RETHINKING THE ESA TO REFLECT HUMAN DOMINION OVER NATURE

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INTRODUCTION

In a recent article in *Science*, The Nature Conservancy's chief scientist, Peter Kareiva, and several co-authors argue that humans have so tamed nature that there is no longer much nature to protect.[1] In their words, "ours is a world of nature domesticated."[2] We have not only "eliminated the largest mammals" on every continent to improve our safety and security, but also converted "roughly 50% of the world's surface area . . . to grazed land or cultivated crops" to feed ourselves.[3] According to Kareiva et al., "[g]lobal maps of the human impact indicate that, as of 1995, only 17% of the world's land area had escaped direct influence by humans."[4] These authors are by no means the first environmentalists and scientists to underscore humanity's profound impact on earth. Already in 1989, environmentalist Bill McKibben was insisting in *The End of Nature* that "we live in a postnatural world" in which "the awesome power of man . . . has overpowered" "Mother Nature."[5]

* Professor, NYU School of Law. This essay benefited from comments and suggestions from Michael Bean and Frank Casey, who generously met with me when I was beginning my research; Jonathan Adler, Dale Jamieson, John Leshy, Dave Owen, J.B. Ruhl, Katherine Schoonover, David Schoenbrod and Richard Stewart, who were generous in their comments; students in the Environmental Governance Seminar; and participants in the *Breaking the Logjam* symposium. I especially appreciated the comments from people who disagree vehemently with the essay.

[1] Peter Kareiva et al., *Domesticated Nature: Shaping Landscapes and Ecosystems for Human Welfare,* 316 SCIENCE 1866 (2007).

[2] *Id.* at 1866.

[3] *Id.*

[4] *Id.* Kareiva et al. counted the following as indicating a human impact on earth: "human population density greater than one person/km^2; agricultural land use; towns or cities; access within 15 km of a road, river, or coastline; or nighttime light detectable by satellite."

[5] BILL MCKIBBEN, THE END OF NATURE 51 (2006); *see also* Peter M.

By comparison, when the Endangered Species Act (the ESA or the Act) was passed in 1973, a more modest view of the scale of humans' impact on earth prevailed among environmentalists and scientists. For example, in their book *Extinction*, published only eight years after the ESA's passage, Paul and Anne Ehrlich wrote that "nature" was threatened by "rivet poppers," such as politicians and businesspeople seeking to extract its plenty.[6] But the Ehrlichs still believed there was something called "nature" and that it was not too late to contain human impacts on it. Many environmentalists and scientists are no longer so confident. Compare, for instance, the Ehrlichs' optimistic faith in 1981 that "[t]he accelerating rate of extinctions can be arrested,"[7] with the resignation of Kareiva and his co-author Michelle Marvier in a 2007 *Scientific American* article. Kareiva and Marvier bluntly state that "[s]ome human-caused extinctions are inevitable, and we must be realistic about what we can and cannot accomplish."[8]

My starting assumption in this essay is that humans by now have profoundly reshaped the earth to suit our purposes. I analyze the implications of our dominion for the ESA, which as described

Vitousek et al., *Human Domination of Earth's Ecosystems*, 277 SCIENCE 494, 498 (1997) ("We live on a human-dominated planet" and "the rate and extent of human alteration of Earth should affect how we think about Earth."); MICHAEL NOVACEK, TERRA: OUR 100-MILLION-YEAR-OLD ECOSYSTEM—AND THE THREATS THAT NOW PUT IT AT RISK xiv (2007) ("Ecologists often point out that . . . [w]e live in a human-dominated world," although "we are hardly the infallible masters of that world.").

[6] PAUL AND ANNE EHRLICH, EXTINCTION: THE CAUSES AND CONSEQUENCES OF THE DISAPPEARANCE OF SPECIES xii–xiii (1981); *see also* Mark Sagoff, *On the Preservation of Species*, 7 COLUM. J. ENVTL. L. 33, 37–38 (1980) (surveying reports from 1970s and 1980 about status of species in U.S. and internationally).

[7] EHRLICH & EHRLICH, *supra* note 6, at xiv.

[8] Peter Kareiva & Michelle Marvier, *Conservation for the People*, SCIENTIFIC AMERICAN, Oct. 2007, at 50, 56; *see also id.* at 55 ("Biodiversity is going to decline. Wilderness separate from human influence no longer exists."). Thanks to environmental philosopher Dale Jamieson for encapsulating for me the shift in thinking about the scale of human impacts on earth between the 1970s and the early 2000s. In a new book, he describes the shift in these terms: "In the 1980s a new way of thinking about environmental problems began to emerge. Instead of seeing environmental problems as a heterogeneous list of insults, scientists and theorists began to see them . . . as systemic, with human actions their main driver." DALE JAMIESON, ETHICS AND THE ENVIRONMENT: AN INTRODUCTION 181–82 (2008). As an aside, Jamieson is critical of the idea that Kareiva and others advance that we have reached the end of nature. *Id.* at 163, 182. He emphasizes that humans can put their imprint on parts of the earth without it ceasing to be natural and that "naturalness is a matter of degree." *Id.* at 164.

above was passed under the assumption that the human impact on the environment was more modest than we now know to be the case. I argue that we have had considerable difficulty realizing the ESA's stated goals of halting and reversing species extinction because of our powerful reshaping of the landscape and its ecological, political, and economic consequences. But my main objective is to begin sketching new ways of protecting biodiversity that reflect the reality of our human-dominated world. This is a challenging project and I openly acknowledge that this essay at best takes some tentative steps in figuring out how to do something to protect biodiversity in a world that has changed profoundly since the 1970s.

At the outset, I emphasize the political obstacles to acknowledging our impact on the world around us and reconceiving our protection of biodiversity in light of this impact. Many people hold fast to the idea underlying the ESA that humans should not eliminate species and are reluctant to openly acknowledge that it is not realistic to protect the existing level of biodiversity given large-scale human domination of the earth. On the other side, there are many people who do not highly value biodiversity and do not want to invest much in saving species. For example, Rush Limbaugh once reportedly said of the spotted owl, "'If the owl can't adapt to the superiority of humans, screw it. If a spotted owl can't adapt, does the earth really need that particular species so much that hardship to human beings is worth enduring in the process of saving it?'"[9] If we are going to improve our track record in protecting species, some of those who support species protection will have to be more willing to target our conservation efforts and not try to save every species. In addition, some of those who have been reluctant to invest much in species will have to be persuaded that there are benefits to doing so.

I. THE CURRENT MORASS

In 1973 Congress passed the ESA as part of the wave of environmental statutes that followed the dramatic industrialization, urbanization, and westward spread of the United States after World War II. The ESA reflected a conviction that human actions should not be extinguishing other species. Several strands of thought

[9] RUSH LIMBAUGH, THE WAY THINGS OUGHT TO BE 161–62 (1992) (quoted in part in JAMIESON, *supra* note 8, at 197).

underlie this conviction. There are economic reasons for preserving some species because humans currently, or could in the future, use species in medicines and build businesses such as eco-tourism around them. But more often, the idea that humans should preserve other species reflects non-economic considerations. These include ethical beliefs that species have intrinsic value or that humans should not be "playing God," aesthetic values, and preferences for living in a world characterized by variety rather than homogeneity.[10]

The ESA was set up to protect imperiled biodiversity[11] in a straightforward, but blunt, way whose consequences were not appreciated in the early 1970s. The ESA requires the Secretaries of the Interior and Commerce to maintain lists of endangered and threatened species.[12] These lists now identify 1,353 species living

[10] On the justifications for protecting nature, including other species, see, e.g., JAMIESON, *supra* note 8, at 157–69; Lisa Heinzerling, *Why Care About the Polar Bear? Economic Analysis of Natural Resources Law and Policy, in* THE EVOLUTION OF NATURAL RESOURCE LAW AND POLICY 15, 15–26 (forthcoming 2008), *available at* http://ssrn.com/AbstractID=1026288 (analyzing the reasons why we care about natural resources such as the polar bear and arguing that economic analysis does a poor job of capturing these reasons); Sagoff, *supra* note 6, at 55–67. The ESA states that species "are of esthetic, ecological, educational, historical, recreational and scientific value to the Nation and its people." Endangered Species Act, 16 U.S.C. § 1531(a)(3) (2000).

[11] The term biodiversity postdates the passage of ESA. W.J. Rosen is credited with coming up with the term and E.O Wilson with first publishing it in 1988. NOVACEK, *supra* note 5 at xxiii.

For a discussion of the many meanings of biodiversity, see Bryan Norton, *Toward a Policy-Relevant Definition of Biodiversity*, *in* 2 THE ENDANGERED SPECIES ACT AT THIRTY: CONSERVING BIODIVERSITY IN HUMAN-DOMINATED LANDSCAPES 49 (J. Michael Scott et al. eds., 2006). The FWS defines biodiversity as "[t]he variety of life and its processes, including the variety of living organisms, the genetic differences among them, and the communities and ecosystems in which they occur." U.S. FISH & WILDLIFE SERVICE, ECOSYSTEM APPROACH TO FISH AND WILDLIFE CONSERVATION (1996), *available at* http://www.fws.gov/policy/052fw1.html.

[12] 16 U.S.C § 1533(a)–(c). Housed in the Commerce Department, the National Marine Fisheries Service (NMFS), also called the National Oceanic and Atmospheric Administration Fisheries (NOAA Fisheries), is responsible for marine and anadromous fisheries under the Act. NMFS is responsible for only 67 species, a much smaller number of species than the FWS. As a result I refer throughout to FWS and the Secretary of the Interior as responsible for the ESA. NOAA FISHERIES, OFFICE OF PROTECTED RESOURCES, ENDANGERED SPECIES ACT, http://www.nmfs.noaa.gov/pr/laws/esa/ (last visited Sept. 16, 2008); *see also* Paul R. Armsworth et al., *Marine Species*, *in* 1 THE ENDANGERED SPECIES ACT AT THIRTY: RENEWING THE CONSERVATION PROMISE 36 (Dale D. Goble et al. eds., 2006).

in the United States, and an additional 574 foreign species.[13] Upon listing, a number of protections automatically kick in on paper to safeguard the species. First, the U.S. Fish & Wildlife Service (the FWS or the Service) must designate critical habitat for the species upon listing.[14] Second, section 7(a)(2) requires that federal agencies consult with the FWS to "insure that any action authorized, funded, or carried out . . . is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of" the critical habitat of a listed species.[15] Third, section 9(a)(1)(B) prohibits public and private actors from taking endangered fish and wildlife, including taking the species' habitat.[16] Fourth, and more proactively, the ESA requires the FWS to develop and implement recovery plans to protect endangered and threatened species.[17]

Thirty-five years after the ESA was passed, there are many indications that it is in entangled in a morass. Consider the following four problems.

A. *Problem #1: The ESA's Mixed Record in Helping Species*

The stated purposes of the ESA include providing "a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, [and] to provide a program for the conservation of such endangered species and threatened species."[18] Under the Act, conservation is defined not merely as ensuring the survival of species but more ambitiously as recovering species' populations to enable them to exist without the safeguards provided by the ESA.[19]

Defenders and opponents of the ESA spar about whether the Act is achieving its stated goal of conserving species. Perhaps a

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[13] U.S. FISH & WILDLIFE SERVICE, SUMMARY OF LISTED SPECIES: LISTED POPULATIONS AND RECOVERY PLANS, http://ecos.fws.gov/tess_public/Boxscore.do (last visited Sept. 16, 2008).

[14] 16 U.S.C. § 1533(a)(3)(A).

[15] *Id.* § 1536(a)(2).

[16] *Id.* § 1538(a)(1)(B). Section 1533(d) allows the FWS to establish prohibitions on taking threatened species. *Id.* § 1533(d).

[17] *Id.* § 1533(f).

[18] *Id.* § 1531(b).

[19] "The terms 'conserve,' 'conserving,' and 'conservation' mean to use and the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this Act are no longer necessary." *Id.* § 1532(3).

fair interpretation of the evidence is that listed species' populations generally stabilize or increase the longer a species is listed, and that listing therefore has kept many species from going extinct.[20] But the Act rarely leads to the recovery of species. As of 2003, thirty years after the ESA was passed, only thirteen species had been delisted because their populations had recovered.[21] This is only a slightly larger number than the nine species that had been delisted because they were presumed extinct.[22] In other words, most listed species are "conservation-reliant," meaning they require ongoing care under the ESA to avoid going extinct.[23] These results call into question the feasibility of the ESA's stated objective of recovering all imperiled species to the point that they no longer require the Act's protections.

B. *Problem #2: The Overburdened Listing Process*

Not only does the ESA not lead to the recovery of species, but it protects only a fraction of the species that scientists consider imperiled. Some estimate that the number of listed species amounts to only 15–20 percent of the total number of imperiled

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[20] J. Michael Scott et al., *By the Numbers*, *in* 1 THE ENDANGERED SPECIES ACT AT THIRTY, *supra* note 12, at 16, 30–31; *see also* Timothy D. Male & Michael J. Bean, *Measuring Progress in US Endangered Species Conservation*, 8 ECOLOGY LETTERS 986, 988 (2005) ("Averaging over 14 years of available data, . . . slightly more than half of listed species were not declining or were consistently improving. . . . [B]y 12–13 years after listing, 68 percent of known status species were reported as having stable or improving status."); Krishna Gifford, *Measuring Recovery Success*, ENDANGERED SPECIES BULL., Sept. 2007, at 4, 4 (41 percent of listed species "are doing better since they have gained protection under the Act").

[21] Scott et al., *supra* note 20, at 32; *see also* Gifford, *supra* note 20, at 4 ("recovery related delistings currently represent only about one percent of the species currently listed").

[22] Scott et al., *supra* note 20, at 31. Moreover, it is presumed that an additional twenty-six listed species already are extinct, but have not been delisted.

[23] Frank W. Davis et al., *Renewing the Conservation Commitment*, *in* 1 THE ENDANGERED SPECIES ACT AT THIRTY, *supra* note 12, at 299 (suggesting the label and recommending a new category of conservation-reliant species in addition to endangered and threatened species) (citing J. Michael Scott et al., *Recovery of Imperiled Species under the Endangered Species Act: The Need for a New Approach*, 3 FRONTIERS IN ECOLOGY AND THE ENV'T 383 (2005)). Scott et al. define conservation-reliant slightly differently than I do in the text: they consider them "species that are at risk from threats so persistent that they require continuous management intervention to maintain population levels above those that would trigger listing as threatened or endangered." *Id.* at 384.

species.[24] The FWS itself currently identifies 280 species as candidates for listing as either endangered or threatened.[25]

It is unlikely that the FWS could list (let alone protect) many of the currently unlisted imperiled species without significantly greater resources. In Fiscal Year (FY) 2007, the FWS was appropriated just under $5,200,000 for new listings.[26] Moreover, the majority of this appropriation was "consumed by court-mandated listing activities."[27] Litigation-driven-listing might not be problematic if environmental non-governmental organizations (ENGOs) could be counted on to sue to list the species most in need of protection. But there are reasons to doubt that ENGOs routinely sue on behalf of the neediest species. According to one study by two ecologists, between 1990 and 1999, "nearly three times as many lawsuits were filed on behalf of threatened species as were filed for endangered ones."[28]

To step back, there are two ways that species can come to be listed under the ESA: at the initiative of the FWS, or as a result of a petition filed by any interested person.[29] Nowadays most species are listed as a result of petitions filed by outsiders, such as environmental organizations. Much to the dismay of the current administration and the Clinton administration before it, the FWS has lost control over the listing process as decisions about whether to list species are largely made in response to citizen petitions for listing and litigation.[30] There is no agreement over the reasons for

[24] Davis et al., *supra* note 23, at 297 (15–20 percent of species at-risk are listed); *see also* D. Noah Greenwald et al., *The Listing Record*, *in* 1 THE ENDANGERED SPECIES ACT AT THIRTY, *supra* note 12, at 51, 51–52 (criticizing delays in listing species as causing extinctions).

[25] Review of Native Species That Are Candidates For Listing as Endangered or Threatened, 72 Fed. Reg. 69,034 (Dec. 6, 2007) (to be codified at 50 C.F.R. pt. 17). "A candidate species is one for which [the FWS] . . . has on file sufficient information on biological vulnerability and threats to support a proposal to list as endangered or threatened, but for which preparation and publication of a proposal is precluded by higher-priority listing actions." Candidate species may be identified by the Service or come to the Service's attention through petitions from outside persons such as ENGOs or scientists. *Id.* at 69,048.

[26] *Id.* at 69,050.

[27] *Id.*

[28] Marco Restani & John M. Marzluff, *Funding Extinction? Biological Needs and Political Realities in the Allocation of Resources to Endangered Species Recovery* 52 BIOSCIENCE 169, 174 (2002).

[29] 16 U.S.C. § 1533.

[30] *See, e.g.*, *Endangered Species Act: Critical Habitat Issues*, *Before the*

the loss of control. Bush Administration officials attribute the loss of control to litigation by environmentalists.[31] Many environmentalists argue that the crisis results from the Bush Administration's reluctance to list species, limited listing budget requests from the FWS, insufficient Congressional appropriations for listings, and the Service's longstanding failure to designate critical habitat for species at the time of listing.[32]

Regardless of the reasons why the FWS has lost control, the fact is that the Service has: it reports that "since FY 2000 the Service has spent essentially all of its listing appropriation on compliance with existing court orders, litigation support, and related program management and administrative functions."[33] Moreover, there is little prospect that the FWS will regain control over the listing process in the near future.[34] Compounding matters,

Subcomm. on Fisheries, Wildlife and Water of the S. Comm. on Environment and Public Works, 108th Cong. (2003) (statement of Craig Manson, Assistant Secretary for Fish And Wildlife and Parks, Department of the Interior), *available at* http://www.fws.gov/laws/Testimony/108th/2003/Manson2003april10.htm ("Simply put, the listing and critical habitat program is now operated in a 'first to the courthouse' mode, with each new court order or settlement taking its place at the end of an ever-lengthening line. We are no longer operating under a rational system that allows us to prioritize resources to address the most significant biological needs.") (quoted in J.B. Ruhl, *Endangered Species Act Innovations in the Post-Babbittian Era—Are There Any?,* 14 DUKE ENVTL. L. & POL'Y F. 419, 421 n.7 (2004)); Juliet Eilperin, *Since '01, Guarding Species is Harder*, WASHINGTON POST, Mar. 23, 2008, at A1 ("Bush officials say they are struggling to cope with an onslaught of litigation.").

The current role of citizen petitions and litigation in prompting listings represents a change in degree rather than in kind from the role that they have played in the past. Historically, citizen petitions and litigation have been an important reason why many species were listed. Greenwald et al., *supra* note 24, at 55 ("when lawsuits are taken into account, 71 percent of all listings are attributable to conservation" NGOs); *id.* ("54 percent" of U.S. listed species "were petitioned by conservation NGOs"); *id.* at 59 ("[O]verall, 39 percent of all species listed from 1974 to 2003 were listed as a result of litigation.").

[31] *See* sources cited *supra* note 30.

[32] Greenwald et al., *supra* note 24, at 61, 64; Holly Doremus, *Science Plays Defense: Natural Resource Management in the Bush Administration*, 32 ECOLOGY L.Q. 249, 269 n.83 (2005); *see also* Eilperin, *supra* note 30 (The Bush administration "has placed 59 domestic species on the endangered list, almost the exact number that his father listed during each of his four years in office.").

[33] U.S. FISH AND WILDLIFE SERVICE, FY 2007 BUDGET JUSTIFICATION 80.

[34] *Id.* (Since "FY 2004, the Service has seen an increase in the petition litigation such that the Department [of Interior] approved a shift of critical habitat funds to listing funds in order to comply with . . . petition deadlines in 2005" and "[t]he program expects continued litigation in FY 2006 and FY 2007.").

in June and July 2007 the NGO Forest Guardians (now WildEarth Guardians) filed petitions to list a total of 681 species.[35] These petitions alone attempt to increase the number of listed species by 35 percent above the current level.[36] One reason that ENGOs and others attach such importance to listing is that it is the gateway to the main regulatory protections that the Act affords. Once a species is listed as endangered, it is automatically protected on paper by the prohibitions in sections 7 and 9, and the FWS is obligated to designate its critical habitat and devise a recovery plan. A species that is listed as threatened gets the benefit of all of these protections except for section 9, but the FWS can apply section 9 or develop more finely grained prohibitions to protect the species.[37] The coming into effect of these provisions potentially sets the stage for federal preemption of state and local land use regulation.[38]

Even if the FWS was able to list all of the thousands of unlisted species currently at-risk, the listing process could collapse in the future under the weight of the pressures to add species that climate change may generate. According to a Working Group of the Intergovernmental Panel on Climate Change, "[a]pproximately 20–30% of plant and animal species assessed so far are likely to be at increased risk of extinction if increases in global average temperatures exceed 1.5–2.5°C."[39] When added to the current number of imperiled but unlisted species, the number threatened

[35] Press Release, Forest Guardians, Group Seeks Federal Protection for 206 Western Endangered Species (July 24, 2007), *available at* http://www.fguardians.org/library/paper.asp?nMode=2&nLibraryID=514; *see also* Eilperin, *supra* note 30 ("[T]he advocacy group WildEarth Guardians filed a lawsuit Wednesday seeking a court order to protect 681 Western species all at once.").

[36] As mentioned earlier there are 1,353 species living in the United States and 574 foreign species, for a total of 1,927 species, currently listed as endangered and threatened. *See* text accompanying *supra* note 13. Adding 681 species would increase the number listed by roughly 35% (681/1927).

[37] 16 U.S.C. § 1533(d) (2000).

[38] Richard A. Epstein, *Babbitt v. Sweet Home Chapters of Oregon: The Law and Economics of Habitat Preservation*, 5 SUP. CT. ECON. REV. 1, 19–20 (1996–1997).

[39] WORKING GROUP II, INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2007: IMPACTS, ADAPTATION AND VULNERABILITY, SUMMARY FOR POLICYMAKERS 11 (2007), *available at* http://www.ipcc.ch/pdf/assessment-report/ar4/wg2/ar4-wg2-spm.pdf; *see also* David Wilcove et al., *Quantifying Threats to Imperiled Species in the United States*, 48 BIOSCIENCE 607, 613–14 (1998) (discussing projected threats to species from climate change).

by climate change calls into question the practicability of the ESA's approach of protecting species by extending regulatory safeguards contingent on listing.[40]

C. *Problem #3: Poor Targeting of Public Funding for Species Recovery*

Listing species is only one step in protecting them. Resources also must be devoted to implementing the legislated protections that are triggered by listing species and undertaking other recovery efforts. These resources come from a variety of sources: public ones such as federal agencies like the FWS, as well as state agencies; private sources such as developers, ranchers, and forestry companies required to comply with the ESA; and not-for-profit sources such as The Nature Conservancy, Defenders of Wildlife, the Environmental Defense Fund, and other ENGOs and land trusts. My focus here is the poor targeting of the limited public funds available for species recovery.

In FY 2007, Congress appropriated $69,551,000 for the recovery of listed species through the FWS's Endangered Species Program.[41] In FY 2004, the most recent year for which information is available, total federal and state expenditures on endangered and threatened species were $1,412,303,018.[42] There is no doubt that these amounts are insufficient to recover the species that have been listed, let alone the many other imperiled species that remain unlisted.[43] But equally troubling, there are reasons for thinking that we are not getting the most conservation for the admittedly limited amounts that we are investing in species

[40] There is growing discussion of the implications of climate change for species protection efforts. *See, e.g.,* Malcolm L. Hunter Jr., *Climate Change and Moving Species: Furthering the Debate on Assisted Colonization*, 21 CONSERVATION BIOLOGY 1356 (2007); Jason S. McLachlan et al., *A Framework for Debate of Assisted Migration in an Era of Climate Change*, 21 CONSERVATION BIOLOGY 297 (2007); J.B. Ruhl, *Climate Change and the Endangered Species Act: Building Bridges to the No-Analog Future*, 88 B.U. L. REV. 1 (2008); David K. Skelly et al., Comment, *Evolutionary Responses to Climate Change*, 21 CONSERVATION BIOLOGY 1353 (2007); Cornelia Dean, *The Preservation Predicament*, N.Y. TIMES, Jan. 29, 2008, at F1.

[41] U.S. FISH AND WILDLIFE SERVICE, FY 2009 BUDGET JUSTIFICATIONS ES-1.

[42] U.S. FISH AND WILDLIFE SERVICE, FEDERAL AND STATE ENDANGERED AND THREATENED SPECIES EXPENDITURES, FISCAL YEAR 2004 ii, 7, *available at* http://www.fws.gov/Endangered/pdfs/expenditures/2004ExpendituresReport.pdf.

[43] Restani & Marzluff, *supra* note 28, at 174–75 (referring to inadequacy of current funding levels).

recovery.

For example, the $69,551,000 that Congress appropriates for recovery under the FWS Endangered Species Program is not allocated based on species-related factors, such as the degree of threat that species face or their likelihood of recovery. Instead, recovery funding is allocated as follows. Congress earmarks some recovery funding for specific species, usually because they are politically popular.[44] The FWS then allocates the rest of the recovery funding that Congress appropriates. First, headquarters allocates funds among the agency's seven regional offices using a formula that focuses on the offices' workloads. The regional offices then allocate funds among their field offices, prominently considering the opportunity field offices have to partner with other individuals and organizations in species recovery.[45]

Although the FWS does not in practice allocate its recovery funding based on species' needs, the Endangered Species Program could do so by allocating funding based on the FWS priority ranking system for developing and implementing species recovery plans.[46] This system ranks listed species based on factors such as the magnitude and the immediacy of the threats that species face, their potential for recovery, and taxonomic status.[47] Notably, a 2005 GAO analysis concluded that the agency's internal allocation of funding for species recovery was consistent with the agency's priority ranking of species. But the analysis suggested that this

[44] J.R. DeShazo & Jody Freeman, *Congressional Politics*, *in* 1 THE ENDANGERED SPECIES ACT AT THIRTY, *supra* note 12, at 68; Restani & Marzluff, *supra* note 28, at 173 ("Congress earmarked 35 to 75 percent of recovery budgets from 1991 . . . to 1994.").

[45] U.S. GEN. ACCOUNTING OFFICE, GAO-05-211, ENDANGERED SPECIES: FISH AND WILDLIFE SERVICE GENERALLY FOCUSES RECOVERY FUNDING ON HIGH-PRIORITY SPECIES, BUT NEEDS TO PERIODICALLY ASSESS ITS FUNDING DECISIONS 4–5 (2005), *available at* http://www.gao.gov/new.items/d05211.pdf. For a slightly different explanation of the allocation of funding to regional offices and from them to field offices, see U.S. GEN. ACCOUNTING OFFICE, GAO-02-581, ENDANGERED SPECIES PROGRAM: INFORMATION ON HOW FUNDS ARE ALLOCATED AND WHAT ACTIVITIES ARE EMPHASIZED 10 (2002), *available at* http://www.gao.gov/new.items/d02581.pdf.

[46] The priority ranking system is mandated by 16 U.S.C. § 1533(f)(1)(A) (2000).

[47] Endangered and Threatened Species Listing and Recovery Priority Guidelines, 48 Fed. Reg. 43,098 (Sept. 21, 1983). The priority ranking system is succinctly explained in U.S. FISH & WILDLIFE SERVICE, REPORT TO CONGRESS ON THE RECOVERY OF THREATENED AND ENDANGERED SPECIES, FISCAL YEARS 2003–2004 20 (2006).

result was the product of happenstance because the FWS does not systematically consider species' priority rankings in allocating recovery funding. The GAO recommended that the FWS track the extent to which its internal allocation results in higher priority species receiving higher amounts of funding.[48]

There also is little reason to believe that other FWS program areas or other federal and state agencies allocate recovery funding based on species-related factors such as threats to species, potential for recovery or taxonomic distinctness. For example, a 2002 study by two ecologists found that total federal and state expenditures on recovery were poorly correlated with FWS's priority rankings for imperiled species.[49] This study suggested that species confined to small ranges such as islands were big losers under the existing allocation of federal and state funds and that this is "dangerous because islands possess the highest degrees of endemism and contain many highly endangered species."[50] Studies also show that most federal and state recovery expenditures go to a very small number of species. One study suggested that under "0.5 percent of listed species account for over 50 percent of state and federal recovery expenditures" on listed species.[51] Another statistic suggests a similar skewed allocation of recovery funding: in 2004, ten species accounted for 33 percent of federal and state spending on listed species.[52]

The overall point is that the limited amounts of public funding available for species recovery are allocated primarily based on

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[48] GAO-05-211, *supra* note 45, at 30–31.

[49] Restani & Marzluff, *supra* note 28, at 169–71. Restani and Marzluff indicate that they found that FWS recovery expenditures correlated poorly with priority rankings, but the authors were actually studying the correlation between total federal and state—not just FWS—expenditures and the FWS's priority rankings for imperiled species. *Id.* at 171–73.

[50] *Id.* at 172.

[51] Davis et al., *supra* note 23, at 299; *see also* Peter Kareiva et al., *Nongovernmental Organizations*, *in* 1 THE ENDANGERED SPECIES ACT AT THIRTY, *supra* note 12, at 176, 190 (describing biases in ESA listings and recovery efforts).

[52] U.S. FISH AND WILDLIFE SERVICE, FEDERAL AND STATE ENDANGERED AND THREATENED SPECIES EXPENDITURES, FISCAL YEAR 2004, *supra* note 42, at 6 tbl.B (listing the ten Species with the Highest Reported Expenditures in FY 2004). The ten species were chinook salmon, steelhead, stellar sea-lion, coho salmon, bull trout, sockeye salmon, red-cockaded woodpecker, pallid sturgeon, chum salmon, and the right whale. Expenditures on these ten species were $465,416,400 out of total expenditures of $1,412,303,018, or roughly 33 percent of total expenditures.

political and bureaucratic considerations, not species-related factors such as their taxonomic status, the degree and immediacy of threat they face or their potential for recovery. A telling example is the decision of a FWS field office in California to allocate funding to help a population of the threatened California red-legged frog. The field office reportedly allocated funding to the frogs because of community feeling in the area where they were found: the frogs lived in the area that was the site for a famous Mark Twain story featuring the jumping frog, and the landowner on whose property they were found was eager to help the frogs.[53] Directing funding toward the famous frog probably bolsters public support for the ESA. But spending money on species with lower FWS priority rankings such as the red-legged frog also has drawbacks from a biological perspective. In this instance it meant that there was less money available for the sixty-five species with higher FWS priority rankings for which the California field office has lead responsibility.[54]

One of the reasons why the ESA may not be recovering many species is the untargeted way public funding is allocated among species. It would not be politically wise or feasible to allocate funds for species recovery without paying attention to popular preferences for certain species given that the ESA ultimately depends for its existence on public support. But we should be attempting to better channel the limited pools of public funding for recovering species to the species recovery efforts from which we will get "the most conservation bang for our buck."

D. *Problem #4: The Debate About How Much the ESA Costs Society*

While there is data on governmental spending on endangered species,[55] there is no data on the costs that the ESA imposes on society at large.[56] In the absence of hard data, the critics and

[53] GAO-05-211, *supra* note 45, at 24.

[54] *Id.*

[55] For example, the FWS publishes annual reports on federal and state spending on endangered and threatened species pursuant to a reporting requirement in section 18 of the ESA. *See, e.g.*, U.S. FISH & WILDLIFE SERVICE, FEDERAL AND STATE ENDANGERED AND THREATENED SPECIES EXPENDITURES, FISCAL YEAR 2004, *supra* note 42.

[56] *See, e.g.*, Barton H. Thompson Jr., *Managing the Working Landscape*, *in* 1 THE ENDANGERED SPECIES ACT AT THIRTY, *supra* note 12, at 104 ("No public statistics are available on the number and type of governmental enforcement

defenders of the ESA rely on anecdotes in debating the magnitude of these costs.

The opponents suggest that the Act imposes enormous costs on society. In support of this, they offer horror stories of the ESA burdening small private landowners who want to use land that is habitat for obscure species.[57] However, there are reasons for thinking that the Act imposes many fewer costs than its critics maintain. For instance, there is probably much less enforcement of the prohibitions in sections 7 and 9 than the horror stories suggest. In addition, holders of incidental take permits have considerable leeway not to comply with their habitat conservation plans because the FWS does not actively monitor compliance with those plans.

Consider section 9. At first glance, the prohibition on taking endangered species would seem to apply broadly after *Sweet Home*[58] to prohibit direct as well as indirect takes of species, including through habitat modification. However, in practice it is very difficult to prove habitat modification violates section 9 because of the legal and evidentiary requirements that *Sweet Home* affirmed.[59] For instance, to prove that a modification of habitat is a taking, it is necessary to establish that the modification was "significant," and that it was the actual and proximate cause of death or injury to wildlife through the significant impairment of "essential behavioral patterns." Knowledgeable observers suggest that these requirements have limited the degree to which governments and public interest groups have attempted to enforce section 9.[60]

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actions and citizen suits under section 9. Even if such data were available, we do not know how often property owners avoid actions that might harm a listed species in order to escape section 9 liability."). By way of contrast, much more data is available about the costs that pollution regulation imposes on society. *See, e.g.*, DAVID SCHOENBROD, SAVING OUR ENVIRONMENT FROM WASHINGTON 187–88 (2005) (discussing costs of pollution control).

[57] *See, e.g.*, Jonathan H. Adler, *Money or Nothing: The Adverse Environmental Consequences of Uncompensated Land-Use Controls*, 49 B.C. L. REV. 301, 320–25 (2008).

[58] Babbitt v. Sweet Home Chapter of Cmtys. For a Great Or., 515 U.S. 687 (1995).

[59] *See, e.g.*, Alan M. Glen & Craig M. Douglas, *Taking Species: Difficult Questions of Proximity and Degree*, 16 NAT. RESOURCES & ENV'T. 65 (2001); James R. Rasband, *Priority, Probability, and Proximate Cause: Lessons From Tort Law About Imposing ESA Responsibility For Wildlife Harm on Water Users and Other Joint Habitat Modifiers*, 33 ENVTL. L. 595, 605–18 (2003).

[60] *See, e.g.,* Steven P. Quarles & Thomas R. Lundquist, *The Pronounced Presence and Insistent Issues of the ESA*, 16 NAT. RESOURCES & ENV'T. 59, 63

Section 7 also probably inhibits agency actions far less often than celebrated cases such as *Tennessee Valley Authority v. Hill*[61] suggest. While courts are willing to intervene when agencies have failed to abide by the section's procedural requirements, they are much less inclined to find that an agency has substantively violated section 7. One reason for the judicial deference is agencies' presumed greater expertise on the biological issues involved in determining whether an action jeopardizes a species or adversely affects its critical habitat.[62] The result may be that both sections 7 and 9 are much less powerful in practice than they appear except in the sporadic cases in which they are enforced to the limit highlighted by the Act's critics.

Since the early 1990s, the FWS has approved an increasing number of habitat conservation plans (HCPs).[63] These are prepared by private landowners or state and local governments to obtain incidental take permits (ITPs).[64] ITPs allow landowners to develop their land and state and local governments to approve development with the certainty that they will not be prosecuted for taking species under section 9. In exchange for an ITP, the recipient typically agrees to undertake some mitigation to reduce the effect of the planned development on species and their

(2001) ("[T]he Supreme Court's language [in *Sweet Home*], and increasingly its application in lower court decisions, apparently has raised the burden of proof to establish the occurrence of 'harm' for plaintiffs in government enforcement actions and citizen suits."); Ruhl, *supra* note 40, at 40 ("The stiff . . . burdens *Sweet Home* imposed largely explain why the government and citizen groups (through citizen suits) so infrequently attempt to prosecute take violation claims."); Thompson, Jr., *supra* note 56, at 105–06 (emphasizing the difficulty of proving a section 9 violation, and therefore the potentially limited leverage that section 9 provides for extracting conservation measures from landowners).

[61] 437 U.S. 153 (1978).

[62] *See, e.g.*, Katherine Renshaw, *Leaving the Fox to Guard the Henhouse: Bringing Accountability to Consultation Under the Endangered Species Act*, 32 COLUM. J. ENVTL. L. 161 (2007). Separately, it is worth noting that the Supreme Court's recent decision in *Nat'l Ass'n of Home Builders v. Defenders of Wildlife*, 127 S. Ct. 2518 (2007), which limits the obligation to consult under section 7 for discretionary actions, may circumscribe the circumstances in which section 7 applies going forward.

[63] *See, e.g.*, James Salzman & J.B. Ruhl, *Currencies and the Commodification of Environmental Law*, 53 STAN. L. REV. 607, 648 n.102 (2000) ("By 1992, FWS had issued only 12 HCP permits, whereas it had issued 225 by October 1, 1997.").

[64] The statutory provisions authorizing the issuance of incidental take permits conditional upon the completion of habitat conservation plans are 16 U.S.C. §§ 1539(a)(1)(B), (a)(2)(A) & (a)(2)(B) (2000).

habitat.[65] Agreed upon mitigation measures could take place on the site of the planned development, or offsite. For example, a developer might pay a fee that could be used to purchase substitute habitat, or might buy credits from a conservation bank that specializes in protecting the habitat of the species that will be disturbed by the development. Whether habitat conservation plans mitigate the effects of development on species obviously depends on the extent to which ITP holders comply with the terms of the plans. In a remarkable series of articles about habitat conservation plans published in 2005, the Seattle Post-Intelligencer reported that the FWS invests very little money and staff time in monitoring the implementation of habitat conservation plans. As a result, many plans are probably not properly implemented.[66] The room for

[65] An HCP does not need to contribute to the recovery of a species. The legal standards governing the issuance of an HCP require only that the taking authorized by the HCP and the ITP "not appreciably reduce the likelihood of the survival and recovery of the species in the wild." 16 U.S.C. § 1539(a)(2)(B)(iv). The FWS interprets the phrase "survival and recovery" to mean that the taking must not appreciably reduce the survival of the species.

[66] *See, e.g.*, Lisa Stiffler and Robert McClure, *Too Often, Inadequate Science Hampers Habitat Planning*, SEATTLE POST-INTELLIGENCER, May 4, 2005 at A1 ("Dozens of regional offices nationwide have a total of $2 million a year to spend on checking the implementation and performance of habitat plans. That means officials often rely on an endangered-species version of Neighborhood Watch, where violators are reported by locals noticing something amiss. . . . Enforcement actions related to the plans are rare—although no one knows exactly how rare. Statistics on enforcement are not compiled. In fact, there is no formal process for addressing failures to live up to the plans, officials say. As a result, there is little leverage to pressure landowners into compliance, and the possibility of revoking a permit is practically non-existent. In the program's 23 years, it has never been done."). There was no mention in the Seattle Post-Intelligencer series of ENGOs suing to enforce HCPs, something which might be hard for ENGOs to do without information about violations.

In general, the Seattle Post-Intelligencer series reflected the skepticism about habitat conservation plans in some elements of the environmental community. In addition to the paucity of monitoring, other concerns that the series raised with the plans include the decades-long terms of many habitat conservation plans that, coupled with the no-surprises policy, insulate landowners from having to take additional measures beyond those specified in the plans to help species while the plans are in force, the quality of the science underlying plans, and a lack of public input into the development of plans. *See* Robert McClure and Lisa Stiffler, *A License to Kill; Flaws in Habitat Conservation Plans Threaten the Survival of Scores of Species*, SEATTLE POST-INTELLIGENCER, May 3, 2005, at A1; Robert McClure, *State Could Log Trees They Previously Fought to Preserve*, SEATTLE POST-INTELLIGENCER, May 3, 2005 (spotted owls); Robert McClure, *Displaced by Automobile Test Facility in California*, SEATTLE POST-INTELLIGENCER, May 3, 2005 (desert tortoise); Robert McClure, *Condominium Project Threatens Beach Mouse Habitat*, SEATTLE

slippage in compliance presumably reduces the costs that habitat conservation plans impose in practice.

Although often called the pit bull of environmental laws, the ESA may in reality be a paper tiger given the extent to which it is not enforced in many cases. But the perception that the ESA is a pit bull itself is costly. There is considerable anecdotal and empirical evidence that private landowners preemptively destroy the habitat of imperiled species to avoid land use restrictions pursuant to sections 7 and 9.[67] This is the familiar "shoot, shovel and shut up" problem that undermines societal efforts to protect species. In addition, the probably exaggerated fears of landowners of becoming enmeshed in the ESA also may lead many to lobby against the ESA and to resist efforts to list species.[68] In short, fears of the costs imposed by the ESA may be making it harder to achieve the statute's goals of recovering species—and incidentally, further validating FDR's belief "that the only thing we have to fear is fear itself."

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POST-INTELLIGENCER, May 3, 2005 (Alabama beach mouse); Robert McClure, *The Wood Rat Struggling to Rebound After Development Halted*, SEATTLE POST-INTELLIGENCER, May 3, 2005 (Key Largo wood rat); Robert McClure, *Protecting Struggling Salmon Runs*, SEATTLE POST-INTELLIGENCER, May 3, 2005 (salmon); Robert McClure, *Houses Crowd Maryland Squirrel's Development*, SEATTLE POST-INTELLIGENCER, May 3, 2005 (Delmarva fox squirrel); Robert McClure, *Giant Garter Snake Threatened By Plan to Pave Over California Farmland*, SEATTLE POST-INTELLIGENCER, May 3, 2005 (snake and Swainson's hawk); Robert McClure, *Pioneer Conservation Plan Falls Short*, SEATTLE POST-INTELLIGENCER, May 3, 2005 (San Bruno plan, butterflies); Robert McClure and Lisa Stiffler, *Some See Politics in Habitat Planning*, SEATTLE POST-INTELLIGENCER, May 3, 2005, at A7 (salmon and steelhead); Robert McClure, *The Public Often Has Little Role in Drafting of Habitat Plans*, SEATTLE POST-INTELLIGENCER, May 4, 2005, at A14; Robert McClure and Lisa Stiffler, *Lone Voice Challenges 'No Surprises,'* SEATTLE POST-INTELLIGENCER, May 4, 2005, at A14 ("No Surprises" policy); Robert McClure and Lisa Stiffler, *Scientists Fault State Habitat Plan*, SEATTLE POST-INTELLIGENCER, May 5, 2005, at A1 (Forests and Fish plan in Washington State); Lisa Stiffler and Robert McClure, *Big Thinking Is Required to Overhaul Habitat Program*, SEATTLE POST-INTELLIGENCER, May 5, 2005; Lisa Stiffler and Robert McClure, *Area Under Habitat Plans Could Soar: Petitions Increase Burden on Fish and Wildlife Service*, SEATTLE POST-INTELLIGENCER, September 26, 2005, at A1.

[67] *See, e.g.*, Adler, *supra* note 57, at 320–31 (surveying anecdotal and empirical evidence).

[68] *Id.* at 347–49. Furthermore, section 9 may discourage landowners from allowing scientists on their land to research the presence of imperiled species, thereby undermining efforts to obtain information about species necessary for optimal regulation. *See* Epstein, *supra* note 38, at 28–30.

The ESA's problems are commonly attributed to political conflicts about how much we should protect species. The overburdened listing process, for instance, is often blamed on the lack of funding for listing due to political opposition to the ESA. But I think we should treat the political conflicts about how much we should invest in species as symptoms, rather than the underlying cause, of the current morass. The underlying cause is the reality of human dominion of the earth that goes unacknowledged in the Act, which dates from a period when humans understood their impact on earth as more modest than it is now. It is this dominion that is endangering species, increasing the cost of protecting species, and in turn generating opposition to the ESA from regulated communities such as property developers who have to bear the costs of species protection. It is also concern about this dominion that is motivating environmentalists to protect species for the ethical, aesthetic, and to some extent economic reasons discussed above.

II. THE UNDERLYING CAUSE

Let me explain why I think that the Act's problems ultimately are rooted in a denial of the extent of human domination of nature.

A. *Problem #1*

Start with problem #1: the ESA's mixed track record in helping species, as exemplified by the limited number of species that have been delisted, and the ESA's success in stabilizing and slightly increasing populations of listed species.

Our ability to keep species alive while failing to recover their populations is directly attributable to our domination of the earth. The vast majority of imperiled species are threatened by human activities.[69] The most important anthropogenic threat to imperiled species in the United States is human-inflicted habitat degradation or loss: 85% of imperiled species are imperiled by such habitat degradation or loss.[70] The leading human activities taking the habitat of endangered species "include agriculture (affecting 38%

[69] In studying the threats facing 1,880 imperiled species, David S. Wilcove et al. could identify only fifty-two species that were not facing "any anthropogenic threats." Wilcove et al., *supra* note 39, at 608.

[70] *Id.* at 609.

of endangered species), commercial development (35%), water development (30%, when agricultural diversion is included)," "[o]utdoor recreation" (27%), and livestock grazing (22%).[71] The second most important human-induced threat to imperiled species is invasive species: 49% of imperiled species are threatened by "[c]ompetition with or predation by alien species."[72] As a leading study on the threats to species explains, "[e]ach new development in the field of transportation creates new opportunities for the transport of alien species, from the first sailing ships to reach US shores, to the building of the nation's road and highway system, to the advent of jet airplanes."[73]

Given the vast scale of the changes humans have wrought, it is not surprising that we are having difficulty recovering the populations of the species that we have imperiled. Nor is it surprising that some of the proponents of protecting biodiversity have advocated protecting a larger unit than species, such as ecosystems, in order to curtail our effects on biological resources.[74] By maintaining larger units, they hope, we stand a better chance of recovering the species within these landscapes and continuing to enjoy the ecosystem services that they provide. But not surprisingly, efforts to protect ecosystems such as the old-growth forests in the Pacific Northwest have encountered the same difficulties resulting from human domination of nature that undermine efforts to safeguard individual species.[75]

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[71] *Id.* at 610.

[72] *Id.* at 609.

[73] *Id.* at 613.

[74] In the 1990s, a number of supporters of protecting biodiversity argued that the science of ecology suggested that the ESA's focus on protecting species was obsolete and that we should be protecting the much broader landscape unit of ecosystems instead. For references to the literature, *see, e.g.*, Eric Biber, *The Application of the Endangered Species Act to the Protection of Freshwater Mussels: A Case Study*, 32 ENVTL. L. 91, 143 n.269 (2002). On the history of the concept of ecosystem management, *see, e.g.*, ROBERT B. KEITER, KEEPING FAITH WITH NATURE: ECOSYSTEMS, DEMOCRACY & AMERICA'S PUBLIC LANDS 48–65 (Yale University Press 2003) (1946).

A standard definition of an ecosystem is that "[a]n ecosystem 'consists of all of the organisms in an area and the physical environment with which they interact.'" RICHARD O. BROOKS, ROSS JONES & ROSS A. VIRGINIA, LAW AND ECOLOGY: THE RISE OF THE ECOSYSTEM REGIME 11 (2002) (quoting PAUL R. EHRLICH & JONATHAN ROUGHGARDEN, THE SCIENCE OF ECOLOGY 521 (1987)).

[75] *See* newspaper articles on the problems with habitat conservation plans cited in note 66. See also KEITER, *supra* note 74, at 112–13 (describing the "mixed results" of the Northwest Forest Plan to protect the spotted owl and old-

B. *Problem #2*

Our dominion over nature also is the root cause of the problems with the listing process, namely the large number of imperiled species that remain unlisted, and the FWS's loss of control of the listing process to the courts and outside interest groups.

In the 1970s, when we understood our impact on earth as relatively modest and containable, it made sense to think that a federal agency, supervised by interested citizens and occasionally prodded by the courts, could sensibly identify and list all the species that were imperiled and act to protect them. But as human dominion over the earth has proceeded apace, species loss has become pervasive rather than the rare event that the ESA's drafters envisioned. Too many species have become imperiled for a federal agency to readily identify, list, and automatically protect all of them upon listing. ENGOs have responded to the agency's sluggish response to what many are calling another mass extinction by turning to the courts to list additional species. As mentioned above, though, ENGOs are not always suing on behalf of the species that require the greatest protection, or whose recovery would be most beneficial for protecting biodiversity.

C. *Problem #3*

The poor targeting of the limited public funding for species recovery also reflects the triumph of human interests over the interests of species. On paper, the ESA contemplates making every effort to protect all species that are listed as endangered or threatened. But given the large number of listed species and vast scale of the response required to conserve all of them, some prioritization of species is necessary in practice. In reality these priorities are made by the individuals in Congress, state legislatures, and state and federal agencies that allocate funding for species. As discussed above, these individuals primarily consider human interests in making allocation decisions, such as the popularity of species among people, and administrative considerations such as office workloads. The species whose populations are imperiled by human activities obviously have no voice in these allocation decisions, underscoring yet again

growth forests in the Pacific Northwest generally).

humanity's dominance of life on earth.

D. *Problem #4*

Human dominance of nature also figures in the background of the debate about how much we are spending on species. This seemingly factual debate about how much we are spending is fundamentally a normative debate about how much we should be spending on recovering species given the benefits that we derive from adapting nature to suit our purposes. While I am generalizing, many of the Act's critics who maintain that we are spending too much as a society to protect species would prefer that we spend less, while ESA defenders who are convinced that the Act is under-enforced would prefer to spend more. ESA critics often argue that society currently is spending too much because governments do not pay private landowners for habitat protection, thus making land use controls such as section 9 seem free to governments. But many of the ESA's defenders resist requiring governments to pay landowners for the costs that the ESA imposes, fearing that mandatory compensation would reduce governmental appetites for protecting species. Thus ESA defenders often fear what many of the Act's critics hope: that requiring governments to compensate for the costs that the ESA imposes would result in less focus on protecting species.[76]

III. A WAY OUT?

My basic critique of the ESA is that it is built on an untenable premise that there is something natural—whether called species, ecosystems or biodiversity—that is out there that we can save from humanity's reach. The morass surrounding the ESA emphasizes the folly of this presumption and the need to recognize our limited ability to halt and reverse the decline of species, ecosystems, and biodiversity given our pervasive impact on the planet.

Today, policy-oriented scientists and legal academics who acknowledge our impact on the earth are discussing two main

[76] There is a third perspective on the desirability of compensation. Some critics of the Act object not to the magnitude of the costs it generates but rather to the current distribution of costs, in particular to the imposition of costs on private landowners on behalf of species. Some of these critics maintain that species would be better protected if landowners were paid to protect species. *See, e.g.*, Adler, *supra* note 57.

approaches for managing biodiversity: the ecosystem services paradigm, and the biological hotspots paradigm.[77] Both of these approaches offer ways of deciding which aspects of nature to protect, given the pervasiveness of human impacts on the earth and the limited funds available to safeguard biodiversity. As I emphasized in Parts I and II, humanity's impact on the environment is at least as great in the U.S. as elsewhere. Moreover, funds for protecting biodiversity are also scarce in the U.S., even if they are much more plentiful here than in the developing countries that house much of the world's remaining biodiversity.

The first of these two strategies for protecting biodiversity characterizes it as an ecosystem service whose value to humans should be recognized. This could be done by assigning biodiversity a value in policy-making, and having governments and private actors buy and sell rights to biodiversity protection through instruments such as conservation easements and ongoing payments for conservation.[78] If ecosystem management was the buzz phrase of the 1990s,[79] ecosystem services seems to be the buzz phrase of the 2000s. In addition to biodiversity, some of the most commonly discussed ecosystem services include air and water purification, flood mitigation, soil fertility, and pollination.[80] In 2005, EPA took a step toward better incorporating the value of ecosystem services such as biodiversity into policy-making. It created a Science Advisory Board panel that is examining how the agency can improve its valuation of ecosystem services in cost-benefit analyses.[81] Some efforts also already have been made in

[77] These two paradigms are distinguished and discussed in Kareiva & Marvier, *supra* note 8.

[78] Proponents of protecting biodiversity by recognizing it as an ecosystem service include Kareiva et al., *supra* note 1; Kareiva & Marvier, *supra* note 8.

[79] For references to important initiatives embracing the concept of ecosystem management, see Oliver A. Houck, *On the Law of Biodiversity and Ecosystem Management*, 81 MINN. L. REV. 869, 929–31 (1997).

[80] For definitions and lists of ecosystem services, see, e.g., J.B. RUHL ET AL., THE LAW AND POLICY OF ECOSYSTEM SERVICES 6–7, 23–26 (2007); James Salzman, *Creating Markets For Ecosystem Services: Notes From the Field*, 80 N.Y.U. L. REV. 870, 872 (2005).

[81] On the panel, see U.S. ENVIRONMENTAL PROTECTION AGENCY, SCIENCE ADVISORY BOARD, COMMITTEE ON VALUING THE PROTECTION OF ECOLOGICAL SYSTEMS AND SERVICES (2008), http://yosemite.epa.gov/sab/sabpeople.nsf/WebCommittees/BOARD (last visited Sept. 14, 2008); *see also* Salzman, *supra* note 80, at 907 n.164 (speculating that EPA created the Committee "to help the

the U.S. to pay for biodiversity protection. For example, the Conservation Reserve Program (CRP) has been made somewhat environmentally-sensitive.[82] The CRP is a major farm subsidy program that transfers more to farmers for not farming land than the federal and state governments combined spend on imperiled species.[83] Farmers are chosen to participate in the CRP through a "competitive bidding process" in which their land is "rated based on an Environmental Benefits Index" (EBI) that evaluates its ability to provide ecosystem services including wildlife.[84] Notably, though, CRP payments have not been effectively targeted in the past to farmers whose lands offer the best hope of providing ecosystem services such as species preservation at the least cost, in spite of the EBI.[85]

I am skeptical that recognizing that biodiversity as a valuable service, pricing it in policy-making and buying and selling it through government subsidies and private payments will be enough to deal with the large-scale challenge that human dominion of the earth represents for species. To be sure, I agree that we should be doing more to value the benefits of protecting species

agency counter demands from the Office of Management and Budget that it justify its regulations through cost-benefit analysis").

Stanford Law School professor Buzz Thompson chairs the panel. U.S. ENVTL. PROT. AGENCY, SCIENCE ADVISORY BOARD, COMMITTEE ON VALUING THE PROTECTION OF ECOLOGICAL SYSTEMS AND SERVICES, BIOSKETCHES (2008), http://yosemite.epa.gov/sab/SABPEOPLE.NSF/WebPeople/Thompson,%20Jr.Barton%20H.%20(Buzz)?OpenDocument (last visited Sept. 14, 2008).

[82] *See, e.g.*, RUHL ET AL., *supra* note 80, at 192 ("Over its twenty year history, in rural America, the CRP has emerged as the primary vehicle for providing a range of ecosystem services related to surface water and groundwater quality, wildlife habitat, recreation, carbon sequestration, and flood mitigation, among others."); Salzman, *supra* note 80, at 892 (describing "the Conservation Reserve Program" as "one of the largest ecosystem service payment schemes in the world"); DEFENDERS OF WILDLIFE, INCENTIVES FOR BIODIVERSITY CONSERVATION: AN ECOLOGICAL AND ECONOMIC ASSESSMENT 57 (2006) ("The Conservation Reserve Program is the largest federal resource conservation program in terms of the number of participants and program expenditures.").

[83] The CRP transfers to farmers "annual . . . rental payments amounting to $1.765 billion" for not farming land. RUHL ET AL., *supra* note 80, at 189. By comparison, total federal and state spending on endangered species was only $1.412 billion in 2004. U.S. FISH & WILDLIFE SERVICE, FEDERAL AND STATE ENDANGERED AND THREATENED SPECIES EXPENDITURES FISCAL YEAR 2004, *supra* note 42, at ii.

[84] RUHL ET AL., *supra* note 80, at 189.

[85] *See, e.g.*, Salzman, *supra* note 80, at 894 (listing criticisms of CRP); DEFENDERS OF WILDLIFE, *supra* note 82, at 57–61 (surveying literature on impacts of CRP and other land rental programs).

and to take into account these benefits in making policy decisions that affect species. We also should aim to pay landowners more often when they can help protect species either through taxpayer-funded conservation payments or private transactions funded by ENGOs and other actors. But simply approaching biodiversity as an ecosystem service, and valuing as well as buying and selling it, will not deal with the fact that protecting biodiversity in the early twentieth-first century requires making choices among species given the pervasive threats they face due to human activities.[86] Valuing biodiversity and paying for it are tools for protecting the species we have chosen to protect, not ways of making now necessary choices about which species we want to protect. While valuable, the new emphasis on ecosystem services is not sufficient to address our current challenges.

The second strategy that some scientists and others have recommended for protecting biodiversity in the late twentieth and early twentieth-first centuries squarely addresses the need to prioritize the protection of some biodiversity if we are to meaningfully protect much of it. This "biological hotspot" strategy starts by assuming that we need to identify priorities for species conservation because "[t]he number of species threatened with extinction far outstrips available conservation resources, and the situation looks set to become rapidly worse."[87] In one of the early articles advocating prioritizing conservation in biological hotspots, Myers et al. identified 25 hotspots around the world "featuring exceptional concentrations of endemic species and experiencing exceptional loss of habitat."[88] In total these hotspots contained "44% of all plant species world-wide" and 35% of vertebrates.[89] Myers et al. emphasized that protecting these 25 hotspots, which represent a mere "1.4% of the Earth's land

[86] It is important to recognize the practical difficulties of monetizing many of the benefits that we derive from the continued existence of species. *See, e.g.*, FRANK ACKERMAN & LISA HEINZERLING, PRICELESS: ON KNOWING THE PRICE OF EVERYTHING AND THE VALUE OF NOTHING 153–78 (2004) (emphasizing the limits of contingent valuation of nature); Heinzerling, *supra* note 10. Also, there are many obstacles to establishing markets and payment programs for ecosystem services such as biodiversity protection, including delineating the services to be protected and assigning property rights that could be traded. *See, e.g.*, Salzman, *supra* note 80.

[87] Norman Myers et al., *Biodiversity Hotspots for Conservation Priorities*, 403 NATURE 853, 853 (2000).

[88] *Id.*

[89] *Id.* at 855.

surface,"[90] would be a cost-effective way of protecting a lot of biodiversity. Subsequently, NGOs such as Conservation International adopted the hotspot strategy to prioritize their conservation work.[91]

From a global perspective, the U.S. is not a major hotspot overall. Under Myers et al.'s definition of a hotspot, the U.S. has only two hotspots: the California Floristic Province and Polynesia/Micronesia (which includes parts of Hawaii). Subsequent analyses using different criteria for defining a hotspot have suggested that there are four biological hotspots in the United States (Hawaii, southern California, southeastern coastal areas in Florida and Georgia, and southern Appalachia)[92] or perhaps twelve.[93] The pattern of listings of endangered and threatened species in the U.S. also indicates that imperiled species are heavily concentrated in a small number of areas in the country. Almost 50 percent of listed species living in the U.S. occur in Hawaii (25 percent of listed species in U.S.) and California (23 percent).[94] "[S]ome 72 percent [of listed species] occur in just six states: California, Hawaii, Florida, Alabama, Tennessee, and Texas."[95] Under the hotspot approach, the geographic concentration of imperiled biodiversity would influence where resources are allocated.

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[90] *Id.*

[91] *See* CONSERVATION INTERNATIONAL, ANNUAL REPORT 2006 (2006), *available at* http://www.conservation.org/Documents/pub_annualReport_06.pdf.

[92] *See, e.g.*, A.P. Dobson et al., *Geographic Distribution of Endangered Species in the United States*, 275 SCIENCE 550, 551 (1997); Jon Paul Rodriguez et al., *Where are Endangered Species Found in the United States?* 14 ENDANGERED SPECIES UPDATE 1 (2007), *available at* http://www.umich.edu/~esupdate/library/97.03-04/rodriguez.html.

[93] Curtis H. Flather et al., *Threatened and Endangered Species Geography*, 48:5 BIOSCIENCE 365, 367 (1998).

[94] As of August 26, 2008, 1,353 species living in the United States are listed as endangered or threatened. U.S. FISH & WILDLIFE SERVICE, THREATENED AND ENDANGERED SPECIES SYSTEM, SUMMARY OF LISTED SPECIES, LISTED POPULATIONS AND RECOVERY PLANS AS OF 08/26/2008 (2008), http://ecos.fws.gov/tess_public/TESSBoxscore (last visited Aug. 26, 2008). Of these listed species, 344 live in Hawaii and 309 in California. U.S. FISH & WILDLIFE SERVICE, USFWS THREATENED AND ENDANGERED SPECIES SYSTEM, HOW MANY SPECIES ARE LISTED IN EACH STATE (BASED ON PUBLISHED POPULATION DATA)? – 08/26/2008 (2008), http://ecos.fws.gov/tess_public/StateListing.do?state=all (last visited Aug. 26, 2008). Thus roughly 25 percent of listed species live in Hawaii (344/1,353) and approximately 23 percent live in California (309/1,353).

[95] Scott et al., *supra* note 20, at 20.

The hotspot approach obviously has pitfalls. While it may maximize the overall number of species that are protected, it will not protect some species that humans care deeply about and as a result it may reduce public support for biodiversity protection. Taken to an extreme, the hotspot approach could lead us to focus on protecting biodiversity in only four to six U.S. states, and to ignore the fact that significant numbers of species are imperiled in many other states.[96] But the hotspot approach does have the advantage of helping to identify priorities for conservation policy, something which is necessary in an era of pervasive threats to biodiversity. Below I suggest how we might reform the ESA and other policy frameworks to enable us to better target biodiversity protection without rigidly limiting ourselves to protecting species only if they are located in hotspots. My reform proposal has four parts.

A. *Continue to List Species but Decouple Listing and Permanent Protections*

I recommend that we continue to list imperiled species much as we do now under the ESA based on the threats that they face and in response to petitions from outside persons as well as internal FWS recommendations. For biologists and many others the imperilment of a species is a singular event worth highlighting.[97] To be sure, there are problems with the existing threat-based criteria in the Act,[98] and the statutory definitions of

[96] According to NatureServe, "in one out of every four states, more than ten percent of native species are at risk." NATURESERVE, STATES OF THE UNION: RANKING AMERICA'S BIODIVERSITY 2 (2002), *available at* http://www.natureserve.org/Reports/stateofunions.pdf (data indicate that four states have "exceptional levels of biodiversity" and that "in one out of every four states, more than ten percent of native species are at risk").

[97] *See* NOVACEK, *supra* note 5, at xviii (biologists regard the loss of species as "a particularly important measure of environmental destruction").

[98] Section 4(a) indicates that a population should be listed if it is "an endangered species or a threatened species because of any of the following factors: (A) the present or threatened destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; or (E) other natural or manmade factors affecting its continued existence." 16 U.S.C. § 1533(b) (2000). Section 1533(b) allows the FWS to not list a population regardless of the threats that it faces if the FWS determines that another domestic or foreign jurisdiction is doing enough to help the population. *See also* Policy for Evaluation of Conservation Efforts When Making Listing Decisions, 68 Fed. Reg. 15, 100 (Mar. 28, 2003).

species,[99] endangerment,[100] and threat[101] that the FWS applies in making listing determinations. For example, under the ESA a species includes a distinct population segment (DPS). Since a DPS is not a scientific concept, there are disputes about whether particular populations meet the test.[102] In addition, the Act provides no clear guidance about when a species is endangered or threatened.[103] Nonetheless, the existing statutory parameters for listing are worth retaining because we have over thirty years of administrative and judicial experience applying them, and it is unclear that we could come up with better parameters now.

As mentioned above, under the current statute once a decision is made to list a species under the current statute a series of protections automatically kick in on behalf of the listed species. While we should still list species as we do now, I recommend decoupling the decision to list a species from decisions about how to protect the species. This decoupling would allow us to develop protections tailored to the needs of each species and its circumstances. It also might reduce the contentiousness of listing decisions by reducing the momentousness of listing.

To elaborate, listing should no longer trigger the seemingly permanent one-size-fits all consequences that it does now in the

[99] Under the ESA, *species* "includes any subspecies of fish or wildlife or plants, and any distinct population segment of any species or vertebrate fish or wildlife which interbreeds when mature." Endangered Species Act, 16 U.S.C. § 1532(16).

[100] An *endangered* species is defined as "any species which is in danger of extinction throughout all or a significant portion of its range." 16 U.S.C. § 1532(6).

[101] A *threatened* species is "any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." 16 U.S.C. § 1532(20).

[102] Cases discussing the ambiguity in the term distinct population segment and agency responses to this ambiguity include Northwest Ecosystem Alliance v. U.S. Fish & Wildlife, 475 F.3d 1136 (9th Cir. 2007); Alsea Valley Alliance v. Evans, 161 F.Supp. 2d 1154 (D. Or. 2001); Trout Unlimited v. Lohn, 2007 WL 1795036 (W.D.Wash. 2007); Alsea Valley Alliance v. Lautenbacher, 2007 WL 2344927 (D.Or. 2007).

[103] Doremus, *supra* note 32, at 267–74; William Burnham et al., *Hands-on Restoration*, in 1 THE ENDANGERED SPECIES ACT AT THIRTY, *supra* note 12, at 237, 244 (recommending that the ESA be amended to include "objective definitions for 'threatened' and 'endangered' that incorporate specific criteria" and criticizing "threatened" especially as "too vague as presently defined"); Scott et al., *supra* note 20, at 21 (noting that ESA "lacks explicit criteria for determining population thresholds (individuals and populations), risk of extinction, and demographic trends").

form of sections 7 and 9, and the requirements to designate critical habitat and prepare a recovery plan. Instead, once a species is listed, it should benefit from a series of protections for a temporary period of time until the FWS identifies the measures that would most cost-effectively protect the species (see Proposal 2 below). Like a preliminary injunction, these temporary protections would safeguard the status quo for species and possibly begin to put it on the path toward recovery, depending on how extensive those protections were. For administrative simplicity, all species would receive the same temporary protections pending the completion of the FWS's review of the measures needed to cost-effectively protect the species. The scope of these protections could be the subject of negotiations among interests groups in the reauthorization of the ESA. Potentially, the protections could include modified versions of the safeguards that currently automatically kick in upon listing, such as the prohibition on taking in section 9 and the no-jeopardy provision in section 7. To repeat, though, whatever the form of these protections, they would apply only until the FWS had identified the measures that would most cost-effectively protect the species.

My hope is that requiring the FWS to identify the most cost-effective ways of protecting a species in the long-term while the species is temporarily safeguarded could allow the FWS to develop protections that are tailored to each species' needs and circumstances. Tailored protection might in turn improve the odds of species recovery. In addition, the approach I recommend might reduce the contentiousness of the listing decision because listing would no longer trigger a series of seemingly permanent one-size-fits-all protections. Reducing the consequences of listing might reduce the incentive to litigate the FWS's listing determinations. With less litigation, the FWS might be able to evaluate many more species for listing. It is possible, though, that requiring the FWS to design cost-effective protections for each species after listing also could open up a new burdensome front for litigation. For example, in addition to, or instead of, litigating listing determinations, groups could challenge the timeliness and adequacy of the FWS's cost-effectiveness analyses.

B. *Identify and Implement the Most Cost-Effective Protections for Species*

I now turn to the idea of requiring the FWS to identify the most cost-effective ways of protecting a species after it is listed. The idea is that the listing of a species would trigger a legal obligation on the FWS to determine the measures that would most cost-effectively protect the species, and then to promulgate any regulations necessary to implement these cost-effective protections. The FWS would be required to identify these cost-effective protections within a legislated timeframe that could be used to force the agency to act. While the FWS undertook its review, the interim measures mentioned above would remain in place to avoid a situation where a species was listed but people were free to reduce its population and its habitat to forestall further protections.

I elaborate on four aspects of this proposed obligation on the FWS to identify cost-effective protections. The first is the purpose of the exercise: identifying measures to protect the listed species. As mentioned above, the ESA currently sets a high but vague goal in relation to listed species, namely recovering their populations to allow them to live without the Act's protections.[104] But in practice few listed species have been delisted and the most frequent beneficial consequence of listing a species has been stabilizing or slightly increasing its population. Our experience under the Act and the pervasive threats to species today raise a fundamental question about whether we still should be aiming to recover listed species or whether it would be preferable to set a more realistic and precise, but less inspiring, objective. This could be something like making it unlikely that the species would become extinct over three human generations,[105] or reducing the risk of extinction to a certain percentage over a 100-year time period.[106] While I do not have a view about what the objective should be, it likely would be necessary to define a more precise goal for listed species than is included in the current Act to implement a cost-effectiveness test.

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[104] *See* text accompanying note 19.

[105] This possible definition of recovery was discussed by participants in the ESA working group organized by the Keystone Center. THE KEYSTONE CENTER, THE KEYSTONE WORKING GROUP ON ENDANGERED SPECIES ACT HABITAT ISSUES: FINAL REPORT 31 (2006).

[106] This is another possible definition of recovery that the Keystone Group discussed. *Id.* at 38.

To identify the most cost-effective ways of protecting a species, the FWS likely would need a more straightforward sense of what it aims to do in protecting the species.

A second issue is what type of measures the FWS should consider in trying to identify the most cost-effective ways of protecting a listed species. One of the advantages of decoupling the listing of a species from decisions about how it should be protected is that there should be greater room for developing creative measures tailored to species' needs and circumstances. In this spirit, the FWS should consider a wide range of measures in ascertaining which would most cost-effectively protect the species. These could include "the old standbys" such as designating critical habitat, prohibiting taking species as under section 9, and imposing special obligations on federal agencies as under the current section 7. In addition, other more flexible and market-based measures used over the past several decades to protect species should be canvassed. These include buying land, conservation payments to state and local governments and private landowners, conservation easements,[107] conservation banking,[108] recovery credit systems,[109] recovery and habitat conservation plans, and fees for converting the habitat of endangered species.[110] Furthermore, it would be

[107] *See, e.g.*, Matt Weiser, *Guardians of the Range: A Conservation Group That Aims to Protect 13 Million Acres Is Doing the Unthinkable: Getting Ranchers and Environmentalists To Work Together*, SACRAMENTO BEE, May 8, 2007, at A1 (discussing efforts of ranchers and environmentalist to protect range land from development, for example through sale and purchase of development rights).

[108] *See* Guidance for the Establishment, Use, and Operation of Conservation Banks, 68 Fed. Reg. 24,753 (May 8, 2003). For a balanced account of the potential benefits and risks of conservation banking and a description of its current use to protect species, see Jessica Fox et al., *Conservation Banking*, in 2 THE ENDANGERED SPECIES ACT AT THIRTY, *supra* note 11, at 228.

[109] *See* Endangered and Threatened Wildlife and Plants; Notice of Availability for Draft Recovery Crediting Guidance, 72 Fed. Reg. 62,258 (Nov. 2, 2007) (proposing recovery crediting system analogous to conservation banking that would allow federal agencies to meet conservation objectives on non-federal lands and identifying program at Fort Hood Military Reservation as the model for the proposal).

[110] *See,* e.g., Thomas A. Scott et al., *Land Use Planning*, in 2 THE ENDANGERED SPECIES ACT AT THIRTY, *supra* note 11, at 206, 213 (referring to a fee developers paid for each housing unit under the Stephens' Kangaroo Rat HCP); *id.* at 214 (describing mitigation fee developers pay to offset interference with endangered species habitat under Western Riverside County Multi-Species HCP); Thompson, Jr., *supra* note 56, at 108 (referring to impact fee in expedited Balcones Canyonlands program); *id.* at 109 (referring to fee for destroying

natural to analyze measures commonly part of today's recovery plans since the FWS's effort to identify the most cost-effective ways of protecting a species would supplant the current recovery planning process.

A third point worth clarifying is the meaning of the cost-effectiveness standard that the FWS would apply in identifying the measures that should be undertaken on behalf of the listed species. I am suggesting that in determining which measures should be implemented, the FWS should choose those that will most cheaply protect the species, whether protection is defined as it is under the current Act as recovering the species to the point that it can be delisted or as something else.[111] However, the FWS should take a broad view of what counts as a cost in determining the costs of the various possible measures, and in selecting those measures that will protect the species at least cost. A measure's costs should include those that are easily monetizable, such as the cost of buying land if land acquisition was under consideration. In addition, harder to monetize costs such as a measure's ethical, political, and distributional costs also should be analyzed. The co-costs of protective measures also should be counted. For example, if a protective measure would harm other species or reduce the availability of valuable ecosystem services, such as water purification, then these harms should be included among the measure's costs.

The point of requiring the cost-effectiveness analysis is to structure the decision-making process, not to limit the FWS to choosing only the package of protections that it predicts will be the cheapest way of protecting a species measured in dollar terms. A more structured decision-making process should make the trade-offs inherent in species recovery more transparent and allow policymakers to be held accountable for the trade-offs that they are making.

Fourth, and finally, there is the procedure that the FWS should follow in designing protective measures. The FWS should

habitat of Houston toad in Texas); *id.* at 116 ("Under the typical regional HCP, developers wishing to build new residential, commercial, or industrial properties pay a fee that is used to help acquire, restore, and manage habitat for the protected species.").

[111] In some respects, my proposal echoes the idea discussed by the Keystone Working Group of getting recovery teams to analyze the least-cost ways of recovering species. KEYSTONE CENTER, *supra* note 105, at 32.

make its proposed package of cost-effective protective measures available for public comment before finalizing it. Upon finalizing the package, the FWS should prescribe any regulations required to implement the package, such as regulations designating critical habitat, or prohibitions on taking the species or obligations that federal agencies consult with the FWS. The FWS also should be required to periodically review and update its determinations of the measures necessary to protect species.

The idea of using a cost-effectiveness test to design protective measures for species on an individual basis builds on several existing features of the ESA. For example, the Act currently recognizes that species require individually tailored protections. One example is the requirement that the FWS prepare a recovery plan after a species is listed. In addition, when a species is listed as threatened, the section 9 prohibition on takings does not automatically apply. Instead, the FWS has the discretion to craft more finely grained prohibitions on taking threatened species than section 9.[112] Some scholars argue that the flexibility to design particularized protections for threatened species is one reason for listing species as threatened.[113]

There is also precedent in the current Act for considering the costs of protections before extending these protections to listed species. Before designating critical habitat for endangered and threatened species, the FWS is required to take into consideration "the economic impact, the impact on national security, and any

[112] 16 U.S.C. § 1533(d) (2000) ("Whenever any species is listed as a threatened species pursuant to subsection (c) of this section, the Secretary shall issue such regulations as he deems necessary and advisable to provide for the conservation of such species."). There are 63 species that have customized protections pursuant to this provision. U.S. FISH & WILDLIFE SERVICE, USFWS THREATENED AND ENDANGERED SPECIES SYSTEM, http://ecos.fws.gov/tess_public/SpecialRule.do?listings=0&type=4d (last visited April 30, 2008).

FWS generally applies the section 9 prohibition to threatened species while NMFS deals with species on a case-by-case basis. Quarles & Lundquist, *supra* note 60, at 63.

[113] *See, e.g.*, Robert L. Fischman, *Cooperative Federalism and Natural Resources Law*, 14 N.Y.U. ENVTL. L.J. 179, 213–14 (2005); Ruhl, *supra* note 40, at 35.

Another reason for listing species as threatened is that by definition threatened species are less imperiled than endangered species and should stand a better chance of recovery since "population status" "at the time of listing" correlates positively with recovery. Scott et al., *supra* note 20, at 21; *see also* Greenwald et al., *supra* note 24, at 62–63 (delays in listing species cause extinctions).

other relevant impact, of specifying any particular area as critical habitat."[114] As a result of this requirement, the FWS has considerable experience assessing the economic impacts of designating critical habitat.[115] The FWS's methodology for assessing the economic impacts of critical habitat designations is by no means beyond criticism. For instance, its economic impact analyses offer much more precise valuations of the costs than the benefits of designating critical habitat. Benefits are discussed in comparatively general terms, and usually not monetized.[116]

Under my proposal, the FWS would not be weighing the costs and the benefits of a possible protective measure before deciding whether to implement it. Instead, the agency would be choosing among possible protective measures based on their relative costs. Since the FWS would only be required to count the costs of different measures its reluctance to properly value benefits would not matter.

I emphasize that I am not seeking to weaken the protection available to species by stipulating that measures to safeguard them should be designed on a case-by-case basis after they are listed.

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[114] 16 U.S.C. § 1533(b)(2).

[115] FWS contracts out the preparation of economic impact assessments of designating critical habitat. *See, e.g.*, INDUSTRIAL ECONOMICS, INC., ECONOMIC ANALYSIS OF CRITICAL HABITAT DESIGNATION FOR THE WINTERING PIPER PLOVER (2007), *available at* http://www.fws.gov/nc-es/piplch/Econ_Analysis.pdf.

[116] *See, e.g.*, Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Blackburn's Sphinx Moth, 68 Fed. Reg. 34,710, 34,727 (June 10, 2003) ("It is not feasible . . . to fully describe and quantify . . . benefits in the specific context of the proposed critical habitat for Blackburn's sphinx moth because of the scarcity of available studies and information relating to the size and value of beneficial changes . . . likely to occur as a result of listing the moth or designating critical habitat.").

Defenders of Wildlife, which has a conservation economics program, criticizes FWS for its inadequate consideration of the benefits of designating critical habitat. DEFENDERS OF WILDLIFE, ECONOMIC IMPACT ASSESSMENT OF DESIGNATING CRITICAL HABITAT FOR THE LYNX (*LYNX CANADENSIS*) 1 (2004), *available at* http://www.defenders.org/resources/publications/programs_and_policy/science_and_economics/conservation_economics/economic_impact_assessment_of_designating_critical_habitat_for_the_lynx_(lynx_canadensis).pdf?ht=lynx%20lynx (supporting analysis of costs and benefits of designating critical habitat but arguing that FWS analyses "devote a disproportionate amount of effort to the estimation of costs" and that "[i]n many cases, the estimation of benefits receive qualitative, cursory, or no treatment at all"). In at least one case, Defenders prepared its own economic impact assessment of designating critical habitat (for the Canada lynx). *Id.*

On the contrary, my goal is to craft stronger protections for listed species than many currently enjoy. As suggested in Part I.D., there is plenty of room for improving the protection that species are afforded given the ambiguities in sections 7 and 9, the under-enforcement of the Act, and the destruction of species and their habitat resulting from the erroneous perception of the Act as the pit bull of environmental statutes. I am betting that we would do better at protecting species generally by reducing the momentousness of the listing decision and, after listing, crafting legally tailored protections that actually could be enforced. The idea is that we should trade off the broad but under-enforced protections that listing currently affords, for more fine-grained but stronger protections that stand a better chance of being enforced and safeguarding species and ecosystem services. Protecting biodiversity should not be an all or nothing decision contingent on listing species as it generally is now.

C. *Direct Funding to Biological Hotspots*

Proposal 2 would help to improve the cost-effectiveness of species protection at the retail level by crafting protections for species on a case-by-case basis after weighing the protections' relative costs. But our overall goal in a world of scarce resources and many imperiled species should be to cost-effectively protect species on the macro or wholesale level. In other words, we should be aiming to protect as many imperiled species as we can using whatever resources we decide to allocate to species conservation.

There is no guarantee that protecting each species cost effectively as Proposal 2 suggests will produce the most conservation for the buck overall. We might simply end up protecting many species in the cheapest way possible on a per-species basis. But in the aggregate it might be more cost-effective to protect a smaller number of indicator or umbrella species in the cheapest way possible. Protecting these species in turn might safeguard many others from extinction without requiring us to specifically target the other species. This is the basic intuition behind the biological hotspot strategy for protecting biodiversity popularized by Myers et al. and implemented internationally by the NGO Conservation International, which identifies 34 hotspots

worldwide.[117]

Ultimately, properly targeting funding for conservation policy to protect the most species possible at the least cost requires rethinking the way we allocate public and private funding for species conservation. This is not something that can be done by reforming the ESA. Public and private actors decide how much to spend on species conservation and how this spending should be distributed among species in response to the political, bureaucratic and other incentives that they face, not based on the requirements of the ESA. These funding decisions have major implications for the ESA though. How much is spent on species conservation and how it is spent can frustrate or facilitate efforts to protect species.

It is difficult to figure out how to induce the reallocation of funding we need to improve our overall track record in protecting species. The current allocation stems from well-entrenched features of the political system. One idea might be to build new reporting requirements into the ESA in an effort to shift popular, political and bureaucratic opinion toward funding protection for hotspots.Currently, the Act requires the FWS to make various reports to Congress.[118] We should add reporting requirements that would force the FWS to determine how the U.S. is doing in protecting its biological hotspots and how current resource allocations compare to those that would protect these hotspots. For example, the FWS might be statutorily required to report every few years on how well the United States is doing in protecting its two (according to Myers), four (according to Dobson et al.) or twelve (according to Flather et al.) biological hotspots. In addition, the FWS might be required to report every two years on how funding for its Endangered Species Program as well as total federal and state funding on imperiled species would be distributed if we were protecting biological hotspots in the United States (as Myers et al., Dobson et al., or Flather et al. define them) and how much the current allocation of funds departs from this theoretical ideal.[119] The FWS also could report periodically on how much its

[117] CONSERVATION INTERNATIONAL, THE HOTSPOTS (2008), http://www.conservation.org/explore/priority_areas/pages/hotspots.aspx (last visited Sept. 14, 2008).

[118] *See, e.g.*, 16 U.S.C. § 1544.

[119] There already is some academic research assessing whether federal and state spending on species is in effect targeting hotspots. *See, e.g.*, Flather et al., *supra* note 93, at 374 (suggesting that currently species-specific spending is not

allocation of funding in its Endangered Species Program, and the allocation of total federal and state spending among species, depart from the allocation suggested by the agency's priority ranking system for species.[120]

Reports such as these would not by themselves trigger wholesale changes in the allocation of funding among species. But these reports might be used by policy entrepreneurs in land trusts, NGOs, academia, Congress and the state legislatures, and federal and state agencies to gradually reconfigure funding to achieve more conservation.

D. *Create Additional Protected Areas*

It is important to recognize that the ESA is only one of the tools at our disposal to protect biodiversity, and perhaps not even the most important one. As just discussed, funding decisions made separately from the ESA have an equal and probably more significant impact on species preservation. Similarly, decisions about which lands and marine areas to protect made under statutes like the Antiquities Act, the Wilderness Act and the Wild and Scenic Rivers Act also have a great deal of influence on whether we are able to successfully protect biodiversity. While we should rethink the ESA so that we can better address the pervasive threats to species today, we should not expect the ESA to bear the full weight of protecting biodiversity. The Act, after all, essentially offers emergency safeguards for species that are on, or close to, the brink of extinction.[121] It would be better to take preventative actions to avoid bringing species to this point by acting under the myriad of other legislative and policy frameworks that allow us to prophylactically protect biodiversity.

In the nineteenth and twentieth centuries the U.S. incrementally and in a rather ad hoc fashion established a broad network of land-based protected areas where exploitation is restricted to varying degrees, such as wilderness areas, national monuments, wildlife refuges, national and state parks, and lands held subject to conservation easements.[122] Some of these protected

targeting hotspots).

[120] *See* text accompanying *supra* note 48.

[121] Bradley C. Karkkainen, *Biodiversity and Land*, 83 CORNELL L. REV. 1, 20 (1997).

[122] For a brief history of federal public lands, see James R. Rasband & Megan E. Garrett, *A New Era in Public Land Policy? The Shift Toward Reacquisition of*

areas are repositories of biodiversity.[123] The distribution of imperiled species in the United States indicates that we will never be able to rely completely on protected areas to safeguard species.[124] Too many species live and depend on privately-owned lands used for agricultural and other purposes for biodiversity to be safeguarded solely by protecting lands. However, there is a powerful argument that one of the best ways of protecting biodiversity is through protected areas because these areas can be managed to privilege biodiversity protection.[125]

At the dawn of the twenty-first century, the time is ripe for expanding our protected areas to respond to the preservation needs of our own time. In light of our over-exploitation of marine resources in the twentieth century, we need to establish protected areas in the U.S. Exclusive Economic Zone before these waters are stripped further of biodiversity.[126] We also need to increase the diversity of our protected areas on land. For example, high-elevation habitats likely are over-represented among our protected

Land and Natural Resources, 53 ROCKY MTN. MIN. L. INST. 6 (2007), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1003809.

[123] Karkkainen, *supra* note 121, at 41.

[124] Mark L. Shaffer et al., *Proactive Habitat Conservation*, *in* 1 THE ENDANGERED SPECIES ACT AT THIRTY, *supra* note 12, at 286, 291, *see also* Adler, *supra* note 57, at 302 ("A significant majority of those species currently listed as threatened or endangered under the Endangered Species Act rely upon private land for some or all of their habitat.") (citing various sources on the importance of private lands for listed species); Davis et al., *supra* note 23, at 304 ("50 percent of listed species [have] . . . 80 percent or more of their known occurrences on private lands."); J.M. Scott et al., *Nature Reserves: Do They Capture the Full Range of America's Biological Diversity?* 11 ECOLOGICAL APPLICATIONS 999, 999 (2001) ("Preliminary assessments of the distribution of threatened and endangered species suggest that >90% of such species occur on private lands, with 66% having >60% of their area on private lands.").

[125] As I mention below, Professor Karkkainen makes a powerful case for establishing biological reserves on federally owned public lands. Karkkainen, *supra* note 121.

[126] STEPHEN PALUMBI, PEW OCEANS COMMISSION, MARINE RESERVES: A TOOL FOR ECOSYSTEM MANAGEMENT AND CONSERVATION (2002), *available at* http://www.pewtrusts.org/uploadedFiles/wwwpewtrustsorg/Reports/Protecting_ocean_life/pew_oceans_marine_reserves.pdf. The U.S. is already taking some steps toward protecting marine life. President Bush recently established a marine reserve that is the largest nature reserve in the world and there are indications he may set aside other marine waters before leaving office. *See* Felicity Barringer, *Support for Marine Reserves*, N.Y. TIMES, August 26, 2008, at A13; Christopher Pala, *A Long Struggle to Preserve a Hawaiian Archipelago and Its Varied Wildlife*, N.Y. TIMES, December 19, 2006, at F3.

areas.[127] In addition, we should be analyzing the likely impacts of climate change on our protected areas, and whether we need to establish new protected areas in light of the expected impacts of climate change on humans and other species. There also is a powerful argument for transferring some acreage currently held in the public domain to private actors, especially if this acreage is being actively exploited, as we expand the number of protected areas overall.

The next Administration and the new Congress elected in 2008 should seize the opportunity to establish a Congressionally-chartered commission to review the U.S.'s current approach to protected areas on land and water, map out the needs for protected areas going forward, and determine how these needs should be met. In the nineteenth and twentieth centuries, we tended to conceive of protected areas as something that governments—especially at the federal level—set aside on publicly owned lands. We still probably want to draw first on publicly owned lands in creating additional protected areas. For example, Professor Bradley Karkkainen has argued convincingly that the federal government should establish ecological reserves on federal lands to protect biodiversity.[128] But the tremendous growth in the past two decades in the acreage held under conservation easements[129] indicates that there is significant scope for land trusts, private actors and NGOs as well as governments to participate in expanding our network of protected areas to better protect biodiversity. However, we might want to steer private and non-profit actors more than we have to date towards protecting acreage in certain parts of the country or certain types of land- and sea-scapes.[130] This could be done by offering extra tax advantages for

[127] Federal public lands mainly feature high-elevation habitats. J.M. Scott et al., *supra* note 124, at 1004–05 ("The small area dedicated to nature reserves on more productive soils at low elevations suggests that the existing network of nature reserves is inefficient in terms of its ability to protect a representative sample of the nation's biodiversity."); Shaffer et al., *supra* note 124, at 291 (citing J.M. Scott et al., *What Are We Protecting?* 2 CONSERVATION BIOLOGY IN PRACTICE 18 (2001); Thompson, Jr., *supra* note 56, at 103.

[128] Karkkainen, *supra* note 121.

[129] *See, e.g.*, Rasband & Garrett, *supra* note 122, at 33; John Echeverria & Jeff Pedot, *Drawing the Line: Striking a Principled Balance Between Regulating and Paying to Protect the Land* 2–3 (Georgetown Environmental Law & Policy Institute, Discussion Draft, 2008).

[130] There is little public oversight or coordination of where conservation easements are placed. Echeverria & Pedot, *supra* note 129, at 7–9.

easements that would protect biodiversity in hotspots.

The ESA alone will not save biodiversity. When we think about improving public health, we do not usually think only of the possibilities for improving the care people in crisis receive in emergency departments. We also consider ways of pro-actively reducing the likelihood that people will become sick in the first place, for example by discouraging smoking and encouraging healthier eating and exercise habits. We should approach biodiversity protection in a similar way. Rather than focusing on the emergency measures that the ESA offers species in crisis, we should aim to prevent species from reaching crisis conditions. Embarking on a new initiative to expand our protected areas to encompass areas of the oceans and under-represented landscapes could be an uplifting, prophylactic complement to reforming the ESA that might make ESA reform politically feasible.

CONCLUSION

For the past decade or so, many of the ESA's supporters and critics have been bogged down in a series of small "p" policy debates about issues such as whether critical habitat should be designated and if so when, whether landowners should be compensated for measures they are required to take to protect species, and the merits of flexible instruments such as habitat conservation plans introduced in the 1990s. It is time to set aside these debates and to address the underlying cause of the ESA's ills: the pervasiveness of human-induced threats to species that are behind the warnings from many ecologists that "[w]e are at the beginning of the sixth great extinction event."[131] The pervasiveness of these threats means that we need to prioritize our conservation efforts. It also requires us to think beyond the ESA. A reformed ESA cannot be the only mechanism through which we attempt to protect biodiversity in the world we now dominate.

[131] NOVACEK, *supra* note 5, at 340.