shared Bureau of Land Management/Forest Service Habitat Conservation Areas can only be partially achieved by increasing the size and numbers of Habitat Conservation Areas on National Forests. This means the population will be distributed much differently than envisioned by the Interagency Scientific Committee with concentrations on National Forests. Additions or expansion of Habitat Conservation Areas on National Forests also partially compensate for increased spacing, loss of habitat patch size,

decreases in cluster size, and reduced future expected populations, which result when comparing the Bureau of Land Management 's current approved plans to that envisioned by the Interagency Scientific Committee.

It is also clear that loss of well distributed dispersal habitat on lands administered by the Bureau of Land Management between the Oregon Coast Range and the other physiographic provinces in Oregon can be only partially compensated for by altered management on National Forests. Increasing numbers and sizes of the Habitat Conservation Areas will improve probabilities of successful dispersal between and among Habitat Conservation Areas. However, probabilities of successful movements of owls among the Oregon Coast Range, the Klamath Mountains, and Oregon Cascades West Physiographic Provinces will be lower than if the Bureau of Land Management complied with the Interagency Scientific Committee's Strategy. High probabilities of successful movement of owls are possible only if lands administered by the Bureau of Land Management provide habitat to support for movement among these provinces.

Another option for improving the likelihood of successful dispersal among and between Habitat Conservation Areas included strengthening standards of the Interagency Scientific Committee's strategy for well distributed habitat by increasing the requirements of the 50-11-40 rule on National Forests. The percentage of the quarter-township required to meet dispersal habitat criteria could be increased upward from 50 percent. The standards for average diameter and canopy closure could likewise be increased. This would tend to move the characteristics of dispersal habitat toward the attributes of nesting, roosting, and foraging habitat and afford dispersing spotted owls greater security from predation as well as increased opportunities for catching prey, thereby increasing odds of successful dispersal. The Scientific Analysis Team has not recommended this option as mitigation to increase amounts of habitat, patch size, and clusters which generally reduce spacing to distances that would enhance the probabilities of successful dispersal.

Loss of Habitat Conservation Areas on Oregon Bureau of Land Management administered lands, which bridge the gaps outside National Forests in the physiographic provinces of Oregon, are impossible to replace. Isolation of the Oregon Coast Range was judged to become increasingly likely if the Bureau of Land Management follows their current approved plans and the suggested mitigation measures are not implemented on the National Forests. We therefore recommended, as a hedge against extirpation, that the Siuslaw National Forest be managed to increase the future population of spotted owls to the maximum extent possible. Such an increased population but increasingly isolated would then have a higher probability of surviving over a long period of time (100 years) and eventually interacting with other populations. See the discussion in Thomas et al. (1990) for a discussion of a similar solution for retaining a demographically isolated population of spotted owls by the Olympic Peninsula.

The subpopulation of owls in the Oregon Coast Range Physiographic Province is disjunct. Here, a mixture of landownerships are intermingled with Federal lands within boundaries of National Forests. This factor combined with low densities of spotted owls precludes assigning a "high" viability rating for spotted owls in this subpopulation of spotted owls in this province alone if the Bureau of Land Management follows their current approved plans. In contrast, a subpopulation of owls on the Olympic Peninsula is similarly geographically isolated, but there the Interagency Scientific Committee concluded a "moderate" rating of viability was possible for the owl population there. This rating was attributed to provisions for a very large, contiguous Habitat Conservation Area which provided for a large number of multiple pairs of owls that had a high probability of interacting.

To further compensate for isolation risks, additional Habitat Conservation Areas should be designated on the northern and southern ends of the Umpqua National Forest and the northern end and western edge of the Siskiyou National Forest. Existing Habitat Conservation Areas on the Rogue River National Forest in the vicinity of the I-5 Corridor (an area of concern) (Thomas et al. 1990) should be increased in size. These increases should improve the likelihood of successful movement of owls among the Oregon Coast Range, Klamath Mountains, and Oregon Cascades West Physiographic Provinces.

Table 2-13 provides a summary of the viability ratings for Alternatives of the Final Environmental Impact Statement assuming Bureau of Land Management follows their current approved plans, and the rating if the National Forest mitigation measures discussed above and included on the map in Appendix 2-B are implemented. A discussion and rationale for each recommended addition to the network is presented in Appendix 2-C.

Table 2-13 Viability Ratings of the Alternatives of the Final Environmental Impact Statement Based on Currently Approved Plans of the Bureau of Land Management Compared to Viability Ratings if Mitigation Recommendations are Implemented.

FEIS Alternative	Viability Rating-BLM Current Approved Plans	Viability Rating-If Mitigation Implemented
A	LOW	No mitigation was offered as this alternative would not retain its identity if mitigated to attain a high rating.
B	MEDIUM LOW	HIGH
C	MEDIUM	HIGH
D	MEDIUM HIGH	HIGH
E	LOW	No mitigation was offered as this alternative would not retain its identity if mitigated to attain a high rating.

Summary - Once the Scientific Analysis Team's assessment of the 13 exempted timber sales under the two scenarios (Exemption/Interagency Scientific Committee and Current Approved Plans) identified an increased risk to the viability of spotted owls, our instructions directed us To provide recommendations that would mitigate for that risk. We have explored the options of management actions that could be accomplished by the Forest Service and found them to be limited. We believe, however, that our recommendations for mitigation if implemented will result in an overall viability rating of "high" for the northern spotted owl.

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Appendix 2-A

Instructions for the Scientific Analysis Team

United States Department of Agriculture	**Forest Service**	**Washington Office**	**14th & Independence SW P.O. Box 96090 Washington, DC 20090-6090**

Reply to: 2630/1950 **Date:** July 30, 1992

Subject: Scientific Team for Northern Spotted Owl

To: Deputy Chiefs, National Forest System and Research
Regional Foresters, Regions 5 and 6
Station Directors, Pacific Northwest and Pacific Southwest

On July 21 Judge Dwyer ordered the Forest Service to submit to the court a schedule for completion of a new or supplemental EIS to remedy the NEPA deficiencies he found in his May 28 order. Deputy Chief Jim Overbay has signed a declaration stating that the Forest Service will need at least 24 months to comply with his order. It is not known whether the Judge will accept this timeline or not. The Department of Justice has filed a notice of appeal of Judge Dwyer's decision with the Ninth Circuit Court of Appeals.

Before any work on an EIS can begin, a scientific review of the points ordered by Judge Dywer must be conducted. I am assigning Dr. Jack Ward Thomas to lead a team of scientists to accomplish this task. Dr. Thomas will be assisted by Staff Assistant Jerry Hutchins. The purpose of this team will be to address the points of noncompliance with NEPA found by Judge Dwyer in the final environmental impact statement for Management of the Northern Spotted Owls on National Forest Lands. The team will also provide an assessment of management actions needed to resolve the noncompliance problems.

Specifically, the team is to:

1. Determine if the decision by the Endangered Species committee to allow 13 timber sales proposed by the BLM causes a change in the viability rating assigned to each alternative in the final EIS. If there would be a change in the rating, the team will determine what the change should be. A precise set of assumptions will be provided to the team from the Washington Office.

2. Determine if the assessment of owl populations prepared by Andersen/Burnham, or any other information on spotted owls that was not examined in the final EIS, require adjustments to maintain a high viability rating. If such adjustments are deemed necessary, they should be identified for the selected conservation strategy.

3. Determine if the northern spotted owl conservation strategy will result in the extirpation of any of the 32 species identified in the Judge's order and develop an analysis of the effect of the conservation strategy on these species.

Dr. Thomas has suggested the following people be assigned to the team:

Grant Gunderson, R6
Bruce Marcot, PNW
Martin Raphael, PNW
Eric Forsman, PNW
David Solis, R5
Dick Holthausen, WO

I ask that you make these personnel available for this task. If there are significant difficulties with this assignment, please work with Dr. Thomas to identify alternates. The team leader may request additional personnel to assist with the work of the team. This will be coordinated by Jerry Hutchins with the appropriate line officers. Also, the team leader is authorized to approve work schedules, overtime, and travel within the United States. The team leader may utilize technical experts from outside the Forest Service and pay for such services and associated costs. The Washington Office spotted owl team will provide coordination in the WO.

This is a high priority project and I request the support of the Regional Foresters and Station Directors. Because of on-going litigation, it is very important that confidentiality of this effort be maintained. This is not the start of a NEPA process, but rather an in-house review of the Judge's order in regards to the adopted conservation strategy.

/s/ George M. Leonard

F. DALE ROBERTSON
Chief

United States Department of Agriculture | **Forest Service** | **Washington Office** | **14th & Independence SW P.O. Box 96090 Washington, DC 20090-6090**

Reply to: 19S0/2630 **Date:** Aug 28, 1992

Subject: Instructions for the Scientific Analysis Team

To: Dr. Jack Ward Thomas, Team Leader

On July 30 the Chief established a scientific analysis team to review the deficiencies noted by Judge Dwyer in the enivornmental impact statement and record of decision for management of the northern spotted owl. In that 1outer three specific tasks were identified for the team to accomplish. After the meeting on August 14, and after receipt of the Judge's August 17 order, we agreed to provide a more specific set of guidelines for use by the team.

Enclosed is a copy of those guidelines. If further clarification is needed, please work with Jerry Hutchins to coordinate that with the WO owl team. Also, attorneys from OGC will be available for consultation during the process.

Thank you for taking on this task. It is an important one and your cooperation and support is appreciated.

JAMES C. OVERBAY
Deputy Chief

cc : Jerry Hutchins
Mary Coulombe
OGC-WO

GUIDELINES FOR THE SCIENTIFIC ANALYSIS TEAM
FOR THE NORTHERN SPOTTED OWL

BACKGROUND

A scientific analysis team has been formed to conduct selected technical analyses associated with the environmental impact statement (EIS) for the northern spotted owl (NSO) (Leonard, 2630/1950, 7/30/92). The analyses needed to meet Judge Dwyer's rulings of May 28, July 2, July 21 and August 17. The specific analyses include:

1. Determine if the decisions by the Endangered Species Committee to allow 13 Bureau of Land Management (BLM) timber sales changes the viability ratings assigned to alternatives in the EIS.

2. Determine if the information developed by Anderson and Burnham on owl populations (or any other "new information" considered by the scientific team to be authoritative and scientifically credible) would change the spotted owl population viability ratings in the EIS.

3. Determine how implementation of the selected NSO management strategy is likely to affect the viability of 32 old growth-related species identified in the EIS as associated with NSO habitats.

GUIDELINES

The scientific team is to conduct selected technical analyses and provide scientific interpretations. They should not be burdened with making legal, administrative, or political interpretations. The scientific team shall examine the effects of the three analyses on the viability ratings for all alternatives. For the purposes of their analyses and interpretations, the scientific team shall be guided by the following:

1. BLM timber sales

A. Revised viability assessments should incorporate the same assumptions as used in the EIS with two exceptions:

1. incorporate the fact that 13 timber sales (1700 acres) are exempted from Section 7 of the Endangered Species Act (ESA). The Endangered Species Committee required the BLM to comply with the Recovery Plan if the 13 sales are cut. Because the Recovery Plan is only in draft, the team should not consider this at this time.

2. assume that all other activities of Federal agencies will comply with Section 7 requirements regarding protection of critical habitat.

B. For analyses and/or constraints consider only approved agency plans and existing regulations.

C. The impacts of the BLM sales should be analyzed and interpreted in the context of influence on viability within physiographic provinces and range-wide viability.

D. Clearly display assumptions used in analyses and discuss sources and implications of uncertainty.

E. If the BLM sales are determined to reduce the viability rating for the selected alternative (Forest Service conservation strategy), recommend appropriate mitigating options to the EIS team.

2. Anderson-Burnham report

A. Accept Anderson-Burnham draft report(s) as new information that must be technically considered.

B. Determine and discuss how Anderson-Burnham data should and should not be used to modify the viability ratings in the EZS.

C. If considerations of Anderson-Burnham indicate need for modifying viability ratings for the alternatives, conduct appropriate viability analyses and propose mitigating options to the EIS team.

D. Items A, B, and C should represent a "reasoned discussion and response..." (Dwyer, 5/28/92, p. 17).

3. Viability of other old growth species associated with NSO habitat

A. Determine if implementation of any of the alternatives would cause the extirpation/extinction of other native vertebrate species identified in the EYS as associated with old growth NSO habitat.

B. In estimating influences on other old growth species, the team is not expected to conduct a formal viability assessment for every species (Dwyer, 7/2/92, p. 9).

C. "Common sense and expert judgement..." can be used (Dwyer), but the process used for establishing viability ratings needs to be explicitly displayed and discussed.

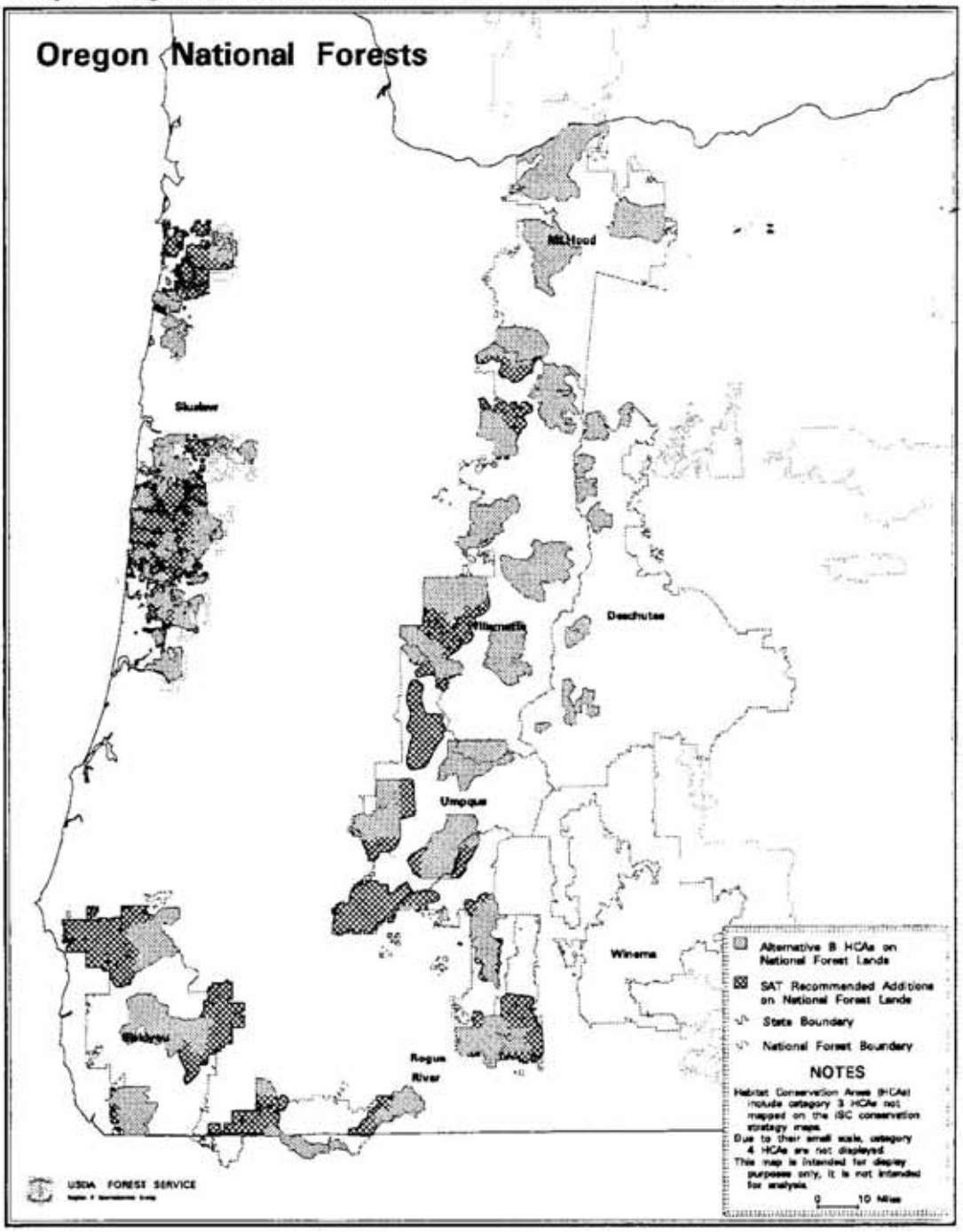
D. If analyses indicate low viability ratings, as a result of proposed Forest Service actions, for other old growth species, the scientific team should propose appropriate mitigating options to the EIS team.

Appendix 2-B

Map of Mitigation Recommendations

Appendix 2-B

Map of Mitigation Recommendations if BLM Continues With Current Approved Plans



Appendix 2-C

Rationale for Recommended Mitigation Options

Appendix 2-C
Rationale for Recommended Mitigation Options

Methods

The following is a description of the mitigation measures recommended for National Forests to maintain a "High" viability rating for the northern spotted owl under the current approved plans scenario. These mitigation measures address provisions for dispersal and number and size of Habitat Conservation Areas if the Bureau of Land Management continued to follow current approved management plans. Isolation and reduction of the Oregon Coast Range Province spotted owl population is a primary concern, as well as movement between the Klamath and Oregon Cascades West Provinces. We attempted to solve the problems of isolation as well as replace lost Bureau of Land Management Habitat Conservation Areas. This approach led to designation, as Habitat Conservation Areas, of a greater amount of lands in the National Forests than the amount lost on lands administered by the Bureau of Land Management.

Results

Table 2-C-1 summarizes the recommended additions to Habitat Conservation Areas and the resulting known owl pairs gained within those additions, along with known owl pairs which would be lost in the future within Habitat Conservation Areas on Bureau of Land Management administered lands. A total of about 1,134,000 acres are recommended for addition to Habitat Conservation Areas. This acreage provides additional long-term protection for 197 known owl pairs, and an undetermined number of adjusted future expected owl pairs on lands managed by the Forest Service. Calculation of adjusted future expected owl pairs for Habitat Conservation Area additions was not completed for this analysis. However, it is believed, based on trends observed as a result of thorough surveys of existing Habitat Conservation Areas on National Forests, that the future number of pairs added through our recommendations will be commensurate with the future numbers of pairs lost from Habitat Conservation Areas within lands administered by the Bureau of Land Management. On these lands, a total of 228 currently known owl pairs and 194 future adjusted expected owl pairs in Category 1 and 2 Habitat Conservation Areas would be lost if the Bureau of Land Management continues to follow current approved management plans.

Where possible, additions to Habitat Conservation Areas were made on National Forests, closest to where Bureau of Land Management Habitat Conservation Areas or portions thereof were lost. This represents an attempt to maintain the Interagency Scientific Committee's Strategy distribution of habitat. Where lack of suitable habitat or ownership patterns prevented additions in the close vicinity, the Scientific Analysis Team selected areas which are expected to improve chances for successful dispersal of owls between Habitat Conservation Areas and reduce risks of isolation of spotted owl pairs or populations.

Appendix 2-C
Rationale for Recommended Mitigation Options (continued)

Table 2-C-1 Known Owl Pairs Lost Within Bureau of Land Management Category 1 and 2 Habitat Conservation Areas and Known Owl Pairs and Acres Added Within Recommended Additions to Forest Service Habitat Conservation Areas by Physiographic Province.

Physiographic Province	HCA Acres Added	Known Owl Pairs Added (FS)[1]	Known Owl Pairs Lost (BLM)[2]
Oregon Coast Range	295,500	33*	93
Klamath Mountains	337,800	56	44
Oregon Cascade West	500,700	108	91
Total:	1,134,000	197	228

* These additional owl pairs are protected in the long terra even though presently all known and future owls on National Forests within the Oregon Coast Range axe presently protected by Category :3 Habitat Conservation Areas. Presently, under Alternative B of the Final Environmental Impact Statement, Category 3 Habitat Conservation Areas are temporary and remain a part of the network until the Category 1 or 2 Habitat Conservation Areas reach target numbers of pairs. The recommended additions axe permanent+ thereby protecting the pairs permanently.

[1] AU known pair numbers on National Forests are reported from 1987 through 1991.

[2] All known pair numbers on Bureau of Land Management administered land are reported from 1986 through 1990.

Oregon Coast Range Physiographic Province - The Siuslaw National Forest contains the only Forest Service managed lands within the Oregon Coast Range Province. As a hedge against demographic isolation discussed in this report, and to attain the maximum possible numbers of spotted owls to increase the probability that such a population would function as a self sustaining metapopulation, it is recommended that the entire Siuslaw National Forest be designated for Habitat Conservation Area status.

These additions will also partially compensate for the loss of portions of Habitat Conservation Areas 0-28, 0-29, 0-30, O-31, 0-32, 0-33 0-35, and 0-36 within lands administered by the Bureau of Land Management.

Appendix 2-C
Rationale for Recommended Mitigation Options (continued)

Klamath Mountains Physiographic Province - Within the Klamath Mountains Province, all or portions of five Habitat Conservation Areas on lands administered by the Bureau of Land Management critical to spotted owl dispersal between provinces will be lost. To compensate for the loss of habitat and pairs of spotted owls, and to maintain proximity of habitat between the Klamath Mountains and Oregon Cascades West Provinces, Forest Service Habitat Conservation Areas should be increased in size and positioned to provide for reduced spacing among Habitat Conservation Areas in the Oregon Coast Range and Oregon Cascades West Provinces. To achieve this, the following additions to the Habitat Conservation Area network are recommended (see map Appendix 2-B):

Habitat Conservation Area 0-20 should be increased in size to partially compensate for loss of habitat and pairs of spotted owls in 0-40.

Habitat Conservation Area 0-21 should be increased in size to compensate for loss of Bureau of Land Management habitat and pairs of spotted owls in 0-21 and to maintain spacing standards to 0-23.

Habitat Conservation Area 0-22 should be increased in size to partially compensate for loss of habitat and pairs of spotted owls in 0-24.

Habitat Conservation Area 0-23 should be increased in size to compensate for the loss of habitat and pairs of spotted owls in 0-24, to maintain adequate spacing to 0-21, and to increase pair clusters within an Habitat Conservation Area which will increase probabilities of successful dispersal between the Klamath Mountains Province and the Oregon Cascades West Province.

Habitat Conservation Area 0-25 should be increased in size to compensate for loss of habitat and pairs of spotted owls in 0-26 and part of 0-27, and to increase pair clusters within an Habitat Conservation Area which will in turn increase probabilities of successful dispersal between the Klamath Mountains Province and the Oregon Cascades West Province within a critical link area.

A new Category 1 Habitat Conservation Area should be designated for the northwest corner of the Siskiyou National Forest to partially replace the loss of Habitat Conservation Area 0-27 and increase the chances of successful movement of spotted owls to the Oregon Coast Range Province.

Appendix 2-C
Rationale for Recommended Mitigation Options (continued)

Oregon Cascades West Physiographic Province - All or portions of nine Bureau of Land Management Habitat Conservation Areas will be lost within the Oregon Cascades West Province. Five of these Habitat Conservation Areas are considered parts of critical links for spotted owl dispersal between the Oregon Cascades West and the Klamath and Oregon Coast Range Provinces. To compensate for the loss of habitat and to reduce the spacing of habitat between the Oregon Cascades West Province and both the Oregon Coast Range and Klamath Provinces, we recommend increasing the size of Habitat Conservation Areas 0-11, 0-14, and O-19. To achieve this, the following additions to the Habitat Conservation Area network are recommended (see map Appendix 2-B):

Habitat Conservation Area O-11 should be increased in size to compensate for habitat and pairs of spotted owls lost in the Bureau of Land Management's portion of O-11 and 0-39, and to increase pair clusters within an Habitat Conservation Area 0-11 which will in turn facilitate dispersal of spotted owls to the Oregon Coast Range Province.

A new Category 1 Habitat Conservation Area should be placed east of Bureau of Land Management Habitat Conservation Area O-12 on lands managed by the Forest Service land to compensate for the loss of habitat and pairs of spotted owls in O-12, and to increase pairs within this newly created Habitat Conservation Area which will in turn facilitate dispersal of spotted owls to the Oregon Coast Range Province.

Habitat Conservation Area O-14 should be increased in size to increase pair clusters within Habitat Conservation Area 0-14 which will aid dispersal between provinces.

A new Category 1 Habitat Conservation Area should be placed east of Bureau of Land Management Habitat Conservation Area O-16 on lands managed by the Forest Service to partially compensate for loss of habitat in O-16 and O-17, and to increase pair clusters within Habitat Conservation Area 0-17 to aid dispersal between provinces.

Habitat Conservation Area O-19 should be increased in size to partially compensate for loss of habitat and pairs of spotted owls in O-40 and to maximize pair clusters within Habitat Conservation Area 0-19 which will in turn increase probabilities of successful dispersal of spotted owls between the Klamath Mountains and Oregon Cascades West Physiographic Provinces.

la addition to loss of Bureau of Land Management "critical link" Habitat Conservation Areas, portions or all of Habitat Conservation Areas 0-6, 0-7, and O-17 will be lost. To compensate for the loss of habitat and pairs of spotted owls, the following Habitat Conservation Areas on National Forests should be increased in size: Habitat Conservation Areas 0-6, 0-4, 0-15, and 0-18.