Conservation Biology and the Law: Assessing the Challenges Ahead

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INTRODUCTION

The emerging discipline of conservation biology is beginning to place a perceptible strain on the American legal system, particularly laws governing public lands and resources. Reflecting a strong commitment to preserving biological resources and supporting ecosystems, the conservation biology agenda challenges many of the fundamental presuppositions underlying our laws and policies.[1] Indeed, the current legal system—based as it is upon politically defined boundaries, private property rights, a consumptive ethic, and single-resource management—runs counter to basic precepts of biodiversity conservation. Nonetheless, on the western public lands and elsewhere, biodiversity conservation is acquiring legitimacy as a central natural resource management tenet, while ecosystem management is being touted as the managerial strategy of choice. Whether the existing legal system can accommodate such a fundamental reorientation in land and resource management remains to be seen.

According to Reed Noss, a leading conservation biologist, it is time to embrace a "new ecological paradigm" for managing public lands and resources.[2] Relying on scientific theory and research, conservation biologists view species extinction and loss as a crisis of major proportions that requires a drastic shift in our governing policies.

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1. Principal works in the field of conservation biology include: CONSERVATION BIOLOGY: AN EVOLUTIONARY-ECOLOGICAL PERSPECTIVE (Michael E. Soule & Bruce A. Wilcox eds., 1980); CONSERVATION BIOLOGY: THE SCIENCE OF SCARCITY AND DIVERSITY (Michael E. Soule ed., 1986); CONSERVATION BIOLOGY: THE THEORY AND PRACTICE OF NATURE CONSERVATION, PRESERVATION, AND MANAGEMENT (Peggy L. Fiedler & Subodh K. Jain eds., 1992); O.H. FRANKEL & MICHAEL E. SOULE, CONSERVATION AND EVOLUTION (1981); LARRY D. HARRIS, THE FRAGMENTED FOREST: ISLAND BIOGEOGRAPHY THEORY AND THE PRESERVATION OF BIOTIC DIVERSITY (1984). On the subject of biodiversity, see BIODIVERSITY (Edward O. Wilson ed., 1988); BRYAN G. NORTON, WHY PRESERVE NATURAL VARIETY (1987); EDWARD O. WILSON, THE DIVERSITY OF LIFE (1992). *See also* DANIEL B. BOTKIN, DISCORDANT HARMONIES: A NEW ECOLOGY FOR THE TWENTY-FIRST CENTURY (1990).

2. Reed F. Noss, *Some Principles of Conservation Biology, As They Apply to Environmental Law*, 69 CHI.-KENT L. REV. 893, 894 (1994).

Stripped to its essentials, the proposed "new ecological paradigm" means that biodiversity preservation should be elevated above other considerations in managing natural resources. Noss unabashedly contends that first priority should be given to maintaining and protecting biodiversity, and calls for real prudence and restraint before land is developed or resources harvested.[3] Noss advocates establishing an extensive system of ecological reserves—one that is large enough to accommodate instability and diverse enough to protect different types of ecological systems—in order to buffer species populations against human encroachment.[4] He also asserts that ecosystem-based management represents a viable strategy for accomplishing these objectives.[5] In short, Noss believes that an effective biodiversity conservation policy will require a reordering of traditional priorities, a significant expansion in our system of preserved lands, and a meaningful commitment to management at the ecosystem level.

Translating these basic biodiversity conservation requirements into legally enforceable obligations will require major changes in the law governing public land and resource management. Although I have elsewhere argued that a rudimentary law of ecosystem management is beginning to emerge on the public lands,[6] these developments fall short of the comprehensive reform necessary to institutionalize a "new ecological paradigm." But precisely because the logic underlying the conservation biology movement cannot be readily dismissed, Noss and his colleagues present a powerful case for fundamental change. This essay, therefore, identifies what appear to be the principal legal obstacles to a "new ecological paradigm" and notes alternative approaches that might be pursued to ensure our biological legacy.

I. REORDERING PRIORITIES: PRIMACY FOR BIODIVERSITY?

According to Noss, conservation biologists adhere to the bedrock principle that biodiversity preservation should receive priority over other considerations in managing public lands and resources. Readily acknowledging that conservation biology is a value-based and mis-

3. *Id.* at 895-97.

4. *Id.* at 898-904.

5. *Id.* at 904-07.

6. *See* Robert B. Keiter, *Beyond the Boundary Line: Constructing a Law of Ecosystem Management*, 65 U. COLO. L. REV. 293, 303-14 (1994) [hereinafter Keiter, *Beyond the Boundary Line*]; Robert B. Keiter, *Taking Account of the Ecosystem on the Public Domain: Law and Ecology in the Greater Yellowstone Region*, 60 U. COLO. L. REV. 923, 997-1001 (1989) [hereinafter Keiter, *Taking Account of the Ecosystem*].

sion-oriented discipline,[7] Noss calls for a fundamental reordering of existing priorities to protect the nation's biological resources against extinction or rapid depletion. To reverse the current slide toward biotic impoverishment, he concludes that "the vital needs of nonhuman species must not be compromised."[8] Moreover, Noss clearly identifies the source of the problem: it is the consumptive ethic—a philosophy that has long dominated natural resource management policy and that gives primacy to economic and other utilitarian considerations.[9] He argues that the current commitment to consumptive use has resulted in single species management as well as an overemphasis on development, and thus has stymied efforts to address pressing biological problems.

These problems, of course, are embedded in the legal system governing public land and resources, which does not prioritize biological considerations over other concerns. Unless a species is facing the very real threat of extinction,[10] biological conservation is but one of several competing considerations in the resource management equation. Under the multiple-use mandates that govern most of the nation's public lands and forests,[11] fish and wildlife are treated as one of several resources and receive no special consideration.[12] In fact, Congress historically has subsidized commodity production activities, such as timber harvesting and livestock grazing, at such disproportionately high levels that biological considerations have all but been forgotten in the overall multiple-use mix on the public domain.[13] Although the

7. Noss, *supra* note 2, at 895.

8. *Id.* at 899.

9. *Id.* at 894. On the historic predominance of the utilitarian ethic on the public domain, see SAMUEL T. DANA & SALLY K. FAIRFAX, FOREST AND RANGE POLICY: ITS DEVELOPMENT IN THE UNITED STATES (2d ed. 1980); SAMUEL P. HAYS, CONSERVATION AND THE GOSPEL OF EFFICIENCY: THE PROGRESSIVE CONSERVATION MOVEMENT, 1890-1920 (1959); PATRICIA N. LIMERICK, THE LEGACY OF CONQUEST: THE UNBROKEN PAST OF THE AMERICAN WEST (1987); CHARLES F. WILKINSON, CROSSING THE NEXT MERIDIAN: LAND, WATER, AND THE FUTURE OF THE WEST (1992).

10. *See* Endangered Species Act of 1973, 16 U.S.C. §§ 1531-1543 (1988); Tennessee Valley Authority v. Hill, 437 U.S. 153 (1978). *See generally* George C. Coggins & Irma S. Russell, *Beyond Shooting Snail Darters in Pork Barrels: Endangered Species and Land Use in America*, 70 GEO. L.J. 1433 (1982).

11. *See* Multiple Use-Sustained Yield Act of 1960, 16 U.S.C. §§ 528-531 (1988) (national forests); Federal Land Policy and Management Act of 1976, 43 U.S.C. §§ 1701-1784 (1988) (BLM-administered public lands).

12. 16 U.S.C. § 531(a); 43 U.S.C. § 1702(c).

13. Regarding congressional subsidization of resource development on the public lands, see DAVID A. CLARY, TIMBER AND THE FOREST SERVICE (1986); RANDAL O'TOOLE, REFORMING THE FOREST SERVICE (1988); George C. Coggins & Margaret Lindeberg-Johnson, *The Law of Public Rangeland Management II: The Commons and the Taylor Act*, 13 ENVTL. L. 1, 74-75 (1982). *See also* WILKINSON, *supra* note 9, at 148-50, 169-71.

National Forest Management Act[14] interjects biodiversity conservation into the forest planning process,[15] the statute has not consistently been interpreted as a substantive commitment to preserve biodiversity.[16] In short, the prevailing multiple-use philosophy effectively undermines any notion that biological concerns are entitled to special deference on the public domain.

The Endangered Species Act,[17] however, represents an unambiguous federal commitment to saving the nation's biological resources from extinction. According to the U.S. Supreme Court in *Tennessee Valley Authority v. Hill*,[18] the Act gives species protection primacy over competing considerations, once a species qualifies for statutory protection. The Act obligates the U.S. Fish & Wildlife Service, which is responsible for administering the statute, to make initial listing decisions solely on the basis of the best available scientific and commercial information.[19] It requires federal agencies to conserve "listed" (or protected) species;[20] it grants the U.S. Fish & Wildlife Service effective veto authority over project proposals that might jeopardize listed species;[21] and it prohibits anyone from "taking" a protected species, regardless of where it is located.[22] The Act also protects designated critical habitat,[23] and it requires preparation of recovery plans for listed species.[24] The courts generally have interpreted these provisions rigorously and required strict procedural compliance.[25] But

14. 16 U.S.C. §§ 1601-1614 (1988). *See generally* Charles F. Wilkinson & H. Michael Anderson, *Land and Resource Planning in the National Forests*, 64 OR. L. REV. 1 (1985).

15. 16 U.S.C. § 1604(g)(3)(B).

16. *Compare* Seattle Audubon Soc'y v. Evans, 771 F. Supp. 1081 (W.D. Wash. 1991), *aff'd*, 952 F.2d 297 (9th Cir. 1991) *with* Sierra Club v. Robertson, 810 F. Supp. 1021 (W.D. Ark. 1992). *See also* Sierra Club v. Robertson, 845 F. Supp. 485 (S.D. Ohio 1994); Krichbaum v. Kelley, 844 F. Supp. 1107 (W.D. Va. 1994); Sierra Club v. Marita, 843 F. Supp. 1526 (E.D. Wis. 1994). *See generally*, Jack Tuholske & Beth Brennan, *The National Forest Management Act: Judicial Interpretation of a Substantive Environmental Statute*, 15 PUB. LAND L. REV. 53 (1994).

17. 16 U.S.C. §§ 1531-1543 (1988).

18. 437 U.S. 153 (1978).

19. This listing decision determines whether the species qualifies for protection under the Endangered Species Act, either as an "endangered" or "threatened" species. 16 U.S.C. § 1533(b).

20. 16 U.S.C. § 1536(a)(1). *See* Carson-Truckee Conservancy Dist. v. Clark, 741 F.2d 257, 261 (9th Cir. 1984). *See generally* Thomas France & Jack Tuholske, *Stay the Hand: New Directions for the Endangered Species Act*, 7 PUB. LAND L. REV. 1, 4-14 (1986).

21. 16 U.S.C. § 1536(a)(2). *See* Thomas v. Peterson, 753 F.2d 754 (9th Cir. 1985).

22. 16 U.S.C. § 1538(a)(1)(b). *See* Federico Cheever, *An Introduction to the Prohibition Against Takings in Section 9 of the Endangered Species Act of 1973: Learning to Live with a Powerful Species Preservation Law*, 62 U. COLO. L. REV. 109 (1991).

23. 16 U.S.C. § 1533(b)(2). *See* Katherine Simmons Yagerman, *Protecting Critical Habitat Under the Federal Endangered Species Act*, 20 ENVTL. L. 811 (1990).

24. 16 U.S.C. § 1533(f).

25. *See, e.g.*, Resources Ltd., Inc. v. Robertson, 8 F.3d 1394 (9th Cir. 1993); Sierra Club v. Yeutter, 926 F.2d 429 (5th Cir. 1991); Bob Marshall Alliance v. Hodel, 852 F.2d 1223 (9th Cir.

while the Act is regarded as the nation's premier environmental protection law, it cannot be treated as a general biodiversity conservation statute. Unless a species qualifies for listing because population numbers have reached a crisis stage, it derives no federal legal protection from the statute. Moreover, the Act is single-species oriented; the extensive protection that it provides to a species-in-crisis can sometimes operate to the detriment of the ecosystem as a whole.[26]

Other federal preservation and conservation laws extend only limited legal protection to biological resources. Although the national parks and wildlife refuges were designed to protect and conserve wildlife resources,[27] the governing organic mandates as well as political realities often place biological needs in direct competition with visitor needs, usually to the detriment of wildlife and its habitat requirements.[28] The amended Fish and Wildlife Coordination Act of 1934,[29] the principal legal mechanism for ensuring that biological impacts are addressed in federal water development projects, merely provides for interagency consultation and mitigation of adverse habitat effects;[30] it does not establish substantive standards to protect species against habitat alteration or population loss. Within state game and fish agencies, which initially were created to revive dwindling wildlife populations,[31] the focus has been on single-species management to provide hunters with a harvestable crop of big game animals; little attention has been devoted to "lesser" species, biodiversity conservation, or other nonconsumptive management goals.[32] Although the recently

1988), *cert. denied sub nom.* Kohlman v. Bob Marshall Alliance, 489 U.S. 1066 (1989); Thomas v. Peterson, 753 F.2d 754 (9th Cir. 1985).

26. Critiques of the Endangered Species Act can be found in Holly Doremus, *Patching the Ark: Improving Legal Protection of Biological Diversity*, 18 ECOLOGY L.Q. 265 (1991); Oliver Houck, *The Endangered Species Act and Its Implementation by the U.S. Departments of Interior and Commerce*, 64 U. COLO. L. REV. 277 (1993). *See also* R. EDWARD GRUMBINE, GHOST BEARS: EXPLORING THE BIODIVERSITY CRISIS 92-101 (1992).

27. *See* 16 U.S.C. § 1 (1988) (national park service); 16 U.S.C. § 668dd (1988) (national wildlife refuge system).

28. *See, e.g.*, ALSTON CHASE, PLAYING GOD IN YELLOWSTONE: THE DESTRUCTION OF AMERICA'S FIRST NATIONAL PARK (1986); ALFRED RUNTE, YOSEMITE: THE EMBATTLED WILDERNESS (1990); U.S. GEN. ACCOUNTING OFFICE, NATIONAL WILDLIFE REFUGES: CONTINUING PROBLEMS WITH INCOMPATIBLE USES CALL FOR BOLD ACTION (1989). *See also* Richard J. Fink, *The National Wildlife Refuges: Theory, Practice, and Prospect*, 18 HARV. ENVTL. L. REV. 1 (1994).

29. 16 U.S.C. §§ 661-67 (1988).

30. 16 U.S.C. § 662. *See* MICHAEL BEAN, THE EVOLUTION OF NATIONAL WILDLIFE LAW 181-95 (2d ed. 1983).

31. *See* John S. Gottschalk, *The State-Federal Partnership in Wildlife Conservation*, *in* WILDLIFE AND AMERICA: CONTRIBUTIONS TO AN UNDERSTANDING OF AMERICAN WILDLIFE AND ITS CONSERVATION 290 (Howard P. Brokaw ed., 1978).

32. *See* THOMAS A. LUND, AMERICAN WILDLIFE LAW 57-79 (1980).

proposed National Biological Survey legislation would elevate biodiversity conservation on the federal natural resources management agenda,[33] it does not provide any additional substantive legal protection for biological resources.

Because existing law, as Noss suggests, places such a heavy burden of persuasion on biodiversity conservation proponents, new legislation may be necessary. While the Endangered Species Act generally gives species preservation priority over other considerations,[34] even it requires some balancing between competing concerns at critical junctures. One of these points is the listing decision, where petitioners must offer substantial scientific or commercial information to make the case for statutory coverage.[35] Although this evidentiary requirement may make listing somewhat more difficult, it is not surprising that the law would allocate the burden of persuasion in this fashion given the significant consequences that attach once a listing occurs.[36] A new biodiversity conservation mandate might avoid the harshness associated with listing by providing for early, flexible intervention on behalf of sensitive species as a safeguard against irreversible error.[37] In the case of the National Environmental Policy Act (NEPA),[38] the statute consistently has been construed to impose only procedural obligations, requiring full disclosure of environmental impacts and mitigation options, but not a particular decision.[39] Although federal land management agencies, following NEPA analysis, have shown a propensity to decide in favor of development, this tendency can be more readily traced to other laws and policies that favor development over environmental protection rather than NEPA itself.[40] Nonetheless, re-

33. The proposed National Biological Survey Act of 1993 would establish the National Biological Survey in the Department of the Interior and authorize it to undertake a comprehensive assessment of the nation's biological resources and to help resolve conflicts under the Endangered Species Act. The bill does not vest the National Biological Survey with any substantive land or resource management authority. H.R. 1845, 103d Cong., 1st Sess. (1993).

34. *See supra* notes 17-26 and accompanying text.

35. 16 U.S.C. § 1533(b)(3)(A).

36. Besides, even candidate species receive some limited protection under the statute. Although candidate species are not directly covered by the Endangered Species Act protections, 50 C.F.R. § 424.15(b) (1993), any candidate species facing immediate jeopardy is subject to emergency listing under the Act. 16 U.S.C. § 1533(b)(7). Furthermore, the courts have been willing to review listing decisions. *See* Endangered Species Comm. of the Bldg. Indus. Ass'n of S. Cal. v. Babbitt, 852 F. Supp. 32 (D.D.C. 1994); Northern Spotted Owl v. Hodel, 716 F. Supp. 479 (W.D. Wash. 1988).

37. *See infra* notes 42-46 and accompanying text.

38. 42 U.S.C. §§ 4321-61 (1988).

39. *See, e.g.*, Robertson v. Methow Valley Citizens Council, 490 U.S. 332 (1989); Strycker's Bay Neighborhood Council, Inc. v. Karlen, 444 U.S. 223 (1980) (per curiam).

40. *See generally* LIMERICK, *supra* note 9; WILKINSON, *supra* note 9.

cent legislative proposals that would require biodiversity analysis as part of the NEPA environmental review process would ensure that biological and ecological considerations are given equal consideration in the decisionmaking process.[41]

The real challenge confronting conservation biologists, therefore, is to convince the public to elevate biodiversity conservation to a position of primacy within public land and resource law. This will involve primarily a political rather than legal discourse, and it will occur principally in a political rather than judicial forum. Drawing upon Aldo Leopold's land ethic[42] as well as other arguments attributing instrumental and intrinsic value to biodiversity itself,[43] conservation biologists must persuade politicians, land managers, and the public that biodiversity merits independent legal protection. They can point to the Pacific Northwest's spotted owl controversy as an example of what can occur when biological considerations are discounted in favor of unrestrained development.[44] Following a series of court injunctions, timber harvesting opportunities on public lands are now quite limited,[45] while other commercial as well as amenity opportunities may also have been lost.[46] In short, because biological considerations were not accorded a prominent role in natural resources policy, the ancient forest ecosystem has now been compromised, causing severe economic dislocation as well as egregious environmental damage.

Nonetheless, significant obstacles must be confronted before biodiversity can be elevated to a position of primacy on the natural resources policy agenda. First, with the Supreme Court reinvigorating

41. *See* National Biological Diversity Conservation and Environmental Research Act, H.R. 305, 103d Cong., 1st Sess. (1993); William M. Flevares, *Ecosystems, Economics, and Ethics: Protecting Biological Diversity at Home and Abroad*, 65 S. CAL. L. REV. 2039, 2052-64 (1992).

42. *See* ALDO LEOPOLD, A SAND COUNTY ALMANAC, WITH ESSAYS ON CONSERVATION ON ROUND RIVER 237 (1966).

43. *See, e.g.*, LISA MIGHETTO, WILD ANIMALS AND AMERICAN ENVIRONMENTAL ETHICS (1991); RODERICK F. NASH, THE RIGHTS OF NATURE: A HISTORY OF ENVIRONMENTAL ETHICS (1989); BRYAN G. NORTON, WHY PRESERVE NATURAL VARIETY? (1987).

44. *See* WILLIAM DIETRICH, THE FINAL FOREST: THE BATTLE FOR THE LAST GREAT TREES OF THE PACIFIC NORTHWEST (1992); KEITH ERVIN, FRAGILE MAJESTY: THE BATTLE FOR NORTH AMERICA'S LAST GREAT FOREST (1989); ELLIOTT A. NORSE, ANCIENT FORESTS OF THE PACIFIC NORTHWEST (1990); STEVEN L. YAFFEE, THE WISDOM OF THE SPOTTED OWL: POLICY LESSONS FOR A NEW CENTURY (1994).

45. For a comprehensive description of the spotted owl litigation, see Alyson C. Flournoy, *Beyond the "Spotted Owl Problem": Learning from the Old-Growth Controversy*, 17 HARV. ENVTL. L. REV. 261 (1993); Victor M. Sher, *Travels with Strix: The Spotted Owl's Journey Through the Federal Courts*, 14 PUB. LAND L. REV. 41 (1993).

46. *See* WILKINSON, *supra* note 9, at 156-67; John M. Volkman & Willis E. McConnaha, *Through a Glass, Darkly: Columbia River Salmon, the Endangered Species Act, and Adaptive Management*, 23 ENVTL. L. 1249 (1993).

the constitutional takings doctrine,[47] any statutory reform effort designed to give biodiversity conservation priority in the management equation must acknowledge the reality that constitutional rights take precedence over statutorily defined rights. The rights of property owners, therefore, must be addressed and accommodated in any statutory scheme mandating biodiversity conservation. Although property rights do not extend to public lands or resources unless expressly granted by the government,[48] private land owners could potentially avail themselves of the constitutional takings provision to challenge biodiversity regulatory programs that extend to privately owned lands.[49] Second, because biodiversity conservation policy will ultimately be framed in a political setting, it must accommodate human considerations, including economic, social, and cultural interests, in any species preservation policy. Even the powerful Endangered Species Act factors economic considerations into the critical habitat designation process,[50] and contains an escape valve—namely the Endangered Species Committee—for overriding the statute's strict preservationist requirements.[51] Perhaps a similar escape valve provision, as well as some degree of managerial flexibility, should be included in any biodiversity statutory scheme. A successful biodiversity conservation program will ultimately require widespread public support and local compliance, particularly in areas where sensitive or controversial species are located.

47. *See* Dolan v. City of Tigard, 114 S. Ct. 2309 (1994); Lucas v. South Carolina Coastal Council, 112 S. Ct. 2886 (1992); Nollan v. California Coastal Comm'n, 483 U.S. 825 (1987); First English Evangelical Lutheran Church v. County of Los Angeles, 482 U.S. 304 (1987). *See generally* Symposium, Lucas v. South Carolina Coastal Council, 45 STAN. L. REV. 1369 (1993); *A Colloquium on* Lucas, 23 ENVTL. L. 883 (1993).

48. *See, e.g.*, Christy v. Hodel, 857 F.2d 1324 (9th Cir. 1988), *cert. denied*, 490 U.S. 1114 (1989); United States *ex rel.* Bergen v. Lawrence, 848 F.2d 1502 (10th Cir.), *cert. denied*, 488 U.S. 980 (1988); Mountain States Legal Found. v. Hodel, 799 F.2d 1423 (10th Cir. 1986), *cert. denied sub nom.* Lawrence v. United States, 480 U.S. 951 (1987); McKinley v. United States, 828 F. Supp. 888 (D.N.M. 1993).

49. For a detailed discussion of takings and biodiversity regulation, see A. Dan Tarlock, *Local Government Protection of Biodiversity: What Is Its Niche?*, 60 U. CHI. L. REV. 555 (1993). *See also* Paula C. Murray, *Private Takings of Endangered Species as Public Nuisance:* Lucas v. South Carolina Coastal Council *and the Endangered Species Act*, 12 UCLA J. ENVTL. L. & POL'Y 119 (1993). *Cf.* Sweet Home Chapter of Communities for a Great Or. v. Babbitt, 17 F.3d 1463 (D.C. Cir. 1994) (invalidating Endangered Species Act regulations that define "take" to include habitat modification).

50. 16 U.S.C. § 1533(b)(2). *See* Craig A. Arnold, *Conserving Habitats and Building Habitats: The Emerging Impact of the Endangered Species Act on Land Use Development*, 10 STAN. ENVTL. L.J. 1 (1991).

51. 16 U.S.C. § 1536(h). *See* Jared des Rosiers, Note, *The Exemption Process Under the Endangered Species Act: How the "God Squad" Works and Why*, 66 NOTRE DAME L. REV. 825 (1991).

Just how close we are to giving biodiversity primacy in public land and resource management may be revealed in forthcoming congressional debates. The Endangered Species Act is ready for reauthorization, and it faces stiff opposition from western politicians as well as property rights organizations. While environmental groups want to strengthen the Act and broaden its focus to provide ecosystem-based protection, opponents are urging Congress to interject additional economic considerations into the statute and to reduce the influence of scientific data.[52] At the same time, Congress is considering the proposed National Biological Survey Act,[53] which would create a new agency within the Department of the Interior to survey and monitor the nation's biological resources. Although the National Biological Survey would not have any enforcement or regulatory power, the legislation has been resisted by property rights advocates who fear further federal encroachment onto private lands and who view the proposal as a means to elevate biological considerations on the federal agenda.

Despite the current congressional stalemate over this legislation, there is evidence that biodiversity is being taken seriously within the federal agencies and is beginning to achieve a coequal status with other resources. The National Biological Survey already has been established administratively.[54] The Secretary of the Interior is actively using the Endangered Species Act to advance the notion of ecosystem-based management, with the goal of avoiding "trainwrecks" like the spotted owl-timber controversy.[55] Each of the principal federal land management agencies has endorsed the concept of ecosystem management,[56] acknowledging biodiversity conservation as an important managerial goal. The Environmental Protection Agency has

52. *See* Human Protection Act of 1993, H.R. 1414, 103d Cong., 1st Sess. (1993); Endangered Species Act Procedural Reform Amendments of 1993, H.R. 1490, 103d Cong., 1st Sess. (1993).

53. H.R. 1845, 103d Cong., 1st Sess. (1993).

54. *See DOI Describes Chain-of-Command of NBS and Some of Mission*, 18 PUB. LAND NEWS, Dec. 9, 1993, at 7.

55. Bruce Babbitt, *Protecting Diversity*, NATURE CONSERVANCY, Jan.-Feb. 1994, at 16. *See also* Bruce Babbitt, *The Endangered Species Act and "Takings": A Call for Innovation Within the Terms of the Act*, 24 ENVTL. L. 355 (1994).

56. *See* NATIONAL PARK SERV., U.S. DEP'T OF THE INTERIOR, MANAGEMENT POLICIES 4:1 (1988); Bureau of Land Mgmt., U.S. Dep't of the Interior, Ecosystem Management in the BLM: A Process to Promote Biological Diversity and Sustainable Development (May 27, 1993) (draft concept paper and action plan, on file with the *Chicago-Kent Law Review*); U.S. Fish and Wildlife Serv., U.S. Dep't of the Interior, Refuges 2003: A Plan for the Future of the National Wildlife Refuge System (1993) (draft environmental impact statement, on file with the *Chicago-Kent Law Review*); Memorandum from Dale Robertson, Chief, U.S. Forest Serv., to Regional Foresters (June 4, 1992) (on file with the *Chicago-Kent Law Review*). *See also* CONGRESSIONAL RESEARCH SERV., ECOSYSTEM MANAGEMENT: FEDERAL AGENCY ACTIVITIES (1994).

adopted biodiversity conservation as a primary goal in tandem with its long-standing commitment to human health protection.[57] And the courts are beginning to interpret key natural resource and environmental statutes in a manner sensitive to ecosystem realities.[58] Given this momentum at the administrative and judicial levels, it may only be a matter of time before Congress is persuaded to follow suit.

II. A BIODIVERSITY RESERVE SYSTEM: BREACHING THE BOUNDARY LINE

As Noss explains, biodiversity conservation is virtually synonymous with the establishment of nature reserves.[59] Species cannot be protected against extinction unless adequate habitat is available, and that habitat must be large enough to support genetically diverse populations over the long term.[60] When sufficiently sizeable reserves are not practical, then available habitat should be connected, through migratory corridors or otherwise, with nearby habitat to permit enough genetic mixing to ensure species survival.[61] This means, according to conservation biologists, that a large system of interconnected nature reserves is required to protect biodiversity.[62] Biologically rich yet still relatively undeveloped, the western public lands offer an ideal setting for such a reserve system.[63] But because fragmentation already has severely reduced functional habitat, Noss argues that the remaining roadless public lands should be protected against development to ensure secure habitat and facilitate opportunities for genetic exchange.[64] He envisions an extensive network of undisturbed nature reserves surrounded by lands open to varying degrees of development determined by proximity to the core area.

57. *See* Robert L. Fischman, *Biological Diversity and Environmental Protection: Authorities to Reduce Risk*, 22 ENVTL. L. 435 (1992).

58. *See* Keiter, *Beyond the Boundary Line*, *supra* note 6, at 303-14.

59. Noss, *supra* note 2, at 900-03.

60. *Id.*

61. *Id.* at 901-03. *See also* LARRY D. HARRIS, THE FRAGMENTED FOREST: ISLAND BIOGEOGRAPHY THEORY AND THE PRESERVATION OF BIOTIC DIVERSITY (1984).

62. Noss, *supra* note 2, at 900-03; Michael E. Soulé & Daniel Simberloff, *What Do Genetics and Ecology Tell Us About the Design of Nature Reserves?*, 35 BIOLOGICAL CONSERVATION 19 (1986).

63. *See* Reed F. Noss, *The Wildlands Project: Land Conservation Strategy*, WILD EARTH, Special Issue 1992, at 10, 10-25; Hal Salwasser, *Managing Ecosystems for Viable Populations of Vertebrates: A Focus on Biodiversity*, *in* ECOSYSTEM MANAGEMENT FOR PARKS AND WILDERNESS 87 (James K. Agee & Darryll R. Johnson eds., 1988). *See generally* GRUMBINE, *supra* note 26.

64. Noss, *supra* note 2, at 903.

In the United States, the lands that come closest to meeting these prescriptions are the national parks, wilderness areas, and wildlife refuges. Indeed, within each of these public land classifications, large blocks of public land have been protected against development, and species preservation can be extracted as at least one of the primary statutory goals.[65] The current system of preserved lands, however, is neither large enough nor diverse enough to preserve a truly representative array of the nation's biological resources. Species extinction has occurred in even the largest national parks.[66] Several different ecosystem types are not represented within the national park system, while the wilderness system mainly consists of spectacular high alpine country, with lower elevation forest lands and desert resources still largely unprotected.[67] In addition, the legal mandates governing the preserved lands do not always guarantee that biodiversity conservation will take precedence over other interests. In many national parks, for example, visitor facilities are located in prime wildlife habitat,[68] and motorized recreational activities often jeopardize resident species within national wildlife refuges.[69]

A critical reform that would enhance biodiversity conservation on the preserved lands involves giving species preservation a clear priority over other responsibilities. Because the governing organic mandates already contemplate wildlife protection, the key to this reform lies with the managing agencies themselves. Exercising their discretionary authority, the agencies have the ability to reinterpret their own governing mandates to give species protection priority over visitor services and other concerns,[70] thus ensuring secure habitat for existing species. The National Park Service's mandate, which empha-

65. *See* National Park Service Organic Act, 16 U.S.C. § 1 (1988); Wilderness Act, 16 U.S.C. § 1131 (c) (1988); National Wildlife Refuge System Act, 16 U.S.C. § 668dd (1988).

66. *See* William D. Newmark, *Legal and Biotic Boundaries of Western North American National Parks: A Problem of Congruence*, 33 BIOLOGICAL CONSERVATION 197 (1985); Hal Salwasser et al., *The Role of Interagency Cooperation in Managing for Viable Populations, in* VIABLE POPULATIONS FOR CONSERVATION 160-62 (Michael E. Soulé ed., 1987) .

67. *See* Noss, *supra* note 63, at 11. *See also* Robert E. Jenkins, *Habitat Preservation by Private Organizations, in* WILDLIFE AND AMERICA 420 (Howard P. Brokaw ed., 1978).

68. *See* CHASE, *supra* note 28, at 197-231; National Wildlife Fed'n v. National Park Serv., 669 F. Supp. 384 (D. Wyo. 1987).

69. *See* U.S. GEN. ACCOUNTING OFFICE, NATIONAL WILDLIFE REFUGES: CONTINUING PROBLEMS WITH INCOMPATIBLE USES CALL FOR BOLD ACTION (Sept. 8, 1989); John Shiffman, *Graham Renews Efforts to Limit Recreation in Wildlife Refuges*, GANNETT NEWS SERVICE, June 9, 1993, available in LEXIS, News Library, Wires File.

70. *See* Chevron U.S.A., Inc. v. Natural Resources Defense Council, 467 U.S. 837 (1984). *See also* Motor Vehicle Mfr. Ass'n v. State Farm Mut. Auto. Ins. Co., 463 U.S. 29 (1983) (holding that agencies must supply a reasoned explanation when changing a rule).

sizes preserving park resources unimpaired for future generations,[71] certainly lends itself to an interpretation giving wildlife priority over visitor convenience in the event of conflict. In the case of the National Wildlife Refuges, the U.S. Fish and Wildlife Service likewise has the ostensible authority to give species protection priority over recreation and other incompatible land uses.[72] Relatedly, relying upon existing mandates, the Park Service and other federal land management agencies have the legal authority to implement ecosystem management policies, including biodiversity conservation initiatives.[73] If the agencies lack the political will or institutional capacity to reprioritize their management obligations to protect biological resources, then additional legislation clarifying these priorities may be necessary.

The process employed to create our system of preserved lands and nature reserves has not been designed with biodiversity conservation principles in mind. Congress has vested itself with the ultimate responsibility for designating park and wilderness lands,[74] which means the process is intensely political. Not surprisingly, therefore, Congress has repeatedly designated boundaries that reflect political compromises rather than biological needs—a fact that accounts for the straight lines that define the perimeters of many national parks. Moreover, as the wilderness designation process has matured, it has evolved into a state-by-state process. Although the Wilderness Act of 1964[75] and initial wilderness designation decisions were forged through national debate and consensus,[76] subsequent wilderness designation decisions have involved a highly localized negotiation process within each state. With state congressional delegations brokering negotiations over which roadless lands are suitable for wilderness designation, Congress essentially has been relegated to the role of confirming a series of locally negotiated state wilderness bills.[77] The problem with this approach is that it defies biological realities in def-

71. 16 U.S.C. § 1. *See* Keiter, *Beyond the Boundary Line*, *supra* note 6, at 304-05.

72. 16 U.S.C. § 668dd(d)(1). *See* Fink, *supra* note 28, at 24-30.

73. See *infra* notes 106-35 and accompanying text for a discussion of ecosystem management.

74. 16 U.S.C. § 1a-5 (national park additions); 16 U.S.C. § 1132(b) (wilderness additions).

75. 16 U.S.C. §§ 1131-36 (1988).

76. *See* Michael McCloskey, *The Wilderness Act of 1964: Its Background and Meaning*, 45 OR. L. REV. 288 (1966). *See generally* RODERICK NASH, WILDERNESS AND THE AMERICAN MIND (3d ed. 1982).

77. *See, e.g.*, Wyoming Wilderness Act of 1984, Pub. L. No. 98-550, 98 Stat. 2807 (1984); Utah Wilderness Act of 1984, Pub. L. No. 98-428, 98 Stat. 1657 (1984). It is widely acknowledged that state wilderness bills will not pass Congress unless both senators from the affected state support the proposal. *See Montana Wilderness Bill Clears House, Bill "Dead on Arrival" in Senate, Aides Say*, LAND LETTER, May 20, 1994, at 2, 2-3.

erence to state-defined political boundaries, and therefore runs the risk of further contributing to the fragmentation evident across the public domain.

Thus, another critical reform that would significantly promote biodiversity conservation involves convincing Congress to change its approach to public land preservation. More specifically, conservation biologists should urge Congress to reconsider its wilderness designation process as well as the criteria for selecting lands for protection. The key elements of reform include using ecological criteria to select appropriate lands for protection on a regional scale, and then requiring that they be managed for the explicit purpose of maintaining and enhancing biological diversity.[78] This approach to preservation would help to establish regional biodiversity reserve systems. The proposed Northern Rockies Ecosystem Protection Act adopts this approach for designating additional wilderness lands in the northern intermountain West.[79] Several legislative proposals addressing the Pacific Northwest's spotted owl-timber controversy adopt a similar approach.[80] Water basin management is already moving in this direction, as reflected in the Great Lakes, Chesapeake Bay, and Columbia River watershed-based initiatives, which are designed to maintain the ecological integrity of these water systems.[81] Although there is little political support for such a drastic revision in congressional policy, recent administrative ecosystem management initiatives could help convince Congress that such an approach is necessary and feasible.

Beyond the preserved lands, conservation biologists also view the multiple-use public lands as important components of any biodiversity conservation system.[82] Because the existing park, wilderness, and refuge areas are not large enough to ensure species populations against extinction, adjacent public lands must play a critical role in biological conservation efforts. In the Yellowstone region, for example, a viable grizzly bear population cannot survive solely within the confines of

78. *See* Noss, *supra* note 63, at 10-25.

79. H.R. 2638, 103d Cong., 1st Sess. (1993). *See* Mike Bader, *The Need for an Ecosystem Approach for Endangered Species Protection*, 13 PUB. LAND L. REV. 137 (1992); Mike Bader, *The Northern Rockies Ecosystem Protection Act: A Citizen Plan for Wilderness Management*, 17 W. WILDLANDS 22 (1991).

80. *See, e.g.*, H.R. 3432, 102d Cong., 1st Sess. (1991); H.R. 1590, 102d Cong., 1st Sess. (1991); H.R. 1156, 102d Cong., 1st Sess. (1991).

81. *See* Paul D. Barker, *The Chesapeake Bay Preservation Act: The Problem with State Land Regulation of Interstate Resources*, 31 WM. & MARY L. REV. 735 (1990); Anthony Earl, *Protecting the Great Lakes: The Case for a Regional Approach*, 24 U. TOL. L. REV. 271 (1993); WILKINSON, *supra* note 9, at 175-218.

82. *See, e.g.*, Noss, *supra* note 63, at 16; Salwasser, *supra* note 63, at 92-94.

the park and surrounding wilderness areas; bear habitat requirements extend to adjacent multiple-use forest lands and beyond.[83] But because adjacent forest lands are used for commodity production activities such as timber harvesting and mineral extraction, they are often unsuitable for bear habitat.[84] Moreover, the roads used to access logging and mining operations create habitat fragmentation and facilitate human access, which can lead to poaching and other problems.[85] Similar problems are evident in the Pacific Northwest, where extensive logging and roading has placed the spotted owl and several salmon populations in jeopardy, causing them to be placed upon the endangered species registry.[86] In short, the managerial regime currently prevailing on the multiple-use public lands does not ensure biodiversity conservation.

To enhance biodiversity levels on multiple-use public lands, the reform options include the creation of buffer zones, revision of the prevailing legal standards, and adoption of ecosystem management policies. A buffer zone system could be used to secure additional habitat on strategically located multiple-use lands adjacent to core park and wilderness lands. As suggested by Noss, buffer zones might be designated as part of a larger concentric zoning system, with development activity allowed to intensify the greater the distance from the core area.[87] Intensive development activities such as logging and mining would not be entirely excluded, but would be carefully sited in deference to species conservation requirements. However, buffer zone proposals involving public lands have not fared well in Congress. National park protection legislative proposals, based upon the notion that protective buffer zones should be established outside park boundaries to control potentially harmful activities, have consistently failed in the Senate.[88] Several state wilderness bills have included express

83. U.S. FISH AND WILDLIFE SERV., GRIZZLY BEAR RECOVERY PLAN 15-32 (1993); Brian L. Kuehl, *Conservation Obligations Under the Endangered Species Act: A Case Study of the Yellowstone Grizzly Bear*, 64 U. COLO. L. REV. 607 (1993).

84. *See* CONGRESSIONAL RESEARCH SERV., 99TH CONG., 2D SESS., GREATER YELLOWSTONE ECOSYSTEM: AN ANALYSIS OF DATA SUBMITTED BY FEDERAL AND STATE AGENCIES 77-79, 131-32 (Comm. Print Dec. 1986).

85. *Id.* at 77-78, 177-78; U.S. FISH AND WILDLIFE SERV., *supra* note 83, at 21-22.

86. 50 C.F.R. § 17.11 (1992).

87. Noss, *supra* note 2, at 906. This concentric zoning proposal, sanctioning different levels and intensity of development in designated zones emanating from a protected core area, closely resembles the United Nations' biosphere reserve program. *See* Vernon C. Gilbert, *Cooperation in Ecosystem Management*, *in* ECOSYSTEM MANAGEMENT FOR PARKS AND WILDERNESS 180-92 (James K. Agee & Darryll R. Johnson eds., 1988).

88. For a description of these legislative proposals, see Robert B. Keiter, *On Protecting the National Parks from the External Threats Dilemma*, 20 LAND & WATER L. REV. 355 (1985).

language prohibiting management of adjacent forest lands as buffers for wilderness lands.[89] Moreover, because land managers are quite reluctant to relinquish any of their managerial prerogatives, the agencies themselves have consistently resisted proposals that would give an adjacent manager any meaningful authority over potential buffer zone lands.[90] It is unlikely, therefore, that Congress could soon be persuaded to endorse the buffer zone concept.

It is also doubtful that Congress is ready to revise legal priorities on multiple-use public lands. Buoyed by tradition, habit, and folklore, the multiple-use management standard is firmly embedded in public land law, virtually becoming part of the mythology of the West.[91] Although Congress, through legislation like the National Forest Management Act[92] and the Endangered Species Act,[93] has imposed significant regulatory restraints on multiple-use land managers, it has shown no predisposition to revise or replace the basic multiple-use standard. Indeed, as we have seen, the major challenge facing conservation biologists is to convince Congress and the American public that biodiversity conservation is important enough to displace multiple-use as the guiding land management principle.[94]

Alternatively, conservation biologists and environmentalists have endorsed ecosystem management as an appropriate governing policy for managing the public lands. Although still defined only in general terms, the ecosystem management concept holds genuine promise as a means for integrating biodiversity conservation goals into public land management at a regional scale.[95] The existing law is sufficiently flexible to enable the land management agencies to experiment with

89. *See* Wyoming Wilderness Act of 1984, Pub. L. No. 98-550, § 504, 98 Stat. 2807, 2813 (1984); Utah Wilderness Act of 1984, Pub. L. No. 98-428, § 303, 98 Stat. 1657, 1661 (1984); Washington State Wilderness Act of 1984, Pub. L. No. 98-339, § 9, 98 Stat. 299, 305 (1984). *See also* Northwest Motorcycle Ass'n v. United States Dep't of Agric., 18 F.3d 1468 (9th Cir. 1994); Park County Resource Council v. United States Bureau of Land Management, 638 F. Supp. 842 (D. Wyo. 1986).

90. *See* Joseph L. Sax & Robert B. Keiter, *Glacier National Park and Its Neighbors: A Study in Federal Interagency Relations*, 14 ECOLOGY L.Q. 207 (1987). Nonetheless, at least in the case of wide ranging species protected under the Endangered Species Act, *de facto* buffer zone management areas have been established through the critical habitat designation process. *Id.* at 214-15. In addition, a concentric zoning system utilizing the buffer zone concept is certainly consistent with emerging ecosystem management principles. *See infra* note 106 and accompanying text.

91. *See generally* CONGRESSIONAL RESEARCH SERV., 102D CONG., 2D SESS., MULTIPLE USE AND SUSTAINED YIELD: CHANGING PHILOSOPHIES FOR FEDERAL LAND MANAGEMENT (Comm. Print Dec. 1992).

92. 16 U.S.C. §§ 1601-14 (1988).

93. 16 U.S.C. §§ 1531-44 (1988).

94. *See supra* notes 7-58 and accompanying text.

95. *See infra* notes 106-35 and accompanying text.

ecosystem management on the multiple-use public lands.[96] In fact, a myriad of administratively-conceived ecosystem management experiments are now underway.[97] But because the ecosystem management concept is so new and untested, Congress may not be prepared to enshrine it in federal legislation yet. Nonetheless, if properly conceived and implemented, the current administrative ecosystem management initiatives should provide useful models for future congressional deliberations.[98]

Beyond the public lands, private lands are also important components in any biodiversity conservation effort.[99] Early settlement in the West mostly occurred in low elevation areas along the rivers, which provide important riparian habitat and critical winter range for several wildlife species. Many of these lands remain in private hands; they generally are not subject to extensive governmental regulation. However, federal regulatory authority does extend to private lands under the Endangered Species Act's "no taking" provision,[100] which has fostered a habitat conservation planning process to accommodate private development with the needs of protected species.[101] In California, with the Endangered Species Act lurking in the background, the state has launched an ambitious and promising Natural Communities Conservation Plan that is designed to enlist private landowners in voluntary habitat protection efforts.[102] At the state and local levels, regulatory approaches that might be used to promote biodiversity conservation on private lands include mandated dedications and fees, flood plain zoning, open space preservation, wetland protection, and sensitive lands protection.[103] But because there continues to be signif-

96. *See* Keiter, *Beyond the Boundary Line*, *supra* note 6, at 303-14; Keiter, *Taking Account of the Ecosystem*, *supra* note 6, at 997-1001.

97. *See* CONGRESSIONAL RESEARCH SERV., ECOSYSTEM MANAGEMENT: FEDERAL AGENCY ACTIVITIES (1994). See also Keiter, *Beyond the Boundary Line*, *supra* note 6, at 316-17, for a description of some of these initiatives.

98. See *Keiter, Beyond the Boundary Line*, *supra* note 6, at 325-32 for a discussion of possible legislative approaches to ecosystem management.

99. *See generally* Evan van Hook, Note, *The Ecocommons: A Plan for Common Property Management of Ecosystems*, 11 YALE L. & POL'Y REV. 561 (1993).

100. 16 U.S.C. § 1538(a)(1)(B). Regarding general federal regulatory authority over private lands adjacent to public lands, see Minnesota v. Block, 660 F.2d 1240 (8th Cir. 1981); United States v. Lindsey, 595 F.2d 5 (9th Cir. 1979). *See also* Joseph L. Sax, *Helpless Giants: National Parks and the Regulation of Private Lands*, 75 MICH. L. REV. 239 (1976).

101. 16 U.S.C. § 1539(a). *See* MICHAEL J. BEAN ET AL., RECONCILING CONFLICTS UNDER THE ENDANGERED SPECIES ACT: THE HABITAT CONSERVATION PLANNING EXPERIENCE (1991). *See also* Tarlock, *supra* note 49, at 605-12.

102. *See* Michael A. Mantell, *Resource Management in California*, LAND USE F., Winter 1993, at 66; Douglas P. Wheeler, *Foreword: A Strategy for the Future*, 12 STAN. ENVTL. L.J. xi (1993) .

103. *See* Tarlock, *supra* note 49, at 574-83, 598-602.

icant political opposition to any expanded governmental presence on private lands for conservation purposes,[104] creative financial incentives may prove as effective as regulatory limitations in securing private landowner cooperation in biodiversity conservation efforts.[105] In any event, an effective biodiversity reserve system will require complementary federal, state, and private commitments.

III. ECOSYSTEM MANAGEMENT: CAN WE MOVE BEYOND "PROCESS?"

In the absence of a new statutory priority for biodiversity conservation or an expanded nature reserve system, biodiversity conservation can best be addressed using the concept of ecosystem management. As Noss explains, ecosystem management represents an appropriate and necessary strategy for pursuing biodiversity goals.[106] It focuses management attention on the relevant spatial and temporal scale in order to ensure that biological resources are given adequate consideration and protection. Since ecological systems generally disregard conventional boundaries, ecosystem management relies heavily upon interagency coordination to address shared resource problems and to ensure ecosystem integrity.[107] And because current knowledge about individual species, ecological processes, and human impacts is still rather limited, ecosystem management policies should be adaptable so managers can respond flexibly to new information. Moreover, because land managers cannot really manage ecosystems

104. In part, this opposition can be traced to two competing conceptions of property. Under the conventional view, property is seen as a commodity to be used or developed for productive purposes according to the owner's virtually unrestrained economic judgment. Under a newly emerging and quite different view, property is seen as part of a larger ecological entity, and property owners are obligated to exercise restraint to maintain functioning ecosystems. For further elaboration on this point, see Eric T. Freyfogle, *Ownership and Ecology*, 43 CASE W. RES. L. REV. 1269 (1993); James P. Karp, *A Private Property Duty of Stewardship: Changing Our Land Ethic*, 23 ENVTL. L. 735 (1993); Joseph L. Sax, *Property Rights and the Economy of Nature: Understanding* Lucas v. South Carolina Coastal Council, 45 STAN. L. REV. 1433 (1993).

105. Environmental and other private organizations, lacking the coercive power available to government, have relied upon the financial incentives associated with direct purchase arrangements as well as conservation easements to enlist private landowners in biodiversity conservation efforts. *See, e.g.*, JANET DIEHL & THOMAS S. BARRETT, THE CONSERVATION EASEMENT HANDBOOK: MANAGING LAND CONSERVATION AND HISTORIC PRESERVATION EASEMENT PROGRAMS (1988); Ellen E. Katz, *Conserving the Nation's Heritage Under the Uniform Conservation Easement Act*, 43 WASH. & LEE L. REV. 369 (1986).

106. Noss, *supra* note 2, at 904-07.

107. An important aspect of coordinated management, according to Noss, is the use of a concentric zoning system, with development intensity regulated depending upon distance from the core protected area. *See supra* note 87 and accompanying text.

themselves,[108] ecosystem management policy should be designed to moderate the effect that human activities have on natural systems and processes.[109]

Most of these features of ecosystem management are evident in the present administrative experiments that are occurring in the shadow of the law on the public domain. Even though the laws governing public lands and resources contain no explicit reference to ecosystem management, the principal federal land management agencies are embracing ecosystem management as their guiding philosophy for managing the public domain.[110] Other federal agencies have also endorsed the concept of ecosystem management,[111] as have several state natural resource management agencies.[112] Although agency officials, on-the-ground managers, and the general public may have only a vague idea of what ecosystem management means, that has not dampened the enthusiasm for this new vision of public land and resource management. Indeed, ecosystem management has become the natural resource management policy of choice.

Although ecosystem management is not easily defined in a few catchy words or phrases, there is nonetheless widespread agreement about what the concept means.[113] First, a key feature of ecosystem management is its focus on protecting and restoring native species as well as natural processes in order to sustain the integrity of ecological systems. This represents a profound shift in focus away from the production of individual resources toward the maintenance of ecosys-

108. Indeed, Noss observes that "the idea that we can manage ecosystems is arrogant and misleading." Noss, *supra* note 2, at 904. *See also* A. Dan Tarlock, *The Nonequilibrium Paradigm in Ecolgy and the Partial Unraveling of Environmental Law*, 27 LOY. L.A. L. REV. 1121 (1994).

109. According to Noss, an effective approach to moderating the effect of human activities on the environment is to design development and extractive activities in a manner that mimics natural processes and disturbance patterns whenever possible. For example, rather than indiscriminately using clearcutting to harvest timber to maximize production, the Forest Service should design timber sales carefully to mimic the impact of natural fire. Noss, *supra* note 2, at 906. *See also* Memorandum from Dale Robertson, *supra* note 56, which uses a similar example to illustrate how ecosystem management may change current practices.

110. *See supra* note 56 and accompanying text.

111. *See supra* note 57 and accompanying text.

112. *See supra* note 102 and accompanying text.

113. For discussions about the meaning of ecosystem management, including comprehensive analyses of proposed ecosystem management definitions, see TIM W. CLARK & STEVEN C. MINTA, GREATER YELLOWSTONE'S FUTURE: PROSPECTS FOR ECOSYSTEM SCIENCE, MANAGEMENT, AND POLICY 56-63 (1993); R. Edward Grumbine, *What is Ecosystem Management?*, 8 CONSERVATION BIOLOGY 27 (1994); Margaret A. Moote et al., *Principles of Ecosystem Management* (research summary and analysis, Water Resources Research Center, University of Arizona College of Agriculture), Jan. 1994. *See also* Keiter, *Beyond the Boundary Line*, *supra* note 6, at 300-03; MAJORITY STAFF REPORT OF THE COMM. ON NATURAL RESOURCES, 103D CONG., 2D SESS., ECOSYSTEM MANAGEMENT: SUSTAINING THE NATION'S NATURAL RESOURCES TRUST, 2-3 (Comm. Print 1994) [hereinafter ECOSYSTEM MANAGEMENT REPORT].

tems, including biodiversity levels. Second, to manage at the ecosystem level, land managers must evaluate options at a spatial and temporal scale that corresponds to ecological processes, and adopt a multidisciplinary approach to resource management decisionmaking. Third, because ecosystem management draws heavily upon scientific principles, research and monitoring are important components of ecosystem management policy.[114] Fourth, since humans are not—and cannot be—divorced from the natural environment, social values also must be taken into account in shaping ecosystem management policy.[115] Fifth, because ecosystems invariably transcend jurisdictional boundaries, effective ecosystem management requires interagency coordination and cooperation.[116] And finally, because ecosystem science is still evolving, management policies must be sufficiently flexible and adaptable to accommodate new information as well as shifts in social values.[117]

The law, as I have argued elsewhere, can be interpreted to support the concept of ecosystem management, even though federal stat-

114. Noting the importance of scientific research in evaluating ecosystem management policies, Noss argues that wilderness and other large natural areas must be preserved to provide managers with important baseline data against which their species management efforts can be measured. In other words, wilderness preservation is an important dimension of ecosystem management, both because it ensures viable habitat and because it provides a valuable scientific measuring standard. *See* Noss, *supra* note 2, at 907. *See also* GRUMBINE, *supra* note 26, at 53-56.

115. An intriguing, difficult and yet unresolved question concerning the role of social values is whose values should be determinative in setting ecosystem management policy. More specifically, should local values—often based upon the immediate needs of small, resource dependent western communities—take precedence over national values—often shaped in an urban setting and quite sensitive to environmental concerns? With the federal land management agencies increasingly relying upon inclusive and collaborative decisionmaking processes, the question of which values prevail in the event of conflict may well prove determinative in some of the most intractable resource controversies. For a discussion of this issue, see Hanna J. Cortner & Margaret A. Moote, *Trends and Issues in Land and Water Resources Management: Setting the Agenda for Change*, 18 ENVTL. MGMT. 167 (1994) [hereinafter Cortner & Moote, *Trends and Issues*]; Keiter, *Beyond the Boundary Line*, *supra* note 6, at 321-23; Robert G. Lee, *Ecologically Effective Social Organization as a Requirement for Sustaining Watershed Ecosystems*, *in* WATERSHED MANAGEMENT: BALANCING SUSTAINABILITY AND ENVIRONMENTAL CHANGE 73 (Robert J. Naiman ed., 1992); Hanna J. Cortner & Margaret A. Moote, Intergovernmental Coordination in Ecosystem Management (1994) (unpublished paper presented at the Congressional Research Service Symposium on the Federal Role in Ecosystem Management, Washington, D.C., March 24-25, 1994, on file with the author).

116. On the subject of interagency coordination and cooperation, see CLARK & MINTA, *supra* note 113, at 37-81; Cortner & Moote, *Trends and Issues*, *supra* note 115, at 169-72; Robert B. Keiter, *Greater Yellowstone: Managing a Charismatic Ecosystem*, *in* 3 CONFLICTS IN NATURAL RESOURCES MANAGEMENT: INTEGRATING SOCIAL AND ECOLOGICAL CONCERNS (College of Natural Resources, Utah State Univ. ed., forthcoming 1994); Sax & Keiter, *supra* note 90. *See also infra* notes 129-30 and accompanying text.

117. On the subject of adaptive management, see KAI N. LEE, COMPASS AND GYROSCOPE: INTEGRATING SCIENCE AND POLITICS FOR THE ENVIRONMENT (1993); CARL WALTERS, ADAPTIVE MANAGEMENT OF RENEWABLE RESOURCES (1986). *See also* Tarlock, *supra* note 108, at 1134-44.

utes contain no explicit reference to the term.[118] Land preservation statutes, like the National Park Service Organic Act[119] and the Wilderness Act,[120] provide significant protection for wildlife on large blocks of public land, while also precluding most development activities. For species teetering on the brink of extinction, the Endangered Species Act[121] establishes a clear protective policy based primarily upon scientific criteria, and it imposes significant restraints on public and private land development activities. The National Forest Management Act[122] expressly injects biological diversity considerations into the forest planning process,[123] and otherwise obligates the Forest Service to manage national forests as ecological entities.[124] The Bureau of Land Management's multiple-use mandate, as set forth in the Federal Land Policy and Management Act,[125] reflects some sensitivity to ecological considerations, even if the agency traditionally has put mining, grazing, and other development activities first on its agenda. The National Environmental Policy Act[126] can and should be interpreted to require ecosystem-based analysis of federal proposals, thus ensuring that projects are assessed in terms of their full ecological impacts.[127] Collectively, the potential impact of these laws is already evident in the Pacific Northwest where they have provided the basis for judicial intervention to preserve ancient forest ecosystems,[128] and where they are shaping the ecosystem management proposals being advanced to resolve the crisis.

Most of these statutes also endorse the concept of interagency and intergovernmental coordination,[129] a key feature of ecosystem management. Indeed, a consistent theme emerging from recent ecosystem management initiatives is a commitment to interagency coordination, though recent Federal Advisory Committee Act litigation

118. *See* Keiter, *Beyond the Boundary Line*, *supra* note 6, at 303-14.

119. 16 U.S.C. §§ 1-18f (1988).

120. 16 U.S.C. §§ 1131-36 (1988).

121. 16 U.S.C. §§ 1531-44 (1988). *See supra* notes 17-26 and accompanying text.

122. 16 U.S.C. §§ 1600-14 (1988). *See generally* Wilkinson & Anderson, *supra* note 14.

123. 16 U.S.C. § 1604(g)(3)(B). *See supra* notes 14-16 and accompanying text.

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

125. 43 U.S.C. §§ 1701-84 (1988).

126. 42 U.S.C. §§ 4321-61 (1988).

127. *See* Robert B. Keiter, *NEPA and the Emerging Concept of Ecosystem Management on the Public Lands*, 25 LAND & WATER L. REV. 43 (1990). *See also* Keiter, *Beyond the Boundary Line*, *supra* note 6, at 312-14.

128. *See* E. Charles Meslow, *Spotted Owl Protection: Unintentional Evolution Toward Ecosystem Management*, 10 ENDANGERED SPECIES UPDATE 34 (1993).

129. *See, e.g.*, 16 U.S.C.A. § 1604(a); 43 U.S.C.A. § 1712(c)(9).

may impede this development.[130] Well aware that ecosystems transcend jurisdictional boundaries, land managers appear concerned that everyone responsible for the ecosystem be involved in the decisionmaking process. However, this commitment to interagency coordination has not been matched with an equal commitment to giving ecosystem management real substantive content, which would involve enshrining biodiversity conservation as a guiding managerial principle. In other words, ecosystem management is being treated largely as a process, rather than a commitment to a new set of priorities and goals.

Perhaps this should not be surprising, given the newness of the ecosystem management concept and continued uncertainty over its ramifications. Public land managers who have not historically worried about matters beyond their boundaries are just beginning to confront the reality of sharing the table (if not decisionmaking power) with their neighbors. The current emphasis on interagency coordination, therefore, perhaps might best be viewed as a transitional phase that is facilitating movement toward ecosystem management while contending factions struggle to define its priorities. In fact, the Clinton administration has refrained from defining ecosystem management with much precision—a conscious decision designed to allow local experimentation to evolve on its own terms, with the expectation that useful and transferrable models will eventually materialize.[131]

In the meantime, the immediate challenge for conservation biologists is to keep the ecosystem management concept, which is so powerfully linked with biodiversity conservation, from being diluted into a mere procedural device.[132] While interagency coordination is a necessary component of ecosystem management, coordination efforts will prove meaningless unless they are directed toward achieving

130. Under the Federal Advisory Committee Act, 5 U.S.C. app. § 2 (1988), any committee with non-federal employees that is created to provide advice to a federal agency must adhere to rigorous procedural requirements, including notification of meetings in the Federal Register and open access to all proceedings. *Id.* at § 10. See *Northwest Forest Resource Council v. Espy*, 846 F. Supp. 1009 (D.D.C. 1994), concluding that the Federal Ecosystem Management Assessment Team convened to address timber harvesting on federal spotted owl forest lands was subject to Federal Advisory Committee Act requirements. *See also* Alabama-Tombigbee Rivers Coalition v. Dep't of Interior, 26 F.3d 1103 (11th Cir. 1994).

131. Will Stelle, Associate Director for Natural Resources, White House Office on Environmental Policy, Statement at the Congressional Research Service Symposium on the Federal Role in Ecosystem Management, in Washington, D.C., (Mar. 24, 1994).

132. There is some evidence that this already is occurring. The Bureau of Land Management, in its proposed grazing reform regulations, defines ecosystem management as "a *process* that considers the total environment." (emphasis added). *See* 58 Fed. Reg. 43,208 (Aug. 13, 1993). See also William E. Shands et al., *From New Perspectives to Ecosystem Management*, 11 GEO. WRIGHT F. 35, 46 (1994), arguing that ". . . Ecosystem Management in its broadest interpretation—is philosophy, attitude, and above all, *process*" (emphasis in original).

clearly defined and shared resource management goals.[133] The problem is perhaps best illustrated when divergent legal mandates come into conflict. How should the Forest Service, for example, decide whether to proceed with a contemplated timber sale on the periphery of a national park in prime elk habitat? Does or should the preservation mandate of the Park Service prevail over the Forest Service's multiple-use mandate in this shared ecosystem? To resolve the issue (and to resolve it consistently), ecosystem management must offer more than just a process; it must establish workable substantive principles and clear priorities for addressing such cases. Indeed, failure to give ecosystem management substantive content related to biodiversity conservation will leave federal land management agencies vulnerable to legal challenges similar to those mounted to preserve the Pacific Northwest's ancient forest ecosystems. If that happens, the federal courts rather than the land management agencies will assume primary responsibility for giving substantive content to ecosystem management.

Over the long term, the real challenge for conservation biologists is to institutionalize ecosystem management within the federal land and resource management agencies. This might be accomplished administratively through the promulgation of regulations giving meaningful definition to the ecosystem management concept. In fact, the Bureau of Land Management's proposed grazing regulations explicitly rely upon ecosystem management to address damaged range conditions.[134] But given the lack of any clear commitment to biodiversity conservation in the proposal, as well as the generally ambiguous ecological standards reflected throughout it, it is not clear that the land management agencies are prepared to endorse biodiversity conservation as a paramount objective of ecosystem management. If that is true, then the necessary next step will be to translate administrative

133. *See* James K. Agee & Darryll R. Johnson, *A Direction for Ecosystem Management, in* ECOSYSTEM MANAGEMENT FOR PARKS AND WILDERNESS 226 (James K. Agee & Darryll Johnson eds., 1988). *See also* Keiter, *Taking Account of the Ecosystem*, *supra* note 6, at 992-97.

134. See 58 Fed. Reg. 43,208 (Aug. 13, 1993), which defines ecosystem management in the following terms:

> Ecosystem management is a process that considers the total environment. It requires the skillful use of ecological, economic, social, and managerial principles in managing ecosystems to produce, restore, or sustain ecosystem integrity and desired conditions, uses, products, values, and services over the long term. Management of individual components of ecological systems for immediate needs is tempered or expanded to responsible management centered on long-term goals and objectives targeted to the entire ecological system. Ecosystem management recognizes that people and their social and economic needs are an integral part of ecological systems.

Id. at 43,208-09.

ecosystem management experiences into a coherent legislative proposal, with the goal of passing a statute that will enshrine biodiversity conservation as a legal requirement on the public domain.[135]

CONCLUSION

Biodiversity conservation appears to have secured a foothold in the contemporary rhetoric of public land and natural resource management. Fostered by the nation's legal commitment to endangered species preservation, federal policy increasingly reflects a concern with protecting biological resources. Under the critical scrutiny of conservation biologists, the land management agencies are beginning to grapple with the ramifications of what biodiversity conservation may mean on-the-ground. At the same time, the legal system is edging, slowly yet perceptibly, toward endorsing biological diversity as a key consideration in managing the public domain. The current movement toward ecosystem management reflects these developments and should lay the groundwork for additional biodiversity preservation efforts. The transformation will be complete when biodiversity conservation achieves a position of primacy in the law, and when a functional system of biodiversity reserves finally gains legal recognition.

135. Indeed, a congressional committee staff report has recommended that "Congress should explore alternative ways to supplement federal land management agency authorities with an enforceable requirement to promote the long-term ecological integrity of the public lands and the ecosystems upon which they depend." ECOSYSTEM MANAGEMENT REPORT, *supra* note 113, at 24. For a preliminary analysis of the shape that ecosystem management legislation might take, see Keiter, *Beyond the Boundary Line*, *supra* note 6, at 325-32. *See also supra* notes 7-58 and accompanying text discussing elevating biodiversity conservation to a position of primacy in public land management.