

The Ecommons: A Plan for Common Property Management of Ecosystems

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Bruce Babbitt, United States Secretary of the Interior, has recently advocated "ecosystem management,"¹ a program which would replace the current crisis-driven protection of specific endangered species with the protection of complete ecosystems.² Mr. Babbitt's enthusiasm for ecosystem management reflects a growing consensus among resource managers and politicians.³ The National Biological Diversity Conservation and Environmental Research Act (the "Biodiversity Act"),⁴ pending before Congress, would require the "identification of regional ecosystems within the United States, and an interagency plan for coordinating federal management of such ecosystems for the purpose of conserving biological diversity."⁵ Officials from a variety of federal agencies, including Carol Browner, Administrator of the United States Environmental Protection Agency (EPA), have expressed strong support for ecosystem management.⁶

Ecosystem management would represent a "remarkable transformation" in the way natural resources have traditionally been managed in this country.⁷ No single strategy will be appropriate for managing every ecosystem. Creativi-

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1. See William K. Stevens, *Interior Secretary is Pushing a New Way to Save Species*, N.Y. TIMES, Feb. 17, 1993, at A1; William K. Stevens, *Babbitt to Map Ecosystems Under New Policy to Save Them*, N.Y. TIMES, Mar. 14, 1993, at 29 [hereinafter *Babbitt to Map*].

2. Robert B. Keiter, *NEPA and the Emerging Concept of Ecosystem Management on the Public Lands*, 25 LAND & WATER L. REV. 43, 43 (1990) [hereinafter Keiter, *NEPA*]. Ecosystems are systems "made up of a community of animals, plants, and bacteria and [their] interrelated physical and chemical environment[s]." WEBSTER'S NEW TWENTIETH CENTURY DICTIONARY 574.

3. See, e.g., The National Biological Diversity Conservation and Environmental Research Act, H.R. 305, 103d Cong., 1st Sess. (1993) [hereinafter *Biodiversity Act*]; Robert D. Barbee & John D. Varley, *The Paradox of Repeating Error*, in PROCEEDINGS OF THE CONFERENCE ON THE MANAGEMENT OF BIOSPHERE RESERVES 125 (John D. Peine ed., 1985) [hereinafter *PROCEEDINGS*]; 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, 924 (1989) [hereinafter Keiter, *Taking Account*].

4. Biodiversity Act, *supra* note 3.

5. *Id.* § 8(b)(2).

6. See *Browner Urges Ecosystem Approach to Watersheds, Other Pollution Problems*, 23 ENV. REP. 3088, 3088-89 (1993) (EPA Administrator Carol Browner claims that Clinton Administration will work to better coordinate ecosystem protection programs and efforts among federal natural resource agencies) [hereinafter *Watersheds*]; see also *Agencies Back Ecosystem Approach for Dealing With Environmental Problems*, 23 ENV. REP. 3062 (1993) (discussing fact that officials of the federal Fish and Wildlife Service, the Army Corps of Engineers, the Bureau of Reclamation, and the Agriculture Department agree that conservation measures can best be implemented through ecosystem protection) [hereinafter *Environmental Problems*].

7. Keiter, *NEPA*, *supra* note 2, at 43.

ty will be required in designing management strategies that are both effective and responsive to the social, political, biological, and geological characteristics of the regions in which they are applied.

The Man and Biosphere (MAB) Program of the United Nations Educational, Scientific, and Cultural Organization (UNESCO) has developed ecosystem management programs. These programs manage ecosystems that contain both large undeveloped areas and a significant human population. Under the MAB plans, ecosystems are separated into "core" and "buffer" areas. Core areas are composed of ecologically sensitive public lands. Humans live and work within the buffer areas, but land use in these zones is strictly regulated. These regions provide a protective buffer for the highly sensitive core areas while allowing for human economic activity.⁸

The MAB plans, however, have been impossible to implement in the United States. Ecosystems encompass both public and private lands, and the MAB plans require broader authority over private land use than our state or federal governments currently exercise. As many individuals working with the MAB program have noted, the lack of a fair and effective method of implementation is the single greatest obstacle to the creation of MAB-style ecosystem preserves in this country.⁹

Government can exercise some authority over private land in the United States. The two traditional governmental tools for controlling how private lands are used in this country are police-power-based regulations¹⁰ and condemnation of property in fee through eminent domain.¹¹ Imposing the land use restrictions required by the MAB plans through police-power-based regulations, however, could violate the constitutional prohibition against taking private

8. See generally TOWARDS THE BIOSPHERE RESERVE: EXPLORING RELATIONSHIPS BETWEEN PARKS AND ADJACENT LANDS (Robert C. Scace & Clifford J. Martinka eds., 1982) [hereinafter BIOSPHERE RESERVE].

9. Jerry F. Franklin, *Objectives and Nature of Scientific Programs in Biosphere Reserves*, in PROCEEDINGS, *supra* note 3, at 57, 61; Keiter, *NEPA*, *supra* note 2, at 60; Keiter, *Taking Account*, *supra* note 3, at 1004; Barry Sadler, *Nature Conservation in the Canadian Rockies: Man and Biosphere in Regional Context*, in BIOSPHERE RESERVE, *supra* note 8, at 86; Robert C. Scace, *Introduction*, in BIOSPHERE RESERVE, *supra* note 8, at 4; R. Michael Wright, *Funding for Biosphere Reserves: An Indicative Survey*, in BIOSPHERE RESERVE, *supra* note 8, at 167.

10. The police power is "the power of the State to place restraints on the personal freedom and property rights of persons for the protection of the public safety, health, and morals or the promotion of the public convenience and general prosperity." BLACK'S LAW DICTIONARY 1156 (6th ed. 1990). Police power may be validly exercised to regulate private land use for the protection of the environment. See, e.g., *Claridge v. New Hampshire Wetlands Bd.*, 485 A.2d 287 (N.H. 1984) (denial of permit to fill ecologically sensitive wetlands on private property was valid exercise of state's police power).

11. Eminent domain is "[t]he power [of government] to take private property for public use." BLACK'S LAW DICTIONARY 523 (6th ed. 1990). The U.S. Constitution requires that when the power of eminent domain is exercised, just compensation must be paid to the party from whom the property was taken. See U.S. CONST. amend. V. The power of eminent domain may be exercised to condemn private lands in order to protect the environment. See, e.g., 16 U.S.C. § 515 (1988) (authorizing Secretary of Agriculture to purchase lands necessary to regulate the flow of navigable streams or to protect timber lands).

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property for public use without just compensation.¹² Even constitutionally sound regulations that limit economic activity without providing compensation create resentment within affected populations. These populations could create obstacles to ecosystem protection through political opposition, poaching, and misuse of the protected lands.¹³

On the other hand, condemnation of all lands within endangered ecosystems would be prohibitively expensive, both because the initial costs of providing compensation for the land would be high and because condemnation would remove the resources on these lands from the economy and the tax base. In addition, condemnation of these lands in fee would be unnecessary since some level of human activity is compatible with the health of most ecosystems.¹⁴

This Note presents a proposal for the implementation of MAB-style ecosystem preserves in the United States through the creation of “ecosystem commons” or “ecocommons,” in which the government would create buffer zones by condemning conservation easements¹⁵ on the private properties surrounding ecologically sensitive public lands. Compensation would be paid for these easements not in cash, but in rights in common to the natural resources on the public lands. Ecocommons could best be created in ecosystems encompassing significant amounts of public land and in which the human economies are centered around exploiting the natural resources on those public lands. I will refer to the human communities participating in these economies as “resource-dependent communities.”¹⁶ The ecocommons plan is premised on the hypothe-

12. See U.S. CONST. amend. V; see also Karen A. Jordan, *Perpetual Conservation: Accomplishing the Goal Through Preemptive Federal Easement Programs*, 43 CASE W. RES. L. REV. 410, 432-35 (1993) (arguing that implementing conservation measures through regulation risks takings challenges).

13. For a fuller discussion of the constitutional and behavioral challenges to implementing MAB-style ecosystem preserves through police-power-based regulations, see *infra* text accompanying notes 63-80.

14. See *infra* note 62.

15. A conservation easement is:

a nonpossessory interest of a holder in real property imposing limitations or affirmative obligations the purposes of which include retaining or protecting natural, scenic, or open-space values of real property, assuring its availability for agricultural, forest, recreational, or open-space use, protecting natural resources, maintaining, or enhancing air or water quality, or preserving the historical, architectural, archeological, or cultural aspects of real property.

UNIF. CONSERVATION EASEMENT ACT § 1, 12 U.L.A. 71 (West Supp. 1993). These restrictions can include the maintenance of plant species and restrictions on future development, see Gerald Korngold, *Privately Held Conservation Servitudes: A Policy Analysis in the Context of in Gross Real Covenants and Easements*, 63 TEX. L. REV. 433, 435-36 (1984), the protection of important vistas, see Carol M. Rose, Comment, *Servitudes, Security, and Assent: Some Comments on Professors French and Reichman*, 55 S. CAL. L. REV. 1403, 1413 (1982), or requirements to allow animals to forage on private property at designated times. See Robert Wade, *Common-Property Resource Management in South Indian Villages*, in MAKING THE COMMONS WORK 207, 213-14 (Daniel W. Bromley ed., 1992).

16. The existence of resource-dependent communities has been recognized in federal law. For example, the recognition and protection of timber-dependent communities is a fundamental mandate of federal forest policy in this country, see Con H. Schallau & Richard M. Alston, *The Commitment to Community Stability: A Policy or Shibboleth?*, 17 ENVTL. L. 429, 429-30 (1987), and is expressed in several of the statutes governing the Forest Service's activities, see, e.g., 16 U.S.C. § 1611 (1982). In addition to timber, communities in this country are dependent on resources such as fish, grazing, recreational use of wilderness areas, and less traditional non-timber forest products. See *infra* text accompanying notes 95-100. The exact

sis that private landowners living within resource-dependent communities would willingly alter their land use practices to protect the ecosystem in exchange for a share of the natural resources of that ecosystem. Other plans have been or are currently being developed for ecosystems that do not fit this description.¹⁷ For ecosystems that do, the creation of ecocommons may be the most effective and least expensive way to implement ecosystem management.

In Part I of this Note, I discuss the importance of ecosystem management. In Part II, I offer a plan for the creation of ecocommons. In Part III, I defend the ecocommons plan against two criticisms that it might encounter. Ecocommons would be created by exchanging natural resources on public lands for conservation easements on private lands. Some might object that it would be more efficient to auction the resources and use the proceeds to purchase the necessary easements. I argue that because the ecocommons plan would tend to preserve the stability of resource-dependent communities, while the open-auction alternative would tend to reduce or destroy the stability of these communities, the ecocommons plan could take advantage of the special characteristics of resource-dependent communities to increase the effectiveness of ecosystem management. In addition, since the ecocommons plan allows for the trading of resource rights after the initial exchange of resources for conservation easements takes place, it captures many of the market benefits of the open-auction alternative.

Critics also contend that the ecocommons plan would require an extraordinary level of cooperation between governmental entities on the national, state, and local levels. The highly protected "core" areas of ecocommons should be composed solely of public lands. Since the federal government owns almost one third of all land in the United States,¹⁸ it inevitably would have a large role in the creation of ecocommons. In addition, since individuals living within the ecocommons would receive preferential access to publicly-owned natural resources, the creation of ecocommons by state and local governments may violate the free trade principles protected by the Interstate Commerce Clause. A federal statute permitting the creation of ecocommons would be advisable to eliminate these constitutional concerns.

On the other hand, state and local governments will have a significant role

point at which a community can be considered "dependent" on a resource is a situation-specific decision, and one subject to differing opinions. One study has defined a region as "dependent" on access to federal forest products when 10% of the economy's income and employment was accounted for by local export base activity attributable to national forest stumpage supplies, and local wood-processing facilities relied on the Forest Service for at least 30% of their stumpage supply. Schallau & Alston, *supra*, at 449 n.67 (citing J. DeVilbiss, Timber Stumpage Supply and Economic Dependency 10, 79-80 (1986) (unpublished Ph.D. dissertation, Michigan State University)).

17. See *infra* text accompanying notes 53-56.

18. GEORGE CAMERON COGGINS & CHARLES F. WILKINSON, FEDERAL PUBLIC LAND AND RESOURCES LAW 1 (2d. ed. 1991).

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to play in creating ecocommons. State- and locally-owned lands may need to be included within "core" areas. Also, while resource-dependent communities share the feature of having economies dependent on the commercial exploitation of natural resources, there is an infinite variability among these communities in other respects.¹⁹ State and local governments should be allowed to experiment with the ecocommons plan in a variety of local settings. Finally, laws governing land use and the transfer of property interests have traditionally been the responsibility of subnational governments in this country.²⁰

Therefore, the national, state, and local governments would all play important roles in creating and administering ecocommons. Many of the environmental statutes in this country already provide for intergovernmental cooperation and could provide a model for an administrative structure to support the creation and maintenance of ecocommons.²¹ The need for intergovernmental cooperation in administering ecocommons may result in more effective dissemination of information on biodiversity among governmental actors. The fact that the ecocommons plan requires intergovernmental cooperation may prove to be not a weakness, but one of its greatest assets.

I. THE IMPORTANCE OF ECOSYSTEM MANAGEMENT

Both professional resource managers and politicians have recognized the importance of ecosystem management as a tool for protecting biological diversity, or "biodiversity." Biodiversity is "the full range of variety and variability within and among living organisms and the ecological complexes in which they occur."²² In a biodiverse ecosystem, resident plant and animal populations have sufficient genetic variation to insure species survival.²³ The global economy,²⁴ and even the physical survival of our species,²⁵ could be

19. For this reason, I have not provided a case study of a specific community in which the ecocommons approach might be applied. Resource-dependent communities differ with regard to the amount and type of land that is privately owned, the types of resources that the communities currently exploit, and the types of alternative resources available. Each ecocommons will be a unique, organic reflection of the cultural and ecological characteristics of the ecosystem in which it is created. The input and participation of local institutions, therefore, will be essential to the successful design of each ecocommons.

20. Jordan, *supra* note 12, at 405.

21. See *infra* notes 182-216 and accompanying text.

22. Biodiversity Act, *supra* note 3, § 3(1).

23. Keiter, *NEPA*, *supra* note 2, at 54.

24. H.C. Coombs, former Governor of the Reserve Bank of Australia, believes that the combination of population increases and the degradation of our natural resource base has brought us to the brink of "an era of economic change dominated by increasing scarcities of natural resources." Unless this trend is counteracted, these shortages will cause upward shifts in prices and interest rates as well as dramatic shifts in wealth distribution away from entrepreneurs and workers, and toward proprietors of natural resources. H.C. COOMBS, *THE RETURN OF SCARCITY: STRATEGIES FOR AN ECONOMIC FUTURE* 104-05 (1990).

25. *Id.* at 40; Edward O. Wilson, *Is Humanity Suicidal?*, N.Y. TIMES, May 30, 1993 (Magazine), at 24 (arguing that current rate of species extinction and ecosystem degradation may indicate that human species is programmed for self-destruction); Biodiversity Act, *supra* note 3, § 2(4) ("reduced biological

threatened by widespread species loss.²⁶ Also, protecting biodiversity generally may be the only way to protect species whose benefits are not yet recognized.²⁷

Despite its importance, biodiversity has fared poorly in this country. The present rate of species extinction is the highest in recorded history.²⁸ A large number of plant and animal species are listed as endangered or threatened with extinction for purposes of the Endangered Species Act²⁹ and many of our national parks have lost wildlife species through extinction.³⁰ As each species is lost, the survival of other species within the ecosystem, which may rely on the presence of that species in innumerable ways, is threatened.³¹

This unimpressive record is in part due to the fact that our approach to maintaining biodiversity has been fragmented, both geographically and by species.³² The boundaries of our protected public lands are determined politically rather than by the biological requirements of ecosystems.³³ Ecosystems are areas of differing sizes that are defined by the geographical range of living and non-living natural phenomena that interact and exchange genetic material.³⁴ Because of the complexity of interactions between species within an ecosystem, biodiversity can be sustained only by protecting complete ecosystems.³⁵

Instead, we have concentrated on preserving isolated parks, wilderness areas, public forests, and other public lands.³⁶ Most public land holdings are

diversity may have serious consequences for human welfare”).

26. See Biodiversity Act, *supra* note 3, § 2(4) (stating that reduced biological diversity may result in “resources for research and agricultural, medicinal, and industrial development [being] irretrievably lost”); *id.* § 2(6) (“reduced biological diversity will diminish the raw materials available for scientific and technical advancement”); William M. Flevaris, Note, *Ecosystems, Economics, and Ethics: Protecting Biological Diversity at Home and Abroad*, 65 S. CAL. L. REV. 2039, 2042 (1992); Edward O. Wilson, *Threats to Biodiversity*, SCI. AM., Sept. 1989, at 108.

27. Flevaris, *supra* note 26, at 2043.

28. See Edward O. Wilson, *Toward Renewed Reverence for Life*, TECH. REV., Nov. 1992, at 1.

29. See 50 C.F.R. §§ 17.11-.12 (1992).

30. Keiter, *Taking Account*, *supra* note 3, at 931-32.

31. See, e.g., Tracy Dobson, *Loss of Biodiversity: An International Environmental Policy Perspective*, 17 N.C. J. INT’L L. & COM. REG. 277, 280-81 (1992) (giving the following example of the unexpected ways in which species rely on one another for survival:

In the tropical moist forests of South America, 900 species of figs provide essential nutrition to spider monkeys, peccaries, and toucans during three months of every year. The existence of the figs depends on pollination by wasps. Thus, without wasps, spider monkeys, peccaries, and toucans and their predators (monkeys and jaguars) would disappear.).

32. See Biodiversity Act, *supra* note 3, § 2(8) (“existing conservation laws focus on the protection of individual species that have already suffered declines, rather than emphasizing ecosystem management to sustain diversity across a range of species”).

33. See generally Lynton K. Caldwell, *The Ecosystem as a Criterion for Public Land Policy*, 10 NAT. RESOURCES J. 203 (1970).

34. Keiter, *Taking Account*, *supra* note 3, at 929. See also Biodiversity Act, *supra* note 3, § 3(3) (defining ecosystem diversity as “the distinctive assemblages of species and ecological processes that occur in different physical settings of the biosphere and distinct parts of the world”).

35. Flevaris, *supra* note 26, at 2048; Keiter, *Taking Account*, *supra* note 3, at 649.

36. Keiter, *Taking Account*, *supra* note 3, at 925.

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too small to support the genetic viability of the resident species³⁷ or have “jagged edges,” which means that portions of the necessary habitat are located on private lands.³⁸ These private lands are developed largely in disregard of the surrounding ecosystem.³⁹

The relationships between animal and plant species within and outside of the preserved areas are varied. Animals hunted outside of the preserved areas can migrate into them and the external hunting affects their behavior with animals within the preserve. Air or water pollution from the outside affects the protected area through connecting airsheds or watersheds.⁴⁰ Moreover, activities on lands surrounding preserved lands can impose an “edge effect,” by which animals are driven by noise or habitat encroachment away from the edges into the core of the preserved lands, further shrinking the effectively preserved habitat.⁴¹

Failing to conform the boundaries of preserved lands to the requirements of ecosystems can fragment and isolate animal and plant species, preventing genetic interchange. The increased inbreeding within the isolated groups may cause genetic weaknesses, further reducing that population’s chances of survival.⁴²

Our policy approach has also been fragmented through a focus on individual species rather than on the matrix of relationships among species within ecosystems.⁴³ For example, the Endangered Species Act of 1973 (ESA)⁴⁴ contains provisions for protecting habitats, but only for endangered species.⁴⁵ While these provisions may indirectly protect other species within the same ecosystems, the Act does not allow for the preservation of ecosystems generally.⁴⁶ In addition, biodiversity is not secure if a resource manager must wait until a species is endangered before protecting it.⁴⁷

37. *Id.* at 931.

38. Kenton R. Miller, *Biosphere Reserves in Concept and Practice*, in *BIOSPHERE RESERVE*, *supra* note 8, at 12.

39. *Id.* For example, timber production activities on private timber lands adjacent to Redwoods National Park in California have led to serious erosion, stream siltation, and trees blow-down within the park. Joseph L. Sax, *Helpless Giants: The National Parks and the Regulation of Private Lands*, 75 MICH. L. REV. 239, 240 (1976).

40. Peter S. White, *Use of Renewable Resources: Workshop Summary*, in *PROCEEDINGS*, *supra* note 3, at 131.

41. Lewin Parks, *How Big is Big Enough?*, 225 SCI. 611, 612 (1984).

42. Brian L. Kuehl, *Conservation Obligations under the Endangered Species Act: A Case Study of the Yellowstone Grizzly Bear*, 64 U. COLO. L. REV. 607, 607-08 (1993).

43. See Biodiversity Act, *supra* note 3, § 2(8).

44. Endangered Species Act of 1973, Pub. L. No. 93-205, 87 Stat. 884 (codified as amended at 7 U.S.C. § 136, 16 U.S.C. §§ 1531-1544, and in other scattered sections of 16 U.S.C.).

45. See 16 U.S.C. § 1533(b)(2).

46. Courts have indicated that the ESA is not to be used as a mechanism for comprehensive planning but should only be concerned with the specific problems of listed species. See Edwin M. Smith, *The Endangered Species Act and Biological Conservation*, 57 S. CAL. L. REV. 361, 367-73 (1984).

47. *Id.* at 387; Biodiversity Act, *supra* note 3, § 2(12) (“maintaining biological diversity through habitat preservation is often less costly and more effective than efforts to save species once they become

These fragmented approaches to preserving biodiversity have been ineffective because they reflect too sharp a distinction between public and private property, and unrealistic distinctions among species. Ecosystem protection requires uniform protection of biota⁴⁸ on lands of varying ownership and recognition of the varied and complex interactions among species and between animals and the botanical and geological features of their habitats.⁴⁹

The first step in implementing ecosystem management will be identifying and mapping ecosystems that are important due to the types of biota they contain or the ecological functions they fulfill. Fortunately, this task has largely been accomplished or is currently being planned by various governmental agencies. EPA Region VIII has begun to develop a "watershed inventory," in which information on ecosystems is "collected[ed] and organiz[ed] . . . along watershed and ecoregion, rather than political, boundaries."⁵⁰ The U.S. Department of the Interior is considering the establishment of a National Biological Survey to map ecosystems "with the same scientific accuracy as the United States Geological Survey charts the country's geology."⁵¹ The Biodiversity Act, if passed, will require the U.S. Council on Environmental Quality to identify "biotic communities . . . of special concern."⁵²

Once these agencies identify important ecosystems, it will be a much larger task to develop administrative structures to protect their health. These administrative structures should reflect the geological and political circumstances of the ecosystems they are designed to protect. Some ecosystems contain only a small number of private landowners. In these areas, the government may be able to negotiate site-specific management plans.⁵³ Other procedures will be required to protect ecosystems in highly developed urban or suburban regions. The Interior Department has developed plans to reconstruct wetlands that have been destroyed by overdevelopment in order to protect the Everglades ecosystem in Florida⁵⁴ and has negotiated with builders to protect the remaining

endangered").

48. Biota is "the animals, plants, fungi, etc. of a region or period." THE RANDOM HOUSE DICTIONARY OF THE ENGLISH LANGUAGE 211 (2d ed.).

49. Cf. Caldwell, *supra* note 33, at 205 (arguing for land management based on ecosystem principles and that even private land is partially public).

50. OFF. OF WATER, U.S. EPA, *The Watershed Protection Approach*, Ann. Rep. (Jan. 1993). In addition, the MAB program has identified 47 important ecosystems in the United States. Juanita Darling, *Environment; Mexico Turning Peasants into Ecological Pioneers; At El Triunfo Biosphere Reserve, Officials are Re-educating the People in an Attempt to Preserve the Land*, L.A. TIMES, Apr. 21, 1992, at 5.

51. Stevens, *supra* note 1; see also Babbitt to Map, *supra* note 1.

52. Biodiversity Act, *supra* note 3, § 5(d)(2).

53. See, e.g., Keith Schneider, *Accord is Reached to Aid Forest Bird, Nature*, N.Y. TIMES, Apr. 16, 1993, at A1 (discussing agreement between Georgia Pacific Company and U.S. Interior Department, in which Georgia Pacific agreed to leave at least 10 acres of trees on its privately owned land around populations of endangered woodpeckers, in return for which they received relaxed regulation of logging on their other lands).

54. See *Plan to Restore Everglades Includes Constructed Wetlands to Filter Runoff*, 24 ENVTL. L. REP. 451 (1993).

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species in developed areas in California.⁵⁵ In other areas, private public-interest groups have raised money to purchase development rights.⁵⁶

The MAB proposals provide a model for managing ecosystems in which there are considerable amounts of public land and in which a significant portion of the human population derives a living from exploiting natural resources. MAB preserves are comprised of an interlocking system of geographical areas with different functions for maintaining biodiversity. At the center is a "core zone" composed of public lands. These areas remain in a pristine condition, with as little contact with or interference from humans as possible. Surrounding this core is a "manipulation zone," composed of less ecologically sensitive public lands. Here, scientists and resource managers conduct research and explore how to harvest natural resources in ways that do not impair the sustainability of the ecosystem. Individuals from the surrounding communities may harvest natural resources within this zone using sustainable harvesting methods.

The MAB plans entail a unique method of incorporating a human presence within protected ecosystems. Surrounding the "core" and "manipulation" zones is a "buffer" zone, consisting primarily of private lands.⁵⁷ Land use within the buffer zone is strictly regulated and biosphere reserve managers work with private landholders to develop new techniques to extract a living from their land in ways that do not damage the surrounding ecosystem. These lands thereby create a protective buffer around the more sensitive core and manipulation zones, while at the same time allowing for the presence of human economic activity.

There are no fully functioning MAB reserves in the United States, primarily because private landowners resist the land use restrictions MAB reserves require.⁵⁸ MAB preserves, however, function well in other countries,⁵⁹ suggesting that MAB preserves could be successful in this country if an implementation method could be found.

55. See Robert Reinhold, *Tiny Songbird Poses Big Test of U.S. Environmental Policy*, N.Y. TIMES, Mar. 16, 1993, at A1; Robert Reinhold, *U.S. to Protect a Songbird But Give Builders Leeway*, N.Y. TIMES, Mar. 25, 1993, at A20.

56. See Jordan, *supra* note 12, at 411; *Money to Save Walden Is Spent Far from Pond*, N.Y. TIMES, Sept. 5, 1993, at 42 (discussing Walden Woods Project, a private group formed to buy environmentally and ecologically endangered lands for preservation).

57. PROCEEDINGS, *supra* note 3, at 7.

58. Franklin, *supra* note 9, at 61; See Scace, *supra* note 9, at 1, 4 (stating that in part because of the variety of types of land ownership and uses, integrating non-core areas will be the most difficult task in creating biosphere preserves).

59. See, e.g., Darling, *supra* note 50 (discussing progress towards environmental goals at the El Triunfo biosphere reserve in Mexico).

II. IMPLEMENTING THE MAB PLANS THROUGH THE CREATION OF ECOCOMMONS

A. *The Inappropriateness of Traditional Land Use Controls*

Land use within the buffer zones of MAB reserves is strictly regulated. However, the traditional methods of controlling private land use in the United States, condemning private property in fee through eminent domain and police-power-based regulations, are inappropriate for implementing MAB reserves. The use of eminent domain to condemn all private lands in fee within the buffer zones would be prohibitively expensive.⁶⁰ Taking these lands out of private hands would also take them off tax rolls, thereby diminishing the real estate tax base,⁶¹ and would take the resources on these lands completely out of the economy. It would also be unnecessary since some level of human activity is compatible with the health of most ecosystems.⁶²

Police-power-based regulation would also be an inappropriate mechanism for creating MAB preserves. The Fifth Amendment to the U.S. Constitution requires that compensation be paid whenever private property is taken for public use.⁶³ Many state constitutions contain similar provisions.⁶⁴ Courts have long recognized that the regulation of private property can impose such heavy burdens on property owners that the regulations effectively "take" the property, giving rise to an obligation on the part of the government to pay compensation. As Justice Holmes described it, "while property may be regulated to a certain extent, if regulation goes too far it will be recognized as a taking."⁶⁵

The exact point at which a regulation imposes so oppressive a burden that it becomes a compensable "taking" is a fact-bound question⁶⁶ involving a consideration of the regulation's economic impact on the landowner, the extent to which the regulation interferes with the landowner's investment-backed expectations, and the precise character of the governmental action.⁶⁷ It would

60. See, e.g. Jordan, *supra* note 12, at 403 (noting that purchasing ecologically sensitive lands in fee is an unnecessarily expensive method of pursuing conservation objectives); Korngold, *supra* note 15, at 444 (claiming that even the most optimistic estimates suggest that future funding will be insufficient for projected state and federal land acquisitions for conservation purposes); Sax, *supra* note 39, at 242 (noting that even when condemnation of lands needed for park use is authorized, it is often not done because of a chronic scarcity of funds).

61. Korngold, *supra* note 15, at 444-45.

62. See Wright, *supra* note 9, at 167.

63. See U.S. CONST. amend. V. ("nor shall private property be taken for public use, without just compensation").

64. See, e.g., ALA. CONST. art. I, § 23 ("private property shall not be taken for, or applied to public use, unless just compensation be first made therefor"); ALASKA CONST. art. I, § 18 ("[p]rivate property shall not be taken or damaged for public use without just compensation").

65. Pennsylvania Coal Co. v. Mahon, 260 U.S. 393, 415 (1922).

66. See Lucas v. South Carolina Coastal Council, 112 S. Ct. 2886, 2893-95 (1992).

67. Penn. Cent. Transp. Co. v. New York City, 438 U.S. 104, 124 (1978).

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be impossible to answer in the abstract whether the creation of MAB preserves through regulation would violate the Constitution.

Nevertheless, the type of land use restrictions that would be imposed in buffer areas have been found to constitute takings in the past. In *Bartlett v. Zoning Commission*,⁶⁸ the Supreme Court of Connecticut found that regulations preventing a private landowner from filling wetlands on his property worked a compensable taking in violation of both the state and federal constitutions. In *Hendler v. United States*,⁶⁹ the court found that a landowner had suffered a compensable taking when he was required to permit EPA officials onto his land for the purpose of remediating environmental damage on neighboring property. In *Nollan v. California Coastal Commission*,⁷⁰ the Supreme Court found that a taking had occurred when a private property owner was required to allow the public to pass over his land. The Tenth Circuit has held that a taking can occur when wild animals exit public lands to forage on surrounding private lands.⁷¹ In *Shellnut v. Arkansas State Game & Fish Commission*,⁷² the Supreme Court of Arkansas found that the takings clause of the Arkansas Constitution had been violated when the state imposed regulations on property requiring the owners to maintain it as a wildlife sanctuary. In *Wisconsin v. Herwig*,⁷³ the Supreme Court of Wisconsin held that a taking had occurred under the Wisconsin Constitution when birds protected by the state foraged heavily on private lands. Also, the U.S. Supreme Court has held that almost any time a regulation causes a private land owner to "suffer a physical invasion of his property," compensation will be required.⁷⁴

Regulations for implementing MAB preserves would often forbid private landowners from altering the natural features of their lands, require them not to interfere with the movement or habits of wild animals, or require them to permit entrance by hunters or reserve personnel. Such regulations, therefore, might well be found unconstitutional if no compensation were provided.⁷⁵

Creating MAB preserves through regulation would not be advisable even if it were constitutionally permissible. Regulations that limit economic activity

68. 282 A.2d 907 (1971).

69. 952 F.2d 1364 (Fed. Cir. 1991).

70. 483 U.S. 825, 831-32 (1987).

71. *Mountain States Legal Found. v. Clark*, 740 F.2d 792 (10th Cir. 1984), *rev'd*, 799 F.2d 1423 (10th Cir. 1986), *cert. denied*, 480 U.S. 951 (1987). *Mountain States* was later reversed on the basis of a fact-bound inquiry into the actual affect of the foraging on the plaintiffs' lands. The possibility remains, however, that the activities of wild animals on private lands could constitute a takings under different factual circumstances.

72. 258 S.W.2d 570 (1953).

73. 117 N.W.2d 335 (1962).

74. *Loretto v. Teleprompter Manhattan CATV Corp.*, 458 U.S. 419 (1982) (regulations requiring landlords to allow placement of cable television facilities that would occupy 1.5 cubic feet of property worked regulatory taking).

75. For a full discussion of Fifth Amendment challenges to conservation regulations, see *Jordan, supra* note 12, at 430-35.

without providing compensation create dangerous levels of resentment within the affected populations.⁷⁶ These populations can pose tremendous threats to preservation objectives through political opposition, poaching, and general misuse.⁷⁷ In the past, individuals adversely affected by conservation regulations in this country have reacted by intentionally killing members of species that the regulations were intended to protect, intentionally destroying protected habitats,⁷⁸ or engaging in acts of violence against the regulators.⁷⁹ In order to counteract this hostility and create positive incentives for conservation,⁸⁰ local populations should be compensated for land use restrictions in a way that makes it clear that the health of the ecosystem and the health of their local economies are inextricably linked.

B. Conservation Easements: An Alternative Tool for Implementing Conservation Policy

Recognizing the limitations of taking property in fee through eminent domain and of police-power-based regulations, governments have turned increasingly to purchasing conservation easements to implement comprehensive habitat preservation measures.⁸¹ Compensation is given for these easements, so the hostility engendered by regulation is largely avoided. At the same time, purchasing easements is cheaper and less disruptive than purchasing property in fee and allows land to remain in taxable economic use for unrestricted purposes.⁸²

Under the federal Environmental Easement Program, the Secretary of Agriculture acquires easements from willing owners of ecologically important

76. See, e.g., Stephen R. Kellert, *Enhancing Public Appreciation of the Role of Biosphere Reserves*, in *BIOSPHERE RESERVE*, *supra* note 8, at 123, 125-26 (describing danger that conservation objectives will become characterized as choosing animals and plants, or the nature fetishes of elite intellectuals, over the real needs of common working people); Mitchell Pacelle, *It Takes Guts Telling Paul Bunyan to Cut Herbs, Spare Timber*, *WALL ST. J.*, Nov. 27, 1992, at A1 (describing resentment of loggers in Northern California at regulations protecting the spotted owl).

77. Kellert, *supra* note 76, at 126. For a discussion of the growth of political opposition to environmental regulation spurred by restrictions on private land use, see Brad Knickerbocker, *Property Rights Movement Gains Ground in Congress*, *CHRIS. SCI. MON.*, Sept. 21, 1993, at 1, and Maura Dolan, *Rural Alliances Fighting Restrictions on Land Use*, *L.A. TIMES*, June 9, 1991, at A1.

78. See Maura Dolan, *Nature at Risk in Quiet War: When Federal Regulations and Property Rights Clash, Endangered Species Can Be the Losers*, *L.A. TIMES*, Dec. 20, 1992, at A1.

79. See *\$7,500.00 Reward in Arson Cases, Owl Killings*, *SEATTLE TIMES*, Feb. 26, 1991, at C4 (describing how arson attacks on two ranger stations are suspected to be protests against restrictions on logging aimed at protecting the spotted owl).

80. See *BIOSPHERE RESERVE*, *supra* note 8, at 5 (arguing that implementation of biosphere concept will ultimately depend on incentives offered to affected communities). See also David Pomper, Comment, *Recycling Philadelphia v. New Jersey: The Dormant Commerce Clause, Postindustrial "Natural" Resources, and the Solid Waste Crisis*, 137 *U. Pa. L. Rev.* 1309, 1330-33 (1989) (arguing that incentives are needed to induce local populations to support landfill conservation measures).

81. See generally Jordan, *supra* note 12.

82. Cf. Korngold, *supra* note 15, at 443-45.

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property in order to “ensure the continued long-term protection of environmentally sensitive lands.”⁸³ The owner of the burdened property is required to develop and implement a natural resource conservation management plan containing various measures for the protection of the environment.⁸⁴ The owner of the burdened property is given cash payments of up to \$50,000 per year for the easement.⁸⁵

Similarly under the Forest Legacy Program, the Secretary of Agriculture, in cooperation with state, regional, and other units of government, purchases easements to protect forest lands with significant environmental value or which are threatened with conversion to non-forest uses. The burdened land must be managed to maintain its ecological value, but may be used for non-destructive purposes. In return, the property owner receives cash payments for the fair market value of the easement.⁸⁶

C. The Creation of Ecocommons

The ecocommons plan is a method for creating and administering MAB preserves within ecosystems containing resource-dependent communities. Under the ecocommons plan, MAB preserves would be created by condemning conservation easements on the private lands that would constitute the buffer zones. While the federal programs discussed above rely on voluntary sales of easements, easements on private lands within the buffer zones of ecocommons would be taken by eminent domain.⁸⁷ More importantly, rather than purchasing easements with cash, compensation would be paid with rights to the natural resources on the public lands that these resource-dependent communities had already been exploiting.

There is no constitutional requirement that compensation for condemned land be paid in cash.⁸⁸ In many areas, the value of the natural resources that

83. 16 U.S.C. § 3839(a) (Supp. IV 1992).

84. 16 U.S.C. § 3839a (Supp. IV 1992).

85. 16 U.S.C. § 3839(c)(f) (Supp. IV 1992).

86. 16 U.S.C. § 2103c (Supp. IV 1992).

87. Eminent domain allows governments to take property for necessary public use regardless of the property owner's willingness to sell. See James G. Durham, *Efficient Just Compensation as a Limit on Eminent Domain*, 69 MINN. L. REV. 1277, 1277-78 & n.1 (1985); see also *Hendler v. United States*, 952 F.2d 1363, 1371 (Fed. Cir. 1991) (“[a] man's home may be his castle, but that does not keep the Government from taking it”).

88. See, e.g., *United States v. Indian Creek Marble Co.*, 40 F. Supp. 811, 819 (E.D. Tenn. 1941) (“[t]he constitutional requirement has no reference to the form in which compensation shall be paid, whether in cash or in benefits incident to the use to which the property taken is put”); *United States v. An Easement and Right of Way*, 43 F.R.D. 318, 321 (finding that if government development of condemned property sufficiently increased the value of the condemnee's remaining land, “the landowner will not be entitled to any compensation in the form of money because he has already been compensated by the benefits which have accrued to his remaining property”); see also Frank Schnidman & R. Lisle Baker, *Planning for Platted Lands: Land Use Remedies for Lot Sale Subdivisions*, 11 FLA. ST. U. L. REV. 505, 588 (1983) (arguing that just compensation could be given through equity participation in government development and other means, rather than with money).

could be harvested on a sustainable basis from public lands is more than adequate for this purpose.⁸⁹ The MAB plans require reserve managers to develop additional methods of harvesting natural resources without damaging the ecosystem. Creativity in this task could enhance and diversify the availability of valuable resources through such measures as wild animal ranching,⁹⁰ trophy hunting,⁹¹ sustainable harvesting of nontraditional forest resources,⁹² and research and extraction permits for new drugs.⁹³ The economic potential of sustainable-yield exploitation of natural resources could also be enhanced by granting intellectual-property-right protection for new sustainable-use methods.⁹⁴

89. Randal O'Toole, Director of Cascade Holistic Economic Consultants, a non-profit consulting firm, gives a conservative estimate that the lands under the jurisdiction of the U.S. Forest Service could yield total receipts of \$2.75 billion from timber, recreation and wildlife, grazing, water, and mineral extraction if properly managed on a sustainable-yield basis. RANDAL O'TOOLE, *REFORMING THE FOREST SERVICE* 224 (1988) [hereinafter O'TOOLE, book]. This does not include the receipts from resources located on lands under the jurisdiction of states, or other federal agencies, such as the Bureau of Land Management or the Park Service.

The economic potential of the resources on public lands has gone largely unrealized in the past for two reasons. First, earlier conceptions of nature preserves saw even sustainable levels of resource extraction as incompatible with the preserves' central mandates to reduce or eliminate the effect of humans within the preserved areas. Today, many preserve and park managers believe they can best ensure the long-term survival of a nature preserve by linking conservation objectives to the economic well-being of the surrounding communities through permitting sustainable harvesting of resources. See Bill Keller, *Africa Thinks About Making Wildlife Pay for its Survival*, N.Y. TIMES, Dec. 27, 1992, at D3 (discussing nature preserves around the world that have enhanced their chances for survival by increasing the economic value of their resources); Pacelle, *supra* note 76 (claiming that giving local populations an economic interest in the health of the ecosystem is the best way to ensure its survival). Second, the government's grossly inefficient management has made it unable to capture the value of the resource extraction permitted on public lands. See, e.g., Randal O'Toole, *Reforming the Forest Service*, 13 COLUM. J. ENVTL. L. 299, 299 (1989) [hereinafter O'Toole, journal] (two out of three national forests lost money on timber sales after sale preparation costs and county payments). Mr. O'Toole attributes this inefficiency to the Forest Service's systemic inability to avoid below-cost timber sales since U.S. law makes the Service partially self-funding out of a fixed portion of timber sales. Therefore, any timber sold adds to the Service's revenues, regardless of whether the price is equal to or less than the costs of making the sale. See *id.* at 299-309; see also Mike Christensen, *Fowler to Hold Hearings on Forest Service Flights, Money Wasted, Inspectors Say*, ATLANTA J. & CONST., July 28, 1992, at A5 (quoting Senator Wyche Fowler Jr. of Georgia claiming that two thirds of the federal timber programs managed by the Forest Service lose money).

90. In a biosphere reserve in Africa, for example, a program to raise native species instead of imported cattle potentially could produce an income ratio of 120 to four in favor of the native species. In addition, the grazing patterns of the native species are often more in sync with the natural growth patterns of the native forage material. See Wright, *supra* note 9, at 179.

91. As one example of the potential for innovation and creativity in this area, some reserves in Africa are considering selling two types of hunting permits which would be highly profitable and which would not do any damage to the sustainability of the ecosystem. Some hunters are willing to pay up to \$100,000 for the chance to hunt animals that, while still majestic-looking, are too old to mate and are on the verge of dying from natural causes. In addition, game managers in Africa often find it necessary to tranquilize large animals, either to move them or for research purposes. Some preserves have found that hunters are willing to pay thousands of dollars for the chance to fire the tranquilizer gun. See Keller, *supra* note 89.

92. See, e.g., Timothy Egan, *Rushing to Gather Up Cash on Northwest's Forest Floor*, N.Y. TIMES, June 28, 1993, at A1 [hereinafter Egan, *Rushing*] (describing new and highly profitable industry of wild mushroom harvesting in the forests of the Pacific Northwest).

93. Approximately 25% of the prescription drugs used in America are derived from plants. Flevares, *supra* note 26, at 2042.

94. Robert Housman & Durwood Zaelke, *Trade, Environment, and Sustainable Development: A Primer*, 15 HASTINGS INT'L & COMP. L. REV. 535, 564 (1992).

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There are many communities in this country whose economies are based on the commercial exploitation of natural resources on public lands. One fifth of the communities in the states of Nevada, Utah, Colorado, Wyoming, the southern half of Idaho, and the western portion of South Dakota are dependent on national forest timber sales.⁹⁵ Congress has specifically found that the economies of many rural communities in this country “depend[] upon the goods and services that are derived from national forests.”⁹⁶ Additionally, many of the communities along our various coasts are dependent on commercial fishing.⁹⁷ Approximately 31,000 ranchers hold permits to graze cattle on the 173 million acres of rangeland administered by the U.S. Bureau of Land Management.⁹⁸ These are only a few examples of resource-dependent communities and the resources they depend on. Other communities are dependent on income derived from recreational use of public lands,⁹⁹ or on natural resources other than those traditionally exploited for profit.¹⁰⁰ Since many of the members of resource-dependent communities are already involved in resource extraction, the creation of ecocommons within these communities would result in less social disruption than would be true in other areas. This would contribute to the ecocommons’ stability.

Within an ecocommons, private landowners in resource-dependent communities would exchange conservation easements on their property for “rights in common” to natural resources on the adjoining public lands. A right in common is “a right or privilege which several persons have to the produce of the lands or waters of another.”¹⁰¹ For centuries, common ownership has been an effective strategy for managing a variety of natural resources.¹⁰²

Within a traditional commons, specific individuals are granted rights to harvest resources and land use is strictly regulated.¹⁰³ Because those holding

95. Schallau & Alston, *supra* note 16, at 448 (citing J. BREWER & M. JOHANNESSEN, SURVEY OF COUNTY DEPENDENCY UPON NATIONAL FOREST TIMBER SALES IN THE ROCKY MOUNTAIN AREA 5 (1967)); see also Timothy Egan, *Timber Country Sees a Vacation Land*, N.Y. TIMES, Sept. 2, 1993, at A14 [hereinafter Egan, *Timber*] (describing how federal government created the modern economy on the Olympic Peninsula in Washington when it opened federal lands for logging in the 1950s).

96. 7 U.S.C. § 6611(a)(2) (Supp. IV 1992).

97. G. Kevin Jones, *Harvesting the Ocean’s Resources: Oil or Fish?*, 60 S. CAL. L. REV. 585, 611 (1987).

98. D. Bernard Zaleha, Note, *The Rise and Fall of BLM’s “Cooperative Management Agreements”*: A Livestock Management Tool Succumbs to Judicial Scrutiny, 17 ENVTL. L. 125, 126 & n.3 (1986).

99. See Egan, *Timber*, *supra* note 95 (describing how communities formerly dependent on logging are developing economies centered on tourists drawn by surrounding national parks).

100. Egan, *Rushing*, *supra* note 92 (noting that as many as 8000 commercial mushroom pickers are involved in a \$40 million dollar industry of harvesting wild mushrooms from the national forests in Oregon); Pacelle, *supra* note 76 (describing how former logging community now has economy based on commercial marketing of moss, pinecones, and herbs).

101. Van Rensselaer v. Radcliff, 10 Wend. 639, 647 (N.Y. Sup. Ct. 1833).

102. See generally Susan Jane Buck Cox, *No Tragedy on the Commons*, 7 ENVTL. ETHICS 49 (1985).

103. *Id.* at 49, 55-56 (defining the common grazing lands of medieval and postmedieval England as the traditional commons); S.V. Ciriacy-Wantrup & Richard C. Bishop, “Common Property” as a Concept in Natural Resources Policy, 15 NAT. RESOURCES J. 713, 719 (1975).

the common interests are able to exclude outsiders and therefore retain the benefits of careful management for themselves, many commons have been managed with high levels of sustainability and cooperation and with relatively low monitoring costs.¹⁰⁴

Common property regimes are most often applied to single resources, such as pasturage or fish. Rights and obligations are connected to that resource: restrictions on present fish harvests within the commons, for example, are rewarded with future fish harvests.¹⁰⁵ The ecocommons plan expands on the notion of managing individual resources to create a common property management regime for complete ecosystems.¹⁰⁶

The extension of the principles of traditional commons to ecosystem management entails a complex matrix of relationships. Limitations on tree harvesting, for example, may be imposed not to protect trees, but to protect fish from river siltation.¹⁰⁷ Restrictions on tree harvesting on buffer zone lands, therefore, may be compensated with rights to future fish harvests on the nearby public lands.¹⁰⁸

Ecocommons would be established through several steps: first, the government¹⁰⁹ would identify ecosystems that are appropriate candidates for ecocommons.¹¹⁰ As under the MAB plans, the public lands within these ecosystems would be designated as core zones or manipulation zones depending on their ecological importance and sensitivity, and on the extractable resources they contain.

The next step would be to inventory the natural resources that could be

104. ELINOR OSTROM, *GOVERNING THE COMMONS* 55-65 (1991).

105. See generally James M. Acheson, *The Lobster Fiefs Revisited*, in *THE QUESTION OF THE COMMONS* 37 (Bonnie J. McCay & James M. Acheson eds., 1987) [hereinafter *QUESTION*].

106. The idea of an ecosystem being a complex form of a commons was suggested to me by Professor Carol M. Rose of the Yale Law School, in conversations during the Fall of 1992.

107. See Bowen Blair, Jr., *Seattle Master Builders & Creative Cooperative Federalism: The Columbia River Gorge National Scenic Area: The Act, Its Genesis and Legislative History*, 17 *ENVTL. L.* 863, 874 (1987) (describing how fishermen believe that clear cutting of forests increases siltation of fish spawning tributaries, thus endangering fish populations); Jean C. Durning, *Comment: Local Employment and Federal Land Management Planning*, in *COMMUNITY STABILITY IN FOREST-BASED ECONOMIES* 107, 108 (Dennis C. Le Master & John H. Beuter eds., 1989) [hereinafter *COMMUNITY STABILITY*] (describing how commercial and sport fisheries are threatened by logging on public lands).

108. The activities of private timber companies on lands adjacent to Redwoods National Park in California have already led to serious stream siltation within the park, damaging fish populations. See Sax, *supra* note 39, at 240.

109. As discussed *infra* part III.B, the ecocommons plan should be implemented through a cooperative effort between the federal and state governments.

110. According to the criteria discussed above, this evaluation would entail a finding that the ecosystem contained a significant amount of public land, and that an adequate number of resource-dependent communities existed within the ecosystem. If passed, Section 8(b)(4) of the Biodiversity Act will require an interagency committee to identify "specific management measures to be taken . . . with respect to . . . conservation through protective measures to maintain existing biological diversity, and through active measures to restore biological diversity [and] provisions for the long-term viability of ecosystems and ecosystems processes." Biodiversity Act, *supra* note 3. The federal government therefore is already contemplating the type of ecosystem analysis and management strategy decisions that would be necessary before determining that an area should be managed under the ecocommons plan.

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extracted from the public lands without damaging the ecosystem.¹¹¹ As discussed above, those completing the inventory should think creatively about the type of resources that could be extracted and about extraction methods.

In the last step, conservation easements on private lands within the buffer zone would be condemned. Specific land use restrictions would be designed for these lands. This would be similar to the creation of the Natural Resource Conservation Management Plans created for burdened properties under the Environmental Easement Program discussed above.¹¹² These Plans set forth conservation measures and practices for the land subject to the easement and the commercial uses still permitted on the burdened land.¹¹³

Creation of such buffer zones would not be a painless task. Private landowners may resist inclusion of their lands out of concern over the attendant regulations.¹¹⁴ Serious political opposition, however, might be avoided. Concern over the loss of biodiversity is rising¹¹⁵ and the political will seems to exist at this time to begin protecting ecosystems.¹¹⁶ Individuals living within ecosystems of vital public importance may have no choice but to reconcile themselves to the fact that they will be subject to some type of ecosystem management plan.¹¹⁷ Supporters of the ecocommons plan can point out that the adjustments required under this plan may be no more significant than those engendered by alternative plans. Also, the resources that would be exchanged for the conservation easements represent a significant payoff to the burdened

111. Since this would be a valuation only of resources that could be exploited economically, it would not entail the difficulties of valuing non-use values of natural resources. Quantifying non-use values for purposes of policy formation or to establish natural resource damages for various environmental statutes is a daunting task, which often leads only to speculative results. See Garey Durden & Jason F. Shogren, *Valuing Nonmarket Recreation Goods: An Evaluative Survey of the Literature on the Travel Cost and Contingent Valuation Methods*, 15 REV. REGIONAL STUD. 1 (1988). For purposes of the ecocommons, it would only be necessary to inventory the use values of natural resources. Such an inventory would not be beyond the capabilities of the fast-developing science of natural-resource valuation. See Michael B. Saunders, Comment, *Valuation and International Regulation of Forest Ecosystems: Prospects for a Global Forest Agreement*, 66 WASH. L. REV. 871 (1991).

112. See *supra* text accompanying notes 83-85.

113. See 16 U.S.C. § 3839a(b) (Supp. IV 1992).

114. In 1984, both Wyoming and Utah passed laws expressly forbidding turning the lands surrounding wilderness areas into buffer zones. See Keiter, *Taking Account*, *supra* note 3, at 954 & n.136.

115. See, e.g., Biodiversity Act, *supra* note 3, §§ 2(1), 2(4) (stating that "the Earth's biological diversity is being reduced at a rate without precedent in human history" and that this "may have serious consequences for human welfare"); Wilson, *supra* note 26 (claiming that human destruction of the ecosystem may indicate that, as a race, we are "suicidal"); Emily Yoffe, *Silence of the Frogs*, N.Y. TIMES, Dec. 13, 1992 (Magazine), at 36, 64 ("Frogs are in essence a messenger. . . . This is about biodiversity and disintegration, the destruction of our total environment.") (quoting David B. Wake, Director of the Museum of Vertebrate Zoology at the University of California, Berkeley on the subject of the rapid disappearance of frog species).

116. Officials in the Department of Interior, see, e.g., Stevens, *supra* note 1, the EPA, see *Watersheds*, *supra* note 6, and the other executive agencies concerned with natural resources, see *Environmental Problems*, *supra* note 6, agree with some members of Congress that biodiversity must be protected. See Biodiversity Act, *supra* note 3.

117. Cf. Egan, *Timber*, *supra* note 95 (describing how certain communities in the Pacific Northwest have resigned themselves to restrictions on logging and have searched for different bases for their economies).

landowners.

Development interests may oppose the ecocommons plans since they would not be able to purchase unburdened land within the buffer zones to convert to more profitable uses. On the other hand, development would not be precluded within these zones, and developers may find that the burdens and benefits promote creative and profitable development ideas that do not damage the surrounding ecosystem.¹¹⁸

Compensation for the condemned easements would be paid in rights in common to a share of the natural resources of the ecosystem ("Resource Rights"). The private lands would be categorized in regions depending on the nature and extent of the easements to be imposed upon them. The number of Resource Rights that landowners received would depend on the region in which their property was located: greater restrictions would be compensated through larger Resource Right allotments.

This plan, therefore, would entail the privatization of a portion of the resources on public lands, but not the privatization of the public lands themselves. Elinor Ostrom makes a useful distinction between resource units and resource systems, explaining both the nature and the purpose of a commons. Resource units, such as fish, animals, or grazing rights, are what individuals harvest from a resource system. The resource system is the biological system that produces the stream of resource units. Subtractability characterizes resource units, while jointness characterizes the resource system. As Ostrom explains it, many boats can fish on a lake resource system, but each fish can be captured by only one person.¹¹⁹ By exchanging rights to resources on public lands for conservation easements on the surrounding private lands, the ecocommons plan would privatize public resource units, while leaving resource systems under public ownership and control.

In addition to allocating resources, Resource Rights would stipulate the conditions under which the resources could be harvested.¹²⁰ Both the easements and the Rights would be recorded in the appropriate deeds and would become permanent benefits and burdens running with the property.¹²¹

118. Cf. GREEN PRODUCTS BY DESIGN, Off. Tech. Assessment No. 052-003-01303-7 (outlining profit potential in innovative, environmentally sound products).

119. Elinor Ostrom, *The Rudiments of a Theory of the Origins, Survival, and Performance of Common-Property Institutions*, in MAKING THE COMMONS WORK, *supra* note 15, at 293, 296.

120. This will not be a novel or difficult task for governments. Leases to harvest natural resources on public property often contain restrictions on extraction methods, imposed to protect the long-term health of the resource. See, e.g., Submerged and Submersible Land Special Lease (Kelp Harvest) (Orefon ML-1038) at app. 1 (June 6, 1988) (on file with the author) (containing explicit seasonal, quantity, and methodological restraints on lessees of kelp beds).

121. Cf. 16 U.S.C. § 3839a(a)(2)(A) (Supp. IV 1992) (requiring burdened property owner to create and record an appropriate deed restriction, in accordance with state law, to reflect environmental easement); Fenster v. Hadi, 1991 WL 257295 (Conn. Super. Ct. Nov. 26, 1991) (purchaser of property entitled to rescind contract of sale where conservation easement was not disclosed); Coons v. Carstensen, 446 N.E.2d 114 (Mass. App. Ct. 1983) (restrictive agreement entered into by prospective vendor with land conservation

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The government with jurisdiction over the public lands forming the core and manipulation zones of the ecocommons would assume management responsibility for the ecocommons. This authority would oversee resource management within the reserve and enforce the land use and harvesting regulations. In addition, the managing authority would organize research both on the biological functioning of the ecosystem and on newly discovered extractable resources or resource extraction methods.¹²²

After the initial distribution, Resource Rights would be leasable.¹²³ Presumably, many of the individuals living within resource-dependent communities would choose to continue in their profession and would exercise their rights directly. However, they would not be forced to do so. Individuals or companies interested in resource extraction could lease the rights to those resources on a yearly basis.¹²⁴ In this way, the market would help ensure that Resource Rights would flow to the individuals valuing them most highly.¹²⁵

Nevertheless, Resource Rights should not be alienable separately from land within the ecocommons. Property owners within the ecosystem should have a permanent stake in the health of the ecosystem in order to preserve their incentives to comply with land use regulations and to monitor the compliance of their neighbors. All property owners within the ecocommons would have, in other words, an equity interest in the ecosystem. The income stream from their Resource Rights would be positively related to the health of the ecosystem, whether or not they were personally employed in resource extraction. Although these limitations on alienability may result in some loss of efficiency in the allocation of resources, this deficit would be compensated for, in part, by increasing the monitoring incentives for the residents of the ecocommons.

Although landowners would not be able to separate the ownership of their land from the ownership of their Resource Rights, there would be no restrictions on the alienation of property within the ecocommons. The fee estate, the conservation servitude, and the Resource Rights would accompany the transfer of property and anyone from outside the community willing to share in the responsibilities of maintaining the ecosystem could purchase land within the

trust was encumbrance which precluded delivery of good and clear record title).

122. This is the management strategy envisioned by the Man and the Biosphere program. See PROCEEDINGS, *supra* note 3, at 7.

123. Cf. Ciriacy-Wantrup & Bishop, *supra* note 103, at 715 (describing how in traditional commons individuals were often able to lease their rights of common).

124. Cf. Carol M. Rose, *Rethinking Environmental Controls: Management Strategies for Common Resources*, 1991 DUKE L.J. 1, 9-10 (claiming that exploitation of fish reserves could be accomplished by auctioning rights to fixed fish take and allowing fishermen to trade rights).

125. This would include those individuals who valued lands most highly as pristine areas who might lease resource extraction rights and retire them. Cf. Matthew L. Wald, *Lung Association Getting A Donation of Cleaner Air*, N.Y. TIMES, March 20, 1993, at 26 (describing plan whereby donors to American Lung Association can purchase and retire pollution rights created under the Clean Air Act). Today, nature conservancy organizations in several regions of the country use their funds to purchase conservation easements from landowners surrounding preserved lands. Korngold, *supra* note 15, at 447.

ecocommons.

Analogues to ecocommons function today. Although none of these examples is as complex as ecocommons would be, each indicates how the plan would work in practice. The North Pacific Fishery Management Council¹²⁶ has approved the Community Development Quota program (CDQ) to aid villages on the western Alaskan coast of the Bering Sea.¹²⁷ This program allocates a portion of the Bering Sea pollock catch,¹²⁸ worth approximately \$30 million,¹²⁹ to corporations organized to represent groups of villages.¹³⁰ These communities may either catch the pollock directly or lease their catch quotas to outside commercial fishing companies. Many of the communities have formed "partnerships" with large international fishing concerns. The villages lease their fishing rights to the fishing concerns in exchange for cash payments or priority in hiring.¹³¹

The purpose of the CDQ program is economic development, rather than ecosystem management. In addition, it is limited to a single resource—fish—rather than extending to the full variety of Resource Rights that would be distributed within an ecocommons. The CDQ program, however, like the ecocommons plan, distributes rights to publicly owned resources to the private individuals living in the area. Also like the ecocommons plan, it allows private individuals either to exercise resource extraction rights directly, or lease them to others. Either alternative maintains the local inhabitants' equity interest in the health of the resource system.

A second analogue exists in Japan. In traditional Japanese villages, rights to the diverse resources on common lands were distributed to surrounding households. Strict rules were established to protect the sustainability of the resource system, stipulating the methods, conditions, and levels of resource extraction. In addition, the rules imposed duties to maintain the health of the system and to protect the system from intruders or violators of the rules.¹³² Today, more than 2.5 million hectares in Japan are held in common.¹³³

Japanese villages have developed ways to make these common property regimes compatible with modern industrial society, in which many people are

126. The North Pacific Fishery Management Council consists of the states of Alaska, Washington, and Oregon, and has authority over the fisheries in the Arctic Ocean, the Bering Sea, and the Pacific Ocean seaward of Alaska. 16 U.S.C. § 1852(a)(7) (1988).

127. Brad Matsen, *Alaska Coastal Villages Get 7.5% of the Bering Sea Pollock Quota*, NAT'L FISHERMAN, March 1993, at 20.

128. 58 Fed. Reg. 24100, 24144 (Apr. 26, 1993).

129. Matsen, *supra* note 127.

130. Norton Sound Economic Dev. Corp., Bering Strait Region Community Development Quota Program 3 [hereinafter Quota Program].

131. *See generally* Matsen, *supra* note 127.

132. Elinor Ostrom, *Institutional Arrangements for Resolving the Commons Dilemma: Some Contending Approaches*, in QUESTION, *supra* note 105, at 250, 258-59.

133. Margaret A. McKean, *Management of Traditional Common Lands (Iriaichi) in Japan*, in MAKING THE COMMONS WORK, *supra* note 15, at 63, 65.

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not employed in resource extraction. In some cases, rather than extracting resources directly, the villagers create a "control group" which harvests and markets the resources and then distributes the proceeds based on proportional rights in common.¹³⁴ Other communities lease their rights in common to outsiders for a fixed fee.¹³⁵

The situation in Japan is an organic development from a historical common property regime, while the ecocommons plan is an attempt to create common property regimes where none existed previously. Like the CDQ program, however, the Japanese system and the ecocommons plan share the idea of distributing rights to resources on common lands, which the rights holders can either exercise directly or lease to parties more interested in resource extraction. Again, whichever alternative is chosen, the rights holders retain an equity stake in the health of the ecosystem.

III. A REFUTATION OF POTENTIAL CRITICISMS OF THE ECOCOMMONS PLAN

A. Efficiency

A critic of the ecocommons plan might argue that a similar result would be obtained in a less restrictive manner if resources on public lands were auctioned by the government and the proceeds were then used to purchase conservation easements on surrounding properties.¹³⁶ Randal O'Toole, for example, has advocated creating "wilderness trusts" out of the proceeds from grazing, mineral extraction, and recreation use fees. Income from these trusts would be used to purchase development rights for surrounding private lands and to compensate dislocated workers.¹³⁷

Under this "open auction" plan, owners of the burdened properties would have a fixed interest in the payments for the easements. Under the ecocommons plan, Rights holders would have an equity interest in the ecosystem. Also

134. *Id.*

135. *Id.*

136. The most obvious objection to the open auction alternative is that it leaves responsibility for marketing the resources in the hands of public officials. Randal O'Toole estimates that current U.S. Forest Service "sales" of timber cost American taxpayers between \$250 and 500 million per year. O'TOOLE, book, *supra* note 89, at xi; see also Robert L. Schaap, *Achieving Community Stability Through a Quality Environment*, in COMMUNITY STABILITY, *supra* note 107, at 146-47 (claiming that on average, Forest Service timber program expenditures exceeded receipts by \$442.6 million per year). O'Toole also claims that this condition cannot be improved without a radical reorganization of the major federal agencies involved in resource management. See O'TOOLE, book, *supra* note 89, at 213-22; O'Toole, journal, *supra* note 89, at 310-314. If our government agencies have such difficulty marketing timber, it is hard to be confident that they could successfully market the full range of resources existing on public lands. However as discussed below, the ecocommons plan could be more efficient than the open auction alternative, even if the government could increase the effectiveness of its marketing of natural resources.

137. See O'Toole, journal, *supra* note 89, at 312.

under the open auction alternative, resources would flow to the highest bidder in the open auction. Under the ecocommons plan, Resource Rights are traded directly with the members of the surrounding resource-dependent communities, thereby guaranteeing them the opportunity of continued access to the resources. Because the ecocommons plan would tend to maintain the stability of resource-dependent communities by giving local inhabitants an equity interest in the health of the ecosystem, the ecocommons plan could be both more efficient and more effective than the open auction alternative.

1. *The Ecocommons Plan Would Be More Effective at Preserving Resource-Dependent Communities*

The ecocommons plan would be more likely to preserve resource-dependent communities than the open auction alternative. Under the open auction alternative, successful bidders could come from any place in the world¹³⁸ and there would be no guarantee that local communities would retain access to the resources. Meanwhile, under the ecocommons plan, members of the local resource-dependent communities would have the opportunity to continue in their occupations if they so desired. Even if the members of the community decided to lease their Resource Rights to resource-extraction companies, they could make the leases conditional on their obtaining employment with those companies, as the Alaskan villagers do under the CDQ program.

In addition to directly displacing workers, the acquisition of resources by non-local companies can drain capital from a region, further weakening community viability. If a non-local firm were to bid successfully for resources, the profits, capital assets, and processing jobs could be expected to be exported to other areas. If, on the other hand, local residents control access to the resources, the community can retain these profits, assets, and jobs.¹³⁹

The federal government has recognized that open auctions of publicly owned resources can impair the stability of the surrounding resource-dependent communities. When the Secretary of Agriculture or the Secretary of the Interior finds that the maintenance of a community or group of communities

138. Natural resources are a central commodity of trade in the international industrial economy. International resource-extraction companies avidly seek access to resource systems throughout the world, and generally oppose restrictions on such access. David Scott Nance, *Natural Resource Pricing Policies and the International Trading System*, 30 HARV. INT'L L.J. 65, 65-67 (1989); see also Timothy Egan, *Montana's Sky and its Hopes are Left Bare After Logging*, N.Y. TIMES, Oct. 19, 1993, at A1 (describing how national timber companies compete for access to timber lands throughout the country).

139. Schaap, *supra* note 136, at 147. As I will discuss in Section III.B, if states granted preferential access to natural resources to inhabitants of ecocommons, their actions could be challenged under the Commerce Clause of the U.S. Constitution. See U.S. CONST. art. I, § 8, cl. 3. For this reason, among others, the ecocommons plan should be implemented through joint cooperation between the federal and state governments. When states discriminate against nonresidents pursuant to an explicit grant of authority by Congress, their actions do not violate the Commerce Clause. See *Maine v. Taylor*, 477 U.S. 131, 138-39 (1986).

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depends primarily on the sale of forest products from federal land, she may designate such communities as “sustained yield units.”¹⁴⁰ Within such units, contrary to customary practice, permits to harvest timber products are not sold in open auction.¹⁴¹ Rather, they are sold only to “responsible purchasers” within the unit.¹⁴² This policy helps to ensure that the resources go to the buyer most able to ensure the continued stability of the local communities.¹⁴³

In addition, in its ordinary timber auctions, the Forest Service must decide whether to make the sale through sealed bids or through oral auction bidding.¹⁴⁴ Sealed bidding is thought to increase the risk that non-local timber firms will purchase and export the timber, thereby disrupting the economies of the surrounding communities.¹⁴⁵ The Forest Service is required to take this risk into account when deciding whether to auction timber through sealed or oral auction bidding.¹⁴⁶ The numerous attempts by state legislatures to prevent exportation of their natural resources provide further evidence of the concern that allowing non-local access to these resources will result in displacement of local commercial access.¹⁴⁷

Finally, prior to the institution of the CDQs in Alaska, rights to the entire pollock catch were sold on the world market. The pollock fleet was taxed and money distributions were made to the local villagers.¹⁴⁸ This procedure destabilized local villages because it prevented these communities from continuing in their traditional fishing occupations. A major purpose of the CDQs is to maintain surrounding villages by guaranteeing them a chance to participate in resource extraction.¹⁴⁹

140. 16 U.S.C. § 583b (1988).

141. *Id.*

142. *Id.*

143. W. Hugh O’Riordan, *Discussion: Neither Complex Nor Obscure in Meaning*, in *COMMUNITY STABILITY*, *supra* note 107, at 51, 52.

144. 36 C.F.R. § 223.88 (1986).

145. Schallau & Alston, *supra* note 16, at 456 n.102.

146. 36 C.F.R. § 223.88(a) (1986).

147. *See, e.g.*, CONN. GEN. STAT. § 25-46 (1888) (limiting commercial access to wild game within the state to state residents). This provision was held constitutional in *Geer v. Connecticut*, 161 U.S. 519 (1896), which was overruled by *Hughes v. Oklahoma*, 441 U.S. 322, 326-35 (1979). *See also* OKLA. STAT. ANN. tit. 29, § 4-115(B) (West 1991) (limiting commercial access to minnows in state streams to state residents). This provision was also found to violate the Commerce Clause in *Hughes*.

148. Matsen, *supra* note 127, at 21.

149. *Id.* at 20-21; Quota Program, *supra* note 130, at 3-4; *see also* Victor Brajer & Wade E. Martin, *Water Rights Markets: Social and Legal Considerations: Resource’s ‘Community’ Value, Legal Inconsistencies, and Vague Definition and Assignment of Rights Color Issues*, 49 AM. J. ECON. & SOC. 35 (1990) (arguing that selling water rights on open market, rather than by giving preference to those living near the water resource system, may not obtain efficient allocation of water because the market price might not capture the “community value” of the water); Richard B. Stewart, *Interstate Resource Conflicts: The Role of the Federal Courts*, 6 HARV. ENVTL. L. REV. 241, 254 (1982) (arguing that allowing localities the freedom to limit natural resource development in the face of development pressures helps to preserve community identity and self-determination).

2. Preserving Resource-Dependent Communities Would Lower the Cost of Condemning Easements to Create Buffer Zones

The open auction alternative could result in members of the local resource-dependent communities being deprived of access to the resources that their economies are based upon. Individuals living within resource-dependent communities often place a high value on their economic activities, lifestyles, and relationships with fellow community members. I will refer to this value as "Community Preservation Value," or CPV. These communities are also particularly vulnerable to disruption through loss of access to the natural resources that form the bases of their economies.¹⁵⁰

The value of CPV in rural communities can be significant. One study found that individuals in a small rural southern town would be willing to forgo an average of fourteen percent of their weekly earnings for the remainder of their working lives, or a lump sum payment of 1.2 to 1.4 times their annual income, to remain part of their communities.¹⁵¹ A separate study conducted in a rural community in Hawaii found considerable consensus that the five most prized values among residents were: living close to family; participating in their traditional culture; extracting a living from the land; living life at a slow pace; and living among people that they knew.¹⁵²

150. See 7 U.S.C. §§ 6611-6614 (Supp. 1992) (noting that communities dependent on resources from national forests can be disrupted by alterations in the supply of federal timber or by changes in land use regulations, and therefore the Act provides aid to these communities to help expand their economic bases); Herbert E. McLean, *Paying the Price for Old-Growth*, AM. FORESTS, Sept. 1991, at 22 (noting that restrictions on logging imposed to protect the endangered spotted owl could result in loss of 50,000 jobs); Schallau & Alston, *supra* note 16, at 456-57 (explaining that the Redwood Park Expansion Act, 16 U.S.C. § 79a-q (1988), withdrew approximately 1.6 billion board feet of timber from commercial access, which threatened four percent of the jobs in the local economy), *cf.* Egan, *supra* note 138 (describing destruction of economies based on timber when timber companies shift production to more profitable regions).

151. L.F. Dunn, *Measuring the Value of Community*, 6 J. URB. ECON. 371, 380 (1977). This study was conducted as follows: the researchers chose a relatively isolated town in the rural South which had a population of 2500 people, and where a single mill was the largest employer and the only major industrial enterprise. The mill closed in 1971. Since there were few alternative sources of employment in the town, when an individual lost her employment at the mill, she effectively was faced with collecting welfare or leaving the community. Soon after the plant was closed, 200 workers were asked the following question:

If the plant does not reopen, and if you could not find another job around here that paid you as much as you made in this plant, would you be willing to take a job which paid less just to be able to stay here in this community—or would you move away first? If you would take less just to stay here, how much less would you take per week before you would move away to take a job?

Id. at 374. Responses to this question represented the amount of money that respondents would be willing to forgo in order to remain part of the community. To arrive at the lump-sum payments, present discounted values were computed at the alternative rates of six and eight percent. *Id.* at 373-75. A follow-up study which was conducted on the same group of workers three years after the original survey lent validity to the original findings. The follow-up study indicated that the initial estimates of what residents would forgo in order to remain part of the community were very reliable. *Id.* at 378-80.

152. Marvin E. Olsen et al., *A Value-Based Community Assessment Process*, 13 SOC. METH. & RES. 325, 347-49 (Feb. 1985). The importance of CPV in resource-dependent communities has been evident to other researchers and reporters considering the issue. See, e.g., Pacelle, *supra* note 76 (discussing efforts to find alternative forest resource-extraction employment for lumberjacks in Northern California because

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If the open auction results in the destabilization of resource-dependent communities with a concomitant loss of CPV, this loss should be compensated when the government condemns easements on the private lands owned by the members of these communities. Joseph Sax makes a compelling equitable argument for compensating individuals for the loss of their communities when private lands are condemned for the creation of national parks. He claims that compensating individuals only for the property rights they relinquish reflects a disaggregative view of what is actually taken. However, the composite effect of taking property from individual community members is the loss of the functioning community, and this loss is greater than the sum of the individual deprivations.¹⁵³

Some judges have recognized that the use of the power of eminent domain can “entail . . . intangible losses, such as severance or personal attachments to one’s domicile and neighborhood and the destruction of an organic community of a most unique and irreplaceable character.”¹⁵⁴ Even if traditional eminent domain practice fails to recognize the loss of community as a compensable harm, it would be dangerous to ignore the loss of CPV when condemning easements for conservation purposes. As discussed above, resentful local populations can do considerable damage to preserved lands and species through political opposition, poaching, and vandalism.¹⁵⁵ Individuals in destabilized resource-dependent communities may rightly feel they have not been compensated adequately for losses caused by the open auction alternative, unless CPV is accounted for in their condemnation awards.¹⁵⁶

While the open auction alternative could cause additional compensable harm by destroying CPV, the ecocommons plan would provide condemnees benefits by preserving that value.¹⁵⁷ The research and management practices conducted by the ecocommons managers would create other benefits such as favorable

of large value that the lumberjacks placed on being able to pursue their occupation); Joseph L. Sax, *Do Communities Have Rights? The National Parks as a Laboratory of New Ideas*, 45 U. PITT. L. REV. 499, 509 (1984) (arguing that communities that have generated distinctive ties to the land through continuity or some special relation should either possess heightened compensable rights in condemnation proceedings, or else special measures should be taken to avoid disrupting the communities). See generally OSTROM, *supra* note 104, at 34-35 (discussing fact that individuals reduce the rate at which they discount natural resources if they believe their children will be able to reap the rewards of their conservation as part of an ongoing community); *id.* at 58-59 (discussing the importance of enduring community ties, particularly among communities of natural resource extractors).

153. See generally Sax, *supra* note 39.

154. *Poletown Neighborhood Council v. City of Detroit*, 304 N.W.2d 455, 481 (Mich. 1981) (Ryan, J., dissenting).

155. See *supra* text accompanying notes 77-79.

156. See Pacelle, *supra* note 76 (describing discontent of forest communities over loss of cherished community and way of life); Sax, *supra* note 152, at 505-06 (describing surprise of National Park Service at the tremendous resentment and opposition of communities whose homes were condemned for the creation of national parks who, although they had received fair compensation for their land, had not been compensated for the loss of their community).

157. Cf. Wright, *supra* note 9 (describing extent to which incomes of individuals within resource-centered economies are supplemented by the enjoyment they derive from pursuing their way of life).

zoning arrangements¹⁵⁸ and scientific help with a broad range of agricultural and resource-extraction problems.¹⁵⁹ When only part of a condemnee's property rights are taken, and the government's use of the condemned interests produces benefits to the condemnee, these benefits can be set off against the compensation due in Resource Rights to the condemnee.¹⁶⁰ The result would be lower condemnation awards under the ecocommons plan than under the open auction.¹⁶¹

3. *Preserving Resource-Dependent Communities Would Lower the Costs of Monitoring the Ecosystem Preserve*

Other efficiencies would accrue through lower monitoring costs once an ecocommons began operating. The ecocommons plan would create "closed-access" commons on the public lands within the ecosystem. The open auction alternative would create an "open-access" commons on these lands with no

158. Coffee growers within the El Triunfo ecosystem reserve in Mexico had been concerned about losing unfarmed land through a government policy which allowed peasants to settle unused private acreage. These farmers were exempted from the policy when their lands were included in the biosphere reserve. Darling, *supra* note 50.

159. Wright, *supra* note 9, at 179. The National Academy of Sciences has called on the federal government to create a centralized repository of scientific information on the nation's biota, which could serve as a clearinghouse for this type of information. See Keith Schneider, *One-Stop Shopping for Ecology Data*, N.Y. TIMES, Oct. 6, 1993, at A22.

160. See, e.g., Board of Comm'rs v. Gardner, 260 P.2d 682 (N.M. 1953) (highway that would be built on condemned land produced benefits to remaining land, and so should be set off against amount of compensation due); City of Tucumcari v. Magnolia Petroleum Co., 259 P.2d 351 (N.M. 1953) (same).

161. If local inhabitants participated in the open auction, their willingness to pay for CPV would be reflected in higher auction prices, but not at an amount sufficient to compensate these individuals for the loss of their communities. CPV would not be maintained unless some critical mass of the local inhabitants were able to bid successfully at the auction. Fearing that their friends and neighbors would not be successful bidders, local residents may not be motivated to allow CPV to influence their bids. Cf. Robert G. Lee, *Community Stability: Symbol or Social Reality?*, in COMMUNITY STABILITY, *supra* note 107, at 36, 41 (describing how individuals in severely depressed timber town would not embark on individualistic economic enterprises because of concern that this would isolate them from their communities). Moreover, even if a community bids the full value of its collective "willingness to pay" (WTP) for CPV, the increase in auction prices would be insufficient to compensate local communities for the loss of CPV if non-local concerns obtained the resources. The amount that individuals would be willing to pay for CPV may be significantly less than the amount that they would be willing to accept (WTA) for having CPV taken away from them. See Jack L. Knetsch, *Environmental Policy Implication of Disparities between Willingness to Pay and Compensation Demanded Measures of Values*, 18 J. ENVTL. ECON. & MGMT. 227, 227-28 (1990). The National Oceanic and Atmospheric Administration has published a contingent valuation methodology report which claims that measures of WTP will usually be more conservative than measures of WTA. 58 Fed. Reg. 4601 (1993).

Except in the unlikely event that a sufficient number of local inhabitants were able to bid successfully for the resources to maintain the viability of the community, the cost to the government of condemning the easements would have to include what the seller was willing to accept for having CPV taken away from her. Cf. Knetsch, *supra*, at 234-35 (arguing that compensation for restrictions imposed by environmental regulations may not be perceived as fair unless it is measured by WTA rather than WTP). Since only WTP would influence the prices at the auction, the cost of purchasing these easements will be increased by (WTA - WTP).

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defined membership class.¹⁶²

Closed-access commons are exploited by a community of rights holders with a defined membership. Communities interact with one another in many ways, and norms of trust and mutually acceptable behavior develop, including norms about how to care for the commons to ensure its sustainability. The frequent interactions with other members of the community and the fear of losing the benefits of being part of the community increase the costs of violating these norms.¹⁶³ Also, because such communities live close to the ecosystem and are relatively small, they are likely to notice when the ecosystem is suffering in some respect and to respond collectively.¹⁶⁴

In contrast, when the appropriators of the resources can come from anywhere in the international market and interact with the ecosystem only to extract resources, the costs imposed by community disapproval are lower.¹⁶⁵ Widely dispersed appropriators are also less likely to notice problems within the system or agree on a response.¹⁶⁶

Under the ecocommons plan, the members of the community have strong financial incentives to monitor themselves and others. Any outsider poaching within the reserve or any community member not adhering to land use regulations would directly reduce the value of the Resource Rights of all the other community members. Hence all Rights holders will act prudently, keeping a watchful eye on their colleagues' activities.¹⁶⁷

The opposite would be true under the open auction alternative. We can demonstrate this phenomenon with a simple example. Consider an ecosystem with a population of 5000 commercially marketable fish. Two five-year permits are auctioned, allowing each permittee to take 1000 fish per year. This

162. See Brajer & Martin, *supra* note 149, at 42 (describing how the courts' interpretation of the Commerce Clause has caused unappropriated groundwater in southern New Mexico to be treated as an open common property resource which over time will be extracted above economically and socially optimal rate).

163. OSTROM, *supra* note 104, at 35-37.

164. COOMBS, *supra* note 24, at 40.

165. OSTROM, *supra* note 104, at 206. See also COOMBS, *supra* note 24, at 103 (arguing that purchasers of natural resources on the international market have less interest in the long-term prosperity of the resource system because they have alternatives and because they do not feel shame at violating norms).

166. COOMBS, *supra* note 24, at 103.

167. Cf. Julian C. Juergensmeyer & James B. Wadley, *The Common Lands Concept: A "Commons" Solution to a Common Environmental Problem*, 14 NAT. RESOURCES J. 361, 364 (1974) (surmising that holders of rights in historical commons were highly protective of their own and fellow rights holders' prerogatives); McKean, *supra* note 133, at 81-83 (describing how villagers in Japanese commons created groups to patrol the commons and doled out punishments for noncompliance, ranging from fines to ostracism). To retain the self-monitoring benefits of ongoing communities within ecocommons, Professor Carol Rose has suggested that it may be necessary to impose residency requirements on land transfers. In such cases, purchasers of land within the ecocommons would be required to live within the community, rather than simply purchasing land to gain access to the Resource Rights. Cf. Joseph L. Sax, *Property Rights and the Economy of Nature: Understanding Lucas v. South Carolina Coastal Council*, 45 STAN. L. REV. 1433, 1453 n. 95 (describing residency requirements for acquisition of land under Homestead Act of 1862).

arrangement brings the permittees ten units of income. To ensure that the fish population remains stable, the government promulgates harvest regulations.¹⁶⁸ The annual cost of complying with these regulations is five income units. A permittee's compliance with these regulations ensures that the fish taken by that permittee will be replaced the following year.¹⁶⁹ Noncompliance results in that permittee's catch being subtracted from the fish population. If the population falls to 2000, harvesting would be prohibited. These permittees will have an almost insurmountable incentive not to comply with the regulations. If, for example, each permittee takes her appropriate level of catch but permittee #2 manages to avoid compliance with the regulations,¹⁷⁰ the following would result:

YEAR	PERMIT #1 INCOME ¹⁷¹	PERMIT #2 INCOME	FISH REMAINING
1	5	10	4000
2	5	10	3000
3	5	10	2000
4	0	0	0
5	0	0	0

If we expand these results to all possible outcomes for each permittee, we get the following results:¹⁷²

168. There are a variety of commonly used regulations for controlling the size and quality of fish populations, including limiting entry to the fishery, regulating the season, time, or location of capture, limiting the level of fishing effort, restricting the type, quality, and quantity of equipment, or imposing total limits on the size of the catch. DEREK MILLS, *ECOLOGY AND MANAGEMENT OF ATLANTIC SALMON* 130-35 (1991).

169. These regulations would, therefore, place the fish population in what is referred to as a "steady state," in which the "number of deaths—over some regular period . . . is nicely balanced by numbers entering the population through reproduction." A.H. WEATHERLY, *GROWTH AND ECOLOGY OF FISH POPULATIONS* 159 (1972).

170. "Cheating" on permits to harvest natural resources can occur in many ways. Individual quotas are extremely difficult to monitor, so permittees may simply exceed their quotas. A common alternative to this is "high grading," in which permittees harvest resources indiscriminately but keep only the best of the species harvested, thereby causing extensive destruction while technically not exceeding their permits. Ralph Townsend & James A. Wilson, *An Economic View of the Tragedy of the Commons*, in *QUESTION*, *supra* note 105, at 318-21.

171. Expressed in terms of net income from fish catch.

172. For a thorough example of the application of game theory to open-access commons, see Todd Sandler, *After the Cold War, Secure the Global Commons*, *CHALLENGE*, July-Aug. 1992, at 16.

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Total Net Income From Permit

		PERMITTEE #1	
		COMPLY	CHEAT
PERMITTEE #2	COMPLY	25, 25	30, 15
	CHEAT	15, 30	20, 20*

The “Nash” equilibrium,¹⁷³ indicated by the asterisk, will be for both permittees to cheat because regardless of whether one permittee complies or cheats, it is always more profitable for the other permittee to cheat. As a result, harvesting would be prohibited after two years and the total income for each permittee would be lower than if both permittees had complied with the regulations.¹⁷⁴

Thus, since the permittees would have no long-term equity interest in the resource system, they would be unable to capture the benefits of careful management.¹⁷⁵ Permittees would find it more profitable to cheat and then move on to the next resource system, than to expend energy monitoring their fellow permittees.¹⁷⁶ These same problems are accentuated when the number of permittees increases.¹⁷⁷ We can expect that this situation will result in high monitoring costs to the managing authority or in widespread noncompliance with harvesting regulations.¹⁷⁸

This picture changes dramatically under the ecocommons plan. Rights holders would want to preserve the stream of income generated by their Rights.¹⁷⁹ If Rights holders protected the resource system, they could expect this income stream to continue indefinitely (α). They would take this into consideration when computing the benefits to be gained from cheating. This

173. The “Nash” equilibrium represents the best response for each player to her counterpart’s best response in a strategic interaction. At the “Nash” equilibrium, neither permittee would unilaterally change her strategic choice because a change would result in a lesser payoff. *See id.* at 18.

174. This result would constitute a “tragedy of the commons,” a concept first discussed in Garrett Hardin, *The Tragedy of the Commons*, 162 *Sci.* 1243 (1968).

175. Townsend & Wilson, *supra* note 170, at 318-21.

176. *See* COOMBS, *supra* note 24, at 103; Sandler, *supra* note 172, at 116 (arguing that the “so-called tragedy of the commons” arises in open-access commons when those having access to the commons are unconcerned with the future of the land, but that the tragedy is avoided when those with access are driven by a bequest motive, and therefore do not overexploit the resources of the commons), *cf.* Egan, *supra* note 138 (describing devastating impacts on communities centered around timber when national timber companies clear-cut large tracts of land and then shift operations to other regions, rather than managing timber lands for long-term sustainability).

177. *See* C. Ford Runge, *Common Property and Collective Action in Economic Development*, in *MAKING THE COMMONS WORK*, *supra* note 15, at 17, 23-27.

178. *See id.*, at 21 (claiming that strict dominance of noncompliance strategy in open-access commons makes any agreement to comply unstable).

179. *See* Daniel W. Bromley, *The Commons, Common Property, and Environmental Policy*, 2 *ENVTL. & RES. ECON.* 1, 13-14 (1992) (describing how, in common-property regimes, it is in interest of ownership group to protect a continued flow of benefits from resource system).

scenario would result in the following:

Total Income to Common-Rights Holders

		RIGHT HOLDER #2	
		COMPLY	CHEAT
RIGHT HOLDER #2	COMPLY	α, α	30, 15
	CHEAT	15, 30	20, 20

In this case, cheating is not the dominant strategy of either Right holder. If Right holder #1 complies, it is in the interest of Right holder #2 to comply as well because this would increase Right holder #2's income. Once both Right holders are in compliance, there is no incentive for either to cheat since this would result in a smaller total payoff. Since noncompliance is no longer the dominant strategy, coordinated strategies of compliance can develop between Rights holders.¹⁸⁰ The Rights would be distributed to a community interacting frequently, thus maximizing opportunities to reinforce and confirm mutual compliance.¹⁸¹ Although it would not entirely eliminate the collective action problems of free riding and cheating, therefore, the ecocommons plan should result in lower monitoring costs and more widespread compliance with harvesting regulations than the open auction alternative.

Because the ecocommons plan would enhance the stability of resource-dependent communities, it would be more efficient than the open auction plan. Potential efficiencies exist because the ecocommons plan would create benefits that would reduce the size of condemnation awards and would exploit the self-monitoring characteristics of closed-access commons. For both of these reasons, the criticism that the open auction alternative could obtain similar results to those of the ecocommons plan, but in a more efficient manner, appears to be unfounded. Resource-dependent communities have special characteristics and a special relationship to the ecosystem of which they are a part. By capitalizing on these special characteristics, the ecocommons plan could reduce the cost of creating and maintaining MAB preserves.

B. *Intergovernmental Cooperation*

In addition to faulting the efficiency of the ecocommons plan, critics may also contend that the plan would require a high level of cooperation between

180. Runge, *supra* note 177, at 30.

181. Cf. OSTROM, *supra* note 104, at 206 (arguing that recurring interaction within small communities reinforces compliance with regulations to protect resource systems).

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federal, state, and local governments. Designing the restrictions that would be imposed on lands within the buffer zones would be similar to designing land use or zoning regulations, which are traditionally the responsibility of local governments.¹⁸² State and local government participation with respect to ecocommons' plan restrictions is beneficial for several reasons. For example, the imposition of these restrictions by a distant bureaucracy probably would not generate the kind of enthusiastic local support essential to the ecocommons' survival.¹⁸³ Also, smaller ecosystems, which might not gain the attention of the federal government, might be the ones most in need of careful management. These ecosystems sustain fewer species, are more susceptible to changes, and often experience faster rates of extinction than larger ecosystems.¹⁸⁴

State experimentation on relatively small ecocommons will also be necessary to fine-tune regional variations in the ecocommons plan.¹⁸⁵ Such experimentation could define appropriate rates of exchange between easements and Resource Rights, could determine the most efficient way for Rights holders to lease their Rights if they chose not to exercise them directly, and could determine which land use restrictions on private lands within the buffer zones were most protective of the ecosystem. One function of our system of federalism is to allow states to experiment, to foster "effective and creative programs for solving local problems."¹⁸⁶ This "federalism" argument is particularly strong with regard to complex environmental issues, which may require innovations both in the underlying science and in the structure of administrative processes. States are more able than the federal government to adjust these innovations to their particular political and ecological needs.¹⁸⁷

Finally, many of the public lands that would be included in the "core" or "manipulation" areas of ecocommons are owned by state or local governments.

182. Flevares, *supra* note 26, at 2058.

183. *See, e.g.*, Jordan, *supra* note 12, at 484 (claiming that federal acquisition of conservation easements risks being perceived as infringement of state and local control over land use decisions); John D. Leshy, *Unraveling the Sagebrush Rebellion: Law, Politics and Federal Lands*, 14 U.C. DAVIS L. REV. 317 (1980) (discussing calls by Westerners for transferring control of federally managed lands in West to local governments).

184. LARRY D. HARRIS, *THE FRAGMENTED FOREST: ISLAND BIOGEOGRAPHY THEORY AND THE PRESERVATION OF BIOTIC DIVERSITY* 82 (1989).

185. *See* William P. Gregg, Jr., *Biosphere Reserves in the United States: Protected Areas for Information and Cooperation*, in *PROCEEDINGS*, *supra* note 3, at 36; Pomper, *supra* note 80, at 1320-21.

186. *Reeves, Inc. v. Stake*, 447 U.S. 429, 441 (1980); *see also* *Hughes v. Alexandria Scrap Corp.*, 426 U.S. 794, 816 (1975) (Stevens, J., concurring) (arguing that the Commerce Clause should not "inhibit a [s]tate's power to experiment with different methods of encouraging local industry").

187. *See* Note, *State Environmental Protection Legislation and the Commerce Clause*, 87 HARV. L. REV. 1762, 1763 (1974) (discussing the advantages and disadvantages of state control). Moreover, the costs imposed by conservation programs will be distributed unevenly among property owners, previously established resource-extraction companies, and workers within these companies. States may be more able than the federal government to accommodate these residents' different interests. *See* OSTM, *supra* note 104, at 214 (remarking that national lawmakers would find it hard to establish rules for commons that are fair to local appropriators); Pomper, *supra* note 80, at 1335.

These governments would have to participate in the creation and management of the ecocommons if their lands were to be included in it.

The federal government also would have to play a large role in creating ecocommons. One third of all land in this country, approximately 732 million acres, is owned by the national government.¹⁸⁸ The use of these lands for "core" or "manipulation" zones would require federal participation. Moreover, the several federal agencies with jurisdiction over natural resources comprise important sources of information on biodiversity and the functioning of ecosystems.¹⁸⁹

There may also be constitutional prohibitions against states creating ecocommons without federal participation. Because ecocommons require the relevant government to give local residents preferential access to publicly owned resources, the creation of ecocommons by subnational governments may violate the free trade values protected by the Interstate Commerce Clause.¹⁹⁰

In *Hughes v. Oklahoma*,¹⁹¹ the Supreme Court considered a Commerce Clause challenge to an Oklahoma statute that limited to state residents commercial access to natural minnows caught in the state.¹⁹² The majority conceded that the maintenance of ecological balance, the avowed objective of the statute, was a legitimate local purpose. The Court held, however, that this purpose could be promoted only in ways consistent with the free trade principles of the Commerce Clause,¹⁹³ such as by placing fixed limits on the number of minnows that could be taken from its streams without distinguishing between residents and non-residents.¹⁹⁴

The ecocommons plan would grant members of local resource-dependent

188. See COGGINS & WILKINSON, *supra* note 18, at 1.

189. See Biodiversity Act, *supra* note 3, § 7(b) (creating Interagency Working Committee on Biological Diversity, comprised of representatives from the Bureau of Land Management, the National Park Service, the Fish and Wildlife Service, the Forest Service, the Department of Defense, the National Oceanic and Atmospheric Administration, the Environmental Protection Agency, the Department of Energy, the National Center for Biological Diversity and Conservation Research, the Council on Environmental Quality, and any other federal entities that the chairman of the committee deems appropriate).

190. See U.S. CONST. art. I, § 8, cl. 3 (granting Congress the power "[t]o regulate commerce with foreign nations, and among the several States, and with the Indian tribes"); see, e.g., Jonathan D. Varat, *State "Citizenship" and Interstate Equality*, 48 U. CHI. L. REV. 487, 559 (1981) ("[w]e know from *Hughes v. Oklahoma* that if the state does not own wildlife and the nonresident's purpose is commercial, then discrimination against interstate commerce is impermissible"); see also *City of Philadelphia v. New Jersey*, 437 U.S. 617, 627 (1978) ("a [s]tate may not accord its own inhabitants a preferred right of access over consumers in other [s]tates to natural resources located within its borders").

191. 441 U.S. 322 (1979).

192. OKLA. STAT. ANN. tit. 29, § 4-115(B) (West 1978).

193. *Hughes*, 441 U.S. at 339.

194. *Id.* at 338. See also *South-Central Timber Dev. v. Wunnicke*, 467 U.S. 82 (1984) (Commerce Clause prohibits states from requiring that timber taken from state-owned lands be processed in-state before export); cf. Richard B. Stewart, *International Trade and the Environment: Lessons from the Federal Experience*, 49 WASH. & LEE L. REV. 1329 (1992) (arguing that restrictions on the export or appropriation by out-of-state consumers or producers of in-state natural resources undercut the benefits of the free trade regime, and cannot be justified as conservation measures because they do not impose similar restrictions on resident use).

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communities preferential access to publicly owned resources. It would not, however, undermine the basic goals of the Commerce Clause.

Under the Articles of Confederation, states had monopolized the natural resources that were, by happenstance, located within their borders, allowing them to profit at the expense of their neighbors in other states. The framers inserted the Commerce Clause to foster the goal of national economic unity.¹⁹⁵ Inhabitants of states paying severance taxes on the export of natural resources continue to voice this complaint.¹⁹⁶

The resources within an ecocommons would not be there by happenstance. Rather, their presence would depend on the stewardship of the ecocommons inhabitants.¹⁹⁷ The goal of national unity can also be undermined by forcing a state to share its carefully conserved resources with non-residents.¹⁹⁸ In addition, states could not prevent individuals from moving into an ecocommons and sharing equally in the benefits of the ecocommons with the prior residents. This reflects a well-established principle in American constitutional law,¹⁹⁹ unaffected by the proposals introduced in this Note.

In reaching its holding, the *Hughes* Court was forced to overrule an earlier case, *Geer v. Connecticut*,²⁰⁰ in which the Court had rejected a Commerce Clause challenge to a Connecticut statute limiting to the state's residents commercial access to wild game located within the state.²⁰¹ The *Geer* Court held that since wild game was "adapted to consumption as food or to any other useful purpose," it was within the police power of the state to regulate it to ensure its future availability to residents.²⁰²

In the nineteenth century, it may have been more obvious to the Court than it is today that we are dependent for our survival on the ecosystems in which

195. See, e.g., James Madison, Preface to Debates in the Convention of 1787, in 3 THE RECORDS OF THE FEDERAL CONVENTION OF 1787, at 542 (M. Farrand ed., 1966) ("[a] source of dissatisfaction was the peculiar situation of some of the States, which having no convenient ports for foreign commerce, were subject to be taxed by their neighbors, thro whose ports, their commerce was carried on"); see also *Baldwin v. G.A.F. Seelig, Inc.*, 294 U.S. 511, 523 (1935) (Commerce Clause "was framed upon the theory that the peoples of the several states must sink or swim together, and that in the long run prosperity and salvation are in union and not division").

196. See, e.g., Walter Hellerstein, *Political Perspectives on State and Local Taxation of Natural Resources*, 19 GA. L. REV. 31, 41-2 (1984) ("[a] common charge emanating from states without significant resource endowments is that the resource-rich states are 'profiteering' from their happy circumstances with a 'beggar-thy-neighbor' policy inconsistent with the tenets of political and economic unity on which the federal system was founded") (citations omitted).

197. Cf. Pomper, *supra* note 80, at 1329; Donald H. Reagan, *The Supreme Court and State Protectionism: Making Sense of the Dormant Commerce Clause*, 84 MICH. L. REV. 1091, 1203 (1986) ("[state citizens] may be entitled to benefit specially from a state policy of general nondevelopment that they specially bear the opportunity costs of").

198. See Varat, *supra* note 190, at 531 n.176. See also *H.P. Hood & Sons, Inc. v. Du Mond*, 336 U.S. 525, 567 (1949) (Frankfurter, J., dissenting) ("in the absence of federal regulation, it is sometimes . . . of greater importance that local interests be protected than that interstate commerce be not touched").

199. See, e.g., *Memorial Hospital v. Maricopa County*, 415 U.S. 250 (1974).

200. 161 U.S. 519 (1896).

201. CONN. GEN. STAT. § 25-46 (1888); see *Geer*, 161 U.S. at 529.

202. *Geer*, 161 U.S. at 533-35 (quoting *State v. Rodman*, 58 Minn. 393 (1894)).

we live.²⁰³ Humans directly depend on the natural systems around them for food, air, water, aesthetic values, and other resources. In return, ecosystems depend on humans for careful management. By reinforcing the reciprocity of this relationship through law, as the ecocommons plan does, we benefit significantly.

The ecocommons plan would not, therefore, undermine the policy of preventing states from profiteering from their unearned natural resource endowments. Also, the plan could further the national policy of ecosystem management. In order to forestall doubts about the plan's constitutionality, Congress should pass federal legislation authorizing states to create ecocommons in appropriate circumstances.²⁰⁴

Congress could at the same time set limitations on the states' use of the ecocommons plan. For example, Congress could determine that the importance to the national economy of the free flow of energy resources justified forbidding states from including energy resources among the Resource Rights traded for easements with the inhabitants of ecocommons.²⁰⁵

The need for cooperation between different levels of government is not new in American environmental law. Under the federal Comprehensive Environmental Response, Compensation, & Liability Act (CERCLA),²⁰⁶ which governs the remediation of sites containing contaminated waste, the federal government must consult with the state in which a site is located before choosing a remediation plan. EPA regulations must provide for meaningful state involvement in the decisionmaking process.²⁰⁷ Also, the EPA is required to consider state and community acceptance when choosing the remediation strategy.²⁰⁸

Similarly, the federal Solid Waste Disposal Act²⁰⁹ requires the EPA to

203. Most of the original colonies, and later the states, had nearly complete discretion in reserving the natural resources located within their borders for the use of their own citizens. This principle was embodied in several colonial statutes, *see, e.g.*, An Act for the Preserving of Oysters in the Province of New Jersey (1719), *reprinted in* 2 LAWS OF THE ROYAL COLONY OF NEW JERSEY 261 (1977) (prohibiting nonresidents from harvesting oysters in New Jersey waters), and was later affirmed in both state law, *see, e.g.*, *Ex parte Maier*, 37 P. 402 (Cal. 1894) (upholding state statute prohibiting sale of deer meat outside of state); *Roth v. State*, 37 N.E. 259 (Ohio 1894) (upholding law forbidding sale of quail outside of state), *American Exp. Co. v. People*, 24 N.E. 758 (Ill. 1890) (upholding state law prohibiting transport of game birds out of state), and federal law, *see, e.g.*, *Manchester v. Massachusetts*, 139 U.S. 240 (1891) (upholding authority of the state of Massachusetts to control and regulate the catching of fish within the bays of the state); *McCrary v. Virginia*, 94 U.S. 391 (1876) (upholding power of the state of Virginia to prohibit citizens of other states from planting oysters within the tide waters of the state).

204. *See* *Maine v. Taylor*, 477 U.S. 131, 138 (1986) ("[i]t is well established that Congress may authorize the States to engage in regulation that the Commerce Clause would otherwise forbid").

205. *See, e.g.*, *New England Power Co. v. New Hampshire*, 455 U.S. 331 (1982) (importance of energy resources in interstate commerce is justification for preventing states from forbidding export of electricity generated from hydroelectric plants on state rivers).

206. 42 U.S.C. §§ 9601-9675 (1988).

207. *See* 42 U.S.C. § 9604(c)(2) (1988).

208. 40 C.F.R. § 300.430(f)(C) (1992).

209. 42 U.S.C. §§ 6901-6992k (1988).

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promulgate guidelines for regional solid-waste management plans after consultation with federal, state, and local authorities.²¹⁰ Under the Forest Legacy Program, the Secretary of Agriculture is required to cooperate with state, regional, and local governmental units to protect forest, riparian, and other ecologically important areas.²¹¹

The Biodiversity Act²¹² provides an excellent model of the type of legislative action needed to implement the ecocommons plan. As part of its goal of protecting biodiversity, this Act seeks “to establish mechanisms for encouraging and coordinating Federal, State, and private efforts to conserve biological diversity and natural environments.”²¹³ The Act creates an Inter-Agency Working Committee on Biological Diversity, made up of representatives from each of the federal agencies whose mandates relate to the protection of the environment and any other agency that the chairman of the Committee deems appropriate. The task of the Committee is to develop a Federal Biological Diversity Strategy for the conservation of biodiversity.²¹⁴ The strategy is required to contain “specific management measures . . . with respect to . . . cooperation and coordination with non-Federal sectors”²¹⁵ for carrying out the Act’s goals.

The implementation of the ecocommons plan in appropriate locations throughout the country would require a similar flexible, consultative, interagency approach. Some ecocommons would be formed solely around federal lands. Even these ecocommons should involve state and local participation, in recognition of these governmental units’ traditional roles in land use and property transfer regulation.²¹⁶ Others might be formed around “core” areas consisting of lands under federal, state, and local jurisdiction. Still others might be formed around exclusively state- or locally-owned public lands.

Federal enabling legislation for ecocommons should provide for a committee similar to that created in the Biodiversity Act. This committee would organize the identification of appropriate areas for ecocommons and coordinate management strategies for ecocommons containing lands under varying jurisdictions. The committee would also serve as a centralized clearinghouse for information on biodiversity and ecocommons management. As discussed above, the enabling legislation should also provide authority for states to create ecocommons that do not include any federal lands, to avoid constitutional challenges under the Commerce Clause.

While the need for intergovernmental cooperation would be a challenge for

210. See 42 U.S.C. §§ 6941-6942 (1988).

211. See 16 U.S.C. § 2103c (Supp. IV 1992).

212. Biodiversity Act, *supra* note 3.

213. *Id.* § 4(4).

214. *Id.* § 8(a).

215. *Id.* §§ 8(b)(4), 8(b)(4)(I).

216. *Cf.* Jordan, *supra* note 12, at 403-05.

the implementation of the ecocommons plan, it would not be one with which current administrators of environmental laws are unfamiliar. An intergovernmental committee would provide a forum and a motivation for frequent interaction and exchanges of information between governmental agencies. This interaction would provide an opportunity to develop a coordinated response to threats to biodiversity. The need for intergovernmental cooperation in the creation and management of ecocommons may thus prove to be one of this plan's greatest assets.

IV. CONCLUSION

The political will is developing to replace our current fragmented and crisis-driven methods of species protection with the comprehensive management of ecosystems. The MAB proposals provide a useful model of how ecosystem management could be implemented in certain areas. The ecocommons plan provides a way to implement these proposals within the constitutional, administrative, and land use traditions prevailing in the United States.

There is a parallel between the biological and the economic requisites of ecosystem management. Public and private lands do not exist in biological isolation. The politically established boundaries between public and private lands must be relaxed to allow for biotic exchanges. These lands also do not exist in economic isolation. Private lands have conservation easements that the public needs, while public lands have natural resources which would be valuable to the surrounding private land owners.

The ecocommons plan would compensate these landowners for conservation easements with an equity interest in the health of the ecosystem. This may both lower the cost and increase the effectiveness of ecosystem management. All communities are dependent for their well-being on the health of the environment in which they live. The ecocommons plan clarifies and capitalizes on this fact in order to enhance the efficiency of ecosystem management.