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Forest Service Planning NOI
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The Wildlife Society is taking this opportunity to submit comments in response to the Notice of Intent to prepare an Environmental Impact Statement related to potential environmental consequences associated with a National Forest System land management planning rule developed in response to the National Forest Management Act (NFMA).

The Wildlife Society was founded in 1937 and is a non-profit scientific and educational association of over 9,000 professional wildlife biologists and managers, dedicated to excellence in wildlife stewardship through science and education. Our mission is to represent and serve wildlife professionals—the scientists, technicians, and practitioners actively working to study, manage, and conserve native and desired non-native wildlife and their habitats worldwide.

The Wildlife Society encourages the Forest Service to adopt ecological sustainability as the foundation for NFMA Planning and National Forest management. This is consistent with the recommendation of the Committee of Scientists in 1999 (COS 1999) and the 2000 Planning Rule. In that rule, ecological sustainability was defined as "the maintenance or restoration of the composition, structure, and processes of ecosystems including the diversity of plant and animal communities and the productive capacity of ecological systems."

Ecological, social, and economic sustainability are interdependent and recognition of ecological sustainability as a foundation does not mean that human uses and values should be excluded from consideration. It is simply a recognition that maintenance of ecological sustainability is necessary in order for the National Forests to contribute to economic and social sustainability.

Planning and managing for ecological sustainability should involve consideration of the following principles:

- Planning and management must focus on several scales of biological organization including ecosystems, communities, and individual species.
- Analyses must focus on appropriate geographic scales and include consideration of cumulative effects across ownerships.
- Analyses and management must take into account those factors that are within the control of the Forest Service as well as those that are not.

- The dynamic nature and variability of ecological systems across time and geography must be recognized when the status of systems is determined and goals for those systems established.
- Uncertainty about how ecological systems work and respond to management must be recognized.
- Due to uncertainty, monitoring and adaptation must be integral to management.

These principles were recognized by the Committee of Scientists in their 1999 report (COS 1999). Both the 2000 Planning Rule and the Forest Service Directives adopted pursuant to the 2005 Rule represent legitimate attempts to implement these principles. We urge the Forest Service to start the current process by revisiting those documents and the lessons learned through their development and implementation. Going back to "ground zero" in the discussion of ecological sustainability would be a tremendous waste of the resources that the Forest Service has already brought to bear on these questions.

More specifically, beginning with the 1982 regulations, two requirements for assessments of biological diversity have had a particularly contentious history within the Forest Service. These are the requirements to monitor and conduct viability assessments at the species level (Noon et al. 2003). The Forest Service has attributed the difficulties they experienced in trying to fulfill these requirements to inadequate funding and to the perception that these requirements exceed the agency's capabilities. Both of these constraints were recognized by the Committee of Scientists report (COS 1999); the Committee partially addressed them by recommending that most monitoring and viability assessments be limited to a small set of focal species. The Committee's argument was simple—it was plainly unreasonable and infeasible to assess the status, trend, and viability of all species, even if limited to vertebrate species. For example, the national forests within the Sierra Nevada ecosystem provide habitat for more than 600 vertebrate species, many with poorly known life histories and distribution patterns. Restricting assessment to a small (e.g., 10-20) set of species was meant to be pragmatic, to address the agency's requirements for conservation of biological diversity, to be within the capabilities of the agency, and to be based on the best available science (reviewed in Noon and Dale 2003).

The focal species concept has been incorrectly equated to the management indicator species (MIS) concept as it appears within the 1982 regulations. MIS were assumed to reflect the status and trends of a large number of unmeasured species (Landres et al., 1988). However, the concept that some species act as direct surrogates of others is untenable unless those species share similar population drivers (Cushman et al., in press). The MIS approach, however, has merit in that it recognizes that the assessment of any complex system, such as an ecosystem, requires a surrogate-based approach. Focal species, in contrast, would commonly be selected on the basis of their functional role in ecosystems (e.g., species that serve keystone functions [Mills et al., 1993], act as engineers of ecological processes [Jones et al., 1994], indicate the action of key stressors [Caro and O'Doherty 1999], or strongly influence food webs via top-down control [Soule et al. 2005]). Noon et al. (2009) recently reviewed categories of focal species, methods to identify them, and how they may serve as surrogates for monitoring on federal public lands.

In the 2005 regulations, the Forest Service restricted its requirement to conserve biological diversity to a coarse-filter approach—that is, the remote monitoring of vegetation communities and their successional stages (also called cover types). However, the limitations of a coarse filter approach to infer species' distributions and status has been known for sometime (Noon et al., 2005). A recent review of the degree to which coarse-filter models can be used to infer animal occurrence concluded that "…the observed error rates were high enough to call into question any management decisions based on these models" (Schlossberg and King 2009:609). These authors went on to state that "…[coarse-filter] models oversimplify how animals use habitats, and the dynamic nature of animal populations" (Schlossberg and King 2009:609). The coarse-filter approach is a necessary component of the assessment of biological diversity but it is not sufficient on its own—it needs to be accompanied by some degree of direct species assessment (Noon et al. 2009).

Species level monitoring and viability assessments are much more feasible today than they were at the time of the Committee of Scientists' report (COS 1999) and the 2000 NFMA regulations. There have been significant advancements in the last decade in survey design, statistical methods, the ability to estimate species distribution patterns based on presence/absence data, and in obtaining estimates of animal abundance based on individual animal identities. Further, it is important to note that scientists within the Agriculture and Interior Departments have made many of these advances. Thus, the capability and understanding of state-of-the-art scientific methods relevant to monitoring and viability analysis reside within the federal agencies responsible for species conservation.

Our proposal to the Forest Service is to take advantage of these advancements and to include in the new planning regulations a requirement to monitor and assess the viability of focal species based largely on the methods we describe below.

A recent significant advance in wildlife monitoring is based on use of presence-absence data which is relatively inexpensive to acquire, allows an exploitation of historical survey data, and can make use of recent advancements in genetic evaluation (e.g., MacKenzie et al. 2005). One variable estimated by occupancy models is the area occupied by a species, a measure of a species' spatial distribution. An example of its relevance to wildlife conservation is that the July 2005 issue of the *Journal of Wildlife Management* devoted a special section to the discussion and application of presence-absence sampling in wildlife monitoring (Vojta 2005) including an application to National Forest System lands (Manley et al. 2005). Temporal and spatial patterns in presence-absence monitoring data also allows inference to changes in animal abundance (MacKenzie and Nichols 2004), the single most important parameter that provides insights into likelihood of species persistence (Lande 1993).

Presence-absence monitoring can be based on real-time observation of a species at a survey site, or evidence that the species was at the survey location sometime in the recent past. One of the most significant advances in presence-absence monitoring takes advantage of the ability to confirm the presence of a species at a survey site based on its genetic signature (e.g., in hair or scat) (Waits 2004, Schwartz et al. 2006). If genetic markers are available, it is relatively straightforward to identify the sample by species on the basis of its DNA signature, and often to the individual level (Waits 2004). The ability to use indirect measures of presence for some species greatly increases monitoring efficiency and reduces survey costs.

These advances in survey methods (e.g., presence-absence models), detection techniques (e.g., genetic analysis), and changes in state variable from direct measures of demographic parameters (e.g., abundance, density, survival) to measures of area occupied have important applications to viability analyses. Traditional viability analyses have been based on estimates of demographic parameters including time series of abundance estimates, survival rates, and reproductive rates (Beissinger and McCullough 2002). Estimates of these parameters require extensive field surveys, frequent capture and marking of individual animals, are costly, and are available for only a small number of species. A consequence is that to require the Forest Service to conduct demographic viability analyses for all focal species is impractical.

We propose that the Forest Service consider indirect methods of viability analysis that take advantage of advances in the monitoring methods and techniques discussed above. These methods use area occupied (estimated from presence-absence data) as a measure of a species' geographic distribution within the survey area (e.g., one or more adjacent nation forests). Area occupied, the viability state variable, serves as a surrogate measure or index of the species abundance in the survey area. Surrogacy is justified on the basis of the well-established positive relationship between a species' abundance and its geographic distribution (e.g., Brown 1984, Gaston 1996). Further justifications for this approach are that methods have been developed to estimate abundance from occupancy data (Royle and Nichols 2003, Stanley and Royle 2005) and that measures of abundance have consistently been shown to be highly correlated to occupancy rates (Gaston et al. 2000, Zuckerberg et al. 2009). Justification for use of the viability index method is also based on the significant positive relation between a species' abundance and its probability of persistence (Lande 1993, Lande et al. 2003).

The proposed index of viability based on presence-absence data will be accompanied by greater uncertainty about a species true viability status than a demographically based analysis. This is inescapable. However, we believe the index method may adequately address the agency's requirements for maintaining plant and animal diversity. Further, we believe this approach meets the requirements for inclusion in the planning regulations:

- It is practicable.
- It is within the capabilities of the agencies to implement and interpret.
- It could serve as an early warning indicator of species imperilment prior to a need to consider as threatened or endangered.
- It has a strong scientific foundation.

In summary, The Wildlife Society recommends that the Forest Service adopt ecological sustainability as the foundation for NFMA Planning and National Forest management and that the Forest Service include species-level monitoring and viability assessments in the new land management planning rule. Thank you for considering the views of wildlife professionals.

Sincerely,

Michael Hutchins, Ph.D., Executive Director/CEO

Literature Cited

Brown, J. H.1984. On the relationship between abundance and distribution of species. American Naturalist 124:255279.

Caro T.M. and G. O'Doherty. 1999. On the use of surrogate species in conservation biology. Conservation Biology 13(4): 805-814.

Gaston, K.J. 1996. Species-range-size distributions: patterns, mechanisms and implications. Trends in Ecology and Evolution 11(5):197-201.

Gaston, K.J., T.M. Blackburn, J.J.D. Greenwood, R.D. Gregory, R.M. Quinn, and J.H. Lawton. 2000. Abundance-occupancy relationships. Journal Applied Ecology 37:39-59.

Committee of Scientists (COS). 1999. Sustaining the people's land: Recommendations for stewardship of the national forests and grasslands into the next century. U.S. Forest Service, http://www.fs.fed.us/forum/nepa/rule/cosreport.html

Cushman, S.A., K.S. McKelvey, B.R. Noon, and K. McGarigal. In press. Use of abundance of one species as a surrogate for abundance of others. Conservation Biology.

Jones C.G., J.H. Lawton, and M. Shachak. 1994. Organisms as ecosystem engineers. Oikos 69: 373-386.

Lande, R. 1993. Risks of population extinction from demographic and environmental stochasticity and random catastrophes. American Naturalist 142:911-927.

Lande, R., S. Engen, and B-R. Saether. 2003. Stochastic Population Dynamics in Ecology and Conservation. Oxford University Press.

Landres P.B., J. Verner, and J.W. Thomas. 1988. Ecological uses of vertebrate indicator species: a critique. Conservation Biology 2(4): 316-328.

MacKenzie, D.I., and J.D. Nichols. 2004. Occupancy as a surrogate for abundance estimation. Animal Biodiversity and Conservation 27:461-467.

MacKenzie, D.I., Nichols, J.D., Sutton, N., Kawanishi, K. and Bailey, L.L. 2005. Improving inferences in population studies of rare species that are detected imperfectly. Ecology 86(5): 1101-1113.

Manley, P.N., M.D. Schlesinger, J.K. Roth, and B. Van Horne. 2005. A field-based evaluation of a presence-absence protocol for monitoring ecoregional-scale biodiversity. Journal Wildlife Management 69:950-966.

Mills L.S., M.E. Soule, and D.F. Doak. 1993. The history and current status of the keystone species concept. BioScience 43: 219-224.

Noon, B.R., and V.H. Dale. 2003. Broad-scale ecological science and its application. Pages 34-51 In: Applying Landscape Ecology in Biological Conservation. Springer, NY.

Noon, B.R., D.D. Murphy, S.R. Beissinger, M.L. Shaffer, and D. DellaSalla. 2003. Conservation planning for U.S. national forests: Conducting comprehensive biodiversity assessments. Bioscience 53:1217-1220.

Noon, B.R., P. Parenteau, and S.C. Trombulak. 2005. Conservation science, biodiversity, and the 2005 U.S. Forest Service regulations. 2005. Conservation Biology 19:1359-1361.

Noon, B.R., K.S. McKelvey, and B.G. Dickson. 2009. Multispecies conservation planning on U.S. Federal lands. Pages 51-84 In: Models for Planning Wildlife Conservation in Large Landscapes. J.J. Millspaugh and F.R. Thompson, III, editors. Academic Press.

Royle, J.A., and Nichols, J.D. 2003. Estimating abundance from repeated presence-absence data or point counts. Ecology 84(3): 777-790.

Schlossberg S. and D.L. King. 2009. Modeling animal habitats based on cover types: a critical review. Environmental Management 43: 609–618.

Schwartz, M.K., G. Luikart, and R.S. Waples. 2006. Genetic monitoring as a promising tool for conservation and management. Trends in Ecology and Evolution 22:25-33.

Soule, M.E., J.A. Estes, B. Miller, and D.L. Honnold. 2005. Strongly interacting species: conservation policy, management, and ethics. Bioscience 55:168-176.

Stanley, T. R. and J. A. Royle. 2005. Estimating site occupancy and abundance using indirect detection indices. Journal of Wildlife Management 69:3874–883.

Vojta, C.D. 2005. Old dog, new tricks: innovations with presence-absence information. Journal of Wildlife Management 69(3): 845-848.

Waits, L.P. 2004. Using noninvasive genetic sampling to detect and estimate abundance of rare wildlife species. Pages 211-228, In: Sampling Rare and Elusive Species. W.L. Thompson, editor. Island Press.

Zuckerberg, B., W.F. Porter, and K. Corwin. The consistency and stability of abundance-occupancy relationships in large-scale population dynamics. Journal Animal Ecology 78:172-181.