Society for Conservation Biology

American Ornithologists' Union

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The Society of Conservation Biology and the American Ornithologists' Union are global communities of conservation and ornithology professionals with a combined membership of >10,000 individuals, and they recognize the profound importance to the United States and the world of scientifically informed management of federal lands and surrounding areas. Accordingly, we decided to use our collective scientific expertise to organize and pursue a formal review of the proposed critical habitat ruling for the northern spotted owl (77 FR 27010) with the hope of contributing in a positive and constructive manner to a successful Rule that is based on the best available science.

What follows is a review of the proposed critical habitat ruling for the northern spotted owl on behalf of The Society for Conservation Biology (North American Section) and The American Ornithologists' Union. We requested reviews of this Ruling from four leaders in the field of avian management and conservation biology, all of whom are familiar with endangered species management and conservation. Two of the reviewers are involved in spotted owl research; the other two are not, but they are familiar with the Northern Spotted Owl and its management issues. We attempted to maintain complete anonymity in the review process (even between reviewers) to ensure objectivity and eliminate any possible outside influences or pressures on reviewers. The reviewers are from geographically diverse areas and did not collaborate on their reviews in any way. They represent university, government agency, and non-profit organizations, thus ensuring diverse backgrounds and perspectives. No two reviewers are from the same institution. What follows is a synthesis of the reviews in a single document, and I am submitting it to the USFWS on behalf of these Societies.

Sincerely,

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On behalf of
The Society for Conservation Biology (North American Section) and
The American Ornithologists' Union

Review of the 2012 proposed critical habitat ruling for the Northern Spotted Owl on behalf of The Society for Conservation Biology (North American Section) and The American Ornithologists' Union.

Summary

Many aspects of the document, especially those concerning critical habitat delineation, are rigorous and informative. This document is an impressive compendium of the extensive scientific knowledge of the Northern Spotted Owl and its habitat. It is thorough and well-documented, and it is also a state-of-the-art application of the principles of conservation biology, combined with a sophisticated modeling framework to support conservation design and land use planning. The complexity of this undertaking is daunting, and yet the document shows every indication of being carefully prepared and solidly based on logical analyses down to fairly fine levels of spatial and vegetation detail. Eleven regions were defined, based on regional patterns of climate, topography, and forest communities, as well as specific patterns of Northern Spotted Owl habitat relationships and prey base relationships. The descriptions of the characteristics of these units and subunits are detailed and evidence both a high level of knowledge and a tremendous amount work and discussion to gain this level of information.

The authors have done well in addressing critical habitat at multiple spatial scales (individual, population, geographic range), habitat was linked to occupancy (which is a defensible proxy for demography), and the importance of currently unoccupied habitat was recognized and addressed.

The important shortcomings of the document are: (1) Lack of analysis of effects of proposed exclusions from critical habitat. The ultimate effectiveness of the critical habitat designation will lie in part in what portion of the area currently proposed as critical habitat will remain in the final designation. This cannot be assessed currently due to not knowing how the economic analysis will be interpreted by the Secretary of the Interior in excluding areas currently listed a critical habitat. (2) Lack of analysis of effects of critical habitat on multi-species conservation goals. (3) The ecological effects of potential "active management" strategies are not rigorously analyzed. The two separate elements of the rule – Where is critical habitat? vs. What is done there? – are not adequately linked, and the second element is not rigorously analyzed. We are particularly concerned about the potential for cumulative effects going unnoticed because assessments will not be triggered for many timber harvest units (i.e., <500 acres).

Introduction

For species in decline, conservation efforts are typically guided by expert opinion, primarily because data are not available to employ more rigorous and objective scientific tools. Given the immense effort during the past two decades to collect data to better understand the population ecology of Northern Spotted Owls, there is a wealth of information available to inform conservation efforts. The science of and tools for conservation planning have advanced markedly since the owl was listed; those scientific tools in concert with comprehensive, high-quality data provide unprecedented potential to develop robust recovery strategies for owls, which is especially challenging because their broad geographic range. We are pleased to report the authors have successfully merged their in-depth knowledge of both the data available and the relevant scientific tools to develop a state-of-the-art strategy for identifying lands essential to recovery of this threatened species.

The proposed rule (77 FR 27010) describes the principles that guide the process the authors developed to identify critical habitat for Northern Spotted Owls. By employing three models (habitat potential, conservation planning, and population persistence), the authors have effectively made explicit the process they used to identify critical habitat – an important feature lacking to varying degrees in

similar efforts driven by expert opinion. Not only are the results superior to previous efforts, but because the steps used in the process of identifying and delineating critical habitat have been made explicit, they can be examined objectively (in *Modeling and Analysis Procedures used to Identify and Evaluate Potential Critical Habitat Networks for the Northern Spotted Owl* and *Appendix C of the Revised Recovery Plan for the Northern Spotted Owl*). The use of models also allows areas to be evaluated that have not been surveyed but have high potential to provide habitat for owls as well as lands that, once restored, will also provide habitat for owls and other old-forest species into the future. These are critical planning elements for recovery.

The authors of the rule also are frank about uncertainties in future conditions as a result of climate change by recognizing that forest composition may change beyond the range of historical variation. Their arguments for resilience are sound and reflect current science. They also acknowledge uncertainty about future Barred Owl populations and distribution, and those impacts on Northern Spotted Owls. But they describe proposed research that should help to clarify those relationships. They also admit that they do not have sufficient information to permit formal modeling of dispersal habitat and the influence of dispersal habitat condition on dispersal success. Their assumption that dispersal success is highest when dispersers move through forests that have the characteristics of nesting, roosting and foraging habitats can also be tested in the future.

Recommendations from scientists to improve Northern Spotted Owl recovery planning documents were adopted. These include conserving old growth trees and forests on Federal lands wherever they are found, and managing forests as dynamic ecosystems that conserve all stages of forest development. This shows a sincere interest in accommodating peer review. We were impressed by the phenomenal amount of information that had to be assembled and analyzed for this proposal. The writing was excellent, the development of ideas logical and based in the latest thinking in conservation biology.

All this said, there were some shortcomings of the rule. The important shortcomings of the document are: The important shortcomings of the document are: (1) <u>Lack of analysis of effects of proposed exclusions from critical habitat.</u> The ultimate effectiveness of the critical habitat designation will lie in part in what portion of the area currently proposed as critical habitat will remain in the final designation. This cannot be assessed currently due to not knowing how the economic analysis will be interpreted by the Secretary of the Interior in excluding areas currently listed a critical habitat. (2) <u>Lack of analysis of effects of critical habitat on multi-species conservation goals.</u> (3) <u>The ecological effects of potential "active management" strategies are not rigorously analyzed.</u> For example, it is assumed that areas subject to thinning will mimic the ecological role of natural early-seral habitat (e.g., burned areas). The two separate elements of the rule – Where is critical habitat? vs. What is done there? – are not adequately linked, and the second element is not rigorously analyzed. We are particularly concerned about the potential for cumulative effects going unnoticed because assessments will not be triggered for many timber harvest units (i.e., <500 acres).

Context of the review

Scientific peer reviewers identified strengths and weaknesses in previous Northern Spotted Owls management documents that are also relevant to this review. For example, the critical habitat rule and modeling appendix (Dunk et al. 2012) builds on similar material presented in Appendix C of the Northern Spotted Owl Draft Revised Recovery Plan. In May 2011, peer reviewers commented on Appendix C and requested the FWS, among other points, to

1) Provide an operational definition of population recovery;

2) Clearly state the criteria that will be used to rank the various scenarios and management alternatives;

3) Tie critical habitat directly to the recovery objectives as a critical part of the risk assessment process—for example, the statement of recovery objectives as target probabilities of persistence over a specified time frame. For species threatened by habitat loss, these objectives can be expressed as a required amount and spatial arrangement of habitat needed for recovery; and

4) Identify as critical habitat those habitat areas, both occupied and currently unoccupied, that if protected in some suitable manner, ultimately allows the Service to determine that the species is no longer endangered or threatened based on the statutory listing factor addressing habitat.

Additionally, various methodological issues were previously raised by peer reviewers, such as the importance of considering effects of environmental stochasticity on population persistence and abundance.

The following review addresses separately a) those questions related to the process used for delineation of critical habitat and evaluation of alternative habitat delineations and b) those questions related to development of management actions within critical habitat.

Delineation of critical habitat

For the most part, the document successfully addresses previous methodological issues regarding delineation of critical habitat and evaluation of its ability to support recovery. Effects of environmental stochasticity have been considered. Both the Maxent and Hexsim modeling methodology are applied appropriately given the goals and context of the analysis. Some recent reviews (e.g., Royle et al. 2012) have criticized the use of methods such as Maxent. However, given that this is an ongoing methodological debate within the field of ecology and statistics, and that a substantial body of literature supports the use of Maxent, the use of Maxent by the FWS is highly defensible in this context. The relationship between recovery goals and ranking of habitat alternatives has also been adequately developed (e.g., Dunk et al. 2012 Table 5 "Categories of population and extinction risk used in comparisons of population modeling results"), as requested in previous peer reviews (as described above).

A review of this aspect (critical habitat delineation and evaluation) of the critical habitat rule supports the conclusion from peer reviews of earlier documents (e.g., Appendix C) that the habitat and viability modeling process makes appropriate use of available data and is based on an appropriate set of methods for informing the planning process. The approach is also innovative and may serve as a model for recovery planning for other species where similarly extensive data exists and the conservation context warrants such spatially explicit planning.

However, at least three aspects of the critical habitat evaluation process remain problematic.

<u>1) Lack of analysis of effects of proposed exclusions from critical habitat</u>

After the evaluation of alternative critical habitat networks was completed, a substantial portion of the resultant critical habitat network was then proposed for exclusion from critical habitat without rigorous analysis of the effects of this exclusion. Proposed alternatives that involve exclusions on non-federal land exclude areas representing 48.3, 56.8, or 100% (Alternatives C, D, and E, respectively) of the total critical habitat on nonfederal lands included in Alternative B. These exclusions represent respectively 6.7, 7.9, and 13.9% of all critical habitat in Alternative B. Although the majority of critical habitat appropriately falls on federal lands, nonfederal land critical habitat included in Alternative B may carry importance beyond that suggested by its areal extent, if this critical habitat lies in key regions that

lack federal lands sufficient for Northern Spotted Owl persistence and connectivity (e.g., Oregon Coast Range, Redwood Coast). Because the effects of such exclusions have not been rigorously evaluated using the Hexsim model, we lack information on the effects of exclusions on Northern Spotted Owl recovery. The draft Environmental Assessment's Appendix D, titled "Preliminary Effects of Areas Considered for Exclusion or Exemption on the Northern Spotted Owl", does not include such a Hexsim-based analysis. Such a quantitative analysis needs to form part of the comprehensive 4(b)(2) analysis that must be done before deciding whether individual lands may be excluded from critical habitat designation.

Consequently, despite the comprehensive effort to identify critical habitat, the ultimate value of this process to conservation and recovery of the owl will depend on what portion of the area currently proposed as critical habitat will remain in the final designation. The authors indicate that this area will be "significantly smaller than the area currently identified" (p. 14063). Specifically, the yet-to-be-completed economic analysis will allow the Secretary of the Interior to exclude areas now proposed as critical habitat (p. 14130). If that process is too heavy-handed, the high-quality science on which recovery of spotted owls depends could be jeopardized; we must keep in mind that there is overwhelming evidence that this species has and continues to decline in abundance and distribution throughout its range. Additionally, the area proposed as critical habitat also will be reduced by exempting or excluding private and other lands already managed for conservation. Although the arguments for this decision are compelling (p. 14132, 14137), we can only hope that existing conservation agreements with private landowners, municipalities, and other entities, such as Habitat Conservation Plans, have been scrutinized thoroughly.

If much of the area identified as critical habitat ultimately remains classified as such, then at least so far as habitat-based threats, recovery of northern spotted owls will be based on a strong foundation; broader goals for critical habitat, such as "…not only to conserve the species, but also to conserve the ecosystem upon which that species depends" may also be well met.

2) Lack of analysis of effects of critical habitat on multi-species conservation goals

Previous peer reviews noted that the Northwest Forest Plan is a multi-species conservation plan. As such, performance of the habitat network for any individual species including the Northern Spotted Owl is necessarily suboptimal compared to a habitat network designed to protect a single species. The critical habitat rule comments in several sections on the greater efficiency of the new critical habitat network over the Northwest Forest Plan reserve delineation in promoting Northern Spotted Owl recovery. However, no analysis is provided as to the relative effectiveness of the new critical habitat network in also capturing habitat for other late-seral/old-growth-associated species of concern. Although designation of Northern Spotted Owl critical habitat does not require de-emphasis of Northwest Forest Plan reserve designations, managers may tend to do so if they believe the Northern Spotted Owl critical habitat adequately protects other species of concern. The language in the critical habitat rule referring to ecosystem rather than single species conservation might lead to this unevaluated assumption. Quantitative analysis of the ability of the Northern Spotted Owl critical habitat network to support other late-seral/old-growth -associated species would greatly enhance the utility of the rule to support ecosystem conservation goals.

3) Lack of appropriate consideration of cumulative effects and scale issues

FR 77:14128 makes a distinction between two scales of impacts. The first is at the scale of the entire critical habitat network. The second is at the project scale (e.g., projects > 500 acres). The USFW proposes to make adverse modification determinations at the scale of the entire designated critical

habitat. **It might also be important to conduct cumulative effects analyses when evaluating possible jeopardy decisions regarding federal projects on public or private lands.** One potential concern is in regard to the temporal and spatial scales at which adverse modification decisions would be made by the USFWS. The USFWS has set a 500 acre threshold for triggering an assessment of effects on critical habitat. Since most timber harvest units in the Pacific Northwest are less than this size, few projects would trigger an evaluation of critical habitat impacts. The potential for unmeasured, cumulative impacts is unknown. Potential cumulative effects issues are mentioned in FR 77:14125, but they are not discussed in any detail.

Most ecological systems—terrestrial, freshwater aquatic, and marine—are experiencing multiple stressors operating at diverse temporal and spatial scales. These stressors produce effects at multiple levels within the biological hierarchy including individual organisms, populations, and communities comprised of multiple species. It is true that most levels within the biological hierarchy have experienced natural stressors/disturbance events as part of their evolutionary history. And, if these stressors fall within the adaptation limits of the individual or species, than those elements of the hierarchy should persist. However, if those stressors are sufficiently intense or chronic, than the adaptational limits of individuals or species may be surpassed and they may be lost from the system. Cumulative effects have both a temporal and a spatial domain. Effects accumulate temporally if the interval between perturbations is less than the system's or individual's recovery time. The ratio of disturbance interval to recovery interval is a useful metric (Turner et al. 1993). Effects accumulate spatially when the spatial proximity between perturbations is smaller than the distance required to disperse the perturbation. The reality is that most perturbations, natural and human-induced, accumulate in both space and time.

The criteria to evaluate "adverse modifications" to critical habitat fall within the realm of cumulative effects in at least 2 dimensions: those projects < 500 acres that will receive no evaluation; and, those projects > 500 acres that may be evaluated only on a project-by-project basis. Active management projects should be considered in terms of the type of cumulative effects expected. Given the effects of changes in landscape configuration (e.g., fragmentation effects, edge effects favoring barred owls, etc.) resulting from silviculture (actual changes to vegetation structure + new roads leading to decreases in landscape connectivity), it is possible that that active management projects will have synergistic effects.

In addition, the current rule favors an “ecosystem conservation” approach (p. 14064), which is laudable. It could be important that as it unfolds on the ground, and exemptions of critical habitat are designated, to compare it to what might be expected from the matrix-reserve strategy currently employed with the Northwest Forest Plan. The matrix-reserve strategy has been a key underpinning of the Northwest Forest Plan with available evidence supporting its effectiveness (Noon and McKelvey 1996, Forsman et al. 2011). Consequently, expectations from this approach might make a good standard against which to compare changes in range-wide vulnerability of the Northern Spotted Owl under future management strategies that propose more “active” management within reserves.

Management strategy within critical habitat

The critical habitat rule places substantial emphasis on an “active management” strategy within critical habitat as a proposed means of reducing loss of Northern Spotted Owl habitat to disturbances such as severe fire. However, the ecological effects of potential “active management” strategies are not rigorously analyzed. For example, the rule states that thinning treatments can assist in restoration of complex early seral forest habitat; e.g., p 14095: “Perry et al. (2011, p. 715) noted that replacement of early successional shrub hardwood communities by closed forests in the absence of fire significantly

impacts landscape diversity. Restoration of appropriate fire regimes and use of targeted silvicultural intervention may be effective where the goal is to restore or maintain this diversity." However, recent reviews have generally concluded that natural and silvicultural disturbances contrast markedly in terms of biological legacies, and that management activities such as logging can reduce the richness within and the duration of early-successional ecosystems (Swanson et al. 2011). Thus it is not known whether areas subject to thinning will mimic the ecological role of natural early-seral habitat (e.g., burned areas).

Presentation of evidence on thinning effects on owl and forest ecosystems (fire behavior, etc.) is generally selective with a bias towards supporting active management. For example, the document cites assessments of the positive long-term effects of thinning on Northern Spotted Owl habitat via effects on fire frequency and severity. However, such assessments generally do not account for the current low probability of treatments experiencing fire at any given time. Not including this probability leads to inflated projections of the effects of thinning vs. not thinning (Campbell et al. 2011). The effects are illustrated by the recent analysis by Roloff et al. (2012). In the dry Cascades they found that estimated crown fire potential was reduced on an average of 6% of the landscape over their 75 year simulation period and assumed all of this potential reduction in fire was realized. However, with a 913 year rotation, the reduced crown fire potential would occur on just 0.45% of the landscape over the 75 years, far less area than would be treated. For any simulation of thinning effects on amounts of high severity fire to be valid, it must explicitly include a term for the rate of high severity fire.

Recommendations

1) Develop a more balanced presentation of the strength of evidence for effects of thinning on Northern Spotted Owl habitat, forest ecosystems and fire behavior;

2) Focus any broad-scale thinning or other "active management" treatments on areas of lower Northern Spotted Owl habitat value (e.g., areas of lower RHS value) and evaluate the effects of treatments on Northern Spotted Owl and other species of concern in an adaptive management context;

3) Develop an analysis of the effects of the proposed critical habitat network on multi-species conservation goals, by overlaying critical habitat boundaries on data on occurrence and habitat distribution for other species of concern;

4) Develop a rigorous and substantive Section 4b2 analysis of the potential impacts on Northern Spotted Owl viability and recovery of proposed critical habitat exclusions. This analysis would necessarily involve the same using assumptions and methods (e.g., optimistic/pessimistic habitat change scenarios) used in the Hexsim analysis of alternative critical habitat networks.

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