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NEPA AND THE EMERGING CONCEPT OF ECOSYSTEM MANAGEMENT ON THE PUBLIC LANDS

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I. INTRODUCTION

Public land management is undergoing a remarkable transformation. For most of the past century, federal land managers have treated natural resources as discrete entities, focusing on their economic value and paying little attention to underlying natural systems or processes.¹ Jurisdictional boundary lines have defined agency authority, and land managers rarely have involved themselves in matters beyond their borders.² This era is now closing. Modern science has revealed that dynamic, complex ecological processes are a vital and important part of the natural environment, and that neither biological processes nor environmental phenomena respect conventional boundary lines.³ Indeed, virtually all of the natural resources found on the public domain are part of ecosystems that extend beyond established legal boundaries.

Throughout the western United States, the principal federal land management agencies—the Forest Service and the Bureau of Land Management (BLM)—are now preparing and implementing comprehensive, interdisciplinary land and resource management plans.⁴ These

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1. See P. LIMERICK, *THE LEGACY OF CONQUEST: THE UNBROKEN PAST OF THE AMERICAN WEST* 134-50 (1987); S. DANA & S. FAIRFAX, *FOREST AND RANGE POLICY* 108-11, 207-09 (2d ed. 1980); S. HAYS, *BEAUTY, HEALTH AND PERMANENCE: ENVIRONMENTAL POLITICS IN THE UNITED STATES, 1955-1985*, at 34-35 (1987).

2. See S. HAYS, *supra* note 1, at 427-58; P. LIMERICK, *supra* note 1, at 134-50.

3. See, e.g., O. Frankel, *The Place of Management in Conservation*, in *GENETICS AND CONSERVATION: A REFERENCE FOR MANAGING WILD ANIMAL AND PLANT POPULATIONS* 2 (C. Schonewald-Cox, S. Chambers, B. MacBryde & L. Thomas eds. 1983); see generally, L. HARRIS, *THE FRAGMENTED FOREST: ISLAND BIOGEOGRAPHY THEORY AND THE PRESERVATION OF BIOTIC DIVERSITY* (1984).

4. See National Forest Management Act of 1976, 16 U.S.C. §§ 1601-1614 (1988); Federal Land Policy & Management Act of 1976, 43 U.S.C. §§ 1701-1783 (1982 & Supp.

land management plans, developed in accordance with the National Environmental Policy Act (NEPA),⁵ are establishing future priorities among resources and activities on the public domain. Preservationist and development interests have been at odds throughout the planning process, particularly in those areas where the prospect of development threatens existing wildland resources.⁶ In regions like the Greater Yellowstone area in northwestern Wyoming and the Cascades of the Pacific Northwest, environmental groups—sometimes joined by the National Park Service and other preservation-oriented agencies—have advocated ecosystem-based management to insure the integrity of existing natural systems.⁷ Responding to this challenge, federal land management officials are beginning to take initial, cautious steps to design meaningful transboundary management programs that protect shared ecosystems and insure native biological diversity.⁸

As we enter this era of ecosystem-based management, one critical question is whether NEPA, the principal law governing federal decisionmaking processes on the public domain, adequately addresses transboundary resource management problems. Does NEPA enable land managers to breach conventional boundaries when assessing environmental impacts to insure the integrity of underlying ecosystems? In answering this question, the recent Supreme Court decision in *Robertson v. Methow Valley Citizens Council*⁹ gives one pause. While holding that NEPA imposes no substantive mitigation requirements on federal agencies reviewing the environmental impact of development proposals, the Court also observed that the Forest Service had no authority either to implement mitigation measures on adjacent property or to compel another governmental entity to adopt such measures.¹⁰ The lesson is simple if troubling: NEPA neither imposes a legal obligation on federal land managers to protect shared ecosystem resources, nor does it vest them with extra-jurisdictional authority.

1987). See generally Wilkinson & Anderson, *Land and Resource Planning in the National Forests*, 64 ORE. L. REV. 1 (1985); *Symposium: The Federal Land Policy and Management Act*, 21 ARIZ. L. REV. 267 (1979).

5. 42 U.S.C. §§ 4321-70 (1982 & Supp. 1987); see 16 U.S.C. § 1604(g)(1) (1988) (requiring preparation of Forest Service land management plans in accordance with NEPA); 43 U.S.C. § 1712 (1982) (requiring public involvement in the preparation of BLM land use plans).

6. See Keiter, *Taking Account of the Ecosystem on the Public Domain: Law and Ecology in the Greater Yellowstone Region*, 60 U. COLO. L. REV. 923 (1989); Sax & Keiter, *Glacier National Park and Its Neighbors: A Study of Federal Interagency Relations*, 14 ECOLOGY L.Q. 207 (1987); G. REYNOLDS, PROMISE OR THREAT? A STUDY OF "GREATER YELLOWSTONE ECOSYSTEM" MANAGEMENT (1987).

7. J. AGEE & D. JOHNSON, ECOSYSTEM MANAGEMENT FOR PARKS AND WILDERNESS (1988); K. ERVIN, FRAGILE MAJESTY: THE BATTLE FOR NORTH AMERICA'S LAST GREAT FOREST (1989); Keiter, *supra* note 6, at 924; Clark & Zaunbrecher, *The Greater Yellowstone Ecosystem: The Ecosystem Concept in Natural Resource Policy and Management*, RENEWABLE RESOURCES J., at 8-16, Summer 1987.

8. See ECOSYSTEM MANAGEMENT FOR PARKS AND WILDERNESS, *supra* note 7 at 180-92; Keiter, *supra* note 6, at 984-88; 14 PUB. LANDS NEWS, no. 21, Oct. 26, 1989, at 1-2 (noting a new Forest Service policy designed to reduce clearcutting and fragmentation in old growth forests).

9. 109 S. Ct. 1835 (1989).

10. *Id.* at 1847.

Yet NEPA has proven to be a powerful law on the public domain. NEPA injunctions have halted many an ill-advised development project,¹¹ and the threat of NEPA litigation has frequently sent agency planners back to the drawing board to reexamine their environmental analyses. As we shall see, NEPA—as a procedural matter—compels land managers to view their actions from an ecological perspective, even if it does not require them to adopt the most ecologically sensitive course of action. Moreover, the NEPA process is being utilized to implement important substantive laws, such as the Endangered Species Act¹² and the National Forest Management Act,¹³ which have profound ecological overtones. This essay will assess NEPA's role as an instrument of ecosystem-based planning and management on the public domain, suggesting how it is facilitating the transition to this new regime while also noting its apparent shortcomings.

II. THE CONCEPT OF ECOSYSTEM MANAGEMENT

The evolving concept of ecosystem-based management is still in its formative stages and remains rather ill-defined. As a general principle, ecosystem management views public lands and resources from a regional or resource system perspective; it regards natural phenomena, such as watersheds, airsheds and wildlife habitats, as the appropriate focus for management decisionmaking. Thus, although the public domain is under the jurisdictional authority of separate land management agencies with quite different legal missions, the resource manager's primary responsibility is to maintain the integrity of existing interdependent natural systems, both to insure sustainable resource development opportunities and to preserve unique, irreplaceable, and valuable resources. In short, management priorities—set in accordance with ecological principles—should transcend jurisdictional boundaries and reflect an overarching commitment to an integrated public domain.¹⁴

Several important characteristics of ecosystem management are now evident. First, ecosystem-based management is being built upon the notion of interagency cooperation, which necessarily involves transboundary consultation, coordination, and even consistency in defining and implementing management policies involving shared resources. Second, effective ecosystem management requires that land managers identify and analyze the full impact, both cumulatively and geographically, of management proposals on existing resource systems to minimize the disruption or fragmentation of ecosystem processes. Third,

11. See, e.g., *Foundation for N. Am. Wild Sheep v. United States*, 681 F.2d 1172 (9th Cir. 1982); *Thomas v. Peterson*, 753 F.2d 754 (9th Cir. 1985); *Sierra Club v. Peterson*, 717 F.2d 1409 (D.C. Cir. 1983); *Wyoming Outdoor Coordinating Council v. Butz*, 484 F.2d 1244 (10th Cir. 1973).

12. 16 U.S.C. §§ 1531-1543 (1988).

13. *Id.* §§ 1601-1614.

14. See ECOSYSTEM MANAGEMENT FOR PARKS AND WILDERNESS, *supra* note 7; NATIONAL PARKS AND CONSERVATION ASS'N, NATIONAL PARKS: FROM VIGNETTES TO A GLOBAL VIEW (1989) (a report from the Commission on Research and Resource Management Policy in the National Park System); Keiter, *supra* note 6; Clark & Zaunbrecher, *supra* note 7; see also THE ECOSYSTEM CONCEPT IN NATURAL RESOURCES MANAGEMENT (G. Van Dyne, ed., 1969); Caldwell, *The Ecosystem as a Criterion for Public Land Policy*, 10 NAT. RESOURCES J. 203 (1970).

ecosystem management is linked closely to modern conservation biology theories, and therefore encompasses a commitment to preserving biological diversity within the regional fauna and flora. Finally, in regions where public lands have been set aside as national parks and wilderness areas, the ecosystem management concept takes account of aesthetic concerns and amenity values; it reflects a commitment to retain and preserve the natural integrity and appearance of the area.

III. NEPA AND ECOSYSTEM MANAGEMENT

Although NEPA has acquired a considerable judicial gloss over the past 20 years, the essence of NEPA law can be stated quite simply. The heart of NEPA is the requirement that federal agencies prepare an environmental impact statement (EIS) whenever they contemplate any action significantly affecting the quality of the human environment.¹⁵ The Supreme Court consistently has construed this environmental analysis requirement as a procedural, not substantive, obligation.¹⁶ According to the Court, the statute establishes "important 'action forcing' procedures" designed to provide agency decisionmakers with detailed information on environmental impacts and to afford the public an opportunity to participate in the process.¹⁷ While federal agencies are obligated to take a "hard look" at environmental consequences, they are not required to reach any particular result.¹⁸ The Court underscored this point in *Methow Valley*: Under NEPA the Forest Service could approve the challenged ski resort proposal even if it would decimate the entire resident mule deer herd.¹⁹ Moreover, the Court discerned no substantive obligation in NEPA requiring the Forest Service to implement any mitigation measures on behalf of the deer; agency officials were only required to identify and review their mitigation options in the EIS.²⁰

The courts, however, have concluded that NEPA and the implementing Council on Environmental Quality (CEQ) regulations impose rigorous procedural requirements on federal agencies,²¹ and they have

15. 42 U.S.C. § 4332(2)(C) (1982). See generally W. RODGERS, ENVIRONMENTAL LAW (2d ed. 1986).

16. See, e.g., *Vermont Yankee Nuclear Power Corp. v. Natural Resources Defense Council*, 435 U.S. 519, 558 (1978); *Strycker's Bay Neighborhood Council, Inc. v. Karlen*, 444 U.S. 223, 227 (1980) (*per curiam*).

17. *Methow Valley*, 109 S. Ct. at 1844-45.

18. *Id.* at 1846. See *Kleppe v. Sierra Club*, 427 U.S. 390, 410 (1976); see also *Strycker's Bay Neighborhood Council, Inc.*, 444 U.S. at 228 n.2 (providing for judicial review of federal agency NEPA decisions on arbitrary or capricious grounds).

19. *Methow Valley*, 109 S. Ct. at 1846.

20. *Id.* at 1847.

21. 40 C.F.R. §§ 1501-1517 (1988). Under NEPA, the CEQ is responsible for administering the statute. 42 U.S.C. § 4344 (1982). Pursuant to a 1977 Executive Order, the CEQ has promulgated detailed regulations defining statutory terms and explaining environmental analysis procedures. Exec. Order No. 11,991, 42 Fed. Reg. 26,967 (1977). The federal courts have treated the CEQ regulations as binding legal obligations when reviewing NEPA challenges to federal agency decisions. See generally Murchison, *Does NEPA Matter?—An Analysis of the Historical Development and Contemporary Significance of the National Environmental Policy Act*, 18 U. RICH. L. REV. 557, 589-92 (1984).

utilized the equitable injunction as a potent remedial device to insure compliance. The Ninth Circuit Court of Appeals, for example, has consistently ruled that NEPA requires federal land management agencies to review thoroughly the full scope and impact of intensive development proposals, such as oil and gas leasing or timber harvesting, before approving the project.²² The *Methow Valley* decision reaffirms the principle that strict procedural compliance with NEPA is necessary to accomplish the statutory goals of informed decisionmaking and meaningful public participation.²³ Because the CEQ regulations establish detailed procedural requirements governing preparation of an EIS,²⁴ it is appropriate to examine how the regulations may promote ecosystem management principles on the public domain. At the same time, it is appropriate to note how other laws interface with NEPA, effectively giving some substantive content to its procedural mandates.

A. Interagency Coordination

In the jurisdictionally fragmented environment of the western public lands, ecosystem management is based upon interagency consultation and coordination. NEPA facilitates interagency relationships among land managers, even among those that operate under fundamentally different legal mandates. First, NEPA mandates consultation in the beginning stages of the environmental review process: "Prior to making any detailed statement, the responsible Federal official shall consult with and obtain the comments of any Federal agency which has jurisdiction by law or special expertise with respect to any environmental impact involved."²⁵ Second, NEPA provides that federal agencies must identify and evaluate the potential impact of projects at the earliest stages in the environmental review process, and that "affected" agencies must be notified of the proposed action and afforded an opportunity to comment on the proposal.²⁶ Third, NEPA requires that the EIS include a discussion of "possible conflicts between the proposed action and the objectives of Federal, regional, State, and local . . . land

22. See, e.g., *Connor v. Burford*, 848 F.2d 1441 (9th Cir. 1988), cert. denied sub nom. *Sun Exploration & Prod. Co. v. Lujan*, 109 S. Ct. 1121 (1989); *Bob Marshall Alliance v. Hodel*, 852 F.2d 1223 (9th Cir. 1988), cert. denied sub nom. *Kohlman v. Alliance*, 109 S. Ct. 1340 (1989); *Thomas v. Peterson*, 753 F.2d 754 (9th Cir. 1985); *Save the Yaak Comm. v. Block*, 840 F.2d 714 (9th Cir. 1988); see also *Sierra Club v. Peterson*, 717 F.2d 1409 (D.C. Cir. 1983).

23. *Methow Valley*, 109 S. Ct. at 1845.

24. 40 C.F.R. §§ 1502.1-25 (1988).

25. 42 U.S.C. § 4332(2)(C) (1982). The CEQ regulations provide that sister federal agencies with jurisdiction over resources or land affected by the proposal should cooperate with the "lead agency" in preparing the EIS, while other agencies possessing special expertise may be included as "cooperating" agencies in the NEPA review process. 40 C.F.R. § 1501.6. Any agency interested in a proposed project or concerned about its potential impact may request "cooperating" agency status. *Id.* See also 40 C.F.R. § 1503.1 (1988) (obligating agencies preparing draft EISs to obtain comments from other federal agencies with jurisdiction or special expertise); *id.* § 1508.16 (defining the term "lead agency"); *id.* § 1508.26 (defining the term "special expertise").

26. 40 C.F.R. § 1501.7 (1988) (defining the "scoping" process).

use plans, policies and controls for the area concerned.”²⁷ Finally, NEPA authorizes the Council on Environmental Quality to mediate inter-agency disagreements through a referral process that can be initiated by either agency.²⁸ In sum, the NEPA environmental review requirements establish an elaborate procedure for interagency consultation, which should also promote interagency cooperation.

NEPA does not, however, explicitly mandate interagency coordination or consistency. Under NEPA, the agency responsible for preparing an environmental analysis of the proposal is not obligated to heed the comments or concerns of another agency. Indeed, agency decision-makers can (and often do) reject another agency’s critical comments,²⁹ and even ignore its opposition to the project being reviewed.³⁰ Thus, while NEPA insures “process” coordination among neighboring federal land management agencies, it does not insure meaningful substantive coordination sensitive to transboundary ecological realities.

Nonetheless, the courts have proven particularly sensitive to inter-agency disagreements or disputes when reviewing NEPA claims. In several cases, courts have relied upon information or comments submitted by other agencies to question the adequacy of environmental documentation supporting a challenged development proposal. In *Foundation for North American Wild Sheep v. United States*, for example, the court, ruling that the Forest Service’s road reconstruction decision required preparation of an EIS rather than simply an environmental assessment, relied upon critical comments from the California Department of Fish and Game to conclude that significant environmental impacts could be expected.³¹ Similarly, in *Thomas v. Peterson*, after noting adverse comments from the U.S. Fish & Wildlife Service and other agencies, the court held that the Forest Service must prepare a com-

27. *Id.* § 1502.16(c).

28. *Id.* § 1504. Not surprisingly, federal land management agencies—jealously protective of their own decisionmaking prerogatives and thus respectful of another agency’s same prerogatives—have not regularly utilized this referral procedure, which would place authority for making recommendations in someone else’s hands where political and other extraneous concerns may dictate the outcome. See Sax & Keiter, *supra* note 6, at 217-22.

29. Under the CEQ regulations, however, the agency preparing the EIS is obligated to respond to comments in the final document. 40 C.F.R. § 1503.4 (1988); *State of California v. Block*, 690 F.2d 753, 772-73 (9th Cir. 1982) (citing 40 C.F.R. § 1506.10(a) (1977)). Of course, agencies are not free to ignore the comments or recommendations of an agency with jurisdiction over an aspect of the proposal. See, e.g., *Thomas*, 753 F.2d at 758.

30. The federal land management agencies—operating in a political environment and sensitive to managerial prerogatives—are ordinarily reluctant to express outright opposition to proposals that are within the organic mandate of a sister agency. See Sax & Keiter, *supra* note 6 at 217-22; Lockhart, *External Park Threats and Interior’s Limits: The Need for an Independent Park Service*, in *OUR COMMON LANDS: DEFENDING THE NATIONAL PARKS* 18-21 (D. Simon, ed. 1988).

31. *Foundation for N. Am. Wild Sheep*, 681 F.2d at 1178-79 n.31 (the California Department of Fish and Game, commenting upon a Forest Service draft environmental assessment, submitted information suggesting that the proposed road would deter native bighorn sheep from using an important “lick”).

prehensive EIS analyzing the cumulative impact of a proposed road and accompanying timber sales before authorizing the road construction.³² By giving legal significance under NEPA to the concerns of other land or resource management agencies, these decisions acknowledge the importance of interagency consultation and coordination in public land management, and thus implicitly endorse the notion of ecosystem management.

Moreover, the NEPA environmental review process must take account of other laws governing public lands and resources. In contrast to NEPA, these laws often inject substantive legal standards into land management calculations, insuring that federal interagency relations on the public domain are not simply a matter of process. The Endangered Species Act,³³ for example, precludes any federal project that would jeopardize a protected species, regardless of the degree of environmental analysis the project has received.³⁴ Similarly, the National Forest Management Act (NFMA)³⁵ prohibits timber harvesting on steep slopes,³⁶ protects sensitive riparian areas,³⁷ and limits clearcutting as a harvest method.³⁸ In addition, the NFMA and the Federal Land Policy Management Act (FLPMA)³⁹ obligate the Forest Service and the Bureau of Land Management to "coordinate" their land and resource management plans with the planning objectives of other federal agencies.⁴⁰

32. 753 F.2d 754, 759-60 (9th Cir. 1985). See also *Natural Resources Defense Council, Inc. v. Hodel*, 865 F.2d 288, 298-99 (D.C. Cir. 1988), where the court relied upon the critical comments of the Environmental Protection Agency to conclude that the Secretary of the Interior violated NEPA by not fully addressing the cumulative impact of off-shore drilling on Alaskan and Pacific waters. *Cf. Save the Yaak Comm. v. Block*, 840 F.2d 714, 718 (9th Cir. 1988) (citing comments of the Forest Service's own biologist to support conclusion that the challenged environmental assessment inadequately evaluated impacts on wildlife).

33. 16 U.S.C. §§ 1531-1539 (1988).

34. *Id.* § 1536(b)(3)(A). See *Thomas*, 753 F.2d at 763-64; see also 40 C.F.R. § 1501.7(a)(6) (1988) (contemplating that the NEPA scoping process will identify other statutory environmental analysis requirements that can be integrated into the NEPA process).

35. 16 U.S.C. §§ 1601-1614 (1988).

36. *Id.* § 1604(g)(3)(E)(i); 36 C.F.R. § 219.14 (1988).

37. 16 U.S.C. § 1604(g)(3)(E)(iii) (1988); 36 C.F.R. § 219.27(e) (1988).

38. 16 U.S.C. § 1604(g)(3)(F) (1988); 36 C.F.R. § 219.27(d) (1988).

39. 43 U.S.C. §§ 1701-1784 (1982 & Supp. 1987).

40. 16 U.S.C. § 1604(a) (1988) (providing that "the Secretary of Agriculture shall develop, maintain, and, as appropriate, revise land and resource management plans for units of the National Forest System, coordinated with the land and resource management planning processes of State and local governments and other Federal agencies"); 43 U.S.C. § 1712(c)(9) (1982 & Supp. 1987) (providing that the Secretary of the Interior shall "coordinate the land use inventory, planning, and management activities of or for such [BLM] lands with the land use planning and management programs of other Federal departments and agencies and of the States and local governments within which the lands are located . . ."). Moreover, NEPA procedural requirements support the notion of substantive federal interagency coordination: The CEQ regulations provide that public land managers must consider regional impacts, as well as impacts on adjacent lands and unique resources when reviewing project proposals. 40 C.F.R. § 1508.27(a) (1988) (defining the term "significantly" to include the regional context of the decision); *id.* § 1508.27(b)(3), (9) (further defining "significantly" to include a determination of whether the decision will impact unique geographic areas such as parklands,

Although neither the NFMA nor the FLPMA further define the term "coordination," this coordination requirement operates as a substantive restraint when the adjacent land manager is under a legal obligation to preserve and protect her lands or resources from degradation,⁴¹ as is the case with the National Park Service.⁴² By taking these laws into account, the NEPA environmental review process can and should result in meaningful, substantive interagency coordination that not only addresses transboundary, region-wide ecological concerns, but also adjusts management priorities to accommodate conflicting mandates and resource management goals. Whether the courts, however, will pierce NEPA's procedural veneer and extract substantive coordination requirements from these other laws as part of the environmental review process remains to be seen.

B. Cumulative Effects

Meaningful ecosystem-based management must be concerned with the cumulative regional impacts accompanying federal land and resource management decisions. Most resource management decisions inevitably cause environmental impacts that reach beyond established boundaries, affecting adjacent and sometimes distant lands, usually through common resource systems. These same decisions will also have future consequences; one decision will beget other decisions compatible with the first one with escalating environmental consequences. A Forest Service proposal to harvest timber in the upper reaches of an undisturbed watershed, for example, is likely to affect downstream water quality well beyond forest borders, and it will open the drainage for further logging, additional roads, more intense recreational visitation, and perhaps other uses. Such a decision, therefore, should be based upon a comprehensive understanding of present and future impacts on ecosystem processes. While NEPA provides that land managers must identify and consider the cumulative environmental impacts accompanying development proposals, it does not insure that this analysis will encompass the relevant ecosystems.

Recognizing that environmental impacts are rarely confined to discrete areas or time periods, the NEPA regulations broadly define the

wetlands, or ecologically critical areas, or of whether it will affect endangered species or their habitat). See, e.g., Glacier-Two Medicine Alliance, 88 IBLA 133, 134, 143 (1985); Sierra Club, 111 IBLA 122 (1989).

41. See Keiter, *supra* note 6, at 988-91 (1989) for a detailed discussion of this argument.

42. 16 U.S.C. § 1a-1 (1988) (providing that "the protection, management, and administration of these areas [national parks] shall be conducted in light of the high public value and integrity of the National Park System and shall not be exercised in derogation of the values and purposes for which these various areas have been established . . ."). See Keiter, *On Protecting the National Parks from the External Threats Dilemma*, 20 LAND & WATER L. REV. 355, 369-75 (1985); Lockhart, *supra* note 30, for further discussion of the National Park Service Organic Act's substantive protection provision. See generally Keiter, *supra* note 6 at 952-56 (also suggesting that the Wilderness Act, 16 U.S.C. §§ 1131-1136 (1988), contains a substantive protection mandate).

scope of an EIS. Federal land managers are obligated to review the impact of proposed actions in relationship to other related actions, including connected, cumulative, and similar actions.⁴³ The regulations define the concept of "cumulative impact" to mean "the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency . . . or person undertakes such other actions."⁴⁴ This recognizes that federal natural resource management decisions rarely are made in isolation; one action is likely to encourage or facilitate other related actions, often by another land manager. To the extent that connected or cumulative actions are reasonably foreseeable and likely to ensue, NEPA obligates agency officials to review the matter as a whole and not as segmented or discrete decisions. In sum, NEPA contemplates that serial development proposals will be analyzed aggregately at the outset and not after the agency has committed itself to a course of action.

The courts have reinforced the cumulative effects concept by enjoining land management decisions that were not sufficiently sensitive to the interrelated impacts accompanying development proposals. In *Connor v. Burford*, for example, the court ruled that NEPA required federal land managers to prepare a comprehensive EIS evaluating the full potential impact of oil and gas development on forest lands before issuing a mineral lease.⁴⁵ The court concluded that the oil and gas development process could not be segmented into discrete phases, and that meaningful environmental analysis must occur at the initial decision-making stage.⁴⁶ Similarly, in *Thomas v. Peterson*, the court invoked NEPA to enjoin a Forest Service road construction project because the EIS did not mention or analyze the timber sales that were scheduled once the road was completed.⁴⁷ In theory, this approach of requiring comprehensive environmental analysis at the earliest stages of project proposals should preclude the unthinking piecemeal fragmentation of public lands by serial development decisions.

The NEPA regulations also require federal land managers to evaluate the full geographical scope of impacts accompanying land and resource management decisions. Indeed, jurisdictional boundaries do not relieve land managers of their obligation to assess the impact of resource management decisions on shared ecosystems. According to the regulations, the environmental impact analysis should address the

43. 40 C.F.R. § 1508.25(a) (1988).

44. *Id.* § 1508.7 (also providing that "cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time").

45. 848 F.2d 1441 (9th Cir. 1988).

46. The court's decision was based upon the conclusion that a mineral lease carries a right to explore so long as it is not limited by a "no surface occupancy" (NSO) clause. *Id.* at 1444; see also *Bob Marshall Alliance v. Hodel*, 852 F.2d 1223 (9th Cir. 1988), cert. denied sub nom. *Kohlman v. Alliance*, 109 S. Ct. 1340 (1989); *Sierra Club v. Peterson*, 717 F.2d 1409 (D.C. Cir. 1983). But see *Park County Resources Council v. United States Dep't of Agric.*, 817 F.2d 609 (10th Cir. 1987).

47. 754 F.2d 753 (9th Cir. 1985); see also *Save the Yaak Comm. v. Block*, 840 F.2d 714 (9th Cir. 1988); *LaFlamme v. Federal Energy Regulatory Comm'n*, 852 F.2d 389 (9th Cir. 1988).

regional implications of the proposal, and it should consider effects that may be "further removed in distance."⁴⁸ Moreover, the analysis should evaluate the cumulative impacts traced to decisions or actions that may be expected to occur on adjacent lands.⁴⁹ Applying these principles, the D.C. Circuit Court of Appeals in *Natural Resources Defense Council, Inc. v. Hodel* recently concluded that the Secretary of the Interior violated NEPA when he failed to "consider the effect of simultaneous inter-regional development on migratory species" in analyzing the environmental impact of off-shore oil development in Pacific and Alaskan waters.⁵⁰ NEPA, therefore, endorses the view that environmental analyses on the public domain should take account of the full ecological ramifications of resource management decisions regardless of existing boundary lines.

Neither the federal land management agencies nor the courts, however, have been eager to expand NEPA obligations beyond traditional jurisdictional boundaries. Although modern scientific research suggests that regions like the Greater Yellowstone area, the southern Utah desert country, and the ancient forests of the Northwest ought each to be regarded as a large interconnected ecosystem,⁵¹ federal land managers have not readily endorsed this proposition. Development proposals in these regions are ordinarily analyzed in terms of environmental impacts to the immediate surroundings; little regard is given to how seemingly discrete and isolated actions in one part of the region, when aggregated with others elsewhere, may effect the ecological integrity or natural character of the area. This approach, of course, is apparently consistent with the Supreme Court's decision in *Kleppe v. Sierra Club*, which held that the Secretary of the Interior was not obligated to prepare a comprehensive EIS addressing the impact of coal development on the Northern Great Plains region.⁵² In short, the cumulative effects concept has not yet been consistently applied to the relevant ecosystem.

48. 40 C.F.R. § 1508.8(b) (1988). See *National Wildlife Fed'n. v. United States Forest Serv.*, 592 F. Supp. 931, 942 (D. Or. 1984) (holding that the Forest Service's EIS, as part of its NEPA cumulative effects analysis, must address the impact of 75 pending timber sales, clearcutting on adjacent BLM lands, and timber harvesting on nearby private lands), *amended judgment*, 643 F. Supp. 653 (D. Or. 1984), *rev'd in part*, 801 F.2d 360 (9th Cir. 1986).

49. 40 C.F.R. § 1508.7 (1988); *id.* at § 1508.25(a)(3).

50. 865 F.2d 288 at 297 (D.C. Cir. 1988).

51. See L. HARRIS, *supra* note 3, at 3-6, 153-65; R. REESE, *GREATER YELLOWSTONE: THE NATIONAL PARK AND ADJACENT WILDLANDS* 13 (1984); Salwasser, Schonewald-Cox & Baker, *The Role of Inter-Agency Cooperation in Managing for Viable Populations, in VIABLE POPULATIONS FOR CONSERVATION* 159 (M. Soule ed. 1987).

52. 427 U.S. 390 (1976). The Court held that the Department of the Interior did not have a "proposal" for regional coal development before it; thus, the Department was not required to prepare an EIS, even though it had prepared reports studying the effect of extensive coal mining on the region. *Id.* at 400-02. See 40 C.F.R. § 1508.23 (1988) (defining the term "proposal"). Moreover, the Court concluded that the Secretary of the Interior was primarily responsible for determining the regional scope of an EIS, and that his determination—based upon the agency's expertise—not to examine the Northern Great Plains region in a single EIS should not be disturbed by the courts unless it was arbitrary. *Kleppe*, 427 U.S. at 411-12. Significantly, however, the Court

Although this situation is now changing, NEPA has only figured tangentially in this development. Other laws, notably the NFMA and the Endangered Species Act, as well as concerted political pressure, have prodded reluctant federal officials into acknowledging the true ecological implications of their resource management decisions. In the Pacific Northwest, for example, the Forest Service has responded to the biological diversity requirements in the National Forest Management Act⁵³ by preparing a regional EIS establishing timber harvest management standards for old growth forests to protect spotted owl habitat.⁵⁴ In the Yellowstone region, the Park Service and Forest Service—responding primarily to political pressures—are jointly preparing what amounts to comprehensive regional management guidelines that will set uniform and coordinated standards for managing these interconnected lands.⁵⁵ Moreover, under the Endangered Species Act, federal and state agencies in the Greater Yellowstone region have developed a computerized cumulative effects model to analyze the aggregate impact development proposals will have on available grizzly bear habitat.⁵⁶ These developments, which essentially represent binding administrative acknowledgments of ecological realities on the public domain, may embolden the courts to use the cumulative effects concept to insure that federal land management agencies consistently evaluate environmental consequences within the context of the relevant ecosystem.⁵⁷ Otherwise, the full promise of the NEPA cumu-

recognized that NEPA obligated the Secretary to review comprehensively the cumulative environmental impacts that accompany seriatim development proposals, taking into account the effect of past development activities. *Id.* at 410 n. 20, 413-14 n. 26. 53. 16 U.S.C. § 1604(g)(3)(B) (1988).

54. 1 U.S. FOREST SERV., DEP'T OF AGRIC., FINAL SUPPLEMENT TO THE ENVIRONMENTAL IMPACT STATEMENT FOR AN AMENDMENT TO THE NORTHWEST REGIONAL GUIDE, SPOTTED OWL GUIDELINES (1988) [hereinafter SPOTTED OWL SEIS]. See *infra* text accompanying notes 72-74.

55. See Keiter, *supra* note 6, at 986-87. Of course, this type of coordinated regional planning is also consistent with the coordination requirement in the National Forest Management Act. 16 U.S.C. § 1604(a) (1988). See *supra* text accompanying notes 39-42.

56. The model utilizes habitat, displacement, and mortality data to predict, through computer analysis, the cumulative impact that particular land use decisions are likely to have on the grizzly bear. Using the model, agency planners are able to calculate how a development proposal, when aggregated with other existing uses in the area, will impact available grizzly bear habitat within an identified bear management unit. See NAT'L PARK SERV., U.S. DEP'T OF THE INTERIOR, DRAFT ENVIRONMENTAL IMPACT STATEMENT DEVELOPMENT CONCEPT PLAN, FISHING BRIDGE DEVELOPED AREA: YELLOWSTONE, app. 6, at 273-95 (1987) for a detailed description of the cumulative effects model. The model has been utilized to determine that a controversial ski resort development proposal would adversely impact the bear, causing the Forest Service to withhold approval for the permit. See GALLATIN NAT'L FOREST, U.S. FOREST SERV., CUMULATIVE EFFECTS ANALYSIS PROCESS FOR THE YELLOWSTONE ECOSYSTEM, SKI YELLOWSTONE BIOLOGICAL ASSESSMENT 87-89 (April 1987); see also *National Wildlife Federation v. National Park Service*, 669 F. Supp. 384 (D. Wyo. 1987) (sustaining against an ESA challenge the Park Service's decision, reached after applying the CEM model, to keep a controversial campground open in Yellowstone National Park).

57. See *Natural Resources Defense Council, Inc. v. Hodel*, 865 F.2d 288 (D.C. Cir. 1988); cf. *Kleppe v. Sierra Club*, 427 U.S. at 411-12 (holding that courts should defer to an agency's expertise in determining the relevant region for NEPA analysis purposes, unless the agency determination is arbitrary). Moreover, the courts already have

ative effects concept, particularly as a vital ecosystem-based management principle, will not be realized.

C. *Biological Diversity*

The concept of biological diversity is linked inextricably to ecosystem preservation. Biological diversity reflects the total numbers of species present in a given location (ecosystem) as well as the genetic characteristics of each species.⁵⁸ Biologically diverse native populations generally possess the requisite genetic variation to insure viability and species survival. Thus, biological diversity is a manifestation of a healthy naturally functioning ecosystem.⁵⁹ Conversely, the diminution of biological diversity presages species extinction, the collapse of ecosystem functions, and drastic change in the natural environment. On the public lands, therefore, the conservation of biological diversity is important to insure the integrity of existing ecosystems, which provide renewable resources, such as timber and water, as well as amenities, such as wildlife and recreational opportunities.⁶⁰

NEPA already provides, at least aspirationally, for federal agencies to take account of biological diversity. As part of the national policy established by NEPA, federal agencies are directed to "maintain, wherever possible, an environment which supports diversity and variety of individual choice."⁶¹ Although this reference to "diversity" is patently ambiguous, the policies underlying NEPA—which include preventing damage to the biosphere,⁶² understanding ecological systems,⁶³ and reviewing the impact of man on all components of the natural environment⁶⁴—strongly suggest that the conservation of biological diversity is consistent with statutory goals. The courts, however, have not derived any meaningful legal standards from these NEPA provisions, and the diversity provision has yet to figure explicitly in any judicial decision.

proven receptive to NEPA challenges to public land management decisions when an adjacent land manager or another agency with expertise expresses concern about the proposal's impact, which often suggests that the proposal will have broader ecological impacts than are being recognized by the reviewing agency. *See supra* text accompanying notes 31-32.

58. *See* B. Norton, *On the Inherent Danger of Undervaluing Species*, in *THE PRESERVATION OF SPECIES: THE VALUE OF BIOLOGICAL DIVERSITY* 111-13 (B. Norton, ed., 1986); *THE WILDERNESS SOCIETY, CONSERVING BIOLOGICAL DIVERSITY IN OUR NATIONAL FORESTS* 2-3 (1986). *See also* U.S. CONGRESS, OFFICE OF TECHNOLOGY ASSESSMENT, *TECHNOLOGIES TO MAINTAIN BIOLOGICAL DIVERSITY-SUMMARY* 5 (March 1987) (explaining that "biological diversity refers to the variety and variability among living organisms and the ecological complexes in which they occur. . . . the term encompasses different ecosystems, species, genes, and their relative abundance") [hereinafter 1987 OTA Report].

59. K. WATT, *PRINCIPLES OF ENVIRONMENTAL SCIENCE* 140 (1973); *THE WILDERNESS SOCIETY, supra* note 58, at 6-11 (1986).

60. *See* 1987 OTA REPORT, *supra* note 58, at 6-9; Smith, *The Endangered Species Act and Biological Conservation*, 57 S. CAL. L. REV. 361, 369-82 (1984).

61. 42 U.S.C. § 4331(b)(4) (1982 & Supp. 1987).

62. *Id.* § 4321.

63. *Id.*

64. *Id.* § 4331(a).

Congress appears intent on changing this situation. It is currently reviewing legislation that would obligate federal agencies to include biological diversity considerations in the environmental analysis of any proposal.⁶⁵ The proposed legislation would also clarify the ambiguous diversity reference in NEPA,⁶⁶ obligate the CEQ to promulgate guidelines for incorporating biological diversity considerations into EISs,⁶⁷ and establish an interagency committee to develop a coordinated federal strategy for conserving biological diversity.⁶⁸

Moreover, Congress has already incorporated the principle of conserving biological diversity into public land law. As part of the NFMA forest planning process, the Forest Service is obligated 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."⁶⁹ The implementing regulations provide that biological diversity shall be preserved "so that it is at least as great as that which would be expected in a natural forest."⁷⁰ To insure wildlife diversity, the regulations obligate the Forest Service to "maintain viable populations of existing native and desired non-native vertebrate species in the planning area."⁷¹

65. H.R. 1268 § 5(d)(1), 135 Cong. Rec. H529 (daily ed. Mar.2, 1989) [hereinafter cited as H.R. 1268]. See Carlson, *NEPA and the Conservation of Biological Diversity*, 19 ENV'T. L. 1 (1988) for a description of the predecessor version of this bill—known as the "National Biological Diversity Conservation and Environmental Research Act"—which was originally introduced during the 100th Congress. See also Laramie Daily Boomerang, Oct. 4, 1989, p. 10 (noting that the House of Representatives approved legislation for forest management in the Pacific Northwest that requires federal agencies to "minimize fragmentation of environmentally significant old-growth forest stands"). But see 135 CONG. REC. H3779, H3781 (daily ed. July 17, 1989) (rejecting an amendment to FLPMA that would have required the BLM to integrate biological diversity considerations into its land management planning).

66. H.R. 1268 § 5(d)(1) (amending NEPA to include a reference to biological diversity). Cf. 22 U.S.C. §§ 2151p-1(c)(10), 2151q(b), 2151q(d) (Supp. 1986) (obligating the Agency for International Development to promote the conservation of biological diversity in its development programs).

67. H.R. 1268 § 5(f)(1).

68. *Id.* § 8(a). See also *id.* § 8(b) (providing for the federal strategy to include "methods of interagency cooperation, such as bioregional management of ecosystems").

69. 16 U.S.C. § 1604(g)(3)(B) (1988). The provision further states: "[A]nd 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 preserve the diversity of tree species similar to that existing in the region controlled by the plan. . . ." *Id.* See generally Wilkinson & Anderson, *supra* note 4 at 290-96.

70. 36 C.F.R. § 219.27(g) (1988). The regulation defines biological diversity requirements as a forest management prescription, which means it sets minimum management requirements for forest planners. *Id.* § 219.27. The diversity requirements are implemented by designating representative "management indicator species" that reflect the health of the forest ecosystem, maintaining viable populations well distributed throughout the forest, providing well distributed habitat for each species, and monitoring population fluctuations. *Id.* § 219.19. See also *id.* § 219.27(a)(6). See generally Wilkinson & Anderson, *supra* note 4, at 290-306.

71. 36 C.F.R. § 219.19 (1988). The regulation further provides: "a viable population shall be regarded as one which has the estimated numbers and distribution of reproductive individuals to insure its continued existence is well distributed in the planning area. . . . [H]abitat must be provided to support, at least, a minimum number of reproductive individuals and that habitat must be well distributed so that those

These diversity requirements, particularly the obligation to maintain minimum viable populations, are reorienting traditional forest management practices. In the Pacific Northwest, for example, the Forest Service has promulgated a regional guide to protect the spotted owl—a designated management indicator species dependent upon old growth forests—from further habitat loss.⁷² The proposal, which has been the focus of extensive litigation,⁷³ curtails logging to preserve old growth forest lands—a significant concession by an agency historically driven by timber in a region with a timber dependent economy. Moreover, the Forest Service has recently announced a new national policy to preserve old growth forests by limiting timber sales in these forests.⁷⁴

Well aware of the spotted owl controversy and the potential impact that biological diversity principles applied on an ecosystem-wide scale can have on land management practices, the Forest Service apparently would prefer to view its diversity mandate simply as a procedural obligation. In a recent NFMA administrative appeal decision, it concluded that diversity requirements are “procedural in nature,” and that it is not obligated to maintain “any specified level of abundance or distribution of particular plant or animal communities.”⁷⁵ This conclusion, however, is difficult to reconcile with the NFMA’s diversity language, its legislative history and the implementing regulations—all of which suggest that biological diversity principles are a substantive constraint

individuals can interact with others in the planning area.” *Id.*; see also *id.* § 219.27(a)(6) (providing for minimum management requirements to insure habitat necessary to maintain viable populations of fish and wildlife).

72. SPOTTED OWL SEIS, *supra* note 54, at II-3-5. To insure the viability of the spotted owl population, the Forest Service has recommended designating from 1,000-2,700 acres of forest land as suitable habitat for each known breeding pair of owls; timber harvesting would not be permitted within these designated areas, which would reduce timber production by 163 MMBF per year in the Pacific Northwest. *Id.* II-41, 44. This Forest Service proposal has been challenged in court by both industry and environmental groups. *Cf.* Northwest Forest Resource Council v. Robertson, 711 F. Supp. 1039 (D. Ore. 1989) (staying action pending resolution of a similar suit pending in Washington federal district court). Moreover, the U.S. Fish & Wildlife Service has proposed listing the spotted owl as a “threatened” species on the endangered species registry. Endangered and Threatened Wildlife and Plants; Proposed threatened status for Northern Spotted Owl, 54 Fed. Reg. 26,666 (June 23, 1989); N.Y. Times, Nov. 18, 1988, at A16, col. 4. See also Northern Spotted Owl v. Hodel, 716 F. Supp. 479 (W.D. Wash. 1988). See generally K. ERVIN, *supra* note 7, at 205-27.

73. See, e.g., Portland Audubon Soc’y v. Lujan, 884 F.2d 1233 (9th Cir. 1989); Portland Audubon Soc’y v. Lujan, 866 F.2d 302 (9th Cir. 1989); Portland Audubon Soc’y v. Lujan, 712 F. Supp. 1456 (D. Or. 1989); Northwest Forest Resource Council v. Robertson, 711 F. Supp. 1039 (D. Or. 1989); Northern Spotted Owl v. Hodel, 716 F. Supp. 479 (W.D. Wash. 1989). Exacerbated by court-imposed injunctions—generally based upon NEPA violations—that have halted more than half of the old growth timber sales in the Pacific Northwest region, Congress recently imposed a one year moratorium on litigation aimed at protecting the spotted owl; the Forest Service, as part of this temporary legislative compromise, agreed to protect several forests scheduled for clearcut logging. See Egan, *Economic Forces That Knock Down The Oldest Forests*, New York Times, Oct. 8, 1989, § 4, at 4, col. 1.

74. 14 PUB. LANDS NEWS, Oct. 26, 1989, no. 21, at 1-2; The Denver Post, Oct. 27, 1989, at 4A.

75. See U.S. FOREST SERVICE NOS. 1467, 1513, APPEAL DECISION, FLATHEAD NATIONAL FOREST LAND & RESOURCE MANAGEMENT PLAN APPEALS 13-14 (Aug. 31, 1988).

on the agency's discretion, particularly in managing its timber program.⁷⁶

No other federal law explicitly mandates the conservation of biological diversity on the public lands. Yet several laws, at least indirectly, promote biological diversity conservation efforts.⁷⁷ Most obviously, the Endangered Species Act protects against the loss of individual species, thus assuring species-specific diversity.⁷⁸ Preservation-oriented laws, such as the National Parks Organic Act,⁷⁹ the Wilderness Act,⁸⁰ and the Wild and Scenic Rivers Act,⁸¹ protect designated lands or resources from intense human development and thus also afford a measure of protection to indigenous species. Moreover, the National Park Service, concluding that preserving biological diversity is an important component of its park management responsibilities, has injected diversity considerations into its own planning decisions,⁸² and it is encouraging neighboring federal land managers to integrate diversity principles into their resource management decisions.⁸³

Even though NEPA does not specifically mandate the conservation of biological diversity, the NEPA process provides one means of pursuing diversity objectives on the public domain.⁸⁴ Of course, Congress, by amending NEPA, could clearly incorporate biological diversity considerations into the governmental decisionmaking calculus for all public lands. Alternatively, the NEPA reference to diversity may provide a sufficient basis for the CEQ to promulgate additional regulations requiring that federal agencies address biological diversity concerns in their

76. See Wilkinson & Anderson, *supra* note 4, at 290-306. Congress recently considered amending the FLPMA, 43 U.S.C. §§ 1701-1783 (1982 & Supp. V 1987), to require BLM land managers to include biological diversity considerations in their resource planning process, but the proposal was deleted during committee hearings. See *supra* note 65. But see 43 U.S.C. § 1712(c)(4) (1982 & Supp. 1987) (mandating the BLM, as a priority matter, to designate "areas of critical environmental concern," defined as "areas within the public lands where special management attention is required . . . to protect and prevent irreparable damage to . . . natural systems or processes," *id.* § 1702(a)).

77. See 1987 OTA REPORT, *supra* note 58, at 12-13 for a list of federal laws relating to biological diversity.

78. 16 U.S.C. § 1536 (1988). But ESA-mandated single species rescue efforts on the public lands, while laudable, can also interfere with efforts to conserve ecosystem-wide diversity. Giving individual species priority means that other species may be sacrificed to insure recovery, even though this may negatively impact diversity and the genetic stock among the disfavored species. See ELEVENTH ANNUAL REPORT OF THE COUNCIL ON ENVIRONMENTAL QUALITY 67 (1980).

79. 16 U.S.C. §§ 1-8(a) (1988).

80. 16 U.S.C. §§ 1131-1136 (1988). The Wilderness Act defines wilderness as an area where "the earth and its community of life are untrammelled by man . . . retaining its primeval character and influence . . . , which is protected and managed so as to preserve its natural conditions and which . . . generally appears to have been affected primarily by the forces of nature . . ." *Id.* § 1131(c); see also 36 C.F.R. § 293.2(a) (1988) (providing that Forest Service wilderness will be managed under the principle of "natural ecological succession").

81. 16 U.S.C. §§ 1271-1287 (1988).

82. U.S. Dept. of the Interior, National Park Service, Management Policies 4:1, 2 (1988).

83. See Sax & Keiter, *supra* note 6 at 253-57.

84. See cases cited *supra* note 73.

environmental analyses.⁸⁵ But absent an explicit legal mandate providing for the conservation of biological diversity, such as the one governing the Forest Service, the land management agencies have the apparent discretion to discount—or perhaps even ignore—diversity concerns to the detriment of existing ecosystems.

D. Aesthetic Values

Aesthetic values lack any evident scientific foundation and are inherently difficult to quantify objectively. Aesthetic considerations, nevertheless, are an important aspect of ecosystem management, particularly in those regions where national park and wilderness lands are intermixed with other multiple-use public lands. Indeed, the national park system, which represents an enduring legacy to the early preservationist movement, was founded upon a common sentiment to preserve the aesthetic appearance of natural landscapes.⁸⁶ More recently, Congress has created the national wilderness preservation system to protect particularly scenic and unique public lands from despoilation by human activities.⁸⁷

NEPA makes provision for aesthetic interests. As a policy goal, NEPA seeks to insure “esthetically and culturally pleasing surroundings,”⁸⁸ and to “preserve important historic, cultural, and natural aspects of our national heritage.”⁸⁹ The CEQ regulations specifically include aesthetic considerations as part of the environmental analysis process: When measuring the “effects” of a proposal, federal agencies must consider direct and indirect “aesthetic” impacts;⁹⁰ and when determining the “significance” of an environmental impact, agency officials must consider the “unique characteristics of the geographic area such as proximity to historic or cultural resources, [or] park lands.”⁹¹ The courts have found NEPA violations when agencies undertaking an environmental analysis have neglected aesthetic impacts accompanying development proposals.⁹² Yet, as we have seen, NEPA is a procedural statute; it does not prioritize aesthetic concerns over other resource management objectives.

Other laws, however, recognize aesthetic considerations as an important dimension of public land law and impose some constraints on the land manager’s administrative discretion. The NFMA provides that

85. Carlson, *NEPA and the Conservation of Biological Diversity*, 19 ENVTL. L. 1, 35-6 (1988).

86. A. RUNTE, NATIONAL PARKS: THE AMERICAN EXPERIENCE 2 (2d ed. 1987); R. NASH, WILDERNESS AND THE AMERICAN MIND 96 (3d ed. 1982).

87. 16 U.S.C. §§ 1131-36 (1988); see NASH, *supra* note 86 at 5.

88. 42 U.S.C. § 4331(b)(2) (1982 & Supp. 1987).

89. *Id.* § 4331(b)(4).

90. 40 C.F.R. § 1508.8(b) (1988).

91. *Id.* § 1508.27(b)(3).

92. See, e.g., *LaFlamme v. Federal Energy Regulatory Comm’n*, 842 F.2d 1063 (9th Cir. 1988).

the Forest Service must take account of aesthetics before permitting clearcut logging,⁹³ and the implementing regulations require forest planners to establish visual quality objectives within each forest plan.⁹⁴ The FLPMA goes even further; it incorporates "natural scenic, scientific and historical values" into the BLM's guiding "multiple-use" legal mandate,⁹⁵ thus effectively injecting aesthetic considerations into all BLM resource management decisions. In addition, where national parks or other "preserved" lands are located near or adjacent to multiple-use public lands, the coordination obligation in the NFMA and the FLPMA takes on sharper focus.⁹⁶ In fact, when this is the case, the coordination obligation should be construed to impose substantive constraints on aesthetically harmful resource development activity. Because such proposals generally require review under NEPA, the NEPA process provides an opportunity to insure that aesthetic concerns figure prominently in the decisionmaking calculus.

IV. CONCLUSION

The legal contours of federal resource management policy on the public domain have historically been shaped by an ongoing institutional dialogue between Congress, the land management agencies, and the courts. The concept of ecosystem management, too, will ultimately bear the imprimatur of these separate institutions. Congress already is reviewing important legislative initiatives, such as the conservation of biological diversity proposal, that would incorporate principles of ecological science into federal natural resources law, including NEPA. Similarly, the courts have become increasingly sensitive to the ecological ramifications of resource management policies; recent decisions obligate land managers to take account of transboundary impacts in their environmental analysis and should promote interagency coordination efforts. Moreover, recent administrative initiatives have effectively endorsed the concept of ecosystem management, which should encourage Congress and the courts to continue redefining federal land management obligations in ecological terms.

Not surprisingly, NEPA principles are figuring prominently in the emerging concept of ecosystem management. Although NEPA may not establish legally enforceable substantive standards, it has become a powerful law of environmental process on the public domain. Just as

93. 16 U.S.C. § 1604(g)(3)(F)(ii), (iii) (1988) (requiring that before clearcut logging is employed as the harvest method, an interdisciplinary review assessing aesthetic and other impacts must be completed, and that cuts must be shaped and blended to fit the natural terrain).

94. 36 C.F.R. § 219.21(f) (1988) (visual resource must be inventoried and evaluated in terms of the landscape's visual attractiveness and the public's visual expectations, and visual quality objectives must be set for each forest).

95. 43 U.S.C. § 1702(c) (1982 & Supp. 1987). The definition of "multiple-use" further provides that decisions should consider "the relative values of the resources and not necessarily . . . the combination of uses that will give the greatest economic return or the greatest unit output." *Id.* Thus, aesthetic concerns cannot be discounted or dismissed solely on economic grounds.

96. See *supra* text accompanying notes 39-42.

NEPA mandates interagency cooperation, the nascent concept of ecosystem management reflects a strong commitment to interagency coordination, with federal land managers in Greater Yellowstone and elsewhere relying upon intricate procedures to address common resource management issues. Just as NEPA transcends jurisdictional boundaries, federal land management officials—not unmindful of recent judicial precedent—are beginning to address environmental issues at an ecologically relevant scale. Moreover, NEPA is being used to implement laws like the NFMA and ESA, which establish enforceable, ecologically-sensitive legal constraints that provide a basis for framing ecosystem-wide policies. In short, the NEPA process is shaping the evolution of substantive ecosystem management standards.