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On the Law of Biodiversity and Ecosystem Management

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INTRODUCTION

One of the more rational conclusions to emerge from America's experience with the Endangered Species Act[1] is that we need to manage ecosystems and protect biological diversity on a scale larger than individual species on the brink of doom. Supported by evidence of a decline in diversity and the crash of environments on which all species depend,[2] "ecosystem management" and "biodiversity" have become new catchwords in the vocabulary of natural resources management.[3]

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1. Endangered Species Act of 1973, 16 U.S.C. §§ 1531-1544 (1994).

2. *See* EDWARD O. WILSON, THE DIVERSITY OF LIFE 280 (1992) (estimating diversity losses in rainforest ecosystems at 27,000 species per year, 74 per day, 3 per hour); *see also* REED F. NOSS & ROBERT L. PETERS, ENDANGERED ECOSYSTEMS: A STATUS REPORT ON AMERICA'S VANISHING HABITAT AND WILDLIFE (1995) (documenting ecosystem and species decline).

3. The original voice of species diversity and ecosystem management is Aldo Leopold, whose focus and publications evolved from wildlife management to landscape management over two decades spanning the Great Depression and the Second World War. *Compare* ALDO LEOPOLD, GAME MANAGEMENT (1933), *with* ALDO LEOPOLD, A SAND COUNTY ALMANAC (1949). Leopold's maxim, "[T]o keep every cog and wheel is the first order of intelligent tinkering," *id.* at 190, has become a fixture in the emerging literature of conservation biology. *See* Reed Noss, *From Endangered Species to Biodiversity*, *in* BALANCING ON THE BRINK OF EXTINCTION: THE ENDANGERED SPECIES ACT AND LESSONS FOR THE FUTURE 227, 227 (Kathryn A. Kohm ed., 1991) (opening with a continuation of the maxim: "We have not yet learned to think in terms of small cogs and wheels"). Initially proceeding at a snail's pace and focused on individual ecosystems, the literature exploded in the 1980s and shows no sign of abating. Classics in the field include: O.H. FRANKEL & MICHAEL E. SOULÉ, CONSERVATION AND EVOLUTION (1981); BRYAN G. NORTON, WHY PRESERVE NATURAL VARIETY? (1987); REED F. NOSS & ALLEN Y. COOP-

We now have to decide what these words mean. The difficulty is not to determine what, in the name of biodiversity and with willing hearts, we *can* do to save species and the landscapes they inhabit, but rather, as pressures to develop these landscapes continue to mount, what we *cannot* do. This Article is a search for the "can't-do's," a bottom line without which diversity and ecosystem protection will remain laudable aspirations but something well short of law. It is a search for law to apply.[4]

ERRIDER, SAVING NATURE'S LEGACY (1994); and WILSON, *supra* note 2. More than 500 sources, nearly all published within the past 10 years, are cited in WILLIAM S. ALVERSON ET AL., WILD FORESTS: CONSERVATION BIOLOGY AND PUBLIC POLICY 259-86 (1994), and NOSS & COOPERRIDER, *supra*, at 343-87. Recent legislative proposals at the federal level include: the Northern Forest Stewardship Act, H.R. 2421, 104th Cong. (1995); the Forest Biodiversity Act, H.R. 2407, 104th Cong. (1995); the Endangered Natural Legacy Protection Act, H.R. 2374, 104th Cong. (1995); the Northern Rockies Ecosystem Protection Act, H.R. 852, 104th Cong. (1995); the National Aquatic Ecosystem Restoration Act, H.R. 4481, 103d Cong. (1994); the National Biological Survey Act, H.R. 1845, 103d Cong. (1993); and the National Biological Diversity Conservation and Environmental Research Act, H.R. 1268, 101st Cong. (1989). A review of state legislation and programs is presented in SUSAN GEORGE, SAVING BIODIVERSITY: A STATUS REPORT ON STATE LAWS, POLICIES AND PROGRAMS (1996). The leading federal administrative proposals and initiatives are discussed in this Article.

4. Compared with scientific publications on the same subject, the legal literature on biological diversity and ecosystem management is relatively thin. Beyond writings focused on the Endangered Species Act, single agencies (e.g., the Forest Service), or particular ecosystems (e.g., the Everglades), recent treatments include Scott W. Hardt, *Federal Land Management in the Twenty-First Century: From Wise Use to Wise Stewardship*, 18 HARV. ENVTL. L. REV. 345 (1994) (proposing an expansion of the multiple-use doctrine); Robert B. Keiter, *Beyond the Boundary Line: Constructing a Law of Ecosystem Management*, 65 U. COLO. L. REV. 293 (1994) (urging a federal ecosystem management mandate); J.B. Ruhl, *Biodiversity Conservation and the Ever-Expanding Web of Federal Laws Regulating Nonfederal Lands: Time for Something Completely Different?* 66 U. COLO. L. REV. 555 (1995) (proposing a partnership between federal, state, and private agencies for private lands conservation); Rebecca W. Thomson, *Ecosystem Management: Great Idea But What Is It, Will It Work, and Who Will Pay?*, NAT. RESOURCES & ENV'T, Winter 1995, at 42 (raising good questions, but offering no answers); and Holly Doremus, Comment: *Patching the Ark; Empowering Legal Protection of Biological Diversity*, 18 ECOLOGY L.Q. 265 (1991) (proposing an extension of Endangered Species Act protections). For a jaundiced view of federal involvement in diversity and ecosystem protection, see Allan K. Fitzsimmons, Federal Ecosystem Management: A Train-Wreck in the Making (Oct. 26, 1994) (unpublished manuscript, on file with author) (portraying ecosystem protection as Big Brother trampling on private rights). Recent symposia on the subject are found in *Symposium on Ecology and the Law*, 69 CHI.-KENT L. REV. 847 (1994), and *Biodiversity Symposium*, 8 TULANE ENVTL. L.J. 1 (1994). While all of these articles contribute proposals to advance diversity and eco-

This Article accepts as a given that biological diversity is a desirable goal.[5] This Article also accepts, and bypasses, the need for multiple approaches to diversity, including gap analysis, dispersion corridors, zoning restrictions, tax incentives, transferable development rights, acquisition programs, public-private partnerships, and other measures proposed in the literature and in Congress. Last and not least, this Article recognizes only briefly the achievement of the Endangered Species Act in bringing the message of diversity to an often-unwilling public.[6] It is not possible to imagine the serious, difficult conversations now taking place over western water management,[7] coastal land development,[8] the depletion of aquifers[9] and the impact of marine fisheries[10] without the existence of endangered turtles, salmon, salamanders and their kin—and the law that backs them up. Indeed, it might be said that the Endangered Species Act is in trouble today not because it fails to address diversity and ecosystems, but instead because it is beginning to address them too well.

The question now is whether we can eliminate the middlemen of endangered species and get to the business of protecting their landscapes in a more straightforward fashion. This Article begins its study of this question by considering

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system management, none offers a legal standard by which diversity and the larger landscape are to be protected. Such a standard, if it exists, and the dangers inherent in acting without one are the subjects of this Article.

5. For the importance and value of biological diversity, see WILSON, *supra* note 2, and sources cited *supra* note 3.

6. *See infra* notes 518-540 and accompanying text (describing the Endangered Species Act and some of its effects). Comprehensive reviews of the Act are presented in MICHAEL J. BEAN, THE EVOLUTION OF NATIONAL WILDLIFE LAW 329-83 (1983); DANIEL J. ROHLF, THE ENDANGERED SPECIES ACT: A GUIDE TO ITS PROTECTIONS AND IMPLEMENTATION (1989); Oliver A. Houck, *The Endangered Species Act and Its Implementation by the U.S. Departments of Interior and Commerce*, 64 U. COLO. L. REV. 277 (1993); and James C. Kilbourne, *The Endangered Species Act Under the Microscope: A Closeup Look from a Litigator's Perspective*, 21 ENVTL. L. 499 (1991). The role of the Act in driving the federal government and, increasingly, non-federal entities towards diversity protection and ecosystem planning is recognized by the Act's supporters and skeptics alike. *See* Ruhl, *supra* note 4, at 579 (asserting that the Endangered Species Act is "without question the center point of the federal biodiversity regulation web").

7. *See infra* notes 546-548 and accompanying text.

8. *See infra* notes 553-556, 567-587 and accompanying text.

9. *See infra* note 551 and accompanying text.

10. *See* Louisiana *ex rel.* Guste v. Verity, 853 F.2d 322, 334 (5th Cir. 1988) (affirming federal requirements that shrimp trawls use turtle excluder devices).

three special problems presented by diversity and ecosystem protection. It then examines the experience of the National Forest Service, the Bureau of Land Management, the National Marine Fisheries Service, and other federal resource managers over the past ten years, as well as more recent advances in multi-species management on private lands. Driven by these case histories, the Article concludes that, however high we raise our sights towards managing the whole, the requirements of individual species will remain the bottom line, or we will have no bottom line, and the entire effort will fail.

I. THREE CHALLENGES OF BIODIVERSITY AND ECOSYSTEM MANAGEMENT

Any proponent of biological diversity or ecosystem management faces several challenges from the start.[11] The first is establishing what these terms mean. A second is appreciating their biological requirements. A third, which overshadows the exercise from start to finish, is appreciating the scale of what diversity and ecosystem protection are going to entail.

A. DEFINITION

The phrases "biological diversity"[12] and "ecosystem"[13] have textbook and scientific definitions that, while serving well in

11. Although the terms are different by definition, this Article takes the risk of considering "biological diversity" and "ecosystem management" together as a single challenge to the law for two reasons. First, they are functionally interdependent, since biodiversity requires ecosystem protection and functioning ecosystems require diversity protection. Second, they present the same challenges to scientists, lawmakers and federal managers. This Article further takes the correlation between species diversity and habitat conservation to be established beyond cavil. *See* WILSON, *supra* note 2, at 259-70 (discussing how the destruction of habitat leads to the destruction of species diversity).

12. Biological diversity has been defined as "the variety of life and its processes. It includes the variety of living organisms, the genetic differences among them, the communities and ecosystems in which they occur, and the ecological and evolutionary processes that keep them functioning, yet ever changing and adapting." NOSS & COOPERRIDER, *supra* note 3, at 5 (modifying a definition developed by the Keystone Dialogue, Keystone Center, 1991). Biodiversity is usually further described at four levels: genetic, species, community or ecosystem, and landscape or regional. *Id.* In case this explanation was not sufficiently complex, the authors continue, "Each of these levels can be further divided into compositional, structural, and functional components of a nested hierarchy. Composition includes the genetic constitution of populations, the identity and relative abundances of species in a natural community, and the kinds of habitats and communities distributed across the land-

academia, become more elusive in the world beyond. Perhaps as technically sound as any is that of the proposed National Biological Diversity Conservation and Environmental Research Act, which states:

> [T]he term "biological diversity" means the full range of variety and variability within and among living organisms and the ecological complexes in which they occur, and encompasses ecosystem or community diversity, species diversity, and genetic diversity.[14]

The Act requires all federal actions to be "consistent" with this goal to the "maximum extent practicable"[15] and requires all federal lands and waters to be "managed to conserve" biological diversity "within the context of the purposes for which those areas were established."[16]

Is this *law*? Eliminate, for the moment, the modifiers "maximum extent practicable" and "the context" of the original purposes, loopholes through which, granted, large exceptions slip daily. Assume that one is a conscientious agency employee intent on carrying out the purpose of the Act, and imagine the discussions that will arise. They will include:

1. Geographic Scale

It is well to speak of community diversity, but to do so begs the question: what community, viewed from what distance? For a timber harvest in the Shoshone National Forest, the community could be lodgepole pine on the North Fork of the

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scape." *Id.* (citation omitted). The difficulty of converting these definitions to a legal concept should be apparent.

13. Wilson has defined an ecosystem as "[t]he organisms living in a particular environment, such as a lake or a forest (or, in increasing scale, an ocean or the whole planet), and the physical part of the environment that impinges on them. The organisms alone are called the community." WILSON, *supra* note 2, at 396. From this definition, the U.S. Fish and Wildlife Service has concluded that an ecosystem can be anything from "a drop of water" to "the entire biosphere." U.S. FISH AND WILDLIFE SERVICE, AN ECOSYSTEM APPROACH TO FISH AND WILDLIFE CONSERVATION 6 (1994). A recent study identifies seven distinct federal agency definitions of ecosystem management. Richard Hauber, *Setting the Environmental Policy Agenda: The Case of Ecosystem Management*, 36 NAT. RESOURCES J. 1, 25 (1996).

14. National Biological Diversity Conservation and Environmental Research Act, H.R. 585, 102d Cong. § 3(1) (1991).

15. *Id.* § 5(b).

16. *Id.* § 5(c). This requirement of the Act is a prosaic restatement of one offered by Aldo Leopold a half century ago: "A thing is right when it tends to preserve the integrity, stability and beauty of the biotic community. It is wrong when it tends to do otherwise." LEOPOLD, A SAND COUNTY ALMANAC, *supra* note 3, at 39. Taken literally, few human undertakings would pass this standard.

Shoshone River, or throughout the Shoshone Forest, or the Northern Rockies, or North America. And while we are at it, lodgepole may exist in Russia as well. Consider the bald eagle, which is well-distributed across Alaska. How should these populations affect planning around a handful of breeding pairs along the Verde River in southern Arizona? Or consider salmon, endangered through most of the Pacific Northwest although some Alaskan stocks remain harvestable; to one Idaho representative, there are plenty of salmon—on the shelves in the grocery store.[17] For some resources, using a broad lens may make communities that are locally-rare, such as eagles, seem well-distributed and plentiful. On the other hand, locally-abundant resources, such as old-growth forest, may look inexhaustible through a small lens but imperiled when viewed more broadly. This problem of scale is exacerbated by a companion issue: time.

2. Temporal Scale

We are asking agencies to plan for and protect the diversity of species and their supporting ecosystems as of when? The arrival of Columbus, perhaps. But no reason jumps to mind why we should ignore the effects of earlier Americans, which could take us back to the saber-toothed tiger and the woolly mammoth. Even using a more contemporary baseline, we are left with many ecosystems that have been irreparably altered—Manhattan, for example—and others that, while theoretically capable of being restored to a natural state, are committed to other uses, such as farming. These systems are beyond change. These realities force us to make judgments about acceptable baselines for diversity that have little to do with mother nature or science. This difficulty with time is, in turn, exacerbated by yet another companion issue: the alterations of nature itself.

3. Change

The more we learn about diversity, the more that knowledge confirms the fact of evolution, and the more we examine ecosystems, the more we see ecosystem change. Populations of

17. *See Goodbye, New West; Hello Lords of Yesterday: Dispatches from the Field*, HIGH COUNTRY NEWS (Carson City), Nov. 28, 1994, at 7 (describing the remark of Representative Helen Chenoweth (R-Idaho) that coho and chinook salmon could not be endangered because "you can buy salmon in a can at Albertson's").

species fluctuate, sometimes wildly, in the natural world. They migrate, invade, get invaded. So, too, the habitats on which they depend grow up, burn down, shift south or north, invade, and get invaded. These observations, while by no means new, have led to the proclamation of a "New Ecology," the ecology of instability and change.[18] For the New Ecologists, the fact of ecological change creates a need for "adaptive management." In its extreme form, "adaptive management" ridicules attempts to save anything in nature. Construed more modestly, it emphasizes flexibility, discretion, and a minimum of legal standards.[19] It is possible to accept the premise of New Ecology without accepting its conclusions, which seem to slide over the fact that, absent some external catastrophe, species evolution, distribution changes, and major habitat alterations take place over long periods of time. The threat today is not the fact but the pace of change. That we will all change, and die, is no reason not to have rules against homicide. Nonetheless, we have the difficulty of focusing on a target that is inevitably, if slowly, in motion.

4. Role of Humans

If efforts to articulate the meaning of diversity and ecosystems trip over concepts of scale, time, and change, they fall flat over the role of human beings in the landscape. Aldo Leopold once observed: "Granting that the earth is designed for man—there is still a question: what man?"[20] Aboriginal humans may have been a harmonious part of their ecosystems, giving and

18. *See generally* DANIEL B. BOTKIN, DISCORDANT HARMONIES: A NEW ECOLOGY FOR THE TWENTY-FIRST CENTURY (1990). Symposia on this concept include *Symposium on Ecology and the Law*, *supra* note 4, and *Beyond the Balance of Nature: Environmental Law Faces the New Ecology*, 6 DUKE ENVTL. L. & POL'Y F. 1 (1996).

19. *Compare* BOTKIN, *supra* note 18, at 8 (criticizing those who "emphasize the benefits of doing nothing and assuming that nature will know best"), *with* A. Dan Tarlock, *The Nonequilibrium Paradigm in Ecology and the Partial Unraveling of Environmental Law*, 27 LOY. L.A. L. REV. 1121, 1139 (1994) (describing how the doctrine of "adaptive management" differs from strict application of fixed legal rules). For a rebuttal to the New Ecology perspective, see Walter Kuhlman, *Making the Law More Biocentric: Responding to Leopold and Conservation Biology*, 6 DUKE ENVTL. L. & POL'Y F. 133 (1996) (characterizing the New Ecology as homocentric and advocating landscape-level protection).

20. Aldo Leopold, *Some Fundamentals of Conservation in the Southwest*, *in* THE RIVER OF THE MOTHER OF GOD 86, 96 (Susan L. Flader & J. Baird Callicott eds., 1991).

taking in kind, but those days have long since given way to human and industrial development that have put a new face on the earth. Manhattan is not exactly Eden—nor is most of the public range—and the difference is people (and cattle). One participant in an extended and ultimately fruitless round-table on the "Colorado Model" for rangeland reform recently summarized his experience as follows:

> The Colorado discussions reveal that common notions of *ecosystems health* and *sustainability*—notions that can be encoded in standards and guidelines for western public lands—will not emerge because range policy lacks mechanisms for exploring and reconciling different perceptions of ecological sustainability. *We are as divided as ever over just what an ecosystem is, and have not yet even found words or useful metaphors to carry on the much needed public discussion on the correct human role in ecosystems.*[21]

We are left with a conundrum. No reasonable person could suggest that human beings are not a part of the ecosystems that sustain all life on earth. On the other hand, once diversity and ecosystems are defined in terms of existing or future human activities, the terms lose whatever science and objectivity they may have had. Ecosystems become simply whatever humans want them to be, and the concept migrates, like "multiple use," towards a standardless, subjective call.

B. SCIENCE

The science of environmental law is difficult and demanding. Reasonable men differ and controversies rage over safe air and water quality levels, the effects of pollution discharges, and tolerance levels for carcinogens, mutagens, and reproductive toxins. Similar disputes rage over the environmental impacts of a dredged canal, an oil lease, or a wilderness road. At times we may ask for more precision than science can deliver, at which point no decision is tenable and the law breaks down.[22]

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21. William E. Riebsame, *People as Part of Ecosystems: The Case for Rangeland Reform*, RESOURCE L. NOTES, Apr. 1996, at 9, 11 (last emphasis added).

22. *See* Natural Resources Defense Council, Inc. v. EPA, 824 F.2d 1146, 1165-66 (D.C. Cir. 1987) (en banc) (noting that, because of "limited scientific knowledge of the effects of exposure to carcinogens at various levels," the EPA Administrator "must use his discretion to meet the statutory mandate"); *see also* Phillip D. Reed, *The Trial of Hazardous Air Pollution Regulation*, 16 Envtl. L. Rep. (Envtl. L. Inst.) 10,066, 10,067 (March 1986) (describing the stalemate produced by the Clean Air Act's "ample margin of safety" standard). For these reasons, the EPA and Congress have gravitated away from science-

Biodiversity and ecosystem protection make particularly great demands on science. In decisions about air quality or water pollution, at least we have had a handle on the variables: one discharge, a few contaminants, and a targeted effect. When it comes to the diversity of an ecosystem, however, there are thousands of organisms in a spade full of soil.[23] We have identified and classified only a fraction of the living organisms on earth.[24] We know even less about their interrelationships.[25] Beyond a few "charismatic megafauna," we know little about the biology of even those species sufficiently well-identified to be listed under the Endangered Species Act.[26]

Despite these complexities, a growing number of scientists have proposed decision-making constructs for diversity and ecosystem conservation. One of the most succinct of these efforts has been offered in support of diversity "reserves," and offers the following principles:

1. Species well distributed across their native range are less susceptible to extinction than species confined to small portions of their range.

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based approaches in pollution control and towards more achievable technology-based standards. *See* Oliver A. Houck, *Of Bats, Birds and BAT: The Convergent Evolution of Environmental Law*, 63 MISS. L.J. 403, 410-22 (1994) (discussing the inherent difficulty in generalized ambient standards and the subsequent recourse to technological standards).

23. *See* WILSON, *supra* note 2, at 132-33; *see also* ALVERSON ET AL., *supra* note 3, at 25 (citing a study finding 250,000 mites, representing 75 to 100 species, in a square meter of Oregon forest soils).

24. *See* Edward O. Wilson, *The Biological Diversity Crisis: A Challenge to Science*, ISSUES IN SCI. & TECH., Fall 1985, at 21.

25. *See* U.S. GENERAL ACCOUNTING OFFICE, ECOSYSTEM MANAGEMENT 7 (1994) ("[U]nderstanding the ecology of an ecosystem will require collecting and linking of large volumes of scientific data . . . . Furthermore, there is still much uncertainty about how ecosystems function—uncertainty that contributes to strong differences in the interpretation of scientific evidence.").

26. *See* Reed F. Noss et al., *Endangered Ecosystems of the United States: A Preliminary Assessment of Loss and Degradation*, 28 BIOLOGICAL REP. 1, 3 (1995) (declaring that "[s]cientists cannot yet say with accuracy how much land or what percentage of an ecosystem type must be kept in a natural condition to maintain" either species or the ecosystem itself); *see also* Michael G. Gippert, *NEPA—What To Do When the Information Is Incomplete, Unavailable, or Keeps Changing: Maintaining Legal Sufficiency in the Face of "New Information!"*, CA45 A.L.I.-A.B.A. 329, 332 (1995) (quoting former U.S. Forest Service Chief Jack Ward Thomas: "[N]ot only are ecosystems more complex than we think—they are more complex than we can think"). In another article, Dr. Thomas concludes, "When is the information base adequate to support emotionally laden, economically explosive decisions so that all parties will be satisfied? The answer, likely, is never." Jack Ward Thomas, *Wildlife in Old-Growth Forests*, FOREST WATCH, Jan.-Feb. 1992, at 13, 15.

2. Large blocks of habitat containing large populations of a target species are superior to small blocks of habitat containing small populations.
3. Blocks of habitat close together are better than blocks far apart.
4. Habitat in contiguous blocks is better than fragmented habitat.
5. Interconnected blocks of habitat are better than isolated blocks, and dispersing individuals travel more easily through habitat resembling that preferred by the species in question.
6. Blocks of habitat that are roadless or otherwise inaccessible to humans are better than roaded and accessible habitat blocks.[27]

These principles have been echoed in other scientific literature[28] and federal documents,[29] and they are "widely accepted" by ecologists and conservation biologists.[30] No statement that *A* is "better than" *B*, however—as accurate as it might be—constitutes law. It does not say that *B* may not be done, or establish conditions or limits for parties who want to do *B*. It does not even require an *A-B* compromise.

Now if the "better than's" were to be removed from these principles, we would have absolutes.[31] Indeed, for resources management we would have something that looks like designated wilderness, which is certainly law to apply.[32] But only a limited amount of public or private land is classified as wilder-

27. NOSS & COOPERRIDER, *supra* note 3, at 141.

28. *See* ALVERSON ET AL., *supra* note 3, at 93 ("Big reserves . . . will be necessary to sustain sensitive elements of diversity over the long run."); Robert Peters et al., *Standard Scientific Procedures for Implementing Ecosystem Management on Public Lands*, *in* THE ECOLOGICAL BASIS OF CONSERVATION: HETEROGENEITY, ECOSYSTEMS AND BIODIVERSITY 320 (S.T.A. Pickett et al. eds., 1997). By way of disclosure, the author contributed to the latter work.

29. *See* COUNCIL ON ENVIRONMENTAL QUALITY, EXECUTIVE OFFICE OF THE PRESIDENT, INCORPORATING BIODIVERSITY CONSIDERATIONS INTO ENVIRONMENTAL IMPACT ANALYSIS UNDER THE NATIONAL ENVIRONMENTAL POLICY ACT 7 (1993) (noting the preference of large, connected "blocks of natural habitat" to conserve biodiversity).

30. NOSS & COOPERRIDER, *supra* note 3, at 141 (citing a report listing five reserve guidelines recognized by many specialists).

31. In fact, the authors do drop the "better than's" in a later description of principles for forest resources management. *See* NOSS & COOPERRIDER, *supra* note 3, at 206-09 (providing more detailed recommendations for preserving landscapes).

32. *See* Wilderness Act of 1964, 16 U.S.C. §§ 1131-1136 (1994). The Act essentially prohibits development or permanent intrusion in designated wilderness areas.

ness.[33] For the remainder, large landscape protection is more a goal than a bottom line.

C. CONSEQUENCES AND THE STATUS QUO

All environmental laws have to confront the status quo, or there would be little reason for them in the first place. What is unique to biodiversity and ecosystem planning is the scale of that confrontation. The Endangered Species Act has enough difficulty bringing its protections to a relative few, if expanding, habitats of listed species. When we start planning for the needs of all species, great and small, common and rare, across the mosaic of landscapes that are America, we make demands of new magnitude. The first lesson of conservation biology about perpetuating species and ecosystems over time is the need for Major Space—Large Tracts of Undisturbed Landscape.[34] Planning around a few endangered species was irritating enough to land managers and developers. Leaving large landscapes undisturbed will send them up the wall.

The status quo, moreover, is not a level playing field. What is commonly called free enterprise is fueled by federal subsidies that encourage the development of the most sensitive natural areas in America.[35] Real estate development—even on

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33. As of January 1992, approximately 95 million acres of the public lands were classified as wilderness. *See* GEORGE CAMERON COGGINS ET AL., FEDERAL PUBLIC LAND AND RESOURCES LAW 1032 (3d ed. 1992).

34. *See* NOSS & COOPERRIDER, *supra* note 3, at 205 (making recommendations for forest reserve management); Noss et al., *supra* note 26, at 17 (noting the inadequacy of small, isolated samples of ecosystems and calling for the use of large, interconnected landscapes). "In the near term, few regions are likely to have reserves large and numerous enough to maintain the full spectrum of nature species and ecological and evolutionary processes. But without reserves we might as well throw in the towel." NOSS & COOPERRIDER, *supra* note 3, at 205.

35. A recent U.S. Department of Interior report identifies 45 major federal subsidy programs encouraging the development of wetland ecosystems. *See* U.S. DEP'T OF INTERIOR, THE IMPACT OF FEDERAL PROGRAMS ON WETLANDS (1994) (analyzing the relationship between wetlands and federal programs). For current federal projects impacting natural areas, see The Green Scissors Campaign of Citizens United to Terminate Subsidies, The Green Scissors Report: Cutting Wasteful and Environmentally Harmful Spending and Subsidies (Jan. 1995) (on file with author); for additional subsidies see Elizabeth Losos et al., Taxpayers' Double Burden: Federal Revenue Subsidies and Endangered Species (1993) (on file with author). For an analysis of subsidies to a single industry, see Roland Hwang, Money Down the Pipeline: Uncovering The Hidden Subsidies to the Oil Industry (Sept. 1995) (on file with author); Bruce Alpert, *Royalty Holiday Ok'd for Oil, Gas,* TIMES-PICAYUNE (New Orleans), Nov. 9, 1995, at C1 ("After intense lobbying by an

beach dunes, floodplains, and high alpine meadows—is encouraged by $70 billion a year in federal income tax deductions.[36] Similar deductions, price supports, and federal projects underwrite large-scale ecosystem conversions from wetland drainage to arid-land agriculture to residential cul-de-sacs at highway interchanges.[37] The most useful step the federal government could take to assure the diversity of species and the ecosystems on which they depend is simply to stop subsidizing their destruction. No one is predicting that this step will be taken.[38]

The status quo is further tilted by psychological dependencies of a new dimension. Over time, if with great difficulty, environmental law could address the problems of pollution control: we installed scrubbers and paid for them in our utility bills, took the lead out of gasoline and continued to drive. Large-landscape conservation challenges deeper assumptions about animals and humans, about the purpose of forests, about the primacy of man on earth.[39] No other objective in environmental law questions more how people live and think than pre-

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unusual alliance of Oil Patch lawmakers and the Clinton administration, the House . . . voted overwhelmingly Wednesday for a royalty holiday on deepwater oil and gas leases . . . .").

36. According to the Joint Committee on Taxation, home mortgage interest deductions cost the U.S. Treasury $45.5 billion in 1994 with a five-year projected cost of $253.9 billion. *See* STAFF OF JOINT COMM. ON TAXATION, 103D CONG., ESTIMATES OF FEDERAL TAX EXPENDITURES FOR FISCAL YEARS 1994-1998, at 13 (Comm. Print 1993). Additionally, $100 billion in incentives over five years in the form of tax free roll-overs, exemptions, and real estate tax deductions were also made available.

37. The primary facilitators of bottomland drainage, arid-land agriculture, and suburban development are public works projects of the U.S. Army Corps of Engineers, Bureau of Reclamation, and Federal Highway Administration, respectively. *See* Reclamation Act of 1902, 43 U.S.C. § 371 (1994) (proclaiming arid-land irrigation as a mission of the Bureau of Reclamation); DEP'T OF INTERIOR, DOCUMENTATION, CHRONOLOGY AND FUTURE PROJECTIONS OF BOTTOMLAND HARDWOOD HABITAT LOSS IN THE LOWER MISSISSIPPI ALLUVIAL PLAN (Nov. 1979) (describing the relationship of Corps projects to wetland loss).

38. Efforts to take such a step have been made. *See* Bruce Alpert, *Subsidies Targeted by Labor Chief*, TIMES PICAYUNE (New Orleans), Dec. 8, 1994, at C1 (marking the proposed elimination of oil and gas royalty exceptions); *see also* Public Resources Deficit Reduction Act, H.R. 721, 104th Cong. (1995) (seeking to eliminate federal subsidies for natural resource depletion).

39. *See* Oliver A. Houck, *Reflections on the Endangered Species Act*, 25 ENVTL. L. 689, 697-99 (discussing the psychological dimensions of this conflict). *See generally* JOHN MCPHEE, THE CONTROL OF NATURE (1989) (describing continuing efforts to tame the Lower-Mississippi River and other natural forces).

serving ecosystems and biological diversity. No less is the challenge to land and resource managers, who have been trained to consider grass, trees, wildlife, and other resources as "outputs" to be maximized by human intervention. Along comes a new doctrine that says: Leave It Alone. The idea extends beyond the pocketbook; it says that the way we have lived and the skills we have learned are wrong-headed, harmful, and in need of change. None of this is easy medicine for the soul.[40]

Against such economic and psychological forces, laws based on aspiration alone will not suffice. Indeed, they have never sufficed in environmental law, nor have statutes authorizing agencies to take protective measures as they see fit. The reality of natural resource law is that commodity users have overridden the good intentions and the discretionary language of the Multiple-Use Sustained-Yield Act of 1960,[41] the Federal Land Policy and Management Act,[42] the National Forest Man-

40. Outbreaks of hostility and lawlessness continue to be directed toward those proposing to modify the status quo to accommodate endangered species. *See Bomb Rips Building in Nevada*, TIMES PICAYUNE (New Orleans), Nov. 1, 1993, at A5 (describing a bomb explosion at offices of the Bureau of Land Management (BLM)); The Conservation Fund, *Pipe Bomber Targets Forest Service Ranger*, LAND LETTER, Sept. 1, 1995, at 6 (describing a bomb attack at a Forest Service employee's home); *Pattern of Violence Out West Alleged*, TIMES PICAYUNE (New Orleans), Aug. 13, 1996, at A2 (citing 58 incidents of violence against federal land managers in the West, including assaults on five federal workers and shots fired at six others). Beyond the level of physical violence are regular reports of firings, transfers, and demotions of state and federal employees attempting to secure environmental protections. *See* ALVERSON ET AL., *supra* note 3, at 240 (relating the dismissal of a Forest Service biologist); Tony Davis, *BLM Chief Jim Baca Leaves Amidst Cheers and Boos*, HIGH COUNTRY NEWS (Carson City), Feb. 21, 1994, at 1 (noting the reaction of a New Mexico Cattle Growers Association spokesperson to the resignation of BLM Chief Baca: "One down and 99 to go"); Adam Duerk, *BLM Manager in Wyoming Gets Trampled*, HIGH COUNTRY NEWS (Carson City), Feb. 22, 1993, at 3 (reporting on the transfer of BLM grazing manager for proposing grazing reductions); Timothy Egan, *Forest Supervisors Say Politicians Are Asking Them to Cut Too Much*, N.Y. TIMES, Sept. 16, 1991, at A1 (describing "intense political pressure" from Congress that Forest Service employees resist "at the risk of their own jobs"); Todd Wilkinson, *Utah Ushers Its Frogs Toward Oblivion*, HIGH COUNTRY NEWS (Carson City), May 27, 1996, at 1 (describing the firings of state biologists for research on disappearing frog populations).

41. 16 U.S.C. §§ 528-531 (1994); *see infra* note 58 and accompanying text (discussing the failure of multiple use as a management standard).

42. 43 U.S.C. §§ 1701-1784 (1994); *see infra* notes 429-437 and accompanying text (discussing the Act's difficulties in bringing conservation to single-use range management)

agement Act,[43] and similar statutes without breaking stride. Whatever the statute, and however well-intentioned the implementing agency, what Justice Holmes once described as the "hydraulic pressure" of "immediate interests"[44] will wear it down. Authorizations to protect languish, "shall's" become "may's," and "may's" simply disappear. Tough odds call for precise law.

Specificity, then, becomes the greatest challenge to any law seeking to protect biological diversity and ecosystems. On one level, it is a question of wrestling potentially limitless questions of scale, time, baselines, and scientific complexity to the ground. On another level, it is a question of standards sufficient to wrestle the most powerful economic forces in the country, if not to the ground, to something closer to a draw.

In this quest for specificity, however, we need not start from scratch. The U.S. Forest Service has been dealing with diversity for the past twenty years. Its experience provides a first guide.

II. THE U.S. FOREST SERVICE EXPERIENCE

Federal planning for biological diversity began with—and until recently pretty much ended with—the U.S. Forest Service, whose history of resource management extends back a century to Gifford Pinchot and Smokey the Bear.[45] Originally es-

43. 16 U.S.C. §§ 1600-1614 (1994); *see infra* Part II.A (describing the Act's spotty record in diversity planning). Some indication of the power of the status quo in forest management can be gleaned from the following data: according to the incoming chief of the U.S. Forest Service, by the year 2000, recreation will account for $97.8 billion of the $130.7 billion generated by uses of the national forests, while fish and wildlife will generate another $12.9 billion; timber will generate only $3.5 billion. *See* Jon Christensen, *The Shotgun Wedding of Tourism and Public Lands*, HIGH COUNTRY NEWS (Carson City), Dec. 23, 1996, at 12, 13. These disparate revenue potentials notwithstanding, the U.S. Forest Service's fiscal year 1997 budget proposes to spend $196 million on timber sales administration, $93 million on timber-related road construction, and $164 million on recreation management. *See Natural Resources Budgets for Fiscal 1997*, LAND LETTER, Oct. 20, 1996, at 4. Whatever its potential for the future, timber continues to wag the dog.

44. Northern Sec. Co. v. United States, 193 U.S. 197, 400-01 (1904) (Holmes, J., dissenting) ("These immediate interests exercise a kind of hydraulic pressure which makes what previously was clear seem doubtful, and before which even well settled principles of law will bend.").

45. Gifford Pinchot, the first Chief of the U.S. Forest Service, is largely credited with its origin, and multiple-use philosophy. *See* STEWART L. UDALL, THE QUIET CRISIS 102-08 (1967). Smokey the Bear, the Service's durable mascot and symbol, was the brainchild of a toy manufacturer and the equally

tablished to protect "forest reserves" from wildcat logging, the Forest Service's priorities shifted massively towards timber production after the Second World War.[46] The National Forest Management Act[47] attempted to restore the balance with new planning requirements, including one specifically for biological diversity. These diversity regulations were developed by a committee of experts in forestry and wildlife sciences whose foresight remains, nearly twenty years later, remarkable. The experience of these regulations is our closest guide to what works in diversity and ecosystem planning.

The Forest Service began serious consideration of the impact of its operations on wildlife species in the 1930s, under the impetus of general wildlife legislation and Service biologists such as Aldo Leopold, who were studying the relationship of habitat to wildlife and all living things.[48] A respectable cadre of wildlife scientists supported research and management activities until the Second World War and the subsequent, post-war timber boom.[49] By the 1950s, even as the agency was escalating its timber production to heroic proportions,[50] it was also conducting modest—if largely ineffective—planning for wildlife. The Multiple-Use Sustained-Yield Act of 1960[51] encouraged the Service to continue these planning efforts, leading to the development of two compatible but differing approaches towards wildlife management.[52] The first emphasized "species

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entrepreneurial President Theodore Roosevelt, who saw its potential for promoting a new conservation ethic. *See generally* SAMUEL TRASK DANA, FOREST AND RANGE POLICY: ITS DEVELOPMENT IN THE UNITED STATES (2d ed. 1980) (providing an overview of the early history of the Forest Service).

46. *See* DANIEL R. BARNEY, THE LAST STAND 69-105 (1974) (describing the Forest Service's swing to massive timber production); CHARLES F. WILKINSON, CROSSING THE NEXT MERIDIAN 135-41 (1992) (describing the Forest Service's swing to massive timber production); *see also infra* note 50 and accompanying text (providing statistics of timber production following World War II).

47. 16 U.S.C. §§ 1600-1614 (1994).

48. *See* Aldo Leopold, *The Conservation Ethic*, 31 J. FORESTRY 634, 641 (1933) (promoting wildlife conservation); Charles F. Wilkinson & H. Michael Anderson, *Land and Resource Planning in the National Forests*, 64 OR. L. REV. 1, 283 (1985) (noting Aldo Leopold's leadership in the Forest Service's wildlife conservation policy).

49. *See* Wilkinson & Anderson, *supra* note 48, at 285 (highlighting the post-war boom).

50. Before the end of the Second World War, the annual cut from the natural forests averaged 1 billion board feet; it jumped to 3.3 billion in 1944, to 4.4 billion in 1952, and to 12.1 billion in 1966. *Id.* at 135-38.

51. 16 U.S.C. § 528 (1994).

52. *See* Wilkinson & Anderson, *supra* note 48, at 288-89 (providing an overview of the emergence of diversity in wildlife management). The "species

richness" with the goal of ensuring that wildlife species within the planning area were maintained in viable numbers. In practice, this method, while broadly inclusive, proved short on the specifics necessary to ensure species viability.[53] The second approach looked to "featured species," the needs of which could be accommodated in timber harvests and other uses. This approach worked best for selected game animals (whose lot was often improved by clearcutting and other habitat modification), and for threatened species with limited habitat needs.[54] In terms of biological diversity, however, the "featured species" approach was long on specifics but short on coverage. Since that time, diversity planning has continued to rely on these two primary approaches to the job.

A. THE FOREST SERVICE DIVERSITY REGULATIONS

In 1976, diversity planning was boosted forward by the "most adventurous congressional incursion" into the activities of the Forest Service,[55] the National Forest Management Act (NFMA).[56] Buried within the Act's many compromises over competing uses of forest resources was the nation's first and only explicit statutory provision for the protection of biological diversity. Section 6(g)(3)(B) directed the Service to:

> provide for diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives, and within the multiple-use objectives of a land management plan adopted pursuant to this section, provide, where appropriate, to the degree practicable, for steps to be taken to

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richness" and "featured species" summaries that follow are taken from this account.

53. *See id.* at 288 (citation omitted) (noting the absence of specific, prescriptive standards for wildlife species).

54. *See id.* at 289.

55. *Id.* at 7.

56. 16 U.S.C. §§ 1600-1614 (1994). Commentators widely hailed the Act as providing substantive law for forest management. *See* Jack Tuholske and Beth Brennan, *The National Forest Management Act: Judicial Interpretation of a Substantive Environment Statute*, 15 PUB. LAND L. REV. 53, 54-56 (1994). In the words of one forestry expert: "When the NFMA was enacted in 1976, I had a great feeling of accomplishment. I felt that the law clearly stated what must and must *not* be done." *Id.* at 67. (citing Arnold W. Bolle, *The Bitterroot Revisited: A University Re-view of the Forest Service*, 10 PUB. LAND L. REV. 1, 5-9 (1989)). Mr. Bolle, Dean of the University of Montana School of Forestry, conducted a study of Forest Service practices that was instrumental in the passage of NFMA. *See* Bolle, *supra*, at 1-15. Little did he know how few "must's" and "must not's" would be found.

preserve the diversity of tree species similar to that existing in the region controlled by the plan.[57]

Left to its own devices, this provision would not travel very far. At first blush its language reads almost as a parody of law, qualified by no fewer than two provisos: "where appropriate" and "to the degree practicable," and, were anything left, by the eviscerating "in order to meet multiple-use objectives," a standard that has consistently failed to limit agency decisions.[58] The legislative history of this section, however, tells a quite different story about what was intended and, indeed, said. The diversity provision of NFMA was a seriously debated and conscious attempt by the Act's leading sponsors to curb the conversion of hardwoods to other species and to forestall monoculture forestry.[59] In context, the use of the term "multiple-use objectives" was intended to limit the reduction of forest diversity to a few dominant species.[60] Departures from the principle

57. 16 U.S.C. § 1604(g)(3)(B) (1994).

58. *See infra* notes 165-174 and accompanying text (illustrating failure of the concept of multiple use to restrain even the most single-use decisionmaking); *see also* Sierra Club v. Marita, 843 F. Supp. 1526, 1556 (E.D. Wis. 1994) (rejecting challenge to the Forest Service's Implementation of the Act); Intermountain Forest Indus. Ass'n v. Lyng, 683 F. Supp. 1330, 1336 (D. Wyo. 1988) (finding no irreparable harm resulting from sale of timber); National Wildlife Fed'n v. United States Forest Serv., 592 F. Supp. 931, 938 (D. Or. 1984) (vacating a judgment and thereby failing to enforce a more stringent reading of the act), *appeal dismissed*, 801 F.2d 360 (9th Cir. 1986); Dorothy Thomas Found. v. Hardin, 317 F. Supp. 1072, 1076 (W.D.N.C. 1970) (allowing sale of timber despite Multi-Use Sustained-Yield Act of 1960); *infra* notes 217-223 and accompanying text (discussing failure to enforce stringent standards). In the words of one forestry expert, "[T]he real problem was timber primacy, which now dominated and controlled Forest Service activity. This marked a clear departure from the broader Congressional concept of multiple use as earlier conceived." Bolle, *supra* note 56, at 11. *See generally* Michael C. Blumm, *Public Choice Theory and the Public Lands: Why Multiple Use Failed*, 18 HARV. ENVTL. L. REV. 405 (1994) (criticizing multiple use as a management standard); George Cameron Coggins, *Of Succotash Syndromes and Vacuous Platitudes: The Meaning of "Multiple Use, Sustained Yield" for Public Land Management*, 53 U. COLO. L. REV. 229 (1982) (analyzing the dismal record of multiple use as a management standard).

59. *See* Wilkinson & Anderson, *supra* note 48, at 170-73, 292-96 (noting the intent of the sponsors).

60. *Id.* at 172-73. Senator Hubert H. Humphrey sought to "elevate wildlife and ecological values in relation to timber," *id.* at 171, while Senator Jennings Randolph—through his own bill, introduced concurrently with Humphrey's proposal—"sought to prohibit any action in a national forest that would result in significant loss of fish or wildlife habitat." *Id.* at 292. The two senators, however, "were united in their concern that timber management had taken top priority at the expense of other forest resources." *Id.* at 293. The language of the Humphrey bill requiring planning regulations to "provide

of species diversity would be allowed only where justified on the basis of "overall" multiple-use objectives, that is to say, objectives other than timber.[61] The burden of this justification lay on the Service.[62] When Congress said "multiple-use" in Section 6(g)(3)(B), it was not thinking license; it was thinking constraint.

Congress went one step further. In order to make the new limitations on timber management a reality, Congress directed the appointment of a Committee of Scientists to assist the Forest Service in developing regulations that would flesh out these provisions and become, in effect, the law of NFMA.[63] The Committee's recommendations on managing for diversity were to become the state-of-the-art.

The Committee of Scientists approached this task with more dedication than Congress had any reason to expect. Meeting eighteen times over a year and a half in public meetings across the country, the Committee assisted the Forest Service staff in drafting regulations, and commented extensively on the initial draft, before it prepared a final draft with comments and a summarizing report.[64] During this process,

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for plant and animal communities based on the suitability and capability of the specific land area," became the basis of the NFMA diversity requirement, but the final bill incorporated an amendment, offered by Senators Metcalf and Bumpers, that drew heavily from Senator Randolph's bill. *Id.* The language "multiple use objectives" was added by the committee staff tasked with merging the Metcalf amendment with the Humphrey bill. *Id.* at 294. The principal drafter of the bill, James Moorman, explained: "The basic injunction . . . is to preserve the natural diversity of forest types and species." *Id.* at 292 n.1561.

61. Senator Bumpers asked Chief McGuire: "[Y]ou can only do [conversions] for one purpose in the long run; that is for timber production. It is not compatible with multiple use; is it?" *Id.* at 172 n.891 (alterations in original). The question was rhetorical.

62. In the words of the most comprehensive analysis of this legislation and its history, "The agency must be able to justify the conversion in terms of the 'overall,' nontimber resource objectives." *Id.* at 172.

63. *See* 16 U.S.C. § 1604(h) (1994).

64. The Committee of Scientists, composed of seven experts in forestry and wildlife biology appointed by the Secretary of Agriculture, held 18 public meetings between May 1977 and January 1979. *See* Supplementary Final Report of the Committee of Scientists, 44 Fed. Reg. 53,967 (1979). The Committee issued its final report in May 1979, Final Report of the Committee of Scientists, 44 Fed. Reg. 26,599 (1979), and a supplementary final report in August 1979. Supplemental Final Report of the Committee of Scientists, 44 Fed. Reg. 53,967 (1979). The Forest Service adopted the Committee's recommendations in September 1979. *See* 36 C.F.R. § 219 (1996). In 1982, the Department of Agriculture proposed changes in the regulations. *See* 47 Fed. Reg. 43,026 (1982). In the face of a substantial and adverse public response, the Department convened a panel of members of the former Committee of

the concept of diversity was one of the most "perplexing issues" faced, as well as one of the most contentious.[65] At least six different draft versions of the diversity ("fish and wildlife") section were circulated and reviewed.[66] At one pole were those who saw Congress's diversity language as entirely (and appropriately) discretionary.[67] At the other were those who, feeling that the "lure of monetary returns" would continue to produce "biological deserts" and "unstable [forest] communities," urged great specificity to ensure that diversity would materialize.[68] The Committee opted for the latter approach, urging as much specificity as science could usefully bring to bear. The Committee saw specificity as "mandatory."[69]

In reaching this conclusion, the Committee reasoned that Congress intended not only that diversity be "considered" in forest planning, but that it be achieved. The Committee rejected the use of "diversity indices" as more mechanistic than useful, and declared it "impossible" to prescribe regulations to identify the ingredients of diversity "in all regions, in a wide variety of vegetation types, and with a wide range of natural and human factors."[70] By the same token, the Committee felt impelled to develop regulations that went beyond the minima of the Act to "assure" that the Forest Service would "indeed 'provide for' diversity by maintaining and preserving existing variety."[71] The first step would set a baseline of the natural forest: "species and community diversity . . . at least similar to

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Scientists. *See id.* The final amendments left the diversity provisions largely, but not entirely, intact. *See infra* notes 72-86 (describing the final amendments).

65. *See* Final Report of the Committee of Scientists, 44 Fed. Reg. at 26,602 (noting criticism of proposed regulations).

66. *See id.* at 26,627.

67. *See id.*

68. *Id.* at 26,609; *see also id.* at 26,604 (discussing the specificity issue); Supplemental Final Report of the Committee of Scientists, 44 Fed. Reg. at 53,968 (same).

69. The Committee explained:

> Section 219.10 contains language intended to meet some of the most difficult and demanding requirements of RPA/NFMA. Therefore, adequate regulations in this section are mandatory. Although the language of the draft regulations is a reasoned approach by the Forest Service . . . it *often falls short of the specificity necessary* to establish appropriate guidelines and standards in these critical and controversial areas.

Final Report of the Committee of Scientists, 44 Fed. Reg. at 26,626-27 (emphasis added).

70. *Id.* at 26,609.

71. *Id.*

that which would be expected in unmanaged areas in the region."[72] The second would be to maintain "viable populations of all existing native vertebrate species," and "habitat of management indicator species."[73] This approach echoed the viable populations and indicator species approaches of yore, with two strengthening amendments: the Service was to maintain *all* native vertebrate species, and it was to select indicator species not on the basis of their local popularity but instead, primarily, for their role as indicators of ecosystem change.[74]

In its final comments and report the Committee defended the specificity of these regulations: it was "simply not possible to carry out the planning requirements of NFMA in accordance with a set of regulations that contain nothing but generalities."[75] The Committee also defended its reliance on species diversity and abundance against arguments that Congress made no particular reference to these factors in the Act: the "kinds and numbers [of species] are the biological ways that diversity is measured."[76] The Service was to use indicator species to achieve diversity of the whole.

And so it did. The Forest Service's final biological diversity requirements are contained in two sections of its planning regulations. Section 219.27, entitled "Management Requirements," provides the goal and the baseline:

> (g) *Diversity.* Management prescriptions, where appropriate and to the extent practicable, shall preserve and enhance the diversity of plant and animal communities, including endemic and desirable naturalized plant and animal species, so that it is at least as great as that which would be expected in a natural forest and the diversity of tree species similar to that existing in the planning area.[77]

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72. *Id.* at 26,653; *see also* Supplemental Final Report of the Committee of Scientists, 44 Fed. Reg. at 53,975 (stating that diversity should be at least as great as that which would be expected in an unmanaged part of the planning area). The Forest Service would convert this baseline from an "unmanaged area" to the "national forest," a conversion of which the Committee disapproved. *See* 36 C.F.R. § 219.27(g) (1996). The consequences of this apparently innocuous change would appear a decade later. *See* discussion *infra* part II.B.5(a) (discussing lessons learned, specifically from problems with an ever-changing baseline).

73. Final Report of the Committee of Scientists, 44 Fed. Reg. at 26,653.

74. *See id.* (describing these amendments).

75. Supplemental Final Report of the Committee of Scientists, 44 Fed. Reg. at 53,968.

76. *Id.* at 53,975.

77. 36 C.F.R. § 219.27(g) (1996).

Granting the modifiers and the qualifiers, there is no escaping that the goal is the diversity of the natural forest. The regulation continues:

> Reductions in diversity of plant and animal communities and tree species from that which would be expected in a natural forest, or from that similar to the existing diversity in the planning area, may be prescribed only where needed to meet overall multiple-use objectives.[78]

Departures from the goal of natural forest diversity face a heavy burden of proof.

The second requirement is contained in Section 219.19, entitled "Fish and wildlife resource."[79] It is specific and prescriptive: Habitat "shall be managed to maintain viable populations" of existing species; that is, populations with sufficient numbers and distribution "to insure" that the species remains "well-distributed in the planning area."[80] The standard is both numerical, "a minimum number of reproductive individuals," and spatial, habitat that is "well distributed" to facilitate interaction and breeding.[81] Notable here is the obligation "to insure" the viability of these populations, language that would seem to call for cautious assumptions in favor of the species.[82] Notable also is the absence of qualifiers and escape clauses. The standard may be difficult, but it is plain.

Section 219.19 then prescribes a mechanism by which diversity shall be identified and managed through management indicator species (MIS).[83] The Service must select species whose "population changes are believed to indicate the effects of management activities."[84] Five categories of species "shall be

78. *Id.* The regulation further explains that planned conversions need to justify their relation to "the process of *natural change*." *Id.* (emphasis added).

79. *Id.* § 219.19.

80. *Id.*

81. *Id.* In 1982, however, the Forest Service moved to qualify its responsibilities here by adding, to their obligation to maintain and improve habitat for management indicator species, the phrase "to the degree consistent with overall multiple-use objectives." *Id.* § 219.19(a). This qualifier was seen as necessary to allow some modification of habitat otherwise relied on by species. It did not purport to qualify the agency's duties to ensure viable well-distributed populations across the planning area. *See* Wilkinson & Anderson, *supra* note 48, at 303 n.1614 (identifying the change in language).

82. Wilkinson & Anderson, *supra* note 48, at 298 (indicating the requirement that planners allow for contingencies, including fire, disease, and ecological changes).

83. 36 C.F.R. § 219.19(a)(1).

84. *Id.* In the scheme and language of the regulations these species are to be those sensitive to, and indicative of, change. *See* Final Report of the

represented where appropriate":[85] species truly indicative of habitat changes, species that may be significantly influenced by management programs, game species, non-game species of "special interest," and threatened and endangered species.[86] In the world envisioned by the Committee and the regulations, the protection of these species and their habitat needs would have become goals of proactive forest planning, with each species identified and monitored to ensure, in turn, a diverse forest ecosystem. In the more mundane world of a commodity-driven forest program, they became instead a defensive, biology-based bottom line—and a legal battleground.

B. FOREST SERVICE DIVERSITY PLANNING AND THE COURTS

Environmental statutes rarely settle controversy, nor do their implementing regulations. At best, these statutes and regulations set the outer limits for battles in which the same arguments that were compromised in the legislative and rulemaking processes reappear, eventually, in court.[87] With the NFMA regulations, the argument would continue between those who believed that NFMA vested, and should vest, maximum discretion in the Forest Service and those who believed that the law had to, and did, limit that discretion in significant, enforceable ways. On the ground, the Forest Service did not suddenly become less interested in cutting timber and more interested in preserving diversity. The same institutional, economic, and congressional pressures remained. The history of diversity planning since NFMA has been one of enormous in-

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Committee of Scientists, 44 Fed. Reg. 26,599, 26,627 (1979) (stating that the species should be selected because their population changes are believed to indicate effects on other species).

85. 36 C.F.R. § 219.19(a)(1). Language amplifying the "where appropriate" modifier was considered and abandoned by the Committee of Scientists. It was also abandoned by the Forest Service in its original regulations, but inserted in its 1982 amendments without further explanation. Wilkinson & Anderson, *supra* note 48, at 301. Whatever the term might mean, it does not appear to remove the Service's obligation to select species that are sensitive indicators of ecosystem change. *Id.* at 302.

86. 36 C.F.R. § 219.19(a)(1).

87. This phenomenon is common to all statutory law, and has been well described in relationship to the Civil Rights Act of 1991. *See* Al Kamen, *Despite Bill's Signing, Fight Has Just Begun: Second Front Opens Over Rights Law's Meaning*, WASH. POST, Nov. 22, 1991, at A14. ("Those fights—a major source of employment in Washington—are generally the stuff of trade and legal journals and industry publications, even though the infighting often lasts much longer and consumes much more time, energy and money than the fight over the bill itself.") So it would be with NFMA.

stitutional resistance, with sufficient countervailing pressure from advocates of wildlife diversity to produce grudging but equally enormous change.[88] Where diversity planning has made its greatest strides, it has been with the aid of judicial review that saw the Forest Service's discretion clearly bounded by Section 219. Where diversity planning has failed to alter the pre-NFMA status quo, it has done so with the approval of courts who saw a very different set of regulations, if indeed they saw regulations at all.

Courts have decided more than two dozen federal cases on Forest Service diversity issues since 1980, the majority of them quite recently. Many of the cases became interrelated as the litigants struggled with the convolutions of standing, ripeness, and the relationships of NFMA, the National Environmental Policy Act (NEPA), and the ESA.[89] This Article will not recapitulate these cases. Rather, it will attempt to determine what this line of litigation says about the effectiveness of standards for the management of biological diversity. To that end, we have two kinds of stories. One story emerges from the Pacific Northwest and from Alaska, where diversity planning has produced nothing short of dramatic change. The other story emerges from forest controversies in Wisconsin, Arkansas, Texas, and elsewhere, where diversity planning has had considerably less impact to date. The difference lies, in large part, in how reviewing courts have perceived the diversity standards themselves.

1. The Pacific Old-Growth Forest

No environmental issue in recent memory has generated as much public attention, passion, and litigation as the conflict between timber interests in the old-growth forests of the Pacific Northwest and the forests' most famous resident, the northern spotted owl.[90] To the President of the United

88. Many of these wildlife advocates have come from the ranks of the Service itself, including the Association of Forest Service Employees for Environmental Ethics (AFSEEE). *See* Solicitation Letter from Dave Iverson, President, AFSEEE 1 (undated) (on file with author).

89. *See infra* Part II.B.1-II.B.5 (summarizing the cases and the various results in different areas of the country).

90. For a sampling of the legal literature surrounding this issue, see generally Alyson C. Flournoy, *Beyond the "Spotted Owl Problem": Learning From the Old-Growth Controversy*, 17 HARV. ENVTL. L. REV. 261 (1993) (suggesting ways to avoid future spotted owl problems); Victor M. Sher, *Travels With Strix: The Spotted Owl's Journey Through the Federal Courts*, 14 PUB. LAND.

States—and much of the general public—this was an endangered species issue, and there is no doubt that its several outcomes were driven by the ESA.[91] They were also driven, however, and were in fact initiated by, use of the owl as an indicator species under NFMA.

From the outset, the northern spotted owl was viewed as the symbol of an ecosystem. The Forest Service had listed it as a management indicator species for old-growth forest in the 1970s,[92] with little effect on timber sales. By the 1980s, federal agencies held nearly 90% of the owl's remaining habitat, the vast proportion of it on Forest Service and Bureau of Land Management (BLM) lands that remained open for logging.[93] Together, the two agencies were selling old growth at the rate of 86,000 acres a year.[94] By the 1990s, perhaps 10% of the original old-growth forest remained.[95]

Environmental plaintiffs brought suit in Washington, challenging Forest Service sales on the basis, inter alia, of NFMA.[96] They also filed in Oregon, challenging BLM timber sales under NEPA, the Federal Land Policy and Management Act (FLPMA), and on related grounds.[97] The cases were soon complicated by the listing of the owl as a threatened species (another lawsuit),[98] a petition for the listing of its critical habi-

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L. REV. 41 (1993) (providing a chronology of the litigation); Steven L. Yaffee, *Lessons About Leadership From the History of the Spotted Owl Controversy*, 35 NAT. RESOURCES J. 381 (1995) (discussing agency inability to deal with the changing social and political climate).

91. *See* Michael Wines, *Bush, in Far West, Sides With Loggers*, N.Y. TIMES, Sept. 15, 1992, at A25 (quoting President Bush's characterization of the ESA as a "sword aimed at the jobs, families and communities of entire regions").

92. See Sher, *supra* note 90, at 43.

93. *See* Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the Northern Spotted Owl, 55 Fed. Reg. 26,114, 26,118 (1990) (describing, inter alia, the habitat locations for the Northern Spotted Owl). (hereinafter Final Rule)

94. *See, e.g.*, INTERAGENCY SCIENTIFIC COMMITTEE, A CONSERVATION STRATEGY FOR THE NORTHERN SPOTTED OWL 14 (1990) [hereinafter ISC REPORT]; Final Rule, *supra* note 93, at 26,182.

95. *See* J.A. Savage, *Timber Companies Can't See the Forest for the Trees*, BUS. & SOC'Y REV., Summer 1990, at 44 (citing statement of F. Dale Robertson, Chief of Forest Service, regarding the timber remaining in the Pacific Northwest).

96. Seattle Audubon Soc'y v. Robertson, Nos. C89-160WD, C89-99(T)WD, 1991 WL 180099, at *1 (W.D. Wash. Mar. 7, 1991) (order on motions for summary judgment and dismissal).

97. Portland Audubon Soc'y v. Lujan, 884 F.2d 1233, 1236 (9th Cir. 1989).

98. *See* Northern Spotted Owl v. Hodel, 716 F. Supp. 479, 483 (W.D.

tat (another lawsuit),[99] an appropriations bill apparently exempting the sales from environmental laws for the next two years (another lawsuit),[100] and an interagency report recommending a conservation plan for the owl (another lawsuit).[101] In March 1991, however, the federal district court in Washington granted summary judgment to the plaintiffs on the NFMA claim.[102] The ruling was based squarely on the diversity regulations, under which the "minimum requirement is that '[f]ish and wildlife shall be managed to maintain viable populations of existing native and desired non-native vertebrate species in the planning area.'"[103] This duty extended "to the entire biological community—not for one species alone,"[104] and was not preempted by the ESA or other subsequent law.[105]

In May 1991, the district court granted an injunction against the sales,[106] finding again that the Service had not adopted a plan "to ensure the owl's viability."[107] Again, the court saw the issue beyond the owl. Citing a recent report that the bird was "inextricably tied to mature and old-growth forests,"[108] the court noted that "the fate of the spotted owl has become a battleground largely because the species is a symbol of the remaining old-growth forest."[109] It was the classic indicator species.

The Forest Service was by no means ready to surrender. On appeal the Service argued—breathtaking as this argument may now appear—that it had no responsibility to consider the owl as an indicator species because, as an endangered species,

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Wash. 1988) (invalidating the Service's decision not to include the northern spotted owl on the endangered or threatened species list).

99. *See* Northern Spotted Owl v. Lujan, 758 F. Supp. 621, 629-30 (W.D. Wash. 1991) (ordering the Service to designate critical habitat for the northern spotted owl).

100. *See* Seattle Audubon Soc'y v. Robertson, 914 F.2d 1311, 1313 (9th Cir. 1990) (upholding the appropriations bill).

101. *See* Seattle Audubon Soc'y v. Evans, 771 F. Supp. 1081, 1085 (W.D. Wash.), *aff'd*, 952 F.2d 297 (9th Cir. 1991) (describing the creation of the Interagency Scientific Committee and its conservation strategy).

102. Seattle Audubon Soc'y v. Robertson, Nos. C89-160WD, C89-99(T)WD, 1991 WL 180099, at *13 (W.D. Wash. Mar. 7, 1991) (order on motions for summary judgment and dismissal).

103. *Id.* at *6 (citation omitted).

104. *Id.*

105. *Id.*

106. *Evans*, 771 F. Supp. at 1096.

107. *Id.* at 1085.

108. *Id.* at 1088.

109. *Id.*

it no longer "indicated" anything.[110] With some restraint, the Ninth Circuit pointed out that the Service's diversity regulations specifically required the use of endangered species as indicators and, besides, to do otherwise "would be to reward the Forest Service for its own failure[]"[111] to maintain viable populations in the first place.

Following this defeat, the Service prepared new owl management guidelines, which came back to district court in early 1992.[112] The new management guidelines constituted a trade-off, permitting "further, near-term loss of owl habitat in return for later recruitment of new habitat"[113] in future reserve areas. The new management guidelines approved the logging of nearly half a million acres in the "near term"[114] over the next fifty years. The question was whether the owl could take that much of a hit. The court declined to defer to the Service's discretion concerning the issue and deemed the Service's optimistic assurances questionable based on the competing concerns of non-Service biologists.[115] The Service's admission that its plan would have only a "low to medium-low probability of providing for viable populations"[116] of old-growth species *other* than owls further troubled the court. "NFMA and its implementing regulations plainly [do] not allow the agency to plan the extermination of native vertebrate species."[117] The court followed this ruling with an injunction a few months later, again emphasizing the diversity violations.[118] The injunction declared that to adopt a plan that might save the owl while sacrificing other species "would defeat the purpose of monitoring to assure general wildlife viability."[119] The injunction also noted that the use of an indicator species did not diminish the separate obligation of the Service to maintain well-distributed, viable populations of existing species. The injunction and its ration-

110. *See* Seattle Audubon Soc'y v. Evans, 952 F.2d 297, 298 (9th Cir. 1991).
111. *Id.* at 301.
112. *See* Seattle Audubon Soc'y v. Moseley, 798 F. Supp. 1473, 1476 (W.D. Wash. 1992).
113. *Id.* at 1478.
114. *Id.*
115. *See id.* at 1480.
116. *Id.* at 1483.
117. *Id.*
118. *See id.* at 1484. The Seattle Audubon Society initially challenged the new regulations in the Spring of 1992 and filed a request for injunctive relief in the Summer of 1992. *See id.*
119. *Id.* at 1489.

ale were upheld on appeal.[120] The Service went back to the drawing board.

Meanwhile, a series of lawsuits stalled BLM timber sales in Oregon, based on "the uncertainty about the ability of the spotted owl to survive as a species."[121] At this point President Clinton intervened, convening a Forest Summit of all affected interests and establishing a Forest Ecosystem Management Assessment Team (FEMAT) of scientists, economists and other government experts. The President instructed FEMAT to develop options to maintain biological diversity, sustainable levels of timber production and local, timber-dependent communities.[122] No small task.

FEMAT was up to the job, which it viewed as nothing less than achieving an "ecosystem approach to forest management."[123] The Team evaluated fifty-four alternatives against biological indicators, thirty-five in more detailed review, and ten in a final review.[124] The assessment considered the effects of these ten options on more than one thousand animal and plant species.[125] The primary indicator, however, and the measurement for the degree of protection it would afford, was the spotted owl. At bottom, the question was how much old growth would be opened to logging, and in what fashion and how much would be reserved. The final options ranged from reserving 11.4 million acres of old-growth forest, the option favored by the environmental community, to reserving only 5.4 million acres; timber production ranged from 1 to 1.8 million board feet.[126] After extensive public hearings and written comment, FEMAT recommended (1) outright reserves keyed primarily to the needs of the spotted owl and other deep forest

120. *See* Seattle Audubon Soc'y v. Espy, 998 F.2d 699, 705 (9th Cir. 1993).

121. Portland Audubon Soc'y v. Lujan, 795 F. Supp. 1489, 1493 (D. Or. 1992) (citing Portland Audubon Soc'y v. Lujan, 712 F. Supp. 1456, 1485 (D. Or. 1989)).

122. *See* FOREST ECOSYSTEM MANAGEMENT ASSESSMENT TEAM, FOREST ECOSYSTEM MANAGEMENT: AN ECOLOGICAL, ECONOMIC AND SOCIAL ASSESSMENT, at i-iv (1993) (explaining FEMAT's purpose and goals). At the helm was Dr. Jack Ward Thomas, a well-respected biologist with the Forest Service and soon, largely on the basis of FEMAT's work, to become the Service's Chief Forester. *See* Yaffee, *supra* note 90, at 401 (discussing Dr. Thomas's contributions to FEMAT and their significance).

123. Seattle Audubon Soc'y v. Lyons, 871 F. Supp. 1291, 1310 (W.D. Wash. 1994), *aff'd*, 80 F.3d 1401 (9th Cir. 1996).

124. *See id.* at 1303.

125. *See id.*

126. *See id.* at 1304.

species, (2) additional circles of protection around known owl habitat in the areas open to timber harvest, (3) additional restrictions along the coast and key watersheds to protect the marbled murrelet and aquatic species, and (4) an ongoing monitoring and evaluation program.[127] Of the remaining old-growth forest, about 10 million acres would be reserved and 1.3 million released for logging.[128] Logging would be reduced 73% from timber sale levels of the 1980s that were even then, in the opinion of the court, unsustainable.[129] On the other hand, even with these reductions, the plan offered only an 80% chance for the northern spotted owl's survival.[130]

Environmental groups and the timber industry both challenged the plan, leading to important interpretations of the federal diversity regulations. The district court upheld the exhaustive FEMAT recommendations against both challenges.[131] Environmentalists objected that if the plan offered the owl and murrelet an 80% chance of survival, it also offered them a 20% chance of extinction.[132] Moreover, they noted that the plan faced a significant threat from logging in the near term. Species would expand and stabilize in new habitat, at best, only over a long period of time. With risk this high, no amount of additional logging could be condoned until the populations were better recovered. The court upheld FEMAT's judgment. It went on to note, however, that "careful monitoring [would] be needed to assure that the plan [in fact] maintains owl viability."[133] The court emphasized that "[n]ew information may require that timber sales be ended or curtailed."[134] In finding the viability projections adequate, the court was influenced by the fact that achieving greater assurances would eliminate all competing uses of the forest, i.e., timber, and, reading between the lines, threaten the success of FEMAT's compromise.[135] To reach this conclusion in law, the court interpreted the viability requirement of the diversity regulations to be qualified by

127. *See id.* at 1306.
128. *See id.* at 1305.
129. *Id.* at 1306.
130. *See id.* at 1316.
131. *See id.* at 1291-92.
132. *See id.* at 1320-21.
133. *Id.* at 1321.
134. *Id.*
135. *See id.* at 1320-21.

"multiple use objectives,"[136] a doubtful proposition because the viable population requirement, as noted earlier, is not qualified by multiple use or any other modifier.[137] As a practical matter, on an issue so controversial, political, and apparently accommodating to the needs of the owl, a more absolute guarantee of viability was not in the cards. Hard cases make bad law.

The timber industry challenged the heart of diversity planning itself. The timber industry pointed out that nowhere in NFMA did Congress mention indicator species or viable populations.[138] The court found both concepts appropriate, however, concluding that "[d]iversity . . . can exist only if individual species survive."[139] The court also dismissed the industry's argument that BLM lacked statutory and regulatory mandates for diversity protection, noting that diversity planning was in accordance with the agency's responsibilities under FLPMA, the Multiple-Use Sustained-Yield Act of 1960 (MUSYA), and related laws. The timber industry also challenged "ecosystem bas[ed]" planning[140] as beyond the multiple-use principles of MUSYA and NFMA. Quoting an earlier decision that NFMA "requires planning for the entire biological community—not for one species alone," the court held that "[g]iven the current condition of the forest, there was no way the agencies could comply . . . without planning on an ecosystem basis."[141] Multiple use itself cannot be provided when native species are extirpated.[142] Against the timber industry's complaint that the owl's range served as indicia of the needs of other species, the court replied exactly so. "The owl [had] long been an indicator species" and this was the way indicator species worked.[143]

136. *Id.* at 1316.

137. *See supra* notes 51-85 and accompanying text (discussing the history, development, and application of multiple-use objectives).

138. *See Lyons*, 871 F. Supp. at 1315.

139. *Id.*

140. *Id.* at 1310.

141. *Id.* at 1311.

142. *See id.*

143. *Id.* at 1312. The industry also attacked the diversity baseline, which it characterized as "pre-European settlement." *Id.* at 1311. Noting that the plan found a return to pre-European conditions unattainable, the court approved the more modest objective of reversing "the management trend of the last 50 years." *Id.*

As the dust settles on this extraordinary saga,[144] it is hard not to conclude that, while viability requirements are difficult and demanding,[145] they generate results that would otherwise be unimaginable.[146] A second conclusion, likely to go unnoticed as the nation and its media move on to new controversies, is that these results did not shut down the Forest Service, the timber industry, or economic development in the Pacific Northwest.[147] They provided for a transition from a status quo that was clearly unsustainable, even in the absence of environmental law.

2. The Tongass Forest of Alaska

As controversial as planning for the northern spotted owl and the Pacific old-growth forests has been, the concept of diversity has met an even greater challenge in the Tongass National Forest of Southeast Alaska. The largest national forest in the United States, nearly 17 million acres of "soaring mountain peaks, narrow fjords, lush woods and more than a thousand named islands,"[148] the Tongass has been openly committed to single-use management to a degree that precluded even consideration, much less planning, for biological diversity.[149]

144. The Ninth Circuit affirmed these opinions in *Seattle Audubon Society v. Moseley*, 80 F.3d 1401 (9th Cir. 1996).

145. *See* Jack Ward Thomas, *Wildlife in Old-Growth Forests*, FOREST WATCH, Jan.-Feb. 1992, at 13 (summarizing his conclusions from the FEMAT exercise and declaring that "[t]he biology of certain wildlife population and habitat relationships is not conducive to precise estimates, no matter how much they are studied"). While Mr. Thomas's comments are doubtless accurate, the demands on science here are no different than those imposed for the development of, inter alia, the Clean Air Act and the Clean Water Act standards. Scientists make their best guesses, and we live with the resulting numbers. *See* Hercules, Inc. v. EPA, 598 F.2d 91, 91-92 (D.C. Cir. 1978) (upholding toxic standards involving multiple educated guesses and arbitrary safety factors for two chlorinated pesticides).

146. *See* Flournoy, *supra* note 90, at 301 ("American resource protection law ensured that the most effective, if not only, strategy for challenging the management of old-growth forest on publicly-owned lands was to rely on a species as a surrogate for a broader range of values.").

147. *See* Timothy Egan, *Forest Service Abusing Role, Dissidents Say*, N.Y. TIMES, May 4, 1994, at A9.

148. Jim Grode, Comment, *The Tongass Timber Reform Act: A Step Towards Rational Management of the Forest*, 62 U. COLO. L. REV. 873, 873 (1991).

149. *See* Steven A. Daugherty, Comment, *The Unfulfilled Promise of an End to Timber Dominance on the Tongass: Forest Service Implementation of the Tongass Timber Reform Act*, 24 ENVTL. L. 1573, 1576 (1994); *see also*

Historically, the Tongass has not been about resource management. Instead, it has been about providing local lumber mills more timber than any other forest in America.[150] From this unlikely venue has come the most advanced and comprehensive example of species-based diversity planning yet seen. It has not been an easy journey, and it is not yet over.

The Tongass, for its sheer size, climate, topography, and biota, is unique to the world. Five hundred miles long and 120 miles wide, the forest is an archipelago of mountainous islands, rivers, marshes, lagoons, and bays. Receiving more than nine feet of precipitation a year in some regions,[151] the Tongass is one of the few remaining temperate rainforests.[152] It harbors 800-year-old Sitka spruce with diameters of ten feet and more, hemlock 200 feet in the air, spawning streams for 90% of southeast Alaska's salmon, and the highest concentrations of grizzly bears and bald eagles on earth.[153] The key to its diversity is the old-growth forest itself, which absorbs the rain, traps the snow, shelters wintering wildlife, holds the soil, filters the runoff, offers snags and dens for smaller mammals, and provides shade and riffles for aquatic life in an economy of work hammered out through eons of evolution.[154]

Of its 18.8 million acres, about a third of the Tongass is classified as productive forest.[155] Of these forests, about 5 million acres are production old growth and only 11% of those acres are rated as high volume old growth, the most valuable both to wildlife and to the timber industry.[156] For the last fifty years, timber sales have focused almost exclusively on the high volume stands.[157] Forty percent are gone.[158] The remaining 60% are the prize.

In 1947, Congress launched the first of a series of initiatives aimed at developing a timber-based economy for southeast Alaska. The Tongass Timber Act of 1947 authorized the

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Grode, *supra* note 148, at 884 (noting that "[t]he only value protected in any meaningful way on the Tongass has been that of the timber industry").

150. *See* Daugherty, *supra* note 149, at 1583-87 (detailing the history of high volume timber harvests on the Tongass).

151. *See id.* at 1581.

152. *See* Grode, *supra* note 148, at 873.

153. *See id.* at 873-74.

154. *See id.* at 874.

155. *See* Daugherty, *supra* note 149, at 1581.

156. *See id.* at 1582.

157. *See id.* at 1583.

158. *See id.* at 1582.

Forest Service to sell Tongass timber despite the claims of Native Americans to the land.[159] In the 1950s, as long-term supply contracts were being phased out in most of the nation's forests, the Service encouraged the construction of two large pulp mills adjacent to the Tongass with fifty-year contracts promising 13.25 billion board feet of timber.[160] Congress followed in 1980 with a $40 million a year subsidy for timber production in the Tongass, and a guarantee to make 4.5 billion board feet available per decade.[161] Lest concern for the capacity of the land to support these harvest levels get in the way, Congress further exempted the Tongass from those provisions of NFMA requiring the Service to reserve those forest areas physically, economically or otherwise unsuitable for production.[162] The Tongass thus became, and became understandable only as, a large public works project. In 1988, nearly half a billion board feet of old-growth forest were cut and sold at bargain prices.[163] At a time when most Forest Service regions were at least covering their costs in timber sales, on the Tongass the Service was getting back as little as eight cents on the dollar.[164]

Environmental lawsuits and, eventually, reform legislation were inevitable. Although initially couched in other language and other provisions of law, the Tongass litigation was from the outset about preserving biological diversity. The first cases were grounded in MUSYA.[165] If ever a proposal were to violate multiple use it would have to be the timber sale at issue in *Sierra Club v Hardin*.[166] In 1958, only six-tenths of 1% of the Tongass commercial forest lands were reserved from log-

159. *See* H.R.J. Res. 205, 80th Cong., 61 Stat. 920, 920-21 (1947) (authorizing the sale of timber from the Tongass "notwithstanding any claim of possessory rights" by Native Americans or others).

160. *See* Daugherty, *supra* note 149, at 1583-84.

161. *See* Alaska National Interest Lands Conservation Act, Pub. L. No. 96-487, § 705(a), 94 Stat. 2371, 2420 (1980) [hereinafter ANILCA].

162. *See id.* § 705(d), 94 Stat. 2420 (mandating that the subsidy and harvest provisions apply despite any limits imposed by the NFMA).

163. *See* Grode, *supra* note 148, at 880 (stating that "the mills' cost of processing alone has sometimes been greater than the market price of the logs"). Half of the harvested timber is used for pulp and half is made into raw logs for export to Japan. *See id.* at 876.

164. *See id.* at 880.

165. 16 U.S.C. §§ 528-531 (1994). MUSYA requires that the resources of the national forests be administered "for multiple use and sustained yield of the several products and services obtained therefrom." *Id.* § 529.

166. 325 F. Supp. 99 (D. Alaska 1971).

ging; 99.4% were to be cut.[167] At 8.74 million board feet, covering 1.09 million acres of land,[168] the proposed sale would have been the largest sale in Forest Service history.[169] The Service justified the sale by asserting that 95% of the commercial forests in southeastern Alaska were occupied by "overmature stands of hemlock, spruce and cedar . . . [which] should be removed by clearcutting methods as soon as possible."[170] It was a policy which the reviewing court characterized as nothing less than "liquidation of the old-growth forests in [s]outheastern Alaska."[171] Although one might conclude that liquidation of the prevailing ecosystem from an entire region might impair such other multiple uses of that ecosystem as hunting and fishing, the court reduced the question to a procedural one: whether the Service had given "due consideration" to non-timber production values.[172] Floundering over what "due" might mean, the court interpreted "due consideration" as "any" consideration.[173] Since the Service had given *some* consideration to the information available, multiple use was satisfied.[174]

The Ninth Circuit reversed this decision explicitly on multiple-use grounds,[175] holding that due consideration was not a license but a caution to ensure that multiple-use factors were "rationally taken into balance."[176] This requirement could "hardly be satisfied by a showing of knowledge of the consequences and a decision to ignore them."[177] Whatever legal potential this holding may have offered for the Tongass and

167. *See id.* at 122.

168. *See id.* at 104.

169. *See id.* at 104 n.4.

170. *See id.* at 122 (citing Forest Service guidelines).

171. *Id.*

172. *See* Sierra Club v. Hardin, 325 F. Supp. 99, 123-24 (D. Alaska 1971) (concluding that, because the Forest Service followed appropriate procedures in making the decision to sell Tongass timber, "the court is forbidden to go further and substitute its decision in a discretionary matter for that of the Secretary").

173. *See id.* at 123 n.48 (considering possible definitions of the term "due consideration," concluding the term is "impossible to define," and holding that "some" consideration was sufficient to satisfy MUSYA).

174. *See id.* at 123-24 (presuming, lacking evidence to the contrary, that the Service gave due consideration to values outlined in MUSYA).

175. *See* Sierra Club v. Butz, 3 Envtl. L. Rep. (Envtl. L. Inst.) 20,292, 20,292 (9th Cir. Mar. 16, 1973) (addressing whether the contested contract violated the "due consideration" requirement of MUSYA).

176. *Id.* at 20,293.

177. *Id.*

MUSYA, new environmental statutes would now take over the action.

The next serious jolt to the timber-only management of the Tongass was sparked by a decision in far-off West Virginia, declaring that the practice of clearcutting violated the Organic Act of 1897, which established the national forests and authorized logging only of marked and identified stands.[178] This opinion was quickly taken to Alaska, where it was seconded,[179] leading to pressure from the timber industry for a new forest management law. The result was NFMA,[180] which, while it did not ban clearcutting, imposed planning requirements[181] that set yet another stage for litigation. NFMA created particularly acute tensions on the Tongass because of the Service's existing long-term contracts and the encouragements of the Alaska National Interest Lands Conservation Act (ANILCA).[182] The Service simply concluded that, whatever NFMA, NEPA and MUSYA might say about multiple use and diversity planning, the Tongass was different. Lawsuits would test that assumption.

An extended series of cases brought by the City of Tenakee Springs and environmental groups challenged the Service's first NFMA plan and subsequent sales on the Tongass.[183] At

178. *See* West Virginia Div. of Izaak Walton League of America, Inc., v. Butz, 522 F.2d 945, 948-54 (4th Cir. 1975) (concluding, after extended analysis of its text and legislative history, that the Organic Act of 1897 requires selective timber cutting in National Forests, and that clear-cutting therefore violates the Act).

179. *See* Zieske v. Butz, 406 F. Supp. 258, 260 (D. Alaska 1975) (issuing a permanent injunction against any cutting of trees other than as required by the Organic Act).

180. Pub. L. No. 94-588, 90 Stat. 2949 (1976) (codified as amended at 16 U.S.C. §§ 1600-1614) (1994)) (amending the Forest and Rangeland Renewable Resources Planning Act of 1974, Pub. L. No. 93-378, 88 Stat. 476 (1974)).

181. *See* National Forest Management Act § 2, 90 Stat. at 2952-54 (outlining criteria and required provisions for land and resource management plans for the National Forest System).

182. *See supra* notes 161-162 and accompanying text (listing ANILCA provisions which encourage continued timber harvesting of the Tongass).

183. In the first round of the Tenakee Springs litigation, the Ninth Circuit reversed the district court's denial of an injunction against construction of a logging road through a national forest. *See* City of Tenakee Springs v. Block, 778 F.2d 1402, 1407 (9th Cir. 1985). The court held that the Service's land management plan was not immune from review under ANILCA and that the contested project's Environmental Impact Statement (EIS) was not sufficiently site specific. *See id.* A district court subsequently granted the City's motion to enjoin construction of a different road covered by the EIS at issue in the first case, and ordered the Service to supplement the EIS in accordance

bottom was the issue of whether the liquidation of the Tongass remained a given, driven by the existing long-term contracts, or whether NEPA and NFMA had ushered in a new day and new environmental values. In 1990, the Ninth Circuit held that the Service was required to consider the alternative of terminating its pre-existing contracts, breaking the great taboo.[184] How the Service might have responded to this order will remain conjectural because Congress stepped in to change the rules of the game.

The Tongass Timber Reform Act of 1990 (TTRA)[185] took important steps to restore balance to the Tongass. It also, however, continued to vest the Service with considerable discretion over most of the remaining old-growth forest. The purpose of the TTRA was "to create a more appropriate balance between timber harvesting and other uses of the natural resources" of the Tongass.[186] The Act repealed ANILCA's[187] timber supply guarantee, automatic $40 million subsidy,[188] and partial exemption from NFMA.[189] It set an additional one million acres of the forest off-limits to commercial logging,[190] and called for buffer strips around anadramous fish streams and best management practices for other watersheds.[191] For the remainder of the forest, the TTRA required the Service to provide a timber supply that meets market demand, but only "to the extent consistent with providing for the multiple use and

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with the Ninth Circuit ruling. *See* City of Tenakee Springs v. Courtright, No. J86-024 CIV., 1987 WL 90272, at *5 (D. Alaska June 26, 1987). In the final round, a district court denied the City's motion for a preliminary injunction based on the inadequacy of the supplemental EIS, *see* City of Tenakee Springs v. Clough, 750 F. Supp. 1430, 1433 (D. Alaska 1990), but the Ninth Circuit again reversed and remanded. *See* City of Tenakee Springs v. Clough, 915 F.2d 1308, 1314 (9th Cir. 1990). On remand, the district court again denied permanent injunctive relief, and the Ninth Circuit this time affirmed, arguing that the matter was resolved by intervening legislation. *See* City of Tenakee Springs v. Franzel, 960 F.2d 776, 779 (9th Cir. 1992).

184. *See Clough*, 915 F.2d at 1312 (holding that "the Service's failure even to discuss, much less evaluate, the consequences of terminating, suspending or amending its contract necessarily implicates the environmental and subsistence interests of the plaintiffs").

185. Pub. L. No. 101-626, 104 Stat. 4426 (1990) (codified as amended at 16 U.S.C. § 539(d) (1994)).

186. H.R. REP. NO. 101-84, pt. 1, at 4 (1989).

187. *See supra* notes 161-162 and accompanying text (summarizing relevant provisions of ANILCA).

188. *See* Tongass Timber Reform Act of 1990 § 101, 104 Stat. at 4426.

189. *See id.* § 102, 104 Stat. at 4426.

190. *See id.* § 201, 104 Stat. at 4428-29.

191. *See id.* § 103(a), 104 Stat. at 4426-27.

sustained yield of all renewable forest resources."[192] The uncertainty of this language is apparent, mirroring those many buck-passing mandates that infect nearly all natural resources law. To environmentalists, the key was multiple use, supported by the full requirements of NFMA. To most Service decisionmakers, the mandate remained satisfaction of annual timber demand. But some members of the Forest Service were now released to take multiple-use planning, and NFMA diversity regulations in particular, to heart.

Back in 1990, the Service had established an Interagency Team—chaired by a Service biologist—to examine with particularity the diversity requirements of the forest and their interaction with various harvest scenarios.[193] Like its sister old-growth controversy to the south, the bottom line would be how much old growth should remain, in what configuration, and where. Unlike the Pacific old-growth planning, however, this exercise was not driven by the needs of a single, bellwether species. It would be multiple species based. It would start where the Pacific experience had stopped.

The Interagency Report began with unaccustomed frankness. Previous Forest Service analyses of wildlife distribution and population viability on the Tongass were "lacking in thoroughness and scientific merit."[194] For a scientifically defensible approach, the Team selected eight vertebrate indicators of Tongass old growth, reviewed the literature concerning their spacial and habitat needs, and created a plan to meet them.[195] Essential to the analysis was the quantification of the needs of a "well distributed" population, which the Team characterized as a population with "a high likelihood of occurring within each

192. *Id.* § 101, 104 Stat. at 4426.

193. *See* Lowell H. Suring et al., A Proposed Strategy for Maintaining Well-Distributed, Viable Populations of Wildlife Associated with Old-Growth Forests in Southeast Alaska 3 (May 1993) (review draft, on file with author).

194. *Id.*

195. The Committee created its plan in five steps: it reviewed prior conservation efforts by the Service, identified species that may have either viability or distribution concerns, documented the best information available and the need for research, proposed management standards to maintain habitat capable of supporting "viable, well-distributed populations" of old-growth species, and consolidated proposed management standards into a conservation strategy for the long term. *See id.* at 12-13. To select the eight species used to formulate the plan's details, 17 criteria were assessed. *See id.* at 13-20. The eight "species of concern" identified were: great blue heron, northern goshawk, gray wolf, brown bear, marten, mountain goat, northern flying squirrel, and river otter. *See id.* at 4.

10,000 acre watershed within its current range."[196] Armed with such objective criteria, the Team could arrive at numbers, and it did. At the heart of the Team's plan was the creation of unmanaged and lightly-managed preserves called Habitat Conservation Areas (HCAs).[197] Large HCAs were designed to accommodate wide ranging indicator species such as the goshawk and the brown bear with enough space to resist stochastic events and allow populations to recolonize unoccupied areas.[198] These large HCAs were mapped at twenty-mile intervals with a minimum of 40,000 acres, including at least one pristine watershed and 10,000 acres of dense old growth.[199] Medium HCAs were designed to provide habitat for small, local populations prone to frequent local extinction; mapped at eight-mile intervals, they totaled 5,000 acres each, half in dense old growth.[200] Small HCAs of 800 acres in old growth would be selected later in the planning process.[201]

These recommendations were explosive. Altogether, the Team called for 38 large and 111 medium HCAs,[202] connected by a network of small HCAs, stream buffers and travel corridors.[203] The allowable sale quantity from the total forest would drop from 714 million board feet to under 580 million.[204] Even with reserves this extensive, the Team acknowledged that the HCAs would provide only "a reasonably high likelihood" of maintaining viable populations, and only then if all of its recommendations were adopted.[205] To the Service, the recommendations were not good news.

So the Service buried them. It ordered members of the Team not to release their report while it prepared its own response in an appendix to a new Environmental Impact State-

196. *Id.* at 12.
197. *See id.* at 4.
198. *See id.* at 26.
199. *See id.* at 24-25.
200. *See id.* at 26.
201. *See id.* at 28.
202. *See id.* at 36.
203. *See id.* at 37-38.
204. *See id.* at 36.
205. *Id.* at 39. Though hard data on the efficacy of travel corridors was lacking, "biological intuition" was that corridors would help preserve diversity, and the team recommended that "existing linkages should be a primary component of conservation planning since it is easier to retain them than to replace them in the future." *Id.* at 29.

ment (EIS) for the Tongass.[206] Appendix M was a remarkable document. It purported to consider and largely adopt the Interagency Team's work, while in fact doing its best to discredit and reject the Team's conclusions.[207] The Service began by discounting the use of viable population analysis and adherence to any numerical standard for species distribution.[208] It went on—in a reprise of its efforts in Oregon and Washington to dismiss the needs of the spotted owl—to state that endangered species would not be used as indicators since they did not have viable populations.[209] It then made its major stroke, asserting that, if the Team's HCAs would maintain species viability, then reserving only *fifty percent* of the HCAs would still provide a *likelihood* of viability.[210] Such logic, from a scientific standpoint, might have come from Alice in Wonderland. All the "curiouser and curiouser," to quote Alice, because the Service's own analysis showed that, under the harvest proposed in its EIS, three entire regions of the Tongass would fall below even the fifty percent threshold.[211] As might be expected, Appendix M took heavy criticism from the environmental and scientific communities.

Congress then intervened once again, requiring the Service to subject the Interagency Team report to peer review.[212] The Service submitted the report, along with Appendix M, apparently confident that its analysis would hold.[213] It was wrong. A peer review team of more than a dozen non-federal scientists[214] reviewed the data and concluded that both Appendix M *and* the Team's recommendations were inadequate to

206. *See* HOUSE APPROPRIATIONS COMMITTEE, 103D CONG., REPORT ON DEPARTMENT OF THE INTERIOR AND RELATED AGENCIES APPROPRIATIONS BILL 73-74 (Comm. Print 1993).

207. *Id.*

208. *See* Tongass National Forest Land Management Planning Team, Appendix M—Fish and Wildlife: A Viability Risk Assessment, at M-2 (Feb. 1993) (on file with author).

209. *See id.*

210. *See id.* at M-20.

211. *See id.* at M-21.

212. *See* HOUSE APPROPRIATIONS COMMITTEE, 103D CONG., *supra* note 206, at 74.

213. *See* A. Ross Kiester & Carol Eckhardt, Review of Wildlife Management and Conservation Biology on the Tongass National Forest: A Synthesis with Recommendations 1 (Mar. 1994) (unpublished manuscript, on file with author). By way of disclosure, the author participated in this peer review.

214. *See id.* at 221-81.

protect diversity in the Tongass.[215] The peer group recommended the creation of Very Large Reserves and the imposition of additional restrictions on management activities within and without the reserves.[216] For the Service, the bad news was finally incontrovertible.

Unable to stiff-arm viable population analysis any longer, the Service released a Final EIS in March of 1996, with yet a new preferred alternative.[217] Facially, the Service adopted the Habitat Conservation Area concept and designations proposed by the Interagency Team.[218] At the same time—in a reprise of the conservation plan first arrived at for the spotted owl—it proposed to allow current levels of harvest to continue at near-current levels for the next ten to fifteen years, at which point the real restrictions would kick in.[219] The timber cut levels would be, coincidentally, an almost even compromise between the business-as-usual of Appendix M and the business-as-reduced by the Interagency Team.[220] The risks to evaluated indicator species would be increased significantly, and in some cases doubled.[221] In a cover letter to its EIS, however, the Service stated that it "believed" these risks to be small and, in

215. *See id.* at 5.

216. *See id.* at 16. The group concluded, for example, that because succession takes so long to climax, a "rotating block" harvest design was not appropriate. *Id.* at 17. The "existing largest blocks of contiguous high volume old-growth forest [should] not be further fragmented by timber harvesting or road building." *Id.* at 25. There should be no "differential cutting" in low altitude, high volume stands. *Id.* The reviewers even suggested Inverse HCAs, with reserves for timbering rather than for wildlife. *See id.* at 16.

217. *See Summary: Revised Supplement to the Draft Environmental Impact Statement: Tongass Land Management Plan Revision*, TONGASS FOREST PLAN REV. (U.S.D.A. Forest Service, Washington, D.C.), Apr. 1996, at 7.

218. *See id.* at 6.

219. *See id.* at 11. The Service declared that continuing the cut at current levels "would not have significantly different environmental effects" than implementing the HCA-based alternative immediately. *Id.*

220. *See id.* at 5. Alternative 2 is the old plan, and Alternative 3 incorporates the HCAs of the Suring study. *See id.* at 6.

221. *See* U.S.D.A. FOREST SERVICE, TONGASS LAND MANAGEMENT PLAN REVISION: REVISED SUPPLEMENT TO THE DRAFT ENVIRONMENTAL IMPACT STATEMENT 3-206 to 3-259 (1996) (presenting the Service's tables on and discussion of its viable population studies). The alternative based on the viable population studies, Alternative 3, was "intermediate in overall risk" even without the ten year wait before its implementation! *Id.* at 3-258. That alternative was, for example, twice as risky for the viability of both the northern goshawk and the marten as was that of the Interagency Team. *See id.* at 3-251. Notably, the viable population studies provided no analysis of the Service's proposal to wait a decade or more to implement the team's strategy.

any event, to be "outweighed" by the "benefits to be derived from the changes."[222] These benefits—to no one's surprise—were continuing timber production at current levels for ten to fifteen years and meeting the terms of its remaining, long-term contract.[223]

However this story ends, and the end may take a while, it is obvious that for Tongass managers the timber-first mindset continues to prevail.[224] This is one powerful status quo, backed up by a congressional delegation that cracks the whip on both appropriations and legislation for natural resource issues. The lesson of the Tongass is not that the Service departed from the conclusions drawn by both its own and other biologists, but rather that slowly, resisting at almost every turn, it began to adopt these conclusions, as painful and revolutionary as they might be. Wherever the Tongass plan ends, Tongass management has been forever changed towards greater protection of the forest's most unique wildlife and its essential ecosystem by planning that was based, objectively and numerically, on the needs of indicator species.

3. Wisconsin Old-Growth and Second-Growth Forests

It is fitting that the most imaginative challenge to biodiversity planning has come from Wisconsin, where near-total

222. Open Letter from the Forest Plan Revision Team 5 (Apr. 5, 1995) (on file with author).

223. *See id.* In late 1996, with prospects of continued congressional subsidies dimming, *see* Margaret Kriz, *Forest Fight*, NAT'L J., Sept. 21, 1996, at 1998, the Louisiana Pacific Pulp Mill in Ketchikan, Alaska, announced that it would close in March 1997. For its part, the Forest Service announced that it would proceed to complete its forest plan revision expeditiously, despite this rather dramatic change in circumstance. *See Ketchikan Pulp Mill Announcement Effect on the Tongass Forest Plan*, TONGASS FOREST PLAN REV. (U.S.D.A. Forest Service, Washington, D.C.), Oct. 1996, at 6.

224. In its latest environmental statement and NFMA plan revision, the Service rejected many of the recommendations and the conclusion of both the peer review committee and its own interagency diversity review team. *See* James G. Deane, *The Tongass's Time of Decision*, DEFENDERS, Summer 1996, at 53, 55. Meanwhile, the Alaska congressional delegation, erstwhile champions of free enterprise in other circumstances, were hammering for continued subsidies to local mills and, to this end, even proposed transferring the entire forest to the state. *See id.* Issues of this scale will obviously not be decided by the habitat needs of northern goshawks and pine marten alone. These species have set too high a standard, however, to allow a return to the status quo ante. At the time this Article went to press, the Service had terminated the remaining long-term contract on the Tongass, with a two-year grace period until 1998.

destruction of the original forests by the early 1900s[225] inspired *A Sand County Almanac* and the ecological principles of Aldo Leopold.[226] Large portions of the clearcut, gullied, and burned-out landscapes of northern Wisconsin were subsequently purchased by the Forest Service and managed, in the spirit of the new times, for the production of timber and deer, objectives that are both largely compatible and hugely popular in the region.[227] Two such forests, the Nicolet and Chequamegon, spread over 1.5 million acres of upstate Wisconsin with a nearly even mix of hardwood and pine species, hundreds of lakes and streams and, as would be expected, a broad range of common to rare plant and animal species.[228] In the early 1980s, the Service began the planning process for these forests under the requirements of NFMA and the diversity regulations.[229]

The planning efforts for the two forests were essentially identical and focused first on identifying and maximizing diversity of tree species by type, age and—convenient to the Service's existing timber harvest program—the number of "upland openings" provided.[230] The Service prepared an elaborate matrix of "diversity indices"[231] (an exercise against which the Committee of Scientists had warned),[232] and extrapolated

225. *See* Sierra Club v. Marita, 46 F.3d 606, 609 n.1 (7th Cir. 1995) ("Until the mid-1800s, both the Nicolet and Chequamegon were old-growth forests consisting primarily of northern hardwoods. Pine logging around 1900, hardwood logging in the 1920s, and forest fires (caused by clear cutting) significantly affected the landscape."); *see also* ALVERSON ET AL., *supra* note 3, at 210-11 (describing history of these two forests).

226. *See supra* note 3 (discussing Leopold and his work).

227. *See* ALVERSON ET AL., *supra* note 3, at 212-13 (describing deer hunting pressures in Wisconsin).

228. *See Marita*, 46 F.3d at 609; ALVERSON ET AL., *supra* note 3, at 218.

229. *See Marita*, 46 F.3d at 608-09. For a summary of the Service's efforts, see *id.* at 616-17.

230. *See* Sierra Club v. Marita, 843 F. Supp. 1526, 1533-36 (E.D. Wis. 1994) (describing the Service's analysis for the Nicolet Forest), *aff'd*, 46 F.3d 606 (7th Cir. 1995). The third variable that the Service considered in addition to tree type and age was "high recreation/wildlife management intensity." *Id.* at 1534. The Service put "particular emphasis on the total acreage of permanent forest openings." *Id.*; *see also* Sierra Club v. Marita, 845 F. Supp 1317, 1323 (E.D. Wis. 1994) ("Finally, the Service concluded that permanent upland openings would optimally account for about five percent of the [Chequamegon] forest."), *aff'd*, 46 F.3d 606 (7th Cir. 1995).

231. *Marita*, 843 F. Supp. at 1533-36.

232. *See supra* note 70 and accompanying text (noting Committee's rejection of "diversity indices").

from it a "preferred vegetative composition for wildlife diversity."[233] This preferred composition formed a "baseline against which alternatives would be evaluated."[234] The baseline would not be the historical forest,[235] nor even the mix of hardwoods and softwoods prevalent at the time. Rather, it would be what the Service "preferred" it to be. The Service then proceeded to measure the impacts of its preferred composition and other alternatives on population viability generally, and on management indicator species.[236] Herein lay a second problem.

Of the eighteen indicators selected for the Nicolet Forest, only one was a reptile or amphibian and none was an invertebrate or plant.[237] Of the vertebrates chosen, the preponderance were "habitat generalists,"[238] able to live in multiple environments. "Young/mature hardwoods," for example, were indicated by the ruffed grouse, which also thrives in cut-over areas.[239] To represent old growth the Service chose the pileated woodpecker,[240] also a frequent resident of second-growth wood and even suburbia. Ditto the ground squirrel, "ubiquitous throughout the forest," and the common yellowthroat, endemic to low brush.[241] Not surprisingly, the preferred composition of forest vegetation would feature aspen, which the Service found to be "especially important to the most abundant game species—the white-tailed deer, ruffed grouse, and the snowshoe hare."[242] For wildlife, the Service continued with perceivable ardor, "the more equal the amount and spacial distribution of aspen and age classes the better";[243] the optimal number of acres under this intensive "wildlife management investment"

233. *Marita*, 845 F. Supp. at 1323 (quoting from Service's final EIS for Chequamegon Forest).

234. *Id.*

235. *See Marita*, 46 F.3d at 621.

236. *See Marita*, 845 F. Supp. at 1322-24.

237. *See* ALVERSON ET AL., *supra* note 3, at 219 (discussing the Forest Service planning for the Chequamegon Forest); *see also Marita*, 46 F.3d at 617 (noting the existence of 33 management indicator species in the Nicolet, 18 in the Chequamegon).

238. ALVERSON ET AL., *supra* note 3, at 219.

239. *Id.*

240. *See id.* In reference to the Nicolet plan, the Forest Service defined "old-growth designated stands" as those "to be managed for timber, but at a delayed rotation age." *Id.* at 222 (emphasis omitted) (quoting the Nicolet Plan).

241. *Id.* at 219.

242. *Id.* at 216 (citation omitted) (quoting from the Nicolet Final EIS).

243. *Id.*

would be 85% of the "total manageable lands" in the Nicolet National Forest.[244] A reviewing court noted that "without some intervention, the forests would return to their pre-1800s, climax hardwood composition, a composition less diverse than at present."[245] In short, diversity was accomplished neither by using the indicators most sensitive to change, nor by maximizing the habitat of rare or reclusive populations. It was done by a body count, and the bodies counted just happened to support timber harvests—and excellent hunting.

Environmentalists appealed, objecting that the plan would exacerbate the problem of forest fragmentation.[246] They proposed, instead, the creation of large reserves called "diversity maintenance areas"[247] that would better accommodate the needs of reclusive, deep forest species. During the administrative appeals, they introduced numerous studies and an array of experts attesting to the adverse effects of chopping up the forest and the benefits of large-scale conservation.[248] As one expert testified: "Supporting large reserves these days is like supporting motherhood. The overwhelming consensus among ecologists and biogeographers is 'the larger the better.' "[249] The testimony was persuasive enough to lead the Chequamegon Supervisor to recommend creating two large diversity management areas.[250] The Chief of the Forest Service rejected this proposal, however, finding that the diversity regulations established "no additional requirements beyond those identified"[251] (i.e., population viability and indicator species). The emerging concepts of conservation biology, while "not new," remained an "untested" subject for the future.[252] The Sierra Club went to court.

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244. Sierra Club v. Marita, 843 F. Supp. 1526, 1534-35 (E.D. Wis. 1994), *aff'd*, 46 F.3d 606 (7th Cir. 1995).

245. Sierra Club v. Marita, 46 F.3d 606, 621 (7th Cir. 1995).

246. *See Marita*, 843 F. Supp. at 1537-38 (describing plaintiffs' view that large tracts of undeveloped land are essential to conservation biology).

247. *Id.* at 1538.

248. *See id.* at 1537-38. Thirteen experts on biological diversity testified before the Service on behalf of the administrative appeal. *See id.* at 1538. No witnesses were produced to the contrary. *See* Sierra Club v. Marita, 845 F. Supp. 1317, 1329 (E.D. Wis. 1994), *aff'd*, 46 F.3d 606 (7th Cir. 1995); *Marita*, 843 F. Supp. at 1541.

249. *Marita*, 843 F. Supp. at 1538.

250. *See Marita*, 845 F. Supp. at 1326.

251. *Id.* at 1328 (quoting from the administrative record).

252. *Id.* (quoting from the administrative record).

The Sierra Club had great facts and difficult law. It lost its cases on both forest plans before the same trial court, in virtually identical opinions.[253] The Service's industrious attention to age-class diversity, its matrices and its cultivations of wildlife—no matter which wildlife—obviously impressed the trial court. So, however, did the plaintiffs' evidence on large scale reserves. Indeed, the court found that it could "safely assume that the principles of conservation biology set forth by plaintiffs represent sound ecological theory."[254] But it found "considerable uncertainty" as to "how exactly these principles should be applied."[255] The court noted, "Nowhere in plaintiffs' exhaustive briefs and supporting materials does there appear any suggestion of what methodology the Service should have used to incorporate principles of conservation biology into its planning process."[256] If the Committee of Scientists could not come up with a formula in 1978,[257] the court would not require one of the Forest Service in 1991.[258] Conservation biology was a good idea, but it was not law to apply.

On appeal, the Sierra Club did not challenge the Service's use and manipulation of indicator species and the resulting viability analysis.[259] It went for the larger prize, arguing that MISs and viability analysis only added up to half the picture of biological diversity.[260] To the Seventh Circuit, the Sierra Club was reading requirements into NFMA that "simply do not exist."[261] Conservation biology was "not a necessary element of diversity analysis" because, beyond MISs and viable populations, "the regulations do not dictate that the service analyze

253. *Compare* Sierra Club v. Marita, 845 F. Supp. 1317 (E.D. Wis. 1994) (Nicolet Forest), *aff'd*, 46 F.3d 606 (7th Cir. 1995), *with* Sierra Club v. Marita, 843 F. Supp. 1526 (E.D. Wis. 1994) (Chequamegon Forest), *aff'd*, 46 F.3d 606 (7th Cir. 1995).

254. *Marita*, 843 F. Supp. at 1541.

255. *Id.*

256. *Id.*

257. *See supra* notes 64-76 and accompanying text (describing the Committee's regulations as based on diversity principles).

258. *Marita*, 843 F. Supp. at 1541-42.

259. *See* Sierra Club v. Marita, 46 F.3d 606, 610 (7th Cir. 1995). This argument was not raised at the trial level. Sierra Club v. Marita, 845 F. Supp. 1317, 1331 (E.D. Wis. 1994) (noting that "plaintiffs do not challenge the assumptions underlying the methodology or the manner in which it was conducted"), *aff'd*, 46 F.3d 606 (7th Cir. 1995).

260. *See Marita*, 46 F.3d at 619.

261. *Id.* at 620.

diversity in any specific way."[262] Furthermore, if the Sierra Club's position on fragmentation and patch size were true, then "an MIS should to some degree indicate their impact on diversity."[263] The game was back to management indicator species.

Which left the question: indicator species for what type of ecosystem? The baseline. To the Sierra Club, the baseline was the "natural forest."[264] The Service, clever with words here, responded that its regulations did not actually require the promotion of " 'natural forest' diversity" but only "the promotion of diversity *at least as great as* that found in a natural forest."[265] The Service was reducing diversity to a numbers game in which lots of common species could trump a few rare ones, every time. Disappointingly, the circuit court accepted this sleight-of-hand. The "extent [to which] the Service's final choice did not promote 'natural diversity' above all else" was a decision "well within its regulatory discretion."[266] At which point, no law remained.[267]

The messages from the Nicolet and Chequamegon decisions should be sobering to any enthusiast of biodiversity planning and ecosystem management. Principles as obvious to contemporary science as the need for large reserves to maintain population diversity are not likely to be accepted until the federal government chooses to accept them, which, given their implications for commodity production and natural resources management, is likely to be a very cold day in hell. Further, the MIS viability process, which is both accepted and comprehensible even to a reviewing court, is subject to gross manipulation to achieve what the Service would call "desired outputs." And finally, the very concept of diversity itself may be stripped of its moorings in natural systems and, with a "preferred ecosystem" as a baseline, put up for grabs. Unfortunately, these

262. *Id.*

263. *Id.* (citation omitted).

264. *Id.*

265. *Id.* at 620-21 (emphasis added).

266. *Id.* at 621 (citation omitted).

267. One never knows, in the continuing saga of natural resources management, exactly who wins and when. On April 22, 1996, the State of Wisconsin enacted legislation requiring state forest management to be "consistent with the ecological capability" of these lands and "with the long-term maintenance of . . . ecosystems." WIS. STAT. ANN. § 28.04(2)(a) (West Supp. 1996). The battle over interpreting these provisions is obviously at hand.

discouraging conclusions are playing out in Forest Service and judicial decisions elsewhere around the country.

4. Four Forests in Texas

One does not tend to associate Texas with woodland, but the Forest Service manages four national forests in the eastern part of the state totaling 662,000 acres of mixed hardwoods and pine.[268] In 1964, the Service began large-scale clearcutting and conversion of these ecosystems to faster-growth pine.[269] By 1976, news of the National Environmental Policy Act had filtered south, and a coalition of environmental organizations began a series of lawsuits against clearcutting in the Texas forests. Twenty years later, the litigation continues; its results reflect the Forest Service's historic and current approaches towards diversity management on the ground.

The first cases raised NEPA claims. Bolstered by the success of contemporary cases in requiring comprehensive, "programmatic" environmental impact statements for on-going federal activities, plaintiffs based their lawsuit on the absence of such a statement for clearcutting programs in the four Texas forests.[270] The federal district court found this argument persuasive and enjoined clearcutting until a programmatic EIS was prepared.[271] Spurred forward by the Texas Forestry Association and a dozen timber company intervenors, the Department of Agriculture appealed,[272] and received a windfall from an unexpected quarter. Just prior to the trial, Congress passed NFMA.[273]

Although the trial court did not base its ruling on the new forest management act, the Fifth Circuit seized on NFMA as its way out of the woods. It reasoned that Congress itself had failed to ban clearcutting in NFMA, choosing instead to limit it on a case-by-case basis through forest management plans.[274] Until these plans were in place, injunctive relief against clear-

268. *See* Texas Comm. on Natural Resources v. Bergland, 573 F.2d 201, 204 (5th Cir. 1978) (stating the acreage and location of the forests).

269. *See id.* at 205.

270. *See* Texas Comm. on Natural Resources v. Bergland, 433 F. Supp. 1235, 1245 (E.D. Tex. 1977), *order rev'd by* 573 F.2d 201 (5th Cir. 1978).

271. *See id.* at 1254.

272. *See Bergland*, 573 F.2d at 206.

273. *See id.*

274. *See id.* at 212.

cutting was inappropriate.[275] Neatly avoiding the question of how the Service was to comply with NEPA in the meantime, the circuit court in effect gave the Service a stay of execution. The stay would last a long time. Forest plans in Texas would not emerge for another ten years.[276] In the meantime, clearcutting and conversions continued.

Phase two of the Texas litigation invoked the Endangered Species Act, which was also spreading south in the wake of the initial and successful cases on the northern forests and the spotted owl. In 1985, the Sierra Club challenged the Service's southern pine beetle control program, under which it was cutting large stands of old-growth timber that included nesting sites of the red-cockaded woodpecker, a listed species.[277] The red-cockaded, dependent on older tree species and their associated conditions (e.g., disease, sap, and low understory), was an indicator species for the original ecosystem and was now on the way to becoming its spotted owl.[278] The court found that, under the guise of beetle control, the Service was cutting extensive stands that were in no way threatened by the insect.[279] Based on these findings, and its palpable skepticism of the Service's forest management, the court decided to restrict these "salvage" cuts.[280]

Two years later, plaintiffs moved directly under the ESA, prompted by a Service biological survey finding a sharp decline in red-cockaded populations.[281] The court tried the facts for four days and took the time to understand them.[282] It found that the demise of the red-cockaded woodpecker was directly attributable to clearcutting, the "sole reason" for which was

275. *See id.* at 210.

276. *See infra* note 297 and accompanying text (noting that the Forest Service developed a NFMA plan in 1987).

277. *See* Sierra Club v. Block, 614 F. Supp. 134 (E.D. Tex. 1985). This first suit, although it concerned impacts on an endangered species, was based on NEPA. *See id.* at 135.

278. See Chuck D. Barlow, *The Proposed Management of the Red-Cockaded Woodpecker in the Southern National Forests: Analysis and Suggestions*, 17 U. ARK. LITTLE ROCK L.J. 727, 729 (1995) (providing a full description of the species and its habitat requirements).

279. *See Block*, 614 F. Supp. at 139-41.

280. *Id.* at 140-41.

281. *See* Sierra Club v. Lyng, 694 F. Supp. 1256 (E.D. Tex. 1988), *aff'd in part, vacated in part sub nom.*, Sierra Club v. Yeutter, 926 F.2d 429 (5th Cir. 1991).

282. The trial judge declared the case a "privilege" to hear and complimented counsel and witnesses on all sides. *Id.* at 1266.

that it was "preferred by the timber companies" with which the Forest Service had a "revolving door" relationship.[283] Although the Service protested that it had prepared management guidelines for the species and was in active consultation with the U.S. Fish and Wildlife Service over an improved plan,[284] what mattered to the court was that, in the meantime, the cuts continued and nothing had changed.[285] In its relief, the court ordered remedial measures that included a 1,200-meter buffer zone around red-cockaded colony sites and requirements on standing trees and logging roads.[286] Objective numbers were finally coming to the four forests in Texas, and they were coming because of an indicator, endangered species.

The story now takes two paths. One follows the trail of the red-cockaded woodpecker and its impact on forest planning. At this story's end, in June 1995, the Forest Service issued a Record of Decision for management of the red-cockaded woodpecker and its habitat on national forests throughout the American South.[287] The plan acknowledged that more than 50% of the known, remaining members of this species live on southern forest system lands; more importantly, twelve of fifteen populations identified as necessary to the recovery of the species "nest and forage for food totally or in part" in these forests.[288] The plan called for the creation of "habitat management areas," large blocks of pine and pine-hardwood managed to provide red-cockaded nesting and foraging habitat.[289] Rather than taking a nest-and-circle approach to existing sites, the HMAs would range from 6,500 to 144,000 acres in size and total 2 million acres in all.[290] The HMAs would not be managed as wilderness. Rather, management would be scaled to the condition of the colonies found within each HMA; the more

283. *Id.* at 1268.

284. *See id.* at 1273.

285. *See id.*

286. *See id.* at 1278. These specific requirements were overturned on appeal as beyond the authority of the trial court; the substance of the court's opinion, however, was affirmed. *See* Sierra Club v. Yeutter, 926 F.2d 429, 440 (5th Cir. 1991).

287. U.S. FOREST SERVICE, RECORD OF DECISION: FINAL ENVIRONMENTAL IMPACT STATEMENT FOR THE MANAGEMENT OF THE RED-COCKADED WOODPECKER AND ITS HABITAT ON NATIONAL FORESTS IN THE SOUTHERN REGION (June 1995).

288. *Id.* at 1.

289. *Id.* at 2.

290. *Id.* at 7-8.

imperiled the species, the greater the protections afforded.[291] Clearcutting, however, was precluded in all HMAs, except in specific situations to improve red-cockaded habitat.[292] To these protections were added delays of up to 120 years in harvest rotations[293] to allow for emergence of old-growth stands, and control of the understory by prescribed burns and other measures, to mimic the historic, savannah-like, longleaf pine ecosystem.[294] In short, the biological requirements of the red-cockaded woodpecker would force a significant step towards restoration of a rapidly vanishing ecosystem across the South.

And that is where the Forest Service drew its line. It would go this far to meet the ESA; it would go no farther for diversity under NFMA. Citing cases it would later rely on in proposing to amend the diversity regulations themselves,[295] the agency concluded that multiple use, not diversity, was its guiding principle and that, beyond the ESA, diversity protection lay in its unreviewable—and largely unexercised—discretion.[296]

The second path of the story returns to the four forests in Texas. In 1987, after the Service had finally produced a NFMA plan on the management of its Texas forests, plaintiffs again sued to enjoin nine timber sales under NEPA and NFMA.[297] Of the more than 6,000 acres scheduled for harvest, more than 90% would be clearcut; less than 10% would use more selective methods.[298] To the trial court, these figures stood NFMA, and its intention that clearcutting be employed only in exceptional circumstances, on its head.[299] Citing a magistrate's findings of fact that old-growth stands were not explicitly considered as an element of diversity, and that indicator species would in fact decline under clearcutting,[300] the court found a substantial likelihood that the Service had violated NFMA's requirement

291. *See id.* at 8. Four levels of management are provided for, depending on the current status of the species. *Id.*

292. *See id.* at 15.

293. *See id.* at 8.

294. *See id.* at app. A, 18-32.

295. *See id.* at 14; *infra* note 344 (listing cases the Service cited when making its diversity proposal).

296. *See* U.S. FOREST SERVICE, *supra* note 287, at 14.

297. *See* Sierra Club v. Espy, 822 F. Supp. 356, 359 (E.D. Tex. 1993).

298. *See id.* at 364.

299. *See id.* at 363-64.

300. *See id.* at 366.

that clearcutting not adversely affect wildlife.[301] The Fifth Circuit however, saw a different NFMA, one bottomed on multiple use and deference,[302] and concluded that NFMA imposed "something less than preservation" but "something more than eradication of species."[303] The court noted with approval that, beyond the red cockaded woodpecker, the Service was going to provide ample numbers of wild turkey, white-tailed deer, and bobwhite quail—all game species.[304] The Service was also committed to maintaining viable populations of chats and bluebirds—open-field, clearcut species.[305] Within this free-fire zone, diversity simply called for the kind of "policy-oriented decision Congress wisely left to the discretion of the experts—here, the Forest Service."[306] Diversity meant the ESA, plus business-as-usual.

The wars continued. Environmentalists sued again, claiming that the 1987 forest plan itself violated NFMA in a host of respects, including its diversity requirements.[307] In 1996, however, before the resolution of this case, the Service issued a new plan for the four Texas forests, responding in part to its critics and in the main to its new red-cockaded woodpecker guidelines.[308] The plan placed 250,000 acres under management primarily for the red-cockaded,[309] including three-quarter-mile circles of protection around known colonies.[310] Logging would be permitted under longer rotations, with intervals of up to 120 years.[311] Overall, the forest acreage in late succession—fifty to ninety years of age—would decline by more than 50%, while that defined as old growth, ninety years and over, would jump threefold.[312] The Texas forests would remain

301. *See id.*

302. *See* Sierra Club v. Espy, 38 F.3d 792, 802 (5th Cir. 1994).

303. *Id.* at 800.

304. *See id.* at 802.

305. *See id.*

306. *Id.* at 800.

307. *See* Sierra Club v. Lyng, 694 F. Supp. 1256, 1262 (E.D. Tex. 1988). For the alleged violations, see Plaintiff Sierra Club's and The Wilderness Society's Proposed Findings of Fact and Conclusions of Law (Aug. 1996) (on file with author).

308. U.S. FOREST SERVICE, REVISED LAND AND RESOURCES MANAGEMENT PLAN, NATURAL FORESTS AND GRASSLANDS IN TEXAS (1996).

309. *See id.* at 96.

310. *See id.* The plan also added more than a dozen prescriptions for burning, shelter trees and other habitat management. *See id.* at 107-34.

311. *See id.* at 122.

312. *See id.* at 307.

highly managed environments, but would move toward a semblance of their original state.

Beyond the protections for the red-cockaded woodpecker, no important management restrictions emerged from diversity analysis or indicator species.[313] The species identified were the usual assortment of wild turkey, squirrel, yellow-breasted chat and deer, most of which would thrive under new management or old.[314] As of this writing, the message from Texas is that the Service would respond to a series of court orders and take steps for bellwether endangered species, and not a great deal more.

5. Additional Forest Plans and Lessons Learned

The histories just described range from earnest and effective diversity analysis with recommendations for major, systemic change to defensive, manipulative analyses designed largely to perpetuate the status quo. With the exception of a few celebrated cases, the Service has adopted the latter approach in forest planning across the country, and the courts have been unwilling to demand more.

A familiar-looking series of cases arose in the Ouichita National Forest of western Arkansas and eastern Oklahoma. *Sierra Club v. Robertson*[315] centered on a Forest Service plan "to cut existing trees and grow pines of uniform height, which in turn will be harvested."[316] The court looked at the statutory language in NFMA, saw no specific diversity requirements, and seemed to stop;[317] nowhere in its three opinions are the MIS or viable population regulations cited or discussed. In-

313. *See id.* at 54-55.

314. *See id.* at 307.

315. The two substantive *Robertson* cases are found at 784 F. Supp. 593 (W.D. Ark. 1991) and 810 F. Supp. 1021 (W.D. Ark 1992), *aff'd*, 28 F.3d 753 (8th Cir. 1994).

316. *Robertson*, 810 F. Supp. at 1024. In characterizing the effects of clearcutting, generally, the court revealed itself to be a latter-day forester at heart, finding:

> Although some vegetation will be removed, the vegetation will be replaced: Some trees will be cut; new trees will grow in their place. Some prescribed burning is planned to enhance wildlife habitat, and there is evidence that the animals hunters pursue will thrive in the wake of the harvest. The court cannot conclude that any net harm will ensue from the Forest Service's contemplated activities.

Robertson, 784 F. Supp. at 599.

317. *See id.* at 609-11 (finding that the NFMA did not require diversity at the compartment level and deferring to the Forest Service's diversity determinations).

stead, it found that the clearcutting itself would "enhance" diversity because—and this, by now, will be no surprise—"certain species will benefit from the clearing, e.g. white-tailed deer, harvest mice, wild turkey and bobwhite quail."[318]

The same conclusion was reached in *Sierra Club v. United States Forest Service*,[319] where clearcuts in the Black Hills National Forest of South Dakota were justified on diversity grounds as providing habitat for white-tailed deer[320]—one of the few native species more abundant today than at the time of Columbus. And again in *Krichbaum v. Kelley*,[321] involving conversion of the George Washington National Forest to "a mosaic of even-age tree stands,"[322] where the Service argued successfully that it was entitled to manage for a "desired future"[323] of diversity:

> Ecosystem management is the means to an end. It is not the end itself. The Forest Service does not manage ecosystems just for the sake of managing them or for some notion of intrinsic ecosystem values . . . . For the Forest Service, ecosystem management means to produce desired resource values, uses, products or services in ways that also sustain the diversity and productivity of ecosystems.[324]

And again, in yet another *Sierra Club v. Robertson*,[325] another "mosaic" forest to be achieved through clearcutting,[326] with the following rationale:

> Timber sales are the most economically viable means of achieving desired plant and animal diversity. Our publics put high values on wildlife-associated recreation and the visual amenities of the Forest. If these benefits were provided through a method other than com-

318. *Id.* at 611. It is hard to tell from these opinions exactly what evidence was presented or what issues were argued. It does appear, however, that the courts were influenced by the relatively small scale of the challenged sales (61 acres in one instance, *see id.* at 604). The courts also seemed influenced by efforts made to reserve at least some percentage of original hardwoods, and the courts were unwilling to inquire at the level of species selection and needs where, of course, diversity planning stands or falls. *See id.* at 601, 604 (noting that the technical questions facing the court were better resolved by "trained agency specialists" and consequently applying a narrow scope of judicial review).

319. 878 F. Supp. 1295 (D.S.D. 1993), *aff'd*, 46 F.3d 835 (8th Cir. 1995).

320. *See id.* at 1311.

321. 844 F. Supp. 1107 (W.D. Va. 1994), *aff'd*, 61 F.3d 900 (4th Cir. 1995).

322. *Id.* at 1114.

323. *Id.*

324. *Id.* at 1115.

325. 845 F. Supp. 485 (S.D. Ohio 1994).

326. *See id.* at 490 (detailing the harvest methods recognized by the Forest Service).

> mercial timber sales, costs would be significantly higher and would eliminate returns to the Treasury.[327]

As for restoring conditions of a natural forest, this was not a natural forest to begin with;[328] the baseline, apparently, was the cut-over landscape, circa 1900.

One emerges from these cases with the conviction that, at some early point, they took a wrong fork in the road. On reflection, Congress took the first wrong turn in assuming, with unrealistic optimism, that the Service could offset decades of timber-first training and continuing pressures to keep the cut high with precatory language about diversity goals and multiple use. Despite the Committee of Scientists' efforts to pin diversity down, it too left enough flexibility and ambiguity in its recommendations to allow diversity planning to continue as an afterthought, and even a justification for the status quo. The courts for their part could have interpreted the diversity regulations both by their intent and their literal word, rather than give up at the first mention of multiple use; they could do so still. So could the Forest Service itself. Wherever the fault lies, it seems clear that, in order to secure diversity across the broad scale of landscapes under Service management, a few truths have become self-evident:

(a) *The natural forest baseline.* The Committee of Scientists clearly had the unmanaged forest in mind as the baseline for diversity planning. The Forest Service has managed to pervert that concept to "natural forest," and from there to "desired" natural forest, and from there sideways, to diversity "equal to" that of a natural forest. From there, the concept of a biological or even an objective goal has disappeared entirely from radar. Either the objective for diversity is the historic natural forest in its unmanaged condition, or it is whatever set of "outputs" the dominant political pressure wants it to be. There is no in between.

(b) *Viable populations.* The viable population concept is demanding, time-consuming, expensive, never certain and often inconclusive—but it works. It produces defensible conclusions on what habitat is needed and how much and where. No other approach provides that level of objectivity and specificity. For decisions that are then going to run a gauntlet of fire from every side, an objective, scientific basis is indispensable.

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327. *Id.* at 498.

328. *See id.* at 502 (noting that the area had been cleared between 1850 and 1880 to fuel the ore smelting industry).

(c) *Management indicator species.* The MIS approach is as excellent or as abysmal as the species selected. The Endangered Species Act is effective because it flatly requires the selection of its listed species for MIS-like analyses. The diversity regulations fail when they allow the selection of common species or species of convenience, obviously selected to continue a high level of locally popular "outputs."

The Forest Service now stands at a crossroads of its own, based on its experience with diversity planning.[329] Its instincts, however, have not been to accept the observations just presented. Rather, as will next be seen, they have been to travel in almost the opposite direction.

C. THE SERVICE SOUNDS RETREAT

In the late 1980s, facing a wave of litigation over NFMA planning that was increasingly focused on biological diversity, the Forest Service initiated proceedings that would minimize the diversity requirements and insulate its decisions from judicial review.[330] In so doing, the Service was doubtless responding to the volume of appeals to its forest plans, to the difficulties it was encountering in protecting viable populations of identified species, and to the trend of court decisions just described, which suggested that it could do nearly anything it wanted in the name of diversity.[331] The rationale it chose to

329. In a January 1997 address to Forest Service employees, incoming Chief Michael Dombeck announced his "expectation" that every action by the Service "will not compromise the health of the land." *See* Letter from Roger Featherstone to Oliver Houck 1 (Jan. 8, 1997) (on file with author) (citing an Associated Press article). Granting the evident sincerity of this announcement, the question remains exactly how the health of the land is to be measured, and its compromise determined.

330. *See* National Forest System Land and Resource Management Planning: Proposed Rule, 60 Fed. Reg. 18,887 (1995) (to be codified at 36 C.F.R. § 219) (proposed Apr. 13, 1995). The Service had also been escalating its rhetoric for diversity protection—while resisting the enforcement of its regulations—through an initiative called "New Perspectives in Forestry." *See* Harold Salawasser, *New Perspectives for Sustaining Diversity in the U.S. National Forest Ecosystems*, 5 CONSERVATION BIOLOGY 567, 567-69 (1991) (describing the Forest Service's approach to diversity planning). "New Perspectives" has been roundly criticized for its high level of public relations effort and its low level of impact on Forest Service decisionmaking. *See, e.g.*, ALVERSON ET AL., *supra* note 3, at 145-50 (criticizing the Service's efforts as a presentation of vague goals having little practical effect).

331. *See* 60 Fed. Reg. at 18,892 (granting the Forest Service full discretion to determine its approach to the diversity goal and noting court decisions which upheld Forest Service discretion under the NFMA).

justify its new approach, however, was neither necessity nor convenience—it was the new, motherhood concept in the field of natural resources: "ecosystem management."[332]

The genesis of the Service's proposals was, officially, a "critique" of its regulations conducted in conjunction with a university forestry school, a conservation organization, and unspecified "others" in 1989.[333] The critique concluded that, while NFMA was basically sound, the planning process was too complex to be user-friendly and should be simplified.[334] Coincidence or no, this critique was followed quickly by a petition for rulemaking from the timber industry.[335] In early 1991, the Service responded with an advance notice of proposed rulemaking,[336] which stalled temporarily, then reemerged in April 1995.[337] The new rules would "streamline"[338] the planning process and "incorporate principles of ecosystem management."[339] Grand in its sweep—ecosystem management was defined as:

> a concept of natural resources management wherein National Forest activities are considered within the context of *economic*, ecological, and *social* interactions within a defined area.[340]

Lest the non-biological nature of this definition elude the reader, the Service made clear that a "key aspect" of ecosystem management would be "meeting people's needs and desires,"[341] and optimizing "net public benefits."[342] Whatever the new goal of this exercise might be—people's needs and desires, public benefits, or economic and social interactions—it would not be

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332. *Id.* at 18,920; *see infra* text accompanying note 340 (defining ecosystem management).

333. *See id.* at 18,887 (noting the process and finding put forth in 1 SYNTHESIS OF THE CRITIQUE OF LAND MANAGEMENT PLANNING (1990)).

334. *See id.* ("The Critique found that the complexity of the forest planning process was so overwhelming that few people understood it.") The Critique also found that the complexity inhibited communications between interested parties and delayed plans. *See id.*

335. *See id.* (noting the response of the National Forest Products Association).

336. *Id.* (citing Advance Notice of Proposed Rulemaking, 56 Fed. Reg. 6508 (1991)).

337. *See id.* at 18,886-932 (detailing the history of the rule-making process).

338. *Id.* at 18,888 (noting the various recommendations to streamline the planning process).

339. *Id.* at 18,919.

340. *Id.* at 18,920 (emphasis added).

341. *Id.* at 18,890.

342. *Id.*

anything one might confuse for science or law. The rest of the regulations followed suit.

A detailed critique of the regulations may await other authors and, if they are adopted, reviewing courts.[343] What is important here is what the Service has proposed to do to diversity planning. Capitalizing on a selected line of jurisprudence,[344] the Service declared its forest plans to be essentially think-pieces, constantly evolving and not ripe for judicial review. The new regulations would postpone review of diversity and other key requirements until implemented in specific "projects,"[345] such as timber sales. By this point, of course, the most important questions, such as whether to sell at all, where, and with what impact on diversity across watersheds and landscapes, would be largely moot.

Whatever got reviewed, it would not be "diversity," which the Service declared inoperative and removed from the regulations.[346] Citing court decisions in its favor,[347] the Service found that diversity was neither the "controlling principle in forest planning," nor even a "concrete standard."[348] The controlling principle was "multiple use objectives."[349] If the Service pro-

343. For one detailed critique, see Defenders of Wildlife & Natural Resources Defense Council, Revised Comments on the Proposed Rule for National Forest System Land and Resource Management Planning (Aug. 17 1995) (on file with author). *See also* Kathie Durbin, *High Noon in the National Forests*, AMICUS JOURNAL, Summer 1996, at 26 (criticizing the Forest Service's approach).

344. *See* 60 Fed. Reg. at 18,892 (citing Sierra Club v. Espy, No. 93-5050 (5th Cir. Nov. 15, 1994); Sierra Club v. Marita, 843 F. Supp. 1526 (E.D. Wis. 1994); Kirschbaum v. Kelly, 844 F. Supp. 1107 (W.D. Va. 1994); Sierra Club v. Marita, 845 F. Supp. 1317 (E.D. Wis. 1994); Sierra Club v. Robertson, 845 F. Supp. 485, 502 (S.D. Ohio 1994); ONRC v. Lowe, 836 F. Supp. 727 (D. Ore. 1993); Glisson v. United States Forest Serv. (S.D. Ill. August 26, 1993); Sierra Club v. Robertson, 784 F. Supp. 593, 609 (W.D. Ark. 1991)). Not cited, for example, is *Seattle Audubon Society v. Evans*, 771 F. Supp. 1081 (W.D. Wash. 1991), *aff'd*, 952 F.2d 297 (9th Cir. 1991).

345. *See* 60 Fed. Reg. 18,903 (1995) (noting that ecosystem analyses are not mandatory precursors to decisionmaking); *id.* at 18,909-10 (stating that a determination of consistency with a forest plan should be made when projects are initiated); *id.* at 18,927-28 (detailing a process for monitoring and evaluating project consistency with forest plans).

346. *See id.* at 18,894-97 (finding it impossible to adequately and consistently define "diversity" for the purpose of regulation).

347. *See id.* at 18,889 (citing Seattle Audubon Society v. Lyons, No. C92-479WD (W.D. Wash. Dec. 21, 1994)).

348. *Id.* at 18,892 (citation omitted).

349. *Id.*

vided for ecosystems, diversity would follow; thinking big would bring in the small.

The Service next freed itself from the shackles of viable population analysis. Viability was a concept that "no longer meets the agency's expectations."[350] It was not possible to guarantee, and was in any event outmoded in the new era of ecosystem science.[351]

Finally, the Service rejected even a goal of the "natural forest."[352] Instead, new forest plans would recognize the "dynamic nature of ecosystems and natural role of disturbances."[353] Natural disturbances could be mimicked, of course, by human disturbances.[354] The baseline, thus, would be whatever humans wanted it to be.

In sum, the regulations eliminated diversity as a goal, viable populations as a standard, and the natural forest as a baseline against which species distribution and abundance would be measured. That done, the regulations relegated diversity and all other critical NFMA decisions to the final and least inclusive stage in forest planning: timber sales.[355] In place of these requirements, two analyses emerged: habitat for "sensitive species"[356] and "ecosystem planning."[357]

In the first of these analyses, the Service would select "sensitive species" from various U.S. Fish and Wildlife Service biological inventories, a process that at least facially could trim its reliance on the ubiquitous bobwhite quail and white-tailed deer.[358] From here, however, few constraints would follow. Only if the Service "predicted" a "continuing downward trend" in the status of a sensitive species would it bother to identify that species' habitat needs. Even if such a trend were detected, moreover, the Service would require plan modifications only if failure to do so would likely result in the need for listing the

350. *Id.* at 18,895.

351. *See id.* at 18,895-96.

352. *See id.* at 18,896-97.

353. *Id.* at 18,897.

354. *See id.* at 18,896 (explaining that examples of natural or human-induced disturbances include floods, wildfires, and oil spills).

355. *See supra* notes 159-224 and accompanying text (describing the government's management policy for the Tongass National Forest as one designed to further only the interests of the timber industry).

356. *See* National Forest System Land and Resource Management Planning, 60 Fed. Reg. at 18,895-97.

357. *See id.* at 18,892-93, 18,903-04.

358. *See id.* at 18,922.

species under the Endangered Species Act, or in the species' extirpation in the plan area.[359] While it may be difficult to perceive a difference between population viability under the old regulations and the avoidance of endangerment under the new, the distinction lies in their presumptions and burden of proof. In the current regulations, the Service must "insure"—a concept requiring caution in the face of weak data or indeterminate science;[360] under the new regulations the burden of proof would be on the species, whose decline must be "predicted"—that is, proven—to trigger a response. The decline, further, must be so drastic as to endanger the species or "extirpate" it from the region. Lest anyone think the Service's judgment on such issues would be subject to review, the proposed regulations go on to caution that decisions as to the "degree of protection" needed by these sensitive species "are inherently dependent on professional judgment."[361] In sum, MISs would be replaced by a very low safety net, trotted out largely at the Service's discretion. But if this net is low—and it is—the second net, strung by another new analysis called "ecosystem management," never gets off the ground.

Turning to ecosystem planning, the Service is quite up front about its responsibilities: it has none. The regulations state: "[E]cosystem analyses are not mandatory, and it is left to agency discretion to conduct them as appropriate."[362] In a frank effort to avoid the requirements of environmental assessment and judicial review, the Service has repeated that "ecosystem analysis is not a decisionmaking effort and does not result in a resource decision."[363] The agency does not intend, moreover, that ecosystem analysis "be used to identify any preferred or desired alternatives or outcomes."[364] In other words, the analysis would be as useless and as minimally influential in actual decisionmaking as possible, and beyond the reach of law.

From here, the reader may proceed to the actual definitions of "ecosystem management" quoted above[365]—which is to

359. *See id.*
360. *See id.* at 18,895.
361. *Id.* at 18,922.
362. *Id.* at 18,903.
363. *Id.* at 18,904.
364. *Id.*
365. *Cf. supra* text accompanying note 340 (defining "ecosystem management" as "a concept of natural resources management wherein National For-

say managing for everything at once and for nothing in particular, except for people's "needs and desire." But why bother? In its definitions without meanings, processes without standards, and replacement of objectivity with generalities, the Service would eliminate any commitment to diversity qua diversity. In the name of "ecosystem management," it would reinvent multiple use.

D. REFLECTIONS ON THE FOREST SERVICE EXPERIENCE WITH BIODIVERSITY AND ECOSYSTEM MANAGEMENT

Emerging from the landscape of the Forest Service's experience with biodiversity, the conscientious development of its regulations, the complexity and difficulty of the Pacific old-growth and the Tongass Forest plans, the continuing warfare over diversity requirements in the courts, the lure of regulations so vague as to render Service plans immune from judicial review, and the lure of a single bullet, unassailable in its target—"ecosystem management"—that would cut through the controversy and solve all of these problems in a stroke, it is hard not to sympathize with the Service as it proposed to run for cover from its planning regulations and their implementation in the next round of forest decisions. In so doing, the Service would make a major strategic mistake. As onerous as rules and the prospect of judicial review may be, they are nothing to the contorting influence on agency life of economic interests and politics.[366] One of the few things in life that can stand up to a bullying committee chairman is law.[367] When the agency cuts itself loose from the specific requirements of species-based planning, in favor of amorphous, unenforceable con-

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est activities are considered within the context of economic, ecological, and social interactions within a defined area").

366. *See supra* notes 87-88 and accompanying text (discussing political pressures against diversity planning). For the development community's enthusiasm for laws that provide maximum agency "discretion," see the comments of the American Forest and Paper Association imposing limits on Forest Service "salvage" logging, *Ag. Secretary Glickman Issues Salvage Rider Order*, LAND LETTER, August 1, 1996, at 1, 2 (explaining that the limits "tighten the handcuffs on professional foresters"), and those of Senator Larry Craig (R-Idaho), *id.* ("[T]he way to try to legislate in this area is to try to allow discretion for the professionals."). The code words fool no one involved: more "discretion" means that industry gets to cut more timber.

367. *See* Don Cornelius, *A Hot Foot for Senator Stevens*, DEFENDERS, Summer 1996, at 23 (describing pressure from Senator Ted Stevens (R-Alaska) to expedite logging on the Tongass Forest; a Service employee concludes: "I wouldn't want to go through another summer like that").

cepts of ecosystem management, it throws its biologists, field managers, and forest rangers to the dogs. They may pick up a lot of apparent discretion, but they will have no shield when the pressure comes on. And when it comes to decisions that will affect large amounts of real estate, these pressures are always on.

Ironically, as the Forest Service was retreating from its commitment to the nitty-gritty of diversity planning, other federal agencies were stepping forward, however tentatively, into the ring.

III. ECOSYSTEM MANAGEMENT SPREADS TO THE FEDERAL FAMILY

The federal government manages nearly one-third of the land mass of the United States, some 650 million acres, 628 million of which are under the differing authorities and philosophies of the Bureau of Land Management, the Forest Service, the Fish and Wildlife Service and the National Park Service.[368] In addition, the National Marine Fisheries Service (NMFS) manages living resources, including commercial fisheries, in federal waters 200 miles out into the Atlantic, the Pacific, and the Gulf of Mexico.[369] These agencies came to ecosystem management in the 1990s, prompted by the realization that local and species-specific management regimes were insufficient to protect even the resources within their jurisdictions, and by the unrelenting consequences of the Endangered Species Act when these regimes failed.

The President's Council on Environmental Quality (CEQ) took an early lead in stimulating the discussion with a 1992 publication promoting diversity and ecosystem planning on public lands.[370] The Secretary of Interior was already heading

368. *See* U.S. GENERAL ACCOUNTING OFFICE, ECOSYSTEM MANAGEMENT: ADDITIONAL ACTIONS NEEDED TO ADEQUATELY TEST A PROMISING APPROACH 12 (1994) [hereinafter U.S. GAO].

369. This authority includes management of marine mammals, 16 U.S.C. § 1361 (1994), marine endangered species, *id.* § 1531, and commercial fisheries, *id.* § 1801.

370. *See* COUNCIL ON ENVIRONMENTAL QUALITY, LINKING ECOSYSTEMS AND BIODIVERSITY 135-87 (1992) (discussing the nature and value of biodiversity and exploring the benefits of ecosystem management). For another early report, see U.S. OFFICE OF TECHNOLOGY ASSESSMENT, TECHNOLOGIES TO MAINTAIN BIOLOGICAL DIVERSITY (1987) (assessing the technological and institutional opportunities and constraints to maintaining biological diversity in the United States and worldwide).

in that direction, if only to avoid future endangered species "train wreck[s]" within his agencies.[371] In 1993, the CEQ issued a second report on incorporating biodiversity considerations into the NEPA process. Among its management principles, this report identified minimizing fragmentation, promoting connectivity, and maintaining naturally-occurring structural diversity.[372] As the President and the Secretary of Interior were trying to quell the fires of controversy in the Pacific Northwest, the Vice President's National Performance Review recommended an executive order establishing policies for ecosystem management government-wide.[373] The U.S. General Accounting Office made a similar recommendation in August 1994,[374] summarizing nascent federal initiatives and identifying barriers to the new approach, among them the fact that, while federal laws define minimum levels of protection for air and water quality and endangered species protection, no one had yet articulated a "minimum level of ecosystem integrity and functioning" for this new agenda.[375]

At about the same time, the White House was convening an Ecosystem Management Task Force to nudge action forward.[376] The Task Force's report, issued in 1995 with the cheery title *The Ecosystem Approach: Healthy Ecosystems and Sustainable Economics*,[377] confirmed that "people are part of ecosystems" and prescribed a "shared vision" of ecosystem conditions and goals, to be achieved through better "communication" and "partnerships" with "nonfederal stakeholders,"

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371. *See* Bruce Babbitt, *The Endangered Species Act and "Takings": A Call for Innovation Within the Terms of the Act*, 24 ENVTL. L. 355, 364 (1994).

372. *See* COUNCIL ON ENVIRONMENTAL QUALITY, INCORPORATING BIODIVERSITY CONSIDERATIONS INTO ENVIRONMENTAL IMPACT ANALYSIS UNDER THE NATIONAL ENVIRONMENTAL POLICY ACT 6-8 (1993).

373. *See* U.S. GAO, *supra* note 368, at 28.

374. *Id.* at 36.

375. *Id.* at 39. In late 1996, the White House proposed the creation of a "coordinated federal ecosystem database" to measure "how the environmental protection system is working." *Gore Calls for Coordinated Federal Ecosystem Monitoring*, INSIDE EPA, Oct. 4, 1996, at 9. The measures chosen will, de facto, become management indicators for federal lands.

376. *See* U.S. GAO, *supra* note 368, at 35. Representatives of 12 federal agencies and of the White House offices of the budget and sciences and technology compose this task force, which the White House Office of Environmental Policy chairs. *Id.*

377. 1 REPORT OF THE INTERAGENCY ECOSYSTEM MANAGEMENT TASK FORCE, THE ECOSYSTEM APPROACH: HEALTHY ECOSYSTEMS AND SUSTAINABLE ECONOMICS (1995).

leading to "resource allocations" and "adaptive management."[378] The concept of ecosystem management, punching every buzzword in the new vocabulary of government, was migrating from scientific principles towards a large, and largely-standardless, town meeting.[379]

Several such processes are now underway. The Forest Service and BLM have launched initiatives in the Columbia Basin that constitute, in effect, consensus-based land use planning. BLM has taken its planning further, to rangewide standards and guidelines in several Western states. The NMFS, for its part, has faced sustainability requirements for commercial fisheries for many years, with relevant lessons for ecosystem management as well. Experience with these programs, heterogeneous and preliminary as they are, demonstrates the same promise and pitfalls seen in the evolution of national forest diversity planning.[380]

A. PACIFIC SALMON: FROM PACFISH TO THE INTERIOR COLUMBIA BASIN ECOSYSTEM MANAGEMENT PROJECT

Pacific salmon make the spotted owl look easy. The owl was a single, well-defined species with basically one habitat, one threatening commodity use, and one management requirement that could be accommodated, albeit with pain in

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378. *Id.* at 6-8.

379. For more of this genre, see COASTAL AMERICA, TOWARD A WATERSHED APPROACH: A FRAMEWORK FOR AQUATIC ECOSYSTEM RESTORATION, PROTECTION, AND MANAGEMENT 11-18 (1994) (promoting coordinated environmental management to treat watershed regions). Ten federal agencies collaborated to produce this report, which urges greater interagency communication and cooperation. *Id.*; *see also* The Keystone National Policy Dialogue on Ecosystem Management (Oct. 1996) (on file with author) (describing ecosystem management as an elaborate "collaborative process").

380. Initiatives of the Park Service and the Fish and Wildlife Service (FWS) typically follow the "soft" path of the White House Task Force and produce few specific guidelines. The FWS planning guide, AN ECOSYSTEM APPROACH TO FISH AND WILDLIFE CONSERVATION, *supra* note 13, launching a planning process around 52 watershed-based ecosystems, *id.* at 7, is not discussed further in this Article because, at the time of this writing, it had not been taken to the next stage of application to management decisions. One identified watershed is the entire Lower Mississippi River Valley, which could lead to a very long planning discussion indeed. Like the White House Task Force's report, the Forest Service's New Perspectives, and the similar BLM document, BUREAU OF LAND MANAGEMENT, DEP'T OF INTERIOR, ECOSYSTEM MANAGEMENT IN THE BLM: FROM CONCEPT TO COMMITMENT (1994), these guides praise partnership and consensus planning for resource goals, but avoid providing rules or standards that might impose restraints or resemble "law to apply."

several local mills, without major economic impact. But there were some 400 different stocks of salmon, steelhead and sea-run cutthroat trout in the Pacific Northwest, ranging in their migrations from the coast of Russia to streams and freshets over 900 miles inland, from sea level to elevations of 7,000 feet, spanning northern California, Oregon, Washington and Idaho.[381] Because they breed, spawn, and migrate in different areas and at different times of the year, we have difficulty even classifying salmon stocks as species.[382] What we do know is that the cumulative effects of high dams, logging and grazing have brought the salmon stocks to their knees.[383] Of the 400 known stocks, 214 were identified as at risk of extinction by the early 1990s;[384] 106 were completely gone.[385]

None of this was a secret in the Pacific Northwest. The Pacific salmon fishery supported a multi-million dollar industry in coastal communities from California to Alaska. Blue ribbon recreational fishing, from offshore to inland Idaho, created a spin-off economy in boats, gear, and tourism that added an order of magnitude of economic impact.[386] Since the 1950s,

381. *See* Murray D. Feldman, *Natural Forest Management under the Endangered Species Act*, NAT. RESOURCES & ENV'T, Winter 1995, at 32, 34. For a sampling of the extensive literature dealing with salmon-related litigation, legislation, and administrative proposals over the past 20 years, see generally Michael C. Blumm, *Saving Idaho's Salmon: A History of Failure and a Dubious Future*, 28 IDAHO L. REV. 667 (1991-92) (examining the decline of Idaho's salmon population and proposing strategies to restore the salmon runs); Colloquium: *Who Runs The River?*, 25 ENVTL. L. 349 (1995) (presenting various issues concerning the Columbia River salmon).

382. *See* 57 Fed. Reg. 14,653 (1992) (discussing difficulties in determining whether salmon stocks constitute species under the ESA); 59 Fed. Reg. 48,855 (1992) (same).

383. For the role of hydropower, see *Idaho Dep't of Fish and Game v. National Marine Fisheries Serv.*, 850 F. Supp. 886 (D. Or. 1994). For the role of clearcutting, grazing, and mining, see 57 Fed. Reg. 14,653 (1992) (to be codified at 50 C.F.R. pt. 227) (listing NMFS endangered salmon species and identifying courses).

384. *See* Willa Nehlson et al., *Pacific Salmon at the Crossroads: Stocks at Risk from California, Oregon, Idaho, and Washington*, 16 FISHERIES 4, 4-21 (1991). Of those 214 stocks, 134 are found on Forest Service lands and 109 on BLM lands. *See* Jason M. Patlis, *BioDiversity, Ecosystems and Species: Where Does the Endangered Species Act Fit In?*, 8 TUL. ENVTL. L.J. 33, 73 (1994).

385. *See* Feldman, *supra* note 381, at 34.

386. *See* The Endangered Species Coalition, The Salmon Scenario (undated) (on file with author). "In 1988, the commercial and recreational Pacific Northwest salmon fishing industry supported an estimated 62,750 jobs and brought in more than $1.25 billion to the region in personal income. Since 1988, the commercial salmon industry has declined by about 97% and recreational salmon fishing has declined by at least 80% throughout the Pacific

state fish and game agencies had been battling federal hydroelectric agencies, the Bureau of Reclamation, the Bonneville Power Administration, and navigation, aluminum manufacturing, and agricultural interests in an effort to win concessions for the fishery.[387] To little avail. After extensive jawboning, they won fish hatcheries that replaced wild stocks with weaker captive breeds, and trucks and barges to carry the fish around.[388] Against Alcoa, Boeing, and the power and promise of cheap electricity, no amount of salmon advocacy was going to change the status quo.

Meanwhile, in the high watersheds of the salmon spawning grounds, cattle were beating the streams into mud, and clearcuts were obliterating dozens of stream miles at a stretch with avalanches of dirt and debris.[389] The advent of NEPA, NFMA and FLPMA produced little change on the ground. These laws remained essentially discretionary, and the economic and political power of the grazing and timber industries was simply too strong. The cattle allotments continued with few restrictions,[390] as did timber harvests in even the steepest forest watersheds.[391]

Enter the Endangered Species Act. The sagas of litigation, administrative action, responsive legislation, and renewed litigation by sportsmen's organizations, Native Americans, and even the State of Idaho over the endangered salmon are well-told elsewhere and beyond the scope of this Article.[392] Suffice it to say that, after long hesitation, the National Marine Fisheries Service finally took the plunge and declared several salmon runs at first threatened, and later and with more realism, endangered.[393] At the close of 1993 it went further, designating

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Northwest." *Id.* (citing data from the Wilderness Society, the Pacific Rivers' Council, and the Pacific Coast Federation of Fishermen's Associations).

387. *See* Daniel Jack Chasan, *Goodbye Wild Salmon?*, DEFENDERS, Sept.-Oct. 1991, at 17 (detailing the demise of salmon populations in the Northwest due to overfishing, pollution, and water removal for irrigation).

388. *See id.* at 31-33; *see also* American Rivers v. National Marine Fisheries Serv., No. 94-940-MA, 1995 WL 464544 (D. Or. April 14, 1995) (challenging salmon barging as a conservation practice under the ESA).

389. For a case illustrating the effects of clearcutting on salmon spawning streams, see *National Wildlife Federation v. United States Forest Service*, 592 F. Supp. 931 (1984).

390. *See infra* note 425 and accompanying text (describing harmful effects of cattle).

391. *National Wildlife Federation*, 592 F. Supp. at 937.

392. *See* sources cited *supra* note 381.

393. After several years in deep denial, in August 1989, an environmental

critical habitat for the listed salmon on the Columbia, Snake and Salmon rivers and their upstream tributaries.[394] Federal agencies would now have to respond. This study focuses on that response and its evolution towards ecosystem planning.

As resistant as they were to listing the salmon as endangered, the Forest Service, BLM and other federal agencies saw the handwriting on the wall and began preparing for it. In January 1991, a year before the first NMFS listing proposal, the Forest Service adopted a *Columbia River Basin Anadromous Fish Habitat Management Policy and Implementation Guide*, directing forests within the region to establish salmon objectives and monitor the effects of permitted activities.[395] What were missing, of course, were those specifics that would produce real change. The endangered species listings required more. For openers, they required these agencies to consult with NMFS on each timber sale, cattle allotment, and other significant intrusion.[396] For the Umatilla Forest alone, 755 projects were up for ESA review; an additional 2,806 projects were identified in the Wallowa-Whitman Forest.[397] The agencies needed a common strategy for handling these consultations and a blueprint for their outcome. The answer was PACFISH.

PACFISH was initiated by the Forest Service and BLM in 1993 as an "interim" strategy for managing anadromous fish habitat on their Northwest holdings.[398] Because the FEMAT plan[399] addressed multiple species conservation from the western slope of the Cascade Mountains to the Pacific Ocean, PACFISH started at the Cascades and went east. At the heart

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lawsuit prodded the NMFS into making an emergency listing of the winter-run Chinook as threatened. 54 Fed. Reg. 32,085 (Aug. 4, 1989) (to be codified at 50 C.F.R. pts. 226 and 227). In 1992, noting an almost 90% decline in the past 25 years and observing that the 1988 class was almost a "total failure," the NMFS reclassified the species as endangered. 57 Fed. Reg. 22,416 (1992).

394. *See* 58 Fed. Reg. 68,543, 68,543-44 (Dec. 28, 1993) (to be codified at 50 C.F.R. pt. 226).

395. *See* Feldman, *supra* note 381, at 34.

396. *See* Pacific Rivers Council v. Robertson, 854 F. Supp. 713 (D. Or. 1993), *aff'd in part, rev'd in part*, Pacific Rivers Council v. Thomas, 30 F.3d 1050 (9th Cir. 1994).

397. *See id.* at 717.

398. *See* UNITED STATES DEP'T OF AGRICULTURE & UNITED STATES DEP'T OF INTERIOR, ENVIRONMENTAL ASSESSMENT FOR THE IMPLEMENTATION OF INTERIM STRATEGIES FOR MANAGING ANADROMOUS FISH-PRODUCING WATERSHEDS IN EASTERN OREGON AND WASHINGTON, IDAHO AND PORTIONS OF CALIFORNIA (March 1994) [hereinafter PACFISH ENVTL. ASSESSMENT].

399. *See supra* notes 112-130 and accompanying text.

of PACFISH is the designation of Riparian Habitat Conservation Areas (RHCAs), buffer zones around anadromous streams in which development activity is limited.[400] Perennial stream RHCAs occupied by anadromous fish extend 300 feet on either side of the waterway; perennial streams not currently occupied are protected out to 150 feet; important seasonal streams to 100 feet; less-important seasonals to 50 feet.[401] In these streamside buffer zones, timber harvests are prohibited altogether; mining, grazing, and road construction are also discouraged and, where necessary, conditioned to protect stream values.[402] Additional, specific stream objectives are established for pool frequency, water temperature, bank stability, log and snag habitat, and width/depth ratios.[403]

What must strike the eye here is the objective, numerical texture of PACFISH's requirements. The need for this specificity is reflected not only in the gross statistics on salmon decline but also in data on upstream conditions that PACFISH brought to light. A study of the Upper Grande Ronde River Subdrainage in the Wallowa-Whitman forest found 80% of the waters in a "deteriorated" condition; only twenty-four adult spring/summer chinook salmon returned to the river in 1992.[404] For the Upper Grande Ronde and 15,000 similar miles of anadromous fish habitat on Forest Service lands alone, the PACFISH prescriptions offered new life.[405] Moreover, the Service took the prescriptions to heart. The Challis National Forest announced a policy of "100 percent compliance" for conditions imposed on grazing permitees; violations will mean revocation.[406] Under PACFISH, federal agencies began at long last to protect the watersheds of the Pacific Northwest—based on the identified needs of individual species.[407]

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400. *See* Feldman, *supra* note 381, at 35.

401. *See id.*

402. *See id.*

403. *See id.*

404. *See* Pacific Rivers Council v. Robertson, 854 F. Supp. 713, 718 (D. Or. 1993), *aff'd in part, rev'd in part*, Pacific Rivers Council v. Thomas, 30 F.3d 1050 (9th Cir. 1994).

405. *See* Feldman, *supra* note 381, at 34.

406. *Id.* at 36.

407. The Forest Service projected that the PACFISH standards might reduce timber sales by 58 million board feet, PACFISH ENVTL. ASSESSMENT, *supra* note 398, at 64, an obvious trigger for the "ecosystem" drama that would ensue.

It remains to be seen whether PACFISH will survive. As we speak, it is being superseded by two large planning efforts jointly named the "Interior Columbia Basin Ecosystem Management Project."[408] The project brochure lists the following goals and "benefits":

> Develop "big picture" ecosystem management strategies that will strengthen *multiple use management* . . . .
>
> Refine PACFISH with flexible approaches that will protect fish and other species and . . . keep ecological risks at acceptable levels
>
> Resolve broad "big picture" problems that cross jurisdictional lines (e.g. salmon) and refine and improve interim strategies (e.g. PACFISH)
>
> Provide for species viability on an ecosystem basis, rather than with a species-by-species approach . . . .[409]

One does not have to be a cat to smell a rat. Two of the seven listed benefits endorse "multiple use management" and reject species-based viability. Two others specifically target revising ("refining") PACFISH. The question is how, and with what. From a draft document, entitled *A Framework for Ecosystem Management in the Interior Columbia Basin*, we can tease out a pretty good idea.[410]

The approach is frankly political. The project goal is "ecosystem integrity" defined as "providing products and serv-

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408. Interior Columbia Basin Ecosystem Management Project, Preliminary Goals for the Development of Alternatives (undated draft) (on file with author); *see also* U.S. Forest Service and Bureau of Land Management, Amendment to the Eastside Ecosystem Management Project (undated draft) (on file with author). The Interior Columbia Basin Ecosystem Management Project originated from the President's commitment in 1993 to resolve the Northwest timber controversy. *See* Richard W. Haynes et al., A Framework for Ecosystem Management in the Interior Columbia Basin 12 (Nov. 11, 1995) (unpublished manuscript, on file with author). In July of that year the President directed the Forest Service to develop a "scientifically sound and ecosystem-based strategy for management of Eastside forests." *Id.* The strategy was to be based on an Eastside Forest Ecosystem Health Assessment that had been developed by agency scientists. *See id.* The Chief of the Forest Service and BLM Director then launched a joint assessment project for Eastern Slope lands in Oregon and Washington, leading towards an Eastern Oregon/Washington Environmental Impact Statement. *See* Eastside Ecosystem Management Strategy, Pacific Northwest Region, 59 Fed. Reg. 4680 (Feb. 1, 1994). Recognizing the need to extend their focus upstream to Idaho and western Montana, in 1995 the two agencies announced a second assessment project leading to an Upper Columbia River Basin Environmental Impact Statement.

409. Upper Columbia River Basin—EIS Project Update, Comments to Issues and More 6 (July 1995) (on file with author) [hereinafter EIS Project Update].

410. Haynes et al., *supra* note 408.

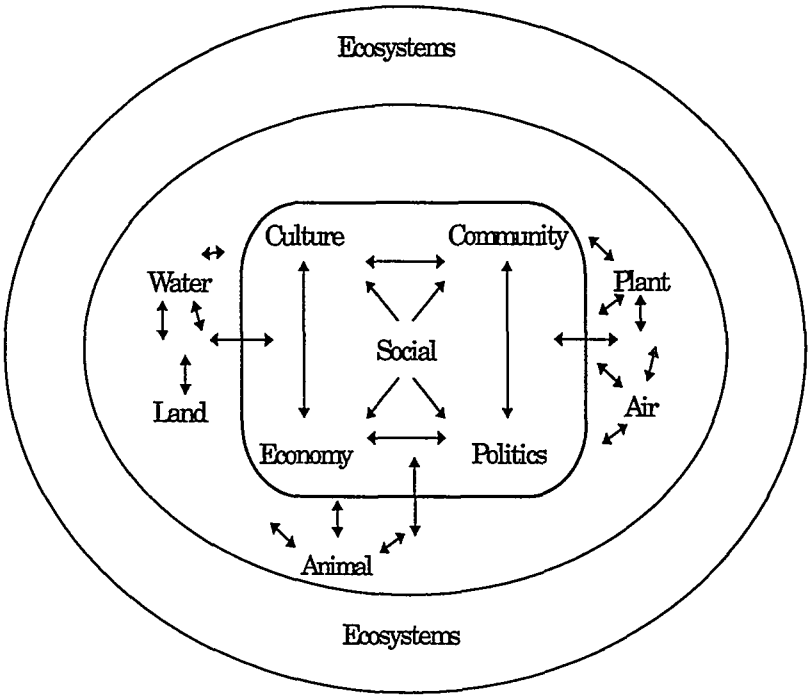
ices within an ecosystem's capabilities."[411] Ecosystems are "dynamic, evolutionary and resilient"; they also have "biophysical, economic and social limits."[412] What is meant by "social limits" is not left to the imagination. Maintaining diversity and the "resilience" of natural resources "depends on an understanding of how society values these resources" and how "natural and human processes" affect the ecosystem.[413] The challenge for resource managers is to balance "biological science" with "how society values renewable and non-renewable natural resources."[414] The role of science, by contrast, is not to provide standards or management principles, but simply to provide information to managers; scientists should "leave important value choices" to "duly recognized decision makers"[415] through "the democratic and institutional processes established."[416]

Having equated ecosystem management with the political process, the Framework identifies six "goals" for ecosystem management.[417] Goal three is to "maintain viable populations of native and desired non-native species";[418] goal five is to "manage for the human sense of 'place' "; and goal six is to "manage to maintain the mix of ecosystem goods, functions and conditions that society wants."[419] No particular weight is given to viable populations of species, nor is any prescription made for resolving the inevitable conflicts between, for example, goals three and six. These management decisions will require "mutual learning experiences for stakeholders, planners and scientists."[420] Viable population analysis leads back to politics.

In all, the Framework comprises over seventy pages of text, appendices, and citations to virtually everything written on ecosystem management to date. One appendix presents a schematic representation of the ecosystem management proc-

411. EIS Project Update, *supra* note 409, at 15.
412. Haynes et al., *supra* note 408, at 18.
413. *Id.* at 28, 29, 39, 40, 41.
414. *Id.* at 17.
415. *Id.*
416. *Id.*
417. *Id.* at 30.
418. *Id.*
419. *Id.*
420. *Id.* at 49.

ess.[421] With the thought that it might save further words, the schematic is reproduced here:



Whatever we have here, it is not law. It is not policy. It is not even a goal. It is an attempt to make unpleasant management decisions acceptable to more people by involving them in their lengthy discussion, and by tempering even the possibility of a "requirement" with administrative discretion and political pressure. The Interior Columbia Basin Ecosystem Management Project has rediscovered—once again—multiple use. The effort may or may not be politically successful. It would certainly not hurt to try, except for what is given up in the process. What are obviously, explicitly, put on the negotiating table in the Interior Columbia Basin process are the hard-won, objective, and necessary standards of PACFISH. PACFISH, with its mandatory three-hundred-foot buffers and percentage of canopy cover, is for trade.

421. *Id.* at 87 fig.8.

Nothing better illustrates the potential benefit and reach of ecosystem management, and its latent danger, than the Inner Columbia Basin story just described. To seek consensus is admirable. Yet it is neither necessary, nor desirable, nor will it ultimately be effective, to trade off law in the process.

B. THE PUBLIC RANGE

The public range, the last frontier, has been something of a last frontier for environmental law as well.[422] Covering fully one-fifth of the United States, the public domain is largely arid, its distances remote, and its historic economy a struggle between cattle and the available grass. The occupation of the West by livestock in the mid-nineteenth century was one of the transforming events in the American landscape. In 1870, Arizona Territory held about 5,000 cattle;[423] twenty-one years later there were 1.5 million; across the West the total number had jumped to 26.5 million head.[424] They ate out native grasses; they trampled streams; they pounded valley floors to a pan of dirt.[425] Between the end of the Civil War and the turn of the century, "700 million acres of grass west of the Mississippi River [were] depleted or destroyed."[426] On these once rich public lands, efforts at ecosystem management and diversity protection face two great challenges. The first is that the ecosystem we see today has been so greatly altered. The second is

422. As used in this Article, the "public range" refers to approximately 160 million acres of public land located in the 11 Western states and administered by the Bureau of Land Management, primarily for grazing. *See* GEORGE CAMERON COGGINS ET AL., FEDERAL PUBLIC LAND AND RESOURCES LAW 688 (3d ed. 1992) (describing the federal lands upon which grazing is permitted).

423. *See* DENZEL FERGUSON & NANCY FERGUSON, SACRED COWS AT THE PUBLIC TROUGH 15 (1983).

424. *See id.*

425. *See id.* at 60-99. For a description of the effects of livestock on one watershed, see WILKINSON, *supra* note 46, at 75-76 (describing overgrazing on Camp Creek, Oregon). *See also* Edward Abbey, *Even the Bad Guys Wear White Hats*, HARPER'S, Jan. 1986, at 51, 53 ("[Cattle] pollute our springs and streams and rivers. They infest our canyons, valleys, meadows, and forests. They graze off the native bluestem and grama and bunch grasses, leaving behind jungles of prickly pear. They trample down the native forbs and shrubs and cactus. They spread the exotic cheat grass, the Russian thistle, and the crested wheat grass."). Some cattlemen see these descriptions as exaggerated, and even absurd. *See* Richard H. Braun, *Emerging Limits on Federal Land Management Discretion: Livestock, Riparian Ecosystems, and Clean Water Law*, 17 ENVTL. L. 43, 50 n.16 (1983) (describing concerns for riparian ecosystems as "ripariopsychorrhea").

426. FERGUSON & FERGUSON, *supra* note 423, at 32.

that the major source of the alteration, large numbers of cattle, remains.

We have never been very good at managing cattle on the public lands. Until recently, we have not even tried. It was not until 1934 that federal law initiated any administration of grazing, and what emerged was essentially a monopoly in grazing permits supported by federal subsidies and run largely by the stockmen themselves.[427] In 1976, with only 16% of federal grazing lands in good condition and 84% at "fair, poor or bad,"[428] Congress moved to upgrade BLM's authority to administer these lands by passing the Federal Land Policy and Management Act.[429] The results were mixed. The Bureau launched a series of resource planning efforts, but the cattle lobby was strong and FLPMA's substantive requirements were highly discretionary,[430] finessing one step everyone knew was necessary for ecosystem restoration: fewer cattle.[431] Even the mod-

427. *See* Taylor Grazing Act of 1934, ch. 865, 48 Stat. 1269 (codified as amended at 43 U.S.C. §§ 315-315r (1994)). For a description of the power of grazing permittees, see George Cameron Coggins, *The Law of Public Rangeland Management V: Prescriptions for Reform*, 14 ENVTL. L. 497, 503-04, 527-28 (1984). The subsidies include below market-cost grazing fees and federal insecticide, herbicide, chaining, and predator control programs. *See* FERGUSON & FERGUSON, *supra* note 423, at 147-70 (outlining federal range improvements and arguing that they amount to a massive subsidy to ranchers); WILKINSON, *supra* note 46, at 93-94 (describing how the Taylor Grazing Act allowed the poisoning of competing animal species and the maintenance of below-market value grazing fees).

428. *See* Natural Resources Defense Council, Inc. v. Morton, 388 F. Supp. 829, 840 (D.D.C. 1974) (citing a BLM budget report), *aff'd mem.*, 527 F.2d 1386 (D.C. Cir. 1976); *cf.* Natural Resources Defense Council, Inc. v. Hodel, 618 F. Supp. 848, 857 (E.D. Cal. 1985) (citing a BLM budget report classifying 19% of grazing lands as "improving," 65% as "static," and 16% as "declining").

429. Pub. L. No. 94-579, 90 Stat. 2744 (1976) (codified as amended at 43 U.S.C. §§ 1701-1784 (1994)).

430. FLPMA's policies bottom out on "multiple use," § 202(c)(1), 90 Stat. at 2747 (codified at 43 U.S.C. § 1712(c)(1) (1994)), for the minimal usefulness of which see *supra* note 58 and accompanying text. *See also* Natural Resources Defense Council, Inc. v. Hodel, 624 F. Supp. 1045, 1062 (D. Nev. 1985) ("Congress attempted to remedy this [overgrazing] situation through FLPMA, PRIA and other acts . . . which [do] not provide helpful standards by which a court can readily adjudicate agency compliance."), *aff'd*, 819 F.2d 927 (9th Cir. 1987).

431. *See* WILKINSON, *supra* note 46, at 99 (describing industry efforts to counter FLPMA stock reductions); *see also* Kelly Nolen, *Residents at Risk: Wildlife and the Bureau of Land Management's Planning Process*, 26 ENVTL. L. 771 (1996) (describing the failure of recent BLM "Fish and Wildlife 2000" and riparian initiatives to significantly reduce grazing impacts). The problem is not unique to BLM; reducing cattle numbers on Native American reservations has been equally difficult even in times of severe drought. *See* Elizabeth

est reductions proposed led to warfare. Unpopular BLM officials were transferred or fired.[432] BLM offices were bombed.[433] The Secretary of Interior was accused of starting a War on the West,[434] and to make sure that he lost, local ordinances were passed forbidding Interior employees from enforcing environmental laws.[435] This was not going to be an easy audience to sell on ecosystem management. As for the idea of biological diversity, this audience had only recently stopped shooting eagles[436] and was still content with the fact that it had finally exterminated the wolves.[437]

In the early 1990s, led by a new Secretary of Interior, BLM tried again. During a three-month period beginning in late 1993, the Secretary met nearly two dozen times with western governors, state and local officials, ranchers, environmentalists and other public lands users to discuss rangeland reform.[438] At about the same time, the department circulated an advance notice of proposed rulemaking on the administration of the public lands, followed by a draft impact statement, more than

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Manning, *Drought Has Navajos Discussing a Taboo Subject—Range Reform*, HIGH COUNTRY NEWS (Carson City), Aug. 5, 1996, at 4 ("The term 'reduction' is still taboo, but officials now speak of 'livestock adjustments,' then quickly add the word 'voluntary.'")

432. *See* Davis, *supra* note 40; Duerk, *supra* note 40.

433. *See Bomb Rips Building in Nevada*, *supra* note 40, at A5 ("A bomb exploded on the roof of the Bureau of Land Management office Sunday. The blast was heard at least two miles away . . . . The bureau is involved in controversies over grazing fees on federal land and mining law enforcement.").

434. *See* Jon Christensen, *Nevada's Ugly Tug-of-War*, HIGH COUNTRY NEWS (Carson City), Oct. 30, 1995, at 1, 10 (describing the combat mentality of some Nevadans in controversies surrounding the use of public lands).

435. *See* Andrea Hungerford, *"Custom and Culture" Ordinances: Not a Wise Move for the Wise Use Movement*, 8 TUL. ENVTL. L.J. 457, 461-68 (1995) (describing the basic elements of local "custom and culture" ordinances and how they are designed to hamper federal enforcement of environmental policy).

436. *See generally* DONALD G. SCHUELER, INCIDENT AT EAGLE RANCH (1980) (describing eagle killings in Texas); *Key Test Avoided on Eagle Killings*, N.Y. TIMES, Nov. 25, 1973, at A66 (describing eagle killings in Wyoming).

437. *See generally* HANK FISCHER, WOLF WARS (1995) (describing the extirpation of wolves in the American West and opposition to their reintroduction); Thomas McNamee, *Warring Over Wolves*, DEFENDERS, Winter 1994/1995, at 15-17 (describing opposition to wolf reintroduction in Yellowstone Park). In the view of one New Mexico resident, the wolf is not endangered; it is in a zoo where it belongs. *See* Charles Bowden, *Lonesome Lobo*, WILDLIFE CONSERVATION, Jan.-Feb. 1992, at 44, 51.

438. *See* Department Hearings and Appeals Procedures; Cooperative Relations; Grazing Administration—Exclusive of Alaska, 60 Fed. Reg. 9,894, 9,894 (1995).

twenty thousand public comments, and final regulations in February 1995.[439] The rules were intended to restore the natural ecosystems of the public range.

Although the new regulations cover a wide range of issues, among the most controversial has been a section titled "Fundamentals of Rangeland Health."[440] In the face of heated opposition—e.g., "rangeland reform is not needed," "rangeland improvement is inconsistent with current laws," reduced allotments would constitute "takings"[441]—the department maintained its goals of restoring the federal range and its proposed methods for getting there. The goals are the maintenance of functional watersheds and healthy biotic communities, water quality standards, and habitat of endangered species and other species of special interest.[442] Where these goals are not met, BLM must take "appropriate action as soon as practical, but not later than the start of the next grazing season"; appropriate action may include reducing livestock numbers, seasons or times of use.[443] A hammer would fall. BLM districts must develop regional or statewide guidelines "to sustain native populations and communities";[444] if appropriate guidelines do not emerge, the regulations provide highly specific "fallback guidelines," for example, that "desired species are . . . allowed to complete seed dissemination in 1 out of every 3 years."[445]

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439. *See id.* at 9,894-95. Several aspects of these regulations, but not those at issue in this Article, were successfully challenged by the ranching industry in Wyoming District Court. Public Lands Council v. United States Dep't of Interior, 929 F. Supp. 1436 (D. Wyo. 1996). The case is now on appeal.

440. 43 C.F.R. § 4180.1 (1995).

441. Department Hearings and Appeals Procedures; Cooperative Relations; Grazing Administration—Exclusive of Alaska, 60 Fed. Reg. at 9,906-09. In response to comments that "rangeland reform is not needed," the Department pointed out that "under current management practices 22 million acres of BLM uplands would be functioning but susceptible to degradation, . . . about 20 million acres would be nonfunctioning," and the toll on riparian areas would be even worse. *Id.* at 9,907.

442. *See id.* at 9,898. A small war over these goals has apparently broken out in Wyoming, which has insisted that its implementing regulations "recognize the economic impact on grazing communities"; the BLM has, as of the time of this writing, insisted that the regulations be "based on science and not socioeconomics." Paul Kirza, *Cow Coup: Wyoming Governor Usurps Federal Grazing Group*, HIGH COUNTRY NEWS (Carson City), Dec. 23, 1996, at 4. The issue, of course, goes to the heart of ecosystem management, and of this Article.

443. 60 Fed. Reg. at 9,898-99.

444. 43 C.F.R. § 4180.2(e)(10) (1995).

445. *Id.* § 4180.2(f)(2)(vii).

In effect, BLM adopted a viable vegetation population analogue to the Forest Service diversity regulations. Unlike the service regulations, the "natural background" measuring stick is absent, due in part to the fact that so much of BLM's natural landscape has been irreversibly altered.[446] Perhaps for the same reason, the BLM regulations also lack any requirement that all such populations be maintained. Instead, the bureau districts must show "significant progress" toward these goals in order to allow continued grazing at current (or any other) levels. The specifics of the implementing standards, including "specific quantitative assessment methods," are left to state and regional guidelines.

Draft Utah regulations were issued in August 1996 with a stated goal of "sustainable production of the ecosystem's desired outputs."[447] Not surprisingly for a grazing district, the document is light in its description of overgrazing and heavy in its description of the "advantageous relationships between plants and grazing animals, each contributing to the benefit of the other."[448] When it further cautions that "rangeland health" is a relative term capable of only qualitative, and not quantitative, measurement,[449] the reader might be inclined to abandon the exercise as pointless. That would be a mistake. The document continues by requiring that its standards be "measurable and attainable,"[450] establish "parameters for management decisions,"[451] and be measured by "indicators" to "determine if standards are being met."[452] That is, they will be something close to law.

446. Native, perennial grasses have been widely replaced by cheatgrass, an annual, exotic species: "It is not likely that knowledge and resources will ever be available to return all of these areas to their natural potential because they have been greatly altered." Utah State Office Bureau of Land Mgmt., Preliminary Draft Proposed Standards and Guidelines For Rangeland Health on Public Lands in Utah 5 (1996) (preliminary draft, on file with author) [hereinafter Preliminary Proposed Standards].

447. Utah State Office Bureau of Land Mgmt., Standards for Rangeland Health and Guidelines for Grazing Management on BLM Lands in Utah 3 (Aug. 1996) (on file with author) [hereinafter Standards for Rangeland Health].

448. *Id.* at 2.

449. *Id.* at 3 n.1.

450. *Id.*

451. *Id.* at 5.

452. *Id.* An earlier draft had gone on to explain the role of indicators as follows: "Just as blood pressure is one indicator of human health, the extent of sheet erosion is one indicator of the health of a rangeland ecosystem." Preliminary Proposed Standards, *supra* note 446, at 5.

The Utah office identified four standards,[453] each supported by narrative indicators such as "root-masses capable of withstanding high streamflow events"[454] and "absence of indicators of excessive erosion such as rills, soil pedestals, and actively eroding gullies."[455] Two of the four standards target an indicator described as the "Desired Plant Community" and defined as plants selected for "their contributions to ecosystem outputs (e.g. wildlife, watershed, clean water, etc.)"[456] based on the "site's natural succession and management capability."[457] Importantly, the "desired" plant community is not defined by human, social or economic demands; rather, it is defined by the natural potential of the area, restrained only by the limits of management to restore it to that condition.[458] The baseline, in other words, is the natural world. The third standard addresses species diversity directly, requiring the "frequency, diversity, density, age classes and productivity of desired species [e.g., species of the natural system] necessary to ensure reproductive capability and survival."[459] Species' habitats are to be "connected at a level that enhances species survival."[460] Native species should "re-occupy habitat niches and voids" caused by "disturbances" (read: overgrazing).[461] Standard three should now look familiar; it is viable population analysis with additional emphasis on reversing habitat fragmentation.[462]

The draft guidelines, the management tools for achieving the standards, are equally straightforward. Grazing manage-

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453. *See* Standards for Rangeland Health, *supra* note 447, at 6-9.

454. *Id.* at 6.

455. *Id.*

456. *Id.* (noting standard one is for upland soils and standard two is for riparian and wetland areas).

457. *Id.* at 62.

458. In practice, BLM intends to refer to U.S. Soil Conservation Service surveys projecting, on the basis of climate, soils, and hydrology, the potential natural community of the area. Telephone Interview with Dean H. Zeller, Rangeland Team Leader, Utah State Office Bureau of Land Management (Aug. 22, 1996).

459. Standards for Rangeland Health, *supra* note 447, at 7.

460. *Id.*

461. *Id.*

462. EPA has adopted a similar approach for prairie wetland ecosystems, *see* Environmental Protection Agency, Bioindicators for Assessing Ecological Integrity of Prairie Wetlands (July 1996) (on file with author), and, as a backup measure, for its Clean Water Act pollution discharge control program. *See* Oliver A. Houck, *The Regulation of Toxic Pollutants Under the Clean Water Act*, 21 Envtl. L. Rep. (Envtl. L. Inst.) 10,528, 10,558 (1991).

ment practices will "meet the physiological requirements of desired [e.g., endemic] plants" and will "maintain viable and diverse populations of plants and animals appropriate for the site."[463] Grazing may continue on rangelands that fail to meet these standards only if conditions are approaching the express requirements.[464] When grazing contributes to poor conditions, BLM will "prescribe actions" aimed at improvement.[465]

The result in Colorado is not so clear. On April 19, 1996, the Colorado State Office published standards and guidelines that target the "potential or capability" of the landscape, but then constrain that capability analysis by "a variety of social-economic factors."[466] The proposal adopted the natural ecosystem as the baseline, but then allowed "local goals" to replace it.[467] The local goal may be a "desired future condition,"[468] that is rooted in conservation, but it is then compromised by defining the "desired plant community" as one that "meets the goals established for the landscape."[469] The standards themselves contain the same ambiguity: upland soils must have "appropriate" ground cover,[470] and riparian systems must have vigorous "desired" plants.[471] These standards reveal an inherent vagueness. Native communities are to be distributed across the landscape, but nothing specifies the means by which these communities are selected. The goal of the exercise remains opaque, the mechanisms unclear.

Neither proposal may survive in its present form. The forces of erosion work on regulations as inexorably as they do on soils, and indeed the Utah regulations were weakened be-

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463. Standards for Rangeland Health, *supra* note 447, at 8.

464. *Id.* at 11. This seemingly straightforward requirement still allows more discretionary enforcement than BLM officials can handle. A previous draft required that when range conditions fell below par and showed no improvement, grazing would be ended until it again became compatible with the ecosystem. Preliminary Proposed Standards, *supra* note 446, at 15. The current draft, by contrast, places the burden of proving the poor conditions and of articulating a proper remedy on the BLM, a burden it has rarely met. Standards for Rangeland Health, *supra* note 447, at 10-11.

465. Standards for Rangeland Health, *supra* note 447, at 11.

466. Colorado State Office, Bureau of Land Management, Standards for Public Land Health and Guidelines for Livestock Grazing Management in Colorado 2 (Apr. 19, 1996) (on file with author).

467. *Id.*

468. *Id.* at 11.

469. *Id.*

470. *Id.* at 4.

471. *Id.*

fore the official public comment period began. The lesson for this study lies in the tools chosen to improve battered ecosystems once management responsibility for that chore has been accepted. Utah turned to objective indicators for guidance. Colorado has kept its options open. Which approach will prove more effective remains an open question, but fifty years of rangeland management without specific standards should provide a clue.

C. THE PUBLIC OCEANS

Beyond public forests and rangelands, beyond the reach of piers and offshore oil platforms, lies one of the world's oldest economies: commercial fisheries. Since 1976, the United States has exercised an extended fisheries jurisdiction stretching 200 miles from the shoreline.[472] This jurisdiction covers more than 100,000 miles of U.S. coastline, and more than 2.2 million nautical square miles of ocean—an area roughly doubling the size of the United States[473] and encompassing nearly 20% of the world's maritime fisheries.[474] As a matter of simple geography, the management responsibility is awesome.

Only this decade have statistics revealed how poorly the United States has exercised this responsibility. Much of the New England fishing fleet, once the pride of the region, now sits grounded in port;[475] the federal government is now trying to buy out the boats.[476] Salmon fishing has been banned off the coast of Washington, and severely restricted down the western seaboard.[477] Chesapeake Bay oysters are at 1% of historical levels; swordfish are landing at 60 pounds instead of 1000 pounds and more; bluefin tuna are down 90% since 1975; had-

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472. *See* 16 U.S.C. § 1811 (1994).

473. *See* Eldon V.C. Greenburg, *Ocean Fisheries*, *in* ENVIRONMENTAL LAW: FROM RESOURCES TO RECOVERY 260 (Celia Campbell-Mohn et al. eds., 1993).

474. *See id.* at 260-61 (quoting S. REP. No. 94-416, at 11 (1975)).

475. *See The Tragedy of the Fisheries*, LAND LETTER, Apr. 20, 1994, at 255; *see also* Deborah Cramer, *Troubled Waters*, ATLANTIC MONTHLY, June 1995, at 22; Ken Hinman, *State of the Seas*, SALT WATER SPORTSMAN, April 1995, at 62; Michael Parfit, *Diminishing Returns*, NAT'L GEOGRAPHIC, November 1995, at 2.

476. In March 1995, the Department of Commerce announced a $2 million pilot program to buy out fishing boats on the Georges Bank and retire them; the pilot was seen as a prelude to a $100 million buyout progam. *See* Roger DiSilvestro, *Are We Headed Toward a Fishless Ocean?*, DEFENDERS, Spring 1995, at 29.

477. *See The Tragedy of the Fisheries*, *supra* note 475, at 255.

dock are down 94% since 1960; and harvestable cod and yellowtail flounder are at their lowest levels on record.[478] Between 1990 and 1992, the chief groundfish species of New England dropped 30% from historic averages.[479] The biomass of bottomfish in the Gulf of Mexico has dropped 85% since 1973, largely due to shrimp trawling.[480]

These declines have economic consequences. In 1990, near the onset of the current crashes, U.S. fishermen landed a record 4.4 million metric tons, valued at $3.6 billion. In that year, U.S. consumers spent $26.7 billion for fishery products;[481] an estimated 17 million recreational fishermen caught 230.9 million fish on 39.8 million trips into just the Atlantic Ocean and the Gulf of Mexico.[482] U.S. fisheries generate an estimated $111 billion a year, and employ 1.5 million working Americans.[483] The collapse of the New England fishing industry alone cost 14,000 jobs and $350 million in annual revenues.[484] Something went very wrong.

Fisheries management will never be a simple business. Managers often lack basic information on fish populations,[485] and even healthy stocks fluctuate widely in nature, often undermined by natural or human events over which managers have no control.[486] Managers also face the balkanization of law enforcement jurisdictions, with state, federal, and international authorities often exercising control over the same stocks and species.[487] Add to this palette the growing conflicts among

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478. *See id.* at 1-2.

479. *See id.* at 1.

480. *See id.* at 2.

481. *See* Greenburg, *supra* note 473, at 267.

482. *See id.*

483. *See The Tragedy of the Fisheries*, *supra* note 475, at 2. The Commerce Department estimates that, with proper national management, U.S. fisheries could create 300,000 new jobs and $3 billion additional income. *Saving the Fish*, N.Y. TIMES, Aug. 24, 1996, at A22.

484. *See Saving the Fish*, *supra* note 483, at A22.

485. *See* Michael Weber, *Federal Marine Fisheries Management*, *in* AUDUBON WILDLIFE REPORT 267 (Amos S. Eno et. al. eds., 1986).

486. *See* Kelley, *Making the Habitat Connection*, NAT'L FISHERIES, April 1991, at 20 (relating the loss of habitat to declines in fish populations).

487. *See* 43 U.S.C. § 1312 (1994) (extending state fisheries and maintenance jurisdiction to three miles from the shoreline). *See generally* WILLIAM T. BURKE, THE NEW INTERNATIONAL LAW OF FISHERIES 1-25 (1994) (discussing the evolution of jurisdictional boundaries; national jurisdiction extends 200 miles before the high seas become subject to international regulation); Greenburg, *supra* note 473, at 269 (noting that as early as the mid-1970s, the United States had entered into 22 international agreements on ocean re-

fisheries users and fishery-dependent communities: recreational fishers versus commercial, seiners versus longliners, large boats versus small, wild culture versus mariculture, and the ultimate enigma of whether the objective of management is to increase production, or biomass, or dollar value, or to lower consumer prices, or to preserve coastal traditions and ways of life.[488] In all of this tug of war, we have never attempted to manage the ecosystem as a whole—assuming that such a thing is even possible[489]—or to preserve ecosystem diversity.[490] More disappointing, we have been unable to maintain even the best-known and most commercially-important fish stocks at sustainable levels, despite an elaborate statutory framework requiring just that. These failures reveal the imprint of both consensus-based politics and a poorly articulated standard of law.

The passage of the Magnuson Fishery Conservation and Management Act of 1976 (FCMA), like the nearly concurrent passage of NFMA and FLPMA, was the watershed event in U.S. ocean fishery management. Although it reads as a conservation law, the FCMA was motivated by the specter of foreign fishing fleets, some the size of small cities, that were stripping the Georges Banks and similar "inexhaustible" fishing grounds of their riches.[491] Under the Act, U.S. fishermen

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sources covering many fish species and stocks, including tuna, herring, halibut, cod and salmon); Weber, *supra* note 485, at 325-26 (discussing the problems caused by fish that spawn and then migrate across jurisdictional boundaries).

488. *See* DiSilvestro, *supra* note 476, at 29 (describing these and other fisheries management conflicts); Parfit, *supra* note 475, at 2 (discussing a variety of management issues and problems).

489. *See* Greenburg, *supra* note 473, at 264 ("Ecosystem interactions may be too inherently complex and marked by too much uncertainty to provide a realistic basis for the management of fish stocks"). *See generally* ELLIOT NORSE, GLOBAL MARINE BIOLOGICAL DIVERSITY: A STRATEGY FOR BUILDING CONSERVATION INTO DECISIONMAKING, at xvii (1993) ("How to accommodate our material needs and growing desires while not degrading the life support systems of a world that was not designed to accommodate billions of us is *the* greatest challenge facing the human species."); Brett Hagar & Raymond Just, *Predator MIS*, 9 TULANE ENVTL. L.J. 385 (1996) (offering a creative solution to incorporating coherent ecosystem principles into management plans).

490. *See* Kokechik Fisherman's Ass'n v. Secretary of Commerce, 839 F.2d 795, 802 (D.C. Cir. 1988) (noting that the FCMA § 301 requires consideration of the impacts of harvests on interrelated stocks, but this requirement has not been regularly implemented).

491. *See* Weber, *supra* note 485, at 282 (showing that, in the Northeast, foreign fleets had driven domestic stocks down by 50% between 1961 and 1973); John P. Wise, Federal Conservation and Management of Fisheries in

would come first, a principle that virtually eliminated foreign fishing in U.S. waters.[492] What it also did, unfortunately, was replace unsustainable fishing by other countries with unsustainable fishing by Americans.[493]

The FCMA establishes a planning process guided by management principles intended to lead to conservation and based on concepts of sustained yield.[494] It begins with a policy statement directing the government "to take immediate action to conserve and manage" U.S. ocean fishery resources.[495] The government will "promote domestic commercial and recreational fishing,"[496] but "under sound management principles,"[497] thus steering the program back toward its original goals.[498] Two features nearly unique to national fisheries law then follow. The first is the replacement of sustained yield by "optimum yield."[499] The second is decisionmaking by regional councils composed of state fishery managers and by representatives of the commercial and recreational fishing industries.[500] Each presents a special problem.

The "optimum yield" (OY) standard for fisheries begins with the concept of sustained yield.[501] The House Report underlying the FCMA describes maximum sustained yield (MSY) as "the safe upper limit of harvest which can be taken consistently year after year without diminishing the stock."[502] In

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the United States 24 (1991) (on file with author) (noting that, as of 1974, while American boats were taking $2.5 billion in fish from the U.S. zone, foreign boats were taking $9 billion from the same waters); *see also* JOSEPH J. KALO, COASTAL AND OCEAN LAW 437-38 (1990).

492. Wise, *supra* note 491, at 26-27; *see also* Associated Vessels Servs. v. Verity, 628 F. Supp. 13 (D.D.C. 1988) (illustrating the lengths to which the United States went to exclude foreign fishing from domestic waters).

493. Wise, *supra* note 491, at 7 ("[T]he major effect of the Act has been replacement of foreign overfishing by domestic overfishing.").

494. *See* 16 U.S.C. § 1851 (1994) (describing the national standards for fishery conservation and management); *id.* § 1853 (describing the contents required of fishery management plans); *id.* § 1854 (describing agency review of management plans); *id.* § 1855 (outlining the process for implementing management plans).

495. *Id.* § 1801(b)(1).

496. *Id.* § 1801(b)(3).

497. *Id.*

498. *Id.*

499. *Id.* § 1851(a)(1).

500. *See id.* § 1852 (describing the establishment and operating characteristics of regional fishery management councils).

501. *See* 50 C.F.R. § 602.11(d) (1995) (discussing in detail the determination of OY and its relationship to a specified MSY).

502. H.R. REP. NO. 94-445, at 46 (1976).

practice, managers may determine MSY from average past catches, computer models, biomass estimates, or similar methods.[503] OY is prescribed on the basis of MSY "as modified by any relevant economic, social, or ecological factor."[504] The opaque quality of this standard should be readily apparent. The legislative history of the FCMA explains the use of OY by noting that conditions may necessitate driving a stock below sustainability, if only temporarily, for the benefit of other stocks or the ecosystem as a whole.[505] Fair enough—thus far, the bottom line remains reasonably objective. The House Report continues, however, by explaining that OY also compels fishery managers to consider "the economic well-being of the commercial fishermen, the interests of recreational fishermen, and the welfare of the nation and its consumers."[506] OY "will be a carefully defined deviation from MSY" in order to accommodate these interests.[507] Exactly how one might arrive at a "carefully defined" departure from the consideration of such broad and open-ended interests is not explained; nor can it be. Pitted against the relentless pressure toward overuse that affects all public resources, from grass to timber to fisheries to water, OY provides no effective brake.[508] To the fishing fleet of

503. *See* 50 C.F.R. § 602.11 (d)(2)-(3) ("MSY . . . must be based on the best scientific information available. . . . MSY may need to be adjusted because of environmental factors, stock peculiarities, or other biological variances . . . .").

504. 16 U.S.C. § 1802(18)(B) (1994).

505. *See* H.R. REP. NO. 94-445, at 47.

506. *Id.* at 48. NMFS regulations proceed to make the concept of OY even more murky by explaining that it "need not be expressed in terms of numbers or weight of fish," 50 C.F.R. § 602.11 (f)(4)(i) (1995), and that management measures should not exceed OY "by a substantial amount." § 602.11(g).

507. H.R. REP. NO. 94-445, at 48.

508. It should be noted that the regulations also prohibit "overfishing." *See* 50 C.F.R. § 602.11(a)-(b) (1995). This prohibition is soon weakened, however, by the statement that "[e]xceeding OY does not necessarily constitute overfishing." § 602.11(g)(2). Overfishing, nowhere defined in the statute, is defined by regulations to mean a level of harvest jeopardizing the "capacity of a stock or stock complex to produce MSY on a continuing basis." § 602.11(c). Unfortunately, NMFS has interpreted this injunction to allow overfishing on a *less* than long-term basis; the definition is also unclear as to whether a stock, once depleted, may still be heavily fished so long as *some* recovery is possible. *See* Maine v. Kreps, 563 F.2d 1052, 1054-55 (1st Cir. 1977) (allowing the Secretary discretion to allow fishing as long as some recovery is possible). As might be expected, NMFS takes the position that it may. To make matters even less clear and therefore less enforceable, the guidelines the Secretary is to develop are stated to be nonbinding and without the force of law. *See* 16 U.S.C. § 1851(b) (1994). The bottom line for overfishing ends up looking familiar to a student of population viability under the Forest Service diversity

New Bedford, Massachusetts, OY means more fish today. Every reasoned analysis of the FCMA has identified OY as an Achilles' heel of the national fisheries program.[509] Particularly so, as next seen, when the prisoners are making the decisions.

The second unique feature of the FCMA is that the commercial fishing fleet of New Bedford and the agency promoting commercial fisheries in the State of Massachusetts are lead players in determining the harvest.[510] The conflicts here have become obvious even to the popular press.[511] A report of the American Fisheries Society asked: "Can people who clearly represent specific economic interests perform adequately as trustees of the public resources they use? [O]n balance the answer is no . . . ."[512] Every reasoned critique of the FCMA has identified this conflict as a source of the catastrophe in the Northeast, and the ones elsewhere to come.[513]

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mandate. Both agencies will allow harvest right down to the point of jeopardy and endangerment; nothing else is enforceable and anything goes. *See supra* notes 90-121 and accompanying text (discussing survival of the northern spotted owl as the bottom line for Pacific old-growth forest management); *supra* notes 162-170 and accompanying text (discussing survival of indicator species as the basis for Tongass Forest planning).

509. *See* KALO, *supra* note 491, at 505-06; Greenburg, *supra* note 473, at 262 (discussing the difficulties in applying the OY standard); Marine Fish Conservation Network, *How Congress Can Conserve America's Fisheries*, NETWORK NEWS, March 1995, at 2 (proposing a stronger OY standard).

510. In order not to run afoul of constitutional limitations on the delegation of federal authority to non-federal entities, the Act reserves final approval of management plans to the Secretary of Commerce. *See* 16 U.S.C. § 1854(a)-(b) (1994). According to one experienced observer, in practice the Secretary exercises "just enough adult supervision over the activities of the self-interested councils to permit the unblushing argument that the system is constitutional." Robert J. McManus, *America's Saltwater Fisheries: So Few Fish, So Many Fishermen*, NAT. RESOURCES & ENV'T, Spring 1995, at 4. Like Mr. Greenburg, Mr. McManus was formerly General Counsel to the National Oceanic and Atmospheric Administration. *Id.* at 1.

511. "[F]ishermen have extracted short-term benefits at the expense of the long-term stability of the resources and the industry." Wise, *supra* note 491, at 8 (citing W.J. Campbell, *Empty Nets—the Devastation of a New England Resource*, HARTFORD COURANT, July 9-11, 1989).

512. *Id.* (citing testimony of the Society on the reauthorization of the Magnuson Act, American Fisheries Society Newsletter 7(2), at 3-7).

513. *See* Marine Fish Conservation Network, *supra* note 509, at 2; McManus, *supra* note 510, at 14; Wise, *supra* note 491, at 8-10; *see also* Barry Meir, *Fight in Congress Looms on Fishing; Concerns Raised on Ethics of Regulatory Councils*, N.Y. TIMES, Sept. 19, 1994, at B9 (discussing conflicts of interest in fishery councils). No participant in or observer of the Regional Council process, with its scientific reports and detailed committee work, can fail to be impressed by the ability and dedication of virtually everyone involved or by its phenomenon of consensus-decisionmaking. As the collapse of

This experience in fisheries management offers some poignant lessons for the protection of diversity and larger ecosystems. One would think that regulating direct take of a single species, implicating as it does what might be left for tomorrow, would be a more simple task both scientifically and politically. Instead, it becomes clear that few public resource users, no matter what might come tomorrow, are going to conserve out of instinct, intelligence, or the goodness of their hearts. It is the classic prisoner's dilemma, and turning resource decisions over to the prisoners is not likely to achieve high levels of either self-restraint or resource protection.[514]

A second and corollary lesson is that, no matter who makes decisions this difficult, they will not be made in favor of conservation without a firm, fact-based standard: law to apply. The only reason that restraints on fishing finally came to New England—despite a level of resource devastation patent even to the most casual observer and long clear to the NMFS and the New England Regional Fisheries Management Council—is that the Conservation Law Foundation of New England brought a lawsuit to require them.[515] Even on the waffling standards of the FCMA, the Foundation was so likely to prevail that the process blinked.[516]

Stepping back from these lessons, one can see an unsettling parallel between fisheries management and the emerging trend towards terrestrial ecosystem management. It rests in the relationship between the people-are-part-of-ecosystems approach of the new ecosystem guidelines, and the people-are-part-of-acceptable-yield tenet of OY. Biological diversity and ecosystem protection are, like fisheries, basically about yield. Once people's wants and desires become the standard for the harvest—whether the subject is timber, grass, watersheds or

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the New England fishery amply demonstrates, however, when it comes to hard calls on harvest levels, consensus and its compromises do not always achieve conservation and sustainability.

514. The stakeholder-decisionmaking nature of the FCMA is not restricted to its Regional Councils. Stakeholders also have ready access to Congress, and few natural resource laws have more special exceptions for one segment of an industry or another, one region or another, than the FCMA. Greenburg, *supra* note 473, at 286-87. The great majority of these exceptions have one thing in common: they undermine conservation in favor of a stakeholder.

515. Conservation Law Foundation of New England, Inc. v. Mosbacher, No. 91-11759-MA, 1991 WL 501640 (D. Mass. Aug. 28, 1991).

516. The Conservation Law Foundation lawsuit led to a consent decree requiring more protective management on a fixed schedule. *See* Greenburg, *supra* note 473, at 258-95.

tuna—there is no standard at all. There is only a process that will continue to lead back to derelict timber towns in the Northern Rockies and the moribund docks of New Bedford, Massachusetts.[517]

IV. DIVERSITY AND ECOSYSTEM PLANNING ON NON-FEDERAL LANDS

While every environmental program contributes in some way to diversity and ecosystem protection,[518] no federal law attempted to safeguard species and their habitat from state and private development until the Endangered Species Act. Adopted in 1972 to protect both listed species and "the ecosystems on which [they] depend,"[519] the Act has become the driving force for large scale conservation on non-federal lands.

Of interest to this study is the extent to which the ESA has brought large-scale, ecosystemic planning to private land development, and the reason it has been able to do so. This extent is remarkable because, in its quest, the ESA has come up against forces so dominant in the American landscape that they had resisted all prior, and at times compelling, impulses for change. Two-thirds of the United States is privately owned, as are the majority of its endangered biological communities.[520]

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517. At the time of this writing, the FCMA was in the final stages of reauthorization, during which serious efforts were made to impose a biological, MSY standard on fishery management plans and to restructure the regional fishery councils. FISHERY CONSERVATION AND MANAGEMENT AMENDMENTS OF 1995, H.R. REP. NO. 104-171, at 22-23. Neither effort had succeeded. *Id.*

518. For example, federal water pollution environmental programs under the Clean Water Act, imposing discharge limits on private industry, have made significant improvements to ecosystems as large as the Great Lakes and the Chesapeake Bay. *See* ENVIRONMENTAL PROTECTION AGENCY, NATIONAL WATER QUALITY INVENTORY 314 (1995) (citing improvements in the Great Lakes); *id.* at 330 (citing improvements in Chesapeake Bay).

519. 16 U.S.C. § 1531 (b) (1994). The statute reads:

> The purposes of this Act are to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, to provide a program for the conservation of such endangered species and threatened species, and to take such steps as may be appropriate to achieve the purposes of the treaties and conventions set forth in subsection (a) of this section.

Id.

520. *See* U.S. GENERAL ACCOUNTING OFFICE, ENDANGERED SPECIES ACT: INFORMATION ON SPECIES PROTECTION ON NONFEDERAL LANDS 4-5 (1994) (stating that 90% of listed species are found on non-federal lands; 73% of listed species have more than 60% of their habitat on non-federal lands, and 37% of them rely exclusively on non-federal habitat).

The accelerating pace of development on these lands is apparent to anyone who looks out the window.[521] Enter the ESA and, for the first time, a bottom line.

A. ENDANGERED SPECIES ACT PLANNING

Despite the purpose of the ESA—to protect ecosystems as well as species—and the authority it conferred to regulate the "taking" of species by private parties,[522] the U.S. Fish and Wildlife Service was fully occupied in the early years of the Act with its application to the localized effects of federal projects.[523] Then, in the early 1980s, two federal courts ratified a Service regulation[524] defining "take" to include habitat modification by state and private actors.[525] At about the same time, a proposed private housing development on San Bruno Mountain, south of San Francisco, threatened the habitat of three endangered butterflies, setting the stage for a classic megabucks-versus-insect confrontation.[526] Instead, the confrontation took an unexpected path.[527] The developer, the state, the county, environmentalists and the Service sat down, negotiated, and after two hard years came up with a development and conservation plan.[528] The inescapable issue of the discussions was how much of what

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521. For readers who have not looked out this window recently, here is the picture on the Front Range of Colorado: "Development is intensifying all along the 70-mile corridor from Denver to Colorado Springs and threatens to merge the two cities into a single metropolis. The State estimates that an average of 10 acres of open lands yield to development every hour, or 90,000 acres per year." *GOCO*, COMMON GROUND, July-Aug. 1996, at 7.

522. 16 U.S.C. § 1538(a)(1)(B) (1994) (stating, in pertinent part, "it is unlawful for any person . . . to take any such species within the United States").

523. For a discussion of these issues, see Houck, *supra* note 6, at 292-311; and Kilbourne, *supra* note 6, at 564-72.

524. 50 C.F.R § 17.21(a), (c) (1995).

525. *See* Palila v. Hawaii Dep't of Land & Natural Resources, 639 F.2d 495, 497 (9th Cir. 1981) (defining the state's maintenance of feral sheep and goats in the Palila's critical habitat as a taking because the action endangered the species); Sierra Club v. Lyng, 694 F. Supp. 1256, 1259 (E.D. Tex. 1988) (taking under advisement claims that agency actions constituted a taking). The Service's regulation has been subsequently upheld in *Babbitt v. Sweet Home Chapter of Communities for a Greater Oregon*, 115 S. Ct. 2407, 2413-16 (1995).

526. *See* William E. Lehman, *Reconciling Conflicts Through Habitat Conservation Planning*, ENDANGERED SPECIES BULL., Jan-Feb. 1995, at 16-17; *see also* Robert D. Thornton, *Searching for Consensus and Predictability: Habitat Conservation Planning Under the Endangered Species Act of 1973*, 21 ENVTL. L. 605, 621-26 (1991) (discussing plans for development on San Bruno Mountain).

527. *See* Lehman, *supra* note 526, at 17-18.

528. *See id.*

type of habitat the butterflies needed, and where.[529] Under the final plan, 80% of the mountain and 90% of the butterfly habitat was protected.[530] The San Bruno plan would set the model—and a very high standard of protection—for all that was to follow.

Emboldened by this experience, in 1982 Congress incorporated the San Bruno process into the Endangered Species Act, allowing private parties to "take" listed species with an approved habitat conservation plan.[531] That done, nothing much happened for a while; between 1983 and 1989, only two other HCPs, involving small parcels of land, were adopted.[532] In 1990, however, the program began to move; by September 1994, the Service had issued 36 HCP permits and 13 more permit amendments; 150 additional HCPs were in the works.[533] Not only did HCP numbers expand, so did their scope. A plan for the Simpson Timber Company, California, covered 380,000 acres; International Paper Company, Alabama, 30,000 acres; Washington County, Utah, 135,000 acres; South Carolina Forestry Commission, 2 million acres; and Kern County, California, 2 million acres.[534] Of the original 36 permits, 22 were for isolated projects, but the remaining 14 were moving to regional-scale planning.[535] The ante was going up.

As the ante went up on private lands, so did fears and frictions between developers and the government.[536] The development community moved aggressively with proposals to

529. *See id.* at 17.

530. *See id.* at 18.

531. *See* 16 U.S.C. § 1539 (1994). A habitat conservation plan is one designed to permit activity that would otherwise harm a listed species through specific measures to minimize and offset that harm. *See* Thornton, *supra* note 526, at 621 (outlining requirements that must be met to allow an incidental taking). Congress has prescribed objective requirements for plan approvals, including a determination that less harmful alternatives are not available, adequate funding, mitigation and impacts that "will not appreciably reduce the likelihood of survival and recovery" of species in the wild. *Id.*

532. *See* Lehman, *supra* note 526, at 18. The development of the early HCPs is well described in MICHAEL J. BEAN ET AL., RECONCILING CONFLICTS UNDER THE ESA: THE HABITAT CONSERVATION PLANNING EXPERIENCE 7-10 (1991).

533. *See* Lehman, *supra* note 526, at 18.

534. *See id.*

535. *See id.* at 19.

536. *See generally* Babbitt, *supra* note 371 (describing tensions between developers and the ESA, and means to alleviate them).

weaken the Act,[537] while the Clinton administration moved as rapidly as it could to make the Act more user-friendly—while keeping it active in the non-federal game.[538] The administration offered states, industry, and private landowners early access to endangered species planning,[539] the opportunity to plan for multiple species at a time,[540] and the certainty that, once an agreement to take protective measures was struck, it would be all but final no matter what bad turn the species, or newly-discovered species, might take.[541] Most germane to this study, the planning itself—which might take place prior to a species listing,[542] in conjunction with the listing of a threatened species,[543] or as a habitat conservation plan for a listed species[544]—

537. *See* Timothy Egan, *Industries Affected by Endangered Species Act Help a Senator Rewrite Its Provisions*, N.Y. TIMES, Apr. 13, 1995, at A20 (discussing the role of affected industries to assist in rewriting the ESA to "scrap major provisions").

538. *See* The White House, *Protecting America's Living Heritage: A Fair, Cooperative and Scientifically Sound Approach to Improving the Endangered Species Act, reprinted in* 8 TULANE ENVTL. L.J. 5 (1994) (announcing initiatives to make the ESA more flexible and to accommodate private landowners).

539. *See* Notice of Availability of Draft Guidance for Candidate Species Under the Endangered Species Act, 59 Fed. Reg. 65,780 (1994) (soliciting public comments of all interested parties on draft guidance for candidate species).

540. *See* Notice of Intragency Cooperative Policy on Recovery Plan Participation and Implementation Under the Endangered Species Act, 59 Fed. Reg. 34,272, 34,273 (1994) (stating a policy to "develop multiple species plan" where possible).

541. *See* U.S. Fish and Wildlife Service & National Marine Fisheries Service, No Surprises: Assuring Certainty for Private Landowners in Endangered Species Act Habitat Conservation Planning (Aug. 11, 1994) (on file with author).

542. *See supra* note 538 and accompanying text (discussing Clinton administration offers of early access to endangered species planning); *see also The Endangered Species Act: Testimony Before the Endangered Species Task Force of the House Resources Comm.*, 104th Cong. (1995), *available in* 1995 WL 331945 (testimony of George T. Frampton, Jr., Assistant Secretary of Interior, describing pre-listing planning); *Current Management and Issues in the Lower Basin of the Colorado River: Statement Before the Water and Power Subcomm. of the Senate Energy and Natural Resources Comm.*, 103d Cong. (1994), *available in* 1994 WL 14188548 (statement of Elizabeth Ann Rieke, Assistant Secretary of Interior, describing pre-listing planning on the Lower Colorado River).

543. Section 4(d) of the ESA allows the Secretary some flexibility in determining conditions of "take" of threatened species, through the issuance of special regulations. 16 U.S.C § 1333(d) (1994). While the limits of this flexibility are not altogether clear, *see* Sierra Club v. Clark, 577 F. Supp. 783 (D. Minn. 1984), *aff'd in part, rev'd in part*, 755 F.2d 608 (8th Cir. 1985), the Department has relied on Section 4(d) authority to negotiate protective regulations for increasingly large habitat areas. *See, e.g.*, 58 Fed. Reg. 16,758 (1993)

would look more comprehensively at large-scale, state-wide, region-wide resource management. ESA-based ecosystem planning was off to the races.

No single study can capture the sweep of this planning. By the summer of 1996, 320 HCPs had been adopted or were under development, in addition to an unrecorded number of Section 4(d) and pre-listing agreements.[545] Irrigation projects on the Umatilla, the Truckee-Carson and the Yakima Rivers were being revised.[546] The Upper Colorado River was deep into a multi-year planning exercise that will inevitably lead to re-management of water levels and instream flows.[547] The Lower Colorado was embroiled in a similar exercise from Colorado to Mexico,[548] as were users and regulators of the Platte River Basin of Wyoming and Nebraska.[549] Hydropower operations were in question along the length of the Columbia River for the Pacific salmon,[550] and along rivers of the eastern seaboard for the Atlantic salmon, the width of the continent away.[551] An entirely new water management regime had come to the Sacra-

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(the California gnatcatcher); 57 Fed. Reg. 594 (1992) (the Louisiana black bear); *see also* 60 Fed. Reg. 9484 (1995) (the northern spotted owl); discussion *supra* notes.

544. *See, e.g.*, Kern County HCP, discussed in text accompanying *supra* note 534.

545. *See* Memorandum of John Kostyack and Tom France, Counsel, National Wildlife Federation, to Scott Jacobs, Office of Rep. Saxton et al., 3 (May 14, 1996) (on file with author).

546. A recent description of these and other irrigation project revisions is contained in Lawrence J. MacDonnell, *Managing Reclamation Facilities for Ecosystem Benefits*, 67 U. COLO. L. REV. 197 (1996).

547. *See* James S. Lochhead, Upper Colorado River Fish: A Recovery Program That Is Working—Myth or Reality? 1 (Symposium, Biodiversity Protection: Implementation and Reform of the Endangered Species Act, University of Colorado School of Law, June 10-12, 1996) (unpublished manuscript, on file with author).

548. *See* U.S. Fish and Wildlife Service, Memorandum of Agreement for Development of a Lower Colorado River Species Conservation Program (1996) (on file with author).

549. *See* Ruhl, *supra* note 4, at 598 n.123 (citing Memorandum of Agreement for Central Platte River Basin Endangered Species Recovery Implementation Program (June 10, 1994)).

550. *See supra* text accompanying note 394.

551. *See* National Ass'n of Fisheries Organizations, Annual Report of U.S. Atlantic Salmon Assessment Committee 12-15 (Mar. 1996) (on file with author). Atlantic Salmon restoration efforts have been driven in part by a petition to list Atlantic Salmon stocks as endangered species. *See* RESTORE: The North Woods, et al., Petition for a Rule to List the Anadromous Atlantic Salmon Under the Endangered Species Act (Sept. 1993) (on file with author).

mento delta[552] and to South Florida as well.[553] Coastal Florida counties were beginning to zone development along their beaches and canals,[554] coastal Alabama along its beaches.[555] Massive private forest holdings were being revamped in Georgia, North Carolina, and across the American South;[556] a plan for 1.6 million acres of state forest lands was adopted in Washington.[557] Central Texas, unable to keep itself from extinguishing its own water supply, was finally being required to think again,[558] as were, to their continuing grief, real estate developers in the hill country around Austin, Texas[559]—each to meet the biological needs of endangered species.

The adequacy of these plans and planning processes is not at issue here;[560] nor are the genuine frustrations of their many participants.[561] Planning on this scale, if it is to effect any

552. *See* Elizabeth Ann Rieke, *The Bay-Delta Accord: A Stride Toward Sustainability*, 67 U. COLO. L. REV. 341, 347-49 (1996) (discussing the agreement between California and the EPA).

553. *See* Thomas T. Ankersen & Richard Haymann, *Ecosystem Management and the Everglades: A Legal and Institutional Analysis*, 11 J. LAND USE & ENVTL. L. 473 (1996).

554. *See* FLA. STAT. § 370.12 (1997) (requiring permits for any development activity affecting endangered marine turtles and the construction of docks and piers in waterways frequented by the endangered manatee).

555. *See* Carl Hulse, *Building Near Endangered Species*, N.Y. TIMES, Dec. 28, 1993, at C4 (describing Alabama plan).

556. *See* Hulse, *supra* note 555 (describing International Paper plans in Alabama, Louisiana, and Mississippi to protect the gopher tortoise and red hills salamander); *see also* Bruce Babbitt, *Save Our Countryside: On the Move to Save the Red-Cockaded Woodpecker*, COUNTRY LIVING, July 1996, at 14, (describing a conservation agreement regarding Georgia-Pacific Corp. forest holdings); Robert L. Peters, *Hope for the Red-Cockaded?*, DEFENDERS, Fall 1996, at 27 (describing a statewide forest conservation plan for Georgia).

557. *See Habitat Planning in Washington*, LAND LETTER, Nov. 15, 1996, at 6 (noting approval of an HCP to manage 1.63 million acres of state-owned timberlands).

558. *See* Carlos Guerra, *This Isn't About Blind Critters, Bunny Huggers*, SAN ANTONIO EXPRESS-NEWS, Aug. 24, 1996, *available in* 1996 WL 11496386 (quoting Senior U.S. District Court Judge Lucius D. Bunton III: "The Edwards Aquifer region has finally reached the point where the aquifer is unable to provide for the needs of all those who depend upon it during dry years").

559. The controversy surrounding this development and the New Balconies HCP is described in J.B. Ruhl, *Regional Habitat Conservation Planning Under the Endangered Species Act: Pushing the Legal and Practical Limits of Species Protection*, 44 SW. L.J. 1393 (1991).

560. For questions concerning the adequacy of the plans, see Houck, *supra* note 6, at 356-58.

561. *See* Ruhl, *supra* note 559, at 1421 (discussing problems with a Texas RHCP); Thornton, *supra* note 526, at 608 (noting frustrations of the development community).

change, is an agony. What is at issue here is the ambition and magnitude of what is currently under way. Those who contend that the ESA is deficient because it fails to address biological diversity and ecosystem protection on a broad enough scale—and these complaints have become something of a mantra in the literature—simply have not opened their eyes. Those who complain that the ESA is forcing "federal solutions" on state and private parties have not opened their eyes either. What the ESA has done in each of these instances is to convene the meeting and draw a bottom line.[562] It has acted as the therapist for conduct we all knew was harmful and had limits, but could not bring ourselves to admit was a problem, much less begin to solve.

That the ESA has been able to do this much is a miracle.[563] Against some of the most entrenched powers on the American landscape, it has managed to compel hard conversations and hold us to them until we agreed on new patterns of behavior. Why the ESA, when all other laws have fallen short? The answer is obvious to anyone who has participated even on the periphery of the process, and is oft-stated by those most heavily and bitterly engaged.[564] The ESA provides the muscle for the discussions: a reason for them to take place, and a boundary below which they cannot fall. The reason is the presence of a salmon, owl, or desert tortoise, an ultimate indicator species.

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562. *See* John H. Cushman, Jr., *U.S. and California Sign Water Accord*, N.Y. TIMES, Dec. 16, 1994, at A24 (describing ESA-driven Sacramento Delta planning); Lindell L. Marsh, *Conservation Planning Under the Endangered Species Act: A New Paradigm for Conserving Biological Diversity*, 8 TUL. ENVTL. L.J. 97, (1994) (describing ESA-driven collaborative planning along California's southern coast).

563. In part, the power and reach of the ESA is due to the early boost it received from the Supreme Court in *TVA v. Hill*, 437 U.S. 153, 173 (1978) (stating that "[t]his language admits of no exception"). It is also, however, due to a strong public sentiment in favor of species preservation, a sentiment that approaches a morality and faith. *See* Oliver A. Houck, *Why Do We Protect Endangered Species, and What Does That Say About Whether Restrictions on Private Property to Protect Them Constitute "Takings"?*, 80 IOWA L. REV. 297, 299 n.10 (1995).

564. For an example, see the acknowledgment of California Secretary of Natural Resources concerning the conservation planning for the southern California coast, *infra* text accompanying note 585; see also the similar remarks of John Volkman, General Counsel for the Northwest Planning Council on revised-planning for the Columbia River, in *Columbia River Salmon: Are Any of the ESA Tools Adequate for the Job?*, Symposium, Biodiversity Protection: Implementation and Reform of the Endangered Species Act, University of Colorado School of Law, June 10-12, 1996 (unpublished manuscript, on file with author).

The boundary is impairment of these species' ability to maintain viable populations. These determinations are objective, science-based and enforceable. They are law to apply. Without such law, very few of these conversations would have taken place.[565] Fewer still would have led to meaningful change.[566]

The truth of these assertions, and their positive impact, can be tested not just by the data summarized above but by examining two ESA case histories in more detail.

B. MULTIPLE-SPECIES MANAGEMENT IN ACTION

The following histories illustrate the potential of multiple species-based planning for ecosystem management on private lands. Each started with a formidable—indeed, historically irresistible—development pressure. Each arrived at a comprehensive plan for diversity and ecosystem protection. And each got there through the use of indicator species.

1. The California Coastal Sage Shrub Plan

The State of California has proven to be the innovator and the test site for much of modern environmental law, and no less for the protection of biological diversity. As noted above, the first habitat conservation plans were developed around California species, precedent for what is now taking place in every region of the country. In California, meanwhile, this

565. Virtually every one of the ESA's achievements and continuing efforts towards ecosystem and large-scale diversity planning was initiated by a listing petition, a critical habitat designation petition, or a lawsuit over current operations under the ESA. *See* discussions *supra* notes 90-147 and accompanying text (Pacific northwest old-growth forests), notes 148-224 and accompanying text (Alaska old-growth forests), notes 381-421 and accompanying text (Columbia River management); *infra* note 571 and accompanying text (coastal California development). A full listing would exceed 100 reported cases and dozens more administrative actions, and is beyond the scope of this Article. Suffice it to say that the fact that the ESA has driven ecosystem planning is the very reason for the government's alternative, train-wreck-avoiding, consensus approach. *See supra* note 562 and accompanying text (explaining that the ESA has drawn a bottom line for ecosystem planning). The question, and the question of this Article, is whether this approach can succeed without a baseline of indicator species.

566. Before the listing of the salmon as endangered under the ESA, for example, discussions over the rapidly diminishing salmon runs on the Columbia River had been continuing—without appreciable effect—for more than 20 years. *See supra* note 550 and accompanying text (noting the long-running efforts to win concessions). Discussions over the depletion of old-growth forests, western rivers and the nearly full range of ecosystem losses had been ongoing as well. *See* NOSS & PETERS, *supra* note 2.

planning has been superseded by more proactive, multiple-species planning that is impressive in its scale and all the more impressive for its first location: smack in the middle of some of the most expensive, desirable and booming real estate in America.[567]

Settlement of southern California began at San Diego in the mid-1700s, but had little impact on the land until the subsequent diversion of water, opening a near-desert ecosystem to large scale development.[568] Today, of the 2.5 million acres between Los Angeles and San Diego, only around 400,000 acres (16%) remain in a natural state. Fifteen million people reside here and the boom continues; raw real estate sells for $200,000 an acre, and ocean view property may sell for $2 million an acre.[569] Orange County occupies the northern tier of this region, and has earned a legendary reputation for its conservatism and its solicitous concern for commercial and private property rights. An annual "patriotic slogan" contest for Orange Country public and private school students offered the following examples of prize winning entries: "Free Enterprise Built America—Let's Keep Building," and "Forget the Whales—Let's Save America."[570] This is not environmentalist country, and any proposal to limit growth faces instinctual and widespread opposition. For biodiversity planning, Orange County was an acid test.

Inevitably, with the transformation of an ecosystem so massive, the test would come, and it came in the form of an endangered species, the coastal California gnatcatcher.[571] The coastal gnatcatcher inhabited the original shrub and scrub coastal desert from Los Angeles south into Mexico. Some 80 to 90% of this habitat has been lost to real estate development.[572] In late 1990, environmentalists petitioned to list the gnat-

567. *See* Pat Brennan, *O.C. Tries New Way to Save Wilderness*, ORANGE COUNTY REG., Apr. 17, 1996, at B1; *see also* Peter Steinhart, *California's Biodiversity Experiment*, DEFENDERS, Fall 1994, at 11, 13-18.

568. *See* Raymond F. Dasmann, *Embattled Eden*, DEFENDERS, Fall 1994, at 40, 42.

569. *See* Ronald B. Taylor, *Crusade for the Gnatcatcher*, DEFENDERS, Fall 1994, at 26, 30.

570. Americanism Education League (undated brochure, on file with author).

571. *See* Charles C. Mann & Mark L. Plummer, *California vs. Gnatcatcher*, AUDUBON, Jan. 1, 1995, at 38, 102-04 (describing listing of gnatcatcher and subsequent developments).

572. *See* Taylor, *supra* note 569, at 30.

catcher under the federal ESA. The gnatcatcher was only the first candidate species from this collapsing ecosystem; up to one hundred more species were in the wings. Anticipating the inevitable, California moved in April 1991 to avert the listing by launching a "Natural Communities Conservation Planning program" (NCCP) targeted, first, at the southern California coastal shrub ecosystem.[573] The program was voluntary; landowners would enroll some of their properties for conservation, in return for permission to develop the rest.[574] The business community was supportive, if not enthusiastic. Several environmental groups were more guarded, criticizing the absence of specific goals and the rapid pace of development—more than 1,000 acres a year—which would continue before the planning took effect.[575]

Hobbled by this lack of consensus, the program moved forward nonetheless to enroll volunteers and even to secure voluntary agreements not to develop listed properties for eighteen months. Once properties were listed, local governments would assess the impacts of development proposals on coastal sage scrub habitat, and "strongly consider" the advice of federal and state wildlife agencies. At the same time, the program commissioned a scientific review panel of conservation biologists and other specialists to assess the ecosystem and, more importantly, to develop guidelines for the ultimate conservation

573. Douglas P. Wheeler, *An Ecosystem Approach to Species Protection*, NAT. RESOURCES & ENV'T, Winter 1996, at 7, 8. Under the Natural Community Conservation Planning Act of 1991, CAL. FISH & GAME CODE §§ 2800-2840 (West Supp. 1997), the California Department of Fish and Game may "enter into agreements with any person for the purpose of preparing and implementing a natural community conservation plan to provide comprehensive management and conservation of multiple wildlife species . . . ." *Id.* § 2810. This "planning may be undertaken by local, state and federal agencies independently or in cooperation with other persons." *Id.* § 2820. As an inducement for creating these agreements, section 2835, allows the "department [to] permit the taking, as provided in this code, of any identified species whose conservation and management is provided for in a department approved natural communities conservation plan," and section 2830 allows the same for candidate [non-listed] species. Finally, section 2840 assures that the department will be adequately funded for these measures. In effect, the NCCP Act creates a formal structure for voluntary contracts for multispecies protection, in return for permitted takings of species.

574. *See* Deborah Schoch, *Big Piece of Common Ground*, L.A. TIMES, Apr. 14, 1996, at A1; Natural Community Conservation Planning Act of 1991, CAL. FISH & GAME CODE §§ 2800-2840 (West Supp. 1997).

575. *See* Steinhart, *supra* note 567, at 19.

plan.[576] This committee of scientists adopted what it saw as the most logical tool for ecosystem protection: management indicator species.

The Committee focused on three target species distributed throughout the planning area—the California gnatcatcher, the coastal cactus wren, and the orange-throated whiptail lizard.[577] It found existing information inadequate to formulate a long-range document; instead, it produced interim rules to guide longer-term planning, and to curb short-term development. Its rules are a case study in population viability analysis, moving from inventory to analysis of dispersal characteristics, corridor use and time-series data on abundance and distribution, followed by population projections and then by surveys to verify the projections made. In the interim, development would be limited to 5% of the remaining sage scrub habitat. It would, further, avoid hotspots of biological diversity, and corridors linking these hotspots to other critical areas. In the ultimate plan, these restrictions would be implemented by categorizing the diversity potential of this habitat as high, medium or low, depending upon those principles of conservation biology urged unsuccessfully in the Wisconsin cases: large, intact, unfragmented habitat at the top.[578] In each planning region, 50% of the sage scrub habitat would be designated as high value, 25 to 40% as intermediate, and 10 to 25% as low.[579] The Committee left as little as possible to chance, politics, and subsequent agency discretion.

Meanwhile, as the voluntary NCCP process was limping forward with major, but by no means full, landowner participation, and under sniper fire from an increasingly impatient environmental community, the U.S. Department of Interior could no longer ignore the pending petitions to recognize the endangered status of the California gnatcatcher and listed the species as "threatened."[580] In so doing, Interior was careful to

576. *See* COMMMITTEE ON SCIENTIFIC ISSUES IN THE ENDANGERED SPECIES ACT, SCIENCE AND THE ENDANGERED SPECIES ACT 84-87 (1995).

577. *Id.* at 85; Taylor, *supra* note 569, at 30.

578. *See* discussion *supra* Part II.B.3.

579. COMMITTEE ON SCIENTIFIC ISSUES IN THE ENDANGERED SPECIES ACT, *supra* note 576, at 86-89.

580. Endangered Species Comm. of the Bldg. Indus. Ass'n of S. Cal. v. Babbitt, 852 F. Supp. 32 (D.D.C. 1994) (invalidating listing because of failure to meet procedural requirements); 58 Fed. Reg. 16,741 (1993) (to be codified at 50 C.F.R. pt. 17). For litigation over this listing, see 56 Fed. Reg. 47,053 (1991) (proposing to list the California gnatcatcher as a threatened species);

preserve the NCCP process and to give the state and local governments additional flexibility to protect the ecosystem on their own. What the federal listing did, in effect, was to transform the state program from voluntary to mandatory, leveling the playing field among those landowners who were willing to agree to a development-gnatcatcher compromise and those who were not. Unwilling landowners would now face the sanctions of the ESA, which they could only avoid by making a deal similar to their neighbors. The compromise would involve setting aside the high value lands, in return for limited development in the low value habitat and development rights outside of the sage scrub habitat area.

The upshot of the federal-state conservation planning is captured in the sub-regional plan developed for Orange County itself.[581] The sub-region includes over 208,000 acres, half of which are still underdeveloped but under heavy development pressure. Within that habitat, 30,833 acres of sage scrub support at least 44 rare plant and animal species, including approximately 600 pairs of gnatcatchers. Of this acreage, 5,336 acres of "low value" habitat are subject to development, leading to the loss of an estimated 110 pairs; another 2,000 acres of low value habitat will be taken by non-participating landowners under the same guidelines.[582] In all, about 80% of the habitat, and 80% of the breeding population, will be preserved. When the full plan for the Los Angeles-to-San Diego corridor is implemented, it will protect approximately 380,000 acres, some 81,000 of which is occupied by coastal gnatcatchers and the remainder by other management indicator species.[583] With some lingering outriders, the business community is largely on board; the State is on board; the environmental community is on board. A miracle in southern California.

That results this dramatic could be produced in Orange County is due to a number of factors, not least of which are foresight and leadership at the state level, and creative and sensitive use of the Endangered Species Act at the federal level. The agencies were moved, no doubt, by a strong environmental community and by property owners themselves, who saw the quality of their own lives crumbling before the conges-

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59 Fed. Reg. 28,508 (1994) (noting invalidation of listing); and 60 Fed. Reg. 15,693 (1995) (affirming decision to list species).

581. 61 Fed. Reg. 27,363-64 (1996).

582. *See id.*

583. *See* Taylor, *supra* note 569, at 30.

tion and pressure of continuing, unchecked development.[584] But the California NCCP was triggered in the first instance by the articulated needs of a legally-protected indicator species, the gnatcatcher. As California's Secretary of Natural Resources explained, "[W]ithout the very real threat of the regulatory power and control that accompany [ESA] listing, natural community conservation planning could not work."[585] The necessity of protecting the gnatcatcher brought landowners to the table and kept them there.[586] Tough odds called for precise law.

The California program was made effective, moreover, not by abstract consideration of an ecosystem, but rather, by the scientific quantification of the needs of three representative species. It was these needs that determined how much habitat was required, and of what kind, and thus what would be developed and what would not. The mechanisms used to redirect that development are the subject of other articles, and offer excellent additional lessons.[587] The lesson here is that, for an objective, scientifically and politically-defensible limit to development in a climate by no means receptive to development constraints, California turned to indicator species. And it worked.

2. The Plum Creek Old-Growth Plan

If Orange County, California was the acid test for restraints on private housing development, Plum Creek Timber Company—the "Darth Vader" of the Northwest forests[588]—posed the ultimate challenge for environmental law on private timberland. Plum Creek was big, and it had an attitude. The

584. *See* Peter Steinhart, *What Will California Tell the World About Saving Biodiversity?*, DEFENDERS, Fall 1994, at 8, 8-9; *see also* Deborah Schoch, *Pact Creates 37,000-Acre Wildlife Preserve*, L.A. TIMES, July 18, 1996, at A3.

585. Steinhart, *supra* note 567, at 20 (quoting California's secretary Douglas Wheeler). Mr. Wheeler further explained, "[I]t is the prospect of listings that creates the incentive for landowners to participate." *Id.*

586. *See* Lynn E. Dwyer et al., *Avoiding the Trainwreck: Observations From the Frontlines of Natural Community Conservation Planning in Southern California*, ENDANGERED SPECIES UPDATE, Dec. 12, 1995, at 5, 6 ("A 'target' species approach made multiple species conservation planning goals achievable.").

587. *See, e.g.*, Thornton, *supra* note 526.

588. Dennis Farney, *Unkindest Cut? Timber Firm Stirs Ire Felling Forests Faster Than They Regenerate; Burlington Northern Spinoff Clearcuts Ancient Stands Granted by Abe Lincoln; Spooked by Corporate Raiders*, WALL ST. J., June 18, 1990, at A1 (quoting Republican Congressman Rod Chandler of Washington).

company's "only concern," said Idaho Governor Cecil Andrus after viewing a Plum Creek clearcut in 1987, was "cashing out their equity at everyone else's expense."[589] The following year, as if to prove Andrus's point, the company was bulldozing a logging road into prime elk habitat in northern Idaho, an area proposed by both the State and its senior Senator as a wildlife refuge.[590] The following year it "jolted" Bozeman, Montana with plans to cut a canyon prized for hiking and hunting.[591] Nothing seemed to stop Plum Creek. Today, Plum Creek is on the leading edge of the most ambitious habitat conservation plan yet designed for a private company.[592] The plan will redirect its management and harvest programs on nearly 200,000 acres of private forest in the Cascade Mountains of Washington, for up to 100 years.[593] Driving the plan, and forming the baseline for its protections, are the habitat requirements of indicator species.

Plum Creek is an important story not only because of the steps it is now proposing, but also because it typifies the history and the psyche of the western timber industry and the challenge they present to diversity and ecosystem protection.

Plum Creek's story begins, as with all the timber giants of the American West, with the western railroads, which received vast grants of land as incentives to reach the Pacific and occupy the continent.[594] Burlington Northern Railroad would end up with timber holdings second only to Weyerhauser in the American West.[595] The lands were granted in alternating tracts a mile square, creating a checkerboard pattern of owner-

589. *Id.* (quoting Governor Andrus).

590. *See id.* The special management area had been proposed by Governor Andrus and Senator Janus McClure. *Id.*

591. *See id.*

592. *See* Availability of a Final Environmental Impact Statement on the Proposed Issuance of a Permit to Authorize Incidental Take of Threatened and Endangered Species on Plum Creek Timber Company, L.P., Lands in the I-90 corridor, King and Kittitas Counties, Washington, 61 Fed. Reg. 16,257, 16,257-58 (1996) [hereinafter Availability of a Final Environmental Impact Statement]; *see also* Leslie Brown, *Environmentalists Still Uneasy with Logging Plan*, NEWS TRIB. (Tacoma), Apr. 15, 1996, at B3 (discussing the plan and some reactions to it).

593. *See* Availability of a Final Environmental Impact Statement, *supra* note 592, at 16,258.

594. *See* Timothy Egan, *Montana's Sky and Its Hopes Are Left Bare After Logging*, N.Y. TIMES, Oct. 19, 1993, at A1 ("The 1864 railroad land grants still haunt much of the West . . . .").

595. *See* Farney, *supra* note 588, at A1.

ship hard to distinguish on the ground but increasingly apparent from the air. By the end of World War II, the clearcutting had begun; in the words of one journalist, "[T]he landscape often looks as if it has been sprayed with buckshot. Clearcuts, clumps of farms and subdivisions have cut holes in the forest fabric like measles and mange."[596]

Burlington Northern managed its holdings passively until the 1980s, when the company, attracted by the burgeoning Japanese demand for raw timber, and seeking to boost its stock values, created the Plum Creek subsidiary and turned it loose.[597] The result was a "cutting spree" at rates "that had not been seen since the cut-and-run logging days of the last century."[598] What Plum Creek saw as profit maximization, its critics saw as "liquidation" of its timber resources.[599] By 1989, the company was cutting 597 million board feet, with another 500 million scheduled for 1990 and 400 million for the years ahead.[600] The annual growth rate of Plum Creek forest was perhaps as high as 250 to 300 million board feet; its own prospectus put it at 210 million.[601] As one company official explained: "We have never said we were on a sustained-yield program and we have never been on a sustained-yield program. Let's get to the heart of it. Sure its extensively logged, but what is wrong with that?"[602]

Plum Creek's clearcutting liquidated more than timber and wildlife; it also liquidated small timber-dependent communities across Washington and Montana. Communities that had long survived on sustained yield forestry were now going into cycles of boom and bust, which always ended at bust.[603] The company characterized growing public criticism of its

596. Bill Dietrich, *Blueprint for Wildlife, Trees in the Works—Biologists Look to Protect Whole Ecosystems*, SEATTLE TIMES, July 7, 1991, at B1; *see also* Egan, *supra* note 594, at A1 ("That [checkerboard] pattern on the map looks the same on the ground in some parts of the state after a decade in which the two big private timber companies [Plum Creek and Champion] clear-cut their square mile patches.").

597. *See* Egan, *supra* note 594, at A1.

598. *Id.*

599. Farney, *supra* note 588, at A1 (discussing Plum Creek's overall growth).

600. *See id.*

601. *See id.*

602. *Id.*

603. Egan, *supra* note 594, at A1 (outlining the process of boom and bust); *see also* M.K. Gefin, *How Two Logging Towns Were Lost*, HIGH COUNTRY NEWS (Carson City), Mar. 8, 1993, at 14-15.

practices as basically a "public relations problem." It tried to sell off its stripped lands for real estate development, but found few takers.[604] Criticism continued to mount. Enter—once again—the spotted owl.

The first—and most celebrated—effects of the spotted owl's ESA listing were on the national forests intermingled with Plum Creek holdings in the Pacific Cascades;[605] but the private forests were not far behind.[606] Plum Creek found itself sitting on the highest density of spotted owls and owl habitat on private lands in the State of Washington.[607] It responded by modifying its cut plans with "leave areas" around owl roosts and "migration corridors" between,[608] but the circular leave areas around owl roosts began to spread like measles on the map of its holdings.[609] Worse yet, the marbled murrelet, another rare resident of these same forests, was about to be listed, and the wide-roaming grizzly bear, wolf and other listed and candidate species were in the wings.[610] Once those circles were added,

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604. *See* Farney, *supra* note 588, at A1 (describing Plum Creek's reaction to public criticism).

605. *See infra* notes 610-621 and accompanying text.

606. A 1992 HCP for the Simpson Timber Company, for example, set aside owl habitat on its holdings in Northern California. Lehman, *supra* note 526, at 18.

607. *See* James A. Kraft, General Counsel, Plum Creek Timber Company, Habitat Based Multi-Species HCPs: Lessons from the Naturalist 3 (Symposium, Biodiversity Protection: Implementation and Reform of the Endangered Species Act, University of Colorado School of Law, June 10-12, 1996) (unpublished manuscript, on file with author). Plum Creek has been surveying spotted owls since 1982. A systematic project was begun in 1990, following the U.S. Fish and Wildlife Service guidelines from PROTOCOLS FOR SURVEYING PROPOSED MANAGEMENT ACTIVITIES THAT MAY IMPACT NORTHERN SPOTTED OWL (1991). In a cooperative effort between Plum Creek and the Forest Service, it surveyed about three-quarters of the HCP area. Plum Creek Timber Co., LP., Cascades Habitat Conservation Plan, 75 (undated) (on file with author) [hereinafter Plum Creek HCP] For instance, between 1991 and 1994 it found 39 nests and 54 fledglings in the planning area, mostly east of the Cascade crest. *Id.* at 77. In 1993-1994, there were 94 adult birds monitored in the planning area. *Id.* at 79.

608. Richard Larsen, *A Reformed Sinner*, SEATTLE TIMES, Sept. 23, 1990, at A17.

609. James A. Kraft, Address at the University of Colorado School of Law Biodiversity Protection Symposium (June 11, 1996).

610. *See* Availability of a Final Environmental Impact Statement, *supra* note 592, at 16,258. There are about 5,500 marbled murrelets in Washington. The population size of murrelets within the Plum Creek HCP boundary is unknown, but it is believed to be small. Plum Creek HCP, *supra* note 607, at 88. There are approximately 28 grizzly bears in Washington, with nine sightings in the planning area between 1974 and 1991. *Id.* at 92. There were also seven

the harvestable remainder would begin to resemble a gerrymandered voting district. Plum Creek had to come up with a better approach.

The complexity of this job rivaled that of the FEMAT plan on federal lands,[611] many of which lay check-by-jowl alongside Plum Creek holdings. The total planning area was more than 400,000 acres, nearly half of it Plum Creek land.[612] The company spent over $1.2 million developing its Habitat Conservation Plan, and eighteen months negotiating it with the Department of Interior.[613] The analytical method was to prepare and link detailed inventories of forest and wildlife resources, providing a matrix of habitats to support multiple indicator species.[614] The four primary wildlife indicators were the owl, murrelet, grizzly, and wolf, although about two dozen other species of "special emphasis" were also identified.[615] The main protections, however, radiate from the owl. Each spotted owl was allotted a 1.8 mile radius habitat circle;[616] 107 such circles were drawn in the total planning area, 67 of them on Plum Creek land.[617] Additional protections were extended for forag-

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gray wolf sightings in the planning area between 1992 and 1994, all on the eastern side of the Cascade crest. *Id.* at 100.

611. *See supra* notes 121-130 and accompanying text (describing FEMAT's undertakings).

612. *See* Plum Creek HCP, *supra* note 607, at 62. The total planning area was over 400,000 acres—201,801 managed by the U.S. Forest Service, 169,177 by Plum Creek and approximately 41,000 other owners. *Id.*

613. *See* Kraft, *supra* note 607, at 3. The demand for Plum Creek's supporting documents has been so great that the company has proposed a list of its 17 major outputs which are available for purchase for a total of $405. The Company provided a copy of the Habitat Conservation Plan to the author at no charge.

614. Plum Creek's forest inventory carried the symbolic acronym FIBRPLAN. *See* Plum Creek HCP, *supra* note 607, at 62. FIBRPLAN is a computer model used to define when stands of timber are available for harvest. *See id.* at 61. Plum Creek's inventory classified "each stand of forest polygon by tree species, size class, and stocking level." *Id.* Inventories and management units for other landowners in the planning area were also developed. *See id.* at 62-63. Field data, management unit information, and yield models were fed into the FIBRPLAN Forest Landscape Simulator, creating a "State of the Forest Data Profiling Future Forest Landscape" including stand structure, owl habitat, other lifeform habitat, economic evaluations, harvest scheduling, and timber inventory. *See id.* at 67. The data generated were combined with maps from the Geographical Information System to create a visual schematic showing how owl and other habitats will change over time, given harvest and regrowth rates. *See id.* at 68.

615. *Id.* at 62-100.

616. *See id.* at 62.

617. *See id.* at 76.

ing and dispersal habitat.[618] To these were added leave areas for wolves and bears, limits on road densities and the retention of ground cover.[619] Wildlife habitats were further protected by enlarged buffers along streams and across wetlands.[620] The major emphasis of the plan, however, and its primary protection, derived not so much from these reserves as from deferrals in harvest schedules that would leave larger tracts of older trees standing for longer periods of time.[621] Over time, the owl circles would move. The combined effect of these restrictions and deferrals was to reduce harvests by up to 90% in some locations, and by lesser degrees in others, with no harvest reductions in some areas.[622] This was timber management, not wilderness, and the plan was clearly a compromise.

Whether the compromise will ultimately prove enough for the species remains to be seen. As critics have pointed out, the plan protects current populations, not areas inhabitable by them, which could be necessary to their restoration.[623] Worse, it might fail to support even those numbers now known and identified. Anticipating this contingency, the plan calls for continuous monitoring and for its own renegotiation in "extraordinary circumstances" that might jeopardize the species in question.[624] Short of that event, however, the plan, its protections and its harvest schedules will continue for the next

618. *See id.*

619. *See id.* at 92-100; *see also* Availability of a Final Environmental Impact Statement, *supra* note 592, at 16,258 (noting the addition of leave areas for additional species).

620. *See* Availability of a Final Environmental Impact Statement, *supra* note 592, at 16,258; *see also Conservation Planning Under Section 10 of the Endangered Species Act and Other Private Land Initiatives*, 104th Cong. (1996) (statement of William J. Snape III, Legal Director, Defenders of Wildlife).

621. *See* Brown, *supra* note 592, at B3 (describing the importance of deferring harvest schedules).

622. Plum Creek divided the planning area into three types. In the most restrictive, it assumed an annual harvest of 2 million board feet for 20 years, a 10% removal of harvestable volume; in the next most restrictive, an annual harvest of 5 million board feet for 50 years, a 50% removal of harvestable volume; in areas of the HCP with no owl restrictions, it assumed the use of traditional harvest methods and an annual harvest of 8 million board feet forever, a 90% removal rate.

623. *See* Availability of a Final Environmental Impact Statement, *supra* note 592, at 16,258 (noting critiques of the plan).

624. Brown, *supra* note 592, at B3; Kraft, *supra* note 607, at 5.

fifty years, and for up to fifty years beyond that so long as habitat is provided above the specified levels.[625]

The proof of the Plum Creek plan will be years in the knowing. The purpose of this analysis is neither to praise nor to criticize it, but rather to show how far Plum Creek came in getting to it, literally from the rear of the pack to somewhere close to the front. Doubtless, the company was motivated by the beating it was taking in public relations from such unusual quarters as state governors, members of Congress and the *Wall Street Journal*.[626] But when push came to shove, it was the defined, empirical needs of protected species that drew the circles, brushed in the corridors and stretched out the harvest rotations to more nearly mimic a natural forest environment. "More nearly mimic" will not satisfy everyone; perhaps it will not even satisfy the basic needs of creatures in considerable peril. But given the history of Plum Creek, it has been an incredible journey, and without legally-protected indicator species there is no reason to think that it would ever have occurred.

C. EXPANDING THE ESA: THE WORKING GROUP PROPOSALS

It should be clear from the foregoing examples of Endangered Species Act planning that the Act—despite a chorus of criticism that it "fails to address ecosystems"—is addressing some badly battered ecosystems on a very large scale, and nudging forward the long-overdue process of their repair. In so doing, the Act has offended a landscape of vested interests that, up to now, have avoided any serious accommodation with the natural world. In 1996, the Endangered Species Act was slated for reauthorization; from this landscape of real and imagined adversaries came a shopping list of "reform" proposals, each designed to weaken a central feature of the program.[627] Partly because of their extremism and partly because

625. *See* Kraft, *supra* note 607, at 6.

626. For an example of Plum Creek's eventual sensitivity to the criticism it was receiving, see Larsen, *supra* note 608, at A17.

627. The lead vehicle for the development community in 1996 was H.R. 1490, introduced by Representatives Tauzin (D-La) and Fields (R-Tex). H.R. 1490, 103d Cong. (1993). Among other features, the bill slowed the ESA listing process, required new benefit-cost analysis, emphasized captive breeding in lieu of habitat protection, expanded compensation to landowners for ESA protection, and limited citizen enforcement suits. *See id.* For the role of industry in drafting these same proposals on the Senate side, see Timothy

of their eclipse by an oncoming presidential campaign, the amendments died in the 104th Congress. One proposal with a serious chance of passage, however, and with an equally serious chance of being the lead vehicle in future reauthorization, was engineered by an unusual coalition of environmental and industry lawyers working with members of the House of Representatives and called the "ESA Working Group."[628] The Group's proposal met with strong criticism from both the development and the environmental community,[629] the merits of which are beyond the scope of this study. Within the scope, however, are its attempt to take the ESA into broader, ecosystem planning on private lands and the vehicle it chose for doing so.

At the heart of the Working Group bill were "Natural Systems Conservation Plans" designed to protect, restore or enhance "identified ecosystems, natural communities, or habitat types" on which endangered species depend.[630] The plans, once approved, would act as multiple-species Habitat Conservation Plans, guaranteeing future development within the planning area consistent with their conditions. The strength of these guarantees—they waived other federal laws,[631] had no time limits, and were irrevocable, except for the breach of a condition, even if jeopardy or a new endangered species were discovered[632]—makes the obvious question all the more important: what was the bottom line? The bottom line was indicator species.[633]

Egan, *Industries Affected by the Endangered Species Act Help a Senator Rewrite Its Provisions*, N.Y. TIMES, Apr. 13, 1995, at A20.

628. *See* Margaret Kriz, *On A Rocky Middle Path*, 28 NAT'L J. 825, 826 (1996) (explaining the cooperation between industry lawyers, environmental lawyers, and members of the House of Representatives). For a full description of the ESA Working Group proposal, see Wm. Robert Irvin, Endangered Species Act Reform Proposals: An Environmentalist's Perspective 3-6 (Symposium, Biodiversity Protection: Implementation and Reform of the Endangered Species Act, University of Colorado School of Law, June 10-12, 1996)(unpublished manuscript, on file with author). Mr. Irvin was a leading participant in the Working Group.

629. *See* Margaret Kriz, *The Center Folds*, 28 NAT'L J. 1469, 1469-70 (1996) (describing the criticisms levied from both sides of the issue).

630. H.R., 105th Cong. § 6 (1997) (discussion draft of a bill introduced by Representative Jim Saxton (R-N.J.)).

631. *See id.* § 6(5) (waiving section 7 of the National Environmental Policy Act); *id.* § 6(8) (waiving section 9 of the National Environmental Policy Act).

632. *See id.* § 6(6).

633. *See id.* § 5(3)(E).

The Natural Systems Conservation Plans depend on two types of indicators. The first, called "indicator species," "collectively served as general indicators of the well being of the ecosystems," and served as surrogates "so as to minimize" the need to designate additional species.[634] These choices appeared to be exclusively based on science, and included the classic flagship and umbrella species of conservation biology; they would not include, one would hope, the "desired species" category that has opened the door for raccoons and white-tailed deer. The second class of indicators was "specialized species," and included officially-recognized endangered, threatened, and candidate species as well as "any other species of comparable rarity or vulnerability" according to a state natural heritage or wildlife agency.[635] So far so good. Then, the bill faltered.

In approving a Natural Systems Conservation Plan, the Secretary of Interior was to find that, "based on the effects of the plan on the indicator and specialized species identified," the plan provided "reasonable certainty" that the habitat within the plan area would support the species.[636] The Secretary was, further, required to disapprove a plan if it was "likely to jeopardize" an indicator or specialized species or cause an unlisted species to become threatened or endangered.[637] Setting aside questions of "reasonable certainty" and burdens of

634. *Id.* § 5(2)(C). It is less clear, however, whether these species include all taxonomic groups, including plants, fungi and other, some would say necessary, indicators of ecosystem health.

635. *Id.* § 6(1)(D).

636. *Id.* § 6(3)(E). The provision reads:

> [B]ased upon the effects of the plan on the indicator and specialized species identified in such planning agreement, provides reasonable certainty that such ecosystems, natural communities, or habitat types will be maintained in the plan area throughout the life of the plan . . . in sufficient quality, distribution, and extent to support within the plan area those species typically associated with such ecosystems, natural communities, or habitat types . . . .

Id. § 3(E).

637. *Id.* § 6(4). The provision reads:

> [T]he Secretary shall disapprove a plan if the Secretary determines, based upon the best available scientific and commercial data, that implementation of the plan—
>
> (A) is likely to jeopardize the continued existence of any indicator or specialized species identified in the planning agreement; or
>
> (B) will cause any indicator or specialized species not endangered or threatened at the time of plan submission to become threatened or endangered . . . .

See id. § 6(4).

proof—which, given the degree of uncertainty that surrounds the exact needs of reclusive species, can be critical[638]—there is an obvious difference between supporting an indicator species within the plan area and taking action so drastic as to jeopardize its existence. The former requirement is similar to that of the current Forest Service diversity regulations: viable populations, well-distributed across the planning area.[639] The latter is very much the approach of the Service's proposed revisions, which allow any disturbance short of one that causes endangerment or outright extirpation at the local level.[640]

These and other provisions of the ESA Working Group proposal are certain to receive more scrutiny in the 105th Congress, under whatever bill number and sponsorship they emerge. Germane to this analysis is the fact that, in reaching towards ecosystem protection from the Endangered Species Act, they chose to broaden the class of target species from which protective planning was to proceed. So choosing, they seem to have cured some of the existing problems with indicator species selection. They also, however, fell into the trap of leaving the degree of protection largely up to discretion and good faith. A requirement that ecosystem plans avoid jeopardy to listed species imposes no bottom line that does not already exist in law. If ecosystems are actually going to be "protected, enhanced and restored" by the use of indicator species, then we are going to have to commit ourselves to "protecting, enhancing and restoring" those species and their habitats more affirmatively, and not simply to preventing their extirpation.

V. REFLECTIONS ON THE LAW OF BIOLOGICAL DIVERSITY AND ECOSYSTEM PROTECTION

The law of diversity and ecosystem protection is at a crossroads. Looking back over our shoulders we can see that single species management has been fairly effective—in some cases wildly effective—in promoting the success of individual species and the habitats on which they depend. This approach has be-

638. This problem has been the focus of strong criticism from the environmental community. *See, e.g.*, Suellen Lowry, Concerns Regarding ESA Working Group Proposal (undated) (on file with author). Mr. Lowry is an attorney with the Sierra Club Legal Defense Fund.

639. *See supra* Part II.A (discussing the Service's regulations).

640. *See supra* Part II.C (discussing the Service's proposed regulations). For the havoc this approach has brought to commercial fisheries, see *supra* Part III.A (discussing the approach's effect on the New England fishery).

gun to lose its steam, however, as more species and more habitats come into view. The temptation to shed our concerns for individual species in favor of conservation on a more holistic, landscape level is strong. All the more so where single species protections require us to make specific and difficult accommodations, while landscape conservation can be assigned to the realm of planning and discretion. At bottom, species-based protection is law. Ecosystem management, as currently promoted, is politics with a strong flavor of law-avoidance.[641]

This conclusion in no way gainsays the need to think, plan and act on a landscape level. Every commentary made in favor of ecosystem management is correct on this point: without landscape-level thinking, over time, the ship sinks. But the great paradox of this, the ultimate issue in natural resources law, is that while we cannot save species without saving the whole, as a practical matter we cannot save the whole unless we focus on species—and build up from there.[642] Our best choice at the current crossroads, therefore, is not to take one or the other fork, but to take them both. Landscape-level planning—to the extent it is based on principles such as island geography, gap analysis and other tenets of conservation biology—will allow us to identify, acquire where necessary, and manage more proactively virtually all pieces of the mosaic. What it will rarely be able to do, however—for whatever lands are identified, acquired or reserved in any category short of wilderness—is justify a reduction in animal unit months on an allotment north of Reno, Nevada or the reservation of minimum stream flows in the San Pedro River. As these decisions escalate to larger and more difficult scales, as they have in the Pacific Northwest and coastal southern California, if we want to impose a measure of restraint on our own behavior we will

641. *See supra* notes 330-365, 411-421 and accompanying text (describing the political nature of ecosystem management). The true test of any conservation policy is not what it would allow a Secretary of Interior Bruce Babbitt to do, but what it would allow a Secretary of Interior James Watt to do. *See* NATIONAL WILDLIFE FEDERATION, MARCHING BACKWARDS: THE DEPARTMENT OF INTERIOR UNDER JAMES G. WATT (1982). On this measuring stick, the prospect of ecosystem management replacing viable population requirements has to be sobering.

642. One prominent scientist in the field of conservation biology has concluded: "Although ecosystem management is the buzzword of the day; management of individual species on a population or metapopulation level remains a necessary part of any conservation strategy." Reed F. Noss, *Some Principles of Conservation Biology as They Apply to Environmental Law*, 69 CHI.-KENT L. REV. 893, 900 (1994).

find ourselves looking to the objective, quantifiable needs of the owl, the gnatcatcher and the silvery minnow.[643] Not because they are the desired result, but because they are an effective mechanism for conservation and change.

One message of this study is that it can be done. The experience of FEMAT and the Pacific Northwest plan, the Tongass interagency report, southern California's NCCP, and Plum Creek's FIBRPLAN is that biologists can look to multiple indicator species, overlay their needs, and arrive at a bottom line that is defensible in law, enforceable, and sufficiently flexible to allow management options. Indeed, indicator species, umbrella species, keystone species are the *only* way that it is being done. They are as far as science can go in delineating exactly how much of an identified ecosystem must remain.

Another lesson emerging from more routine forest planning examined in this study is that, for a species-based process to work, it must be honest in selecting its baseline and its indicators. To identify the natural system as whatever humans have made of it or may want it to be, and to select species on the basis of their popularity or tolerance of human disturbance is abusive and shameless; fortunately, it is also correctable through a process that places biological decisions in the hands of biologists, where they belong. The determination of what an ecosystem requires to retain its contribution to diversity is—like a decision on whether a species is sufficiently rare to be listed as endangered, or sufficiently threatened by a proposed action as to be in jeopardy—a factual, scientific call. Whether humans want to abide by that determination is another question. But there is no reason to distort it. Other than, of course, that it is unwelcome news.

Why is it that indicator species work? Granted, they are by no means perfect surrogates for ecosystems and, granted again, the proof of their requirements can be complex and demanding for scientists operating at the far edge of data and predictability and trained to conclude nothing until all possible alternative hypotheses, however remote, have been disproved.

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643. The converse is equally true. For examples of planning failures for want of a standard, see Stephen C. Trambulak, *The Northern Forest: Conservation Biology, Public Policy and a Failure of Regional Planning*, 11 ENDANGERED SPECIES UPDATE, Dec. 1994, at 7 (describing an extended, fruitless planning effort for New England forests and concluding: "We must be aware of the danger . . . of legitimizing 'business as usual' under a veneer of 'consensus building' and participatory democracy"), and *supra* note 21 and accompanying text (discussing the "Colorado Model" rangelands).

Nonetheless, indicators work because, in the end, they produce specifics.[644] Viewed from a different but related perspective, they work because they remove the impossible factor from the equation: the ecosystem of human beings. Determining the essential minima of the sage shrub community of coastal California based on the gnatcatcher and other indicators is indeed difficult, and at times will be open to legitimate scientific challenge; but it is at least possible. Determining, on the other hand, what a "desired" ecosystem of coastal California should look like given what we have already done to it and are going to continue to do as fast as we can is not, in any legal sense, remotely possible. Once you put humans into the baseline, the standards disappear into a smudge of "multiple use," "optimal yield," and "people-are-part-of-ecosystems" rhetoric of the emerging and highly political federal process. Which is why, for federal managers, they are so tempting. They slip the shackles of law.

The great and current danger is that federal agencies will succumb to this temptation. There is every reason to encourage their enlarged visions of the Greater Yellowstone Ecosystem and the Northern Rockies, but there is every reason to fear their abandonment of indicator species to establish the necessary protections—until species are reduced to the point of endangerment. It is scary to see this trend emerge in proposed Forest management regulations, and be mimicked by the land managers of BLM and fishery managers of NMFS. There is more at work here than enthusiasm for an attractive new concept. There is at least an equal enthusiasm to avoid being driven by the needs of species into making very hard decisions. The emerging ecosystem approach is friendly and nonthreatening; it perpetuates business-as-usual and defers the hard decisions to a later day. If I were a Regional Forester or BLM manager, I might find that option quite attractive—right up until the time I saw the need to make some changes. At which point I would be begging for some indicator species to

644. The dependence of pollution control law on specificity is longstanding and linear. Progress in air, water, and waste management is measured and achieved through ambient and technology-based standards that—although influenced by the political process—are objectively derived, numerical, and enforceable. By contrast, natural resources law has been characterized by nearly unlimited discretion, and correspondingly uneven performance. Management indicators provide a first step towards objectivity for managing the land base of the country. None too soon.

back me up. At which point I might well be told: "Hell, they're not endangered yet are they?"

The ultimate question is whether we will restrain ourselves to accommodate the natural world. It is the question in all of environmental law, but it is raised with particular poignancy in those laws that deal with resource management and development because they contain few hard restraints at all. Except, of course, for the Endangered Species Act. What the ESA does, in effect, is draw a small (but growing) number of circles of enforceable restraint around the nests, breeding grounds, and habitats of a few creatures on the brink of extinction. The plight of these creatures may, but does not always, reflect the plight of the ecosystems they inhabit. It is now up to us to say whether we are willing to draw larger concentric rings around keystone, flagship, indicator species for the natural systems of this earth—and adhere to them. Not to wall ourselves out of them, but to limit our conduct within them by the predicted needs of the species and their support systems. The conclusion of this study is that it can be done.

In the final analysis, it is important to have a process to work collaboratively towards landscape conservation on the largest possible scale. We can call this process "ecosystem management" if we wish, and Godspeed. But it is also important to motivate people to collaborate, and to give all parties a line below which the result may not fall. We may call this line "species diversity," and we should never lose it from view.

VI. EPILOGUE

Perhaps the most endearing story of the Bible is Noah's Ark, in which we see that Noah—albeit with less than enthusiasm and good grace—saves the wildlife of the world. From which we conclude that the God-Noah combination is not only impressively powerful but also, basically, compassionate. Much of the literature surrounding the Endangered Species Act and, more recently, biodiversity law, repeats the same allegory: compassionate stewards that we are, like Noah, we are saving the creatures.

In so concluding, we may have the point backwards. What we miss is that Noah and his crew were saved too. And the reason they were saved is that they were the ones who were carrying the animals. The animals brought Noah home.

The conclusion of this study is that, whatever else we may do in the name of maintaining the natural world, we need the

animals as much as Noah did. If we ignore them, we sink. If we focus on saving them, they will bring us home.