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Biodiversity Federalism

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BIODIVERSITY FEDERALISM

A. DAN TARLOCK*

I. INTRODUCTION: WHY BIODIVERSITY PROTECTION IS A HARD FEDERALISM PROBLEM

Environmental protection policy is subdividing into two branches: risk minimization and biodiversity protection.[1] Risk reduction is a difficult, if problematic, objective to accomplish because we have no reliable way to measure the magnitude of the risks that we are trying to minimize.[2] However, this objective has been widely accepted as a legitimate public policy for the past twenty-five years. Risk prevention is consistent with the Western legal tradition because it seeks to prevent or redress human injury.[3] Biodiversity protection on the

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1. *See* Donald T. Hornstein, *Lessons from Federal Pesticide Regulation on the Paradigms and Politics of Environmental Law Reform*, 10 YALE J. ON REG. 369 (1993) (exploring the reasons that "risk reduction" has become the leading environmental regulatory objective and the limits of this paradigm when one moves from cancer prevention to the maintenance of biodiversity).

The division is not of course an absolute one. All environmental management is science-based, *see infra* notes 57-60 and accompanying text, and biodiversity is threatened by the continued release of toxic pollutants into the air, water, and land. The two branches of environmental protection were linked in Rachel Carson's influential early brief against pesticides, *Silent Spring*. *See infra* notes 52-53. Nonetheless, the significant differences between human health protection and natural resources management in promoting human and nonhuman values justify the division as an organizing principle for environmental law.

2. *See* Hornstein, *supra* note 1, at 378-79 (discussing the failure to include various factors in risk assessment).

3. The acceptance of risk prevention can be seen in the occasional incorporation of probabilistic concepts of risk into tort law. *See, e.g.*, Potter v. Firestone Tire & Rubber Co., 863 P.2d 795, 818 (Cal. 1993) (ruling that recognition of fear of cancer as a result of exposure to toxic substances divorced from immediate "physical" injury is a basis for tort liability in limited circumstances); Village of Wilsonville v. SCA Serv., Inc., 426 N.E.2d 824, 836-37 (Ill. 1981) (enjoining the operation of a hazardous waste landfill to prevent "highly probable . . . substantial injury"). In contrast, biodiversity protection remains positive or statutory law. *See* A. Dan Tarlock, *Environmental Law But Not Environmental Protection*, *in* NATURAL RESOURCES POLICY AND LAW: TRENDS AND DIRECTIONS 172-75 (L.J. MacDonnell & Sarah F. Bates eds., 1993) (discussing sources of biodiversity protection laws). A leading environmental historian has argued that environmental protection represents the logical progression of the Western concern for human dignity. *See* RODERICK F. NASH, THE RIGHTS OF NATURE: A HISTORY OF ENVIRONMENTAL ETHICS 3-12 (1989). This theory is fundamentally flawed. The prevailing Western tradition is one of negative rather than positive political rights and duties, but environmentalism seeks to impose positive duties on governments and individuals to act. *See generally* CASS SUNSTEIN, AFTER THE RIGHTS REVOLU-

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other hand presents much more difficult problems of legitimacy and implementation within this tradition because it partially collapses the ethical dichotomy between humans and nature.[4] As a result of scientific and popular alarm over species declines, the maintenance of biological diversity has rapidly emerged as a primary objective of both international[5] and United States environmental law,[6] because it provides a reasonably coherent and general principle of natural resources management.[7] However, the achievement of this objective remains highly contingent because biodiversity protection strategies pose greater challenges to existing legal institutions as compared with the reduction of air, water and land pollution risks. At bottom, the achievement of effective biodiversity protection is difficult because the very idea of biodiversity protection is antithetical to the Western idea of human economic progress through science, technology and the encouragement of individual initiative.[8] These challenges vividly manifest themselves in the efforts to fit biodiversity protection into a federal system which seeks to promote values associated with economic progress.

This Article explores ongoing efforts to implement biodiversity protection programs within the United States federal system, although the problems are the same in analogous political systems such as Australia and Canada. Federalism problems are a subset of the much noticed fragmentation of biodiversity protection efforts both in the United States and other countries.[9]

TION: RECONCEIVING THE REGULATORY STATE (1990). Professor Sunstein argues that public rights must be measured against a constitutional or common law background, but concludes that the background for environmental rights is neutral so that legislatures can apply benefit-cost analyses in defining legislative entitlements.

4. *See* JOHN PASSMORE, MAN'S RESPONSIBILITY FOR NATURE (1974) (exploring the Western legacy that nature exists to benefit mankind).

5. United Nations Conference on Environment and Development: Convention on Biological Diversity, concluded at Rio de Janeiro, June 5, 1992, entered into, December 29, 1993, *reprinted in* 31 I.L.M. 818 (1992).

6. *See* Holly Doremus, *Patching the Ark: Improving Legal Protection of Biological Diversity*, 18 ECOLOGY L.Q. 265, 269-304 (1991) (providing an overview of United States biodiversity law).

7. *See id.* at 269-83 (discussing the appeal for the preservation of biological diversity).

8. *See generally* BRUCE RICH, MORTGAGING THE EARTH: THE WORLD BANK, ENVIRONMENTAL IMPROVEMENT AND THE CRISIS OF DEVELOPMENT (1994) (exploring the link between the triumph of scientific objectivity and the loss of biodiversity due to the economic and environmental policies of the World Bank since World War II).

9. In the United States, for example, efforts to develop a Greater Yellowstone Ecosystem to provide effective regional protection of biodiversity, which the world-prototype Yellowstone National Park by itself cannot accomplish, have been frustrated largely because of inter-jurisdictional conflicts. *See* 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, 933-42

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Biodiversity protection programs reflect the tension between the universality of the abstract justifications for the exercise of national power to promote this objective, and the inherently local or site-specific nature of the problems. Universal biodiversity protection goals may be easily articulated, but they cannot be applied across the board. The chief threat to biodiversity protection is habitat loss.[10] Thus, the

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(1989) (discussing obstacles to establishing ecosystem boundaries in the Yellowstone region). Although the largest land area in the functional ecosystem is Yellowstone National Park, the Park Service's mandate to preserve the park for future generations has, nevertheless, been interpreted to allow intense visitor development. *See id.* at 924 n.2 (noting the common theme among the mandates for "preserved" lands is to preserve them in their pristine state). To complicate matters, adjacent forest service lands are managed under an older, multiple-use mandate which encourages commodity production. *Id.* at 968. Newer forest management legislation requires that the Forest Service identify environmentally sensitive areas, but destructive clear-cutting continues to degrade the surrounding forest system. *See id.* at 972-75 (discussing problems with timber harvesting). The result is that ecosystem planning remains subject to high levels of administrative discretion and, thus, multiple-constituency pressure. *See* JIM ROBBINS, LAST REFUGE: THE ENVIRONMENTAL SHOWDOWN IN YELLOWSTONE AND THE AMERICAN WEST 101-32 (1993) (discussing the constituency pressures in the context of logging at Yellowstone); Robert B. Keiter, *Beyond the Boundary Line: Constructing a Law of Ecosystem Management*, 65 U. COLO. L. REV. 293, 296-303 (1994) (discussing the history of public land policy in the United States).

The problems are similar in Australia and Canada, although their federalism framework is different. *See generally* Colin Rankin & Michael M'Gonigle, *Legislation for Biological Diversity: A Review and Proposal for British Columbia*, 25 U. BRITISH COLUMBIA L. REV. 277, 294 (1991) (discussing the Australian and Canadian federal legislative regimes that delegate power to provincial governments). The federal or national governments in both countries have extensive power to manage federal lands for biodiversity, but these federal systems face an additional problem. In general, central governments have established the most effective environmental protection regimes, but regulatory power and the resource base are shared more equally between these national and state or provincial governments. *See id.* (discussing the power over environmental matters held by the British Columbian government). In Australia, for example, a major source of Commonwealth constitutional power to protect biodiversity is the external affairs power. Thus, Commonwealth action must be tied to the implementation of an international obligation. *See* Commonwealth v. Tasmania, 46 A.L.R. 625 (1983). Nonetheless, given Australia's weak national government tradition, when power is exercised, it falls short of the full constitutional authority. For example, Australia enacted a Commonwealth Endangered Species Protection Act in 1992 with a listing process, but it covers Commonwealth areas which equal only 0.2% of the country. *See* John Bradsen, *The "Green Issues": Biodiversity Conservation in Australia*, *in* ENVIRONMENTAL OUTLOOK: LAW AND POLICY (B. Boer et al. eds., 1994); Nicolee Dixon, *Protection of Endangered Species—How Will Australia Cope?*, 11 ENVTL. & PLANNING L.J. 6 (1994). The Commonwealth relies on cooperative efforts with the states. See *id.* at 17-26 for a survey of recent state nature conservation legislation, but no state has an effective overall ecosystem program. *See* Andrew H.H. Kelly, *Protecting Endangered Fauna in NSW: Informed Habitat Destruction*, 1 AUSTRALIAN J. NAT RESOURCES L. & POL'Y (forthcoming 1995) (critique of New South Wales endangered species legislation because it is limited to assessment of impacts on selected higher order species and does not protect total ecosystems); *see also* A. Dan Tarlock, *Biodiversity Protection in the Pacific Rim: The Land Use Challenge*, 4 ASIA PAC. L.J. (forthcoming Winter 1995).

10. EDWARD O. WILSON, THE DIVERSITY OF LIFE 243-80 (1992).

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objective of any protection program is habitat conservation and restoration,[11] rather than the regulation of industrial activities through the application of standard technology. As Edward O. Wilson has written, "[t]he primary tactic in conservation must be to locate the world's hot spots and to protect the entire environment they contain."[12] In short, biodiversity protection requires strong land-use regulation and incentive schemes to induce the dedication of protected habitat, both of which are among the most difficult natural resources management or environmental objectives to achieve in a federal system.

None of the dominant models of federalism are suited to protect biodiversity or to describe the protection experiments underway. In fact, federalism principles are as likely to frustrate biodiversity protection as to promote it for three principal reasons. First, federalism is premised on the search for the optimum exclusive regulatory balance, and this can often frustrate necessary intergovernmental cooperation. Second, the maintenance of national protection floors supplemented by states is unworkable because in contrast to air and water pollution control,[13] there are no uniform standards that one can realistically apply to biodiversity in states as different as Alaska, Arizona and Florida. Third, the national government must rely on powers, primarily land-use controls and water-rights administration, that are traditionally and firmly lodged within state and local governments.

This misfit is critically important to biodiversity protection because the main threat to achieving this objective is local resistance that may undermine national efforts.[14] This statement simply reflects the

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11. The restoration of degraded ecosystem is becoming an important biodiversity protection strategy because there is less undisturbed habitat to preserve. *See* COMMITTEE ON RESTORATION OF AQUATIC ECOSYSTEMS, NATIONAL RESEARCH COUNCIL, RESTORATION OF AQUATIC ECOSYSTEMS: SCIENCE, TECHNOLOGY, AND PUBLIC POLICY (1992) [hereinafter COMMITTEE ON AQUATIC ECOSYSTEMS]. The idea of restoration has been challenged by many students of environmental ethics because only areas that have not been subjected to human intervention are authentic "nature." *See generally* C. Mark Cowell, *Ecological Restoration and Environmental Ethics*, 15 ENVTL. ETHICS 19 (1993) (discussing human interaction aspects of biodiversity protection).

12. WILSON, *supra* note 10, at 336. For an interesting historical survey that explores the roots of the endless destruction of habitat, see CLIVE PONTING, A GREEN HISTORY OF THE WORLD (1991).

13. The need for uniform standards is greatly debated within environmental law. *See* James E. Krier, *On the Topology of Uniform Environmental Standards in a Federal System—and Why It Matters*, 54 MD. L. REV. 1226 (1995) (arguing for non-uniform federal environmental standards); Richard L. Revesz, *Rehabilitating Interstate Competition: Rethinking the "Race-to-the-Bottom" Rationale for Federal Environmental Regulation*, 67 N.Y.U. L. REV. 1210, 1227-33 (1992) (discussing the practice of some states that employ stricter environmental regulations than the federal government).

14. For a review of some of the celebrated local objections to federal mandates because of the high costs of protection, see *Is the Endangered Species Act in Danger?*, 267 SCIENCE 1256

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long standing tension between national articulation of resource management goals and local efforts to promote unrestricted access to natural resources for economic exploitation. Although the tradition of local resistance to national conservation is well into its second century, the current manifestation of this tension is the wise-use movement which seeks to tie all regulation to statutory compensation in excess of that required under federal or state constitutional law.[15] Innovative state and local attempts to promote biodiversity are driven by the need to comply with federal mandates, primarily the Endangered Species Act. But, despite the constitutional power of the national government to achieve this objective,[16] federal mandates are perceived as intrusions on state and local sovereignty.[17]

Federalism exacerbates the tension between local and national "prerogatives" because the essence of a federal system is the division of power between the national sovereign and lesser sovereign units. This division either is based on a constitutional scheme of power fragmentation or is justified as a means to match problems with competent jurisdictions.[18] In our constitutional system, the emphasis has been on the establishment of negative liberties and on the location of regulatory competence. The quasi-constitutional jurisprudence of the European Court of Justice,[19] for example, focuses only on the former,

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(1995), and WALLACE KAUFMAN, NO TURNING BACK: DISMANTLING THE FANTASIES OF ENVIRONMENTAL THINKING (1994). *But see* Revesz, *supra* note 13, at 1211-12 (discussing then rejecting this theory).

15. *See* WILLIAM L. GRAF, WILDERNESS PRESERVATION AND THE SAGEBRUSH REBELLIONS 225-32 (1990) (discussing movements to return land regulation to the states).

16. *See, e.g.*, Hodel v. Virginia Surface Mining & Reclamation Ass'n, 452 U.S. 264, 290-93 (1981) (holding that the commerce power extends to national regulation of private land-use for environmental purposes).

17. *See* J.B. Ruhl, *Biodiversity Conservation and the Ever Expanding Web of Federal Laws Regulating Nonfederal Lands: Time for Something Different?*, 66 U. COLO. L. REV. (forthcoming 1995).

18. *See* Richard B. Stewart, *Pyramids of Sacrifice? Problems of Federalism in Mandating State Implementation of National Environmental Policy*, 86 YALE L.J. 1196, 1225-31 (1977) (writing before National League of Cities v. Usery, 426 U.S. 833 (1976), was overruled in Garcia v. San Antonio Metro. Transit Auth., 469 U.S. 528 (1985), and identifying three bases for national pollution control regulation: (1) the promotion of intrastate welfare; (2) the prevention of interstate spillovers; and (3) the implementation of national moral ideals).

19. European Community (now European Union) law has evolved into a quasi-federal regime, but the limited, original mandate of the Community to regulate trade and competition among sovereign nations has led to a greater focus on the respective competencies of the Community and individual member states to regulate environmental matters. For example, a recent European Commission decision allowing a German chemical ban, Commission Decision 94/783 Concerning the Prohibition of PCP Notified by the Federal Republic of Germany, 1994 O.J. (L 316) 43, has been criticized both because it is inconsistent with the nondiscriminatory trade policies of the European Union (EU) and because an earlier EU directive on the use of the chemical adequately protected health concerns of

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but the two ideas have been joined in our constitutional system. Supreme Court federalism jurisprudence is an attempt to balance the constitutional plan of competing centers of power within a single nation, by developing principles to mediate conflicting assertions of regulatory authority.

The net result is that, whatever its general merits, the Supreme Court's federalism jurisprudence is problematic from a biodiversity perspective for three reasons. First, biodiversity protection is at best an indirect goal of a federal system, and thus the Supreme Court's decisions are often irrelevant. Second, Supreme Court federalism jurisprudence is an abstract and backward-looking doctrine that seeks an ideal diffusion of power without a clear articulation of the values sought to be advanced by this objective, which makes it difficult to develop functional doctrines.[20] Third, judicial federalism is problematic for biodiversity protection, which seeks permanent, scientifically driven solutions, because the balance of power between the national and state governments can change in response to shifts in political opinion.

Federalism jurisprudence continues to oscillate between radically different views of the merits of a strong national government. Prior to the New Deal, the constitutional assumption was that regulatory power or competence must be exclusive either to the national government or to the states in order to protect individual liberty through the diffusion of regulatory power.[21] However, this view subordinated the Marshallian notion of a strong national government to deal with new problems. During the New Deal, dual federalism was replaced with a

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member nations. *See generally* Eckard Rehbinder & Richard Stewart, *Environmental Protection Policy*, *in* 2 INTEGRATION THROUGH LAW: EUROPE AND THE AMERICAN FEDERAL EXPERIENCE (Mario Cappelletti et al. eds., 1985).

20. *See* Erwin Chemerinsky, *Rehabilitating Federalism*, 92 MICH. L. REV. 1333, 1334 (1994) (reviewing SAMUEL H. BEER, TO MAKE A NATION: THE REDISCOVERY OF AMERICAN FEDERALISM (1993)). This incoherence is symptomatic of the Burger-Rehnquist Court's retreat from constitutional adjudication which articulates the national experience to arid scholasticism. *See* Morton J. Horwitz, *The Constitution of Change: Legal Fundamentality Without Fundamentalism*, 107 HARV. L. REV. 32, 98 (1993) (observing that current Supreme Court opinions reflect "hardly a trace of wisdom concerning the meaning of the American past or the possibilities of its future . . . no picture of American ideals or destiny . . . no recognition that the world is rapidly changing and that the Court's understanding of the role of law may be growing dangerously out of touch with American society").

21. *See* Cass R. Sunstein, *Beyond the Republican Revival*, 97 YALE L.J. 1539, 1561-62 (1988) (locating the "checking" function of federalism in both classic republican and pluralist political theory); *see also* Akhil R. Amar, *Of Sovereignty and Federalism*, 96 YALE L.J. 1425, 1492-1519 (1987) (arguing that the purpose of federalism is to create inter-governmental competition to protect individual rights grounded in popular sovereignty).

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presumption of the need for national regulation[22] and the gradual realization that politically rather than judicially enforced federalism was the means to achieve the Constitution's objectives. The fruit of this non-dual federalism was the theory of cooperative or "marble cake" federalism,[23] which underlies the law of pollution reduction. In cooperative federalism, the states become the agents of the national government.[24] The principal focus of constitutional law shifted from concern about the infringement of reserved state authority to an inquiry into the congressional intent behind the preemption of state regulatory authority.[25]

The immediate consequence of the shifting nature of federalism jurisprudence for biodiversity protection is that post-New Deal federalism has in turn decayed into a fragile and often dysfunctional balance between national and subordinate authority. Cooperative federalism has proved better in theory than in practice,[26] and the New Deal faith in the need for national solutions has rapidly eroded in the past twenty years.[27] Instead of cooperative or "marble cake" federalism, we

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22. Edwin Corwin, *The Passing of Dual Federalism*, 36 VA. L. REV. 1, 16-17 (1950) (arguing that the New Deal Court dismantled the dual federalism system of constitutional interpretation); *see also* BEER, *supra* note 20, at 379-92 (arguing that a strong national government virtually unconstrained by reserved state sovereignty accurately reflects the framers' intent).

23. The term was coined by Morton Grodzins. MORTON GRODZINS, THE AMERICAN SYSTEM: A NEW VIEW OF GOVERNMENT IN THE UNITED STATES 8-9 (1966).

24. *See* New York v. United States, 112 S. Ct. 2408, 2423-25 (1992) (rejecting cooperative federalism except in limited circumstances where the federal government preempts state regulation).

25. The tradition of concern for state prerogatives, however, endures. *See* Deborah J. Merritt, *The Guarantee Clause and State Autonomy: Federalism for the a Third Century*, 88 COLUM. L. REV. 1, 17-22 (1988) (expressing support for state rights and maintenance of the federalist structure); Robert F. Nagel, *Federalism as a Fundamental Value:* National League of Cities *in Perspective*, 1981 SUP. CT. REV. 81, 107-09. *See generally* Symposium, *Federalism's Future*, 47 VAND. L. REV. 1205 (1994) (addressing the future roles of states and the federal government).

26. The debate over the failure of New Deal federalism has centered on whether federal programs become captured by the regulated or benefited community, or whether the efforts to isolate them from capture make them excessively cumbersome and costly to implement. *See* PAUL E. PETERSON ET AL., WHEN FEDERALISM WORKS 7-10 (1986).

27. This decay can be traced in the Supreme Court's preemption jurisprudence which has evolved from a weak to a strong formal preference for concurrent regulatory authority. *Compare* Rice v. Santa Fe Elevator Corp., 331 U.S. 218, 236 (1947) (ruling that absent a conflict with federal law, states may regulate matters not regulated by a federal act) *with* Pacific Gas & Elec. Co. v. California State Energy Resources & Dev. Comm'n, 461 U.S. 190, 205 (1983) *and* R.J. Reynolds Tobacco Co. v. Durham County, 479 U.S. 130 (1986) (allowing for concurrent regulation). The Court's application of the presumption remains hopelessly incoherent. *Compare* Wisconsin Pub. Intervenor v. Mortier, 501 U.S. 597, 616 (1991) (holding that federal pesticide law does not preempt local regulation of pesticide application) *with* Gade v. National Solid Wastes Management Ass'n, 112 S. Ct. 2374, 2388

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now have either prefectorial federalism or neo-dual federalism,[28] resulting in incomplete solutions to problems, especially resource management problems. Prefectorial federalism would require states to comply with federal mandates but not fund the compliance costs or provide other incentives to comply, while a neo-dual federalism redelegates power to the states with minimal federal controls.

This Article explores some familiar federalism problems through the lens of biodiversity protection to illustrate the misfit between biodiversity protection and federalism principles which arises from the paradox of national objectives and sub-national implementation. Part II of the Article examines the concept of biodiversity protection and the science that supports it in order to illustrate the difficulties of implementing biodiversity across jurisdictional boundaries. Part III describes five specific examples of the misfit between existing federalism doctrines and biodiversity, and Part IV concludes with a brief examination of several new federal-state experiments that illustrate the development of new federalism models that fit none of the existing conventional or theoretical ones.

This Article argues that neither the New Deal presumption that federal power should displace state power nor the neo-dualism presumption of non-preemption and return to exclusive competencies promotes biodiversity protection. The risk of ineffective protection arises from too much regulation with the New Deal model and too little with neo-dualism.[29] As responsibility devolves, the historic resistance of lower political jurisdictions to higher level mandates will increase to the detriment of nature. If the idea of biodiversity protection is to succeed, it must be articulated at the national level and applied to all resource management activities by all levels of government. Biodiversity protection is, in fact, slowly evolving from a central government mandate and responsibility to an obligation shared at all levels of government, and, increasingly, by the private sector as well. Federalism jurisprudence can make a modest contribution to this effort by replacing the current abstract doctrines with a more focused inquiry. When a federal or state government has en-

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(1992) (holding that the Occupational Safety and Health Act preempts state hazardous waste licensing scheme).

28. *See* JOHN E. THORSON, RIVER OF PROMISE, RIVER OF PERIL: THE POLITICS OF MANAGING THE MISSOURI RIVER (1994) (providing an excellent study of the decay of federalism as illustrated by the failure of federal agencies to manage the Missouri River effectively).

29. Michael C. Blumm, *The Clinton Wetlands Plan: No Net Gain in Wetlands Protection*, 9 J. LAND USE & ENVTL. L. 203, 228-29 (1994) (arguing that the Clinton administration's plan to increase state and local responsibility for wetlands management is not "likely to achieve the plan's long-term goal of increasing the quantity and quality of the nation's wetlands").

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acted protection legislation, the presumption ought to be that this objective should be furthered at the jurisdictional level of the legislation unless (1) Congress has clearly dictated a contrary result, or (2) core federalism values, such as the protection of individual liberties or the protection of the fundamental autonomy of the constituent units, require otherwise. This layered approach would not only retain the necessary federal backstop, but also would take a more functional approach to issues such as the concurrent exercise of regulatory authority and the presumption against the exercise of federal power.

II. THE SCIENTIFIC BASIS OF BIODIVERSITY PROTECTION

This section briefly describes the scientific basis of biodiversity protection in order to illustrate the challenges that this concept poses to the idea of political hierarchies and management units defined by fixed physical boundaries. The argument advanced here is that the basis of biodiversity protection is primarily scientific rather than ethical and that the emergence of a non-equilibrium paradigm in ecology makes it more difficult to use science to protect biodiversity because the idea of resource preservation to protect "nature" must be supplemented by the idea of adaptive management. In short, biodiversity protection must inevitably be a shared, ongoing multi-jurisdictional effort.

Biodiversity protection is based on a scientifically-influenced ethic: "Let nature be." Philosophers have purported to raise a complex and controversial scientific theory—that ecosystems tend toward harmony or balance—to a Kantian and non-homocentric ethic.[30] But their effort to create an ethic divorced from the limits of the underlying science has, at best, only reinforced science's claim that there are important practical reasons for society to worry about the magnitude of human-caused ecosystem disturbance and to develop protection strategies that are scientifically-driven.[31] The philosopher's ethic cannot be the basis for protection because it fails the test of providing operative guidelines for resource management and because it cannot adapt to changes in the underlying science.

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30. *E.g.*, J. BAIRD CALLICOTT, IN DEFENSE OF THE LAND ETHIC (1989).

31. This statement takes a clear position in the debate over whether environmentalism is morally or spiritually based versus scientifically based. The scientific case is well articulated in Holmes Roloston, III, *Science-Based Versus Traditional Ethics*, *in* ETHICS OF ENVIRONMENT AND DEVELOPMENT: GLOBAL CHALLENGE, INTERNATIONAL RESPONSE 64 (J. Ronald Engle & Joan G. Engel eds., 1993).

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A. *Biodiversity Protection Defined*

Biodiversity is defined as the "variety and variability within and among living organisms and the ecological complexes in which they occur."[32] Diversity can be defined as the number of different items and their relative frequency. For biological diversity, these items are organized at many levels, ranging from complete ecosystems to the chemical structures that are the molecular basis of heredity. Biodiversity protection encompasses three levels of protection: (1) generic diversity, (2) species diversity, and (3) ecosystem or community diversity.[33] The last two measures have the largest impact on regulation because the achievement of these objectives requires the delineation of new landscape boundaries. Thus, the term encompasses different ecosystems, species, genes, and their relative abundance. Biodiversity, however, is not simply a numbers game, but has a qualitative component requiring native species in naturally occurring patterns of abundance. Native species in naturally occurring patterns are hallmarks of ecosystem health. For example, non-native species may increase the quantity of species and genes but they destroy the original patterns of interrelationships in the ecosystem.

Biodiversity is not easy to measure on the ground because the core idea of species richness encompasses essentially normative rather than scientific constructs. Biologists have developed measures of taxonomic richness but these must be applied on differing geographic scales. Biodiversity must be measured at the global, national and regional level. Nonetheless, science is rapidly developing a set of measures for biodiversity on both small and large scales that can be used to provide information about the status of current ecological trends and to measure progress toward protection goals.[34] The basic measures are:

1. *Percentage of Species Richness.* This measure looks at factors such as taxonomic richness, primarily plants and vertebrates.

2. *Species at Risk.* This measure examines the absolute number as well as the percentage of species threatened with extinction or extirpation and the percentage of species at risk from habitat loss and other stresses. It also can include indices of the range of risks that the target species are facing. For example, "biodiversity hot spots" can be

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32. OFFICE OF TECHNOLOGY ASSESSMENT, U.S. CONGRESS, TECHNOLOGIES TO MAINTAIN BIOLOGICAL DIVERSITY 3 (1987).

33. JEFFREY A. MCNELLEY ET AL., CONSERVING THE WORLD'S BIODIVERSITY 17 (1990).

34. This analysis is adapted from WALTER REID ET AL., BIODIVERSITY INDICATORS FOR POLICY MAKERS (1993).

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identified based on the percentage of endemic species in relation to the land area available to sustain them.

3. *Protection Ratios.* This measure seeks to inventory the effectiveness of existing land dedications for habitat protection of threatened and endemic species and other protection measures such as *in situ* conservation. This index effectively highlights problem regions such as Asia. For example, the percentage of land in protected areas is low in the Pacific Rim, including Australia, compared to all other regions of the world.[35]

4. *Community Diversity Indicators.* This index includes estimates of the extent of area dominated by non-domesticated species and the patch size of these areas. It also includes the amount of the area within protected designations dominated by non-domestic vegetation, agricultural crops, and livestock.

B. The Science of Biodiversity

Biodiversity protection can be seen as the logical outcome of the ecological paradigm for resource management that emerged in the 1960s. To implement the politics of environmentalism, the perceived teachings of ecology were quickly and uncritically incorporated into environmental law and management.[36] Modern environmentalism was a visceral reaction to visible and spectacular pollution insults or public works projects that destroyed natural areas.[37] National conservation group opposition to multiple-purpose dams in the 1950s paved the way for environmentalism, but the movement lacked a scientific theory or, any theory for that matter.[38] This movement had achieved political and popular success sometime earlier on the neo-pagan theory that nature—at least the landscape of the western part of the United States—was divine. For example, in 1930, Robert Marshall, one of the major proponents of wilderness preservation, contrasted the "dynamic beauty" of primitive areas to the static beauty of a Gothic cathedral and argued that "wilderness furnishes perhaps the best opportunity for pure aesthetic enjoyment."[39]

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35. *Id.* at 19.

36. *See* FRANK B. GOLLEY, A HISTORY OF THE ECOSYSTEM IN ECOLOGY: MORE THAN THE SUM OF ITS PARTS 3 (1993) (arguing that the environmental movement seized on the concept of an ecosystem because it provided a rational explanation of nature).

37. *See generally* STEPHEN FOX, JOHN MUIR AND HIS LEGACY 250-90 (1981) (discussing the environmental movement from 1945-1965).

38. *See id.* at 285 (discussing opposition to Echo Park Dam in Colorado).

39. Robert Marshall, *Wilderness Esthetics, in* A DOCUMENTARY HISTORY OF CONSERVATION IN AMERICA 78, 80 (Robert McHenry & Charles Van Doren eds., 1972).

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Aesthetic enjoyment continues to play a role in biodiversity protection, but the main thrust of current protection strategies focuses upon rational resource management. There is a long and troubled history of the application of science to natural resources management in this country,[40] but the search for scientific, comprehensive rationality springs eternal, and in 1968 ecology offered the hope of coherent and rational resources management which proved so elusive in the past. The National Environmental Policy Act of 1969 (NEPA)[41] is the most enduring legal application of ecology. NEPA was the first piece of federal legislation to raise ecology to primary status. NEPA's concept of environmental assessment, along with risk assessment, remains one of the few innovative operational ideas of environmental law. It rested on the premise that ecology could provide the rationale to guide administrative action.[42]

Environmental law and policy is premised on the equilibrium paradigm in ecology.[43] This paradigm was based on Sir Alfred George Tansley's ecosystem concept, which represented a break from earlier theories.[44] The basic idea was that systems, not organisms, evolve;[45] evolution was assumed to move toward homeostasis or balance. Tansley's conceptual shift from an organism to a system carried with it the longstanding scientific belief that all "systems" tended toward equilibrium.[46] The idea of a "holistic ecological concept which combined living organisms and the physical environment into a system"[47] was a theory in the grand scientific tradition: it was not based on field observations. Two American ecologists, Ralph Lindeman and Eugene Odum, took the steps to make Tansley's theory operational in the field.[48] In so doing, they paved the way for the shift in environmental policy discourse from the aesthetic and spiritual to the scientific. The concept of "relatively stable dynamic equilibrium" crystallized for Tan-

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40. *See* GRAF, *supra* note 15, at 244 (stating that scientists had limited involvement in the wilderness debate).

41. 42 U.S.C. §§ 4321-4370 (1988) [hereinafter NEPA].

42. *See* NEPA § 101, 42 U.S.C. § 4331 (outlining the purpose of NEPA).

43. I have traced this influence in A. Dan Tarlock, *The Nonequilibrium Paradigm in Ecology and the Partial Unraveling of Environmental Law*, 27 LOY. L.A. L. REV. 1121 (1994), and in Fred P. Bosselman & A. Dan Tarlock, *The Influence of Ecological Science on American Law: An Introduction*, 69 CHI.-KENT L. REV. 847 (1994).

44. Bosselman & Tarlock, *supra* note 43, at 861.

45. *Id.*

46. *Id.* at 862.

47. GOLLEY, *supra* note 36, at 8.

48. Bosselman & Tarlock, *supra* note 43, at 862.

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sley in 1935,[49] and has since been popularized by Aldo Leopold in his *A Sand County Almanac*,[50] published posthumously. In turn, these ideas drew on the image of a nature in balance which was central to both the Judeo-Christian and Enlightenment world view.[51] For example, the idea of the balance of nature radically disturbed by human intervention was the signal message of Rachel Carson's indictment of chemical pesticides, *Silent Spring*,[52] perhaps the book most responsible for the environmental movement.[53]

Eugene Odum made an important extension of ecosystem theory by providing a general hypothesis of ecosystem development and function[54] in a way that was understandable to an informed lay audience. He was the ecologist most read by the small group of social scientists, lawyers, and others who developed the first generation of environmental regulation in the unique political environment between the late 1960s and the OPEC oil embargo.[55] "Environmentalists seized upon the ecosystem concept as a way to maintain their faith in holism"[56] and to shore up their rapid political success with a universal scientific justification.

For the non-scientist and the policy-maker seeking wisdom in the late 1960s, Eugene Odum introduced the potential power of ecology to rationalize natural resources management.[57] Odum's brother, Howard, took Lindeman's trophic level theories and reduced them to mechanical theories of how ecosystems function, linked to the hard

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49. A.G. Tansley, *The Use and Abuse of Vegetational Concepts and Terms*, 16 J. ECOLOGY 284 (1935).

50. ALDO LEOPOLD, A SAND COUNTY ALMANAC (1949).

51. *See* DANIEL BOTKIN, DISCORDANT HARMONIES: A NEW ECOLOGY FOR THE TWENTY-FIRST CENTURY 32-35 (1990) (discussing the development of modern theories about the balance of nature). The late Charles J. Meyers traced the influence of this idea on environmental law in his 1975 Addison Harrison lectures at Indiana University, Bloomington. Charles J. Meyers, *An Introduction to Environmental Thought: Some Sources and Some Criticisms*, 50 IND. L.J. 426, 439-45 (1975) (discussing four principles of ecology that promote the balance of nature).

52. RACHEL CARSON, SILENT SPRING 63-83 (1962).

53. Former Secretary of the Interior Stuart Udall writes that Carson's book "was a masterstroke . . . . It shifted the debate over pesticides into a context where ecological, not economic, values would predominate." STEWART L. UDALL, THE QUIET CRISIS AND THE NEXT GENERATION 200 (1988). For a more detailed review of her contribution to the environmental movement, which reaches the same conclusion, see Linda J. Lear, *Rachel Carson's Silent Spring*, 17 ENVTL. HIST. REV. 23 (1993).

54. *See* DONALD WORSTER, THE WEALTH OF NATURE: ENVIRONMENTAL HISTORY AND THE ECOLOGICAL IMAGINATION 160 (1993) (discussing Eugene Odum's theory that ecosystems evolve into a "symbiotic relationship" to control the surrounding environment).

55. *See generally id.* at 158-61 (discussing the impact and substance of Odum's theories).

56. GOLLEY, *supra* note 36, at 8.

57. *See generally* EUGENE ODUM, FUNDAMENTALS OF ECOLOGY (1959).

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sciences.[58] Eugene Odum used the pyramidal model of the food chain in an ecosystem to develop a powerful theory that ecosystems were greater than the sum of their parts and inevitably progressed to steady states through the processes of climax and succession.[59] Odum's text provided an elegant, scientific neo-Kantian principle upon which environmental regulation and assessment could rest:

> Homeostasis at the organism level is a well known concept in physiology. . . . We find that equilibrium between organisms and environment may also be maintained by factors which resist change in the system as a whole. Much has been written about this 'balance of nature' but only with the recent development of good methods for measuring rates of function of whole system has a beginning been made in the understanding of the mechanisms involved.[60]

The ideal of scientific management burns bright,[61] but there is a problem: The science being developed to support biodiversity protection is more complicated than policy-makers originally assumed. A paradigm shift in ecology is just beginning to penetrate the legal consciousness. Since its incorporation into environmental law and policy, the equilibrium paradigm has undergone a Kuhnian revolution.[62] The equilibrium concept was flawed from the start, but until recently many scientists and policy-makers thought that the problem was the lack of necessary data rather than in the paradigm itself.[63] By the 1980s, the equilibrium paradigm had been replaced with more hard-edged probabilistic theories of non-equilibrium ecosystem behavior.[64]

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58. "In the ecosystem model, species acted abstractly, like robots." GOLLEY, *supra* note 36, at 106.

59. *See* ODUM, *supra* note 57, at 13-16 (using a pond as an example of an ecosystem at work).

60. *Id.* at 25.

61. One of the most persistent criticisms of environmental law is that it is based on "bad" rather than "good" science, consequently reforms seek to move toward more scientifically based solutions. In the current political debate over the future of environmentalism, both the Republican Congress and the Clinton administration place great faith in the application of good science. *See, e.g.*, U.S. Dep't of Interior, Protecting America's Living Heritage: A Fair, Cooperative and Scientifically Sound Approach to Improving the Endangered Species Act, Mar. 6, 1995 (memorandum).

62. THOMAS S. KUHN, THE STRUCTURE OF SCIENTIFIC REVOLUTIONS x-xii (1962).

63. Bosselman & Tarlock, *supra* note 43, at 869.

64. *Id.* We can now more clearly understand that Odum's theory of ecosystem equilibrium is one of the last gasps of 19th century deterministic science and was more descriptive than integrative. It was a sophisticated and nuanced extension of Clements's theory of plant communities as stable superorganisms as the consequence of a series of successional stages leading to a superorganistic permanent climax. Frederick E. Clements, *The Nature and Structure of the Climax*, 24 J. ECOLOGY 252, 255-56 (1936). In elite science, deterministic theories had already been replaced by probabilistic ones, but the shift came late to biology

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Non-equilibrium ecology rejects the vision of a balance of nature[65] with its deep roots in both religious and Enlightenment mechanistic thinking.[66] As one ecologist recently commented, "The idea [of balance of nature] makes good poetry but bad science."[67] In a path-breaking book, Daniel Botkin has "deconstructed" the equilibrium paradigm as a misguided effort to match science to theological and scientific visions of a perfect universe.[68] His basic argument is that the images of nature which had influenced ecology were static when, in practice, the problems faced required a dynamic view of nature—one which starts from the premises that human action is one of the principal forces operating on ecosystems and that system disturbances are both predictable and random.[69]

Ecosystems are patches or collections of conditions that exist for finite periods of time.[70] The accelerating interaction between humans and the natural environment makes it impossible to return to the concept of an ideal state of nature.[71] The best evidence of this paradigm shift is a short but extremely influential *Great Ideas for Ecology for the 1990s* published in 1992 by Eugene P. Odum himself.[72] His first and over-arching great idea states that "an ecosystem is a thermodynamically open, far from equilibrium system."[73]

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and even later to ecology. *See* Daniel Simberloff, *A Succession of Paradigms in Ecology: Essentialism to Materialism and Probabalism, in* CONCEPTUAL ISSUES IN ECOLOGY 63 (Esa Saarinen ed., 1982). Ecologists reported varying levels of indeterminate results testing the paradigm, but many scientists glossed over them because of an extreme case of "physics-envy." J.E. Cohen, *Mathematics and Metaphor*, 172 SCIENCE 674 (1971). The point for lawyers is that this internal debate was missed in the rush to implement Leopold's dictum to "think like a mountain" in the heady days of the rise of environmentalism. The dictum continues to dominate environmental thinking. *See* Eric T. Freyfogle, *The Land and Pilgrim Leopold*, 61 U. COLO. L. REV. 217 (1990) (championing Leopold's philosophy).

65. Tarlock, *supra* note 43, at 1129.

66. *Id.*; Bosselman & Tarlock, *supra* note 43, at 869.

67. Wallace Kaufman, *How Nature Really Works*, AMERICAN FORESTS, Mar./Apr. 1993, at 17, 18.

68. BOTKIN, *supra* note 51, at 188-92. The relationship between biodiversity and the idea that nature expresses God's perfection is traced in Mark Sagoff, *Biodiversity and the Culture of Ecology*, 74 BULL. ECOLOGICAL SOC'Y AM. 374 (1993).

69. *Id.*

70. D.L. Urban et al., *Landscape Ecology*, 37 BIOSCIENCE 119 (1987).

71. The philosophical basis for the new ecology can be found in Bill McKibben's widely read, *The End of Nature*, which argues the modern mind separates humanity from nature and thus the romantic visions of harmony between humanity and nature are impossible. WILLIAM T. MCKIBBEN, THE END OF NATURE (1989).

72. Eugene P. Odum, *Great Ideas for Ecology for the 1990s*, 42 BIOSCIENCE 542 (July/Aug. 1992).

73. *Id.* Ironically, Odum cites the third edition of his classic text, EUGENE P. ODUM, BASIC ECOLOGY (3d ed. 1983).

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The new paradigm challenges the biodiversity preservation strategies adopted in the first generation of environmental laws. The legal implications of the non-equilibrium paradigm are substantial over space and time.[74] Adherents to the non-equilibrium paradigm have pioneered a sophisticated new regulatory, scientific, conservation biology to protect ecosystems from human insults.[75] Conservation biology seeks to understand relationships between species extinction and habitat fragmentation[76] and to develop models that adaptively manage minimum habitat reserves for endangered species. As a consequence, resource management generally is shifting from preservation as the dominant biodiversity strategy to preservation as an integral component of ecosystem restoration and adaptive management.[77] At best, ecosystems can be managed rather than restored or preserved, and management will become a series of calculated, risky experiments.[78] "[N]ature moves and changes and involves risks and uncertainties and . . . our judgments of our actions must be made against this moving target."[79] The basic management objective is, through adaptive management,[80] to manage nature to mimic natural systems based on evolving scientific information.[81]

III. THE MISFIT BETWEEN FEDERALISM AND BIODIVERSITY PROTECTION

Biodiversity protection, which must cope with the implications of the non-equilibrium paradigm, does not mesh well with federalism for a number of reasons. The most important are: (1) federalism often impedes the protection of biodiversity because the political boundaries of the federal system do not match ecosystem boundaries; (2) many of the implementation problems involve conflicts among different federal agency mandates, a subject outside the scope of traditional federalism jurisprudence; (3) many of the constitutional values sought

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74. *See* COMMITTEE ON SCIENTIFIC AND TECHNICAL CRITERIA FOR FEDERAL ACQUISITION OF LANDS FOR CONSERVATION, NATIONAL RESEARCH COUNCIL, SETTING PRIORITIES FOR LAND CONSERVATION 113-38 (1993) [hereinafter COMMITTEE FOR FEDERAL ACQUISITION OF LANDS] (discussing why national resources management is now an ongoing experiment instead of a series of discrete, final decisions).

75. *See generally* CONSERVATION BIOLOGY: AN EVOLUTIONARY-ECOLOGICAL PERSPECTIVE (M.E. Soule & B.A. Wilcox eds., 1980) (series of articles discussing the preservation of biological diversity and its evolutionary potential).

76. *See* Bruce A. Wilcox & Dennis D. Murphy, *Conservation Strategy: The Effects of Fragmentation on Extinction*, 125 AM. NATURALIST 879 (1985).

77. COMMITTEE FOR FEDERAL ACQUISITION OF LANDS, *supra* note 74, at 113-38.

78. *Id.*

79. BOTKIN, *supra* note 51, at 190.

80. *See supra* note 74.

81. BOTKIN, *supra* note 51, at 190.

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to be protected by federalism, specifically those protecting private property and individual liberty interests, are difficult to adapt to biodiversity protection; (4) federalism jurisprudence is neutral with respect to biodiversity maintenance and thus Supreme Court decisions and doctrines are as likely to hinder as promote it; and (5) the demands of biodiversity protection exceed the effective ability, as opposed to the constitutional authority, of the national government to achieve effective protection without state and local cooperation in the experiment.

A. The Boundary Mismatch

Biodiversity protection necessarily collapses jurisdictional boundaries while management strategies can be frustrated by federalism's instinctive search for an exclusive management authority over a particular resource. One of the central problems of scientific natural resources management from the post-Civil War era to the present has been the mismatch between natural systems and political boundaries. The Constitution provides only two mechanisms for interstate cooperation to overcome these legal barriers to better resource management: the Supremacy Clause[82] and the Compact Clause.[83] Neither is entirely satisfactory. In the twentieth century, the interstate compact emerged as a potential vehicle to overcome the rigidity of political boundaries, but, aside from the allocation of some major river systems,[84] the hope of then-Professor Felix Frankfurter[85] and others for the use of compacts to address urgent cross-jurisdictional problems has atrophied. The extreme difficulty of moving from narrow to ecosystem-wide approaches to resource management is illustrated by the fate of efforts to manage resources through river basin rather than jurisdiction models.

Starting with John Wesley Powell's efforts to realign the Homestead laws with watershed boundaries to promote efficient water use[86] through the 1960s, there have been many efforts to overcome the mismatch of federalism and biodiversity through the creation of new

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82. U.S. CONST. art. VI, § 2.

83. *Id.* art. I, § 10, cl. 3.

84. The most comprehensive study remains JEROME C. MUYS, INTERSTATE WATER COMPACTS: THE INTERSTATE COMPACT AND FEDERAL-INTERSTATE COMPACTS (1971).

85. Felix Frankfurter & James M. Landis, *The Compact Clause of the Constitution—A Study in Interstate Adjustments*, 34 YALE L.J. 685, 701-03 (1925) (discussing the benefit of and necessity for interstate compacts).

86. JOHN WESLEY POWELL, REPORT ON THE LANDS OF THE ARID REGION OF THE UNITED STATES WITH A MORE DETAILED ACCOUNT OF THE LANDS OF UTAH (Wallace Stegner ed., 1962).

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overlay institutions or intergovernmental cooperation institutions. The effort most relevant to biodiversity protection has been the river basin model. River basin models attempt to integrate land and water (as well as air quality) regulation around river development and use. From the 1930s through the 1950s, planners and resource managers urged the creation of authorities modeled after the Tennessee Valley Authority to manage all major rivers. The idea lives on in the current efforts to organize water quality and quantity management around a watershed approach[87] and in the Clinton administration's attempts to develop a flood control policy that relies less on expensive and ineffective dams and levees and more on less costly flood damage avoidance strategies.[88] However, the river basin or watershed model has not succeeded. Fragmentation rather than integration is the real rule of resource management. Federalism helps to maintain this condition because it can only reinforce the constitutionally mandated fragmentation of authority.

Resource management problems are still managed within existing political boundaries and remain focused on specific media. Moreover, regulatory approaches, such as our wetlands programs, are reactive; the project initiator, rather than the regulator, defines the geographical scope of the regulatory response. In one of the foremost studies of biodiversity protection, ecologist John Cairns, Jr. put the point succinctly:

> Ecologists perpetually talk about the interdependence of nature and lip service is given to this notion on Earth Day, but, in practice, environmental problems are approached one fragment at a time, not as a complex, multivariate, interdependent landscape. The coexistence of technology[ ] and biodiversity depends on switching from a fragmented to a landscape view.[89]

The adoption of the goal of biodiversity protection has profound implications for all existing land-use categories because it calls for new allocations of management responsibility among different levels of government in both federal and unitary systems of government. Biodiversity protection requires either the dedication of significant

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87. *See* Long's Peak Report, *Reforming National Water Policy: America's Waters: A New Era of Sustainability, Report of the Long's Peak Working Group on National Water Policy*, 24 ENVTL. L. 157 (1994).

88. INTERAGENCY FLOOD PLAIN MANAGEMENT REVIEW COMM., SHARING THE CHALLENGE: FLOODPLAIN MANAGEMENT INTO THE 21ST CENTURY (1994).

89. Pete Lavigne, *Challenges in Watershed Activism*, RIVER VOICES, Summer 1994, at 1, 1 (quoting John Cairns, Jr.).

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amounts of land to habitat reserves or the intensive management of public lands dedicated to commodity protection such as timber harvesting and livestock grazing. It requires equally new controls on land dedicated to new urban, industrial development as well as on existing agricultural lands. Land-use regulation is divided (either by "title" or the right to use or control) among different levels of governments, public and semi-public entities, and private individuals. A biodiversity perspective collapses these boundaries and ownership classifications as species and ecosystems do not respect these artificial boundaries. But the history of reliance on politically bound entities to manage physical problems continues to frustrate biodiversity protection.[90]

B. The Problem is Inter-Federal Agency Conflict

A major barrier to the achievement of biodiversity protection is the persistence of outmoded federal resource exploration and management mandates at the end of the twentieth century. In the late nineteenth and early twentieth centuries, public lands and related resources were withdrawn from entry so that they could be more efficiently managed for commodity protection. These mandates have been supplemented (but not supplanted) by preservation and biodiversity maintenance mandates. However, agencies often resist adapting their missions to these new mandates, in large part because states and state-based interest groups constitute the agency's constituency, and biodiversity protection suffers as a result of inter-agency conflicts. For example, in reviewing the Clinton administration's forest recovery plan to protect old growth forests in the Pacific Northwest, a district judge noted that for years federal land management agencies "had operated independently and sometimes in conflict."[91] Inter-agency conflicts generally come to the courts over questions of statutory interpretation rather than preemption, but federalism concerns may in fact explain many cases in which a court has construed a statute to favor the agency with the least incentive to protect biodiversity, or where a court has refused to resolve an inter-agency conflict.

The South Dakota water marketing litigation controversy is an example of inter-agency conflicts resolved in a way that frustrates bi-

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90. The legacy of the past can be seen in the proposed rule for the most ambitious experiment in ecosystem management to date, the protection of the spotted owl in the old growth forests of California, Oregon and Washington. The proposed Special Rule for the Conservation of the Northern Spotted Owl on Non-Federal Lands, 60 Fed. Reg. 9494, 9495 (to be codified at 50 C.F.R. pt. 17) (proposed Feb. 17, 1995), excludes the State of Oregon because an effort is underway to develop a state-private landowner stakeholder management strategy.

91. Seattle Audubon Soc'y v. Lyons, 871 F. Supp. 1291, 1310 (W.D. Wash. 1994).

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odiversity protection. In the 1980s, South Dakota wanted to market water to a coal slurry pipeline from what it considered its equitable share of the Missouri River impounded in a federal reservoir.[92] The Oahe reservoir was built by the Army Corps of Engineers, but jointly managed by the Bureau of Reclamation and the Corps as part of a complex 1944 legislative compromise over how the River should be developed.[93] South Dakota signed a contract with the Department of Interior rather than the Corps because the Corps indicated that it would take two or three years to conduct the studies necessary to issue a permit.[94] Downstream states, which benefit from the Corps's management of the river for navigation enhancement, challenged the contract, and the Supreme Court held that the Department of Interior had no authority to execute it because the Corps, not the Department of Interior, built the dam.[95] The decision effectively put the management of the Missouri River in the hands of the agency that has done the most to degrade the biodiversity of the river by destroying riparian habitat.[96]

In the late 1980s, upstream states unsuccessfully attempted to modify the operation of the reservoirs to benefit sport fishing.[97] As is often the case, the application of the Endangered Species Act changed the political dynamic. The Corps began to respond to these concerns in January 1995, when the Fish and Wildlife Service announced that it was considering listing two fish as endangered.[98] The Corps has proposed a shortened navigation season in order to keep more water upstream during the spring spawning season.[99]

As Congress responds to biodiversity concerns, courts have more opportunities to strike a new balance. Judicial intervention in the management of the Columbia River illustrates the power of a court to subordinate traditional federalism concerns to a national mandate when the issue is clearly presented to it. In brief, the damming of the

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92. ETST Pipeline Project v. Missouri, 484 U.S. 495, 497-98 (1988); *see* THORSON, *supra* note 28, at 86-90 (detailing the history of this episode during our short-lived quest for energy independence).

93. *ETSI Pipeline Project*, 484 U.S. at 498, 500.

94. *Id.* at 497-501.

95. *Id.* at 497-99; *see* John P. Guhin, *The Law of the Missouri*, 30 S.D. L. REV. 347, 437 (1985) (discussing the history of the Flood Control Act of 1944, 33 U.S.C. §§ 701-709, and the subsequent development of the Missouri River).

96. THORSON, *supra* note 28, at 83-85 (discussing the effect of the Corps of Engineers' management of the Missouri River).

97. South Dakota v. Hazen, 914 F.2d 147 (8th Cir. 1990); *see* THORSON, *supra* note 28, at 176-81.

98. 60 Fed. Reg. 3614 (1995).

99. WESTERN STATES WATER COUNCIL, WESTERN STATES WATER, NO. 1083 (1995).

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Columbia River for power and irrigation has pushed many species of salmon to the brink of extinction. In 1980, Congress created a federal-state planning council and mandated that power and fish be given equal weight in the management of the river.[100] The Northwest Power Planning Council eventually adopted a water budget to produce adequate flows for salmon, while also meeting power demands. The water budget approach did not, however, appear to reverse the decline of salmon runs.[101] In 1992, the Council adopted a new *Strategy for Salmon*, rejecting the fishery managers' call for substantially increased spring and summer flows, which would decrease water available for power generation. Instead, the Council adopted an incremental approach thereby postponing confrontation of the conflict between declining runs and power generation.[102] Environmental groups along with Indian tribes successfully challenged the incremental policy on procedural grounds derived from the purpose of the NWPPCA.

In a forceful and historically engaged opinion, the Ninth Circuit Court of Appeals set aside the Council's *Strategy* because it conflicted with the Act for two reasons.[103] First, the Council failed to provide an adequate written justification, as required by the Act, when it rejected the recommendations of the fishery agencies and tribes.[104] The failure to give substantial weight to the opinions of those with fisheries expertise undermined the legislative mandate that hydropower and fish and wildlife interests be given parity.[105] Second, the court found that the Council failed to adopt "sound biological objectives," such as particle travel time, because "the record evidences the Council's intent ultimately to refrain from adopting biological objectives," which also conflicted with the parity mandate of the Act.[106] The NWPPC responded with a new salmon strategy in December 1994 which pro-

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100. Northwest Power Planning and Conservation Act (NWPPCA), 16 U.S.C. §§ 839-839h (1988); *see* Michael C. Blumm, *The Northwest's Hydroelectric Heritage: Prologue to the Pacific Northwest Electric Power Planning and Conservation Act*, 58 WASH. L. REV. 175 (1983).

101. *See* John M. Volkman & Willis E. McConnaha, *Through a Glass Darkly: Columbia River Salmon, the Endangered Species Act, and Adaptive Management*, 23 ENVTL. L. 1249, 1252-63 (1993) (discussing the Pacific Northwest Electric Power Planning and Conservation Council's attempt to link energy conservation with fish and wildlife recovery). For a balanced history of the development of the Columbia River for power at the expense of salmon, see WILLIAM DIETRICH, THE GREAT COLUMBIA RIVER (1995).

102. Northwest Resource Info. Ctr., Inc. v. Northwest Power Planning Council, 35 F.3d 1371, 1381-83 (9th Cir. 1994).

103. *Id.* at 1383-95.

104. *Id.* at 1386-89.

105. *Id.*

106. *Id.* at 1392. The court was influenced by Idaho Dep't of Fish and Wildlife v. NMPS, 850 F. Supp. 886 (D. Ore. 1994), which found that the National Marine Fisheries Service's

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vides more water for the fish and less for power generation.[107] Dam operations through the system will be modified, but most of the new flows will come from releases from the four federal dams on the lower Snake River.[108]

C. *The Conflict Between Biodiversity Protection and the Constitutional Values of Localism*

Federalism doctrines may undermine biodiversity for both ethical and practical reasons because they unduly check national authority. Biodiversity protection is more the province of national elites than local citizens and runs counter to the often expressed preferences for lower-level rather than higher-level political control for the use of private property claims to block environmental regulation. The fact that biodiversity is frustrated by lower-level resistance is, of course, not in and of itself a basis for criticizing a constitutionally derived doctrine. However, biodiversity protection may provide a new interest for courts to consider in federalism and constitutional adjudication when no other compelling constitutional values are at stake.

The root of the problem is the preference for local decision-making that runs through much federalism jurisprudence. This preference can frustrate biodiversity because it concentrates power at the level where opposition to biodiversity protection may be the strongest. The preference for local decision-making rests on an alternative vision of the virtues of America as a confederation of city-states, coexisting with the Marshallian vision of a strong central government curbing parochial tendencies. Professor Carol Rose finds the persistence "of stubborn local particularism" a logical "evolution of a kind of Anti-Federalist praxis, almost invisible in an intellectual environment of overwhelming Federalist theory."[109] Biodiversity protection is especially vulnerable to this form of localism because it is both a novel and thus difficult theoretical, legal, and political problem.

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biological opinion was arbitrary and capricious. *Northwest Resource Info. Ctr.*, 35 F.3d at 1390-91.

107. WESTERN STATES WATER COUNCIL, WESTERN STATES WATER, NO. 1075 (1994).

108. *Id.*

109. Carol M. Rose, *The Ancient Constitution vs. The Federalist Empire: Anti-Federalism from the Attack on "Monarchism" to Modern Localism*, 84 NW. U. L. REV. 74, 99 (1989). Some times the vision is not so faint. *See, e.g.*, City of Renton v. Playtime Theatres, Inc., 475 U.S. 41 (1986) (holding that the First Amendment does not prohibit community from dumping adult movie theatres next to the tracks); Town of Hallie v. City of Eau Claire, 471 U.S. 34 (1985) (finding that state authorization immunizes municipal land use and utility policies from antitrust liability); Village of Belle Terre v. Boraas, 416 U.S. 1 (1974) (finding that a restrictive definition of family promotes "the blessings of quiet seclusion" which outweighs any rights of association and travel).

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Biodiversity protection excites intense opposition because it counsels the partial subordination of immediate human demands to longer term human and non-human concerns.[110] Biodiversity protection is the more difficult concept to understand because it is at an extreme edge of the anthropocentric paradigm of law as a set of human relationships. Protection objectives are often phrased as utilitarian objectives. However, the thrust of many efforts to maintain or restore the integrity of ecosystems as a hedge against future and largely unknown risks[111] comes close to an intrinsic justification,[112] and the legitimacy of this value is the subject of intense debate. The great issue is whether the scientific rather than the aesthetic case for of biodiversity protection can overcome the natural human resistance to the subordination of immediate human demands. The likelihood is that the level of state and local resistance to biodiversity protection will be more intense compared to pollution and hazardous waste protection. At the practical level, biodiversity protection is difficult to implement because land-use regulations infringe on both public prerogatives and private choices about the exploitation and use of land and related water resources and because such regulations run counter to development expectations long explicit in the administration of land-use and water laws.

Federal public land and water law, and the "takings" jurisprudence[113] of the Supreme Court are the two prime areas of the law where localism frustrates biodiversity protection. In federal public land and water resources law, the Supreme Court has frequently used the history of western settlement to conclude that Congress did not intend to exercise its full constitutional power to protect public lands.[114] This has led to extreme but unsuccessful constitutional

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110. *See* CALLICOTT, *supra* note 30.

111. *See* WILSON, *supra* note 10, at 271-72.

112. *See* BIODIVERSITY AND INTERNATIONAL LAW (Simon Bilderbeck ed., 1992) (collection of speeches discussing the importance of biodiversity protection); Doremus, *supra* note 6 (discussing four rationales for biodiversity protection). *See generally* Susan Emmenegger & Axel Tschentscher, *Taking Nature's Rights: The Long Way to Biocentrism in Environmental Law*, 6 GEO. INT'L ENVTL. L. REV. 545 (1994) (discussing range of theories justifying biodiversity protection).

113. The Fifth Amendment states in pertinent part, "No person shall be . . . deprived of . . . property, without due process of law; nor shall private property be taken for public use, without just compensation." U.S. CONST. amend. V.

114. The Property Clause, U.S. CONST. art. IV, § 3, cl. 2, 3, gives Congress the powers of both a sovereign and a proprietor, Kleppe v. New Mexico, 426 U.S. 529 (1976), as well as the power to regulate the use of adjacent non-federal land to protect a federal land management unit. *See* Minnesota v. Block, 660 F.2d 1240 (8th Cir. 1981), *cert. denied*, 455 U.S. 1007 (1982); *see also* Eugene R. Gaetke, *Refuting the "Classic" Property Clause Theory*, 63 N.C. L. REV. 617 (1985) (tracing the history of resistance to the theory that the Property Clause

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claims that the federal government lacks the power to manage or even to retain federal lands and has unnecessarily weakened the power of the federal government to protect biodiversity.[115] The Supreme Court's reluctance to conclude that Congress has exercised the full extent of its power manifests itself in continuing local resistance to non-commodity uses of public land and in the continued willingness of federal officials to subordinate federal power to state and local interests.

The presumption of non-exercise can be seen in federal non-Indian reserved water rights law. As proprietor of the public lands, Congress has the power to reserve water rights to fulfill the purposes of a federal reservation such as a national monument or park.[116] This power allows the land management agencies to reserve instream flows to protect ecosystem integrity on public lands. This authority could be a major component of a national biodiversity protection strategy as the doctrine applies to public lands in all parts of the country. However, the Supreme Court has used the presumption of non-exercise virtually to eviscerate the doctrine. In 1978, the Court held that there is no implied intent to reserve water when federal lands are set aside for a water-related purpose, unless a reserved right is (1) necessary to prevent the frustration of the purpose of the withdrawal, and (2) is for a primary rather than secondary management purpose.[117] This narrow standard effectively destroys the federal government's reserved water rights in national parks and monuments, and leaves national forests and Bureau of Land Management lands unprotected.[118]

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is a full grant of congressional power to manage public lands). Public land users, however, resist *Kleppe*. *See* United States v. Vogler, 859 F.2d 638 (9th Cir. 1988), *cert. denied*, 488 U.S. 1006 (1989) (rejecting the argument that Congress lacks power over public lands because it is not an enumerated Article I grant).

115. Western states and local communities continually deny federal power to retain public lands. For a history of the most recent "Sage Brush Rebellion," see GEORGE C. COGGINS ET AL., FEDERAL PUBLIC LAND AND RESOURCES LAW 194-96 (3d ed. 1993).

116. *See* Cappaert v. United States, 426 U.S. 128, 138 (1976) (holding that the federal government reserves the right to maintain sufficient water levels when it reserves a national park); Arizona v. California, 373 U.S. 546 (1963) (finding that Congress has power to apportion Colorado River among states).

117. United States v. New Mexico, 438 U.S. 696, 702 (1978). At the time of the litigation, the New Mexico State Supreme Court did not recognize instream appropriations because a physical diversion was required to perfect a water right and the state had enacted no legislation to authorize instream flow appropriations. *Id.* at 704, 713. Ironically, the case arose out of the Gila National Forest where Aldo Leopold first articulated the need for wilderness areas. *See* LEOPOLD, *supra* note 50, at 122-54.

118. The Department of Justice made a substantial effort to use fluvial geomorphology to establish the need for stream flows in national forests to further the two primary purposes of national forests—timber production and downstream watershed protection. However, a Colorado Water Judge rejected that theory of federal reserved rights. *In re*

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Takings law is an example of the opposite problem: federal law that is insufficiently deferential to local situations in a way that impedes the protection of biodiversity. Private property is a protected constitutional right, but it is different from other civil rights. The reason for the difference is not, as the Supreme Court suggested in the famous *Carolene Products* footnote,[119] because economic rights are less important than human rights, but because property rights are subject to limitations that are more geographically based than human rights.[120] The right to free exercise of property rights should be the same in Florida as it is in Utah, but a property owner's expectation that she has the right to drain a wetland or build in a sensitive area may not be the same. This idea, however, has been submerged in the Court's taking cases.

There are two major issues in takings law: (1) What percentage of the value of the property can a regulation diminish, and (2) even if this threshold is exceeded, can the diminution in value be excused?[121] The Supreme Court's decision in *Lucas v. South Carolina Coastal Council*[122] recognized that a government regulation does not constitute a taking if the regulation simply codifies "background principles of nuisance and property law," although it is clear that Justice Scalia did not intend the *Lucas* rationale as a widely available justification for severe regulation.[123] Background limitations based in the common law reflect the idea that property is a legal construct and that the Constitu-

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Amended Application of the United States of America for Reserved Rights in the Platte River, District Court, Water Division No. 1, No. W-8439-79. Another Water Judge used the same evidence to recognize federal reserved rights in flows for the Rocky Mountain National Park because they were consistent with Congress's concern for the preservation of natural conditions and scenic beauty. Memorandum of Decision and Order Concerning the Application for Water Rights of the United States of America for Reserved Rights in Rocky Mountain National Park, District Court, Water Division No. 1, No. W-8439-76, Dec. 29, 1993; *see* John R. Hill, *Colorado Court Recognizes Reserved Rights to Instream Flows in Rocky Mountain National Park*, 5 RIVERS 243 (1995) (agreeing with the decision finding federal reserved rights in flows for Rocky Mountain National Park); Terresa A. Rice, *Colorado Water Court Denied Reserved Rights Claims for Channel Maintenance Flows*, 4 RIVERS 146 (1993) (criticizing the decision to reject the Department of Justice's attempt to find federal reserved rights in instream flows in national forests).

119. United States v. Carolene Prods., 304 U.S. 144, 152 n.4 (1938).

120. *See* TIMOTHY BEATLY, ETHICAL LAND USE: PRINCIPLES OF POLICY AND PLANNING 130 (1994).

121. Lucas v. South Carolina Coastal Council, 112 S. Ct. 2886, 2892-2902 (1992).

122. *Id.*

123. *Id.* at 2900. The broader issue is whether the *Lucas* majority was correct in limiting restrictions on the use of property solely to common law nuisance. For an argument that the majority's approach is inconsistent with the history of judicial identification of the sources of land use regulation, see Louise A. Halper, *Why the Nuisance Knot Can't Undo the Takings Muddle*, 28 IND. L. REV. 329 (1995).

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tion permits the state to define the scope of its use by providing property owners with adequate notice of the non-recognition of a claim. A federalism reading of the *Lucas* qualification would afford substantial deference to state law in defining the background conditions[124] and would support a less unidimensional concept of property than currently exists in Supreme Court jurisprudence.[125] A federalism approach to the definition of property rights would not compel the adoption of an ecological concept of property, but would incorporate an ecosystem support limitation into the right,[126] and would permit states to integrate this approach into takings law.[127]

This is not an abstract concern given that post-*Lucas* state takings cases have, in fact, promoted biodiversity, contrary to Justice Scalia's hostility to the idea. The Colorado Supreme Court has held that the enforcement of state radiation control regulations against a mill that produced uranium tailings was not a taking because no investment-backed expectations were frustrated.[128] "The Mill was 'on notice' that the radioactive materials present on the property were dangerous and highly regulated at both the state and federal level as was the use of the property itself."[129]

The Massachusetts Supreme Judicial Court has remanded a takings claim to determine if a city can prevent the development of littoral land flooded by a public waterbody under the *Lucas* title limitation doctrine.[130] The Nevada Supreme Court has held that regulatory delays in development approvals in the Lake Tahoe Basin do not consti-

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124. *See* Robert M. Washburn, *Land Use Control, The Individual, and Society:* Lucas v. South Carolina Coastal Council, 52 MD. L. REV. 162, 201-02 (1993) (arguing that after *Lucas*, the common law of nuisance will govern the determination of whether a taking has occurred). *But see* Frank I. Michelman, *Property, Federalism, and Jurisprudence: A Comment on* Lucas *and Judicial Conservatism*, 35 WM. & MARY L. REV. 301 (1993) (pointing out the tension in *Lucas* between the desire to expand the scope of regulatory takings and the Court's respect for "our federalism").

125. *See* Fred P. Bosselman, *Four Land Ethics: Order, Reform, Responsibility, Opportunity*, 24 ENVTL. L. 1139 (1994) (arguing that no single "land ethic" is adequate to define property for Fifth Amendment purposes).

126. *See* LEOPOLD, *supra* note 50, at 201-26 (providing the foundation of the ecological definition); Joseph L. Sax, *Property Rights and the Economy of Nature: Understanding* Lucas v. South Carolina Coastal Council, 45 STAN. L. REV. 1433, 1438 (1993) (sketching a concept of property as a usufruct rather than an exclusive right to maximization exploitation); Oliver A. Houck, *Why Do We Protect Endangered Species, and What Does That Say About Whether Restrictions on Private Property to Protect Them Constitute "Takings"?*, 80 IOWA L. REV. 297, 308-21 (1995).

127. *See* Michelman, *supra* note 124, at 318-28 (discussing a potential combined state-federal federalism approach post-*Lucas*).

128. Colorado Dep't of Health v. The Mill, 887 P.2d 993 (Colo. 1994).

129. *Id.* at 1000.

130. Lopes v. City of Peabody, 629 N.E.2d 1312 (Mass. 1994).

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tute a taking because the developer had notice of a complex regulatory process, and the protection of the Tahoe Basin would benefit the developer when his property was granted development approval.[131] The Supreme Court of Iowa used a similar analysis to hold that state legislation protecting Indian burial mounds on private property precluded a takings claim.[132] A recent survey of federal and Florida law concludes that if the state restores riverine and wetland ecosystems by flooding land reclaimed from the beds of navigable waters "[t]he property owner may not be entitled to compensation to the extent that value has been created by government public works specifically enhancing their property."[133]

D. Federalism Jurisprudence Provides Inconsistent Protection of Biodiversity

Biodiversity protection has suffered both from the Supreme Court's application of preemption and related doctrines to federal natural resources law for the reasons discussed in the last section, and for opposite reasons discussed in the previous sections. Local checks on national insensitivity have often been ignored. Since the progressive era, the national government has asserted an increasingly strong interest in the management and use of natural resources both on and off federal public lands. This gradual assertion challenged strong state and private expectations that the national role would be limited to facilitating the disposal of public lands or setting the ground rules for the acquisition of the privilege to exploit.[134] The result is a natural resources federal jurisprudence with a strong presumption that state law controls federal law with the exception of the Federal Energy Regulatory Commission and federal regulation of water rights. In this context, biodiversity preservation suffers as much as it gains.

The basis of the presumption of state control is the recent assertion of a national interest in natural resources management. During the nineteenth century, complementary federal and state interests resulted in few jurisdictional or legal conflicts, but federal power was considerably limited in purpose and geographic scope. Water allocation and management is not an enumerated constitutional power, although the Commerce Clause has been accepted as a source of fed-

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131. Kelly v. Tahoe Regional Planning Agency, 855 P.2d 1027 (Nev. 1993), *cert. denied*, 114 S. Ct. 684 (1994).

132. Hunziker v. State, 519 N.W.2d 367 (Iowa 1994), *cert. denied*, 115 S. Ct. 1313 (1995).

133. Sharon S. Tisher, *Everglades Restoration: A Constitutional Takings Analysis*, 10 J. LAND USE & ENVTL. L. 1, 44 (1994).

134. *See* George C. Coggins, *Trends in Public Land Law*, *in* NATURAL RESOURCES POLICY AND LAW, TRENDS AND DIRECTIONS (Lauren J. MacDonnell & Sarah F. Bates eds., 1993)

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eral power to control navigation. Until the twentieth century, the assumption was that federal power was limited to commercially navigable rivers. Accordingly, the federal government confined itself to the promotion of inland navigation[135] and to the disposition of the public domain to the states and private individuals. This minimal federal role changed at the end of the nineteenth century with the emergence of reliable scientific information about the consequences of rapid resource exploitation. Science provided the foundation for the progressive conservation movement which was premised on the need for a strong federal role in natural resources policy.[136] To conserve resources, the progressive conservation agenda included federal retention of public lands, the construction of multiple purpose water resources projects and federal financial support for irrigation projects. With the exception of flood control projects, most federal efforts were concentrated in the western United States because federal public land disposition policy was inadequate for arid lands.[137]

The major legal consequences of the progressive conservation movement were delayed until the New Deal when the modern era of large multi-purpose water projects began. Federal-state conflicts were initially minimal because the federal government did not seek to displace state allocation institutions and law. On the contrary, Congress mandated that the two major federal construction water agencies, the United States Army Corps of Engineers and the Bureau of Reclamation, must acquire the necessary water rights under state law and operate the federal projects in a manner consistent with state law.[138] Congress had imposed a similar mandate on the Federal Power Commission (now the Federal Energy Regulatory Commission), which was created in 1920 to license private hydroelectric projects on navigable waters.[139]

Power follows the purse, however, and federal policies began to conflict with state policies. To resolve these conflicts, the Supreme Court eventually rendered a series of decisions that validated the expanding federal water resources allocation and preempted inconsistent state water laws.[140] Recently, the Court has begun to return to

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135. BEATRICE H. HOLMES, A HISTORY OF FEDERAL WATER RESOURCES PROGRAMS, 1800-1960 (1972).

136. *See* SAMUEL P. HAYS, CONSERVATION AND THE GOSPEL OF EFFICIENCY 1-4 (1959).

137. *See* DAVID L. FELDMAN, WATER RESOURCES MANAGEMENT: IN SEARCH OF AN ENVIRONMENTAL ETHIC (1991).

138. Reclamation Act of 1902, 43 U.S.C. § 383 (1988).

139. Federal Power Act of 1920, 16 U.S.C. § 797(e) (1988).

140. *See* cases cited *infra* notes 155-168.

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the original vision of the federal-state balance.[141] The earlier preemption decisions, moreover, were tied to the construction of multiple purpose flood control and reclamation projects. Their immediate relevance has diminished as the era of the construction of federal water projects to promote regional growth has ended.[142] However, the growing importance of federal environmental regulatory programs which impact the use of water, such as the Clean Water Act and the Endangered Species Act, continues to produce federal-state conflicts.[143]

1. Water Management: Reserved Rights and the Bureau of Reclamation—From a strictly legal point of view, there are no federal-state conflicts over water management. The federal government either has the constitutional power to control the use of water or it does not. If the federal government has the power, the Supremacy Clause displaces conflicting state law.[144] If the federal government lacks the constitutional power to regulate, state law is the exclusive source of authority.

The history of federal deference to state law complicates this analysis. Federal-state disputes have classically revolved around three statutory construction problems: (1) Congress's intent to exercise federal power; (2) Congress's intent to preempt the field and exclude state regulation; and (3) the existence of provisions allowing continuing, coordinate or subordinate state power. The last inquiry is particularly important because Congress has generally deferred to state water law in the operation of federal programs. Section 8 of the Reclamation Act is the model for shared federal-state responsibility in the use of water. It provides "[t]hat nothing in this Act shall be constructed as affecting or intended to affect in any way [or] interfere with the laws of any State or Territory relating to the control, appropriation, use or distribution of water used in irrigation."[145]

Federal reclamation law illustrates the use of state law as a biodiversity protection check on federal authority. The basic idea behind the Reclamation Act of 1902 was that the federal government would provide the financing for the construction of small reclamation

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141. *See* California v. United States, 438 U.S. 645 (1978).

142. FELDMAN, *supra* note 137.

143. *See, e.g.*, Riverside Irrigation Dist. v. Andrews, 758 F.2d 508 (10th Cir. 1985).

144. U.S. CONST. art. VI, cl. 2. For an insightful analysis of the difference between the Supremacy Clause and preemption, and an argument that modern doctrines such as field preemption cannot be derived from the Supremacy Clause, see Stephen A. Gardbaum, *The Nature of Preemption*, 79 CORNELL L. REV. 767 (1994).

145. Reclamation Act of 1902, Pub. L. No. 57-161, 32 Stat. 388 (1902) (codified as amended in scattered sections of 43 U.S.C. §§ 371-498 (Supp. V 1993).

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projects serving family farmers. Water rights would be acquired and distributed in accordance with state law. To limit the distribution of water to bona fide yeomen, as opposed to speculators, the delivery of waters was limited to 160 acres for single ownership or 320 acres for land owned by a husband and wife.[146] The history of federal reclamation law is one of constant adjustment to the reality of irrigation. In most areas, the cost of reclaiming arid land was too costly to realize enough return to repay the projects.[147] Accordingly, reclamation gradually evolved from a self-financing to a federal subsidy program, financed by the generation of hydroelectric power, and thus the federal government's management authority grew.[148] Reclamation program subsidies are now either interest free or "ability to pay" repayment obligations.[149] The scale of federal projects also became larger than originally envisioned, and in states such as California substantial blocks of water were delivered to "excess" lands.

The Supreme Court's reclamation jurisprudence has evolved through three phases: (1) the denial of federal power; (2) the confirmation of federal power and the displacement of state law; and (3) a presumption of state supremacy. The constitutionality of the Reclamation Act of 1902 arose indirectly in the Supreme Court's first equitable apportionment case when the federal government petitioned to intervene and urged the Court to adopt a uniform rule of prior appropriation.[150] The Court dismissed the petition, finding that the federal government had no such power because reclamation of arid lands was not among the enumerated powers of the Constitution.[151] Federal power expanded dramatically during the New Deal when the Court adopted a broad interpretation of the Commerce Clause. This expansion led to the conclusion that the federal government need no longer rely on the fiction of navigation improvement to allocate water. In 1950, the Supreme Court held that the spending power of Congress authorized federal reclamation projects.[152]

Prior to 1958, reclamation law was premised on the assumption that the federal government was simply a carrier and distributer of project water and thus had to acquire all water rights needed for a

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146. *Id.* § 3, 32 Stat. 389.

147. FREDERICK MERK, HISTORY OF THE WESTWARD MOVEMENT 511 (1978).

148. RICHARD W. WAHL, MARKETS FOR FEDERAL WATER: SUBSIDIES, PROPERTY RIGHTS, AND THE BUREAU OF RECLAMATION 29-30 (1989).

149. *Id.* at 33.

150. Kansas v. Colorado, 206 U.S. 46 (1907).

151. *Id.* at 87-100.

152. United States v. Gerlach Live Stock Co., 339 U.S. 725 (1950).

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federal project pursuant to state law.[153] The Bureau of Reclamation held these rights in trust for project beneficiaries and had to operate any project in conformity with state laws.[154] Federal law did not displace state law until a seminal 1958 decision arising out of California's fierce resistance to the Reclamation Act of 1958.[155] To maintain deliveries to excess lands, farmers in California convinced the state supreme court that the excess lands provision of the Reclamation Act of 1902 violated state law.[156] This was a dubious conclusion and, even if correct, federal law nevertheless controls because section 5 of the Reclamation Act clearly and unequivocally imposes a federal policy on the delivery of water to project beneficiaries.[157] Section 8 was never intended to repeal this express federal policy, and the Supreme Court held that federal law supersedes state law.[158] The Court went beyond this simple holding, however, and characterized section 8 as merely a just compensation rule.[159] The Bureau of Reclamation merely had to follow state law to determine the amount of money due if it interfered with any vested state rights.[160]

This new reading of section 8 became the new reclamation law. Five years later, the Supreme Court held that a California law recognizing a preference for areas of origin—a biodiversity protection strategy—was preempted by the Reclamation Act, although, unlike the 160 acre limitation, there was no clear conflict between federal policy and state law.[161] The Court reaffirmed its earlier dictum that state law served only to define the "property interests, if any, for which compensation must be made."[162]

The presumption that a broader and exclusive sphere was necessary to carry out federal objectives was reversed in 1978, and reclamation law was restored to the original intent of Congress. In *California v. United States*,[163] the Supreme Court held that state law controls the operation of federal reclamation projects unless it conflicts with an explicit congressional directive.[164] Ironically, the opinion allowed

153. Nebraska v. Wyoming, 325 U.S. 589, 614-16 (1945).
154. *Id.*
155. Ivanhoe Irrigation Dist. v. McCracken, 357 U.S. 275 (1958).
156. *Id.* at 287-89.
157. *See id.* at 291.
158. *Id.* at 294-300.
159. *Id.*
160. *Id.*
161. City of Fresno v. California, 372 U.S. 627 (1963).
162. *Id.* at 630.
163. 438 U.S. 645 (1978).
164. *Id.* at 674-75. The basic conflict in the case was whether the State of California could impose releases to support downstream white water rafting until the federal govern-

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California temporarily to block the filling of a federal reservoir to preserve a stretch of white water below the dam.[165]

2. *FERC.*—The Federal Energy Regulatory Commission (FERC), the successor to the Federal Power Commission, is subject to a statute which protects state water law from federal interference. However, state concerns, which have often included biodiversity protection, have until recently been ignored. The Supreme Court has consistently held that a FERC license preempts contradictory state laws, with the result that biodiversity has been subordinated to hydroelectric power in many cases.[166] FERC has both the power to issue or deny licenses for hydroelectric projects on navigable streams[167]—which are the ones best adapted to the comprehensive development of the river—and the authority to decommission dams.

In 1946, the Supreme Court addressed the relationship between state law and the Federal Power Act. The state of Iowa wanted to enforce a law limiting diversions to the watershed of origin, a biodiversity protection rule.[168] The Supreme Court read section 27 of the Federal Power Act to require deference to state law only for the purpose of defining compensable water rights.[169] Any further deference to state law would defeat the objective of the Act, which the Court erroneously defined as "the comprehensive development of the water resources of the Nation."[170]

Congress began to limit FERC's authority in 1968 with the passage of the Wild and Scenic Rivers Act,[171] but the agency never fully assimilated the message of the Act nor the change in water resources policy that it signaled.[172] In the past thirty years, criticism of FERC's environmental performance has mounted. The Court had a second opportunity to check the power of FERC and promote biodiversity protection as states began to impose minimum flow conditions on

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ment could demonstrate that all water was needed to fulfill project purposes. California prevailed on this ground. *See* United States v. California, 694 F.2d 1171 (9th Cir. 1982).

165. *Id.*

166. *See, e.g.*, First Iowa Hydro-Elec. Coop. v. Federal Power Comm'n, 328 U.S. 152 (1946) (deferring to state law only in cases of compensable water rights).

167. 16 U.S.C. § 797(e) (1988).

168. *First Iowa Hydro-Elec. Coop.*, 328 U.S. at 152; *see* Lynda Butler, *Allocating Consumptive Water Rights in a Riparian Jurisdiction: Defining the Relationship Between Public and Private Interests*, 47 U. PITT. L. REV. 95, 111-17 (1985).

169. *First Iowa Hydro-Elec. Coop.*, 328 U.S. at 175-76.

170. *Id.* at 180.

171. 16 U.S.C. § 1271.

172. *See* Carolyn Ragensperger & A. Dan Tarlock, *The Wild and Scenic Rivers Act at 25: The Need for a New Focus*, 4 RIVERS 81 (1993).

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FERC licenses under section 27. But in 1990, the Court reaffirmed *First Iowa Hydro-Electric Cooperative* on stare decisis grounds and held that California could not impose minimum flow license conditions on the fiction that they interfered with FERC's comprehensive planning authority.[173]

The states, however, have partially circumvented the wall of preemption which shields FERC licenses from state regulation, again illustrating the inconsistent protection which biodiversity receives under federalism jurisprudence. Section 401 of the Clean Water Act (CWA)[174] requires that the appropriate state pollution authority must certify under all federal permits and licenses that the proposed activity will not interfere with state water quality standards.[175] The scope of section 401 has been controversial. Federal licensees and permittees argue that the term is limited to point-source discharges, while states have taken a much broader view of their authority.[176] In a rare decision reflecting sensitivity to biodiversity protection, the Supreme Court agreed with the states and collapsed the "artificial distinction" between quantity and quality regulation. In *PUD No. 1 of Jefferson County v. Washington Department of Ecology*,[177] the Court held that section 401 permits the state to impose minimum flow conditions on a FERC licensee for a project on the Dosewallips River (located at the edge of Olympic National Park), which was classified as "extraordinary" under the state's anti-degradation standards.[178] Section 401(d) gives states the authority to condition approval on compliance with state effluent limitations, water quality standards, and with "other appropriate requirements of state law."[179] Justice O'Connor, writing for the majority of the Court, found that the minimum flow requirements were proper because they were imposed to ensure compliance with water quality use designations and anti-degradation standards, authorized by section 303 of the Clean Water Act[180] and because they were adopted to preserve a designated use—salmon and trout runs.[181]

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173. California v. Federal Energy Regulatory Comm'n, 495 U.S. 490, 496-506 (1990).

174. Federal Water Pollution Control Act, §§ 101-607, 33 U.S.C. §§ 1251-1387 (1988) [hereinafter CWA].

175. CWA § 401, 33 U.S.C. § 1341.

176. *See, e.g.*, Arnold Irrigation Dist. v. Department of Envtl. Quality, 717 P.2d 1274, 1277-78 (Or. Ct. App. 1986) (holding that state may consider only those factors listed in the Clean Water Act in their decisions on permit and license applications), *cert. denied*, 726 P.2d 377 (Or. 1987).

177. 114 S. Ct. 1900 (1994).

178. *Id.* at 1914.

179. *Id.* at 1910.

180. 33 U.S.C. § 1313.

181. *PUD No. 1 of Jefferson County*, 114 S. Ct. at 1909.

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FERC argued that section 303 required states to adopt water quality standards with numeric rather than narrative criteria as a prerequisite to invoking section 401.[182] The Court disagreed and held that water quality standards have two components, the designated use and the criteria based on water quality. The Court explained that "EPA has not interpreted § 303 to require the States to protect designated uses exclusively through enforcement of numerical criteria."[183]

E. The Solutions Exceed the Effective Reach of Federal Power

Classic federalism doctrines are rapidly becoming irrelevant as all levels of government move from a single media or species approach to cooperative ecosystem approaches to biodiversity management. Ecosystem management is creating a paradox in federal-state relations: the achievement of effective biodiversity protection efforts relies on unexercised rather than exercised federal power. Ecosystem management's collapse of conventional boundaries and the integration of public and private lands in a single functional unit makes local rather than state governments much more important, especially for land-use issues. As a result, the importance of the science of conservation biology is magnified. Science is the source of both substantive management principles, such as the dedication of viable patches of habitat linked by biological corridors,[184] and the possibility for consensus. For example, adaptive management is now seen as the primary strategy because it increases the possibility for consensus and makes possible the creation of processes with self-correction mechanisms.[185] The net result is that the search for a permanent exclusive regulatory authority—the essence of federalism jurisprudence—is counterproductive. National standards are replaced by "place-driven"

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182. *Id.* at 1910.

183. *Id.* at 1911.

184. *See* Rebecca W. Thomson, *Ecosystem Management: Great Idea, But What Is It, Will It Work, and Who Will Pay?*, 9 NAT. RESOURCES & ENV'T 42 (1995); Note, *Saving an Endangered Act: The Case for a Biodiversity Approach to ESA Conservation Efforts*, 45 CASE W. RES. L. REV. 553 (1995).

185. A recent National Research Council-National Academy of Sciences study captures the essence of adaptive management:

> Adaptive planning and management involve a decision making process based on trial, monitoring, and feedback. Rather than developing a fixed goal and an inflexible plan to achieve the goal, adaptive management recognizes the imperfect knowledge of interdependencies existing within and among natural and social systems, which requires plans to be modified as technical knowledge improves . . . .

COMMITTEE ON AQUATIC ECOSYSTEMS, *supra* note 11, at 357.

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ones[186] in which cooperation requires the subordination rather than the exercise of federal authority.

Biodiversity protection experiments driven by the Endangered Species Act illustrate the paradox which is a result of the historical refusal to delegate land-use and water allocation authority to the national government. The exercise of preemptive power is difficult if not impossible to sustain because the success of these experiments depends on state and local cooperation. In recent years, however, the federal government has asserted the authority to preempt state land and water laws to protect endangered species and prevent water pollution.[187] Ultimately, the federal government has had to defer to state and local governments and rely on loosely structured cooperative partnership agreements to achieve these objectives.[188]

The recent agreement between the federal government and the state of California (styled "Club Fed") to manage the San Francisco Bay-Delta illustrates the structural, as well as political limits of federal authority. For over fifty years, California has been studying the impact of diversions on the fresh-to-salt water balance in the Delta but declined to address the problem because it would threaten the continued enjoyment of vested water rights.[189] The issue came to a head in 1986 when an intermediate California appellate court held that state law requires the integration of water quality and quantity allocation, in essence that the Delta cannot be allowed to deteriorate.[190] State efforts to augment Delta flows had been initially blocked by San Joaquin and Southern California water users. In the early 1990s, the federal government threatened to "run" the Delta under the Clean Water

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186. Thomas W. Jackson & Joshua S. Wyner, *The New Hot Doctrine: Ecosystem Management*, NAT'L L.J., Dec. 5, 1994, at C6. In a more general survey of environmental federalism, Professor Breckenridge reaches the same conclusion. Lee P. Breckenridge, *Fractal Federalism: Evolving National-State Relations in U.S. Environmental Law*, *in* GOVERNMENT STRUCTURES IN THE U.S.A. AND FORMER U.S.S.R. ch. 6 (James E. Hickey & Alexej Ugrinksy eds., forthcoming 1996).

187. The takings issues raised by the Act are discussed in Note, *Does* Lucas *Provide a Takings Action Against Federal Regulation Under the Endangered Species Act?*, 71 WASH. U. L.Q. 1217 (1993). Both the Endangered Species Act and § 404 of the Clean Water Act create regulatory water rights. *See, e.g.*, United States v. Glenn-Colusa Irrigation Dist., 788 F. Supp. 1126 (E.D. Cal. 1992); A. DAN TARLOCK ET AL., WATER RESOURCE MANAGEMENT 728-48 (1993).

188. For the most extensive theoretical discussion of the tension between local and national biodiversity control and the new forms of cooperative management that are emerging in this area, see Lee P. Breckenridge, *Reweaving the Landscape: The Institutional Challenges of Ecosystem Management for Lands in Private Ownership*, 19 VT. L. REV. 363 (1995).

189. *See* JOSEPH L. SAX ET AL., LEGAL CONTROL OF WATER RESOURCES 590-96 (1991).

190. United States v. State Water Resources Control Bd., 227 Cal. Rptr. 161, 179-80 (Cal. Ct. App. 1986).

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and Endangered Species Acts by setting water quality standards and listing species. However, in 1994 the federal government and the state reached a framework agreement on the principles for the future management of the Delta.[191]

The agreement commits the federal government and the state to a long-term cooperative management experiment within the context of state water law and existing federal environmental protection mandates.[192] Its success depends on the establishment of long-term cooperation between state and federal agencies and on the ability of both sides to develop ecosystem management strategies based on sound, continuously acquired scientific information. The strategies must provide adequate environmental flows within existing water entitlement allocations and permit a more flexible interpretation of federal law.

Cooperation rather than preemption is required, moreover, to assemble the necessary financial resources. The agreement was facilitated by three factors: (1) the Central Valley Project Improvement Act of 1992 (CVPIA);[193] (2) the policy of Secretary of the Interior Babbitt to seek cooperative federal-state ecosystem management strategies to achieve the objectives of the Endangered Species Act and other federal environmental mandates without imposing undue burdens on existing property right holders;[194] and (3) the willingness of the Metropolitan Water District of Southern California to guarantee a three-year $10 million annual commitment for non-flow strategies such as improved fish screens.[195] The CVPIA enabled the federal government to shoulder the major burden of meeting Delta water quality demands. All Central Valley Project water will be credited against an 800 acre foot block dedicated in 1992, with any additional water needs met through the purchase of existing entitlements.[196] Thus, California avoided—at least for the foreseeable future—quantifying and curtailing a large portion of the state's water rights, although the state must "immediately thereafter initiate water right proceedings to implement the adopted plan."[197] For example, by 1998, the state must

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191. For a detailed discussion of the principles, see A. DAN TARLOCK, LAW OF WATER RIGHTS AND RESOURCES § 5.19[8] (1995 Release).

192. *Id.*

193. *See* Central Valley Project Improvement Act (CVPIA), Pub. L. No. 102-575, 106 Stat. 4707 (1992).

194. *See infra* text accompanying notes 208-210.

195. TARLOCK, *supra* note 191, § 5.19[8].

196. *Id.*

197. *Id.*

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allocate the responsibility among water right holders in the San Joaquin basin for seasonable flows to protect Chinook Salmon.[198]

The Clinton administration has recently negotiated several similar agreements to resolve bitter land-use disputes that have arisen under the Endangered Species Act (ESA). Federal land-use authority comes from section 9 of the Act which makes any "taking" on private or public land a violation of the Act.[199] Section 9 has threatened to block residential development in areas where endangered species live, unless developers and local governments agree to federal Habitat Conservation Plans.[200] The ESA gives the federal government the power to preempt state and local land-use controls when a listed species is potentially present within the jurisdiction, but the Department of Interior has shifted to the use of special listing rules under section 4(d).[201] This section allows the Department to list a species as threatened but to use state or local land-use authority as the protection mechanism.[202]

To resolve an especially protracted dispute in the Hill Country around Austin, Texas after the county voted down a bond issue in 1995 to finance habitat acquisition,[203] Secretary Babbitt agreed to open land to development under a plan which creates marketable mitigation certificates to finance a 30,000 acre habitat reserve for two songbirds and six cave bugs.[204] Developers may purchase "Participa-

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198. The crux of the agreement is a seasonable Delta water export cap tied to the runoff of an eight river index. The agreement expresses the hope that no new species will be listed until 1998 and that "[c]ompliance with the take provisions of the biological opinions under the Federal . . . ESA is intended to result in no additional loss of water supply annually within the limits of the water quality and operational requirements of these Principles." If additional species are listed for "unforeseen circumstances," no additional Delta flows will be required. *Id.* Such state-local-federal ongoing multi-species protection partnerships dramatically illustrate the emergence of a new federalism model which is gradually replacing the threat of preemption with the promise of estoppel.

199. 16 U.S.C. § 1538. Taking has been defined to include habitat destruction, 50 C.F.R. § 17.3 (1995), and the Secretary's interpretation of the statute has been upheld by the Supreme Court. Babbitt v. Sweet Home Chapter of Communities for Greater Oregon, 63 U.S.L.W. 4665 (U.S. June 29, 1995).

200. 16 U.S.C. § 1539.

201. *Id.* § 1533(d).

202. The Department of Interior has proposed a complex 4(d) rule, 60 Fed. Reg. 9484 (to be codified at 50 C.F.R. pt. 17) (proposed Feb. 17, 1995), to protect the spotted owl on non-federal lands in California and Washington state and to lift the blanket prohibitions against "takes" imposed by federal injunctions. For a concise summary of the controversy and the litigation that led to the proposed 4(d) rule, see COGGINS ET AL., *supra* note 115, at 827-32.

203. *See* Ruhl, *supra* note 17.

204. U.S. DEP'T OF INTERIOR, BALCONES CANYONLANDS CONSERVATION PLAN (BCCP): SHARED VISION 1 (1995) (draft version).

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tion Fee Certificates" from governments who have contributed land or funds to a reserve program to mitigate capital improvements.[205] The hope is that the $2750 to $5500 per acre cost of the certificates will be cheaper than the $9000 per acre that has historically been spent on mitigation in the Balcones Canyonlands. Landowner participation is voluntary,[206] the details on local government implementation are "in process,"[207] and the long-term likelihood of success is not high.

The net result of these experiments is an attempt to encourage partnership federalism. In contrast to previous models of cooperative federalism, partnership federalism, which allows states and local governments to define the content of federal mandates, is increasingly characterized by federal waivers of power rather than preemption. For example, to encourage cities to develop multi-species land-use plans and regulatory programs, the Department of Interior announced an Assurances Policy in 1994.[208] The policy, popularly known as the "no surprises" policy, goes to the limits of the basic constitutional doctrine that the sovereign cannot contract away the police power[209] by promising that once a Habitat Conservation Plan is approved, no new reserve dedications or other mitigation measures will be allowed except in "extraordinary circumstances."[210] This policy, if upheld, should, along with other incentives, encourage more public and private participation in multiple species protection plans because local land-use plans define the substantive protection mandates. Partnership federalism still rests on latent federal supremacy, but as a recent evaluation of a similar California program, that seeks to promote voluntary public and private biodiversity conservation programs, concludes:

> In order for this approach to work, the threat of an endangered or threatened species listing must be close enough to motivate landowners to participate in a voluntary effort to

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205. *Id.*

206. Individual landowners may still seek section 10(a) permits.

207. On February 7, 1995, the Texas Capital Area Builders Association withdrew from the task force studying the plan because they hope to repeal or substantially weaken the ESA. Amy Smith, AUSTIN BUSINESS J., Feb. 10, 1995, § 1, at 1. *See generally* TIMOTHY BEATLEY, HABITAT CONVERSATION PLANNING: ENDANGERED SPECIES AND URBAN GROWTH (1994).

208. U.S. DEP'TS OF INTERIOR AND COMMERCE, ASSURING CERTAINTY FOR PRIVATE LANDOWNERS IN ENDANGERED SPECIES ACT HABITAT CONSERVATION PLANNING (1994) (Joint Statement of Secretaries of Interior and Commerce) [hereinafter ASSURING PRIVATE LANDOWNERS].

209. The doctrine rests of the principle that the federal government cannot be estopped to exercise the police power. *See* Stone v. Mississippi, 101 U.S. 814 (1880).

210. ASSURING PRIVATE LANDOWNERS, *supra* note 208.

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> conserve habitat, but not so close that species might actually be listed before the voluntary program can get off the ground . . . .[211]

The limited ability of the federal government to protect biodiversity both on its own public lands and on private property has forced the federal government to induce state and local cooperation to implement national objectives. A more functional and less abstract concept of federalism can support this experiment. Courts can encourage state and local biodiversity initiatives that do not conflict with congressional policies by sanctioning constitutionally-supported national biodiversity protection responses.

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211. Jon Welner, *Natural Communities Conservation Planning: An Ecosystem Approach to Protecting Endangered Species*, 46 STAN. L. REV. 319, 346 (1995). Professor Breckenridge's study of the Northern Forest Lands Council, a six-year U.S. Forest Service exploration of ecosystem management in upper New York State and northern New England, reached a similar conclusion. "Partnerships for managing ecosystems are best seen as attempts to develop new hybrid forms of decision-making, a 'third way,' that is decentralized and 'private' enough to allow diverse, semi-autonomous action, but at the same time centralized and 'public' enough to achieve coordination on a region-wide basis." Breckenridge, *supra* note 186, at 409.

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