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SCIENTISTS IN THE WILDERNESS

Alverson, William S., Walter Kuhlmann, and Donald M. Waller 1994. **Wild forests: conservation biology and public policy.** Island Press, Washington D.C. xxiii + 300 p. \$49.95 (cloth), ISBN: 1-559-631-872 (acid-free paper; \$29.95 (paper), ISBN: 1-559-631-880 (acid-free paper).

Scientists can play many roles in public policy debates, from expert witnesses to members of advisory committees. The authors describe a management controversy in which they played the role of litigants in a suit against two National Forests in Wisconsin over effects of forest plans on biological diversity. Their book is not so much the story of a lawsuit, however, as it is an argument for a "Dominant-Use Zoning" (DUZ) of National Forests including large forest blocks to restore old growth. Their proposal is similar to the "Multiple-Use Module" (MUM) model of L. D. Harris (1984 *The fragmented forest: island biogeography theory and the preservation of biotic diversity*. University of Chicago Press, Chicago, Illinois) but DUZ reserves would focus on restoration rather than preservation and would be much larger than MUM reserves.

The book is well-written and compelling as it builds from principles of conservation biology to a history and critique of forest management and policy. It climaxes in the description of a new approach to forest management and the case history of the Wisconsin National Forest controversy. The synthesis of science, management, and public lands policy is one of the strengths of the book. The authors effectively lead the reader through the wilderness of tangled, sometimes contradictory laws and utilitarian and wilderness traditions that have guided land management on National Forests. They develop a scientific and ultimately moral argument that natural processes and not human engineering should be allowed to determine biological diversity in large areas of National Forests. The central questions of the book are: is there a strong scientific argument for designating large forest reserves? and do the existing policies obligate managers to create them? While the authors present a strong case for answering "yes" to these questions, a federal court did not agree. And, a separate report by a scientific panel, including one of the authors, (Crow, T. R., A. Haney, and D. M. Waller. 1993. Report of the Scientific Roundtable on Biological Diversity Convened by the Chequamegon and Nicolet National Forests. USDA Forest Service GTR NC-166) recommended that management be conducted on a landscape basis but did not specify a large-reserve strategy.

I was most interested in reading how the authors used science and policy to arrive at a specific landscape design, in a setting where large charismatic species such as owls or woodpeckers did not serve as umbrella species. In my experience, developing detailed recommendations about size, number, and distributions of reserves from general conservation principles is as much art as science. This was also true of the

approach described in this book. The authors recommended reserve blocks of about 20 000 acres based on a reasonable scientific rationale about edge effects from herbivory by high populations of deer and the size and frequency of large windthrow events. While ample evidence of the negative impact of edge effects on biological diversity is presented, there is still a strong element of uncertainty in designing a specific solution to the problem, given the complexity of responses, a lack of ecological information, and the stochastic nature of disturbances. The number of reserves or what percentage of the National Forests they recommend for reserves (20–25%) is not clearly justified with a scientific rationale other than by citations of conservation proposals from other regions. It is clear that while the state of the science is good at documenting the problems and general approach to their solutions, it requires subjective judgments to produce detailed conservation designs.

I was disappointed at the lack of discussion of how science might be better integrated into decision-making. Perhaps this was a function of the lack of openness of management to landscape perspectives in the 1980's and the litigious nature of the interaction. While scientists should have a more prominent role in the management of National Forests than they have had in the past, the limits of ecological science, ethical nature of biodiversity protection, ambiguity of terms like "natural processes" and "ecological integrity," and realities of public policy decision-making, make it clear that conservation can not be based on ecological science alone. The authors acknowledge that scientific recommendations will be modified by political concerns but they do not present any framework for how science and scientists could contribute to the compromise that is characteristic of policy debates. For example, the use of alternative scenarios and ecological risk assessments are not discussed.

The book has a few other weaknesses. Old-growth is defined simply as virgin or primary forest without reference to process and structure-based definitions that have been developed in recent years. The authors do not adequately consider the implications of creating reserves in fire-dominated ecosystems where it is very difficult to let natural processes operate without human intervention. Relatively little space is devoted to management for biological diversity in the lands outside of reserves which can be of equal or greater importance than the reserves.

The book is divided into four parts. Part I consists of chapters that review the historical changes in forest use and biodiversity, identify the importance of less visible elements of biological diversity, and demonstrate the problems of maintaining and restoring old-growth in the eastern U.S. Part II develops the ecological basis of biological diversity with chapters that focus on patch dynamics, edge effects, fragmentation, and monitoring of diversity. The chapter on edge effects is well documented and the prose is sometimes impassioned and colorful, e.g. "... deer are analogous to oce-

anic sharks able to climb onto shore to ravage inland dwellers." Part III describes how forest management has evolved on public lands and correctly points out how recent attempts to modify management to meet biodiversity objectives fall short because they were primarily public relations efforts or lacked a landscape perspective. Part IV discusses the legal basis of their recommendations, the case history of the Wisconsin controversy, and the elements of the DUZ approach.

Despite its weaknesses, I highly recommend this book to natural resource professionals, advanced undergraduates, and

graduate students. It demonstrates how scientists can challenge society to conserve biological diversity by identifying ecological problems and their consequences. However, it also demonstrates the challenge society places before ecologists to leave their ivory towers and participate in the social and political processes to find acceptable solutions.

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