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## Upstream of Peril: The Role of Federal Lands in Addressing the Extinction Crisis: Twelfth Annual Lloyd K. Garrison Lecture on Environmental Law

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**TWELFTH ANNUAL LLOYD K. GARRISON  
LECTURE ON ENVIRONMENTAL LAW**

**Upstream of Peril: The Role of Federal Lands  
in Addressing the Extinction Crisis**

KARIN P. SHELDON\*

This talk developed in part from a dialogue—a monologue really—that I had with my car radio. I have a forty-minute commute through a rural part of Vermont. Cell phone reception is non-existent or lousy, and radio stations alternate among the earnest droning of the local National Public Radio outlet, occasional wafts of world music with ads in French from Montreal, and blasts of a mega-hertz classic rock station that is probably beamed out of Cleveland. Consequently, I often turn to books on tape.

In February, I decided to tackle Jared Diamond's *Collapse: How Societies Choose to Fail or Succeed*.<sup>1</sup> I confess I have a copy of the book at home, at the bottom of several layers of *Bon Appetit* magazine, but somehow I was not disciplined enough to work my way through it. *Collapse* is a spectacular review of the catastrophic fate of societies that ignored the fundamental principles

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\* Professor of Law, Associate Dean for the Environmental Law Program and Director of the Environmental Law Center, Vermont Law School. I am indebted to the Conservation Department of Defenders of Wildlife for its significant contribution to the research for this lecture, particularly to Dr. J. Christopher Haney, Director of Conservation Science, who was generous with his time, deep knowledge of ecology and endangered species, and resource materials.

1. JARED DIAMOND, *COLLAPSE: HOW SOCIETIES CHOOSE TO FAIL OR SUCCEED* (2005).

of ecology and behaved as if they were exempt from the rules of Nature. I highly recommend the book to you.

As Diamond laid out one after another story of the collapse of societies around the globe, I began to yell at my radio—"Good grief! We're making the same mistakes as the Norse in Greenland!<sup>2</sup> We ignore ecological reality and refuse to learn from the experience of native people who succeeded in mastering the environment." "Why didn't the Easter Islanders see it coming? What do you expect when you cut all your trees to move giant heads around?"<sup>3</sup> (Of course, we are doing the same thing with fossil fuels and limousines.) "Where did the Maya think they were going when they exhausted their land through their slash and burn farming practices?"<sup>4</sup>

It was bad enough when Diamond focused on past "primitive" societies, which might be excused because of a lack of scientific and technical knowledge and foresight, but then he moves on to describe manifestations of the same causes of collapse today, singling out the Bitterroot Valley of Montana as "an ideal case study."<sup>5</sup> The Valley's environmental problems include those that undermined pre-industrial societies in the past and now threaten societies everywhere.<sup>6</sup> Deforestation and damage from livestock grazing head the list, followed by a cascade of biodiversity loss, water shortages, pollution, and climate change. If these impacts are apparent in the Bitterroot—which has a small population and is pristine and breathtakingly beautiful—the collapse is upon us.

I will not address the panoply of issues examined by Jared Diamond, nor am I going to discuss climate change (although it includes and eclipses all other environmental issues we face in the twenty-first century). Rather, I want to focus on one particular set of troubles in paradise: the ongoing collapse of biodiversity and the limitations of our federally-owned public lands to provide an "upstream" solution for this problem. I would also like to offer some thoughts on what we might do to address the matter.

It has been said that we are in the midst of the sixth great extinction—a collapse of biodiversity most notable because it is

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2. *Id.* at 211-76 (discussing the rise and fall of Norse Greenland).

3. *Id.* at 79-119 (discussing Easter Island).

4. *Id.* at 157-77 (discussing the Mayan collapse).

5. *Id.* at 32.

6. *Id.* at 27-75 (discussing Montana's Bitterroot Valley).

being caused by human beings and not natural processes.<sup>7</sup> The extent and speed of wildlife and ecosystem loss in the United States is shocking. Biologist Larry Harris has said that “we swept across this continent so quickly . . . that we really never knew what was here.”<sup>8</sup> The destruction has been chronicled by Mathiesen and others,<sup>9</sup> and called a biologic history of “profound impoverishment” by conservation biologists Reed Noss and Allen Cooperrider.<sup>10</sup>

Congress recognized the impact of human activities on wildlife and ecosystems in the Endangered Species Act (“ESA” or “the Act”),<sup>11</sup> now more than thirty-five years old. The objectives of the ESA are to protect plant and animal species in danger of extinction and provide a means to conserve the ecosystems upon which such species depend.<sup>12</sup> Species are “listed” under the Act because of their limited numbers and perilous biological status.<sup>13</sup> Listed species must be “conserved,” which means that agencies of the federal government are to do whatever is necessary to bring species to the point where the protections of the Act are no longer required.<sup>14</sup> The ESA has a very broad reach. It prohibits anyone, whether private individual or government agency, from killing or harming listed species or damaging their habitat.<sup>15</sup> It also prohibits its federal agencies from authorizing, funding, or implementing

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7. RICHARD LEAKEY & ROGER LEWIN, *THE SIXTH EXTINCTION: PATTERNS OF LIFE AND THE FUTURE OF HUMANKIND* 245 (1995) (“Dominant as no other species has been in the history of life on Earth, *Homo sapiens* is in the throes of causing a major biological crisis, a mass extinction, the sixth such event to have occurred in the past half billion years.”).

8. REED F. NOSS & ALLEN Y. COOPERRIDER, *SAVING NATURE’S LEGACY: PROTECTING AND RESTORING BIODIVERSITY* 16 (1994) (quoting D. Chadwick, *The Biodiversity Challenge*, 65 DEFENDERS 19 (1990)).

9. PETER MATHIESEN, *WILDLIFE IN AMERICA* (Penguin Books 1977) (1959); NOSS & COOPERRIDER, *supra* note 8, at 14-17, 62-65.

10. NOSS & COOPERRIDER, *supra* note 8, at 15.

11. Endangered Species Act, 16 U.S.C. §§ 1531-1543 (2000).

12. *Id.* § 1531(b).

13. *Id.* § 1533. Decisions to list species are made by the Secretary of the Interior “solely on the basis of the best scientific and commercial data available.” *Id.* § 1533(b)(1)(A).

14. *Id.* § 1532(3).

15. *Id.* §§ 1532, 1538. “Harm” to a species is further defined by Fish and Wildlife Service regulations to include damage or destruction of habitat that results in a direct take of species. 50 C.F.R. § 17.3 (2005). The regulation was upheld as an appropriate interpretation of the ESA in *Babbitt v. Sweet Home Cmtys. for a Greater Or.*, 515 U.S. 687 (1995).

actions that would result in “destruction or adverse modification” of habitat determined to be “critical” for species survival.<sup>16</sup>

Not everyone agrees with the Supreme Court’s conclusion in *Tennessee Valley Authority v. Hill* that “the plain language of the [Endangered Species] Act, buttressed by its legislative history, shows clearly that Congress viewed the value of endangered species as ‘incalculable.’”<sup>17</sup> The ESA has been the subject of considerable debate since its enactment, both in Congress and the society at large. Perhaps the most controversial aspect of the ESA is its application to development activities on private lands.<sup>18</sup> Opponents of the Act repeat stories of endangered species preventing hard-working farmers from deriving a living from the soil or developing their property.<sup>19</sup> Inevitably, the species to blame is a lowly and contemptible creature with no fathomable earthly purpose, especially when measured against economic progress or property rights.<sup>20</sup>

The Endangered Species Act is in the cross-hairs again today.<sup>21</sup> It is disparaged for its lack of success in recovering species (the Endangered Species List, it is said, is like the “roach motel”—species go on, but they never come off), the costs associated with its implementation, the delay it causes to development and economic activities, and the burden it allegedly places on private property owners conscripted by the statute into acting as zookeepers of the national zoo.<sup>22</sup>

Some of the ESA’s detractors suggest that the federally-owned lands of the United States are the perfect place to protect and preserve threatened and endangered species, biological diversity, and wildlife habitat.<sup>23</sup> These critics contend that publicly-

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16. 16 U.S.C. § 1536(a)(2).

17. *Tenn. Valley Auth. v. Hill*, 437 U.S. 153, 187 (1978) (quoting H.R. REP. NO. 93-412, at 4-5 (1973)).

18. Karin P. Sheldon, *Habitat Conservation Planning: Addressing the Achilles Heel of the Endangered Species Act*, 6 N.Y.U. ENVTL. L.J. 279-80 (1998).

19. *See id.*

20. *Id.*

21. In September 2005, the House of Representatives passed The Threatened and Endangered Species Recovery Act of 2005, H.R. 3824, 109th Cong. (2005), sponsored by Representative Richard Pombo (R-Calif.). The Pombo bill makes significant changes in the ESA to address criticisms of the current law.

22. *Babbitt v. Sweet Home Cmty. for a Greater Or.*, 515 U.S. 687, 714 (1995) (Scalia, J., dissenting).

23. Section 24 of Representative Pombo’s bill, H.R. 3824, directs the Secretary of the Interior to survey lands under the jurisdiction of the Bureau of Land Management and Forest Service to determine their value for management for species recovery and addition to the National Wildlife Refuge System.

owned lands should assume the burden of preventing species extinction, thereby relieving private property owners of the responsibility for imperiled wildlife.

This is a very appealing idea. The federal government manages about 671.8 million acres of land—29% of the nation's land base.<sup>24</sup> There is federal land in every state. While a dozen states have fewer than a half-million acres of federal land within their borders, another dozen have over ten million acres.<sup>25</sup> These federal lands support an astonishing array of wildlife and plants, both common and rare. Indeed, the United States is “the most ecologically diverse nation on earth.”<sup>26</sup> It has a multitude of climatic, topographic, and geologic features that have produced a remarkable diversity of ecologic types and wildlife species.<sup>27</sup> These range from totem American animals, such as bison, grizzly bear, wolverine, wolf, and mountain lion, to a myriad of small mammals, birds, fish, and reptiles. Almost one-quarter of U.S. mammals are endemic—that is, they occur nowhere else.<sup>28</sup> These homegrown species include the black-footed ferret, the prong horn antelope, and the mountain beaver, as well as “a prolific variety” of darters (a small fish).<sup>29</sup> For many of these animals, especially the wide-ranging, large, and fierce ones, federal lands are vital to their continued survival. Private lands cannot provide the habitat, range, food, or security these species require.<sup>30</sup>

Unfortunately, despite the biological richness of the federal lands and the attractiveness of the idea that they offer an upstream solution to the extinction crisis, there are three substantial barriers to placing the responsibility for the future of American wildlife upon them. These are the matters of: biology, management, and politics.

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24. CAROL HARDY VINCENT, CONGRESSIONAL RESEARCH SERVICE, THE LIBRARY OF CONGRESS, RL32393, FEDERAL LAND MANAGEMENT AGENCIES: BACKGROUND ON LAND AND RESOURCES MANAGEMENT 2 (2004), available at <http://www.ncseonline.org/nle/crsreports/04Aug/RL32393.pdf>.

25. *Id.*

26. THE NATURE CONSERVANCY & ASS'N FOR BIODIVERSITY INFO., PRECIOUS HERITAGE: THE STATUS OF BIODIVERSITY IN THE UNITED STATES 208 (Bruce A. Stein et al. eds., 2000) [hereinafter PRECIOUS HERITAGE].

27. Bruce A. Stein et al., *A Remarkable Array: Species Diversity in the United States*, in PRECIOUS HERITAGE, *supra* note 26, at 55-92.

28. *Id.* at 70-71.

29. *Id.* at 55, 70-71.

30. J. Christopher Haney & Christopher Herbst, *Lost in Space: Making Geographic Sense Out of Species Imperilment, Habitat, and the Endangered Species Act* 9 (Sept. 12, 2006) (unpublished manuscript on file with the Pace Environmental Law Review).

## I. BIOLOGY

At the outset, it is important to recognize that we are at an uncomfortable juncture between the structure of the current generation of environmental law, now more than thirty years old, and our more recent understanding of ecosystems and how they function. Environmental statutes, which are based mostly on artificial geographical boundaries and single resource management, reflect the snapshot theory of ecosystems, an "equilibrium paradigm."<sup>31</sup> Under this theory, steady-state, picture perfect ecosystems can be achieved and maintained through human management.

We now know that the equilibrium paradigm is wrong.<sup>32</sup> Ecosystems are dynamic, unpredictable, perhaps even chaotic. Ecological phenomena operate across regions and landscapes. Thus we cannot draw lines on maps, declare areas protected, and walk away to leave them to their own devices. Nor can we engineer an ecosystem to the point where what is in it will remain unchanged. Even areas that are set aside to protect their natural resources are buffeted by outside forces.

### A. Where the Wild Things Aren't

Dr. Mark L. Shaffer, the scientist responsible for developing the process for analyzing the future viability of wildlife populations, says that the federal lands alone cannot maintain wildlife, in general, and imperiled species, in particular, into the future.<sup>33</sup> According to Dr. Shaffer, if we want to rely solely on publicly-owned lands to sustain biodiversity, we need a different set of lands.<sup>34</sup>

The distribution of threatened and endangered species illustrates this problem. Only 12% of species listed under the Endangered Species Act are found exclusively on federal lands.<sup>35</sup> Nearly

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31. A. Dan Tarlock, *The Nonequilibrium Paradigm in Ecology and the Partial Unraveling of Environmental Law*, 27 LOY. L.A. L. REV. 1121, 1122 (1994).

32. *Id.* at 1123.

33. Telephone Interview with Mark Shaffer, Director of the Environment Program, Doris Duke Foundation (Jan. 2006).

34. *Id.*

35. Bruce A. Stein, Tom Breden, & Richard Warner, *The Significance of Federal Lands for Endangered Species*, in U.S. DEPT OF THE INTERIOR, NAT'L BIOLOGICAL SERVS., OUR LIVING RESOURCES: A REPORT TO THE NATION ON THE DISTRIBUTION, ABUNDANCE, AND HEALTH OF U.S. PLANTS, ANIMALS, AND ECOSYSTEMS 398, 400 (1995), available at <http://biology.usgs.gov/s+t/pdf/OLR.pdf>.

half of all listed species are not known to exist on federal lands.<sup>36</sup> Indeed, 40% of all federally listed species exist only on state or private lands.<sup>37</sup>

## B. And Where They Are

Plant and animal species, in general, and imperiled species (those that are rare, limited in range, or have small populations), in particular, tend to be concentrated in what ecologists call biodiversity “hot spots.”<sup>38</sup> Hot spots reflect topographic and climatic conditions more than ownership. In the United States, hot spots are primarily at lower elevations and along the coastal areas toward our southern borders.<sup>39</sup> There are four principal hot spots in the United States: California, Hawaii, Texas, and Alabama.<sup>40</sup> If you overlay federal land ownership on these hot spots you will find that, for the species occurring in them, reliance on federal lands for habitat protection is entirely misplaced. Only California has any significant amount of federal land within its borders. Forty-seven percent of California is owned and managed by the federal government.<sup>41</sup> Only 16% of Hawaii is owned by the federal government, while Texas and Alabama have virtually no federal land at all.<sup>42</sup>

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36. Studies differ on the exact percentage. *Id.* at 401 (stating that “fully 50% of federally species are not known to occur on federal lands”); Craig R. Groves et al., *Owning Up to our Responsibilities: Who Owns Lands Important for Biodiversity?*, in *PRECIOUS HERITAGE*, *supra* note 26, at 275 (stating that “federal lands support at least one example of about three-fifths (59%) of federally listed species”).

37. Haney & Herbst, *supra* note 30, at 9.

38. Reed F. Noss, *Some Principles of Conservation Biology, As They Apply to Environmental Law*, 69 CHI.-KENT L. REV. 893, 905 (1994); A. P. Dobson, J. P. Rodriguez, W. M. Roberts, & D. S. Wilcove, *Geographic Distribution of Endangered Species in the United States*, 275 SCIENCE 550, 551 (1997); Stephen J. Chaplin et al., *The Geography of Imperilment: Targeting Conservation Toward Critical Biodiversity Areas*, in *PRECIOUS HERITAGE*, *supra* note 26, at 162, 165-73.

39. See Chaplin et al., *supra* note 38, at 165-99.

40. BRUCE A. STEIN, *STATES OF THE UNION: RANKING AMERICA'S BIODIVERSITY 2* (2002), available at <http://www.natureserve.org/Reports/stateofunions.pdf>; see also Dobson et al., *supra* note 38, at 550-53; Curtis H. Flather, Michael S. Knowles, & Iris A. Kendall, *Threatened and Endangered Species Geography: Characteristics of Hot Spots in the Conterminous United States*, 48 BIOSCIENCE 365 (1998).

41. Vincent, *supra* note 24, at 3.

42. *Id.*



### C. Why Is This So?

By virtue of our history, the most biologically productive areas of the United States are not in public ownership.<sup>43</sup> From the moment European settlers arrived to “discover” the North American continent, low elevation lands with water, good soils, forage, and forest cover were transferred to private hands through means both legal and not. What was left after disposition tended to be more arid, less biologically diverse, and at higher elevations. Indeed, the largest component of the federal land system—the land under the jurisdiction of the Bureau of Land Management (“BLM”)—is often referred to as “the lands that nobody wanted.”

Plants and animals are integral parts of particular ecosystems. If we look at the geographic location and ownership of ecosystem types in the United States, we find that all federal and tribal lands “have large gaps in their coverage of . . . ecosystem diversity.”<sup>44</sup> Of the 135 major terrestrial and wetland ecosystem types in the United States, nine are not represented at all on any federal or tribal lands.<sup>45</sup>

The national forest system, which includes grasslands, wilderness areas, and wild and scenic rivers, has the best coverage and highest representation of ecosystem types of all federal lands. Seventy-three percent of U.S. ecosystem types are represented.<sup>46</sup> The National Park System, which includes monuments, wilderness, and a large variety of other designations, comes next. Sixty-seven percent of ecosystem types are represented on lands managed by the Park Service.<sup>47</sup>

You may be shocked to learn that more than half of all major ecosystem types, 53%, are missing from the national wildlife refuge system—the only component of the federal lands established

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43. The history of federal land disposition is discussed in PAUL W. GATES, *HISTORY OF PUBLIC LAND LAW DEVELOPMENT* (1968); E. LOUISE PEFFER, *THE CLOSING OF THE PUBLIC DOMAIN: DISPOSAL AND RESERVATION POLICIES 1900-50* (Arno Press Inc. 1972) (1951); Karin P. Sheldon, *How Did We Get Here? Looking to History to Understand Conflicts in Public Land Governance Today*, 23 *PUB. LAND & RESOURCES L. REV.* 1 (2002).

44. David W. Crumpacker et al., *A Preliminary Assessment of the Status of Major Terrestrial and Wetland Ecosystems on Federal and Indian Lands in the United States*, 2 *CONSERVATION BIOLOGY* 103, 113 (1988); Robert W. Dietz & Brian Czech, *Conservation Deficits for the Continental United States: An Ecosystem Gap Analysis*, 19 *CONSERVATION BIOLOGY* 1478, 1485 (2005).

45. Crumpacker et al., *supra* note 44, at 106.

46. *Id.* at 113.

47. *Id.*

explicitly for wildlife conservation.<sup>48</sup> The wildlife refuge system was created primarily to protect migratory waterfowl along the flyways of the Midwest and coastal areas of the Southeast. While the scope of the refuge system has been expanded in recent years to include threatened and endangered species and other wildlife, the majority of refuge lands are still habitat for ducks.<sup>49</sup>

The lands managed by the Department of Defense (“DOD”) are often overlooked as a reservoir of habitat and biodiversity. Although DOD lands represent just 3% of the federal estate,<sup>50</sup> they harbor 40% of the nation’s major ecosystem types,<sup>51</sup> as well as the greatest number of listed species of any federal agency.<sup>52</sup>

## II. MANAGEMENT

Even if the federal lands represented all the nation’s ecosystem types and provided habitat for all common and imperiled species, they cannot serve as a safe haven for wildlife under current management regimes. Despite the biological wealth of our federal lands, we do not have a comprehensive wildlife conservation system. The majority of our federal lands are not managed for biodiversity or ecosystem protection.<sup>53</sup> Except for the National Wildlife Refuge System Administration Act (“Refuge Act”),<sup>54</sup> no federal land statute puts wildlife first in its management scheme. Even the Refuge Act allows refuges to be used for an array of activities—mining, oil and gas exploration and development, jet skiing, cattle grazing—at odds with the idea of refuges as sanctuaries for wildlife.<sup>55</sup>

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48. *Id.*

49. Fifty-nine (11%) of all wildlife refuges were established for the purpose of conserving federally listed threatened and endangered species. U.S. Fish & Wildlife Service, National Refuges Established for Endangered Species, <http://refuges.fws.gov/habitats/endSpRefuges.html> (last visited Jan. 6, 2007). Only 288 (23%) of the 1258 federally listed species found in the United States occur on the refuge system. U.S. Fish & Wildlife Service, Threatened and Endangered Species on National Wildlife Refuges Database, [http://www.fws.gov/refuges/databases/ThreatenedEndangeredSpecies/ThreatenedEndangered\\_Search.cfm](http://www.fws.gov/refuges/databases/ThreatenedEndangeredSpecies/ThreatenedEndangered_Search.cfm) (last visited Jan. 6, 2007).

50. Groves et al., *supra* note 36, at 280.

51. Haney & Herbst, *supra* note 30, at 6.

52. Groves et al., *supra* note 36, at 279.

53. Michael J. Bean, *Strategies for Biodiversity Protection*, in PRECIOUS HERITAGE, *supra* note 26, at 257.

54. 16 U.S.C. §§ 668dd-668ee (2000).

55. Such activities are permitted if the Secretary of the Interior determines that they are “compatible” with wildlife protection. *Id.* § 668dd(d)(1)(A).

### A. Multiple Use Lands

The bulk of the federal estate, that is, national forest and BLM lands, is managed to facilitate the production of natural resource commodities. These commodities include timber, minerals, forage, oil and gas, water, and, in recent years, recreation. The overarching management standard for national forest and BLM lands is "multiple-use/sustained-yield" which directs the agencies to produce a high level of output of goods and services from these lands.<sup>56</sup> Wildlife is listed as one of the multiple uses of the federal lands, along with timber, forage, water, and recreation, but rarely drives any decisions. At best, wildlife is one of many "considerations" in the decision-making process.<sup>57</sup>

To understand the limited influence of wildlife in federal land management we turn again to history.<sup>58</sup> Unlike more modern environmental law, federal land law has roots in the 1700s and 1800s as the United States acquired title to the North American continent through conquest, purchase, treaty, and settlement. The Founding Fathers never envisioned that the central government would be a large land holding entity. Beginning with the Land Ordinance of 1785, the goal of federal land policy was to transfer title from the federal government to private parties as quickly as possible. The purposes of this disposition were multi-fold: to pay Revolutionary War debt, to secure the continent against European invaders, and to subdue Native Americans. Disposition was also designed to implement the Jeffersonian ideal of the small agrarian farmer.

In the mid to late 1800s and early 1900s, Congress dangled free land in front of landless immigrants and Eastern city dwellers who flocked to America and set off for the West in droves. Congress promised to swap land for labor in statutes like the Mining Law of 1872, the Homestead Act, the Timber Culture Act, and

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56. Multiple-Use, Sustained-Yield Act of 1960, 16 U.S.C. §§ 528-531 (2000). Gifford Pinchot, the first chief of the Forest Service, is generally credited with the development of the multiple use management philosophy. His idea was to end the reckless logging of federal forest reserves by treating trees as a crop. See STEWART L. UDALL, *THE QUIET CRISIS* 109-20 (Avon Books 1966) (1963).

57. See Robert B. Keiter, *Conservation Biology and the Law: Assessing the Challenges Ahead*, 69 CHI.-KENT L. REV. 911, 913-15 (1994) [hereinafter Keiter, *Challenges Ahead*].

58. This history is well chronicled. See, e.g., GATES, *supra* note 43; Robert B. Keiter, *Public Lands and Law Reform: Putting Theory, Policy, and Practice in Perspective*, 2005 UTAH L. REV. 1127, 1130-42 (2005) [hereinafter Keiter, *Public Lands*]; Sheldon, *supra* note 43.

the Stockraising Homestead Act. In the best tradition of John Locke, Congress rewarded those who put sweat into the soil and turned land to productive use with ownership of the property and its resources.

The consequence of western settlement was not just the transfer of lands, but a sharp decline and loss of the nation's ecosystems. Researchers have identified twenty-seven "critically endangered" ecosystem types that have been reduced by more than 98% of their extent since European settlement.<sup>59</sup>

The low elevation, prime agricultural lands of the Midwest went first. Today, the grasslands and savannas of the central part of the United States are the most endangered ecosystems in the country because of agricultural conversion, overgrazing, and invasion of exotic species.<sup>60</sup> Land with trees and water went next. Some 96% of the virgin forests of the northeastern and central states were logged by 1920.<sup>61</sup> By 1980, 95% of the virgin forests in the lower forty-eight states were gone.<sup>62</sup> Some forest types remain as fragmentary reminders of their former abundance.<sup>63</sup> The longleaf pine forest of the Southeast, for example, has been reduced by 98% since European settlement and is the nation's most endangered forest ecosystem.<sup>64</sup>

There was a reason the premier pioneer trail went to Oregon, a territory with good soils, rainfall, timber, and a host of other natural resources. Just imagine what the exhausted followers of Brigham Young thought looking out over the vast desert of Utah. "This is the place?"

Settlers of the West were not interested in watching the deer and the antelope play. They wanted the land to support an economy. Other entities were interested in this goal as well and were anxious to make use of the vast federal real estate. Congress gave railroad companies ninety-one million acres of federal land directly, and another thirty-seven million acres indirectly through the states so that rail lines could be constructed to deliver raw materials to the East and finished products to the burgeoning

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59. Mark T. Bryer, Kathleen Maybury, Jonathan S. Adams & Dennis H. Grossman, *More Than the Sum of the Parts*, in *PRECIOUS HERITAGE*, *supra* note 26, at 229.

60. NOSS & COOPERRIDER, *supra* note 8, at 64.

61. *Id.* at 63.

62. *Id.*

63. *Id.*

64. *Id.*

markets of the West.<sup>65</sup> The railroad grants represent one of the most bizarre land allocation systems ever devised—alternating 640 acre sections of land along the proposed railroad right of way, often for ten or more miles in either direction.<sup>66</sup> The result was the checkerboard pattern of land ownership that continues today across the West, a pattern that still creates headaches in resolving access rights for wildlife (and humans) to cross private property in order to reach federal lands.<sup>67</sup>

The policy of disposition of federal land was formally ended by Congress in 1976 by the Federal Land Policy and Management Act (“FLPMA”),<sup>68</sup> although it had virtually ceased as a reality decades earlier.<sup>69</sup> FLPMA declared that federal land would remain in federal ownership.<sup>70</sup> The statute did not, however, change the practice of transferring the natural resources of the federal lands into private hands. Instead, the legal regime for federal land management remains designed to promote commodity production.

Charles Wilkinson has written that the Mining Law of 1872, the grazing laws, the prior appropriation doctrine of water law, and the timber harvest laws continue to rule federal land management today.<sup>71</sup> He calls these laws “the Lords of Yesterday.”<sup>72</sup>

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65. SAMUEL T. DANA & SALLY K. FAIRFAX, *FOREST AND RANGE POLICY: ITS DEVELOPMENT IN THE UNITED STATES* 28 (2d ed. 1980).

66. *Id.* at 19-20. See generally RICHARD O’CONNOR, *IRON WHEELS AND BROKEN MEN: THE RAILROAD BARONS AND THE PLUNDER OF THE WEST* 7-13 (1973).

67. *Bergen v. Lawrence*, 848 F.2d 1502 (10th Cir. 1988), illustrates the problems created by the checkerboard land grants. Rancher Lawrence constructed a twenty-eight mile long fence on his ranch, located in a checkerboarded area of south central Wyoming. Although the fence was built entirely on private land, it enclosed 20,000 acres of federal land. The fence prevented antelope from access to their winter range, and in the severe winter of 1988, hundreds of them died trying to cross the fence. The federal government sued Lawrence under the Unlawful Inclosures Act and raised the issue of whether the statute, enacted to deal with the access problems created by the checkerboard land grants, applied to wildlife as well as humans. The court held that it did.

68. Federal Land Policy and Management Act of 1976, Pub. L. No. 94-579, 90 Stat. 2743 (1976) (codified as amended at 43 U.S.C. §§ 1701-1784 (2000)).

69. The Taylor Grazing Act of 1934, 43 U.S.C. §§ 315-315n (2000), is usually credited with closing the public domain and ending the free range era. The Act withdrew all unappropriated federal lands and authorized the Secretary of the Interior to establish grazing districts to halt the damage of unrestricted grazing. PEFFER, *supra* note 43, at 329, 338-41.

70. 43 U.S.C. § 1701(a)(1).

71. See generally CHARLES F. WILKINSON, *CROSSING THE NEXT MERIDIAN: LAND, WATER, AND THE FUTURE OF THE WEST* (1992).

72. *Id.* at 17.

James Huffman says that it isn't the laws that are the lords, but the private interests that benefit from public largesse.<sup>73</sup>

To a significant extent those laws do govern public lands and western resource management, but the laws are not the lords. The lords of the public lands are and always have been private interests. . . . In the public lands debate, the rhetoric is about public rights, the reality is about private rights.<sup>74</sup>

Yesterday the federal government gave land to private parties. Today it gives them natural resources.<sup>75</sup> The list of resources given includes minerals, oil and gas, coal bed methane, and oil shale, as well as the traditional surface resources of trees and forage.

Commodities control agency budgets. Michael Dombeck, former Chief of the Forest Service, explained that the Forest Service "trades trees for dollars."<sup>76</sup> In a perverse way then, the dollars produced by timber harvest, which destroys wildlife habitat, provide the financial support for wildlife protection and other programs.

## B. It's All About Habitat

Of course, there is a direct relationship between managing land for exploitation of its resources and the condition of its biodiversity. E.O. Wilson observed that species loss falls into four categories, which he termed "the mindless horsemen of the environmental apocalypse."<sup>77</sup> They are all variations on habitat destruction and degradation and the invasion of non-native species that usually accompany habitat degradation. The specific causes of habitat loss include agriculture, extractive land uses (such as logging, mining, and grazing), commercial development, and water projects (i.e., dams and diversions). Virtually all of these

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73. James Huffman, *The Inevitability of Private Rights in Public Lands*, 65 U. COLO. L. REV. 241, 276 (1994).

74. *Id.* at 276-77.

75. See Huffman, *supra* note 73, at 245-54; Michael C. Blumm describes "the carrying costs of the Lords of Yesterday" inherent in multiple-use management in *Public Choice Theory and the Public Lands: Why "Multiple Use" Failed*, 18 HARV. ENVTL. L. REV. 405, 408-15 (1994).

76. Dr. Michael Dombeck, Remarks at the Theodore Roosevelt Association and Franklin and Eleanor Roosevelt Institute Roundtable Conference on Public Lands (Sept. 20, 2000).

77. EDWARD O. WILSON, *THE DIVERSITY OF LIFE* 253 (1992).

activities occur on federal lands; indeed, they are the multiple uses mandated by law!

Grazing is particularly problematic. It has adversely affected 33% of threatened and endangered plants and 14% of listed animals.<sup>78</sup> Grazing is the single largest use of the federal lands, except for recreation.<sup>79</sup> It is permitted on all components of the federal land system—except for most national parks—including wilderness areas and wildlife refuges where it may directly compete with the species for which the refuge was established. The damage from grazing is not limited to the direct harm caused by livestock—although cattle and sheep do a mean job on forage and riparian areas. Management of grazing involves fencing, water development, predator and pest control, and vegetative manipulation (i.e., removal of less palatable plant species). All of these programs impact wildlife.<sup>80</sup> All occur on federal lands and are paid for by you, me, and other taxpayers.

Logging and mining adversely affect 12% and 11% of endangered species, respectively.<sup>81</sup> These activities are especially harmful to aquatic species, which are subject to erosion and siltation from land disturbance, acid mine drainage, and other types of water pollution.<sup>82</sup>

Human impacts from recreational use of federal lands have increased significantly in recent years. National forests now have more visitors than national parks. Outdoor recreation harms some 27% of vulnerable species—mostly from off-road vehicle use.<sup>83</sup>

Roads pose terrible threats to wildlife.<sup>84</sup> More than 15% of all threatened and endangered species are adversely affected by

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78. David S. Wilcove et al., *Leading Threats to Biodiversity: What's Imperiling U.S. Species*, in PRECIOUS HERITAGE, *supra* note 26, at 239, 247 [hereinafter Wilcove et al., *Leading Threats*].

79. GEORGE CAMERON COGGINS ET AL., FEDERAL PUBIC LAND AND RESOURCES LAW 13 (5th ed. 2002).

80. NOSS & COOPERRIDER, *supra* note 8, at 241.

81. Wilcove et al., *Leading Threats*, *supra* note 78, at 247.

82. *Id.*

83. David S. Wilcove et al., *Quantifying Threats to Imperiled Species in the United States*, 48 BioSCIENCE 607, 610 (1998).

84. For a discussion of the impacts of roads on wildlife and ecosystems, see NOSS & COOPERRIDER, *supra* note 8, at 54-57; PATRICIA A. WHITE & MICHELLE ERNST, SECOND NATURE: IMPROVING TRANSPORTATION WITHOUT PUTTING NATURE SECOND (2005), available at [http://www.transact.org/library/reports\\_pdfs/Biodiversity/second\\_nature.pdf](http://www.transact.org/library/reports_pdfs/Biodiversity/second_nature.pdf).

roads through their habitat.<sup>85</sup> This is not just the direct slaughter we see as we whiz by in our automobiles (more than one million vertebrates die on our roadways each day!).<sup>86</sup> Roads block the movement of animals across their territories to food supplies, winter or summer range, potential mates, and genetic diversity. Roads also fragment habitat. A study by the Council on Environmental Quality found that construction of just one mile of interstate highway resulted in the loss of up to forty-eight acres of habitat.<sup>87</sup> The smaller the habitat segment, the more vulnerable an animal is to harm from both natural and man-made causes.

Do you think our federal lands are roadless and, therefore, more protective of habitat? The national forests have more than 380,000 miles of roads,<sup>88</sup> more than twice the number of miles in the national highway system.<sup>89</sup> The national park system was deliberately roaded so that tourists could see the scenic wonders from their cars.<sup>90</sup>

### C. Conservation Lands

Of course, not all of our federal lands are managed for commodity production. Throughout our history, there has been a strong conservation ethic in the United States that has served to swing the pendulum back from heedless exploitation to the protection of natural resources. Even as Congress was disposing of federal lands in the 1800s and early 1900s, it was setting some of them aside to preserve their scenery, cultural and historic objects, natural resources, and wildlife. Indeed, the idea of reserving special areas as parks has been called America's contribution to world culture.<sup>91</sup>

In addition to parks, Congress has created a wilderness system made up of areas "where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain."<sup>92</sup> Although "primitive and unconfined recreation" is

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85. Wilcove et al., *Leading Threats*, *supra* note 78, at 247.

86. NOSS & COOPERRIDER, *supra* note 8, at 55.

87. WHITE & ERNST, *supra* note 84, at 5.

88. U.S. Dep't of Agric. Forest Service, Road Management Website, [http://www.fs.fed.us/eng/road\\_mgt/overview.shtml](http://www.fs.fed.us/eng/road_mgt/overview.shtml) (last visited Jan. 6, 2006).

89. U.S. Dep't of Transportation, The National Highway System, <http://www.fhwa.dot.gov/hep10/NHS/index.html> (last visited Jan. 6, 2006).

90. See DYAN ZASLOWSKY & THE WILDERNESS SOCIETY, *THESE AMERICAN LANDS: PARKS, WILDERNESS, AND THE PUBLIC LANDS* 24 (1986).

91. *Id.* at 9.

92. Wilderness Act, 16 U.S.C. § 1131(c) (2000).



allowed in wilderness, roads and motor vehicles are prohibited as are permanent structures, timber harvest, and oil and gas exploration and development.<sup>93</sup> Wilderness is to be managed principally to support its ecological processes.<sup>94</sup>

So why aren't our conservation lands enough to sustain our biodiversity and ecosystem types? Unfortunately, our national parks and wilderness areas are located primarily on relatively unproductive lands at high elevations—the wrong places to provide effective environmental protection.<sup>95</sup> Only a small percentage of the lands containing most U.S. ecosystem types are managed primarily to support biodiversity conservation.<sup>96</sup> The wilderness system is often referred to as one of “rocks and ice,” an apt description expressing both the political difficulty of engineering wilderness designations through Congress and the public's predilection for choosing spectacular mountain vistas as the wilderness paradigm. Every year I ask the students in my federal natural resources law class to close their eyes and envision wilderness. Only those from the Southwest see anything other than snow-capped, tree-covered peaks. While these vistas are aesthetically marvelous, they are relatively unproductive biologically.

Furthermore, our national parks and wilderness areas are too small to be optimal for the protection of ecosystems or wide ranging wildlife species.<sup>97</sup> Studies indicate that the loss of species from parks is inversely correlated with the size of the park.<sup>98</sup> Yellowstone National Park is a prime example. At 2.2 million acres it is a pretty fair piece of real estate. The park, however, is a “grossly incomplete sample” of the fourteen million acre Greater Yellowstone Ecosystem (“GYE”).<sup>99</sup> The GYE does maintain a natural diversity of species and ecosystem processes relatively intact. But “greater ecosystem,” is not a recognized legal designation or a management regime.<sup>100</sup> Consequently, we rely on Yellowstone

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93. *Id.*

94. *See id.*

95. Dietz & Czech, *supra* note 44, at 1485; J. Michael Scott et al., *Nature Reserves: Do They Capture the Full Range of America's Biological Diversity?*, 11 ECOLOGICAL APPLICATIONS 999, 1004-06 (2001).

96. Haney & Herbst, *supra* note 30, at 8.

97. Tim W. Clark & Dusty Zaunbrecher, *The Greater Yellowstone Ecosystem: The Ecosystem Concept in Natural Resources Policy and Management*, 5 RENEWABLE RESOURCES J. 8 (1987).

98. NOSS & COOPERRIDER, *supra* note 8, at 71-72.

99. *Id.* at 134.

100. In the late 1980s a multi-agency Greater Yellowstone Coordinating Committee did try to create a plan for coordinated management of the federal lands in the

Park to be a safe haven for wildlife. Unfortunately the wildlife in question does not always know that it is supposed to stay within park boundaries. Because Yellowstone is too small to support viable populations of some of its species, they wander or range out of the park. If they are large and fierce (like wolves and bears) or large and in competition with cattle (like bison and elk), they get into trouble with surrounding ranchers and state governments.

This problem is growing more serious as time passes and humans continue their relentless incursion into occupied wildlife habitat. When many of our national parks were set aside, the lands outside park boundaries were the same as the lands within. When Yellowstone was created in 1872, neither a human nor an animal visitor could have determined the park's boundaries without a map. Now, by deliberate choice and because of population and development pressures, the lands surrounding national parks and wilderness areas are subject to active multiple-use management.

Furthermore, neither the park system nor the wilderness system is managed principally for biodiversity or ecosystem protection. National parks have two purposes: "to conserve the scenery, and the natural and historic objects and wild life therein" and "to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."<sup>101</sup> Parks are to be "pleasuring grounds" for people, not wildlife sanctuaries.<sup>102</sup>

The National Park Service has struggled to balance its seemingly contradictory resource conservation and public enjoyment mandate and to decide which of these goals is more important. For many years the agency opted for promotion of park use as the number of visitors to national parks increased exponentially. It paved trails, installed handrails and fencing, translocated wildlife, and allowed concessioners to offer more and more goods and services. Did you know that you can play golf and tennis, have a makeover, or attend a cooking class or a conference in some national parks? Is this what the national park experience should be?

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region. This effort fell apart in the face of local opposition and political pressure. Bruce Goldstein, *Can Ecosystem Management Turn an Administrative Patchwork into a Greater Yellowstone Ecosystem?*, 8 NW. ENVTL. J. 285, 287-95 (1992); Keiter, *Challenges Ahead*, *supra* note 57, at 1193 n.409.

101. National Park Service Organic Act, 16 U.S.C. § 1 (2000).

102. ZASLOWSKY, *supra* note 90, at 15.

Wilderness management comes as close as any other federal land management regime to conserving biodiversity—mostly because of the prohibition on roads and other habitat damaging activities. It is ironic that the areas that most restrict human activities are the least productive ecologically.

### III. POLITICS

It is perhaps inevitable—given what we have said about the private interest constituencies of the public lands—that even where land management agencies have tried to move in the direction of ecosystem management and biodiversity protection, there has been political interference with the effort. This alone could be a whole talk, but two examples will amply illustrate the problem.

The National Forest Management Act of 1976<sup>103</sup> (“NFMA”) was Congress’s response to the public outcry over the practice of clearcutting in the national forests.<sup>104</sup> Following the beginning of World War II, the Forest Service drastically accelerated the output of timber from the national forests from an average of 1 billion board feet (“bbf”) in the three decades before the War to more than 4.4 bbf in 1952 and 12.1 bbf in 1966.<sup>105</sup> Clearcutting—clearing all the trees in a forest at once—became the agency’s primary silvicultural method.

Concern about the effects of clearcutting on other forest resources, including wildlife, prompted Congress to seek the advice of a committee of scientists who recommended including a requirement for protecting plant and animal diversity within the national forests in the legislation.<sup>106</sup>

The result was the only explicit statutory provision in federal land law addressing the protection of biodiversity. The NFMA directed the Forest Service to promulgate detailed planning regulations, including guidelines to “provide for diversity of plant and animal communities” within each national forest.<sup>107</sup> In its plan-

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103. National Forest Management Act of 1976, 16 U.S.C. §§ 1600-1614 (2000).

104. DANIEL R. BARNEY, *THE LAST STAND* 69-105 (1974); WILKINSON, *supra* note 71, at 135-46. For a history of the early Forest Service, see generally DANA & FAIRFAX, *supra* note 65.

105. CHARLES F. WILKINSON & H. MICHAEL ANDERSON, *LAND AND RESOURCE PLANNING IN THE NATIONAL FORESTS* 133-38 (1987).

106. Oliver A. Houck, *On the Law of Biodiversity and Ecosystem Management*, 81 MINN. L. REV. 869, 885-91 (1997). Professor Houck’s article makes it clear that the drafters of the NFMA intended the protection of wildlife and habitat to be priorities in National Forest management. See *id.* at 886-87, nn.60-62.

107. 16 U.S.C. § 1604(g)(3)(B).

ning regulations the Forest Service interpreted the statutory requirement to require the agency to “maintain minimum viable populations of existing native and desired non-native vertebrate species” in national forests.<sup>108</sup>

The population viability requirement was a vital tool for protecting wildlife from the impacts of other forest management activities, particularly timber cutting and road building. It moved wildlife from an also-ran position to a significant factor in the multiple-use lineup. In order to maintain viable populations of species, the Forest Service had to explicitly identify and evaluate the consequences of its management activities on all wildlife, not just those species listed under the Endangered Species Act. Indeed, the population viability regulation was the basis for protecting the northern spotted owl well before it was listed under the Endangered Species Act.<sup>109</sup>

In 2005, the Bush Administration’s Forest Service made major changes to the NFMA planning regulations and eliminated the population viability requirement.<sup>110</sup> The agency also abandoned the requirement to monitor the effects of activities such as logging, mining, and recreation on forest diversity. The 2005 regulations do not provide the measurable or enforceable standards necessary to meet the NFMA’s broad goals.<sup>111</sup>

#### IV. WHAT’S THE SOLUTION?

Biology, management, and politics stand in the way of allowing the federal lands to provide an upstream solution for species decline and habitat loss. Is our wildlife doomed? Are we in the midst of ecosystem collapse that we will understand and mourn only after it is complete? Are we the modern version of the Norse, the Maya, and the Easter Islanders? Will we at some point in the near future look around and find ourselves alone?

This seems likely if we do not act now. The operative word in Jared Diamond’s title is “choose.” He describes “How Societies Choose to Fail or Succeed.” We can choose to succeed by managing our lands and our treasure of biodiversity in a different way

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108. 36 C.F.R. § 219.19 (2005).

109. *Seattle Audubon Soc’y v. Robertson*, Nos. C89-160WD, C89-99(T)WD, 1991 U.S. Dist. LEXIS 10131, at \*14-\*16 (W.D. Wash. 1991), *rev’d*, 503 U.S. 429 (1992).

110. Barry R. Noon et al., *Conservation Science, Biodiversity, and the 2005 U.S. Forest Service Regulations*, 19 CONSERVATION BIOLOGY 1359, 1360 (2005).

111. *Id.*

than we have in the past. As a society, we are not adrift without oars on an inexorable river flowing to doom.

Our legal, social, and cultural arrangements represent human decisions and actions. They can be changed to better reflect today's social goals and scientific understandings. We still have time to create a conservation land system that would be successful in protecting many of the nation's plant and animal species and reversing ecosystem loss. To do this, conservation biologists suggest that approximately 25% of all land in the United States must be given some sort of conservation status.<sup>112</sup> Before you dismiss that out of hand, consider that we do not have to protect everything—just some of everything and enough of it to last.

Think of what we already have! Although the federal lands alone are not enough, they are a marvelous base on which to build. One easy way to significantly boost the protective capacity of the federal lands is to combine roadless national forest and BLM lands with national parks, wildlife refuges, and wilderness areas and manage them all in a coordinated way to sustain biodiversity.<sup>113</sup> The addition of roadless areas to conservation lands would greatly increase ecosystem representation, the number of biologically productive sites at low elevations, and the size of contiguous blocks of habitat necessary to support species requiring large, undisturbed ranges.<sup>114</sup>

In 2001, the Clinton Administration adopted a Roadless Area Conservation Rule, which protected 58.5 million acres of roadless lands in the national forests from new road building, timber harvest, and other kinds of environmentally degrading development.<sup>115</sup> This rule was the result of “a three-year process that included more than 600 meetings and generated a record 1.6 million public comments—95 percent of which supported strong protection for roadless national-forest lands.”<sup>116</sup> Unfortunately, the

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112. Mark L. Shaffer et al., *Noah's Options: Initial Cost Estimates of a National System of Habitat Conservation Areas in the United States*, 52 BIOSCIENCE 439, 441 (2002).

113. See Robert L. DeVelice & Jon R. Martin, *Assessing the Extent to Which Roadless Areas Complement the Conservation of Biodiversity*, 11 ECOLOGICAL APPLICATIONS 1008 (2001); Haney & Herbst, *supra* note 30, at 10.

114. Haney & Herbst, *supra* note 30, at 10; Michele R. Crist et al., *Assessing the Value of Roadless Areas in a Conservation Reserve Strategy: Biodiversity and Landscape Connectivity in the Northern Rockies*, 42 J. OF APPLIED ECOLOGY 181 (2005).

115. Forest Transportation System, 66 Fed. Reg. 3243 (Jan. 12, 2001) (to be codified at 36 C.F.R. pt. 294).

116. NATURAL RES. DEF. COUNCIL, *REWRITING THE RULES: THE BUSH ADMINISTRATION'S ASSAULT ON THE ENVIRONMENT* 4 (2002).

Bush Administration withdrew this rule and changed the Roadless Area policy,<sup>117</sup> so this resource of undeveloped habitat may not be available in the future.<sup>118</sup>

Time is passing quickly. It is more evident every day that the future mission of all federal lands should be rewritten to give priority to the protection of habitat and wildlife, support of ecosystem functions, and recreation.<sup>119</sup> The days of natural resources exploitation and liquidation are over. Too often, these activities cost us more than they are worth in dollars and environmental destruction.

State and private lands must play a role. It is not possible to rely on the federal lands alone. States have considerable authority to protect wildlife and habitat through water pollution control laws, public health codes, fish and game regulations, forest practices acts, and controls on sediment and erosion.<sup>120</sup> Wildlife is regarded as a public trust resource traditionally managed by states.<sup>121</sup> Although there is significant federal wildlife law, many federal statutes, including the NFMA and FLPMA, defer to state management of wildlife populations.<sup>122</sup>

Many states have become partners with federal agencies and groups such as The Nature Conservancy in data collection, habitat acquisition, and species protection programs. For example, natural heritage programs have been established in all fifty states to

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117. State Petitions for Inventoried Roadless Area Management, 70 Fed. Reg. 25,654, 25,654-56 (May 13, 2005) (to be codified at 36 C.F.R. pt. 294).

118. The Bush Administration's decision to withdraw the Clinton era Roadless Rule has been challenged by states and environmental groups alike in several recent lawsuits. Following the spring 2006 presentation of this lecture, a November 2006 court decision in the Northern District of California reinstated the Roadless Rule and enjoined road building, timber harvest, and other development activities on national forest lands subject to the Rule. This court decision (and others which may follow) will allow federal land managers to continue to combine this significant natural area with other conservation lands to substantially improve the capacity of the federal lands for effective biodiversity protection. See *California ex rel. Lockyear v. U.S. Dep't of Agric.*, No. C05-03508 EDL, 2006 U.S. Dist. LEXIS 89843 (N.D. Cal. Nov. 29, 2006).

119. Michael Blumm writes of the need for a new "public use paradigm" for the public lands to replace multiple use management. Blumm, *supra* note 75, at 432.

120. See A. Dan Tarlock, *Local Government Protection of Biodiversity: What Is Its Niche?*, 60 U. CHI. L. REV. 555 (1993).

121. Michael C. Blumm & Lucus Ritchie, *The Pioneer Spirit and the Public Trust: The American Rule of Capture and State Ownership of Wildlife*, 35 ENVTL. L. 673, 693-96 (2005).

122. For example, the Multiple-Use, Sustained-Yield Act of 1960, 16 U.S.C. § 528 (2000), which was incorporated into the NFMA, provides that "[n]othing herein shall be construed as affecting the jurisdiction or responsibilities of the several states with respect to wildlife and fish on the national forests."

provide inventories of natural communities and species distribution.<sup>123</sup> The Fish and Wildlife Service's Gap Analysis Project is a cooperative effort among federal and state agencies and universities.<sup>124</sup> Gap analyses are carried out state-by-state to assess representation of vegetation types, species, and ecosystems.<sup>125</sup> Gap analysis maps can be used with maps showing land ownership and management status to identify key areas for biodiversity protection.<sup>126</sup>

Even local governments have power to protect biodiversity, although they may not know it.<sup>127</sup> Legal mechanisms such as flood plain zoning, open space preservation, wetland and sensitive land protection, and impact fees are potentially very useful ways to achieve habitat and biodiversity protection.<sup>128</sup>

Given the location of biodiversity hot spots, private lands also have a significant role to play in a conservation land system. Not all private lands, however, are necessary for a successful system. Nor will the federal government have to purchase all the appropriate lands, although it ought to acquire some strategic portion of them. Acquisition may be done by the federal or state governments or by groups like The Nature Conservancy.

Perhaps even more promising for the creation of a national biodiversity conservation system are techniques such as conservation easements, leases and rental agreements, habitat conservation plans, incentives, and cooperative endeavors that can be used by willing private landowners to provide protected habitat.<sup>129</sup> These arrangements work. A recent Land Trust Alliance census documents the success of efforts to protect natural areas, wetlands, and wildlife habitat on private lands.<sup>130</sup> These efforts resulted in a doubling of the amount of private land protected nationally from 1999 to 2003 to more than nine million acres.<sup>131</sup>

To avoid the mistakes made by the societies chronicled by Diamond, we need to change our ideas of what to protect and where to protect it. We must save more than species on the brink of

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123. NOSS & COOPERRIDER, *supra* note 8, at 111-13.

124. *Id.* at 113-18.

125. *Id.*

126. *Id.* at 117.

127. Tarlock, *supra* note 120, at 574-83.

128. *See id.*

129. Bean, *supra* note 53, at 260-73.

130. Jessica E. Jay, *Third-Party Enforcement of Conservation Easements*, 29 VT. L. REV. 757, 757-58 (2005).

131. *Id.*

doom and “charismatic megafauna.” We must extend protection regimes beyond publicly-owned lands. Conservation biologists tell us that the conservation land system we need to establish should include all major ecosystem types, support viable populations of native species in natural patterns of abundance and distribution, and sustain ecological and evolutionary processes.<sup>132</sup>

The effort to create such a system has begun. The Wildlands Project is working to establish corridors between habitat areas to facilitate animal movement and knit the landscape back together for wildlife. Wonderful ideas such as the Yellowstone to Yukon proposal and the Northern Rockies Ecosystem Protection Act express the concepts of size and connectivity that are the underpinnings of effective land conservation.

Lawyers and legal scholars are also beginning to articulate the design of an overarching conservation mission for all the federal lands. Professor Oliver Houck has written persuasively about the importance of specific and enforceable standards and requirements so that wildlife is not an afterthought.<sup>133</sup> He is right, of course, for without clear and concrete measuring sticks for agency performance, wildlife will never compete with commodities. Professor Robert Keiter has discussed a variety of legislative reforms, including a new organic statute based on ecosystem principles.<sup>134</sup> Although I suspect such a legislative outcome remains more of a hope than a reality in the current political climate, the idea is worth serious consideration.

In the absence of new law, consistent and coordinated biodiversity and ecosystem management among all the federal land managing agencies would go a long way toward producing rational administration of the federal estate, even within the context of current statutory directives. Such coordination can be done now without legislative or regulatory change.

Remember that the National Forest Management Act still includes the requirement to maintain diversity of plant and animal communities. Congress could clarify the population viability requirement for the federal lands, either as an amendment to all relevant federal land laws or as a free standing statute.

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132. Noss, *supra* note 38, at 895.

133. Houck, *supra* note 106.

134. Keiter, *Public Lands*, *supra* note 58, at 1216-20.



## V. NOAH'S OPTIONS

What would it cost to secure a national system of habitat conservation areas in the United States? Drs. Shaffer, Scott, Casey and others have made some initial estimates.<sup>135</sup> They conclude that an initial annual investment of between five and eight billion dollars sustained over thirty years would do it.<sup>136</sup> That may sound like a lot of money, even to secure a priceless heritage, but consider that five billion dollars is roughly only one quarter of the annual cost of maintaining the national highway system.<sup>137</sup> It is also, more significantly, a tiny fraction of what the United States has already spent in Iraq.

Obviously, making changes, both legally and on the ground, to accomplish a national conservation system is a tall order. But I can't think of a more important or joyful effort, or a better use of the legal training and skills you are acquiring here. Lawyers translate science into policy and law. Lawyers resolve social and economic problems and speak for those who cannot speak for themselves. Lawyers are responsible for taking the public's concern for the environment to the agency, the courtroom, and the legislature. Lawyers can create a new framework for environmental law that is based on an understanding of the biological needs of wildlife and how ecosystems function.

E.O. Wilson has issued a challenge to us all. We have "an ethical imperative" to "go beyond mere salvage and to begin the restoration of natural environments, in order to enlarge wild populations and stanch the hemorrhaging of biological wealth. There can be no purpose more enspiriting than to begin the age of restoration, reweaving the wondrous diversity of life that still surrounds us."<sup>138</sup>

As for me—I am going to try another book on tape. Next up: *The World is Flat*.<sup>139</sup>

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135. Shaffer et al., *supra* note 112, at 443.

136. *Id.*

137. *Id.*

138. WILSON, *supra* note 77, at 351.

139. THOMAS FRIEDMAN, *THE WORLD IS FLAT: A BRIEF HISTORY OF THE TWENTY-FIRST CENTURY* (2005).